POLICY ISSUE
(Information)

December 1, 1992

SECY-92-400

For: The Commissioners

From: James M. Taylor
Executive Director for Operations

Subject: Supplement to NRC Bulletin 90-01, "LOSS OF FILL-OIL IN TRANSMITTERS MANUFACTURED BY ROSEMOUNT"

Purpose: To inform the Commission that the staff intends to issue Supplement 1 to NRC Bulletin 90-01, "Loss of Fill-Oil in Transmitters Manufactured by Rosemount." This action is being provided pursuant to the guidance in SECY-92-224, "Revised Implementing Procedures for Issuance of Generic Communications." A copy of the proposed supplement is enclosed.

Discussion: In NRC Bulletin 90-01 and the proposed supplement, the staff is addressing the safety issue of the need to determine whether or not the Rosemount transmitter meets the current criteria as a reliable component for which failures can be readily detected. The NRC issued General Design Criterion (GDC) 21, "Protection System Reliability and Testability," in Appendix A to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR Part 50) to require the protection system to be designed with high functional reliability and with sufficient capability to allow periodic testing of its functioning when the reactor is operating. The NRC established this requirement to ensure that the licensee can readily detect failures of subcomponents and subsystems within the protection system and can readily detect loss of the required protection system redundancy

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NOTE: TO BE MADE PUBLICLY AVAILABLE IN 10 WORKING DAYS FROM THE DATE OF THIS PAPER

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when it occurs. In 10 CFR 50.55a(h), the NRC requires that protection systems meet the Institute of Electrical and Electronics Engineers Standard, "Criteria for Protection Systems for Nuclear Power Generating Stations" (IEEE-279). In IEEE-279, it is stated that means shall be provided for checking, with a high degree of confidence, the operational availability of each system input sensor during reactor operation. To achieve a high functional reliability, a transmitter must have a low probability of failing while it is operating. When failures occur, they should be readily detectable, commensurate with the safety function, while the transmitter is operating. Upon reviewing the analyses, evaluations, and historical data on the loss of fill-oil, the staff concludes that actions requested by the previous bulletin are insufficient to ensure the transmitters achieve the desired high functional reliability.

The actions requested in the bulletin supplement represent new positions of the staff and are considered a backfit to bring licensees into compliance with GDC 21. This supplement is based upon the original Bulletin 90-01, with additional data gathered from licensee event reports, licensee's responses to NRC Bulletin 90-01, technical information submitted by Rosemount, site visits, the NUMARC report 91-02, "Summary Report of NUMARC Activities to Address Oil Loss in Rosemount Transmitters," and numerous meetings with representatives from the industry, NUMARC, and Rosemount. On April 7, 1992, the proposed Supplement 1 to Bulletin 90-01, was published in the Federal Register. The staff received 12 replies to this notice. The comments received primarily concerned the scope of coverage for the transmitters to be addressed and clarification of the exact nature of requested actions. On July 23, 1992, the staff held a public meeting to discuss the comments received and their disposition. The staff received additional comments at this meeting. These comments were primarily requesting clarification of terms used in the proposed Supplement, and endorsing the enhanced surveillance concept. The staff has reviewed all comments received both during the public comment period and during the meeting, and has modified the supplement where warranted. On September 8, 1992, the Committee to Review Generic Communications (CRGR) reviewed the proposed supplement, including the disposition by the staff of comments received, and recommended changes which the staff incorporated into the supplement. The ACRS was

also provided a copy of this proposed bulletin supplement for their information.

The staff rationale for addressing the Rosemount issue by issuing a generic communication rather than by initiating a rulemaking or issuing individual orders is that this is a compliance issue. The actions requested in the proposed bulletin supplement would ensure compliance with GDC 21 and with 10 CFR 50.55a(h) for the reliability and testability of protection systems. The staff chose to address this issue by issuing a supplement to NRC Bulletin 90-01 to maintain consistency with the previous generic communication.

The staff intends to issue this supplement approximately 10 working days after the date of this information paper.

