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Docket No. 50-410

Mr. Gerald K. Rhode
Senior Vice President
Niagara Mohawk Power Corporation
300 Erie Boulevard West
Syracuse, New York 13202

Dear Mr. Rhode:

Subject: Nine Mile Point 2 OL Safety Review - Request for Additional Information

We have completed our initial review of the Power Systems area, including Chapter 8 and portions of Chapters 9 and 10 of the Nine Mile Point, Unit 2 FSAR. In order to complete our review of this area, additional information required is identified in the enclosure.

An expeditious response to this request for information will be required in order to maintain the present licensing schedule for Nine Mile Point, Unit 2. A schedule for responding to the requests for information enclosed should be provided within 14 days of the date of this letter. An effort should be made in the schedule to respond to the requests promptly in order to maintain the present licensing schedule. In accordance, the staff will be prepared to review the responses expeditiously in order to maintain the present review schedule.

The responses to the enclosed request for additional information should be submitted as changes to the FSAR.

If you have any questions concerning the enclosure, please call the Licensing Project Manager, Mary F. Haughey, at (301) 492-7897.

Sincerely,

Original signed by

A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing

Enclosures:
As stated

cc w/enclosures:
See next page

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ENCLOSURE

POWER SYSTEM

Request for Additional Information

NINE MILE POINT UNIT 2

430.2 (SRP 8.2) The staff understands that the configuration of the offsite power circuits will be changed from that which is currently described in the FSAR. Accordingly, provide an FSAR amendment which includes:

a. A revised Figure 8.2-1 and narrative description of the new offsite power circuit configuration.

b. Drawings of the physical orientation of the offsite circuits around the Nine Mile Point and Fitzpatrick Power Stations. Suggest using Figures similar to 2.1-2 and 2.1-3.

c. Drawings which show tower spacing for lines which share a common right of way.

d. Steady state and transient stability analyses results for the new offsite configuration including the loss of the largest capacity to the grid or removal of the largest load from the grid.

430.3 (SRP 8.1 & 8.2) Provide information and a discussion of grid availability, including the frequency, duration, and causes of outages as required by R.G. 1.70.

430.4 (SRP 8.2) Regarding the circuit switchers and disconnect switches installed in the 115 KV switchyard:

a. Are they capable of carrying the maximum available fault current, assuming a bolted three phase fault at their terminals, for the length of time required to clear the fault by the SCRIBA substation circuit breakers?

b. Describe the coordination used between the circuit switchers and the SCRIBA substation circuit breakers that will preclude the possibility of a circuit switcher opening under a fault that is greater than its interrupting capability.

c. FSAR Section 8.2.1.4 describes conditions under which a circuit switcher or disconnect switch can be opened or closed. Do these conditions include actual permissive interlocks or simply administrative controls?

offsite power circuits configuration was informally forwarded to the staff. These changes should be documented in an FSAR amendment. The amendment should include:

430.5 (SRP 8.2) Regarding the 345 KV SCRIBA substation:

a. Provide a one-line diagram of the dc power supplies which feed the circuit breaker dual trip coils and redundant relaying. Indicate on this drawing the source of ac power to the power supplies.

b. Describe the type of maintenance and surveillance provided for the relays, circuit breakers and power supplies.

c. Describe the substation systems and equipment which are monitored and controlled in the Nine Mile Point Unit 2 control room. If there is no monitoring or control provided in the control room or only portions are provided there, describe where the equipment is monitored and controlled from and describe how the Nine Mile Point operators will be made aware of its status.

430.6 (SRP 8.2) In FSAR Section 8.2.1.4 you state that the two reserve station service transformers and auxiliary boiler transformer are arranged side by side with fire walls provided between the transformers. A deluge fire protection system is also provided. Describe the features of this design that would prevent the spread of fire to the adjacent transformers assuming the loss of the entire oil content of one transformer and activation of the deluge system. Do the retaining curbs have the capacity to retain the entire water and oil volume under this situation? If overflow occurs will the oil spread towards or away from the adjacent transformers and cabling or bus? The concern is that such a postulated event could cause the loss of all offsite power sources.

430.7 (SRP 8.2) Describe the routing and separation between the offsite circuits from the 115 KV switchyard to the Class 1E buses.

430.8 (SRP App. 8A) Regarding the degraded voltage condition and undervoltage relays discussed in FSAR Section 8.2.2:

a. You state that 517.5 V (90 percent of the motor nameplate voltage of 575 V) is required at the 600 V buses to ensure proper starting and running of all Class 1E motors. Since 90 percent is the motor rated voltage for continuous operation, the additional voltage drop from the 600 V buses to the motor terminals will result in the motors operating at less than their continuous rated voltage. Justify this condition. Likewise, justify the capability to start 80% rated NSSS and MOV motors with only 80% of the motor rated voltage up at the buses.

b. You state that from the voltage profile study the grid voltage needed to maintain adequate station voltages at the lowest tap of the load tap changer (LTC) is below the normal operating range of the grid. Is this the worst case condition? Since the sensing for the LTC is on the 13.8 KV system, is there a lightly loaded 13.8 KV condition concurrent with heavily loaded 4.16 KV condition which would result in the LTC being on a higher tap and consequently worse 4.16 KV voltages? Also, provide the results of your analysis for the opposite condition, i.e. heavily loaded 13.8 KV system and lightly loaded 4.16 KV system resulting in 4.16 KV system overvoltages.

c. You state that when the auxiliary boiler transformer is supplying the onsite emergency power distribution system and the grid is at its normal operating minimum, the voltage at the 600 V buses under the most severe load conditions is 460 V (80 percent of 575 V). Per the discussion in item (a) above justify the capability to start NSSS and MOV motors and to operate continuously all Class 1E motors at this low voltage.

d. Extend your analysis to include all Class 1E equipment (not just motors) down to the 120/208 and 120/240 volt levels, and provide the Class 1E bus voltage profiles for steady state and transient conditions.

e. Provide a detailed description of your second level undervoltage relay design, including setpoints; and address each position of SRP Branch Technical Position PSB-1.

430.9
(SRP 8.2)

Section 8.3.1.1.2 states that automatic transfer of the normal 13.8 KV buses is prohibited if reserve station service transformer 2RTX-XSRIA 13.8 KV side neutral grounding switch is open. Why is this lockout limited to only one of the two reserve station service transformers? If the grounding switch referred to is the one which shunts the grounding resistor shown in Figure 8.3-1, explain why the switch is to be closed for transfer since both the reserve and normal transformer 13.8 KV windings are normally resistively grounded?

430.10
(SRP 8.2)

For the Class 1E switchgear 2ENS*SWG101, 102 and 103 shown in Figure 8.3-2, state whether the "cubicle only" positions for access to the alternate offsite source normally have a circuit breaker installed. Describe what is required to connect the alternate offsite source to the safety buses through these cubicles.

430.11 (SRP 8.2) For a turbine generator trip condition, describe the source of power for the stub buses 2NNS-SWG014 and 015. Are they energized from the normal buses or the safety buses?

430.12 (SRP 8.3.1) Regarding the Division I and II Class 1E load centers and motor control centers shown in Figure 8.3-2:

a. Describe the intent of dual feeds to the load centers and motor control centers. Are the feeds routed separately?

b. Why are two of the divisional MCCs a two-bus design and one is not?

c. For the MCCs that are a two-bus design is one feeder cable sized to carry the entire MCC load with the tie breaker closed?

d. Discuss the need for and operation of the key interlocks between incoming circuit breakers on the MCCs.

e. Describe the provisions taken in the design and selection of the load center transformer circuits to ensure equal division of load between parallel circuits. Is one transformer circuit sized sufficiently to carry the entire load center load?

