U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-247/89-12

Docket No. 50-247

License No. DPR-26 Category C

Licensee: Consolidated Edison Company of New York, Inc.
Broadway and Bleakley Avenue
Buchanan, New York 10511

Facility Name: Indian Point Unit 2

Inspection At: Buchanan, New York

Inspection Conducted: May 1-5, 1989

Inspectors: Leonard S. Cheung 6/5/89
L. S. Cheung, Senior Reactor Engineer, DRS Team Leader — date

A. Della Greca, Reactor Engineer, DRS
J. Knox, Senior Electrical Engineer, NRR
J. Jacobson, Electrical Engineer, NRR
S. Athavale, Electrical Engineer, NRR
S. Kobylarz, ERCE, NRC Consultant

Approved by: C J Anderson 6/14/89
C. J. Anderson, Chief, Plant System Section, EB, DRS — date

Inspection Summary: A special announced team inspection of the licensee's electrical separation program was conducted at the Indian Point Unit 2 on May 1-5, 1989 (50-247/89-12).

Areas Inspected: A special inspection of Indian Point 2 electrical separation program was conducted. The inspection included a review of Indian Point Unit 2 cable routing surveillance reports and related documents, and observations of cable raceway conditions and of separation barrier installations. Also, included in this inspection is a review of the licensee's corrective actions associated with the electrical issues identified during the January 1988 Safety System Function Inspection (SSFI).

Results: For the electrical separation program, one violation and four unresolved items were identified. For the SSFI issues, one item was closed. The unresolved items and the status of the SSFI issues are listed below:

A. Violation

Item No.	Description	Discussed in Paragraph
50-247/89-12-01	Lack of written procedures for electrical separation program activities	4.0

B. Unresolved Items

Item No.	Description	Discussed in Paragraph
50-247/89-12-02	480V vital bus Voltmeter selector switch not meeting single failure criterion	5.0
50-247/89-12-03	Redundant power cable separation barrier does not meet established separation criteria	6.1
50-247/89-12-04	Separation barrier between cable trays is not properly supported	6.2
50-247/89-12-05	Cable separation for service water screen motors does not meet established criteria	6.4

C. Status of SSFI Issues

Item No.	Description	Status	Discussed in Paragraph
50-247/88-200-01	Power Supplies for service water strainer motors	Open	7.1
50-247/88-200-02	Short circuit current for DB-50 breakers	Open	7.2
50-247/88-200-03	Setting of electrical protective devices	Open	7.3

C. Status of SSFI Issues

Item No.	Description	Status	Discussed in Paragraph
50-247/88-200-04	Service water system heat tracing	Open	7.4
50-247/88-200-05	Contact-to-contact isolation in diesel generator starting circuits	Closed	7.5
50-247-88-200-06	Battery sizing calculation	Open	7.6

Details

1.0 Persons Contacted

1.1 Consolidated Edison Company (Con Ed)

D. Bishop, Test Supervisor
H. Chu, Generation Protection Engineer
J. Curry, Chief, Plant Engineer
*J. DelPercio, Manager, Regulatory Affairs and Safety Assessment
R. Eifler, Supervising Engineer
*J. Etzweiler, Senior Engineer, Regulatory Affairs
*J. Grob, Technical Consultant
*A. Kaffarham, Senior Electrical Engineer
*W. Mahlmeister, QC Inspector
*B. Marguolio, Manager, NPQA
*M. Miele, General Manager, Technical Service
R. Miller, Special Analysis, Tenesa, Consultant to Con. Ed.
J. Moorney, Principal Engineer
E. Perry, Test and Performance Engineer
*S. Quinn, General Manager, NPG
*S. Razzouk, Electrical Engineer
*H. Sager, Project Manager, Design Basis Document
T. Schmeiser, Operation Manager, Nuclear Power Generation
*M. Selmen, Executive Vice President
*J. Tuohy, Project Coordinator, Technical Services
*T. Wong, Electrical Plant Project Engineer
*A. Wynne, Director, NQA

1.2 U.S. Nuclear Regulatory Commission (NRC)

*D. Brinkman, Senior Project Manager, NRR
*L. Rossbach, Senior Resident Inspector
*J. Strosnider, Chief, Engineering Branch, DRS
*P. Swetland, Section Chief, DRP

*Denotes those persons present at the May 5, 1989 exit meeting.

