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February 5, 1979

Director
Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Sir:

Subject: Oyster Creek Nuclear Generating Station
Docket No. 50-219
125V DC System Equipment Qualifications

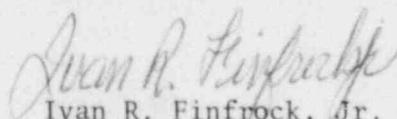
Your letter of December 22, 1978, requested a summary report describing the qualification requirements and status of the qualifications for the following 125 DC system modification related equipment:

1. The Battery
2. The Battery Racks
3. The Battery Charger
4. The Motor Control Center

In response to your letter, enclosed is the requested summary report. Part 1 of the report presents a discussion of the equipment qualification requirements invoked by Jersey Central Power & Light with respect to the 125V DC system modification. Part 2 of the report presents a discussion of the status of equipment qualifications with respect to invoked equipment qualification requirements, and the appendices present documentation pertinent to the equipment qualifications.

We have provided the enclosed summary report in an effort to be responsive to your request. Since this modification was accomplished under the provisions of 10 CFR 50.59(a), the associated safety evaluation and specific documentation has been filed and is available for examination by your Office of Inspection and Enforcement. Please note that Appendix IV is extracted from IE Inspection Report 50-219/78-35.

Very truly yours,


Ivan R. Finfrock, Jr.
Vice President

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Enclosure

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PART 1EQUIPMENT QUALIFICATION REQUIREMENTS INVOKEDBY JCP&L WITH RESPECT TO 125V DC SYSTEM MODIFICATION

Final Requirements: A description of the then proposed modification, and the modification related equipment design criteria, were included in the enclosure to a letter to the Director of Nuclear Reactor Regulation from I. R. Finfrock, Jr. dated April 4, 1978 Re: Modification to 125V D. C. Power System. Within that document it was stated that "All new 125V DC system equipment will be class 1E, meeting the requirements of IEEE Standard 323-1974." In addition to the requirements of this standard and those additional standards referenced by this standard, other standards and codes were--as a matter of good engineering practice--invoked. A list of all of the standards and codes which have been invoked for the subject equipment is attached as Appendices I, II, and III (Note: Appendix I covers both the batteries and the battery racks). Further, in that the requirements of many of these standards are somewhat general more specific requirements were specified to the respective equipment vendors in the form of detailed procurement specifications. Jersey Central Power & Light's Quality Assurance and Engineering Departments were, and continue to be, involved with the vendors in assuring they meet the requirements of those procurement specifications which provides adequate assurance that the intent of all the invoked codes and standards will be met. In this same regard, the NRC Region I Office of Inspection and Enforcement has inspected many of the documents which make up this over-all management control system, and their efforts are documented in pages 8 through 13 of their Inspection Report 50-219/78-35. As noted

in this documentation (See Appendix IV), no items of noncompliance were found to exist.

Equipment Qualification Interim Requirements: As was also stated in the cover letter of the referenced April 4, 1978 transmittal to the Director of Nuclear Reactor Regulation, "Because of the short lead time available for this modification, it may not be possible to obtain all of the class 1E equipment identified in the enclosed modification description. Should that be the case, we will complete the modification by the required date using the most qualified equipment available at that time, and install the IEEE 323-1974 qualified equipment when it becomes available and plant operating conditions permit." As the situation continued to evolve, it became apparent that the above referenced equipment qualification final requirements could not be met on all the equipment by the end of the 1978 refueling outage, and in those situations equipment was utilized which was the most qualified available at the time. As indicated in Part 2 of this report, JCP&L is proceeding with measures to assure that all equipment will be qualified to IEEE 323-1974. If the currently installed equipment can not be qualified it will be replaced with qualified equipment as it becomes available and plant operating conditions permit.

PART 2
STATUS OF EQUIPMENT QUALIFICATIONS
WITH RESPECT TO INVOKED EQUIPMENT QUALIFICATION REQUIREMENTS

Qualification Status of Batteries and Battery Racks:

With Respect to Final Requirements:

The currently installed new battery "C" and associated battery racks were designed, constructed and installed so as to meet all the Appendix I referenced codes and standards. At this time, however, a shake test pursuant to the guidance of IEEE 323-1974 and IEEE 344-1975 has not yet been completed. This test is currently scheduled for April 1979.

Assuming this test is successful, after JCP&L's receipt and approval of these test results, the new battery "C" and its associated battery racks (as they currently exist at Oyster Creek) will be fully qualified per the Appendix I referenced final codes and standards.

