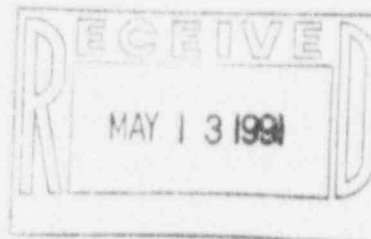




ENTERGY

ENCLOSURE 3



R. F. Burski

W3F1-91-0293
A4.05
QA

May 10, 1991

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
Waterford 3 Response to NRC
Inspection Report No. 50-382/90-23
[Notice of Violation (382/9023-01, -02)
and Notice of Deviation (382/9023-03)]

Gentlemen:

In accordance with 10CFR Part 2.201, Entergy Operations hereby submits the Waterford 3 responses to the two violations and one deviation in NRC Inspection Report 50-382/90-23.

We have included with this letter an Appendix A which provides a definition and status of the actions which Waterford 3 will implement to address each of the NRC follow-up items described in the inspection report.

We concur with the commitments described in the executive summary of the inspection report as clarified or defined in greater detail in the responses to the violations, deviation, and NRC follow-up items.

In response to the constructive feedback contained in the Electrical Distribution Functional Inspection (EDSFI) report and our ongoing efforts to enhance the engineering practices and programs to achieve engineering excellence, the following initiatives are highlighted:

1. Electrical Calculational Upgrade Program

In addition to upgrading specific calculations as a result of the EDSFI findings, Waterford 3 will implement a calculation upgrade program for electrical calculations. The objective of this program is to prioritize and thus accelerate the upgrade of safety related electrical calculations based on technical considerations. The program will review and assure the adequacy of the assumptions, methodologies, and results of the original

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calculations. Due to the significance of this endeavor and our desire to use in-house resources to the greatest extent possible, the electrical calculations update will be completed by June 30, 1993.

2. Design Modifications and Validation of Calculations

Waterford 3 will review and revise existing procedures to ensure they reflect the intent of the guidelines in NUREG-1397, "An Assessment of Design Control Practices and Design Reconstitution Program in the Nuclear Power Industry." Although the design basis document program at Waterford 3 reflects the intent of the guidelines of NUREG 1397, the program does not presently require that original calculations affected by modifications be validated. Thus, in the future, when Design Changes are performed, the original impacted calculations will be evaluated to ensure the adequacy of the assumptions, methodologies, and results. The review and the revision of procedures to institute this validation objective will be completed by October 31, 1991.

3. Assessment of Design Engineering Programs

A comprehensive self critical assessment of Design Engineering programs is necessary to ensure that our engineering initiatives are properly focused and are of sufficient breadth. Toward this end, an experienced multidiscipline team of engineers from Arkansas Nuclear One, Grand Gulf Nuclear Station, and Waterford 3 will be identified to perform a design engineering assessment. We anticipate the assessment will be completed by July 31, 1991 with recommendations and action plans finalized by August 31, 1991.

4. Training of Design Engineering Staff

Additional emphasis will be placed on the following training curriculum in order to enhance the capabilities of the Design Engineering staff.

- a. Ongoing enhancement training programs will include root cause analysis and human performance training. It is our goal to have appropriate personnel complete this training by June 30, 1993.
- b. Calculation performance and upgrade training in accordance with NUREG 1397.
- c. Set point methodology training.
- d. Ongoing systems training for engineering personnel.
- e. DBD use training in accordance with NUREG 1397.

The lesson plans and the initial training of appropriate personnel for items b, c, and e will be completed by October 31, 1991.

May 10, 1991

5. In-House SSFI Audit

Waterford 3 will continue the present program for performing in-house SSFI audits to validate the DBF process. The next SSFI which is for the Chemical and Volume Control System will be completed by July 31, 1992.

6. Technical Specification Surveillance Procedure Upgrade

A review of all Technical Specification related electrical distribution setpoints will be performed by design engineering to ensure that long term drift is properly accounted for. Based on the results of that review, the appropriate procedures will be revised to incorporate the new setpoints. The setpoints will be reviewed and any necessary procedure revisions will be completed prior to startup following refuel 5.

Additionally, existing plant procedures will be upgraded so that "as-found" results of technical specification surveillance tests are adequately reviewed. This procedure enhancement will ensure that abnormal drift rates are identified and corrective actions taken in a timely manner. The necessary procedure revisions will be completed prior to startup following refuel 5.

7. Self Assessment of Vendor Equipment and Technical Information Program

Waterford 3 will perform a self assessment of the Vendor Equipment and Technical Information program to look for generic problems when incorporating this information into procedures. This assessment will involve a sampling of vendor manuals to identify procedural requirements and then to match these requirements to procedures that are in place. The Operations Support and Assessments Group will perform this assessment by December 31, 1991.

Initiatives 1, 2, 6 and 7 are also restated in the responses to the two violations.

We appreciated the opportunity to meet with the NRC on April 30, 1991 to discuss the EDSFI inspection. We believe our discussions have provided a better mutual understanding of our efforts to enhance engineering practices and programs.

Please contact me or Robert J. Murillo should there be any questions regarding this letter.

Very truly yours,


RFB/RJM/dc

cc: Messrs. R.D. Martin, NRC Region IV, D.L. Wigginton, NRC-NRR, E.L. Blake,
R.B. McGehee, N.S. Reynolds, NRC Resident Inspectors Office

REPLY TO A NOTICE OF VIOLATION
ELECTRICAL DISTRIBUTION SYSTEM FUNCTIONAL INSPECTION

VIOLATION NO. 382/9023-01

Failure to verify or to check the adequacy of design

Criterion III of Appendix B to 10 CFR Part 50, requires that design control measures be established for verifying or checking the adequacy of design, and for assuring that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions.

Contrary to the above, the following are examples whereby the licensee's established measures failed to verify or to check the adequacy of design.

