

## LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

## FACILITY NAME (1)

Prairie Island Nuclear Generating Plant U1

## DOCKET NUMBER (2)

05000 282

## PAGE (3)

1 OF 4

TITLE (4) Discovery That Containment Hydrogen Monitors Are Not Being Calibrated Correctly Due to Personnel Error

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 NAME	DOCKET NUMBER	
3	15	95	95	-- 03 --	00	04	13	95	Prairie Island U2	05000 306	
									FACILITY NAME	DOCKET NUMBER	
										05000	
OPERATING MODE (9)		N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)								
			20.402(b)			20.405(c)			50.73(a)(2)(iv)		73.71(b)
POWER LEVEL (10)		100	20.405(a)(1)(i)			50.36(c)(1)			50.73(a)(2)(v)		73.71(c)
			20.405(a)(1)(ii)			50.36(c)(2)			50.73(a)(2)(vii)		OTHER
			20.405(a)(1)(iii)			X 50.73(a)(2)(i)			50.73(a)(2)(viii)(A)		(Specify in Abstract below and in Text, NRC Form 366A)
			20.405(a)(1)(iv)			50.73(a)(2)(ii)			50.73(a)(2)(viii)(B)		
			20.405(a)(1)(v)			50.73(a)(2)(iii)			50.73(a)(2)(x)		

## LICENSEE CONTACT FOR THIS LER (12)

## NAME

Arne A Hunstad

## TELEPHONE NUMBER (Include Area Code)

612-388-1121

## 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)

YES

(If yes, complete EXPECTED SUBMISSION DATE).

X

NO

EXPECTED  
SUBMISSION  
DATE (15)

MONTH

DAY

YEAR

## ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

The Containment Hydrogen Monitor is a post-accident monitoring system. All hydrogen sensors had been replaced over the last 3 years because of environmental qualification concerns and other concerns. On February 14, 1995, during routine surveillance testing, one Unit 1 hydrogen sensor was found out of specification. A Work Order was written for investigation and repair of the channel. During post-maintenance engineering review of the corrective work order, data on a tag accompanying the new hydrogen sensor was compared with earlier data located with the calibration cards; differences were noted and questions were raised. Meaning of the data was not immediately clear, but the system engineer suspected that some constants must require updating, because of the differences in data on the tags. The instrument technician was not aware of any requirement to revise constants. The engineer contacted the sensor manufacturer and learned that temperature compensation coefficients are unique to each sensor and must be revised any time a sensor is changed. Proper constants for all the sensors were entered and the channels were recalibrated.

9504190228 950413  
PDR ADOCK 05000282  
S PDR

NRC FORM 366A (5-92)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB NO. 3150-0104 EXPIRES 5/31/95	
LICENSEE EVENT REPORT (LER) TEXT CONTINUATION				ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.	
FACILITY NAME (1)		DOCKET NUMBER (2)	LER NUMBER (6)		PAGE (3)
Prairie Island Unit 1		05000 282	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER
			95	-- 03 --	00
					2 OF 4

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

#### EVENT DESCRIPTION

The Containment Hydrogen Monitor (EHIS Component Identifier MON) is a post-accident monitoring system. Two redundant channels per unit each contain two hydrogen sensors. All 8 hydrogen sensors had been replaced over the last 3 years because of environmental qualification concerns and other concerns. On February 14, 1995, during routine surveillance testing, one Unit 1 hydrogen sensor was found out of specification. A Work Order was written for investigation and repair of the channel. During post-maintenance engineering review of the corrective work order, data on a tag accompanying the new hydrogen sensor was compared with earlier data located with the calibration cards; differences were noted and questions were raised. Meaning of the data was not immediately clear, but the system engineer suspected that some constants must require updating, because of the differences in data on the tags. The instrument technician was not aware of any requirement to revise constants. The engineer contacted the sensor manufacturer and learned that temperature compensation coefficients are unique to each sensor and must be revised any time a sensor is changed. Proper constants for the failed sensor were entered and the channel was recalibrated. Work Orders were written to revise constants and recalibrate the remaining 7 sensors.

Meanwhile, work continued with the vendor to determine the effect of the miscalibration on monitor operability. Calculations showed that at least one of the two sensors for each channel would have read high, and since hydrogen concentration indication uses the auctioneered high reading, the effect of the error would be conservative operator response during a postulated accident.

