U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-255/86028(DRS)

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

Licensee: Consumers Power Company
212 West Michigan Avenue
Jackson, MI 49201

Facility Name: Palisades Nuclear Generating Plant

Inspection At: Covert, MI

Inspection Conducted: September 16 through October 23, 1986

Inspector: Z. Falevits Zelig Falevits 11/12/86

Approved By: J. W. Muffett, Chief James W Muffett 11/12/86
Plant Systems Section Date

Inspection Summary

Inspection on September 16 through October 23, 1986 (Report No. 50-255/86028(DRS)
Areas Inspected: Special, unannounced safety inspection conducted to review licensee events and followup on failures of Diesel Generator (DG) breaker to close upon demand, review of a design deficiency in the DC distribution system such that ECCS is rendered vulnerable to a single failure, examination of licensee's evaluation of the overloading of feeder cables to 2.4KV IE switchgear, review of the potential for overloading the feeder cables to 2.4KV 1D switchgear during a LOCA condition, design control and review of as-built configuration of electrical systems and components (230733, 93702).
Results: Of the areas inspected, one violation with three examples was identified: (a) failure to correctly translate design requirements; (b) failure to maintain an as-built design drawings program; and (c) failure to perform an adequate load analysis and cable sizing review, Paragraphs 2.a, 2.b, and 2.d.

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DETAILS

1. Persons Contacted

*J. G. Lewis, Plant Technical Director
*T. J. Palmisano, Plant Projects Superintendent
*P. F. Bruce, Electrical Superintendent
*R. P. Margol, Quality Assurance (QA) Administrator
*R. M. Brzezinski, I&C Superintendent
*R. A. Vincent, Plant Safety Engineer
*K. E. Osborne, Technical Engineer, Licensing
*W. L. Ford, General Engineer
*R. D. Orosz, Engineering and Maintenance Manager
*D. G. Malone, Senior Engineer, Licensing
R. E. McCaleb, QA, Director
**T. Leva, Electrical Engineer

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*E. R. Swanson, Senior Resident Inspector
*C. D. Anderson, Resident Inspector

*Denotes those in attendance of exit meeting of October 2, 1986.

**Person contacted during telephone exit on October 23, 1986.

The inspector also contacted and interviewed other licensee personnel during this inspection.

2. Review of Licensee Events Relating to Electrical System Problems

During the recent outage of Palisades, numerous electrical system problems occurred and/or were discovered. Most notable these involved: (1) failures of Diesel Generator (DG) breaker to close upon demand due to maintenance activities in progress and an identified miswiring in the 2.4KV breakers switchgear cubicles; (2) discovery of a design deficiency in the D.C. distribution system such that under certain conditions it renders the ECCS vulnerable to a single failure; (3) the overloading of feeder cables to 2.4KV, 1E (BOP) switchgear, and the potential of overloading the feeder cables to 2.4KV, 1D (ESF) switchgear during a LOCA condition.

The inspector performed an electrical inspection to review the events described above and examine the root cause of the problems. The inspector reviewed licensee corrective actions taken to correct the specific failure, and actions taken to reduce or prevent the probability of recurrence.

a. Review of Licensee Events Reports (LER) Relating to Inadvertent Diesel Generator Starts and Failure of Feed Breaker to Close on Demand

(1) The inspector reviewed the following LERs which occurred during 1986 and which directly relate to inadvertent diesel generator starts:

LER-86-006 dated February 24, 1986
LER-86-008 dated February 25, 1986
LER-86-014 dated March 31, 1986
LER-86-019 dated July 10, 1986
LER-86-020 dated July 17, 1986
LER-86-026 dated September 15, 1986
LER-86-027 dated September 17, 1986
LER-86-029 dated September 16, 1986

The review indicated that some of the root causes for the events that lead to the inadvertent diesel generator starts were (1) inadequate preparation or failure of personnel to ensure proper initial test and maintenance work conditions. (This issue is addressed as a violation in Report No. 355/86023); (2) operational and maintenance personnel errors; (3) inadequate instructions or procedures to conduct the activity; (4) very limited training conducted regarding the events, and training given only to Personnel involved with the particular event.

