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NRCB 90-01

ENCLOSURE 1

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

March 9, 1990

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

Addressees:

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

Purpose:

This bulletin requests that addressees 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 leaking fill-oil.

Description of Circumstances:

NRC Information Notice No. 89-42, "Failure of Rosemount Models 1153 and 1154 Transmitters," dated April 21, 1989, was issued to alert industry to a series of reported failures of Rosemount Models 1153 and 1154 pressure and differential pressure transmitters. The reported failures occurred at Northeast Utilities' Millstone Unit 3 between March and October 1987. Subsequent investigation into the cause of the failures by Rosemount confirmed that the failure mode was a gradual loss of fill-oil from the transmitter's sealed sensing module.

Discussion of Safety Significance:

The performance of a transmitter that is leaking fill-oil gradually deteriorates and may eventually lead to failure. Although some failed transmitters have shown symptoms of loss of fill-oil prior to failure, it has been reported that in some cases the failure of a transmitter that is leaking fill-oil may be difficult to detect during operation. An undetected transmitter failure has a greater adverse effect on safety system reliability than a failure that would be readily detectable during normal operation. For example, electronic circuit malfunctions are routinely detected either by observing instrument channel readout or during periodic surveillance tests. Transmitter failures that are not readily detectable increase the potential for common mode failure and may result in the affected safety system not performing its intended safety function. This common mode failure potential is of increased concern when transmitter designs are particularly susceptible to loss of fill-oil.

Discussion:

Model 1151, 1152, 1153, and 1154 Rosemount transmitters are utilized extensively in nuclear power plants. Model 1153 and 1154 transmitters are supplied by Rosemount as both seismically and environmentally qualified equipment. Model 1152 transmitters are supplied by Rosemount only as seismically qualified equipment. Model 1151 transmitters are supplied by Rosemount as commercial-grade equipment.

Rosemount has indicated, to date, that failure of approximately 91 Model 1153 Series B, Model 1153 Series D, and Model 1154 transmitters due to loss of fill-oil from a glass to metal seal failure have been confirmed. Since the sensing module is sealed, loss of fill-oil cannot be visually confirmed without destructive analysis of the sensing module. NRC staff review of this issue has identified additional Model 1153 and 1154 transmitters with symptoms indicative of loss of fill-oil that may not have been brought to Rosemount's attention. Thus, the number of Model 1153 and 1154 transmitters that have experienced a loss of fill-oil may be even greater than that confirmed by Rosemount.

Model 1153 Series B, Model 1153 Series D, and Model 1154 transmitters, because their construction incorporates the use of a metal o-ring, appear to be particularly susceptible to loss of fill-oil due to a glass to metal seal failure. Accordingly, the NRC staff believes that the degree of susceptibility of these transmitters to loss of fill-oil warrants their being subjected to an enhanced surveillance program. In addition, certain manufacturing lots of Model 1153 Series B, Model 1153 Series D, and Model 1154 transmitters have been identified by Rosemount as having had a high failure fraction due to loss of fill-oil. Specific information needed to identify transmitters that are from these suspect lots has been provided to industry by Rosemount concurrent with Reference 4. Accordingly, the NRC staff believes that this additional degree of susceptibility warrants not utilizing these suspect lot transmitters in the reactor protection or engineered safety features actuation systems.

Rosemount has indicated that failures of Model 1151 and 1152 transmitters due to loss of fill-oil have also been confirmed. The construction of Model 1151, 1152, and 1153 Series A transmitters is similar to that of Model 1153 Series B, Model 1153 Series D, and Model 1154 transmitters (i.e., the utilization of a glass to metal seal) except the construction of Model 1151, 1152, and 1153 Series A transmitters incorporates an elastomeric o-ring instead of a metal o-ring. The NRC staff does not, at present, have sufficient information to effectively address the susceptibility of Model 1151, 1152, and 1153 Series A transmitters to loss of fill-oil. Therefore, in order to obtain relevant operational experience data, addressees are encouraged to report Model 1151, 1152, and 1153 Series A, as well as Model 1153 Series B, Model 1153 Series D and Model 1154 transmitters that may have exhibited symptoms indicative of loss of fill-oil or have been confirmed to have experienced a loss of fill-oil to the Nuclear Plant Reliability Data System (NPRDS). In addition, while enhanced surveillance of Model 1151, 1152, and 1153 Series A transmitters is not specifically requested by this bulletin, addressees are encouraged to undertake such efforts on Model 1151, 1152, and 1153 Series A transmitters utilized in either safety-related systems or systems installed in accordance with 10 CFR 50.62 (the ATWS rule).

