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REGION I

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Report No.	50-387/98-08, 50-388/98-08
Licensee:	Pennsylvania Power and Light Company 2 North Ninth Street Allentown, Pennsylvania 19101
Facility:	Susquehanna Steam Electric Station
Location:	P.O. Box 35 Berwick, PA 18603-0035
Dates:	June 1 through June 30, 1998
Inspectors:	K. Jenison, Senior Resident Inspector J. Richmond, Resident Inspector
Approved by:	Clifford Anderson, Chief Projects Branch 4 Division of Reactor Projects

EXECUTIVE SUMMARY

Susquehanna Steam Electric Station (SSES), Units 1 & 2
NRC Inspection Report 50-387/98-08, 50-388/98-08

This special inspection was conducted to review events, significance, reportability, and corrective actions for a nonconformance in the emergency diesel generator fuel oil system.

- In 1990, a PP&L safety evaluation for a facility modification concluded a Technical Specification (TS) revision was involved for a proposed change to the diesel day tank minimum volume. The safety evaluation failed to identify the proposed change as an unreviewed safety question. PP&L did not obtain NRC approval prior to implementing the change and did not submit a TS change until 1996. This is considered a violation of 10 CFR 50.59 requirements. However, this violation is not cited, based on the exercise of discretion in accordance with Section VII.B.6 of the Enforcement Policy.

- In 1990 and 1991, PP&L identified the fuel oil transfer pump automatic start level-switch setpoints in the emergency diesel generator day tanks did not meet the American National Standards Institute (ANSI) requirement to ensure a day tank minimum fuel oil volume sufficient for 60 minutes of operation at the level where fuel oil is automatically added to the day tank, at rated load, plus a 10% margin. PP&L documented this nonconforming condition in Nonconformance Report 90-0173 and engineering study SEA-ME-332, and implemented administrative controls, as compensatory measures, but failed to effect timely resolution. The failure to effect timely resolution of this nonconformance is considered a violation of 10 CFR 50 Appendix B, Criterion XVI, Corrective Action.

TABLE OF CONTENTS

ATTACHMENTS

Report Details

III. Engineering

E2 Engineering Support of Facilities and Equipment

E2.1 Emergency Diesel Generator Day Tank Minimum Volume

a. Inspection Scope (37551)

The inspectors reviewed the Technical Specification (TS) bases and the Final Safety Analysis Report (FSAR) design description associated with a revised operability determination for an emergency diesel generator (EDG) day tank check valve leak.

b. Observations and Findings

Identification of Issue

Condition Report (CR) 98-0491 identified a degraded condition of the "E" EDG day tank. The day tank level was slowly decreasing, requiring periodic fuel oil addition. The operability determination for CR 98-0491 was reviewed in NRC Inspection Report 50-387,388/98-01,section O4.1. During that review, the inspectors observed that the diesel day tanks were administratively controlled, by an SSES Technical Specification Interpretation (TSI), at a level significantly higher than specified by TS.

SSES Licensing & Design Basis

TS 3.8.1.b.1 requires a diesel day tank minimum volume of 325 gallons of fuel for each diesel engine (e.g., the "A" thru "E" EDGs). TS surveillance requirement 4.8.1.1.2.a.1 requires the day tank fuel level to be verified in accordance with the frequency specified in TS Table 4.8.1.1.2-1 in order to demonstrate diesel operability. The TS bases, in part, state the requirements for demonstrating operability are in accordance with Regulatory Guide (RG) 1.137, Fuel-Oil Systems for Standby Diesel Generators, revision 1, October, 1979. RG 1.137, in turn, endorses American National Standards Institute (ANSI) N195-1976, Fuel-Oil Systems for Standby Diesel-Generators. The ANSI standard specifies a day tank minimum volume "sufficient to maintain at least 60 minutes of operation at the level where oil is automatically added to the day tank" (i.e., fuel oil transfer pump automatic start level-switch setpoint), at rated diesel load, plus a 10% margin.

FSAR section 9.5.4.1, Diesel Generator Fuel Oil Storage and Transfer System Design Basis, states the diesel fuel oil system design complies with ANSI N195-1976. FSAR section 9.5.4.2, Diesel Generator Fuel Oil Storage and Transfer System - System Description, states "the day tank [for each diesel] contains sufficient oil for over one hour continuous diesel generator operation at its continuous rated load." Therefore, the FSAR design requirements and commitments are consistent with the TS basis.

Summary of Modification to EDG Fuel Oil Systems

In 1990, SSES performed modification 90-3009A-D to the diesel fuel oil systems to send excess fuel, bypassed from the mechanical fuel injection pumps, to the underground diesel fuel oil storage tanks, for the "A" through "D" diesels. This modification did not apply to the "E" diesel. Prior to the modification, the excess fuel was effectively returned to the day tank through a fuel oil cooler. This change removed the fuel oil coolers and re-routed the bypassed fuel to the fuel oil storage tanks. As a result, the amount of fuel oil supplied to the diesel from the day tanks, to provide for a 60 minute diesel run (plus 10% margin), increased from 325 gallons to 424 gallons, per calculation M-DOS-006. In June 1990, modification 90-3009A-D revised calculations M-DOS-006, EC-023-0512, EC-023-0513, EC-023-0514, and EC-023-0517 for the fuel oil transfer pump automatic start level-switch setpoints to ensure day tank minimum volume compliance with ANSI N195-1976. The level setting diagram J-653, sheet 48 was revised accordingly.