- a. Degraded grid (undervoltage) relay setpoint calculations did not analyze for the potential of undervoltage conditions on Class 1E loads at all onsite electrical system distribution levels. Consequently, the existing 4.16kV ac undervoltage protective relays were set at a trip setpoint which would have resulted in inoperable downstream 120V ac safety-related equipment should an untripped degraded voltage condition exist.
- b. Design Change Package DCP-3080, which changed loads to Power Distribution Panel PDP 390SA, "Static Uninterruptible Power Supply (SUPS) 3A-S," failed to verify or to check Design Calculation EE-7-39-02, "Load Study for PDP-390SA," Revision 3, during the modification change process in 1989. As a result, calculation errors and nonconservative assumptions were not addressed (e.g., failure to consider an appropriate power factor and load factor for 120 volt ac loads).
- c. The function of the protective shutdown circuits associated with safety-related inverters SUPS 3A-S and SUPS 3B-S was not adequately considered in verifying design considerations. As such, the potential existed for the safety inverters to shutdown prematurely when the associated batteries reached a minimum operating voltage band.

This is a Severity Level IV violation. (382/9023-01)(Supplement I)

REPLY TO A NOTICE OF VIOLATION
ELECTRICAL DISTRIBUTION SYSTEM FUNCTIONAL INSPECTION
(CONTINUED)

WATERFORD 3 RESPONSE

Waterford 3 accepts the violation. The violation was predicated on three examples; 1.a, 1.b, and 1.c. The reason, corrective steps taken, corrective steps to be taken, and date when full compliance will be achieved are discussed separately for each example.

1.a Degraded grid (undervoltage relay setpoint calculation)

Reason for violation:

The reason for this violation is failure to properly interpret the provisions of Branch Technical Position (BTP) PSB-1, "Adequacy of Station Electrical Distribution System Voltages," July, 1981. The NRC has recently provided additional clarification for BTP PSB-1 in NRC Information Notice 91-29, "Deficiencies Identified During Electrical Distribution System Functional Inspections," dated April 15, 1991.

This issue, addressed in Branch Technical Position (BTP) PSB-1 is based on events at Millstone and Arkansas Nuclear One. As described in BTP PSB-1, the events at Millstone showed that adverse effects on the Class 1E could be caused by sustained low grid voltage conditions when the Class 1E buses are connected to offsite power. BTP PSB-1 specified that low voltage conditions would not be detected by loss of voltage relays (loss of offsite power) whose low voltage pickup setting is generally in the range of 0.7 per unit voltage or less. BTP PSB-1 further stated that the Millstone events determined that improper voltage protection logic could itself cause adverse effects on the Class 1E system and equipment, such as spurious load shedding of Class 1E loads from the standby diesel generators and spurious separation of Class 1E systems from offsite power due to normal motor starting transients. The events were centered around 480V motor control centers and motor contactors dropping out.

The Waterford 3 undervoltage (UV) relay setpoints were selected by the architect-engineer based on the understanding of events related to BTP PSB-1. Specifically, BTP PSB-1 was understood to require an undervoltage scheme to detect loss of offsite power at the Class 1E buses and a second level of undervoltage protection with time delay to protect Class 1E equipment at the 4160V and 480V during degraded grid conditions. This understanding for undervoltage protection for Class 1E equipment at the 4160 and 480 volt level was documented during the licensing stage of Waterford 3 in the response to question 040.132. The voltage levels anticipated at the 4160V and 480V buses and the UV relay setpoints were also delineated in the response to question 040.132.

As a self initiated effort, a Safety System Functional Inspection (SSFI) type technical review of Design Basis Document W3-DBD-002, Emergency Diesel Generator, was performed by a contractor and Waterford 3 personnel. The review began on September 29, 1990, and was completed on October 19, 1990. Observation EE-05, Revision 1, dated October 18, 1990, identified the lack of a basis and need

REPLY TO A NOTICE OF VIOLATION
ELECTRICAL DISTRIBUTION SYSTEM FUNCTIONAL INSPECTION
(CONTINUED)

for analysis for a degraded voltage condition. At the onset of the EDSFI, Waterford 3 Design Engineering was in the process of reviewing the basis of the UV relays in response to the EDG SSFI. Preliminary conclusions based on the interpretation of BTP PSB-1 indicated that the requirements of BTP PSB-1 for protection of rotating equipment were adequately addressed. Waterford 3 did not interpret the intent of BTP to protect and permit operation of devices at 120V level.

The offsite power system is the preferred and the most reliable source of power for nuclear plant safety systems. Plants remain connected to the preferred source for as long as possible. The UV relays should therefore delay actuation until sustained degraded voltage conditions are detected. If the design of the electrical distribution system is such that the 120V device operation dictates the trip setting of the 4160 UV relays, then the resultant relay set points may be so high that minor grid perturbations can result in loss of offsite power to the plant. This is in conflict with the preferred design concept. The current UV relay settings at Waterford 3 were optimized to permit operation and safe shutdown of the plant using offsite power for maximum duration while protecting 4160V and 480V equipment. The "fail safe" mode of devices at 120V level supports this design. However, if some devices, at 120V AC buses, require remote actuation, then their operation may not be assured. This would thus be contrary to the NRC interpretation of BTP PSB-1 as discussed in Information Notice 91-29.

Corrective steps taken and results achieved:

On January 21, 1991, Condition Identification (CI) No. 273370, was generated to address the degraded voltage issue. CI No. 273370 included an engineering evaluation of the issues related to degraded voltage conditions. The evaluation established the following:

- a. The 230 kV system will not degrade to the postulated levels when Waterford 3 is operational and supplying power to the grid. The second level undervoltage relays, GE type, NGV relays would not be challenged when the unit auxiliary transformers are supplying power to the 1E buses.
- b. If the 1E buses are powered from the startup transformers, the 4160 V voltage degrades to a level slightly above the trip setting and an accident is postulated resulting in the starting of a large motor (for example HPSI or LPSI) the bus voltage would dip to actuate the NGV relays. The relays would not reset if the system voltage did not recover to approximately 93% within 10 seconds. In this event, the NGV relays would isolate the 1E buses from the offsite power source and provide the start signal for the EDGs to restore the buses to normal voltage.
- c. If the 1E buses are powered from the startup transformers, an accident is in progress, and the grid starts to degrade to a level above the trip setpoint of the relays, then the 4160V and 480V motors would continue to operate. The

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(CONTINUED)

equipment at the 120V level is expected to fail safe. However, if remote actuation (energization) of some devices is needed, then their operation cannot be assured at the calculated voltage levels.