Rosemount has indicated that they have instituted additional quality control and quality assurance steps in the manufacturing process and modified specifications on bolt torque to reduce stress levels. These changes should minimize the potential for Model 1153 Series B, Model 1153 Series D, and Model 1154 transmitter failures due to loss of fill-oil. As a result, Rosemount has indicated that transmitters of these types manufactured after July 11, 1989 are not subject to their May 1989 10 CFR Part 21 notification. The NRC staff has not, to date, received operational experience data that indicates that Model 1153 Series B, Model 1153 Series D and Model 1154 transmitters manufactured after July 11, 1989 are as susceptible to loss of fill-oil as those manufactured prior to July 11, 1989. Accordingly, while enhanced surveillance of transmitters of these types manufactured after July 11, 1989 is not specifically requested by this bulletin, addressees are encouraged to undertake such efforts on these transmitters if they are utilized in either safety-related systems or systems installed in accordance with 10 CFR 50.62 (the ATWS rule). In addition, Model 1153 Series B, Model 1153 Series D and Model 1154 transmitters manufactured after July 11, 1989 that exhibit symptoms indicative of loss of fill-oil or are confirmed to have experienced a loss of fill-oil should be reported in accordance with the report requirements of this bulletin.

The NRC staff encourages utilities to work collectively under the guidance of a technical industry organization to develop and analyze an operational experience database concerning all models of Rosemount transmitters. The NRC staff will continue to obtain and analyze operational experience data pertaining to Model 1151, 1152, 1153, and 1154 transmitters. Further regulatory action, such as requesting expansion of enhanced surveillance activities to include Model 1151, Model 1152, and Model 1153 Series A transmitters and Model 1153 Series B, Model 1153 Series D and Model 1154 transmitters manufactured by Rosemount after July 11, 1989 or requesting replacement of additional suspect lot transmitters, may be taken if warranted.

Addressees may have obtained transmitters that were manufactured by Rosemount or that contain Rosemount manufactured sensing modules from a number of different sources. The following information is provided to facilitate addressee's identification of transmitters that were manufactured by Rosemount or that contain Rosemount manufactured sensing modules:

- Rosemount has indicated that unauthorized remanufacturers and refurbishers exist for Model 1151 transmitters. Unauthorized remanufacturers and refurbishers may also exist for Model 1152, 1153, and 1154 transmitters.

- All Model 1153 and 1154 transmitters, whether obtained directly from Rosemount, obtained through intermediary suppliers, or provided as an integral part of another component (such as an emergency diesel generator), should a) indicate manufacture by Rosemount, b) have a distinctive Rosemount model and serial number, c) have the physical

profile characteristics of a Rosemount transmitter, and d) have a blue or stainless steel housing. Rosemount has indicated that Model 1153 and 1154 transmitters are not provided to other manufacturers for resale under a different brandname. In addition, a simplified diagram that describes the typical physical characteristics of a Rosemount transmitter is provided by Attachment 1.

- Model 1152 transmitters, except as noted below, should a) indicate manufacture by Rosemount, b) have a distinctive Rosemount model and serial number, c) have the physical profile characteristics of a Rosemount transmitter, and d) have a blue or stainless steel housing. Rosemount has indicated that they have supplied Model 1152 transmitter sensing modules to Bailey Controls (formerly Bailey Meter). Bailey manufactured transmitters that contain Rosemount manufactured Model 1152 sensing modules have gray housings that appear slightly different than Rosemount housings.