430.13 (SRP 8.3.1) In the FSAR Section 8.3.1.1.2 discussion of the Class 1E Uninterruptible Power Supplies it is stated that these supplies feed the emergency diesel generator control panels. Describe the type of diesel generator control loads these supplies feed. Are these loads necessary for successful starting of the diesel generators? Describe the effect of the failure of this power supply on the diesel generator.

430.14 (SRP 8.3.1) In the FSAR Section 8.3.1.1.2 discussion of the diesel generators' load sequencing capability it is stated that the HPCS voltage and frequency recover to within 90 and 98 percent, respectively, within 60 percent of each load sequence time. Does the HPCS division utilize load sequencing? Clarify the FSAR statement.

430.15 (SRP 8.3.1) Provide the following information regarding the Division I and II automatic starting and loading systems:

a. If the offsite source is lost when it is powering the Class 1E buses with the diesel generator running in standby will the residual bus voltage be allowed to decay prior to sequencing the first group of loads? Describe how this is accomplished.

b. Explain the various starting times indicated for the SW pumps in Table 8.3-1.

c. Clarify Tables 8.3-5 and 8.3-6. It is difficult to discern discrete load sequencing intervals and to correlate the times given in these tables with the times given in Table 8.3.1. It is also difficult to correlate the numbers given in the "starting," "running" and "total load" columns of Tables 8.3-5 and 8.3-6.

d. Describe whether the Class 1E LOCA loads are sequenced on offsite power or block loaded. If they are load sequenced, we require that a separate sequencer for offsite and onsite power for each electrical division be provided. Alternatively, provide a detailed analysis to demonstrate that there are no credible sneak circuits or common failure modes in the sequencer design which could render both onsite and offsite power sources unavailable. In addition, provide information concerning the reliability of your sequencer and reference the design detailed drawings.

e. Table 8.3-5 indicates that the diesel generator load for the final load sequence interval during a simultaneous LOOP and LOCA is 4,679 KW. This is in excess of the 4400 KW continuous rating of the diesel generator shown in Figure 8.3-2. Justify the operation of the diesel generator at greater than its continuous rating.

430.16 (SRP 8.3.1) Regarding the control and protection systems for Division I, II and III diesel generators discussed in FSAR Section 8.3.1.1.2:

a. Is coincident logic used on the Division I and II generator phase over-current trip as required by R.G. 1.9?

b. Are all conditions which shutdown the diesel generator during test but bypassed during emergency operation, alarmed in the main control room in accordance with R.G. 1.9?

c. Cross reference the diesel generator conditions, you have identified in FSAR Section 8.3.1.1.2 subparagraphs 1, 2, 3 and 4 with the annunciation provided in the main control room identified in subparagraph 5. Do this for both Divisions I and II and III.

430.17
(SRP 8.3.1)

FSAR Section 8.3.1.1.2 does not provide sufficient information on the qualification tests performed on the Division I, II and III diesel generators for the staff to evaluate their adequacy. Provide a description of the tests performed and their results identifying pertinent machine parameters (voltage, frequency, temperature, etc.) observed during the tests. Identify any failures or deviations from the criteria contained in IEEE 387, R.G. 1.9 or NEDO 10905-3. As an alternate to this, if the machine is identical to one which has previously been qualified for use in a nuclear power plant, provide a comparison of the Nine Mile Point machines to the previously qualified unit; and provide the additional tests and/or analysis required by Sections 5.4.2, 5.4.3 and 5.4.4 of IEEE 387-1977.

430.18
(SRP 8.3.1)

For the Division I, II and III diesel generators address whether an automatic start signal will separate the diesel generator from the test mode and return control of the diesel to the automatic system. Also, address whether a loss of power occurrence during a test will separate the diesel generator from the test mode and make it available for automatic loading. For this case, a loss of power signal may not be generated if the diesel generator maintains bus voltage, and overcurrent or underfrequency trips must be relied on to separate from the offsite circuits. These trips should not result in a lockout for this condition. Describe the sequences which take place to separate the diesel generator from its test mode during the above events.

430.19
(SRP 8.1,
8.3.1 &
8.3.2)

Regarding protection of containment electrical penetrations:

a. FSAR Section 8.3.1.1.5 states that power feeders passing through electrical penetrations are provided with primary and backup protective devices. The overcurrent protection should not be limited to power feeders. All electrical circuits with available fault current greater than the continuous rating of the penetration (to maintain mechanical integrity) should be protected by two overcurrent devices. Verify that this is the case.

b. All primary and backup breaker overload and short circuit protection systems should be qualified for the service environment including seismic. However, the seismic qualification for non-Class 1E circuit breaker protection systems should as a minimum assure that the protection systems remain operable during an operating basis earthquake. In addition, the non-Class 1E circuit breaker and protection system shall be of high quality. Verify that this is the case.

c. Indicate whether redundant overcurrent penetration protection is provided on the low frequency mg set feeds to the reactor recirculation pump feeds. Either provide the redundant protection or justify omission of the redundant device.

d. Where external control power is needed for tripping breakers, signals for tripping the primary and backup breakers should be independent, physically separated and powered from separate sources. Verify that your design complies and identify the power supplies to the redundant circuit breakers.

e. Provide the fault current clearing-time curves of the penetrations' primary and secondary current current interrupting devices plotted against the thermal capability (I^2t) curve of the penetration (to maintain mechanical integrity). Also provide a simplified one line diagram showing the location of the protective devices in the penetration circuit and indicate the maximum available fault current of the circuit.

430.20 (SRP 8.1 & 8.3.1) In FSAR Section 1.8 and 8.3.1.3.1, you state that cables are marked at 15 ft. intervals. The requirement for marking cables at 5 ft. intervals in R.G. 1.75 is not a typographical error. The marking interval is specified as 5 ft. in both the 1975 and 1978 versions of the regulatory guide. Therefore, justify the wider marking interval used at Nine Mile Point Unit 2. Also verify that raceways are marked, prior to installation of cables, not exceeding 15 ft. intervals and at entry to and exiting from enclosed areas in accordance with IEEE 384-1974.

430.21 (SRP 8.1 & 8.3.1) FSAR Section 8.3.1.3.2 indicates that armored cable and direct burial cable are given an alphanumeric code for raceway. Discuss the reasons for this and describe the application and installation of these cables at Nine Mile Point Unit 2.

430.22 (SRP 8.1 & 8.3.1) In the discussion of electrical isolation in Section 8.3.1.4.1 you state that whenever a safety-related power or control circuit is connected with any nonsafety-related circuit, appropriate isolation devices are used. Discuss what you consider an appropriate isolation device for a power circuit. In accordance with R.G. 1.75 a circuit breaker tripped on a LOCA signal is an acceptable isolation device. Also provide a list of non-Class 1E loads that are connected to Class 1E power supplies and identify their isolation devices. For the 600 V emergency lighting panels 2 LAC*PNL100A and 300B and their loads, identify which portions of the system are qualified Class 1E and which are not and identify the isolation devices used between the Class 1E and non-1E portions. Since these panels feed other critical Class 1E safety related loads, the panels themselves should not be tripped on a LOCA signal.

430.23 (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 comparible 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?

430.24 (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?

Provide a description of the control room cable spreading areas and the separation between circuits in these areas. Does the area contain high energy equipment such as switchgear, combustible transformers, and rotating equipment or piping (high and moderate energy) that could be a potential source of missiles or of pipe whip? Are flammable materials stored in the area? Are power cables routed through the area? [illegible] moderate energy)

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 stresspoints and their relationship with battery rack support.