Technical Specification 3.15.A requires 2 channels (and 2 sensors per channel) to be operable, with allowable outage times of 7 days for one channel or 48 hours for both channels. Some of the sensors would have erred in a nonconservative direction by an amount larger than the instrument uncertainties assumed in emergency operating procedures. Therefore, the containment hydrogen monitors were judged inoperable from the time of their replacement in 1992. On March 15, 1995, the event was judged to be reportable since the operability requirements of Technical Specification 3.15.A were not met.

#### CAUSE OF THE EVENT

Cause of the event is that the responsible system engineer and I&C staff did not understand that the temperature compensation coefficients needed to be changed when a hydrogen sensor was changed. The misconception dates back to original installation of the containment hydrogen monitors in the early 1980's, and was passed along as the system was turned over to other responsible individuals. Review of the vendor's technical manual by the engineer and technician was done; a reference was found stating that constants are unique for each sensor, but the terminology was vague.

#### ANALYSIS OF THE EVENT

The hydrogen sensors are galvanic devices which provide a millivolt signal proportional to

NRC FORM 366A (5-92)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB NO. 3150-0104 EXPIRES 5/31/95							
LICENSEE EVENT REPORT (LER) TEXT CONTINUATION				ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.							
FACILITY NAME (1)		DOCKET NUMBER (2)		LER NUMBER (6)							
Prairie Island Unit 1		05000 282		<table border="1"> <tr> <td>YEAR</td> <td>SEQUENTIAL NUMBER</td> <td>REVISION NUMBER</td> </tr> <tr> <td>95</td> <td>-- 03 --</td> <td>00</td> </tr> </table>		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	95	-- 03 --	00
YEAR	SEQUENTIAL NUMBER	REVISION NUMBER									
95	-- 03 --	00									
				PAGE (3)							
				3 OF 4							

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

the concentration of hydrogen. Internal to the sensors is a thermistor network that provides gross temperature compensation to the sensor output. The thermistor-compensated signal is read by the computer and further compensated using the temperature compensation coefficients. The programmed coefficients are unique to each individual sensor and provide fine tuning to bring the indicated concentration to within  $\pm 0.2\%$  of actual over the entire temperature span of the sensor. The compensation coefficients are a multiplier similar to an adjustable gain of the received signal. If incorrect coefficients are programmed, the wrong gain is applied to the signal.

Calculations show that at least one of the two sensors for each channel would have read high, and since hydrogen concentration indication uses the auctioneered high reading, the effect of the error would be conservative operator response during a postulated accident.

Hydrogen monitor qualification requires that the calibration sequence be performed after 24 hours post-accident (after conditions have stabilized) and every 30 days thereafter for 1 year. Emergency Procedures ensure the calibrations are performed. The first post-accident calibration is performed 24 hours after the accident with the containment atmosphere at elevated temperature. As containment temperature decreases, calculations show that a conservative error in hydrogen concentration builds in; that is, the indicated concentration, based on the incorrect temperature compensation, is higher than actual on all sensors. Significant hydrogen concentration is not expected until after 24 hours into the accident, which would occur after the initial post-accident calibration. Therefore, the safety significance of the miscalibration of the hydrogen sensors is minimal. Health and safety of the public were unaffected.

Technical Specification 3.15.A requires 2 channels (and 2 sensors per channel) to be operable, with allowable outage times of 7 days for one channel or 48 hours for both channels. Some of the sensors would have erred in a nonconservative direction by an amount larger than the instrument uncertainties assumed in emergency operating procedures. Therefore, the containment hydrogen monitors were judged inoperable from the time of their replacement in 1992. The event is reportable pursuant to 10CFR50.73(a)(2)(i)(B) since the operability requirements of Technical Specification 3.15.A were not met.

#### CORRECTIVE ACTION

A Work Order was written to investigate and repair the failed sensor.

Proper constants were applied to all hydrogen monitor channels and they were all recalibrated.

I&C engineering and technical staff will be reminded of the need to review pertinent documentation and manuals when performing maintenance activities.

Procedures will be revised, before their next use, to provide for proper handling of temperature compensation coefficients.

NRC FORM 366A (5-92)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB NO. 3150-0104 EXPIRES 5/31/95	
LICENSEE EVENT REPORT (LER) TEXT CONTINUATION				ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.	
FACILITY NAME (1)		DOCKET NUMBER (2)		LER NUMBER (6)	
Prairie Island Unit 1		05000 282		YEAR 95	SEQUENTIAL NUMBER -- 03 --
				REVISION NUMBER 00	PAGE (3) 4 OF 4

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

FAILED COMPONENT IDENTIFICATION

None.

PREVIOUS SIMILAR EVENTS

There have been no previous similar events reported at Prairie Island.