

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

April 29, 1992

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

Serial No.: 92-288  
Docket No.: 50-280  
License No.: DPR-32

Gentlemen:

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

REPORT NUMBER

50-280/92-005-00

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. R. Kansler  
Station Manager

Enclosure

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

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9205050298 920429  
PDR ADOCK 05000280  
S PDR

*Handwritten initials/signature*

**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) <b>Surry Power Station Unit 1</b>		DOCKET NUMBER (2) <b>05000280</b>	PAGE (3) <b>1 OF 6</b>
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TITLE (4)  
**Loss of Refueling Containment Integrity Due to Inadequate Procedures and Work Practices**

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)
04	02	92	92	005	00	04	29	92		050000
										050000

OPERATING MODE (9) **N** 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)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
20.405(a)(1)(iv)	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)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME <b>M. R. Kansler, Station Manager</b>	TELEPHONE NUMBER AREA CODE <b>804</b> 357-3184
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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)

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 April 2, 1992, at 1145 hours, with Unit 1 defueled during a scheduled refueling outage, welders preparing to replace the "B" Main Steam Trip Valve (MSTV) bypass line check valve, 1-MS-117, noticed air inleakage when removing the valve bonnet and installed a temporary cover on the valve. At 1940 hours, it was determined that refueling containment integrity (refueling integrity) did not exist, since the secondary side of the "B" Steam Generator (SG) was open for sludge lancing, the internals had been removed from the "B" MSTV, 1-MS-TV-101B, and a potential leakage path from the containment atmosphere to the Unit 1 Safeguards Building atmosphere through 1-MS-TV-101B to 1-MS-117 existed. Further investigation revealed that the 3/4 inch "A" SG main feedwater line drain valve inside containment, 1-FW-9, was open while the bonnet and internals of the "A" MSTV, 1-MS-TV-101A, were removed for maintenance. Thus, an additional potential leakage path from the containment atmosphere to the Unit 1 Safeguards Building atmosphere through 1-MS-TV-101A existed. Because fuel movement had taken place and leakage paths through the "A" and "B" SGs had not been properly closed, a condition not allowed by the Technical Specification 3.10.A.1 existed. The event was caused by inadequate procedures and work practices. The bonnet was re-installed on 1-MS-117 and 1-FW-9 was closed. A walkdown and a review of valve tagouts were performed to ensure that there were no additional refueling integrity concerns. A Root Cause Evaluation of the event was conducted. The processes for establishing refueling containment integrity will be revised. This report is required by 10 CFR 50.73(a)(2)(i)(B).

**LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION**

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

**1.0 - DESCRIPTION OF THE EVENT**

On April 2, 1992, at 1145 hours, with Unit 1 defueled during a scheduled refueling outage, welders preparing to replace the "B" Main Steam Trip Valve (MSTV) bypass line check valve, 1-MS-117 [EIS-SB,V], noticed air inleakage when removing the valve bonnet. The welders installed a temporary cover on the valve, taped the cover, and reported the condition to their foreman since they would be unable to weld the new valve in place with a vacuum in the line. At 1417 hours, loading of fuel into the reactor commenced. Fuel load was suspended at 1501 hours after two fuel assemblies had been moved. At approximately 1900 hours, the welding foreman notified the Operations Shift Supervisor of the inleakage when 1-MS-117 was opened. The Shift Supervisor dispatched an operator, who confirmed that air inleakage occurred when the tape was pulled back. At 1940 hours, it was determined that refueling containment integrity (refueling integrity) did not exist, since the secondary side of the "B" Steam Generator (SG) [EIS-SB,HX] was open for sludge lancing, the internals were removed from the "B" MSTV, 1-MS-TV-101B [EIS-SB,ISV], and a potential leakage path from the containment atmosphere to the Unit 1 Safeguards Building atmosphere had existed through 1-MS-TV-101B to 1-MS-117.

Further investigation revealed that the 3/4 inch "A" SG main feedwater line drain valve [EIS-SJ,ISV] inside containment, 1-FW-9, was open while the bonnet and internals of the "A" MSTV, 1-MS-TV-101A, were removed for maintenance. It was determined that the reactor vessel head and internals had been removed and that the fuel had been off-loaded with 1-FW-9 open and with maintenance performed on 1-MS-TV-101A. Thus, an additional potential leakage path from the containment atmosphere to the Unit 1 Safeguards Building atmosphere had existed through 1-MS-TV-101A.

After review of the event on April 3, 1992, a four hour, non-emergency report was made in accordance with 10 CFR 50.72(b)(2)(iii)(C) and (D) because the potential for radioactive release through the identified leakage paths during a fuel handling accident had existed. This report was later withdrawn as discussed in Section 5.0.

This written report is being submitted pursuant to 10 CFR 50.73(a)(2)(i)(B) since the unit was in a condition not allowed by Technical Specification 3.10.A.1. Technical Specification 3.10.A.1 requires that, during refueling operations, systems which provide a direct path from the containment atmosphere to the outside atmosphere be capable of closure by operable automatic containment isolation valves or be closed by at least one valve in each line penetrating the containment.

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

**2.0 - SIGNIFICANT SAFETY CONSEQUENCES AND IMPLICATIONS**

Maintaining refueling integrity during refueling operations ensures that the off-site radiation doses resulting from a postulated fuel handling accident inside containment would be within the limits of 10 CFR 100. The limiting fuel handling accident inside containment is analyzed in the Surry Updated Final Safety Analysis Report (UFSAR) with the assumption that there is a complete failure of the containment purge system [EHS-JM] to automatically isolate and that the purge system is not manually secured. It is assumed that the filtration of the containment purge exhaust during refueling is 70% efficient. Thus, all of the radionuclides released from the fuel handling accident that reach the surface of the refueling cavity are released from containment through charcoal filters that remove 70% of the iodine. The exclusion area boundary doses calculated for this case are 75.8 Rem thyroid and 4.52 Rem whole body.