Interim Requirements:

Based on a review of the documentation which exists to describe the existing battery "A" and its associated battery racks, it has been concluded that the new battery "C" and its associated racks are of a quality which is greater than that of the existing battery "A" and its associated racks, when new; therefore, installation of the new battery "C" and its associated racks as it was performed during the 1978 refueling outage both (a) enabled the 125V DC system modification project objective (i.e. provide increased separation in the 125V DC system) to be achieved by the end of the 1978 refueling outage, yet (b) did not give rise to an unreviewed safety question as defined by 10CFR50.59.

Qualification Status of Battery Static Chargers:With Respect to Final Requirements:

Except for the following open items, both of the subject static chargers (as they are currently installed at Oyster Creek) meet all of the Appendix II referenced codes and standards:

- a.) Although the 460V AC input breakers to, and the 125V DC output breakers from, the chargers are physically identical to the breakers which will eventually be installed as IE qualified breakers, the currently installed breakers lack QA documentation. The breakers which we anticipate installing as IE qualified breakers recently arrived at Oyster Creek and, provided the QA documentation is in order, they should be installed within the month.
- b.) A shake test was performed pursuant to the guidance of IEEE 323-1974 and 344-1975, and on Friday, January 19, 1978, the test report was received by JCP&L. This document is currently being reviewed by JCP&L; the review should be completed within the month.

In summarizing the static chargers equipment qualification status, following installation of the above noted IE qualified breakers, and JCP&L review and approval of the shake test report, both static chargers will meet all the requirements of the Appendix II referenced codes and standards.

With Respect to Interim Requirements:

Based on a review of the documentation which exists to describe the existing battery "A" chargers and physical examinations thereof, it was concluded that the new static chargers are of a quality which is greater than that of the existing chargers (i.e. MG set charger and static charger); therefore, installation of the new static chargers as it was performed during the 1978

refueling outage both (a) enabled the 125V DC system modification project objective (i.e. provide increased separation in the 125V DC system) to be achieved by the end of the 1978 refueling outage and yet (b) did not give rise to an unreviewed safety question as defined by 10CFR50.59.

Qualification Status of Motor Control Center:

With Respect to Final Requirements:

The only motor control center added with the subject modification is designated DC-2 on the drawings which were forwarded in our April 4, 1978 submittal, and except for one open item, the motor control center as it is currently installed meets all of the Appendix III referenced codes and standards. The one open item relates to a timing relay which failed in a test of a "Type" unit. The cause of failure at this time appears to be related to the relay's having been thermally aged at an excessive rate. The test procedures for the subject type test are still being reviewed and it is currently anticipated that thermal aging at a slower rate (while still achieving the same cumulative amount of thermal aging) will result in the relays qualifying per the requirements of IEEE 323-1974. Currently, we are attempting to complete these additional tests by the end of March, 1979, and should these tests be accomplished satisfactorily, the motor control center will be qualified per the requirements of all the Appendix III referenced codes and standards.

With Respect to Interim Requirements:

Based on a review of the documentation which exists to describe the existing motor control center DC-1 and physical examinations thereof, it was concluded that the new motor control center is of a quality which is greater than that of motor control center DC-1; therefore, installation of motor control center DC-2 as it was performed during the 1978 refueling outage both (a) enabled

the 125V DC system modification project objective to be achieved (i.e. provide increased separation in the 125V DC system) by the end of the 1978 refueling outage, yet (b) did not give rise to an unreviewed safety question as defined by 10CFR50.59.

APPENDIX I

2. STANDARDS AND CODES (Cont'd)

ANSI - American National Standards Institute

ANSI C1 -1978 - National Electric Code - Article No. 480

ANSI C18.1-1972 - Specifications for Dry Cells and Batteries

NEMA - National Electrical Manufacturers' Association

NEMA IB1-1971 - Definitions for Lead-Acid Storage Batteries

IEEE - Institute of Electrical and Electronics Engineers

IEEE 450-1975 - Recommended Practice for Maintenance Testing and Replacement of Large Stationary Type Power Plant and Substation Lead Storage Batteries

IEEE 484-1975 - Recommended Practice for Installation Design and Installation of Large Lead Storage Batteries for Generating Stations and Substations

In addition to the above, all Class IE and Seismic Category I equipment are designated Class IE in accordance with IEEE 308-1974 - "Standard Criteria for Class IE Power Systems for Nuclear Power Generating Stations" and shall comply with the following standards:

ANSI - American National Standards Institute

ANSI N45.2.2-1972 - Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants

IEEE - Institute of Electrical and Electronics Engineers

IEEE 323-1974 - Standard for Qualifying Class IE Electric Equipment for Nuclear Power Generating Stations

IEEE 344-1975 - Recommended Practices for Seismic Qualification of Class IE Equipment for Nuclear Power Generating Stations

NRC - Nuclear Regulatory Commission

Regulatory Guide 1.38 1976 - Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage, and Handling of Items for Water-Cooled Nuclear Power Plants

APPENDIX II

EBASCO SPECIFICATION 213-71

Station Battery Charger

QUALIFICATION OF CLASS IE EQUIPMENT

The equipment described in this Specification is designated Class IE in accordance with IEEE Specification 303 - IEEE criteria for Class IE electric systems for nuclear power generating stations.