- Model 1151 transmitters, except as noted below, should a) indicate manufacture by Rosemount, b) have a distinctive Rosemount model and serial number, c) have the physical profile characteristics of a Rosemount transmitter, and d) have a blue housing. Model 1151 transmitters manufactured by Rosemount may have been supplied for use in nuclear power plants by other original equipment manufacturers. These transmitters should have the physical profile characteristics of a Rosemount transmitter and have a blue housing. Fisher Controls may also offer for resale under their own brandname Model 1151 transmitters purchased from Rosemount. These transmitters should have the physical profile characteristics of a Rosemount transmitter, but have a green housing.

The earliest symptom a Model 1153 Series B, Model 1153 Series D, or Model 1154 transmitter may exhibit during normal operation prior to failure if it is leaking fill-oil is:

- a sustained drift

The symptoms a Model 1153 Series B, Model 1153 Series D, or Model 1154 transmitter may exhibit during normal operation subsequent or immediately prior to failure if it is leaking fill-oil include:

- a sustained drift

- an abrupt decreasing drift (for high range gauge or absolute transmitters)

- a change in process noise including amplitude variations, "one-sided-noise," or asymmetric noise distributions

- slow response to or inability to follow planned or unplanned plant transients

The symptoms a Model 1153 Series B, Model 1153 Series D, or Model 1154 transmitter may exhibit during calibration activities if it is leaking fill-oil include:

- inability to respond over the entire design range
- slow response to either an increasing or decreasing test pressure
- a sustained zero or span shift

The NRC staff believes these symptoms can also be utilized to detect Model 1151, 1152, and 1153 Series A transmitters that may be experiencing a loss of fill-oil.

The NRC staff has reviewed the information which has been provided by Rosemount, including References 1, 2, 3, and 4, to assist industry in detecting transmitters that may be leaking fill-oil. The NRC staff has concluded that Rosemount has provided sufficient bases to support their proposed diagnostic procedures (trending calibration data, trending operational data, sluggish transient response, and process noise analysis) for detecting whether a transmitter may be leaking fill-oil. Accordingly, the actions requested in this bulletin are intended to reflect these diagnostic procedures. However, the NRC staff has concluded that Rosemount has not provided sufficient bases to support their proposed methodology (pressure versus time-in-service) for identifying which transmitters should be subject to an enhanced surveillance program. Specifically, the NRC staff believes that the methodology utilized by Rosemount to support their proposed pressure versus time-in-service criteria for identifying which transmitters should be subject to an enhanced surveillance program does not provide the necessary high degree of confidence that this failure mode will not occur.

Rosemount had initially indicated that Model 1153 Series B, Model 1153 Series D, and Model 1154 transmitters that were experiencing a loss of fill-oil should fail within approximately 36 months of in-service time. Recent information indicates that the rate of loss of fill-oil is application and pressure dependent. Although transmitters subject to continuous high-pressure (e.g. reactor operating pressures) may fail within this timeframe, transmitters utilized in low-pressure systems or not subject to continuous high-pressure may take longer to fail.

General Design Criterion (GDC) 21 "Protection System Reliability and Testability" of 10 CFR 50, Appendix A requires the protection system to be designed for high functional reliability and with sufficient capability to allow periodic testing of its functioning when the reactor is in operation in order to readily detect failures of subcomponents and subsystems within the protection system as well as loss of the required protection system redundancy as they occur. 10 CFR 50.55a(h) requires that protection systems meet the Institute of Electrical and Electronics Engineers Standard: "Criteria for Protection Systems for Nuclear Power Generating

Stations" (IEEE-279). IEEE-279 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. Thus, the NRC staff concludes that facilities that utilize transmitters that may be particularly susceptible to loss of fill-oil may not be in full compliance with these regulations because undetected transmitter failure could occur. Accordingly, the NRC staff requests that addressees take the actions requested below.

Requested Actions:

Operating Reactors

All holders of operating licenses for nuclear power reactors are, within 120 days after receipt of this bulletin, requested to:

1. Identify Model 1153 Series B, 1153 Series D, and Model 1154 pressure or differential pressure transmitters, excluding Model 1153 Series B, 1153 Series D, and Model 1154 transmitters manufactured by Rosemount subsequent to July 11, 1989, that are currently utilized in either safety-related systems or systems installed in accordance with 10 CFR 50.62 (the ATWS rule).