When the modification was completed for each EDG A-D fuel oil system, the fuel oil transfer pump automatic start level-switch setpoints were changed to assure 424 gallons remained in each diesel day tank at the point where the pump started.

Detailed Review of Modification and Identification of Nonconforming Condition

Safety evaluation 90-3009, revision 1, dated May 24, 1990, stated the proposed action involved a revision to TS 3.8.1.1, in that "this modification changes the amount of fuel required to support the [ANSI] N195 requirement." However, the safety evaluation failed to evaluate the change for the potential to reduce the margin of safety as defined in the TS bases.

Based on the diesel day tank minimum fuel oil volume of 325 gallons (i.e., as specified by TS 3.8.1.b.1), if the fuel oil transfer pump failed to start, then the diesel run time, after reaching the automatic start level-switch setpoint for the transfer pump, would only have provided approximately 45 minutes of diesel operation. This would be a reduction in diesel run time of about 30%, from the 60 minutes, plus 10% margin, specified by the ANSI standard. The TS basis states "The surveillance requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of...Regulatory Guide 1.137." The RG 1.137 endorses ANSI standard N195-1976 which, in turn, specifies a minimum volume as providing 60 minutes of diesel operation, plus a 10% margin. Therefore, the value for the day tank minimum volume is considered defined in the TS bases as the volume necessary to meet 60 minutes of diesel operation, plus a 10% margin. This modification to the fuel oil system increased the fuel oil consumption rate from the day tank. The inspector concluded that this change resulted in a reduction in a margin of safety as defined in the TS basis, because, after the modification, a volume of 325 gallons, as specified by the TS limiting conditions for operation (LCO) and verified by surveillance requirements, would no longer provide 60 minutes of diesel operation plus a 10% margin, as specified by the TS basis, but only provide approximately 45 minutes of diesel operation.

After the safety evaluation had been approved by the Plant Operations Review Committee (PORC), PP&L subsequently determined that prior NRC approval, for the change in day tank minimum volume, was not required because the revised value (i.e., 424 gallons) would be greater than the minimum value (i.e., 325 gallons) required by the current TS. PP&L further concluded that since the facility change would not result in "violating current TS," administrative controls would be adequate until a change to the TS could be processed. PP&L informed the NRC of this determination by PP&L letter PLA-3400, dated June 7, 1990. The licensee established Technical Specification Interpretation (TSI) 1(2)-90-004, revision 0, dated June 18, 1990, to ensure the diesel day tanks satisfied the intent of the TS basis. The TSI, in part, stated "this interpretation shall remain in effect until an appropriate change to the Technical Specifications is approved."

The PP&L modification group prepared a TS Change Request TSCR-213, dated June 27, 1990, but PORC rejected TSCR-213, and ordered field testing, by actual diesel load runs, to verify acceptability of the day tank level switch setpoints. The intention, as stated in the PORC Meeting Minutes, was not to cancel TSCR-213, but to delay TSCR-213 until after setpoint verification. However, TSCR-213 was never re-submitted to PORC.

In August 1990, after the modification was completed on the "A" and "C" EDGs, field testing determined that the ANSI requirements were not met, in that the day tank level switch setpoint only allowed 64 and 65 minutes, respectively, of diesel operation, instead of greater than 66 minutes, as required. PP&L initiated Non-conformance Report (NCR) 90-0173 to resolve the identified nonconforming condition for the "A" and "C" EDG day tank setpoints. NCR 90-0173 performed an operability assessment and documented the disposition action to be taken as "licensing department will evaluate the intent of the ANSI Standard N195-1976 and determine whether the current status of the [day] tanks is in adherence with this intent. If not in compliance with the intent of the ANSI Standard, an exception to the Standard will be pursued." Field testing results for the "D" EDG were satisfactory; no field testing results for the "B" EDG could be located.

In April 1991, engineering study SEA-ME-332 was performed in response to NRC concerns identified during an Emergency Diesel Safety Function Inspection (EDSFI), to account for certain non-conservative factors in SSES day tank minimum volume calculations. The study concluded the fuel oil transfer pump automatic start level-switch setpoints for the "A" thru "D" EDGs did not meet the ANSI requirements and would result in a diesel run time of 57 minutes, instead of greater than 60 minutes plus a 10% margin (i.e., 66 minutes). The study further concluded the "E" EDG would also not meet the requirements, unless a lower kW load (i.e., less than diesel "rated" load, as specified by ANSI N-195), equal to that used for the "A" thru "D" EDGs, were used to calculate the fuel oil consumption rate (note: the "E" EDG has a higher rating than the "A" thru "D" EDGs). The study identified that the nonconforming condition, previously identified by NCR 90-0173, applied to all five EDGs. PP&L initiated Engineering Discrepancy Report (EDR) G10082 to assess and resolve the identified condition.

