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 AUTH. NAME AUTHOR AFFILIATION  
 BEILMAN, T.P. Indiana Michigan Power Co. (formerly Indiana & Michigan Ele  
 SMITH, W.G. Indiana Michigan Power Co. (formerly Indiana & Michigan Ele  
 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 89-003-00: on 890119, valve stem seal leak allows air into sensor capillary tubing causing RVLIS calibr shift. R  
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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) <b>D. C. COOK NUCLEAR PLANT - UNIT 2</b>	DOCKET NUMBER (2) <b>0 5 0 0 0 3 1 6 1</b>	PAGE (3) <b>0 4</b>
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TITLE (4) **VALVE STEM SEAL LEAK ALLOWS AIR INTO SENSOR CAPILLARY TUBING CAUSING REACTOR VESSEL LEVEL INDICATION SYSTEM (RVLIS) CALIBRATION SHIFT**

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)		
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES		DOCKET NUMBER(S)
01	19	89	89	003	00	02	17	89			05000

OPERATING MODE (8) <b>6</b>	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)									
POWER LEVEL (10) <b>0 0 0</b>	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.406(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)						
	<input type="checkbox"/> 20.406(a)(1)(i)	<input type="checkbox"/> 50.38(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)						
	<input type="checkbox"/> 20.406(a)(1)(ii)	<input type="checkbox"/> 50.38(c)(2)	<input checked="" type="checkbox"/> 50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)						
	<input type="checkbox"/> 20.406(a)(1)(iii)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)							
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	<input type="checkbox"/> 20.406(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)							

LICENSEE CONTACT FOR THIS LER (12)

NAME <b>T. P. BEILMAN INSTRUMENTATION AND CONTROL DEPARTMENT SUPERINTENDENT</b>	TELEPHONE NUMBER
	AREA CODE: <b>6 1 6 4</b>   NUMBER: <b>6 5 1 5 9 0 1</b>

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

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ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On January 19, 1989 the following event was determined to be reportable.

During the last channel calibration surveillance of the Unit Two Reactor Vessel Level Instrument System (RVLIS), the as found transmitter calibration data indicated that both RVLIS trains had exceeded their system design accuracy specification of one percent. Subsequent repair activities indicated that the probable cause of the accuracy shift was that the fill valves located at the high point of the reactor head sensor capillary tubing had allowed air to leak into the capillary system. Review of the Unit Two operating history indicated that the air in-leakage may have occurred at a time which affected the Technical Specification operational availability requirements.

After refilling the sensor capillary tubing, the steel dust caps were seal welded to the high point fill valves to ensure an air-tight system and the transmitters were calibrated to the design specification.

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		8   9	-   0   0   3	-   0   0	0   2	OF 0   4

TEXT (If more space is required, use additional NRC Form 368A's) (17)

Conditions Prior To Occurrence

Unit Two in Mode 6 (refueling).

Description of Event

On January 19, 1989 the following event was determined to be reportable.

During the last routine channel calibration surveillance of the Unit 2 Reactor Vessel Level Instrumentation System (RVLIS) (EIIS/AB-LI) in August and September 1988, the as found calibration data indicated that both RVLIS trains were out of tolerance. The three transmitter (EIIS/AB-LT) outputs on Train A were low by 40.75 percent, 9.45 percent, and 3.70 percent. The three transmitter outputs on Train B were low by 13.73 percent, 2.99 percent, and 1.45 percent. The RVLIS design specification for the front end portion (sensor bellows (EIIS/AB-BLL), capillary tubing (EIIS/AB-TBG), hydraulic isolators (EIIS/AB-XB) and transmitters) of RVLIS is less than ±1 percent. Since all six front ends exceeded this ±1 percent, it must be assumed that sometime prior to the last surveillance both RVLIS trains had exceeded their system design accuracy specifications.

Review of the as found data and discussions with the manufacturer's service representative indicated that the probable cause of the accuracy shift was air getting in to the reactor vessel head sensor capillary tubing. Also, it was concluded that the fill valves (EIIS/AB-V) located at the high point of this capillary could have allowed the air to leak into the capillary system via the valve stem seals (EIIS/AB-SEAL). An attempt was made to determine when the front end shift had occurred. At first it was thought that the air leakage into the capillary tubing of both RVLIS trains could have occurred during the steam generator (EIIS/AB-SG) replacement work. However, since no leaks could be found during the refill of the capillary system, the only conclusion that can be reached is that the air in-leakage occurred sometime between the past two channel calibrations (April 1986 and September 1988).

