I. OVERVIEW / SIGNATURES

Facility: Waterford 3

Document Reviewed: ER-W3-2005-0145-000 **Change/Rev.:** 00

System Designator(s)/Description: 3716 MWt Extended Power Uprate Technical Specification Uncertainty Application

Description of Proposed Change:

Due to NRC concerns related to Technical Specification (TS) compliance, the NRC imposed a License Condition as part of NRC approval of the Extended Power Uprate (EPU) License Amendment 199. This condition limits Waterford 3 facility operation at a power level not to exceed 3441 MWt (pre-EPU power level) until such time Waterford-3 provides the NRC a description of how Entergy accounts for instrument uncertainty for each TS parameter impacted by the Waterford 3 Extended Power Uprate.

Engineering evaluation ER-W3-2005-0145-000 documents the evaluation of the parameters which were revised in association with EPU or pertinent to EPU analyses and identifies necessary Operations procedure changes and calculation revisions required to remove the License Condition. Since the intent of many Technical Specifications is to provide assurance that the plant is within the initial condition assumptions of the accident analyses, it is appropriate that instrument measurement uncertainties be accounted for in some manner. The TS parameters in the scope of this ER were evaluated by identifying instrument uncertainty and comparing this value against the applicable analytical, Technical Specification, and surveillance procedure limits. Procedure and analysis changes were specified in cases where instrument uncertainty had not been fully considered in both conservative and non-conservative directions. One of the parameters evaluated requires LBD changes: 5" w.g. Annulus Negative Pressure. These LBD changes are associated with FSAR Chapters 6, 9 and 15 and are evaluated in the Section IV, 50.59 Evaluation, of this 50.59 Review. The engineering evaluations and/or changes associated with the remaining parameters do not impact LBDs and were thus screened out. No hardware changes are required as a result of the procedure, analysis or LBD changes performed in support of this engineering evaluation.

Check the applicable review(s): (Only the sections indicated must be included in the Review.)

☐	**EDITORIAL CHANGE of a Licensing Basis Document**	**Section I**
☒	**SCREENING**	**Sections I and II required**
☐	**50.59 EVALUATION EXEMPTION**	**Sections I, II, and III required**
☒	**50.59 EVALUATION (#: 05-019)**	**Sections I, II, and IV required**

Preparer: W.H. Chenault / Enercon / Projects / 5/26/05
Name (print) / Signature / Company / Department / Date

Reviewer: David Tolman / Enercon / DE / 5/26/05
Name (print) / Signature / Company / Department / Date

OSRC: R. A. Dodds III / 5/26/2005
Chairman's Name (print) / Signature / Date
[Required only for Programmatic Exclusion Screenings and 50.59 Evaluations.]

II. SCREENINGS

A. Licensing Basis Document Review

1. Does the proposed activity impact the facility or a procedure as described in any of the following Licensing Basis Documents?

Operating License	YES	NO	CHANGE # and/or SECTIONS IMPACTED
Operating License	☐	☒	
TS	☐	☒	
NRC Orders	☐	☒	
If "YES", obtain NRC approval prior to implementing the change by initiating an LBD change in accordance with NMM ENS-LI-113. (See Section 5.2[13] for exceptions.)			

LBDs controlled under 50.59	YES	NO	CHANGE # (if applicable) and/or SECTIONS IMPACTED
FSAR	☒	☐	DRN 05-785 (Chapter 6), DRN 05-787 (Chapter 9), DRN 05-791 (Chapter 15)
TS Bases	☐	☒	
Technical Requirements Manual	☐	☒	
Core Operating Limits Report	☐	☒	
NRC Safety Evaluation Report and supplements for the initial FSAR[1]	☐	☒	
NRC Safety Evaluations for amendments to the Operating License[1]	☐	☒	
If "YES", perform an Exemption Review per Section III OR perform a 50.59 Evaluation per Section IV OR obtain NRC approval prior to implementing the change. If obtaining NRC approval, document the LBD change in Section II.A.5; no further 50.59 review is required. However, the change cannot be implemented until approved by the NRC. AND initiate an LBD change in accordance with NMM ENS-LI-113.			

LBDs controlled under other regulations	YES	NO	CHANGE # (if applicable) and/or SECTIONS IMPACTED
Quality Assurance Program Manual[2]	☐	☒	
Emergency Plan[2, 3]	☐	☒	
Fire Protection Program[3, 4] (includes the Fire Hazards Analysis)	☐	☒	
Offsite Dose Calculations Manual[3, 4]	☐	☒	
If "YES", evaluate any changes in accordance with the appropriate regulation AND initiate an LBD change in accordance with NMM ENS-LI-113. No further 50.59 review is required.			

[1] If "YES," see Section 5.2[5]. No LBD change is required.
[2] If "YES," notify the responsible department and ensure a 50.54 Evaluation is performed. Attach the 50.54 Review.
[3] Changes to the Emergency Plan, Fire Protection Program, and Offsite Dose Calculation Manual must be approved by the OSRC in accordance with NMM OM-119.
[4] If "YES," evaluate the change in accordance with the requirements of the facility's Operating License Condition or under 50.59, as appropriate.

2. **Does the proposed activity involve a test or experiment not described in the FSAR?** ☐ Yes ☒ No

   If "yes," perform a 50.59 Evaluation per Section IV OR obtain NRC approval prior to implementing the change AND initiate an LBD change in accordance with NMM LI-113. If obtaining NRC approval, document the change in Section II.A.5; no further 50.59 review is required. However, the change cannot be implemented until approved by the NRC.

3. **Basis**

Explain why the proposed activity does or does not impact the Operating License/Technical Specifications and/or the FSAR and why the proposed activity does or does not involve a new test or experiment not previously described in the FSAR. Discuss other LBDs if impacted. Adequate basis must be provided within the Screening such that a third-party reviewer can reach the same conclusions. Simply stating that the change does not affect TS or the FSAR is not an acceptable basis.

