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Limerick Generating Station
P.O. Box 2300
Sanatoga, PA 19464

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10CFR50.73

July 27, 2001

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: LER 2-01-003 2B Containment Hydrogen Recombiner

Limerick Generating Station, Unit 2
Facility Operating License No. NPF-85
NRC Docket No. 50-353

This Licensee Event Report (LER) addresses a failure of the temperature controller for the 2B Containment Hydrogen Recombiner that occurred during restoration of control power. The controller failed to respond to temperature setpoint adjustment demands. This failure was discovered during restoration from maintenance activities.

Report Number:	2-01-003
Revision:	00
Event Date:	August 28, 2000
Discovered Date:	June 1, 2001
Report Date:	July 27, 2001
Facility:	Limerick Generating Station P.O. Box 2300, Sanatoga, PA 19464-2300

This LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(i)(B).

Very truly yours,



Robert C. Braun
Plant Manager

cc: H. J. Miller, Administrator Region I, USNRC
A. L. Burritt, USNRC Senior Resident Inspector, LGS

IE22

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LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1) Limerick Generating Station Unit 2	DOCKET NUMBER (2) 05000 353	PAGE (3) 1 OF 4
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TITLE (4)
2B Containment Hydrogen Recombiner Temperature Controller Failure

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
08	28	00	01	0 03	00	07	27	01	FACILITY NAME	DOCKET NUMBER
										05000
										05000

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) (11)									
	20.2201(b)			20.2203(a)(3)(ii)			50.73(a)(2)(ii)(B)		50.73(a)(2)(ix)(A)	
POWER LEVEL (10) 100	20.2201(d)			20.2203(a)(4)			50.73(a)(2)(iii)		50.73(a)(2)(x)	
	20.2203(a)(1)			50.36(c)(1)(i)(A)			50.73(a)(2)(iv)(A)		73.71(a)(4)	
	20.2203(a)(2)(i)			50.36(c)(1)(ii)(A)			50.73(a)(2)(v)(A)		73.71(a)(5)	
	20.2203(a)(2)(ii)			50.36(c)(2)			50.73(a)(2)(v)(B)		OTHER Specify in Abstract below or in NRC Form 366A	
	20.2203(a)(2)(iii)			50.46(a)(3)(ii)			50.73(a)(2)(v)(C)			
	20.2203(a)(2)(iv)			50.73(a)(2)(i)(A)			50.73(a)(2)(v)(D)			
	20.2203(a)(2)(v)			X 50.73(a)(2)(i)(B)			50.73(a)(2)(vii)			
	20.2203(a)(2)(vi)			50.73(a)(2)(i)(C)			50.73(a)(2)(viii)(A)			
20.2203(a)(3)(i)			50.73(a)(2)(ii)(A)			50.73(a)(2)(viii)(B)				

LICENSEE CONTACT FOR THIS LER (12)

NAME Marino Kaminski Manager-Experience Assessment	TELEPHONE NUMBER (Include Area Code) (610) 718-3400
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
B	X	TC	B045	Y					

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).				X NO				

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

Failure analysis of the 2B Containment Hydrogen Recombiner temperature controller determined that the controller failed to respond to temperature setpoint adjustments following restoration of control power. This controller had failed following power restoration on three occasions prior to identification of this failure mode. It was later determined that the 2B Containment Recombiner was inoperable for a period that exceeded the 30 day LCO specified in TS 3.6.6.1. Further investigation determined that the 2A Containment Recombiner had been inoperable for approximately eleven days during planned maintenance activities concurrent with the 2B recombinder inoperability.

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

Unit Conditions Prior to the Event

Unit 2 was in Operational Condition (OPCON) 1 (Power Operation) at 100% power. There were no structures, systems or components out of service that contributed to this event.

Description of the Event

On June 1, 2001, the 2B Containment Hydrogen Recombiner(EIIS:BB) temperature controller failed to respond to setpoint adjustment demands following system restoration from a planned maintenance activity. Failure analysis of the temperature controller identified a failure of an integrated circuit. The controller was replaced and underwent enhanced testing including multiple power down / power up cycles.

