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ACCESSION NBR:8409170268 DOC.DATE: 84/09/13 NOTARIZED: YES DOCKET #
FACIL:50-410 Nine Mile Point Nuclear Station, Unit 2, Niagara Moha 05000410
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RECIP.NAME RECIPIENT AFFILIATION
SCHWENCER,A. Licensing Branch 2

SUBJECT: Forwards responses to SER Open Items 60,71,153,168,172, 430.24,430.99 & 430.102.Info will be included in next FSAR amend.

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NIAGARA MOHAWK

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

September 13, 1984
(NMP2L 0160)

Mr. A. Schwencer, Chief
Licensing Branch No. 2
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Re: Nine Mile Point Unit 2
Docket No. 50-410

Dear Mr. Schwencer:

Enclosed for your use and information are Unit 2 responses to the Nuclear Regulatory Commission's Safety Evaluation Report open items. This information has been previously discussed with your staff and is submitted to aid your review of the Unit 2 license application for the resolution of these open items 60, 71, 153, 168, 172, 430.23, 430.24, 430.99, 430.102.

The enclosed will be included in the next Final Safety Analysis Report Amendment.

Very truly yours,

CVMangan

C. V. Mangan
Vice President
Nuclear Engineering & Licensing

NLR:ja
Enclosure
xc: Project File (2)

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)

Niagara Mohawk Power Corporation) Docket No. 50-410

(Nine Mile Point Unit 2))

AFFIDAVIT

C.V. Mangan, being duly sworn, states that he is Vice President of Niagara Mohawk Power Corporation; that he is authorized on the part of said Corporation to sign and file with the Nuclear Regulatory Commission the documents attached hereto; and that all such documents are true and correct to the best of his knowledge, information and belief.

CVMangan

Subscribed and sworn to before me, a Notary Public in and the the State of Maryland and County of Montgomery, this 13 day of September 1984.

Ruth Etheridge
Notary Public in and for
Montgomery County, Maryland

My Commission expires:

7/1/86

Appendix A, Item 5, need not apply to this portion of the instrumentation system. This is a new requirement.

Incore thermocouples located at the core exit or at discrete axial levels of the ICC monitoring system that are part of the monitoring system should be evaluated for conformity with Attachment 1, Design and Qualification Criteria for PWR Incore Thermocouples, which is a new requirement.

The types and locations of displays and alarms should be determined by performing a human-factors analysis taking into consideration:

1. Use of this information by an operator during both normal and abnormal plant conditions.

2. Integration into emergency procedures.

3. Integration into operator training.

4. Other alarms during emergency and need for prioritization of alarms.

Nine Mile Point Unit 2 Position

The BWR Owners Group has concluded that no additional instrumentation is required to monitor inadequate core cooling. NMPC endorses this position. The present water level instrumentation, described in the response to Task II.K.3.27, is fully adequate for predicting the approach to inadequate core cooling and in allowing the plant operator to respond properly under all postulated reactor conditions.To reduce vulnerability to failures or malfunctions, analog level transmitters are used to detect water level. This has been evaluated and documented in the GE report NEDO-24708, entitled Additional Information Required for NRC Staff Generic Report on Boiling Water Reactors.

In addition, emergency procedure guidelines have been submitted by the BWR Owners Group to enable operators to recognize the approach to inadequate core cooling. These are being incorporated into NMPC's emergency operating procedures.

NMPC believes the above procedures and analysis satisfy the requirements of this NRC position relative to inadequate core cooling.

Refer to the response of Question 421.21 and Question 421.23 for further information regarding Nine Mile Point Unit 2 position.

Refer to the response for Task II.F.1 for a discussion of incore thermocouples and to the response for Task I.D.1 for

SER#71

stainless steel which is welded to the box wall. Poison installation throughout the design is vented.

No poison material is provided in the north-south interface between racks and on the periphery of the rack array. At the north-south interface a 3-in water gap, instead of poison, is provided. It is maintained by spacer blocks welded to one of the two adjacent racks. The periphery of the rack array is provided with 3-in stand-offs, where needed, welded to the sides of the racks. They prevent any fuel assembly from being placed closer to the stored fuel than is criticality safe.

