U. S. NUCLEAR REGULATORY COMMISSION
REGION III

Report No. 50-255/91019(DRS)

Docket No. 50-255 License No. DPR-20

Licensee: Consumers Power Company
1945 West Parnall Road
Jackson, MI 49201

Facility Name: Palisades Nuclear Power Plant

Inspection At: Covert, MI

Inspection Conducted: November 4 through December 13, 1991

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Inspection Summary
Inspection on November 4 through December 13, 1991 (Report No. 50-255/91019(DRS))
Special electrical distribution system functional inspection in accordance with Temporary Instruction (TI) 2515/107 (25107).
Results: The team determined that the electrical distribution system was functional and that engineering and technical support was adequate. A summary of strengths and weaknesses in system design and engineering support is provided in the Executive Summary of this report.

Three violations were identified regarding (1) inadequate test control (Sections 3.1.15, 3.1.16, 3.2.5 and 4.2); (2) failure to follow design requirements for sizing thermal overloads for electric motors (Section 3.1.17); and (3) failure to promptly and adequately correct diesel generator ampere loads exceeding limits (Section 3.1.20). In addition, two deviations from licensee commitments were identified: (1) FSAR Chapter 8.4.1.3

commitment for diesel generator "Control Switch Not in Automatic" alarm in control room was not installed (Section 3.2.7); and (2) failure to implement FSAR Chapter 8.4.1.3 commitments for independent diesel generator start circuits. (Section 3.1.18) An unresolved item was identified concerning engineered safeguards testing (Section 3.1.14).

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Executive Summary

During the period of November 4 through December 13, 1991, a Region III inspection team conducted an electrical distribution system functional inspection (EDSFI) at the Palisades Nuclear Power Plant to review the design and implementation of the plant electrical distribution system (EDS) and the adequacy of the Engineering and Technical Support (E&TS) organizations. The team reviewed the electrical and mechanical support systems of the EDS, examined installed EDS equipment, reviewed EDS testing and procedures, and interviewed selected corporate and site personnel.

The team considered the design and operation of the electrical distribution system at Palisades to be acceptable. However, the team identified several design vulnerabilities. These included: (1) the ungrounded 2400 volt ac system that is being operated so that a ground could affect both of the safety buses; (2) non-coincident emergency diesel generator trips; and, (3) overloaded feeder cables between startup transformer 1-2 and the Class 1E buses. The team recognizes an important step has been taken by Consumers Power in installation of an additional transformer and cabling between the switchyard and the plant to address significant vulnerabilities in your off-site power supply. Your commitment to consider additional modifications and procedure changes to address design vulnerabilities identified by the team is important as well.

Other deficiencies were identified by the team. These included: (1) inadequate diesel generator testing and surveillances; (2) instances of inadequate design control and verification which resulted in failure to properly implement motor thermal overload design changes and the use of non-conservative assumptions in design calculations and cable sizing studies; (3) failure to perform complete post-modification testing; and, (4) instances of missing or inadequate design documentation. Many of the design control problems were associated with initial design. However, some occurred in recent work indicating that, notwithstanding some recent improvements in this area, continued management attention is warranted. The team recognizes that steps such as the recent relocation of engineering resources to the site and improved capability to handle design projects in-house offer potential for further improvement in your overall engineering efforts.

Several strengths were identified. Most significant were: (1) an experienced and competent engineering staff located on-site; and, (2) your configuration control program (CCP) in the electrical design area. Several aspects of the CCP were notable. Many deficiencies identified by the team had been previously identified by you in the CCP program. Also, reconstitution of selected design information and detailed design studies of issues such as cable tray ampacity are important.

DETAILS

1.0 Introduction

During electrical inspections at various operating plants in the country, the NRC staff had identified several electrical distribution system (EDS) deficiencies. The Special Inspection Branch of the Office of Nuclear Reactor Regulation (NRR) initiated inspections of the EDS at other operating plants after they determined that such deficiencies could compromise design margins. Examples of these deficiencies included unmonitored and uncontrolled load growth on safety buses and inadequate modification, design calculations, testing, and qualification of commercial grade equipment used in safety related applications. The NRC considered inadequate engineering and technical support (E&TS) to be one cause of these deficiencies.

The objectives of this inspection were to assess the performance capability of the Palisades EDS and the capability and performance of the licensee's E&TS group in this area. For this inspection, the EDS included the sources of power to systems required to remain functional during and following the design basis events. EDS components reviewed included the emergency diesel generators (EDGs), 125Vdc batteries, offsite circuits and switchyard, 2400 Vac switchgear, 480Vac load centers (LCs), 480Vac Motor Control Centers (MCCs), 125Vdc MCCs, battery chargers, inverters, associated buses, breakers, relays, and other miscellaneous components.

The team reviewed the adequacy of the emergency, offsite and onsite power sources for EDS equipment, the regulation of power to essential loads, protection for postulated fault currents, and coordination of the current interrupting capability of protective devices. The team also reviewed the mechanical systems that interface with the EDS, including air start, lube oil, and cooling systems for the EDGs plus the cooling and heating systems for the EDS equipment. The team walked down originally installed and as-modified EDS equipment for configuration and equipment ratings and reviewed qualification, testing, and calibration records. The team assessed the capability of the licensee's E&TS organization with respect to personnel qualification and staffing, timely and adequate root cause analyses for failures and recurring problems, and engineering involvement in design and operations. The team also reviewed training for Operations and E&TS personnel relative to the EDS.

The team verified conformance with General Design Criteria (GDC) 17 and 18 and the applicable 10 CFR 50, Appendix B criteria. The team also reviewed plant Technical Specifications (TS), the Updated Safety Analysis Report (USAR), and appropriate Safety Evaluation Reports (SERs) to verify that TS requirements and licensee commitments were met.

The areas reviewed and the concerns that were identified are described in Sections 3.1, 3.2, and 3.3 of this report. Conclusions are given after each of these sections. A list of the personnel contacted and those who attended the exit meeting on December 13, 1991, is provided in Appendix A of this report.

A complete listing of the team's requests for information is attached as Appendix B of the report.

2.0 Action on Previously Identified Inspection Findings

a. (Closed) Deviation (255/89014-04) - Unsealed cable penetration in top of switchgear bus 1C cabinet. The inspector verified that the open cable penetration in the top of bus 1C had been sealed and other cabinets inspected to assure that all openings are properly closed to prevent water ingress. This item is considered to be closed.

b. (Closed) Violation (255/88020-03) - Three terminal lugs secured by holding nuts that lacked full thread engagement in diesel generator excitation panel C-22. Review of original design drawings revealed that the three terminal lugs were now installed as designed. The licensee performed an engineering evaluation of the three lugs on one termination and found that the current installation meets original design requirements in effect when the plant was built. This item is considered to be closed.

c. (Closed) Unresolved Item (255/88020-07) - Two different fuse sizes were observed in diesel generator (DG) circuits which performed identical functions. A 15 amp fuse was observed in the DG 1-1 circuit and a 20 amp fuse was observed in DG 1-2. The licensee's calculations established that fuse sizes between 10.6 and 25 amperes were adequate for this application. For consistency between diesels, the licensee changed the DG 1-1 fuse to 20 amperes as used in DG 1-2. This item is closed.

d. (Closed) Violation (255/88020-06B) - The licensee failed to take prompt corrective action to resolve a wiring discrepancy in DG Panel G-31 that resulted in bypassing the lubrication oil heater flow switch of DG 1-2 for eight months. The licensee corrected the wiring discrepancy on October 25, 1988, under Deviation Report #D-PAL-88-166 and Work Order #24806204. The circuit was tested for proper operation. This item is considered closed.

3.0 Electrical Systems

3.1 AC Systems

In order to assess the capability of the electrical system, the team reviewed the regulation of EDS loads, overcurrent protection, the coordination of protection devices for compliance with regulations, design engineering standards, and accepted engineering practices. The review included system descriptions, station FSAR, equipment sizing calculations, system protection, controls and interlocks, equipment specifications, modification packages, licensee event reports (LERs), related test and operating procedures, one-line diagrams, elementary diagrams, and equipment layout drawings.

The characteristics of the power system electric grid to which the Palisades Plant is connected were reviewed to assess the adequacy of important parameters, such as voltage regulation, short circuit contribution, protective relaying, surge protection, control circuits, stability and reliability. The preferred power supply transformers were reviewed in terms of their kVA capability, their connections to safety buses, and voltage regulation. The 2400Vac buses and their connected loads were reviewed to assess load current and short circuit current capabilities, voltage regulation, protection, adequacy of cable connections between transformers and buses and buses to their loads, compliance with single failure criteria, adequacy of fast bus transfer scheme in terms of any effects on the safety systems, and applicable separation criteria.

3.1.1 Electrical Load Study

The team evaluated the licensee's study conducted in 1988 and 1989 of the adequacy of station power systems to supply adequate voltage under worst-case loading conditions and identified the following concerns:

- The study assumed a temperature of 75°C for all cables No. 8 and smaller and 65°C for all cables No. 6 and larger. However, the cables in the plant are rated for a maximum conductor temperature of 90°C. The cable resistance at this temperature will be greater than the resistance at the assumed temperature.

- The resistance and reactance values used were based on Westinghouse T & D Handbook, Table 6. The reactance values shown in this table are for a grounded neutral system and paper insulated cables. These values are not applicable to the type of cable used in this plant.

- The impedance of circuit breaker contacts and fuses were not considered.

- The loads considered were not the "worst-case loads", (i.e., all motors running).

- The licensee identified in Audit Report QA-91-06 that the impedance of the buried cables from the switchyard to safeguards transformer was incorrectly specified in the calculations. Audit results indicated that the actual impedance was approximately 30 times greater than the impedance values used in the calculations.

In response to the team's concern, the licensee submitted new data which demonstrated that the effect of higher resistance on system voltage was negligible, and agreed to update the study in 1992. This item remains open pending NRC review of the updated study (255/91019-01(DRS)).

3.1.2 Degraded Grid Undervoltage Relaying

The team determined that the second level of undervoltage protection for Class 1E systems did not meet the intent of Branch Technical Position PSB-1. PSB-1 states that two separate time delays shall be selected for the second level of undervoltage protection. The first time delay should be of a duration that establishes the existence of a sustained degraded voltage condition (to override the motor starting transient). The second time delay should be of a limited duration such that the permanently connected Class 1E loads will not be damaged. Following this delay, if the operator failed to restore adequate voltages, the Class 1E distribution system should be automatically disconnected from the offsite power system.

At Palisades, the second level undervoltage relays were set at approximately 92% of rated voltage to protect against sustained degraded voltage conditions. These relays had a built in time delay of 0.5 seconds, after which both EDGs received a start signal and annunciators in the control room were activated. If bus undervoltage existed for an additional 6 seconds, the respective incoming circuit breakers would be tripped and a bus load shed would be initiated.

The built in 0.5 second time delay did not permit the existence of a sustained degraded voltage condition to allow the operators time to correct the degraded voltage on the Class 1E buses and prevent unwanted EDG starts. Since the lack of adequate time delay could result in significant and unnecessary transients on plant equipment, the team considered this to be a design weakness.

3.1.3 Overvoltage on Class 1E Equipment

The team was concerned that plant operating procedures did not adequately direct corrective actions to be taken in the event of higher than 2400v on the Class 1E buses caused by a stuck safeguards or startup transformer tap changer. This condition could result in Class 1E motors being exposed to voltages higher than their rating. The team also noted that no formal calculations were in place identifying the expected voltages on Class 1E motor terminals during conditions of a stuck tap changer concurrent with high system voltages.

In response to the team's concern, the licensee determined that the voltage on the 2400v Class 1E buses should be maintained at less than 2530v to prevent exceeding the voltage limitations of the 2300v and 460v motors. The licensee also agreed to revise the appropriate procedures to identify operator actions to be taken to maintain voltages below 2530v during stuck tap changer conditions. This item remains open pending NRC review of the revised procedures (255/91019-02(DRS)).

3.1.4 Auto-Closure of EDG Breaker with a Faulted Bus

The team noted that there was no provision to prevent the EDGs from attempting to supply a faulted bus. During normal operation, Class 1E buses 1C and 1D are supplied from the 2400v safeguards bus A14. Should a fault occur on either Class 1E bus, a fast transfer to the startup transformer (alternate supply) is blocked to avoid its connection to a faulted bus. However, there is no provision for preventing the auto closure of an EDG output breaker.

The licensee had previously identified this issue during the development of Design Basis Document (DBD) 5.06. The licensee agreed that the absence of a faulted bus auto-close lockout logic circuit in the EDG breaker was a variation from common practice but concluded that this condition was not detrimental to plant safety. The team concurred with the licensee's position.

The licensee stated that this aspect of design was under formal consideration for modification as a reliability enhancement.

3.1.5 Overloading of Buses 1C and 1D Feeder Cables from Startup Transformer

During review of the "Steady State and Transient Cable Ampacities for Buses 1C, 1D & 1E, Palisades Plant", dated December 1988, the team noted that the 500 MCM cables from startup transformer 1-2 to buses 1C and 1D were heavily overloaded during small LOCA transients. An operator action was required to reduce the load within 11 hours to avoid damage to the cables. Based on this study, the licensee instituted administrative loading limits pending replacement of the cables. A subsequent special ampacity study, "SUT 1-2 500 MCM, Buses 1C and 1D via SUT 1-2," Revision 0, dated September 21, 1991, was performed utilizing a 105°C emergency overload temperature. This study resulted in the cancellation of the cable replacement and removal of the administrative loading limits.

