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QA

May 11, 1992

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-38-125

Gentlemen:

The attached description and safety analysis requests a change to the Waterford 3 Technical Specifications 3/4.3.2, Engineered Safety Features Actuation System Instrumentation, and 3/4.8.1, A.C. Sources-Operating. This request is submitted for your approval to resolve an issue raised during the Electrical Distribution System Functional Inspection, concerning the degraded voltage protection relay setpoint.

In order to meet our current commitment to resolve this issue before startup following refueling outage number 5, this change must be approved. Refuel 5 is currently scheduled to begin in September 1992, therefore, Entergy Operations Incorporated, respectively requests your timely review.

Should you have any questions or comments on this matter, please contact Paul Caropino at (504) 739-6692.

Very truly yours,

RPB/PLC/dc
Attachment: Affidavit
NPF-38-125
cc: R.D. Martin (NRC Region IV), D.L. Wigginton (NRC-NRR), R.B. McGehee, N.S. Reynolds, NRC Resident Inspectors Office, Administrator Radiation Protection Division (State of Louisiana), American Nuclear Insurers

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the matter of	)	
	)	
Entergy Operations, Incorporated	)	Docket No. 50-382
Waterford 3 Steam Electric Station	)	

AFFIDAVIT

R.P. Barkhurst, being duly sworn, hereby deposes and says that he is Vice President Operations - Waterford 3 of Entergy Operations, Incorporated; that he is duly authorized to sign and file with the Nuclear Regulatory Commission the attached Technical Specification Change Request NPF-38-125; that he is familiar with the content thereof; and that the matters set forth therein are true and correct to the best of his knowledge, information and belief.

R.P. Barkhurst
Vice President Operations - Waterford 3

STATE OF LOUISIANA)
) ss
PARISH OF ST. CHARLES)

Subscribed and sworn to before me, a Notary Public in and for the Parish and State above named this 11TH day of MAY, 1992.

Notary Public

My Commission expires WITH LIFE.

DESCRIPTION AND SAFETY ANALYSIS
OF PROPOSED CHANGE NPF-38-125

This change affects the specified values for the degraded voltage protection relays appearing in Table 3.3-4 item 6(c), Table 3.3-5 item 10. and the minimum voltage output for the Emergency Diesel Generator in surveillance requirement 4.8.1.1.2.

Existing Specifications

See Attachment A

Proposed Specifications

See Attachment B

Description

The following Technical Specification changes are proposed to improve the protection of the Class 1E electrical equipment from degraded voltage conditions.

1. In Specification 3/4.3.2, Table 3.3-4: Engineered Safety Features Actuation System Instrumentation Trip Values, the "trip value" and "allowable values" for the 4.16 KV Emergency Bus Undervoltage (Degraded Voltage) are being changed from ≥ 3640 volts and ≥ 3604 volts to ≥ 3875 volts and ≥ 3860 volts, respectively.

2. In Specification 3/4.3.2, Table 3.3-5: Engineered Safety Features Response Times, the 4.16 KV Emergency Bus Undervoltage (Degraded Voltage) "Response Time In Seconds" is being changed from ≤ 11 seconds to ≤ 14 seconds.

3. In Specification 3/4.8.1: A.C. Sources, the Emergency Diesel Generator minimum voltage of surveillance requirement 4.8.1.1.2 paragraphs a.4, d.1, d.3.b, d.4, d.5.b, and d.6 is being changed from 4160 ± 420 volts to 4160 + 420, -240 volts.

The above noted changes resulted from an issue raised during the Electrical Distribution System Functional Inspection (Inspection Report Violation 382/9023-01). The NRC, in reviewing protective relaying, concluded that, the Technical Specification "trip setpoint" and "allowable value" for the 4.16 KV bus degraded grid relays were too low to ensure proper operation of all Class 1E equipment (i.e., downstream loads) had the bus voltage degraded to a value slightly above the established setpoint. In addition, the NRC found that the existing G.E. NGV degraded voltage relay had excessive drift due to the adjustment potentiometer. In response to this concern Waterford 3 imposed interim corrective action in Standing Instruction 91-02. Additional corrective action involved installation of new solid state relays (i.e. during Refuel 5), conducting load flow and voltage drop analyses,

and selecting trip setpoints to accommodate operation of electrical equipment down to 120V level under varying grid conditions. For additional details concerning this item, see Waterford 3 submittal W3F1-91-0298 dated May 10, 1991.