Technical Specifications and Bases

As noted in the Description of Proposed Change section above, each Technical Specification limit in the scope of this ER was evaluated by identifying instrument uncertainty and comparing this value against the applicable analytical, Technical Specification, and surveillance procedure limits. The following parameters were evaluated:

- Minimum T_{cold} for Criticality
- RWSP Minimum Temperature
- RWSP Maximum Temperature
- Containment Minimum Pressure
- Containment Maximum Pressure
- Containment Minimum Temperature
- Containment Maximum Temperature
- 5 inwg Annulus Negative Pressure
- CSP Minimum Temperature
- CSP Maximum Temperature
- Ultimate Heat Sink WCT Level
- Ultimate Heat Sink WCT Temperature
- 23 Feet Water Over Irradiated Fuel (over vessel flange when moving fuel)
- Containment Spray Riser Level

The Technical Specifications were reviewed to determine if they would be impacted due to the results of the engineering evaluation related to instrument uncertainty. It was determined that there is no impact to the Technical Specifications since no changes were identified for any of the Technical Specifications parameters within the scope of this review. The Technical Specifications Bases were also reviewed to ensure that none of the assumptions contained within the bases would be impacted by the results of the engineering evaluation related to instrument uncertainty. The changes in procedural values for parameters identified in the ER are not in conflict with the Bases and are below the level of detail discussed in the Bases.

The impact to the FSAR regarding Annulus Negative Pressure and the potential FSAR impact review of the other parameters are discussed in the "FSAR" review section below.

LCO 3.6.6.2 states: SHIELD BUILDING INTEGRITY shall be maintained with an annulus negative pressure greater than 5 inches water gauge. This LCO will continue to be met for EPU conditions, however, the FSAR change related to this parameter requires evaluation under 50.59; see the discussion in the "FSAR" review section below.

Technical Specifications Bases 3.6.6.2, states: *"Shield Building Integrity ensures that the release of radioactive materials from the primary containment atmosphere will be restricted to those leakage paths and associated leak rates assumed in the safety analyses. This restriction, in conjunction with operation of the shield building ventilation system, will limit the site boundary radiation doses to within the limits of 10 CFR 50.67 during accident conditions."* This Technical Specification Basis will continue to be satisfied for

EPU conditions, however, the FSAR change related to this parameter requires evaluation under 50.59, see the discussion in the "FSAR" review section below.

No changes to the Technical Specifications or their bases are required as a result of this engineering evaluation, i.e., the Technical Specifications and their bases remain valid and bounding.

FSAR

The FSAR was searched for impact regarding the subject parameters' analytical, Technical Specification, and procedural limits. Based on the review, it was determined the FSAR does not require revision for the following parameters:

- Minimum T_{cold} for Criticality

  There is no specific discussion of this parameter in the FSAR. Technical Specifications Basis 3/4.1.1.4 states that the purpose of the specification ensures that the reactor will not be made critical with the Reactor Coolant System cold leg temperature less than 520°F. This limitation is required to ensure (1) the moderator temperature coefficient is within its analyzed temperature range, (2) the protective instrumentation is within its normal operating range, (3) the pressurizer is capable of being in an OPERABLE status with a steam bubble, (4) the reactor pressure vessel is above its minimum RT_{NDT} temperature, and (5) the ECCS analysis remains valid for the peak linear heat rate of Specification 3.2.1.

- RWSP Minimum Temperature

  The applicable FSAR section for the RWSP is Section 6.2, which includes no discussion on minimum temperatures. Technical Specifications Basis 3/4.5.4 states that the minimum limit on the RWSP temperature is required to prevent freezing and/or boron precipitation in the RWSP.

- RWSP Maximum Temperature

  FSAR Section 6.2.1.1.3 lists the analytical limit of 100°F as an initial conditions for LOCA and Main Steam Line Break (MSLB). Technical Specifications Basis 3/4.5.4 states that the maximum limit on the RWSP temperature ensures that the assumptions used in the containment pressure analysis under design base accident conditions remain valid and avoids the possibility of containment overpressure.

- Containment Minimum Pressure

  FSAR Section 6.2 and Table 6.2-5 lists containment pressure limits. Technical Specification Bases 3/4.6.1.4 states that the limit of 14.275 psia for initial negative containment pressure ensures that the minimum containment pressure is consistent with the ECCS performance analysis ensuring core reflood under LOCA conditions. The 14.275 psia limit also ensures the containment pressure will not exceed the containment design negative pressure differential with respect to the annulus atmosphere in the event of an inadvertent actuation of the containment spray system.

- Containment Maximum Pressure

  FSAR Section 6.2 and Table 6.2-5 lists containment pressure limits. Technical Specification Bases 3/4.6.1.4 states that the limit of +27 inches water (approximately 1.0 psig) for initial positive containment pressure is consistent with the limiting containment pressure and temperature response analyses inputs and assumptions.

- Containment Minimum Temperature

  FSAR Section 6.2 and Table 6.2-5 lists containment temperature limits. Technical Specifications Bases 3/4.6.1.4 states that the limitation on containment minimum average air temperature ensures that the ECCS is capable of maintaining a peak clad temperature (PCT) less than or equal to 2200°F under LOCA conditions.

- Containment Maximum Temperature

  FSAR Section 6.2 and Table 6.2-5 lists containment temperature limits. Technical Specifications Bases 3/4.6.1.4 states that the limit of 120°F high average containment temperature is consistent with the limiting containment pressure and temperature response analyses inputs and assumptions.

- CSP Minimum Temperature

  The design of condensate storage pool is described in FSAR Subsection 10.4.9, however, it does not discuss minimum CSP temperatures. Technical Specifications Bases 3/4.7.1.3 states that the

minimum limit on CSP temperature ensures that the assumptions used in the MSLB return to power event remain valid.

