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Southern Nuclear Operating Company
the southern electric system

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U.S. Nuclear Regulatory Commission
ATTN.: Document Control Desk
Washington, DC 20555

Joseph M. Farley Nuclear Plant
Reply to Unresolved Items and Inspector Follow-up Items
Report Numbers 50-348/92-17 and 50-364/92-17
NRC Inspection of June 8 - July 10, 1992

Gentlemen:

This letter refers to the Unresolved Items and Inspector Follow-up Items identified in the subject inspection report. Attachment 1 provides the Southern Nuclear Operating Company (SNC) response to each item requested by the NRC.

Note that issues associated with Unresolved Items 5, 6, 7 and 8 and Inspector Follow-up Items 11 and 12 were under investigation by SNC prior to the EDSFI. In addition, significant efforts were underway toward resolution of these items.

If there are any questions, please advise.

Respectfully submitted,

J. D. Woodard

DPH:cht-92.2206

Attachments

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JE01

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Attachment 1
SNC Responses to NRC Issues
Farley Nuclear Plant
EDSFI-NRC Inspection 6/8/92 - 7/10/92

NRC Issue:

(1) Unresolved Item 348, 364/92-17-05, Degraded Grid voltage Relay Settings Specified by Technical Specifications are Inadequate.

Current calculations indicate that the degraded grid voltage relay settings (TS values) are inadequate to ensure sufficient voltage to all safety loads below the 600 V level. The licensee ensures acceptable voltage through administrative controls, with the offsite dispatch center having the primary responsibility. Licensee personnel indicated that a study was in progress to further address deficiencies in the current degraded grid relay settings. The licensee is requested to respond to this item providing its plans and schedule. (Section 2.2)

SNC Response

At the time of the design of the undervoltage protection system for FNP, the industry practice was that analyses were only performed down to the 600V system with the assumption that the 208V and 120V systems could be modeled as lumped loads on the 600V system. This analysis and the corresponding undervoltage relay setpoints were accepted through NRC review.

In recent years Southern Company Services (SCS) has developed a load study to evaluate the adequacy of voltage to safety related components at FNP. This evaluation employs computer methods not available at the time of original plant design and licensing. The most recent version of the updated analysis models the electrical system to a level of detail that includes the 208V and 120V systems. Analyses were in progress at the time of the EDSFI to evaluate the performance of components at the 208V and 120V level based on the anticipated voltage available at the degraded grid relay setpoint. The results indicate that some components on the 208V and 120V systems may receive less than the originally specified minimum voltages should the grid voltage drop to slightly above the degraded grid relay setpoint. All components on the 4160V and 600V systems receive acceptable voltage at the degraded grid relay setpoint.

To address the potential of plant operation under degraded grid conditions, FNP-1/2-AOP-5.2 was implemented. Per the procedure, plant operation with 4160V bus voltage less than the voltage corresponding to the minimum expected switchyard voltage is limited to one hour prior to initiation of an orderly shutdown. Analyses have been completed to demonstrate adequate voltage to all components, including the 120V level, at the minimum expected switchyard voltage. This procedure was in place at the time of the EDSFI and was reviewed by the NRC. The NRC concluded the administrative controls result in reliable offsite power. However, the NRC stated that "the automatic controls intended through the degraded voltage relay settings specified in the Technical Specifications were not fully provided."

Although the existing scheme for undervoltage protection does not provide automatic means to ensure sufficient voltage to some safety loads below the 600V level, it is the SNC position that the current procedural means of addressing potential undervoltage conditions are the preferred mechanism in terms of minimizing the challenge to plant safety systems and the system grid. Existing measures ensure plant safety is maintained while allowing a reasonable period of time to take measures to restore adequate system voltage and avoid separation from preferred power.

Although existing measures provide adequate protection for degraded grid conditions, the NRC expressed concern that degraded grid alarms exist only for system dispatchers and are not directly available for licensee personnel. As an enhancement, a control room annunciator will be installed for each unit to provide notification of degrading 4160V bus voltage. These modifications will be scheduled for the Unit 1 twelfth refueling outage (Spring 1994) and the Unit 2 ninth refueling outage (Fall 1993).

