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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUN 10 1980

Docket No. 50-382

Mr. D. L. Aswell
Vice President, Power Production
Louisiana Power and Light Company
142 Delaronde Street
New Orleans, Louisiana 70174

Dear Mr. Aswell:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION - WATERFORD STEAM ELECTRIC STATION, UNIT 3

Enclosed are requests for additional information. These include requests 040.72 through 040.125, concerning power systems and 030.1 through 030.8 concerning instrumentation and control systems. Please advise us of the date you expect to provide responses to the enclosed requests.

Sincerely,

A. Schwencer

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

Enclosure:
Request for Additional Information

cc w/enclosure:
See next page

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ENCLOSURE

REQUESTS FOR ADDITIONAL INFORMATION

040.0 Power Systems Branch

040.72 The written descriptions in FSAR Section 8.1 and 8.2 are not clear,
(8.1, 8.2) as regards the utility grid system and its relationship to the nuclear unit. In some cases, there are conflicts between the written text and the various figures. Clarify the following items:

a) On the back side of Figure 8.1-2 (New Orleans Area block) one triangle is called "Waterford Sw. Sta.". The written description indicates that this is the Waterford switchyard.

b) The terms "switchyard", "switching station", and "substation" have been used very loosely in the FSAR. Define what you mean by these terms.

c) Figure 8.1-4 (Preferred Power System Switchyard) shows a line in bay No. 7 to the Waterford "substation". Identify the location of this substation in relationship to the nuclear unit.

d) On the back side of Figure 8.1-2 (New Orleans Area block) there are three 230KV lines to Waterford from the "Waterford Sw. Sta.". There is also a 230KV line from Little Gypsy that crosses all three of these lines. Provide details of these crossovers including distances between them and construction of the lines.

e) The various electric lines on Figure 8.2-1 (Transmission Line System) are not labeled well enough to get a clear understanding of the system layout. Provide a better identification of each of the lines.

f) For Figure 8.1-4, provide the drawing reference which will show the type and location of supporting structures for the 115KV line which passes through the switchyard. Also indicate the termination points for this line.

g) The description in FSAR Section 8.2.1.1, (first paragraph) does not match what is shown in Figure 8.1-2, 8.1-4, and 8.2-1.

h) In Section 8.2.1.3, you are addressing the "switching station" breakers, but state that the control power....is furnished by 125 volt "switchyard" batteries. Clarify this section of the FSAR.

i) In FSAR Section 8.2.2.1 (4), identify the two lines that cross the Mississippi River on common towers.

040.73 (8.1) In FSAR Section 8.1.2, there is no indication whether the offsite power facilities mentioned are completed, under construction or planned. Indicate this status and give estimated completion dates for those that are not completed.

040.74 (8.0) SRP Section 8.1, III, 5, Revision 1, requires that criteria applicable to the design should be identified and the degree of conformance defined. SRP Table 8-1 gives the applicability of these criteria to each FSAR section. It is extremely difficult to tell from your FSAR whether all of the criteria have been addressed. Each section of your FSAR, Chapter 8, should specify conformance (or exception) to all of the criteria of SRP Table 8-1. This may be done by a single comprehensive table in FSAR Section 8.1 which would make reference to the subsequent sections. Where exceptions relative to the electrical power systems are taken, these should be <u>specifically</u> noted and referenced to a detailed explanation.

040.75 (8.3) Regulatory Guide 1.70 and Standard Review Plan, Section 8.3.2 - state that DC safety loads are to be clearly identified. FSAR Tables 8.3-3, 8.3-4, and 8.3-5 are primarily a list of DC safety buses. Revise FSAR Tables 8.3-3, 8.3-4 and 8.3-5 to address the following:

a) Clearly identify DC safety loads.

b) Provide characteristics of each load (e.g., motor horsepower and volt-amp ratings, inrush current, starting volt-amps and torque).

c) The length of time each load is required.

d) The combined load demand connected to each battery or battery charger during the "worst" operating condition.

040.76 (8.3) Regulatory Guide 1.70 states that components of Class 1E systems are to be marked or labeled in a distinctive manner to preclude the need to consult any reference material. FSAR Section 8.3.1.3 states that Class 1E equipment labels contain the name, identifying number, safety-related division and are color coded. This method of labeling does not clearly identify Class 1E components. Include in your present design a method for labeling Class 1E components distinctively (e.g., nuclear safety).

