VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

February 28, 2005

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

Serial No. 05-011
NL&OS/GDM R0
Docket No. 50-280
License No. DPR-32

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNIT 1
FOURTH INTERVAL INSERVICE TESTING PROGRAM
REVISED RELIEF REQUEST P-8

In a letter dated June 25, 2003 (Serial No. 03-354), Dominion submitted the fourth interval Inservice Testing (IST) Programs for Pumps and Valves for Surry Power Station Units 1 and 2. The submittal included, among other relief requests, Relief Request P-8 for Surry Unit 1, which requested relief from testing the Surry Containment Spray (CS) pumps 1-CS-P-1A and 1B within 20% of the design flow. This test requirement was imposed by the ASME OM Code 1998 Edition, 2000 Addenda, which is effective for Surry Units 1 and 2 at the start of the fourth interval. Dominion provided additional information in response to NRC questions associated with the relief request in a subsequent letter dated December 17, 2003 (Serial No. 03-354A). The NRC denied the request in a letter dated July 2, 2004.

Dominion has subsequently determined that the CS pump design flow rate that should have been referenced in Relief Request P-8 is the value assumed in the plant safety analyses, rather than the pump design flow rate capacity value obtained from the Updated Final Safety Analysis Report. Based on the corrected CS pump design flow rate, as well as additional CS pump full flow test data that was recently retrieved, Dominion has revised Relief Request P-8 for the Surry Unit 1 CS pumps to allow testing at a flow rate that is less than 80% of the accident analysis flow rate. A conference call was held with the NRC on January 6, 2005 to discuss this new information and the proposed revision of the relief request.

Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), Dominion requests relief from the specific ISTB Code requirements identified in attached Surry Unit 1 Relief Request P-8 associated with CS pumps 1-CS-P-1A and 1B.

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

Very truly yours,

Eugene S. Grecheck
Vice President – Nuclear Support Services

Attachment

Commitments made in this letter: None

cc: U.S. Nuclear Regulatory Commission
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Attachment

Revised Relief Request P-8
Containment Spray Pumps

Surry Power Station Unit 1
Virginia Electric and Power Company
(Dominion)

RELIEF REQUEST P-8

Systems: Containment Spray

Pump(s): 1-CS-P-1A
1-CS-P-1B

Group: B

Class: 2

Function: The containment spray pumps provide a cooled, chemically treated, borated spray to reduce containment pressure following a loss of coolant accident.

ISTB Code Requirements
for Which Relief Is Requested

ISTB-3300(e)(1) (Reference Values) requires that reference values shall be established within ±20% of pump design flow rate for comprehensive tests.

Basis for Relief (ISTB-3300(e)(1))

The test loop for the containment spray pumps is shown in Figure P-8.1. The containment spray pumps take suction from the refueling water storage tank (RWST) and discharge back to the RWST. With this test loop, it is difficult to consistently achieve reference flow rates that are within 20% of the pump design flow rate of 2000 gpm. Therefore, relief from the Code requirement is requested for Surry Unit 1.

Pump Design Flow Rate Basis

The containment spray system resistance limits a single pump delivery flow to 2000 gpm at 238.6 total developed head (TDH) in feet. This TDH corresponds to the accident analysis conditions when a containment spray pump starts and is subject to its most limiting operating conditions. Specifically, the Surry accident analysis assumes a minimum pump flow rate of 2000 gpm when the RWST, which is the containment spray suction source, is at the Technical Specifications minimum allowable level and the containment is at the design pressure of 45 psig.

As containment pressure decreases during a design basis accident following spray actuation, the containment spray pump TDH will decrease and the flow will increase above 2000 gpm as the pump operating point moves out on the pump curve. The pump response along the pump curve as modeled in the accident analysis is for a degraded pump. The actual pump head performance at 1600 gpm (the approximate test flow rate) is well above the corresponding head of the accident analysis degraded pump curve requirement.

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A model of the containment spray system hydraulic circuit for each pump has confirmed the limiting accident analysis assumptions for containment spray pump flow versus head.