In order to preclude the condition identified in item c. and as an operational precautionary measure, standing instruction 91-02 was issued on January 23, 1991 to monitor the grid voltage for degraded conditions. The standing instruction provides for conditions when the grid decays to 223 KV or less. For this scenario, operations personnel are required to:

1. If critical, trip the reactor.
2. Start both emergency diesels.
3. After confirming satisfactory voltage and frequency of EDGs, separate the 1E and non-1E buses by opening the tie breakers at the 4160 volt level.
4. Allow the EDGs to carry the safety related loads until grid conditions improve and the EDGs can be systematically shutdown.

Corrective steps that will be taken to avoid further violations:

Load flow and voltage drop analyses are in progress to establish the optimum operating voltages for all safety related buses. New solid state undervoltage relays are being considered in accordance with the provisions of BTP-PSB-1, IEN 89-83, and IEN 84-02. The relay trip setpoints shall be selected to accommodate the operation of equipment at the 120V level under varying grid conditions.

Date when full compliance will be achieved:

The analyses and any changes in the setting of existing relays, or the installation of new relays, shall be completed before startup following the refuel 5 outage.

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ELECTRICAL DISTRIBUTION SYSTEM FUNCTIONAL INSPECTION
(CONTINUED)

1.b Failure to verify and check a design calculation EE-7-39-02 associated with Design Change Package DCP-3080.

Reason for violation:

The reason for the violation is the failure to have explicit procedural controls in place which required the adequacy of the assumptions, methodologies, and results of calculations to be validated when plant modifications are performed.

The design change which necessitated a revision to calculation EE-7-39-02 was implemented by Design Change Package (DCP) 3080. In accordance with NOECP-309, "Design Inputs," Conceptual Design Change (CDC) 3080, in the "Affected Document List," specifically identified calculations EE-7-39-02 and EE-7-39-03 as affected documents. Calculations EE-7-39-02R3 and EE-7-39-03R3 were approved on August 21, 1989 and incorporated the appropriate loads to reflect the design change. The design change process was therefore in essence properly implemented to the extent that design inputs were identified and changed. However, the bases for using the existing numerical values for load and diversity factors were not provided.

Calculations EE-7-39-02R3 and EE-7-39-03R3 numerically determined the size of the loads on PDP-390-SA and PDP-391-SB, respectively. These calculations indicated that the total connected loads were marginally greater than the rated capacity of the power supplies for the panels. However, with diversity and power factors of 0.8 and 1.0 respectively, the calculations established the running loads to be less than the ratings of the power supplies, and the panels were thus considered adequately sized.

Corrective steps taken and results achieved:

Calculations EE-7-39-02R3 and EE-7-39-03R3 have been reevaluated to confirm that the simultaneous energization of all connected loads would not overload PDP-390-SA and PDP-391-SB nor the power supplies SUPS 3A-S and 3B-S. The calculations are currently in the approval process. Calculations EE-7-39-02R3 and EE-7-39-03R3 used best estimate conservative values for loads, based on published data or engineering judgment. The reevaluation used actual load data for equipment. The evaluation established that the SUPS are loaded at 50 % of their capacity rating.

As a result of our ongoing evaluation efforts, various other findings were established regarding the assumptions, bases, or methodologies for various calculations or studies. Waterford 3 has documented these findings internally in order to assure the calculations are evaluated or revised in accordance with a specified schedule.

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(CONTINUED)

Corrective steps taken to avoid further violations:

Waterford 3 will implement a calculation upgrade program for electrical calculations. The objective of this program is to prioritize and thus accelerate the update of electrical safety related calculations based on technical considerations. The program will review and assure the adequacy of the assumptions, methodologies, and results of the original calculations. This program for electrical calculations will be completed by June 30, 1993.

Waterford 3 will review and revise existing procedures to ensure they reflect the intent of the guidelines in NUREG 1397, "An Assessment of Design Control Practices and Design Reconstitution Program in the Nuclear Power Industry". Although the design basis document program at Waterford 3 reflects the intent of the guidelines of NUREG-1397, the program does not presently require that original calculations affected by Design Changes be validated. Thus, in the future, when design changes are performed, the original impacted calculations will be evaluated to ensure the adequacy of the assumptions, methodologies, and results. The review and the revision of procedures to institute this validation objective will be completed by October 31, 1991.

Date when full compliance will be achieved:

Waterford 3 will be in full compliance with this example of the violation by June 30, 1993.

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ELECTRICAL DISTRIBUTION SYSTEM FUNCTIONAL INSPECTION
(CONTINUED)

1.c Failure to evaluate shutdown of inverter on low DC input.

Reason for violation:

The reason for the violation is failure to exercise proper control over the original design to the extent there was no evaluation of the feeder cable impedance and its impact on the trip setpoint of the inverter and final battery discharge.

The Waterford 3 DC system was originally designed for a maximum voltage of 140V (battery equalization) and a minimum voltage of 105V for the final discharge level. The specification for the 3A and 3B static uninterruptible power supplies (SUPS) delineates this voltage range for the Waterford 3 DC system. The manufacturer of the SUPS considered 105V as the minimum DC input voltage and provided protective circuits to shutdown the inverter when this input voltage falls below 105V DC. This design concept does not allow for any voltage drop in the feeder between the battery and the SUPS. During loss of all ac power to the SUPS, the battery supplies the inverter. As the battery approaches the allowable discharge limit, the voltage at the SUPS input terminals will reach 105 volts a few minutes prior to the battery reaching 105V leading to inverter shutdown.

