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Docket Nos. 50-387
and 50-388

JAN 0 3 1979

Mr. Norman W. Curtis
Vice President - Engineering
and Construction
Pennsylvania Power and Light Company
2 North Ninth Street
Allentown, Pennsylvania 18101

Dear Mr. Curtis:

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION UNIT NOS. 1 AND 2 - REQUEST FOR ADDITIONAL INFORMATION

As a result of our review of your application for operating licenses for the Susquehanna Steam Electric Plant, we find that we need additional information in the area of Power Systems. The specific information required is listed in the Enclosure.

Please inform us of the date when this requested additional information will be available for our review.

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

Sincerely,

Original Signed By
O. D. Parr
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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OFFICE➤	LWR #3:LPM	LWR #3:BC				
SURNAME➤	SMiner/LLM	ODParr				
DATE➤	1/3/79	1/3/79				

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ENCLOSURE

REQUEST FOR ADDITIONAL INFORMATION

SUSQUEHANNA STEAM ELECTRIC STATION

DOCKET NOS. 50-387 AND 50-388

040.15 (8.2) Provide your bases and justification for performing the grid transient stability studies using the 1980 50% of summer peak loads. Also provide a brief description of your operating philosophy with respect to Susquehanna Units 1 and 2 during light grid loading conditions and your projections of generation verses load for as far into the future as you have available and use for planning purposes.

040.16 (8.2) Provide the approximate loading ($\pm$ 5 MVA) of the auxiliary and startup transformers at full unit power output assuming normal bus alignments as shown on Figure 8.3-1 of the FSAR. Identify the power sources for the forced cooling provided for these transformers.

040.17 (8.2) (8.3) Provide note 4 for FSAR Figure 8.3-1 and describe the role of the Unit 1 main transformer circuit breaker.

040.18 (8.2) Describe the interlocking circuit that prevents automatic transfer of the startup busses to the alternate start-up transformer when the unit auxiliary transformer is the source of power.

040.19 (8.2) (8.3) For an offsite power system event that directly or indirectly removes the 500-230 Kv switchyard bus tie, describe the provisions of the design of the onsite power system to prevent the tying together of the two offsite grids through the onsite power distribution system.

040.20 (8.2) It appears from your description in Section 8.3.1.3.10 that the emergency loads are sequenced with offsite preferred power available.

If this is true, provide your bases and justification. Provide a comparison on a bus by bus basis for all emergency busses of the voltage and motor starting transients associated with sequenced versus instantaneous loading for the condition of grid voltage at the low end of its normal range and maximum plant auxiliary load.

Provide a description of what would be required to remove this nonstandard design feature from your design and the associated safety implications, if any.

040.21 (8.3) FSAR Section 8.3.1.3.2 states that the 4 Kv power feeder cables and the larger 480 volt cables are aluminum conductor. Provide a discussion as to how you will deal with any dissimilar metals interface problems.

040.22 (8.3) Describe the provisions of your design that alerts the Unit 1 and 2 control room operators as to which unit is supplying DC control power to each of the shared diesel generators.

040.23 (8.3) With respect to the acceptability of the use of swing busses as part of the LPCI system of BWR-4 plants, the staff has documented its position in NUREG 0138 Issue #3.

The staff position is that for those plants that can meet all Appendix K to 10 CFR Part 50 requirements assuming the total loss of LPCI system, the swing bus is an acceptable concept and the design is scrutinized during the review. For those plants that need some portion of the LPCI system in order to meet Appendix K requirements, the staff has required a redesign of this portion of the system. Please provide a discussion of how Susquehanna meets this position or provide the bases and justification for any noncompliance.

040.24 (8.1) Provide a detailed description of all of the various circuit isolation schemes used in your design and referenced in Section 8.1.6.1.n.2.

