CATEGORY 1

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NRC - No Detailed Affiliation Given

SUBJECT: Part 21 rept re excessive failure rate of Borger-Warner (BWIP) pressure switches used in gas treatment,svc water, heating & ventilation sys.Effects of failed switch can be valve failing to open & being unable to close.

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CATEGORY 1 DOCUMENT

Part 21

POWER REACTOR	EVENT NUMBER: 31822

FACILITY: NINE MILE POINT REGION: 1 UNIT: [ ] [2] [ ] STATE: NY RX TYPE: [1] GE-2, [2] GE-5	NOTIFICATION DATE: 02/20/97 NOTIFICATION TIME: 15:13 [ET] EVENT DATE: 02/18/97 EVENT TIME: 14:30 [EST] LAST UPDATE DATE: 02/20/97
NRC NOTIFIED BY: K. LAMPMAN, M. McCORMICK HQ OPS OFFICER: LEIGH TROCINE	NOTIFICATIONS
EMERGENCY CLASS: NOT APPLICABLE 10 CFR SECTION: CCCC 21.21 UNSPECIFIED PARAGRAPH	LARRY NICHOLSON RDO VERN HODGE, RVIB NRR

UNIT	SCRAM CODE	RX CRIT	INIT PWR	INIT RX MODE	CURR PWR	CURR RX MODE
2	N	Y	100	POWER OPERATION	100	POWER OPERATION

EVENT TEXT

10 CFR PART 21 NOTIFICATION REGARDING THE EXCESSIVE FAILURE RATE OF BORG-WARNER (BWIP) PRESSURE SWITCHES USED IN THE GAS TREATMENT, SERVICE WATER, AND HEATING AND VENTILATION SYSTEMS

SEVERAL BWIP PRESSURE SWITCHES FAILED DURING OPERATION AND INITIAL CALIBRATION, AND AN EVALUATION CONCLUDED THAT THE SWITCHES ARE UNABLE TO MAINTAIN THE CORRECT RESET POINT WHEN THE SETPOINT IS ADJUSTED. ACCORDING TO THE MANUFACTURER, THE SUBJECT SWITCHES DO NOT HAVE AN ACCURATELY ADJUSTABLE RESET VALUE. THE RELATIONSHIP BETWEEN THE SETPOINT OF THE SWITCHES AND THEIR RESET POINT IS NOT LINEAR NOR CONSISTENT BETWEEN DIFFERENT SWITCHES OF THE SAME MODEL. THEY ARE DESIGNED TO OPERATE WITH A MAXIMUM SETPOINT AND MINIMUM RESET WINDOW ONLY. AS A RESULT, THE SWITCHES ARE NOT CONSISTENTLY ABLE TO BE INITIALLY CALIBRATED TO THE DESIRED SETPOINT; AND ONCE INSTALLED AND CALIBRATED, MINOR SETPOINT DRIFT MAY PLACE THE SWITCHES OUTSIDE THEIR ACCEPTABLE TOLERANCES.

THERE ARE A TOTAL OF 40 QUESTIONABLE BWIP PRESSURE SWITCHES INSTALLED IN THE PLANT (22 IN THE GAS TREATMENT SYSTEM, 6 IN THE SERVICE WATER SUPPLY TO COOLERS AND CHILLERS, AND 12 IN THE CONTROL BUILDING VENTILATION SYSTEM). EACH OF THE ASSOCIATED VALVES HAS TWO OR THREE OF THE SWITCHES WITHIN ITS HYDRAULIC CONTROLS. THE TYPE OF FAILURE ASSOCIATED WITH THE SWITCH DEPENDS ON WHICH SWITCH HAS FAILED. THE EFFECTS OF A FAILED SWITCH CAN BE A VALVE FAILING TO OPEN AND BEING UNABLE TO CLOSE OR A VALVE FAILING CLOSED AND BEING UNABLE TO OPEN.

THE LICENSEE PERFORMED AN OPERABILITY DETERMINATION AND CONCLUDED THAT THERE IS REASONABLE ASSURANCE THAT THE SWITCHES WILL OPERATE AS REQUIRED. THIS DETERMINATION WAS BASED ON SUCCESSFUL INITIAL CALIBRATION TESTING,

(Continued on next page)

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POSITIVE TEST DATA OF INSTALLED CALIBRATIONS, AND IMPLEMENTATION OF ADDITIONAL ADMINISTRATIVE CONTROLS TO SHORTEN THE CALIBRATION FREQUENCY.

THE LICENSEE HAS BEEN IN CONTACT WITH ENERTECH (THE VENDOR) IN CALIFORNIA AND WITH BORG-WARNER (THE MANUFACTURER). THE LICENSEE ALSO BELIEVES THAT ENERTECH HAS BEEN IN CONTACT WITH THE NRC.

THE LICENSEE PLANS TO NOTIFY THE NRC RESIDENT INSPECTOR. (REFER TO THE HOO LOG FOR SITE CONTACT TELEPHONE NUMBERS.)

