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February 9, 1984

Mr. Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Crutchfield:

Subject: Oyster Creek Nuclear Generating Station
Docket No. 50-219
Technical Specification Change Request No. 88
Response to NRC Request for Information

This letter transmits the information requested by members of your staff during a November 21, 1983 conference call regarding the use of voltage regulators at Oyster Creek and the clarification of the Technical Specifications. This information presents a more detailed explanation of our position which was stated previously in our October 18, 1982 letter on the same subject.

The enclosed information will facilitate your review and final approval of Technical Specification Change Request No. 88 with respect to the second level (degraded grid) undervoltage relays. The portion of the previously submitted change request pertaining to the batteries had already been approved as Amendment No. 55 dated August 13, 1981.

If you have any questions regarding the enclosure, please call Mr. James Knubel at (201) 299-2264.

Very truly yours,

P. B. Fiedler
Vice President/Director
Oyster Creek

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RESPONSE TO NRC REQUEST FOR INFORMATION

I. Conservatism of Analysis

A. Grid Voltage Predictions

The grid voltage of 214.8 KV was predicted by an analysis which included the following assumptions:

1. Oyster Creek generator outage.

2. Southern NJ generation of 553 MW out of a possible 805 MW which has been analyzed and the probability of this level of generation is 0.26. This is independent of the other assumptions.

3. The highly improbable loss of a major 230 KV tie line to the west referred to as the Windsor-Lawrence 230 KV line.

The grid voltage level of 214.8 KV does not include nor take credit for the following improvements:

1. Installed voltage regulators (Automatic ± 10% capability).

2. Increasing Southern Area generation levels.

3. Operation of Load Tap Changer controls on the 230 KV-34.5 KV transformers at Oyster Creek which improves the 34.5 KV voltage profile. This operation is performed by personnel in the Oyster Creek control room.

4. Availability of the 34.5 KV capacitors to improve voltage levels. This action is also performed by control room operators.

5. Ability to decrease Southern Area loads on the distribution system.

B. Burns and Roe Voltage Analysis

The voltage analysis performed by Burns and Roe assumed a grid voltage level of 214.8 KV as the minimum voltage on the 230 KV system. The analysis did not take any credit for the voltage regulators, capacitors, or load tap changes on the 230 KV - 34.5 KV transformers. In addition, there were two other fairly conservative assumptions utilized in their analysis.

1. Bus loading was conservatively assumed to include all safety loads and normal plant loads including all Reactor Feed Pumps running. It is highly unlikely that all of these loads would be running at the same time.

2. Actual setting of the new second level (degraded grid) voltage relays is 3671 volts but the analysis included the 1% tolerance of the device and used 3635 volts as the minimum allowable 4160 volt bus voltage which will insure that all safety related motor starters will have enough voltage to pick up at the 460 volt level.

C. Outcome of Analysis

Utilizing conservative assumptions and an improbable grid voltage level, the only questionable plant equipment loads were the fuel pool filter pumps and the CRD feed pumps. All other plant safety loads were found to have acceptable voltage levels.

The fuel pool filter pumps are rated at 460 volts. At (-)10%, a minimum of 414 volts would be required to safely run these pumps. The analysis computed a minimum voltage of 398 volts at the setpoint of the second level voltage relays. This voltage difference would be compensated for by automatic operation of the voltage regulators or by manual operation of capacitors and/or load tap changers on the 230 KV-34.5 KV transformers.

It was also stated in previous submittals that the Fuel Pool Filter pumps are not considered to be important to Reactor shutdown or cooldown and are not required to be running continuously. Therefore, these pumps could be off for extended periods of time and running only when voltage conditions permit.

Burns and Roe recommended that the overload heaters be replaced for the Fuel Pool Filter pumps in order to comply with the NEC requirements for overcurrent protection. This replacement was accomplished in 1981 and the new overload heaters protect the pumps from thermal damage by providing overcurrent protection as well as some measure of undervoltage protection.

The CRD feed pumps are rated at 480 volts. At (-)10%, the minimum required voltage is 432 volts. The analysis computed a voltage level of 402 volts at the setpoint of the undervoltage (second level) relays. This voltage difference would be compensated by the automatic operation of the voltage regulators or the manual operation of the LTC's on the 230 KV-34.5 KV transformers and/or the 34.5 KV capacitors.