040.25 (8.3) It appears that diesel generator sequencing capability is based upon the assumption of simultaneous sequencer initiation on both safety busses fed by each generator. The assumption further being that one unit has a LOCA and the other goes to a shutdown condition. It is not clear from the limited description provided in the FSAR that this is truly the design basis nor that this is a conservative assumption. Provide a detailed description of this aspect of your design. This description should also address the following contingencies:

(1) The two safety busses for a given diesel might not be fed frcm the same startup transformers. This greatly increases the probability of a single failure causing the diesel generator to initially energize only one safety bus. Subsequent loss of offsite power would cause the second safety bus to initiate sequencing out of time phase with the first sequencer.

(2) A spurious accident signal in the second unit.

040.26 (8.3) Provide a listing of all motor operated valves within your design that require power lock out in order to meet the single failure criterion and provide the details of your design that accomplish this requirement.

040.27 (8.3) Provide a description of the capability of the emergency power system battery chargers to properly function and remain stable upon the disconnection of the battery. Include in the description any forseen modes of opeation that would require battery disconnection such as when applying an equalizing charge.

040.28 (8.3) Provide the details of your design of the DC power system that assures equipment will be protected from damaging overvoltages from the battery chargers that may occur due to faulty regulation or operator error.

040.29 (8.3) 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.

040.30 (8.3) We request that you perform a review of the electrical control circuits for all safety related equipment, so as to assure that disabling of one component does not, through incorporation in other inter locking or sequencing controls, render other components inoperable. All modes of test, operation, and failure should be considered. Describe and state the results of your review.

040.31
(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:

(1) 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.

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

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

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

(a) the public address communications system, and

(b) any other additional communication system provided at that working station.

(5) 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 cortrol room or emergency shutdown panel is possible under all conditions.

(6) Identify and describe the power source(s) provided for each of the communications systems.

(7) Discuss the protective measures taken to assure a functionally operable onsite communication system. The discussion should include the considerations given to component failures, loss of power, and the severing of a communication line or trunk as a result of an accident or fire.

040.32
(9.5.2)
(RSP)

In Section 9.5.2.2 you describe the plant communications system provided. It is noted that use of radio (portable and fixed) communications has been excluded. As part of the plant defense-in-depth concept, in the event of an accident or fire in an area where fixed communications systems cannot be used, we require (as a minimum) that portable communications equipment be provided at strategic work stations in the plant for use by personnel under such conditions.

040.33 (9.5.3) Identify the vital areas and hazardous areas where emergency lighting is needed for safe shutdown of the reactor and the evacuation of personnel in the event of an accident (including fire). Tabulate the lighting systems provided in your design to accommodate those areas so identified.

040.34 (9.5.3) (RSP) In section 9.5.3.2.3 you state that emergency lighting in remote buildings and areas where emergency dc lighting service is not available you are providing battery powered self-contained units. Identify the remote buildings and areas where this type of lighting is used.

As part of the plant defense-in-depth concept in addition to normal and emergency lighting systems we require emergency self-contained (including charger) sealed beam battery powered units with individual 8 hour minimum capacity. These units should be installed in the control room, all locations required to safely shutdown the plant, in stairways, and along exit routes from each floor throughout the plant. Provide a detailed description of the self contained battery powered units, how they will be powered under normal plant conditions, and how they will be controlled under accident conditions in the absence of both the normal and emergency lighting systems.

040.35 (9.5.4) Section 9.5.4.1, Emergency Diesel Engine Fuel Oil Storage and Transfer System (EDEFSS), does not specifically reference ANSI Standard N195 "Fuel Oil Systems for Standby Diesel Generators". Indicate if you intend to comply with this standard in your design of the EDEFSS; otherwise provide justification for non-compliance. (SRP 9.5.4, Rev. 1, Part II, Item 12).

040.36 (9.5.4) In section 9.5.4.2 you state the diesel generator fuel oil storage tank has a 50,000 gallon capacity which is sufficient to operate the diesel generator for 7 days at full rated load, the fuel oil transfer pump has a suction strainer which is located 2 ft. above the bottom of the tank, and the transfer pump requires 1 ft. 6 inch NPSH. You also state the fuel oil storage tanks are designed to include the NPSH required by the pump. Clarify this statement.