040.77 (8.3) Standard Review Plan, Section 8.3.2 states that where the design provides for connection of non-safety DC loads to safety-related DC buses, one of the following provisions must be provided:

a) The non-safety loads capable of being connected to the safety bus must be included in the DC power supply sizing criteria.

b) The design must provide for the automatic disconnection of those non-safety-related loads upon detection of an emergency condition.

Expand your discussion in the FSAR to describe how you comply with the above.

040.78 (8.2) Provide a table listing safety-related equipment that would be submerged following a large loss-of-coolant accident. For each piece of equipment, provide the time before it becomes submerged following the accident.

040.79 (8.3) FSAR Section 8.3.2.1.2 - The statement is made that a fully discharged battery can be recharged by each of its chargers while the batteries supply the steady state DC bus load. In FSAR Section 8.3.2.2.1.4 - the statement is made that a fully discharged battery can be recharged by each of its chargers while the chargers supply the steady state DC bus load. Address the following:

a) Correct the above discrepancy.
b) Provide the time limit required to fully recharge a fully discharged battery while the charger is also supplying the largest combined demand of the steady state DC bus loads irrespective of the status of the plant during which these demands occur.

040.80 (8.3) Section 8.3.1.2.3, page 8.3.23, paragraph (f) - Provide the surveillance requirements for the method of testing and interval to demonstrate that the electrical interlocks which prevent the connection of buses 3A3-S and 3B3-S are functioning properly.

040.81 (8.2) Expand your description in the FSAR and include drawings to describe the automatic transfer of power feed to bus 3A2 and 3B2 from the unit auxiliary transformers to the start-up transformers upon loss of power from the Waterford 3 generator.

040.82 (8.3) Explain how you comply with Regulatory Guide 1.9, Revision 1, paragraph C.9 with respect to first out alarm indication.

040.83 (8.3) Your response to request 040.54 is unacceptable since you plan to use one alarm to indicate conditions that may or may not render a diesel incapable of responding to an automatic emergency start. This type alarm has led to misinterpretation. As outlined in request 040.54 you should separate the alarms so that there is one alarm for the conditions that render a diesel incapable of responding to an automatic start, the other for the remaining alarm conditions. Regulatory Guide 1.108, position C.1.6.4, requires that a surveillance system be provided with remote indication in the control room as to diesel generator unit status, i.e., under test, ready-standby, and lockout. Also, Regulatory Guide 1.47, position C.3, requires automatic indication for each bypass or deliberately induced inoperable status. Modify your response to address these matters.

040.84 (8.1) IEEE 308-1978 specifies that, "The preferred power source shall consist of two or more circuits from the transmission network or equivalent source of electrical energy to the Class 1E distribution system input terminals". Your FSAR Figure 8.1-7 shows that there is only one offsite feed to each ESF bus in addition to the diesel generator connected to each bus. We recommend that you comply with IEEE 308-1978 by providing two sources of preferred power to each ESF bus. Offsite feeds could be connected to bus 3B3-S from bus 3A2 from bus 3B2. Modify your response to address this recommendation.

040.85 (8.3) FSAR Section 8.3.2.1.1 states that the peak capacity of each battery will meet peak current demand for a minimum period of one minute. Standard Review Plan, Section 8.3.2 states that the short term rating for the batteries is to be specified. Revise FSAR Section 8.3.2.1.1 to specify this short term rating of each battery and the peak current load demand expected during the "worst" operating conditions.

040.86 (8.3) FSAR Section 8.1.4.3 states that wherever alternative approaches are used to meet the intent of some requirements of IEEE Standards, the method of attaining an acceptable level of safety is provided. FSAR Section 8.3.2.1.8, final three paragraphs, uses the terminology, to meet the intent of, but does not provide the alternative approach. Provide a detailed description of the following battery tests to facilitate a determination of an acceptable level of safety.

a) Battery capacity test.

b) Performance discharge test.

c) Battery service test.