The inspector closely examined the documents, drawings, and field installations associated with an identified miswiring which prevented the automatic closure of diesel generator feed breaker 152-213.

The following design documents and drawings were examined:

- FC-460-Bus 1C and 1D Secondary Level Undervoltage Modification dated May, 1980.
- Technical Specification 3.7 (Electrical Systems)
- 2.4KV Breaker 152-108 connection diagram (C/D) E5 sh. 37, Revision 7.
- 2.4KV Switchgear 1C unit 108 C/D E605 sh. 27.
- 2.4KV Master wiring diagram, units 107 111, drawing E5 sh. 52, Revision 4.
- 2.4KV Breaker 152-203 C/D drawing E5 sh.60, Revision 12.
- 2.4KV Breaker No. 10 unit No. 203 C/D drawing E-605 sh. 43, Revision 13.

- 2.4KV Master wiring diagram, units 201-206, drawing ES sh. 49, Revision 5.

- Schematic diagram 2.4KV & 4.16 Bus Undervoltage & Load Shedding drawing E-137 sh. 1, Revision 15; and sh. 1, Revision 5.

- Schematic diagram Load Centers & Switchyard Feeders drawing E133 sh. 1, Revision 6.

- Technical Specification 12447-022-E45(0) - Electrical Installation for Modification GWO-8538, dated February 4, 1980.

During licensee's investigation of this problem, a wiring error was detected in the field such that load shed relays which should be fed from 125V DC fuses (as shown on schematic diagram E137 sh. 1, Revision 15), where actually fed from another 125V DC source which feeds Station Power Transformer 1-2 feed breaker circuitry as delineated on schematic diagram E133 sh.1, Revision 6.

The miswiring was identified in both, the circuitry associated with breaker 151-213 which ties Emergency Diesel Generator 1-2 to bus 1-D, and the circuitry associated breaker 152-107 which ties Emergency Diesel Generator 1-1 to bus 1-C. During the review of this problem the inspector noted that the miswiring occurred in 1980 during the installation of the second level undervoltage protection circuitry per Facility Change FC-460 and specification 12447-022-E45. Further review indicated that specification testing as denoted on Page 5, Revision 1, required that "Testing shall include the wiring insulation resistance, continuity, and correctness of connections in accordance with connection diagram." Since the connection diagram was erroneous (containing the miswiring), the apparent testing performed using the connection diagrams should have detected the problem. Furthermore, since schematic diagram E137 sh.1 reflects the correct circuit logic as designed, the miswiring should have been detected during the original design review which should have been conducted before the drawings were issued to the field for implementation. The miswirings were identified in Station Power Transformer 1-2 to bus 1-D feed breaker 152-203, and in 2.4KV bus 1-C to Switchyard Transformer SPX2 feed breaker 152-108 (Reference relay and metering drawing WD950 sh. 17).

Whenever power is removed from the Station Power Transformer 1-2 feed breaker (if the fuse blows or during maintenance) the load shedding relays would de-engerize and disable the automatic closure of diesel generator 1-2 incoming breaker 152-213. (The same logic applies to bus 1-C breaker 152-108 and diesel generator 1-1 incoming breaker 152-107).

Postulating a condition in which the power fuses for Station Power Transformer 1-2 feed breaker 152-203 are removed during maintenance, and at the same time a malfunction in feed breaker 152-108 occurs causing the power fuses for this control circuit to blow. This condition will prevent the automatic closure of both diesel generator's feed breakers. These breakers could be closed manually when the problem is detected.

