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TECHNICAL EVALUATION REPORT

Evaluation of Utility Response to Supplement 1 to NRC Bulletin 90-01: Farley-1/-2

Docket No. 50-348 and 50-364

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SUMMARY

This report documents the Lockheed Idaho Technologies Company review of the Joseph M. Farley Nuclear Plant, Unit Nos. 1 and 2, submittals that respond to Supplement 1 to NRC Bulletin 90-01. This NRC Bulletin provides information regarding the loss of fill-oil in certain pressure and differential pressure transmitters manufactured by Rosemount, Inc. This report finds the licensee complies with the requested actions and the reporting requirements of the Supplement.

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PREFACE

This report is supplied as part of the "Technical Assistance in Support of the Instrumentation and Controls Systems Branch." It is being conducted for the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Division of Reactor Controls and Human Factors, by Lockheed Idaho Technologies Company, National Nuclear Operations Analysis Department.

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1. INTRODUCTION

The NRC issued Bulletin 90-01 on March 9, 1990 (Reference 1). That Bulletin discussed certain Rosemount pressure and differential pressure transmitter models identified by the manufacturer as prone to fill-oil leakage. The bulletin requested licensees to identify whether these transmitters were or may later be installed in safety-related systems. Actions were detailed for licensee implementation for identified transmitters installed in a safety-related system. Those same actions apply to the identified transmitters held in inventory for later installation in a safety-related system.

With the gradual leakage of fill-oil, the transmitter would not have the long term accuracy, time response, and reliability needed for its intended safety function. Further, this condition could go undetected over a long period. Redundant instrument channels are subject to the same degradation mechanism. This increases the potential for a common mode failure. Thus, this potential failure mechanism raised concern for the reliability of reactor protection systems (RPS), engineered safety features (ESF) actuation systems, and anticipated transient without scram (ATWS) mitigating systems. To achieve high functional reliability, there must be a low probability of component failure while operating, with any failures readily detectable.

Supplement 1 to NRC Bulletin 90-01 (Reference 2) was issued on December 22, 1992. The Supplement informed licensees of NRC staff activities regarding the subject transmitters, and noted continuing reports of transmitter failures. The NRC requested licensee action to resolve the issue. The Supplement also updated the information contained in the original bulletin. The licensee was requested to review the information and determine if it was applicable at their facility. Further, the licensee was requested to modify their actions and enhanced surveillance monitoring programs to conform with the direction given. Finally, the licensee was instructed to

those submittals. It also determines whether proposed surveillance methods are adequate to determine fill-oil loss-caused degradation of the transmitter. Finally, this report addresses the interval of surveillance proposed by the licensee for any transmitters included in the enhanced surveillance monitoring program.

Many Rosemount transmitter failures have been attributed to the use of stainless steel "O"-rings between the sensing module and the process flanges. Rosemount improved the manufacturing process for transmitters manufactured after July 11, 1989. Those improvements included a limit of the torque applied to th· flange bolts. This limits the stress caused in the sensing module by the "O"-ring. Post-production screening, including pressure testing of the sensing module for this potential latent defect, was also implemented at that time. Therefore, as described in Supplement 1 of NRC Bulletin 90-01, those Rosemount transmitters manufactured after July 11, 1989, are not subject to this review.

justification can be based on high functional reliability provided by redundancy or diversity.

c. For boiling water reactors (BWR) --

For those identified transmitters having a normal operating pressure greater than 500 psi and less than or equal to 1500 psi, and are installed as part of reactor protection trip systems, ESF actuation systems, or ATWS mitigating systems, either replace the transmitter, or monitor monthly with an enhanced surveillance monitoring program, until the transmitter reaches the designated (by Rosemount) psi-month criterion (60,000 psi-month or 130,000 psi-month, depending on the transmitter range code).

For transmitters that provide signals to the RPS or ATWS trips for high pressure or low water level, the enhanced surveillance must be monthly. For other transmitters in this classification, enhanced surveillance on a refueling (not exceeding 24 months) basis is acceptable. Under this option, justification must be based on the service record and the specific safety function of the transmitter. That justification can be based on high functional reliability provided by redundancy or diversity.