Corrective steps that have been taken and results achieved:

At Waterford 3, the 3A-S and 3B-S SUPS are normally powered from the offsite AC source. Upon loss of off-site power, the onsite emergency diesel generators power the SUPS within 27 seconds. If a single failure is postulated (e.g. loss of one diesel or one DC bus or one SUPS) simultaneously with loss of off-site power, then the redundant train is available for plant shutdown. The Waterford 3 batteries are therefore required to power the SUPS for 27 seconds only. During these 27 seconds the trip set point of the SUPS is not a concern.

If an additional failure (over and above the design requirements) of the rectifiers associated with the SUPS is postulated, then the battery is required to power the inverter for 27 seconds until two 100% battery chargers are sequenced on the emergency diesel generators.

During these 27 seconds the trip set point of the SUPS is not a concern for plant safe shutdown. Thus, for safe shutdown concerns not related to the station blackout issue, the Waterford 3 batteries are required to power DC loads for a maximum of 27 seconds until the chargers are sequenced on to the diesel generators.

The FSAR depicts a one hour battery profile for loss of all AC to one shutdown train to demonstrate the battery capacity. This is not the profile for plant shutdown for accident analyses documented in Chapter 15 of the FSAR.

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(CONTINUED)

During the EDSFI audit, the NRC requested technical substantiation that the SUPS would not shut down at the end of the one hour FSAR battery capacity profile. Draft calculations were performed using current procedures, conservative battery room temperatures, and end of life battery capacities. Various scenarios were evaluated to demonstrate that for the extreme case of loss of AC power to the SUPS and battery chargers, the battery load profile did not shut down the SUPS at the end of one hour. This is beyond the 27 second requirement for the battery to supply the IE loads.

The above analyses demonstrated that there was no immediate safe shutdown concern.

Corrective steps that will be taken to avoid further deviations:

An engineering team has been formed to update electrical calculations and design criteria for this specific concern. The design features of all safety related SUPS will be analyzed for design bases, normal plant operation, and safe shutdown requirements. For the 3A-S and 3B-S SUPS, the following actions will be implemented:

- i) Evaluate the requirements for the trip setpoint
- ii) Consider lowering the trip set point to a value below 105V DC
- iii) Document all conclusions

The analyses for the trip setpoint requirements and comparison of design bases shall be completed by December 31, 1991. Should hardware modifications be required, they shall be completed prior to startup following refuel 5.

Date when full compliance will be achieved:

Waterford 3 will be in full compliance with this example of the violation prior to startup following refuel 5.

REPLY TO A NOTICE OF VIOLATION
ELECTRICAL DISTRIBUTION SYSTEM FUNCTIONAL INSPECTION
(CONTINUED)

VIOLATION NO. 382/9023-02

Failure to establish, follow, and maintain procedures appropriate to the circumstances

Technical Specification 6.8.1 requires, "...written procedures be established, implemented, and maintained..." covering a list of activities including the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, November 1972. Appendix A to Regulatory Guide 1.33, November 1972, listed typical safety-related activities such as the calibration, testing, and adjustment of equipment that provide interlock permissive or prohibit functions.

Contrary to the above, the licensee failed to establish procedures appropriate for calibration of critical safety-related equipment and/or failed to maintain certain safety-related procedures. The following examples apply:

- a. Surveillance Procedure ME-003-319, "GE Undervoltage Relay Model 12NGV13B," Revision 4, directed setting the relays' setpoints at the Technical Specification value without adequate consideration of tolerances or potential drift. Furthermore, the procedure did not provide adequate guidance for engineering review responsibilities should the relays be found outside the acceptance band.
- b. Surveillance Procedures ME-004-131 and ME-003-327, "4.16kV GE Magne-Blast Breakers," did not incorporate applicable maintenance checks for the tertiary contacts as specified in the vendor's maintenance manual.
- c. The licensee had failed to establish appropriate procedures for a formalized fuse control program to ensure configuration management as related to fuses used in safety-related applications. Recent fusing problems experienced in the Process Analog Cabinet OP26 indicated that the licensee could not establish that the existing configuration was identical or equivalent to the initial plant licensing configuration.
- d. Maintenance Procedures ME-004-175, "Uninterruptible Power Supply 3A-S and 3B-S," Revision 3, and ME-004-172, "Static Uninterruptible Power Supplies 3MA-S, 3MB-S, 3MC-S, and 3MD-S," Revision 4, did not incorporate testing requirements specified in the applicable vendor technical manuals.
- e. Procedure UNT-001-003, "Procedure Initiation, Review and Approval; Change and Revision; and Deletion," Revision 13, required a biennial review of

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(CONTINUED)

plant procedures. During the inspection, Procedure OP-6-001, "Operating Procedure Plant Distribution (7kV, 4kV and safe shutdown) Systems," was found to be beyond the required 2-year review requirement. Specifically, the procedure review period was from 1988 through 1990 with a late date of October 28, 1990.

This is a Severity Level IV violation. (382-9023-02)(Supplement I)

REPLY TO A NOTICE OF VIOLATION
ELECTRICAL DISTRIBUTION SYSTEM FUNCTIONAL INSPECTION
(CONTINUED)

WATERFORD 3 RESPONSE

The violation was predicated on five examples; 2.a, 2.b, 2.c, 2.d and 2.e. Waterford 3 accepts the violation, except for example 2.d. The reason, corrective steps taken, corrective steps to be taken, and the date when full compliance will be achieved are discussed separately for examples 2.a, 2.b, 2.c, and 2.e. The basis for denial is provided for example 2.d.

2.a Surveillance Procedure ME-003-319, "GE Undervoltage Relay 12NGV13B"

Reason for violation:

The root cause of this specific example was a lack of awareness by personnel involved with the electrical distribution system of the importance of long term drift and measurement uncertainties.