2. Determine whether any transmitters identified in Item 1 are from the manufacturing lots that have been identified by Rosemount as having a high failure fraction due to loss of fill-oil. Addressees are requested not to utilize transmitters from these suspect lots in the reactor protection or engineered safety features actuation systems; therefore, addressees are requested to develop and implement a program to replace, at the earliest appropriate opportunity, transmitters from these suspect lots in use in the reactor protection or engineered safety features actuation systems.

3. Review plant records (for example, the three most recent calibration records) associated with the transmitters identified in Item 1 above to determine whether any of these transmitters may have already exhibited symptoms indicative of loss of fill-oil. Appropriate operability acceptance criteria should be developed and applied to transmitters identified as having exhibited symptoms indicative of loss of fill-oil from this plant record review. Transmitters identified as having exhibited symptoms indicative of loss of fill-oil that do not conform to the operability acceptance criteria should be addressed in accordance with the applicable technical specification. Transmitters identified as having exhibited symptoms indicative of loss of fill-oil that do not conform to the operability acceptance criteria and are not addressed in the technical specifications should be replaced at the earliest appropriate opportunity.

4. Develop and implement an enhanced surveillance program to monitor transmitters identified in Item 1 for symptoms of loss of fill-oil. This enhanced surveillance program should consider the following or equally effective actions:

a) Ensuring appropriate licensee personnel are aware of the symptoms that a transmitter, both during operation and during calibration activities, may exhibit if it is experiencing a loss of fill-oil and the need for prompt identification of transmitters that may exhibit these symptoms;

b) Enhanced transmitter monitoring to identify sustained transmitter drift;

c) Review of transmitter performance following planned or unplanned plant transients or tests to identify sluggish transmitter response;

d) Enhanced awareness of sluggish transmitter response to either increasing or decreasing test pressures during calibration activities;

e) Development and implementation of a program to detect changes in process noise; and

f) Development and application to transmitters identified as having exhibited symptoms indicative of loss of fill-oil of an appropriate operability acceptance criteria. Transmitters identified as having exhibited symptoms indicative of loss of fill-oil that do not conform to the operability acceptance criteria should be addressed in accordance with the applicable technical specification. Transmitters identified as having exhibited symptoms indicative of loss of fill-oil that do not conform to the operability acceptance criteria and are not addressed in the technical specifications should be replaced at the earliest appropriate opportunity.

5. Document and maintain in accordance with existing plant procedures a basis for continued plant operation covering the time period from the present until such time that the Model 1153 Series B, 1153 Series D, and Model 1154 transmitters from the manufacturing lots that have been identified by Rosemount as having a high failure fraction due to loss of fill-oil in use in the reactor protection or engineered safety features actuation systems can be replaced. In addition, while performing the actions requested above, addressees may identify transmitters exhibiting symptoms indicative of loss of fill-oil that do not conform to the established operability acceptance criteria and are not addressed in the technical specifications. As these transmitters are identified, this basis for continued plant operation should be updated to address these transmitters covering the time period from the time these transmitters are identified until such time that these transmitters can be replaced. When developing and updating this basis for continued plant operation, addressees may wish to consider transmitter diversity and redundancy, diverse trip functions (a separate trip function that may also provide a corresponding trip signal), special system and/or component tests, or (if necessary) immediate replacement of certain suspect transmitters.

Construction Permit Holders

1. All construction permit holders that anticipate receiving an operating license within 120 days after receipt of this bulletin are requested to perform Items 1, 2, 4, and 5 of Requested Actions for Operating Reactors within 120 days after receipt of this bulletin.

2. All construction permit holders that do not anticipate receiving an operating license within 120 days after receipt of this bulletin are requested to, prior to the date scheduled for fuel loading, complete Items 1 and 4 of Requested Actions for Operating Reactors and to address the intent of Items 2 and 5 of Requested Actions for Operating Reactors by:

   a) Identifying and replacing Model 1153 Series B, 1153 Series D, and Model 1154 transmitters from the manufacturing lots that have been identified by Rosemount as having a high failure fraction due to loss of fill-oil that are installed in the reactor protection or engineered safety features actuation systems; and

   b) Documenting and maintaining in accordance with existing plant procedures a basis for continued plant operation that addresses transmitters that, subsequent to fuel loading, are identified as exhibiting symptoms indicative of loss of fill-oil that do not conform to the established operability acceptance criteria and are not addressed in the technical specifications covering the time period from the time these transmitters are identified until such time that these transmitters can be replaced.