The neutron poison material is Boraflex, a silicon polymer containing uniformly distributed B_4C which contains a minimum B-10 loading of 0.028 g/cm^2. Extensive testing of this material has proven that there is no significant deterioration of the material when subjected to 1×10^{11} rads gamma, in a water environment, which is in excess of that which the material will be subjected to in the spent fuel pool. The material is controlled through an extensive QA program which ensures that it is the proper material with the correct composition and the correct amount of B-10. Visual examination of the finished rack provides the assurance that all poison sheets are in place. The Boraflex Poison Surveillance Program is an accelerated test of the ability of the poison material to withstand high energy radiation, in the spent fuel storage pool. THe accelerated testing is accomplished by establishing a "controlled" cell. The "controlled" cell is a pre-selected bundle location in which a freshly discharged bundle will be placed. That is, at each refueling outage (after the first) the old bundle will be removed and a freshly discharged bundle will be placed in the "control" cell to ensure that it receives the highest exposure, the "control" cell will have test samples located alongside the rack.

The test samples are 2" squares, made up as a string of 30. This string of samples, approximately 7' long, is hung on the side of a rack and is axially centered on the spent fuel in the fuel assembly.

The sample string is removed every five years from the spent fuel storage pool. Each time, three samples are removed from the bottom of the string for physical testing at a qualified laboratory. The test values for the three samples are compared to their original values and to an unirradiated control sample. Neutron transmissability testing will be performed and documented.

NINE MILE POINT UNIT 2

SER 153 (4.2)

The mechanical fracturing analysis is usually done as part of the seismic-and-LOCA loading analysis (see SER 163). The staff has reviewed and approved the generic analytical method used by GE (described in NEDE-21175-3) to determine that fuel rod mechanical fracturing will not occur as a result of combined seismic-and-LOCA loadings. However, the applicant has not demonstrated that this generic report is applicable to NMP-2 or presented an acceptable alternative. In either case, the staff requires a plant-specific analysis.

RESPONSE

The method described in NEDE-21175-3-P was applied to Nine Mile Point Unit 2.

The results of the plant specific analysis are summarized in Table 3.9B-20. The results show that the most limiting accelerations for the fuel assembly (including channel) are within the allowables. This assures that

1) the stress due to dynamic loading is within the code allowables,

2) a coolable geometry is maintained in the core,

3) the fuel assembly will not interfere with the control rod movement.

Table 3.9B-2o

FUEL ASSEMBLY (INCLUDING CHANNEL) (2) (3)

Acceptance Criteria	Loading	Primary Load Type	Calculated Peak Acceleration	Evaluation Basis Acceleration
Acceleration Envelope	Horizontal Direction: Peak Pressure Safe Shutdown Earthquake Annulus Pressurization	Horizontal Acceleration	2.6G	(1)
	Vertical Direction: Peak Pressure Safe Shutdown Earthquake Safety Relief Valve Chugging	Vertical Accelerations	2.8G(4)	(1)

(1) Evaluation basis accelerations and evaluations are contained in NEDE-21175-3-P.

(2) The calculated maximum fuel assembly gap opening for the most limiting load combination is 0.01 inch based on the methodology contained in NEDE-21175-3-P. This is much less than the gap required to start the disengagement of the lower tie plate from the fuel support casting.

(3) The fatique analysis indicates that the fuel assembly has adequate fatique capability to withstand the loadings resulting from multiple SRV actuations and the OBE + SRV event.

(4) These values are determined using methodology contained in NEDE-21175-3-P.

SER #168

QUESTION F440.16 (5.4.6)

BWR operating experience has shown that the HPCI and RCIC systems have been rendered inoperable because of inadvertent leak detection isolations caused by equipment room area high differential temperature signal. The events occurred when there was a relatively sharp drop in outside temperature.

1. Provide a discussion of the modifications that have been or will be made to prevent inadvertent isolations of this type which affect the availability and reliability of the RCIC and the RHR systems.

2. Provide the trip settings for isolation of the RCIC and RHR systems due to high area temperature in terms of degrees above ambient temperature.

3. Discuss the method of specification that would be applied. Demonstrate that the setting could not be set too low and cause inadvertent isolation when the system is needed.

RESPONSE

Where such inadvertent isolations have occurred, they have been isolated cases and do not reflect a generic problem with the leak detection system design. The unit 2 RCIC and RHR equipment area HVAC (see Section 9.4.2) provide the necessary space cooling or heating to maintain the area temperatures within the environmental and system design parameters. Supply ventilation air is tempered as required, to maintain a constant minimum air supply temperature. Since these areas are interior areas, this design will preclude any adverse effects due to a relatively sharp drop in outside temperature.