Based on the results of SEA-ME-332, TSI 1(2)-90-004 was revised, in July 1992, to require a day tank minimum volume to 461 gallons for the "A" through "D" diesels, and 528 gallons for the "E" diesel, be maintained in order for the associated diesel to be operable. However, the post modification fuel oil transfer pump automatic start level-switch setpoints were not changed, the switch setpoint calculations were not revised, and the level setting diagrams were not revised. Although the TSI value for minimum volume had been revised, the actual day tank minimum volume, as established by the actual fuel oil transfer pump automatic start level-switch setpoint, remained unchanged at 424 gallons.

In November 1991, a second TS change, TSCR-236, was initiated to revise the TS day tank requirements to be consistent with the PP&L calculation performed following the EDSFI. However, TSCR-236 was never approved by PORC, for reasons unknown.

In March and April 1992, PP&L closed out the EDR and NCR based on additional administrative controls which had been incorporated into plant procedures to require the day tanks to be "topped off" each time a diesel is operated. The EDR and NCR disposition stated PP&L Nuclear Licensing had "evaluated the intent of the ANSI Standard" and determined that the action to top off the day tanks satisfied the criteria. This action allowed the nonconforming condition to remain in place, based on administrative controls (i.e., compensatory actions), without any further tracking mechanism or operability assessment. The system design requirements, as specified in the FSAR and the TS basis were not revised, and the design documentation, such as calculations and level setting diagrams, were not revised.

In 1996, PP&L submitted an Improved Technical Specification (ITS) amendment (6-years after the modification) which proposed changes to the TSs regarding diesel day tank minimum fuel oil volume, to revise the day tank minimum volume requirement (i.e., change the TS bases) from 60 minutes of diesel operation, plus a 10% margin, to "approximately 45 minutes of diesel operation."

Safety Significance of Nonconforming Condition

Since the modification to the diesel fuel oil system increased the rate of fuel consumption from the day tanks, the time between LOW DAY TANK LEVEL alarm annunciation (e.g., a tank level indicating the transfer pump failed to automatically start) and emptying the day tank decreased from approximately 66 minutes to 56 minutes (contrary to the FSAR and TS basis). This would reduce operator response time to recover day tank level, and prevent the loss of a running diesel generator, in the event a malfunction were to occur with the fuel oil transfer system from the storage tank. The change in recovery probability, for the loss of a diesel generator caused by about a 10 minute reduction in day tank recovery time associated with this issue, is considered a negligible increase in the SSES probabilistic risk assessment (PRA) for core damage.

Regulatory Requirements

10 CFR 50.59(a)(1), in part, states that a licensee may make changes to the facility without prior Commission approval unless the proposed change involves a change in the technical specifications or an unreviewed safety question (USQ). In 1990, Nuclear Department Instruction NDI-QA-9.1.1, Safety Evaluations, implemented the programmatic requirement at SSES. NDI-QA-9.1.1, in part, stated that PP&L must establish that a Technical Specification change is not required and that a USQ does not exist prior to implementing a plant change, or obtain NRC approval prior to implementation.

As of June 18, 1990, a change was made to the emergency diesel generator fuel oil system, which was evaluated by PP&L safety evaluation 90-3009, revision 1, dated May 24, 1990, as involving a change to TS 3.8.1.b.1. In addition, PP&L failed to evaluate the potential of the change to reduce the margin of safety, as defined in the basis for TS 3/4.8.1, and therefore did not identify this portion of the modification as an USQ. This modification represented an USQ because at the technical specification diesel day tank minimum fuel oil volume of 325 gal, the emergency diesel generator run time would have been approximately 45 minutes rather than the 60 minutes, plus 10% margin specified in the TS basis. PP&L did not obtain NRC approval prior to implementing the facility change and did not submit a license amendment to change the TS until 1996 (ITS submittal). The failure to obtain prior NRC approval for a change that involved a USQ and to submit a TS change request prior to the facility change is considered a violation of 10 CFR 50.59 requirements. This issue did not represent a significant USQ, because it involved an insignificant reduction of a margin of safety defined in a TS basis. In addition, PP&L, although incorrect in its determination that prior NRC approval was not required, did inform the NRC by letter of its determination to perform the modification prior to submitting a TS change. Therefore, this violation is not cited, based on the exercise of discretion in accordance with Section VII.B.6 of the Enforcement Policy (Violations Involving Special Circumstances). **(NCV 50-387, 388/98-08-01)**

10 CFR 50, Appendix B, Criterion XVI, Corrective Action, requires, in part, that licensees establish measures to assure that conditions adverse to quality, such as nonconformances are promptly identified and corrected. As identified by the inspectors in June 1998, between August 1990 and June 30, 1998, PP&L failed to correct a nonconformance in the emergency diesel generator fuel oil transfer system. Specifically, in August 1990, in Non-Conformance Report 90-0173 and in April 1991, in PP&L engineering study SEA-ME-332, PP&L identified the fuel oil transfer pump automatic start level-switch setpoints in the emergency diesel generator day tanks did not meet the ANSI N195-1976 requirement, as specified in FSAR section 9.5.4.1 and TS Basis 3/4.8.1, to ensure a day tank minimum fuel oil volume sufficient for 60 minutes of operation at the level where fuel oil is automatically added to the day tank, at rated load, plus a 10% margin. The fuel oil transfer pump automatic start level-switch setpoints that existed in April 1991 were not changed to meet ANSI N195-1976 requirements. This is example of a failure to

effect timely resolution of a nonconformance, and is considered a violation of 10 CFR 50 Appendix B, Criterion XVI, Corrective Action. (VIO 50-387,388/98-08-02)

c. Conclusions

In 1990, a PP&L safety evaluation for a facility modification concluded a Technical Specification (TS) revision was involved for a proposed change to the diesel day tank minimum volume. The safety evaluation failed to identify the proposed change as an unreviewed safety question. PP&L did not obtain NRC approval prior to implementing the change and did not submit a TS change until 1996. This is considered a violation of 10 CFR 50.59 requirements. However, this violation is not cited, based on the exercise of discretion in accordance with Section VII.B.6 of the Enforcement Policy.