Reporting Requirements:

Operating Reactors

1. Provide, within 120 days after receipt of this bulletin, a response that:

   a) Confirms that Items 1, 2, 3, 4, and 5 of Requested Actions for Operating Reactors have been completed.

   b) Identifies the indicated manufacturer; the model number; the system the transmitter was utilized in; the approximate amount of time at pressure; the corrective actions taken; and the disposition (e.g., returned to vendor for analysis) of Rosemount Model 1153 Series B, Model 1153 Series D, and Model 1154 transmitters that are believed to have exhibited symptoms indicative of loss of fill-oil or have been confirmed to have experienced a loss of fill-oil. This should include Model 1153 Series B, Model 1153 Series D and Model 1154 transmitters manufactured after July 11, 1989.

   c) Identifies the system in which the Model 1153 Series B, 1153 Series D, and Model 1154 transmitters from the manufacturing

lots that have been identified by Rosemount as having a high failure fraction due to loss of fill-oil are utilized and provides a schedule for replacement of these transmitters which are in use in the reactor protection or engineered safety features actuation systems.

2. Model 1153 Series B, Model 1153 Series D and Model 1154 transmitters that, subsequent to providing the response required by Item 1 above, exhibit symptoms of loss of fill-oil or are confirmed to have experienced a loss of fill-oil should be reviewed for reportability under existing NRC regulations. If determined not to be reportable, addressees are requested to document and maintain, in accordance with existing plant procedures, information consistent with that requested in Item 1 b) above for each transmitter identified.

Although not required by this bulletin, addressees are encouraged to report information consistent with that requested in Item 1 b) above through the Nuclear Plant Reliability Data System (NPRDS) for all Rosemount Model 1151, 1152, 1153 and 1154 transmitters that exhibit symptoms indicative of a loss of fill-oil or are confirmed to have experienced a loss of fill-oil.

Construction Permit Holders

1. All holders of construction permits that anticipate receiving an operating license within 120 days after receipt of this bulletin are required to, within 120 days after receipt of this bulletin, provide a response that:

   a) Confirms that Items 1, 2, 4, and 5 of Requested Actions for Operating Reactors have been completed; and

   b) Identifies the system in which the Model 1153 Series B, 1153 Series D, and Model 1154 transmitters from the manufacturing lots that have been identified by Rosemount as having a high failure fraction due to loss of fill-oil are utilized and provides a schedule for replacement of these transmitters which are in use in the reactor protection or engineered safety features actuation systems.

2. All holders of construction permits that do not anticipate receiving an operating license within 120 days after receipt of this bulletin are required to, prior to the date scheduled for fuel loading, provide a response that confirms that Item 2 of Requested Actions for Construction Permit Holders has been completed.

3. Model 1153 Series B, Model 1153 Series D and Model 1154 transmitters that, subsequent to providing the response required by Item 1 or 2 above, exhibit symptoms of loss of fill-oil or are confirmed to have experienced a loss of fill-oil should be reviewed for reportability under existing NRC regulations. If determined not to be reportable, addressees are requested to document

and maintain, in accordance with existing plant procedures, information consistent with that requested in Item 1 b) of the Reporting Requirements for Operating Reactors above for each transmitter identified.

Although not required by this bulletin, addressees are encouraged to report information consistent with that requested in Item 1 b) of the Reporting Requirement for Operating Reactors through the NPRDS for all Rosemount Model 1151, 1152, 1153 and 1154 transmitters that exhibit symptoms indicative of loss of fill-oil or are confirmed to have experienced a loss of fill-oil.

