May 1, 2000

Mr. Charles M. Dugger
Vice President Operations
Entergy Operations, Inc.
17265 River Road
Killona, LA 70066-0751

SUBJECT: NOTICE OF ENFORCEMENT DISCRETION FOR ENTERGY OPERATIONS, INC. REGARDING WATERFORD STEAM ELECTRIC STATION, UNIT 3 (NOED NO. 00-6-006)

Dear Mr. Dugger:

By letter dated April 27, 2000, you requested that the Nuclear Regulatory Commission (NRC) exercise discretion not to enforce compliance with the actions required in the Technical Specification (TS) 3.6.2.2 Limiting Condition for Operation (LCO). Your letter documented information previously discussed with the NRC in a telephone conference on April 26, 2000, at 9:00 a.m. The principal NRC staff members who participated in that telephone conference included, among others, Mr. S. Richards, Project Director, Mr. R. Gramm, Section Chief, and Mr. G. Hubbard, Section Chief, all from NRC Headquarters; Mr. K. Brockman, Division Director and Mr. D. Proulx, Acting Branch Chief, from Region IV; and Mr. T. Farnholtz, the Senior Resident Inspector at Waterford Steam Electric Station, Unit 3 (Waterford 3). You stated that as of April 24, 2000, at 10:16 p.m., Waterford 3 did not meet the LCO for TS 3.6.2.2, which requires two trains of Containment Fan Coolers (CFC) be OPERABLE, with two fan coolers in each train in Modes 1 through 4. With one train inoperable, the inoperable train must be restored to an operable status within 72 hours (April 27, 2000 at 10:16 p.m) or the plant must be in HOT STANDBY within the next six hours.

You requested that a Notice of Enforcement Discretion (NOED) be issued pursuant to the NRC's policy regarding exercise of discretion for an operating facility, set out in Section VII.c, of the "General Statement of Policy and Procedures for NRC Enforcement Actions" (Enforcement Policy), NUREG-1600, and be effective for the period until Waterford 3 Technical Specification Change Request NPF-38-224 is approved or an outage of sufficient duration occurs to accommodate repair of the containment fan cooler. This letter documents our telephone conversation on April 27, 2000, at 3:45 p.m. when we orally issued the NOED.

The CFC system consists of four fan coolers which draw air from containment and discharge it to a ring header around the top of containment. The CFC system coolers are divided into two trains - Train A, which contains CFCs "A" and "C," and Train B, which contains CFCs "B" and "D." On April 24, 2000, at 10:16 p.m., CFC "C" tripped following vibration alarms. CFC "C" was declared inoperable and the Action Statement for TS 3.6.2.2 was entered. A containment entry was performed at 02:37 a.m. on April 25, 2000, to visually inspect CFC "C" and the following conditions were noted:

1. Hot spots (paint discoloration) were identified at the 2 o'clock and 4 o'clock to 7 o'clock positions where it appeared the fan blades had rubbed against the shroud.
2. The edges of the fan blades appeared to be worn or melted.
3. Lubricant was noted to have leaked out of the motor outboard bearing.
4. The motor/fan base plate bolts could be turned using a wrench.
5. The fan could not be turned by hand due to restrictions caused by the blades rubbing on the shroud.

After a second containment entry to perform a more detailed inspection of CFC "C," it was determined that an on-line repair was not feasible within the 72 hour LCO Action Statement Allowed Outage Time. You requested enforcement discretion to allow plant operation to continue with one operable fan cooler per train.

NRC Inspection Manual, Part 9900, Notice of Enforcement Discretion, Section C.4 requires that the request for NOED address the following 11 items, as appropriate. In your letter dated April 27, 2000, you provided the responses.

1. The TS or other license conditions that will be violated.

   The LCO for TS 3.6.2.2, “Containment Cooling System” requires the following:

   “Two independent trains of containment cooling shall be OPERABLE with two fan coolers to each train.”

2. The circumstances surrounding the situation, including root causes, the need for prompt action, and identification of any relevant historical events.

   Following the trip, electricians meggered the motor and checked phase to phase resistances. These checks were all found to be satisfactory. The containment entry performed at 02:37 a.m. on April 25, 2000, noted that the fan blades on CFC “C” appeared to have rubbed against the shroud, the edges of the fan blades appeared to be worn or melted, lubricant was noted to have leaked out of the motor outboard bearing, and the fan could not be turned by hand because the fan blades were rubbing the shroud.

   The other three CFCs were inspected and tested to provide added assurance that a similar condition did not exist. Specifically, the motor diagnostic testing and vibration diagnostics, including external inspection, were done on CFCs “A,” “B,” and “D.” In addition, an internal visual inspection was performed on CFC “A.” The results of the eccentricity spectrum for each motor showed no signs of eccentricity problems. The vibration readings taken on the housing of the vane axial fan (readings could not be taken from the bearing casing directly, since the bearing casing is inaccessible) lead to the conclusion that the CFCs were operating in the good range in regards to vibration. There were no unusual audible noises nor were abnormalities observed. The results of the internal visual inspection of CFC “A” indicate that the fan is in good condition with no evidence of a bearing problem, the fan rotated freely with adequate clearance between

the fan blades and shroud, and all the hardware appeared to be firmly in place with no free play detected in the bearing.