Burns and Roe recommended that the motors or motor windings for the CRD feed pumps be replaced with those rated at 440 volts. This recommendation was not followed and the motors remain rated at 480 volts.

The CRD feed pumps are important for plant operation but are not needed during an accident and have not been taken credit for in any accident analysis. Voltage conditions during plant operation have been analyzed and no adverse effects on the CRD feed pumps were found (refer to our submittal of April 30, 1981). The Burns and Roe analysis computed a voltage level of 402 volts at the terminals of the CRD feed pumps during an accident condition without any credit for voltage regulators, capacitors, or LTC's. But, as stated previously, the CRD feed pumps are not needed during the accident scenario assumed in their analysis.

D. Conclusion

Based on the above information, it is our position that the voltage regulators provide a useful service but do not perform a safety function and are not safety grade equipment. They are merely an added feature which improves voltage levels in much the same manner as the capacitors and the LTC's. They should not, in our view, have to be included in the Technical Specifications as an L.C.O.

II. Overvoltage Conditions

Under minimum load conditions and with the maximum predicted grid voltage the computed maximum MCC voltage is 498 volts. Thus, even taking credit for some voltage drop in the feeder cables, does not guarantee that the 440 volt motors' maximum voltage limit of 484 volts is not exceeded.

The difference in the computed maximum voltage level and the allowable maximum rating is compensated for automatically by the operation of the voltage regulators. There are, however, other actions that can be taken to ensure that this maximum limit is not exceeded. First, operators could maintain sufficient load on the Startup transformers to prevent this limit from being exceeded. And second, operators could change the taps on the 230 KV-34.5 KV transformers by utilizing the LTC controls.

The control room operators are kept aware of any overvoltage conditions by means of overvoltage relays which alarm in the control room but do not perform any tripping function. These relays were installed at the same time as the new second level (degraded grid) undervoltage relays and they alert the operators to the overvoltage condition so that the above actions can be taken to bring the voltage down to acceptable levels.

III. 460 Volt Motor Starter Ratings

As stated in previous submittals the following MCC starter voltage criteria apply:

Normal Voltage	460 VAC
Drop out Voltage	60% of Normal (276 V)
Pickup Voltage	85% of Normal (391 V)

The maximum voltage drop in control wiring for any safety related starter circuit is 3 volts. Since the motor starters' control transformers have a 4:1 ratio, 12 volts on the primary of these transformers is required to account for this control wiring voltage drop. Thus the minimum voltage on the primary side of the control transformers which will guarantee all starters pick up is 403 volts (391 volts + 12 volts).

Therefore, the Burns and Roe Analysis demonstrates that at the undervoltage relay trip setpoint (including device tolerance) at least 403 volts is available at the substation/MCC levels to guarantee all starters pick up.

IV. LCO For Safety Bus Tie Breakers

Reference Technical Specification Change Request No. 88 which was submitted August 11, 1980, on page 3.7-1 para. 3.7.A.5 Bus tie breaker ED and EC is in the open position. Copy of this page is attached. For some reason, this change was not included in Amendment No. 55 dated August 13, 1981. Also, attached to this submittal is a simplified one line diagram of the OCNGS electrical distribution system which shows breakers EC and ED. This diagram is actually Figure 1 from the August 1981, EG&G report on the Adequacy of Station Electric Distribution System Voltages Oyster Creek Nuclear Power Station.

V. Technical Specifications Clarifications

Copies of the following revised Technical Specifications are provided to clarify the requested changes in light of other changes which have been incorporated during this review cycle.

- Page 4.1-6a (reference Amendment 63 October 15, 1982)
- Page 4.7-1 (reference Amendments 55 Aug. 13, 1981 and 60 Feb. 3, 1982)
- Page 4.7-1a with March 19, 1981 cover memo
- Page 3.7-3 (reference Amendment 60 February 3, 1982)
- Page 4.7-2 (typo and Amendment 60 Feb. 3, 1982)

3.7 AUXILIARY ELECTRICAL POWER

Applicability: Applies to the operating status of the auxilary electrical power supply.