- CSP Maximum Temperature

  The design of condensate storage pool is described in FSAR Subsection 10.4.9, however, it does not discuss maximum CSP temperatures. Technical Specifications Bases 3/4.7.1.3 states that the maximum limit on CSP temperature ensures that the assumptions used in design basis accidents with EFW flow remain valid.

- Ultimate Heat Sink WCT Level

  FSAR Subsection 9.2.5 contains a detailed description of the ultimate heat sink; it does not discuss specific WCT levels, however, FSAR Table 9.2-10 lists the WCT basin volume requirements. Technical Specifications Bases 3/4.7.4 states that the minimum WCT basin capacity contains enough volume to account for water evaporation and drift losses expected during a LOCA. Additional volume is needed from the second WCT basin to handle the non-essential load of fuel pool cooling during the LOCA. The WCT minimum capacity bounds the amount of EFW required from the WCT basin for all design basis accidents.

- Ultimate Heat Sink WCT Temperature

  FSAR Subsection 9.2.5 contains a detailed description of the ultimate heat sink, however, it does not discuss WCT temperature limitations. Technical Specifications Bases 3/4.7.4 states that the limitations on minimum water level and maximum temperature are based on providing a 30-day cooling water supply to essential equipment without exceeding their design basis temperature and is consistent with the recommendations of Regulatory Guide 1.27, "Ultimate Heat Sink for Nuclear Plants," March 1974.

- 23 Feet Water Over Irradiated Fuel (over vessel flange when moving fuel)

  FSAR Table 9.3-16, Failure Mode And Effects Analysis Shutdown Cooling System (SDCS), contains the 23 Feet over vessel flange requirement, however, it is only stating the Technical Specification requirements. Additionally, FSAR Table 15.7-6, Parameters Used In Evaluating The Radiological Consequences Of A Fuel Handling Accident, lists the minimum water level above damage rods is 23 feet. The minimum water depth is consistent with the assumptions of the safety analysis. FSAR Section 9.1.3.2.4.3 notes that spent fuel pool level is monitored by a level switch, which actuates a high and a low alarm locally and in the main control room. This satisfies a requirement of Regulatory Guide 1.13 (3/71) that monitoring equipment be provided to alarm locally and in a continuously manned location if the water level in the fuel pool falls below a predetermined level. Technical Specification Bases 3/4.9.10 and 3/4.9.11 states that the restrictions on minimum water level ensure that sufficient water depth is available such that the iodine released as a result of a rupture of an irradiated fuel assembly is reduced by a factor of at least 200. The minimum water depth is consistent with assumptions of the safety analysis. ER-W3-2004-0453-000 has been initiated to provide additional monitoring capability for the refueling cavity when the relevant Technical Specifications (3.9.10.1, 3.9.10.2, 3.9.11) are applicable. The proposed change would add a local mechanical type indicator (e.g., ruler) in the refueling cavity that has sufficient resolution to ensure the required water level is maintained. The addition of this indicator is not within the scope of this 50.59 review; it will be evaluated by the 50.59 Review for the implementing ER. Licensing Action LO-LAR-2005-00029, Corrective Action 1 is tracking the implementation of ER-W3-2004-0453-000. Additionally, this issue does not impact the spent fuel pit water level indication since the existing instrumentation is adequate when considering instrument uncertainty.

- Containment Spray Riser Level

  FSAR Section 6.2.1.1.3 lists the analytical limit of 149.5 feet as an initial condition for LOCA and Main Steam Line Break (MSLB) and notes that the limiting LOCA and MSLB cases are analyzed using this value. No further discussion of the riser level requirements is included in the FSAR.

Background of Annulus Negative Pressure Issue Requiring a 50.59 Evaluation:

LCO 3.6.6.2, states: Shield Building Integrity shall be maintained with an annulus negative pressure greater than 5 inches water gauge.

ER-W3-2005-0145-000 determined that the Analytical Limit for this Technical Specification parameter is >5" w.c., the Technical Specification Limit is >5" w.c. (LCO 3.6.6.2) and the Surveillance Limit is >5" w.c.. There is no apparent margin between the Surveillance and/or Technical Specification Limit and the

Analytical Limit, i.e., all values are >5" w.c.. When instrument uncertainty for the instrumentation used to measure annulus pressure during normal operation is considered for this parameter, then even if the surveillance limit is met, the actual annulus pressure at the start of a LOCA could be less than -5" w.c..

As stated in FSAR Sections 6.2.3.1.a) and 6.2.3.2.2.a), the purpose of the Shield Building Ventilation System (SBVS) is to prevent the Shield Building Annulus pressure from going positive to prevent primary containment outleakage to escape unfiltered through the Shield Building wall to the outside atmosphere post-LOCA. In order for the SBVS to accomplish this function, the Annulus must be at a negative pressure prior to the LOCA. The non-safety related Annulus Negative Pressure System is designed to maintain the annulus at negative pressure during normal operation to ensure that the initial condition assumptions of the accident analyses remain valid. If the negative pressure prior to the accident is not greater than or equal to the Analytical Limit (>5" w.c.) then by the time the SBVS is in operation the pressure may go positive (there is a delay in SBVS operation following the initiation of a LOCA due to diesel generator start time, sequencer time, valve travel time, etc.). Per Branch Technical position (BTP) CSB 6-3, Determination of Bypass Leakage Paths in Dual Containment Plants, any pressure above -0.25" w.c. is to be considered positive and the leakage-prevention function of the secondary containment is to be assumed to be negated.

As stated in the Technical Specification Bases 3.6.6.2 quoted above, the purpose of maintaining the integrity of the shield building along with the operation of the SBVS is to ensure that radioactive material from the primary containment atmosphere is restricted to leakage paths and leakage rates assumed in the safety analysis and to maintain boundary radiation doses to within the limits of 10 CFR 50.67, post-LOCA. Therefore, as long as assumptions in the safety analysis remain valid and the site boundary radiation dose remains within limits post-LOCA, the Shield Building and the SBVS will accomplish their intended function. As discussed below, these requirements are met.