NRC Issue:

(2) Unresolved Item 348, 364/92-17-06, Lack of Coordination Calculation for 208 V Subsystems.

There was no calculation analyzing the coordination between the 600/208 VAC transformer primary protection and the protective devices for the 208 VAC motor control centers (MCCs). The team was particularly concerned that there could be miscoordination between transformer protection and protection for non-Class 1E loads fed from the MCCs. Faults stemming from the non-Class 1E loads in an accident could potentially cause both trains of 208 V Class 1E loads to be lost through a trip of the transformers. Licensee personnel argued against this concern on the basis that the cables and raceways used for both Class 1E and non-Class 1E loads were the same. The licensee is requested to provide its official position on this matter, including its plans and schedule for any analysis and hardware changes to be performed. (Section 2.4.1)

SNC Response

At FNP, the 208 volt MCC sections are fed from 600/208 V step down transformers. The primary of each transformer is protected by a 100 amp frame Molded Case Circuit Breaker (MCCB) which has a non-adjustable instantaneous magnetic trip. Individual loads on the 208 volt MCCs are protected by MCCBs which also have non-adjustable magnetic trip units. It is well known that protection coordination cannot be demonstrated for all fault levels when MCCBs are applied in a series configuration. However, in practical applications such coordination inherently exists. In addition, MCCBs are proven to provide coordination for overload currents and eliminate the potential for single phasing that is present when fuses are used.

In response to NRC concerns associated with protection coordination for non-Class 1E loads fed from safety related MCCs, the potential failure modes of the system have been reviewed. All the cables used for power circuits at FNP for the safety related loads were procured as Class 1E cables and are installed in a seismically supported raceway system. Any fault on the cable, breaker or on Class 1E equipment would be considered the single failure and could result in the loss of only one train. Therefore, only failures of non-Class 1E equipment need to be considered further.

The potential failure modes of the non-Class 1E devices can be categorized as open circuits, overloads and faulted conditions. These failure modes are addressed below.

Failure of a non-Class 1E device to operate due to an open circuit poses no adverse consequences for any associated Class 1E systems and has no impact on protection coordination.

Failure of a non-Class 1E device in an overload mode, such as would result from motor seizure, is the most likely scenario. Coordination of existing MCCBs has been successfully demonstrated in the overload range.

Failure of a non-Class 1E device in a manner producing a bolted fault is very uncommon. The minimum requirement for electrical equipment used in nuclear power plants is that it be commercial grade. Such equipment is designed to be inherently rugged both from a physical as well as an electrical basis. As a consequence, a bolted fault at the input terminals of such a device is extremely unlikely. This being the case, a bolted fault at more than one device simultaneously is not credible.

In addition to the inherent ruggedness and reliability of commercial grade equipment, there are no additional stresses placed on this equipment during or at the onset of a DBA. The equipment is not required to function to mitigate an accident. Consequently, there are no accident induced start signals which would activate the equipment simultaneously. Furthermore, the commercial grade equipment which is fed from the class 1E MCCs is all located in areas of the plant which are not subject to sprays or harsh environmental parameters as a result of the DBA. Since there are no unusual demands or operating conditions imposed on the equipment, there is no increased probability of failure of this equipment during a DBA. Based on the above, the occurrence of a bolted fault on a commercial grade component in conjunction with a single failure involving loss of the other train is extremely remote.

In practice the existing system is adequate to ensure plant safety. However, as a design enhancement a protection coordination study has been initiated to determine if postulated faults on non-class 1E equipment would produce current levels of sufficient magnitude to result in coordination overlaps. The preliminary results of the protection coordination st show

coordination exists in all cases except for MCCs 1F, 1G and 1L. Once the protection coordination study is finalized, design changes will be implemented to ensure that tripping of the 600V MCCB feeding the 600/208V step-down transformer will not be caused by non-safety related equipment overloads or faults at the equipment terminals. These PCNs will be scheduled for implementation in the next Unit 1 refueling outage (Spring 1994).