In 1990 and 1991, PP&L identified the fuel oil transfer pump automatic start level-switch setpoints in the emergency diesel generator day tanks did not meet the American National Standards Institute (ANSI) requirement to ensure a day tank minimum fuel oil volume sufficient for 60 minutes of operation at the level where fuel oil is automatically added to the day tank, at rated load, plus a 10% margin. PP&L documented this nonconforming condition in Nonconformance Report 90-0173 and engineering study SEA-ME-332, and implemented administrative controls, as compensatory measures, but failed to affect timely resolution. The failure to effect timely resolution of this nonconformance is considered a violation of 10 CFR 50 Appendix B, Criterion XVI, Corrective Action.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results, on the emergency diesel generator day tank minimum volume issues, to members of licensee management at an exit meeting on July 2, 1998. The licensee acknowledged the findings presented.

The licensee expressed a differing opinion on the 50.59 issues and the identified nonconforming condition, and presented a position that the items identified by the inspectors did not warrant issuance of a violation of NRC requirements. The basis for the licensee's position was contained in an SSES report, "Evaluation of NRC Questions on Emergency Diesel Generator Fuel Oil Day Tanks" (see Attachment 2 of this report), and in PP&L Letter to NRC PLA-3400, dated June 7, 1990, "Susquehanna Steam Electric Station Unreviewed Safety Question" (see Attachment 3 of this report).

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT 1

INSPECTION PROCEDURES USED

IP 37551	Onsite Engineering Observations
IP 62707	Maintenance Observations
IP 71707	Plant Operations

ITEMS OPENED, CLOSED, and DISCUSSED

Opened

50-387,388/98-08-02	VIO	Emergency Diesel Generator Day Tank Minimum Volume (section E2.1)

Updated

None.

Closed

50-387, 388/98-08-01	NCV	Emergency Diesel Generator Day Tank 10 CFR 50.59 Review (section E2.1)

LIST OF ACRONYMS USED

ANSI	American National Standards Institute
ASO	Auxiliary Systems Operator
CCF	Common Cause Failure
CFR	Code of Federal Regulations
CR	Condition Report
DCP	Design Change Package
EDG	Emergency Diesel Generator
EEI	Escalated Enforcement Item
FSAR	Final Safety Analysis Report
GL	[NRC] Generic Letter
IN	[NRC] Information Notice
IR	[NRC] Inspection Report
IPE	Individual Plant Examination
ITS	Improved Technical Specification
LCO	Limiting Condition for Operation
LOCA	Loss of Coolant Accident
LOOP	Loss of Offsite Power
NDAP	Nuclear Department Administrative Procedure
NDI	Nuclear Department Instruction
NOV	Notice of Violation
NPO	Nuclear Plant Operator
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation

NSE	Nuclear System Engineering
OD	Operability Determination
PORC	Plant Operations Review Committee
PRA	Probabilistic Risk Assessment
RG	[NRC] Regulatory Guide
SER	Safety Evaluation Report
SRO	Senior Reactor Operator
SS	Shift Supervisor
SSES	Susquehanna Steam Electric Station
STA	Shift Technical Advisor
TS	Technical Specification
TSI	Technical Specification Interpretation
US	Unit Supervisor
USQ	Unreviewed Safety Question
VIO	Violation
WA	Work Authorization

ATTACHMENT 2

SUSQUEHANNA SES

EVALUATION OF NRC QUESTIONS ON
EMERGENCY DIESEL GENERATOR FUEL OIL DAY TANKS

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PP&L EVALUATION OF NRC QUESTIONS ON EMERGENCY DIESEL GENERATOR FUEL OIL DAY TANKS

Background

Recently, the NRC Resident Inspectors have raised several issues relative to the Emergency Diesel Generator (EDG) fuel oil day tanks:

1. A 50.59 Safety Evaluation associated with several EDG modifications stated that the proposed action involved a change to the Technical Specification associated with the day tanks, but the modifications were implemented prior to submittal and receipt of the Tech Spec change. The concern is that this action did not comply with 10CFR50.59, which requires NRC approval of a Tech Spec change prior to implementation of an associated proposed change to the facility.

2. PP&L is implementing operating procedures that require the day tanks to be topped off after each run in order to ensure that ANSI N195-1976 requirements are met, in accordance with the FSAR. At issue is whether or not the standard requires this additional volume after initiation of the fuel oil transfer pump subsequent to initial draindown of the day tank, when the additional volume afforded by topping off the tank would be unavailable.