Using the above stated data demonstrate by analysis that the volume of usable fuel oil (tank volume above pump NPSH level) in the fuel oil storage tank is sufficient to operate its diesel generator for a period of 7 days at full rated load.

040.37 (9.5.4) In section 9.5.4.2 you state the diesel generator fuel oil storage tanks are filled and replenished from trucks through the fill connection which branches to each of the four tanks. Provide a drawing (plan and elevation) showing the location of the truck fill and tank vent connection and location of the fuel oil storage tanks with respect to the diesel generator building. Also provide a description of how the tank fill and vent connections are protected against tornado missiles and the precautions taken in your design of the emergency diesel engine fuel oil storage and transfer system to minimize the entrance of deleterious material into the system during recharging, by operator error or natural phenomena. (SRP 9.5.4, Part III, item 1, 2 and 4).

040.38 (9.5.4) (RSP) Figure 9.5-19 shows the tank fill connection and branch fill lines to each fuel oil storage tank as non-seismic, Class D construction. Also figure 9.5-19 does not identify the piping classification of the tank vent line and other connections. It is our position that the fuel oil storage tank fill line from the tank interface up to and including the truck fill interface and all other tank connections should be seismic Category I, Class C construction. Revise your system design accordingly.

040.39 (9.5.4) In section 9.5.4.3 you state fuel oil for the diesel generators is delivered onsite for trucks and rail. Identify the sources where diesel quality fuel oil will be available and the distances required to be travelled from the sources to the plant. Also discuss how fuel oil will be delivered onsite under extremely unfavorable environmental conditions. (SRP 9.5.4, Part III, item 5b).

040.40 (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.

040.41 (9.5.4) 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 deliterious insoluble substances; procedure for testing newly delivered fuel, periodic sampling and testing of on-site 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 specific industry (or other) standards which will be followed to assure a reliable fuel oil supply to the emergency generators. (SRP 9.5.4, Part III, item 3 and 4).

040.42 (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 method to be provided for cleaning the affected storage tank. (SRP 9.5.4, Part III, Item 4).

040.43 (9.5.4) Discuss what precautions have been taken in the design of the fuel oil system in locating the fuel oil piping with regard to possible exposure to ignition sources such as open flame and hot surfaces. (SRP 9.5.4, Part III, Item 6).

040.44 (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 availablity of the diesel generators when needed. (SRP 9.5.4, Part III, Item 8 SRP 9.5.5, Part III, item 4, SRP 9.5.6, Part III, item 5; SRP 9.5.7, Part III, item 3; SRP 9.5.8, Part III, item 6c).

040.45 (9.5.5) In section 9.5.5.2 you state that the diesel generator cooling water system includes a standpipe that serves as a reservoir, deaerator and an expansion tank. Makeup water to the standpipe is from the non-seismically designed demineralized water system.

In addition to the items monitored, the standpipe is to provide for venting of air from the system, minor leaks at pump shaft seals, valve stems and other components and to maintain required NPSH on the system circulating pump. Provide the size of the standpipe, location and elevation relative to the diesel engine cooling system. Demonstrate by analysis that the standpipe size will be adequate to maintain required circulating pump NPSH and include a sufficient volume of water for system leaks for seven days continuous operation of the diesel engine at full rated load without makeup, or provide a seismic Category I, safety Class C makeup water supply to the standpipe.

040. 46 (9.5.5) Describe the provisions made in the design of the diesel generator cooling water system to assure all components and piping are filled with water. (SRP 9.5.5, Part III, item 2).

040. 47 (9.5.5) In section 8.3.4.1 you state the diesel generators are capable of continuous operation with no load. This statement should be expanded and clarified. In the event of a LOCA it may be necessary to operate diesel generator(s) for a period of 30 days or more. The diesel generators are automatically started and run unloaded during a LOCA condition when offsite power is available to the Class 1E buses. Should a LOCA occur with availability of offsite power,

provide a detailed discussion on how long the diesel generator(s) are capable of operating unloaded without degradation of engine performance or reliability. (SRP 9.5.5, Part III, Item 7).

