VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

July 10, 2003

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Serial No. 03-349
NL&OS/GDM R0
Docket Nos. 50-280/281
License Nos. DPR-32/37

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
10 CFR 50 APPENDIX R
ALTERNATE APPENDIX R FLOWPATH

10 CFR 50, Appendix R, Section III.L requires that, for alternative shutdown capability, the reactor coolant makeup function shall be capable of maintaining the reactor coolant level within the level indication of the pressurizer. RCS level is maintained at Surry Power Station during normal operation by the Chemical Volume and Control System via the charging and letdown flowpaths. However, in certain postulated Appendix R fire scenarios, such as an auxiliary building, emergency switchgear room (ESGR) or cable vault and tunnel (CV&T) fire, the power to the affected unit's charging pumps may be lost or the charging system valves could spuriously operate resulting in the unavailability of the RCS makeup flow provided by the charging flowpaths. Consequently, pursuant to Appendix R requirements, alternative shutdown capability must be provided to ensure that RCS level is maintained within pressurizer level indication.

As documented in the Surry Appendix R report, reactor coolant level can be maintained in accordance with 10 CFR 50, Appendix R, Section III.L requirements by isolating the charging system letdown path, aligning a cross-tie path from the unaffected unit's charging system and providing make up via the RCP seal injection path or the normal charging path. Surry Fire Contingency Action (FCA) procedures provide instructions for implementing the alternate flowpath strategy to maintain pressurizer level during an Appendix R fire in the Auxiliary Building, ESGR or CV&T. Specifically, an FCA procedure directs the operator to re-establish seal injection flow to the RCP at 6 to10 gpm, in addition to re-establishing the flow through the normal charging line. Adequate time is available to re-establish seal cooling and charging flow to the affected unit via the charging cross-tie from the unaffected unit such that RCS level would remain within the pressurizer level indication. The Appendix R strategy noted above was documented as part of the fire protection evaluation included in the Surry Power Station, Units 1 and 2, 10 CFR 50, Appendix R Report, Rev. 4, dated April 1987, which was submitted to the NRC for review. The NRC documented their review in "Surry Units 1 and 2

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– Safety Evaluation of Revised Post-Fire Safe Shutdown Methodology (TAC Nos. M65840 and M65841)," dated July 23, 1992. The NRC SER noted that the "...chemical and volume control system (CVCS) will be used to maintain an adequate shutdown margin by injecting borated water into the reactor coolant system from the refueling water storage tank. The CVCS (including the letdown paths) is also used to provide the reactor coolant inventory function and the reactor coolant pressure control function." The SER concluded that, "The safe shutdown capability of Surry Power Station Units 1 and 2, as described in the '10 CFR 50 Appendix R Report, Rev. 4' dated April 1987 (Ref. 1) and the responses to questions, meets the intent of the requirements of Sections III.G.3 and III.L of Appendix R and the criteria of Generic Letter 81-12 and is therefore acceptable."

During the 2003 Triennial Fire Protection Inspection at Surry (Reference NRC Inspection Report 50-280/03-07 and 50/281/03-07, dated March 31, 2003), the NRC identified a potential concern with the established alternative shutdown capability for an Appendix R fire in the ESGR and the CV&T. Specifically, the NRC questioned whether the actions contained in the current FCA procedures for re-establishing seal injection following a prolonged loss of all seal cooling were adequate to achieve the performance goal of maintaining pressurizer level within the indicating range. Until a charging pump is recovered or the charging pump cross-tie to the opposite unit's charging system can be established, reactor coolant pump (RCP) seal injection flow would be lost. In an Appendix R fire in the ESGR or the CV&T, component cooling water (CCW) system flow to the RCP thermal barriers may also be lost. Loss of RCP thermal barrier cooling in conjunction with loss of RCP seal injection would result in a total loss of RCP seal cooling. This condition would result in RCP seal heat up and subsequent increased reactor coolant system (RCS) leakage through the seals. Loss of the charging pumps would also result in the loss of high pressure make up capability to the RCS. The NRC expressed concern that the FCA procedures were not consistent with Westinghouse guidelines for re-establishing seal injection following a loss of seal cooling, and that a possible seal failure could result due to thermal shock. Such a scenario could likewise result in RCS leakage beyond the capacity of the opposite unit's charging system to provide flow via the charging pump cross-tie.

Due to this uncertainty regarding re-establishing the seal injection flowpath after a prolonged loss of seal cooling, Dominion has identified two flowpaths, in lieu of the seal injection flowpath, that will be used in addition to the existing normal charging flowpath to ensure that sufficient borated water is supplied to the RCS during an Appendix R fire for events when RCP seal cooling may be lost. The flowpaths are as follows:

1. The 3" high head safety injection (HHSI) to cold legs flowpath through SI-MOV-1/2867C or D. (See attached figure.) When one of these MOVs is opened, borated water from the Refueling Water Storage Tank (RWST) can be supplied from the opposite unit's charging pump(s) via the cross-tie and through the normal charging pump header.

