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FACIL:50-220 NINE MILE POINT NUCLEAR STATION, UNIT 1, NIAGARA POWE 05000220
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DISE,D.P. NIAGARA MOHAWK POWER CORP.
RECIP.NAME RECIPIENT AFFILIATION
IPPOLITO,T.A. OPERATING REACTORS BRANCH 3

SUBJECT: RESPONDS TO NRC 790327 REQUEST FOR ADDL INFO RE PLANNED MODS TO REACTOR PROTECTION SYS & CORE SPRAY SYS.FORWARDS UTIL SAFETY EVALUATION FOR REACTOR PROTECTION SYS MOD WHICH HAS COMMENCED.

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NIAGARA MOHAWK POWER CORPORATION/300 ERIE BOULEVARD WEST, SYRACUSE, N.Y. 13202/TELEPHONE (315) 474-1511

April 3, 1979

Director of Nuclear Reactor Regulation
Attn: Mr. Thomas Ippolito, Chief
Operating Reactors/Branch #3
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Ippolito:

Re: Nine Mile Point Unit 1
Docket No. 50-220
DPR-63

Your March 27, 1979 letter requested information related to planned modifications to the Reactor Protection System and the Core Spray System at Nine Mile Point Unit 1.

In response, enclosed is Niagara Mohawk's safety evaluation for the Reactor Protection System modification. As indicated, it has been determined that this modification does not constitute an unreviewed safety question; therefore, installation has commenced in full compliance with the requirements of Section 50.59 of 10CFR50.

The following additional information related to this modification was provided in a letter from Mr. G. K. Rhode to Mr. T. A. Ippolito dated March 27, 1979:

(1) interface description as delineated in Section 5.4 of NEDO-21617-1 dated January 1978

(2) environmental qualifications for normal, abnormal and accident conditions as defined by Standard Review Plan 3.11 (Rev. 1)

(3) effect on the capability to assess plant conditions during and following an accident

(4) effect on the Reactor Protection System, and

(5) separation criterion.

Installation of this modification will be consistent with the Nine Mile Point Unit 1 Fire Protection Program and Fire Protection Technical Specifications. Additionally, the following specific criteria have been implemented:

A001
S

(1) Instrument and power cable are qualified to IEEE 383-1974. This includes flame testing.

(2) There is physical independence and separation of the transmitters and trip units for the channels in the same trip system.

(3) Single failure criterion and separation of channels have been maintained.

Revised Technical Specifications are not required for installation or operation with the Reactor Protection System modification. However, improved plant reliability and lower operating costs would result from implementation of certain proposed Technical Specification changes submitted by Niagara Mohawk Power Corporation on February 12, 1979. These proposed changes deal with instrument scale reference and calibration frequencies.

The Core Spray System modification has been cancelled until a later date. Before this modification is made, Niagara Mohawk will provide the information requested in your letter.

Sincerely,

NIAGARA MOHAWK POWER CORPORATION

Donald P. Dise

Donald P. Dise
Vice President-Engineering

WRD/szd

Enclosure

SAFETY EVALUATION

PLANT: Nine Mile Point Unit 1

SYSTEM: Reactor Protection System

MODIFICATION: Analog Transmitter Trip System (REVISION 2)

			REVISION 1	REVISION 2
PREPARED BY:	P. Francisco	DATE	12/12/78	4/2/79 MEF
REVIEWED BY:	M. Mosier	DATE	12/13/78	4/2/79 MAM
APPROVED BY:	W. D'Angelo	DATE	12/29/78	4/2/79 WRD

DATE SORC REVIEWED	1/24/79	4/3/79
DATE SRAB REVIEWED		

I. REACTOR PROTECTION SYSTEM

A. Present Design

The Reactor Protection System for Nine Mile Point Unit 1 is described in Volume I Section VIII A of the Final Safety Analysis Report.

B. Modification

This modification involves the replacement of the present mechanical type sensors with analog transmitter trip devices. Table 1 lists those instruments being replaced. Figure 1 shows the interconnection between a typical new transmitter and trip unit and the existing wiring. Rev. 1

In addition to replacing the instruments indicated in Table 1, this modification will require associated tubing and cable for installing the instruments, four RPS cabinets with seismically designed foundations and modifying the transmitter rack supports in the east, west and north instrument rooms to meet seismic requirements. Rev. 1

The requirements of Appendix B to 10CFR50 apply to this modification.

