

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

October 14, 1993

U.S. Nuclear Regulatory Commission
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Gentlemen:

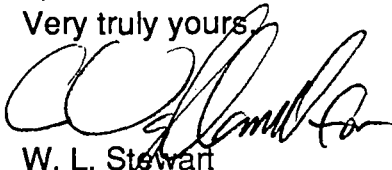
VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
NORTH ANNA POWER STATION UNITS 1 AND 2
SUPPLEMENTAL RESPONSE TO NRC BULLETIN 90-01, SUPPLEMENT 1
LOSS OF FILL-OIL IN TRANSMITTERS MANUFACTURED BY ROSEMOUNT

Our March 16, 1993 letter provided our response to NRCB 90-01, Supplement 1, concerning loss of fill-oil in pressure transmitters manufactured by Rosemount. In our letter we stated that for high head safety injection (HHSI) flow transmitters outside containment we would 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. After further evaluation, we have determined that these transmitters can be calibrated every 18 months.

There is currently one outside containment HHSI flow transmitter at Surry Unit 2 and one at North Anna Unit 1 that have not reached the psi-month threshold and are therefore statistically considered more likely to lose fill oil. These HHSI flow transmitters will be calibrated every 18 months and monitored monthly for zero drift using the operational monitoring program.

Additional information and justification are 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
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Mr. R. D. McWhorter, Jr.
NRC Senior Resident Inspector
North Anna Power Station

Mr. M. W. Branch
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Surry Power Station

**Calibration Frequency of HHSI Flow Transmitters
Rosemount Transmitter Loss of Fill-oil
NRCB 90-01, Supplement 1
North Anna and Surry Power Stations**

I. Statement of Problem

Supplement 1 to NRC Bulletin 90-01 was issued December 22, 1992. The Supplement provided surveillance guidelines for various categories of Rosemount transmitters based on normal operating pressure and function. The purpose of the surveillance is to detect loss of sensor fill-oil in Rosemount 1153 and 1154 series transmitters before the oil loss results in a transmitter unable to perform its intended function. Loss of fill-oil affects response time and both the zero and the span of the transmitter. Virginia Power's response to NRC Bulletin 90-01, Supplement 1, was issued on March 16, 1993, and provided our proposed actions for each of the categories.

By NRC definition of the various categories, surveillance requirements vary depending on whether transmitters have reached their Rosemount established psi-month threshold, at which time a transmitter is considered mature and statistically less likely to fail.

NRCB 90-01, Supplement 1, states that surveillance on Category 1b transmitters can be reduced to refueling cycle frequency if the transmitter is mature and the monitoring interval is justified based on performance in service. Transmitters in this category at North Anna and Surry include the High Head Safety Injection (HHSI) flow transmitters.

Category 1b of the Supplement states:

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.

At the time Virginia Power's response was developed, approximately half of the applicable HHSI flow transmitters outside Containment at North Anna and Surry were not mature. Since that time, four additional transmitters have matured and one has been replaced with a non-suspect transmitter. Because the HHSI flow transmitters are not in normal operational flow paths, operational data above a "zero" reading is not available. Our original solution was to perform quarterly surveillance via transmitter calibration, which would check the zero and span shift and the response time to a step change in pressure for each of the HHSI transmitters involved. We are revising our position based on further study of this issue.

II. Summary of Study

Mature Transmitters

The HHSI flow transmitters are range code 6. Most of these are now mature. A Rosemount-approved method for evaluating the oil loss in a range code 6 transmitter is determining the cumulative zero shift that has occurred between calibrations, calculating the shift per month based on the accumulated shift and months between calibrations, and then conservatively calculating the estimated months to reach the Rosemount published limits (at which time degraded performance could occur). If this calculated value is greater than the time to the next calibration (18 months for the HHSI flow transmitters), the transmitter has reasonable assurance of continued operability. This methodology is contained in Rosemount Technical Bulletin No. 4.

These calculations have been done for the Surry and North Anna HHSI flow transmitters. The estimated time remaining for the transmitters greatly exceeds the 24 month calibration threshold established by the NRC in NRCB 90-01, Supplement 1. Also the majority of the transmitters do not drift consistently in one direction (positive or negative), which demonstrates that the transmitters are not exhibiting loss of fill-oil symptoms. The mature HHSI flow transmitters have drift rates so low that the vendor-stated limits will not be reached before the end of an additional 18 months of operation, which was the original calibration frequency of these transmitters.

The Rosemount HHSI flow transmitters that are mature do not require enhanced monitoring or surveillance and do not require calibration more frequently than each 18 months. Their limited zero shift seen during the past several calibrations indicate that they are not leaking fill-oil, and that continued acceptable performance in the future is expected.

Non-Mature Transmitters

There is now only one HHSI flow transmitter at Surry (2-SI-FT-2940A) and one at North Anna (1-SI-FT-1943-1) that is not mature. Because loss of fill-oil affects a transmitter's zero setpoint, monitoring the zero reading is one method of determining if a transmitter has lost fill-oil. Trending zero shift is part of the enhanced surveillance monitoring program presently in place at both stations. This computerized program utilizes calibration as-found data for individual transmitters and compares it with the previous calibration as-left data to determine the zero shift. This trending is performed whenever a transmitter in the surveillance program is calibrated.

Computer calculations are also performed monthly on operating data to determine the shift between redundant transmitters. These calculations take both the zero and span shift limits published by Rosemount into account when establishing acceptance criteria. Transmitters falling outside the accepted limits are subject to further investigation, and may require re-calibration. This is the preferred method, since any error effect resulting from a loss of fill-oil (zero or span shift) would be detected. However, monitoring transmitter zero alone is a technically acceptable method of determining performance in service for transmitters in not normally operating systems, such as the HHSI flow transmitters.

North Anna transmitter 1-SI-FT-1943-1 is expected to mature in 1995 and Surry transmitter 2-SI-FT-2940A is expected to mature in 1994. There have been several calibrations performed on these transmitters, from which no significant trends can be seen. These transmitters will have their zero readings monitored under the operational monitoring program in addition to calibration every 18 months. The combination of no adverse trend seen during enhanced surveillance and future monthly monitoring of their zero readings provides assurance that the transmitters are not expected to fail due to loss of fill-oil, and that incipient failure would be detected if it were to occur.