NRC Issue:

(3) Unresolved Item 348, 364/92-17-07, Auxiliary Building Battery Voltage is Marginal for Present Load Requirements.

Recent licensee calculations indicated that battery power to the auxiliary building DC distribution system provided little voltage margin for actuation of some important safety-related equipment. In relation to this the team identified three concerns:

- The TS and FSAR imply two hours of adequate battery voltage in the absence of other DC sources. The licensee's calculations demonstrated only a one minute capability. Licensee personnel stated that this was sufficient in that, within one minute of a loss of offsite power, EDGs would be in operation providing DC power through the chargers.

- The calculations were non-conservative in that the assumed conductor temperature appeared low and the effects of battery operation design temperatures as low as 60 degrees F had not been considered. Also, the current drawn during the first minute was lower than that to be included in the next revision of the FSAR contained in the Plant Change Notice B-92-8099.

- The licensee did not appear to have proper justification for the adequacy of voltage to actuate 4 kV breakers and for EDG field flashing, which should occur within the first minute. In the case of EDG field flashing, there was insufficient data to fully demonstrate the adequacy of the present minimum expected voltage. The method used to demonstrate adequate closing coil voltage to 4 kV switchgear, testing a small sample, was questioned. Subsequent to the inspection the team was informed that adequate field flashing voltage had been verified.

The licensee is requested to respond to the above concerns stating its position and any plans and schedule to address (a) the marginal adequacy of the voltage, (b) discrepancies and ambiguities between design capabilities demonstrated by calculations and the design indicated in the FSAR and the TS requirements, (c) non-conservatisms in the calculations, and (d) justification for the adequacy of the limited test data applied in demonstrating sufficient voltage for operation of the 4 kV switchgear. (Section 2.4.2.1)

SNC Response

During the EDSFI, the NRC identified the three concerns described above as general indicators of marginal Auxiliary Building battery voltage for present load requirements.

1) The selection of batteries for FNP was performed in accordance with IEEE 308-1971. The batteries selected per this criteria were determined to have adequate capacity to supply all required loads for a period of 2 hours under accident conditions. Technical Specifications were implemented to verify that the installed batteries would continue to perform in accordance with the original selection criteria. These Technical Specifications remain in effect.

   In response to concerns identified in Information Notice 89-16, "Excessive Voltage Drop in DC Circuits", design calculations for DC loading and voltage drop were performed. These calculations considered the effects of temperature and aging on batteries which was not included in the original selection criteria. When analyzed at the minimum specified battery voltage of 1.75 volts per cell, the calculated voltage at some components was less than minimum specified by the manufacturers.

   However, the updated calculations confirm that adequate voltage will be available to all safety related components under design basis accident conditions until AC power is restored. The voltage drop calculations were based on an LOSP/Safety Injection scenario where the battery chargers are load shed from the AC system and the batteries are required to provide support for all the safety related loads. Once the diesels have started the battery chargers will be automatically reenergized during sequencer step 6. This will occur well within the time of one minute assured in the voltage drop calculations. Any failure of the battery charger to sequence onto the diesel generators is considered a single failure and the redundant train will be available for safe shutdown. There is no design scenario that requires the batteries to supply accident loads for a period of two hours without charger support. This is consistent with FSAR paragraph 8.3.2.2 which states that the safety design basis for each of the 125V DC batteries is to supply adequate capacity to supply the vital loads required to safely shut down the reactor without charger support until AC power is restored.

   The approach to addressing Information Notice 89-16 was discussed with the NRC during their inspection on April 23-27, 1990. This is documented in NRC Inspection Report No. 50-348, 364/90-03.

   It should be noted that although the batteries are only required to supply accident loads for one minute without charger support, they are actually capable of supplying adequate voltage to all accident loads for approximately one hour based on preliminary calculations performed during the FDSFI.

The basis for the requirement to operate the batteries for a 2 hour duration is to provide power to normal operating loads upon loss of a charger, allowing the operator adequate time to line up the backup battery charger as indicated in FSAR 8.3.2.2.