3. In 1990, PP&L established the need for changing the Tech Specs to reflect a corrected minimum volume requirement for the day tanks, but did not submit a proposed amendment correcting the error until submittal of the Improved Tech Specs in 1996. We have been asked why it took so long for us to request this change.

EDG Fuel Oil Storage and Transfer System Overview

Design Basis (FSAR 9.5.4.1):

a) Provides onsite storage and delivery of fuel oil to the diesel generators for at least seven days of operation. This provides emergency power to meet the load requirements for the engineered safety features following loss of offsite power and a DBA.
b) Designed so that a single failure of any active component cannot affect the ability of the system to store and deliver fuel oil as required by design basis a) above.
c) Designed to remain operable after a Safe Shutdown Earthquake.

The FSAR also states that "The design complies with ANSI Standard N195-1976."

Operational Basis (Tech Spec Bases 3/4.8.1)

Relevant to this discussion is the statement that "The surveillance requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of ....Regulatory Guide 1.137 "Fuel-Oil Systems for Standby Diesel Generators", Revision 1, October 1979."

Description of Relevant System Components (FSAR 9.5.4.2):

- Fuel Oil Storage Tanks: Four 50,000 gal. storage tanks are provided for EDGs A, B, C, and D, and one 80,000 gal. storage tank is provided for EDG E. One storage tank is provided for each EDG, and each is sufficient for seven days full load continuous operation. Each tank is buried underground adjacent to the building associated with the respective EDG.

- Fuel Oil Transfer Pumps: One fuel oil transfer pump is provided for each storage tank, and its design assures that at least seven days of usable fuel from each storage tank can be provided to the associated day tank. For EDGs A, B, C, and D the pump is a submersible design. The E EDG has a horizontal, self-priming pump.

- Fuel Oil Day Tanks: EDG's A, B, C, and D have a 550 gal. day tank; EDG E has a 650 gal. day tank (these are tank volumes, not useable volumes). Connections for filling, overflow return, recirculation, level instrumentation, venting, and emptying are provided. A manhole is provided on the tank for inspection. The day tank contains fuel oil sufficient for over one hour continuous EDG operation at its continuous rated load.

Each transfer pump takes suction from its storage tank and pumps the oil directly to the day tank. Because the capacity of the transfer pump is greater than the fuel oil consumption of the engine, the pump can supply fuel oil to the diesel and simultaneously increase the inventory of the day tank. For EDGs A, B, C, and D, the fuel oil transfer pumps are started and stopped automatically by day tank level switches. For EDG E, the fuel oil transfer pump is started and stopped automatically by day tank level switches except when an emergency start signal is received. In the emergency mode, the pump runs continuously.

Evaluation Against Design Basis Criteria (FSAR 9.5.4.3)

a) The total capacity of the storage and day tanks is sufficient for seven days of 4000 kW continuous operation. This is sufficient for a DBA in one unit and a concurrent safe shutdown of the non-DBA unit. Within this period, additional fuel could be delivered to the site as necessary.
b) There is physical redundancy of active components in the EDG fuel oil system. An independent fuel oil supply train is provided for each EDG. Each transfer pump is powered from the bus to which the EDG it serves is connected. Failure of one pump or EDG will not impact the operability of any component in another train. Three EDGs are required during loss of offsite power and DBA conditions to meet the engineered safety feature load requirements. The transfer pump discharge headers have a manually operated common connection line to permit fuel oil from one storage tank to be pumped to any EDG if required. Rupture of any portion of the transfer piping would impact the fuel oil supply of only one EDG.
c) The EDG fuel oil system is designed in accordance with Seismic Category I requirements.

Investigation of Issues

In order to determine the facts related to these questions, a chronology was developed. A discussion of the pertinent events follows.

In September, 1989, the NRC issued a Notice of Deviation in Inspection Report 89-18 based on the FSAR statement that we had two hours of fuel in the day tanks, when in fact this did not reflect the useable amount. PP&L responded in October 1989 in PLA-3265, with a commitment to revise the FSAR by July 1990. This change, LDCN 1629, was made in FSAR Rev. 42 in May, 1990.

As an outfall of two EDG crankcase overpressurization events in September and October 1989, PP&L undertook numerous corrective actions; one was to control the intake air manifold temperature on each EDG in order to provide more consistent combustion. The safety evaluation for this modification (90-3009) also addressed another modification for EDG's A, B, C and D (the design of the E EDG already addressed the concern) that was directed at limiting the temperature of the fuel injection pumps at low load. The latter modification removed the fuel oil coolers, and rerouted the injection pump flowing vents on each EDG from the day tank to the underground storage tank. Since this action reduced the fuel oil volume available for consumption in the day tank, the modification also proposed raising the fuel oil transfer pump initiation setpoint in order to ensure compliance with ANSI N195-1976, which states the following:

"Each diesel shall be equipped with day or integral tank or tanks whose capacity is sufficient to maintain at least 60 minutes of operation at the level where oil is automatically added to the day or integral tank or tanks. This capacity shall be based on the fuel consumption at a load of 100% of the continuous rating of the diesel plus a minimum margin of 10%."

