ATTACHMENT 3

Pennsylvania Power & Light Company
Two North Ninth Street • Allentown, PA 18101 • 215 / 770-5151

June 7, 1990

Director of Nuclear Reactor Regulation
Attention: Dr. W. R. Butler, Project Director
Project Directorate I-2
Division of Reactor Projects
U.S. Nuclear Regulatory Commission
Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
UNREVIEWED SAFETY QUESTION
PLA-3400 FILE A17-8, SO24

Docket Nos. 50-387
50-388

Dear Dr. Butler:

The purpose of this correspondence is to request NRC approval to install a modification at Susquehanna which was determined to constitute an unreviewed safety question when evaluated per 10CFR50.59. Additionally, PP&L is taking this opportunity to inform you of administrative controls that have been determined to be required as a result of this modification.

BACKGROUND

Two overpressurization events occurred on the 'B' and 'C' diesel generators during September and October of last year. The subsequent root cause investigation identified low combustion air temperature as a contributor to the diesel events.

The diesel generator combustion air is drawn through an air intake filter and into the compressor section of the turbo-charger. Once compressed, the combustion air passes through one of the two intercoolers and then into the combustion chambers. The intercoolers have heating sections, heated by engine jacket water, and cooling sections cooled by Emergency Service Water (ESW). The combustion air temperature in the intake manifolds has been measured as low as 35°F. The optimum range of combustion air temperature is between 95°F and 125°F.

It was determined that the low combustion air temperature was attributable to the inability to control ESW flow through the intercoolers. PP&L's present design is for full flow ESW through the intercoolers whenever the diesels are running.

To control the combustion air temperature, an automatic temperature control valve is being installed on the outlet of the intercoolers and upstream of an existing butterfly valve which will be used for ESW system flow balancing.

A functional description of the proposed modification is provided as Attachment 1 to this PLA.

UNREVIEWED SAFETY QUESTION

The 10CFR50.59 safety evaluation performed for this modification resulted in answering 'Yes' to the question 'Does the proposed action create a possibility for an accident or malfunction of a different type than any evaluated previously in the SAR?'

The valves being installed are safety related and fully qualified. However, two portions of the control equipment are not immediately available as 'Q'. The controller module and the dual indicator module will be purchased and installed as commercial grade.

Installation of these valves creates a new failure mechanism. The valves themselves could fail and the use of commercial grade components increases the probability that the components will fail.

EVALUATION OF SAFETY

We have evaluated the impact of the new valves failing as well as the failure of the associated commercial grade components and determined the modification will not impact plant safety. The modification was designed in light of potential failure modes and the need to preserve the design basis of the plant.

If the controller fails, the most serious effect is closure of the valve, which will reduce to nothing or to a minimum, the flow of ESW to the intercooler causing intake air temperature to rise. Test data from the engine manufacturer (Cooper-Bessemer) shows that full load can be maintained even with intake air temperatures of 165°F - 175°F. In the event intake air temperature continues to rise, the modification is designed with a high-high alarm at 160°F which terminates power to the valve

causing it to fail safe (full open position). Once this high-high alarm is activated, the valve remains open until a manual reset action is initiated.

The engines are currently configured to allow full ESW flow through the intercooler whenever ESW is running and have shown distress only after repeated starts.

If the controller fails and results in the valve failing in-position the same arguments apply. This failure mode is probably less severe and the time period over which the intake air temperature will rise is longer. If the valve fails at a conservative setting the temperature may not rise at all.

The controller module and dual indicator module for this modification are identical to those used in other non-Q applications at Susquehanna. The equipment is highly reliable and there is little risk being introduced. Also, 'Q' components are being procured in parallel and will be installed by year end.

In summary, the worst case scenario associated with this modification is failure of the controller and valves. The arguments above demonstrate that the safety function of the on site power system is not compromised, considering failure of one diesel is an analyzed condition.

We request NRC review this submittal and provide approval by July 13, 1990 which supports installation of the modification on Diesel Generator 'B'.

ADMINISTRATIVE CONTROL OF DAY TANK MINIMUM VOLUME

As part of the modification discussed above, PP&L plans to revise the design of the fuel oil system for diesel generators A, B, C, and D to provide added cooling to the combustion air. Flowing vents will be added to the fuel injection pumps and the existing fuel oil coolers will be bypassed. As a result of this change, excess fuel from the pumps will be rerouted to the underground storage tank instead of being returned to the day tank. This added drain on the day tank requires a greater minumum volume to be established in order to meet ANSI N195-1976 requirements. Currently, the minimum volume specified in the Technical Specifications is not sufficient to support what will be required as a result of the modification; accordingly, we are preparing a proposed change to the Technical Specifications. However, the revised value, since it is greater than the minimum requirement, will not violate the current Technical Specifications. Our 10CFR50.59 review has therefore determined that a Technical

Specification change prior to the modification is not required as long as we administratively control the day tank volume to the value which we determine to meet ANSI N195-1976. This position was reviewed with the NRC Project Manager and the Sr. Resident Inspector; if the NRC has any questions on this determination, please contact us.

For your information, PP&L has determined that due to the higher output of the E diesel (the E diesel already incorporates flowing vents), it should also have a higher required minimum volume. In order to ensure that ANSI N195-1976 is met for the E diesel, PP&L will implement administrative controls to ensure the larger minimum volume is met until a change to the Technical Specifications can be processed.

If you have any questions please contact Mr. D. J. Walters at (215) 770-6536.