2.0 Purpose

The purpose of this inspection was:

(1) To review the licensee's activities for identifying and correcting the deficiencies associated with the electrical separation of heavy power cables at Indian Point 2.

(2) To evaluate the adequacy of the licensee's facility validation program for the heavy power cable/raceway system at Indian Point 2.

(3) To review the licensee's corrective actions of electrical items identified during the February 1988 SSFI.

3.0 Background

On December 23, 1987, the licensee sent a letter to the NRC stating that they had identified electrical separation deficiencies as a result of their QA inspections. These deficiencies were documented in a 1987 Open Item Report (OIR) by the licensee's QA department. Short term commitments by the licensee for corrective actions included a review of other current and past modifications involving cable installation. Long term commitments included standardization of the separation design criteria and additional field walkdowns. To meet long term commitments, the licensee commenced a facility validation program to assure that the cable/raceway documents were accurate.

On March 11, 1988, in response to a February 26, 1988 NRC request, the licensee submitted for NRC information and use the original design bases for the electrical cable/raceway systems at Indian Point Unit 2. The NRC reviewed this design basis as it related to independence and protection of cables associated with the redundant reactor protection and engineered safety system circuits. The NRC concluded that the design bases, with the exception of power cables at point of entry to switchgear or other equipment, meet the independence and protection requirements of criterion 17 of Appendix A to 10 CFR Part 50 for safety system circuit cables. For entry points to switchgear and other equipment, the original design basis is such that power cables may be routed with little or no separation from redundant system instrumentation, control, and power circuit cables. The NRC staff concluded that if this routing is found, the independence requirements of criterion 17 may not be fully satisfied. However, since redundant power circuits generally originate from separate redundant switchgear units and terminate at separate redundant equipment, it is unlikely that this type of cable separation will be found at Indian Point Unit 2. The details of the NRC evaluation of the original design basis is attached to this report as Attachment 1.

4.0 Indian Point 2 Electrical Separation Program

On April 11, 1989, the licensee presented to the NRC staff in Region I offices a general description of their facility validation program for resolving electrical separation concerns. The program was initiated in September 1987 with a planned completion date in 1993. The program includes:

1) Review of plant and licensing documentation in order to develop design basis documentation and standardized design and installation criteria for cable/raceway systems.

2) Surveillance of existing cable/raceway systems to develop as-built field documentation.

3) Identification and engineering evaluation of differences between as built conditions and plant drawings.

4) Implementation of modification to make as built conditions the same as plant drawings or reconstitute the evaluations and/or judgment to support the differences.

The licensee divided their electrical separation program into three phases. Phase I is the pilot program which started during the 1987 refueling outage when they identified the electrical separation deficiencies. It ended at the beginning of the current refueling outage. The second phase lasts for the entire duration of the current outage. The third phase will start at the end of the current refueling outage and will extend through the completion date of this program. The first and second phases deal with heavy power cables only (for motors greater than 100 HP) while the third phase covers light power cables (for equipment of 100 HP or less), and control and instrumentation cables.

The program involves verification of cable routing and cable separation, and corrective actions for identified deficiencies. The verification includes tracing each cable from the switchgear down the various tray systems, to the end equipment. The verification will be used to update as built drawings and cable schedules, to affirm the cable separation criteria established and to initiate modifications whenever deviations are found which are determined by analyses to be unacceptable. The ultimate goal of the program is that of validating as-built conditions affecting all power cables as well as control and instrumentation cables.