PP&L held a number of discussions regarding the intake air modification with the NRC in early 1990. On April 3, 1990, we transmitted a letter to NRC explaining that we were reviewing the modification as a potential unreviewed safety question due to the unavailability of "Q" control valves, and that it was our plan to use non-Q valves as an interim measure, given the safety importance of improving EDG reliability. A safety evaluation was developed for the modification; it concluded that the use of the non-Q valves was an unreviewed safety question. In response to the question "Does the proposed action involve a change in a Technical Specification ?", the answer was marked yes, based on the recognition that Tech Spec 3/4.8.1.1 required at least 325 gallons of fuel oil in each EDG day tank, and the modification would create the need for 424 gallons. The safety evaluation was reviewed by both PORC and SRC at the end of May, and approval was given by both committees to seek approval of the unreviewed safety question from the NRC. The minutes of these meetings did not specifically address the Tech Spec change question, nor was a Tech Spec change package provided for review at these meetings.

Separate from this modification on the A - D EDG's, an Engineering Discrepancy Report (EDR) G00030 was written against the E EDG day tank capacity in the Tech Specs on June 1, 1990. This EDR established that the E EDG required a different capacity due to its higher output.

A request for NRC approval prior to implementation of the unreviewed safety question was transmitted on June 7, 1990 (PLA-3400). A Tech Spec change was not proposed at this time. However, the June 7 letter included documentation of PP&L's determination that:

- the flowing vents modification on the A - D EDG's would result in an added drain on the day tank that would require a greater minimum volume in order to meet ANSI N195-1976 requirements,
- a Tech Spec change was being prepared, but was not required prior to implementation since Tech Specs would not be violated by the more conservative limit, and that this position had been reviewed with the NRC,
- the E EDG original design also required a higher Tech Spec limit, and
- administrative controls on all EDG day tank volumes would ensure compliance with the ANSI standard.

It specifically stated:

"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."

Subsequent to this communication, on June 18, 1990, PP&L documented a Technical Specification Interpretation (TSI 1-90-004) for the E EDG that established administrative controls pending completion of a change to the Technical Specifications. TSI controls for EDGs A, B, C and D were not provided because they were not needed: the flowing vent modification had not yet been performed.

On June 21, 1990, PP&L signed off an "Action Required" form documenting that procedures had been changed to require "topping off" the day tank following diesel generator runs. These changes were accomplished via PCAF's 1-90-0470, 0471, 0472, and 0473. The reason for this action was documented as follows:

"Following review of PP&L's response to Notice of Deviation, the NRC Resident Inspector has requested additional action (i.e., operators to "top off" diesel generator fuel oil day tanks following surveillance runs). Revise SO's and any other applicable procedures as necessary."

On June 28, 1990, a Technical Specification was proposed to PORC consistent with calculations (M-DOS-006, Rev. 1) that assumed implementation of the flowing vent mod for EDGs A, B, C and D, and accounting for the higher output of EDG E. The change was rejected by PORC (ref. PLI-64842) until field testing could be performed to validate the Tech Spec number.

On August 14, 1990, the A EDG was field tested and the day tank setpoint was changed. The run time of 63.52 minutes did not meet PP&L's interpretation of the ANSI requirement (one hour plus ten percent margin = 66 minutes). As a result, Non Conformance Report (NCR) 90-0173 was initiated. On August 23, the TSI was revised to reflect the results of the A EDG field test, and calculations for the other (B through E) EDGs. The C and D tanks remained at 325 gallons since the drain modification had not yet been performed. The TSI also noted that it would remain in effect until modification of all EDGs was completed.

On August 26, the C EDG was field tested. The run time of 65.16 minutes did not meet the ANSI requirement; on October 3, 1990, the NCR was revised to include the C EDG. On October 11, 1990 the D EDG was field tested. The run time of 67.32 minutes met the ANSI requirement. The day tank setpoints for the C and D EDG's were changed on August 28 and October 12, respectively.

The above field tests were performed subsequent to the flowing vents modification. Although the TSI was not revised right after the C and D mods/field tests, the existing action to top off the tanks proceduralized in June 1990 remained in effect, and it is believed that further changes to the TSI were awaiting disposition of the NCR on the A and C EDG field tests.

In April 1991, the NRC EDSFI questioned the adequacy of the day tank calculation. A calculation was performed (SEA-ME-332; later renamed as EC-024-0595) and confirmed that the ANSI requirement was not met based on the day tank setpoints. EDR G10082 was written, and subsequently closed based on existing EDR G00030, which was tracking implementation of a proposed Technical Specification change.

In March and April 1992, respectively, EDR G00030 and NCR 90-0173 were closed based on the existing proceduralized action to top off the day tanks. The EDR closure states:

"The action to top off the diesel day tank each time the diesel is operated at the conclusion of operation will satisfy the criteria of having enough fuel oil for at least on hour of operation (ANSI N195-1976 requirement) plus a 10% margin."

The NCR disposition contains similar wording.

Another TS change (TS-236) was initiated in November, 1991 to revise the day tank requirements consistent with the EDSFI calculations. This change was never approved beyond the originator. No documentation explaining why was located.

On July 30, 1992, following disposition of all open deficiencies, the TSI was revised to reflect the requirements of the calculation performed in response to the EDSFI, and also included reference to the procedural requirement to top off the day tanks after each. The reference in the previous TSI revision to a need to change the Tech Specs was dropped at this time.