The Technical Specifications continue to provide confirmation that the batteries satisfy the original selection criteria. Revision of procedures to address voltage requirements from accident analyses is addressed in response to EDSFI Inspector Followup Item 348, 364/92-17-10.

PCN 92-0-8099 was issued prior to the EDSFI to clarify the design basis for the Auxiliary Building batteries. However, the NRC was of the opinion that the bases for both the one minute and two hour requirements were not clearly addressed. SNC commits to thoroughly review and revise the FSAR as necessary to clearly document the design basis for the Auxiliary Building batteries. This revision will be included in the July 1993 revision to the FSAR Update.

The preliminary calculation performed during the EDSFI to determine the maximum time that the batteries will supply adequate voltage to all accident loads will be formalized by November 30, 1992 and maintained as documentation of the margin available beyond the safety design basis.

2) The EDSFI Inspector was of the opinion that the cable conductor temperature of 50° C assumed in the voltage drop calculations was too low. The 50° C (122° F) temperature has been used in calculations to determine the resistance values for the following cables:

- control cables for the 4kV switchgear and the 600V load center breakers
- the power cables for the control power supply to the diesel generator control panels from the 125V DC switchgear and for the control power to the breaker control circuits from the 125V DC distribution panels.

The temperature of 50° C is a design criteria selected on the following basis. The control circuit cables for both the close and trip coils are normally deenergized and when energized carry current for a very short duration (less than 50 msec). The power cables mentioned above carry very small currents relative to their size since the size of the conductor selected was based on voltage drop considerations rather than ampacity. Therefore, the magnitude and duration of the current are adequate to justify that the conductor will not be subjected to any significant temperature rise due to self-heating. Since the use of the 50° C conductor temperature is justified, no further action is necessary.

The EDSFI Inspector was of the opinion that the manufacturers curve for battery performance should be adjusted for the minimum battery room temperature of 60° F. Previously, calculations for voltage drop were based on the manufacturers curve at 77° F. During the EDSFI the battery manufacturer provided information indicating that the curve should be adjusted for anticipated ambient conditions.

Voltage drop calculations have been revised to consider the effects of the minimum battery room temperature of 60° F. The updated voltage drop calculation confirms that adequate voltage is available to accident loads assuming a minimum battery temperature of 60° F coincident with temperature in the surrounding rooms of 104° F (corresponds to cable conductor temperature of 50° C). This is very conservative since it is highly improbable that minimum battery room temperature and maximum surrounding room temperature would occur simultaneously.

With regard to the calculated current drawn during the first minute and that to be included in the next FSAR revision identified in PCN 92-0-8099, the following clarification is provided. The purpose of the calculation referred to by the NRC was to determine the permissible control circuit lengths on the 125V DC system using the existing (i.e. present as-built configuration) loads during the first minute. The current indicated in PCN 92-0-8099 is the maximum allowable battery load current (500A) during the first minute which can be obtained without exceeding voltage limits on existing control circuit lengths and was determined by a separate calculation. Therefore, no further action is required.

3)a. 4kV breaker coil data

During the preliminary review for the adequacy of the control circuit voltages against IN 89-16, it was determined that the published current value of 4 amps at 125V DC was unduly conservative when operating at the minimum published voltage of 90V DC. However, there was no published data for the closing and tripping coil current at the minimum pickup voltages (90V DC for closing and 70V DC for tripping). Therefore a test was performed on three randomly selected breakers to obtain the required data.

The results of these tests indicate that the trip and close coils of all three breakers are capable of operating at less than the minimum published voltage and at currents less than that obtained through straight line extrapolation of the nominal published value at 125V DC. The highest recorded current for the three breakers at 90V DC was 2.2 amps. A margin of 0.3 amps (greater than 10%) was added to account for any manufacturing variations. No credit was taken for the capability of the coils to operate at below the minimum pickup voltage. Therefore, the data from the testing was applied conservatively to determine the adequacy of the voltage for the 4kV circuit breakers.

