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

OCT 16 1979

Docket Nos.: 50-373
and 50-374

Mr. D. Louis Peoples
Director of Nuclear Licensing
Commonwealth Edison Company
P. O. Box 767
Chicago, Illinois 60690

Dear Mr. Peoples:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION CONCERNING LA SALLE COUNTY STATION, UNITS 1 & 2

As a result of our continuing review of the La Salle Final Safety Analysis Report, we find we need additional information in the area of instrumentation and control systems, power systems and structural engineering to continue our evaluation. The specific information required is listed in the Enclosure.

Please inform us after receipt of this letter of the date you can supply the requested information.

Please contact us if you desire any discussions or clarification of the information requested.

Sincerely,

Olan D. Parr, Chief
Light Water Reactors Branch No. 3
Division of Project Management

Enclosure:
As stated

cc: w/enclosure:
See next page

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ENCLOSURE

REQUEST FOR ADDITIONAL INFORMATION

030.0 INSTRUMENTATION AND CONTROL

031.272 The response to Question 031.244 is not acceptable as discussed below.

(1) We requested a listing of each type of relay that must be energized or remain energized during a seismic event. The response lists only ECCS relays. The list should be revised to include all Class IE relays, whose unintended change of state during a seismic event, could cause an undesired condition.

(2) We requested that the coil voltages at which the above relays were qualified be provided. The response states that the ECCS relays were qualified at the normal voltages. Seismic testing using only the normal voltages is not acceptable since the test does not demonstrate that the relay will perform its safety function during extreme voltage conditions. The relay may fail to pick up or it may drop out during a seismic event if the coil voltage is at the minimum level. The seismic qualification program should be modified to include testing at the voltage extremes or a justification on some other basis should be provided. The FSAR including responses to questions, specifically 031.244, should be revised to be consistent with this position.

031.273 The response to Question 031.236 is not acceptable. We requested a description of the Seismic Qualification Program for the condenser vacuum switches (component #B21-N056). The response states that these switches are qualified by their similarity to a previously qualified switch. We request (1) a complete comparison between the two switches and (2) a complete description of the Seismic Qualification Program used for the switch that is similar to the condenser vacuum switch. This information should clearly demonstrate that the condenser vacuum switches will survive a seismic event and continue to function. The response to 031.236 should be revised to be consistent with this response.

031.274 The response to Question 031.148 - (3) and (4) does not satisfy our concerns. We requested a schedule for completion of the testing for units which have not been qualified. Table 3.10-1 page 3-10-27 states that qualification information will be available after July 1978 for penetration assemblies. Also Table 3.10-1 page 3-10-30 states that qualification information will be available after September 1978 for main control boards. Table 3-10-1 should be revised to show the qualification results for this equipment. We also requested identification of the documents which describe the verification test method, procedures, and results of seismic qualification for each piece of Class IE equipment. This information has not been included in Table 3-10-1 nor elsewhere in the FSAR; therefore, the FSAR should be revised to provide this information.

031.275 The response to Question 031.52 is not acceptable. This response indicates some indicators and recorders are seismically qualified. We require that all equipment used for post-accident monitoring and safe shutdown be qualified to function within acceptable limits following a seismic event, this includes all indicators and recorders. The response to Question 031.52 and other parts of the FSAR should be revised to show conformance with this position.

031.276 Question 031.148(1) requested a revision of Tables 3.10-1 and 3.10-2 to include all Class IE equipment. Qualification for the ADS solenoid valves were not included in the responses. The ADS valves perform a safety function and are considered Class IE. These valves should be environmentally and seismically qualified.

The qualification information for these valves, as specified in Questions 031.83.148 and 031.156(2) through (7), should be provided and Tables 3.10-1 and 3.10-2 should be revised to include these items.

031.277 The response to Question 031.250 which refers to Question 031.5 is incomplete. The test plan, test set up and test procedures have not been provided for (1) the damper operator for OBC05YA, (2) the fan motor IVGOZC, or (3) the SGTS logic equipment and the main steamline isolation valve, solenoid valve. We request that you provide this information.

031.278 We request that you describe the qualification requirements for the equipment which protects RPS components from abnormal voltages and frequencies due to a failure of the RPS Motor Generator set, regulation system. The response should include a description of how these requirements have been satisfied.