The team was concerned that the analysis had not quantified the cable rating in terms of total allowable time at cable temperatures beyond 90°C. The team pointed out that the cable could be operated at 105°C for up to 100 hours only and not indefinitely as assumed by the analysis. The licensee agreed that additional studies were required to quantify the time for operating beyond the 90°C rating of the cable and agreed to incorporate these limits into appropriate operating procedures. This item remains open pending NRC review of the additional studies and procedure revisions (255/91019-03(DRS)).

3.1.6 Switchyard Station Power Transformer Cable

The team questioned the ability of the feeder cable to switchyard station power transformer No. 2 to withstand postulated fault currents. Switchyard station power transformer No. 2 is fed from 2400v bus 1C through three single conductor cables. The maximum fault current at the load terminals of the circuit breaker is 30,900 Amps (5 cycle value). The team performed an informal calculation which questioned the cable's ability to withstand the fault current caused by a fault located at the breaker's terminal. The calculations submitted by the licensee in response to the team's concern confirmed that for the postulated fault, the cable would exceed its damage temperature threshold in approximately 2.8 hertz. The licensee immediately issued Deviation Report D-PAL-91-195 to further analyze the concern. This item remains open pending resolution of D-PAL-91-195 (255/91019-04(DRS)).

3.1.7 Short Circuit Study

The team was concerned that non-conservative values for system voltage and cable temperature were used in calculation EA-E-ELECT-FLT-10/91-1, dated October 28, 1991, which was prepared to determine fault duties on the 4160v, 2400v, and 480v AC systems. In response to the team's concern, the licensee provided an analysis that demonstrated that the voltage assumed in the calculation was conservative in relation to the maximum historical switchyard voltage. In addition, the licensee provided an analysis that demonstrated that the non-conservative high cable temperatures would not have a significant effect on the overall results of the calculation. The licensee committed to revise the calculation to provide a clarification of voltage criteria and to reflect conservative cable temperatures. Pending further NRC review, these issues are considered an open item (255/91019-05(DRS)).

3.1.8 Operator Response to Ground Fault Indication

The team determined that existing plant procedures do not provide adequate guidance on how to identify the location of a faulted bus and do not alert operators of the dangers of operating two safety buses from the same source when a ground fault exists on the ungrounded 2400v system. In case of a solid single line to ground fault on an ungrounded system, the location of the fault cannot be immediately determined by observing system instruments. Also, although continued operation is possible, an overvoltage of 73% will occur on the unfaulted phases and a second fault on the system could cause the simultaneous loss of redundant loads.

In response to this concern, the licensee agreed to revise their procedures to direct operators to transfer the 2400v buses one at a time to the alternate offsite source while observing the status of the ground fault relays and to supply the faulted bus from a separate supply until the fault is located. The licensee has committed to complete these actions in the first quarter of 1992. Pending further NRC review, this is an open item (255/91019-06(DRS)).

3.1.9 Overvoltage on Ungrounded 2400v System

The team was concerned that the 2400v electrical system, which was designed to be ungrounded, was susceptible to high voltage transients caused by intermittent ground faults. The 2400v electrical distribution system, including safety buses 1C and 1D, is designed as an ungrounded system in order to permit continued operation with a single ground fault on the system. However, ungrounded systems are susceptible to severe overvoltages caused by repetitive intermittent ground faults such as can be produced in a piece of vibrating equipment. This phenomenon can rapidly produce voltages five or six times normal and may cause failures in motors connected to the system before operators can intervene. Also, since the safety buses are interconnected through cables or buses when being supplied from the primary or alternate offsite source, an overvoltage originating anywhere in the 2400v system will appear on both safety buses. Although the condition described here is considered to be of low probability, it is of concern because it represents a potential common mode failure mechanism. Pending further NRC review, this matter is considered an open item (255/91019-07(DRS)).

3.1.10 Diesel Generator Testing Inadequacy

The team determined that the electrical loading on the EDGs during testing did not demonstrate the ability of the generators to carry continuous or short time accident loading (2880kVA). The diesel generators are tested by paralleling the units with the grid and loading them to 2400kw ±100kw. This satisfies the Technical Specification (TS) requirements for periodic testing; however, electrical loading on a generator is most accurately represented by kVA rather than KW. There is no provision in the testing program to maintain a minimum kVA output.

Data from a typical recent test indicates that the diesel generators were loaded to approximately 2520kVA. Loadings during certain LOCA scenarios are as high as 2598kVA continuous and 2880 kVA for a short time overload (less than 2 hours). The team concluded that the use of a less conservative test method for the EDGs was a weakness in the EDG test program.

3.1.11 Retransfer of Bus to Preferred Source

The team determined that operating procedures provide insufficient guidance regarding the potential adverse effects, during a LOCA concurrent with a loss of offsite power, of retransferring from onsite power (EDGs) to restored offsite power. When loads are being supplied from the EDGs during a concurrent LOCA and loss of offsite power, operating procedures require retransfer to the preferred source, should it become available again. However, when LOCA loads are applied to the offsite source, a voltage drop slightly larger than 2% can occur on the safety bus. If the bus voltage is too low, this additional drop could cause the second level undervoltage relays to drop out causing the loads to be transferred back to the onsite source. (A rough calculation performed by the team indicated that an initial voltage greater than .94 pu would be required to maintain loads, using startup transformer 1-2 as the offsite source.) In this case, it would be preferable to leave the bus connected to the onsite source. In response to this concern, the licensee agreed to perform analyses to establish minimum required voltages to enable successful retransfer, and to revise procedures accordingly. Pending further NRC review of the revised procedures, this matter is considered an open item (255/91019-08(DRS)).

3.1.12 Diesel Generator Steady State Loading Calculation

The team was concerned that the magnitude, start time, and duration of manually started loads identified in EDG steady state loading calculation DRS-010990-1 may not reflect worst case conditions. This could result in the application of heavier loadings on the EDGs than were reflected in the calculation. The loads evaluated were based on manual operator actions listed in the EOPs, and the timing criteria used was based on expected plant conditions and the author's experience. The licensee agreed to perform additional studies to assess worst case contingencies and to revise operating procedures as appropriate.

In addition, the licensee could not provide evidence that calculation EA-P-SA-8602, which was used as an input to the EDG loading calculation, was prepared in accordance with accepted design control procedures. Pending further NRC review of the revised procedures and studies, this issue remain open (255/91019-09(DRS)).

3.1.13 Diesel Generator Trip Logic

The team noted that the EDG control scheme employs the following automatic trip mechanisms that do not require two or more independent measurements of the trip parameter:

- Generator trip on underspeed (<600 RPM) through the Field Shutdown Timer.

- Engine and generator trip on engine underspeed (<120 RPM).

- Engine and generator trip on jacket water low pressure, start circuit B only.

- Engine and generator trip on generator overcurrent.

Since these trips do not employ coincident logic, they increase the potential for spurious EDG trips, which could cause loss of a division during an emergency.

In addition, the non-coincident jacket water low pressure signal provides an unintended DG trip mechanism and can result in the engagement of the air start motors while the engine is running. This could cause equipment damage and deplete the starting air supply. The licensee had previously identified these conditions and has committed to correct them by the fourth quarter of 1992. Pending further NRC review of the licensee's corrective action, these issues remain open (255/91019-10(DRS)).

3.1.14 Engineered Safeguards Testing

The team identified that Surveillance Procedure RT-8C&D requires that less than 50% of the equipment required to be load shed during a Safety Injection System (SIS) actuation, coincident with loss of offsite power (LOOP), be verified to have properly shed. Additionally, during the load sequencing portion of the test, only a few selected loads were verified to auto start. In the event of a SIS actuation coincident with a LOOP, failure of one or more major loads to shed could effect the EDGs' ability to maintain voltage levels during load sequencing. Also, there is a potential of a generator overload trip, as the DG overcurrent relay trip signal is not bypassed during an ESF actuation.

The licensee's response to the team's concern was that surveillance procedure RT-8C&D meets the TS objective to demonstrate overall automatic operation of the emergency power system based on initial construction testing which verified that each relay contact operated properly.

The TS wording that allows for the automatic starting of only "Selected Motors and Equipment" (apparently original TS wording) is not consistent with emergency diesel testing as stated in the Combustion Engineering Standard TS.

Palisades has committed to implement a restructured TS that contains a more conservative EDG testing requirement. This item is unresolved pending NRC review of Palisades implementation of the restructured TS (255/91019-11(DRS)).

3.1.15 Diesel Generator Ten Second Starting Time Requirement

The team was concerned that surveillance procedure MO-7A-1&2, which verified that EDG start times were less than 10 seconds, failed to account for the following EDG control circuit relay and breaker response time contributions:

- The surveillance test used the energization of the EDG air start solenoid operated valve (SOV) as the start point for the 10 second TS timing requirement instead of Engine Start Relay ESR1, which is the first sensor in the EDG control circuit. Based on previous licensee response testing results, the response time contribution from relay ESR1 to the EDG auto start solenoid was approximately 830 milliseconds (ms).

- The surveillance test used the energization of the EDG output relays (2,000 Volt Setpoint) as the timing stop point instead of EDG output breaker closure, which is required before the system could accept loading. The licensee estimated this response time at approximately 150 ms.

- The monitoring device for the 10 second timing requirement was a stop watch which offered the potential for an additional error.

The team determined that the licensee's surveillance test results were not representative of the actual EDG start times. Based on reviews of two Left Channel Monthly Surveillance Tests, the average start times were within .2 seconds of exceeding the 10 second limit. If the response time contributions identified above were added to the start time results for the two Monthly Surveillance Tests reviewed, the 10 second limit would have been exceeded in both cases. The failure to accurately demonstrate that the EDG is ready for loading within the required time is a violation of 10 CFR 50, Appendix B, Criterion XI (255/91019-12(DRS)).

3.1.16 Modification FC-687 - Test Procedure T-FC-687-001

The team determined that post modification test procedure T-FC-687-001 for Modification FC-687, completed June 6, 1986, was inadequate in that it did not test the control functions associated with contacts 3/3C, 4/4C, 5/5C, and 11/11C located on Handswitch HS-152-106RLTS. These contacts isolate the breaker-1C control circuit from control room components to allow local c rol of the breaker in the event of a fire in the control room or cable spread. g room. Failure of the licensee to implement adequate post modification testing is considered a violation of 10 CFR 50, Appendix B, Criterion XI (255/91019-13(DRS)).

The team reviewed schematic and logic drawings to independently verify that the testing deficiencies did not compromise equipment operability. The licensee responded to the team's concern and committed to conduct a root cause analysis evaluation and undertake required corrective action.

3.1.17 Thermal Overloads

During a walkdown of the switchgear rooms, the team observed that the thermal overloads (TOL) for EDG fuel transfer pump motors P18A and P18B were sized different than data listed on the System Protection Engineering (SPE) setting sheets. The setting sheets required H1031B TOLs; however, the TOLs observed were H1030B, which were nonconservative. Subsequently, the licensee identified 17 TOLs in safety related MCCs that were not sized according to the setting sheets.

The team determined that in March 1986, the licensee recalculated the size of a number of safety related motor TOLs as part of a coordination study. The licensee revised the SPE setting sheets; however, the licensee never implemented the TOL change. The licensee stated that the setting sheets should have been sent to the field testing lab and that a work order should have been written to initiate the field work. On November 13, 1991, the licensee issued Deviation Report D-PAL-91-188 to address the discrepancies, evaluate a possible root cause and initiate action to install the correct TOLs.

Failure to implement a design change associated with safety related components is considered a violation of 10 CFR 50, Appendix B, Criterion III (255/91019-14(DRS)).

3.1.18 Redundancy of EDG Start Circuits

The team observed that, since March 1990, during four separate monthly surveillances, EDG 1-2 had failed to satisfy TS 4.7.1 requirements that it achieve 2000 volts output within 10 seconds. Subsequent to each failure, the licensee satisfactorily retested EDG 1-2 by using the combined output of both EDG air start motors.

The team noted that the design of the EDG start circuits did not result in two independent circuits. If either the starting circuit B breaker or the field flashing unit fuse failed, the EDG would not be capable of starting within the required 10 seconds. This was contrary to Section 8.4.1.3 of the licensee's FSAR which stated that to assure reliability, each EDG had two independent start circuits on separate DC sources. The team considered the lack of independent start circuits to be a deviation from the commitment made in Section 8.4.1.3 of the FSAR (255/91019-15(DRS)).

3.1.19 Cable Separation and Cable Tray Fill

The team considered the licensee's efforts to resolve cable separation deficiencies and problems with overfilled cable trays to be commendable. On July 9, 1991, the licensee notified the NRC of safety related circuits which were routed with opposite channel circuits (LER 91004). The licensee's FSAR Section 8.5.3.1 required that opposite channel circuits be separated. Additional cable routing problems were identified after the licensee conducted drawing reviews and performed verifications of cable routing with a signal tracer. The licensee had created a data base to identify overfilled cable trays and had committed to perform walkdowns of the cable tray areas. Although the licensee continued to identify problems, prompt corrective actions were evident.

The team identified a number of safety related components which were not separated. The team observed in the cable spreading room that redundant safety related inverters, battery chargers, MCCs and load centers were not physically separated. These components which fed redundant circuits were either in physical contact or within a few feet of each other. The licensee's FSAR did not address this issue; however, the team considered this a design weakness.

3.1.20 Diesel Generator Technical Specification Limit Exceeded

During the review of deviation reports (DR) related to the EDG system, the team noted that on July 18, 1989, September 17, 1990 and September 17, 1991, the TS limit of 750 amperes load was exceeded during surveillance testing. In each case, the DG was paralleled to bus 1C which was fed by station power. This parallel mode of operation can present large changes in the DG reactive current when the bus voltage changes by only a small amount. Even though the DG voltage regulation is designed to make appropriate adjustments to maintain bus voltage, its ability to compensate can be exceeded, especially if the voltage changes are sufficiently large.

