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PY-CEI/NRR-1199 L

US Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Perry Nuclear Power Plant (PNPP)
Docket No. 50-440
Potential Loss of Fill-Oil in
Rosemount Transmitters
(Bulletin 90-01)

Gentlemen:

The subject Bulletin requests that PNPP (1) identify the installation of designated models of Rosemount transmitters in safety-related systems, and (2) take appropriate corrective actions for transmitters that may leak fill-oil. The Bulletin outlines specific reporting requirements which are addressed as follows:

1. This letter confirms that:
 - (a) Items 1, 2, 3, 4 and 5 of the Requested Actions are completed with the exception that trending of calibration records (Item 3) is scheduled for completion by 9/30/90.
 - (b) Designated transmitters that have exhibited loss of fill oil are identified and their disposition discussed in Attachment 1.
 - (c) "Suspect lot" transmitters are listed by application and scheduled for replacement in Attachment 1.
2. Designated transmitters that exhibit loss of fill oil symptoms, or that lose fill oil, will continue to be reviewed for reportability under established procedures and applicable regulations. If not reportable, information consistent with that found in Attachment 1 will be maintained for each transmitter so identified.

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Operating Companies:
Cleveland Electric Illuminating
Toledo Edison

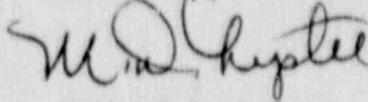
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In addition, we have concluded that selective replacement of "suspect" transmitters during our second refueling outage, and replacement of the remaining such transmitters at our third outage will maintain margins of safety consistent with the original operating license. Attachment 2 provides the basis for continued operation on this basis.

Please feel free to call if you have additional questions.

Sincerely,



Michael D. Lyster
Vice President, Nuclear - Perry

Attachments

cc: NRC Region III
Sr. Resident Inspector
NRR Project Manager
NUMARC - Alex Marion

History of Rosemount (and "Suspect Lot")
Transmitter Performance at PNPP

"Suspect lot" Rosemount transmitters, Model 1153 DB5 with a pressure differential range of 0 to 750 inches of water (Range 5), are installed in the PNPP ESF Actuation Systems noted below. There are no other identified applications of Rosemount Model 1153 Series B, Model 1153 Series D, or Model 1154 at PNPP manufactured before July 11, 1989 in reactor protection or ESF actuation systems associated with suspect lot transmitters. The previous calibration data for 20 of the 21 transmitters listed below has been compiled and analyzed for cumulative zero shift (the reactor head spray flow indication transmitter is for indication only; a review of calibration on its instrument loop revealed no adjustments required to the transmitter during any of the loop calibrations). The trend data on these transmitters show no distinguishable zero shift trend with at least 4 calibration points per instrument.

<u>Part No.</u>	<u>System</u>	<u>Function</u>
(1) *B21N044C#	NSSS	} RPV water level indication (Fuel Zone)
(1) B21N044D#	NSSS	
(1) *B21N490#	NSSS	
(1) B21N073C#	NSSS	} RPV water level 2 HPCS initiation, level 8 isolation
(1) *B21N073G	NSSS	
(1) *B21N073L	NSSS	
(1) B21N073R	NSSS	
(1) *B21N081B	NSSS	} RPV water level 1 MSIV isolation, level 2 BOP isolation
(1) B21N081C	NSSS	
(1) B21N081D	NSSS	
(1) *B21N091A#	NSSS	RPV water level 1 LPCS + LPCI"A" + RCIC initiation
(1) *B21N091B#	NSSS	RPV water level 1 + LPCI"B" & "C" + RCIC initiation
(1) B21N091E	NSSS	RPV water level 1 LPCS + LPCI"A" + RCIC initiation
(2) C61N001	Remote Shutdown	RHR A system flow indication
(2) C61N010	Remote Shutdown	RPV water level indication
(2) E12N013	RHR	Reactor Head Spray flow indication
(2) E22N005	HPCS	HPCS flow indication
(1) E31N084B	Leak Detection	RHR/RCIC steam flow high - isolation
(3) G43N090B#	Supp. Pool Makeup	Suppression Pool water level indication
(2) P45N071A	ESW	Diesel ESW flow indication
(2) P45N071B	ESW	Diesel ESW flow indication

*To be replaced at second refueling, others at third refueling.

#Regulatory Guide 1.97 Category 1, used in emergency procedures.

- (1) Operated 855 days at reactor pressure (~29,000 psi-mo) as of 6/15/90.
- (2) Operated 855 days at 50 psi (~ 1400 psi-mo) as of 6/15/90.
- (3) Operated 855 days at 22 psi (~ 600 psi-mo) as of 6/15/90.

RPV = reactor pressure vessel	MSIV = main steam isolation valve
LPCS = low pressure core spray	BOP = balance of plant
LPCI = low pressure coolant injection	RHR = residual heat removal
RCIC = reactor core isolation cooling	ESW = emergency service water
HPCS = high pressure core spray	

None of the listed "suspect" transmitters have indicated oil loss. Bulletin 90-01 also requests information on any Rosemount Models 1153 Series B, 1153 Series D, and 1154 transmitters that have exhibited loss of fill-oil symptoms. There have been three such occurrences at PNPP, which resulted in replacement and return of failed transmitters to Rosemount for evaluation.