An additional consideration is that the containment spray pumps are expected to operate for less than 2 hours after a design basis accident. Accident analyses demonstrate that the RWST is exhausted quickly, depending on the number of containment spray and safety injection pumps that are running. The operators stop the containment spray pumps when RWST level reaches about 3% indication.

Surry has determined that the containment spray pump design flow rate is 2000 gpm based on the plant safety analyses. The Code requires that the containment spray pump flow be tested within 80% of the design flow rate, or 1600 gpm. The average test flow rate for tests conducted since 1999 is 1593 gpm for Unit 1. The containment spray system is a fixed resistance system and the test flow rates tend to vary several gpm based on initial RWST level. Although the Unit 1 pumps have met the Code required flow rate of 1600 gpm during some of the previous flow tests, there will likely be future tests where 1600 gpm cannot be achieved.

Pre-Operational Testing

During the construction period, the containment spray headers were fitted with blind flanges that allowed the connection of temporary drain lines for initial testing of the subsystem. After the subsystem was completely installed, temporary connections between the spray headers were made using blind flanges on the spray headers, and pipe plugs were placed in the spray nozzle sockets. The containment spray pumps were started and operated over a range of flows, circulating water through the spray header supply line to the spray headers, out the temporary drain connections and to the opposite spray headers. The water was then directed to the RWST through the 4" recirculation line. Although the pre-operational test did not produce full flow conditions, it provided a full-system capability test and demonstrated that the pumps were operating on the manufacturer pump curve. It also flushed the system to remove any particulate matter that could plug the spray nozzles at a future time. At the completion of this test, the temporary drain connections were removed, the blind flanges replaced, the pipe plugs removed, the nozzle pipe nipple inspected, and the spray nozzles installed.

Additional Full Flow Testing

In addition to the pre-operational testing performed on the containment spray system, a special RWST/Chemical Addition Tank draw down test was performed on April 30, 1980 using pump 2-CS-P-1A at flow rates substantially greater than the current achievable test flow rates. The purpose of the draw down test was to validate the analytical model used to perform the Surry site boundary dose analysis. Temporary 8" discharge piping was installed from the bonnet of check valve 2-CS-13, located downstream of the pump and inside containment at elevation 15' 9", to the reactor cavity at elevation 48' 1". Flow rates up to 2133 gpm were achieved during the test. This test demonstrates that the

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containment spray pump 2-CS-P-1A has been operated at design flow conditions in its installed configuration. The four containment spray pumps on Surry Units 1 and 2 are essentially identical, so the conclusion from the Unit 2 containment spray pump test that pump 2-CS-P-1A can achieve the design flow rate is applicable to the Unit 1 pumps.

Surry Predictive Maintenance Program

In addition to the testing described above, the containment spray pumps are included in the Surry Predictive Maintenance Program. For the containment spray pumps, this program employs predictive monitoring techniques, such as vibration monitoring and analysis beyond that required by ISTB, and oil sampling and analysis.

If the measured parameters are outside the normal operating range or are determined by analysis to be trending toward an unacceptable degraded state, appropriate actions are taken that may include:

- monitoring additional parameters,
- reviewing component specific information to identify cause, and/or
- removing the pump from service to perform maintenance.

Detection of Pump Degradation

Testing the containment spray pumps at or near 1600 gpm will detect degradation in performance and verify that the pumps are operating acceptably. The 1600 gpm point (50% of the point of best efficiency of approximately 3200 gpm) is in a portion of the pump curve where degradation will be detected. Also, there is significant margin available above the minimum acceptable pump curve when testing the pump on the test loop. For pump 1-CS-P-1A, the margin is approximately 20 feet of TDH and for pump 1-CS-P-1B the margin is approximately 18 feet. A decrease in the available margin is detectable before pump performance becomes unacceptable.

Figure P-8.2 shows the nominal vendor pump curve for 1-CS-P-1A, a typical test point, the minimum test point below which performance is considered unacceptable, and the design point (2000 gpm at 238.6 feet TDH). Figure P-8.3 shows the same information for pump 1-CS-P-1B. The proposed alternative to ISTB-3300(e)(1) provides an acceptable level of quality and safety.