040.48 (9.5.7) What protective measures have been incorporated in the design of the lubrication oil system to maintain the required quality of lubricating oil during diesel engine operation, and during standby conditions. (SRP 9.5.7, Part III, item 1).

040.49 (9.5.7) What system design precautions have been taken to prevent entry of deliterious materials into the diesel engine lubrication oil system due to operator error during recharging of lubrication oil or normal operation (SRP 9.5.7, Part III, item 1c).

040.50 (9.5.7) What protective measures have been taken to prevent unacceptable crankcase explosions and to mitigate the consequences of such an event. Identify and discuss the protective measures and describe how the protective measures will mitigate the consequences of a crankcase explosion.

040.51 (9.5.8) Describe the instrumentation, controls, sensors, and alarms provided in the design of the diesel engine combustion air intake and exhaust system to warn the operators when design parameters are exceeded. (SRP 9.5.8, Part III, item 1 and 4).

040.52 (9.5.8) Indicate which system components in the diesel generator air intake and exhaust system are exposed to inclement weather conditions (heavy rain, freezing rain, ice or snow). Discuss how these components are protected from possible clogging to assure availability of the emergency diesel generators when needed (SRP 9.5.8, Part III, item 5).

040.53 (10.1) Provide a general discussion of the design criteria and bases of the various steam and condensate instrumentation systems in section 10.1 of the FSAR. The FSAR should differentiate between normal operation instrumentation and required safety instrumentation.

040.54 (10.2) For the turbine speed control system, provide. with the aid of system schematics (including turbine control and extraction steam valves to the heaters), a detailed explanation of the turbine and generator electrical load following capability. Tabulate the individual overspeed protection devices (normal, emergency and backup), the design speed (or percent of rated speed) at which it performs its safeguards function and specify the valve or other component which is subsequently activated to complete the turbine trip. In order to evaluate the adequacy of the control and overspeed protection system include identifying numbers to valves and mechanisms (mechanical and electrical) on the schematics and provide a discussion to describe in detail with references to the identifying numbers, the sequence of events in a trip, including response times. Show that stable turbine operation will result after a trip. Provide the results of a failure mode and effects analysis for each of the overspeed protection systems. Show that a single valve failure cannot disable the turbine overspeed trip functions. (SRP 10.2, Part III, Items 1, 2, 3 and 4)

040.55 (10.2) In sections 10.2.1 and 10.2.2.2 you state that the generator is cooled by hydrogen at 75 psig pressure. Describe, with the aid of drawings, your design of the bulk hydrogen storage facility including controls, its location and distribution system. Include the protection measures and system design features considered to prevent fires and explosions during normal plant operations.

040.56 (10.4.1) Discuss the measures taken to prevent galvanic corrosion of condenser tubes and components (SRP 10.4.1, Part III, Item 1).

040.57 (10.4.1) Indicate what design provisions have been made to preclude failures of condenser tubes or components from turbine by-pass blowdown. (SRP 10.4.1, Part III, item 1).

040.58 (10.4.4) Provide the following additional information (with the aid of drawings) for the turbine by-pass valves and associated instruments and controls: 1) number, size, principle of operations, construction, set points; 2) the capacity of each valve; 3) the malfunctions and/or modes of failure considered in the design; 4) the maximum reactor power step change the system is designed to accommodate without reactor or turbine trip and 5) the maximum electric load step change the reactor is designed to accommodate without reactor control rod motion or steam bypassing. (SRP 10.4.4, Part III, Items 1 and 2).

040. 59 (10.4.4) Demonstrate that a high energy line failure of the turbine by-pass system (TBS) will not have an adverse effect or preclude operation of turbine speed controls or any safety related components or systems located close to the TBS. (SRP 10.4.4, Part III, Item 4).