The inspector informed the licensee that failure to correctly translate the design requirements of schematic diagram E137 sh. 1 onto the applicable connection diagram, and to properly implement the correct design requirement in the field, (This applies to both breaker 152-203 circuitry and breaker 152-108 circuitry) is an example of a violation contrary to the requirements of 10 CFR 50, Appendix B, Criterion III (355/86028-01A(DRS)).

b. The inspector performed a visual as-built inspection of the two switchgear cubicles that contained the miswirings and of several randomly selected safety related switchgear and MCC cubicles. This inspection was conducted to determine if the as-built electrical system conforms to the design drawings and is in agreement with CPCo Quality Assurance program CPC-2A requirements, and with regulatory and FSAR commitments. The visual inspection was not intended to be a comprehensive point to point wiring check. The inspector merely verified if the number of internal and external conductors terminated at terminal blocks and electrical components conform to the latest applicable design drawings. A general idea of the as-built condition of the electrical system in the plant can be obtained from this kind of inspection. The inspector noted the following discrepancies between the design drawings and the as-built condition in the field:

(1) Service 2.4KV Unit No. 203, Station Power Transformer to 1D feed breaker No. 152-203.

Drawings Used - Breaker 152-203 connection diagram E5 sh. 60, Revision 12.

Breaker 152-203 connection diagram E605 sh. 43, Revision 13.

Master wiring diagram units 201-206 No. E5 sh. 49, Revision 5.

Findings - (a) The following devices or terminals contained terminated conductors in the field which were not shown on the connection diagrams TD-2, TC-8, TC-11, TB-12, 174-A12, point 4, 164-2 Points 1 and 2, 151X-203 points 5 and 6 127-2/2X points 6 and 16.

(b) The following conductors were shown on the design drawings but not wired in the field as required by the drawings:

TE-7, TE-8, TC-5, TC-10, TA-7 (two wires), 164-2 points 9 and 10, 151X-203 points 6 and 7, XD-11, B-1, 127-2/2X points 15 and 16, 127-2/XY points 15 and 16, Test Sw points 5, 8 and 11.

(2) Service - 2.4KV Unit 108, Bus 1C to Switchyard Transformer SPX2 feed breaker No. 152-108

Drawings Used - Breaker 152-108 connection diagram E5 sh. 37, Revision 7.

Breaker 152-108 connection diagram E605, sh. 27, Revision 12.

Master wiring diagram units 107-111 drawing E5 sh. 52, Revision 4.

Findings - (a) The following devices or terminals contained terminated conductors in the field which were not shown on the connection diagrams: SF4-10, SF5-2, SF5-10, TB-1, TB-6, TA-11, TE-1 and 3, 164-1 points 1 and 3, SF4-3, 4 and 5.

(b) The following conductors were shown in the design drawing but not wired in the field as required by the drawing: 164-1 points 9 and 10, fuse R point 4, Jumper SF5-7 to 11.

(c) Field wiring of undervoltage relays 127-1 did not conform to relay and metering drawing E-11, Revision 14.

(3) Service - 2.4KV Unit 107, Diesel Generator 1-1 incoming breaker 152-107.

Drawings Used - Breaker 152-107 connection diagram E5 sh. 36, Revision 12.

Breaker 152-107 connection diagram E605 sh. 26, Revision 11.

Master wiring diagram units 107-111, E5 sh. 52, Revision 4.

Findings - The following terminals contained terminated conductors in the field which were not shown on the connection diagrams. TA-2, 3, 4 and 9. TC-8 and 9. 162-107 point L2, 162-107X point 8.

(4) Service - 2.4KV Unit 213, Diesel Generator 1-2 incoming breaker 152-213.

Drawings Used - Breaker 152-213 connection diagram E605 sh. 52, Revision 1.

Breaker 152-213 connection diagram E5 sh. 69, Revision 14.

Master wiring diagram units 207-213, drawing E5 sh. 50, Revision 6.

Findings - (a) The following terminals contained terminated conductors in the field which were not shown on the connection diagram. TC-6, 9 and 10.

