

Rosemount Nuclear Instruments

Rosemount Nuclear Instruments, Inc.
12001 Technology Drive
Eden Prairie, MN 55344 USA
Tel: 1 (612) 941-5580
Fax: 1 (612) 828-3088

May 27, 1994

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Re: Notification under 10 CFR Part 21 on Rosemount Model 1153 Series F Transmitter.

Pursuant to 10CFR21 Paragraph 21.21 (b), Rosemount is writing to inform you of an anomaly discovered with the model 1153 Series F nuclear qualified pressure transmitter. The Model 1153 Series F transmitters measures pressure, flow, and level on safety-related applications in nuclear power stations with 10-50 mA current loops. This letter addresses the applicable units supplied and documents the details of the effect on transmitter output.

The anomaly discovered is related to the transmitters response to a low side overpressure event. When subjected to a low side overpressure, the transmitter's output may return to the normal 10-50 mA operating range rather than maintaining an output below 10 mA.

Rosemount Nuclear Instruments, Inc. does not have complete information relating to the possible effects of the anomalous output condition in the plant application. As a result, we cannot evaluate the impact of this condition from an application standpoint.

1.0 Name and address of the individual providing the information:

Mr. Mark Van Sloun
Vice President & General Manager
Rosemount Nuclear Instruments, Inc.
12001 Technology Drive
Eden Prairie, MN 55344

2.0 Identification of items supplied:

Model 1153 Series F Differential and High Differential pressure types with 10-50 mA output. A total of 81 units have been shipped through May 27, 1994. See the enclosed Attachment B for the list of transmitters shipped to your plant site.

Note: Model 1153 Gage and Absolute transmitters are not affected by this notification.

000038

FISHER-ROSEMOUNT

9406090087 940527
PDR PT21 EMVROSM
94 PDR

TE19
11

3.0 Identification of firm supplying the item:

Rosemount Nuclear Instruments, Inc.
12001 Technology Drive
Eden Prairie, MN 55121

4.0 Nature of the failure and potential safety hazard:

The anomaly is associated with the output of the transmitter returning into the normal 10-50 mA operating range when subjected to a low side overpressure condition. Under an overpressure condition the transmitter normally will saturate output above 50 mA (High side overpressure) and less than 10 mA (Low side overpressure). Under a low side overpressure condition, the output of the transmitter will travel below 10 mA but may then increase near the 10 mA output point. This effect is not present during a high side overpressure since the unit output will remain above 50 mA at all times. Since only a low overpressure condition will result in the anomaly, only Differential and High Differential transmitters are affected.

No field failures have been reported to date. The anomaly was identified during standard audit performance testing of Model 1153 Series F transmitters.

Please reference the enclosed Attachment B for detailed information related to the anomaly.

Rosemount Nuclear Instruments, Inc. does not have sufficient information to determine the safety impact related to the anomalous output in plant applications.

5.0 The corrective action which is taken, the name of the individual or organization responsible for that action and the length of time taken to complete that action:

No reports of field failures have been reported. Rosemount identified the condition during standard audit testing of Model 1153 Series F transmitters.

No corrective actions have been identified at this time. The time frame for completion of our corrective actions is 120 days.

Mr. Van Sloun is responsible for any further action related to this issue.

10CFR21
27 MAY 94
Page 3

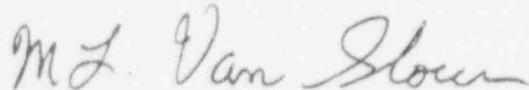
6.0 Any advice related to the potential failure of the item:

We recommend that users review the applications where the Model 1153 Series F is used to determine any safety considerations in the operation of the plant.

Rosemount Nuclear Instruments, Inc. has a strong commitment to the nuclear industry and wants to assure you that we are dedicated to the supply of high quality products and services to our customers. If there are any questions, or you require additional information related to this issue, please contact Tim Layer (612) 681-5830 or Jane Sandstrom and Ian Baldy (612) 681-5808.