C. Analysis

The present instrumentation at Nine Mile Point has been subject to frequent setpoint drift outside the limitations allowed by the Technical Specifications. In addition to this, a high rate of surveillance has been imposed by the NRC. This surveillance testing requires a large amount of manpower and places the plant in a half scram condition when some instruments are out of service for calibration or testing. Moreover, sensor calibration, rack bumping and valving errors can lead to inadvertent scram and associated downtime losses.

Addition of the new analog transmitter trip devices will: Rev. 1

1) Reduce the calibration frequency for the primary sensor from once per quarter to once per operating cycle for multi-channel variables. This will allow the primary sensor to be calibrated when the reactor is shut down.

2) Dcrease by an order of magnitude the amount of time required to functionally test or calibrate the safety trip points.

3) Reduce the length of time the plant is in a half-scram mode for functional testing or calibration of a safety trip.

4) Reduce the potential for scrams caused by valving errors hydraulic pressure spikes.

5) Reduce the number of Licensee Event Reports filed with the NRC for setpoint drift for the variables that are changed to the new analog system.

6) Eliminate instrument testing related scrams.

More detailed information concerning the analog transmitter/trip unit design, calibration, stability, and surveillance testing is contained in a General Electric Licensing Topical Report NEDO-21617 and Revision 1 titled Analog Transmitter/Trip Unit System for Engineered Safeguard Sensor Trip Inputs. Rev. 2

Addition of the Analog Transmitter/Trip Unit System will not affect the ability to monitor plant conditions during and following an accident. The Analog Transmitter/Trip Unit System is a replacement for mechanical sensor switches. The addition of this hardware into RPS and ECCS instrument systems affects the systems at the sensor level and not the logic level. Since the dual channel design (with two trip systems) of the Reactor Protection System is not being altered, the safe and reliable operation of the trip system is not compromised. The automatic and manual initiation and protective action of essential systems remains unchanged.

A comparison of the normal, abnormal and accident environmental conditions shows that the equipment to be installed is environmentally qualified for the maximum conditions in the Reactor Building as indicated in Table 2, attached. Rev. 2

The trip unit cabinets have been seismically qualified to meet the maximum floor acceleration at the cabinet floor level (see Table 3 attached).

The instrument cable required for interconnection from the new primary transmitters to the trip units will be twisted and shielded #16 AWG with cross-linked polyethylene insulation. The power cable required for the power supplies for the new trip units will be 2-conductor #12 AWG with cross-linked polyethylene insulation. The new instrument and power cable is qualified to IEEE 383-1974. Rev. 2

The physical independence separation and isolation of the protective instrumentation systems has not been changed. Rev. 2

As can be seen in Table 1, instrument nos. RE17 (opens core spray valves on low reactor pressure) and RE23 (closes main steamline valves on low reactor pressure) are not being replaced one for one. These two functions will be slave units to new instrument nos. 36-07 (RE03) and 36-08 (RE15), respectively, which will have dual functions. Since the Reactor Protection System is designed to accommodate any single failure and still perform its intended function, the failure of one of the dual function instrument channels will not prevent the two functions from being performed. Therefore, the same margin of safety is maintained. Rev. 1

The new primary sensors will be installed exactly as the existing instrumentation with the same setpoints, with the exception of the low-low-low reactor vessel water level indicators RE18A-D (new instrument no. 30-05). These instruments will be installed in accordance with recommended manufacturer's instructions with the high pressure side connected to the Core Spray Inlet Header and the low side connected to the condensing pot. In this way, the indicator scale will be decreasing as the water level decreases. Although the indicator scale setpoint will be different, the actual water level setpoint elevation (7'-11" below minimum normal water level) will be the same. Therefore, the same margin of safety will be maintained.

II. COMPLIANCE TO NRC STANDARDS (10CFR50.59)

A. The probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report remains the same since present instrumentation is being replaced with instrumentation of better or equal quality with accuracy and stability which greatly reduces instrument drift. Survellance testing will also be reduced which eliminates the potential for spurious scrams. Rev. 1

B. The possibility for an accident or malfunction of a different type than any evaluated in the safety analysis report remains the same since the function of the RPS is the same. This modification is merely changing the primary sensors of certain RPS instruments. Rev. 1 Rev. 2

C. The margin of safety, as defined in the bases for any technical specification remains the same. The calibration and test interval for the primary sensors can be increased and still provide the same calculated failure probability indicated in the Bases for 3.6.2 and 4.6.2, Protective Instrumentation.

II. COMPLIANCE TO NRC STANDARDS (10CFR50.59) -- Continued

Based on II A, B, and C above, this modification does not constitute an unreviewed safety question.

Rev. 2

D. Changes in the Technical Specifications have been submitted to allow calibrating and testing the primary sensors once per operating cycle. The proposed Technical Specification changes are not necessary for operation or installation of the modification, but will allow for improved operating flexibility.