It is highly unlikely that a combination of a failure in the unit 2 HVAC system, coupled with a sudden drop in outside temperature would occur at precisely the time that the RCIC or RHR (Steam) is required to operate. Therefore, leak detection logic and instruments are deemed adequate.

The leak detection system monitors the ambient temperature in the RCIC equipment and pump room as well as the difference between the HVAC supply and exhaust temperatures. The leak detection system provides an automatic system isolation signal when either local ambient or supply/exhaust differential temperature exceed analytical set points corresponding to 25 GPM leakage.

Based on the analysis of a 25 GPM equivalent steam leak in the RCIC pump room, room temperature is predicted to increase to 141°F from its initial condition with a resulting maximum differential temperature of 76°F. This setpoint is significantly more than the 55°F differential temperature between the design maximum RCIC room temperature of 120°F and minimum supply air temperature of 65°F. Therefore, inadvertent system isolation is not expected to occur as a result of changes in the outside air temperature.

A similar analysis for the RHR pump room "B" yields a temperature of 92°F following a leakage of 25 GPM. In this case, the isolation set point for differential (supply/exhaust) temperature will be on the order of 27°F. The design maximum RHR pump room temperature is 120°F.

It should also be noted that the actual instrument set points based on the analytical limits discussed above are currently being verified. The actual set points will conservatively include the overall instrument loop accuracy and drift allowances.

NINE MILE POINT TWO

SER NO. 172

Single active component failures and operator errors are considered in the transient analysis of moderate frequency. The most limiting transient event is a feedwater controller failure with maximum demand with the failure of turbine bypass. The change in CPR is about 0.27 for an initial MCPR of 1.24 which results in violation of MCPR safety limit of 1.06. The applicant has stated that this transient event is one of only 2 to 3 seconds duration: no fuel failure would be expected. The staff requires that the applicant demonstrate how they meet a small fraction of 10 CFR 100 criteria violating OL MCPR limit. The applicant should also demonstrate the method used to identify this event when all moderate frequency transients combined with single failure/operator error are considered in the evaluation.

RESPONSE

As stated in the response to Question 440.41, for moderate-frequency events in Chapter 15, the inclusion of any additional single failure or operator error would shift the events to infrequent or limiting fault category which has less stringent safety criteria.

Responses to Questions 440.41 and 440.43 have identified that:

1) The worst additional single failure/operator error is the postulated failure of turbine bypass, and

2) Among all moderate-frequency transients coupled with turbine bypass failure, the most limiting event is feedwater controller failure with maximum demand.

In this postulated event, the final CPR would fall below the 1.06 safety limit for a period of 2 to 3 seconds. As a result, less than 770 fuel rods could fail even if no credit is taken for the short period of time that these rods experience boiling transition. A comparison of this event with the rod drop accident analyzed in Chapter 15 indicates that the potential radiological release due to the assumed fuel failure in this event would be less than a small fraction of the 10 CFR 100 limit.

QUESTION F430.23 (SRP 8.1, 8.3.1)

Regarding separation of electrical circuits:

a. Describe the separation of non 1E circuits from associated circuits and Class 1E circuits. Also address the qualification and identification of the associated circuits.

b. In FSAR Section 8.3.1.4.2 you state that if the required 6 inch separation cannot be maintained between circuits on terminal boards a fire resistant barrier is provided between the terminals or an analysis is made to establish that a fire in one divisional circuit inside the panel will not disable both divisions. Identify the areas where an analysis is used and provide the analysis results for staff review.

c. Does the electrical penetration separation discussed in Section 8.3.1.4.2 result in 3 ft. horizontal and 5 ft. vertical clearance between redundant Class 1E circuits and Class 1E and non-Class 1E circuits?

d. Justify the routing of redundant Class 1E circuits in the east vertical cable chase and the routing of Class 1E and non-Class 1E circuits in the second and third electrical tunnels. Your response should address position C.8 of R.G. 1.75.

e. Is flexible conduit utilized as a barrier in the NSSS or non-NSSS portions of the plants? If so identify the areas where it is used and the separation distances maintained.

f. Describe the separation provided for the RPS circuits.

g. FSAR appendix 9A, section 9.A.3.7.3, addresses the means used to route cables into the control building and through the cable routing areas within the control building. Provide a comparable description in FSAR Chapter 8 which addresses the cable separation used in those areas to meet the IEEE 384-1974 and R.G. 1.75 requirements. Do these areas contain high energy equipment or piping (high or moderate energy) that could be a potential source of missiles or pipe whip? Are power cables routed through the area?