The walkdown currently performed by the licensee is two-fold: configuration control and cable separation analysis. Since both purposes ultimately have in view the safety of the plant, the licensee was asked if a procedure had been prepared to identify the specific issues needed to be addressed by the walkdown, the method of implementing the program and the manner to document, analyze and control disposition of all of the findings. The licensee responded that no written procedures have been prepared for these activities. This lack of procedures for a quality activity is in violation of 10 CFR 50 Appendix B Criterion V which requires that activities affecting quality be prescribed by documented procedures and that theses activities be accomplished in accordance with these procedures (50-247/89-12-01).

Not withstanding a lack of written procedures, the inspectors did not identify any unacceptable conditions in the surveillance reports which were generated as a result of the Phase I and Phase II walkdown of heavy power cables (See Section 5.0 for additional detail).

During the licensee's presentation on April 11, 1989, it was noted by the NRC that sheet metal was being used in place of transite to maintain vertical separation between power cables and other redundant cables

located above. The original design basis (submitted to the NRC on March 11, 1988) only specifies transite barriers. During this inspection, the licensee provided for the inspector's review Westinghouse construction drawing No. 9321-F-3066-9, "Cable Support Detail" dated October 1, 1973. This drawing specifies either sheet metal or transite as acceptable separation barriers. In addition, the licensee performed a 10 CFR 50.59 safety evaluation (No. 89-022-GM) for the sheet metal barrier. The inspectors reviewed this evaluation to verify the equivalency of the sheet metal barriers as compared to the transite barriers specified in the original design basis. No deficiencies were identified.

Based on the results of the team's review of electrical separation program documents (see section 5.0) and physical inspection (see section 6.0) of licensee's installation of separation barriers, the team concluded that the licensee's Phase I (high power cables outside the reactor containment) and Phase II (high power cables inside the reactor containment) activities of the electrical separation program are acceptable.

5.0 Review of Electrical Separation Program Documents

The licensee generated about 30 surveillance reports as a result of the Phase I and Phase II activities. The inspector selected the following nine surveillance reports for review to verify their depiction of as-built field conditions and their identification of deviations from the original design basis for electrical cable/raceway systems.

Surveillance Report No.	Raceway No.	Area
88-SR-200	T-56A	480V SWGR Room
88-SR-202	T-54A	480V SWGR Room
88-SR-208	T-94A, 95A, 27B 6.9KV Tray	480V SWGR Room
88-SR-212	T-50B, 51B, 52B, 53B, T-41C, 42C, 43C, 44C T-45C, 52C, 53C	Electrical Tunnel and lower PAB
88-SR-220	T-96D, 98D, 10D, 03F	Electrical Penetration
88-SR-223	T-30D, 33D, 15D, 40D	Electrical Penetration
88-SR-230	T-02C, 07C, 08C, 09C, 06C, 51H, 52H, 53H, 61H, 62H	Upper Elevation of PAB
88-SR-245	All	Inside Reactor Containment

The inspectors did not identify any unacceptable conditions in the surveillance reports. However, while reviewing the Indian Point 2 FSAR to obtain information regarding the electrical separation criteria, the inspectors noticed that the bus voltage of all four emergency buses, 2A, 3A, 5A and 6A (shown in Figure 8.2-6 of FSAR) was monitored through a single voltmeter and a voltmeter selector switch. The voltmeter selector switch, where the wires from the four potential transformers converge, is

a Westinghouse Type W-2 switch. Further evaluation of FSAR figure 8.2-6 and Con Edison 3-line diagram Drawing. No. 9321-F-3007-10 revealed that the same potential transformers used in the voltmeter circuit also power the undervoltage relays which, upon loss of normal and offsite power, provide signals for diesel generator starting, bus shedding and load sequencing under emergency conditions. This arrangement presents a potential problem in that a short circuit at the switch involving two or more wires, or if one contact of the switch fails shorted, could cause the associated fuses to blow resulting in de-energization of the undervoltage relays from two or more independent emergency buses. This would prevent load sequencing of the buses affected. These types of failures are particularly significant because they are not detectable until bus voltage is lost and the diesel generators are connected to the bus. Under these circumstances the first diesel generator on the bus will back feed the other bus through the potential transformers causing the fuses involved to blow on overload. The loss of the fuses will cause the applicable under-voltage relays to de-energize and remain de-energized, thus preventing the sequencing of the emergency loads on the buses affected. Following the inspection, on May 17, 1989, the NRC contacted the license concerning this issue. The licensee stated that they had evaluated the potential problem with this switch and found an appropriate solution. This item is unresolved pending the NRC's review of the licensee's evaluation and resolution of this issue (50-247/89-12-02).