The licensee stated in Deviation Report D-PAL-91-152 that a long term method to reduce the occurrence of instability and VAR transients would be developed. However, no corrective action has been implemented to date. Failure to provide prompt and adequate corrective action is a violation of 10 CFR 50, Appendix B, Criterion XVI (255/91019-16(DRS)).

3.1.21 Fuse Control

The team was concerned that the licensee did not have a fuse list or drawings which provided information regarding correct fuse class, manufacturer or type (such as current limiting or dual element). Additionally, the team observed several fuses which had missing manufacturer's labels. A replacement of the fuse in this situation would only assure that the size of the fuse was correct but would not assure the correct fuse class or type. The licensee's fuse control program only contained the fuse current rating or size (in amperes). During a previous routine inspection at Palisades in May 1990, the NRC found several examples of inadequate coordination between fuses and breakers. Without information such as time/current characteristics of the fuse, proper coordination and protection may not always be obtained. The licensee stated that the original Bechtel fuse design information was not available. The team considered the lack of fuse class and type information to be a weakness in the licensee's fuse control program.

3.1.22 Conclusion

The team determined that, in general, the performance of the Class 1E AC system was acceptable. Engineering calculations were found to be technically sound although some non-conservative assumptions were identified. Improvements are required in procedures relative to the testing and surveillance of emergency diesel generators. The team identified no operability concerns.

3.2 DC Systems

The team reviewed the station Class 1E DC systems, AC inverters and containment electrical penetrations for design compliance to applicable standards and codes. The inspection included the review of the 125Vdc battery design with respect to sizing, duty cycle loading, cell temperature, battery age and capacity. The associated battery charger designs were reviewed for total loading capabilities and the applicable calculations were reviewed for acceptance. The inverter sizing and design calculations were reviewed for their adequacy. Short circuit calculations and voltage drop calculations for the 125Vdc system and 120Vac system from the inverters were reviewed for correctness and for meeting standard engineering practices. The electrical parameters of the penetrations were reviewed for their adequacy. The cables in the 125Vdc and 120Vac systems were checked and the cable design criteria were reviewed for conformance with standard engineering practices. The circuit breakers and fuses were checked for their applicability in sizing and coordination. The team also reviewed the plant annunciation system.

3.2.1 Engineering Drawings

The team noted various minor discrepancies between single line diagram E-8, Sheets 1 and 2, and other relevant engineering documents. Examples of observed discrepancies included:

- Circuit breakers 72-18 and 72-28 were shown on diagram E-8, Sheet 1 as having thermal and magnetic trips whereas FSAR and coordination curves correctly indicated that there were only thermal trips in these breakers.

- The feeders to panels D11-1, D11-2, D21-1 and D21-2 were shown on diagram E-8, Sheet 1 as 2#4/0 (1c/pole) whereas calculations D11/SC and D21/SC correctly indicated 2x2#4/0 (2c/pole).

- Main single line diagram E-1, Sheet 1 did not show the 1200 A fuses in series with the 500 A breakers on the feeders to dc distribution panels D10 and D20, whereas diagram E-8, Sheet 1 correctly showed the 1200 A fuses.

The licensee agreed to revise and update all relevant drawings. This item remains open pending NRC review of the licensee's corrective action (255/91019-17(DRS)).

3.2.2 Cable Selection and Sizing Criteria

The team was concerned that the licensee's voltage drop and short circuit calculations developed for sizing 125Vdc and 125Vac cables did not consider worst case temperature conditions. Existing design documentation did not identify important cable data such as cable resistance and temperature ratings. The licensee stated that for cables larger than 8 AWG, the temperature used in the voltage drop calculations was 65°C and for cables 8 AWG and smaller the temperature used was 75°C. The team determined that for the XLPE and EPR cables, a non-conservative value of 90°C was used. In addition, the team noted that the licensee used a value of 30°C in short circuit calculations instead of a more conservative value of 25°C. Finally, the team noted that AC resistance values were used in the short circuit calculations for DC circuits resulting in lower than actual calculated short circuit currents. The licensee is currently updating calculations and agreed to use cable resistances at 25°C for short circuit calculations and cable resistances at rated temperature for voltage drop calculations. This item remains open pending NRC review of the updated calculations (255/91019-18(DRS)).

3.2.3 Battery Charger Input and Output Cables

The team was concerned that the battery charger's input and output cables were inadequately sized. The input and output rating of the chargers were 90 A and 200 A respectively, and the cables used were 2 AWG and 4/0 rated 120 A and 253 A respectively. Applying the derating factor of 0.7 used by the licensee in their calculations, the cables should not have been used for currents more than 84 A and 177 A respectively. The licensee re-evaluated the sizing of the battery charger on September 11, 1989, (Deviation Reports D-PAL-89-148 and -149) and concluded that the existing cables were acceptable. However, the team's informal calculations indicated that the cables were undersized for the battery charger's rating. However, since the battery chargers are not operating at their full rated capacity, the team had no immediate operability concerns for the cable. The licensee's response to the team's concern was that these cables would be included in their cable tray ampacity study plan, a program in progress to be completed during the fourth quarter of 1993. This issue remains open pending NRC of the results of the ampacity study for the battery chargers (255/91019-19(DRS)).

3.2.4 DC Ground Detection System

The team was concerned that the licensee's ground detection system was not sensitive enough to detect moderate to solid grounds and that the licensee lacked acceptance criteria for responding to grounds. The licensee stated that a ground was required to be investigated upon receipt of the "125v DC bus ground" alarm at ±5 milliamps ground current. However, the licensee's ground detection system used two 30K ohm resistors across the ground relay. If a solid ground was present, the maximum current that would flow through the circuit would be 4.3 milliamps. The licensee had previously recognized the problem with the failure of grounds to consistently alarm in the control room; however, no action was taken to evaluate or correct the problem.

In addition to the 0-5 milliamp ground detector, the licensee used a ±125v DC recording voltmeter (located in the cable spreading room) to measure the presence of a ground. Although the operator's procedure required that the voltage be recorded once a shift, there was no acceptance criteria to determine the need for initiating corrective action or troubleshooting.

The team did not identify an instance when the licensee failed to respond to a solid ground. However, the design of the ground detection system and lack of acceptance criteria were considered weaknesses.

3.2.5 Battery Charger Testing

The team noted that the licensee had not established a program to periodically test the safety related battery chargers. Technical Specification Section 3.7.1 required that one battery charger be operable. Additionally, the Technical Specification basis. Section 3.7, stated that the battery chargers were rated at 200 amps and that the capacity of the two battery chargers would handle all loads following a design basis accident (DBA). However, the licensee did not have the battery chargers in a surveillance or testing program, nor had the licensee ever verified the 200 amp rating. Failure to demonstrate that the battery chargers will perform satisfactorily during service conditions is a violation of 10 CFR 50, Appendix B, Criterion XI (255/91019-20(DRS)).

3.2.6 Switchyard Battery

The team noted that the licensee did not monitor the temperature in the switchyard battery room. Technical Specification Section 3.7.1.j. required the switchyard battery to be operable at primary coolant temperatures above 325°F. Additionally, the licensee stated that the design temperature of the switchyard battery was 55°F. Although the battery was in a heated building in the switchyard, the licensee had never measured the temperature in the battery room. The team was concerned that during extreme cold weather, the switchyard battery could become inoperable. The licensee committed to record the battery room temperature if the outside temperature fell below 40°F. The team considered the lack of battery monitoring to be a weakness.

3.2.7 Plant Annunciation System

The team determined that with the diesel generator remote/local transfer switch in "LOCAL", there was no alarm indication in the control room to notify the operator that the capability of the diesel generator to start automatically was defeated. FSAR Section 8.4.1.3 states that each diesel generator is provided with a remote "Control Switch Not in Automatic" alarm in the control room. The team considered the failure to provide the above alarm to be a deviation from a commitment made in FSAR Section 8.4.1.3 (255/91019-21(DRS)).

3.2.8 Conclusion

The team determined that the performance of the Class 1E DC system was acceptable. Design calculations were generally adequate, however, additional attention is needed in the areas of cable sizing and component testing. The team did not identify any operability concerns.

3.3 Mechanical Systems

The team reviewed the EDGs and their mechanical support systems to determine their adequacy following design basis accidents. Included in the review were the fuel oil system, air start system, lube oil system, EDG air intake and exhaust systems, and the jacket water cooling system. In determining the functional adequacy of the system, the team examined sample documentation and conducted system walkdowns. Electrical power demands for major pump loads were also reviewed to confirm the design basis calculations. Areas of concern are identified in the following sections.

3.3.1 Diesel Engine Support Systems

3.3.1.1 Fuel Oil Supply System

The team identified the following discrepancies in the design documentation associated with the EDG fuel oil storage tanks:

- o Fuel consumption tests were not documented.
- o The calculations regarding the capacities of the EDG day tanks and belly tanks were inconsistent.
- o The low level day tank alarm setpoint did not provide an accurate tank inventory.
- o The UFSAR, TS and various engineering analyses stated different EDG running time capabilities.

The team noted that the day tank emergency supply lines and their external valves DE-115 and 116, were not included in a maintenance and testing program to assure their availability at all times. The supply lines provide compensation for the fact that storage tank T-10 and its appurtenances are not seismically or tornado qualified. The team was also concerned that the TS required minimum 16,000 gallons of fuel in storage tank T-10 would not assure 7 days of dedicated EDG fuel supply. The licensee currently maintains tank levels above the TS minimum to satisfy calculated 7 day fuel supply requirements. The licensee's responses to the team's concerns committed to evaluate and provide necessary corrective action by the fourth quarter of 1992. This item remains open pending NRC review of the licensee's corrective action (255/91019-22(DRS)).

3.3.1.2 Diesel Room Heating, Ventilation and Air Conditioning

The team questioned the ability of each EDG room heating, ventilation and air conditioning (HVAC) system to maintain the ambient air temperature below 104°F with only one of two fans fed by Class 1E power, considering all heat sources in the room, and the design maximum intake air temperature of 95°F. The information provided by the licensee did not provide confidence that fans V-24A (K-6A) or V-24C (K-6B) would be able to provide adequate ventilation. Most of the team's concerns had been previously identified by the licensee who retained the services of Bechtel Corporation for the preparation of an analysis demonstrating the capacity of the existing system. After the completion of this analysis, appropriate corrective actions to resolve the concern will be performed by the licensee. This issue remains open pending NRC review of the analysis and corrective action (255/91019-23(DRS)).

3.3.1.3 Emergency Diesel Generator Air Intake and Exhaust

During system walkdowns, the team found the EDG exhaust mufflers unbolted from their pedestals. The nuts had been removed and the ends of the bolts flame cut to prevent the reinstallation of the nuts. This raised a concern regarding the ability of the exhaust system to function after an earthquake. The licensee explained that the mufflers were left unbolted during preoperations testing in order to accommodate thermal expansion of the exhaust piping. No formal modifications documentation was available for review. The licensee committed to include the EDG exhaust system in its Seismic Verification Project under the auspices of the Seismic Qualification Utility Group (SQUG), and to formally document the anchoring design of the mufflers for both seismic loadings and thermal expansion during the first quarter of 1992. This item remains open pending NRC review of the design documentation (255/91019-24(DRS)).

3.3.1.4 Emergency Diesel Generator Starting

The team noted that the EDGs have never been tested to demonstrate their ability to start at minimum hot standby conditions as specified by the manufacturer (i.e., 90°F lube oil and jacket water temperature and 65°F room temperature). EDG monthly testing does not verify these parameters prior to startup. The licensee committed to test start the EDGs under these temperature conditions by the end of the next refueling outage.

The possibility that jacket water and room temperatures could fall below the minimum hot standby conditions was considered significant since these parameters are not under automatic alarm surveillance. The licensee's response to the team's concern committed to evaluate methods to assure that these temperatures do not fall below design temperatures, including modification or procedure revisions as required. This item remains open pending NRC review of the licensee's corrective action (255/91019-25(DRS)).

3.3.2 Limiting Conditions of Operation and Maintenance for Emergency Diesel Generators

The team was concerned that plant procedures or policies neither prohibit nor control work in the switchyard or on redundant systems when one EDG is inoperable because of maintenance or testing. Unnecessary risk of loss of offsite power should be clearly eliminated by procedures when only one EDG is operable. An incident of this nature is described in NRC Information Notice 91-34. The licensee agreed to incorporate into plant administrative procedures the guidance to assure that testing or maintenance is avoided which has reasonable potential to affect redundant equipment. This issue remains open pending NRC review of the procedure and policy revisions (255/91019-26(DRS)).

3.3.3 Switchgear, Battery, Cable Spreading and New Electrical Equipment Room Heating, Ventilation, and Air Conditioning

The team noted that no documentation was available to support the design of the HVAC systems for the switchgear, battery, cable spreading or new electrical equipment rooms. The team reviewed the test reports attached to a

November 1, 1982 letter (K. A. Toner, CPCo to D. M. Crutchfield, NRC) and noted that the tests performed qualified the ventilation system for normal conditions only and not for emergency conditions following a design basis accident (DBA). The licensee stated that during a DBA, if ventilation proved inadequate, the doors to these rooms would be opened to provide additional cooling. The team was concerned that the adequacy of air mass flow rate and distribution plus the effect of this ventilation scheme on the remainder of the plant's ventilation system(s) had not been reviewed. The team also questioned the capability of the overall system to withstand tornadoes or seismic events.

The licensee committed to an in-depth review of auxiliary building HVAC systems as part of the development of a design basis document (DBD) and their response to USI A-46 for HVAC scheduled for completion in 1994. The adequacy of the battery room ventilation will be verified during the development of this DBD as well as the adequacy of room cooling by door opening. The issue of tornado loads and seismic effects will also be evaluated.