040. 60 (10.4.4) Provide the results of a failure mode and effects analysis to determine the effect of malfunctions of the turbine by-pass system on the operation of the reactor and main turbine generator unit. (SRP 10.4.4, Part III, Item 4).

040. 61 (10.4.4) Discuss the affect of the maximum turbine by-pass flow on condenser back pressure and turbine exhaust temperature in reference to allowable values.

Dist:
Docket 50-~~387~~ 387 & 388
M. Rushbrook
S. Miner
LWR-3

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

JAN 3 1979

Docket No. 50-387 & 50-388

Mr. Norman W. Curtis
Vice President - Engineering
and Construction
Pennsylvania Power and Light Company
2 North Ninth Street
Allentown, Pennsylvania 18101

Subject: SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 & 2

The following documents concerning our review of the subject facility are transmitted for your information:

- [ ] Notice of Receipt of Application.
- [ ] Draft/Final Environmental Statement, dated ______________.
- [ ] Safety Evaluation, or Supplement No. ______, dated ______________.
- [ ] Notice of Hearing on Application for Construction Permit.
- [ ] Notice of Consideration of Issuance of Facility Operating License.
- [ ] Application and Safety Analysis Report, Vol. ______________.
- [ ] Amendment No. __________ to Application/SAR, dated ______________.
- [ ] Construction Permit No. CPPR-__________. dated ______________.
- [ ] Facility Operating License No. DPR-________, NPF-________, dated __________.
- [ ] Amendment No. ______ to CPPR-______ or DRR-______, dated ______________.
- [x] Other: Order Scheduling Special Prehearing Conference, dated 12/14/78.
- [ ] ______________________________

Office of Nuclear Reactor Regulation

Enclosures:
As stated

cc: See attached sheet

Ap 3
GD

OFFICE ▶	DPM/LWR-3	DPM/LWR-3				
SURNAME ▶	MRushbrook	ODParr				
DATE ▶						

NRC-21 (6-76)

cc with enclosure:

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2 North Ninth Street
Allentown, Pennsylvania 18101

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
PENNSYLVANIA POWER & LIGHT COMPANY	)	Docket Nos. 50-387
and	)	50-388
ALLEGHENY ELECTRIC COOPERATIVE, INC.	)	
	)	
(Susquehanna Steam Electric Station, Units 1 and 2)	)	

ORDER SCHEDULING SPECIAL PREHEARING CONFERENCE

The special prehearing conference provided for in the Atomic Safety and Licensing Board's Memorandum and Order of October 26, 1978, will commence at 2:30 p.m., local time, on Monday, January 29, 1979 (and will continue on January 30 and, if necessary, January 31) in Courtroom No. 2, Federal Building and United States Courthouse, 197 South Main Street, Wilkes-Barre, Pennsylvania 18701.

In accordance with the provisions of 10 CFR §2.751a, and to the extent consistent with the nature of an operating license proceeding (see 10 CFR §2 760a), the conference will be held to:

(1) Consider all intervention petitions to allow the Board to make such preliminary or final determinations as

to the parties to the proceeding, as may be appropriate;

(2) Permit identification of the key issues in the proceeding;

(3) Take any steps necessary for further identification of the issues; and

(4) Establish a schedule for further actions in the proceeding.

As further provided in the October 26, 1978 Memorandum and Order, those who have filed petitions for leave to intervene may amend or supplement their petitions by no later than Monday, January 15, 1979. The Applicants and NRC Staff are invited to respond to any such supplements. The responses must be in our hands by Friday, January 26, 1979.

As permitted by 10 CFR §2.715(a), and to the extent that time is available, the Board will hear oral limited appearance statements. It is our present intention to hear any such statements on Tuesday morning, January 30, 1979, beginning at 9 a.m.

IT IS SO ORDERED.

THE ATOMIC SAFETY AND
LICENSING BOARD
designated to rule on
petitions for leave
to intervene.

Charles Bechhoefer

Charles Bechhoefer, Chairman

Dated at Bethesda, Maryland,

this 14th day of December, 1978.