NIAGARA MOHAWK

#31822

NINE MILE POINT NUCLEAR STATION
P.O. BOX 63, LYCOMING, NEW YORK 13093

FAX COVER LETTER

NINE MILE POINT UNIT 2

FROM:

FAX TELEPHONE NUMBER: (315) 349-1400

NAME: STEVE LEONARD

DEPARTMENT: LICENSING/ENVIRONMENTAL

TELEPHONE NUMBER: (315) 349 ~ 4039

TO:	FAX #
NRC Operations Center	301-816-5151

TOTAL NUMBER OF PAGES FAXED (INCLUDING COVER LETTER): 6

DATE: 2/20/96 TIME: 1500

MESSAGE:

ENCLOSURE 1
EVALUATION OF DEVIATION, DEFECT, FAILURE TO COMPLY FORM

PART I - REPORTING

Nine Mile Point 2 (Affected Unit)

DER No. 2-96-3145
Date of Discovery 12/19/96

TYPE OF CONDITION

A. Deviation

1. Basic Component (✓)
   a. Structure ( )
   b. System ( )
   c. Component (✓)
   d. Design ( )
   e. Inspection ( )
   f. Testing ( )
   g. Consulting Service ( )
2. Other Condition ( )

B. Defect

1. Deviation ( )
2. Other Condition ( )

C. Failure to Comply

1. Atomic Energy Act ( )
2. Rule ( )
3. Regulation ( )
4. Order ( )
5. License ( )

Description: Excessive failure rate of BWIP pressure switches used in the GTS, SWP, and HVK systems.

PART II - EVALUATION CHECKLIST

A deviation related to a Basic Component or a failure to comply shall be evaluated to determine if it presents a substantial safety hazard. A condition is a substantial safety hazard if it causes a major reduction in the degree of protection to the public. Criteria for determining substantial safety hazards include: a) Moderate exposure to or release of licensed material; b) Major degradation of essential safety-related equipment; and c) Major deficiencies involving design, construction, inspection, test or use of license facilities or materials (see NUREG-302).

The following checklist is used to determine if a major reduction in safety exists. If the answer is "yes" to any of the following, it may be reportable per 10CFR part 21 and requires further evaluation.

ENCLOSURE 1 (Cont)

PART II - EVALUATION CHECKLIST (Cont)

	CONSEQUENCE	YES	NO
1.	Exposures received in excess of 10CFR20 limits for immediate notification.		✓
2.	Exposure of an individual in an unrestricted area in excess of 10CFR20 limits.		✓
3.	Release of radioactive material to an unrestricted area in excess of 10CFR20 limits.		✓
4.	Exceeding a safety limit as defined in the facility technical specifications.		✓
5.	A condition which could disable or prevent operation of a system required for safe shutdown, emergency core cooling, post accident containment heat removal or post accident containment atmosphere cleanup.		✓
6.	A condition which could disable or reduce the safety margins for the reactor coolant pressure boundary, core or reactor internals, functions or operation.		✓
7.	A condition which could disable or prevent operation of the spent fuel storage pool cooling and storage including the fuel racks.		✓
8.	A condition which could disable or prevent operation of redundant Class IE electrical systems, including electric and mechanical devices and circuitry.		✓
9.	A condition which could disable or prevent operation of the reactivity control systems; that is, control rods, control rod drives, and boron injection systems.		✓
10.	A condition which could disable or prevent operation of radioactive waste systems that could create offsite doses greater than Part 100.		✓
11.	A condition which could disable or prevent operation of the primary and secondary containment.	✓	

ENCLOSURE 1 (Cont)

PART II - EVALUATION CHECKLIST (Cont)

	CONSEQUENCE	YES	NO
12.	A condition which could disable or prevent operation of structures, components, or systems whose continued function is not required, but whose failure could reduce or disable systems that are required.		✓
13.	A condition involving the security system which could cause a substantial safety hazard.		✓
14.	Other deviations in Basic Components or failures to comply which cause a substantial safety hazard.		✓
15.	A condition that creates an unreviewed safety question (10CFR50.59).		✓
16.	A condition which does not meet a rule, regulation, license or order and creates a substantial safety hazard.		✓

PART III - EVALUATION (to be completed by Nuclear Licensing)
(check applicable category)

☐ Condition does not meet criteria for a potential defect or failure to comply because (attach additional sheets as necessary): _____

☐ Condition does not involve a substantial safety hazard because (attach additional sheets as necessary): _____

☒ Condition involves a potential substantial safety hazard (attach additional sheets as necessary): See attached.

☐ Condition does not meet criteria for Potential Defect or Failure to Comply, but is reportable under 10CFR50.9.