Alternate Testing Proposed

A comprehensive test reference flow rate will be established for each pump at or near 80% of the pump design flow rate, but not less than 76% of design flow rate (1520 gpm).

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The containment spray pumps are also subject to the additional testing, trending and diagnostic analysis of the Surry Predictive Maintenance Program.

Using the provisions of this relief request as an alternative to the specific requirements of ISTB-3300(e)(1) identified above will provide adequate indication of pump performance and continue to provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i) we request relief from the specific ISTB Code requirements identified in this relief request.

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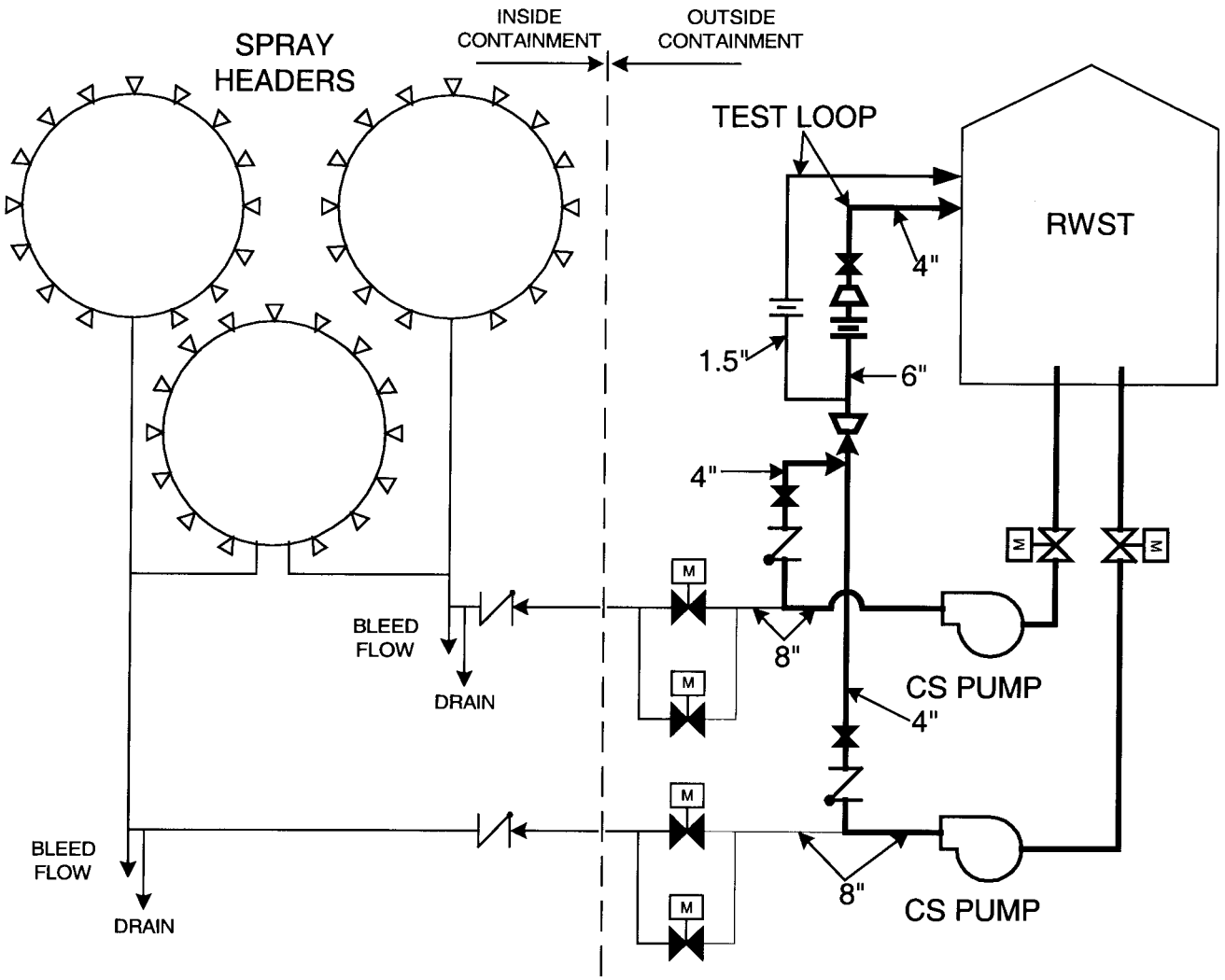