3.3.4 Seismic Qualification of Mechanical and Electrical Systems

The team observed that because Palisades is an older generation plant, many of the systems and components of the EDS and its support systems did not meet current seismic design practices.

In response to the team's concern, the licensee committed to prepare an emergency power system equipment list and perform preliminary screening, walkdown, and evaluations and to schedule and prioritize under their SQUG program any resulting modifications required before the end of 1992.

3.3.5 Conclusion

The team concluded that the overall design and performance of the mechanical systems supporting the EDS was acceptable. The lack of design information in the areas of seismic qualification and tornado loading prevented the team from reaching conclusions in these areas. The team recognized that Palisades is an older design plant and that the reviews and analyses required by USI A-46 and SQUG program will address these issues. The team did not identify any operability concerns in this area.

4.0 Engineering and Technical Support

During the inspection, the team evaluated Palisades' E&TS capability. The team reviewed the licensee's programs for temporary modifications, permanent modifications. engineering interfaces, drawing control, discrepancy management, 10 CFR 50.59 evaluations, test development and control, manual operator actions, maintenance, and QA/QC. In addition, the team reviewed the electrical training programs for engineers and the root cause analysis for licensee event reports (LERs).

4.1 Design Control Deficiencies

The team's review of electrical calculations/modification packages indicated that there were deficiencies in design control. For example:

- The load flow calculations contained nonconservative assumptions, in that the worst case voltages were not used.

- The short circuit calculation used a non-conservative cable temperature in determining the cable resistance.

- The sizing calculation for the input and output cables to the battery chargers did not consider the worse cases, i.e., current limiting and equalization.

- The impedance of the buried cables from the switchyard to the safeguards transformer was incorrectly modeled in the load flow analysis.

Some of the same types of deficiencies were also found in the mechanical review of the EDG support systems. For example, the calculation for the EDG room HVAC did not consider the fan as part of the heat load into the room.

The team recognized that the licensee's own initiatives were proactive in identifying deficiencies in design control. In fact, approximately half of the above examples were also identified by the licensee's audits, independent design reviews, and the configuration control project. However, it was clear to the team that the licensee has not been entirely successful in achieving adequate design control.

The licensee made the following commitments to improve design control:

a. Complete design basis document training for all electrical, I&C, and computer design engineers by the end of January 1992.

b. Conduct in-depth reviews similar to those conducted in the Design Engineering Self-Assessment on calculations performed by the engineering organization and on calculations performed for Palisades outside by engineering organizations.

c. Implement as a pilot program in the electrical and I&C areas, the program described in a position paper dated October 11, 1991. This program is to include:

   (1) Review of calculations to be controlled for technical quality and suitability of input assumptions.

   (2) Evaluate the need for additional engineering guidance in the development of analysis input assumptions.

   (3) Evaluate and implement as appropriate, similar calculation controls, reviews and guidance in other engineering disciplines.

The team considered this response acceptable and had no further concerns. The results of these corrective actions will be reviewed in future inspections.

4.2 Post Modification Testing

The team identified inadequate post modification testing of pump P55B. Facility change (FC) FC-839 issued in 1989, required that charging pump motor P55B be powered from the same power supply as charging pump P55C. The modification also required that the low suction pressure and low lube oil pressure trips be blocked when charging pump P55B was supplied by the pump P55C bus. The licensee closed out FC-839 on February 1, 1991, but did not test whether the low suction pressure and low lube oil pressure trips were blocked. Failure to block these trips would have resulted in the inability to start pump P55B. On December 4, 1991, the licensee issued DR D-PAL-91-197 to initiate action to perform the post modification test of pump P55B required by FC-839.

Failure to implement adequate post modification testing is considered a violation of 10 CFR 50, Appendix B, Criterion XI (255/91019-27(DRS)).

4.3 Conclusions

The team determined that, while the plant's modification process and calculation controls have improved, problems were identified in some of the calculations performed in 1991. Examples included nonconservative assumptions, failure to use worst cases, and errors that should have been found in the checking process.

The team considered the licensee's electrical engineering staff qualified and competent. The team determined that while the electrical engineering staff was not overloaded in general, certain key people seemed to do most of the work. This led to a concern that the licensee's engineering staff could be weakened by the loss of these key personnel. The team saw an improvement in the plant's E&TS capability since the plant moved the engineers to the site and took "ownership" for design. The team noted that the Configuration Control Program had identified many of the issues identified by the EDSFI team.

5.0 Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, violations, or deviations. An unresolved item disclosed during this inspection is included in Section 3.1.14.

6.0 Open Items

Open items are matters which have been discussed with the licensee, which will be reviewed further by the team, and which involve some action on the part of the NRC or licensee or both. Open items disclosed are discussed in Sections 3.1, 3.2 and 3.3.

7.0 Exit Interview

The team conducted an exit meeting on December 13, 1991, at the Palisades Nuclear Power Plant to discuss the major areas reviewed during the inspection, the strengths and weaknesses observed and the inspection results. Licensee representatives and NRC personnel in attendance at this exit meeting are documented in Appendix A of this report. The team also discussed the likely informational content of the inspection report with regard to documents reviewed by the team during the inspection. The licensee did not identify any such documents or processes as proprietary.

Appendix A

Personnel Contacted

Consumers Power Company

*D. P. Hoffman, Vice President, Nuclear Operations
*D. L. Anderson, Nuclear Performance Assessment Engineer
*W. J. Axdorff, Senior Engineer
J. A. Blewett, Project Engineer, Configuration Control Project
*R. J. Conbett, Programs Engineer
*P. M. Donnelly, Director, Plant Safety and Licensing
S. Forte, Programs Engineer
*R. M. Hamm, Section Head, Instrument and Control Engineering
*B. Harshe, Supervisory Engineer
*J. Haumersen, Superintendent, Instrumentation and Control Department
*C. Hillman, Plant Licensing Engineer
*J. Kuemin, Licensing Administrator
*S. G. Kupka, Systems Engineer
R. A. Moceri, Systems Engineer
*L. Morse, Licensing Engineer
*M. T. Nordin, System Engineer
*R. D. Orosz, Manager, Nuclear Engineering and Construction
*K. E. Osborne, Manager, Systems Engineering
*R. W. Phillips, Programs Engineer
*R. J. Pienkos, System Protection Engineer
*R. M. Rice, Manager, Palisades Operations
*G. B. Slade, General Manager, Palisades Plant
*K. A. Toner, Manager, Electrical, Instrumentation and Control Engineering
*D. J. VandeWalle, Manager, Engineering Programs

U. S. Nuclear Regulatory Commission

*R. N. Gardner, Chief, Plant Systems Section, Region III
J. K. Heller, Senior Resident Inspector, Palisades
B. E. Holian, Project Manager, Palisades, NRR
*B. L. Jorgensen, Chief, Projects Section 2A, Region III
*H. J. Miller, Director, Division of Reactor Safety, Region III
*J. R. Roton, Resident Inspector, Palisades

*Denotes those present at the exit meeting on December 13, 1991.

PALISADES EDSFI QUESTIONS

1. PROVIDE PROCEDURES DETAILING INTERFACES BETWEEN ENGINEERING AND OTHER DEPARTMENTS, ARCHITECT/ENGINEERS, PROCUREMENT, ETC?
2. PLEASE PROVIDE LIST OF OUTSTANDING TEMPORARY MODIFICATIONS/ALTERRATIONS.
3. PROVIDE A COPY OF PALISADES MODIFICATION PROCEDURES.
4. PROVIDE A LIST OF MODIFICATIONS INVOLVING ELECTRICAL SYSTEMS AND COMPONENTS SINCE JANUARY 1987.
5. PROVIDE COPIES OF PROCEDURES GOVERNING MODIFICATIONS/ALTERATIONS.
6. PROVIDE TRAINING REQUIREMENTS FOR DESIGN AND SYSTEMS ENGINEERS.
7. PROVIDE A COPY OF PROCEDURES FOR CONTROLLING ACTIVITIES OF CONTRACTORS.
8. PROVIDE SHORT CIRCUIT CALCULATIONS FOR SIZING OF 2400 AND 480V BREAKERS.
9. PROVIDE PROCEDURES FOR GROUND FAULT, LOSS OF OFFSITE POWER/LOCA, AND EDG OPERATION.
10. PROVIDE SHORT CIRCUIT CALCULATION FOR AC SYSTEMS, MEDIUM AND LOW VOLTAGE.
11. ARE SURGE ARRESTORS PROVIDED ON THE SECONDARY SIDE OF THE START-UP AND STANDBY TRANSFORMERS?
12. PROVIDE A COPY OF THE FAST BUS TRANSFER STUDY IF ONE EXISTS.
13. PROVIDE A COPY OF THE SIZING CRITERIA FOR POWER CABLES.
14. PROVIDE A COPY OF THE SIZING CALCULATIONS FOR THE START-UP AND SAFEGUARDS TRANSFORMERS.
15. ARE THERE ANY RACEWAY SECTIONS WHERE THE CABLE AMPACITY IS EXCEEDED?
16. PROVIDE A COPY OF THE EDG LOAD STUDY/TRANSIENT ANALYSIS.
17. PROVIDE A RECORD OF GRID VOLTAGE FLUCTUATIONS FOR THE PAST YEAR.
18. WHAT ARE THE MINIMUM STARTING AND RUNNING VOLTAGES FOR THE ESSENTIAL MOTORS?
19. PROVIDE PROTECTIVE RELAY AND CB COORDINATION CURVES FOR AC SYSTEMS, MEDIUM AND LOW VOLTAGE.
20. ARE THERE ANY TRAY SECTIONS THAT ARE OVERFILLED WITH CABLES?
21. IS THERE AN AUTOMATIC FUNCTION OF THE FUEL OIL TRANSFER PUMPS FOR THE EDGs AND IS IT TESTED?
22. PROVIDE THE PROCEDURE FOR THE DAY TANK LEVEL SWITCH CALIBRATION.
23. HOW ARE BATTERY ROOM TEMPERATURES MONITORED? WHAT ARE THE ALARMS FOR HIGH/LOW TEMPERTURE?
24. IS THERE A LOAD GROWTH PROGRAM FOR THE BATTERIES? PROVIDE MOST UP-TO-DATE LOAD LIST AND PROFILE.
25. PROVIDE THE OPERATING INSTRUCTIONS FOR THE DC GROUND DETECTORS. PROVIDE GROUND DETECTOR WIRING DIAGRAMS AND CONNECTION DIAGRAMS FOR THE BATTRY SYSTEM.
26. ARE DC GROUND DETECTORS CHECKED AND AT WHAT ACCURACY?
27. WHAT IS THE LOW VOLTAGE SHUTDOWN POINT FOR THE INVERTERS?
28. PROVIDE VENDOR INSTRUCTIONS/MAINTENANCE MANUAL FOR THE INVERTERS AND RELATED REGULATING TRANSFORMERS.
29. PROVIDE VENDOR INSTRUCTIONS/MAINTENANCE MANUAL FOR THE BATTERY CHARGERS.
30. PROVIDE DESIGN AND PURCHASE SPECIFICATIONS FOR THE 120V INVERTERS.
31. PROVIDE SIZING CALCULATION FOR THE INSTRUMENT INVERTERS.
32. PROVIDE THE MOST RECENT DC BATTERY CHARGER SIZING CALCULATIONS/STUDIES.
33. PROVIDE CURRENT COMMITMENT REGUARDING BREAKER/FUSE COORDINATION FOR THE dc DISTRIBUTION SYSTEM.
34. IS THERE A LOAD GROWTH PROGRAM FOR MOTOR CONTROL CENTERS?
35. WHAT ARE THE CRITERIA FOR CABLE TRAY FILL/CONDUIT LOADING?
36. PROVIDE THE PROGRAMS/PROCEDURES FOR FUSE CONTROL.
37. PROVIDE EXISTING PROCEDURES FOR BREAKER SETTING/VERIFICATION
38. PROVIDE EXISITING PROCEDURES FOR SETTING MOTOR THERMAL OVERLOAD HEATERS.
39. WHAT IS THE BASIS DOCUMENT FOR CABLE SEPARATION?
40. ARE THERE PROGRAMS/PROCEDURES FOR CONFIGURATION CONTROL?
41. PROVIDE ELECTRICAL DEVIATION REPORTS FOR THE PAST THREE YEARS.
42. PROVIDE A LIST OF OPEN ELECTRICAL WORK REQUESTS.
43. PROVIDE A LIST OF CLOSED ELECTRICAL MODIFICATIONS FOR THE PAST THREE YEARS.
44. PROVIDE THE PROCEDURES FOR THE EMERGENCY BUS LOSS OF VOLTAGE AND DEGRADED VOLTAGE RELAYS.
45. PROVIDE THE CALIBRATION PROCEDURES FOR THE EDG LUBE OIL TANK LEVEL TRANSMITTER.
46. PROVIDE A SCHEMATIC OF THE EDG FUEL TRANSFER PUMP CONTROL LOGIC.
47. PROVIDE THE PROCEDURE AND DATA SHEETS WHICH CHECK THE REGULATION OF THE SAFETY RELATED INVERTERS.
48. PROVIDE THE LAST SURVELLANCES FOR THE DIV 1&2 BATTERIES.
49. PROVIDE THE LAST THREE 18 MONTH DIV 1&2 BATTERY SURVEILLANCES REQUIRED BY TECH SPECS.
50. PROVIDE CLOSE-OUT DOCUMENTATION FOR THE FOLLOWING PREVIOUS INSPECTION ITEMS: 88020-04, 89007-1K, AND 91002-01.
51. PROVIDE THE PROCEDURES FOR TESTING THE OVERCURRENT DEVICES.
52. PROVIDE THE 18 MONTH OVERLOAD PROTECTION SURVEILLANCES FOR THE ESSENTIAL MOVs.
53. PROVIDE THE LAST THREE 18 MONTH SURVEILLANCES OF THE PRIMARY CONTAINMENT PENETRATION CONDUCTOR OVERCURRENT PROTECTIVE DEVICES.
54. PROVIDE THE LAST THREE WEEKLY SURVELLANCES FOR THE DIV 1&2 BATTERIES.
55. PROVIDE A LIST OF ELECTRICAL LERs ISSUED SINCE JANUARY 1987.
56. PROVIDE A LIST OF DERs GENERATED SINCE JANUARY 1987.
57. PROVIDE RESULTS OF THE LAST 6 OIL SAMPLE TESTS.
58. PROVIDE PROCEDURAL CONTROLS FOR THE STORAGE TANK DUMP VALVES.
59. PROVIDE METHOD FOR VERIFYING CHECK VALVES WORK FOR THE AIR RECEIVER CHECK VALVES.
60. PROVIDE LOAD GROWTH CONTROLS FOR EDG LOADING.
61. HAVE EDGs EVER BEEN DEMONSTRATED TO START AT THE LOW TEMPERATURE ALARM SETPOINT?