The preventive maintenance work history on CFC “C” has been reviewed. During refueling outage 9, the motor was lubricated, routine motor maintenance was performed, and the vibration survey was satisfactory. The failure of the CFC “C” motor bearings could have been caused by either misalignment of motor/fan assembly with housing as a result of failed mounting rods or a lubrication fault. The root cause will be determined as a part of the Corrective Action Program when the licensee removes CFC “C” from the containment and performs a motor tear down. The licensee will also assess industry bearing failure data as part of its root cause analysis.

3. The safety basis for the request, including an evaluation of the safety significance and potential consequences of the proposed course of action. This evaluation should include at least a qualitative risk assessment derived from the licensee's probabilistic risk analysis (PRA).

A safety evaluation for operating the plant with one CFC per train is based on containment pressure and temperature response analyses performed for the limiting large break Loss of Coolant Accidents (LOCA) and limiting Main Steam Line Break (MSLB) events using the GOTHIC computer code. These analyses have been submitted to NRC for approval in TS Change Request NPF-38-224. Several LOCA and MSLB events are analyzed using GOTHIC and the Waterford 3 containment model to determine the limiting cases for:

- LOCA containment peak pressure
- Post-LOCA containment pressure at 24 hours
- MSLB peak containment pressure
- MSLB peak containment temperature

The limiting LOCA for containment peak pressure was determined to be the double ended hot leg slot break. The peak pressure for the hot leg break occurs near the end of the blowdown phase, which is prior to the start of safety injection flow, start of CFC operation, and start of containment spray flow into the containment. The calculated peak containment pressure was 35.2 psig, which is well below the containment design pressure of 44 psig. The current Updated Final Safety Analysis Report (UFSAR) Chapter 15 analysis had determined that the double ended suction leg slot break with minimum safety injection flow assumption was the limiting LOCA for containment peak pressure with pressure of 43.1 psig that occurs during reflood. The difference between the new and old results is due primarily to the new mass and energy data, which shows a lower mass and energy into containment during the reflood time period. The limiting LOCA for containment pressure at 24 hours was determined to be the double ended discharge leg slot break with minimum safety injection flow assumption. The peak containment pressure for this case was calculated to be 33.27 psig. Thus, the containment pressure at 24 hours must be reduced to less than half the containment peak pressure or 16.64 psig. The containment pressure at 24 hours was calculated to be 15.5 psig, which is less than half the associated containment peak pressure. This

meets Acceptance Criteria II, Section b in the Standard Review Plan 6.2.1.1.A, “PWR Dry Containments, Including Sub-atmospheric Containments.”

The limiting MSLB event for containment peak pressure was determined to be a MSLB from 102 percent power with failure of one containment heat removal train consisting of one containment spray (CS) pump and one CFC operable. The calculated peak containment pressure was 42.68 psig, which is below the containment design pressure of 44 psig. The current UFSAR licensing analysis determined that the limiting MSLB event was a MSLB from 75 percent power with the failure of one train of containment heat removal system consisting of one CS train and two operable CFCs with a peak pressure of 42.9 psig. The limiting event for containment peak temperature was determined to be a MSLB from 102 percent power with failure of one main steam isolation valve to close. The calculated peak containment temperature was 397.4 °F, which is less than the current maximum allowed temperature of 413.5 °F.

PRA Considerations

In the Waterford 3 PRA model, CFCs provide cooling for the containment to prevent a long term overpressurization failure. Analyses were done to show that one fan cooler or one CS train was adequate to remove sufficient heat to prevent containment overpressure failure. The impact on containment failure probability due to one CFC being inoperable is negligible. The probability of failure for all containment cooling (both spray trains and all fan coolers) was calculated to be 1.9E-4. This is dominated by failures of common support systems, such as electrical power or component cooling water. These support system failures are not affected by the inoperability of one CFC. Cutsets with individual CFC failures that would be affected are below 1E-9 and therefore have only a negligible impact on containment failure probability. The impact of CFC failures on the core damage frequency during a LOCA (containment overpressurization failure resulting in rapid depressurization of the containment and cavitation of the operating safety injection recirculation) is extremely low, about 1E-11, and is also negligible.

4. The basis for the licensee's conclusion that the noncompliance will not be of potential detriment to the public health and safety and that neither an unreviewed safety question nor a significant hazard consideration is involved.