James M. Taylor
Executive Director
for Operations

Enclosure:
Supplement 1 to NRC Bulletin 90-01,
"Loss of Fill-Oil in Transmitters
Manufactured by Rosemount"

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OMB No.: 3150-0011
NRCB 90-01, Supplement 1

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555

NRC BULLETIN NO. 90-01, SUPPLEMENT 1: LOSS OF FILL-OIL IN TRANSMITTERS MANUFACTURED BY ROSEMOUNT

Addressees

All holders of operating licenses or construction permits for nuclear power reactors

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this bulletin supplement to inform addressees of activities taken by the NRC staff and the industry in evaluating Rosemount transmitters and to request licensees to take actions to resolve this issue. This supplement updates information provided in Bulletin 90-01, "Loss of Fill-Oil in Transmitters Manufactured by Rosemount." It is requested that recipients review the information for applicability to their facilities and modify, as appropriate, their actions and enhanced surveillance programs as described in this bulletin supplement.

Description of Circumstances

On April 21, 1989, the NRC issued Information Notice (IN) 89-42, "Failure of Rosemount Models 1153 and 1154 Transmitters," to alert the industry to a series of reported failures of Models 1153 and 1154 pressure and differential pressure transmitters manufactured by the Rosemount Inc. (Rosemount). Rosemount investigated the cause of the failures and confirmed that the failure mode was a gradual loss of fill-oil from the sealed sensing module of the transmitter. On March 9, 1990, the NRC issued Bulletin 90-01, in which it requested that licensees promptly identify and take appropriate corrective actions for Model 1153 Series B, Model 1153 Series D, and Model 1154 transmitters manufactured by Rosemount that may be or have the potential for leaking fill-oil. During the summer and fall of 1990, the Nuclear Management and Resources Council (NUMARC) surveyed the industry to gather data on all installed Rosemount Model 1153 and 1154 transmitters and safety-related Model 1151 and 1152 transmitters at commercial nuclear facilities. NUMARC also requested data on all suspected or confirmed failures of Rosemount transmitters attributed to a loss of fill-oil from these same facilities.

Discussion

The staff has reviewed the Rosemount transmitter loss of fill-oil issue by analyzing data gathered from (1) licensee event reports, (2) the licensee's responses to NRC Bulletin 90-01, (3) technical information provided by Rosemount, (4) site visits, (5) NUMARC report 91-02, "Summary Report of NUMARC Activities to Address Oil Loss in Rosemount Transmitters," (Reference 5) and (6) numerous meetings with representatives from the industry, NUMARC, and Rosemount. The NRC became concerned about this complex technical issue because the failure could occur and remain undetected while the transmitter was in service and could be a common mode failure. The manufacturer indicated that these failures resulted from a failure of a glass-to-metal seal inside the sensor which allowed fill fluid to leak out of the sensor at a very slow rate. When this condition occurs, the transmitter performance gradually deteriorates and may lead to failure. The loss of fill-oil failures has not been traced to a specific time of manufacture, manufacturing lots, or process conditions for transmitters manufactured before July 11, 1989. The manufacturer performed extensive analyses to thoroughly understand and quantify the symptoms of the failure and to develop diagnostic guidelines for detecting a loss of fill fluid. While performing these analyses and reviewing historical data on the failed transmitters, the manufacturer found that the issue involved a number of interacting factors. These factors are discussed in references (1) through (5). These factors include the range code of the transmitter, the ability of various evaluation methods to detect the characteristics of a loss of fill fluid, the operating pressure of the transmitter, and the amount of time that the transmitter had been in service.

Rosemount attributed many of the failures resulting in a loss of fill-oil to the use of stainless steel "O" rings and the increased stresses on the sensor module that result. The manufacturer made improvements to the manufacturing process and the post-production screening for transmitters and sensors produced after July 11, 1989. These improvements included making process changes to reduce stresses on the sensor modules and pressure testing the sensors to identify any incipient failures caused by leaking fill fluid. By making these improvements, the manufacturer corrected to a large extent the problem of sensor fill-oil loss, since only one failure attributed to a loss of fill-oil has been found in transmitters manufactured after that date.