The Seller shall be totally responsible for the performance testing and quality control necessary to qualify, the Battery Chargers and all associated material covered by this Specification as Class IE equipment in accordance with the following.

- Ebasco Spec 860-78 - Quality Control for Supplier's of Equipment and Services.
- IEEE 323-74 - General Guide for Qualifying Class I Electric Equipment for Nuclear Power Generating Stations.
- IEEE 344-75 - IEEE Recommended Practice for Seismic Qualification of Class IE Equipment for Nuclear Power Generating Stations

Radiation

This equipment will be subject to radiation exposure. All material and components which would not normally require earlier replacement shall be designed for 40 years of normal plant operation plus one year of Post Accident Operation, during which time they will be exposed to a max. integrated radiation dose of 1×10^4 Rads.

The Seller shall submit a list of any components which will not meet with this requirement and will therefore require early replacement. Seller shall submit proof that the remaining material will not fail due to degradation resulting from this radiation exposure.

APPENDIX III

QUALIFICATION OF CLASS 1E EQUIPMENT

.01 STANDARDS

The equipment described in this Specification is designated Class 1E in accordance with IEEE Specification 308 - IEEE criteria for Class 1E electric systems for nuclear power generating stations.

The Seller shall be totally responsible for the performance testing and quality control necessary to qualify, the motor control center and all associated material covered by this Specification as Class 1E equipment in accordance with the following:

- Ebasco Spec 860-78 - Quality Control for Supplier's of Equipment and Services.
- IEEE 323-74 - General Guide for Qualifying Class I Electric Equipment for Nuclear Power Generating Stations.
- IEEE 344-75 - IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations
- ANSI N45.2.2-1972 - Packaging, Shipping, Receiving, Storage and Handling of items for Nuclear Power Plants (Level E).

.02 RADIATION

This equipment will be subject to radiation exposure. All material and components which would not normally require earlier replacement shall be designed for 40 years of normal plant operation plus one year of Post-Accident Operation, during which time they will be exposed to a total integrated radiation dose of 1×10^4 Rads.

The Seller shall submit a list of any components which will not meet with this requirement and will therefore require early replacement. Seller shall submit proof that the remaining material will not fail due to degradation resulting from this radiation exposure.

.03 QUALIFICATION PROGRAM

Seller shall furnish an outline of his qualification program (which complies with the requirements of IEEE 323 and IEEE 344 Standards) with the bid for purchaser's review and comments. Seller shall furnish the full program for purchaser's review after contract award.

1. SCOPE

This is Part Two of a Specification covering Control Centers and associated equipment for use in a Central Power Station.

.1 This Specification consists of Part One and Part Two which are mutually dependent. Both parts are essential for correct and complete interpretation. Part One covers specific requirements and includes an itemized list of equipment to be furnished. Part Two covers general requirements, which are ordinarily uniform for all projects. When requirements of the two parts conflict, those of Part One shall govern.

.2 It is not the intent to specify details of design and construction except where necessary to establish performance requirements; nor is it intended to set forth those performance requirements which are adequately specified by applicable standards.

2. STANDARDS

All equipment shall meet the requirements of the latest applicable published standards of AN Standards Institute, Institute of Electrical and Electronic Engineers, National Electric Code, Underwriters Laboratories UL845 and National Electrical Manufacturers' Association, in the above order of preference.

Materials and services hereunder shall comply with the latest revisions of the Occupational Safety and Health Act of 1970 and all applicable standards thereunder.

3. BASIS OF RATING

All equipment shall be suitable for the rated load current and short-circuit currents at rated voltage (as specified in Part One of this Specification).

.1 Seller shall carefully review Purchaser's selection of breakers, starters, trip elements and all other components, as well as ratings, space requirements, etc, and advise Purchaser of any equipment which may not meet the functional requirements of this Specification.