(b) The following conductors were shown on the design drawings, but not wired in the field as required by the drawing: TC-5 and 8, A-6, B-8. In addition drawing E5 sh. 69, indicated that fuses 5 are 2.5 amp fuses; however, field installed fuses were found to be 12 amp fuses.

(5) During the visual inspection of breaker cubicle 108, the inspectors noted a posted warning sign mounted inside the breaker top cubicle stating "Terminals with florescent orange or violet markings are designated for fire protection modification concerning local tending of Diesel Generator and 2400 volt buses. No modification should be done to this wiring except as authorized by EOP-10.2 or without reviewing intention of this fire protection modification reference FC-407-14E." Further review revealed that a modification had been recently completed whose purpose was to relocate the fuse block assemblies of the auxiliary fuses used to supply power to undervoltage, metering, synchronizing and ground detectors for bus 1C. The inspector examined the following subject related documents:

- Modification SC-86-121-03
- Emergency Procedure EPS-E-7 page 5
- Work Request 087099
- Technical Specification 3.7
- Safety Evaluation Form 10 CFR 50.59

- Procedure 3.01 Attachment 1
- Relay and Metering Drawings E11, Revision 14
- 2.4KV Unit 108 connection diagram E5 sh. 37, Revision 7 and E605, sh. 27.

No documented evidence was available for review to indicate that EOP-10.2 procedure was reviewed prior to the relocation of the fuses in the cubicle. Neither was it possible to determine from the design drawings, specifically the applicable connection diagrams, that the requirements of Emergency Procedure No. EPS-E-7 page 5 would be accomplished as specified due to the fact that the drawings contained numerous errors relating to the relay and metering circuitry as shown on drawing E-11, Revision 14, and when compared to connection diagrams E5, sh. 37, Revision 7 and E605, sh. 27, Revision 12.

The following are examples: (1) drawings E5 sh. 37, indicated that 1V1, 1V2, and 1V3 on points 3, 4, and 5 are terminated at terminal block but the other end of the terminations does not appear to be in use; (2) drawing E5 sh. 37, indicated that conductors (1V1, 1V2, and 1V3) terminated on the right side of metering, synchronizing and ground detector 6A fuses; however, the other end of these conductors do not appear to be in use. In addition, during the licensee's implementation of the fuse relocation modification it was noted that the three conductors terminated on the right side of the fuses originated at the adjacent switchgear cubicle potential transformers. This was not reflected on connection diagram E5, sh. 37, Revision 7.

The inspector noted that the majority of the identified discrepancies occurred during the performance of field changes and modifications. ANSI N45.2.11 requires that where changes to previously verified designs have been made, design verification shall be required for the changes, including evaluation of the effects of those changes on the overall design. Further, N45.2 states that records which correctly identify the "as-built" condition of items in the nuclear facility shall be maintained and stored for the life of the particular item while it is installed in the nuclear facility. Additionally, 10 CFR 50, Appendix B, Criterion III, states in part that design and field changes shall be subject to the same design control procedures as the original design.

It is apparent that at present, in order to perform a modification to any safety related electrical circuit, completed "finger phasing" of the affected circuitry is required in order to assure that the specified circuit

requirements are met. Although the licensee acknowledged the definite need to trace or "finger phase" the wiring whenever a modification is performed, a documented requirement to this affect could not be found. The licensee stated that most engineers conduct a field verification of the affected system prior to performing a modification.

(6) The inspector conducted a visual field inspection of ESF480V MCC No. 1, Unit No. 183, using drawing E-608 sh. 183, Revision 3. This compartment services Penetrations and Fan rooms. The drawing indicated that the external power motor cable should be terminated as follows: White conductor to terminal z; Black conductor to terminal y; and Red conductor to terminal x.

Contrary to the above, Field cable was observed to be terminated as follows: Red conductor to terminal z; Black conductor to terminal y; and white conductor to terminal x.

(7) The inspector conducted a visual field inspection of ESF 480V MCC No. 1, Unit 191, using drawing E608 sh. 191, Revision 2. This compartment services Boric Acid Pump P56B.