POWER SYSTEM BRANCH (PSB) COMMENTS:

a. Your response on associated circuits should describe the identification and color coding used for these circuits. Do the circuits become associated because of inadequate separation distances or by virtue of being connected to the Class 1E power system? Verify that the associated circuit is routed only with the division to which it is associated down to an isolation device.

b. Your response to this question states that to date there are no cases where analysis has been used to justify less than 6-in. separation. Verify that this response includes cabinets located in the PGCC.

c. Response OK

d. In accordance with position C.8 of R.G. 1.75 verify that the electrical tunnels and vertical cable chases are ventilated.

e. Your response indicates that flexible conduit is used as a barrier in NSSS panels to achieve required separation. Provide an analysis supported by tests which indicate the flex conduit is a suitable barrier and describe the separation maintained between the flex conduit and external circuit. We also understand that a fire retardant tape will be used as a barrier in PGCC cabinets. Provide an analysis supported by tests which indicate the tape is a suitable barrier and describe the separation maintained between the tape and external circuit.

RESPONSE

See revised Sections 8.3.1.4.1 and 8.3.1.4.2 for response to parts a, c, d, e, f and g.

In response to part b, to date there are no cases where analysis has been used to justify less than 6-in separation.

RESPONSE TO PSB COMMMENTS:

A) See revised Section 8.3.1.4.1

b) REFER TO QUESTION 421.47

d) Electrical tunnels and vertical cable chases are ventilated. See Section 9.4.1.2.1 and 9.4.1.2.6.

e. <u>Flexible steel conduit as a separation barrier</u>:

The testing has demonstrated that the electrical short circuit in a #10 AWG, tefzel insulated wire circuit, supported by a continuous source of DC current, ranging from zero to 140 amps, within a flexible steel conduit, cannot cause electrical fire of sufficient magnitude and induce thermal energy migration through a flexible steel conduit barrier. The wiring which generates heat to the separation barrier melts apart and becomes an open circuit before significant thermal damage can occur to the separation barrier.

<u>Fire retardant tape as a separation barrier</u>:

Tests were conducted on siltemp tape samples using "siltemp" as an electrical separation barrier. The tests demonstrated that the tape is capable of preventing propagation of damage between the circuits under maximum short circuit and neighboring rated current circuits. Thus the "siltemp" tape provides adequate thermal and electrical insulation to preclude propagation of damage between two redundant circuits.

<u>ADDITIONAL INFORMATION</u>

<u>QUESTION 1</u>

Please provide test reports for siltemp tape and flexible conduit.

RESPONSE:

The test reports will be provided under separate cover.

<u>QUESTION 2</u>

Identify any non-Class 1E circuits running in proximity of divisional circuits within PGCC.

RESPONSE:

PGCC ducts are divisionalized for separation, Class 1E circuits through these ducts are run into their respective division. Non-divisional wiring is routed through non-1E ducts. Any non-1E wiring which must be run in close proximity to Class 1E wiring is placed in conduit (rigid or flexible) or separated from Class 1E wiring by a barrier. Thus, there is no mixing of non-Class 1E circuits with divisional circuits within PGCC and PGCC floor ducts.

QUESTION 3

Concerning the test reports for Flexible Conduit and for Sil-Temp tape, the staff wants to see the PGCC site configuration to compare with the test documents to verify that test documents are applicable to NMP-2.

RESPONSE:

Flexible Conduit

The actual installation of flexible conduit within PGCC ducts or panels is the same as or no worse than the flexible conduit test configuration. Wherever practical, a one inch air gap has been maintained between conduits of different divisions and between conduit and other cables. The test configuration did not take credit for conduit to conduit or conduit to cable separation.

Sil-Temp Tape

Limited application of Sil-Temp tape as a barrier within PGCC panels is used to prevent propagation of damage between circuits under maximum short conditions. Sil-Temp tape is not used where flexible conduit is required for a grounding path in fail-safe circuits and in scram signal cables.