The staff has reviewed licensee individual responses to NRC Bulletin 90-01 and concluded that the actions taken as a result of the bulletin helped to improve the safety of operating reactors by reducing the susceptibility to Rosemount transmitter failures due to a loss of fill-oil. This was accomplished mainly by prompting licensees to remove Rosemount transmitters that were installed in the reactor protection systems (RPS) or engineered safety feature (ESF) actuation systems that the manufacturer found to have a high failure fraction resulting from a susceptibility to a loss of fill-oil (i.e., suspect lot

transmitters). The licensee also was to evaluate against appropriate operability acceptance criteria those transmitters that were suspected of exhibiting symptoms of a loss of fill-oil when reviewing the plant's historical records on the calibration of those transmitters. The licensees established enhanced surveillance programs by considering various diagnostic procedures for detecting transmitter fill-oil leakage. These diagnostic procedures included trending calibration data, trending operational data, reviewing transmitter performance for sluggish transient response, and conducting process noise analysis.

However, the staff raised a number of concerns upon reviewing the licensee's responses. These included the following:

1. The responses from two licensees indicated that they did not intend to replace suspect lot transmitters installed in RPS or ESF actuation systems. These responses were reviewed with the licensees concerned, and the staff determined that based on the available monitoring program or the specific applications and available backup indications, the licensee actions were acceptable.

2. Using pressure times time-in-service criteria provided in the Rosemount Technical Bulletin No. 4 (Reference 4) as a means to identify which transmitters should be included in the enhanced surveillance program. In evaluating the industry survey data, the staff has since confirmed a relationship, as had been previously found by Rosemount and NUMARC, between operating pressure, time-in-service and failure rate, and that these parameters were acceptable for identifying which transmitters should be included in an enhanced surveillance program.

3. Eliminating low pressure application (below 250 psi) transmitters from the enhanced surveillance program because the low oil pressure was not sufficient to cause oil loss. The staff has since confirmed a relationship between operating pressure and transmitter failure. A high operating pressure was the most dominant factor leading to a loss of fill-oil. Transmitters in low pressure applications had low failure rates due to a loss of fill-oil.

4. The difference between the number of transmitters manufactured by Rosemount and the total number of transmitters (those installed and those in the suspect lots) found from the responses of all licensees, and the reasons for this difference. The staff has since found the NUMARC report evaluation and the associated database sufficiently account for the difference between the number of transmitters manufactured by Rosemount and the total number of transmitters (those installed and those in the suspect lots) identified from the responses of all licensees to the original Bulletin 90-01.

5. The adequacy of the licensee's enhanced surveillance programs to detect failed transmitters. The staff has since completed a review of the NUMARC transmitter data and specific modified and additional requested actions regarding enhanced surveillance programs are contained within this supplement.

During the licensee response period to Bulletin 90-01, NUMARC surveyed all utilities to collect data on all installed Rosemount Model 1153 and 1154 transmitters, and on Rosemount Model 1151 and 1152 transmitters installed in safety-related systems. NUMARC conducted the survey to address the staff's concerns (2) through (4) above, the closure of enhanced surveillance monitoring activities, and to address concerns regarding the loss of fill-oil in the Rosemount Model 1151, 1152, and 1153 Series A transmitters.

The staff reviewed the data collected by NUMARC to (1) verify NUMARC conclusions, (2) evaluate surveillance issues regarding the licensee's responses in implementing the enhanced surveillance program requested by the staff in the bulletin, and (3) determine if other insights could be drawn from this data. The Brookhaven National Laboratory (BNL) assisted the staff in evaluating the data by assessing the failure rates for various types of transmitters by operating pressure, time-in-service, and suspect or nonsuspect lot classification. BNL provided the staff with the report, "Evaluation of Surveillance and Technical Issues Regarding Rosemount Pressure Transmitter Loss of Fill-Oil Failures," December 20, 1991 (Reference 6). The staff evaluated the effect of the various failure rates to address the staff concerns (2), (3), and (5) discussed above. In addition, the staff considered the effects of the various failure rates on the potential for anticipated transients without scram (ATWS). The staff concluded that estimated unavailabilities and the associated impact on ATWS frequency could be very sensitive to changes in the transmitter failure rate.

In evaluating this issue, the staff confirmed a relationship, as had been previously found by Rosemount and NUMARC, between operating pressure, time-in-service, and the suspect and nonsuspect lot classifications in identifying where the transmitters would most likely fail. A high operating pressure was the most dominant factor leading to a loss of fill-oil.

Second among these factors was time-in-service, with those transmitters having been in service for less than 60,000 psi-months exhibiting higher failure rates than transmitters that had been in service for more than 60,000 psi-months. Attachment 1 represents the staff estimates of Rosemount transmitter failure rates based on pressure application and the time in service derived from the NUMARC survey data.