(a) Termination points 33 and 34 and external cable IG101-FA/B02-J8350 were presented on the drawing but could not be located in the field;

(b) Termination points A, 12 and 11 did not conform to the configuration on the drawing.

(8) During the review of the schematic diagrams the inspector noted several errors on the following drawings:

(a) Schematic diagram E-246 sh.2, Revision 12, (SIRW Tank containment sump valves) indicated that contact 4 of relays 4L3 and 4L4 are being used for SIRW Tank 2/4 logic low level. However, contact 6 of relays 4L3 and 4L4 was being used.

(b) Schematic diagram E-137 sh 1, Revision 15 (2.4KV and 4.16KV bus undervoltage and load shedding) indicated that contact 1 of relay 127-/YZ is connected to contact of relay 127-1/XY and contact 11 of 127-1/YZ was shown connected to contact 1 of 127-1/ZX. Review of associated drawings indicated that contact 1 and 11 of relay 127-1/YZ should have been interchanged.

(9) The inspector also visually inspected bus 1C and 1D undervoltage relay junction box J-9400 and J-9401. No deficiencies were noted during the as-built review of these junction boxes.

The inspector discussed the discrepancies identified during the as-built review with the licensee and expressed his concern that an apparent deficiency exists with the as-built program pertaining to design drawings which are required to reflect the as-installed configuration of the electrical system.

Consumers Power Company, Quality Assurance Program for operational nuclear plants No. CPC-2A, Section 3, design control policy states "Modifications to structures, systems and components are accomplished in accordance with approved designs. Activities to develop such designs are controlled. . . . The controls apply to preparation and review of design documents, including the correct translation of applicable regulatory requirements and design basis into design, procurement and procedural documents."

The inspector indicated that the existing electrical deficiencies might lead to personnel errors and eventually to equipment malfunctions, that during emergency conditions it will be extremely difficult to follow the design drawings, specifically the connection diagrams.

During a telephone conversation a week after the inspection was conducted the licensee stated that a review was conducted to verify the inspectors findings, and that so far no hardware problems were identified, and that the problem lies in the design drawings.

Based on the findings outlines in items b(1) through b(8) above, the inspector informed the licensee that the as-built discrepancies identified indicate that measures were not implemented to assure that the design basis is correctly translated into applicable documents and correctly reflected in the design drawings and that deviations from such design basis are controlled. This is an example of a violation, and is contrary to the requirements of 10 CFR 50, Appendix B, Criterion III (355/86028-01B(DRS)).

c. <u>Design Deficiency in the D.C. Distribution System Such That ECCS is Rendered Vulnerable to Single Failure</u>

During a recent simulator training of the Palisades operators, a loss of DC power to the bus was simulated. During this transient it was observed that the containment sump and SIRW tank outlet valves associated with the operable bus changed position, thereby lining up the ESS pump suction to the dry containment sump. If a Safety Injection System (SIS) actuation occurs concurrent with the loss of D.C. power to the bus, the ESS pumps would run without water, defeating the SIS intended function and burning up the pumps. The licensee issued Deviation Report No. D-PAL-86-168 to document this issue.

The inspector conducted a detailed drawing and document review of the existing proposed design of the SIRW tank low level logic. Presently, the Recirculation Actuation System (RAS) receives its actuation signal from redundant SIRW tank low level 2 out of 4 logic matrices. The RAS has two safety related positions, the first is being lined up to the SIRW tank. The second is being lined up to the containment sump. Immediately after the onset of a LOCA, the ESS pumps and valves are aligned to SIRW tank, this ensures adequate inventory and a Net Positive Suction Head (NPSH) for the on-coming ESS pumps. An inadvertent actuation at this time will align the pumps to a dry sump. Approximately twenty minutes into the accident, upon low tank level RAS auto-initiates and the ESS pumps are realigned from the tank to the containment sump to maintain NPSH.