Figure P-8.1 Containment Spray System

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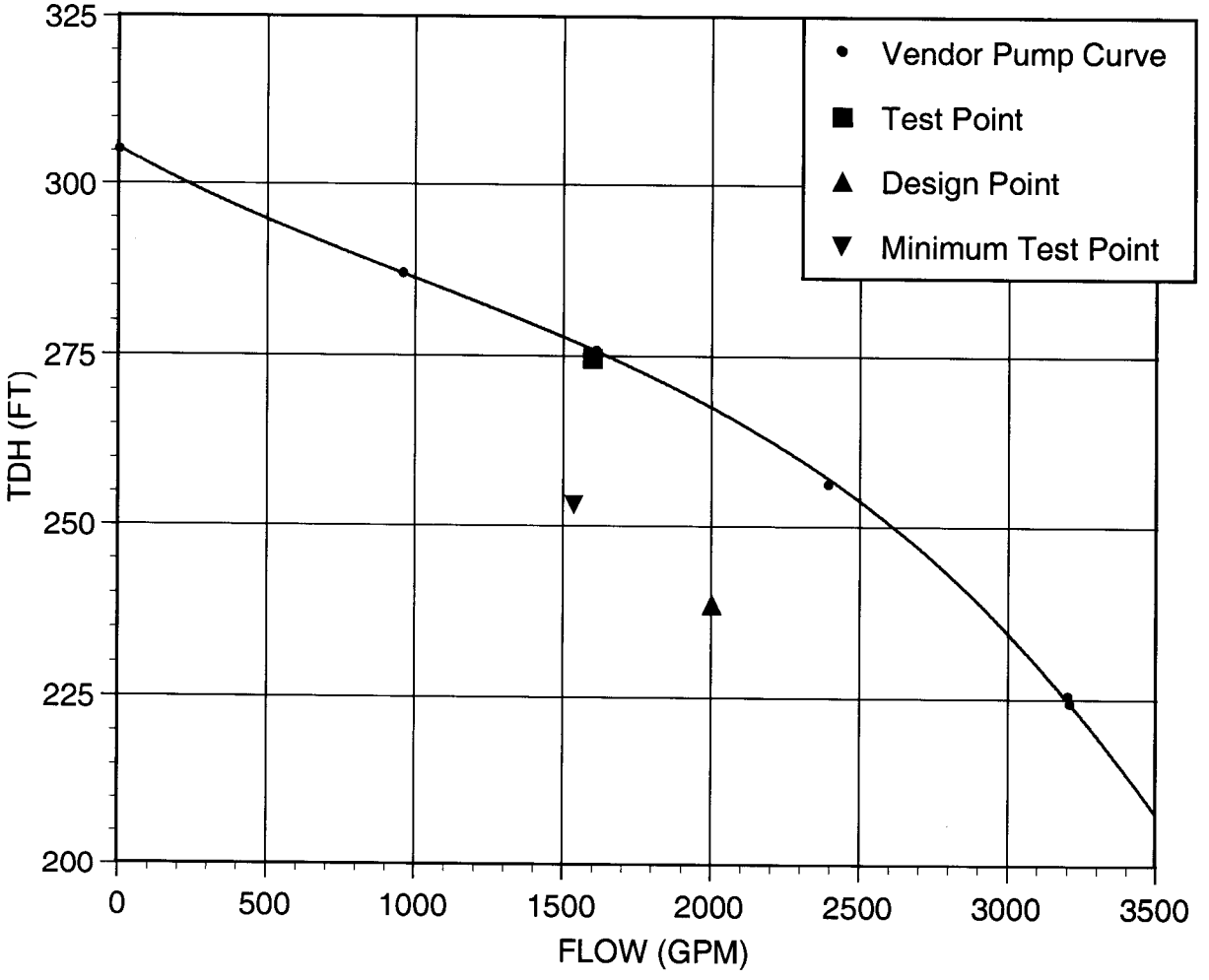