TABLE 1

Reactor Protection System Instrumentation Replacement

	Service Function	Old Instrument No.	New Instrument No.
1.	Main Steam Flow High	RE22A-H	01-26
2.	Drywell Pressure High	RE04A-D	201.2-476
3.	Reactor Vessel Level High and Reactor Vessel Level Low	RE05A-D	36-03
4.	Reactor Vessel Level Low Low	RE02A-D	36-04
5.	Reactor Vessel Level Low Low Low	RE18A-D	36-05
6.	Reactor Vessel Pressure High and Reactor Vessel Pressure Low	RE03A-D RE23A-D	36-07
7.	Reactor Vessel Pressure High (Emergency Condenser Initiation and Reactor Vessel Pressure Low (Opens Core Spray Discharge Valves)	RE15A-D RE17A-D	36-08
8.	Emergency Condenser Flow High	IB05A-D	36-06

TABLE 2

Equipment	Equipment Location	Environmental Conditions	Nor	Abnor	Accident	Environmental Qualification	Time Required to Operat
36 Master Transmitters	Reactor Building Outside the Drywell	TEMPERATURE	70°	110°	150°	212°F	**
		PRESSURE	-.25"WC	Atmos	0.28 psig	60 psi	
		REL. HUM.	20-80%	100%	100%	Steam	
		RADIATION	5-15mr/hr	15-50mr/hr	$1x10^4$R	1.7×10^5R	
		CHEMICALS	N/A	N/A	N/A	N/A	
		VIBRATION	N/A	N/A	N/A	N/A	
36 Master Trip Units	Reactor Building Outside the Drywell	TEMPERATURE	80°	110°	150°	156°F	**
		PRESSURE	-.25"WC	Atmos	0.28 psig	60 psi	
		REL. HUM.	20-80%	100%	100%	99%	
		RADIATION	1-5 mr/hr	5-25mr/hr	$1x10^4$R	1.7×10^5R	
		CHEMICALS	N/A	N/A	N/A	N/A	
		VIBRATION	N/A	N/A	N/A	N/A	
12 Slave Trip Units	Reactor Building Outside the Drywell	TEMPERATURE	80°	110°	150°	156°F	**
		PRESSURE	-.25"WC	Atmos	0.28 psig	60 psi	
		REL. HUM.	20-80%	100%	100%	99%	
		RADIATION	1-5 mr/hr	5-25mr/hr	$1x10^4$R	$1.7x10^5$R	
		CHEMICALS	N/A	N/A	N/A	N/A	
		VIBRATION	N/A	N/A	N/A	N/A	
8 Power Supplies	Reactor Building Outside the Drywell	TEMPERATURE	80°	110°	150°	156°F	**
		PRESSURE	-.25"WC	Atmos	0.28 psig	60 psi	
		REL. HUM.	20-80%	100%	100%	100%	
		RADIATION	1-5 mr/hr	5-25mr/hr	$1x10^4$R	1.7×10^5R	
		CHEMICALS	N/A	N/A	N/A	N/A	
		VIBRATION	N/A	N/A	N/A	N/A	
8 Trip Relays	Reactor Building Outside the Drywell	TEMPERATURE	80°	110°	150°	156°F	**
		PRESSURE	-.25"WC	Atmos	0.28 psig	60 psi	
		REL. HUM.	20-80%	100%	100%	100%	
		RADIATION	1-5 mr/hr	5-25mr/hr	$1x10^4$R	1.7×10^5R	
		CHEMICALS	N/A	N/A	N/A	N/A	
		VIBRATION	N/A	N/A	N/A	N/A	

** All of the instrumentation is required to operate during and following an accident.

TABLE 3

Cabinet Seismic Qualification

Natural Frequency/ Direction	Maximum Floor Acceleration at Cabinet Floor Elevation	Cabinet Design Acceleration
33 Hz/Vertically	.15g	1.75g
25 Hz/Front to Back	.22g	2.00g
10 Hz/Side to Side	.22g	4.00g

MODIFICATION: Analog Transmitter Trip System

Fire Protection Analysis

A. Does the modification affect, preclude or degrade the design or function of the following:

1. Fire Protection Systems

a) Detection	Yes	(No)
b) Suppression	Yes	(No)
c) CO_2	Yes	(No)

2. Fire Barriers

a) Control Room and Auxiliary Control Room	Yes	(No)
b) Turbine Building	Yes	(No)
c) Waste Building	Yes	(No)
d) Battery Room	Yes	(No)
e) Diesel Generator	Yes	(No)
f) Reactor Building	Yes	(No)
g) Administration Building	Yes	(No)
h) Screen and Pump House	Yes	(No)

B. Does the modification require a fire watch? Yes or (No)

C. Are there any other fire prevention functions that should be required to install this modification? (Yes) or No

Installation of one of the RPS cabinets will require relocating fire hose station no. FS-109 located in the Reactor Building near column K-11 at floor elevation 281'. While this station is inoperable, an additional hose of equivalent capacity at an operable fire hose station shall be provided to reach the effected area.

