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FACIL: 50-410 Nine Mile Point Nuclear Station, Unit 2, Niagara Moha 05000410
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RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 87-047-00: on 870806, RWCU sys isolations occurred. Caused by const & design deficiencies. RWCU suction flow element properly oriented. Flex hoses will be removed & blocking globe valves reoriented & element relocated. W/870904 ltr.

DISTRIBUTION CODE: IE22D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 9
TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

NOTES: 21 05000410

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NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO 3150-0104
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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Nine Mile Point Unit 2	0 5 0 0 0 410	1 OF 07

TITLE (4) Two Reactor Water Cleanup System Isolations 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)
									N/A	0 5 0 0 0
08	06	87	87	047	00	09	04	87	N/A	0 5 0 0 0

OPERATING MODE (9)	1
POWER LEVEL (10)	009

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

	20.402(b)		20.405(c)	X	60.73(a)(2)(iv)
	20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)
	20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)
	20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(viii)(A)
	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)

	73.71(b)
	73.71(c)
	OTHER (Specify in Abstract below and in Text, NRC Form 366A)

LICENSEE CONTACT FOR THIS LER (12)

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

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

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

On August 6, 1987 at 0028 hours, and again on August 9, 1987 at 2045 hours, Nine Mile Point Unit 2 (NMP2) experienced actuations of an Engineered Safety Feature, specifically, isolations of the Reactor Water Cleanup (RWCU) system. At the time of the first event (August 6) the plant was in its initial power ascension phase with the reactor mode switch in the "RUN" position (Operational Condition 1) and reactor power was approximately nine percent. During the second event, (August 9) the reactor was in hot shutdown (Operational Condition 3) and at a temperature and pressure of 242 degrees fahrenheit and 11.25 pounds per square inch gauge respectively. These isolations, initiated by differential flow signals, occurred as Operations attempted to manipulate the RWCU system lineup. In both instances the isolations were reset by the operators within 23 minutes ending the events.

The two root causes for these events are construction and design deficiencies.

The corrective actions for these events are:

1. The RWCU suction flow element has been properly oriented.
2. The flex hoses will be removed and the blocking globe valves re-oriented.
3. A special task force has been assigned to evaluate and troubleshoot the RWCU flow transmitter problems.
4. The reject flow transmitter orifice element will be relocated.

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I. DESCRIPTION OF EVENTS

Event 1

On August 6, 1987 at 0028 hours, Nine Mile Point Unit 2 (NMP2) experienced an 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 its initial power ascension phase with the reactor mode switch in the "RUN" position (Operational Condition 1). Reactor power during the event was approximately nine percent.

The Niagara Mohawk licensed operators were attempting to place the RWCU system in the reject mode. To accomplish this, the operators had to change the RWCU system lineup from return path to the reactor vessel via the feedwater lines to full reject path to the main condenser. The operators were manipulating valves (2WCS*MOV200 and 2WCS-FV135) to lineup the system when erratic indication was observed on the RWCU flow indicators. These erratic flow signals were interpreted by the Leak Detection System (LDS) to be a flow differential (see note). As a result, an RWCU system isolation was automatically initiated. The operators' immediate actions were to verify the plant status as normal and to reset the isolation signal. The RWCU system was subsequently returned to service eleven minutes later.

For the event, operator actions were per the approved Temporary Procedure 87-41, "Feedwater/Clean-Up System Operation". This procedure was in effect to mitigate feedwater line temperature stratification.

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.

Event 2

On August 9, 1987 at 2045 with the reactor in hot shutdown (Operational Condition 3) and at a temperature and pressure of 242 degrees fahrenheit and 11.25 pounds per square inch gauge respectively, Nine Mile Point Unit 2 experienced an isolation of the Reactor Water Cleanup system. This isolation, initiated by a differential flow signal, occurred as Operations was attempting to startup the RWCU system, with the system lined up to the condenser hotwell.

Refer to Figure 1

Upon starting the RWCU cleanup pump (at 2044 hours) and opening its discharge valve, erratic flow indications were observed on the RWCU suction and blowdown flow indicators. These erratic flow signals were interpreted by the Leak Detection System to be a flow differential (see note). As a result, an RWCU system isolation was automatically initiated. The isolation signal was reset by Operations at 2108 after verifying the plant status as normal, and the RWCU system was successfully restarted at 2207. The duration for this event, from the isolation initiation to its reset, was 23 minutes.