ER-W3-2001-1133, Shield Building Ventilation Setpoint Changes, revised the exhaust setpoint at which SBVS operates; the setpoint was changed from -1" w.c. to -3" w.c.. This change impacted the timing and duration of the SBVS discharge flow to the environment which in turn impacted the control room and offsite radiological dose consequences. FSAR Chapters 6 (DRN 02-9) and 15 (DRN 02-139) were revised to reflect these changes. One of the changes to FSAR Chapter 15 was to Section 15.6.3.3.5.1.1.b.8. This section was revised to include an assumption that the annulus pressure exceeds -0.25" w.c. for 30 seconds. This assumption was made to conservatively bound the annulus pressure during initial operation of the SBVS during an accident. These changes were evaluated by 50.59 Evaluation 02-006 and found to be acceptable, i.e., the increase in dose related to this change was found to be acceptable since it was less than 10% of the available margin between the existing doses and the acceptance limits provided in 10 CFR 100, GDC 19 and SRP 6.4. Subsequent to approval of ER-W3-2001-1133, DRN 02-9, DRN 02-139 and 50.59 Evaluation 02-006, Condition Report CR-WF3-2005-00942 was written to document inconsistent information in the FSAR due to the changes made by DRNs 02-9 and 02-139 via ER-W3-2001-1133. It documented that at least two other FSAR sections, 9.4.5.8 and 6.2.3, should have been updated to reflect the change made to FSAR Section 15.6.3.3.5.1.1.b.8, i.e., that positive pressure (i.e., above -0.25" w.c.) could occur in the annulus post-LOCA. This ER (ER-W3-2005-0145-000) is updating those FSAR sections identified in the CR to correct the discrepancies as well as updating FSAR Sections 15.6.3.3.5.1.1.b.8 and Appendix 6.2A to reflect the current assumption that the annulus pressure could be positive (i.e., above -0.25" w.c.) for about a minute when instrument uncertainty for the instrumentation used to measure annulus pressure during normal operation is considered.

Calculation ECS04-001, the Large Break LOCA (LBLOCA) Dose Analysis, assumes that there could be positive (i.e., above -0.25" w.c.) annulus pressure post-LOCA. Calculation ECS04-001 includes a contribution due to releases through the annulus which is based on the calculated annulus transient during a LBLOCA documented in Calculation 3A1-7. ECS04-001 assumes that the annulus reaches a positive pressure at 30 seconds post-LOCA and remains positive for the following 30 seconds. If instrument uncertainty for the instrumentation used to measure annulus pressure during normal operation is considered, then the pressure could go positive (i.e., above -0.25" w.c.) prior to 30 seconds. However, in accordance with Regulatory Guide 1.183 Section 3.3 the onset of gap release is at 30 seconds after the initiation of the event. Therefore, per the ECS04-001 dose calculation there would be no release in the first 30 seconds of the event and the annulus going positive earlier than 30 seconds would have no adverse impact over what is currently evaluated. For these assumptions to be supported using the existing surveillance requirement of >-5" w.c., Calculation 3A1-7 has determined that the instrument uncertainty for the instrument used to measure pre-LOCA annulus pressure must be less than 1.50" w.c.. Calculation ECI91-039 has determined that the instrument uncertainty for the PMC is 1.12" w.c., and the

instrument uncertainty using the control board indicator is 1.53" w.c.. The existing surveillance procedure requirement of ≥-5.0" w.c. is adequate when utilizing the PMC or when the board indicator is used instead of the PMC. While the indicator uncertainty slightly exceeds the allowance provided in Calculation 3A1-7, the difference of 0.03" w.c. is statistically insignificant and is easily bounded by conservative assumptions made in Calculation ECI91-037. Calculation 3A1-7 demonstrates that the SBVS will maintain the annulus negative after the first 60 seconds of the accident based on the above assumptions.

Therefore, the existing LBLOCA dose calculation remains bounding since the initial conditions for the accident, related to annulus pressure, remains valid. The FSAR will be revised to reflect the analysis which shows that annulus pressure could go positive (i.e., above -0.25" w.c.) post-LOCA; these changes are discussed below under the Summary of FSAR Changes section.

Summary of FSAR Changes:

It was determined by the FSAR review that FSAR Chapters 6, 9 and 15 will require revision to address the parameter, 5" w.g. Annulus Negative Pressure. These FSAR changes are discussed below and in Section IV, 50.59 Evaluation, of this 50.59 Review and documented in DRNs 05-785 (Chapter 6 changes), 05-787 (Chapter 9 changes) and 05-791 (Chapter 15 changes).

FSAR Section 6.2.3.1.a) discussion of the Shield Building and Shield Building Ventilation System (SBVS) is being revised to reflect that annulus pressure could exceed atmospheric pressure post-LOCA.

FSAR Section 6.2.3.2.2.a) discussion of the Shield Building Ventilation System (SBVS) is being revised to reflect that annulus pressure could exceed atmospheric pressure post-LOCA and that the LOCA dose analysis accounts for this.

FSAR Section 6.2.3.3.1.b), which references Figures 6.2-47a and 6.2-47b (Shield Building Annulus Pressure Following A 9.82 ft^2 DESLS), is being revised to indicate, contrary to the figures, that annulus pressure could go positive for a short period of time if instrument uncertainty for the instrumentation used to measure annulus pressure during normal operation is accounted for.

FSAR Appendix 6.2A discussion of the WATEMPT Computer code used to calculate the shield building annulus transient, is being revised to indicate that annulus pressure could go positive for a short period of time when instrument uncertainty for the instrumentation used to measure annulus pressure during normal operation is accounted for in the calculation.

FSAR Section 9.4.5.8.1 discussion regarding the Annulus Negative Pressure System is being revised to reflect that the system maintains a negative pressure during normal plant operation to support the assumptions in the LOCA dose calculations which reflect that annulus pressure may be positive during the initial period following a DBA.