The Technical Specification for the degraded voltage relay and timer setpoints provide for degraded voltage conditions to be recognized and corrected such that the safety-related loads do not experience voltages outside their ratings for any sustained period of time. When the normal offsite power supply to the 4.16 KV safety related bus(es) becomes degraded and voltage falls to an unacceptable level, the degraded voltage relays will separate the 4.16 KV safety related buses from the offsite electrical supply, start the diesel generators, and load the Engineered Safety Features equipment to the bus. The degraded voltage protection system time delay accommodates the voltage drops, resulting from starting motors, by blocking actuation of the degraded voltage protection system. If, during this time delay, the bus voltage recovers to a level above the degraded voltage protection system's reset setpoint the system will reset and no further action will ensue.

Branch Technical Position (BTP) PSB-1 "Adequacy of Station Electrical Distribution System Voltages," provides the criteria for determining adequate degraded voltage protection. Waterford 3 has conducted an engineering review and analysis of the Electrical Distribution System, which meets the intent of BTP PSB-1 in order to establish the technical specification trip setpoints and allowable values for the degraded voltage relays. The analysis also considered the information provided by NRC Information Notices 84-02, 89-83 and 91-29 which pertain to degraded voltage.

The new analysis established a technical specification "allowable value" of 3860V (92.8% of 4160) and a "trip value" of 3875V (93.1% of 4160V). The allowable value is based on the minimum voltage required by safety related equipment plus voltage compromised by equipment inaccuracy. The "trip value" is based on the "allowable value" plus the relay drift value.

The degraded voltage "Response Time In Seconds" in specification Table 3.3-5 is based on the relay timer setpoint. The degraded voltage relay timer setpoint is based on motor acceleration times. The analysis determined the maximum motor acceleration time to be 11.1 seconds. This value was subjected to the timer tolerance of ± 10% resulting in a value of 12.2 seconds. The 12.2 seconds value was rounded to 12.5 seconds for the nominal setpoint. The setpoint (12.5 seconds) was again subjected to the 10% tolerance to accommodate for potential positive drift resulting in 13.75 which was rounded to 14 seconds.
The analysis evaluated the impact on running motors at a voltage value slightly above the loss of voltage trip for the extended time delay to determine any detrimental effects and concluded that running motors would not stall and motor qualification would not be adversely impacted.

The revised setpoint and reset values of the degraded voltage relay impact technical specification surveillance requirement 4.8.1.1.2, which in part assures that the minimum voltage output of the Emergency Diesel Generator (EDG) is adequate. The current minimum voltage of 3740V will be changed to 3920V or 4160-240. This will ensure the degraded voltage relay will reset under the worst equipment drift and inaccuracy condition. It should be noted that the EDG primary and backup voltage regulators are capable of maintaining the output voltage to within .5% (i.e., 4160 +4180 -4140).

The Technical Specification changes identified above are supported by the new analysis and dependent upon several modifications to the Electrical Auxiliary System as briefly described below:

1) The Control Element Drive Mechanism (CEDM) fans presently do not trip upon initiation of an Safety Injection Actuation (SIAS) signal. The control logic will be changed to trip all four CEDM fans upon initiation of an SIAS signal. CEDM fans are nonsafety and credit is not taken for their availability during an accident. If the CEDM fan were not tripped, the degraded voltage setpoint would be higher and potentially subject the degraded voltage relay to inadvertent trips.

2) The three heater drain pumps will be tripped upon actuation of a generator lockout relay. The heater drain pumps are not required for safe shutdown. If the heater drain pumps were not tripped the degraded voltage relay would trip at a grid voltage slightly below the normal minimum voltage. Thus, tripping the heater drain pumps will allow the grid to degraded to a value well below the normal minimum grid voltage without tripping the degraded voltage relay.

3) The safety-related transformers for Power Distribution Panels 360/394-SA, 361/395-SB, 362-SAB, 3004-SA and 3005-SB will have their tap setting changed from center to -5%. This tap setting will improve the 120V system voltage to an acceptable value during a degraded voltage condition.

4) The present degraded voltage computer alarm will be modified to include an annunciator window which will alarm prior to tripping the degraded voltage relay. This annunciator will warn the operator of a potential trip due to degraded voltage and to avoid starting any motors.

5) The load on the power distribution panel 360-SA will be balanced to provide a uniform voltage drop at the 120V system. This will improve the 120V system voltage to an acceptable value during a degraded voltage condition.

6) The existing G.E. NGV electromechanical and agastat timing relays will be replaced with ABB 27N electronic relays. The existing G.E. NGV relay were found to have excessive drift due the calibration potentiometer. The new relays have a self test feature and a "target" to indicate the relay has tripped; a feature not present on the existing relay. The electronic relays are more accurate (± 0.1%) and will be set to reset at approximately 0.4% (15V) above setpoint.