Third among these factors was the classification of the lot as suspect or nonsuspect. All suspect lots as defined by Rosemount contained at least one confirmed failure and possibly more, depending on the size of the lot.

However, many confirmed or suspected failures caused by a loss of fill-oil were identified in nonsuspect lots. If all other factors were assumed equal, suspect lots had higher failure rates than nonsuspect lots. When pressure application or time-in-service was considered, classification by suspect or nonsuspect lot was of lesser importance.

Throughout this evaluation period, the staff found several noteworthy items including the following:

1. The manufacturer continues to confirm that transmitters are failing because of a loss of fill-oil.

   When the NRC issued Bulletin 90-01, the manufacturer confirmed that approximately 90 transmitters had failed because of a loss of fill-oil. By taking the actions requested in the bulletin, the licensees would have removed from service both those groups of transmitters identified as suspect transmitters and those transmitters suspected of oil loss based on historical calibration data. Since that time, Rosemount has confirmed approximately 50 additional transmitters as having failed because of a loss of fill-oil. While the number of failures resulting from a loss of fill-oil has decreased recently, this condition continues to cause transmitters to fail. However, only one failure attributed to a loss of fill-oil has been found in transmitters manufactured after July 11, 1989.

2. The manufacturer continues to classify more transmitters as being suspect lots.

   In December 1989, Rosemount issued the initial list of suspect lot transmitters which included approximately 1075 transmitters. Since that time, the manufacturer has updated this list with four addenda (references 1 through 4), with the most recently issued addendum adding approximately 215 transmitters in December 1991. The current number of transmitters found in the suspect lots is approximately 1700. The staff now concludes that the suspect lot classification is of lesser importance than operating pressure and time-in-service.

3. At nuclear facilities, Model 1151 and Model 1152 transmitters have failed because of a loss of fill-oil.

   The fact that these transmitters failed indicates that the failures are not limited to transmitters with stainless steel "O" rings. However, the number of Model 1151 and Model 1152 transmitters which have been confirmed to have failed due to loss of fill-oil is very small for their considerable operating experience.

4. In November 1991, Rosemount informed the NRC that it was recalling approximately 1300 Model 1151 transmitters based on a Rosemount engineering analysis which indicated that these transmitters are susceptible to a loss of fill-oil.

   Rosemount indicated that it had shipped only a few of these transmitters to nuclear facilities and that none had been reported as having failed because of a loss of fill-oil. The staff reviewed information on these transmitters and concluded that Rosemount has addressed the issue adequately by making a recall. Rosemount is also improving the postproduction screening test of Model 1151 transmitters.

The staff concern throughout the evaluation of this issue is the need to determine whether or not he Rosemount transmitter meets current criteria as a reliable component for which failures can be readily detected. The NRC issued General Design Criterion (GDC) 21, "Protection System Reliability and Testability" in Appendix A to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR 50) to require the protection system to be designed with high functional reliability and with a capability to permit periodic testing of its functioning when the reactor is in operation. The NRC established this requirement to ensure that the licensee can readily detect failures of subcomponents and subsystems within the protection system and can readily detect loss of the required protection system redundancy when it occurs. In 10 CFR 50.55a(h), the NRC requires that protection systems meet the Institute of Electrical and Electronics Engineers Standard, "Criteria for Protection Systems for Nuclear Power Generating Stations" (IEEE-279). In IEEE-279, the Standard states that means shall be provided for checking, with a high degree of confidence, the operational availability of each system input sensor during reactor operation. To achieve a high functional reliability, a transmitter must have a low probability of failure while it is operating. Furthermore, failures should be readily detectable, commensurate with the safety function, while the transmitter is in operation. Upon reviewing the analyses, evaluations, and historical data on the loss of fill-oil, the staff concludes that actions requested by the previous bulletin are insufficient to ensure compliance with the regulations requiring that the transmitters achieve the desired high functional reliability.

