Entergy

Entergy Operations, Inc.
17265 River Road
Killona, LA 70066
Tel 504 739 6660
Fax 504 739 6678

Charles M. Dugger
Vice President, Operations
Waterford 3

W3F1-2000-0170
A4.05
PR

January 8, 2001

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

Subject: Waterford 3 SES
Docket No. 50-382
License No. NPF-38
Technical Specification Change Request NPF-38-227
Revision of Containment Internal Pressure Requirement

Gentlemen:

In accordance with 10CFR50.90, Entergy Operations, Inc. (EOI) is hereby proposing to amend Operating License NPF-38 for Waterford 3 by requesting the NRC Staff review and approval of the attached changes to the Technical Specifications (TS). The attached description and safety analysis support the proposed changes to the Waterford 3 TS. The proposed change revises the lower limit of the allowable containment internal pressure in TS 3.6.1.4, "Containment Systems - Internal Pressure," from 14.375 to 14.275 psia. This change is needed in order to provide additional operating margin when performing containment purging during low atmospheric pressure conditions. A change to the TS 3/4.6.1.4 Bases has been included for information only to support this change. The proposed value of 14.275 psia is supported by current plant analyses.

This proposed change has been evaluated in accordance with 10CFR50.91(a)(1), using the criteria in 10CFR50.92(c), and it has been determined that this request involves no significant hazards consideration.

The circumstances surrounding this change do not meet the NRC Staff criteria for exigent or emergency review. EOI is not requesting a specific approval date at this time; however, we respectfully request an expeditious review. EOI requests the effective date for this TS change be within 60 days of approval.

A001

There are no commitments contained in this submittal. Should you have any questions or comments concerning this request, please contact D. Bryan Miller at (504) 739-6692.

Pursuant to 28 U.S.C.A. Section 1746, I declare under penalty of perjury that the foregoing is true and correct. Executed on January 8, 2001.

Very truly yours,

C.M. Dugger
Vice President, Operations
Waterford 3

CMD/fgb/dbm/ssf
Attachments: 1. NPF-38-227, Technical Specification Change Request
2. NPF-38-227, Proposed Marked-Up Specifications

cc: E.W. Merschoff, NRC Region IV
N. Kalyanam, NRC-NRR
J. Smith
N.S. Reynolds
NRC Resident Inspectors Office
Administrator Radiation Protection Division
(State of Louisiana)
American Nuclear Insurers

ATTACHMENT 1
To W3F1-2000-0170

NPF-38-227

Technical Specification Change Request
Revision of Containment Internal Pressure Requirement

DESCRIPTION AND NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION OF PROPOSED CHANGE NPF-38-227

Summary of Proposed Change

The proposed change revises the lower limit of the allowable containment internal pressure in Technical Specification (TS) 3.6.1.4, "Containment Systems - Internal Pressure," from 14.375 psia to 14.275 psia. This change will provide greater operational flexibility when performing containment purging during low atmospheric pressure conditions. The proposed value of 14.275 psia is supported by current plant analyses. Changes to the TS 3/4.6.1.4 Bases are also included for information only to support this revised value and add additional clarification to the design basis for the ECCS performance analysis and the initial negative containment pressure.

Proposed Marked-up Specification

See Attachment 2

Background

Waterford 3 has a steel containment vessel enclosed inside the shield building, which is a reinforced concrete structure. The design pressures for the steel containment are 44 psig internal pressure and 0.65 psid external to internal differential pressure. The containment is designed to withstand the pressure and temperature transients after a loss of coolant accident (LOCA) or a main steam line break (MSLB) while limiting the release of radioactive material to the outside environment below the limits of 10CFR100. Additionally, the containment is designed to withstand the differential pressure associated with an inadvertent actuation of the containment heat removal (containment spray) system during normal plant operation.

The Waterford 3 design includes a containment atmosphere purge (CAP) system that is used to reduce the level of radioactive contamination and replenish oxygen levels in the containment atmosphere to permit personnel access to the containment during inspection, refueling, and maintenance operations. The CAP system is non-safety, except for the containment penetrations and isolation valves, and is not required to operate following a design basis accident.