The manufacturer has documented that the approach used for determination of minimum current was reasonable. Additionally, IEEE 323-1974, "IEEE Standard for Qualifying Class 1E Equipment for Nuclear power Generating Stations" addresses the subject of equipment testing. The standard is written specifically for environmental qualification of equipment and has been endorsed as such in 10CFR50.49. However, it is worthy of note that for the purpose for which it was intended, IEEE 323-1974 endorses the testing of single specimens to be representative of an entire line of equipment. In section 4 of the standard it discusses the various portions of a Quality Assurance (QA) program and notes that such a program assures that "subsequent equipment of the same type matches that which was qualified..." In other words, the QA program obviates the need for statistical sampling since it provides assurance that all samples will be identical within the bounds of manufacturing tolerance. In addressing the issue of manufacturing tolerance, section 6.3.1.5 states that margins need to be applied during testing "to account for normal variations in commercial production of equipment and reasonable error in defining satisfactory performance." Even though no values of margin for current were included in IEEE 323-1974, the plus 10% value included in the FNP test is consistent with other margins in the standard.

On this basis, the breaker testing uses methodology acceptable to both the manufacturer and the IEEE and also relies on available published data. Consequently, it is appropriate to rely on the test data for application in calculations for FNP.

3)b. EDG air start solenoids and field flashing contactors

At the time of the EDSFI, data were unavailable for the minimum pickup voltages for the diesel generator air start solenoids and field flashing contactors. Subsequently, the manufacturers provided the minimum voltage pickup ratings and these voltages have been incorporated into the appropriate calculations. The results of the calculation have demonstrated that the voltage at the air start solenoids and the field flashing contactors for all five diesel generators is above the vendor specified minimum. No further action is necessary.

NRC Issue:

(4) Unresolved Item 348, 364/92-17-08, Some Safety-Related Equipment Rooms could Experience Temperatures Above Those Stated in the FSAR.

Recent calculations indicated that certain auxiliary building rooms containing safety-related equipment could experience accident temperatures in excess of those originally identified in the FSAR. Licensee personnel reported that a previous informal survey indicated significantly higher temperatures than given in the FSAR would be acceptable. They stated that none of the rooms would experience temperatures above that established as acceptable in the informal

survey for the first 16 days of an accident. The licensee is requested to respond to this item providing its plans and schedule to ensure that all equipment is capable of performing its safety-related functions in the increased temperature environments. (Section 3.10.1)

SNC Response

During original plant design it was assumed that the heat loads applied for HVAC sizing calculations included sufficient conservatism to preclude the need for as-built verification. During the process of upgrading HVAC calculations, several rooms in the Auxiliary Building were identified as having heat loads greater than assumed in the original design calculations. Accordingly, the peak temperatures predicted for these rooms is greater than the original design. An Engineering Study (ES 90-1711) was undertaken to investigate the functional capabilities of equipment in these rooms for a postulated thirty day period following a Design Basis Accident.

The maximum temperature predicted by the updated analysis was 131° F. It should be noted that the heat-up of the Ultimate Heat Sink (UHS) during the recirculation phase subsequent to an accident involving an LOSP is a slow process. Room temperatures exceeding the documented capability of critical components are not encountered until at least 20 days following the accident.

The evaluation of the impact of temperatures up to 131° F on equipment located in the subject rooms is near completion. All equipment has been verified to maintain the capability to perform its intended function with the following exceptions:

MCCs 1A, 1B, 2A and 2B will perform acceptably provided the overload relay adjustment knobs are set in positions recommended by ES 90-1711. These settings will be verified or reset by March 31, 1993.

Documentation has not been obtained for the performance of General Electric relays at elevated temperatures. Informal conversations with GE indicate that the relays can be expected to perform as required.

SNC will complete efforts to obtain documentation to verify acceptable performance of the relays by December 31, 1992. Should attempts to document acceptable performance of the relays prove impractical, the relays will be tested at the higher temperatures, replaced with acceptable relays or procedural actions will be established to ensure that the relays are not exposed to temperatures beyond documented capabilities. As noted above, at least 20 days post-accident would be available to accomplish any required actions under the most severe postulated accident conditions. All required actions will be accomplished by the next refueling outage for each unit (Unit 1/Spring 1994 and Unit 2/Fall 1993).