Very truly yours,

(Signed) H. W. KEISER

H. W. Keiser

cc: Document Control Desk (original)
Mr. M. C. Thadani NRC Project Manager - White Flint
Mr. G. S. Barber NRC Sr. Resident Inspector - SSES

DJW\SAFQUES.DJW

bcc: W. E. Barberich A2-3
F. G. Butler A6-3
R. G. Byram A6-1
J. M. Kenny A2-4
A. M. Male A6-2
J. Miltenberger A6-1
D. F. Roth SSES
R. R. Sgarro A2-4
H. G. Stanley SSES
D. J. Walters A2-4
SRMS Corresp. File A6-2
Diesel Team

For simplicity, the following description describes changes on Diesel Generator A. Identical changes will be made on the other diesels, therefore any references to component numbers, etc. must be correlated to the appropriate diesel generator to understand the entire scope of the modifications.

INTAKE AIR TEMPERATURE CONTROL

The diesel generator combustion air temperature going into the combustion chamber will be controlled in the range of 95°F to 125°F by controlling the flow of ESW through the intercoolers. An automatic control valve is added in the common line downstream of the two bias valves. The control valve is a 3" globe valve who position is determined by a ITT Barton Hydramotor Actuator Type NH92. Temperature of the combustion air in the left and right intake manifolds is sensed by RTD's and processed within Bailey 7000 series instrument control equipment located in a new control panel OC 597A. The air temperature inputs from the left and right manifolds are compared, the high value selected, and a signal sent to the hydramotor actuator to adjust the valve. Control of the hydramotor actuator and positioning of the control valve is on the higher temperature of the two intake manifolds. The control circuit maintains approximately 110°F in the warmer manifold. In the event the temperature should exceed 160°F in either manifold, the control circuit interrupts power to the hydramotor actuator causing the valve to go full open so that there is maximum ESW flow through the intercooler. Once the High-High temperature override circuit is activated the valve remains open until a manual reset action is initiated at panel OC597A. This feature is to prevent the turbocharger from exceeding the maximum temperature of 1200°F in the turbine portion.

The type NH92 hydramotor actuator is designed to move the control valve to the fail open position when power or control signal is interrupted to the actuator. Power to the actuator is 120V AC Class 1E power from OC577A located on El. 710' in the Diesel Generator A Bay. Power to OC577A is from Class 1E MCC OB516 located on El. 677' in the Diesel Generator A bay. The operating mode is selected by and the power supply to the actuator is controlled by two switches on control panel OC597A. A contact of the 4X2 diesel generator start relay closes to energize the actuator motor and relief valve circuit when the OFF-AUTO selector switch is in AUTO. When the diesel generator is not running, the 4X2 contact opens to de-energize the actuator motor and relief valves circuit, allowing the actuator spring to move the control valve to the open position and results in full design flow through the intercooler. Full flow when ESW is available

and the diesel is not running permits the removal of any silt accumulation and a change of water, thereby avoiding the effects of any stagnant water corrosion. Placing the selector switch in the OFF position disconnects the power supply to the actuator circuit and opens the valve.

A NORMAL-BYPASS selector switch is also provided for operating the control valve when the diesel generator is not running. With the OFF-AUTO selector in the AUTO position and the NORMAL-BYPASS selector in the BYPASS position, a contact in parallel with the 4X2 contact is closed, energized the actuator circuit and allowing automatic or manual control of the ESW flow when the diesel is not operating. Placing the selector switch in the NORMAL position opens the parallel contact route of the power supply.

A Bailey 701 controller located in OC 597A on Elev. 677' of the Diesel Generator A bay allows automatic or manual control of the valve. The controller functions include a set point station, controller output indicator and a MANUAL-AUTO selector switch with OPEN-CLOSE pushbuttons. In the AUTO or MANUAL modes the controller provides a 4 to 20 mA DC signal to the valve actuator to control the valve position. However, as described previously, the valve will only respond to the control signal when the OFF-AUTO selector switch is in the AUTO position and the diesel generator is running or the NORMAL-BYPASS switch is in the BYPASS position. When the controller is in the AUTO position, the higher input signal from the two intake air temperature sensors is compared to a set point and the output signal to the valve is adjusted to maintain desired temperature. When the controller is in the MANUAL position, the OPEN and CLOSE pushbuttons are used to regulate valve position. A manual handwheel on the actuator with a chain is also provided to change valve position when the OFF-AUTO selector switch is in the OFF position. This handwheel/chain operator shall be locked in the valve open position when not being used to control valve position. Full or partial extension of the manual operator prevents the electro-hydraulic actuator from operating properly, limiting valve opening to that of the manual operator position.

A green indicating light and a reset pushbutton are provided on panel OC597A to indicate that High-High temperature override of the modulating control circuit has been activated and to allow manual reset to normal control when the temperature drops below 160°F. A seal in circuit prevents automatic return to modulating control when the over-temperature condition disappears. Pressing the pushbutton momentarily interrupts the normally closed contact, allowing power to be restored to the hydramotor actuator if the temperature is below 160°F.

Indication of combustion air temperature in the left and right intake manifolds is provided on OC 597A next to the valve controller. In addition, a mechanical bulb thermometer for the left manifold is provided at the valve location for the plant operator.

Annunciation is provided on the diesel engine panel OC521A for combustion air temperature greater than 125°F or less than 95°F in either intake manifold or a temperature difference between the manifolds greater than 15°F. These three conditions appear as a common alarm window on OC521A which is connected to the Diesel Generator low priority trouble alarm in the main control room. The 125°F, 95°F and differential alarm conditions require a diesel start followed by a time delay of approximately three minutes to become active alarms. The time delay permits the air temperature in the manifold to rise above the low alarm point of 95°F and prevents spurious alarms. Once activated, the alarms occur immediately when the conditions exceed the setpoint(s). The OFF position of the OFF-AUTO switch on OC597A for the hydramotor actuator is connected to the "Control Switches Not Proper for Remote Auto Operation" window on OC521A which presently inputs the Diesel Generator not in auto mode trouble alarm.