NRC FORM 195 (2-76)

U.S. NUCLEAR REGULATORY COMMISSION

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TO:	FROM:	DATE OF DOCUMENT
Mr. R. W. Reid	Metropolitan Edison Company Reading, Pa. R. C. Arnold	5/12/77
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DESCRIPTION

Ltr. trans the following:

ENCLOSURE

Consists of information concerning the alarm circuitry and diesel generator control circuitry for the diesel generators at Unit No. 1.....

DO NOT REMOVE

ACKNOWLEDGED

PLANT NAME: (1-P) (4-P)

Three Mile Island Unit No. 1

RJL

FOR ACTION/INFORMATION

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METROPOLITAN EDISON COMPANY

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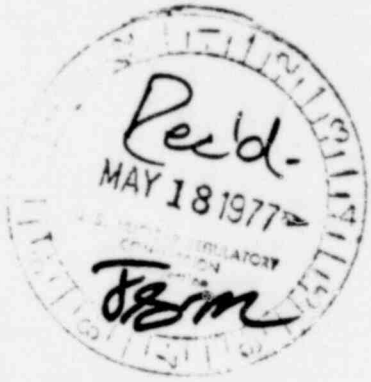
May 12, 19..
GQL 0632



Regulatory Docket File

Director of Nuclear Reactor Regulation
Attn: R. W. Reid, Chief
Operating Reactors Branch 4
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Sir:

On March 28, 1977, you sent a letter requesting a reply, in forty-five days, to five questions concerning the alarm circuitry and diesel generator control circuitry for the diesel generators at Three Mile Island Nuclear Station, Unit 1.

Attached is our response to these questions. Should you have any further questions, please contact either myself or Mr. D. G. Mitchell (ext. 88-169).

Sincerely,

R. C. Arnold
Vice-President

RCA:DGM:bar

Attachments

1469 035

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Attachment
Metropolitan Edison Company
GQL 0632
5/12/77

Background

The NRC has requested that a review of the alarm and control circuitry for the diesel generators be conducted to determine how any condition that renders a diesel generator unable to respond to an automatic emergency start signal is alarmed in the Control Room. This review is to consider all aspects of possible diesel generator operational conditions, including tests and local control operations. Specifically, the NRC has requested:

a) All conditions that render the diesel generator incapable of responding to an automatic emergency start signal.

b) The wording on the annunciator window in the Control Room that is alarmed for each of the conditions identified in (a).

c) Any other alarm signals that also cause the same annunciator to alarm.

d) Any condition that renders the diesel generator incapable of responding to an automatic emergency start signal which is not alarmed in the Control Room.

e) Any proposed modifications resulting from this evaluation.

Conclusion

It has been determined from this review that the information available to the Control Room can be confusing and some information is not available to the operator. This is caused by the sharing of a single annunciator in the Control Room by all the alarms on the local alarm panel. Some of the local alarms are disabling while the others only indicate an abnormal, but not disabling condition. Also, whenever any one of these local alarms is annunciated in the Control Room, any other condition that is alarmed will not be annunciated in the Control Room because this annunciator does not have a reflash capability. The attached Table A provides the information required for items a, b and c of the NRC request.

For item d, the only condition that is not presently alarmed, but would render the diesel generator unable to respond to an automatic emergency start signal, would be the exciter control circuitry not in the reset condition. If the exciter reset is not operated after local testing, the exciter field cannot be flashed on a subsequent start, preventing the diesel generator from generating the required load.

Attachment
Metropolitan Edison Company
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The proposed modifications to both A and B diesel generators are:

1. Change the Control Room annunciation as outlined in the attached Table B.

2. Add a new alarm, Exciter Not Reset, to the local alarm panel in the spare window slot. This alarm would in turn annunciate in the Control Room on the associated Diesel Generator Blocked annunciator.

3. Add a reflash capability to the Control Room annunciator, Diesel Generator Trouble Alarms.

Tentative date for completion of modifications is the next scheduled refueling outage - 1978.

Discussion

The present system of alarming conditions that render a diesel generator unable to respond to an automatic emergency start signal can be misleading and confusing. The proposed modifications will better inform the Control Room operator of the status of the diesel generators. The Control Room operator will be able to monitor the status all the time, and will be able to determine if the diesel generator has been restored to the proper operating mode after tests or local control operations. Also, the operator will be informed whenever more than one alarm condition exists with the reflash capability instead of the current mode of the first alarm annunciating and subsequent alarms not annunciating in the Control Room. This will prevent maintained spurious alarms from disabling the annunciator.