FSAR Section 15.6.3.3.5.1.1.b.8 discussion of containment leakage contribution following a LOCA is being revised to reflect that the shield building pressure may rise above -0.25" w.g. for up to one minute following a LOCA as opposed to the 30 seconds that the section currently indicates.

Summary of FSAR Review:

The FSAR was reviewed to determine if the assumptions or descriptions contained within the FSAR would be impacted by the results of the engineering evaluation related to instrument uncertainty. As discussed above, only the Annulus Negative Pressure change require a change to the FSAR and this change is discussed further in Section IV, 50.59 Evaluation. It was determined that the changes in procedural values for parameters identified in the ER are not in conflict with the FSAR and are below the level of detail discussed in the FSAR, i.e., the FSAR describes the parameter values assumed for these parameters (for example in containment analyses) and is silent on the question of how to monitor these initial conditions.

Operating License

Due to NRC concerns related to Technical Specification (TS) compliance, the NRC imposed a License Condition as part of NRC approval of the EPU License Amendment 199. This condition limits Waterford 3 facility operation at a power level not to exceed 3441 MWt until such time Waterford-3 provides the NRC a description of how Entergy accounts for instrument uncertainty for each Technical Specification parameter impacted by the Waterford 3 Extended Power Uprate. This engineering evaluation documented the evaluation of parameters which were revised in association with EPU or pertinent to EPU analyses and identified necessary operations procedure changes and calculation revisions required to remove the

License Condition. Entergy Letter W3F1-2005-0032 is the formal response to the NRC on this issue and will request the removal of the License Condition.

Technical Requirements Manual

The Technical Specification Limits in the scope of this ER are not addressed in the TRM.

Test or experiment not described in the FSAR

This ER does not involve a physical modification to any plant equipment. The change does authorize changes to procedures, however, the changes are limited to specifying Technical Specification minimum and maximum surveillance limits that account for uncertainty and ensure compliance with Technical Specification requirements; no change is authorized that would allow plant equipment to be operated in an unanalyzed condition or require unique testing. Therefore, this activity does not involve a test or experiment that is not described in the FSAR.

Other LBDs

None of the other LBDs listed in Section II.A.1 are impacted by the engineering evaluation within the scope of ER-W3-2005-0145-000.

4. References

Discuss the methodology for performing LBD searches. State the location of relevant licensing document information and explain the scope of the review such as electronic search criteria used (e.g., key words) or the general extent of manual searches per Section 5.5.1[5](d) of LI-101. **NOTE: Ensure that manual searches are performed using controlled copies of the documents. If you have any questions, contact your site Licensing department.**

LBDs/Documents reviewed via keyword search:	Keywords:
Autonomy 50.59 search	T_{cold}, criticality, containment, annulus, CSP, RWSP, WCT, ultimate heat sink, refueling cavity, irradiated fuel, vessel flange, spent fuel pool, containment spray, riser, 23 feet, maximum pressure, minimum pressure, maximum temperature, minimum temperature, condensate storage pool

LBDs/Documents reviewed manually:
Technical Specifications and Bases
Sections 3.1.1.4, 3.5.4c, 3.6.1.4, 3.6.1.5, 3.6.6.2, 3.7.1.3, 3.7.4a, 3.7.4b, 3.9.10.1, 3.9.10.2, 3.9.11, 4.6.2.1a
FSAR
Sections 6.2, 6.3, Appendix 6.2A, 9.1, 9.2, 9.4, 9.5, 10.4.9, 15.6
FSAR Tables 6.2-5, 9.2-10, 9.3-16, 15.0-4, 15.6-18, 15.7-6

5. Is the validity of this Review dependent on any other change? ☒ **Yes** ☐ **No**

If "YES", list the required changes/submittals. The changes covered by this 50.59 Review cannot be implemented without approval of the other identified changes (e.g., license amendment request). Establish an appropriate notification mechanism to ensure this action is completed.

ER-W3-2004-0453-000 has been initiated to provide additional monitoring capability for the refueling cavity when the relevant Technical Specifications (3.9.10.1, 3.9.10.2, 3.9.11) are applicable. The proposed change would add a local mechanical type indicator (e.g., ruler) in the refueling cavity that has sufficient resolution to ensure the required water level is maintained. The addition of this indicator is not within the scope of this 50.59 review; it will be evaluated by the 50.59 Review for the implementing ER. Licensing Action LO-LAR-2005-00029, Corrective Action 1 is tracking the implementation of ER-W3-2004-0453-000.

B. ENVIRONMENTAL SCREENING

If any of the following questions is answered "yes," an Environmental Review must be performed in accordance with NMM Procedure ENS-EV-115, "Environmental Evaluations," and attached to this 50.59 Review. Consider both routine and non-routine (emergency) discharges when answering these questions.

Will the proposed Change being evaluated:

	Yes	No	
1.	☐	☒	Involve a land disturbance of previously disturbed land areas in excess of one acre (i.e., grading activities, construction of buildings, excavations, reforestation, creation or removal of ponds)?
2.	☐	☒	Involve a land disturbance of undisturbed land areas (i.e., grading activities, construction, excavations, reforestation, creating, or removing ponds)?
3.	☐	☒	Involve dredging activities in a lake, river, pond, or stream?
4.	☐	☒	Increase the amount of thermal heat being discharged to the river or lake?
5.	☐	☒	Increase the concentration or quantity of chemicals being discharged to the river, lake, or air?
6.	☐	☒	Discharge any chemicals new or different from that previously discharged?
7.	☐	☒	Change the design or operation of the intake or discharge structures?
8.	☐	☒	Modify the design or operation of the cooling tower that will change water or air flow characteristics?
9.	☐	☒	Modify the design or operation of the plant that will change the path of an existing water discharge or that will result in a new water discharge?
10.	☐	☒	Modify existing stationary fuel burning equipment (i.e., diesel fuel oil, butane, gasoline, propane, and kerosene)?[1]
11.	☐	☒	Involve the installation of stationary fuel burning equipment or use of portable fuel burning equipment (i.e., diesel fuel oil, butane, gasoline, propane, and kerosene)?[1]
12.	☐	☒	Involve the installation or use of equipment that will result in a new or additional air emission discharge?
13.	☐	☒	Involve the installation or modification of a stationary or mobile tank?
14.	☐	☒	Involve the use or storage of oils or chemicals that could be directly released into the environment?
15.	☐	☒	Involve burial or placement of any solid wastes in the site area that may affect runoff, surface water, or groundwater?