Waterford 3 has six GE NGV undervoltage relays for the protection of rotating equipment during sustained degraded voltage conditions. The relay settings are calibrated at 18 month intervals in accordance with procedure ME-3-319. The equipment and technique used in that procedure results in a +/- 1% accuracy. The procedure requires only that the relay setting be left at anywhere from 104 to 105 volts. If it is assumed that the 1% measurement accuracy is applied in the negative direction, the relay could potentially be set at 103 volts. While this value (103 volts) is acceptable, no further negative drift could be tolerated.

Corrective actions taken and results achieved:

Procedure ME-3-319 was changed on January 24, 1991 to ensure that the relay is actually set to 105 volts during the calibration, regardless of the as found value. All six NGV relays were then calibrated using the changed procedure.

A review of surveillance results since 1985 shows that in 2 out of 24 calibrations the setpoints were found to have drifted below the allowable value in the Technical Specification 3.3.2, Table 3.3-4.6. On January 25, 1991 an engineering evaluation was performed and documented to establish that the settings of the NGV relays outside the Technical Specifications did not challenge the safe shutdown capability of Waterford 3. The basis for that evaluation is summarized in the response to example 1.a of violation 382/9023-01.

REPLY TO A NOTICE OF VIOLATION
ELECTRICAL DISTRIBUTION SYSTEM FUNCTIONAL INSPECTION
(CONTINUED)

WATERFORD 3 RESPONSE

The violation was predicated on five examples; 2.a, 2.b, 2.c, 2.d and 2.e. Waterford 3 accepts the violation, except for example 2.d. The reason, corrective steps taken, corrective steps to be taken, and the date when full compliance will be achieved are discussed separately for examples 2.a, 2.b, 2.c. and 2.e. The basis for denial is provided for example 2.d.

2.a Surveillance Procedure ME-003-319, "GE Undervoltage Relay 12NGV13B"

Reason for violation:

The root cause of this specific example was a lack of awareness by personnel involved with the electrical distribution system of the importance of long term drift and measurement uncertainties.

Waterford 3 has six GE NGV undervoltage relays for the protection of rotating equipment during sustained degraded voltage conditions. The relay settings are calibrated at 18 month intervals in accordance with procedure ME-3-319. The equipment and technique used in that procedure results in a $\pm 1\%$ accuracy. The procedure requires only that the relay setting be left at anywhere from 104 to 105 volts. If it is assumed that the 1% measurement accuracy is applied in the negative direction, the relay could potentially be set at 103 volts. While this value (103 volts) is acceptable, no further negative drift could be tolerated.

Corrective actions taken and results achieved:

Procedure ME-3-319 was changed on January 24, 1991 to ensure that the relay is actually set to 105 volts during the calibration, regardless of the as found value. All six NGV relays were then calibrated using the changed procedure.

A review of surveillance results since 1985 shows that in 2 out of 24 calibrations the setpoints were found to have drifted below the allowable value in the Technical Specification 3.3.2, Table 3.3-4.6. On January 25, 1991 an engineering evaluation was performed and documented to establish that the settings of the NGV relays outside the Technical Specifications did not challenge the safe shutdown capability of Waterford 3. The basis for that evaluation is summarized in the response to example 1.a of violation 382/9023-01.

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ELECTRICAL DISTRIBUTION SYSTEM FUNCTIONAL INSPECTION
(CONTINUED)

An analysis was performed of all of the previous calibration results of each of the six NGV undervoltage relays to determine if any adverse trending patterns existed. The baseline for the analysis was picked to be October of 1985 since a new type of test equipment was first used at that time. It was established that no specific drift pattern existed. All relays except 3A12Y have negligible drift either in the upward or downward direction. Relay 3A12Y had drifted downward a total of -1.92% during the trending period but has shown negligible drift in the last six months. That relay will be tested again in June of 1991 and if excessive drift exists, it will be replaced.

Corrective steps to avoid further violations

A review of all Technical Specification related electrical distribution setpoints will be performed by design engineering to ensure that long term drift is properly accounted for. Based on the results of that review, the appropriate procedures will be revised to incorporate the new setpoints. The setpoints will be reviewed and any necessary procedure revisions will be completed prior to startup following refuel 5.

Additionally, existing plant procedures will be upgraded so that "as-found" results of Technical Specification surveillance tests are adequately reviewed. This procedure enhancement will ensure that abnormal drift rates are identified and corrective actions are taken in a timely manner. The necessary procedure revisions will be completed prior to startup following refuel 5.

Date when full compliance will be achieved:

Waterford 3 will be in full compliance with this example of the violation prior to startup following refuel 5.

REPLY TO A NOTICE OF VIOLATION
ELECTRICAL DISTRIBUTION SYSTEM FUNCTIONAL INSPECTION
(CONTINUED)

2.b Maintenance Checks for Tertiary Contacts

Reason for violation:

The reason for the violation is over reliance on self knowledge by personnel who prepared the maintenance procedures and failure to translate general information in the vendor manual into specific maintenance instructions.

The vendor manuals general maintenance instructions for General Electric magnet blast circuit type AM-4.16-350-2 requires that silver plated contacts be wiped clean and lubricated during each maintenance period. The vendor manual does not specify by name which contacts are silver plated. Maintenance procedures, ME-004-131 and ME-003-327, require that the primary, stationary and moveable, contacts to be wiped clean and lubricated. The primary and tertiary contacts are silver plated, and their moveable contacts are mounted on the same contact arm in close proximity to each other. The vendor manual and field verification was used by technicians knowledgeable with the breakers to write these maintenance procedures. The maintenance procedures were written based on knowledge that the vendor instruction identified the primary, stationary and moveable, contacts as silver plated. The knowledge retained by the experienced technicians and the field verification lead to a conclusion that the silver plated contacts could be identified as primary, stationary and moveable, contacts. The implicit knowledge and logic applied was thus that by the tertiary contact being in close proximity to the primary contacts, the cleaning and lubrication would be done on both the primary and tertiary contacts without having to mention the tertiary contacts explicitly.

Maintenance personnel believe that maintenance has been performed on the tertiary contacts. However, since the maintenance records did not identify the tertiary contacts explicitly, documented evidence could not be provided validating that maintenance had been performed on the tertiary contacts.