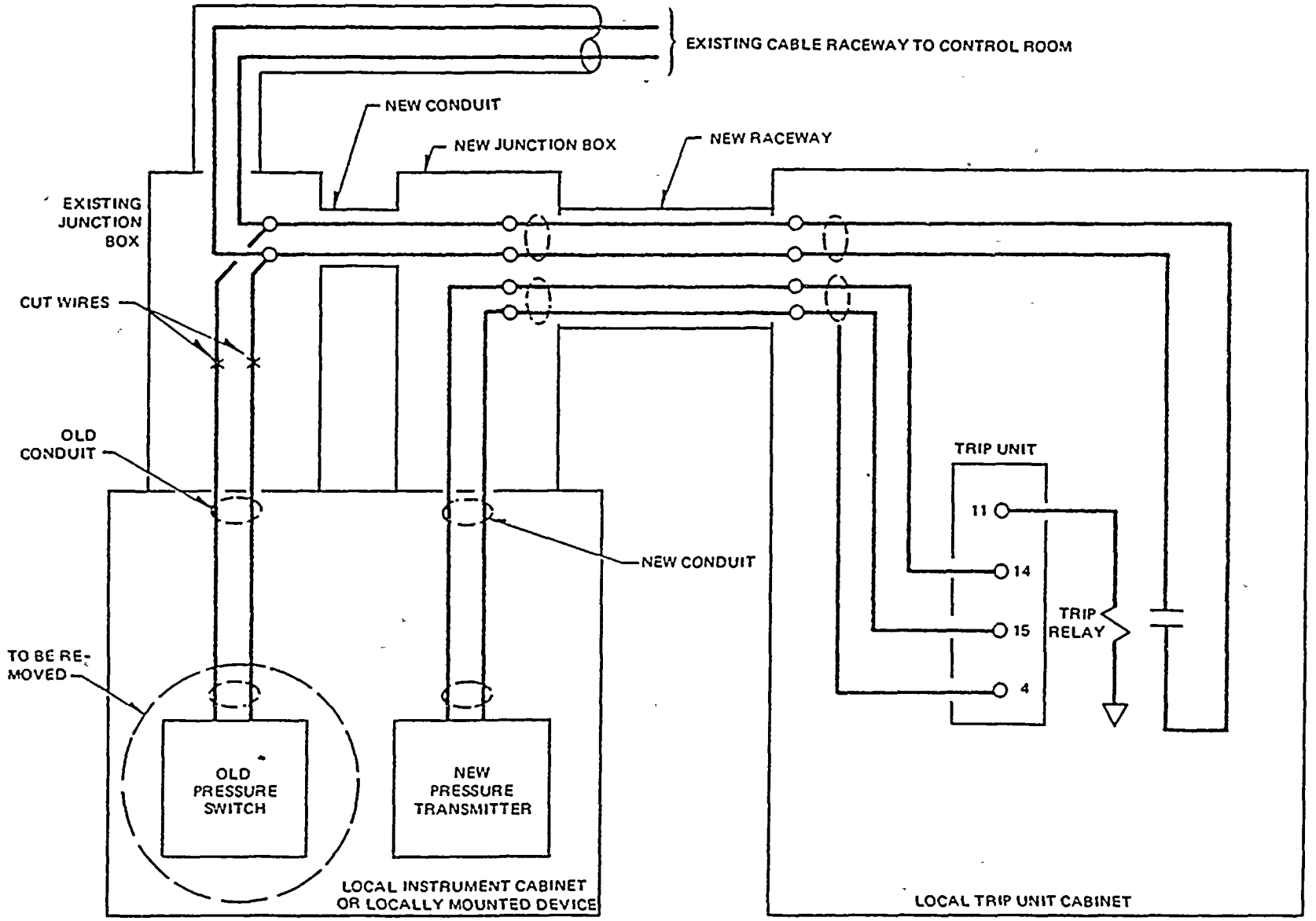

Figure 1 Interconnection Between New Transmitter/Trip Unit and Existing Wiring (Local Installation)