The review of as-built heat loads conducted under ES 90-1711 includes all rooms with coolers supplied with service water. In addition, HVAC calculations for the Diesel Building and Service Water Intake Structure have been recently reviewed as a result of the Diesel Generator and Service Water Self-Initiated Safety System Assessments (SSSA). Continuing development of Functional System Descriptions and performance of SSSAs will provide additional review of original plant design relative to as-built configuration.

NRC Issue:

(5) Unresolved Item 348, 364/92-17-09, Updating of Controlled Vendor Manuals.

A section of the licensee's controlled copy of the vendor manual for the 600 V load center switchgear was an out-of-date revision (Rev. B versus Rev. G). A licensee engineer had recognized this discrepancy and obtained the appropriate revision, but the official controlled copy had not been replaced. The team was concerned that the vendor had not provided the updated manual section to the licensee and questioned whether there was a breakdown in the system for updating vendor information. The licensee is requested to respond to this item indicating its findings and corrective action. (Section 4.4)

SNC Response:

During the review of PMs for 600V load centers, the NRC noted that the vendor manual section, "Instructions for Low Voltage Power Circuit Breakers Types DS-206, DS-416 and DS-532," contained within the FNP controlled vendor manual for the 600V switchgear was out of date (Revision B versus Revision G). As pointed out by the NRC, an FNP engineer had informally obtained the later revision and was pursuing the need for updating of the controlled manual. However, subsequent to the EDSFI, Westinghouse indicated that the Revision G of the manual was not applicable to the Farley vintage switchgear and the Revision B controlled copy, as supplemented by Technical Bulletins, is appropriate. Therefore, no further action is necessary.

NRC Issue:

(6) Inspector Follow-up Item 348, 364/92-17-10, Battery Test Procedures Did Not Verify Design Adequacy.

TS periodic battery test procedures were not formulated to demonstrate that batteries would provide the voltage required by design but did demonstrate TS requirements would be met. During the inspection licensee personnel indicated the test procedures would be revised to demonstrate that both design and TS requirements were met. The licensee is requested to respond to this item providing its plans and schedule. (Section 4.3.2)

SNC Response:

In accordance with the FNP Technical Specifications, the Auxiliary Building battery service test requires the appropriate load profile to be applied to the batteries for a period of two hours. The pilot cell voltage, temperature and specific gravity are taken at 15 minute intervals for the duration of the test.

This test fully accomplishes Technical Specification requirements. As an enhancement, this test procedure will be revised to record voltage during the first minute. This reading will be compared to the appropriate acceptance criteria from the voltage drop calculations for accident loading. SNC will determine the appropriate acceptance criteria and revise the applicable procedure by December 31, 1992.

NRC Issue:

(7) Inspector Follow-up Item 348, 364/92-17-11, Invalid Diesel Generator Start Test Failures Not Identified or Reported.

In response to an industry recommendation, the licensee initially performs all TS EDG start tests using only one air supply header in order to facilitate early detection of degraded air supply conditions. In the event of a start failure, the licensee retests using both headers, which is the normal alignment. The licensee classified any failed "one header" EDG starts as invalid tests on the basis that they did not represent the full start capabilities present to respond to an accident. However, the licensee did not also count and report the failed one header starts as invalid failures. According to the TSs both valid and invalid failures are to be reported to the NRC annually. The licensee is requested to provide its official position on this matter and to indicate any plans to revise the criteria it uses for counting and reporting invalid failures. (Section 4.3.4.1)

SNC Response

SNC has reviewed test classification criteria with regard to diesel start failures in which the the diesel start system is disabled for test purposes. Regulatory Guide 1.108 section C.2.e.(1) states that components required for automatic startup should be operable. Section C.2.e.(2) further states that unsuccessful starts due to operator error, spurious trips that are bypassed in the emergency mode, malfunctions of equipment not operative in the emergency operating mode or not part of the defined diesel unit design should not be considered valid tests or failures.