The actual installation of the Sil-Temp tape in the PGCC site configuration is as follows:

The cable or wire bundles are wrapped with Sil-Temp tape using a minimum overlap of 1/2 inch. The start and end of wrap area (2-1/2 inches) is finished with a minimum of two layers secured by a stainless steel strap. All wrapped sections of the cables are continuously wrapped with scotch 3M No. 69 tape applied counter to the wrapping direction of the tape. Ty-raps are used to secure the tape at 12 inch intervals. Ty-raps may also be used to anchor the bundle to a supporting structure.

The laboratory test configuration for the Sil-Temp tape is described in test report #56719 in Section 4.0, Summary and under TEST DATA SHEETS, Page 23.

The PGCC uses the same Sil-Temp tape and similar application procedures as the test configuration. The PGCC site configuration is not more severe than the test configuration.

QUESTION 4

Is Flex Conduit used in floor sections? The test analysis assumes a fault within a cable and not a short to the conduit itself.

If Flex Conduit is used within floor sections, a one inch air space surrounding the conduit would be acceptable to the staff, or, verify that a short to the conduit will not affect the surroundings.

RESPONSE:

Flex Conduit is used in PGCC floor sections to achieve separation. The test configuration reflected the worst case application with respect to the damage potential occurring from an electrical fire within the flexible conduit housing the wiring. All PGCC conduits are grounded at a maximum of 30 feet intervals along the entire length of the conduit. Thus, the test configuration is more severe than a short to the grounded conduit.

QUESTION 5

In the Flex Conduit test reports, there appears to be a discrepancy in thermocouple placement as described in Section C, page 2 and Section 6, page 13. Which set of thermocouples is correct or were there two sets of thermocouples? Also, address the discrepancy in temperature rises between Section C page 3 and Section 6 page 12.

RESPONSE:

The Flexible Conduit test report contains eight sections designated as; A, B, C, D, E, F, G and H. Section C was a trial run conducted to assure that all equipment was functioning properly and to.identify the worst case configuration. The final, successful test is included in Section A.

8.3.1.4.1 Electrical Isolation

The three divisions of th plant onsite power system are electrically independent of each other. This independence is maintained through the loads the divisions feed; each division feeds a separate load group and there is no chance of interconnecting indepenent divisions through the loads. Each division has its dedicated standby power source that is independent of the standby power source of any other division. There is no provision for paralleling the standby power sources of different divisions or for using the standby power source of one division to feed the loads of any other division. Each division uses its own control power sources for ionstrumentation and control, and the control power source of each division is independent of the control power of any other division. Thre is no provision for interconnecting these control power sources or for feeding the control circuits of one division from the control power sources of any other division.

Each division is also isolated from the associated nonsafety-related systems. Whenever a safety-related power or control circuit is connected with any nonsafety-related circuit, appropriate isolation devices as defined in Regulatory Guide 1.75 and IEEE 384 are used. Nonsafety power loads are not fed from safety buses except the stub bus loads (see Tables 8.3-1 and 8.3-2). The stub buses are tripped on LOCA siognal.

Certain circuits become associated circuits by virtue of being connected to the class 1E power system. These circuits are treated as class 1E. They are identified and color coded as the class 1E circuit they are associated with and are isolated by appropriate isolation devices. They are not routed with any other division than the one they are associated with.

8.3.1.4.2 Physical Separation

Physical Separation of the Class 1E Equipment

The items of equipment associated with each of the three independent divisions of the Class 1E onsite power systems are located in separate Seismic Category I structures to physically isolate them from each other. The Class 1E 4.16-kV switchgear buses of the three divisions are located in the Division I, II and III emergency switchgear rooms in the control building at el 261 ft. The Class 1E 600-V load centers associted with Divisions I and II are located in the emergency switchgear room of the respective division. The Class 1E MCCs associated with Divisions I and II are located in the emergency switchgear rooms of the respective division, in separate rooms in the screenwell building (el 261 ft) and in the reactor auxiliary building auxiliary

QUESTION F430.24 (SRP 8.3.2)

Regarding the 125 V dc Class 1E power distribution systems:

a. What is the operating voltage range of the loads connected to the Division I, II and III dc distribution systems?

b. Are the metal battery racks grounded?

c. Does the Division III system have a battery discharge alarm or low voltage alarm set approximately at battery open circuit voltage?

d. Describe the location of the water facilities in the battery rooms and discuss the potential for inadvertent spilling of water on the batteries from these facilities.

e. Recent operating experience has shown that an incompatibility between the battery rack and the battery may cause cracking of the battery case. The cracking may be caused in part by improper support at the battery stress points. Describe the battery stress points and their relationship with battery rack support.