430.25 (SRP 8.1) Describe the means used to bypass the thermal overload protection to Class 1E MOVs during accident conditions. Describe what indication of the bypass or lack of bypass is provided in the control room. Give MOV drawing references as specific examples of the design.

430.26 (SRP 8.3.2) Note 1 in Table 8.3-8 on the Battery Load Profile indicates that the motor starting currents occur approximately 1 second after the beginning of the load cycle, and the tripping amps for circuit breakers occur during the first second of the load cycle. Provide the rationale behind this statement and also provide the one minute ratings of the Class 1E batteries.

430.27 (SRP 8.3.2) On FSAR Figure 8.3-10, circuit breaker cubicles labeled "Future" are shown connected to a test load for dc Divisions I and II; and a circuit breaker on the Division III dc system is also shown connected to a test load. Describe how the connections are completed from the battery to the test load and what controls or interlocks are provided to assure that the test loads are not connected during normal operation. If the test connections are permanently wired from the three dc safety buses to a common test panel or switchgear also provide the single line diagram for this arrangement.

430.28 (SRP 8.1 & 8.3.1) In the discussion of conformance to R.G. 1.108, FSAR Section 1.8 states that the full load capability test of the diesel generator will be preformed at the continuous rated load for 22 hours and at the 2,000 hour rating load for 2 hours. Will the 2000 hour rating that is used be at the 4700 or 4750 KW machine rating shown in Figure 8.3-2 or at the diesel rating of 6,620 bhp (4937 KW minus generator losses) shown in FSAR Section 8.3.1.1.2. Also clarify the discrepancy between the 4700 and 4750 KW ratings shown for the Division I and II diesel generators on Figure 8.3.2. Aren't these two machines identical?

430.29 (SRP 8.1)

FSAR Section 1.8 states that the discussion of conformance to Regulatory Guide 1.118 will be provided in a future amendment. Please provide this information.

430.30 (SRP 8.3.1 & 8.3.2)

Identify all electrical equipment, both safety and non-safety, that may become submerged as a result of a LOCA. For all such equipment that is not qualified for service in such an environment provide an analysis to determine the following:

1. The safety significance of the failure of this electrical equipment (e.g. spurious actuation or loss of actuation function) as a result of flooding.

2. The effects on Class 1E electrical power sources serving this equipment as a result of such submergence, and

3. Any proposed design changes resulting from this analysis.

430.31 (SRP 8.1)

Provide the results of a review of your operating, maintenance, and testing procedures to determine the extent of usage of jumpers or other temporary forms of bypassing functions for operating, testing, or maintaining of safety related systems. Identify and justify any cases where the use of the above methods cannot be avoided Provide the criteria for any use of jumpers for testing.

430.32 (SRP Appendix 8A)

With respect to the application of single failure criterion to manually-controlled, electrically-operated valves, list all valves for which Branch Technical Position ICSB 18 (PSB) may apply. Describe (1) how control power is locked out to active and passive valves, (2) how power can be reinstated from the control room if valve repositioning (active valves) is required later, and (3) how the valve position indication meets the single failure criterion.

430.33 (SRP 8.3.1 & 8.3.2)

Recent experience with nuclear power plant Class 1E electrical system equipment protective relay application has established that relay trip setpoint drifts with conventional type relays have resulted in premature trips of redundant safety related system pump motors when the safety system was required to be operative. While the basic need for proper protection for feeders/equipment against permanent faults is recognized, it is the staff's position that total non-availability of redundant safety systems due to spurious trips in protective relays is not acceptable.

Provide a description of your circuit protection criteria for safety systems/equipment to avoid incorrect initial setpoint selection and the above cited protective relay trip setpoint drift problems.

430.34 (SRP 8.3.1 & 8.3.2) Incidents have occurred at nuclear power stations that indicate a deficiency in the electrical control circuitry design. These incidents included the inadvertent disabling of a component by racking out the circuit breakers for a different component.

As a result of these occurrences, we request that you perform a review of the electrical control circuits of all safety related equipment at the plant, so as to assure that disabling of one component does not, through incorporation in other interlocking or sequencing controls, render other components inoperable. All modes of test, operation and failure should be considered. Verify and state the results of your review.

Also your procedures should be reviewed to ensure they provide that, whenever a part of a redundant system is removed from service, the portion remaining in service is functionally tested immediately after the disabling of the affected portion. Verify that your procedures include the above cited provisions.

430.35 (SRP 8.3.1 & 8.3.2) Recent experience with nuclear power plant Class 1E motor-operated valve motors has shown that in some instances the motor winding on the valve operator could fail when the valve is subjected to frequent cycling. This is primarily due to the limited duty cycle of the motor. Provide the required duty cycle of the ECCS and RCIC steam and water line motor operated isolation valves as they relate to their respective system modes of operation during various events.

Demonstrate that the availability of the safety systems in the Nine Mile Point Unit 2 design will not be compromised due to the limited duty cycle of the valve operator motors.

430.36 (8.3) Operating experience at certain nuclear power plants which have two cycle turbocharged diesel engines manufactured by the Electromotive Division (EMD) of General Motors driving emergency generators have experienced a significant number of turbocharger mechanical gear drive failures. The failures have occurred as the result of running the emergency diesel generators at no load or light load conditions for extended periods. No load or light load operation could occur during periodic equipment testing or during accident conditions with availability of offsite power. When this equipment is operated under no load conditions insufficient exhaust gas volume is generated to operate the turbocharger. As a result the turbocharger is driven mechanically from a gear drive in order to supply enough combustion air to the engine to maintain rated speed. The turbocharger and mechanical drive gear normally supplied with these engines are not designed for standby service encountered in nuclear power plant application where the equipment may be called upon to operate at no load or light load condition and full rated speed for a prolonged period. The EMD equipment was originally designed for locomotive service where no load speeds for the engine and generator are much lower than full load speeds. The locomotive

turbocharged diesel hardly ever runs at full speed except at full load. The EMD has strongly recommended to users of this diesel engine design against operation at no load or light load conditions at full rated speed for extended periods because of the short life expectancy of the turbocharger mechanical gear drive unit normally furnished. No load or light load operation also causes general deterioration in any diesel engine.

To cope with the severe service the equipment is normally subjected to and in the interest of reducing failures and increasing the availability of their equipment EMD has developed a heavy duty turbocharger driven gear unit that can replace existing equipment. This is available as a replacement kit, or engines can be ordered with the heavy duty turbocharger drive gear assembly.

To assure optimum availability of emergency diesel generators on demand, applicant's who have in place, on order or intend to order emergency generators driven by two cycle diesel engines manufactured by EMD should be provided with the heavy duty turbocharger mechanical drive gear assembly as recommended by EMD for the class of service encountered in nuclear power plants. Confirm your compliance with this requirement. (SRP 8.3.1, Part III)

430.37 (8.3) Provide a detail discussion (or plan) of the level of training proposed for your operators, maintenance crew, quality assurance, and supervisory personnel responsible for the operation and maintenance of the emergency diesel generators. Identify the number and type of personnel that will be dedicated to the operations and maintenance of the emergency diesel generators and the number and type that will be assigned from your general plant operations and maintenance groups to assist when needed.

In your discussion identify the amount and kind of training that will be received by each of the above categories and the type of ongoing training program planned to assure optimum availability of the emergency generators.