Corrective action taken and results achieved:

Maintenance procedures ME-004-131 and ME-003-327 have been changed to explicitly identify the tertiary contacts as requiring maintenance. The corresponding record forms associated with ME-004-131 and ME-003-327 have been changed so that they will provide an explicit record that maintenance has been performed on the tertiary contacts.

REPLY TO A NOTICE OF VIOLATION
ELECTRICAL DISTRIBUTION SYSTEM FUNCTIONAL INSPECTION
(CONTINUED)

Corrective steps to avoid further violations:

Maintenance will review by August 31, 1991 the vendor's general maintenance instructions to identify other potential cases wherein vendor recommendations may be too generally stated. Should any such cases be identified, the appropriate maintenance procedures will be revised by December 31, 1991 to ensure maintenance procedures provide explicit instructions for requisite maintenance.

Waterford 3 will perform a self assessment of the Vendor Equipment and Technical Specification Information program to look for generic problems when incorporating this information into procedures. The assessment will involve a sampling of vendor manuals to identify procedural requirements and then to match these requirements to procedures that are in place. The Operations Support and Assessments Group will perform this assessment by December 31, 1991.

Date when full compliance will be achieved:

Waterford 3 will be in full compliance for this example of the violation by December 31, 1991.

REPLY TO A NOTICE OF VIOLATION
ELECTRICAL DISTRIBUTION SYSTEM FUNCTIONAL INSPECTION
(CONTINUED)

2.c Fuse Control Program

Reason for violation:

The reason for this violation is failure to establish procedures for the control of safety related fuses.

The NRC team inspected approximately 25 fuses in the 6.9 kv switchgear and the EDG control panels. Though none of these fuses were found to be improperly sized, there was not enough supporting documentation to verify other fuse characteristics. The NRC team also found that there was not a central listing of fuses for Waterford 3. The incident on October 31, 1990 where Waterford 3 found improperly sized fuses in the Process Analog Cabinet system further demonstrated the need for a formal fuse control program.

Corrective steps taken and results achieved:

A fuse control task force was initiated February 7, 1991. This task force will address the violation identified during the NRC inspection and review the practices relating to fuse control at Waterford 3. At this time, the task force has initiated the following:

- 1) Provide a group of safety related fuses for sampling during the refuel 4 outage.
- 2) Assigned responsibility for developing a fuse control interim procedure until long term solutions are formulated.

The results of both of the above actions will be available for review by June 30, 1991.

Corrective steps taken to avoid further violations:

The fuse control task force will select groups of fuses based on information access. These groups will also be sampled to determine the status of fuses in plant systems. This process will continue until selected groups of fuses will be centrally documented with a high degree of confidence. The task force will also look at the process of obtaining and using fuses at Waterford 3 and make recommendations to ensure that this high degree of confidence will be maintained. The fuse control task force will also develop a means to control fuse replacements when there is not an obvious like for like replacement.

The fuse control task force will make decisions on the issue of fuse control until there is an established program at Waterford 3.

REPLY TO A NOTICE OF VIOLATION
ELECTRICAL DISTRIBUTION SYSTEM FUNCTIONAL INSPECTION
(CONTINUED)

The following will be established by December 31, 1991:

- 1) Procedure(s) will be in place to control fuses from receipt to replacement.
- 2) The reviewed groups of fuses will be integrated into the Station Information Maintenance System with proper controls.

The remaining groups of fuses will be included in the program as information becomes available and sampling is complete.

At this time, estimates for completion of the identified groups are not available for the following reasons:

- 1) Research to determine design information may be extensive.
- 2) Plant status may inhibit our ability to do the sampling.

Date when full compliance will be achieved:

As we gain experience in the sampling process, we will provide to the NRC by December 31, 1991 a further assessment for completing the remaining groups.

REPLY TO A NOTICE OF VIOLATION
ELECTRICAL DISTRIBUTION SYSTEM FUNCTIONAL INSPECTION
(CONTINUED)

2.d Testing requirements specified by vendor technical manuals

Waterford 3 denies this example of the violation. Waterford 3 maintains that maintenance practices for the Elgar and Solid State Controls SUPS were in accordance with the vendor technical manuals. The basis for this position is the following:

The Elgar static uninterruptible power supply vendor manual (Section IV, Theory of Operation) discusses four automatic shutoff features: low dc voltage, overcurrent, blown fuse, and low logic supply voltage. This section of the vendor manual also provides instructions on how to adjust the shutoff setpoints for low dc voltage and overcurrent. There are no adjustments available for the blown fuse and low logic supply voltage shutoffs. A blown fuse will shutdown the inverter in two ways: 1) preclude dc voltage to the inverter, which is required to produce an ac voltage output, and 2) the inverter analog logic board will sense the blown fuse and shutdown the inverter controls. The blown fuse alarm and shutdown receive the same logic input, and the blown fuse alarm is tested by the maintenance procedure ME-004-175. As confirmed with the vendor via telecon on April 26, 1991, it is not feasible to field test the low logic supply voltage shutoff. Station Modification 148 tested the low dc voltage and overcurrent shutoffs. A vendor test engineer was also present during the acceptance test performed in accordance with station modification 148.

Section V, Maintenance, of the Elgar vendor manual states that preventive maintenance generally consists of only cleaning and inspection of the unit for obviously damaged parts or printed circuit boards. Section V makes no mention of functional tests for the alarm and shutoff features.

The Solid State Controls, Inc. (SCI) static uninterruptible power supply vendor manual and electrical schematics shows four automatic shutdowns: high dc rectifier voltage, off frequency, high ac volts, and low ac volts. Maintenance procedure ME-004-172, Revision 0, had provisions to test these shutdowns. The off frequency, high ac volts, and low ac volts shutdowns were defeated in the subsequent revisions of the maintenance procedure to prevent undue cycling of the circuit breakers that actually shut the inverter down.