[1] See NMM Procedure ENS-EV-117, "Air Emissions Management Program," for guidance in answering this question.

C. SECURITY PLAN SCREENING

If any of the following questions is answered "yes," a Security Plan Review must be performed by the Security Department to determine actual impact to the Plan and the need for a change to the Plan.

Could the proposed activity being evaluated:

	Yes	No	
1.	☐	☒	Add, delete, modify, or otherwise affect Security department responsibilities (e.g., including fire brigade, fire watch, and confined space rescue operations)?
2.	☐	☒	Result in a breach to any security barrier(s) (e.g., HVAC ductwork, fences, doors, walls, ceilings, floors, penetrations, and ballistic barriers)?
3.	☐	☒	Cause materials or equipment to be placed or installed within the Security Isolation Zone?
4.	☐	☒	Affect (block, move, or alter) security lighting by adding or deleting lights, structures, buildings, or temporary facilities?
5.	☐	☒	Modify or otherwise affect the intrusion detection systems (e.g., E-fields, microwave, fiber optics)?
6.	☐	☒	Modify or otherwise affect the operation or field of view of the security cameras?
7.	☐	☒	Modify or otherwise affect (block, move, or alter) installed access control equipment, intrusion detection equipment, or other security equipment?
8.	☐	☒	Modify or otherwise affect primary or secondary power supplies to access control equipment, intrusion detection equipment, other security equipment, or to the Central Alarm Station or the Secondary Alarm Station?
9.	☐	☒	Modify or otherwise affect the facility's security-related signage or land vehicle barriers, including access roadways?
10.	☐	☒	Modify or otherwise affect the facility's telephone or security radio systems?

Documentation for accepting any "yes" statement for these reviews will be attached to this 50.59 Review or referenced below.

IV. 50.59 EVALUATION

License Amendment Determination

Does the proposed Change being evaluated represent a change to a method of evaluation ONLY? If "Yes," Questions 1 – 7 are not applicable; answer only Question 8. If "No," answer all questions below. ☐ Yes ☒ No

Does the proposed Change:

1. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the FSAR? ☐ Yes ☒ No

   BASIS:

   The proposed change revises the FSAR to reflect that that annulus pressure could go positive (i.e., above -0.25" w.c.) for a short period of time post-LOCA if instrument uncertainty of the instrumentation used to measure annulus pressure during normal operation is accounted for. The shield building, the negative pressure in the annulus pre-LOCA, and the operation of the Shield Building Ventilation System (SBVS) mitigate the consequences of accidents with radiological consequences, however, they are not accident initiators and the proposed change does not affect any accident initiator. Therefore, the change does not result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the FSAR.

2. Result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component important to safety previously evaluated in the FSAR? ☐ Yes ☒ No

   BASIS:

   The structures, systems and components important to safety related to this change are the Shield Building and Shield Building Ventilation System (SBVS). Additionally, the pressure in the Shield Building Annulus which is maintained negative by the Annulus Negative Pressure System during normal operation is integral in meeting the initial conditions assumed in the accident analysis and is governed by the Technical Specifications. The malfunction of concern would be failure of the SBVS to achieve negative pressure in the annulus in a timely manner post-LOCA and/or failure to maintain the required negative pressure during the LOCA. (Reference FSAR Section 6.2.3.1, 6.2.3.2.2, 6.2.3.3.1, Appendix 6.2A, and Section 15.6.3.3.5.1.1.)

   The proposed change revises the FSAR to reflect that that annulus pressure could go positive (i.e., above -0.25" w.c.) for a short period of time post-LOCA if instrument uncertainty of the instrumentation used to measure annulus pressure during normal operation is accounted for.

   As stated in FSAR Sections 6.2.3.1.a) and 6.2.3.2.2.a), the purpose of the SBVS is to prevent the Shield Building Annulus pressure from going positive in order to prevent primary containment outleakage to escape unfiltered through the Shield Building wall to the outside atmosphere post-LOCA. In order for the SBVS to accomplish this function, the Annulus must be at a negative pressure prior to the LOCA. The non-safety related Annulus Negative Pressure System is designed to maintain the annulus at negative pressure during normal operation to ensure that the initial condition assumptions of the accident analyses remain valid. If the negative pressure prior to the accident is not greater than or equal to the Analytical Limit (>5" w.c.) then by the time the SBVS is in operation the pressure may go positive (there is a delay in SBVS operation following the initiation of a LOCA due to diesel generator start time, sequencer time, valve travel time, etc.). Per Branch Technical position (BTP) CSB 6-3, Determination of Bypass Leakage Paths in Dual Containment Plants, any pressure above -0.25" w.c. is to be considered positive and the leakage-prevention function of the secondary containment is to be assumed to be negated.

   As stated in the Technical Specification Bases 3.6.6.2, the purpose of maintaining the integrity of the shield building along with the operation of the SBVS is to ensure that radioactive material from the primary containment atmosphere is restricted to leakage paths and leakage rates assumed in the safety analysis and to maintain boundary radiation does to within the limits of 10 CFR 50.67, post-LOCA. Therefore, as long as assumptions in the safety analysis remain valid and the site boundary radiation dose remains within limits post-LOCA, the Shield Building and the SBVS will accomplish their intended function.