62. HAS VENTILATION, SUPPLY AIR, AND EXHAUST PIPING BEEN EVALUATED FOR TORNADO INDUCED DEPRESSURIZATION?
63. PROVIDE LAST SURVEILLANCE TEST RESULTS FOR ALL DIESEL MONTHLIES AND 18 MO.
64. PROVIDE EDG PRE-OPERATIONAL TEST RESULTS.
65. PROVIDE TEST DATA DEMONSTRATING FUEL OIL CONSUMPTION AT DESIGN CONDITIONS.
66. PROVIDE DRAWINGS OF STORAGE AND DAY TANK INTERNAL DIMENTIONS.
67. PROVIDE CALCULATIONS FOR FUEL OIL STORAGE CAPACITY.
68. PROVIDE SETPOINTS FOR STORAGE TANK AND DAY TANK LEVEL ALARMS AND SWITCHES.
69. PROVIDE EDG FUEL SYSTEM CONTROL SCHEME.
70. PROVIDE TEST DATA DEMONSTRATING TECH SPEC REQUIRED STARTS WITHOUT RECHARGING RECEIVER TANKS.
71. PROVIDE SETPOINTS FOR PRESSURE SWITCHES AND ALARMS.
72. PROVIDE QUANTIFICATION OF LEAKAGE RATE FROM AIR START SYSTEM.
73. PROVIDE JACKET WATER EXPANSION TANK ALARM LEVEL ALARM SETPOINT & BASES.
74. WHAT IS THE JACKET WATER LEAKAGE RATE DUE TO SHAFT SEALS AND VALVE STEMS ETC?
75. WHAT IS THE HEAT TRANSFER CAPABILITY OF THE EDG SERVICE WATER SYSTEM AT RATED LOAD WITH MAX SERVICE WATER TEMPERATURE?
76. PROVIDE HVAC LOAD CALCULATION FOR LOP/LOCA OPERATION FOR THE SWITHGEAR ROOMS.
77. PROVIDE HVAC LOAD CALCULATION FOR LOP/LOCA OPERATION FOR THE BATTRY ROOMS.
78. PROVIDE HVAC LOAD CALCULATION FOR LOP/LOCA OPERTION FOR THE EDG ROOMS.
79. PROVIDE A LIST OF AUDITS AND SURVEILLANCES INVOLVING ELECTRICAL SYSTEMS/COMPONENTS PERFORMED BY QA SINCE JANUARY 1987.
80. HOW OFTEN ARE THE dc GROUND DETECTORS CHECKED?
81. WHEN IS A GROUND PRESENT, THAT IS, AT WHAT RESISTANCE VALUE WOULD A GROUND BE INVESTIGATED?
82. PROVIDE A COMPLETED COPY OF A PROCEDURE FOR TESTING A SAFETY RELATED 480V LOAD CENTER BREAKER
83. PROVIDE CALCULATION INDEX AND DESIGN INSTRUCTIONS INDEX FOR APPENDIX "R".
84. HOW IS AIR DRIER PERFORMANCE MONITORED FOR DEGRADATION OF PERFORMANCE?
85. HOW IS WATER REMOVED FROM EDG AIR START "U" LEG PIPING?
86. PROVIDE PRE-OPERATIONAL TEST PROCEDURE RESULTS AND VIBRATION TEST RESULTS FOR EDG SW PUMP.
87. PROVIDE DETAIL DESIGN OF LUBE OIL PIPING INCLUDING FLANGE CONNECTIONS.
88. WHAT IS THE ALLOWABLE MISALLIGNMENT OF FLANGE CONNECTIONS?
89. WHAT IS DESIGN LIFE OF QUALIFIED EXPANSION JOINTS & BASIS FOR QULIFICATION.
90. WHAT INSPECTIONS ARE CARRIED OUT TO INDICATE DEGRADATION?
91. WHAT IS THE DESIGN LIFE EXPECTED IN ENVIRONMENT FOR EXPANSION JOINTS?
92. WHAT IS THE BASIS OF DESIGN ENVIRONMENT, eg. VIBRATION?
93. WHAT INSPECTIONS ARE CARRIED OUT TO INDICATE DEGRADATION?
94. PROVIDE COPIES OF EDG LOADING SEQUENCER LOGIC DIAGRAMS AND ELECTRICAL SCHEMATICS.
95. PROVIDE SPECIFICATION FOR EDG LOADING SEQUENCER.
96. PROVIDE MANUFACTURERES LITERATURE FOR EDG LOADING SEQUENCER.
97. PROVIDE THE PROCEDURES FOR TESTING OF 480v MOLDED CASE CIRCUIT BREAKERS.
98. PROVIDE SEISMIC QUALIFICATION DOCUMENTATION FOR BATTERIES. IN PARTICULAR DISCUSS HOW BATTERIES ARE RESTRAINED IN THE VERTICAL PLANE.
99. PROVIDE EDG OPERATING PROCEDURE WHICH IDENTIFIES DG OUT OF SERVICE FOR MAINTENANCE.
100. PROVIDE DOCUMENTATION OF SEISMIC QUALIFICATION OF EDG LUBE OIL TANK, FUEL OIL DAY TANKS, AND MAIN STORAGE TANKS.
101. PROVIDE OR MAKE AVAILABLE ISEG REPORTS ISSUED SINCE JANUARY 1990.
102. PROVIDE DRAWINGS OF OIL STORAGE ROOM FLOOR DRAIN SYSTEM.
103. PROVIDE THE FOLLOWING FOR CABLE PENETRATIONS: SIZING CALCULATIONS, PROTECTION CALCULATIONS, AND MANUFACTURER'S INFORMATION FOR MEDIUM VOLTAGE, LOW VOLTAGE AND CONTROL PENETRATIONS.
104. PROVIDE MAINTENENCE AND OPERATING MANUALS FOR THE EDGs.
105. PROVIDE THE FOLLOWING INFORMATION FOR THE CORE SPRAY AND RHR PUMP SYSTEMS: A) NAME PLATE DATA FOR EACH LOAD AT 2400 & 480V. B) ELECTRICAL CONTROL SCHEMATICS FOR EACH ASSOCIATED LOAD. C) ASSOCIATED CIRCUIT BREAKER AND MOTOR STARTER DATA.
106. PROVIDE DETAILS OF TRANSFER SCHEME FOR SUPPLY OF DIV I AND DIV II,INCLUDING LOGIC STATEMENTS AND SCHEMATICS.
107. PROVIDE THE PROCEDURE FOR SETTING THE OVERCURRENT RELAYS.
108. PROVIDE OPERATOR'S EOP PROCEDURES TO CONTROL MANUAL LOADING ON EDG.
109. WHAT IS THE GUIDANCE TO LOAD BATTERY CHARGERS ON THE EDG AFTER THEY HAVE BEEN LOAD SHED? WHEN RUNNING ON BATTERIES AFTER LOAD SHED, HOW OS BATTERY CONDITION/CAPACITY MONITORED?
110. DO ENGINEERS ASSIGNED TO CORPORATE ENGINEERING RECEIVE PLANT SYSTEMS INTERFACE TRAINING?
111. PROVIDE EXISTING PROCEDURES FOR TRACKING IMPLEMENTATION OF INDUSTRY INITIATIVES (INCLUDE A LIST OF SILs, TILs, ETC.).
112. PROVIDE THE PROCEDURE FOR LOCATING DC GROUNDS.
113. WHAT ARE THE MINIMUM STARTING AND RUNNING VOLTAGES FOR THE SAFETY RELATED 2400v MOTORS?
114. HAS THE OUTPUT REGULATION OF THE INVERTERS BEEN TESTED BY VARYING THE INPUT VOLTAGE FROM THE LOWEST TO THE HIGHEST EXPECTED INPUT VOLTAGES?
115. WHAT IS THE BACKLOG OF WORK ITEMS IN THE TECHNICAL ENGINEERING GROUP BY CATEGORY, MANHOURS, AND MANYEARS? WHAT IS THE TREND FOR THE PAST SIX MONTHS?
116. PROVIDE CABLE TRAY/CONDUIT LOADING EXCEPTION LISTING (ITEMS WHICH FALL OUTSIDE GUIDELINES).
117. PROVIDE 4160 AND 480V BREAKER ACCEPTANCE TESTS. (A SAMPLE OF RECENTLY COMPLETED TESTS)
118. PROVIDE MANUFACTURERS DATA SHEETS FOR BATTERIES, CHARGERS, INVERTERS, dc DIST. PANELS, AND VITAL AC PANELS, LARGE DC MOTORS, MOVs, BREAKER MOTORS, SOLENOID VALVES, AND CONTROL RELAYS.
119. PROVIDE THE PROCEDURES FOR THE AC LOAD GROWTH PROGRAM.
120. MAX/MIN VOLT RATINGS OF dc AND VITAL AC SYSTEM DEVICES? VERIFY DEVICES WILL HAVE ADEQUATE VOLTS TO OPERATE WITHIN THIS RANGE. VERIFY EQUALIZING VOLTS WILL NOT CAUSE OVER VOLTSE AND REDUCED VOLTS DURING BATT CHRG WILL NOT CAUSE UV TO DEVICES.
121. ARE THE BATTERIES SIZED FOR THE FULL CAPACITY OUTPUT OF INVERTERS OR ARE THEY SIZED ON EXISTING INVERTER LOADS?