Also discuss the level of education and minimum experience requirements for the various categories of operations and maintenance personnel associated with the emergency diesel generators. (SRP 8.3.1, Parts II and III)

430.38 (8.3) Periodic testing and test loading of an emergency diesel generator in a nuclear power plan is a necessary function to demonstrate the operability, capability and availability of the unit on demand. Periodic testing coupled with good preventive maintenance practices will assure optimum equipment readiness and availability on demand. This is the desired goal.

To achieve this optimum equipment readiness status the following requirements should be met:

1. The equipment should be tested with a minimum loading of 25 percent of rated load. No load or light load operation will cause incomplete combustion of fuel resulting in the formation of gum and varnish deposits on the cylinder walls, intake and exhaust valves, pistons and piston rings, etc., and accumulation of unburned fuel in the turbocharger and exhaust system. The consequences of no load or light load operation are potential equipment failure due to the gum and varnish deposits and fire in the engine exhaust system.

2. Periodic surveillance testing should be performed in accordance with the applicable NRC guidelines (R.G. 1.108), and with the recommenations of the engine manufacturer. Conflicts between any such recommendations and the NRC guidelines, particularly with respect to test frequency, loading and duration, should be identified and justified.

3. Preventive maintenance should go beyond the normal routine adjustments, servicing and repair of components when a malfunction occurs. Preventive maintenance should encompass investigative testing of components which have a history of repeated malfunctioning and require constant attention and repair. In such cases consideration should be given to replacement of those components with other products which have a record of demonstrated reliability, rather than repetitive repair and maintenance of the existing components. Testing of the unit after adjustments or repairs have been made only confirms that the equipment is operable and does not necessarily mean that the root cause of the problem has been eliminated or alleviated.

4. Upon completion of repairs or maintenance and prior to an actual start, run, and load test a final equipment check should be made to assure that all electrical cicuits are functional, i.e., fuses are in place, switches and circuit breakers are in their proper position, no loose wires, all test leads have been removed, and all vales are in the proper position to permit a manual start of the equipment. After the unit has been satisfactorily started and load tested, return the unit to ready automatic standby service and under the control of the control room operator.

Provide a discussion of how the above requirements have been implemented in the emergency diesel generator system design and how they will be considered when the plant is in commerical operation, i.e., by what means will the above requirements be enforced. (SRP 8.3.1, Parts II and III)

430.39
(8.3)

The availability on demand of an emergency diesel generator is dependent upon, among other things, the proper functioning of its controls and monitoring instrumentation. This equipment is generally panel mounted and in some instances the panels are mounted directly on the diesel generator skid. Major diesel engine damage has occurred at some operating plants from vibration induced wear on skid mounted control and monitoring instrumentation. This sensitive instrumentation is not made to withstand and function acurately for prolonged periods under continuous vibrational stresses normally encountered with internal combustion engines. Operation of sensitive instrumentation under this environment rapidly deteriorates calibration, accuracy and control signal output.

Therefore, except for sensors and other equipment that must be directly mounted on the engine or associated piping, the controls and monitoring instrumentation should be installed on a free standing floor mounted panel separate from the engine skids, and located on a vibration free floor area. If the floow is not vibration free, the panel shall be equipped with vibration mounts.

Confirm your compliance with the above requirement or provide justification for noncompliance. (SRP 8.3.1, Parts II and III)

430.40
(9.5.2)

The information regarding the onsite communications system (Section 9.5.2) does not adequately cover the system capabilities during transients and accidents. Provide the following information:

(a) Identify all working stations on the plant site where it may be necessary for plant personnel to communicate with the control room or the emergency shutdown panel during and/or following transients and/or accidents (including fires) in order to mitigate the consequences of the event and to attain a safe cold plant shutdown.

b) Indicate the maximum sound levels that could exist at each of the above identified working stations for all transients and accident conditions.

(c) Indicate the types of communication systems available at each of the above identified working stations.

(d) Indicate the maximum background noise level that could exist at each working station and yet reliably expect effective communication with the control room using:

1. the dial telephone system
2. the PP/PA system
3. the M/CC system
4. the SPC system

(e) Describe the performance requirements and tests that the above onsite working stations communication systems will be required to pass in order to be assured that effective communication with the control room or emergency shutdown panel is possible under all conditions. (SRP 9.5.2, Parts I and II)

430.41 (9.5.2) Expand the communication section of your FSAR to provide a discussion on how effective communications will be maintained under the following conditions:

(a) loss of offsite power (LOOP)

(b) design basis seismic event (w/LOOP)

(c) LOOP (seismic event) coincident w/single active failure of one emergency diesel generator

Describe any operator actions which may be required to establish and/or restore communications to the working stations identified previously. State where the action must be taken, and the time required for this operation (SRP 9.5.2, Part II and II)

430.42 (9.5.2) The description of the interplant (plant to offsite) communication systems is inadequate. Provide a detailed description for each communication system provided for Nine Mile Point. The detailed description shall include an identification and description of each system's power source, a description of each system's components (headsets, handsets, switchboards, amplifiers, consoles, handheld radios, etc.), location of major components (power sources, consoles, etc.) and interfaces between the systems. (SRP 9.5.2, Parts II and III)

430.43 (9.5.2) Provide a complete legend for the communication systems symbols shown on FSAR Figures 9.5-5 through 9.5-39. (SRP 9.5.2, Part III)

430.44 (9.5.3) In FSAR Section 9.5.3.2, you discuss emergency lighting for plant areas required for "operating" safety related equipment. However, there is no discussion of emergency lighting in the areas where the actual safety related equipment is located. This is not in conformance with SRP 9.5.3 recommenations and guidelines. Revise your design to provide justification for non-compliance. (SRP 9.5.3, Part II)

430.45 (9.5.3) In FSAR Section 9.5.3.2, you state that the emergency lighting system is "treated" as Class 1E. Provide clarification for the term "treated." Are the emergency lighting system components, up to the lighting fixtures, i.e., MCC's, transformers, lighting

panels, conduits, raceways, etc., actually certified Class 1E? If not, then to what standard have these components been fabricated and installed? Provide a detail discussion on this aspect of the lighting system.

430.46 (9.5.3) In FSAR Section 9.5.3.3, you state that emergency lighting to essential plant areas is fed from redundant emergency lighting divisions. In Table 9.5.1, you provide a list which shows the percentage of total lighting for various plant areas which is provided by emergency lighting. However, it is not clear (in Table 9.5.1) which areas are fed from redundant divisions, and what percentage of emergency lighting is fed from each division. Revise Table 9.5.1 to provide this information. Also, provide a tabulation of the areas for which emergency lighting is provided and the lighting levels maintained by the emergency lighting system. Show that the lighting levels are adequate to perform all necessary functions in all listed plant areas under design basis seismic event or accident conditions. (SRP 9.5.3, Parts I and II)

430.47 (9.5.3) The essential lighting system is non-Class 1E, and cannot be connected to onsite emergency power. Therefore, lighting for passageways to and from safety related equipment areas would be lost immediately following a design basis seismic event, or within a short time (1-2 hours) following a LOOP. This is not in conformance with SRP 9.5.3 recommendations and guidelines. Revise your design to provide access lighting to safety related areas under all accident and/or transient conditions, or provide justification for non-compliance. (SRP 9.5.2, Parts I and II)

430.48 (9.5.3) The egress lighting system is non-Class 1E. Therefore, following the design basis seismic event, there would be no egress lighting for evacuation of personnel. This is not in conformance with SRP 9.5.3 recommendations and guidelines. Revise your design to provide egress lighting which will remain functional following the seismic event, or provide justification for non-compliance. (SRP 9.5.3, Part II)

430.49 (9.5.3) Provide additional discussion on the battery pack-type lighting units around the main control board as described in FSAR Sections 9.5.3.2 and 9.5.3.3. State whether these units are seismically supported, describe their operation, give the illumination levels that these units will provide, and a detail description of the maintenance and periodic testing these units will receive.