Purging of the containment is performed by initially establishing a negative pressure in the containment with the ventilation system. This is accomplished by exhausting containment air through filters for radioactive particulates and radioiodines. Once containment pressure drops to -2.0 inches water gauge (WG) with respect to atmospheric pressure, the CAP makeup valves and dampers open to allow makeup air into containment. If containment pressure reaches -8.4 inches WG with respect to

atmospheric pressure the system will trip and the makeup and exhaust valves and dampers will close.

If the CAP system was initiated during low atmospheric pressure conditions (with atmospheric pressure at approximately 14.68 psia), the TS 3.6.1.4 limit of 14.375 psia would be reached if containment pressure reached the CAP system trip setpoint of -8.4 inches WG. In order to protect the TS limit of 14.375 psia, plant procedures currently restrict operation of containment purge with barometric pressure less than 29.9 inches mercury (14.68 psia).

Description and Safety Considerations

The proposed change revises the lower limit of the allowable containment internal pressure in TS 3.6.1.4, "Containment Systems - Internal Pressure." Changes to TS 3/4.6.1.4 Bases are also included to support this revised value and add additional clarification regarding the design basis for the ECCS performance analysis and the initial negative containment pressure.

Specifically, the proposed change revises the lower limit for containment internal pressure from 14.375 psia to 14.275 psia in the Limiting Condition for Operation for TS 3.6.1.4 and the TS 3/4.6.1.4 Bases. Additionally, the following is added to the TS 3/4.6.1.4 Bases to clarify the bases for the ECCS performance analysis and the limits on negative containment pressure.

> ... thus ensuring peak cladding temperature and cladding oxidation remain within limits. The 14.275 psia limit also ensures that the containment pressure will not exceed the containment design negative pressure differential with respect to the annulus atmosphere in the event of inadvertent actuation of the containment spray system.

The limitations on containment internal pressure ensure that: (Item 1) the containment structure is prevented from exceeding its design negative pressure differential with respect to the annulus atmosphere of 0.65 psid, (Item 2) the containment peak pressure does not exceed the design pressure of 44 psig during either LOCA or MSLB, and (Item 3) the minimum pressure of the Emergency Core Cooling System (ECCS) performance analysis is satisfied.

The proposed change of lowering the minimum containment internal pressure from 14.375 psia to 14.275 psia has already been accounted for in the current Waterford 3 analyses. Therefore, the analyses based on minimum containment internal pressure do not require revision to support the proposed TS change. The associated analyses are discussed below.

The design event for negative pressure differential (Item 1) is an inadvertent actuation of containment spray during normal operation. The actuation of the containment spray system results in a decrease in the containment internal pressure, thereby increasing the differential pressure across the containment boundary. The current analysis for this event assumes an initial minimum containment pressure of 14.25 psia, which bounds the proposed TS value of 14.275 psia. Therefore, the proposed change has no affect on the calculated maximum negative pressure differential for this event. The maximum calculated pressure differential, 0.49 psid, remains less than the design limit of 0.65 psid.

This proposed TS change does not affect the containment peak pressure response (Item 2). The peak pressure response analysis is based on the maximum allowed internal containment pressure which is unaffected by the proposed change.

For ECCS performance (Item 3), analysis has shown that using a minimum initial containment pressure results in a higher peak clad temperature and higher clad oxidation during a large break LOCA. The Waterford 3 ECCS performance was previously analyzed in accordance with 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors," using an initial containment pressure of 14.275 psia. This value is consistent with the proposed TS change; therefore, the proposed change has no affect on the analyzed ECCS performance. The calculated peak clad temperature, 2177°F, and clad oxidation, 8.6%, are within the acceptance limits.

The proposed change makes use of the initial assumption values used in current analyses to provide additional operating margin for the CAP system. As stated previously, operation of the CAP system is restricted with atmospheric conditions less than 14.68 psia. The occurrence of this atmospheric condition concurrent with the desire to perform containment purging has interrupted purging in the past. Atmospheric pressures less than 14.68 psia are usually associated with short-term weather events.

Currently, when these conditions do occur, containment purging is delayed until atmospheric pressure increases above 14.68 psia. This delay could impact maintenance and refueling activities that require entry into the containment. By reducing the TS lower limit for containment internal pressure, the atmospheric pressure at which CAP system operation is restricted can be reduced accordingly.