Section 4, Maintenance and Troubleshooting Tips, of the SCI vendor manual states that SCI Static Inverters do not require planned maintenance or preventive maintenance.

Although the vendors do not specify periodic functional testing of the alarm or shutdown features, Waterford 3 does perform alarm testing for the Elgar SUPS and performs some form of functional testing of the SCI SUPS. A method will be established by engineering for enhancing the testing of the shutdown features, and the testing provisions will be incorporated in ME-4-172 and ME-4-175. The appropriate procedures will be revised prior to startup following refuel 5 to incorporate the functional testing for the shutdown features of the SUPS.

REPLY TO A NOTICE OF VIOLATION
ELECTRICAL DISTRIBUTION SYSTEM FUNCTIONAL INSPECTION
(CONTINUED)

2.e Biennial review of plant procedures

Reason for violation:

The reason for the violation is failure to adhere to procedural commitment to perform biennial review of procedures.

Technical Specification 5.8.1 requires that written procedures be established, implemented, and maintained covering the activities addressed by Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)", Revision 2, February 1978. Regulatory Guide 1.33 in turn endorses ANSI N18.7, "Quality Assurance Requirements for the Operational Phase of Nuclear Power Plants," 1976. Section 4.5 of ANSI N18.7 states that audits of selected aspects of operational phase activities shall be performed with a frequency

commensurate with their safety significance and in such a manner as to ensure that an audit of all safety-related functions is completed within a two year period. Waterford 3 has implemented various procedures in order to implement the biennial review commitment. UNT-001-003, "Procedure Initiation, Review and Approval; Change and Revision; and Deletion," is the procedure which implemented the biennial review commitment for OP-6-001, "Operating Procedure Plant Distribution (7kV, 4kV and safe shutdown)".

Corrective steps taken and results achieved:

As part of the Waterford 3 quality assurance process, various Quality Notices (QNs) including QN QA-91-050 were issued to document a condition adverse to quality when several procedures were found to exceed the biennial review schedule. OP-6-001 was one of the procedures that had been identified and included in Quality Notice QA-91-050 issued March 26, 1991. The biennial review was performed on OP-6-001, and the necessary changes were made and approved on April 27, 1991.

REPLY TO A NOTICE OF VIOLATION
ELECTRICAL DISTRIBUTION SYSTEM FUNCTIONAL INSPECTION
(CONTINUED)

Corrective steps that will be taken to avoid further violations:

The basis for the biennial review as discussed in ANSI N18.7, is to ensure procedures reflect new technical information as a result of plant modifications, plant industry incidents, and feedback from the users of procedures. Although several procedures have exceeded the biennial review schedule, a preliminary evaluation of the program in place at Waterford 3 indicates that controls are in place, above and beyond the commitment to perform biennial reviews, to ensure procedures are reviewed in accordance with the guidance provided in ANSI N18.7. The evaluation is continuing, and the results of the evaluation will be completed July 1, 1991.

Procedures which have passed the biennial review schedule and are identified by QNs will be reviewed and revised, as appropriate, by December 31, 1991.

Date when full compliance will be achieved

Waterford 3 will be in full compliance with this example of the violation by December 31, 1991.

RESPONSE TO REGULATORY GUIDE 1.97 DEVIATION
ELECTRICAL DISTRIBUTION SYSTEM FUNCTIONAL INSPECTION

NOTICE OF DEVIATION

Based on the results of an NRC inspection conducted during the period of December 4, 1990, through February 1, 1991, a deviation from your commitments to the provisions of Regulatory Guide 1.97, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following An Accident," was identified. In accordance with the "Generic Statement of Policy and Procedure for NRC Enforcement Actions," 10 CFR Part 2, Appendix C (1991)(Enforcement Policy), the deviation is listed below.

By letter to the NRC dated July 6, 1983, the licensee committed to comply with the provisions of Regulatory Guide 1.97, Revision 2, and provided a listing of instrumentation that would be used to meet those provisions. Included in that listing as Category 1 instruments were the pressurizer level indicators and recorders.

Regulatory guide 1.97, Category 1 instruments were designated as key variables for post accident monitoring of facility conditions. As such, the Category 1 instruments were required to be redundant or diverse and powered by station standby power sources backed up by battery supplies to prevent a loss of instrumentation during a loss of offsite power event.

In deviation to the above, Operating Procedure OP-902-005, "Loss of Offsite Power/Station Blackout Recovery Procedure," Revision 4, directed the removal of power to, among others, the pressurizer level recorders, during a loss of offsite power event (382/9023-03).

WATERFORD 3 RESPONSE:

The NRC from December 4, 1990 through February 1, 1991 conducted an electrical distribution functional inspection (EDSFI) of Waterford 3. Deviation 382/9023-03 was issued based on Operating Procedure OP-902-005 directing the removal of power to, among others, the pressurizer level recorder, during a loss of offsite power event concurrent with loss of one diesel; whereas by letter to the NRC dated July 6, 1983 Waterford 3 committed to monitor and record pressurizer level. Waterford 3 accepts the deviation.

The reasons for and the corrective actions for deviation 382/9023-03 substantially relate to issues identified during the Regulatory Guide 1.97 NRC inspection and documented in deviation 382/9023-03. Therefore, a substantial part of the following information is a restatement of the evaluation and corrective action specified by Waterford 3 in response to the Regulatory Guide 1.97 deviation.

As part of the regulatory guide 1.97 inspection conducted August 20-24, 1990 and the corresponding deviation 382/9016-01, the NRC identified a number of examples wherein Waterford 3 deviated from regulatory guide 1.97 commitments. As part of the evaluation performed by Waterford 3, several reasons were identified for the findings. In the response to deviation 382/9016-01, Waterford 3 letter W3P90-1514, the root cause was identified as poor licensee control of the initial R.G. 1.97 process. This resulted in R.G. 1.97 licensing basis documentation that was

nonexplicit and in some cases self-contradictory. Additionally, as identified by the NRC in the R.G. 1.97 inspection report, and concurred with by Waterford 3, there was a lack of operator familiarity and training with the requirements of R.G. 1.97. These very root causes are the reasons why deviation 382/9023-03 occurred.