   Calculation ECS04-001, the Large Break LOCA (LBLOCA) Dose Analysis, assumes that there could be positive (i.e., above -0.25" w.c.) annulus pressure post-LOCA. Calculation ECS04-001 includes a

contribution due to releases through the annulus which is based on the calculated annulus transient during a LBLOCA documented in Calculation 3A1-7. ECS04-001 assumes that the annulus reaches a positive (i.e., above -0.25" w.c.) pressure at 30 seconds post-LOCA and remains positive for the following 30 seconds. If instrument uncertainty for the instrumentation used to measure annulus pressure during normal operation is considered, then the pressure could go positive (i.e., above -0.25" w.c.) prior to 30 seconds. However, in accordance with Regulatory Guide 1.183 Section 3.3 the onset of gap release is at 30 seconds after the initiation of the event. Therefore, there would be no release in the first 30 seconds of the event and the annulus going positive earlier than 30 seconds would have no adverse impact on dose consequences in the first 60 seconds over what is currently evaluated. For these assumptions to be supported using the existing surveillance requirement of >-5" w.c., Calculation 3A1-7 has determined that the instrument uncertainty for the instrument used to measure pre-LOCA annulus pressure must be less than 1.50" w.c.. Calculation ECI91-039 has determined that the instrument uncertainty for the PMC is 1.12" w.c., and the instrument uncertainty using the control board indicator is 1.53" w.c.. The existing surveillance procedure requirement of ≥-5.0" w.c. is adequate when utilizing the PMC or when the board indicator is used instead of the PMC. While the indicator uncertainty slightly exceeds the allowance provided in Calculation 3A1-7, the difference of 0.03" w.c. is statistically insignificant and is easily bounded by conservative assumptions made in Calculation ECI91-037. If the annulus pressure during normal operation is maintained within the limits specified above, then the time the annulus pressure remains positive (i.e., above -0.25" w.c.) will be within the analyzed value of less than or equal to 60 seconds and the accident analysis will remain bounding.

The application of instrument uncertainty to the instrumentation used to measure annulus pressure during normal operation does not adversely impact long term shield building annulus negative pressure.

Additionally, the positive pressure of approximately 2" w.c. calculated to occur during a LOCA is less than the Shield Building internal design pressure of 3 psi." (reference DBD-028, Section 3.3.1.4).The Shield Building and Shield Building Ventilation System (SBVS) will continue to meet their design function to ensure that radioactive material from the primary containment atmosphere is restricted to leakage paths and leakage rates assumed in the safety analysis and to maintain boundary radiation does to within the limits of 10 CFR 50.67, post-LOCA. Therefore, the change will not result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component important to safety previously evaluated in the FSAR.

3. Result in more than a minimal increase in the consequences of an accident previously evaluated in the FSAR? ☐ Yes ☒ No

BASIS:

The accident with radiological consequences related to this change is a LOCA (reference FSAR Section 6.2.3.1, 6.2.3.2.2, 6.2.3.3.1, Appendix 6.2A, and Section 15.6.3.3.5.1.1).

The proposed change revises the FSAR to reflect that that annulus pressure could go positive (i.e., above -0.25" w.c.) for a short period of time post-LOCA if instrument uncertainty of the instrumentation used to measure annulus pressure during normal operation is accounted for.

As stated in FSAR Sections 6.2.3.1.a) and 6.2.3.2.2.a), the purpose of the SBVS is to prevent the Shield Building Annulus pressure from going positive in order to prevent primary containment outleakage to escape unfiltered through the Shield Building wall to the outside atmosphere post-LOCA. In order for the SBVS to accomplish this function, the Annulus must be at a negative pressure prior to the LOCA. The non-safety related Annulus Negative Pressure System is designed to maintain the annulus at negative pressure during normal operation to ensure that the initial condition assumptions of the accident analyses remain valid. If the negative pressure prior to the accident is not greater than or equal to the Analytical Limit (>5" w.c.) then by the time the SBVS is in operation the pressure may go positive (there is a delay in SBVS operation following the initiation of a LOCA due to diesel generator start time, sequencer time, valve travel time, etc.). Per Branch Technical position (BTP) CSB 6-3, Determination of Bypass Leakage Paths in Dual Containment Plants, any pressure above -0.25" w.c. is to be considered positive and the leakage-prevention function of the secondary containment is to be assumed to be negated.

Calculation ECS04-001, the Large Break LOCA (LBLOCA) Dose Analysis, assumes that there could be positive (i.e., above -0.25" w.c.) annulus pressure post-LOCA. Calculation ECS04-001 includes a contribution due to releases through the annulus which is based on the calculated annulus transient during a LBLOCA documented in Calculation 3A1-7. ECS04-001 assumes that the annulus reaches a positive (i.e., above -0.25" w.c.) pressure at 30 seconds post-LOCA and remains positive for the following 30

seconds. If instrument uncertainty for the instrumentation used to measure annulus pressure during normal operation is considered then the pressure could go positive prior to 30 seconds. However, in accordance with Regulatory Guide 1.183 Section 3.3 the onset of gap release is at 30 seconds after the initiation of the event. Therefore, there would be no release in the first 30 seconds of the event and the annulus going positive (i.e., above -0.25" w.c.) earlier than 30 seconds would have no adverse impact on dose consequences in the first 60 seconds over what is currently evaluated. For these assumptions to be supported using the existing surveillance requirement of >-5" w.c., Calculation 3A1-7 has determined that the instrument uncertainty for the instrument used to measure pre-LOCA annulus pressure must be less than 1.50" w.c.. Calculation ECI91-039 has determined that the instrument uncertainty for the PMC is 1.12" w.c., and the instrument uncertainty using the control board indicator is 1.53" w.c.. The existing surveillance procedure requirement of ≥-5.0" w.c. is adequate when utilizing the PMC or when the board indicator is used instead of the PMC. While the indicator uncertainty slightly exceeds the allowance provided in Calculation 3A1-7, the difference of 0.03" w.c. is statistically insignificant and is easily bounded by conservative assumptions made in Calculation ECI91-037. If the annulus pressure during normal operation is maintained within the limits specified above, then the time the annulus pressure remains positive (i.e., above -0.25" w.c.) will be within the analyzed value of less than or equal to 60 seconds and the accident analysis will remain bounding.