040.87 (8.3) Battery loading data shown in FSAR Tables 8.3-3, 8.3-4 and 8.3-5 doe not agree with FSAR Figures 8.3-2, 8.3-3 and 8.3-4. Address the following:

a) Correlate the loading cycle figures to accurately reflect the loading tables.

b) Expand the FSAR to include data which confirm that the Waterford Unit Three batteries are sized to carry combined post-accident loads.

040.88 (8.3) FSAR Section 8.3.1.2.8, page 8.3-24 and Section 8.3.2.2.1.4, page 8.3-39 - The statement is made that "transient" loads are not experienced by the battery charger since the loads are applied only when AC power is unavailable. Provide a list of these "transient" loads, magnitude of inrush current and duration of time each load is required.

040.89 (8.3) FSAR Table 8.2-5, page 8.2-19, item C and Section 8.3.2.1.3, page 8.3-36, first and second paragraphs - 125V DC bus fault current is listed in turn as being first 10KA then 20KA and finally 30KA. Also the fault current considered for bus 3AB-DC-S is listed as being first 20KA and then 30KA. Correct these discrepancies.

040.90 (8.3) FSAR Section 8.2.1.1.1, page 8.3-6, fourth paragraph-The statement is made that after emergency loads are applied to the diesel generator additional loads may be manually started only one at a time by the operator. Explain the mechanism which restricts the operator to only start one load at a time.

040.91 FSAR Section 8.3.1.1.2.8, page 8.3-9a, third paragraph - The
(8.3) statement is made that the undervoltage relays are set so as not to trip during the diesel generator starting sequence. Change this statement to indicate diesel generator loading sequence.

040.92 FSAR Section 8.3.1.1.2.13, page 8.3-15, paragraph (f) - The
(8.3) statement is made that all power centers are energized within two seconds of the generator's starting. Clarify the time as to when the power centers are energized assuming time zero is when the diesel generator gets a start signal.

040.93 FSAR Section 8.3.1.1.3, page 8.3-18, paragraph (b) - Provide the
(8.3) exact location of the voltage profile mentioned in this paragraph.

040.94 FSAR Section 8.3.1.1.3, page 8.3-19, paragraph (g) - Class 1E
(8.3) grounding design is accomplished using a proprietary computer program. Provide information as to where this program has been used successfully and by whom has it been approved.

040.95 FSAR Section 8.3.1.2.2, page 8.3-23 - Expand this
(8.3) paragraph to clearly indicate if one diesel generator is supplying power in an emergency condition that the other diesel generator will undergo a periodic test.

040.96 FSAR Section 8.3.2.2.1.5, page 8.3-40, first paragraph - The
(8.3)

statement is made that each battery can supply sufficient power to start and operate all required loads during a loss of power from the AC system. Expand this paragraph to include the length of time each battery will supply sufficient power to emergency loads f both redundant chargers are without AC power or are disabled.

040-97 (8.3) FSAR Section 8.3.1.2.15, page 8.3-29, paragraph (c.5) - The statement is made that connection of non-Class 1E circuits to Class 1E sources is accomplished through circuit breakers located in Class 1E structures. There are two problems with the above statement; first, the term Class 1E is misused in referring to structures and second the circuit breakers are to be Class 1E, per IEEE-308. Correct these descrepancies.

040.98 (8.3) FSAR Section 8.3.1.2.15, page 8.3-29, paragraph (e.6) - The statement is made that sufficient fuel is provided at the site to sustain the operations of both diesels for seven days. Technical Specifications, Section 3.8.1.2, requires that 40,000 gallons be maintained. FSAR Section 9.5.4.2 states that 42,500 gallons are to be maintained for a seven day supply. Clarify these statements as to precisely how much fuel is necessary for a seven day supply.

040.99 (8.3) FSAR Section 8.3.1.2.15, page 8.3-29, paragraph (e.7) - The statement is made that all loads supplied by the standby sources are provided with both automatic and manual controls for selections, disconnection and starting. Section 8.3.1.1.2.8 indicates that only emergency loads are equipped for automatic connection. Clarify this discrepancy.

040-100 (8.3) FSAR Section 8.3.1.2.19, page 8.3-32, paragraph (c) - Clarify this paragraph to specifically indicate where the remote and local controls for the diesel generator are located.