The staff concludes the following:

1. The following Rosemount transmitters are not achieving high functional reliability: Model 1153 Series B, Model 1153 Series D, and Model 1154 transmitters manufactured before July 11, 1989, that are currently used in either safety-related systems or systems installed in accordance with 10 CFR 50.62 (the ATWS rule), and that:

   a. have a normal operating pressure greater than 1500 psi, or

b. have a normal operating pressure greater than 500 psi and less than or equal to 1500 psi that have not reached the appropriate psi-month threshold recommended by Rosemount (60,000 psi-months or 130,000 psi-months depending on the range code of the transmitter).

Since these transmitters are not achieving high functional reliability, the transmitters should be replaced or use of an enhanced surveillance program should be implemented. Details are provided in Requested Actions below. The availability of access points to the instrument loops and the potential for inadvertent actuation should be considered in any decision to implement the enhanced surveillance program option rather than replace transmitters. Plant shutdown solely for the purposes of implementing the replacement option of transmitters identified in the Requested Actions is not intended.

2. The following Rosemount transmitters are achieving a high functional reliability: Model 1153 Series B, Model 1153 Series D, and Model 1154 transmitters manufactured before July 11, 1989, that are currently used in either safety-related systems or systems installed in accordance with 10 CFR 50.62 (the ATWS rule), and that:

   a. have a normal operating pressure less than or equal to 500 psi, or

   b. 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 recommended by Rosemount (60,000 psi-months or 130,000 psi-months depending on the range code of the transmitter).

   These transmitters may remain in service and may be excluded from any enhanced surveillance program provided that a high degree of confidence is maintained for detecting degradation of these transmitters caused by a loss of fill-oil and a high degree of reliability is maintained for the function consistent with its safety significance.

3. As a minimum, enhanced surveillance monitoring programs should provide 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. To achieve the desired accuracy, the licensee can determine the trending of zero drift and span drift from the calibration data for most Rosemount transmitter range codes. Other methods may include measuring the output of a transmitter that is in service using a calibrated instrument and comparing the results with redundant channels.

4. The appropriate enhanced surveillance test interval for each of the transmitters in the program should consider the specific safety function(s), available diversity, and other factors. In determining the

test interval for those transmitters which are to be monitored by an enhanced surveillance program, the licensee may find that the normal calibration interval may not be sufficient to provide a high degree of confidence for detecting degradation caused by a loss of fill-oil.

5. Replacing a Rosemount transmitter with one manufactured after July 11, 1989, means installing a transmitter which has been refurbished with a sensor module manufactured after July 11, 1989 (sensor module number greater than 2182605), or installing a transmitter manufactured after July 11, 1989 (a transmitter having a serial number greater than 500000).

6. The performance experience and identified failures do not indicate that additional licensee action is warranted to address the issue of a loss of fill-oil for Rosemount Model 1151, 1152, and 1153 (Series A) transmitters. The number of Model 1151 and Model 1152 transmitters which have been confirmed to have failed due to a loss of fill-oil is very small given their operating experience, and therefore is sufficiently low to be of minimum concern.

7. The NUMARC report evaluation and the associated database sufficiently account for the difference between the number of transmitters manufactured by Rosemount and the total number of transmitters (those installed and those in the suspect lots) found from the responses of all licensees to the original Bulletin 90-01. The NUMARC survey data provided the staff a "snapshot" of the installed population of Rosemount transmitters subject to the bulletin, including application by function, time-in-service, and operating pressure.

Requested Actions

Operating Reactors

The NRC requests that all holders of operating licenses for nuclear power reactors take the following actions:

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. Expeditiously 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.

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, 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 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.

c. [For BWRs] Replace, or monitor on a monthly basis using an enhanced surveillance monitoring program, until the transmitter reaches the appropriate psi-month threshold criterion recommended by Rosemount, any transmitters that have a normal operating pressure greater than 500 psi and less than or equal to 1500 psi, that are installed in reactor protection trip systems, ESF actuation systems or ATWS systems. On a case-by-case basis except for transmitters that initiate reactor protection or ATWS trips for high pressure or low water level, licensees may monitor using an enhanced surveillance program at least once every refueling cycle, but not exceeding 24 months, if sufficient justification is provided 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 PWRs] 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 a 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.

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 transmitters 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.

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.

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.

Summary tables are included as Attachment 2 to aid in understanding the above actions requested in this Bulletin Supplement compared with those in Bulletin 90-01.

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.

The actions described in this supplement supersede the actions requested in the original bulletin. Compliance with applicable Commission requirements may be the subject of NRC audits or inspections in the future.

