

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

March 16, 1993

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

Serial No. 92-846
NL&P/RMN R16
Docket Nos. 50-280
50-281
50-338
50-339
License Nos. DPR-32
DPR-37
NPF-4
NPF-7

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
NORTH ANNA POWER STATION UNITS 1 AND 2
RESPONSE TO NRC BULLETIN 90-01, SUPPLEMENT 1
LOSS OF FILL-OIL IN ROSEMOUNT TRANSMITTERS

We have received your December 22, 1992 letter concerning loss of fill-oil in pressure transmitters manufactured by Rosemount. Based on a March 8, 1993 discussion between Mr. L. Engle of the NRC and Mr. J. Hegner of Virginia Electric and Power Company, the response date for this submittal was extended from March 8 to March 15, 1993. Our response is provided in the attachment.

If you have any questions or require additional information, please contact us.

Very truly yours,



W. L. Stewart
Senior Vice President - Nuclear

Attachment

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cc: U.S. Nuclear Regulatory Commission
Region II
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Atlanta, Georgia 30323

Mr. M. S. Lesser
NRC Senior Resident Inspector
North Anna Power Station

Mr. M. W. Branch
NRC Senior Resident Inspector
Surry Power Station

RESPONSE TO NRC BULLETIN NO. 90-01
SUPPLEMENT 1:
LOSS OF FILL-OIL IN TRANSMITTERS
MANUFACTURED BY ROSEMOUNT
NORTH ANNA AND SURRY POWER STATIONS

On December 22, 1992, the Nuclear Regulatory Commission (NRC) issued Supplement 1 to NRC Bulletin 90-01. The Supplement requires that all holders of operating licenses or construction permits for nuclear power reactors identify and take appropriate corrective actions for Model 1153, Series B, Model 1153, Series D, and Model 1154 Rosemount manufactured transmitters that may be leaking fill-oil.

NRC Bulletin 90-01, Supplement 1, requests that each licensee of nuclear power reactors perform the following actions for operating nuclear power reactors. The item numbers used below correspond with those in the Supplement.

1. **Review plant records and identify any Rosemount Model 1153 Series B, Model 1153 Series D, and Model 1154 transmitters manufactured before July 11, 1989, that are used or may be used in the future in either safety-related systems or systems installed in accordance with 10 CFR 50.62 (the ATWS rule), and**
 - a. **Expediently replace, or monitor for the life of the transmitter on a monthly basis using an enhanced surveillance monitoring program, any transmitters that have a normal operating pressure greater than 1500 psi and that are installed in reactor protection trip systems, ESF actuation systems or ATWS systems. Action for those transmitters that have not met the Rosemount psi-month threshold criterion should be expedited. At their discretion, licensees may monitor using an enhanced surveillance program at least once every refueling cycle, but not exceeding 24 months, transmitters in this category if the appropriate psi-month threshold criterion recommended by Rosemount has been reached, and the monitoring interval is justified based upon transmitter performance in service and its specific safety function. The justification should show that a sufficiently high level of reliability for the function is provided by the redundancy or diversity of applicable instrumentation and control systems, commensurate with the importance of the function, when considered in conjunction with the overall performance of the reactor protection trip system, ESF actuation systems, or ATWS system. Provide to the NRC a copy of the licensee justification to extend the enhanced surveillance program beyond the monthly test interval for transmitters that have reached the appropriate psi-month threshold criterion recommended by Rosemount.**

Response:

The transmitters at North Anna and Surry that meet this criterion are the pressure, flow, and level protection transmitters associated with the reactor coolant system (RCS). We will continue the present monthly operational monitoring of these transmitters.

Transmitter calibration procedures and training programs were revised after the issuance of the original bulletin to alert instrument technicians and operators to the problem of loss of fill-oil, and the signs when this phenomenon may be occurring. The technicians test the transmitter during calibration for sluggish response to step increases and decreases in pressure. The enhanced calibration program includes trending calibration results with a computer based system that calculates the zero shift that occurred between calibrations. Enhanced calibration/testing of these transmitters will continue to occur every refueling cycle, not exceeding 24 months.