The Graded Approach for Treatment of Uncertainties

Waterford 3 uses a graded approach to instrument uncertainties based on the recognition that safety analyses or procedures must account for instrument uncertainties in all cases, either explicitly or implicitly. In applying the graded approach, the level of rigor applied to documenting the instrument uncertainty and the associated accounting of the instrument uncertainty in the applicable analyses and procedures

may vary based on the safety significance of the instrument function as determined by the relative magnitude of the uncertainty compared to the available margin. In those cases where the analysis margin is high and the instrument uncertainty is small, there is no need to explicitly include instrument uncertainty in the analysis inputs. Rather, the uncertainty is accounted for implicitly by the analysis margin. This approach is consistent with the original Waterford 3 licensing basis and with NRC Branch Technical Position HICB-12, "Guidance on Establishing and Maintaining Instrument Setpoints". In applying the graded approach, the magnitude of the margin can be determined by reviewing factors such as the following:

- Margins available in the associated analysis (e.g., through use of conservative assumptions) and margins inherent in the analysis methods (e.g., source terms and 10 CFR 50.46 required methodology vs. realistic analysis).
- The sensitivity of the associated analysis to changes in the parameter.

The analyses applicable to the technical specification changes requested herein (i.e., negative pressure differential and large break LOCA ECCS analysis), which are discussed above, contain substantial conservatisms in the underlying assumptions. The conservative assumptions used in the negative pressure differential analysis include using 50°F spray water, all four containment fan coolers operating with a very conservative heat removal rate, both containment spray trains inadvertently starting, and disregarding heat from internal containment structures. The conservative assumptions used in the large break LOCA ECCS performance analysis are described in the 10CFR50.46 model requirements. Thus, the analyses that support this change demonstrate that there are substantial margins and conservatisms to limits that will assure the performance of the safety function.

The instrument uncertainty for the measurement of the containment pressure is less than 0.25 psi. Informal analyses were performed to assess the sensitivity to initial containment pressure and help quantify the impact of uncertainty. An informal negative pressure differential sensitivity analysis using the GOTHIC code shows that for a decrease in initial containment pressure of 0.25 psi, the calculated maximum pressure differential increase is small (less than 0.001 psi). Thus, the impact of instrument uncertainty on the calculated differential pressure is negligible. Similarly, an informal large break LOCA ECCS sensitivity analysis shows that, for a decrease in initial containment pressure of 0.275 psia, the peak cladding temperature increases by approximately 20 °F. The impact of instrument uncertainty therefore is small and bounded by the large amount of conservatism required by the 10 CFR 50.46 ECCS Evaluation Model.

The above efforts demonstrate that the impact of instrument uncertainty is negligible compared to the margin available in the analyses. Therefore, it is acceptable to account for instrument uncertainty in an implicit manner in which discrete components of each of the margins to safety are not evaluated on an individual basis but rather are included within an overall safety margin. Accordingly, based on the Waterford 3 graded approach to instrument uncertainty, the proposed technical specification value (14.275 psia) will also be the indicated value used to verify technical specification compliance.

Conclusion

The proposed change to TS 3.6.1.4 will allow a lower minimum containment internal pressure during Modes 1, 2, 3, and 4. This change is supported by the initial containment pressure assumptions used in the current analyses. As a result, greater operational flexibility will be afforded to initiate containment purge during conditions with low atmospheric pressure. This change allows greater operational flexibility without changing the initial conditions used in or the results of applicable design analyses.

No Significant Hazards Consideration Determination

The proposed changes described above have been evaluated in accordance with 10 CFR 50.92(c). The change shall be deemed to involve a significant hazards consideration if there is a positive finding in any of the following areas:

1. Will the operation of the facility in accordance with this proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response:

   The proposed change revises the lower limit of the allowable containment internal pressure in TS 3.6.1.4 from 14.375 psia to 14.275 psia. This change will allow additional operating margin for the containment atmosphere purge (CAP) system during conditions of low atmospheric pressure. The containment minimum pressure parameter is not an accident initiator and does not affect the probability of any initiating event scenario. Although the TSs will allow a lower initial containment internal pressure, the current analyses for the associated design events are not affected since the lower pressure has already been conservatively included. The proposed change in initial containment internal pressure is bounded in the current design. Therefore, this proposed change does not involve an increase in the probability or consequences of an accident previously evaluated.

