

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

September 17, 1980

Mr. James P. O'Reilly, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Region II - Suite 3100
101 Marietta Street
Atlanta, Georgia 30303

Dear Mr. O'Reilly:

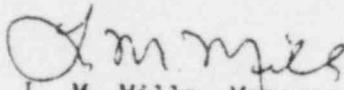
HARTSVILLE AND PHIPPS BEND NUCLEAR PLANTS - REPORTABLE DEFICIENCY -
ROSEMOUNT MODEL 1152 PRESSURE TRANSMITTER DEFECTS (NCR PRC 80-28)

Initial notification of the subject deficiency was made to NRC-OIE, Region II, Inspector R. W. Wright on June 3, 1980. This deficiency was reported under 10 CFR Part 21 to NRC-OIE Region V by General Electric Company (GE), San Jose, California, on June 2, 1980. GE is the supplier to TVA of equipment containing these pressure transmitters. The first interim report of the subject deficiency was submitted on July 2, 1980.

In compliance with paragraph 50.55(e) of 10 CFR Part 50, we are enclosing the second interim report of the subject deficiency. TVA anticipates transmitting the final report on or before April 3, 1981. If you have any questions, please call Jim Domer at FTS 857-2014.

Very truly yours,

TENNESSEE VALLEY AUTHORITY


L. M. Mills, Manager
Nuclear Regulation and Safety

Enclosure

cc: Mr. Victor Stello, Director (Enclosure)
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, DC 20555

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HARTSVILLE AND PHIPPS BEND NUCLEAR PLANTS, ALL UNITS
ROSEMOUNT MODEL 1152 PRESSURE TRANSMITTER DEFECTS
10CFR50.55(e) REPORT NO. 2 (INTERIM)
PRC-80-28

On June 3, 1980, TVA informed NRC-OIE Region II Inspector, R. W. Wright, of a reportable deficiency concerning defects in Rosemount model 1152 pressure transmitters being supplied for use at the HTN and PBN plants. This deficiency was reported under 10CFR21 to NRC-OIE Region V on June 2, 1980, by General Electric (GE) Company, San Jose, California, the supplier to TVA of NSSS equipment containing these pressure transmitters. It was also reported under 10CFR21 to NRC-OIE in Washington, DC, on June 17, 1980, by the Carrier Air Conditioning Company, Syracuse, New York (Carrier), who supplied air-conditioners containing these pressure transmitters to TVA. This is the second interim report on this reportable deficiency. TVA anticipates transmitting the final report on or before April 3, 1981.

Description of Deficiency

Rosemount notified GE and Carrier of the existence of the defect described below in model 1152 pressure transmitters with an "A" or "D" output. They in turn notified NRC-OIE and TVA. Discussions with Rosemount indicate that model 1151 pressure transmitters with "A" or "D" outputs may have the same problem as the 1152's.

Rosemount's models 1151 and 1152 pressure transmitters provide a specified linear output of 4 to 20 mA throughout the calibrated range of operation. Transmitter output is not specified by Rosemount for pressures outside of the calibrated range of operation. It has been observed in a limited number of transmitters that an output between 4 and 20 mA can occur with certain input pressures outside of the calibrated range. These ambiguous outputs can occur in both an overpressure condition and a reverse pressure condition. Both conditions arise when the center diaphragm of the pressure sensor bottoms out against either of the fixed capacitor plates. In each case the normal capacitance signal becomes a very high capacitance signal which affects the operation of the electronic circuit.

For the overpressure condition, the effect of the high capacitance from the sensor is a modulated output on the oscillator circuit which may cause the output current of the transmitter to drop below 20 mA. In a limited sample size, the ambiguous output during this overpressure condition occurred in 5 percent of the transmitters at ambient conditions. This does not occur until the overpressure condition is greater than or equal to 140 percent of the upper range limit regardless of span. At that point, a discontinuity can occur with the output current instantaneously decreasing to less than 20 mA. Note that the significant figure for use in determining the pressure above which an ambiguous output can occur is the specified upper range limit of the transmitter, not the customer-selected upper range value.

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For the reverse pressure condition, the effect of the high capacitance from the sensor is the oscillator circuit drawing more current which may cause the output current of the transmitter to exceed 4 mA. In a limited sample size, the ambiguous output during this reverse pressure condition occurred in 55 percent of the transmitters at ambient conditions. This does not occur until the reverse pressure condition exceeds 140 percent of the upper range limit regardless of the span. At this point the output may exceed 4 mA. Also note that with absolute pressure units a reverse pressure is not possible since the low pressure side of the cell is evacuated. With gage units, a reverse pressure is possible only if a vacuum is present on the connected part since the low pressure side of the cell is vented to ambient atmosphere. Since the maximum reverse pressure would be one atmosphere, only range 3 and 4 gage units could obtain a reverse pressure exceeding 140 percent of the upper range limit.

Due to the effects of radiation or elevated temperature, Rosemount believes that the frequency of occurrence of the ambiguous output will be greater in a radiated or an elevated temperature environment than was experienced in the limited sample size testing, which was in a nonradiated ambient temperature environment.

After the occurrence of an ambiguous output from an overpressure or a reverse pressure condition, the transmitter will return to specified operation when the input pressure returns to the calibrated range, provided the overpressure or reverse pressure was within the maximum pressure limits specified by Rosemount.

Safety Implications

The existence of the defects described above could cause erroneous information to be transmitted to reactor operators or temperature controlling devices during overpressure conditions which might lead to failure of a safety-related component or system, thereby jeopardizing the safety of operations of the plant.

Corrective Action

TVA site individuals have prepared or are in the process of preparing lists of Rosemount 1151 and 1152 transmitters which have arrived at the Hartsville and Phipps Bend site, including those in STRIDE (from Carrier). GE has also prepared a list of all 1151 and 1152 pressure transmitters which are in all the NSSS equipment at both sites. The GE list includes the shipping status of each of the transmitters. The site lists need to be verified by comparison with the GE list and a determination made as to which of the transmitters have "A" or "D" outputs. GE then plans to analyze the operating conditions for each of the transmitters with "A" or "D" outputs to determine if the over or reverse pressure conditions can occur (as requested in IE Bulletin 80-16). If any are found which could have an anomalous output, the "A" or "D" printed circuit (PC) boards will be replaced with new type "E" PC boards.