

REGulatory INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 8710090234 DOC. DATE: 87/10/02 NOTARIZED: NO DOCKET #  
 FACIL: 50-410 Nine Mile Point Nuclear Station, Unit 2, Niagara Moha 05000410  
 AUTH. NAME AUTHOR AFFILIATION  
 RANDALL, R. G. Niagara Mohawk Power Corp.  
 LEMPGES, T. E. Niagara Mohawk Power Corp.  
 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 87-053-00: on 870903, unit experienced actuation of ESF, specifically isolation of RWCU sys. Caused by const & design deficiencies. Flex hoses inside primary containment replaced w/rigid tubing. W/871002 ltr.

DISTRIBUTION CODE: IE22D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 6  
 TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

NOTES: 21

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INTERNAL:	ACRS MICHELSON	1 1	ACRS MOELLER	2 2
	AEOD/DOA	1 1	AEOD/DSP/NAS	1 1
	AEOD/DSP/ROAB	2 2	AEOD/DSP/TPAB	1 1
	DEDRO	1 1	NRR/DEST/ADS	1 0
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	NRR/DEST/ICSB	1 1	NRR/DEST/MEB	1 1
	NRR/DEST/MTB	1 1	NRR/DEST/PSB	1 1
	NRR/DEST/RSB	1 1	NRR/DEST/SGB	1 1
	NRR/DLPQ/HFB	1 1	NRR/DLPQ/QAB	1 1
	NRR/DOEA/EAB	1 1	NRR/DREP/RAB	1 1
	NRR/DREP/RPB	2 2	NRR/DREP/SIB	1 1
	NRR/PMAS/ILRB	1 1	REG FILE 02	1 1
	RES DEPY GI	1 1	RES TELFORD, J	1 1
	RES/DE/EIB	1 1	RGN1 FILE 01	1 1
EXTERNAL:	EG&G GROH, M	5 5	H ST LOBBY WARD	1 1
	LPDR	1 1	NRC PDR	1 1
	NSIC HARRIS, J	1 1	NSIC MAYS, G	1 1



LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) <b>Nine Mile Point Unit 2</b>	DOCKET NUMBER (2) <b>0 5 0 0 0 4 1 0</b>	PAGE (3) <b>1 OF 05</b>
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TITLE (4) **Reactor Water Cleanup System Isolation on a Flow Differential Signal Due to Construction and Design Deficiencies**

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)		
09	03	87	87	053	00	10	02	87	N/A		0 5 0 0 0		
									N/A		0 5 0 0 0		

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

OPERATING MODE (8) <b>2</b>	20.402(b)	20.406(c)	<input checked="" type="checkbox"/>	50.73(e)(2)(iv)	73.71(b)
POWER LEVEL (10) <b>001</b>	20.406(a)(1)(i)	50.36(c)(1)	<input type="checkbox"/>	50.73(e)(2)(v)	73.71(c)
	20.406(a)(1)(ii)	50.36(c)(2)	<input type="checkbox"/>	50.73(e)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	20.406(a)(1)(iii)	50.73(e)(2)(i)	<input type="checkbox"/>	50.73(e)(2)(viii)(A)	
	20.406(a)(1)(iv)	50.73(e)(2)(ii)	<input type="checkbox"/>	50.73(e)(2)(viii)(B)	
	20.406(a)(1)(v)	50.73(e)(2)(iii)	<input type="checkbox"/>	50.73(e)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME <b>Robert G. Randall, Supervisor Technical Support</b>	TELEPHONE NUMBER
	AREA CODE <b>315</b> <b>349-2445</b>

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)       NO

EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

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

On September 3, 1987 at 0849 hours, Nine Mile Point Unit 2 (NMP2) experienced the actuation of an Engineered Safety Feature (ESF), specifically, isolation of the Reactor Water Cleanup (RWCU) system. At the time of the event, the plant was in the startup mode with reactor power less than 1% and the reactor mode switch in the "STARTUP/HOT STANDBY" position. Reactor pressure and temperature were approximately 700 pounds per square inch gauge (psig) and 505°F, respectively.

The root cause for the event is construction and design deficiencies.

The corrective actions for the event are:

1. The flex hoses inside primary containment have been replaced with rigid tubing and the blocking globe valves re-oriented.
2. A special task force has been assigned to evaluate and troubleshoot RWCU flow transmitter problems.
3. The reject flow transmitter orifice element has been relocated.

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		87	— 053	— 00	02	OF	05

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

I. DESCRIPTION OF EVENT

On September 3, 1987 at 0849 hours, Nine Mile Point Unit 2 (MP2) experienced the actuation of an Engineered Safety Feature (ESF), specifically, isolation of the Reactor Water Cleanup (RWCU) system. At the time of the event, the plant was in the startup mode with reactor power less than 1% and the reactor mode switch in the "STARTUP/HOT STANDBY" position. Reactor pressure and temperature were approximately 700 pounds per square inch gauge (psig) and 505°F, respectively.

In preparation for the Test Condition 2 outage, an orderly shutdown commenced at 1735 hours on September 2. As the shutdown progressed, temperature stratification in the feedwater lines developed. In order to mitigate this stratification, the RWCU system was placed on full reject to the Main Condenser, rather than return the water to the feedwater system. With the temperature stratification in the feedwater lines improving, the RWCU system remained on full reject.

Control room personnel, cognizant of previous RWCU system isolations while performing system manipulations (i.e. changing system alignment, throttling of valves) during the startup/shutdown process, performed no further RWCU system manipulations. Still, as system pressure was reduced, a sensed high flow differential between the RWCU system suction and reject flow transmitters alarmed in the control room. Niagara Mohawk licensed operators responded to the alarm by adjusting the reject flow rate. This effort, however, was unsuccessful and the RWCU system isolated.