Construction Permit Holders

All holders of construction permits are requested to complete Items 1 and 2 of Requested Actions for Operating Reactors before the date scheduled for loading fuel.

The actions described in this supplement supersede the actions requested in the original bulletin. Compliance with applicable Commission requirements may be the subject of NRC audits or inspections in the future.

Reporting Requirements

Operating Reactors

Provide within 60 days after receipt of this bulletin, a response that includes the following:

1. A statement whether the licensee will take the actions requested above.

2. With regard to the actions requested above that the licensee is taking:

   a. A list of the specific actions that the licensee will complete to meet Item 1 of Requested Actions for Operating Reactors provided in this supplement, including justifications as appropriate.

   b. The schedule for completing licensee actions to meet Item 1 of Requested Actions provided in this supplement.

   c. A statement confirming that Item 2 of Requested Actions for Operating Reactors provided in this supplement has been completed.

3. A statement identifying those actions requested by the NRC that the licensee is not taking and an evaluation which provides the bases for not taking the requested actions.

Construction Permit Holders

Before the date scheduled for loading fuel, all holders of construction permits are required to provide a response that confirms that the Requested Action for Construction Permit Holders has been completed.

The written reports required above with respect to both operating reactors and plants under construction shall be addressed to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555, and shall be submitted under oath or affirmation pursuant to the provisions of Section 182a, Atomic Energy Act of 1954, as amended and 10 CFR 50.54(f). A copy shall also be submitted to the appropriate Regional Administrator. Because the information sought above is to verify licensee compliance with 10 CFR 50.55a(h) and GDC 21, which are part of the current licensing basis for all plants, justification for this information request need not be prepared by the Commission pursuant to 10 CFR 50.54(f).

Backfit Discussion

The NRC is requesting that the addressees take the actions described herein to ensure that they promptly detect transmitter failures caused by a loss of fill-oil. A loss of fill-oil may result in a transmitter not performing its intended safety function.

The actions requested in this bulletin supplement represent new positions of the staff and thus, this request is considered a backfit in accordance with the NRC's procedures. The staff is imposing this backfit to bring facilities into compliance with existing requirements and did not perform a full backfit analysis. However, the staff performed an evaluation of the type discussed in 10 CFR 50.109(a)(6) including a statement of the objectives of and reasons for the actions requested and the basis for invoking the compliance exemption. It will be made available in the Public Document Room with the minutes of the 228th meeting of the Committee to Review Generic Requirements. The staff disposition of comments received on the proposal for this Supplement 1 to Bulletin 90-01, which was published in the Federal Register on April 7, 1992 will also be made available with those minutes.

This request is covered by Office of Management and Budget Clearance Number 3150-0011 which expires June 30, 1994. The estimated average number of burden hours is 2 person-hours for each transmitter for each licensee. This includes the time needed to assess the requested actions, review plant records, analyze the data obtained from plant records, evaluate the existing enhanced surveillance program, and prepare the required response. This does not include the time needed to revise the enhanced surveillance programs or to replace transmitters. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Information and Records Management Branch,

Division of Information Support Services, Office of Information Resources Management, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555; and to Ronald Minsk, (3150-0011), Office of Management and Budget, Washington, D.C. 20503.

Although no specific request or requirement is intended, the following information would be helpful to the NRC in evaluating the cost of complying with this bulletin supplement:

(1) the licensee staff time and costs to perform requested inspections, evaluations, modifications, and associated testing

(2) the licensee staff time and costs to complete the requested reports and documentation

(3) the additional short-term costs incurred as a result of performing the requested actions such as the costs of additional corrective actions or costs of down time

(4) an estimate of the additional long-term costs which will be incurred in the future as a result of implementing commitments such as the estimated cost of conducting future surveillances or increased maintenance

If you have any questions about the information in this supplement, please contact the technical contact listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