040.101 (8.3) FSAR Section 8.3.1.3, page 8.3.34, fifth paragraph - The statement is made that a 50 ft. maximum distance between raceway markers is used rather than the 15 ft. distance mentioned in IEEE Standard 384 and that the greater distance has been demonstrated to be reasonable for long raceway runs. Provide information as to where this 50 ft. distance has been demonstrated to be reasonable and by whom it was approved.

040.102 (8.3) FSAR Section 8.3.2.1.2, page 8.3-36, fourth paragraph - The statement is made that overvoltage shutdown for the battery chargers occurs at 144 volts. Table 8.3-2, page 8.3-50 indicates possible float and equalize charges of 146 and 155 volts respectively. Correct this discrepancy.

040.103 (8.3) FSAR Section 8.3.2.1.8, page 8.3-38, second paragraph - The statement is made that some equipment has been qualified by satisfactory operation at other operating stations. Provide a list of equipment qualified at other operating stations, list the station and by whom was the equipment qualified.

040.104 FSAR Section 8.3.1.1.2.13, page 8.3-13, paragraph (b) - Correct this
(8.3) paragraph to reflect how many times each redundant starting system can crank the diesel engine per response to request 040.63.

040.105 FSAR Table 8.3-6, page 8.3-56, paragraphs (e) and (f) under
(8.3) comments - The ESF buses are listed as being 4.15KV vice 4.16KV. Correct this discrepancy.

040.106 Your responses to requests 040.03 and 040.48 are not complete with
(8.3) regard to the voltage-time characteristic curve. Provide the basis for the selection of the voltage-time characteristic curve in Figure 040.48-1. Also provide the following:

a) Tabulate voltage requirements of the safety-related loads at all onsite system distribution levels.

b) Verify that allowable time delays, including margins do not exceed the maximum time delay that is assumed in the FSAR accident analysis.

c) Provide the accident analysis report for a sustained degraded voltage condition on the onsite power system and specify the maximum time delay assumed.

d) Verify that the allowable time duration of a degraded voltage condition at all distribution levels shall not result in failure of safety systems or components.

040.107 (8.3) Expand FSAR Section 8.3.1.1.2.8 to clearly indicate that the voltage sensors automatically initiate a disconnection of offsite power sources whenever the voltage setpoints and time delays have been exceeded on the time-voltage characteristic curve (Figure 040.48-1). Your reponses to requests 040.03 and 040.48 do not clearly explain this.

040.108 (8.3) Specify where in Chapter 16, Technical Specifications, you include the limiting condition for operation, surveillance requirements, trip setpoints with minimum and maximum limits, and allowable values for the second level voltage protection sensors and associated time delay devices.

040.109 (8.3) Expand your FSAR to include a description of how you assure a diesel generator is capable of responding automatically to a LOVS-SIAS condition after completion of and during a periodic test. Address the following:

a) Governor control settings.

b) Monitoring of Diesel Generator Sync-Speed setting.

c) Voltage regulator settings.

040.110 (8.3) Your response to request 040.51 is not acceptable. Address the following:

a) Your response No. 1 to request 040.51 does not comply with Regulatory Guide 1.108, C,2a.6. Justify your position for not including this in your design.

b) Your response No. 2 to request 040.51 does not comply with

Regulatory Guide 1.108, C.2a.3. Testing the diesel generator for only eight hours also fails to comply with the power rating for the diesel unit (see your response to request 040.14). Revise your Technical Specifications to reflect the requirements of Regulatory Guide 1.108.

c) Presently your Technical Specifications do not adequately address Regulatory Guide 1.108, C.2a.4 and C.2a.5. Revise your Technical Specifications to reflect all the requirements of Regulatory Guide 1.108.

040.111 (8.3) Expand your response to request 040.11 to clearly indicate if the person making the modification (item 5), the person verifying installation of the modification (item 6), the person removing the modification and restoring system (item 7) and the person verifying restoration (item 8) are:

a) The same person.

b) Different persons from the same department.

c) Different persons from different departments.

040.112 (8.3) FSAR Table 8.3-1, page 8.3-42 - The total kilowatt load for Block three is added incorrectly. Correct this discrepancy.