Transmitter 1E31N085A (RCIC steam flow) was a Range 7 pressure transmitter (Model 1153GB7) replaced on April 17, 1990. It failed to pass calibration on April 12, 1990 after 27 months at reactor pressure (~ 27,000 psi-mo).

1E31N076E (RWCU differential flow) was a Range 5 differential pressure transmitter (Model 1153DB5) replaced on November 6, 1988. It failed to pass calibration on November 5, 1988 after 14.8 months at reactor pressure (~ 15,000 psi-mo).

1E31N083B (RCIC steam flow) was a Range 5 differential pressure transmitter (Model 1153DB5) replaced on September 2, 1988. It failed to operate normally during a fill and vent of the transmitter condensing pots on August 30, 1988 after 13.3 months at reactor pressure (~13,000 psi-mo).

Basis for Continued PNPP Operation,
Bulletin 90-01 Action Item Number 5 Response

Bulletin 90-01:

"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 [RPS] or engineered safety features [ESF] 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."

This basis for continued PNPP operation addresses those transmitters in Attachment 1 which are scheduled for replacement at our second or third refueling. These transmitters have to date maintained normal calibration accuracy and there is no evidence of degradation in performance or oil loss. The transmitters have also performed normally during plant scrams and transients.

Basis for Continued Operation

Enhanced surveillance continues to verify the continuing reliability of installed Model 1153 transmitters in ESF service. The PNPP enhanced surveillance program corresponds to Bulletin 90-01 Action Item 4 as follows:

- a) Appropriate PNPP personnel have been trained on the symptoms of transmitter failure due to loss of fill fluid. I&C technicians have completed Rosemount training during their continuing training program for 1990 and operations personnel have recently received similar training during operator requalification training.
- b) Enhanced monitoring is accomplished by three methods. These diagnostic procedures are consistent with Rosemount Technical Bulletin Numbers 1 through 4.
 - (1) Rosemount calibration instructions have been changed to address oil loss, including a rapid pressure transient test to 130% of calibrated span.

- (2) A PC data base is being utilized to trend for cumulative zero shift of all Rosemount model 1153 transmitters.
- (3) Administrative controls are in place to investigate any instrument calibration data outside its Leave-As-Is-Zone, requiring evaluation for indication of unacceptable trends.
- c) A review of transmitter performance following plant transients is based on available computer points collected from initiating transmitters following a reactor scram.
- d) An enhanced awareness of transmitter response during testing has been achieved by plant I&C instructions and the training referenced in item (a).
- e) Development of a program to detect changes in process noise was not considered at PNPP. It requires a certain amount of process noise not present on the majority of Rosemount transmitters installed. However this testing method may be utilized in troubleshooting where it could be beneficial in diagnosing problems.
- f) Transmitters identified as clearly exhibiting symptoms of loss of fill oil, if the amount of oil loss has or will result in exceeding the limit on drift established by Rosemount Technical Bulletin 4, will be declared inoperable if Technical Specification related. Technical Specification transmitters declared inoperable will have their appropriate actions taken. Transmitters that are not Technical Specification related will be replaced at the earliest appropriate opportunity dependent upon transmitter function and redundancy. Acceptance criteria for making the operability determination are based on Rosemount Technical Bulletin Numbers 1 through 4.

The applicable ESF actuation and isolation transmitters in Attachment 1 are arranged in 1-out-of-2-taken-twice logic. For one applicable RCIC channel listed in Attachment 1, the transmitters are arranged in a 1-out-of-2 logic (RCIC is not an engineered safeguard system). Both logic arrangements would require multiple transmitter failures in an unsafe mode (e.g. sluggish response) before an ESF channel or RCIC channel failure could occur. Replacing 1 transmitter per division for more model diversity further reduces this risk. It is further pointed out that installation of replacements does not provide 100% reliability; by this selective replacement we can qualify the redesigned transmitters for one fuel cycle (~18000 psi-months) before committing entirely to the new model. Meanwhile, new failure modes that may have been introduced by the new model are also protected against by redundant original transmitters. This approach is at least as conservative as complete replacement.

With transmitter diversity and nearly 3 years of successful operation with the Model 1153's in service (~29,000 psi-months), we conclude that the net effect on system availability of leaving the selected Model 1153 transmitters installed is negligible.

In addition to maintaining ESF functions with no discernible degradation in actuation reliability, ESF actuations for LOCA conditions are also provided by diverse and redundant high drywell pressure channels. The transmitters for high drywell pressure are not suspect lots and their reliability is not in question.

For the following reasons, we conclude that PNPP can continue to operate as originally licensed with the Model 1153 transmitters designated in Attachment 1 replaced on the schedule noted:

- (1) Augmented surveillance has verified original performance characteristics. Further assurance of accurate performance trending is provided by the lower range code application at PNPP, which results in earlier and more reliable indication of oil loss.
- (2) Availability of ESF actuation instrument channels using Model 1153 suspect lot transmitters is statistically improved by length of successful operation, and by selective replacement at the Fall 1990 refuel outage to provide additional diversity.
- (3) Diverse and redundant high drywell pressure channels are provided to accomplish the same ESF actuation functions provided with the subject Rosemount transmitters; and redundant/diverse emergency coolant injection systems provide additional assurance of core cooling.

This basis for continued operation will be updated if other safety-related Model 1153 transmitters are found to exhibit loss of fill-oil symptoms. If needed, our evaluation will cover the period of time from symptom identification to planned transmitter replacement.

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