430.50 (9.5.4) (9.5.5) (9.5.6) (9.5.7) (9.5.8) The staff requires that emergency diesel generator auxiliary systems piping and components be fabricated and installed in accordance with ASME Section III, Class 3 requirements, and be seismic Category I. The staff requirement is applicable to all auxiliary system piping and components, including engine mounted, up to the diesel engine interface. The diesel engine interface is defined as the first connection off the diesel engine block, be it welded, flanged, or screwed.

The design of the diesel engine auxiliary systems, as discussed in FSAR Sections 9.5.4 through 9.5.8, does not fully comply with the above requirement, and is therefore not acceptable. Revise your design and appropriate FSAR sections to demonstrate compliance with the staff requirements. Show the auxiliary systems piping and component classifications on the appropriate P&ID's, along with the diesel engine interface. (SRP 9.5.4 through 9.5.8, Part III, and Regulatory Guide 1.26)

430.51 (9.5.4) (9.5.5) (9.5.6) (9.5.7) (9.5.8)

Identify all high and moderate energy lines and systems that will be installed in the diesel generator room. Discuss the measures that will be taken in the design of the diesel generator facility to protect the safety related systems, piping and components from the effects of high and moderate energy line failure to assure availability of the diesel generators when needed. (SRP 9.5.4, through 9.5.8, Parts II and III)

430.52 (9.5.4)

Revise FSAR Section 9.5.4 and Figures 9.5-40b and 9.4-40c to include the following information:

(a) A complete description of the fuel oil system from the day tank to the diesel generator, including engine mounted piping and components. The FSAR should identify all system components and describe their operation/function during both normal and emergency operation.

(b) A P&ID for that portion of the fuel oil storage and transfer system described in (a) above.

430.53 (9.5.4)

Describe the instruments, controls, sensors and alarms provided for monitoring the complete diesel engine fuel oil storage and transfer system and describe their function. Discuss the testing necessary to maintain and assure a highly reliable instrumentation, controls, sensors and alarm system and where the alarms are annunciated. Identify the temperature, pressure and level sensors which alert the operator when these parameters exceed the ranges recommended by the engine manufacturer and describe what operator actions are required during alarm conditions to prevent harmful effects to the diesel engine. Discuss the system interlocks provided. (SRP 9.5.4, Part III)

430.54 (9.5.4)

In FSAR Section 9.5.4, you do not address tornado missile protection for the fuel oil storage tank fill, vent, and sounding lines located outside the diesel generator building. This is a staff requirement. Therefore, expand your FSAR to include a discussion on tornado missile protection for these lines, or provide a justification for not complying with staff criteria. (SRP 9.5.4, Part III)

430.55 (9.5.4) In FSAR Section 9.5.4.1, you state that the fuel oil storage and transfer system conforms to ANSI Standard N195-1976. Expand your FSAR to include a detailed discussion of the internal and external corrosion protection that is provided for the fuel oil storage tanks. Include the appropriate industry codes and standards that will be followed in the design and application of this protection. Also, include a discussion of the cathodic protection that is provided, or, if cathodic protection is not used, a justification for not having it. (SRP 9.5.4, Part II)

430.56 (9.5.4) In FSAR Section 1.8, you state that the fuel oil storage and transfer system will comply with Regulatory Guide 1.137, except for those portions dealing with oxidative stability and cloud point. This is not acceptable. The staff requires that you test for oxidative stability, and that the minimum acceptability cloud point be identified in accordance with ASTM D975. Revise your FSAR accordingly.

430.57 (9.5.4) Figures 9.5-40b and 9.5-40c show what appears to be a simplex strainer in the fuel oil transfer pump discharge lines for both the standby diesel generators and the HPCS diesel generator. This is not in conformance with the recommendations of ANSI N195, which recommends use of a duplex strainer with a pressure differential alarm. Revise your design to conform to ANSI N195, or provide justification for noncompliance. (SRP 9.5.4, Part II)

430.58 (9.5.4) Discuss the means for detecting or preventing growth of algae in the diesel fuel storage tank. If it were detected, describe the methods to be provided for cleaning the affected storage tank. (SRP 9.5.4, Part III).

430.59 (9.5.4) In FSAR Section 9.5.4.4, you discuss periodic testing of fuel oil to ensure its quality meets the requirements of ASTM D975-1978. However, there is no discussion of testing of new fuel per ANSI N195, nor is the term "periodically" defined. The staff requires that all new fuel be analyzed and stored fuel be analyzed on a minimum quarterly basis, in accordance with ANSI N195 and Regulatory Guide 1.137 requirements. Revise your FSAR accordingly. (SRP 9.5.4, Part II)

430.60 (9.5.4) Discuss what precautions have been taken in the design of the fuel oil system in locating the fuel oil day tank and connecting fuel oil piping in the diesel generator room with regard to possible exposure to ignition sources such as open flames and hot surfaces. (SRP 9.5.4, Part III)

430.61 (9.5.4) In Section 9.5.4.3 you state that diesel fuel oil is available from local distribution sources. Identify the sources where diesel quality fuel oil will be available and the distances required to be travelled from the source(s) to the plant. Also discuss how fuel oil will be delivered onsite under extremely unfavorable environmental conditions. (SRP 9.5.4, Part I)

Discuss the precautionary measures that will be taken to assure the quality and reliability of the fuel oil supply for emergency diesel generator operation. Include the type of fuel oil, impurity and quality limitations as well as diesel index number or its equivalent, cloud point, entrained moisture, sulfur, particulates and other deleterious insoluble substances; procedure for testing newly delivered fuel, periodic sampling and testing of onsite fuel oil (including interval between tests), interval of time between periodic removal of condensate from fuel tanks and periodic system inspection. In your discussion include reference to industry (or other) standard which will be followed to assure a reliable fuel oil supply to the emergency generators. (SRP 9.5.4, Parts II and III)

430.62 (9.5.4) Assume an unlikely event has occurred requiring operation of a diesel generator for a prolonged period that would require replenishment of fuel oil without interrupting operation of the diesel generator. What provision will be made in the design of the fuel oil storage fill system to minimize the creation of turbulence of the sediment in the bottom of the storage tank. Stirring of this sediment during addition of new fuel has the potential of causing the overall quality of the fuel to become unacceptable and could potentially lead to the degradation or failure of the diesel generator. (SRP 9.5.4, Parts I, II, and III)

430.63 (9.5.4) FSAR Figures 9.5-40b and 9.5-40c show day tank vents which appear to terminate above the diesel generator building roof line. If this is correct, then provide a drawing, or a drawing reference, which shows the day tank vent terminations, and a description of the tornado missile protection provided for these vents. (SRP 9.5.4, Part I)

430.64 (9.5.4) Assume a leak or a crack in fuel oil piping and/or fittings in the day tank rooms. Describe the provisions included in the design of the day tank rooms which will:

(a) preclude spilling of any fuel oil into the diesel generator rooms, and

(c) alert the plant operators that a fuel oil leak has developed.