040.113 (8.3) Your responses to requests 040.14, 040.62, and 040.63, contain insufficient and inconsistent data which does not allow an adequate evaluation of the Waterford 3 diesel generator set. Address the following in detail:

a) Expand FSAR Section 8.3.1.1.2.13 (k) to include a discussion of the differences in the Waterford 3 diesel-generator set and the diesel-generator sets considered in the prototype qualification program.

b) Correct the following discrepancies:

- FSAR Section 8.3.1.1.2.13, page 8.3-17, paragraph (k), the statement is made that the Waterford 3 diesel generator is a Model KSV-16-T. The response to request 040.62 states that the Waterford 3 diesel generator is a Model KSU-16.
- The response to request 040.14 states that the Waterford 3 diesel generator has a WR^2 of 67,900 lb.-ft^2. The response to request 040.63 states that the Waterford 3 diesel generator has a WR^2 of 102,600 lb.-ft^2.
- The response to request 040.63 utilizes a diesel generator Model 1CSV-16-T at the Pennsylvania Power & Light Company Susquehanna Nuclear Power Station, for prototype qualification. The response to request 040.14 utilizes a diesel generator Model KSV-16-T at the Commonwealth Edison Zion Nuclear Power Station for prototype qualification.

040.114 (8.2) In FSAR Section 8.2.2.1 (page 8.2-11), expand your discussion of grid outages indicating the actual number of outages, the duration of each and their cause for each year since 1972.

040.115 FSAR Section 8.2.1.6.2 makes reference to transfer tripping and refers to subsection 8.1.2.6.4. Change this reference to subsection 8.2.1.6.4.

040.116 (8.2) With regard to FSAR Section 8.2, Offsite Power System, in addition to the nominal voltage level of 230KV, provide the maximum and minimum voltages of the grid. Indicate whether or not the grid has had variations outside of these limits, and if so, provide the reason and duration.

040.117 (8.2) Provide a discussion and/or table of the annunciated alarm conditions for the switchyard, switching station and transformer yard which are reported to the nuclear facility control room.

040.118 Provide a detailed discussion (or plan) of the level of training proposed

(8.3) 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 operation 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 of personnel 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.

040.119 (8.3) Periodic testing and test loading of an emergency diesel generator in a nuclear power plant 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:

a) 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.

b) Periodic surveillance testing should be performed in accordance with the applicable NRC guidelines (R.G. 1.108), and with the recommendations 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.

c) 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.

d) 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 circuits 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 valves 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 commercial operation, i.e., by what means will the above requirements be enforced.

040.120 The availability on demand of an emergency diesel generator is

(8.3) dependent upon, among other things, the proper functioning of its

RSP 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 accurately 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 or equipped with vibration mounts.

Confirm your compliance with the above requirement or provide justification for noncompliance.

040.121 (9.5.5) Your response to request 040.62 is incomplete. You stated in response 040.32 that the standby diesel engine design is such that it can operate at no load and full speed for seven days without degradation of the engine. Your response to 040.62 modified the above to indicate that the normal operating procedure would be to load the engine at specific time intervals during the seven days for short durations. The no load procedural philosophy was based on operating experience and test data of engines similar to Waterford's diesel engine. Provide the operating experience and test data and discuss how it applies to your engine. Include in the discussion the differences between your engine and the engines used to obtain the above data. Also provide any manufacturers test results which verify your statements.

040.122 (9.5.6) RSP

A study by the University of Dayton has shown that accumlation of water in the staring air system has been one of the most frequent causes of diesel engine failure to start on demand. Condensation of entrained moisture in compressed air lines leading to control and starting air valves, air start motors, and condensation of moisture on the working surfaces of these components has caused rust, scale and water itself to build up and score and jam the internal working parts of these vital components thereby preventing starting of the diesel generators.

In the event of loss of offsite power the diesel generators must function since they are vital to the safe shutdown of the reactor(s). Failure of the diesel engines to start from the effects of moisture condensation in air starting systems and from other causes have lowered their operational reliability to substantially less than the desired reliability of 0.99 as specified in Branch Technical Position ICSB (PSB) 2 "Diesel Generator Reliability Testing" and Regulatory Guide 1.108 "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants."

