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NOV 10 2003

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station OP1-17
Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 50-387/2003-005-00
LICENSE NO. NPF-14
PLA-5691

Docket No. 50-387

Attached is Licensee Event Report 50-387/2003-005-00. This event was determined to be reportable per 10 CFR 50.73(a)(2)(i)(B) and 10 CFR 50.73(a)(2)(v)(D) because the Diesel Generator fuel control linkage was found separated from the governor terminal shaft lever thus rendering the diesel generator inoperable. The diesel generator was subsequently restored to operable status. There were no consequences to the health and safety of the public as a result of this event. This Licensee Event Report contains no new commitments.

Richard L. Anderson
Vice President - Nuclear Operations

Attachment

IE22

cc: Mr. H. J. Miller
Regional Administrator
U.S. Nuclear Regulatory Commission
475 Allendale Road
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Mr. S. L. Hansell
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LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-G E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME Susquehanna Steam Electric Station - Unit 1				2. DOCKET NUMBER 05000387				3. PAGE 1 OF 4			
4. TITLE "D" Diesel Generator Fuel Rack Linkage Became Disconnected											
5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED		
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER	
07	05	2000	2003	005	00				Susq. SES - Unit 2	05000388	
									FACILITY NAME	DOCKET NUMBER	
9. OPERATING MODE			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)								
1			20.2201(b)			20.2203(a)(3)(ii)			50.73(a)(2)(ii)(B)		
10. POWER LEVEL			20.2201(d)			20.2203(a)(4)			50.73(a)(2)(iii)		
100			20.2203(a)(1)			50.36(c)(1)(i)(A)			50.73(a)(2)(iv)(A)		
			20.2203(a)(2)(i)			50.36(c)(1)(ii)(A)			50.73(a)(2)(v)(A)		
			20.2203(a)(2)(ii)			50.36(c)(2)			50.73(a)(2)(v)(B)		
			20.2203(a)(2)(iii)			50.46(a)(3)(ii)			50.73(a)(2)(v)(C)		
			20.2203(a)(2)(iv)			50.73(a)(2)(i)(A)			50.73(a)(2)(v)(D)		
			20.2203(a)(2)(v)			50.73(a)(2)(i)(B)			50.73(a)(2)(vii)		
			20.2203(a)(2)(vi)			50.73(a)(2)(i)(C)			50.73(a)(2)(viii)(A)		
			20.2203(a)(3)(i)			50.73(a)(2)(ii)(A)			50.73(a)(2)(viii)(B)		
12. LICENSEE CONTACT FOR THIS LER											
NAME John L. Tripoli - Nuclear Regulatory Affairs						TELEPHONE NUMBER (Include Area Code) 570 / 542-3021					
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT											
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX		
A	EK	DG	C628	Y							
14. SUPPLEMENTAL REPORT EXPECTED						15. EXPECTED SUBMISSION DATE			MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).						X	NO				
16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)											
During the performance of a monthly surveillance on March 19, 2003, the D Diesel Generator (DG) load suddenly decreased from 3000 kW to 2000 kW. Investigation revealed that the fuel control linkage had separated from the governor terminal shaft lever causing the change in generator output. A ½ inch bolt that is designed to attach the fuel control linkage to the governor terminal shaft lever was found to have backed out. The bolt was reinstalled and tightened and the D DG successfully passed the monthly surveillance. A Root Cause Analysis Team is nearing the completion of its review of this event. A review of maintenance records indicated that the only time this bolted connection is disturbed is when the EGB50 electro/mechanical governor is replaced. This governor was last replaced on the D DG on July 5, 2000. It is believed that a human performance error occurred when the ½ inch bolt was installed in a hand tight condition only. Since the bolt was not adequately tightened, it was subject to further loosening each time the D DG was run. During diesel generator runs, the linkage is exposed to movement as the fuel racks reposition and to the movement associated with normal diesel generator running vibration. These combined effects gradually allowed the ½ inch bolt to back out until the linkage became disconnected during the monthly surveillance run conducted on March 19, 2003. Immediate corrective actions included restoration of the D DG fuel control linkage to the governor terminal shaft lever, and verifying that this linkage was tight on all five Susquehanna Emergency Diesel Generators. Actions to prevent recurrence include human performance reviews, enhancing the work instructions that control the relevant activities to provide specific direction to apply Loctite and torque the ½ inch bolt, adding a confirmation requirement to this work step, and determining the torque requirements for any critical component fasteners that do not already have an established torque requirement on all five diesel generators.											

