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Dalwyn R. Davidson
VICE PRESIDENT
SYSTEM ENGINEERING AND CONSTRUCTION

April 21, 1982

Mr. A. Schwencer
Chief, Licensing Branch No. 2
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Perry Nuclear Power Plant
Docket Nos. 50-440; 50-441
Response to Draft SER
Power Systems Branch

Dear Mr. Schwencer:

This letter and its attachment is submitted to provide revised responses to the concerns identified in the Draft SER for Power Systems.

It is our intention to incorporate these responses in a subsequent amendment to our Final Safety Analysis Report.

Very Truly Yours,

Dalwyn R. Davidson

Dalwyn R. Davidson
Vice President
System Engineering and Construction

DRD: mlb

cc: Jay Silberg
John Stefano
Max Gildner

B001
S1/1

430.30 (9.5.5) Describe the provisions made in the design of the diesel engine cooling water system to assure that all components and piping are filled with water. (SRP 9.5.5, Part III, Item 2)

Response

Each standby diesel generator system is vented to ensure that all spaces are filled with water. A jacket standpipe serves as a reservoir and is equipped with a low water level alarm. The setpoint for the low water level alarm is above the system high point. Whenever the standby diesel is operating, the jacket water cooling pumps will be functioning, supplying water to the diesel at sufficient head and flow to keep all piping and cavities in the flow path filled up to the cooling water outlet manifold header (discharging from the engine to the standpipe).

The HPCS diesel generator cooling water system has a built in provision to assure all components and piping are completely filled with water by having two system high point vents, one coming off the manifold, and the other coming off the water side of the lube oil cooler. These high point vents are attached directly to the cooling water expansion tank to maintain the closed system. In addition there is a low positive pressure in the system from the engine driven water circulating pump, which helps drive out any entrapped air in the system. The manufacturer has demonstrated through long and extensive use of these engines, in both stationary power plants, and in locomotives, the success of this type of system.

The high-point vents are of adequate size upon startup to remove air in the crossover manifold, above the expansion tank, to prevent the air from reaching the circulating pumps and causing binding.

430.40 (3) Partial

Describe the protective features provided to prevent unacceptable crankcase explosion and to mitigate the consequences of such an event.

Response

A crankcase pressure detector is provided for the HPCS diesel engine to detect change in the normally negative crankcase pressure to a positive pressure. If the crankcase pressure should become positive, the high crankcase pressure alarm annunciates. The oil relief valve is released and lube oil pressure to the oil pressure switch is relieved. Low lube oil pressure at the switch will initiate engine shutdown during the test mode of operation. During other modes of operation, the low lube oil pressure trip signal is bypassed as required by Regulatory Guide 1.9. A local high crankcase pressure alarm and a diesel generator trouble alarm in the control room is provided. The operator can then take appropriate action to correct the condition in accordance with manufacturers recommendations. This is consistent with the guidelines of Regulatory Guide 1.9 that, "...a trip may be bypassed under accident conditions, provided the operator has sufficient time to react appropriately to an abnormal diesel-generator unit condition".

430.46 (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 eggine 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 for the HPCS diesel generator to provide your justification for not installing an electric prelube oil pump.

Response

Manual pre-lubrication on a weekly basis and before each manual diesel engine start will be provided in accordance with the manufacturer's recommendations.

Following NRC approval, the manufacturer's recommended modifications (GM-EMD-MI-9644) are planned to improve the HPCS diesel engine lube oil circulating system and eliminate the need for manual pre-lube.

430.17 (3.2) (9.5.4) (9.5.5) (9.5.6) (9.5.7) (9.5.8) The FSAR text and Table 3.2-1 states that the components and piping systems for the diesel generator auxiliaries (fuel oil system, cooling water, lubrication, air starting, and intake and combustion system) that are mounted on the auxiliary skids are designed Seismic Category I and are ASME Section III Class 3 quality. The engine mounted components and piping are designed and manufactured to DEMA standards, and are Seismic Category I. This is not in accordance with Regulatory Guide 1.26 which requires the entire diesel generator auxiliary systems be designed to ASME Section III Class 3 or Quality Group C. Provide the industry standards that were used in the design, manufacture, and inspection of the engine mounted piping and components. Also show on the appropriate P&ID's where the Quality Group Classification changes from Quality Group C.

Response

Compliance with current regulations is reflected in revised Sections 9.5.4.3, 9.5.5.3, 9.5.6.3, 9.5.7.3, 9.5.8.1, and 9.5.9.3.

The industry standards applicable to the design, manufacture and inspection of the HPCS diesel generator are given in NEDO 10905.

The P&ID's indicate the safety classification changes from Safety Class 3 (Quality Group C) to non-safety class. Refer to Figures 9.5-8, 9.5-9, 9.5-10. 9.5-11, and 9.5-12.

The design of the standby diesel generator engine mounted auxiliary system piping components and the HPCS diesel generator auxiliary systems piping and components, both engine mounted and auxiliary skid-mounted can be demonstrated equivalent to systems designed to ASME Section III Class 3 requirements with regard to system functional operability and inservice reliability.

This piping and components as part of the diesel engine package are seismically qualified to Category I requirements which provides assurance of operability for a design basis seismic event. The diesel engines are manufactured, and tested, and inspected in accordance with the quality

assurance program requirements of ANSI 45.2 "Quality Assurance Program Requirements for Nuclear Facilities". Qualification and periodic testing in accordance with the guidelines of Regulatory Guides 1.9, "Selection, Design, and Qualification of Diesel-Generator Units used as Standby(Onsite) Electric Power Systems at Nuclear Power Plants", and 1.108, "Periodic Testing of Diesel Generator Units used as Onsite Electric Power Systems at Nuclear Power Plants" provides further assurance of inservice reliability.

Additionally, an analysis of system stresses will be performed to show that the piping and associated components are designed with sufficient margin for the system application and stresses are within the limits of ANSI Standard B31.1, "Code for Pressure Piping".