- b. Replace, or monitor for the life of the transmitter on a quarterly basis using an enhanced surveillance monitoring program, any transmitters that have a normal operating pressure greater than 1500 psi and that are used in safety-related applications but are not installed in reactor protection trip systems, ESF actuation systems, or ATWS systems. At their discretion, the licensee may monitor using an enhanced surveillance program at least once every refueling cycle, but not exceeding 24 months, transmitters in this category if the appropriate psi-month threshold criterion recommended by Rosemount has been reached, and the monitoring interval is justified based upon transmitter performance in service and its specific function. Provide to the NRC a copy of the licensee justification to extend the enhanced surveillance program beyond the quarterly test interval for transmitters that have reached the appropriate psi-month threshold criterion recommended by Rosemount.**

Response:

The transmitters at North Anna and Surry that meet this criterion are the reactor coolant system wide range pressure transmitters, high head safety injection (HHSI) flow transmitters, and charging system makeup flow transmitters.

The reactor coolant system wide range pressure transmitters have reached their psi-month threshold. Enhanced calibration/testing of these transmitters will continue to occur every refueling cycle, not exceeding 24 months.

The HHSI flow transmitters do not see any flow during normal plant operation. Flow from the HHSI pumps goes to two headers. Each header has two redundant flow transmitters outside containment. Each header connects to branches inside containment that lead to the individual RCS legs. Each branch has a flow transmitter. These branch transmitters are not relied upon during performance of emergency procedures.

Only Surry has inside containment HHSI flow transmitters manufactured by Rosemount. These transmitters are safety related only for pressure boundary consideration. The inside containment Rosemount transmitters will continue to have enhanced calibration performed at each refueling outage. The zero drift values found at calibration will be used together with Rosemount published zero drift limit values to predict when the Rosemount drift limits would be exceeded. If the calculated time is less than the time to the next calibration, the transmitter will be declared inoperable.

For the HHSI flow transmitters outside containment we will either: 1) calibrate the transmitters quarterly using the enhanced calibration method, or 2) replace the transmitters, or 3) provide justification for a longer calibration period for those transmitters that have exceeded their psi-month limit.

North Anna has one charging system makeup flow transmitter that has not yet met its psi-month threshold. (The other one has been replaced with a transmitter with a serial number greater than 500000. The two at Surry have met their psi-month threshold.) This transmitter provides control and indication functions and has no redundant transmitter/channel with which to compare during plant operation. This transmitter cannot be easily removed from operation for frequent calibration due to its control function. We will continue monthly operational surveillance on this transmitter until it reaches its psi-month threshold.

- c. **Replace, or monitor at least once every refueling cycle, but not exceeding 24 months, using an enhanced surveillance program until the transmitter reaches the appropriate psi-month threshold criterion recommended by Rosemount, any transmitters that have normal operating pressure greater than 500 psi and less than or equal to 1500 psi and that are installed in reactor protection trip systems, ESF actuation systems, or ATWS systems.**

Response:

The transmitters at North Anna and Surry that meet this criterion are the steam generator narrow range level transmitters, and the main steam line flow and pressure transmitters. Enhanced calibration/testing of these transmitters will occur every refueling cycle, not exceeding 24 months. Those that have met their threshold will be removed from the enhanced monitoring program in accordance with "e" below.

- d. **Replace, or monitor at least once every refueling cycle, but not exceeding 24 months, using an enhanced surveillance monitoring program until the transmitter reaches the appropriate psi-month threshold criterion recommended by Rosemount, any transmitter used in safety related systems that have a normal operating pressure greater than 500 psi and less than or equal to 1500 psi, and that are not installed in reactor protection trip systems, ESF actuation systems, or ATWS systems.**

Response:

The transmitters at North Anna and Surry that meet this criterion are the safety injection accumulator pressure transmitters, steam to turbine driven auxiliary feedwater pump (TDAFWP) flow transmitters, and auxiliary feedwater (AFW) flow transmitters. Enhanced calibration/testing of those transmitters that have not met their psi-month threshold will occur every refueling cycle, not exceeding 24 months. Those that have met their threshold will be removed from the enhanced monitoring program in accordance with "e" below.

- e. **At licensee discretion, exclude from the enhanced surveillance program any transmitters that have a normal operating pressure greater than 500 psi and less than or equal to 1500 psi that have reached the appropriate psi-month threshold criterion recommended by Rosemount (60,000 psi-months or 130,000 psi-months depending on the range code of the transmitter). A high degree of confidence should be maintained for detecting failure of these transmitters caused by a loss of fill- oil and a high degree of reliability should be maintained for the function consistent with its safety significance.**

Response:

Normal calibration/testing of these transmitters will occur every refueling cycle, not exceeding 24 months.