430.65 (.5.4) The diesel genertor structures are designed to seismic and tornado criteria and are isolated from one another by a reinforced concrete wall barrier. Describe the barrier (including openings) in more detail and its capability to withstand the effects of internally generated missiles resulting from a crankcase explosion, failure of one or all of the starting air receivers, or failure of any high or moderate energy line and initial flooding from the cooling system so that the assumed effects will not result in loss of an additional generator. (SRP 9.5.4, Parts II and III)

430.66 (9.5.5) Operating experience indicates that diesel engines have failed to start on demand due to water spraying on locally mounted electronic/electric components in the diesel engine starting system. Describe what measures have been incorporated in the diesel engine electrical starting system to protect the electronic/electrical components from such potential environment. (SRP 9.5.5, Part I)

430.67 (9.5.5) Provide the results of a failure mode and effects analysis to show that failure of a piping connection between subsystems (engine water jacket, lube oil cooler, governor lube oil cooler, and engine air intercooler) will not degrade engine performance or cause engine failure. (SRP 9.5.5, Part I)

430.68 (9.5.5) You state in Section 9.5.5.2 that the diesel engine cooling water is treated with a corrosion inhibitor in accordance with the manufacturer's recommendations to preclude corrosion and organic fouling. Provide additional details of your diesel engine cooling water system chemical treatment with regards to organic fouling and corrosion, and discuss how your treatment complies with the engine manufacturers recommendations. (SRP 9.5.5, Part I)

430.69 (9.5.5) In FSAR Section 9.5.5.3, you provide a list of indicators and alarms associated with the Division I/II, and Division III diesel generators. For the Division I/II system, control room alarms are provided for "diesel generator mechanical failure." The function of these alarms is not clear. Expand your FSAR discussion to include an explanation of these alarms and how and when they function. If these alarms are a type of "common trouble" alarm, such as provided for the Division III diesel generator, then so state, and identify the alarms and/or trips associated with each. Also, identify how and where the Division III diesel generator trip(s) is/are annunciated. (SRP 9.5.5, Part I)

430.70 (9.5.5) Discuss the testing necessary to maintain and assure a highly reliable instrumentation, controls, sensors, and alarm system. Identify the temperature, pressure, level, and flow (where applicable) sensors which alert the operator when these parameters exceed the ranges recommended by the engine manufacturer and describe what operator actions are required during alarm conditions to prevent harmful effects to the diesel engine. (SRP 9.5.5, Part I)

430.71 (9.5.5) The diesel generators are required to start automatically on loss of all offsite power and in the event of a LOCA. The diesel generator sets should be capable of operation at less than full load for extended periods without degradation of performance or reliability. Should a LOCA occur with availability of offsite power, discuss the design provisions and other parameters that have been considered in the selection of the diesel generators to enable them to run unloaded (on standby) for extended periods without degradation of engine performance or reliability. Expand your FSAR to include and explicitly define the capability of your design with regard to this requirement. (SRP 9.5.5, Part III)

430.72 (9.5.5) You state in Section 9.5.5.1 and Table 9.5-2 of the FSAR that each diesel engine cooling water system is provided with a standpipe or an expansion tank to provide for system expansion, for venting air from the system to provide for minor system leaks at pump shafts seals, valve stems and other components for up to 30 days. In addition to the items mentioned, the expansion tank is to maintain required NPSH on the system jacket water and intercooler water pumps. Provide the location of the standpipes and expansion tank. Demonstrate by analysis that the standpipes and expansion tank size are adequate to maintain required pump NPSH and make up water for days continuous operation of the diesel engine at full rated load without makeup, or provide a seismic Category I, safety Class 3 makeup water supply to the diesel generators (SRP 9.5.5, Parts I, III and III)

430.73 (9.5.5) Recent licensee event reports have shown that tube leaks are being experienced in the heat exchangers of diesel engine jacket cooling water systems with resultant engine failure to start on demand. Provide a discussion of the means used to detect tube leakage and corrective measures that will be taken. Include jacket water leakage into the lube oil system (standby mode), lube oil leakage into the jacket water (operating mode), jacket water leakage into the engine air intake and governor systems (operating or standby mode). Provide the permissible inleakage or outleakage in each of the above conditions which can be tolerated without degrading engine performance or causing engine failure. The discussion should also include the effects of jacket water/service water systems leakage.

430.74 (9.5.5) In FSAR Section 9.5.5.2, you state that antifreeze compounds are not used in the diesel generator cooling water systems because they are located in a heated building. Consider a loss of heating to one or more diesel generator rooms, and describe the provisions in your system(s) design to prevent freezing of the diesel engine cooling water.

430.75 (9.5.5) In FSAR Section 9.5.5.2.1, you discuss the operation of a "two-way thermostatic valve" in the cooling water system for Division I and II diesel generators. As described, it appears that this valve will bypass cooling water flow around the primary, three-way thermostatic temperature regulating valve and prevent the system from reaching operating temperature. Expand your FSAR description of this valve function to demonstrate that the above condition will not occur.

430.76 (9.5.5) For the Division III diesel generator, describe the provisions made in the design of the diesel engine cooling water system to assure that all componenets and piping are filled with water. Show how your design will preclude long term corrosion of piping with attendant system degradation. (SRP 9.5.5, Part I & II)

430.77 (9.5.5) For the Division III diesel generator, provide the results of a test which demonstrates that the "thermosyphon" design in your keep warm system will maintain a uniform temperature within the diesel engine jacket water and throughout the cooling water system of at least 120°F. Provide the lowest ambient temperature (diesel generator room) at which the keep warm system can maintain this temperature. Also what provisions have been made to warn the operator if room ambient fall below the above minimum temperature.

430.78 (9.5.6) The air starting system for the Division I and II diesel generators has two receivers, each sized for three engine starts. However, the design of the system is for both redundant compressed air trains to operate in parallel, thereby giving only three start capability, total for the redundant trains. As stated in SRP Section 9.5.6, the staff requires that each diesel generator be provided with a starting system that is capable of providing a minimum of five starts in the normal operation mode. Revise your design accordingly or justify the present design. (SRP 9.5.6, Part II)

430.79 (9.5.6) For the Division I, II and III diesel generators, expand your FSAR to provide the following information:

(a) define what constitutes a successful engine cranking cycle, i.e., a given number of diesel engine revolutions, reaching a preset engine RPM, a specified period of cranking time, a given receiver pressure drop, etc., and does this conform with manufacturer's recommendations.

(b) what is the minimum receiver pressure required to allow the requisite number of starts (i.e., 5) without recharging?

(c) what is the lowest point to which the receiver pressure can drop and still be capable of starting the diesel generator?

(d) assuming the diesel engine fails to start in the required 10 seconds, or at the conclusion of a "start cycle," does the engine continue to crank until compressed air is exhausted, or does cranking stop automatically?

If engine cranking is automatically stopped, describe the electrical circuitry in the appropriate chapter of Section 8.0 of the FSAR. Include a discussion of fuel and/or starting air lockouts which are a part of your design.

430.80 (9.5.6) The design of the air start systems for the Division I, II and III diesel generators does not include air dryers. This is not acceptable. The staff requires air dryers in the system with the capability of producing dry air (to the receivers) at a dewpoint a minimum of 10°F below the lowest possible ambient temperature in the diesel generator rooms. Revise your design accordingly. (SRP 9.5.6, Part III)

[illegible]

[illegible]

[illegible]

[illegible]

430.81
(9.5.6)

Describe the instrumentations, controls, sensors and alarms provided for monitoring the diesel engine air starting system, and describe their function. Describe the testing necessary to maintain a highly reliable instrumentation, control, sensors and alarm system and where the alarms are annunciated. Identify the temperature, pressure and level sensors which alert the operator when the parameters exceed the ranges recommended by the engine manufacturer and describe any operator actions required during alarm conditions to prevent harmful effects to the diesel engine. Discuss system interlocks provided. Revise your FSAR accordingly. (SRP 9.5.6, Part III)

430.82
(9.5.6)

The diesel generators at NMP II utilize air pressure or air flow devices to control diesel generator operation and/or emergency trip functions. The air for these controls is supplied from the emergency diesel generator air starting system. Provide the following:

(a) Expand your FSAR to discuss any diesel engine control functions supplied by the air starting system or any air system. The discussion should include the mode of operation for the control function (air pressure and/or flow), a failure modes and effects analysis, and the necessary P&IDs to evaluate the system.