122. WAS WORST CASE TEMPERATURE RATING USED TO DETERMINE THE MAXIMUM AVAILABLE SHORT CIRCUIT CAPACITY OF THE BATTERY? WHAT IS THE ROOM MAXIMUM TEMP? WHAT IS THE ELECTROLYTE TEMP USED TO CALCULATE MAX SHORT CIRCUIT TEMPERATURE.
123. WHAT CABLE CONDUCTOR TEMPERATURE WAS USED TO DETERMINE CONDUCTOR RESISTANCE USED IN VOLTAGE DROP CALCULATIONS? WHAT IS THE MAX DESIGN TEMPERATURE ALLOWED IN THE PLANT?
124. WHAT IS THE EDG FIELD FLASH LOADS VOLTAGE DROP? ARE THERE FSAR/TECH SPEC COMMITMENTS TO MINIMUM VOLTAGE LEVEL? WHAT IS THE EDG MANUFACTURER'S REQUIRED MINIMUM VOLTAGE?
125. PROVIDE VOLTAGE DROP CALCS THAT VERIFY ADEQUATE VOLTAGE FOR DC MOVs. HOW ARE THE MOVs ANALYZED TO VERIFY ADEQUATE TORQUE TO ACTUATE IN WORST CASE CONDS? PROVIDE TORQUE SW SETTINGS WHICH ARE CONTROLLED TO CONFORM WIH ANALYSIS.
126. WHAT ARE THE MINIMUM PICKUP VOLTAGES FOR THE 480v SAFETY RELATED MOTORS?
127. WHAT ARE THE MINIMUM PICKUP VOLTAGES A(THE SAFETY RELATED MOTOR CONTACTORS?
128. HOW MANY MAINTENENCE WORK REQUESTS ARE ON HOLD AWAITING RECEIPT OF PARTS OR MATERIALS? WHAT IS AVERAGE AGE OF WRs AWAITING PARTS?
129. ARE ALL THE SAFETY RELATED SWITCHGEAR ROOM COOLERS FED FROM A CLASS 1E POWER SUPPLY? PROVIDE APPLICABLE DRAWINGS.
130. PROVIDE A COPY OF THE LATEST RELOAD ANALYSIS.
131. PROVIDE SCHEMATIC FOR ALL EDG TRIP CIRCUITS AND RELAY SETPOINTS.
132. PROVIDE PROCEDURES FOR NRC INFO NOTICE RESPONSE AND TRACKING.
133. PROVIDE A LISTING OF ELECTRICAL AND I&C INFO NOTICES SINCE 1987.
134. PROVIDE COPY OF PROTECTIVE RELAY CALIBRATION PROGRAM.
135. PROVIDE BATTERY CAPACITY AND DISCHARGE CURVES.
136. PROVIDE BATTERY TEST PROCEDURES.
137. PROVIDE CABLE SIZING CRITERIA.
138. PROVIDE SHORT-CIRCUIT CALCUAL;TIONS FOR THE DC DISTRIBUTION SYSTEM.
139. PROVIDE BREAKER/FUSE CHARACTERISTIC CURVES.
140. WHAT CONDUCTOR TEMPERATURE WAS USED TO DETERMINE THE CONDUCTOR RESISTANCE USED IN THE SHORT CIRCUIT CALCULATION.
141. WHAT HAPPENS IF THE FAST BUS TRANSFER FAILS?
142. WHAT IS THE PHASE ANGLE DIFFERENCE BETWEEN POWER SUPPLIES PRIOR TH BUS TRANFER?
143. PROVIDE THE DEGRADED VOLTAGE SETPOINT CALCULATION AND SUPPORTING LOADFLOW DOCUMENTS.
144. PROVIDE THE HISTORICAL RECORDS OF 345kV SWITCHYARD VOLTAGES.
145. PROVIDE PROCEDURES FOR OPERATOR ACTIONS TAKEN IF SIS SIGNAL ACTUATION OCCURS DURING ESDG TESTING (MONTHLY SURVEILLANCE TEST).
146. PROVIDE SAFEGUARD TRANSFORMER SIZING CALCULATION.
147. PROVIDE STATION POWER TRANSFORMER 1-2 SIZING CALCULATION.
148. PROVIDE A COPY OF THE FAST BUS TRANSFER IEEE PAPER BY KE YEAGER.
149. PROVIDE MOTOR STARTING CALCULATIONS WHICH REPRESENT WORST CASE TRANSIENT AND STEADY STATE VOLTAGES.
150. PROVIDE CABLE SIZING CRITERIA.
151. PROVIDE A WALKDOWN OF AC SYSTEMS (LIGHTNING ARRESTORS).
152. PROVIDE DRAWING LIST/INDEX FOR 2400Vac, edg SYSTEMS INCLUDING THE FOLLOWING AS APPLICABLE: ONE-LINES, SCHEMATICS, RELAY AND METERING KEY DIAGRAMS.
153. PROVIDE CLOSE-OUT PACKAGES FOR THE FOLLOWING PREVIOUS NRC INSPECTION ITEMS: 88020-02 AND 88020-6B.
154. EDG LOADS: PROVIDE PUMP CURVES SHOWING SYSTEM OPERATING POINTS, ACTUAL MOTOR SPECS vs ABOVE PUMP CURVES, AND MOV SPECIFICATIONS.
155. PROVIDE A COPY OR COPIES OF THE VENDOR MANUAL FOR THE TYPE OF PROTECTIVE OVERCURRENT RELAYS INSTALLED IN SAFETY RELATED SWITCHGEAR.
156. PROVIDE THE SCHEMATICS FOR EACH OF THE TWO EDG START CIRCUITS FOR BOTH EDGs.
157. ARE THE FOLLOWING SEISMICALLY QUALIFIED: (1) 2400v SWITCHGEAR 1E, 1D, & 1C, AND SWITCHGEAR ROOM. (2) SAFEGUARDS BUS A14 AND THE ROOM.
158. DOES THE FAULT ON NON CLASS 1E 2400v CABLE OR CB 152-302 AFFECT ANY OF THE CLASS 1E CHANNELS?
159. WHAT IS THE VOLTAGE AND INTERRUPTING RATING OF THE TWO BREAKERS WHICH CONNECT DC BUS D10 FROM (1) BATTERY D01 AND (2) DISTRIBUTION PANEL D11? PLEASE PROVIDE VENDOR DATA.
160. WHAT IS THE ONE MINUTE DISCHARGE RATE OF BATTERIES D01 AND D02 TO 105Vdc?
161. PROVIDE A LIST OF SAFETY RELATED CALCULATIONS.
162. UNDER WHAT CONDITIONS IS THE PLANT ALLOWED TO OPERATE WITH THE BUS TIE BETWEEN LC11 AND LC12 CONNECTED? WHAT RESTRICTIONS APPLY TO THIS ARRANGEMENT?
163. WOULD FAILURE OF CBs 152-302 AND 152-303 DURING A SEISMIC EVENT (eg SHORT-CIRCUIT), OR FIRE AFFECT THE CLASS 1E BUSES 1D AND 1C?
164. HOW IS BUS 1E (NON-CLASS 1E) ELECTRICALLY SEPARATED FROM CLASS 1E BUSES 1C AND 1D?
165. PROVIDE SEISMIC QUALIFICATION STATUS OF ALL PROCESS PIPING, DUCTING, AND EQUIPMENT IN THE EDG ROOMS AND DEMONSTRATE QUALIFICATION. WHEN EDG AUXILIARY SYSTEM EXTEND BEYOND EDG ROOM, PLEASE ALSO INCLUDE.
166. PROVIDE STARTING AIR RECEIVER'S PRV TESTING PROCEDURE.
167. SHOULD A LOSS OF 345Kv BUS F OCCUR DURING TESTING OF EDG 1-1 OR 1-2, HOW OS BUS TRANFER INITIATED TO TRANSFER THE LOADS FROM S.G 1-1 TO S.U 1-2.
168. PROVIDE CO-ORDINATION CURVES FOR THE FOLLOWING: (1) CB 152-302/303 (2) CB 152-203/202 (3) CB 152-105/106.
169. IS THE EDG GASOLINE AIR COMPRESSOR BATTERY CHARGER FED FROM A SAFETY RELATED 120Vac POWER SOURCE? PLEASE PROVIDE DRAWINGS.
170. PROVIDE THE COMPLETED CALIBRATION DATA SHEETS FOR THE BUS 1C AND 1D OVER CURRENT RELAYS.
171. IS THE DIFFERENTIAL PROTECTION SCHEME COVERING CBs 152-401, 152-302, AND 152-105 QUALIFIED? IF SO, PLEASE PROVIDE ANY BACKUP DOCUMENTATION.
172. Provide the latest polarization index data sheets for the safety related 2400V motors.
173. ARE ANY ALUMINUM CABLE USED IN ANY SAFETY RELATED APPLICATION.

174. PROVIDE DRAWINGS SHOWING LOCATIONS OF DIFFERENTIAL CTs ON CB 152-203 AND CB 152-105.
175. PROVIDE THE LATEST TEST RESULTS ON 125 Vdc D01 AND D02 1. 18 MONTH SERVICE TEST RESULTS 2. 60 MONTH PERFORMANCE TEST RESULTS.
176. PLEASE PROVIDE LARGER SIZE DRAWINGS OF DC AND PREFFERRED AC SYSTEMS; FIGURE 8-12 SHEET 1 OF FSAR; FIGURE 8-12 SHEET 2 OF FSAR.
177. WHAT ROOM ARE SMOKE DETECTORS LOCATED IN?
178. IS THE HVAC FOR THE ERR ROOM SEPARATE FROM THE 1D SWITCHGEAR ROOM?
179. PROVIDE THE LAST 3 RELAY CALIBRATION DATA SHEETS FOR THE FOLLOWING RELAYS: 127-1, 127-2, 127-3, 127-7, AND 127-8. ALSO PROVIDE A COPY OF THE CALIBRATION PROCEDURE.
180. PROVIDE A COPY OF THE FOLLOWING PROCEDURES: SMS-02, ESTS-13, AND ESTS-20.
181. PLEASE EXPLAIN THE SEQUENCE OF EVENTS THAT TAKE PLACE UNDER THE FOLLOWING SCENARIO: (1) EDG1 IS BEING TESTED AND CONNECTED TO BUS 1D. (2) A FAULT OCCURS ON THE FEEDER FROM A-16 TO BUS 1E.
182. PROVIDE YOUR RESPONSE FILE TO THE FOLLOWING INFO NOTICES: 87-062, 88-083, 88-086, 88-086S1, 89-068, 91-006, 91-013, AND 91-051.
183. PROVIDE LIST OF SAFETY RELATED INSTRUMENTS IN RECALIBRATION PROGRAM.
184. WHAT IS THE NORMAL NITROGEN PRESSURE IN THE ELECTRICAL PENETRATION ASSEMBLIES?
185. AT WHAT VALUE IN OHMS OR IN VOLTS DOES THE GROUND DETECTOR(S) ALARM?
186. PROVIDE VOLTAGE DROP CALCULATIONS FOR DC OPERATOR CLOSING AND TRIPPING COILS OF CIRCUIT BREAKERS HAVING LONGER CABLE RUNS AND AT THE END OF DISCHARGE VOLTAGE OF BATTERIES D01 AND D02. INDICATE MIN ACCEPTABLE VOLTS FOR THE COILS PER MFGR RECOMMENDATIONS.
187. PROVIDE THE MOST RECENT BATTERY SIZING CALCULATIONS FOR BATTERIES D01 AND D02.
188. PROVIDE COPIES OF THE FOLLOWING PROCEDURES: ETP-01, ETP-07, ETP-11, AND ETP-15.
189. CRITICAL SERVICE WATER: PROVIDE DB CALC, TESTING, & PROGRAM IN PLACE TO ENSURE ADEQUATE FLOW AND TEMP TO JACKET WATER & LUBE OIL COOLERS INCLUDING ASSURANCE THAT MIN FLOW IS MAINTAINED UNDER ALL DB CONDITIONS, SYSTEM OPERATING MODES, AND FAILURES.
190. WHAT INSPECTIONS AND CLEANUP PROGRAM IS IN PLACE FOR THE JACKET WATER AND LUBE OIL HEAT EXCHANGERS (SEE QUESTION 189 ALSO)? IS SERVICE WATER SYSTEM SEISMICALLY QUALIFIED?
191. PROVIDE THE MINIMUM FAULT CURRENT FOR WHICH THE SAFEGUARD BUS DIFFERENTIAL RELAY 187-1 PICKS UP (OR INITIATES A FAST TRANSFER).
192. WHAT IS THE ADMINISTRATIVE ACTION FOR AN "AS-FOUND" RELAY SETPOINT WHICH IS FOUND TO BE OUT-OF-TOLERANCE DURING A CALIBRATION TEST?
193. PROVIDE LATEST CAL SHTS FOR FOLLOWING INSTRUMENTS: PI-1485, PI-1488, PI-1489, PI-1490, PI-1492, LG-1471, LG-1492, SPI-1213L, D/G VOLTMETER C-04, DPI-1485, DPI-1486, TI-1488, DP-1487, LG-1492, TI-1487, TI-1491, PS-1482, PS-1498, PS-1476, PS-1496, LG-1470.
194. PROVIDE THE CALCULATIONS AND DESIGN INFORMATION FOR SIZING THE THERMAL OVERLOADS FOR THE AUX FW S.G. E50B ISOLATION VALVES MO-0755 AND MO-0743 AND FUEL OIL TRANSFER PUMP P18-B(52-123).
195. PROVIDE THE CALCULATIONS AND DESIGN INFORMATION FOR SETTING THE INSTANTANEOUS TRIP FOR AFW E505 ISOLATION VALVE MO-0755 AND MO=-0743 AND FUEL OIL TRANFER PUMP P18-B(52-123).
196. PROVIDE THE MAUFACTURERS MOMENTARY AND INTERRUPTING RATING FOR THE 480Vac FUEL OIL TRANSFER PUMP P18-B MOLDED CASE BREAKER IN CUBICLE 52-123.
197. PROVIDE THE FOLLOWING DESIGN RELAY SETTING SHEETS: (1) SERVICE WATER PUMP P7B OVERCURRENT RELAY (2) EDG 1-1 AND 1-2 OVERCURRENT RELAYS
198. SINCE THE DEGRADED VOLTAGE ON CLASS 1E BUSES CAUSES LOSS OF BOTH OFF-SITE CIRCUITS COMING INTO THE PLANT (IE. BOTH SOURCES, SAFEGUARDS XFRMER AND STARTUP XFRMER) BECOME UNAVAILABLE, PLEASE JUSTIFY HOW THE ELECTRICAL POWER SYSTEM MEET THE INTENT OF GDC 17
199. (CONT. OF QUESTION 67) IDENTIFY ALL OF T-10 SUPPLY RESPONSIBILITIES AND HOW IT AFFECTS QUESTION 67; PROVIDE CALCS SHOWING SET POINT ESTABLISHMENT FOR DAY TANK AND BELLY TANK; INCLUDE IN QUESTION 67 STRATAGY(PROG) TO ASSURE ADEQUATE (7 DAYS) FUEL STORAGE.
200. PROVIDE LATEST COPY OF EDG SURV. PROCEDURE FOR DEMONSTRATION OF OVERALL AUTOMATIC OPERATION OF THE EMERGENCY POWER SYSTEM. (TECH SPEC 4.7.12) BY LOSS OF POWER & SIS SIGNAL.
201. HOW IS THE FSAR REQUIREMENT FOR A MINIMUM DAY TANK FUEL OIL AVAILABILITY OF 2500 GAL. SATISFIED?
202. REF. DBD 5.01, PAGE 55. 1986 TEST WAS PERFORMED WITH 55°F WATER TEMPERATURE AND UNDEFINED FLOW. WAS ANOTHER TEST PERFORMED AT MAX TECH SPEC TEMPERATURE AND MIN TECH SPEC FLOW?
203. PROVIDE DETAILS OF 1984 SERVICE WATER FAILURE AND RESULTING MODIFICATIONS TO ENSURE FUTURE SYSTEM RELIABILITY. COULD TCVs 1477 AND 1482 NOT RENDER CV-0884 REDUNDANT?
204. PROVIDE BACK-UP CALCULATIONS FOR SIZING AND SELECTING CABLES TO CLASS 1E MOTORS, SWITCHGEARS AND TRANSFORMERS.
205. a) AFTER ECCS LOADS ARE ON-LINE SELECTED LOADS WHICH HAD BEEN SHED ARE MANUALLY RE-ENERGIZED b) PROVIDE PROCEDURES INDICATING HOW THE ADDITION OF LOAD IS CONTROLLED c)WHAT IS THE MAX PEAK LOAD ON BUSES 1C,1D,1E,&SU XFR 1-2 DURING CONDITION DEPICTED IN b)
206. PROVIDE: 1) COORD. PLOTS FOR MCCs 22,24,26,&2(FEED BRKR vs LARGEST LOAD BRKR). 2) PLOT SHOWING PROT. OF LC TRFR PROT. USING THROUGH FAULT PROT. CURVE(ANSIC37-91) 3) PROT. DEV. SETTING SHTS AND CALCS (IF AVAIL. FOR TYP. MOTORS ON BUS 10, LC N012, &MCC N02
207. PROVIDE A COPY OF THE SAFETY RELATED BATTERY CHARGER VENDOR MANUAL.
208. THE TAP SETTING FOR PHASE "B" OF SW PUMP NO. P7B IS AT POSITION 5.0 THE OTHER TWO PHASES ARE SET AT 4.5 ARE THE ABOVE SETTINGS CORRECT?
209. PROVIDE A COPY OF THE 120V INVERTER VENDOR MANUAL.
210. PROVIDE THE TEST PROCEDURE THAT VERIFYS THAT EACH OF THE TWO BATTRY CHARGERS ARE CAPABLE OF SUPPLYING THE NORMAL DC LOADS ON THE BUUS AND SIMULTANEOUSLY RECHARGING THE BATTERY IN A REASONABLE TIME (FSAR 8.3.5.3).