2. The 3" alternate high head safety injection to cold legs flowpath through SI-MOV-1/2842. (See attached figure.) When this valve is opened, borated water from the RWST can be supplied from the opposite unit's charging pump(s) via the cross-tie and through the alternate charging pump header.

An engineering analysis has been completed regarding the adequacy of these two flowpaths. It was concluded that either the HHSI or the alternate HHSI to the cold legs flowpath is adequate to provide RCS make up in excess of the analyzed leakage rate of 21.1 gpm per RCP and will ensure that pressurizer level will be maintained during an Appendix R fire in the Auxiliary Building, ESGR or CV&T. Adequate Appendix R lighting has also been verified to support manual operation of the MOVs in these flowpaths should this be required. Therefore, the applicable FCA procedures have been revised to replace the seal injection flowpath with the two alternate flowpaths discussed above, and the Surry Appendix R Report and drawings are currently being revised to reflect these changes. These revisions will ensure that the reactor coolant make-up function is capable of maintaining the reactor coolant level within the level indication of the pressurizer in compliance with 10 CFR 50, Appendix R, Section III.L.

If you have any questions or require additional information, please contact Mr. Gary D. Miller at (804) 273-2771.

Very truly yours,

L. N. Hartz
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Attachment

Commitments made in this letter: None

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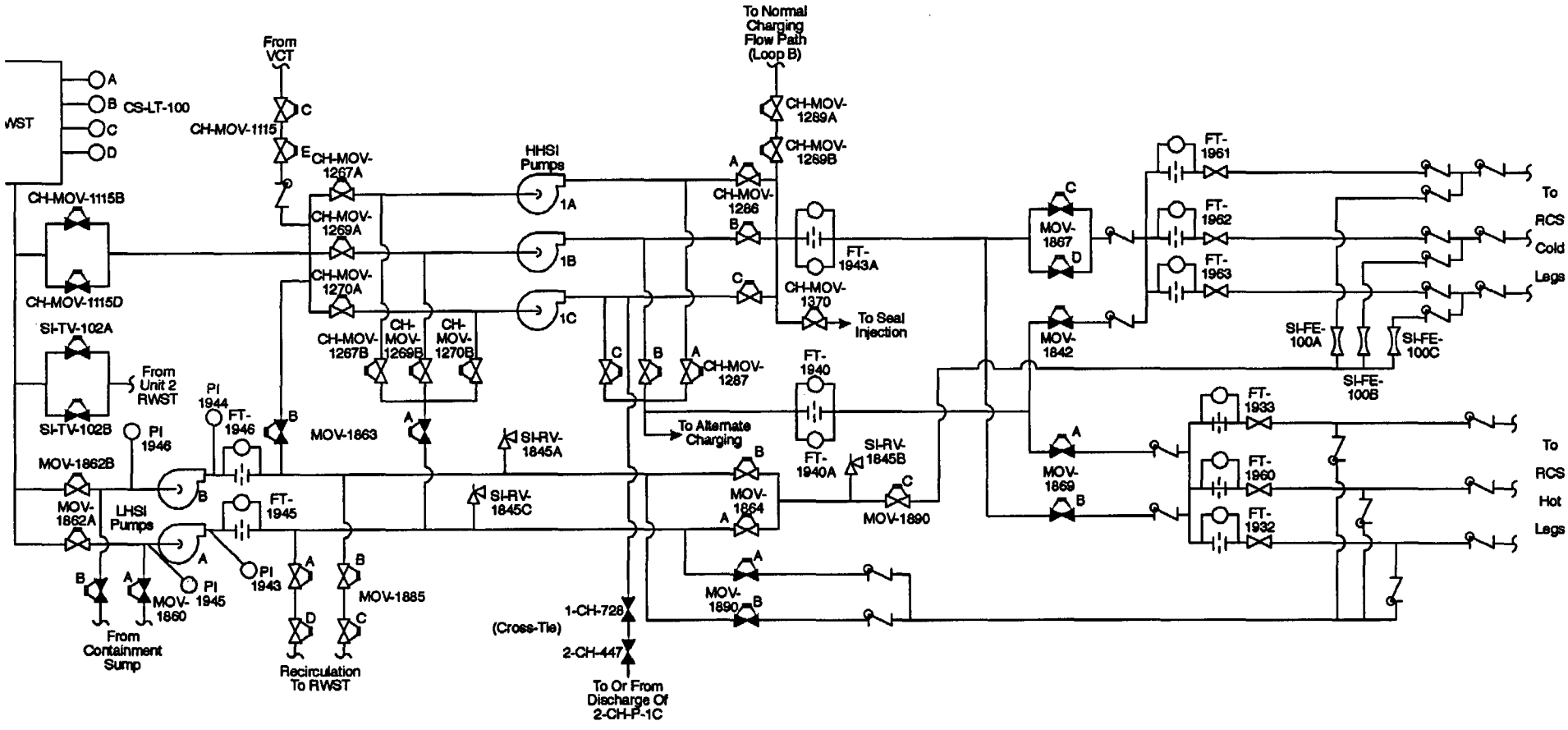

Attachment
Safety Injection System Diagram

Graphics No: LD142E

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