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New York Power Authority

J. Phillip Bayne
Executive Vice President
Nuclear Generation

June 1, 1983
IPN-83-50

Director of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. Steven A. Varga, Chief
Operating Reactors Branch No. 1
Division of Licensing

Subject: Indian Point 3 Nuclear Power Plant
Docket No. 50-286
Environmental Qualification Safety
Evaluation Report - 30-Day Response
Information

Dear Sir:

This letter provides the 30-day response information required to be submitted pursuant to the NRC's "Safety Evaluation Report (SER) for Environmental Qualification of Safety-Related Electrical Equipment for Indian Point Unit 3" as transmitted by your December 30, 1982 letter and as clarified by your April 28, 1983 letter ("Clarification of Environmental Qualification Safety Evaluation Report for the Indian Point Unit No. 3 Nuclear Generating Plant (IP-3)"). This information is being submitted in accordance with the schedule established by the April 28, 1983 clarification letter.

The December 30, 1982 SER requested the Authority to provide information with respect to the following four items:

- Submission of information for items in NRC Categories I.B, II.A, and II.B for which justification for continued operation (JCO) was not previously submitted to NRC or Franklin Research Center (FRC),

- Resolution of deficiencies identified in Appendix D of the FRC Technical Evaluation Report (TER) regarding JCO,

- Resolution of the concern identified on page 5-1 of the FRC TER regarding material aging information for equipment Items 51 through 68, and

- Resolution of the staff concern regarding the pressure/temperature service conditions outside containment.

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The April 28, 1983 clarification letter requested the Authority to:

- Review all JCOs submitted to date to ensure that a JCO exists for all equipment which may not be qualified,
- address equipment items in NRC Categories I.B, II.A, and IV, and
- address equipment items in NRC Category II.B following the special procedure outlined in the April 28, 1983 clarification letter, if such equipment exists at Indian Point 3.

Attachment A to this letter provides the 30-day response information requested by the December 30, 1982 SER as clarified by the NRC's April 28, 1983 letter. With respect to equipment items in NRC Categories II.B and IV, it should be noted that no such equipment has been identified at Indian Point 3. Attachment A also provides JCOs for the equipment listed in Section 3 ("Other Equipment Requiring Qualification") of the Authority's May 20, 1983 submittal (IPN-83-45) entitled "Environmental Qualification (EQ) of Electric Equipment Important to Safety - 10 CFR 50.49(g)." Enclosures 1 and 2 provide detailed information with respect to the responses presented in Attachment A.

Should you or your staff have any questions regarding this matter, please contact Mr. P. Kokolakis of my staff.

Very truly yours,

J. P. Bayne
Executive Vice President
Nuclear Generation

cc: Resident Inspector's Office
Indian Point Unit 3
U. S. Nuclear Regulatory Commission
P. O. Box 66
Buchanan, New York 10511

ATTACHMENT A

ENVIRONMENTAL QUALIFICATION OF ELECTRICAL EQUIPMENT

RESPONSE TO NRC
EQ SER
OF DECMEBER 30, 1982
AS CLARIFIED BY LETTER
DATED APRIL 28, 1983

NEW YORK POWER AUTHORITY
INDIAN POINT 3 NUCLEAR POWER PLANT
DOCKET NO. 50-286
JUNE 1983

BACKGROUND

In a letter dated December 30, 1982, the NRC transmitted to the Power Authority of the State of New York (the Authority) the "Safety Evaluation Report (SER) for Environmental Qualification of Safety-Related Electrical Equipment for Indian Point Unit 3." The NRC letter also transmitted Franklin Research Center (FRC) Technical Evaluation Report (TER)-456 dated June 9, 1982. The information presented below provides the Authority's responses to the items requiring special attention as requested in the SER, and as clarified by the NRC's April 28, 1983 clarification letter ("Clarification of Environmental Qualification Safety Evaluation Report for the Indian Point Unit No. 3 Nuclear Generating Plant (IP-3)").