211. CALCULATIONS: DCP-090789-1 AND DCP-062188-1 PROVIDE THE SOURCE OF INFORMATION FOR CABLE IMPEDANCE. WHAT CABLE TEMPERATURE WAS CONSIDERED FOR THE CLCULATIONS?
212. TS SECTION 4.7.1 REQUIRES THAT THE SIGNAL TO START THE EDG WILL BE VARIED TO VERIFY THAT STARTING CIRCUITS A & B ARE OPERABLE. HOW IS THIS VERIFIED? PROVIDE THE PAGE IN THE SURVEILLANCE WHERE THIS IS VERIFIED.
213. SECTION 4.7.1.e OF THE TS REQUIRES THAT THE EDG FUEL TRANSFER PUMPS BE VERIFIED OPERABLE EACH MONTH. PROVIDE THE PAGE IN THE SURVEILLANCE PROCEDURE WHERE THIS IS VERIFIED.
214. IS THE OVERSPEED TRIP OF THE EDGs CHECKED PERIODICALLY? PROVIDE PERTINENT DATA SHEETS.
215. PROVIDE CALCULATION DRS-032591-1 S[illegible] 119
216. PROVIDE LEVEL SETTING DIAGRAM FOR THE EDG FUEL OIL BELLY TANK AND DIESEL OIL STORAGE TANKS.
217. TS SECTION 3.7(3-44) STATES THA 28 HOURS RUNNING TIME FOR THE EDG IS AVAILABLE BEFORE TRANSFER TO THE STORAGE TANK IS MANATORY. SINCE THE EDG CAN USE UP TO 180 GAL/HR IS THE STATEMENT IN THIS SECTION CORRECT?
218. TS SECTION 3.7, PAGE 3-45 STATES THAT THE BATTERY CHARGERS ARE RATED AT 200 AMPS. IS THERE A SURVEILLANCE THAT VERIFIES THE 200 AMP BATTERY CHARGER DISCHARGE RATE? OLEASE PROVIDE SURVELLANCE.
219. TS SECTION 4.7.1 REQUIRES AN INSPECTION OF THE EDG. PLWEASE PROVIDE INSPECTION PROCEDURE.
220. PLEASE CONFIRM IF THE MARKED-UP CIRCUIT IS QUALIFIED (1E).
221. WHAT IS THE MAXIMUM OPERATING TEMPERATURE ALLOWED FOR THE 2.4 KV SWITCHGEAR OUTGOING TERMINALS?
222. WHAT IS THE MAXIMUM TEMPERATURE RISE IN THE 1C AND 1D SWITCHGEAR ROOM SHOULD THE HVAC SYSTEM FAIL - IS HIGH TEMPERATURE IN THE ABOVE ROOMS ALARMED IN THE CONTROL ROOM? WHAT IS THE SETTING? -IS THE COMPLETE HVAC SYSTEM QUALIFIED?
223. IF A SIS SIGNAL OCCURS DURING EDG TESTING, DOES IT BYPASS THE TEST MODE (PARALLEL MODE)? PLEASE PROVIDE SUPPORTING
224. IS THERE ANY FIRE PROTECTION IN THE CABLE SPREADING ROOM? SPRINKLERS?
225. IS THE FAST TRANSFER SCHEME TESTED PERIODICALLY? PLEASE PROVIDE PROCEDURES AND TEST RESULTS FOR LAST 5 [illegible]
226. PLEASE PROVIDE A COPY OF DISCREPANCY REPORTS #FC-CG-89-182/183/184.
227. PROVIDE A COPY OF THE PROCEDURE THAT TESTS THE "AUTOMATIC LOGIC" OF THE EDG FUEL OIL TRANSFER PUMPS.
228. PROVIDE THE INSULATION CO-ORDINATION STUDY TO BACKUP THE SELECTION OF SURGE ARRESTORS IN THE PLANT (2.4kV).
229. PROVIDE COPIES OF THE FOLLOWING NRC OPEN ITEMS AND PALISADES RESPONSES: 90005-04, 90005-03, 89014-04, 89014-05, 88020-6A, 87027-01, 87027-02, 88020-03.
230. PA SYSYTEM IS FED FROM 125Vdc BUSES. A MOTOR/GENERATOR IS ALSO SHOWN IN THE SLD CONNECTED TO THE PA SYSTEM. UNDER WHAT CONDITIONS WILLL THE MG SET FEED THE PA SYSTEM? WHAT IS THE POWER SUORCE TO THE MG.SET?
231. SLD SHOWS AN AMMETER WITH A 200-0-200A 1200-0-1200A SCALER CONNECTD TO THE BATTERIES. WHAT IS THE READING OF THE AMMETER UNDER NORMAL CONDITIONS WHEN THE CHARGER AMMETER SHOWS APPROX. 100A? WHAT IS THE DIRECTION OF THE CURRENT?
232. BATTERY ROOM TEMPERATURE IS MONITORED AND HAVE STEADY READINGS OF APPROX. 81°F AND 85°F IN THE TWO ROOMS. WHAT ARE THE ELECTROLYTE TEMPERATURES?
233. UNDER NORMAL OPERATION, BATTERY CHARGERS LIMIT THE CURRENT AT 220A. WHAT WILL BE THE INITIAL CURRENT THE CHARGERS WILL DELIVER DURING A SHORT CIRCUIT BEFORE REACHING A CURRENT LIMIT? HOW LONG WILL IT TAKE TO SETTLE AT 220A CURRNET LIMIT DURING A SC?
234. PROVIDE COPIES OF THE LATEST COMPLETED MAINTENANCE WORK AND TESTING PERFORMED ON BREAKERS 72-21, 72-16, 72-18, AND 72-28.
235. PROVIDE COPIES OF THE LATEST COMPLETED MAINTENENCE WORK AND TESTING PERFORMED ON BREAKERS 52-1202 AND 52-1[illegible]02.
236. PROVIDE COPIES OF THE LATEST COMPLETED MAINTENANCE WORK AND TESTING ON 2.4kV BREAKERS 152-110 AND 152-[illegible]11. ARE THE BREAKERS SAFETY RELATED?
237. PROVIDE COPIES OF THE LATEST COMPLETED MAINTENANCE WORK AND TESTING PERFORMED ON BREAKERS 52-225 AND 52-145.
238. PROVIDE THE LATEST CALIBRATION DATA SHEETS FOR THE EDG 1-2 OVERCURRENT RELAY. WHAT IS THE CALIBRATION FREQUENCY?
239. IS THE SWITCH YARD BATTERY TEMPERATURE MONITORED? AT WHAT TEMPERATURE WILL THE BATTERY MAINTAIN THE DESIGN RATING?
240. PROVIDE CALCULATION EA-E-PAL-89-011-01 AND EA-P-SA-8602 COVER SHEETS. (EDG STEADY STATE LOADING REFERENCE DOCUMENTS)
241. PROVIDE VOLTAGE DROP CALCULATION FOR ALLIS-CHALMERS BREAKER OPERATING DEVICES (CLOSINF COILS, TRIP COIL, SPRING CHARGING MOTOR AND SPRING RELEASE COIL).
242. PROVIDE VOLTAGE DROP CALCULATION FOR OIL LIFT PUMP MOTOR. WHAT IS THE MINIMUM ACCEPTABLE VOLTAGE AND MAXIMUM ALLOWABLE VOLTAGE FOR THE MOTOR?
243. PROVIDE THE PURCHASE SPECIFICATION FOR 2400V CABLES.
244. PROVIDE A COPY OF SCHEMATIC DIAGRAM 950W48M12, SH 97, REVISION 0 AND INFORMATION PERTAINING TO UNRESOLVED ITEM 255/88020-07
245. PROVIDE A COPY OF DEVIATION REPORT PAL-88-179 AND INFORMATION PERTAINING TO UNRESOLVED ITEM 255/88020-03
246. THE ALCO EDG VENDOR MANUAL STATES THAT THE OVERSPEED TRIP OCCURS AT 990-1035 RPM. HOWEVER, THE PRESENT TRIP SETPOINTS ARE 1055 FOR EDG 1-1 AND 1094 FOR EDG 1-2. WHAY ARE THE PRESENT TRIP SETPOINTS DIFFERENT THAN THE VENDOR'S RECOMMENDATIONS?
247. PROVIDE COPIES OF THE FOLLOWING LERs: 89-015, 89-021, 90-015, 90-021, AND 910-010
248. EDG OVERLOAD RATINGS ARE EXPRESSED IN TERMS OF KW. ARE OVERLOAD RESTRICTIONS DUE TO ENGINE OR GENERATOR CONSTRAINTS? IF OVERLOAD RESTRICTIONS ARE GENERATOR CONSTRAINTS, IDENTIFY LOAD POWER FACTOR ALLOWED OR ACTUAL KVA OVERLOAD RATINGS.
249. PROVIDE VOLTAGE DROP CALCULATION FOR 120Vac RELAYS USED IN SAFETY INJECTION CIRCUITS (EX: S1S-1). PROVIDE VOLTAGE DROP CALULATIONS FOR EDG CONTROL PANEL 125Vdc (EX: ONE RELAY). PROVIDE MINIMUM AND MAXIMUM VOLTAGE AND CURRENT AND VOLTAGE FOR RELAYS
250. PROVIDE THE PUMP CHARACTERISTICS FOR P81A BEARING OIL LIFT PUMP.
251. 1) PLEASE PROVIDE CALCS. SHOWING THE MAXIMUM VOLTAGES ON CLASS 1E MOTOR TERMINALS WHEN THE GRID VOLTAGE IS MAXIMUM AND SG TRANSFORMER1-1 TAP CHANGER IS STUCK TO GIVE MAXIMUM VOLTAGE ON THE SECONDARY.2) PROVIDE PROCEDURE TO GUARD AGAINST ABOVE.
252. PROVIDE COPIES OF THE FOLLOWING CORRECTIVE ACTION DOCUMENTS: EPAL -89032, EPAL - 89042, AND EPLAL - 91016.
253. PROVIDE A COPY OF THE PROCEDURE THAT DESCRIBES HOW TO FILL OUT LERs.
254. WHAT ARE THE SHORT CIRCUIT WITHSTAND RATINGS AND AVAILABLE SHORT CIRCUIT CURRENTS ON BUSES D11 AND D21?
255. IF OFFSITE POWER IS RESTORED FOLLOWING A LOSS OF OFFSITE POWER, DO OPERATING PROCEDURES ALLOW/REQUIRE RETRANSFER TO THE OFFSITE SOURCE? PROVIDE PROCEDURES THAT GOVERN THIS CONDITION.