Objective: To assure the operability of the auxiliary electrical power supply.

Specification: A. The reactor shall not be made critical unless all of the following requirements are satisfied:

1. The following buses or panels energized.

   a. 4160 volt buses 1C and 1D in the turbine building switchgear room.
   b. 460 volt buses 1A2, 1B2, 1A21, 1B21 vital MCC 1A2 and 1B2 in the reactor building switchgear room: 1A3 and 1B3 at the intake structure; 1A21A, 1B21A, 1A21B, and 1B21B and vital MCC 1AB2 on 23'6" elevation in the reactor building; 1A24 and 1B24 at the stack.
   c. 208/120 volt panels 3, 4, 4A, 4B, 4C and VACP-1 in the reactor building switchgear room.
   d. 120 volt protection panel 1 and 2 in the cable room.
   e. 125 volt DC distribution centers C and B, and panel D, Panel DC-F, isolation valve motor control center DC-1 and 125V DC motor control center DC-2.
   f. 24 volt D.C. power panels A and B in the cable room.

2. One 230 KV line is fully operational and switch gear and both startup transformers are energized to carry power to the station 4160 volt AC buses and carry power to or away from the plant.

3. An additional source of power consisting of one of the following is in service connected to feed the appropriate plant 4160 V bus or buses:

   a. A second 230 KV line fully operational.
   b. One 34.5 KV line fully operational.