It is the Purchaser's intent that Seller supply and be responsible for a completely coordinated breaker, starter, and thermal overload system which will permit continuous operation; correctly protect the motors from overloads; successfully disconnect the source of power under all short-circuit conditions as specified in Part One; will operate properly under the supply conditions specified in Part One, Paragraph 2.0, without damage to the breakers and starters not including thermal overload heater elements.

Station Battery Charger

1. The purpose of this Specification is to describe the requirements for 2, 125 volt static battery charging rectifiers, (number)

SCOPE

The battery chargers shall be complete in all respects and be furnished with all required accessories, whether or not they are detailed herein.

.1 The Seller shall furnish all the equipment necessary to perform the functions described in this Specification. In this respect, the Seller's responsibility shall include but is not limited to the specific items of equipment listed in this Specification. All items supplied must be compatible.

.2 It is not the intent to specify details of design and construction except where necessary to establish performance requirements; nor is it intended to set forth those performance requirements which are adequately specified by applicable standards.

2. The design of the station battery charger and accessories as well as the materials used in their construction shall be as recommended by Seller unless specified by Purchaser. The battery charger shall comply with all applicable regulations, safety codes, specifications and standards, including applicable technical definitions as acknowledged and accepted in the industry. The issue date or revision of the standards and codes shall be as indicated below.

STANDARDS

Equipment shall comply with but shall not be limited to the following:

IEEE - Institute of Electrical and Electronics Engineers

IEEE 59-62 - Semiconductor Rectifier Components

NEMA - National Electrical Manufacturers Association

NEMA RI-2-66 - General Purpose and Communication Battery Chargers

ANSI - American National Standards Institute

ANSI N45.2.2-1972 - Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants

NRC - Nuclear Regulatory Commission

Regulatory Guide 1.38-1976 - Quality Assurance Requirements for Packaging, Shipping, Receiving, Storing and Handling of Items for Water-Cooled Nuclear Power Plants

APPENDIX IV

b. Fire Detection Instrumentation Surveillance Requirements

The inspector verified that procedures have been prepared for the following Fire Protection System requirements:

- Fire Detection Instrumentation
- Fire Suppression Water System
- Spray and/or Sprinkler Systems
- Fire Hose Stations

The inspector verified that the fire detection instrumentation procedures for each fire detection area/zone listed in table 3.12.1, 3.12.2, and 3.12.3 of technical specification amendment No. 29 requires testing to be performed as specified in section. A review of the data for the listed procedures verified that the above table requirements were being complied with.

- Fire Detection Instrumentation, No. 645.4.005
- Fire Suppression Water System
 - No. 645.4.001 - weekly
 - No. 645.4.004 - monthly
 - No. 645.1.007 - yearly
- Spray and/Sprinkler Systems - Preliminary
- Fire Protection System - Pump and Isolation valve operability - one/month

No items of noncompliance were identified.

8. 125 Volt DC Power System Modification

The new DC distribution system consist of one 60 cell battery (designated as Battery C) two 100 percent capacity solid state battery chargers, and one distribution center C.

a. Specifications, Purchase Orders, and Test Results

The inspector reviewed the following documentation associated with the 125 v DC modifications.

- Station Battery Charger Specification, dated February 23, 1978, No. 213-71
- Station Battery Charger Procurement Specification, dated July 10, 1978, No. 210-77-7
- Packaging and Shipping Manual Specification, dated May 9, 1978, No. 74-50
- Storage Battery Specification, dated February 23, 1978, No. 288-77
- Class IE Signal and Power Cable Specification, dated April 27, 1978, No. 7024
- Seismic Test Report for Station Battery Charger, dated October 16-17, 1978, No. 78-35-3
- Material Conformance Identification Sheets Form No. 3005-01, dated December 7, 1977
- Quality Data Record Receipt Inspection Form 4012-01, dated June 15, 1978 and PQA #7835, dated September 27, 1978
- Gould Test Log Data Sheets for the Batteries, dated October 19, 1978, Test No. 66
- Rockbestos Company Cable/Wire Certification of Conformance, dated June 8, 1978, reference P.O. No. 19334.

No items of noncompliance were identified.

b. Installation Data

The inspector reviewed the following installation procedures and data associated with 125 volt DC Power System Modifications.

- Special Procedure 78-18, dated June 12, 1978, entitled, "125 v DC System Modification Electrical Conduit Support Fabrication and Installation." The turnover data package SMF1-Revision 2, dated November 22, 1978, included the following documentation:
 - (1) Conduit Runs, PVI File No. 78-002 drawings
 - (2) Condenser Bay Restraints Drawings
 - (3) Weld History Records
 - (4) Hanger Data Sheets, and,
 - (5) Visual Inspection of Welds-Reports.