In 1993, TS 236 was still active and being tracked as the resolution to a Design Basis Document (DBD) Open Item (No. 40 in DBD 13 on the EDGs) involving compliance with ANSI N195.

In October, 1993, PP&L began cost/benefit reviews of conversion to the Improved Technical Specifications, based on the September 1992 issuance of NUREG-1433. Sometime after work began on ITS, a decision was made that TS 236 would be handled through the ITS submittal (this was documented in the DBD Open Items database during a complete re-review of these open items that occurred in early 1996 in response to industry CLB issues). The Rev. 0 proposed ITS amendment occurred on August 1, 1996; this submittal contained the proposed revisions associated with the day tanks.

PP&L Position on Issues

Issue 1: A 50.59 Safety Evaluation associated with several EDG modifications stated that the proposed action involved a change to the Technical Specification associated with the day tanks, but the modifications were implemented prior to submittal and receipt of the Tech Spec change. The concern is that this action did not comply with 10CFR50.59, which requires NRC approval of a Tech Spec change prior to implementation of an associated proposed change to the facility.

PP&L Response: The Safety Evaluation in question, 90-3009, clearly indicated that the proposed fuel oil modification "involved" a change to the Technical Specifications. It did not document when or how this change would be sought. PP&L determined that the Technical Specification change was not required prior to implementation of the modification because the modification would not cause a Tech Spec violation. Administrative controls were developed and implemented, and a Tech Spec change was initiated. This position was reviewed with key NRC personnel, and documented in a letter to the NRC prior to implementation of the modifications. The letter specifically stated, "if the NRC has any questions on this determination, please contact us."

Although PP&L recognizes our accountability for the determination, we believe that the record clearly demonstrates that substantial communications were held openly with the NRC on this issue at the time it occurred, and that our position was not challenged at that time. Since the focus of 10CFR50.59 is to establish the need for NRC review prior to acting on a proposed change, PP&L believes that our actions met the intent of the regulations as they were viewed eight years ago.

In retrospect, although the record indicates PP&L's intent to pursue a Tech Spec change, the thinking that resulted in Rev. 2 of the TSI dropping statements referring to the need for a Tech Spec change may have been the result of a debate over whether or not the change was really required. The position may have been taken that the Tech Spec value should reflect only that volume which would be consumed by the engine over 66 minutes, since this is the regulatory basis of the requirement. Any additional volume that would bypass the engine and return to the fuel oil storage tank could be accounted for in plant procedures, such that the consumption-based Tech Spec value was ultimately verified to be available.

Despite this interpretation, we have determined that we would not implement the same modification today without requesting a Tech Spec change from the NRC. Although we continue to believe that Tech Spec changes that do not violate Tech Spec requirements can be implemented administratively in certain cases (e.g., an identified Tech Spec error), we would not today

implement a modification that would create such a situation. We further believe that this occurred in 1990 only because of the perception of urgency associated with EDG reliability after the crankcase overpressurization events; and that it therefore represents an isolated event.

It is also important to point out in response to this issue that no evidence was found that PP&L was trying to avoid making a required change. The letter which was submitted:

- was associated with highly visible concerns on EDG reliability that were under substantial NRC scrutiny,
- included a request for prior NRC review and approval of another modification that was determined to be an unreviewed safety question, and
- clearly defined our position and documented that it had been reviewed with key NRC personnel.

Based on the above, PP&L does not believe that NRC issuance of a violation of 50.59 requirements is warranted.

Issue 2: PP&L is implementing operating procedures that require the day tanks to be topped off after each run in order to ensure that ANSI N195-1976 requirements are met, in accordance with the FSAR. At issue is whether or not the standard requires this additional volume after initiation of the fuel oil transfer pump subsequent to initial draindown of the day tank, when the additional volume afforded by topping off the tank would be unavailable.

PP&L Response: The FSAR states that our design complies with ANSI N195-1976, which states:

"Each diesel shall be equipped with day or integral tank or tanks whose capacity is sufficient to maintain at least 60 minutes of operation at the level where oil is automatically added to the day or integral tank or tanks. This capacity shall be based on the fuel consumption at a load of 100% of the continuous rating of the diesel plus a minimum margin of 10%."

The standard can be viewed as a good design practice that ensures an hour's supply exists if the transfer pump is lost at any time over the seven day period. It can also be viewed as a requirement to ensure that an hour's supply exists without dependence on the transfer pump for the initial phase of a DBA, which is the way PP&L has considered it since it is monitored by the Tech Specs. From a safety perspective, either is acceptable, since SSES is analyzed for the loss of one EDG. However, since the issue concerns Tech Spec compliance, our position is that the administrative controls on day tank level to ensure the initial hour's supply meet the intent of the Standard as it applies to the Tech Spec surveillance. We believe that this interpretation was shared by the NRC Sr. Resident at the time, based on documentation indicating that in January 1990 he provided input to our decision to top off the tanks in order to ensure compliance with the standard.