031.279 We requested a description of the qualification program to demonstrate that various Class IE isolation devices are acceptable (see Questions 031.128, 031.137 and 031.146). The response to 031.137-2 and 3 states that the RMC system and the RBM system are not Class IE therefore the isolators between these systems do not have to be qualified. We conclude that the RBM system is a safety related system requiring all associated equipment to be qualified, see Question 031.282.

We request that the environmental qualification information specified in Questions 031.5 and 031.148-(2), (3) and (4) be provided for the equipment associated with the RBM system, including the isolation devices. The response to Question 031.137-2 and 3 should be revised to be consistent with this position.

031.280 Qualification of Isolation Amplifiers

We require safety circuits to be separated from nonsafety circuits in accordance with IEEE Std-279-1971, and General Design Criterion Number 5 and Number 24. Therefore:

(1) An acceptable way for separating safety circuits from non-safety circuits is by the use of qualified isolators. Information describing the qualification program for isolators which are used to separate Class IE circuits from non-Class IE circuits has been requested, but not provided. Specifically, in Questions 031.069, 031.128 and 031.146, qualification information for isolators used in the startup transient recorder system was requested, and this information has not been provided. A list identifying each Class IE input to the startup transient recorder system should be provided. Also a description of how these safety related inputs are protected from failures in non-safety related-startup transient system should be provided.

(2) Questions 031.93, 031.128, 031.137, 031.158 and 031.228 requested qualification information on isolators, used to separate Class IE circuits from non-Class IE circuits. Each interface between Class IE and non-Class IE circuits should be listed with location specified. The isolation device between the circuits listed above should be identified and the qualification program for each should be provided. The qualification program should include all information specified in Question 031.148-(2), (3) and (4).

(3) The responses to Questions 031.89(3) and 031.143(5) do not satisfy our concerns. The response to 031.143(5) states "the LSCS system design does not include separation between divisional-associated and non-divisional-associated circuits for the plant process computer".

This does not answer the question that we asked which was:

Clarify the response to Question 031.89 Part 3. Include the following topics in the clarification:

(a) Justification for the use of the plant computer for essential functions,

(b) Schematic diagrams for the plant process computer Divisions 1 and 2, essential back up circuits,

(c) Identification of the computer based essential circuits, and

(d) Justification for interconnecting Divisions 1 and 2 wiring with a flamable pathway in violation of the response to PSAR Question 7.3 Part f.

We request that this information be provided. Also we request a definition of the terms divisional-associated circuits and non-divisional-associated circuits. The definitions should clearly explai the differences between the two terms.

031.281 Branch Technical Position EICSB#23, listed in Appendix 7A of the Standard Review Plan (NUREG-75/087), states our requirements for instrumentation for post accident monitoring and safe shutdown. There are inconsistancies in the FSAR and your design does not satisfy all of our requirements. Therefore:

(1) FSAR Section 7.5.2.2(b) indicates that several recorders and indicators may not perform their required function following a seismic event. This is not acceptable since the requirements of IEEE-Std-279-1971 are not satisfied. The response to Question 031.84 states that "indicators and recorders utilized for post accident monitoring were seismically tested and shown to be operable after test". This is in conflict with FSAR section 7.5.2.2(b).

We require all indicators and recorders, used for post accident monitoring and safe shutdown should be qualified to operate within acceptable limits following a seismic event without operator action or maintenance. The FSAR, including all questions and responses, should be revised to remove all inconsistancies with this position.

(2) Branch Technical Position EICSB#23 requires that instrumentation for post accident monitoring and safe shutdown should be redundant, with indicators in the control room for both channels with at least one channel recorded. FSAR Section 7.5.1.2 does not satisfy this requireme ince there are no provisions to record the suppression pool temperature. FSAR Section 7.5.1.2 and LSCS design should be revised to show that all post accident monitoring and safe shutdown instrumentation has redundant channels with an indicator for each channel and a recorder for at least one of the redundant channels.

(3) Branch Technical Position EICSB#23 also requires that instrumentation for post accident monitoring and safe shutdown should be energized from the onsite emergency power supplies. FSAR Section 7.5.1.2(a) lists five systems which provide reactor shutdown information to the reactor operator. With exception of the control rod status lamps, these systems are all energized from non-Class IE sources. Thus, failure of the single Class IE source to the control rod status lamps in conjunction with loss of off-site power would result in loss of all shutdown status information to the operator. We require that the design be modified to provide Class IE power to one of the other systems providing shutdown status information.