For pressurized water reactors (PWR) --

For those identified transmitters having a normal operating pressure greater than 500 psi and less than or equal to 1500 psi, and are installed as part of reactor protection trip systems, ESF actuation systems, or ATWS mitigating systems, either replace the transmitter, or monitor with an enhanced surveillance monitoring program, until the transmitter reaches the designated (by Rosemount) psi-month criterion (60,000 psi-month or 130,000 psi-month, depending on the transmitter range code) on a refueling (not exceeding 24 months) basis.

d. For those identified transmitters having a normal operating pressure greater than 500 psi and less than or equal to 1500 psi, and are installed as part of a safety-related system other than reactor protection trip systems, ESF actuation, or ATWS mitigating systems, either replace the transmitter or monitor with an enhanced surveillance monitoring program, until the transmitter reaches the designated (by Rosemount) psi-month criterion (60,000 psi-month or 130,000 psi-month, depending on the transmitter range code) on a refueling (not exceeding 24 months) basis.

3. EVALUATION

The licensee provided responses to Supplement 1 of NRC Bulletin 90-01 on February 11, 1993, and April 7, 1993. On December 2, 1994, the licensee informed the NRC that the commitments made are complete. Those responses were compared to the Bulletin Reporting Requirements and Requested Actions as described below. The licensee reports having, in February 1993, 6 Rosemount transmitters that are subject to the Requested Actions of the Supplement.

3.1 Evaluation of Licensee Response to Reporting Requirements

The licensee states they will take the Requested Actions detailed in Supplement 1 of NRC Bulletin 90-01. Included with that statement is clarification, interpretation, and the limits placed on that commitment. The licensee described the specific actions taken to implement the Requested Actions. The licensee also discussed the associated schedule for completion.

The submittal identifies where the licensee took no action and provides evaluation and justification supporting the position that the action is not necessary. The licensee has scheduled transmitter replacements. Reference 5 provides notification that the scheduled work is complete.

The licensee submittals conform with the Reporting Requirements of Supplement 1 of NRC Bulletin 90-01.

3.2 Evaluation of Licensee Response to Requested Actions

Supplement 1 of NRC Bulletin 90-01 requested licensee action to resolve the issue of fill-oil leakage in Rosemount transmitters. In this Technical Evaluation Report, Section 2 summarizes the Requested Actions and associated transmitter criteria. The licensee identified a total of 6 transmitters that are in the scope of this review as of February 1993. The following sections discuss the licensee response.

3.2.4 Licensee Response to Requested Action 1.d

The licensee states there is one Rosemount transmitter from this transmitter classification at the Farley Nuclear Plant. This transmitter is Q1P23FT3229A, Auxiliary Feedwater Flow. Previous enhanced surveillance of this transmitter shows no symptoms of loss of fill-oil. With timely replacement, the Supplement does not require an interim enhanced surveillance monitoring program for these transmitters. The licensee scheduled this transmitter for replacement in the spring of 1994. Reference 5 notes this replacement is complete. The replacement transmitter was manufactured after July 11, 1989.

3.2.5 Licensee Response to Requested Action 1.e

The licensee states the transmitters mentioned above will be replaced. Therefore, there are no Rosemount transmitters from this transmitter classification at the Farley Nuclear Plant.

3.2.6 Licensee Response to Requested Action 1.f

The licensee states there are two Rosemount transmitters from this transmitter classification at the Farley Nuclear Plant. These transmitters are:

Q1P17LT3027C	Component Cooling Water Surge Tank Level
Q1P17LT3027D	Component Cooling Water Surge Tank Level

The licensee states these transmitters are not subject to replacement or to an enhanced surveillance monitoring program. However, the licensee, in Reference 5, states they intend to replace these two Unit 1 transmitters in the fall of 1995. The licensee notes that these replacement transmitters

4. CONCLUSIONS

Based on our review, we find the licensee has completed the reporting requirements of Supplement 1 of NRC Bulletin 90-01. Further, the licensee conforms to the requested actions of Supplement 1 to NRC Bulletin 90-01.

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10. SUPPLEMENTARY NOTES

11. ABSTRACT (200 words or less)

This report documents the Lockheed Idaho Technologies Company review of the Southern Nuclear Operating Company submittals that respond to Supplement 1 to NRC Bulletin 90-01 for the Joseph M. Farley Nuclear Plant, Unit Nos. 1 and 2. This NRC Bulletin provides information regarding the loss of fill-oil in certain pressure and differential pressure transmitters manufactured by Rosemount, Incorporated. This report finds the licensee conforms to the requested actions and the reporting requirements of the Supplement.

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