Sincerely,

ROSEMOUNT NUCLEAR INSTRUMENTS, INC.



M. L. Van Sloun
Vice President & General Manager

MVS:TJL

Enc.: Attachment A

ATTACHMENT A
10CFR PART 21
27 MAY 94

A. Overview of Condition:

Rosemount pressure transmitters provide a DC milliamp output proportional to input pressure. When subjected to a high or low side overpressure the transmitter output will correspondingly "saturate" either high or low. The saturation current is always outside the normal operating output range (4-2 mA or 10-50 mA) and indicates the input pressure is outside the calibrated measurement range.

An anomaly has been discovered with the model 1153 Series F 10-50 mA relative to its response to a low side overpressure event. Specifically, the transmitter's output when subjected to a low side overpressure may return to the on-scale 10-50 mA range, rather than remaining saturated below 10 mA. The low side overpressure phenomena will not occur for applied low side pressures less than 100% of the upper range pressure value. For high side overpressure, the transmitter output responds normally and always remains saturated above 50 mA. *This issue therefore applies only to applications where a low side overpressure (in excess of 100% of upper range value) may be applied to the transmitter. Gage and absolute transmitters are unaffected by this issue.*

B. Technical Detail:

Rosemount performs regular product audit testing of its pressure transmitters to verify performance relative to published specifications. A recent audit of 1153 Series F 10-50 mA transmitters uncovered a performance issue during overpressure testing.

With the maximum rated overpressure applied and maintained on the low side, the test transmitters' outputs did not saturate low. On one test unit the output actually exceeded the 10 mA with low side overpressure applied.

Further testing indicated that the 1153 Series F responds normally to a high side overpressure and remains saturated high regardless of applied overpressure. The units respond normally to a low side overpressure when subjected to overpressure magnitudes less than the upper range value of the sensor. With zero based calibration, any pressure applied to the low side will yield a reading below 10 mA. The 1153 Series F responds normally to low side overpressure (output stays below 10 mA) until the overpressure magnitude exceeds the upper range limit of the sensor. When the overpressure magnitude exceeds the upper range limit, a point is eventually reached where the transmitter output will return to a reading close to or possibly exceeding 10 mA.

The point where the return occurs corresponds to the point where the sensing cell center diaphragm is pressed against the inner wall of the cell half. At this point, there is a change in capacitance which causes the output to rise slightly. This change in capacitance is not abnormal, and is inherent to the sensor design. The problem occurs with the model 1153 Series F due to its quiescent operating circuit, and hence a minimum saturation current, is approximately 8 mA. The change in cell capacitance when the center diaphragm contacts the inner cell wall can cause the output to rise from 8 mA to near, and possibly exceeding, 10 mA.

Testing over temperature ranges indicates the phenomenon is present regardless of the ambient temperature. The value of the return current is greater at higher temperatures. For example, the worst case unit exhibited a output of 10.23 mA at room temperature (72 F) and 13.0 mA at 200 F.

This condition is NOT an issue with any other Rosemount 4-20 mA or 10-50 mA transmitter model. Because the saturation current of these models is well below the normal operating range and therefore any effect would not exceed the minimum output value of 4.0 mA or 10.0 mA throughout the published ambient temperature operating range. The Model 1153 Series F has this condition due to the higher quiescent current due most exclusively to the radiation hardened operating amplifier. This device was chosen to qualify the Model 1153 Series F for operation in a radiation environment.

3.0 Corrective Action:

Rosemount Nuclear Instruments, Inc. is currently evaluating corrective actions for this condition and expect to have results in 120 days. No specific corrective actions have been identified at this time.

The users of Model 1153 Series F Differential and High Differential transmitters must be aware of this characteristic and its potential implications on plant process. Again, the phenomenon is only present when the unit is subjected to a low side overpressure of greater than 100% of the sensor upper range limit.