PSB COMMENTS

a. The maximum battery terminal voltage indicated on FSAR page 8.3-57 for the division III batteries is 2.5 volts higher (137.5 V vs 135 V) than the maximum operating voltage of the loads.. Demonstrate how a 2.5 volt drop to the terminals of the loads is maintained at light load and maximum voltage while no more than a 2.5 volt drop is maintained during heavy load and minimum voltage (battery voltage 112.5 V vs load voltage 110 V). There also appears to be a discrepancy between the maximum battery voltage (137.5 V) indicated on FSAR page 8.3-57 and that indicated on page 8.3-58 (2.33 V/cell X 60 = 139.8). Resolve this discrepancy.

c. The division III bus low voltage alarm setting of 112.5 V is not set sufficiently high to act as a battery discharge alarm. A battery low voltage alarm set at 123-125 V dc or a separate discharge alarm should be provided.

RESPONSE

The division III batteries are floated at 2.22V/Cell (133.2Vdc) to minimize the periodic equalization of the batteries. Whenever equalization is required, the vendor recommends equalizing at 2.28-2.29 Volts/Cell (137.4Vdc). The normal operating voltage range of the dc loads is 110 to 135Vdc, which is maintained by battery float voltage of 133.2 volts. However, during equalization state (137.4Vdc) and lightly loaded conditions, the voltage drop in the circuit brings the voltage at the load terminals within the operating range. For the low voltage and heavy load condition, the dc bus voltage is expected to be about 120 V or above. The maximum equalizing voltage will not jeopardize dc loads under all conditions.

If inadvertently the battery terminal voltage drops to 123 Volts, a control room alarm "Division 3 emergency dc bus 125 Vdc system trouble" will be annunciated with no time delay. This will alert the operator to take necessary action to restore the bus voltage. If the bus voltage is not restored, the battery will continue to supply all connected dc loads assuming that the battery chargers are not available. The battery is designed to supply power for four hours. Following this four hour period, if the battery terminal voltage drops to 112.5 volts, then the dc control devices not already energized may fail to energize. At this point, the Division 3 dc system is not operable and the Division 3 DG may not be capable of responding to LOCA demand. At this point the Tech Spec limitations will be employed, depending on availability of Division 1 and 2 DG's. The Division 3 dc bus is backed by two redundant chargers powered from two separate power sources. Probability is remote that both of these sources will fail simultaneously. This assures the design adequacy of the 125 Vdc power source.

See revised section 8.3.2.1.2.

f. Division III standby diesel generator standby fuel pump.

g. Division III standby diesel generator field flashing.

All the loads with their magnitudes and durations are given in Tables 8.3-8 through 8.3-10.

The normal operating voltage range of the Division III dc loads listed in Tables 8.3-10 is 110 to 135 Volts. The Division III 125V dc battery terminal voltage is normally maintained between 112.5 and 137.5 volts dc in order to provide adequate operating voltage for the connected loads.

Safety-Related DC System Design Criteria

The safety-related dc system is designed to the following criteria:

1. The emergency 125-V dc system consists of three physically separate and electrically independent dc power divisions corresponding to the three divisions of the onsite ac power system. Each division feeds a separate emergency dc load group through a separate distribution system.

2. Each division of the emergency dc system has its own battery, primary and backup battery chargers, dc switchgear and distribution panels, which are all Class 1E and Category I.

3. Each emergency battery is sized in accordance with Regulatory Guide 1.32, IEEE-308-1974 and IEEE-485-1978. It is capable of performing its duty cycle (Tables 8.3-8 through 8.3-10) following the loss of chargers after the battery had been floated between 130 and 135 V dc, is fully charged at 65°F and with capacity deteriorated to 80 percent. Adequate design margin is included in sizing the battery to support future load growth and less than optimum operating conditions. Should both battery chargers for any particular battery be out of service at any point in the dc load cycle, the battery is capable of starting and operating its associated loads for two hours according to a precalculated load profile without the battery terminal voltage falling below 105 V dc.