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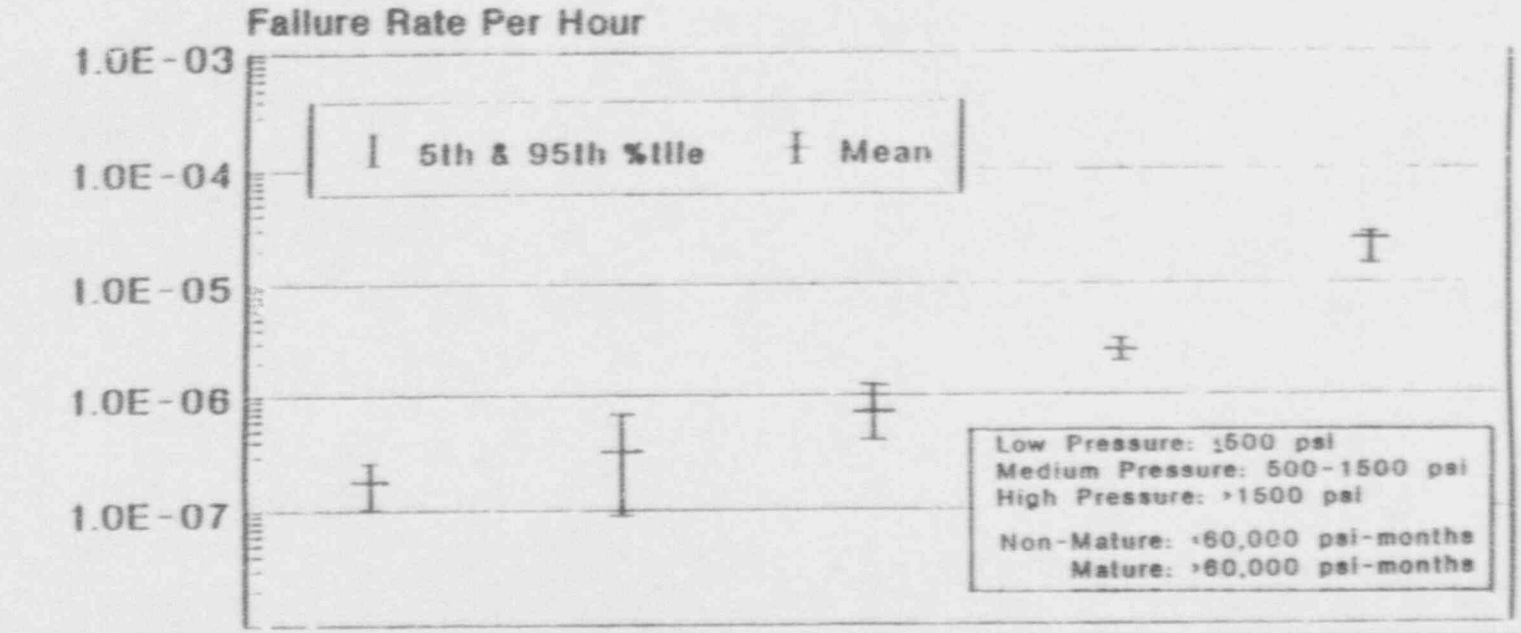
Attachments:

1. Figure 1, Rosemount Transmitter Failure Rates
2. Comparison of Requested Actions
3. List of Recently issued NRC Bulletins

References:

1. Rosemount Technical Bulletin No. 1, May 10, 1989
2. Rosemount Technical Bulletin No. 2, July 12, 1989
3. Rosemount Technical Bulletin No. 3, October 23, 1989
4. Rosemount Technical Bulletin No. 4, December 22, 1989
5. NUMARC Report 91-02, "Summary of NUMARC Activities to Address Oil Loss in Rosemount Transmitters," April 1991.
6. BNL Report, "Evaluation of Surveillance and Technical Issues Regarding Rosemount Pressure Transmitter Loss of Fill-Oil Failures," December 20, 1991.



Pressure (L,M,H)	L	M	H	M	H
Mature-M Non-Mat-NM	N M	M	M	N M	N M
Population	2881	185	370	2512	347
No. of Failures (Suspected and Confirmed)	13	3	10	138	43

Figure 1. Rosemount Transmitter Failure Rates
(90% chi-squared confidence interval)

