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SUBJECT: LER 87-024-02:on 870517,secondary containment isol on low air flow signal due to use of too conservative setpoints.
W/8 ltr.

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NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

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 05

TITLE (4) Secondary Containment Isolation on a Low Air Flow Signal due to the Use of Too Conservative Trip Setpoints for the Reactor Building Ventilation System

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)
05	17	87	87	—	024	— 02	02	09	89	N/A	0 5 0 0 0
										N/A	0 5 0 0 0

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
2	20.402(b)	20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) 001	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 (Specify in Abstract below and in Text, NRC Form 366A)
	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)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER	
	AREA CODE	
Peter A. Mazzaferro, Superintendent Technical Assessment	315	349-7919

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 May 17, 1987 at 1424 hours and on May 27, 1987 at 1303 hours, Nine Mile Point Unit 2 (NMP2) experienced the actuation of an Engineered Safety Feature (ESF). Each event consisted of a secondary containment isolation and initiation of the Standby Gas Treatment (GTS) system. A sensed low air flow condition in the above refueling floor main exhaust duct of the Reactor Building Ventilation (HVR) system initiated the May 17 event. The May 27 event was initiated by a sensed low air flow condition in the below refueling floor main exhaust duct. At the time of the May 17 event, the plant was in a shutdown condition with the reactor mode switch in the "SHUTDOWN" position and all control rods inserted. At the time of the May 27 event, the plant was at less than 1% power with the reactor mode switch in the "STARTUP" position.

The root cause of both events has been determined to be the use of an excessively conservative trip setpoints for the flow switches. Use of these setpoints provided only a small margin between the flow switches' trip setpoint and normal system flow. Corrective actions have been to recalibrate the flow switches in both the above and below refueling floor main exhaust ducts to more accurately reflect normal air flow conditions.

Additional corrective action includes installation of a low flow override switch to be used while performing noraml system operational evolutions.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Nine Mile Point Unit 2	0 5 0 0 0 410	87	— 024	— 02	02 OF 05

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

I. DESCRIPTION OF EVENTS

On May 17, 1987 at 1424 hours and on May 27, 1987 at 1303 hours Nine Mile Point Unit 2 (NMP2) experienced the actuation of an Engineered Safety Feature (ESF). Each event consisted of a secondary containment isolation and initiation of the Standby Gas Treatment (GTS) system. At the time of the event on May 17, the plant was in a shutdown condition with the mode switch in the "SHUTDOWN" position and all control rods inserted. At the time of the May 27 event, the plant was at less than 1% power with the mode switch in the "STARTUP" position.

On May 17, following the performance of the Operations Surveillance Procedure N2-OSP-GTS-R001, "Standby Gas Treatment System Operability Test", GTS Train "A" was stopped and the Reactor Building Ventilation (HVR) System was returned to service. At the request of the cognizant contractor test engineer, a Niagara Mohawk operator rotated into service exhaust fan 2HVR-FN5B for 2HVR-FN5A, per Operating Procedure N2-OP-52, "Reactor Building Ventilation".

Subsequent to the fan rotation, flow switch 2HVR*FS36B tripped on what it sensed to be a low air flow condition ($\leq$ 2200 feet per minute air velocity) in the above refueling floor main exhaust duct. The tripped flow switch initiated a secondary containment isolation and initiation of the GTS system Train "A". Train "B" of the GTS system did not initiate, since it was secured at the time of the event.

On May 27, again the event was initiated subsequent to an exhaust fan rotation. Per procedure, when the Niagara Mohawk operator rotated the below refueling floor exhaust fan 2HVR-FN2A for 2HVR-FN2B, the two associated flow switches, 2HVR*FS37A and 2HVR*FS37B, tripped on a sensed low air flow condition. The tripped flow switches initiated a secondary containment isolation and initiation of both Train "A" and Train "B" of the GTS system.

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

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

II. CAUSE OF EVENT

For exhaust fan rotation, the operating fan must be shutdown before the standby fan may be started. This creates a decrease in the system flow, but it should not be significant enough to initiate a system isolation. Following the May 17 event, it was thought that the trip setpoint of the flow switch 2HVR*FS36B may have drifted. Work Request (WR) WR117110 was written to recalibrate the above refueling floor flow switches. An additional work request, WR 117384, was issued for the below refueling floor flow switches due to their similar design.

A check of the above and below refueling floor flow switches per the referenced WR's revealed that no setpoint drift had occurred, as the setpoints were the same as from the previous calibration. However, the margins of difference between the normal air flow conditions and the flow switches' trip setpoints for low flow conditions were found to be excessively conservative.