4. Each emergency dc bus has a primary and a backup battery charger. Each emergency battery charger is capable of supplying the largest combined demands of the steady-state loads on the battery while recharging the battery from the design minimum charge state to the fully charged state within 24 hr.

5. All components of the emergency 125V dc system are designed as Class 1E and Category I. The components of the three divisions are located in separate rooms in a Category I structure.

6. Each emergency battery room has a separate exhaust duct that is directly discharged to the atmosphere that limits the hydrogen accumulation to less than 2 percent by volume and maintains the battery room temperature between 65° and 104°F. Each battery room has smoke detection equipment located in 3 hr. rated fire areas.

7. The installation design for the emergency batteries provides adequate space for inspection, maintenance, replacement and testing of the batteries.

8. The emergency dc system is ungrounded.

Safety-Related DC System Description

Emergency Batteries Division I and II emergency batteries 2BYS*BAT2A and 2BYS*BAT2B are calcium grid type lead-acid batteries having an amp-hr rating of 2,550, on an 8-hr basis at 77°F. The average float voltage is 2.22 V/cell; the average equalizing voltage is 2.33 V/cell. One minute rating of Division I and II batteries is 2,720 amps at 1.75 V per cell.

Division III emergency battery 2BYS*BAT2C consists of calcium grid lead acid cells having an amp-hr rating of 100 on an 8-hr basis. The average float voltage is 2.22 V/cell. The average equalizing voltage range is 2.28-2.29 V/cell. One minute rating of Division III battery is 148 amps at 1.75 V per cell.

The battery cell containers are made of translucent plastic material. The cells are sealed type with covers fixed in place with permanent leakproof joints. High and low electrolyte level markers are provided on all four sides of the plastic containers. Cell covers have flash vent arrestor and sample tube openings. All Class 1E batteries are mounted on two-step Category I steel racks with restraining members arranged to prevent motion of the cells relative to each other or to the rack. The battery racks are grounded. The emergency batteries 2BYS*BAT2A, 2BYS*BAT2B and 2BYS*BAT2C are located in three separate battery rooms in the control building on el 261 ft. The emergency batteries are qualified for their serivce environment in accordance

The Division III emergency 125V dc panel is designated as 2CES*IPNL414. The bus is rated for 100 amp which is based on the maximum 1-min demand on the battery. The main and feeder breakers are molded case circuit breakers with overcurrent protective devices. The main breaker for the battery is rated for the maximum 1-min demand on the battery. The circuit breakers are rated for 10-kA interrupting capability. The panel has ground detection and bus under-voltage alarm. Loss of power to the battery chargers and the bus undervoltage conditions are annunciated in the control room when the bus voltage falls below 123V dc. The bus voltage and the battery current are indicated in the control room for monitoring. The Division III emergency 125V dc panel is located in the Division III diesel generator control room in the emergency diesel generator building at el 261 ft.

The Division I and II emergency 125-V dc systems utilize other emergency distribution panels connected to the dc switchgear for miscellaneous dc circuits. These panels are in NEMA 12 enclosures suitable for indoor application. These panels have fusible switches for branch circuit protection.

Safety-Related DC System Instrumentation and Control

Remote indications and alarms are provided for all three divisions in the main control room for monitoring the status of the emergency dc system as follows:

1. Indications:

    a. Ammeter for the battery current.

    b. A common ammeter for the primary and backup charger output currents.

    c. Voltmeters for the dc bus voltages.

2. Alarms:

    a. Division I dc system trouble alarm, actuated by the Division I dc bus undervoltage/overvoltage bus ground, battery breaker open and battery charger undervoltage.

    b. Division II dc system trouble alarm, actuated by the Division II dc bus undervoltage/overvoltage, bus ground, battery breaker open and battery charger undervoltage.

QUESTION F430.99 (9.5.8)

Provide the results of any analysis that demonstrates that the function of your diesel engine air intake and exhaust system design will not be degraded to an extent which prevents developing full engine rated power to cause engine shutdown as a consequence of any meteorological or accident condition. Include in your discussion the potential and effect of fire extinguishing (gaseous) medium, recirculation of diesel combustion products, or other gases that may intentionally or accidentally be released on site, on the performance of the diesel generator. (SRP 9.5.8, Part II)

RESPONSE

See revised Section 9.5.8.5.