The proposed change reduces the number of CFCs from two to one required to be operable in each train of the containment cooling system (CCS) for Modes 1, 2, 3, and 4. This change does not create any new system interactions and has no impact on operation or function of any system or equipment in a way that could cause an accident. The CFCs are not an initiator of any events, nor do they affect any accident initiators of any events analyzed in Chapter 15 of the UFSAR. Therefore this change will not impact the probability of occurrence of an accident. The results of the reanalysis of the limiting LOCA and MSLB accidents show that the consequences of an accident previously evaluated are not increased by the change in the required number of operable CFCs.

This proposed change does not involve a change in plant design, nor does it involve any potential initiating events that would create any new or different kind of accident. This proposed change does not alter the way in which the plant is operated. Therefore, since no hardware modifications will be made, the proposed change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

This proposed change does not adversely impact a margin of safety, involve a change in plant design, or have any affect on the plant protective barriers. Therefore, the proposed change will not involve a significant reduction in the margin of safety.

Based on the above review, it is concluded that: (1) the operation of the plant with CFC “C” inoperable, does not constitute a significant hazards consideration as defined by 10 CFR 50.92; (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.

5. The basis for the licensee's conclusion that the noncompliance will not involve adverse consequences to the environment.

The requested enforcement discretion does not adversely affect normal operation of the unit and does not adversely affect any accident analysis results. Operation within the enforcement discretion will not involve any change in the types or amounts of effluents that may be released offsite and no increase in the individual or cumulative occupational radiation exposure. Therefore, this request for enforcement discretion does not involve any adverse environmental consequences.

6. Any proposed compensatory measure(s).

No long term compensatory actions are required. In response to the unexpected failure of CFC “C,” Entergy Operations, Inc. (Entergy) has determined that the failure is an isolated event. Continued operation with one fan cooler per train is acceptable from a safety standpoint. Investigation has determined that CFCs “A,” “B,” and “D” are currently operable and capable of fulfilling their intended safety function.

Additionally, TS Surveillance 4.6.1.5 states three temperature inputs from the four containment fan coolers shall be used to calculate the arithmetical average of containment temperature. The TS does not require operation of the associated fan. Procedure OP-903-001 requires that the inlet temperatures to the three running containment cooling fans be used to calculate the arithmetical average of containment temperature for TS Surveillance 4.6.1.5. Therefore, there are no compensatory actions required due to one fan being inoperable based on the procedural requirement to use the input from the three running fans.

7. The justification for the duration of the noncompliance.

   The duration for this NOED is until Waterford 3 TS Change Request NPF-38-224 is approved or an outage of sufficient duration occurs to accommodate repair of the CFC, which should be RF10 in the fall of 2000. The justification for the duration is the negligible risk significance of operating with only one fan cooler operable per CCS train as compared with the risk associated with potential undesirable transients as a result of complying with the current TS requirement to shutdown the plant.

8. A statement that the request has been approved by the facility organization that normally reviews safety issues (Plant Onsite Review Committee, or its equivalent).

   This request for enforcement discretion was reviewed by the Plant Operations Review Committee and approved by the General Manager, Plant Operations on April 26, 2000.

9. The request must specifically address how one of the NOED criteria for appropriate plant conditions specified in Section B is satisfied.

   This NOED is intended to avoid an undesirable transient as a result of forcing compliance with the TS as currently written and, thus, minimize potential safety consequences and operational risks. Without approval of this enforcement discretion, a plant shutdown will be required. A plant shutdown is a transient that places thermal stress on RCS components and increases the potential for plant upset that challenges safety systems.

10. If a follow-up license amendment is required, the NOED request must include marked-up TS pages showing the proposed TS changes. The actual license amendment request must follow within 48 hours.

    Entergy submitted a TS change request on October 18, 1999. This proposed TS change requested modification of TS 3.6.2.2 LCO to allow Waterford 3 to operate with two independent trains of containment cooling consisting of one fan cooler per train, operable during Modes 1, 2, 3, and 4. A copy of the marked-up TS pages was attached to this request for enforcement discretion.

11. For NOEDs involving severe weather or other natural events..., acceptability of any increased radiological risk to the public and the overall public benefit.

    There are no severe weather or other natural events associated with this NOED request.

On the basis of the staff's evaluation of your request, we have concluded that a NOED is warranted because we are clearly satisfied that this action involves minimal or no safety impact, is consistent with the enforcement policy and staff guidance, and has no adverse impact on public health and safety. Therefore, it is our intention to exercise discretion not to enforce compliance with TS 3.6.2.2 for the period from April 27, 2000, at 03:45 p.m. hours until issuance of a license amendment pursuant to your application dated October 18, 1999, or an outage of sufficient duration occurs to accommodate repair of CFC "C." The staff plans to complete its review and issue the license amendment within four weeks of the date of this letter.

As stated in the Enforcement Policy, action will be taken, to the extent that violations were involved, for the root cause that led to the noncompliance for which this NOED was necessary.

Sincerely,

/RA/

Stuart A. Richards, Director
Project Directorate IV and Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No.: 50-382

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