The EDSFI inspection report discusses deviation 382/9023-03 in the context of the engineering response. The NRC makes the observation that procedures for shedding Regulatory Guide 1.97 instrumentation loads were developed without deference to the licensing commitment for R.G. 1.97. However, a review of the applicable records has determined that engineering provided appropriate engineering direction. PEIR 10682 R1 was the vehicle that provided direction to operations for stripping loads from OP-902-005. The PEIR clearly identified that circuit breaker RC-EBKR-MA-10, for pressurizer level, should be opened for station blackout. Operations applied the SBO guidance to the loss-of-offsite power section of OP-902-005 as a prudent and technically justifiable measure to preserve battery capacity.

Reasons for Deviation

The reasons for the deviation are: poor control of the initial R.G. 1.97 process, non-explicit and self contradictory R.G. 1.97 licensing basis documentation, and lack of W-3 personnel familiarity and training with the requirements of R.G. 1.97.

Corrective Steps That Have Been Taken and the Results Achieved

The following first two corrective steps were communicated to the NRC as part of the R.G. 1.97 inspection deviation response and apply to deviation 382/9023-03.

By letter dated February 28, 1991, Waterford 3 submitted to the NRC a report describing the implementation of Regulatory Guide 1.97, Revision 3. The report provides explicit and consistent information on a variable basis for determining the implementation of R.G. 1.97, Revision 3.

Procedure NOECP-309, Design Input, was revised. The procedural revision specifically identifies R.G. 1.97 as being a design document which should be reviewed when preparing a design change.

As previously discussed with NRC staff, temporary R.G. 1.97 labels have been placed on control panels until such time as permanent labels are installed.

Corrective Steps That Will be Taken to Avoid Further Deviations

The following are corrective steps that were communicated to the NRC as part of the R.G. 1.97 inspection deviation response and which apply to deviation 382/9023-03.

- The Post Accident Monitoring Equipment Labeling Program will be updated and maintained. The maintenance of this program will be ensured by having one accurate R.G. 1.97 list which uniquely identifies the instruments, and any additional plant changes will be required to have a review of R.G. 1.97 conducted in accordance with NOECP-309. DC-3283 will be implemented by December 31, 1991 and will verify and update the instrument labeling on the control panels.
- The FSAR will be revised by inserting a new table which will accurately reflect and uniquely identify R.G. 1.97 instrumentation and its availability for different scenarios, for example, station blackout. The Licensing Document Change Form (LDCR) to revise the FSAR will be approved by December 31, 1991.

The following are corrective steps that are supplemental to the corrective steps communicated to the NRC as part of the R.G. 1.97 inspection deviation response.

- The training department will revise appropriate lesson plans and train operators not only to identify R.G. 1.97 instrumentation but to assure that operations personnel maintain an awareness of R.G. 1.97 to an extent required to assure procedural changes are consistent with the licensing basis. This training will be an ongoing training, and the lesson plans and initial training will be completed by June 1, 1992.
- The engineering departments will develop lesson plans and train engineering personnel to achieve an awareness of the R.G. 1.97 and station blackout licensing basis. This training will be an ongoing training, and the lesson plans and initial training will be completed by June 1, 1992.

Date When Full Compliance Will be Achieved

The date for full compliance with this deviation will be June 1, 1992.

APPENDIX A

STATUS FOR INSPECTOR FOLLOW-UP ITEMS

1. Inspector Follow-up Item (382/9023-04),
Station Grounding Grid Adequacy

The grounding grid calculation is in the review process, and the calculation will be approved by June 30, 1991.

2. Inspector Follow-up Item (382/9023-05),
Review Calculations Concerning Replacement of
Batteries 3A-S, 3B-S, and 3AB-S

Inspector Follow-up Item (382/9023-06),
DC Short-Circuit Calculations

The battery charger calculations, battery charger specification, battery loading and short circuit calculations are in the review process. The calculations and specification will be approved by October 31, 1991. These calculations will address temperature requirements for the battery rooms. Any maintenance requirements for battery room temperatures will be developed from these calculations and implemented by October 31, 1991 rather than July 1991 as identified in the executive summary of the inspection report. A Licensing Document Change Request will be prepared and approved by November 31, 1991 to reflect the essential elements of the revised battery loading calculational information. The FSAR will be changed in accordance with the schedule specified in 10CFR50.71e. A new battery life will be evaluated and documented by October 31, 1991.

3. Inspector Follow-up Item (382/9023-07),
Uncontrolled Chain Hoists

As a result of an engineering walkdown, recommendations have been developed for the dismantling and storage of the various rigging assemblies in the plant. The recommendations were documented and issued by letter W3C5-91-0115 on April 30, 1991. The appropriate maintenance procedures will be revised by December 31, 1991 to reflect the recommendations. Design Specification LOU 1564.729 will be revised by October 31, 1991 via DRN C9101370 to require storage positions to be indicated on design drawings.

Appendix A

Status for Inspector Follow-up Items

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4. Inspector Follow-up Item (382/9023-08),
Review Licensee's Activities to Correct Station Battery Electrolyte and
EDG Mechanical System Inconsistencies

The basis for 0.005 deviation for battery electrolyte specific gravity is currently being evaluated. The basis for the 0.005 deviation will be established and documented by October 31, 1991. The documented evaluation will address the need to change the FSAR, including schedule. A technical specification request will be submitted to the NRC by January 31, 1992, should the evaluation establish a need to revise the technical specification.

The issue related to the testing of the EDG air receivers will not require a technical specification change, but rather will require a setpoint change. The evaluation to change the setpoint is in process and will be completed and documented by October 31, 1991. The documented evaluation will address the need to change the FSAR, including schedule.

A technical specification change request NPF-38-114 addressing the onsite emergency diesel generator (EDG) fuel oil storage requirement and EDG fuel oil transfer surveillance testing is in the review process and will be submitted to the NRC by May 17, 1991.