PSB COMMENTS:

Not acceptable. No response for the Div. III DG has been provided. The response covering the Div. I & II DG's is acceptable.

RESPONSE TO PSB COMMENTS:

SEE REVISED SECTION 9.5.8.5

QUESTION F430.102 (9.5.8)

Experience at some operating plants has shown that diesel engines have failed to start due to accumulation of dust and other deleterious material on electrical equipment associated with starting of the diesel generators (e.g., auxiliary relay contacts, control switches, etc.). Describe the provisions that have been made in your diesel generator building design, electrical starting system, and combustion air and ventilation air intake design(s) to preclude this condition to assure availability of the diesel generator on demand.

Also describe under normal plant operation what procedure(s) will be used to minimize accumulation of dust in the diesel generator room; specifically.address concrete dust control. (SRP 9.5.8, Part II)

Diesel generators for nuclear power plants should be capable of operating at maximum rated output under various service conditions. For no load and light load operations, the diesel generator may not be capable of operating for extended periods of time under extreme service conditions or weather disturbances without serious degradation of the engine performance. This could result in the inability of the diesel engine to accept full load or fail to perform on demand. Provide the following:

(a) The environmental service conditions for which your diesel generator is designed to deliver rated load including the following:

Service Conditions

(a) Ambient air intake temperature range - °F

(b) Humidity, max - %

(b) Assurance that the diesel generator can provide full rated load under the following weather disturbances:

(1) A tornado pressure transient causing an atmospheric pressure reduction of 3 psi in 1.5 seconds followed by a rise to normal pressure in 1.5 seconds.

(2) A low pressure storm such as a hurricane resulting in ambient pressure of not less than 26 inches Hg for a minimum duration of two (2) hours followed by a pressure of no less than 26 to 27 inches Hg for

an extended period of time (approximately 12 hours).

(c) Discuss the effects low ambient temperature (subzero temperatures), will have on engine standby and operation and effect on its output particularly at no load and light load operation. Will air preheating be required to maintain engine performance versus ambient temperature for your diesel generator at normal rated load, light load, and no load conditions. (SRP 9.5.8, Parts I, II, and III)

RESPONSE

Provisions have been made in the design of the diesel generator rooms to minimize entrance of dust. The diesel generator control panels are located in separate, temperature-controlled and ventilated rooms. The control panels, except for the generator high voltage panels, have dust-tight enclosures.

See revised Section 9.5.8.5.

PSB COMMENTS:

The response on ambient operating conditions is acceptable for the Div. I & II DGs, only. No response has been provided for the Div. III DG. This is not acceptable.

RESPONSE TO PSB COMMENTS:

SEE REVISED SECTION 9.5.8.5

The Division I and II diesel generators are designed for the following service conditions:

Ambient air intake temperature range:	-20°F to 100°F
Maximum humidity:	100%

They are designed for tornado pressure transient causing an atmospheric pressure reduction of 3 psi in 3 sec. Being of turbocharged design, they will be able to provide full-rated load when subjected to a low-pressure storm such as a hurricane, resulting in ambient pressure of not less than 26 in. Hg for a minimum duration of 2 hrs followed by a pressure of no less than 26 to 27 in. Hg for an extended period of time (approximately 12 hrs).

The Division III diesel generator is designed for the following service conditions:

Ambient Air Intake Temperature Range:	Subzero to 120°F
Maximum Humidity:	90%

It is designed for tornado pressure transient causing an atmospheric pressure reduction of 3 psi in 3 sec. Being of turbocharged design, it will be able to provide full-rated load when subjected to low-pressure storm such as a hurricane, resulting in ambient pressure of not less than 26 in. Hg. for a duration of 12 hours.

The effects of high and moderate energy piping in the diesel generator building are discussed in Section 9.5.5.5.

The failure modes and effects analysis (FMEA) of the balance-of-plant instrumentation and controls components of the diesel generator combustion air intake and exhaust system is provided in the Nine Mile Point Unit 2 FSAR FMEA report.

9.5.9 Auxiliary Electric Boiler

9.5.9.1 Design Bases

9.5.9.1.1 Safety Design Basis

The auxiliary electric boiler is not required to effect or support safe shutdown of the reactor or to perform in the operation of reactor safety features.