(b) Since air systems are not completely air tight, there is a potential for slight leakage from the system. The air starting system uses a non-seismic air compressor to maintain air pressure in the seismic Category I air receivers during the standby condition. In case of an accident, a seismic event, and/or loop, the air in the air receivers is used to start the diesel engine. After the engine is started, the air starting system becomes nonessential to diesel generator operation unless the air system supplies air to the engine controls. In this case the controls must relay in the air stored in the air receivers, since the air compressor may not be available to maintain system pressure and/or flow. If your air starting system is used to control engine operation, with the compressor not available, show that a sufficient quantity of air will remain in the air receivers, following a diesel engine start, to control engine operations for a minimum of seven days assuming a reasonable leakage rate. If the air starting system is not used for engine control describe the air control system provided and provide assurance that it can perform for a period of seven days or longer.

430.83
(9.5.6)

The Division I and II diesel generator starting systems utilize a number of "shuttle valves." Expand your FSAR to include their purpose, and a discussion of these valves and how they operate (a) with pressure balanced on both sides, and (b) with air pressure unbalanced on either side of the valves.

430.84 (9.5.7) Your description of the turbocharger lubrication system for the Division I and II diesel generator is not clear. Expand your FSAR to include a more detailed discussion of this system and its components as shown on FSAR Fig. 9.5-47. Start at the turbocharger pressure regulatory and describe the oil flow through the ratio relay and on to the oil header. Identify the post lube valve, as well as all other valves and components in this system, and describe their functions. This includes the air controls associated with the system controls. Describe how excessive prelubrication to the turbocharger is precluded. Revise your FSAR and P&ID accordingly (SRP 9.5.7, Part III)

430.85 (9.5.7) In FSAR Section 9.5.7.3, you provide a list of indicators and alarms associated with the Division I/II and Division III diesel generators. For the Division I/II system, control rom alarms are provided for "diesel generator shutdown, mechanical failure," and "diesel generator mechanical failure." The function of these alarms is not clear. Expand your FSAR to include an explanation of these alarms and how and when they function. If these alarms are a type of "common trouble" alarm, such as provided for the Division III diesel generator, then so state, and identify the alarms and/or trips associated with each. Also identify how and where the Division III diesel generator trips are annunciated. (SRP 9.5.7, Part III)

430.86 (9.5.7) Your discussion of the prelubrication systems for the Division I/II and Division III diesel generators indicates that prelubrication is provided to the upper parts of the diesel engines (valves, rocker arms, rocker shafts, etc.). For some diesel engine designs, excessive or continuous prelubrication to the upper engine areas could result in lube oil entering and collecting in the cylinders with the potential for causing extensive engine damage when called on to start. Revise your FSAR to specifically address the design of all diesel generators with regard to this potential problem, and the applicable design considerations to preclude this from occurring.

430.87 (9.5.7) For all three diesel generators, provide additional information on the design of the crankcase breathers. Provide the piping quality, design standard and seismic qualifiation, state where the breather is located on each engine, describe what happens to the vapors which are vented from the crankcase, and discuss the provisions in your design to prevent crankcase vapors from creating an explosion hazard in the diesel generator room. Also, describe the features includes in your diesel engine design to prevent and mitigate a crankcase explosion. (SRP 9.5.7, Part II)

430.88
(9.5.7) In FSAR Section 9.5.7.2, you state that there is adequate lube oil in the sump of the Division I and II diesel generators for seven days of operation without adding lube oil. Expand your FSAR discussion to include details as listed below. Also, provide similar information for the Division III diesel generator.

(a) Provide the normal lube oil usage rate for each diesel engine under full load conditions. Also provide the lube oil usage rates which would be considered excessive.

(b) Show with the lube oil in the sump tank at the minimum recommended level that the diesel engine can operate without refilling the lube oil sump for a minimum of seven days at full rated load. If the sump tank capacity is insufficient for this condition, show that adequate lube oil will be stored onsite for each engine to assure seven days of operation at rated load. Also provide the lube oil sump capacity. (SRP 9.5.7, Parts II and III)

430.89
(9.5.7) What measures have been taken to prevent entry of deleterious materials into the engine lubrication oil system due to operator error during recharging of lubricating oil or normal operation. (SRP 9.5.7, Part II)

430.90
(9.5.7) Assume an unlikely event has occurred requiring operation of a diesel generator for a prolonged period that would require replenishment of lube oil without interrupting operation of the diesel generator. Provide the following:

(a) What provision has been made in the design of the lube oil system to add lube oil to the sump. These provisions shall include procedures or instructions available to the operator on the proper addition of lube oil to the diesel generator as follows:

1. How and where lube oil can be added while the equipment is in operation.

2. Particular assurance that the wrong kind of oil is not inadvertently added to the lubricating oil system, and

3. That the expected rise in level occurs and is verified for each unit of lube oil added.

(b) Verification that these operating procedures or instructions will be posted locally in the diesel generator rooms.

(c) Verification that personnel responsible for the operation and maintenance of the diesel are trained in the use of these procedures. Verification of the ability of the personnel on the use of the procedures shall be demonstrated during preoperational tests and during operator requalification.

(d) Verfication that the color coded, or otherwise marked, lines associated with the diesel generator are correctly identified and that the line or point for adding lube oil (when the engine is on standby or in operation) has been clearly identified. (SRP 9.5.7, Part II)

430.91 (9.5.7) Define the term "periodically" as used in the FSAR with regard to frequency of testing of lube oil to determine lube oil quality and/or the necessity for changing lube oil. Also, provide details on the type of analysis that will be used for determining lube oil quality. (SRP 9.5.7, Part I)

430.92 (9.5.7) Describe the testing and calibration program that will be used to ensure a highly reliable instrumentation, control, sensors, and alarm system for the diesel generators lubricating oil systems. (SRP 9.5.7, Part II)

430.93 (9.5.7) Provide the design margin (i.e., excess heat removal capability) for the lube oil coolers for the Division I and II and Division III diesel generators. (SRP 9.5.7, Part II)

430.94 (9.5.7) The description of the Division III diesel generator circulating and soak back pumps operation is not clear. The piping arrangement shown on Figure 9.5-48 shows oil flow paths that are not consistent with the FSAR written description. Specifically, there is oil flow to the turbocharger at all times, rather than only on startup as indicated in the FSAR. Revise the FSAR and/or Figure 9.5-48, as required, to correct this inconsistency.