TABLE A

Attachment
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Item a - Conditions that render the diesel generator incapable of responding to an automatic emergency start signal.	Item b - Wording on the Annunciator Window in Control Room that is alarmed.	Item c - Any other alarm signals that also cause the same annunciator to alarm.
1. Selector Switch (43) in Control Room not in the automatic (standby) position.	Diesel Gen. Blocked	Either diesel gen., 1A or 1B will alarm. (1)
2. Control Switch at engine panel not in the "Normal" position	Diesel Gen. Trouble (Annun. B/1-5 for 1A,	Any one of 19 alarms from local alarm panel in diesel gen. room (2)
3. Diesel Gen. Breaker Lockout Relay	Diesel Gen 1A/1B Gen. Bkr. Locked-Out	Either diesel gen., 1A or 1B will alarm (3)
4. Overspeed Trip Relay energized - caused by overspeed or diesel fuel rack not engaged	Diesel Gen. Trouble	Any one of 19 alarms from local alarm panel (2)
5. Starting Air Pressure Low - air pressure less than 150#	Diesel Gen. Trouble	Any one of 19 alarms from local alarm panel (2)
6. Shutdown Relay energized by any of the following - lube oil pressure low (2 out of 3 pressure switch matrix	Diesel Gen. Trouble	Any one of 19 alarms from local alarm panel (2)
7. Manual Air Valve Not Open	Diesel Gen. Trouble	Any one of 19 alarms from local alarm panel (2)

NOTES:
1. Data Logger differentiates which diesel caused alarm.
2. Local Alarm Panel Alarms are: 1) Lube Oil Pressure Low, 2) Lube Oil Temp. Low, 3) Lube Oil Level Low, 4) Jacket Coolant Temp. High, 5) Jacket Coolant Press. Low, 6) Jacket Coolant Level Low, 7) Fuel Oil Day Tank High or Low, 8) Fuel Oil Pressure Low, 9) Starting Air Pressure Low, 10) Starting air manual valve closed, 11) Start Failure, 12) Overspeed, 13) Engine crankcase pressure, 14) a switch not in automatic (accessory equipment), 15) Field ground, 16) Gen. Bkr. open, 17) D. C. fuel oil pump operating, 18) control fuse failure, 19) Maintenance shutdown.
3. Data Logger differentiates which diesel caused alarm.

TABLE B

Existing Control Room Annunciator Wording	Change Annun. Wording To Read	Conditions Which Will Alarm This Annunciator
1. Diesel Gen. Blocked	Diesel Gen. A Blocked	1. Selector Switch Not in Auto 2. Control Switch Not in Normal 3. Shutdown Relay Energized 4. Starting Air Pressur Low 5. Starting Air Manual Valve Closed (2) 6. Exciter Not Reset 7. Gen. Bkr. Locket-Out
2. Diesel Gen. Bkr.	Diesel Gen. B. Blocked	Same as item 1.
3. Diesel Gen. Trouble 1A	No Change to Wording	Provide reflash on this alarm to prevent blocking by any one of 16 local alarms (1)
4. Diesel Gen. Trouble 1B	No Change to Wording	Provide reflash on this alarm to prevent blocking by any one of 16 local alarms (1)

NOTES:

1. The following existing local alarms would be modified to alarm Diesel Gen. Blocked annunciator:
   a. Starting Air Pressure Low
   b. Manual Air Valve Closed
   c. Maintenance Shutdown

   The following existing local alarms would continue to alarm Diesel Gen. Trouble annunciator but with reflash capability:
   a. Lube Oil Press. Low
   b. Lube Oil Temp. Low
   c. Lube Oil Level Low
   d. Jacket Coolant Temp. High
   e. Jacket Coolant Press. Low
   f. Jacket Coolant Level Low
   g. Fuel Oil Day Tank High or Low
   h. Fuel Oil Press. Low
   i. Start Failure
   j. Engine Crankcase Pressure
   k. A switch not in auto. (accessory equip.)
   l. Field Ground
   m. Gen. Bkr. Open
   n. D. C. Fuel Oil Pump Operating
   o. Control Fuse Failure
   p. Overspeed

2. New alarm to be added to Spare position on Local Panel to alarm Diesel Gen. Blocked annunciator.