6.0 Physical Inspection of Electrical Separation

6.1 The inspectors conducted a physical inspection of the heavy-power cable routing and separation barriers in the 480V switchgear area and in the Primary Auxiliary Building (PAB). While in the PAB, the inspectors observed that cable tray T-02C contains redundant channel power cables and that the power cables of one channel are separated from those of the other channel by a single metal barrier. (This is also true for cable trays T-45C, 52C and 53C as documented in the licensee's Surveillance Report No. 89-SR-215.) The inspectors asked the licensee under what condition should a double metal barrier be used. The licensee stated that their current separation criteria are: 1) redundant channel cables are separated by a single metal barrier; and 2) double metal barrier with 1" air space is used only for cable derating considerations. The inspector found these criteria to be contrary to the criterion described on page 2 of the Safety Evaluation Report (see Attachment 1) which states "...Horizontal separation between redundant power cables is by a double 16 gauge sheet metal barrier with one inch of space..." The Safety Evaluation Report was issued by the NRC based on the licensee's March 11, 1988 submittal to the NRC. In response to this issue, the licensee stated that they would evaluate this difference and address this issue in their standardized design criteria (now under development and planned to be completed in June 1989). This item is unresolved pending NRC review of the licensee's evaluation (if single metal barriers are sufficient) or corrective actions (if double metal barriers are required) (50-247/89-12-03).

6.2 While in the PAB, the inspector observed two sheet metal barriers, each measured about 2' X 4', one on cable tray T-45C and the other on T-53C. These metal barriers were not properly supported with bolts as shown on Westinghouse Drawing No. 9321-F-3066-9, "Cable Tray Support Detail," Revision 9, dated October 1, 1973. The inpectors did not find additional examples of these barrier support deficiencies, during the walkdown. The inspectors considered this deficiency to be an isolated case. This is an unresolved item pending NRC review of the licensee's corrective actions (50-247/89-12-04).

6.3 While in the 480V switchgear room, the inspectors noted that a sheet metal barrier mounted between the heavy power cable trays was not adequately supported. The sheet metal barrier disengaged from a supporting clamp during the inspection. The configuration for mounting the subject sheet metal barrier is shown as Detail 12 on Con Ed drawing 243798-AA revision 01. In response to this finding, the licensee modified the installation design to include a lock washer and lock nut on the support beam clamp bolts. In addition, the licensee increased the number of clamps from one every three feet to one every two feet. The inspector concluded that these design modifications resolved this issue. The inspector had no further concerns.

6.4 The six service water strainer motors are presently powered from three safety related source of supply (channels) which also furnish power to the six associated control panels. A walkdown of the system revealed that the control panels also contain a space heater which is powered by a non-safety related source. Some of the wiring for the six heaters is presently routed through redundant channel wiring troughs. This is in contrary to the separation criteria established by the licensee for Indian Point 2. These criteria, although they permit a non-safety related cable to be associated and routed with a safety related channel, forbid the same non-safety related cable from leaving the raceway of one channel and entering the raceway of another. In response to this issue, the licensee stated that they had not decided whether the service water screen motors are safety-related. If the motors are safety-related, then the licensee must evaluate this issue. This item is unresolved pending NRC review of the licensee's evaluation (50-247/89-12-05).

7.0 Status of Previous Inspection Findings

7.1 (Open) Observation 50-247/88-200-01 concerning the fact that the service water pumps and their associated strainer motors were powered from different diesels. This resulted in a condition where loss of one diesel could potentially have caused the loss of two of the three service water trains on the essential service water header.

