

Virginia Electric and Power Company
Surry Power Station
P. O. Box 315
Surry, Virginia 23883

September 9, 1991

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Serial No.: 91-525
Docket Nos.: 50-280
50-281
License Nos.: DPR-32
DPR-37

Gentlemen:

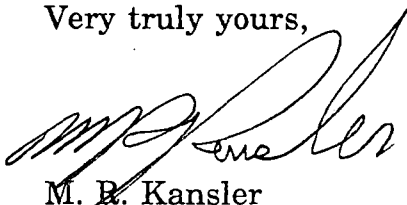
Pursuant to Surry Power Station Technical Specifications, Virginia Electric and Power Company hereby submits the following Licensee Event Report for Units 1 and 2.

REPORT NUMBER

91-017-00

This report has been reviewed by the Station Nuclear Safety and Operating Committee and will be reviewed by the Corporate Management Safety Review Committee.

Very truly yours,



M. B. Kansler
Station Manager

Enclosure

cc: Regional Administrator
Suite 2900
101 Marietta Street, NW
Atlanta, Georgia 30323

9109120238 910909
PDR ADOCK 05000280
S PDR

JE 23

LICENSEE EVENT REPORT (LER)

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) Surry Power Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 8 0	PAGE (3) 1 OF 0 5
--------------------------------------------------	--------------------------------------	----------------------

TITLE (4) Diesel Generator Rendered Inoperable Due to Personnel Error in Adjusting the Governor

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	5	09	91	01	7	0	0	90	Surry, Unit 2	0 5 0 0 0 2 8 1
0	5	09	91	01	7	0	0	90		0 5 0 0 0

OPERATING MODE (8) N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)							
POWER LEVEL (10) 1, 0, 0	20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)	
	20.405(a)(1)(i)		50.38(c)(1)		50.73(a)(2)(v)		73.71(c)	
	20.405(a)(1)(ii)		50.38(c)(2)		50.73(a)(2)(vii)		OTHER (Specify in Abstract below and in Text, NRC Form 366A)	
	20.405(a)(1)(iii)		50.73(a)(2)(i)	X	50.73(a)(2)(viii)(A)			
	20.405(a)(1)(iv)		50.73(a)(2)(ii)	X	50.73(a)(2)(viii)(B)			
20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)				

LICENSEE CONTACT FOR THIS LER (12)	
NAME M. R. Kansler, Station Manager	TELEPHONE NUMBER AREA CODE: 8 0 4 3 5 7 3 1 8 4

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)										
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
<input checked="" type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)	<input type="checkbox"/> NO		1	1	91

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

On August 9, 1991, with Unit 1 and Unit 2 at 100% power, it was determined that Emergency Diesel Generator (EDG) #3 had been inoperable since May 9, 1991. This determination was made while performing a root cause evaluation of the observed performance of EDG #3 during an August 2, 1991, Engineered Safeguards Feature (ESF) actuation on Unit 2. This safety injection/reactor trip, which occurred as a result of vital bus power oscillations on one channel and a failed steam generator pressure transmitter on another channel, is being reported separately by Licensee Event Report S2-91-007-00. A root cause investigation team appointed to determine the cause of the failure of EDG #3 to achieve rated speed found that inadequate Post Maintenance Testing (PMT) was specified. This was due to a cognitive error on the part of utility and vendor personnel following maintenance actions performed during PMT activities. The maintenance actions resulted in a misadjustment of the engine's governor following replacement of the governor on May 7, 1991. During the period EDG #3 was inoperable, the Unit's other source of emergency power, EDG #2, was inoperable for approximately thirteen hours on July 15, 1991. This event is being reported pursuant to 10CFR50.73(a)(2)(i)(B) and (ii)(B).

**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)

DOCKET NUMBER (2)

LER NUMBER (6)

PAGE (3)

Surry Power Station, Unit 1

0 5 0 0 0 2 8 0

YEAR	SEQUENTIAL NUMBER	REVISION NUMBER
91	017	00

0 2 OF 0 5

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

1.0 DESCRIPTION OF THE EVENT

On August 9, 1991, with Unit 1 and Unit 2 at 100% power, it was determined that Emergency Diesel Generator (EDG) #3 (EHS-EK-DG) had been inoperable since May 9, 1991. This determination was made while performing a root cause evaluation of the observed performance of EDG #3 during the August 2, 1991, Unit 2 Engineered Safeguards Feature (ESF) actuation. During this event EDG #3 failed to achieve rated speed of 900 rpm \pm 2%. A speed of approximately 835 rpm was attained, which is equivalent to a frequency of 55.67 Hz. This speed is below the 870 rpm speed permissive needed to allow the EDG output breaker to close. Operator action would have been required to bring the EDG up to speed to allow the output breaker to close should it have been necessary for the EDG to supply electrical power to the emergency bus. Station procedures were in place to provide guidance to operating personnel to take appropriate action to adjust speed and energize the emergency bus if required. However, because manual operator action would have been required, EDG #3 was declared inoperable on August 2, 1991, since it could not automatically fulfill its design function.

