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SUBJECT: Forwards response to 830603 request for addl info ine proposed mods to Class IE protection sys on reactor protection sys motor generator sets.

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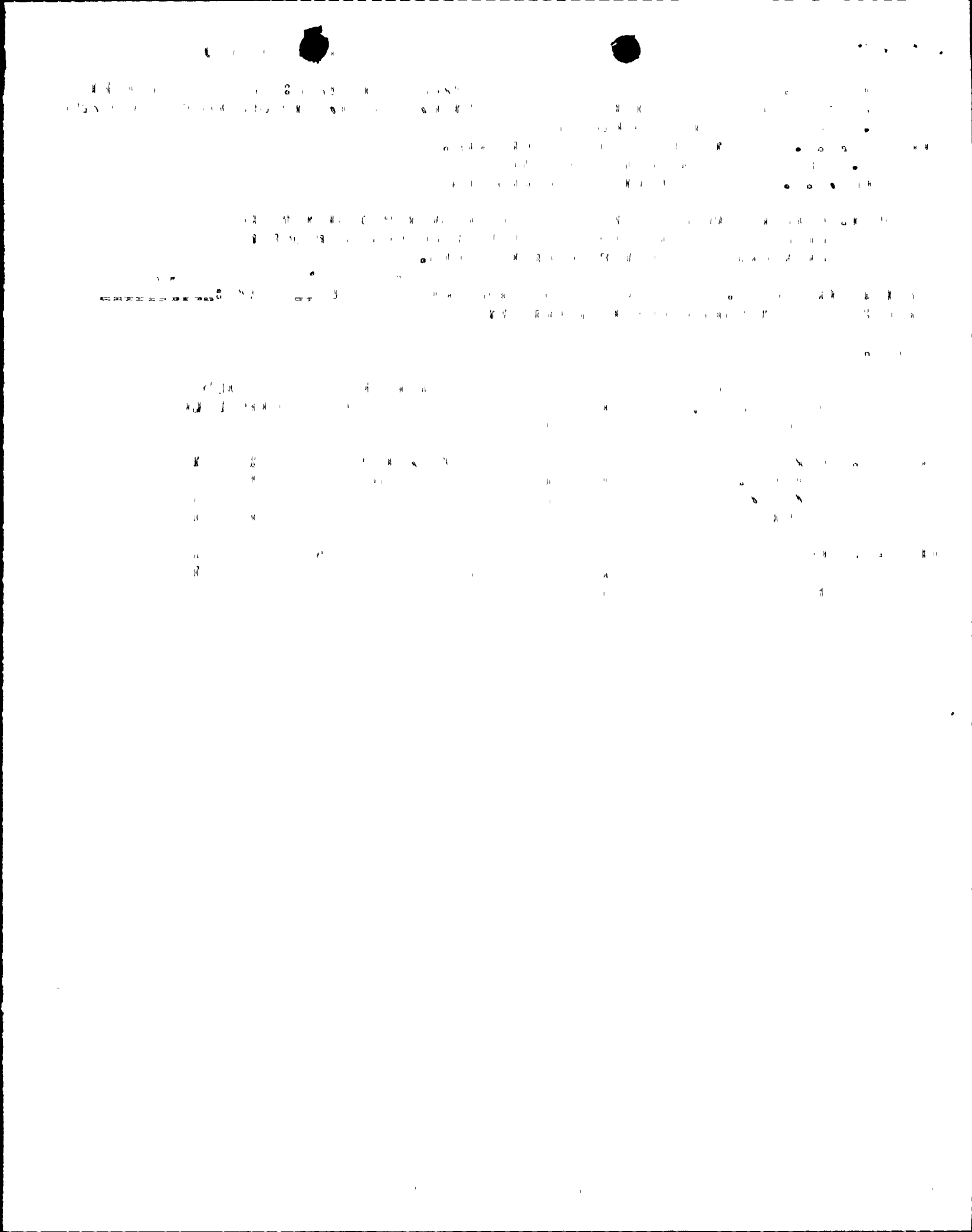

NIAGARA MOHAWK

NIAGARA MOHAWK POWER CORPORATION/300 ERIE BOULEVARD WEST, SYRACUSE, N.Y. 13202/TELEPHONE (315) 474-1511

July 22, 1983

Director of Nuclear Reactor Regulation
Attention: Mr. Domenic B. Vassallo, Chief
Operating Reactors Branch No. 2
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Nine Mile Point Unit 1
Docket No. 50-220
DPR-63

Gentlemen:

On December 1, 1982 we submitted design information on the Class 1E protection system on the reactor protection system motor generator sets at Nine Mile Point Unit 1. Your letter of June 3, 1983 requested additional information relating to the proposed modifications. The attachment to this letter provides that information.