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

There were no other inoperable systems which contributed to this event. No plant system or component failures resulted from this event.

NOTE: Flow signals from the RWCU Suction (2WCS*FT67X and 67Y), Feedwater Return (2WCS*FT68X and 68Y), and Blowdown (2WCS*FT69X and 69Y) Flow Transmitters are inputted to a Leak Detection System which will initiate an RWCU isolation upon detection of a leak. A leak is determined by comparing the suction and discharge flows for a differential. If a flow differential is sensed, this is interpreted to be a loss of process fluid somewhere in the monitored system and the LDS system will automatically initiate an isolation.

II. CAUSE OF EVENTS

The most probable root causes for these events are; (1) construction deficiency and (2) design deficiency.

There has been a history of erratic flow indication problems, specifically 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 signals experienced in the events discussed in this report and for the RWCU system isolations. 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.

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 are positioned horizontally with a small vertical slope. This orientation allows air to collect in the uneven interior surface of the hose. The instrument tubing run 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. These valves could have been installed with the stems horizontal avoiding this collection point. (3) The RWCU Suction Flow Element (2WCS*FE115) was installed at an improper orientation, with the vent and drain holes not at top and bottom but rotated at a 45 degree angle. This improper installation allowed an air collection point by eliminating a vent passage. Proper orientation of this orifice would (again) have avoided this air collection point.

Flow oscillations from the RWCU Blowdown Flow Transmitters (2WCS*FT69X(Y)) are attributed to the location of the Flow Element (2WCS*FE126), which is an identified design deficiency. Modification PN2Y87MX119 has been prepared by Niagara Mohawk to relocate this flow element when the Power Ascension schedule permits. This modification, when implemented, should mitigate future erratic flow indications.

III. ANALYSIS OF EVENTS

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 (ESF)), a small part of which is part of the reactor coolant pressure boundary (RCPB) 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, nor is there any conceivable impact to plant or public safety stemming from this event. The RWCU isolation function operated as designed with no other transients or inoperable systems contributing to these events.

These events are 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 elapsed time for the first event (August 6, 1987), from the isolation initiation to its reset, was approximately 11 minutes. The elapsed time for the second event (August 9, 1987) was approximately 23 minutes.

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IV. CORRECTIVE ACTIONS

1. The RWCU Suction Flow Element (2WCS*FE115) has been properly oriented to eliminate an air collection point.

2. Per NMP2 Modification PN2Y87MX167, the RWCU Suction Flow Transmitter (2WCS*FT67X(Y)) sensing lines inside the primary containment will be modified as follows to eliminate identified air collection points; the flex hoses will be removed and the blocking globe valves will be re-oriented. This work is presently scheduled to be completed during the Test Condition 2 outage.

   If the actions described above are not effective in reducing the erratic flow signals (from the RWCU suction flow transmitters) to an acceptable level, the transmitter 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.

   This corrective action in conjunction with corrective action item #1 should minimize transient effects on the RWCU suction flow transmitters due to entrapped air in the sensing lines.

3. A special task force has been assigned to evaluate and troubleshoot the RWCU transmitter problems.

4. Modification PN2Y87MX119 will incorporate the suggested design changes from General Electric Service Information Letter (SIL) 450. SIL 450 recommends that the RWCU Blowdown Flow Element (2WCS*FE126) be placed upstream of 2WCS-FV135 to prevent erratic flow indications from the RWCU Blowdown Flow Transmitters (2WCS*FT69X(Y)) and unnecessary RWCU isolations. This modification is scheduled to be completed during the Test Condition 2 outage. (See Figure 1)

V. ADDITIONAL INFORMATION

There has been one previous similar event which is discussed in LER 87-32.

A 10 CFR 21 evaluation will be initiated addressing the design deficiency concerns discussed in this report.