Item 1:

The SER requested:

"• Submission of information within thirty (30) days for items in NRC Categories I.B, II.A and II.B for which justification for continued operation was not previously submitted to NRC or FRC"

RESPONSE: Enclosure 1 entitled:

ENVIRONMENTAL QUALIFICATION OF ELECTRICAL EQUIPMENT

INFORMATION CONCERNING

JUSTIFICATIONS FOR CONTINUED OPERATION

contains, as Exhibits C and D, the Justifications For Continued Operation (JCOs) for NP-1 series solenoid valves (TER Item 20) and for motorized valve actuators (TER Items 52, 53, 54, 62, 63, 64, 65, 66, 67, 68), which were not previously furnished to the NRC by the Authority on an itemized basis. It should be noted that no equipment was assigned to NRC Category II.B for Indian Point 3.

Item 2:

The SER requested:

"● Resolution of deficiencies identified in Appendix D of the FRC TER regarding JCO's.

"● Resolve any deficiencies identified in Appendix D of the FRC TER regarding justification for continued operation. If, as a result of resolving these deficiencies, the previous justification for continued operation is changed, provide within thirty (30) days of receipt of this SER the new justification for continued operation regarding each affected item."

RESPONSE: Enclosure 1 also contains, in Exhibits A and B, the revised JCO to resolve the deficiencies identified in Appendix D of the TER.

Item 3:

The SER requested:

"● Resolution of the concern identified on page 5-1 of TER-456 regarding material aging information for equipment items 51 through 68,

The FRC TER stated:

"Appendix C of the NRC SER (24) identified equipment that was considered acceptable or conditionally acceptable. The principal qualification deficiency identified was "A - Material Aging Evaluation, Replacement Schedule, and Ongoing Equipment Surveillance." The licensee has not responded on an item-by-item basis to the SER and TER concerns for these equipment items, and has provided only general aging information as described in Section 4.3.1 of this report. (The equipment items are Items 51 through 68 inclusive; see Appendix B.) With respect to Limitorque MOVs, it should be noted that the Licensee has not obtained information from the manufacturer confirming that the cited references apply to the equipment installed in the plant. Such confirmation should be obtained, and the Licensee should analyze the aging data for the components of the equipment and from this establish a conservative qualified life."

RESPONSE: The Authority has retained the services of a consulting firm to assist in evaluating age-related degradation of TER Items 51 through 68, as well as other safety-related electrical equipment installed at Indian Point 3. A combination of materials data, vendor information, operating experience and the Arrhenius technique is being used as necessary to perform aging analyses. For application of Arrhenius techniques, computer analyses are employed. All aging information developed is being evaluated for applicability to the surveillance and maintenance program in effect at Indian Point 3. Any degradable parameter that can be reliably measured nondestructively on a sampling basis will be factored into the Authority's program.

Item 4:

The SER requested:

"● Resolution of the staff concern regarding the pressure/temperature service conditions outside containment. The analyses submitted by the Licensee have not been accepted by the staff and additional information in this area is required from the Licensee. The Indian Point Unit 3 temperature calculated by COBREE takes credit for heat transfer through the compartment walls and condensation, while most utilities do not take credit for either heat removal mechanism. Furthermore, there is no conservatism incorporated in the staff calculation; thus, any revised temperature provided by Indian Point Unit 3 should be higher than was calculated by COBREE."

RESPONSE: The Authority notes that the NRC has performed COBREE computer analyses of environments resulting from a HELB in the Auxiliary Feedwater Pump Room and the Steam and Feedline Penetration Area. The input data for the analyses was previously furnished to NRC by the Authority. Since its submittal of the report "Analysis of High Energy Lines" by letter (Trosten to Giambusso) dated May 14, 1973, the Authority has been concerned about the effects of high-energy line breaks outside of containment, and has taken several steps to eliminate or reduce the

effects of such accidents. The Steam and Feeline Penetration Area accident conditions are limited as discussed in Exhibit B of Enclosure 1. Exhibit A of Enclosure 1 discusses the protection of equipment in the Auxiliary Feedwater Pump Room, and confirms that the steam line will be isolated before the environment can become severely harsh.