Very truly yours,

T. E. Lempges
Vice President - Nuclear Generation

TEL/MGM:bd

Attachment

A001
1/1

RESPONSE TO REQUEST
FOR ADDITIONAL INFORMATION
ON
PROTECTION SYSTEMS
FOR
REACTOR PROTECTION SYSTEM
MOTOR-GENERATOR SETS

NINE MILE POINT UNIT 1

July 1983

1. Question

Submit the nominal voltage and frequency at the input to the monitoring system from which the setpoints are selected. Verify that this voltage will ensure the General Electric required normal operating RPS component terminal voltage of 115 ± 2 volts.

Response

Protection system inputs (voltage and frequency) are obtained directly from the generator output of its associated motor generator set. Each protection system is located adjacent to its associated motor generator. The generator's nameplate voltage and frequency ratings for each motor generator set is 120 Volts A.C. and 60 Hertz, respectively. The following is a list of the voltage and frequency variation from no load to full load for each Motor Generator set. This information was obtained from the original test data supplied by General Electric.

MG Set	Voltage Variation (No Load to Full Load)	Frequency Variation (No Load to Full Load)
MG Set 131	121 to 119 Volts A.C.	59.92 to 59.4 Hertz
MG Set 141	121 to 119 Volts A.C.	59.92 to 59.4 Hertz
MG Set 162	121.2 to 118.8 Volts A.C.	A.C. Drive 60 Hertz D.C. Drive 60.6 to 59.4 Hertz
MG Set 172	121.2 to 118.8 Volts A.C.	A.C. Drive 60 Hertz D.C. Drive 60.6 to 59.4 Hertz

A study being performed in response to question number 4 will ensure proper operating voltages at the terminals of the Reactor Protection System components.

2. Question

Submit verification that the design and installation of the monitoring system (including control power, independence, etc.) meet the requirements of GDC 2, GDC 21, IEEE 279-1971 and IEEE 384-1974.

Response

The following paragraphs address the requirements of:

1. General Design Criteria 2, "Design Basis for Protection Against Natural Phenomena".

2. General Design Criteria 21, "Protection System Reliability and Testability".

3. IEEE 279-1971, "Criteria for Protection Systems for Nuclear Power Generating Stations.

4. IEEE 384-1974, "Criteria for Independence of Class 1E Equipment and Circuits".

The design of the protection system contains solid state protective relays. These protective relays will monitor the output of the Motor Generator Sets and automatically initiate appropriate protective action (contactor opening) whenever a condition monitored by these relays reaches a preset level and remains there for a preset period of time. This equipment will perform these functions for the full range of conditions (environmental, seismic, fire and combinations of these conditions) that could exist at the equipments location.

Equipment, such as protective relaying cabinets and the equipment contained within these cabinets, will be qualified to the requirments of IEEE 323-1974, "Qualifying Class 1E Equipment for Nuclear Power Generating Stations" and IEEE 344-1975, "Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Station." The test response spectra on the new equipment will be analyzed to verify that it meets or exceeds the required response spectra. In addition, this modification is designed to comply with IEEE 384-1974, criteria for Independence of Class 1E Equipment and Circuits.

Each of the five protection systems contains two completely redundant and independent protective relaying packages. Therefore, no single failure will result in the loss of the protection function.

The equipment contained in the five protection systems will be completely isolated from the control system equipment for each Motor Generator Set. The input will be to the protection systems connected directly from the output of the Motor Generator Sets. Each channel can be functionally tested and each sensor can be calibrated during power operation without initiating a protection action at a systems level. This is accomplished by transferring the Motor Generator Sets load to Maintenance Supply Instrument and Control Bus 130A. Control Room Annunciation is provided if the protection system is bypassed or rendered inoperative for any purpose. Protective actions are identified down to the channel level and sensor level by the operation of indicating lights on each sensor. Equipment used in the protection system will be distinctly identified by the use of nameplates. In addition, each channel will be uniquely identified in the same manner.

2. Question

Response (cont'd)

The locations of the protection systems and their associated cable and raceway are such that no equipment will be located in a pipe failure hazard area, a missile hazard area or a fire hazard area. The equipment will be located in a limited hazard area as defined in IEEE-384-1974.

New cable and raceway will meet the minimum separation distances for limited hazard areas. The protection systems shall be designed to be independent and sufficiently separated to assure operability of the protection system despite any single design basis event.

Protection systems are independent and isolated from each other and Non-Class 1E circuits. This has been accomplished by wiring techniques and other isolation devices. These isolation devices have been applied so the maximum creditable voltage or current transient applied to the devices Non-Class 1E side will not degrade the operation of the circuit connected to the devices Class 1E side below an acceptable level. In addition, shorts, grounds or open circuits occurring in the Non-Class 1E side will not degrade the circuit connected to the Class 1E side below an acceptable level.