The investigation of this event determined that similar failures of the 2B Containment Hydrogen Recombiner had occurred on two prior occasions. On August 28, 2000, the 2B Containment Hydrogen Recombiner failed to respond to temperature setpoint adjustment demands following restoration from a maintenance activity. The controller card was determined to have dirty edge connectors. The controller card was cleaned, tested and returned to service. On April 6, 2001, the 2B Containment Hydrogen Recombiner failed to respond to temperature setpoint adjustment demands during restoration from refueling outage testing of LOCA/LOOP ECCS actuation logic. The controller card was replaced with a new card, tested and returned to service. All three of these failures are now determined to be due to a failure mode associated with activities that remove and then restore control power to the temperature controller. This failure mode was not identified prior to returning the equipment to the operable status.

An Operability Determination was performed for the 1A, 1B and 2A Containment Hydrogen Recombiners. Each train was verified to be unaffected by prior evolutions that resulted in control power being removed and restored. The 1A, 1B and 2A Containment Hydrogen Recombiners were determined to be operable.

It is likely that this failure mode existed since the failure on August 28, 2000. The 2B Containment Hydrogen Recombiner has been inoperable since that time. TS 3.6.6.1 requires restoration of an inoperable Containment Hydrogen Recombiner within 30 days or be in HOT SHUTDOWN within the next 12 hours. There is no TS 3.6.6.1 action for both trains being inoperable. Therefore, TS 3.0.3 would apply to the time that 2A Containment Hydrogen Recombiner was out of service. Also the Unit was restarted on two occasions with the 2B Containment Hydrogen Recombiner inoperable and undetected. This is not permitted per TS 3.0.4. These conditions are prohibited by the plant's Technical Specifications and therefore reportable.

This LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(i)(B).

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

Analysis of the Event

There were no actual safety consequences associated with this event. No release of radioactive material occurred. The potential safety consequences of this event were also minimal. The redundant train was operable for the entire period except for approximately eleven days during which planned maintenance was performed.

A LOCA or LOOP would have resulted in a power down / power up cycle on the affected instrument and may have resulted in recurrence of this failure mode. Normal troubleshooting would restore availability of the failed train prior to exceeding the time credited in the safety analysis.

The Containment Hydrogen Recombiners do not have a mitigative function associated with preventing core damage. No change in core damage frequency occurs due to loss of the Containment Hydrogen Recombiner system.

UFSAR section 6.2.5.3 states that the Containment Hydrogen Recombiner system is required to be in service 39 hours after an accident occurs if containment is inerted, to prevent oxygen concentration from exceeding 5%. If containment is de-inerted, then the recombinder system is required to be in service 19 hours after an accident occurs to prevent hydrogen concentration from exceeding 4%. Due to warmup restraints, the recombinder is required to be placed in service 2 hours prior to being needed. Limerick trip procedures prescribe initiation of the recombinder at 1% hydrogen concentration that is exceeded within the first hour for a design basis accident LOCA. The failed temperature controller would have been detected during the recombinder startup and troubleshooting would then be initiated. Repairing the temperature controller and restarting the recombinder would return the recombinder to operation well within the time constraints of an inerted or de-inerted containment.

Failure analysis of two failed controller cards determined that the failure was due to degraded performance of the U1 integrated circuit on one failed controller card and the U8 integrated circuit on the other failed controller card. Either of these integrated circuits can prevent the oscillator clock circuit from properly initiating. Failure of the oscillator clock circuit prevents adjustment of the temperature controller setpoint.

Cause of the Event

This event was caused by a degraded integrated circuit that failed to properly initiate the crystal oscillator clock circuit. The apparent cause of the integrated circuit degraded performance is age related.

Corrective Action Completed

The 2B Containment Hydrogen Recombiner temperature controller card was replaced and successfully tested.

The failed controller cards and all in stock controller cards were removed for refurbishment and testing.

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

Corrective Actions Planned

Testing of the in service controllers will be performed during the next outage for each train.

Periodic maintenance activities will be developed to test for this failure mode and replace the integrated circuits on the temperature controller card.

Previous Similar Occurrences

None

Failed Component Data

Manufacturer: Bailey
Model Number: 722001AAAN2