256. HVAC - SWITCHGEAR, CABLE SPREADING, AND BATTERY ROOMS. REF: PID M-218, SHEET 1. PROVIDE STATUS OF SEISMIC QUALIFICATION.
257. PROVIDE CALCULATIONS AND PROTECTIVE RELAY AND ASSOCIATED METERING BURDENS PLACED ON A (ONE) CURRENT TRANSFORMER AND A (ONE) POTENTIAL TRANSFORMER.
258. PLEASE PROVIDE THE CRITERIA FOR SETTING OF OVERLOAD RELAYS FOR CLASS 1E MOTORS (460 V AND 2300V).
259. THE FIELD FLASHING UNIT FOR THE EDG IS ONLY ON THE "B" START LOGIC. SINCE THE EDG MUST COME UP TO APPROX. RATED VOLTAGE IN LESS THAN 10 SECONDS, HAS THE LOSS OF THE "B" START LOGIC BEEN ANALYZED FOR EMERGENCY STARTING?
260. TS 3.7.1 RESERVES A MIN 16,000 GAL OF FUEL FOR THE EDG IN T-10. WHAT PROCEDURAL CONTROLS EXIST IN ORDER TO ENSURE THAT THIS MIN IS MAINTAINED FOR THE EXCLUSIVE USE OF THE EDG WHEN T-10 IS ALSO SUPPLYING THE HEATING & EVAPORTOR BOILERS & FIRE PUMP DIESEL?
261. THE FEEDER TO SWITCHYARD STATION POWER TRANSFORMER # 2 FROM CLASS 1E 2400V BUS IS # 1/0. PLEASE PROVIDE BACKUP CALCULATIONS TO SUPPORT THE ADEQUACY OF CONDUCTOR SIZE TO SUSTAIN THE MAXIMUM SHORT CIRCUIT CURRENT ON BUS 1C.
262. DWG NO. E-8, SHEET 1 SHOWS THE PA SYSTEM FED FROM BREAKER 72-17 OF THE 125VDC BUS D-10. EXPLAIN WHY DC POWER IS SUPPLIED TO THE PA SYSTEM?
263. THE DC BRKR DATA SHTS REQ THAT THE BRKRS BE TESTED WITH AC CURRENT. PROVIDE DESIGN CALCS AND/OR INFO ON HOW THE PICKUP AND INST SETPOINTS WERE SELECTED FOR BREAKERS 72-16, 72-18, 72-21, AND 72-28. ALSO, WHEN WAS BREAKER 72-18 LAST TESTED?
264. JUNE 1983, LTR TO NRC FROM D. VANDEWALLE AGREED TO REVIEW AND DOC: 1)APPROX INTERRUPT CURRENT CAP. FOR ALL PWR PENETRATIONS 2)SAMPLE I&C PENETRATIONS 3)SURVEIL TESTING FOR CIRCUIT PROT DEVICES 4) MODS NEEDED TO CONFORM TO CUR LIC CRITERIA. NEED THIS DOC.
265. THE TRANSFER FROM SG TO SU IS BLOCKED IF SU VOLTAGE IS LOW. PLS PROVIDE THE SETTING OF THIS RELAY, AND THE JUSTIFICATION FOR SELECTING THE SETTING
266. ARE THE LOAD CABLES ON THE 2400V SAFETY RELATED BUSES SHIELDED?
267. PROVIDE COPIES OF THE FOLLOWING SURVEILLANCES: 88-26, 88-73, 89-12, 89-38, 90-05, 90-06, 90-37, 90-58, 91-01, 91-011, 91-023, and 91-044.
268. PROVIDE COPIES OF THE FOLLOWING AUDITS: QA 89-05, QA 89-06, QT 89-04, QT 89-13, QA 90-01, QA 90-08, QA 91-06, AND QA 91-18.
269. ARE THERE ANY PROCEDURAL OR PHYSICAL CONSTRAINTS WHICH WOULD PREVENT OPERATORS FROM TRANFERRING TO THE OFFSITE SOURCE WHEN LESS THAN ADEQUATE VOLTAGE IS AVAILABLE? (SEE ATTACHMENT)
270. PLEASE PROVIDE THE BACKUP CALCULATIONS TO SUPPORT THE NORMAL LOAD CURRENTS INDICATED IN TABLE 1 OF INTERNAL CORRESPONDANCE RJP-01-89, 'PALISADES BUS 1C,1D AND BUS 1E CABLE AMPACITY.
271. PROVIDE CALCULATIONS TO SUPPORT VOLTAGE DROPS SHOWN IN FIGURES 2 AND 3 OF DBD-4.02.
272. NON 1E POWER IS CONNECTED WITH 1E POWER THROUGH A NON 1E BREAKER WHEN THE ALTERNATE PRESS. POWER IS CONNECTED. THIS ISSUE WAS RAISED AS SSDC # 5. WHAT ACTION WAS TALEN TO CORRECT THE SITUATION.
273. PLS PROVIDE THE ACTION TAKEN TO ADDRESS ATTACHED SSDC # 2
274. THE LOAD CENTER TRANSFORMERS ARE NOT PROVIDED WITH GROUND FAULT RELAYS. PROVIDE EXPLANATION OF TRANSFORMER PROTECTION AGAINST HIGH IMPEDANCE GROUND FAULTS.
275. HOW MUCH TIME DOS LTC TAKE TO CHANGE FROM ONE TAP TO THE NEXT. DOES UV RELAY ALLOW LTC SUFFICIENT TIME TO CORRECT THE VOLTAGE ON BUSES 1C AND 1D. PLS PROVIDE THE NECESSARY ANALYSIS.
276. PLS PROVIDE 50-59 AND/OR SER FOR FC 600, OFFSITE POWER RELIABILITY IMPROVEMENT, GWO 8303, FILE 114.2
277. PROVIDE A COPY OF THE CHART RECORDER GRAPH AND ENGINEERING ANALYSIS (STEP 5.8.1) FOR SURVEILLANCE PROCEDURE RT-8C PERFORMED ON 2-21-91.
278. PROVIDE ONE POTENTIAL TRANSFORMER AND ONE CURRENT TRANSFORMER VENDOR MANUALS OF THE TYPE USED FOR PROTECTIVE RELAYING.
279. 1)PROVIDE DESIGN DETAILS(TYPE OF EQUIP, CALCS, WIRING DIAGRAM, ETC)FOR 2400V GRD DETECTOR 2) HOW IS SYST GRND ANUNC. IN THE CONTROL ROOM & WHAT OPERATOR ACTIONS ARE TAKEN 3) WHAT PRECAUTIONS ARE TAKEN TO PREVENT TRANS OV DUE TO CKT BRKR OPENING DURING GF
280. PROVIDE AN UPDATED LIST OF PLANT EQUIPMENT THAT WOULD BE LOAD-SHED DURING AN "SIS WITH A LOSS OF OFF SITE POWER" WITH THE PLANT AT 100% POWER.
281. ON THE DRAWINGS FOR 125Vdc (E-8, SHEET 1& 2), INDICATE WHICH LOADS ARE CLASS 1E.
282. PROVIDE THE FOLLOWINF MODIFICATION PACKAGES: FC-890, FC-839, FC-807, AND FC-854 (MAY HAVE BEEN PROVIDED, CAN'T FIND).
283. PROVIDE THE BACK-UP CALCULATION FOR "NORMAL LOAD CURRENT" SHOWN IN TABLE 1 OF "STEADY-STATE AND TRANSIENT CABLE CABLE AMPACITIES FOR BUSES 1C, 1D, & 1E PALISADES PLANT".
284. V-33, V-43, & V-47 SWGR RM COOLERS ARENT NORMALLY FED FROM 1E POWER SUPPLIES. 1) WHAT PROVISIONS ARE MADE TO TRANSFER TO 1E SUPPLIES? 2) DO TEMP SENSORS IN ROOMS ALARM IN CONTROL ROOM? 3) IS MAX RM TEMP 104 DEGEES F. 4) IF SO WHY IS SET PT/ACTION LEV 104
285. 1. THE ELECTRICAL SECTION OF NECO AT PALISADES WAS REQUESTED TO PROVIDE THE NRC WITH INFORMATION REGARDING THE LOCATION OF ANNUNCIATORS ON THE 125Vdc SYSTEM. NO SPECIFIC ANNUNCIATORS WERE REQUESTED. 2. DOES ANY OF THE Y-PANELS CONTAIN ANNUNCIATORS?
286. PROVIDE A COPY OF THE LER ASSOCIATED WITH THE TS 4.7.1d VIOLATION IDENTIFIED IN DEVIATION REPORT D-PAL-89-131.
287. IS THERE A BECHTEL OR A PLANT SPECIFICATION THAT ADDRESSES THE MAXIMUM NUMBER OF LUGS ON ONE TERMINATION POINT? IF SO, PROVIDE A COPY OF THE SPECIFICATION.
288. WILL ALL THE SAFETY RELATED DC EQUIPMENT OR COMPONENTS OPERATE FROM 130Vdc TO 105Vdc? (THAT IS, OPERATE WITHOUT DROPPING OUT) IF NOT, PROVIDE THE WORST CASE LIMITING EXAMPLES.
289. FC-839 REQUIRED THAT THE LOW SUCTION PRESSURE AND THE LOW LUBE OIL PRESSURE ARE TO BE BLOCKED WHEN PUMP "B" IS FED FROM THE PUMP "C" BUS. PROVIDE THE SECTION IN THE POST MODIFICATION TEST WHICH VERIFIED THE ABOVE TESTING REQUIREMENT. ALSO, PROVIDE THEAPPLICABLE SCHEMATIC DIAGRAMS.
290. FC-661 REQUIRED THAT UPON RECEIVING A CHR SIGNAL, THE NORMALLY CLOSED CONTACTS WOULD OPEN AND THUS RENDER THE SUMP PUMPS INOPERABLE. PROVIDE A COPY OF THE PMT WHICH VERIFIED THE ABOVE AND PROVIDE THE SCHEMATICS BEFORE THE MOD AND THE SCHEMATICS AFTER THE MOD WAS IMPLEMENTED.

291. PROVIDE SOME COPIES OF COMPLETED "FORM 40" (AN UNOFFICAL TRACKING SYSTEM).
292. PROVIDE A COPY OF PROCEDURE NO. 5.19, "POST MAINTENENCE TESTING".
293. PROVIDE LETTER FROM MANUFACTURER STSTING THAT THE SET POINT OF 1055rpm FOR THE EDG 1-1 OVERSPEED TRIP SET POINT IS ACCEPTABLE (REF. SPECIAL TEST T-302).
294. PROVIDE A COPY OF THE NUCLEAR PERFORMANCE ASSESSMENT GROUPS CHARTER FOR THE 17 TECHNICAL GROUPS.
295. DEMONSTRATE THE ABILITY OF T-10 AND APPURTENANCES TO RESIST FLOODS AND TORNADOS.
296. PLEASE PROVIDE BACKUP CALCULATIONS TO SUPPORT THE CORRECTION OF CABLE IMPEDANCE ERROR IN SG TRANSFORMER CABLE IMPEDANCE AS POINTED OUT IN THE ATTACHED FINDING(#3, D-QG-91-12). THIS VALUE AFFECTS THE LOAD FLOW ANALYSIS.
297. PROVIDE COPIES OR MAKE AVAILABLE FOR REVIEW THE FOLLOWING MODs/SCs SC-91-107, SC-90-285, SC-84-041, SC-87-298, FC-824, AND FC-438.
298. PROVIDE COPIES OF DISCREPANCY REPORT NOS F-GC-91-106, F-GC-91-107, AND F-GC-91-109 AND ANY ASSOCIATED DEVIATION REPORTS.
299. LOAD SHED IS BLOCKED WHEN EDG IS CONNECTED IN PARALLEL TO 1C OR 1D. WHAT HAPPENS TO THE EDG IN CASE OF A LOOP WHILE BEING TESTED?
300. PROVIDE INFORMATION ON THE FUEL FILTERS AND LUBE OIL STRAINERS IN REGARD TO ABILITY TO SHIFT CLEAN AND INSPECT. (VERBAL QUESTION FROM JOUBERT TO KUPKA - INSPECTOR HAS ALREADY RECEIVED THE INFORMATION - QUESTION ISSUED FOR TRACKING PURPOSES)
301. DO DAY TANK (T-25 A&B) VENT LINES HAVE FLAME ARRESTORS?
302. THE ABOVE DRAWING REFERS TO SHEET 31 FOR THE INPUT TO THE GENERATOR FIELD RELAYS. THIS DRAWING COULD NOT BE LOCATED. PLEASE IDENTIFY AND PROVIDE THE CORRECT DRAWING.
303. DBD-5.06 PG 5 OF 9 STATES THAT AN UNDERVOLTAGE ON ONE 2400Vac CLASS 1E BUS PROVIDES A START COMMAND TO ONLY THAT DIESEL CIRCUIT "A", AS WELL AS A START SIGNAL TO THE OPPOSITE DIESEL START CIRCUIT "B". WITH RESPECT TO THE FIRST DIESEL 1) ON AN AUTOMATICSIGNAL IS ANY PART OF THE "B" CIRCUIT ENERGIZED? IF NOT, 2) HOW IS FIELD FLASHING AND THE AIR START SOLENOID FOR CIRCUIT "B" ENERGIZED?
304. ARE THE DC GROUND DETECTORS CONNECTED TO GROUND IN ANY WAY? IF SO, WHAT WAS THE PLANT'S RESPONSE TO IE NOTICE 88-86, SUPPLEMENT 1, WITH REGARD TO OPERATING WITH A GROUND THROUGH THE GROUND DETECTOR?
305. SEVERAL AREAS IN THE PLANT HAVE LEFT CHANNEL AND RIGHT CHANNEL MCCs, INVERTORS, AND BATTERY CHARGERS LOCATED SIDE-BY-SIDE; THERFORE, THERE IS NO SEPARATION BETWEEN INDEPENDENT SAFETY RELATED EQUIPMENT. HAS THIS ISSUE BEEN RAISED BEFORE? IF SO, PROVIDE THE APPROPRIATE DOCUMENTATION.
306. ON MARCH 12, 1986, A DESIGN CHANGE FROM SPE MODIFIED THE THERMAL OVERLOADS (TOLs) FOR THE FUEL TRANSFER PUMPS 1B A&B. ON ,ARCH 13, 1986, THE SETTING SHEETS WERE UPDATED. WHY WASN'T THE TOL CHANGE IMPLEMENTED? WERE THERE ANY OTHER CALCULATIONS OR SET POINT CHANGES MADE AROUND THIS TIME TO MODIFY SAFETY RELATED TOLs? ALSO, PROVIDE PROCEDURES (THAT EXISTED IN 1986 TIME FRAME) WHICH DELINEATE SPE, FIELD LAB, & SYS ENG RESPONSIBILITY TO IMPLEMENT A SETPOINT CHANGE.
307. DATA SHEETS PROVIDED UNDER QUESTION 245 INDICATED THAT BREAKER 72-302 AND 72-401 WERE LAST TESTED IN 1980. ARE THESE BREAKERS IN A REGULAR PM PROGRAM? IS BREAKER 72-18 IN A PM PROGRAM? IF NOT, WHY AREN'T THESE BREAKERS IN A TESTING PROGRAM. HOW CAN THE PLANT ASSUME THAT THE TRIP SET POINTS HAVE NOT DRIFTED OVER TIME?