Surry's EDGs utilize Woodward UG-8D governors for engine speed and load control. This governor is of a mechanical-hydraulic design and is driven by a spur gear on the accessory gear train of the EDGs. A new replacement governor was installed on EDG #3, adjusted, and tested satisfactorily for fast start operation on May 7, 1991. On May 8, 1991, full load post maintenance testing of EDG #3 was begun. During initial full load testing, EDG #3 would not achieve full load. The EDG was secured, a hot fuel rack adjustment was performed, and testing was resumed. During this subsequent full load testing, additional adjustments were made to the governor. The cumulative affects of these adjustments was that EDG #3 did not achieve its rated speed when called upon to respond to a fast start. Because no PMT was performed to verify proper response of EDG #3 to a fast start following these adjustments, the root cause evaluation team determined that EDG #3 had been inoperable since May 9, 1991.

Therefore, contrary to Technical Specification 3.16.B.1, EDG #3 was inoperable from May 9, 1991 through August 2, 1991. In addition, the redundant emergency power supply (EDG #2) had been inoperable for approximately thirteen hours on July 15, 1991. This event is being reported pursuant to 10CFR50.73(a)(2)(i)(B) and (ii)(B).

**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) Surry Power Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 8 0 9 1	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		0 1 7	0 0	0 3	OF	0 5	

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

2.0 SIGNIFICANT SAFETY CONSEQUENCES AND IMPLICATIONS

Surry's emergency electric power system is designed to provide reliable power to engineered safety functions and other essential loads in the event of loss of off-site power (LOOP). The system consists of three 100% capacity diesel generator sets for the two Units. One generator is used exclusively for Unit 1 (EDG #1), the second exclusively for Unit 2 (EDG #2), and the third (EDG #3) functions as a backup for either Unit. Each Unit has two emergency buses normally fed from an independent off-site power source, with the EDGs functioning as on-site backup power sources.

A safety injection signal, whether automatic or manually initiated, starts an EDG (EDG #1 or #2, depending upon the Unit affected) and the redundant EDG (EDG #3). By design, during a safety injection, the EDGs start and accelerate to 900 rpm, but their output breakers do not close unless there is an undervoltage condition sensed on the associated 4160 volt emergency bus.

During the event, EDGs #2 and #3 started as required and EDG #2 accelerated to 900 rpm. However, EDG #3 reached only 835 rpm which does not satisfy the 870 rpm speed permissive requirement for closure of the output breaker. This speed is also below the GDC-17 and EDG load-sequencing scheme acceptable minimum of 882 rpm. The EDGs by design are required to automatically supply electrical power to the 4160 volt emergency buses on a loss of power to those buses. Had it been required, existing procedures directed operations personnel to manually place EDG #3 on its respective emergency bus.

Although EDG #3 failed to achieve rated speed, during this event, EDG #2 functioned as designed and could have carried its emergency bus had the need arisen. Both during this event and on July 15, 1991 when EDG #2 was inoperable, no actual demands were made on the emergency power system. Therefore, the health and safety of the public were not affected.

3.0 CAUSE OF THE EVENT

The reason for the EDG #3 not reaching its required speed and frequency range was attributed to the combined effects of fuel rack and engine governor adjustments. The cumulative effect of these adjustments was not anticipated due to a cognitive error by utility and vendor personnel. Consequently, an automatic fast start post maintenance test, which would have detected the need for the high

**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) Surry Power Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 8 0	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		9 1	— 0 1 7	— 0 0	0 4	OF	0 5

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

speed limit switch cam to be adjusted, was not specified and, therefore, not performed.

4.0 IMMEDIATE CORRECTIVE ACTION(S)

EDG #3 was declared inoperable August 2, 1991, and an investigation into its failure to achieve rated speed was initiated.

5.0 ADDITIONAL CORRECTIVE ACTION(S)

The governor was readjusted and the engine was tested and returned to operable status at 1000 hours on August 3, 1991, approximately seventeen hours after it had failed to achieve rated speed.

EDG #1 and EDG #2 were tested to verify operability. EDG #1 "as found" speed and frequency were within the allowable target band. EDG #2 "as found" speed and frequency were slightly above the target band, but the engine was determined to be operable. Both governors were adjusted and two more fast starts of each engine confirmed speed and frequency to be well within specification.

The governor gearing and speed knobs for the EDG #1 and EDG #2 governors were scribed at the 900 rpm setting. Because of previous testing activities for speed control of EDG #3, these scribe marks were already in place on that governor. Station operating procedures were changed to direct the speed knobs to be reset to the scribe marks as part of aligning the EDGs for automatic operation. The resetting of the speed knobs for the 900 rpm scribe marks eliminates the need for the servo motor to adjust the governor during the starting sequence. This resetting also makes up the high speed limit switch and prevents the servo motor from energizing.

A root cause investigation team of station and corporate personnel was formed to investigate the August 2, 1991 event.

6.0 ACTIONS TO PREVENT RECURRENCE

"See through" plates are being designed for the governor gearing so that the scribe marks may be observed without disassembly.

Station maintenance procedures will be developed or revised to provide additional direction for adjustments to the fuel racks and governor during maintenance.

**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) Surry Power Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 8 0 9 1	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		0 1	0 1 7	0 0	0 5	OF	0 5

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

A diesel performance evaluation team is examining diesel governor maintenance, testing, and reliability following an August 26, 1991 loss of power and the apparent drifting of the EDG #2 governor. Final recommendations of the root cause and diesel performance evaluation teams will be evaluated and implemented as appropriate. A supplement to this Licensee Event Report will be submitted to incorporate the results of the additional investigation into the maintenance, testing, and reliability of the Woodward UG-8D governor.

7.0 SIMILAR EVENTS

None.

8.0 ADDITIONAL INFORMATION

None.