2. Will the operation of the facility in accordance with this proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response:

   The proposed change affects the TS allowed lower limit on containment internal pressure and consequently the atmospheric pressure range in which the CAP system can be operated. The change in the lower limit on containment internal pressure is encompassed by current design analyses and does not result in a change of analyzed conditions or analyzed operating ranges.

   Based on the proposed TS change, CAP system operation will be allowed at a lower atmospheric pressure. This change does not change the function of the system or its method of operation. Although the initial atmospheric pressure at which the CAP system can be initiated is being lowered, this is within the current design of the CAP system and does not change the differential pressures at which it will be operated.

   Therefore, the proposed changed does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Will the operation of the facility in accordance with this proposed change involve a significant reduction in a margin of safety?

   Response:

   The proposed change makes use of the initial containment pressure assumption values used in current analyses to provide additional operating margin for the CAP system. The margin of safety that was inherent in the results of these safety analyses has been preserved. The associated analyses ensure the negative pressure differential associated with an inadvertent actuation of the containment spray system is acceptable, and ensure that the emergency core cooling system can satisfy its design safety function under worst case conditions. The calculated maximum differential pressure is 0.49 psid which is within the design limit of 0.65 psid. The peak clad temperature for the worst case large break loss of coolant accident is 2177°F which is within the acceptance criteria given in 10CFR50.46. Since the proposed change does not affect the initial containment pressure utilized in these analyses, the results of the analyses are unchanged. Therefore, there is no affect on any margin of safety associated with this parameter.

Safety and No Significant Hazards Consideration Determination

Based on the above No Significant Hazards Consideration Determination, it is concluded that: (1) the proposed change does not constitute a significant hazards consideration as defined by 10CFR50.92; (2) there is a reasonable assurance that the health and safety of the public will not be endangered by the proposed change; and (3) this action will not result in a condition which significantly alters the impact of the station on the environment as described in the NRC final environmental statement.

ATTACHMENT 2
To W3F1-2000-0170

NPF-38-227

PROPOSED MARKED-UP SPECIFICATIONS
(Bases pages included for information only.)

INTERNAL PRESSURE

LIMITING CONDITION FOR OPERATION

3.6.1.4 Primary containment internal pressure shall be maintained less than 27 inches H_2O guage and greater than ~~14.375~~ 14.275 psia.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

With the containment internal pressure outside of the limits above, restore the internal pressure to within the limits within 1 hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.1.4 The primary containment internal pressure shall be determined to be within the limits at least once per 12 hours.

3/4.6.1.4 INTERNAL PRESSURE

The limitations on containment internal pressure ensure that (1) the containment structure is prevented from exceeding its design negative pressure differential with respect to the annulus atmosphere of 0.65 psid, (2) the containment peak pressure does not exceed the design pressure of 44 psig during either LOCA or steam line break conditions, and (3) the minimum pressure of the ECCS performance analysis (BTP CSB 61) is satisfied.

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.

The limit of ~~14.375~~ 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. INSERT HERE

3/4.6.1.5 AIR TEMPERATURE

The limit of 120°F on high average containment temperature is consistent with the limiting containment pressure and temperature response analyses inputs and assumptions. The limits currently adopted by Waterford 3 are 269.3°F during LOCA conditions and 413.5°F during MSLB conditions.

3/4.6.1.6 CONTAINMENT VESSEL STRUCTURAL INTEGRITY

This limitation ensures that the structural integrity of the containment steel vessel will be maintained comparable to the original design standards for the life of the facility. Structural integrity is required to ensure that the containment vessel will withstand the maximum pressure resulting from the design basis LOCA and main steam line break accident. A visual inspection in conjunction with Type A leakage test is sufficient to demonstrate this capability.

3/4.6.1.7 CONTAINMENT VENTILATION SYSTEM

The use of the containment purge valves is restricted to 90 hours per year in accordance with Standard Review Plan 6.2.4 for plants with the Safety Evaluation Report for the Construction License issued prior to July 1, 1975. The purge valves have been modified to limit the opening to approximately 52° to ensure the valves will close during a LOCA or MSLB;and therefore, the SITE BOUNDARY doses are maintained within the guidelines of 10 CFR Part 100. The purge valves, as modified, comply with all provisions of BTP CSB 6-4 except for the recommended size of the purge line for systems to be used during plant operation.

Insert for Bases 3/4.6.1.4 Internal Pressure

thus ensuring peak cladding temperature and cladding oxidation remain within limits. 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.