CONTRACTION DISTRICT SYSTEM (RIDS)

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ACCESSION NBR:	8706240157 DOC.DATE: 87/06/15 NOTARIZED: NO Nine Mile Point Nuclear Station, Unit 2, Niagara Moha	DOCKET # 05000410
	AUTHOR AFFILIATION	1
RANDALL, R. G.		•
LEMPGES, T. E.	Niagara Mohawk Power Corp.	
RECIP. NAME	RECIPIENT AFFILIATION	

SUBJECT: LER 87-024-00: on 870517-27, ESF actuations from low air flow signal in reactor bldg occurred. Caused by nonexposure of flow switches to recommended setpoints. Flow switches in both refueling floor main exhaust ducts recalibr. W/870615 ltr.

DISTRIBUTION CODE: IE22D COPIES RECEIVED:LTR <u>I</u>ENCL <u>I</u>SIZE: <u>I2</u> TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

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	I. DESCRIPTION OF EVENTS	5		~
	Unit 2 (NMP2) experienced th Each event consisted of a se Standby Gas Treatment (GTS) plant was in a shutdown cond	ne actuation of two Eng econdary containment is system. At the time of lition with the mode sy ed. At the time of the	vitch in the "SHUTDOWN" posit May 27 event, the plant was	;). He tion
	On May 17, following the per N2-OSP-GTS-ROO1, "Standby Ga was stopped and the Reactor service. At the request of Mohawk operator rotated into Operating Procedure N2-OP-52	as Treatment System Ope Building Ventilation (the cognizant contract service exhaust fan 2	erability Test", GTS Train "A (HVR) System was returned to cor test engineer, a Niagara 2HVR-FN5B for 2HVR-FN5A, per	/n
	to be a low air flow conditi refueling floor main exhaust containment isolation and in	ion (<2200 feet per mi c duct. The tripped finitiation of the GTS sy	S36B tripped on what it sens nute air velocity) in the ab ow switch initiated a second stem Train "A" Train "B" o ured at the time of the event	ove lary of
	Per procedure, when the Niag exhaust fan 2HVR-FN2A for 2H and 2HVR*FS37B, tripped on a	gara Mohawk operator ro HVR-FN2B, the two assoc a sensed low air flow c ary containment isolat	nt to an exhaust fan rotation otated the below refueling fl ciated flow switches, 2HVR*FS condition. The tripped flow ion and initiation of both Tr	oor 37A
	There were no other componen service which contributed to failures resulted from these	o these events. No pla	ere inoperable and/or out of ant system or other component	;
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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 refueling floor flow switches 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 flow switches' output for normal air flow conditions and their trip setpoints for low flow conditions were found to be too conservative.

A flow profile of the exhaust ducts at the location of the flow switches to determine trip setpoints was not originally performed. Instead the flow switches were calibrated to trip at vendor (Fluid Component Incorporated) 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 has acquired an operating history, the flow patterns in the vicinity of the flow switches has 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 now exposed to a slower moving stream of air. With this reduction in the margin between the trip setpoints and the flow switches' output for 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 Analysis Program", and has concluded that the root cause was the use of the vendor recommended setpoints, based on an average air flow, to which the flow switches are not exposed. Use of these setpoints provided only a small margin between the flow switches' trip setpoints and their output for normal operating conditions.

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III. ANALYSIS OF EVENT

NRC Form 366A

(9.83)

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.

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, is being written. Additional temporary flow instruments (pitot tube/manometer) will be installed at the same location as the flow switch, where the total flow across the duct will be measured. System flow will then be manually restricted by repositioning dampers to the minimum design air flow. The flow switch will then be calibrated to trip at this new flow reading for the minimum flow condition. Once recalibrated, the flow switches will not be as sensitive to minor changes in the air flow to which they are exposed. However, this procedure will also account for possibly significant changes in the air flow pattern to which the switches are exposed in the future. The technician is instructed to compare the current normal flow reading from the flow switch with the previous normal flow reading. Should the new reading indicate that the air flow pattern in the vicinity of the flow switch has changed, the flow switch will be recalibrated following Engineering evaluation and approval.