- f. **At licensee discretion, exclude from the enhanced surveillance program any transmitters that have a normal operating pressure less than or equal to 500 psi. A high degree of confidence should be maintained for detecting failure of these transmitters caused by a loss of fill-oil and a high degree of reliability should be maintained for the function consistent with its safety significance.**

Response:

Normal calibration/testing of these transmitters will continue every refueling cycle, not exceeding 24 months.

2. **Evaluate the enhanced surveillance monitoring program to ensure that the program provides measurement data with an accuracy range consistent with that needed for comparison with manufacturer drift data criteria for determining degradation caused by a loss of fill-oil.**

Response:

The enhanced surveillance program in place at both North Anna and Surry Power Stations has two parts: 1) the transmitter's response testing and trending of calibration data subsequent to calibration, and 2) monthly monitoring of transmitter readings/data during unit operation.

The trending of calibration data occurs after calibration of a particular transmitter. The data sheets for a particular transmitter are submitted and the pertinent calibration data is entered into a personal computer database program, which calculates the zero shift that has occurred between calibrations. This calculated shift is compared with the Rosemount-established limits to determine whether or not the transmitter should remain in service. This data has accuracy consistent with requirements for comparison with manufacturer drift criteria.

The monthly enhanced operational monitoring is performed as follows. The monthly monitoring system records the outputs of the various transmitters connected to the Emergency Response Facility (ERF) computer system on magnetic tape using a high-speed digital recording system normally used to capture plant transient data. These tapes are then read by a mainframe computer and imported into a personal computer database program. The program calculates the variation between redundant channels, calculates the acceptable variance based on Rosemount-established limits, and compares the values. Transmitters that are outside the acceptable variance are then identified for further evaluation.

The equipment used for the operational monitoring system has the required accuracy to allow application of the Rosemount drift data. We have been successful using this system in estimating time to failure based on drift data and time at pressure. The inputs to the system are the same as the inputs to the ERF computer, and are therefore calibrated to the requirements of that system. These inputs are calibrated to $\pm 0.25\%$.

REPORTING REQUIREMENTS

NRC Bulletin 90-01, Supplement 1 requires a response that:

1. **Confirms that the actions in items 1 and 2 of Requested Actions will be performed.**

Response:

The requested actions will be performed. We have elected to remove certain transmitters from monthly enhanced surveillance. In one case, we propose to perform quarterly calibrations. Procedural changes will be required for transmitters where surveillance requirements have been changed. All transmitters, except those excluded by items 1e and 1f above, will continue to have enhanced surveillance performed when the transmitters are calibrated on a refueling frequency. We may subsequently choose to replace transmitters rather than continue the enhanced surveillance.

- 2a) **Lists the specific actions that will be completed to meet the requirements of item 1 of Requested Actions, including justifications as appropriate.**

Response:

The specific items are as follows.

1. Continue to monitor monthly, with the enhanced operational monitoring system described earlier, those transmitters in category 1a that have redundant channels/signals that can be readily and accurately compared. These items will continue to be monitored at calibration, which does not exceed 24 months.
2. Remove from enhanced surveillance those transmitters operating at a pressure greater than 500 psi and less than 1500 psi that have exceeded their psi-month threshold. For category 1b HHSI flow transmitters outside containment, either: 1) do enhanced calibration on the transmitters quarterly, or 2) replace the transmitters, or 3) provide justification for a longer calibration period. Continue enhanced calibration of those transmitters in category 1c and 1d that have not met their threshold.
3. Remove from the enhanced surveillance program transmitters operating at a pressure less than 500 psi that have no safety function (i.e., are for indication). These will continue to be tested for response to step changes in pressure at calibration.

- 2b) **Provides a schedule for completing the requirements of item 1 of Requested Actions.**

Response:

The requested actions have been completed, as discussed in our response to the requested actions. If we determine that a longer than quarterly calibration period for the outside containment HHSI flow transmitters is justified, we will provide the justification to the NRC.

- 2c) **Provides a statement confirming that items 1 and 2 have been completed.**

Response:

The requested actions have been completed, as discussed in our response to the requested actions.

3. **Provides a statement identifying those actions requested by the NRC that will not be completed.**

Response:

Not applicable, all requirements are met.