During this inspection it was noted that a modification had been written to utilize the power to the service water pumps and their

associated strainer motors. However the strainer motors are classified as non-1E equipment. Power to the strainer motors is being fed directly from the associated service water pumps through a Class 1E circuit breaker. It could not be determined if this circuit breaker is coordinated with the supply circuit breaker to the service water pump. Therefore, loss of the non-1E strainer motors could potentially trip off the associated service water pumps. This item will remain open until either the strainer motors are upgraded to Class 1E status or proper coordination can be assured between the strainer motor and the service water pump circuit breakers.

7.2 (Open) Observation 247/88-200-02 concerning 480-Volt bus short circuit calculation. Consolidated Edison prepared Calculation No. EPG 88-1 entitled, "Verify Adequacy of 480V Switchgear to Withstand and Interrupt Worst Case Short Circuit." The calculation was prepared by the licensee to address a concern raised by the NRC during the SSFI that the switchgear interrupting rating may not be adequate, due to weaknesses identified in the original short circuit calculations, which were prepared by the licensee's architect-engineers to determine the interrupting rating of the switchgear. The NRC inspectors reviewed the calculation to determine the adequacy of the data utilized, and to verify the validity of the design assumptions and the methodology of the calculation.

The inspectors found that the calculation addressed the concerns raised during the SSFI by incorporating maximum bus prefault voltage (grid voltage) in the calculation of the short circuit current. The calculation also addressed worst case fault conditions and incorporated a conservative value of 480 volt motor reactance (0.1667 per unit).

The inspectors found that the licensee's calculations verified that the momentary asymmetrical short circuit current available during normal plant operating conditions, when the diesel generator is not being load tested, is within the DB-50 circuit breaker interrupting rating of 60,000 amperes asymmetrical. The available short circuit current for this condition, 58,570 amperes, is 97.6% of the breaker rating. However, this value of calculated current is derived conservatively.

However, the inspectors found, in the case of the analysis which determined the short circuit contribution for the diesel generator in-test condition, that the licensee considered the short circuit contribution from only 750 horsepower (hp) of large motors (motors with a hp rating greater than 50 hp), namely:

Service Water Pump	350 hp
Component Cooling Water Pump	250 hp
Rod Power Supply MG Set	150 hp
Total	750 hp

The NRC inspectors reviewed the Central Control Room Log Sheets for August 1980 and found that during conditions when the diesel generator was actually tested, the sum total of the motor HP ratings for the large motors operating on the 480 volt bus exceeded 1600 hp. Therefore, the inspectors concluded that the licensee had not adequately identified the worse case short circuit current contribution from the large motors on the system for the condition when the diesel generator was tested.

The error in the motor contribution resulted from the failure to consider the operation of the Containment Recirculation Fans, as well as the maximum number of Service Water Pumps which can operate during worse case plant operating conditions. Using the methodology of the calculation, the inspectors estimated that over 5,800 amperes additional asymmetrical current may be available for the switchgear to interrupt. Since the calculation indicated only a 200 amperes margin for the DB-50 circuit breaker asymmetrical interrupting rating of 60,000 amperes when the diesel is load tested (monthly), or 59,800 amperes available, the inspectors could not confirm the adequacy of the switchgear interrupting rating.

The licensee was requested to review the maximum large motor load that may be operating when the diesel is load tested and revise the calculation accordingly. The inspectors understand that the licensee will modify the conservative design assumptions in the calculation to demonstrate greater margin in the calculation to accommodate the actual short circuit current available from the operating motors on the system.

The inspectors also noted that test data was not available from the licensee to justify a circuit breaker minimum contact parting time that would justify calculating a reduced maximum asymmetrical and symmetrical interrupting current requirement. This data can be obtained from the manufacturer test data and should be made a part of the revised short circuit calculation.

