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SUBJECT: Special rept: on 870609, personnel discovered that less than required number of sensors in one of two available reactor vessel level monitoring sys channels operable. Caused by personnel error & deficiency in surveillance procedure.

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JULY 6 1987

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U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Gentlemen:

Re: St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389
Special Report
Date of Event: June 6, 1987
Reactor Vessel Level Monitoring
System (RVLMS) Channels Out of Service

The attached Special Report is being transmitted pursuant to the requirements of St. Lucie Unit 1 Technical Specification 3.3.3.8 and Unit 2 Technical Specification 3.3.3.6 and pursuant to Technical Specification 6.9.2. The report provides notification that an RVLMS channel was out of service for greater than seven (7) days and the plans to restore the channels to service.

Should there be any questions on this information, please contact us.

Very truly yours,

for C. O. Woody
Group Vice President
Nuclear Energy

COW/GRM/cn
Attachment

cc: Dr. J. Nelson Grace, Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, St. Lucie Plant

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NRC SPECIAL REPORT

Reactor Vessel Level Monitoring System Channels Out of Service

Amendment 79 to the St. Lucie Unit One Technical Specifications and Amendment 19 to the St. Lucie Unit 2 Technical Specifications were issued by the NRC on April 7, 1987. These new amendments added operability requirements for the Reactor Vessel Level Monitoring System (RVLMS) to the existing Accident Monitoring Instrumentation requirements.

On June 9, 1987, it was discovered by plant personnel that less than the required number of sensors in one of the two available RVLMS channels on each unit were operable. The RVLMS on each unit is comprised of sixteen total sensors, eight per channel. On Unit One, seven of sixteen sensors are operable; on Unit Two, eight of sixteen sensors are operable.

The RVLMS on both St. Lucie Units One and Two is designed to monitor post-accident reactor vessel water inventory above the top of the active core when the Reactor Coolant System is at saturation conditions. Reactor vessel level is indicated by the existence of a temperature differential between adjacent heated and unheated thermocouples. The monitoring of a single RVLMS sensor will ensure that an adequate coolant inventory exists over the top of the core. In a fluid with relatively good heat transfer properties (liquid water), the temperature differential between the adjacent thermocouples is small; in a fluid with relatively poor heat transfer properties (steam vapor), the temperature difference is large. The combination of one heated and unheated thermocouple constitutes a sensor; the RVLMS consists of two separate A and B channels, each of which has eight sensors.

When the new Technical Specification amendments were received at the plant, Operations personnel added surveillance requirements for the RVLMS to the existing monthly accident monitoring instrumentation surveillance procedures for both units. On June 6, 1987, the Reactor Control Operator (RCO) performing this surveillance on Unit One noted that several of the unheated thermocouples appeared to have failed. A plant work order was written for the Instrumentation and Controls (I&C) Department to investigate.

On June 9, 1987, at 1030 hours, Unit One Operations and I&C personnel determined that the 1A Channel of the RVLMS was not operable as per the requirements of Technical Specification 3.3.3.8. Further investigation showed that the Unit Two 2B Channel of the RVLMS was inoperable as per the requirements of Specification 3.3.3.6.

Five sensors on the 1A Channel and six sensors on the 2B channel were rendered administratively inoperable due to leads which were lifted and resistors which were installed by I&C technicians and supervisors over the past twelve months (March 28, 1987, on Unit 1, August 21 and November 21, 1986, on Unit Two). The lifted leads and jumper wires

to dummy resistors were installed due to operational problems in individual thermocouples and sensors. Tables provided in Attachment One detail the status of the sensors in each RVLMS channel for both units.

The inoperability of the sensors was not detected prior to June 9 by Operations personnel due to a deficiency in the surveillance procedure. The verification of operability of the sensors in each RVLMS channel was incomplete in that only the unheated junction thermocouple readings were verified, rather than the heated and unheated thermocouple readings. This resulted in only one half of each sensor being verified as operable. The surveillance procedures for both units were corrected immediately upon the discovery of the error, and the appropriate channels declared inoperable.

I&C personnel responsible for the maintenance of the RVLMS were not fully cognizant of the operability requirements for each sensor as defined in the new technical specifications. This resulted in a failure to accurately verify the status of the RVLMS when the technical specifications were implemented.

The failure to accurately determine the status and operability of the RVLMS system was due to personnel errors on the part of I&C supervisors, and due to a deficiency in the surveillance procedure.

Immediate corrective actions

1. The surveillance procedures for both units for accident monitoring instrumentation were corrected to accurately reflect sensor operability.
2. The appropriate RVLMS channels were declared inoperable.

Long-term corrective actions

1. Department supervisors will be required to verify the adequacy of the implementation of new technical specifications.
2. The St. Lucie Plant Quality control Department will perform independent verifications of the actions.
3. All inoperable channels are scheduled for replacement during the next refueling outage for each unit, as per the requirements of the specification.
4. Alternate means of determining reactor vessel level are currently being developed on plant specific basis from CEOG generic guidelines. Should there be any additional sensor failures in the IA Channel of the RVLMS an alternate method of monitoring will be initiated.

ATTACHMENT ONE

UNIT ONE RVLMS SENSOR STATUS

1A Channel

Sensor	Unheated Thermocouple	Heated Thermocouple
1	Inoperable ¹	Inoperable ¹
2	Operable	Inoperable ²
3	Inoperable ¹	Inoperable ¹
4	Operable	Inoperable ²
5	Operable	Operable
6	Operable	Inoperable ²
7	Operable	Operable
8	Operable	Operable

1B Channel

Sensor	Unheated Thermocouple	Heated Thermocouple
1	Operable	Operable
2	Operable	Inoperable ²
3	Operable	Operable
4	Inoperable ¹	Inoperable ¹
5	Operable	Operable
6	Inoperable ¹	Inoperable ¹
7	Operable	Operable
8	Inoperable ¹	Inoperable ¹

¹Input drift; leads lifted

²Heater malfunction

UNIT TWO RVLMS SENSOR STATUS

2A Channel

Sensor	Unheated Thermocouple	Heated Thermocouple
1	Inoperable ³	Inoperable ²
2	Operable	Operable
3	Operable	Operable
4	Operable	Operable
5	Operable	Operable
6	Inoperable ³	Inoperable ²
7	Operable	Operable
8	Operable	Operable

2B Channel

Sensor	Unheated Thermocouple	Heated Thermocouple
1	Operable	Operable
2	Inoperable ³	Operable
3	Operable	Inoperable ²
4	Inoperable ³	Operable
5	Operable	Inoperable ²
6	Operable	Operable
7	Inoperable ¹	Inoperable ¹
8	Inoperable ¹	Inoperable ¹

¹Input drift; leads lifted

²Heater malfunction

³Temperature element malfunction



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