The licensee has determined that the existing 2 out of 4 logic matrices used in the RAS logic is in conflict with the requirements of 10 CFR 50, Appendix A (GDC-35), FSAR Chapter 8, 10 CFR 50.46, Appendix K, and industry standards such as IEEE-279 1971 (Section 4.2).

The engineering evaluation of this situation indicated that the results of a bus DC failure will disable all ESS equipment on the affected division because no control power will be available to start the required ECCS components. At the same time, the resulting loss of the two preferred AC buses cause operable ESS pumps on the opposite division to take suction from a dry containment sump. This configuration was determined to be original plant design and has existed since initial plant construction.

The licensee has evaluated the inherent advantages and disadvantages of several alternate logic configurations by analysis, and concluded that 1 out of 2 logic taken twice is preferred to the existing 2 out of 4 RAS logic.

In the 1 out of 2 taken twice logic, four of six possible two channel combinations will actuate the RAS, and failure of one channel plus the failure of another "Correct" channel is required to cause inadvertent actuation. The licensee's evaluation indicated that the selected logic provides the least susceptibility to cause an inadvertent RAS initiation due to a spurious component failure and it eliminates the potential single failure that can disable an entire DC bus.

The inspector reviewed the following documents and design drawings associated with this issue:

- 10 CFR 50.59 safety evaluation from No. FC-707, dated September 11, 1986
- Plant Safety Engineering Assessment No. P86-062, dated August 28, 1986
- SIRW tank level switch interlocks test Procedure No. RI-14, Revision 4.

- Safeguard safety injection and isolation Procedure No. ARP 8, Revision 4.
- Technical Specification surveillance Procedure No. QO-2, Revision 4.
- Installation Procedure No. I-FC-707-01, Revision B (modification to RAS logic circuitry)
- Logic, schematic and connection diagrams associated with this modification.
- Technical Specification Table 3-17-4.

The inspector reached the conclusion that the licensee has conducted a comprehensive and detailed review of this issue. Licensee proposed corrective actions appears to be adequate in resolving the identified design deficiency. The licensee has committed to complete the RAS logic modification prior to completion of the present outage.

d. Overloading of Feeder Cables to 2.4.KV Switchgear 1E (BOP) and the Potential Overloading of Feeder Cables to Switchgear 1D (ESF) During LOCA Conditions

Deviation Report No. PAL-86-198, dated August 8, 1986, documents potentially overloaded feeder cables (500MCM) supplying 2.4KV 1C, 1D, and 1E switchgears. During an evaluation for the addition of future loads to 1E switchgear, the licensee's engineer noted a maximum current on 1E switchgear of 990 amps per phase, and a maximum current of 919 amp per phase on 1D switchgear feed cables. Preliminary evaluation indicated that peak amperage valves taken from plant log book (which may represent only eight hours in duration) have exceeded the calculated overload valve of 760A as follows:

Bus Feeder	Normal Operating Value	Cold Shutdown Value	LOCA Worst Case Value
1C	630A	630A	766A*
1D	500A	510A	819A*
1E	990A*	580A	320A

*Overload (>760A)

The licensee attributed the cause for exceeding the feeder cables ampacities loading limits to long-term load growth at the plant, such as the addition of the Support Building (750KVA), Warehouse (500KVA), Station Power Banks 90, 91 and 200 to 1E switchgear, and the addition of MCC 26 and ventilation loads to 1D switchgear. As early as April 1981, normal operating ampacity on 1E switchgear was observed to be 830 amps (760A design limit amp).

The overloading of the feeder cables has been apparently caused by an insufficient load analysis and improper cable sizing to allow for load growth during initial construction, and the failure to conduct

an adequate design review for proper switchgear feeder cable sizes and routing configuration when additional loads are added to the switchgear.

