NRC FORM 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

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LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
SURRY POWER STATION , Unit 2	05000 – 281	1 OF 4

TITLE (4)

EDG Inoperable Longer than Allowed by TS Due to Governor Compensation Valve

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 NAME	DOCKET NUMBER
11	09	1998	1999	– 004	-- 00	10	01	1999		05000 --
									FACILITY NAME	DOCKET NUMBER 05000 --

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	100%	20.2201(b)	20.2203(a)(2)(v)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)
		20.2203(a)(1)	20.2203(a)(3)(i)	50.73(a)(2)(ii)	50.73(a)(2)(x)
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
		20.2203(a)(2)(ii)	20.2203(a)(4)	50.73(a)(2)(iv)	OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iv)	50.36(c)(2)	50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
E. S. Grecheck, Site Vice President	(757) 365-2001

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
X	EK	65	Woodward Governor Co.	Y						

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On November 2, 1998, emergency diesel generator (EDG) No. 3 was rendered inoperable by an electrical fault. Repairs were effected and testing was performed to return the EDG to service. During the testing, the EDG governor load response characteristics were not as expected. Engineering and vendor personnel investigated the condition and concluded that the observed anomaly would occur only under test conditions and would not affect EDG emergency operation. EDG No. 3 was returned to an operable status on November 7, 1998. During the following two days, the potential causes of the governor load response anomaly were further evaluated. As a conservative measure, the suspect governor was replaced on November 10, 1998, and was subsequently sent to the vendor for testing. On September 9, 1999, engineering personnel concluded, based on the results of the vendor testing, that the governor would not have maintained the correct speed during emergency operation. Based on this conclusion, EDG No. 3 remained inoperable from November 2 to 10, 1998. This event was caused by the governor compensation valve being closed. A root cause evaluation is being performed to determine how the compensation valve became closed. This report is being submitted pursuant to 10 CFR 50.73 (a)(2)(i)(B) since EDG No. 3 was inoperable longer than allowed by Technical Specifications.

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

1.0 DESCRIPTION OF THE EVENT

On November 2, 1998, during the performance of routine surveillance testing, emergency diesel generator (EDG) No. 3 [EIIS-EK,DG] was rendered inoperable as a result of an electrical fault in the remote excitation cabinet. Repairs were effected and testing was performed on November 5 and 6 to return EDG No. 3 to service. During the testing, the EDG governor [EIIS-EK,65] load response characteristics were not as expected. However, operators were able to maintain control of EDG operation and the testing criteria were satisfied. Engineering and vendor personnel investigated the condition extensively and determined that the observed anomaly would be limited to the EDG testing configuration (i.e., droop applied and generator output parallel to the grid) and would not affect the emergency operating condition (i.e., isochronous operation with no droop applied). Based on these conclusions, EDG No. 3 was returned to an operable status on November 7, 1998. During the following two days, engineering and vendor personnel further discussed the potential causes of the governor load response anomaly. Based on these discussions, management concluded that it would be prudent to replace the suspect governor to ensure EDG No. 3 was fully operable. On November 10, 1998, the governor was replaced and EDG No. 3 was tested satisfactorily. The replacement governor exhibited a normal load response.

The suspect governor was subsequently sent to the vendor for inspection and testing. While being bench tested, with droop applied, the governor exhibited load response characteristics that were similar to those seen during testing on November 5 and 6, 1998. Further testing, with no droop applied, demonstrated that the required speed (rpm) band would not have been maintained as load was applied. On September 9, 1999, engineering personnel concluded, based on the results of the vendor testing, that the governor would not have maintained the correct speed in the emergency operating condition. Based on this conclusion, EDG No. 3 remained inoperable throughout the period of November 2 to 10, 1998, during which Unit 1 was at refueling shutdown and Unit 2 operated at 100% power.

Technical Specification (TS) 3.16.B allows an EDG to be inoperable for a period of up to seven days, provided certain compensatory actions are taken. During this event, EDG No. 3 inadvertently remained in an inoperable condition for approximately 8 days and 18 hours. Therefore, this report is being submitted pursuant to 10 CFR 50.73 (a)(2)(i)(B) for operation prohibited by TS 3.16.

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2.0 SIGNIFICANT SAFETY CONSEQUENCES AND IMPLICATIONS

Unit 1 and Unit 2 have dedicated EDGs, Nos. 1 and 2, respectively. Both units share a backup EDG, No. 3. During the period of concern (i.e., November 7 to 9, 1998, in which EDG No. 3 was considered operable with the suspect governor installed), each unit's dedicated EDG remained fully operable and capable of providing power to the emergency buses [EIIS-EB,BUS].

A probabilistic risk assessment was performed with respect to Unit 2 operation for the period of concern. The assessment concluded that the core damage frequency increased approximately 50%, but remained in the green risk region and was well below the yellow limit. In addition, the maximum core damage probability (8.0E-8) for this period was well below the potentially risk significant limit (1.0E-5), as specified in the Electric Power Research Institute's PSA Applications Guide.

EDG No. 3 inoperability during the period of concern was deterministically evaluated with respect to the Unit 1 refueling outage activities. The evaluation determined that the affected emergency power function was maintained, although the function's defense in depth was reduced.

In conclusion, this event resulted in no safety consequences or significant implications and the health and safety of the public were not affected at any time.

3.0 CAUSE

The vendor testing and inspection revealed that the governor compensation valve was fully closed, which did not allow the speed to be maintained within the required speed band when load was applied. When the compensation valve was correctly adjusted, the governor responded properly to load changes.

A root cause evaluation (RCE) is being performed to determine how the compensation valve became closed.

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4.0 IMMEDIATE CORRECTIVE ACTION(S)

An incorrectly adjusted governor compensation valve would result in an abnormal load response during the performance of routine monthly surveillance testing. The surveillance testing of EDG Nos. 1, 2, and 3, performed subsequent to this event, have been satisfactory and have not evidenced any such abnormal load response characteristics. Therefore, no immediate corrective actions were necessary, upon discovery of this event.

5.0 ADDITIONAL CORRECTIVE ACTIONS

Additional corrective actions will be identified through the RCE and implemented through the corrective action program.

6.0 ACTIONS TO PREVENT RECURRENCE

Approved RCE recommendations, designed to prevent the recurrence of a similar event, will be implemented through the corrective action program.

7.0 SIMILAR EVENTS

The previous events listed below were similar to this event in that an EDG was rendered inoperable by an incorrect governor control setting. The previous events, however, did not involve compensation valve adjustment.

LER 50-280, 50-281/1991-018-00
Switchyard Transformer Fault Results in Loss of 4160V Transfer Buses, Start of Emergency Diesel Generators (EDG), and Identification of EDG Underspeed Condition

LER 50-280, 50-281/1991-017-01
Emergency Diesel Generator Rendered Inoperable Due to Personnel Error in that Specified Testing was Not Performed

8.0 MANUFACTURER/MODEL NUMBER

Woodward Governor Company
Model: UG-8D