Observation 247/88-200-02 will remain open pending NRC review of documentation noted above that indicates the adequacy of the 480-volt switchgear interrupting rating, for the condition of load testing of the diesel generators, or other limiting plant operating conditions.

7.3 (Open) Observation 247/88-200-03 pertaining to the settings of electrical protective devices. The licensee furnished the inspectors with a preliminary "480V MCC Coordination Calculation" prepared by an architect-engineer. The inspectors questioned whether the analysis completely covered the coordination of all safety-related circuits, since credit is taken for Class 1E breakers

as isolation devices to limit the effects of failures of non-Class 1E circuits on the Class 1E system. The inspectors also noted various cases where the analysis indicated problems in the coordination and protection which could potentially affect safety-related circuits. The licensee indicated that the coordination study is under review. Protection and coordination problems will be evaluated when the review is completed.

Additionally, a review was conducted of the Con Ed response to the original SSFI finding relating to an improperly selected overload heater. Upon completion of the January 1988 inspection, Con Edison located a change that has been made to the Electrical Material List for the subject modification which indicated the correct FH-88 type overload had been delineated. In addition, Con Edison verified that the correct overload was actually installed in this application.

Observation 247/88-200-03 will remain open pending completion of the 480-volt coordination study and review of the study by the licensee, and review of the results of the study by the NRC.

7.4 (Open) Observation 50-247/88-200-04 concerning inadequate heat tracing installed on the service water separators and associated piping.

After completion of the January 1988 SSFI inspection, Con Edison performed an initial review of this issue where it was determined that, the installed heat tracing was inadequate in some installations. As a result, a generic modification was written to replace heat tracing in the plant on an "as needed" basis. Modification EGP-88-00906-E for installation of the new three wire Chemelex heat tracing was reviewed. This newly designed system contains a third wire which provides an alarm signal should the heat tracing become damaged at any point along its installation. Calculations for determining the heat trace required thermal output were also reviewed and found to be acceptable. It was noted that heat trace sizing calculations are not performed by engineering and documented in the modification package. Although no deficiencies in this modification were identified by the inspector, no generic review had been performed by Con Edison concerning the acceptability of other original heat trace installations. Some of the installations are being upgraded, however, no review has been performed of the old heat trace installations that are not currently scheduled for replacement. This item remains open until justification for the acceptability of the old heat trace installations is established.

A review was conducted of the Con Edison documents relative to the procurement of the new heat tracing to be used during this modification. Although the heat tracing was classified as "Class A," no quality assurance requirements were placed on the vendor for this purchase. It was determined that the new heat tracing was considered to be a "commercial grade equivalent item" even though it was of a different type and safely classification than that previously installed.

Con Ed procedures (I-240-1 and OP-290-1) Section 5.11 allow the procurement of commercial grade equivalent items from unapproved vendors. The procedures do not require the performance of a commercial grade dedication before the item is considered to be acceptable for Class A service. These procedures do not provide guidance as to what can actually be considered an equivalent item. This apparent deficiency in the Con Edison procurement program is considered to be an additional part to the existing observation.

7.5 (Closed) Observation 247/88-200-05, concerning contact-to-contact isolation in diesel generator starting circuits. The NRC inspectors identified a concern during the SSFI that the arrangement of the undervoltage logic circuits which automatically start the diesel generators is such that a single failure within one system (undervoltage starting relay) may jeopardize the capability of the redundant system to perform its safety function. This could happen if the effects of the fault propagate through the relay output contacts. The inspectors questioned the contact-to-contact isolation capability of the undervoltage starting relay.

The inspectors reviewed the licensee's response to the NRC concern regarding contact-to-contact isolation in the undervoltage relay input to the diesel generator starting circuits. In summary, the licensee's response was as follows:

1) Each diesel generator has a primary and a backup auto-start circuit. Each circuit has a two-out-of-three-logic for undervoltage on either Bus 5A or 6A. The arrangement is such that a failure of one single relay will not prevent auto-starting any of the three diesel generators.

