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 RECIP. NAME    RECIPIENT AFFILIATION

SUBJECT: LER 90-014-00: on 900712, discrepancy between FSAR required & actual diesel fuel inventory identified.

W/9    ltr.

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August 13, 1990


U.S. Nuclear Regulatory Commission  
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SUSQUEHANNA STEAM ELECTRIC STATION  
LICENSEE EVENT REPORT 90-014-00  
FILE R41-2  
PLAS -438

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Docket No. 50-387  
License No. NPF-14

Attached is Licensee Event Report 90-014-00 which describes a condition determined reportable per 10CFR50.73(a)(2)(ii)(B) and 10CFR50.73(a)(2)(i)(B). Engineering review identified a discrepancy between the FSAR-required capability of the emergency diesel generator fuel oil storage tanks and the actual capability. An error in the original design capability calculation also renders past compliance to the Technical Specification required minimum volume in the tanks as indeterminate.

  
H.G. Stanley  
Superintendent of Plant - Susquehanna

RRW/mjm

cc: Mr. T. T. Martin  
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LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) <b>Susquehanna Steam Electric Station - Unit 1</b>	DOCKET NUMBER (2) <b>0 5 0 0 0 3 8 7</b>	PAGE (3) <b>1 OF 0 4</b>
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TITLE (4)  
**Discrepancy Between FSAR - Required and Actual Diesel Fuel Inventory**

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)		
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)	
0 7	1 2	9 0	9 0	0 1 4		0 0	0 8	1 3	9 0	SSES - Unit 2	0 5 0 0 0 3 8 8
											0 5 0 0 0

OPERATING MODE (9) **1**

POWER LEVEL (10) **1 0 0**

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
20.405(a)(1)(iv)	X 50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME: **Richard R. Wehry - Compliance Engineer**

TELEPHONE NUMBER: **7 1 7 5 4 2 - 3 6 6 4**

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)  NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On July 12, 1990, both Unit 1 and Unit 2 were in the Run mode at 100% of rated power. It was determined that a discrepancy existed between the actual Emergency Diesel Generator (EDG) fuel oil storage tank capability and the FSAR-required capability. Specifically, paragraph 9.5.4.2 of the FSAR dictates that each of the storage tanks contain a 7 day supply of fuel oil sufficient to support the diesel load profile delineated per FSAR Table 8.3. A recent engineering calculation illustrated that the 'A', 'C' and 'D' storage tanks did not presently contain sufficient capacity to meet the requirements stated in FSAR paragraph 9.5.4.2. This discrepancy represents a condition which could place the plant in a condition outside of its analyzed design basis. Additionally, a non-conservative error in the original tank design capability calculation also renders past compliance to the Technical Specification required minimum volume of fuel oil in the tanks as indeterminate. The cause of this condition was inadequate analysis in that the FSAR requirements for on-site EDG fuel inventory were not correctly analyzed in the integration of the FSAR requirements into the Technical Specifications and an inadequate verification of the original fuel oil storage tank design calculations for tank total volume. Further engineering analysis determined that, considering the conservative assumptions of the FSAR requirement coupled with actual diesel fuel consumption from test data, sufficient fuel exists in the tanks to ensure the 7 day operation requirement of ANSI N195-1976 if the load on the diesel is returned to a value conservatively less than the continuous machine rating within 24 hours of a DBA. Additional EDG fuel consumption testing is being performed. FSAR Table 8.3 will be revised to correct the excessively conservative requirements. A setpoint change for storage tank minimum levels was implemented to ensure Technical Specification compliance.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)  Unit 1 Susquehanna Steam Electric Station	DOCKET NUMBER (2)  0   5   0   0   0   3   8   7   9   0	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
TEXT (If more space is required, use additional NRC Form 368A's) (17)			- 0   1   4	- 0   0	0   2	OF 0   4

DESCRIPTION OF EVENT/CONDITION

On July 12, 1990, both Unit 1 and Unit 2 were in the Run mode operating at 100% of rated power. It was determined that a discrepancy existed between the actual Emergency Diesel Generator (EIIS Code: EK) fuel oil storage tank (EIIS Code: DE) capability and the FSAR-required capability. Specifically, paragraph 9.5.4.2 of the FSAR dictates that each of the storage tanks contain a 7 day supply of fuel oil sufficient to support the diesel load profile delineated per FSAR Table 8.3. A recent engineering calculation illustrated that the 'A', 'C' and 'D' storage tanks did not presently contain sufficient capacity to meet the requirements stated in paragraph 9.5.4.2 of the FSAR. This discrepancy represents a condition which results in the plant being in a condition outside of its analyzed design basis. Additionally, a nonconservative error in the original tank design capability calculation also renders past compliance to the Technical Specification required minimum volume of fuel oil in the tanks as indeterminate.

CAUSE OF EVENT/CONDITION

This condition was caused by inadequate analysis in that the FSAR requirements for onsite EDG fuel inventory were not correctly analyzed in the integration of the FSAR requirements into the Technical Specifications and an inadequate verification of the original fuel oil storage tank design calculations for tank total volume (original calculation incorrectly utilized tank outside diameter rather than inside diameter measurements in calculating tank volume).