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

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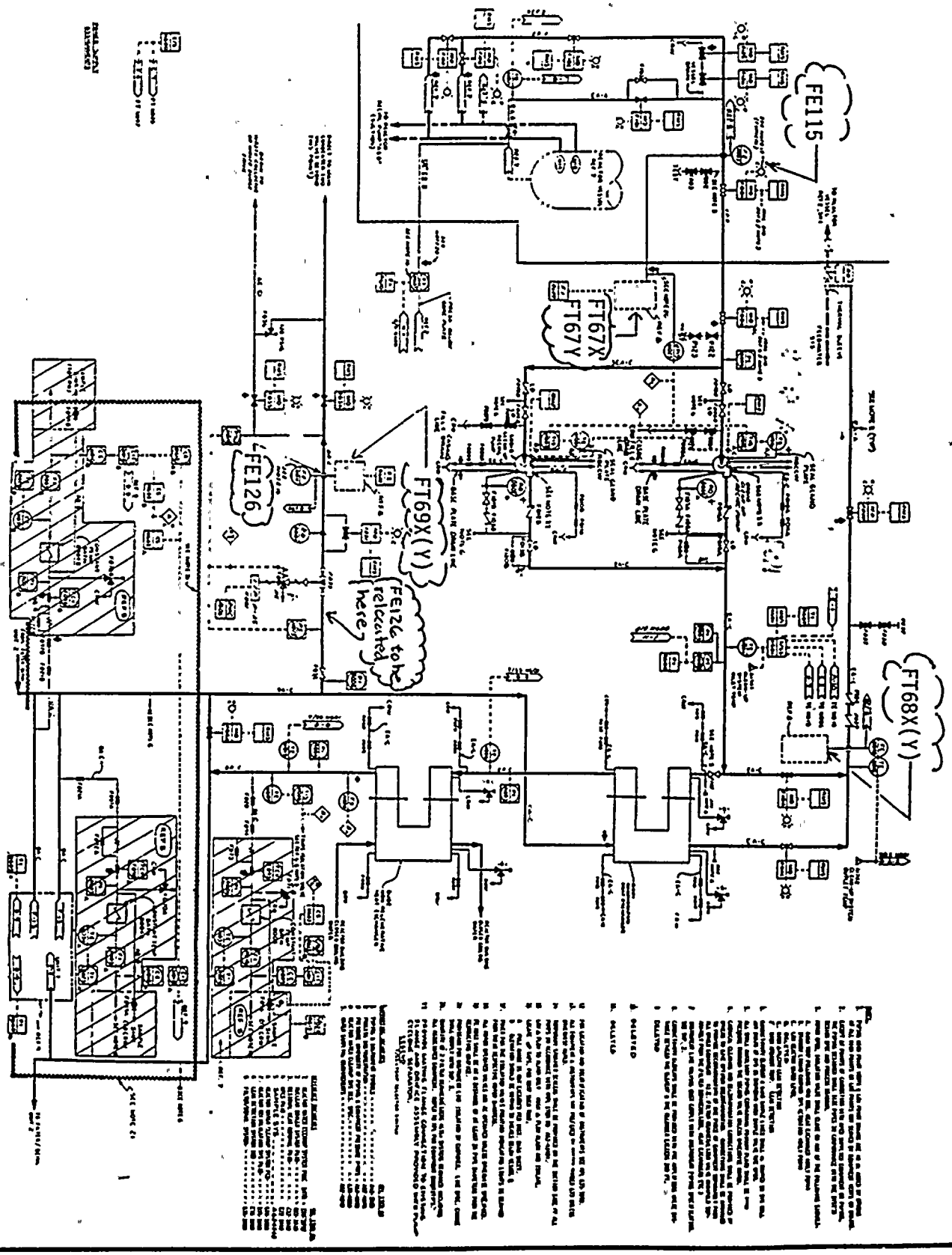
FIGURE 1



NMP26461

NIAGARA MOHAWK POWER CORPORATION

NIAGARA MOHAWK

301 PLAINFIELD ROAD
SYRACUSE, NY 13212

THOMAS E. LEMPGES
VICE PRESIDENT—NUCLEAR GENERATION

September 4, 1987

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

RE: Docket No. 50-410
LER 87-47

Gentlemen:

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

LER 87-47 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."

10 CFR 50.72 reports were made on August 6, 1987 and on August 9, 1987.

This report was completed in the format designated in NUREG-1022, Supplement No. 2, dated September 1985.

Very truly yours,

Thomas E. Lempges

Thomas E. Lempges
Vice President
Nuclear Generation

TEL/POB/SCN/mjd

Attachments

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

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