FNP considers a single header start failure as an unsuccessful start attempt. In a single header start the diesel is not in its defined normal configuration for starting and thus a single header start failure followed by a successful dual header start does not constitute a valid start or a failure.

SNC's position on this matter is substantiated by the following recent industry guidance on diesel generator test failure classification:

NRC Draft Revision 3 to Regulatory Guide 1.9

INPO Plant Performance Indicator Program

NUMARC 87-00 Revision 1 Appendix D

Based on the above, SNC believes its interpretation of Regulatory Guide 1.108 for reporting of invalid failures is appropriate and no further action is necessary on this matter.

NRC Issue:

(8) Inspector Follow-up Item 348, 364/92-17-12, Weaknesses in DC Ground Fault Detection.

There were a number of weaknesses in the licensee's DC ground fault detection system. The licensee was aware of deficiencies in the design and was instituting modifications. The team observed that a procedure for use of the system was also lacking. The licensee is requested to indicate their plans and schedule to address weaknesses in this area. (Section 2.4.3.2)

SNC Response:

Weaknesses in the ground fault detection system for FNP are attributable to the industry practice and the state-of-the-art of available equipment at the time of FNP design and construction. These weaknesses were identified in the evaluation performed for Information Notice 88-86.

The EDSFI Inspection Report states that the ground fault detection calculation was "deficient in assuming only an infinite resistance to ground of the negative pole, whereas in practice, the resistance would have some finite value." This statement is inaccurate in that the calculation for the ground fault through the most sensitive components has been determined with discreet values of Rfp and Rfn (representing positive to ground and negative to ground resistance values). These values are considered to represent the total resistance due to system insulation resistance and the fault resistance.

In response to evaluations performed for Information Notice 88-86, the Auxiliary Building ground alarm setpoint was lowered from $\pm$ 0.35 ma to $\pm$ 0.30 ma. Calculations demonstrate that the new setpoint will ensure that safety related electrical components connected to the Auxiliary Building 125V DC system will not spuriously actuate when there is a ground fault on the components circuit in conjunction with a prior ground fault below the alarm setpoint on either positive or negative bus.

On the basis above, the existing ground fault detection equipment and calculations are considered adequate, within the limitations of the installed equipment.

As an enhancement, plant procedures will be revised to periodically measure positive and negative ground faults to determine the magnitude of any that may exist below the alarm setpoint. Appropriate action will be taken to address significant faults. This procedure change will be implemented by December 31, 1992.

As a result of evaluations performed in response to Information Notice 88-86, design has been issued for modification of the Service Water Intake Structure (SWIS) ground detection system. The performance of the modified SWIS ground fault detection will be evaluated and, once acceptable performance has been confirmed, a similar system will be installed for Auxiliary Building ground detection.

NRC Issue:

(9) Inspector Follow-up Item 348, 364/92-17-13, Inadequate Motor Overload Protection.

Motor overload protection may be set too high for some 600 V motors and there is no overload protection for the Reactor Coolant Pump motors. Licensee personnel indicated that the 600 V motor vendor had been contacted and was in the process of verifying the adequacy of the protection. The licensee is requested to provide its official position on the adequacy of the motor overload protection for both the Reactor Coolant Pump motors and the 600 V motors. (Section 2.3.2)

SNC Response:

1) Review of the protection for 600V motors indicates that the relay settings were selected in accordance with the Bechtel criteria for Farley relay settings. This criteria was established in 1972 and remains in effect in the latest revision dated July 20, 1979.

   Although protective relay settings selected in accordance with the above criteria are slightly higher than settings selected in accordance with more recent criteria (reference NEC-1990 section 430-32), the settings are conservative with regard to plant safety since the threat to spurious trip during motor start and acceleration is minimized. In all cases the relay settings are adequate to protect the feeder cable and prevent propagation of the fault to other areas. Therefore, the risk of motor damage is an economic consideration. Based on the original setting criteria and FNP operational experience, the long time delay settings are adequate and no further action is necessary.