Once the above and below refueling floor main exhaust duct flow switches are recalibrated, a one time special test will be performed on the HVR system. This test will rotate both 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. Fan rotations will be performed with three different HVR exhaust fan damper configurations. One rotation sequence will have the standby fan discharge damper fully open, another sequence will have the standby fan discharge damper 40% open (standby fan start permissive setpoint) and the remaining rotation sequence will have the standby fan discharge damper fully closed. With the standby fan discharge damper fully open, a decreased flow condition will exist due to the establishment of a recirculation flow path through the standby fan. Fan rotation with the damper standby fan 40% open simulates current operator practice, while rotation with the damper fully closed simulates an automatic start of the standby fan without operator intervention. The flow readings for each flow switch during each fan rotation will be recorded.

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I. DESCRIPTION OF EVENTS

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

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 two Engineered Safety Features (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-ROO1, "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 (<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 other 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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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 refueling floor flow switches 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 flow switches' output for normal air flow conditions and their trip setpoints for low flow conditions were found to be too conservative.

A flow profile of the exhaust ducts at the location of the flow switches to determine trip setpoints was not originally performed. Instead the flow switches were calibrated to trip at vendor (Fluid Component Incorporated) 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 has acquired an operating history, the flow patterns in the vicinity of the flow switches has 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 incn), are now exposed to a slower moving stream of air. With this reduction in the margin between the trip setpoints and the flow switches' output for 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 Analysis Program", and has concluded that the root cause was the use of the vendor recommended setpoints, based on an average air flow, to which the flow switches are not exposed. Use of these setpoints provided only a small margin between the flow switches' trip setpoints and their output for normal operating conditions.

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NRC Form 366A (9-83)	LICENSEE EVENT R	EPORT (LER) TEXT CONT	INUATION	U.S. NUCLEAR REGULATORY COMMISSION APPROVED OMB NO. 3150-0104 EXPIRES: 8/31/88			
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III. ANALYSIS OF EVENT

TEXT IN more spece is required, use additional NRC Form 306A's) (17)

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.

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, is being written. Additional temporary flow instruments (pitot tube/manometer) will be installed at the same location as the flow switch, where the total flow across the duct will be measured. System flow will then be manually restricted by repositioning dampers to the minimum design air flow. The flow switch will then be calibrated to trip at this new flow reading for the minimum flow condition. Once recalibrated, the flow switches will not be as sensitive to minor changes in the air flow to which they are exposed. However, this procedure will also account for possibly significant changes in the air flow pattern to which the switches are exposed in the future. The technician is instructed to compare the current normal flow reading from the flow switch with the previous normal flow reading. Should the new reading indicate that the air flow pattern in the vicinity of the flow switch has changed, the flow switch will be recalibrated following Engineering evaluation and approval.

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Once the above and below refueling floor main exhaust duct flow switches are recalibrated, a one time special test will be performed on the HVR system. This test will rotate both 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. Fan rotations will be performed with three different HVR exhaust fan damper configurations. One rotation sequence will have the standby fan discharge damper fully open, another sequence will have the standby fan discharge damper 40% open (standby fan start permissive setpoint) and the remaining rotation sequence will have the standby fan discharge damper fully closed. With the standby fan discharge damper fully open, a decreased flow condition will exist due to the establishment of a recirculation flow path through the standby fan. Fan rotation with the damper standby fan 40% open simulates current operator practice, while rotation with the damper fully closed simulates an automatic start of the standby fan without operator intervention. The flow readings for each flow switch during each fan rotation will be recorded.

NRC FORM 366A

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Nine Mile Point Unit 2	0 5 0 0 4 1 0 8 7 -	<u> </u>	0 5 OF 0
calibration procedure and	will be performed upon final a ecial test, and the availabilit uld be completed prior to the r eduled for mid-July.	ty of required	
V. ADDITIONAL INFORMAT			
			erred 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.

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NMP23898

NIAGARA MOHAWK POWER CORPORATION



301 PLAINFIELD ROAD SYRACUSE, NY 13212

THOMAS E, LEMPGES VICE PRESIDENT-HUCLEAR GEMERATION

June 15, 1987

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

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

Gentlemen:

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

LER 87-24 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,

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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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NMP23898

NIAGARA MOHAWK POWER CORPORATION



301 PLAINFIELD ROAD SYRACUSE, NY 13212

THOMAS E. LEMPGES VICE PRESIDENT-NUCLEAR GENERATION

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