4. The station batteries B and C are available for normal service and a battery charger is in service for each battery.

5. Bus tie breakers ED and EC are in the open position.

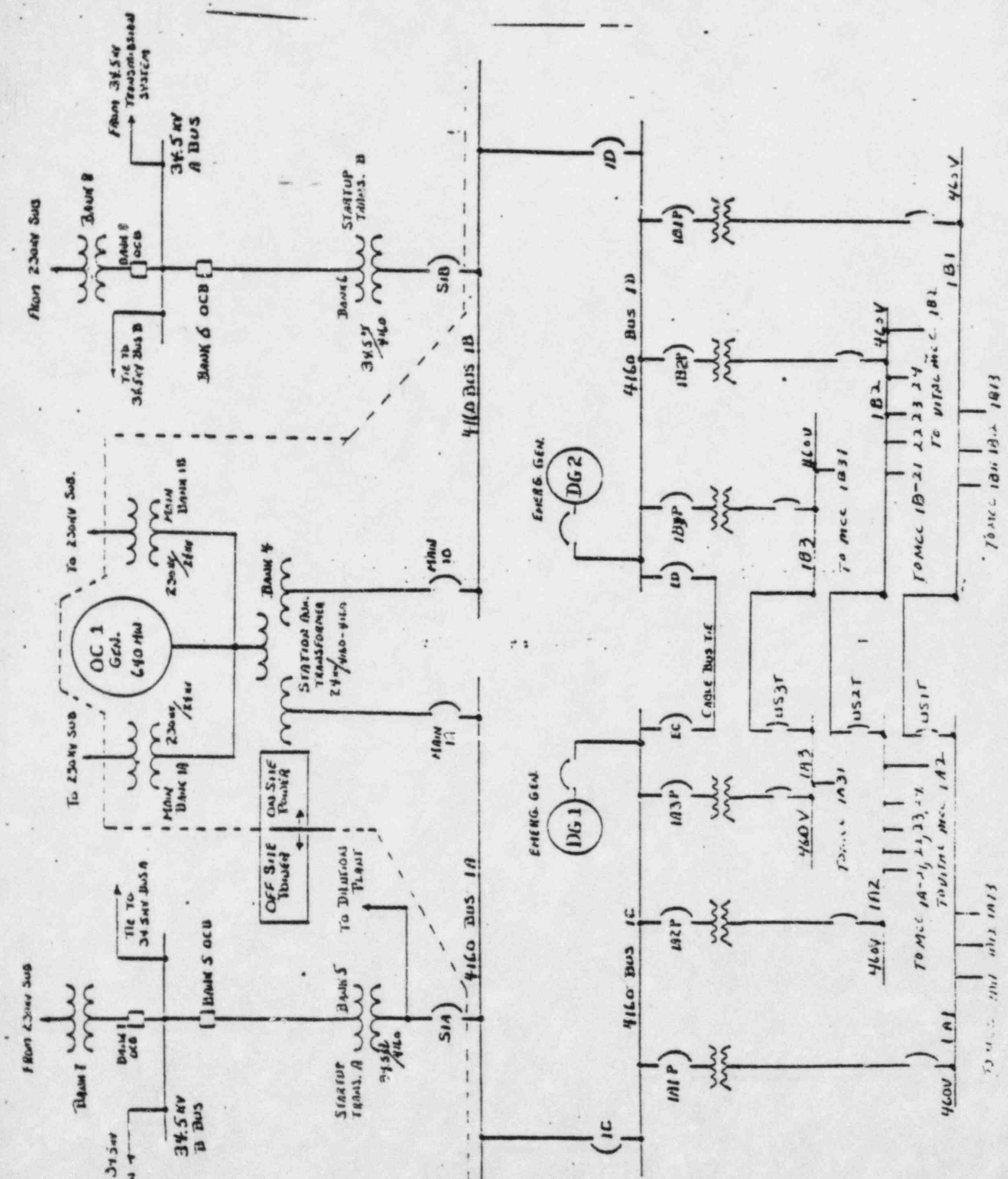

Figure 1. Oyster Creek Nuclear Power Station electrical distribution system single-line diagram.

	Instrument Channel	Check	Calibrate	Test	Remarks (Applies to Test & Calibration)
19.	Manual Scram Buttons	NA	NA	1/3 mo.	
20.	High Temperature Main Steamline Tunnel	NA	Each Refueling outage	Each refueling outage	Using heat source box
21.	SRM	*	*	*	Using built-in calibration equipment
22.	Isolation Condenser High Flow ΔP (Steam and Water)	NA	1/3 mo.	1/3 mo.	By application of test pressure
23.	Turbine Trip Scram	NA		Every 3 months	
24.	Generator Load Rejection Scram	NA	Every 3 months	Every 3 months	
25.	Recirculation Loop Flow	NA	Each Refueling Outage	NA	By application of test pressure
26.	Low Reactor Pressure Core Spray Valve Permissive	NA	Every 3 months	Every 3 months	By application of test pressure
27.	Scram Discharge Volume (Rod Block)				
	a) Water level high	NA	Each Refueling Outage	Every 3 months	By varying level in switch column
	b) Scram trip bypass	NA	NA	Each refueling outage	
28.	Loss of Power				
	a) 4.16 KV Emergency Bus Undervoltage (Loss of voltage)	Daily	1/18 mos.	1/mo.	
	b) 4.16 KV Emergency Bus Undervoltage (Degraded Voltage)	Daily	1/18 mos.	1/mo.	

*Calibrate prior to startup and normal shutdown and thereafter check 1/s and test 1/wk until no longer required.

Amendment No. 63

4.7 Auxiliary Electrical Power

Applicability: Applies to surveillance requirements of the auxiliary electrical supply.

Objective: To verify the availability of the auxiliary electrical supply.

Specification: A. Diesel Generator

1. Each diesel generator shall be started and loaded to not less than 20% rated power every two weeks.

2. Each diesel generator shall be automatically activated (by simulating a loss of offsite power in conjunction with a safety injection actuation test signal) and functionally tested during each refueling outage by:

   a. Verifying de-energization of the emergency busses and load shedding from the emergency busses.

   b. Verifying the diesel starts from ambient conditions on the auto-start signal, energizes the emergency busses with permanently connected loads, energizes the auto-connected emergency loads through the load sequence timers listed in Table 3.1.1 and operates for ≥ 5 minutes while its generator is loaded with the emergency loads.

   c. Verifying that on diesel generator trip, the loads are shed from the emergency busses and the diesel restarts on the auto-start signal, the emergency busses are energized with permanently connected loads, the auto-connected emergency loads are energized through the load sequences and the diesel operates for ≥ 5 minutes while its generator is loaded with the emergency loads.

3. Each diesel generator shall be given a thorough inspection at least once per 18 months during shutdown.

4. The diesel generators' fuel supply shall be checked following the above tests.

5. The diesel generators' starting batteries shall be tested and monitored the same as the station batteries, Specification 4.7.B.