7) To improve voltage at the starter coils and other auxiliary devices (120V relays, solenoids, etc.) some control cables will be paralleled or the existing control power transformer will be replaced with a larger transformer. This will improve the voltage at the starters and auxiliary device (relays, solenoids, etc.) to an acceptable value during a degraded voltage condition.

In addition, administrative controls will be placed on the following in support of information provided by NRC Information Notice No. 84-02, "Operating Nuclear Power Plant at Voltage Levels Lower Than Analyzed."

a. A minimum main generator voltage while supplying the auxiliary equipment from the unit auxiliary transformer

b. A minimum grid voltage will be required while synchronizing the emergency diesel generator with offsite power to ensure the degraded voltage alarm is not inadvertently actuated.

Safety Analysis

The proposed change described above shall be deemed to involve a significant hazards consideration if there is a positive finding in any of the following areas:

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

   Response: No

   The degraded voltage relay is used to assess whether adequate voltage is available to operate electrical class 1E equipment. If sufficient voltage is not available within a specified period of time the Class 1E and non-Class 1E buses will be separated which will result in the emergency diesel generator starting and loading. The proposed technical specification change will increase the voltage and timer setpoints of the degraded voltage relay to adequately protect all Class 1E electrical equipment at the 4.16 KV, 480V and 120V level.

Occurrence of a degraded voltage is not part of any limiting accident previously evaluated. Therefore, this change which modifies degraded voltage relay setpoints cannot change the consequences of any limiting accident.

A review of anticipated operational occurrences (AOO, moderate frequency and infrequent incidents) documented in Chapter 15 of the FSAR indicates that none of these incidents are affected by the degraded voltage relay delay time. Therefore, occurrence of a degraded voltage condition simultaneously with an AOO or during the course of an AOO will have no significant impact on the sequence of consequences of these events.

Replacement of the existing General Electric electromechanical NGV degraded voltage relays with the more accurate ABB Brown Bavari 27N Electronic relays will increase the reliability and will not affect any accidents previously evaluated. The replacement relays are Class 1E and will be able to withstand a seismic event as defined in the Final Safety Analysis Report (FSAR).

Power Distribution Panel (PDP) transformer tap setting will be changed to increase (improve) voltage of the 120V Class 1E voltage system during a degraded voltage condition. This increase in voltage will allow Class 1E equipment supplied from these PDPs to operate within their specified voltage range. Changing these transformer taps will optimize voltage levels and will have no impact on accidents previously evaluated.

Class 1E starter and auxiliary device (i.e. relays, solenoids, etc.) control circuits will be modified (i.e. parallel conductors/replace control transformer) to improve the voltage at the 1E device to allow pickup during a degraded voltage condition. Changing these control circuits will have no impact on accidents previously evaluated.

Balancing the load on the power distribution panel 360-SA to provide uniform voltage at the 120V system will have no impact on accidents previously evaluated.

Lastly, modification to the CEDM fan and heater drain pump control circuits will have no impact on postulated accidents, since this equipment is nonsafety.

The above proposed changes will have no negative impact on the reliability or performance of Class 1E equipment protected by the degraded voltage relays. Therefore, the proposed change will not involve a significant increase in the probability or consequences or any accident previously evaluated.

2. Will 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: No

   The proposed technical specification changes and the modifications noted above in Item #1 to support the proposed change are designed to improve the present protection of Class 1E electrical equipment during a degraded voltage condition. Improvement of the present protection scheme does not involve a change in the design of the degraded voltage function. The degraded voltage protection scheme will continue to use a 3 out of 3 logic to separate the Class 1E from the non-Class 1E electrical distribution system and to start and load the emergency diesel generator. Because the proposed amendment will not change the design, function or method of operation of Class 1E equipment at Waterford 3, it will not create the possibility of a new or different kind of accident from any previously evaluated.

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

   Response: No

   The proposed technical specification changes and the modifications noted above in Item #1 are designated to improve the present protection of Class 1E electrical equipment during a degraded voltage condition. These changes will have no adverse impact on protective boundaries or safety limits. Therefore, the proposed change will not involve a significant reduction in a margin of safety.

The Commission has provided guidance concerning the application of standards for determining whether a significant hazards consideration exists by providing certain examples (48 FR 14870) of amendments that are considered not likely to involve significant hazards considerations. The changes identified in this submittal closely match example (ii):

> (ii) A change that constitutes an additional limitation, restriction, or control not presently included in the technical specifications, (i.e., a more stringent surveillance requirement);

<u>Safety and Significant Hazards Determination</u>

Based on the above safety analysis, it is concluded that: (1) the proposed change does not constitute a significant hazards consideration as defined by 10 CFR 50.92; and (2) there is a reasonable assurance that the health and safety of the public will not be endangered by the proposed changes; 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.