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17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

EVENT DESCRIPTION

During the performance of a monthly surveillance on March 19, 2003, the D Diesel Generator (EIS Code: EK) load suddenly decreased from 3000 kW to 2000 kW. Investigation revealed that the fuel control linkage had separated from the governor terminal shaft lever causing the change in generator output. A ½ inch bolt that is designed to attach the fuel control linkage to the governor terminal shaft lever was found to have backed out. The bolt was reinstalled and tightened and the D Diesel Generator successfully passed the monthly surveillance. This ½ inch bolted connection was checked on the four other Susquehanna Diesel Generators. No loose connections were found.

CAUSE OF EVENT

A Root Cause Analysis Team is nearing the completion of its review of this event. A review of maintenance records indicated that the only time this bolted connection is disturbed is when the EGB50 electro/mechanical governor is replaced. This governor was replaced on the D Diesel Generator on July 5, 2000. The team believes that the ½ inch bolt was installed on July 5, 2000 in a hand tight condition with the intention to return to this connection and to tighten the bolt more securely at some later time. A human performance error occurred when this connection was not subsequently more securely tightened. The mechanic (Utility, non-licensed) that performed this work is unavailable and could not be interviewed to confirm this conclusion.

Since the bolt was not adequately tightened, it was subject to further loosening each time the D Diesel Generator was run. During Diesel Generator runs, the linkage is exposed to movement as the fuel racks reposition and to the movement associated with normal diesel generator running vibration. The combination of these loadings gradually allowed the ½ inch bolt to back out until the linkage became disconnected during the monthly surveillance run on March 19, 2003.

The ½ inch bolt is designed to attach the fuel control linkage to the governor terminal shaft lever. Discussions with vendor personnel indicated that if this fitting was wrench tight there is adequate force to prevent loosening since there is a very low turning force applied from the linkage. The ½ inch bolt that is designed to attach the fuel control linkage to the governor terminal shaft lever is unique in that it is the only linkage connection without any locking mechanism (i.e. lock nut). Use of Loctite is not required by the vendor but is permitted. PPL has determined through the review of this event that in addition to torquing this ½ inch bolt, it is prudent to apply Loctite.

REPORTABILITY DETERMINATION/ASSESSMENT OF SAFETY CONSEQUENCES

Background

Susquehanna has five (5) emergency Diesel Generators. Four (4) are required in service per Susquehanna Technical Specifications and one is a spare. The safety function for the Diesel Generators is to provide sufficient power for the electrical loads required for a simultaneous shutdown of both reactors. This includes the loads required to mitigate the effects of a design basis Loss of Coolant Accident (LOCA) on one unit with a complete Loss of Offsite Power (LOOP) plus a single failure in the onsite power system (e.g. failure of a diesel generator) concurrent with a safe shutdown

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17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

REPORTABILITY DETERMINATION/ASSESSMENT OF SAFETY CONSEQUENCES (continued)

Background (continued)

on the other unit. Based on the licensing basis as described in the FSAR, with one diesel generator unavailable, the remaining three (3) in-service diesel generators have the capacity and capability to supply the required engineered safeguard features loads in one unit and the equipment needed to safely shutdown the second unit. The Susquehanna Probabilistic Risk Assessment (PRA) concludes that two (2) diesel generators are required for a dual unit LOOP.