3. Question

Provide procedures for testing the design modifications after installation to ensure that acceptable voltages and frequency are present at the terminals of the RPS components, such as the scram discharge solenoid valve.

Response

The following is an outline of the testing to be performed on the protective relaying package following installation. This will ensure that acceptable voltages and frequencies are present at the terminals of the reactor protection system components.

Prior to system testing, protective relays will be tested and calibrated following applicable procedures.

1. For each Motor Generator Set, connect a variable voltage and frequency power supply to one protective relaying package.

2. Step-change an increase in voltage to a pre-determined value.

3. Step-change a decrease in voltage to a pre-determined value.

4. Step-change a decrease in frequency to a pre-determined value.

5. Recording the following on pen recorders:

   - Input voltage
   - Output voltage
   - Test voltage
   - Test frequency

   Note: Elapsed time will be determined by measuring distance from step-change of test voltage (frequency) to V_{out} = 0 volts.

6. Compare results with pre-determined values to ensure proper functioning of the protective relaying package.

7. Repeat steps 1 through 6 for the redundant protective relaying package on each Motor Generator Set.

4. Question

Verify from manufacturer data that the overvoltage, undervoltage, and underfrequency trip setpoints with their associated time delays (including tolerances) are acceptable. The acceptable setpoints should ensure adequate protection of all RPS components, such as the scram solenoid discharge valve.

Response

Loads associated with Motor Generator Sets 131, 141, 162 and 172 have been identified. Manufacturers data related to voltage and frequency requirements are currently being obtained. This data will be the basis for determining the normal operating voltage for each Motor Generator Set as well as the proposed relay settings. The current settings are contained in the response to Question 5.

This study will be completed by November 1, 1983. Final technical specifications with any necessary changes will be submitted at that time.

5. Question

Submit draft proposed Technical Specification changes to incorporate the design modifications in accordance with the Standard Technical Specifications (i.e., LCO's, surveillance requirements and trip setpoints). The proposed changes should also include the time delays associated with each trip setpoint.

Response

A draft proposed technical specification is attached. It has not been reviewed nor approved by the Site Operations Review Committee nor the Safety Review and Audit Board.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
3.6.9 REACTOR PROTECTION SYSTEM MOTOR GENERATOR SET MONITORING	4.6.9 REACTOR PROTECTION SYSTEM MOTOR GENERATOR SET MONITORING
Applicability:	Applicability:
Applies to the operability of the monitoring system on Motor Generator sets that supply power to the reactor protection system and reactor trip buses.	Applies to the surveillance of instrumentation that provides protection of the reactor protection Motor Generator sets.
Objective:	Objective:
To assure the operability of the instrumentation required for safe operation of the Motor Generator sets supplying power to the reactor protection system and reactor trip system.	To verify the operability of protection instrumentation on the Motor Generator sets supplying power to the reactor protection and reactor trip buses.
Specification:	Specification:
a. Except as specified in specifications b and c below, two Motor Generator set protective relay channels shall be operable for each Motor Generator set.	a. At least once per refueling cycle Demonstrate operability of the over voltage, under voltage and under frequency protective instrumentation by performing an instrument channel test including simulated automatic actuation of the protective relays tripping logic output circuit breakers and verifying the setpoints in Table 4.6.9.
b. With one monitoring channel inoperable, restore the inoperable channel to an operable status within 72 hours or remove the Motor Generator set from service.	
c. With both monitoring channels inoperable, restore at least one to an operable status within 30 minutes or remove the associated Motor Generator set from service.	

Table 4.6.9

REACTOR PROTECTION SYSTEM M-G SET MONITORING

	Relay Pickup	Time Delay	Allowable Values
Overvoltage	126.5 volts	3.0 seconds ± .5 seconds at 152 volts 0.75 seconds ± .25 seconds at 190 volts	125.5 - 127.5 volts
Undervoltage	103.5 volts	8.0 seconds at 83 volts 3.0 seconds at 0 volts	102.5 - 104.5 volts
Under Frequency	57.5 Hz (MG sets 162,172 and Bus 130)	1.5 seconds at 90 volts	57.3 - 57.7 hertz
	55.1 Hz (MG sets 131,141)	1.5 seconds at 90 volts	54.9 - 55.3 hertz

6. Question

The underfrequency setpoint (pick up frequency) is to protect the RPS components from abnormal frequency. Explain why the underfrequency setpoints for Motor Generator Sets 162 and 172 are different from those Motor Generator Sets 131 and 141.

Response

We are currently investigating these differences with our vendor. A response will be provided by November 1, 1983.