In an effort toward improving diesel engine starting reliability we require that compressed air starting system designs include air dryers for the removal of entrained moisture. The two-air dryers most commonly used are the dessicant and refrigerant types. Of these two types, the refrigerant type is the one most suited for this application and therefore is preferred. Starting air should be dried to a dew point of not more than 50°F when installed in a normally controlled 70°F environment, otherwise the starting air dew point should be controlled to at least 10°F less than the lowest expected ambient temperature.

Revise your design of the diesel engine air starting system accordingly, to describe this feature of your design.

040.123 (9.5.7) RSP

Several fires have occurred at some operating plants in the area of the diesel engine exhaust manifold and inside the turbocharger housing which have resulted in equipment unavailability. The fires were started from lube oil leaking and accumulating on the engine exhaust manifold and accumulating and igniting inside the turbocharger housing. Accumulation of lube oil in these areas, on some engines, is apparently caused from an excessively long prelube period, generally longer than five minutes, prior to manual starting of a diesel generator. This condition does not occur on an emergency start since the prelube period is minimal.

When manually starting the diesel generators for any reason, to minimize t. potential fire hazard and to improve equipment availability, the prelube period should be limited to a maximum of three to five minutes unless otherwise recommended by the diesel engine manufacturer. Confirm your compliance with this requirement or provide your justification for requiring a longer prelube time interval perior to manual starting of the diesel generators. Provide the prelube time interval your diesel engine will be exposed to prior to manual start.

040.124 An emergency diesel generator unit in a nuclear power plant is normally

(9.5.7) in the ready standby mode unless there is a loss of offsite power, an

RSP accident, or the diesel generator is under test. Long periods on standby have a tendency to drain or nearly empty the engine lube oil piping system. On an emergency start of the engine as much as 5 to 14 or more seconds may elapse from the start of cranking until full lube oil pressure is attained even though full engine speed is generally reached in about five seconds. With an essentially dry engine, the momentary lack of lubrication at the various moving parts may damage bearing surfaces producing incipient or actual component failure with resultant equipment unavailability.

The emergency condition of readiness requires this equipment to attain full rated speed and enable automatic sequencing of electric load within ten seconds. For this reason, and to improve upon the availability of this equipment on demand, it is necessary to establish as quickly as possible an oil film in the wearing parts of the diesel engine. Lubricating oil is normally delivered to the engine wearing parts by one or more engine driven pump(s). During the starting cycle the pump(s) accelerates slowly with the engine and may not supply the required quantity of lubricating oil where needed fast enough. To remedy this condition, as a minimum, an electrically driven lubricating oil pump, powered from a reliable DC power supply, should be installed in the lube oil system to operate in parallel with the engine driven main lube pump. The electric-driven prelube pump should operate only during the engine cranking cycle or until satisfactory lube oil pressure is established in the engine main lube distribution header. The installation of this prelube pump should be coordinated with the respective engine manufacturer. Some diesel engines include a lube oil circulating pump as an integral part of the lube oil preheating system which is in use while the diesel engine is in the standby mode. In this case an additional prelube oil pump may not be needed. Confirm your compliance with the above requirement or provide your justification for not installing an electric-driven prelube oil pump.

Also, you do not state in your FSAR 9.5.17 whether the electric-driven lube oil pump, which is required during emergency conditions, is powered from the DC power supply. Provide a complete description of the pump starting circuitry and of system operation.

040.125 (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 the procedure(s) to be used to minimize accumulation of dust in the diesel generator room. Specifically address concrete dust control.

030.0 Instrumentation and Control Systems Branch

030.1 (7.1.2.7 8.3.1.2.13) The section on compliance with Regulatory Guide 1.75 states that some non-safety-related computer digital inputs and annunciator inputs emanating from safety-related equipment form a category termed "information" circuits. The section further states that the "information" circuits are non-Class 1E, but, by virtue of their low power levels, the "information" circuits may share Class 1E and non-Class 1E raceways without the use of any isolation devices. RG 1.75, Section C6, states that analyses made on this topic should be submitted as part of the Final Safety Analysis Report and should identify those circuits installed in the described manner. Provide this analysis and identification of circuits in the FSAR.