Requirements

Susquehanna Technical Specifications require four (4) Diesel Generators (DGs) in MODES 1, 2, and 3. To maintain the safety function, three (3) Diesel Generators are required.

Impact of Failure

The D Diesel Generator would not have been a reliable power source had it been called upon to supply ECCS loads for an extended run under accident conditions. Changes in emergency load demands would normally result in the governor continuously repositioning the fuel control cylinder, which in turn would adjust the amount of fuel supplied to each of the engine cylinders. If the linkage at the output of the governor became disconnected the fuel racks would not respond properly to regulate fuel consumption.

The bolt fell out of the D Diesel Generator during a surveillance test on 3/19/2003. It was run for approximately one hour prior to the failure. The D Diesel Generator was unable to achieve rated load as required by the monthly surveillance test. This resulted in the diesel being declared inoperable. It is believed that the bolt was not properly tightened after maintenance and normal running movement and vibration eventually caused the bolt to work its way free. If an extended LOOP had occurred, there is reasonable doubt that the D Diesel Generator would have completed an extended run under load.

Reportability Determination

This situation represents a condition prohibited by Technical Specifications. Since there is reasonable doubt that the D Diesel Generator would complete an extended run under load, there is a period of time where the Technical Specification requirement to have four operable diesel generators was not met. Consequently, this condition is reportable under 10 CFR 50.73(a)(2)(i)(B) as an operation or condition prohibited by Technical Specifications.

In January 2003, the B & E Diesel Generators were inoperable for 74.5 hours. If it is assumed that the D Diesel Generator was unable to complete an extended run under load during this period, then a loss of safety function occurred since A & C would have been the only available diesel generators. Three diesel generators are required to maintain the safety function. Consequently, this condition is also reportable under 10 CFR 50.73(a)(2)(v)(D) as an event or condition that could have prevented the fulfillment of a safety function.

The event date of this condition was July 5, 2000 when the human performance error occurred. The discovery date was September 11, 2003 and the report date was November 10, 2003. The impact on the D Diesel Generator's capability for an extended run was not understood when the latent human performance error manifested itself on March 19, 2003.

NRC FORM 366A U.S. NUCLEAR REGULATORY COMMISSION
(7-2001)**LICENSEE EVENT REPORT (LER)**

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17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

REPORTABILITY DETERMINATION/ASSESSMENT OF SAFETY CONSEQUENCES (continued)**Assessment of Safety Consequences**

There were no actual safety consequences from this event since the diesel generators were not called upon to perform their safety function. The potential safety significance is low since the period of time with less than three diesel generators was short, and the D Diesel Generator had some capability for a run under load. Although no provisions were in place, it is also believed that recovery of the D Diesel Generator from this condition could be achieved relatively quickly. Furthermore, the Susquehanna PRA concludes that two (2) diesel generators are required for a dual unit LOOP.

CORRECTIVE ACTIONS

The following corrective actions were taken or are planned:

- ◆ The bolted connection on the fuel control linkage to the governor terminal shaft lever was verified to be tight on all five Susquehanna Emergency Diesel Generators.
- ◆ Appropriate personnel, using a case study approach, will review the human performance and other aspects of this event. Susquehanna has found the case study method to be effective for learning from human performance events.
- ◆ The work instructions controlling the relevant activities have been enhanced to provide specific direction to apply Loctite and to torque the ½ inch bolt. Recognizing that self-checking and peer checking were factors in this event, a confirmation step will be added to ensure this connection is torqued.
- ◆ A torque requirement will be determined for any critical component fastener that does not already have an established torque requirement on all five Diesel Generators. Critical components are those that directly affect the operation of the Diesel Generator.

A Root Cause Analysis Team is nearing completion of its review of this event. A supplement to this LER will be provided if the final results of this evaluation would significantly change the perception of the course, significance, or consequences of this event or if there are substantial changes in corrective actions.

ADDITIONAL INFORMATION

Failed Component Information: Diesel Generator (0G501D)
Manufacturer – Cooper Energy Services
Model Number – KSV-16-T