A flow profile of the exhaust ducts at the location of the flow switches to determine trip setpoints was not originally performed. Instead, Engineering determined that the flow switches were to be calibrated to trip at vendor (Fluid Component Incorporated (FCI)) recommended values. These values, based on an average flow, were determined under optimum flow conditions at the vendor's facilities. However, with the air flow pattern developed in the HVR system, a less than average flow exists at the location of flow switches. Under the initial condition of the HVR system (i.e., clean filters and ducts, very little operating time on the equipment) an adequate margin existed between the flow switches' output at normal flow and trip setpoints. However, as the system acquired an operating history, the flow patterns in the vicinity of the flow switches changed. Although total flow through the exhaust ducts has remained constant, the flow switches which are sensitive to flow changes in a very small area (approximately one square inch), are exposed to a slower moving stream of air. The effect of this slower moving stream of air on the flow switches was identified by the Instrument and Control (I&C) Department and a recommendation made to recalibrate the flow switches. This recommendation was approved by the Engineering Department, however, Engineering determined that more conservative trip setpoints than those requested by the I&C Department should be implemented. With this reduction in the margin between the flow switches' trip setpoints and normal flow conditions, minor disruptions in the air flow (i.e., exhaust fan rotation) initiated the system isolations.

A root cause analysis for the events has been completed per Supervisory Procedure S-SUP-1, "Root Cause Evaluation Program", and has concluded that the root cause was the use of excessively conservative trip setpoints for the flow switches. Use of these setpoints provided only a small margin between the flow switches' trip setpoints and normal operating conditions.

III. ANALYSIS OF EVENT

Both the secondary containment isolations and initiations of the Standby Gas Treatment System, which occurred as a result of sensed low flow conditions, are conservative actions and pose no adverse safety consequences at any reactor power level. The events did not in any way adversely affect any other safety systems nor the operators' ability to achieve safe shutdown.

The total duration of the events were approximately seven minutes for the May 17 event and forty minutes for the May 24 event.

IV. CORRECTIVE ACTIONS

Immediate corrective actions for each event were for the operators to reset the low flow signals, secure the GTS system and return the HVR system to service.

The applicable flow switches switches were recalibrated on July, 1987 per WR 121388 and WR 121389. To recalibrate the FCI flow switches at NMP2, a new Instrument and Control Procedure (N2-ICP-GEN-@003) for the calibration of FCI flow switches was written. Using currently installed averaging flow elements, system flow was manually restricted by repositioning dampers until the minimum system design air flow was achieved. The flow switches were then calibrated to trip at a flow value slightly higher than the minimum flow condition of 80% of normal system air flow. Having been recalibrated, the flow switches are not as sensitive to minor changes in the air flow to which they are exposed.

In addition to the recalibration of the flow switches, a one time special test has been performed on the HVR system. This test rotated both the above and below refueling floor exhaust fans to assure that this normal disruption of the air flow does not initiate a low air flow trip.

Successful completion of the special test demonstrated that exhaust fan rotations can be performed without initiating a low flow isolation signal. However, additional HVR system isolations have occurred on low air flow during normal system manipulations due to human factors and configuration design deficiencies identified in LER 87-49, Supplement 1. Therefore, to further reduce the possibility of unnecessary HVR system isolations on low air flow, an additional corrective action has been implemented.

A low flow override switch has been incorporated into the HVR design. This switch will eliminate unwanted low flow signals when performing normal system operational evolutions (i.e. exhaust fan rotation, system startup). This item was installed during the current midcycle outage.

V. ADDITIONAL INFORMATION

Identification of Components/Systems Referred to in this LER

Component/System	IEEE 803 EIIS Funct	IEEE 805 System ID
Flow Switch	FS	VA
Reactor Building Ventilation (HVR)	N/A	VA
Standby Gas Treatment (GTS)	N/A	VA

There have been no previous similar events at NMP2. However, there has been five events resulting in HVR system isolation on low air flow while restoring normal HVr operation. These events are detailed in LER's 86-12, 87-45, 87-49 Supplement 1 and 87-78.

Failed Components - None

NIAGARA MOHAWK

NMP44073

NINE MILE POINT—UNIT 2/P.O. BOX 63, LYCOMING, NY 13093/TELEPHONE (315) 343-2110

February 9, 1989

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

RE: Docket No. 50-410
LER 87-24
Revision 2

Gentlemen:

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

LER 87-24 Revision 2	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)."

10 CFR 50.72 (b) (2) (ii) reports were made at 1500 hours on May 17, 1987, and at 1415 hours on May 27, 1987.

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

Very truly yours,

J. L. Willis
General Superintendent
Nuclear Generation

JLW/JTD/mjd

Attachments

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

IE22
1/1