030.2 (7.1.1) Continuing the pattern set in this section, include a paragraph which shows the supplier/designer and states what information and which systems may be found in 7.7, "Control Systems Not Required for Safety."

030.3 (7.2.2.3.1) The Standard Review Plan in Table 7-1 gives a list of acceptance criteria for Section 7.0 of the FSAR. Section 7.0 of the FSAR does not indicate compliance to some of the acceptance criteria. Include in Subsection 7.2.2.3.1 your conformance to the following criteria from Appendix A of 10 CFR 50, General Design Criteria for Nuclear Power Plants (July 7, 1971) as related to Section 7.2: Criteria 19, 26, 27, 28, 35, and 37.

030.4 (7.2.1.1.9.4) The "RPS Channel Trip Select" switch is shown connected directly to the negative power supply terminal in Figure 7.2-9, but through the "System Channel Trip Select" switch in Figure 7.2-7. The "Matrix Relay Trip Select" switch is shown in the positive leg of the matrix relay hold winding in Figure 7.2-9, but in the negative leg in Figure 7.2-7. The "System Channel Trip Select" switch is shown between the bistable relay test winding and the power supply positive terminal in Figure 7.2-9, but between the test winding and the negative terminal in Figure 7.2-7. Figure 7.2-7 shows two sets of contacts of the "Matrix Relay Hold" switch in the hold winding circuit, but Figure 7.2-9 shows only one set of contacts. Correct the switch arrangement discrepancies in either or both figures to what is actually used. Also, explain the winding markings on the double coil relays used in Figures 7.2-7 and 7.2-9.

030.5 (7.2.1.1.1.7 7.2.2.2.7) A potential safety hazard exists in the steam generator level indication sensors following high energy pipe break accidents inside containment. Previous analyses analyses of peak containment temperature and pressure may have been non-conservative. IE Bulletin 79-21 included further information on this problem and addressed appropriate actions to be taken by licensees of operating plants.

Applicants for an operating license are requested to provide the following information and to revise their safety analysis report consistent with this response.

1. Describe the liquid level measuring systems within containment that are used to initiate safety actions or are used to provide post-accident monitoring information. Provide a description of the type of reference leg used i.e., open column or sealed reference leg.
2. Provide an evaluation of the effect of post-accident ambient temperatures on the indicated water level to determine the

change in indicated level relative to actual water level. This evaluation must include other sources of error including the effects of varying fluid pressure and flashing of reference leg to steam on the water level measurements.

3. Provide an analysis of the impact that the level measurement errors in control and protection systems (2 above) have on the assumptions used in the plant transient and accident analysis. This should include a review of all safety and control setpoints derived from level signals to verify that the setpoints will initiate the action required by the plant safety analyses throughout the range of ambient temperatures encountered by the instrumentation, including accident temperatures. If this analysis demonstrates that level measurement errors are greater than assumed in the safety analysis, address the corrective action to be taken. The corrective actions considered should include design changes that could be made to ensure that containment temperature effects are automatically accounted for. These measures may include setpoint changes as an acceptable corrective action for the short term. However, some form of temperature compensation or modification to eliminate or reduce temperature errors should be investigated as a long term solution.

4. Review and indicate the required revisions, as necessary, of emergency procedures to include specific information obtained

from the review and evaluation of Items 1, 2, and 3 to ensure that the operators are instructed on the potential for and magnitude of erroneous level signals. Provide a copy of tables, curves, or correction factors that would be applied to post-accident monitoring systems that will be used by plant operators.

030.6 (7.2.2.2.4 7.2.2.2.5) Detail the isolation of the narrow range pressurizer pressure transducer for operation into the high pressurizer pressure comparator and the core protection calculator to prevent interference.

030.7 (7.2.1.1.1.1) Provide details as to how the three flux signals are averaged for obtaining the high linear power level signal and as to what happens to the signal average if one chamber malfunctions. Also detail how the flux signals are isolated for use in the CPC.

030.8 (7.2.1.1.3) Overvoltage/underfrequency conditions have the potential for damaging relays such that they may fail to drop out when de-energized. Specify the overvoltage/underfrequency detection, indication and protection provided in the Waterford Plant Protection System.