- Essential Document Package Turnover, dated October 23, 1978, entitled, "C Battery Structural Steel," including the following documentation:
 - (1) 125 v DC System Modification Battery Room Structural Steel Repair Procedure No. 78-48, dated August 15, 1978
 - (2) Weld History Record and Data Sheets
 - (3) Quality Assurance Inspection Report, Recap Sheets, and Dispositions.

- 125 Volt DC Modification Electrical Cable Cutting and Pulling Procedures 78-26, dated June 30, 1978, and pulling/megger data sheets attached

- 125 VDC System Modification "C" Battery Room Structural Steel Installation Procedure #78-20, dated June 16, 1978, including the following documentation:
 - (1) Quality Assurance Inspection Report, Recap Sheets, and Dispositions
 - (2) Welding, Burning, and Grinding Work Permits Data Records and,
 - (3) Sketch SK-1, dated September 25, 1978, with torque values for mounting of roof fan/duct supports and anchor plates on 23' 6" elevation

-- 125 VDC Modification Heating and Ventilation Installation Procedure #78-79, dated September 25, 1978. This procedure required penetrations of conduits in the following areas:

- (1) Panel 9XF, Control Room
- (2) 460 volt Unit Substation 1A1, 1A2, and 1A3, 460 Volt Switchgear Room
- (3) Panel DC-F-460 volt Switchgear Room,
- (4) Battery Charger C1 and C2 - 4160 volt Switchgear Room, and,
- (5) Computer Supply Inverter - Chemistry Laboratory, Mezzanine.

Above penetrations were sealed with BISCO SF-20. This is the same material that previous penetration modifications were sealed with.

No items of noncompliance were identified.

c. Drawings

The following drawings were used by the inspector in performing installation inspection, verification, and equipment layout location of the 125 VDC Power System Modification:

- Room Conduit Layout South, Bottom and Top Layer 4160 volt Sketch, dated July 17, 1978
- 460 volt Control Room to Condensor Bay, to 4160 volt, Sketch dated September 28, 1978
- 125 Volt DC System Modification Panel Modification and Installation Procedure No. 78-19, dated June 30, 1978 and data sheets for the following panels:
 - (1) Control Room Panel 9XF - Sketch
 - (2) 460 Volt/DC-F - drawing G-3111-OB

- (3) 4160 volt/HVAC - drawing G-3039-1B
- (4) 4160 volt/C1 - drawing G-3039-1B
- (5) 4160 volt/C2 - drawing G-3039-1B
- (6) 4160 volt/DC-C - drawing G-3039-12C and,
- (7) 75' elevation/DC-2 - drawing 1339-12C
- Cabinet Outline Static Battery Charger Drawing No. D-55-1571-3 (PCP)
- 3 phase SCP Controlled Battery Charger Drawing No. D-55-1571-3 (PCP)
- 3S-130-500 Battery Charger Wire Diagram Drawing No. D-55-1571W (PCP)
- BISCO Redi-Kit-Bisco SF-20, Specification No. RK-03 made with DC3-6548.

No items of noncompliance were identified.

d. Testing

The inspector reviewed the test procedures and data associated with the system verification of the 125 volt DC system modification. The following listed procedure and associated data sheets were reviewed by the inspector.

- Battery "C" Electrical Tie Ins Procedure #78-100 dated October 28, 1978. This procedure instructed safety load transfers from existing 125 Volt DC system Battery "A" to the Battery "C" 125 volt DC modification system. Section 6.0 of procedure entitled Testing, required verification of all class IE system on the "C" battery bus to be tested prior to start-up.
- Oyster Creek Station Battery "C" Charge and Discharge Test, Procedure #78-105 dated October 26, 1978.
- Battery Room "C" HVAC System Check-Out and Start-Up Procedure #78-101, dated October 17, 1978, Revision 1, FSR 303E1512, and attached data and chart sheets.

- Battery Room "C" Charger C1 and C2 Power Conversion Products Battery Chargers Check-Out/Start-Up Procedure #78-99, dated October 17, 1978, Revision 1, FSR 303E 1512, and attached data and chart sheets.
- MSA Combustible Gas Detection System, Series 500, and attached Instruction Manual and data sheets.

No items of noncompliance were identified.

9. Unresolved Items

Unresolved items are matters about which more information is required to ascertain whether they are acceptable items, items of noncompliance, or deviations. Unresolved items disclosed during the inspection are discussed in Paragraphs 2 and 6.a.

10. Exit Interview

The inspector met with the licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection. The inspector summarized the purpose and scope of the findings. The licensee acknowledged the inspector's findings.