Figure P-8.2 Containment Spray Pump 1-CS-P-1A

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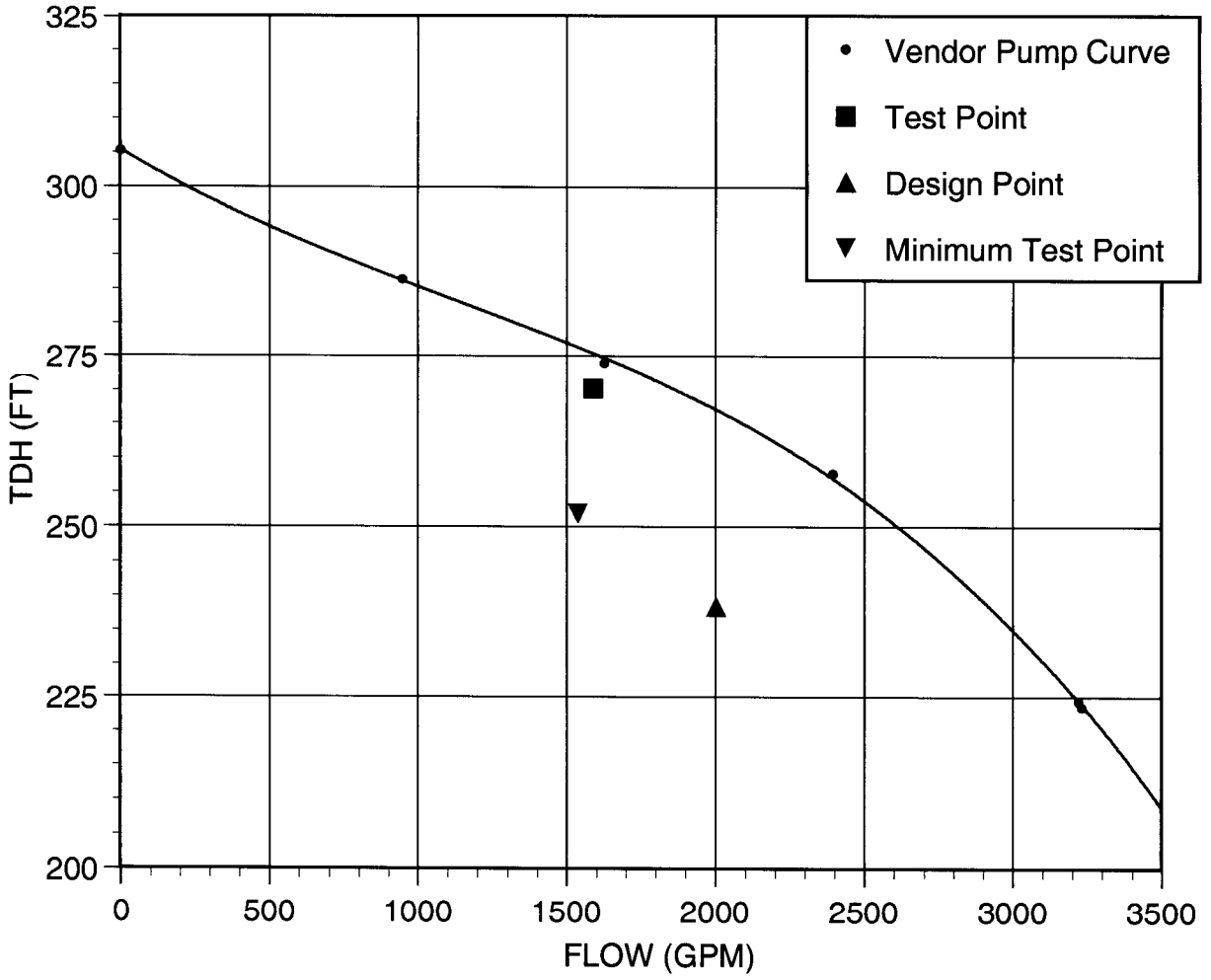

Figure P-8.3 Containment Spray Pump 1-CS-P-1B