The application of instrument uncertainty to the instrumentation used to measure annulus pressure during normal operation does not adversely impact long term shield building annulus negative pressure.

Based on current analyses (reference calculation ECS04-001, 3A1-7 and ECI91-039), the dose consequences reported in FSAR Table 15.6-18 remain bounding and account for any leakage that would occur within the first 60 seconds of the accident. The radiological consequences of a LOCA has not been increased by this change and the boundary radiation does remains within the limits of 10 CFR 50.67.

4. Result in more than a minimal increase in the consequences of a malfunction of a structure, system, or component important to safety previously evaluated in the FSAR? ☐ Yes ☒ No

BASIS:

The proposed change revises the FSAR to reflect that that annulus pressure could go positive (i.e., above -0.25" w.c.) for a short period of time post-LOCA if instrument uncertainty of the instrumentation used to measure annulus pressure during normal operation is accounted for.

This change does not impact any other system and does not create any new system interaction. The proposed change does not increase the reliance of the plant on SBVS or any other SSC. Therefore, the consequences of the malfunction of the SBVS post-accident will be the same as before. The proposed change does not create new system interactions that did not previously exist. Therefore the change does not result in more than a minimal increase in the consequences of a malfunction of a structure, system, or component important to safety previously evaluated in the FSAR.

5. Create a possibility for an accident of a different type than any previously evaluated in the FSAR? ☐ Yes ☒ No

BASIS:

The proposed change revises the FSAR to reflect that that annulus pressure could go positive (i.e., above -0.25" w.c.) for a short period of time post-LOCA if instrument uncertainty of the instrumentation used to measure annulus pressure during normal operation is accounted for. This change has been accounted for in the LOCA analysis. This change does not impact any other system and does not create any new system interaction. A period of positive pressure has already been documented as part of the licensing basis. Allowing the timing of this period to begin slightly earlier will not cause any new or different system interactions. Neither the SBVS nor the negative pressure in the Shield Building Annulus are initiators of any accident and no initiator that was previously considered not credible has been made credible by this change. Therefore, this change does not create the possibility for an accident of a different type than any previously evaluated in the FSAR.

6. Create a possibility for a malfunction of a structure, system, or component important to safety with a different result than any previously evaluated in the FSAR? ☐ Yes ☒ No

BASIS:

The proposed change revises the FSAR to reflect that that annulus pressure could go positive (i.e., above -0.25" w.c.) for a short period of time post-LOCA if instrument uncertainty of the instrumentation used to

measure annulus pressure during normal operation is accounted for.

As stated in the Technical Specification Bases 3.6.6.2, the purpose of maintaining the integrity of the shield building along with the operation of the SBVS is to ensure that radioactive material from the primary containment atmosphere is restricted to leakage paths and leakage rates assumed in the safety analysis and to maintain boundary radiation does to within the limits of 10 CFR 50.67, post-LOCA. Therefore, as long as assumptions in the safety analysis remain valid and the site boundary radiation dose remains within limits post-LOCA, the Shield Building and the SBVS will accomplish their intended function. Based on current analyses (reference calculation ECS04-001, 3A1-7 and ECI91-039) these SSCs will continue to perform their intended function.

These changes do not change the function of the Shield Building Ventilation system, or the design function of the Annulus. The failure modes effects analysis is not impacted by this proposed change. This change does not create a possibility for a malfunction of a structure, system, or component important to safety with a different result than any previously evaluated in the FSAR.

7. Result in a design basis limit for a fission product barrier as described in the FSAR being exceeded or altered? ☐ Yes ☒ No

BASIS:

The proposed change revises the FSAR to reflect that that annulus pressure could go positive (i.e., above -0.25" w.c.) for a short period of time post-LOCA if instrument uncertainty of the instrumentation used to measure annulus pressure during normal operation is accounted for.

The SBVS maintains a negative pressure in the annulus during post-accident operation to ensure no unfiltered discharge from the annulus to the environment occurs. (SBVS is in standby during normal operation of the plant. Annulus Negative Pressure maintains the annulus at a negative pressure during normal operation of the plant.) SBVS operation mitigates the consequences of fission product barrier failures (fuel clad and RCS) but has no protective function for the fission product barriers. Specifically, the ability to maintain a negative pressure in the annulus is not a design basis limit for a fission product barrier. Therefore, this change does not impact the design basis limits for any fission product barrier.

8. Result in a departure from a method of evaluation described in the FSAR used in establishing the design bases or in the safety analyses? ☐ Yes ☒ No

BASIS:

The proposed change revises the FSAR to reflect that that annulus pressure could go positive (i.e., above -0.25" w.c.) for a short period of time post-LOCA if instrument uncertainty of the instrumentation used to measure annulus pressure during normal operation is accounted for.

This change required the re-performance of Shield Building Annulus Transient Post-LOCA calculation 3A1-7 to determine the impact of accounting for instrument uncertainty of the instrumentation used to measure annulus pressure during normal operation. The calculation determined that if the annulus pressure during normal operation is maintained within the limits specified, then the time the annulus pressure remains positive will be within the analyzed value of less than or equal to 60 seconds and the accident analysis will remain bounding. The methods used to calculate the annulus transient and dose due to this change is the same as the methods described in the FSAR. Therefore, there is no departure from a method described in the FSAR.

If any of the above questions is checked "YES", obtain NRC approval prior to implementing the change by initiating a change to the Operating License in accordance with NMM Procedure ENS-LI-113.