As has been previously indicated, the NRC staff believes that the methodology utilized by Rosemount to support their proposed pressure versus time-in-service criteria for identifying which transmitters should be subject to an enhanced surveillance program does not provide the necessary high degree of confidence that this failure mode will not occur. Additional operational experience data, such as that to be generated in response to this bulletin, could be utilized by industry either to provide additional insight as to the appropriateness of Rosemount's pressure versus time-in-service criteria or to develop bases for staff consideration of an amendment to or termination of the actions requested by this bulletin. Accordingly, the NRC staff encourages utilities to work collectively under the guidance of a technical industry organization to develop an operational experience database concerning all models of Rosemount transmitters.

The written reports required above 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). In addition, a copy shall be submitted to the appropriate Regional Administrator.

Backfit Discussion

The objective of the actions requested in this bulletin is to ensure that transmitter failures due to loss of fill-oil are promptly detected. Loss of fill-oil may result in a transmitter not performing its intended safety function.

The actions requested in this bulletin represent new staff positions and thus, this request is considered a backfit in accordance with NRC procedures. Because established regulatory requirements exist but were not satisfied, this backfit is to bring facilities into compliance with existing requirements. Therefore, a full backfit analysis was not performed. An evaluation of the type discussed in 10 CFR 50.109(a)(6) was performed, including a statement of the objectives of and reasons for the actions requested and the basis for invoking the compliance exception. It will be made available in the Public Document Room with the minutes of the 179th meeting of the Committee to Review Generic Requirements.

This request is covered by Office of Management and Budget Clearance Number 3150-0011 which expires January 31, 1991. The estimated average burden hours are 6 person-hours per transmitter per licensee. This includes assessing the requested actions, gathering and reviewing plant records, analyzing the data

obtained from the plant records, and preparing the required response. This does not include developing and implementing the requested enhanced surveillance program or replacing transmitters from the manufacturing lots that have been identified by Rosemount as having a high failure fraction due to loss of fill-oil that are utilized in the reactor protection or engineered safety features actuation systems. 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 the Paperwork Reduction Project (3150-0011), Office of Management and Budget, Washington, D.C. 20503.

If you have any questions about this matter, please contact one of the technical contacts listed below or the appropriate NRR project manager.

Charles E. Rossi

Charles E. Rossi, Director
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Technical Contacts: Jack Ramsey, NRR
(301) 492-1167

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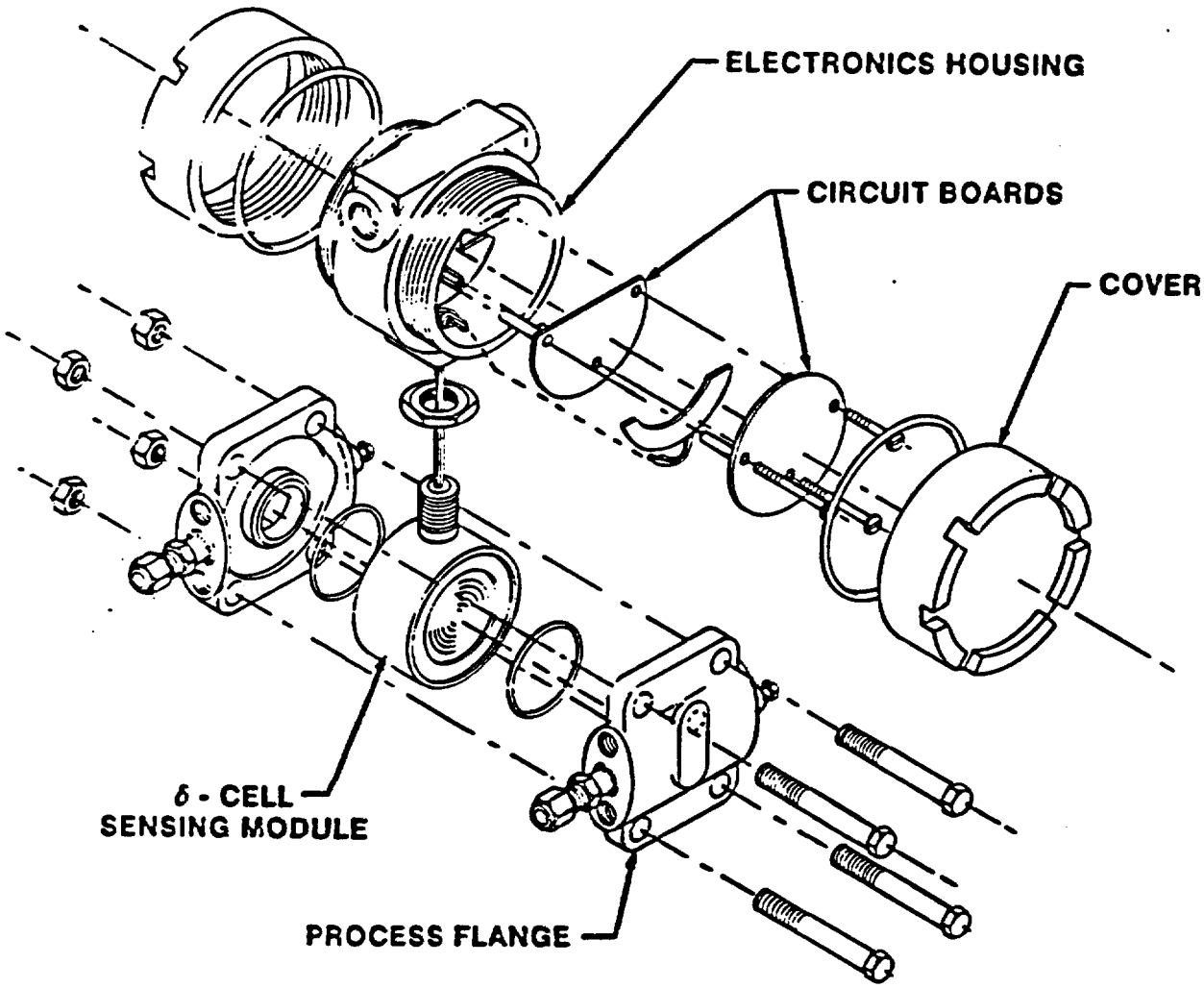
References:

1. Rosemount Technical Bulletin No. 1 dated May 10, 1989
2. Rosemount Technical Bulletin No. 2 dated July 12, 1989
3. Rosemount Technical Bulletin No. 3 dated October 23, 1989
4. Rosemount Technical Bulletin No. 4 dated December 22, 1989

Attachments:
1. Typical Physical Characteristics of a Rosemount Transmitter
2. List of Recently Issued NRC Bulletins

TYPICAL PHYSICAL CHARACTERISTICS OF A ROSEMOUNT TRANSMITTER



LIST OF RECENTLY ISSUED NRC BULLETINS

Bulletin No.	Subject	Date of Issuance	Issued to
89-03	Potential Loss of Required Shutdown Margin During Refueling Operations	11/21/89	All holders of OLs or CPs for PWRs.
88-10, Supplement 1	Nonconforming Molded-Case Circuit Breakers	8/3/89	All holders of OLs or CPs for nuclear power reactors.
89-02	Stress Corrosion Cracking of High-Hardness Type 410 Stainless Steel Internal Preloaded Bolting in Anchor Darling Model S350W Swing Check Valves or Valves of Similar Design	7/19/89	All holders of OLs or CPs for nuclear power reactors.
89-01	Failure of Westinghouse Steam Generator Tube Mechanical Plugs	5/15/89	All holders of OLs or CPs for PWRs.
88-08, Supplement 3	Thermal Stresses in Piping Connected to Reactor Coolant Systems	4/11/89	All holders of OLs or CPs for light-water-cooled nuclear power reactors.
88-07, Supplement 1	Power Oscillations in Boiling Water Reactors	12/30/88	All holders of OLs or CPs for BWRs.
88-11	Pressurizer Surge Line Thermal Stratification	12/20/88	All holders of OLs or CPs for PWRs.
88-10	Nonconforming Molded-Case Circuit Breakers	11/22/88	All holders of OLs or CPs for nuclear power reactors.
88-05, Supplement 2	Nonconforming Materials Supplied by Piping Supplies, Inc. at Folsom, New Jersey and West Jersey Manufacturing Company at Williamstown, New Jersey	8/3/88	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
CP = Construction Permit