430.95 (9.5.7) In the FSAR, you state that the Division III lube oil circulating pump is rated at 6 GPM and is used only when the diesel generator is in the standby mode. At 6 GPM, the amount of oil circulated through the engine during standby is substantially less than that circulated by the main lube oil pump during operation. The purpose of circulating lube oil during standby is to enhance <u>first</u> try start reliability by ensuring an oil film on all moving parts, as well as maintaining these parts at recommended preheated temperature. Therefore, demonstrate that the standby circulating pump has adequate capacity to (1) maintain an adequate oil film, on the engine moving parts, and (2) that this capacity is sufficient to maintain the moving parts at recommended preheat temperature. (SRP 9.5.7, Part II and III)

430.96 (9.5.7) Discuss the interlocks on the Division I and II standby circulating oil pumps, and the Division III standby circulating and soak back pumps. (SRP 9.5.7, Part III)

430.97 (9.5.8) FSAR Figures 9.5-49 through 9.5-51, and 1.2-17 through 1.2-19, do not provide adequate details of the missile protection provided for the diesel generator combustion air intake and exhaust systems. Provide additional plan elevation, and section views, as required, which clearly show what the missile protection consists of, where it is located relative to the intakes and exhaust, and the relationship of the protective devices with the diesel generator building and other buildings, as appropriate. (SRP 9.5.8, Part I)

430.98 (9.5.8) In FSAR Section 9.5-8, you state that "intake and exhaust silencing is not a safety-related function." This is not correct. The emergency diesel generator and its support auxiliary systems are required to be safety related. Intake and exhaust silencers are integral parts of emergency diesel generator auxiliary systems, and their proper functioning in the event of a design basis accident is essential to diesel generator operation and availability. Therefore, the silencers, their supports, piping and connections to this system are required to be safety related. Revise your FSAR Sections 9.5.8 and 9.5.8.1 to reflect this request. (SRP 9.5.8, Part I)

430.99 (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 wich 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)

430.100 (9.5.8) Discuss the provisions made in your design of the diesel engine combustion air intake and exhaust system to prevent possible clogging, during standby and in operation, from abnormal climatic conditions (heavy rain, freezing rain, dust storms, ice and snow) that could prevent operation of the diesel generator on demand. (SRP 9.5.8, Part II)

430.101 (9.5.8) Show by analysis that a potential fire in the diesel generator building together with a single failure of the fire protection systems will ot degrade the quality of the diesel combustion air so that the remaining diesel will be able to provide full rated power. (SRP 9.5.8, Part II)

430.102
(9.5.8)

Experience at some operating plants has shown that diesel engines have failed to start due to accumulation of dust and other deliterious 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 of 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 no 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 verses 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)

430.103 (9.5.8) In FSAR Section 9.5.8.2, you discuss the operation of the combustion air aftercoolers, including the "heater section." Expand your FSAR to provide more information on this design feature. State whether there are two sections to the aftercooler, and, if so, how they function with respect to each other. Describe any controls, automatic or otherwise, which may be associated with aftercooler operation, and the effect on diesel generator performance if the controls fail. Revise your P&ID's, as requred.

430.104 (9.5.8) In FSAR Section 9.5.8.2, you state that exhaust gasses from the Division III diesel generator bypass the turbocharger except at high load conditions. Expand your FSAR to provide additional information on how this system functions, the components involved, details of any control system, and the effect of system failure on diesel generator operation. Also discuss the load(s) at which turbocharger bypass occurs.

430.105 (9.5.8) Provide a P&ID for the diesel engine combustion air intake and exhaust system. Identify all system components and provide the design classification for same. Identify the diesel engine interface. (SRP 9.5.8, Section I)

430.106 (10.2) Expand your discussion of the turbine speed control and overspeed protection system. Provide additional explanation of the turbine and generator electrical load following capability for the turbine speed control system with the aid of system schematics (including turbine control and extraction steam valves to the heaters). Tabulate the individual speed control protection devices (normal, emergency and backup), the design speed (or range of speed) at which each device beings operation to perform its protective function (in terms of percent of normal turbine operating speed). In order to evaluate the adequacy of the control and overspeed protection system provide schematics and include identifying numbers to valve and mechanisms (mechanical and electrical) on the schematics. Describe in detail, with references to the identifying numbers, the sequence of events in a turbine trip including response times, and show that the turbine stabilizes. Provide the results of a failure mode and effects analysis for the overspeed protection systems. Show that a single steam valve failure cannot disable the turbine overspeed trip from functioning. (SRP 10.2, Parts II and III)

430.107 (10.2) In the turbine generator section discuss: 1) the valve closure times and the arrangement for the main steam stop and control and the reheat stop and intercept valve in relation to the effect of a failure of a single valve on the overspeed control functions; 2) the valve closure times and extraction steam valve arrangements in relation to stable turbine operation after a turbine generator system trip; 3) effects of missiles from a possible turbine generator failure on safety related systems or components. (SRP 10.2, Parts II, III and IV)

430.108 (10.2) Discuss the effects of a high and moderate energy piping failure or failure of the connection from the low pressure turbine to condenser on nearby safety related equipment or systems. Discuss what protection will be provided the turbine overspeed control system equipment, electrical wiring and hydraulic lines from the effects of a high or moderate energy pipe failure so that the turbine overspeed protection system will not be damaged to preclude its safety function. (SRP 10.2, Parts III and IV)

430.109 (10.2) Your FSAR discussion of the turbine generator, Section 10.2.2, does not include any reference to inservice inspection and exercising of the turbine main steam stop and control and reheater stop and intercept valves. Expand your FSAR to include a detailed description of (1) the turbine main steam stop and control and reheat stop and intercept valves, and (2) the inservice inspection and testing program for these valves. (SRP 10.2, Part II)

430.110 (10.2) In Section 10.2.2 you discuss the extraction steam valves, but you do not discuss the inservice inspection, testing and exercising of the extraction steam valves. Provide a detail description of: (1) the extraction steam valves, and (2) your inservice inspection and testing program for tehse valves. Also provide the time interval between periodic valve exercising to assure the extraction steam valves will close on turbine trip. (SRP 10.2, Part III)

430.111 (10.4.1) Discuss the effect of main condenser degradation (leakage, vacuum, loss) on reactor operation. (SRP 10.4.1, Part III)

430.112 (10.4.1) Discuss the measures taken to prevent loss of vacuum. (SRP 10.4.1, Part III)

430.113 (10.4.1) In Section 10.4.1 you have discussed the provisions for tests and initial field inspection but not the frequency and extent of inservice inspection of the main condenser. Provide this information in the FSAR. (SRP 10.4.1, Part II)

430.114 (10.4.1) Discuss the effect of loss of main condenser vacuum on the operation of the main steam isolation valves. (SRP 10.4.1, Part III)

430.115 (10.4.4) Provide the results of an analysis indicating that failure of the turbine bypass system high energy line will not have an adverse effect or preclude operation of the turbine speed control system or any safety related components or systems located close to the turbine bypass system. (SRP 10.4.4, Parts I and II)

430.116 (10.4.4) In Section 10.4.4.4 of the FSAR you state that during refueling shutdowns, the turbine bypass valves and turbine bypass system controls will be inspected and tested for proper operation. We find this inspection program partially acceptable. Since the operation of the turbine bypass system eliminates the need to rely solely on safety systems which are required to meet the redundancy and power source requirements of GDC 34, the turbine bypass system should be tested (full stroking of the valve) on a frequent basis, but no less than once every three months. Modify your inservice inspection program accordingly. (SRP 10.4.4, Part II)

430.117 NRC inspection report no. 50-410/83-06 dated August 11, 1983 identified an inconsistency between the load sequencing logic described in FSAR section 7.3 and that described in section 8.3. In an FSAR amendment provide the load sequencing times which will actually be used for the Nine Mile Point Unit 2 loads. Verify that these are the load sequencing time intervals used in the preparation of the Chapter 15 accident analysis.

The NRC inspection report also identified an inconsistency between the actual Emergency Diesel Generator loading calculation numbers and those specified in the FSAR. Provide an FSAR amendment with the correct diesel generator loading.

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