We recognize that the "good design practice" interpretation of the standard is not met by our administrative controls, and we interpret this to be a qualification issue as defined by Generic Letter 91-18 Rev. 1. PP&L proposed a Tech Spec change with the Improved Tech Specs that

would obviate the need for interpretation by changing the one hour requirement to 45 minutes that has since been tabled based on the concerns being addressed herein. However, after discussion with the EDG vendor, we have determined that an option exists to withdraw this change, and to modify the bypass fuel path on EDG's A, B, C and D such that it returns to the day tank. In order to obviate further discussion on these issues, PP&L has decided to implement this modification during planned upcoming EDG outages.

Based on the above, PP&L believes that our interpretation of the ANSI Standard is correct as it applies to the Tech Spec requirements on EDG day tank level, and that the EDG's have not been operated outside of their design basis as defined by 10CFR50.2. We now recognize, however, that a non safety significant qualification issue has been identified regarding verbatim compliance with the ANSI standard and we are taking appropriate action to resolve it.

Issue 3: In 1990, PP&L established the need for changing the Tech Specs to reflect a corrected minimum volume requirement for the day tanks, but did not submit a proposed amendment correcting the error until submittal of the Improved Tech Specs in 1996. We have been asked why it took so long for us to request this change.

PP&L Response: PP&L has not been able to substantiate the precise reasons why TS-236 was not pursued more vigorously after being originated in late 1991. We believe that it was originally paced by resolution of the related open deficiencies, and Rev. 2 of the TSI, but these were completed by mid-1992. Subsequently, the DBD Program tracked TS-236 as an open item until a decision was made that the ITS Project would resolve the issue. As stated in the response to Issue 1 above, it is plausible that an interpretation occurred that the additional volume required by the modification should be controlled by procedures rather than the Tech Specs, since it was not actually consumed by the EDG. This would provide the missing rationale as to why Rev. 2 of the TSI discontinued tracking the need for a Tech Spec change.

Regardless, we do not believe that our actions on this item were timely. We do believe that the current CR program would ensure that a similar change today would be dispositioned on an acceptable schedule.

PP&L Position on Safety Significance

PP&L does not believe the issues that have been raised are safety significant for the following reasons:

1. The safety design basis of the fuel oil system is to provide for seven days of operation under LOOP and DBA conditions including single failures of active components, and also to remain operable after a safe shutdown earthquake. The capability of the system to do this was never in question.

2. The one hour day tank requirement imposed by the standard through reference in the FSAR assures that one hour of EDG operation is available if the transfer pump fails. This provides defense in depth, but is bounded by the design assumption that one EDG will fail.

3. At the time the issue came up in 1990, diesel reliability was a very visible safety issue for both PP&L and the NRC due to EDG events that had occurred at SSES. The modification in question was viewed at the time as one of a number of safety enhancements to the diesels.

4. The modification in question was reviewed by two internal safety committees, and independently with the NRC both verbally and on the docket; clearly, no concerns were raised at the time.

5. Upon installation of the modification, PP&L assured compliance with the one hour requirement by imposing administrative controls on day tank level based on calculations that accounted for the impact of the modification. These controls took the form of Tech Spec Interpretations (and Operating procedures) that were controlled by Operations.

6. PP&L subsequently performed non-required field testing and revised the administrative controls to account for the test results.

7. The ANSI Standard requires ten percent margin under the assumption that the day tank volume required to support one hour of operation is based solely on calculations. Since PP&L performed field testing, this ten percent represents additional safety margin that has been assumed, but should not be required.

References

1. NRC Inspection Reports 50-387/89-18 and 50-388/89-16, dated 9/1/89.
2. PLA-3265 (Letter in response to Notice of Deviation), dated 10/2/89.
3. DCP Safety Evaluation No. 90-3009 Rev. 1, dated 5/25/90.
4. PORC Meeting 90-060 Minutes (PLIS 35613) dated 7/3/90.
5. SRC Meeting 90-3 Minutes dated May 90.
6. EDR G00030 (E EDG day tank does not meet ANSI), originated 6/1/90.
7. PLA-3400 (Letter requesting review of USQ and documenting admin control of day tank level), dated 6/7/90.
8. TSI 1/2-90-004, dated 6/18/90.
9. PCAF's 1-90-0470, 0471, 0472, and 0473.
10. Tech Spec change TS-213, dated 6/27/90.
11. PLI-64842, originated 8/9/90.
12. Test Control Documentation Sheet for TP-024-092 dated 8/14/90.
13. NCR 90-0173 (A EDG day tank doesn't meet ANSI) dated 8/14/90.
14. TSI 1/2-90-004 Rev. 1, dated 8/23/90.
15. PORC Meeting 90-078 Minutes (PLIS-35887) dated 8/29/90.
16. EDR G10082 (EDSFI), originated 4/12/91.
17. SEA-M-332, dated 4/2/91. (Renamed EC-024-0595).
18. Tech Spec change TS-236, originated 11/13/91.
19. TSI 1/2-90-004 Rev. 2, dated 7/30/92.
20. EC-023-0507, dated 5/31/96.
21. PLA-4488, (Letter submitting proposed ITS amendment), dated 8/1/96.
22. TSI 1/2-90-004 Rev. 4, dated 1/29/98.
23. CR 98-1663, 5/12/98.
24. FSAR Rev. 52, Section 9.5.4.
25. ANSI N195-1976, "Fuel Oil Systems for Standby Diesel-Generators".