REPORTABILITY/ANALYSIS

This condition was determined reportable per 10CFR50.73(a) (2) (ii) (B) and 10CFR50.73(a) (2) (i) (B). Engineering review identified a discrepancy between the FSAR-required capability of the 'A', 'C' and 'D' tanks of emergency diesel generator fuel oil storage tanks and the actual capability which could place the plant in a condition that is outside of its analyzed design basis. Also, an error in the original design capability calculation (use of outer tank diameter vice inner tank diameter measurements for calculating tank volume) renders past compliance to the Technical Specification required minimum volume (per T.S. 3.8.1.1) in the A-D tanks as indeterminate. The condition reported by this LER is applicable to both Unit 1 and Unit 2.

Susquehanna has a total of five EDG's. All five EDG's are common to Units 1 and 2. Four EDG's ('A' - 'D') are normally aligned and are capable of supplying power to either Unit 1 or Unit 2. The fifth EDG ('E') is a spare EDG and can be substituted in place of 'A', 'B', 'C' or 'D' EDG's.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)  Unit 1 Susquehanna Steam Electric Station	DOCKET NUMBER (2)  0 5 0 0 0 3 8 7	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		9 0	- 0 1 4	- 0 0	0 3	OF 0 4

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FSAR Section 9.5.4.2 states that the Fuel Storage Tank for each EDG has sufficient capacity for 7 days of continuous operation at the loading specified in FSAR Table 8.3. Additionally, Technical Specification 3.8.1.1 requires minimum Storage Tank volumes of 47,570 gallons for 'A' - 'D' and 60,480 gallons for the 'E' storage tanks. The basis for these values is 7 days continuous operation at full load.

The original Bechtel calculation determined the required fuel storage tank capacity for the 'A' - 'D' EDG's to be 45,864 gallons based on an EDG loading of 4000 KW and fuel consumption of 273 gallons per hour. However, FSAR Table 8.3 indicates that the 'A', 'C' and 'D' EDG's will be loaded to values greater than 4000 KW during the 7-day continuous operation period. Fuel consumption calculations were performed at the loading of FSAR Table 8.3 and results showed that there is insufficient fuel for the 'A', 'C' and 'D' EDG's to meet the 7-day requirement as specified by FSAR Section 9.5.4.2 and the basis for Technical Specification 3.8.1.1 (Regulatory Guides 1.1.3.7 and 1.9 and ANSI N195-1976).

Additionally, the storage tank volumes identified on Bechtel original calculations incorrectly used the tank outer diameter rather than the inner diameter measurements in calculating tank total volume. As a result, the actual tank total volume is less than that originally calculated. This renders past compliance to the Technical Specification required minimum volume in the 'A' - 'D' tanks as indeterminate since the level indication reading required to assure compliance to Technical Specification is actually higher than that which was used in the past, due to the calculation error.

The worst case diesel loading condition is a LOCA/LOOP event where one unit experiences a large break DBA LOCA and the other unit has a forced shutdown. In this condition at 60 minutes and beyond 4 core spray pumps and 2 RHR pumps are loaded on the diesel for the LOCA unit and two RHR pumps are loaded onto the diesels for the non-LOCA unit.

For the LOCA unit the minimum required equipment to respond adequately to the worst case large break LOCA is 2 RHR pumps and 2 core spray pumps. For the non-LOCA unit only 1 RHR pump is required to maintain long term cooling. Additionally, all 4 ESW pumps and all 4 RHRSW pumps are loaded on the diesel. For the above condition only 2 ESW PUMPS AND 2 RHRSW pumps are required.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		9   0	-   0   1   4	-   0   0	0   4	OF	0   4

TEXT (If more space is required, use additional NRC Form 366A's) (17)

Based on this the load could be returned following an accident to a value conservatively less than the 4000 KW assumed for the original sizing of the fuel oil storage tanks within 24 hours of the accident. Given this capability coupled with the actual diesel fuel consumption from the pre-op test data, sufficient fuel exists in the fuel storage tanks for each diesel to ensure the conservative seven day operation at continuous rating required by ANSI N195-1976.

In accordance with the guidance provided in NUREG 1022 Supplement 1, Items 14.1 and 14.10, the required submission date for this report was determined to be August 13, 1990.

CORRECTIVE ACTIONS

Engineering performed a calculation using tank inside diameter measurements and provided the correct indicating instrument setpoints necessary to ensure compliance to Technical Specification 3.8.1.1. The setpoint changes were implemented and Operations personnel incorporated these new required values into all affected operating procedures. FSAR Table 8.3 will be revised by 10/31/90 to correct the excessively conservative requirements and appropriate operating procedures will be revised as necessary to provide guidance to operators on diesel load reduction after 24 hours following a DBA. Additional testing is being performed to determine current EDG fuel oil consumption rates. The results of this testing will be evaluated pursuant to any impact on storage tank capabilities and ANSI N195-1976 compliance and additional actions will be taken as warranted.

An error in FSAR Section 9.5, which states the required fuel for a 7-day run on the 'E' EDG is 63,400 gallons, will also be revised to 60,480 gallons to agree with the value in the Technical Specifications, which has been determined to be the presently correct value necessary to meet ANSI N195-1976 requirements.

ADDITIONAL INFORMATION

Failed Components Identification: Not Applicable.

Previously Reported Similar Events: None

Fuel Oil Storage Tank Level indication instrumentation problems have also been identified via the Significant Operating Occurrence Report (SOOR) program at SSES, relative to instrument accuracy and type of instrument and indicators used. To resolve concerns in this area new, more dependable level instrumentation is being installed in all diesel fuel oil storage tanks by the end of the 3rd quarter, 1990.



1-1-1