The inspector reviewed CPCo Report No. OAS-83-RP-45, dated June 1983 relating to steady-state station auxiliary system conditions following the 1983 refueling outage. The report summary stated "The 2.4KV Station Auxiliary System at Palisades has been appraised for base load and LOCA steady state conditions following the 1983 Refueling Outage (REFOUT). All load additions and electrical modifications have been incorporated into the studies. No undervoltages, transformer overloads, or short-circuit overduties could be found for steady state base load and LOCA conditions using the current model of the station auxiliary system." Apparently the study was not adequate in detecting the overloading of the feeder cables to the 1D and 1E switchgears.

Subsequent to this finding the licensee conducted the following evaluation and calculations which were reviewed by the inspector:

- Ampacity calculations of Single Conductor, 500 MCM, 5000V GE Super Flamerol SI-58243 cable, analysis EA-D-PAL-86-198-01, dated August 8, 1986.

- Evaluation of the overloading of Feeder cables from Station Transformer 1-2 to 1E Switchgear No. EA-D-PAL-86-198-02 dated October 1, 1986

- Evaluation of the Potential Overloading of Feeder cables from startup transformer 1-2 to 1D switchgear during a LOCA. No. EA-D-PAL-86-198-03, dated October 1, 1986.

Licensee concluded that the feeder cables to IE switchgear from Station Transformer 1-2 have been degraded by overloading the feeder cables to above 859 amps. (859 amps is the new licensee calculated ampacity of three single conductor copper cable in conduit in air exposed to sunlight), that cable service life was reduced by approximately 0.3 years using the Arrhenius equation, that the increase in failure rate of the cable is .61%, and that the degradation noted above will not significantly increase that change of cable failure. The licensee concluded that based on this analysis the feeder cables to 1E switchgear may remain is service but should be replaced in 1987 or 1988.

Regarding feeder cables to 1D switchgear the licensee concluded that the cables could have withstood 1064 amps for up to 100 continuous hours without a significant increase in chance of failure, that had a LOCA occurred at Palisades, 1D switchgear feeder cables would have functioned adequately to supply LOCA loads even though the cables would have operated for some period of time above the allowed existing ampacity of 859 amps.

During the review the inspector noted that the licensee in his calculations has considered the maximum current readings using graphs which covered the years 1983, through 1986 only. Since the overloaded conditions were noted as early as April 1981, this assumption appeared to be inadequate. In addition, a minor mathematical error was noted on sh. 7 Item 4.g. of Calculation EA-D-PAL-86-198-01.

Calculation No's EA-D-PAL-86-198-02 and 03, dated October 17, 1986, have been transmitted to NRR for evaluation (refer AITS F0304286).

Some of the licensee's proposed remedial corrective actions to resolve this issue and prevent recurrence included (1) Improve the ampacity of the feeder cables to 1D switchgear from S/U transformer 1-2 by installing a solar shield on the exposed conduit; (2) Improve the ampacity of the feeder cables to 1E switchgear from station transformer 1-2 by removing conduit and installing covered cable tray per plant design drawings; (3) evaluate the LOCA loading and the sequency of the loading on the 1C and 1D buses from both the S/U transformers and from the diesels and evaluate future growth on 1C and 1D to determine if cable ampacity is adequate and upgrade if required.

At the conclusion of the inspection the licensee stated that some corrective actions have been completed to reduce cable ampacities and that considerations are being given to replacing some of the cables.

Based on the findings discussed above, the inspector informed the licensee that lack of adequate cable sizing review and an inadequate load analysis conducted when additional loads are added to the switchgear is a violation contrary to 10 CFR 50, Appendix B, Criterion III (355/86028-01C(DRS)).

During the exit interview the manager of engineering and maintenance stated that the Palisades philosophy regarding identified field deficiencies is to make the equipment operable and not be concerned with updating the drawing. The inspector expressed his opinion that this philosophy is unappropriate.

3. Exit Interview

The Region III inspector met with licensee representatives (denoted under Paragraph 1) at the conclusion of the inspection on October 2, 1986. The inspector sumarized the purpose and findings of the inspection. The licensee acknowledged this information. The inspector also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. The licensee did not identify any such documents/processes as proprietary.