2) The physical arrangement of the undervoltage relays assures that complete failure of either safeguard relay cabinets G1 or G2 will not prevent an auto-start of any or all three diesel generators on undervoltage.

3) The contact breakdown voltage for the undervoltage logic relays, type BFD, is above 25000 volts. This voltage is considered more than adequate to withstand any voltages in these circuits. The maximum credible circuit working voltage is 480 volts.

Based on discussions with the licensee and the documentation reviewed, the inspectors concluded that adequate isolation has been provided in the design. This item is considered closed.

7.6 (Open) Observation 88-200-06 concerning the station battery sizing calculation for Class 1E batteries 21, 22, 23, and 24. The licensee has generated a new Calculation No. 69986-EN-XB "DC Load Study" dated April 28, 1989 to resolve concerns of this observation. The team reviewed the new calculation. Following is a description of the concern and the licensee's resolution of the concern.

1) In the previous calculation, values of loads used for the discharge profile could not be substantiated by reference documents. In the new calculation supporting documents such as vendor's data manual, plant testing data records have been referenced. This item is considered resolved.

2) In the previous calculation, the inverter loading on the battery was taken equal to 7.5KVA instead of 10KVA which is the full rating of the inverter. In the new calculation an inverter loading equal to 10KVA was used for the sizing calculation for batteries 21 and 22. However, for sizing batteries 23 and 24, only 64% of the full rating of the inverter was considered. For batteries 23 or 24, if a high impedence fault up to the maximum rating of the inverter occurs on the load side, the inverter would continue to feed the fault to its maximum limit, without being noticed (since there is no overload alarm). This would deplete the batteries. The inspection team believes that batteries 23 and 24 should also be sized based on a 100% rating of the inverters. In the event of the loss of batteries 21 or 22, loads are automatically transferred to batteries 23 and 24, respectively. The licensee informed the team that they will evaluate this condition and revise the calculations. This item remains open pending NRC review of the licensee's revised calculation.

3) The previous calculation did not consider the increase in current as voltage decreases (inverters are considered constant power loads). The new study uses maximum values of inverter currents for batteries 21 and 22. This item will be considered during the licensee's reevaluation for batteries 23 and 24 discussed above. This item remains open pending NRC review of the licensee's revised calculation.

4) The previous calculation did not consider the efficiency of motors and inverters. The new calculation assumed maximum loading of the inverters connected to batteries 21 and 22. The loading of the inverters connected to bus 23 and 24 will include the efficiency of the inverters. In the case of the motors, the licensee used test data from the test conducted for 20 hp seal oil pump motor, and for two other motors (15 hp BFP emergency lube oil pump motor and 60 hp main turbine gen. emergency lube oil pump motor). The loading values used in the new calculation were derived from the plant instrument readings. The licensee intends to verify these values by testing the motors. This item is considered resolved.

5) The previous calculation did not address loads such as control power for Class 1E switchgear and field flashing of the diesel generators. The new calculation accounts for these loads. This item is considered resolved.

6) The previous calculation had a discrepancy regarding the values of the rating factors for positive plates. The new calculation uses correct values for rating factors. This item is considered resolved.

8.0 Unresolved Items and Observations

Unresolved items are matters which more information is required in order to ascertain whether they are acceptable items, or violations. Unresolved items identified during this inspection are discussed in Details, paragraphs 5.0 and 6.0.

Observations are items similar to unresolved items. The observations documented in this report were identified during the January 1988 Safety System Function Inspection. The licensee's corrective actions regarding the observations were reviewed during this inspection. The results are documented in paragraph 7.0.

9.0 Exit Meeting

The inspector met with licensee and construction representatives (denoted in paragraph 1.0) at the conclusion of the inspection on May 5, 1989 at the plant site.

The inspector's summarized the scope of the inspection, the inspection findings and confirmed with the licensee that the documents reviewed by the inspector did not contain any proprietary information. The licensee agreed that the inspection report may be placed into the Public Document Room without prior licensee review for proprietary information.

At no time during this inspection was written material provided to the licensee.