COMPARISON OF REQUESTED ACTIONS

High Pressure	Supplement to Bulletin 90-01	Original Bulletin 90-01
Non-Mature RPS/ESF/ATWS	Replace or monitor with an enhanced surveillance program on a monthly basis.	Replace suspect lot transmitters Monitor remainder in an enhanced surveillance program
Non-Mature Non-RPS/Non-ESF/Non-ATWS	Replace or monitor with an enhanced surveillance program on a quarterly basis.	Monitor with an enhanced surveillance program
Mature RPS/ESF/ATWS	Replace or monitor with an enhanced surveillance program on a monthly basis. (24 month basis with adequate justification.)	Replace suspect lot transmitters Monitor remainder in an enhanced surveillance program
Mature Non-RPS/Non-ESF/Non-ATWS	Replace or monitor with an enhanced surveillance program on a quarterly basis. (24 month basis with adequate justification.)	Monitor with an enhanced surveillance program

NOTE: Non-Mature refers to a transmitter that has not reached the appropriate psi-month threshold recommended by Rocemount (60,000 psi-months or 130,000 psi-months depending on the range code of the transmitter). Mature refers to a transmitter that has met the Rosemount psi-month threshold criterion.

COMPARISON OF REQUESTED ACTIONS

Medium Pressure	Supplement to Bulletin 90-01	Original Bulletin 90-01
Non-Mature RPS/ESF/ATWS	(BWR) Replace or monitor with an enhanced surveillance program on a monthly basis. (24 month basis with adequate justification, except for transmitters that initiate RPS or ATWS trips for high pressure or low water level.) (PWR) Replace or monitor with an enhanced surveillance program at intervals no greater than 24 months.	Replace suspect lot transmitters Monitor remainder in an enhanced surveillance program
Non-Mature Non-RPS/Non-ESF/Non-ATWS	Replace or monitor with an enhanced surveillance program at intervals no greater than 24 months.	Monitor with an enhanced surveillance program
Mature RPS/ESF/ATWS	Enhanced surveillance program discretionary Maintain ability to detect failures	Replace suspect lot transmitters Monitor remainder in an enhanced surveillance program
Mature Non-RPS/Non-ESF/Non-ATWS	Enhanced surveillance program discretionary Maintain ability to detect failures	Monitor with an enhanced surveillance program

NOTE: Non-Mature refers to a transmitter that has not reached the appropriate psi-month threshold recommended by Rosemount (60,000 psi-months or 130,000 psi-months depending on the range code of the transmitter). Mature refers to a transmitter that has met the Rosemount psi-month threshold criterion.

COMPARISON OF REQUESTED ACTIONS

Low Pressure	Supplement to Bulletin 90-01	Original Bulletin 90-01
Non-Mature RPS/ESF/ATWS	Enhanced surveillance program discretionary Maintain ability to detect failures	Replace suspect lot transmitters Monitor remainder in an enhanced surveillance program
Non-Mature Non-RPS/Non-ESF/Non-ATWS	Enhanced surveillance program discretionary Maintain ability to detect failures	Monitor with an enhanced surveillance program
Mature RPS/ESF/ATWS	Enhanced surveillance program discretionary Maintain ability to detect failures	Replace suspect lot transmitters Monitor remainder in an enhanced surveillance program
Mature Non-RPS/Non-ESF/Non-ATWS	Enhanced surveillance program discretionary Maintain ability to detect failures	Monitor with an enhanced surveillance program

NOTE: Non-Mature refers to a transmitter that has not reached the appropriate psi-month threshold recommended by Rosemount (60,000 psi-months or 130,000 psi-months depending on the range code of the transmitter). Mature refers to a transmitter that has met the Rosemount psi-month threshold criterion.

Division of Information Support Services, Office of Information Resources Management, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555; and to Ronald Minsk, (3150-0011), Office of Management and Budget, Washington, D.C. 20503.

Although no specific request or requirement is intended, the following information would be helpful to the NRC in evaluating the cost of complying with this bulletin supplement:

(1) the licensee staff time and costs to perform requested inspections, evaluations, modifications, and associated testing

(2) the licensee staff time and costs to complete the requested reports and documentation

(3) the additional short-term costs incurred as a result of performing the requested actions such as the costs of additional corrective actions or costs of down time

(4) an estimate of the additional long-term costs which will be incurred in the future as a result of implementing commitments such as the estimated cost of conducting future surveillances or increased maintenance

If you have any questions about the information in this supplement, please contact the technical contact listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

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Attachments:

1. Figure 1, Rosemount Transmitter Failure Rates
2. Comparison of Requested Actions
3. List of Recently issued NRC Bulletins