There were no components or systems which were inoperable and/or out of service which contributed to the event. No plant system or component failures resulted from the event.

II. CAUSE OF EVENT

The root cause for this event has been determined to be a combination of design and construction deficiencies.

There has been a history of erratic flow indication problems with the RWCU system flow indicators. It has been determined that air in the transmitter sensing lines is the most probable cause for the erroneous flow signal experienced and the subsequent RWCU system isolation. Air in the sensing lines can have an amplifying affect on perturbations that may be present in the process system. Additionally, the type of transmitters used for RWCU flow indication have a very fast response time and are particularly sensitive to air amplified noise.



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Efforts have been expended to determine the air source and the areas where air collects. It has been determined that air coming out of aqueous solution at decreasing reactor pressures tends to collect at specific points in the transmitter sensing lines. Furthermore, it has been determined that these air collection points could have been avoided by using a different design or proper construction techniques. Specifically, the following design and construction deficiencies have been identified; (1) The RWCU Suction Transmitter (2WCS\*FT67X(Y)) sensing line flex hoses were positioned horizontally with a slight vertical slope (LER 87-47). This orientation allows air to collect in the uneven interior surface of the hose. The sensing lines could have been designed with a greater vertical slope, eliminating these collection points. (2) The globe blocking valves on the RWCU suction flow transmitter sensing lines were installed with their stems in a vertical orientation creating another air collection point (LER 87-47). These valves could have been installed with the stems horizontal avoiding this collection point.

Flow oscillations from the RWCU Blowdown Flow Transmitters (2WCS\*FT69X(Y)) have been attributed to the location of the Flow Element (2WCS\*FE126), which was an identified design deficiency (LER 87-26).

III. ANALYSIS OF EVENT

The NMP2 Final Safety Analysis Report Section 5.4.8 states: "The RWCU system is classified as a primary power generation system (not an engineered safety feature), a small part of which is part of the RCPB [Reactor Coolant Pressure Boundary] up to and including the outside isolation valve. The other portions of the system are not part of the RCPB and can be isolated from the reactor. The RWCU system may be operated at any time during planned reactor operations or it may be shutdown if water quality is within the Technical Specification limits."

An RWCU isolation does not impair the station's capability to achieve a safe shutdown condition. The RWCU isolation function operated as designed with no other transients or inoperable systems contributing to the event.

The event is considered reportable via 10CFR50.73 (a)(2)(iv) because the isolation function is an ESF function which is part of the Primary Containment and Reactor Vessel Isolation Control System.

The duration of the event was approximately 51 minutes.





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IV. CORRECTIVE ACTIONS

Initial corrective actions were for the operators to verify the plant status as normal and restore the RWCU system to service.

Additional corrective actions include:

1. Per NMP2 Modification PN2Y87MX167, the RWCU Suction Flow Transmitters (2WCS\*FT67X(Y)) sensing lines inside the primary containment have been modified to eliminate identified air collection points by replacing the flex hoses with rigid tubing and the blocking globe valves have been properly oriented.

If the actions described above are not effective in reducing the erratic flow signals (from the RWCU suction flow transmitters) to an acceptable level, transmitter sensing lines outside of the primary containment will be reworked to eliminate probable air collection areas. These actions are being taken as part of a systematic troubleshooting program to correct the RWCU flow transmitter problems.

2. A special task force has been assigned to evaluate and troubleshoot RWCU transmitter problems.
3. Modification PN2Y87MX119 has been completed, incorporating the suggested design changes from General Electric Service Information Letter (SIL) 450. SIL 450 recommends the placement of the RWCU Blowdown Flow Element (2WCS\*FE126) upstream of the flow control valve (2WCS-FV135) to prevent erratic flow indications from the RWCU Blowdown Flow Transmitters (2WCS\*FT69X(Y)) and unnecessary RWCU isolations.



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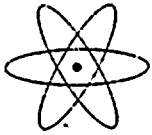
V. ADDITIONAL INFORMATION

Identification of Components Referred to in this LER

Component	IEEE 803 EIIS Funct	IEEE 805 System ID
Flow Transmitter	FT	IJ
Instrument Line	TBG	CE
Reactor Water Cleanup System	N/A	CE
Leak Detection System	N/A	IJ
Flow Indicator	FI	CE
Isolation Logic System	N/A	JE
Globe Valve	RTV	IJ

There have been three previous similar events. Details of these events are presented in LER 87-32-01 and LER 87-47. Corrective actions specified in these LERs could not be fully implemented until the Test Condition 2 outage. This outage did not begin until September 4, 1987 and therefore, the modifications were not installed prior to this event.





NIAGARA MOHAWK POWER CORPORATION

NIAGARA  MOHAWK

301 PLAINFIELD ROAD  
SYRACUSE, NY 13212

THOMAS E. LEMPGES  
VICE PRESIDENT—NUCLEAR GENERATION

October 2, 1987

United States Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

RE: Docket No. 50-410  
LER 87-53

Gentlemen:

In accordance with 10 CFR 50.73, we hereby submit the following Licensee Event Report:

LER 87-53 Is being submitted in accordance with 10 CFR 50.73 (a) (2) (iv), "Any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS). However, actuation of an ESF, including the RPS, that resulted from and was part of the preplanned sequence during testing or reactor operation need not be reported."

A 10 CFR 50.72 (b) (2) (ii) report was made at 1109 hours on September 3, 1987.

This report was completed in the format designated in NUREG-1022, Supplement 2, dated September 1985.

Very truly yours,

Thomas E. Lempges  
Vice President  
Nuclear Generation

TEL/JTD/mjd

Attachments

cc: Regional Administrator, Region 1  
Sr. Resident Inspector, W. A. Cook

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