2) Protective relay settings for the reactor coolant pump (RCP) motors are consistent with original design criteria. The RCP motors are provided with automatic overcurrent protection above 2000 amps. Below 2000 amps, the RCP motors are protected by motor winding temperature alarms and operator actions.

   Based on existing design features and operational experience to date, the protection provided for the reactor coolant pumps is adequate and no further action is necessary.

NRC Issue:

(11) Inspector Follow-up Item 348, 364/92-17-15, No Preventive Maintenance for Oil Static 230 kV Cable System.

There was no preventive maintenance (PM) for the oil static 230 kV cable system (e.g., on associated pumps and instruments). The team perceived this as a weakness considering the importance of the cables. Licensee personnel indicated there were plans to develop PMs and revise procedures for this equipment. The licensee is requested to respond to this item indicating its plans and schedule to implement the preventive maintenance. (Section 4.4)

SNC Response:

Although no formal PM program had been developed for the oil static 230KV cable system equipment, some inspections had been performed on the motors, pumps, panels and instruments. In response to comments received during the EDSFI, the oil static system was inspected and all deficiencies were corrected. Instrumentation (e.g. pressure switches and gauges) will be added to the FNP Calibration Program. General inspections will be included in the PM program. Any applicable lubrications will be added to the Plant Lubrication Program. These programs will be revised by December 31, 1992.

NRC Issue:

(12) Inspector Follow-up Item 348, 364/92-17-16, Recommended Preventive Maintenance Not Performed on Oil-Filled 4160/600 V Transformers and TDAFW Uninterruptable Power Supply Panels.

The preventive maintenance recommended by the vendor manuals was not being performed on oil-filled 4 kV/600 V transformers and TDAFW Uninterruptable Power Supply panels. The licensee is requested to respond to this item indicating its position and any plans and schedule to implement preventive maintenance for the equipment. (Section 4.4)

SNC Response:

Prior to the EDSFI, FNP evaluation of the need for additional PMs was underway through Reliability Centered Maintenance reviews. Temperature readings and nitrogen pressure readings had been identified and were being incorporated in PMs prior to the EDSFI. Vendor recommendations will be reviewed and appropriate PMs will be implemented for the TDAFW UPS panels.

The revision and/or development of PMs will be accomplished by March 31, 1993.

NRC Issue:

(13) Inspector Follow-up Item 348, 364/92-17-17, Circuit Breaker and Fuse Configuration Control Discrepancies.

Inspection of a selected sample of fuses and circuit breakers identified a number of instances in which the fuses and the breaker instantaneous trip settings were not as specified by the respective fuse list and design drawings. None of the breaker setting or fuse differences were found to be operability concerns. However, further evaluation and correction of installation or design documents is desirable. The licensee is requested to respond to this item indicating its position and any plans and schedule to provide corrections. (Section 4.2.1)

SNC Response:

With regard to the FNP fuse control program, a statistical sampling was performed by the FNP staff. Based on this sampling, there is a 95% probability with a 95% confidence that acceptable fuses are installed in safety related equipment. This information was provided to the NRC as the FNP response to Unresolved Item 348, 364/87-33-01. The NRC has closed the Unresolved Item. The fuse manual is updated as fuses are replaced or based on walkdown information as PMs are performed on electrical equipment. None of the fuses that have been identified as discrepancies since the original walkdown have resulted in operability concerns.

The EDSFI report states there were discrepancies between the fuse manual and five installed fuses. Based on SNC walkdowns performed during the EDSFI, four fuse discrepancies actually existed. This was clarified in the written responses to questions provided to the NRC during the EDSFI. The fuse manual has been updated as appropriate to address the four discrepancies. The four fuse discrepancies identified by the NRC would not have prevented any component from functioning properly and are not indicative of a weakness in the manual update process.

With regard to breaker instantaneous trip settings, all of the safety related MCC breaker settings have been recorded and are being evaluated. Appropriate changes to drawings or actual settings will be implemented to ensure that the drawings and settings are consistent with approved design parameters. The estimated completion date for resolution of all discrepancies associated with breaker instantaneous trip settings is June 30, 1994.

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