The air in-leakage could only have happened when the Reactor Coolant System (EIIS/AB) was completely depressurized. In addition to the refueling outages occurring at the times noted above (April 1986 to September 1988), Unit 2 was also shut down and depressurized between refuelings for maintenance activities. There could have been air in-leakage during any of these outages when the unit was completely depressurized. Applicable channel checks could not have detected the larger transmitter errors due to the at-power indication for these channels are off scale when functioning properly. Consequently, we are unable to determine exactly when this

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
					0   3	OF 0   4

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accuracy shift in RVLIS occurred. However, the conservative assumption is that the reactor (EIIS/AB-RCT) was at power with the accuracy shift in effect, rendering the two independent RVLIS trains inoperable. The RVLIS is a system required for post-accident monitoring and Technical Specifications require that one train, as a minimum (3 channels/train) be operable in Modes 1, 2 and 3.

Cause of the Event

The observed transmitter accuracy shift is concluded to be due to leakage of the high point fill valve stem seals, allowing air into the sensor capillary system when the Reactor Coolant System was completely depressurized.

Analysis of Event

Based on the review actions taken above, the condition described is reportable under 10 CFR 50.73(a)(2)(i)(B) and 10 CFR 50.73(a)(2)(vii)(D). The safety consequences, however, would have been negligible, and therefore the condition did not represent a significant hazard to the public health and safety.

The Westinghouse RVLIS Manual explains that with the Reactor Coolant Pumps off, the operator would have four level indications, two from each RVLIS: the upper plenum level indication (hot leg to top of vessel) and the narrow indication (bottom to top of vessel).

Plant Emergency Operating Procedures (EOP) were reviewed to determine when these indications would be required and what inappropriate action might result due to an incorrect reactor vessel level indication. The only post accident situation of potential safety significance would be a situation with the reactor vessel full and low level indication in the four RVLIS level indicators. EOP Inventory Status Tree would tell the operator to enter EOP Response to Voids in Reactor Vessel, as a result of having a RVLIS indication of upper plenum not full 100 percent. The operator would assume then that voids in the reactor vessel were responsible for the RVLIS low level indication. The EOP instructs the operator to vent the reactor vessel head and look for an increase in RVLIS indication. As a result of the venting of coolant inventory, the RVLIS indication could potentially decrease. In addition, continued venting would also result in an increase in containment sump level and a decrease of the pressurizer level.

FACILITY NAME (1)  D. C. COOK NUCLEAR PLANT - UNIT 2	DOCKET NUMBER (2)  0   5   0   0   0   3   1   6   8   9   -   0   0   3   -   0   0	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
						0   4   OF   0   4

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All of this should be sufficient to alert the operator to the fact that the RVLIS low level indication was erroneous, and he would not rely on this system for subsequent actions. During all this time there would be sufficient core cooling, and from the point of view of Insufficient Core Cooling (ICC), the shift of the RVLIS transmitters was in the conservative direction.

In addition, the EOP has five reactor vessel venting termination criteria, which must be reviewed prior to start of venting. Therefore, it is reasonable to assume that at least one of these venting termination criteria is met, and the operator would not initiate venting operations.

A review of all eleven EOP's that reference RVLIS confirmed that the situation described above is the only one with potential safety significance.

Corrective Action

The high point fill valves are equipped with a steel dust cap to cover the valve stem and o-ring seal. After refilling the sensor capillary tubing, the valve caps were seal welded, ensuring an air-tight system. All transmitters were then calibrated to the RVLIS design specification in December 1988.

Failed Component Identification

None.

Previous Similar Events

None.

Indiana Michigan  
Power Company  
Cook Nuclear Plant  
P.O. Box 458  
Bridgman, MI 49106  
616 465 5901



February 17, 1989

United States Nuclear Regulatory Commission  
Document Control Desk  
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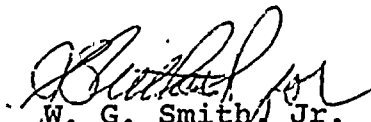
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Document Control Manager:

In accordance with the criteria established by 10 CFR 50.73  
entitled Licensee Event Reporting System, the following  
report is being submitted:

89-003-00

Sincerely,

  
W. G. Smith, Jr.  
Plant Manager

WGS:clw

Attachment

cc: D. H. Williams, Jr.  
A. B. Davis, Region III  
M. P. Alexich  
P. A. Barrett  
J. E. Borggren  
R. F. Kroeger  
NRC Resident Inspector  
Wayne Scott, NRC  
R. C. Callen  
G. Charnoff, Esq.  
Dottie Sherman, ANI Library  
D. Hahn  
INPO  
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A. A. Blind  
S. J. Brewer/B. P. Lauzau

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11