PLANT: Nine Mile Point Unit 2 DER NO. 2-96-3145

TITLE: High Failure Rate - BWIP Pressure Switches

DESCRIPTION OF CONDITION:

Several BWIP pressure switches have failed during operation and initial calibration. An evaluation has concluded that the switches are unable to maintain the correct reset point when the setpoint is adjusted. According to the manufacturer, the subject switches do not have an accurately adjustable reset value. The relationship between the setpoint of the switches and their reset point is not linear nor consistent between different switches of the same model. They are designed to operate with a maximum setpoint and minimum reset window only. As a result, the switches are not consistently able to be initially calibrated to the desired setpoint, and once installed and calibrated, minor setpoint drift may place the switches outside their acceptable tolerances.

The subject switches were supplied and recommended by the vendor as replacement switches. The vendor is aware of the specific setpoints associated with each switch part number ordered by Niagara Mohawk. However, instead of providing switches designed to operate at the specific setpoint and reset, the vendor supplies a switch made to operate somewhere within the maximum setpoint and reset range for all switches of this type.

Each of the associated valves has 2 or 3 of the switches within its hydraulic controls. The type of failure associated with a switch depends on which switch has failed. The effects of a failed switch can be a valve failing open and unable to close, or a valve failing closed and unable to open.

For the HVK or SWP systems, due to their design and application, an assumed switch failure would cause the associated valve to fail open. SWP valves 2SWP*TV35A and 35B provide temperature control for the control and relay room chillers. HVK valves 2HVK*TV21A, 21B, 22A, and 22B provide individual temperature control for air conditioning units in both the control room and relay rooms. If these valves were to fail, control/relay room temperature could increase potentially beyond its acceptable design range. Redundant air conditioning units are available in addition to the ability to manually control cooling flow if required, however, under design basis assumptions neither are credited as being available.

For GTS (2GTS*MOV2A, 2B, 3A, 3B, 28A, 28B, and 2GTS*PV5A, 5B) should an associated pressure switch fail by not actuating at the desired setpoint, the setpoint overlap would prevent correct actuator response. Since the subject valves are located on the entrance, exit, bypass and recirculation lines around each Standby Gas Filter Train, the system may not be able to perform its intended safety functions.

Notwithstanding the fact that all systems are designed redundant and the ability exists to manually control flow around SWP valves 2SWP*TV35A and 35B, a deviation exists with the pressure switches for HVK, SWP, and GTS systems that assuming the coincident failure of all switches or a second unrelated single failure (as required by the design basis and Part 21 guidelines), the presence of the switches created a substantial safety hazard as defined by Part 21. Presently an engineering operability determination is in place that documents reasonable assurance that the switches will operate as required. This determination is based on having passed initial calibration testing, positive test data trends of installed calibrations and implementation of additional administrative controls to shorten the calibration frequency.

This evaluation concludes that although operable at this time, under the guidance of Part 21, the BWIP pressure switches are reportable.

ATTACHMENT : AFFECTED SWITCHES AND COMPONENTS
NMPC Part 21 Evaluation

SWITCH	PRESSURE, OPERATOR MODEL NUMBER 85430, ORIGINALLY SUPPLIED ON NMPC PURCHASE ORDER NOS. NMP2-P304Y. SPARE / REPLACEMENT PARTS ORIGINALLY SUPPLIED UNDER NMPC PURCHASE ORDER NUMBER NMP2-P304Y SHALL BE QUALIFIED TO BORG WARNER TEST REPORT NUMBER 2125, REV B	2GTS*MOV2A-ACT 2GTS*MOV2B-ACT 2GTS*MOV3A-ACT 2GTS*MOV3B-ACT
SWITCH	PRESSURE, OPERATOR MODEL NUMBERS 85960, 86060, AND 86040, ORIGINALLY SUPPLIED ON NMPC PURCHASE ORDER NOS. NMP2-P304Y AND NMP2-C051M, BWIP P/N 88739. SPARE / REPLACEMENT PARTS ORIGINALLY SUPPLIED UNDER NMPC PURCHASE ORDER NUMBERS NMP2-P304Y AND NMP2-C051M SHALL BE QUALIFIED TO BORG WARNER TEST REPORT NUMBERS 2125, REV B AND 2140 REV A.	2GTS*MOV28A-ACT 2GTS*MOV28B-ACT ~~2IGS*PCV115-ACT~~ 2SWP*TV35A 2SWP*TV35B
SWITCH	PRESSURE, OPERATOR MODEL NUMBERS 85960, 86060, 86080, AND 86040, ORIGINALLY SUPPLIED ON NMPC PURCHASE ORDER NOS. NMP2-P304Y AND NMP2-C051M, BWIP P/N 86819. SPARE / REPLACEMENT PARTS ORIGINALLY SUPPLIED UNDER NMPC PURCHASE ORDER NUMBERS NMP2-P304Y AND NMP2-C051M SHALL BE QUALIFIED TO BORG WARNER TEST REPORT NUMBERS 2125, REV B AND 2140 REV A.	2GTS*MOV28A-ACT 2GTS*MOV28B-ACT ~~2IGS*PCV115-ACT~~ 2SWP*TV35A 2SWP*TV35B