031.282 Questions 031.14, 031.67, 031.117 and 031.150 requested information on the RBM system to demonstrate that this system satisfies the requirements for a safety related system. Chapter 15 of the FSAR takes credit for the function of this system to prevent unsafe operation of the nuclear plant, and FSAR Section 15.4.2 specifically states that the RBM is designed to be single failure proof. We require that the design of RBM be modified to satisfy the requirements of a safety related system, or when exceptions to these requirements are taken that these exceptions be identified and justified. We also require a complete description of how this system will perform its intended safety function when required.

031.283 The main steamline isolation valve leakage control system does not meet the single failure criterion. The failure of a single relay would permit the uncontrolled blowdown of a main steamline. This design deficiency is common to both the inboard and the outboard leakage control systems.

During the review of Hatch 2, changes were made by General Electric to ensure that the design would meet the single failure criterion. The LaSalle drawings do not incorporate these changes. We require that the design be modified to meet the single failure criterion. Revised drawings should be provided showing these changes.

031.284 Questions 031.044(2), 040.70, 031.149, 031.237 and 031.260 all request information for our review, so that we may determine that methods used for testing safety related systems are acceptable. The requested information has not been provided. We discourage the use of fuse pulling, jumpers, removal of wires and disconnection of connectors, in order to test safety related circuits. However, we will accept these procedures when we have determined, that from our reviews, that all safety related systems have been returned to their normal operational mode following the tests. Therefore, we require that the following information be provided for our review.

(1) Identify each circuit where fuse pulling, jumpers, wire lifting or disconnecting connectors are used when performing a test.

(2) Justify the reason for each case.

(3) Describe how restoration or each circuit is verified after testing is complete.

Table 031.260-(1) provides examples of this information, however, we require a list describing each case where a safety circuit is disabled. Revise the table to provide this information.

040.0 POWER SYSTEMS BRANCH

040.113 (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. In your response also consider the condition when Unit 1 is in operation and Unit 2 is under construction (abnormal generation of dust).

040.114 (9.5.6) RSP Operating experience has shown that accumulation of water in the starting 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. Figure 9.5-8 of the FSAR, "Diesel Generator Starting Air System P&ID," shows that the diesel engine for the high pressure core spray (HPCS) has no air dryer while the standby diesel generator has a refrigerated air dryer. 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 HPCS diesel engine air starting system accordingly, describe this feature of your design.

040.115 (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.

040.116 (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 the 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.

040.117
(9.5.7)
RSP

An emergency diesel generator unit in a nuclear power plant is normally in the ready standby mode unless there is a loss of offsite power, an 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 intregal 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 prelube oil pump.

040.118
(8.3)
RSP

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 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 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.

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 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.

040.119
(8.3)
RSP

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 accurately for prolonged periods under continuous vibrational stresses normally encountered with internal combustion engines. Operation of senstive 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.

040.120 (8.3) RSP 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 combusion 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 drive gear unit that can replace existing equipment. This is available as a replacement kit, or engines can be ordered with the heavy duty turbo-charger drive gear assembly.

To assure optimum availability of emergency diesel generators on demand, the emergency generators for the La Salle County Station, Units No. 1 and No. 2 driven by two cycle diesel engines manufactured by EMD should be provided with 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, or provide justification for not making this change.

130.0 STRUCTURAL ENGINEERING BRANCH

130.23 The response to Question 130.22 as stated in Amendment 46 to the FSAR does not provide adequate information to judge that the proper soil properties have been used in the elastic half space analysis. Modeling of the soil structure interaction system should be consistent for calculating dynamic responses as well as for calculating soil properties. Therefore we require the following additional information be provided in Table 130.22-1:

(1) Based on the soil property curves (shear modulus vs strain, damping values vs strain) used in the half-space analysis, provide the corresponding soil strain for each layer of soil.

(2) Based on the assumption and theory of elastic half-space modeling of soil, calculate the maximum soil strain during an SSE event for each layer of soil.

Compare the results of (1) and (2) above. If significant differences are indicated, modify the soil properties and reanalyze until the results of (1) and (2) agree reasonably well. However, to avoid reiteration soil properties corresponding to low strain level may be used.

Revise your comparison of floor response spectra computed by means of the two modeling methods (finite element shear beam vs half-space) if necessary.