An engineering evaluation has been performed to assess the potential consequences of a fuel handling accident at Surry during the fuel movements that occurred during the partial loss of refueling integrity. It was concluded that the radiological consequences would be much lower than those for the limiting case analyzed in the UFSAR for two principal reasons. First, fuel movement began 18 days after reactor shutdown rather than 100 hours as assumed in the UFSAR analysis. Thus, the source term was greatly reduced. Second, an unfiltered release could only occur if the containment purge system did shut down as designed. In this case, any release from containment would be limited to a small fraction of containment volume, rather than the total release assumed in the UFSAR analysis, due to the absence of any significant containment pressurization.

If the containment purge system shuts down as designed in the event of a fuel handling accident, and it is conservatively assumed that the containment atmosphere heats up at a 10 degree F per hour rate and that there is no leakage path resistance, unfiltered releases from the containment for the two hour period considered in determining exclusion area boundary doses would be less than 3.8% of containment volume. Thus, doses would be about a factor of eight less than those shown for the limiting UFSAR analysis assuming only 100 hours of decay after shutdown. A decay time after shutdown of 18 days compared to the 100 hours assumed in the UFSAR dose analysis reduces the dose equivalent Iodine 131 available for release to about 30% of the dose equivalent Iodine 131 in the fuel at 100 hours. This source term reduces the off-site dose consequences to a factor of 26 less than those shown in the limiting UFSAR analysis.

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No actual fuel handling accident or abnormal radioactive release took place inside containment during the period that the leakage paths existed; therefore, it is concluded that there were no actual or potential consequences to public health and safety.

**3.0 - CAUSE OF THE EVENT**

A Root Cause Evaluation attributed the event to a programmatic weakness in the procedures and work practices associated with establishing and maintaining refueling containment integrity. The specific weaknesses are summarized as follows:

Procedure 1/2-OP-1G, "Refueling Containment Integrity and RCS Mid-Loop Containment Closure Checklist" specifically lists only those containment boundary components located outside of containment, although the boundary can be established inside containment. In addition, tagging of containment boundary valves is not required and there are no restrictions on changing the containment boundary once it is established. On March 16, 1992, 1-OP-1G was completed with the containment boundary established inside containment for the "A" SG, not recognizing that 1-FW-9 was open.

Personnel are not required to consult the Operations Department after resuming work on extended jobs which have the potential to affect refueling integrity. Disassembly and inspection of 1-MS-117 had been initiated before refueling integrity was required. On March 14, 1992, it was determined that replacement of the valve was necessary and the bonnet was re-installed at that time. When work resumed on April 2, 1992, the valve had become part of the containment boundary.

**4.0 - IMMEDIATE CORRECTIVE ACTIONS**

On April 2, 1992 at 1940 hours, when it was determined that refueling integrity did not exist, fuel movement had already been suspended for unrelated reasons. No other immediate corrective actions were necessary.

**5.0 - ADDITIONAL CORRECTIVE ACTIONS**

On April 2, 1992 at 2204 hours, mechanics re-installed the bonnet on 1-MS-117. Operations conducted walkdowns and reviewed tagouts to determine if any additional refueling integrity concerns existed. This review revealed that 1-FW-9 was tagged open.

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On April 3, 1992 at 0300 hours, 1-FW-9 was closed. At 0337 hours, refueling integrity was established. Fuel load resumed at 0426 hours.

A Root Cause Evaluation was performed.

Station personnel were coached on the importance of maintaining close attention to detail despite the high level of activity associated with the Unit 1 refueling outage.

On April 20, 1992, the four hour report made in accordance with 10 CFR 50.72 (b)(2)(iii)(C) and (D) was withdrawn based on the evaluation described in Section 2.0. This evaluation demonstrated that the leakage paths which had existed would not have affected the ability of the containment to limit off-site radiation doses to within 10 CFR 100 limits had a fuel handling accident occurred.

**6.0 - ACTIONS TO PREVENT RECURRENCE**

The refueling containment integrity procedure will be enhanced to provide specific requirements for establishing refueling integrity. Components used to establish integrity inside as well as outside containment will be listed. The station tagging system will be used to ensure boundary valves are not inadvertently mispositioned.

Outage activities will be planned to include refueling integrity "windows". During periods when refueling integrity is required, modifications to the containment boundary and access to boundary components will be restricted.

The Operations Department will be consulted before re-starting work on a lengthy job to ensure work is not performed on a component which has become part of the refueling integrity boundary.

Model work orders for components which may be used to establish refueling integrity will be revised to identify them as such.

Procedure 1/2-OP-1G will be separated into two procedures. One will control refueling containment integrity and the other will control mid-loop containment closure. This will avoid any potential confusion which could result from the differing requirements.

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**7.0 - PREVIOUS EVENTS**

Licensee Event Report 281/89-001: With Unit 2 in refueling operations, it was discovered that a blind flange did not adequately cover the opening left by removal of a SG safety valve. The main feedwater line to the "A" SG had been opened inside containment for maintenance; therefore, a leakage path from the containment atmosphere to the Safeguards Building atmosphere existed. This event was caused by inadequate procedural control. The refueling containment integrity procedure was modified to require that "special order" tags be placed on any flange or cover that is part of the containment boundary for refueling operations. The procedure is written for establishing the containment boundary outside containment, however, and the requirement for tagging flanges and covers was not applied to components inside containment.

**8.0 - ADDITIONAL INFORMATION**

None