The Authority considers that, regardless of the computational techniques applied, the design features incorporated into the plant protect the areas--and the equipment in those areas--from the environments calculated as theoretical upper limits by any accepted methods.

In addition to the four items identified in the body of the SER, as discussed above, the SER transmittal letter states:

> "As indicated in the conclusion section of the Safety Evaluation Report, we request that you reaffirm the justification for continued operation and within thirty (30) days of receipt of this letter, submit information for items in NRC Categories I.B, II.A and II.B (presented in the enclosed Technical Evaluation Report) for which justification for continued operation was not previously submitted to the NRC. We suggest that the clarification set forth in Item 8 of Generic Letter No. 82-09, "Clarification Questions and Answers on Environmental Qualification Requirements," should be considered in your justification for continued operation."

RESPONSE: Enclosure 1 contains a tabular listing of the Equipment Items contained in TER-456, and affirms by the letter "P" that the JCO previously provided is still applicable. Revised JCO's, and new JCO's, are contained in Exhibits A, B, C, and D of Enclosure 1.

The NRC's April 28, 1983 clarification letter also requested a review of all JCO's submitted to date to ensure that a JCO exists for all equipment which may not be qualified. The preceeding paragraphs

describe the Authority's review of JCO's for all equipment addressed in the SER and TER.

In the Authority's May 20, 1983 submittal (IPN-83-45) entitled "ENVIRONMENTAL QUALIFICATION (EQ) OF ELECTRIC EQUIPMENT IMPORTANT TO SAFETY - 10CFR50.49(g)," additional equipment requiring qualification pursuant to 10CFR50.49(a) and (b) was identified and listed in Section 3 ("OTHER EQUIPMENT REQUIRING QUALIFICATION"). For completeness, Enclosure 2 ("ENVIRONMENTAL QUALIFICATION OF ELECTRICAL EQUIPMENT, JUSTIFICATION'S FOR CONTINUED OPERATION FOR ADDITIONAL EQUIPMENT REQUIRING QUALIFICATION PURSUANT TO 10CFR50.49") of this submittal provides JCO's for the equipment listed in Section 3 of the May 20, 1983 submittal.

ENCLOSURE 1

ENVIRONMENTAL QUALIFICATION OF ELECTRICAL EQUIPMENT

INFORMATION CONCERNING
JUSTIFICATIONS FOR CONTINUED OPERATION

NEW YORK POWER AUTHORITY

INDIAN POINT 3 NUCLEAR POWER PLANT

DOCKET NO. 50-286

JUNE 1983

JUSTIFICATION FOR CONTINUED OPERATION

INDIAN POINT 3

The table beginning on the following page lists the equipment identified in FRC TER-456 in NRC Categories I.B, II.A and II.B. Also shown is the EQ Group Number now being used by the Authority to identify this equipment; its type, manufacturer and model; and information concerning the Justification For Continued Operation (JCO). Note that the letter "P" designates that the JCO is the same as in the previous EQ submittal dated August 21, 1981, while Exhibits A through D contain revised or new JCO information for some of the equipment items.

ELECTRICAL EQUIPMENT ENVIRONMENTAL QUALIFICATION

INDIAN POINT 3

EQ GROUP NO.	TER ITEM NO.	TYPE*	MANUFACTURER	MODEL DESIGNATION	JCO**
155E	2	FTR	Barton	386	P
156E	3	PTR	Foxboro	E11GM (MCA)	P
157E	4	PTR	Foxboro	E11GH	P
158E	5	FTR	Foxboro	E13DM (MCA)	P
255E	6	PTR	Foxboro	E11GM	P
255E	7	PTR	Foxboro	E11GM	P
256E	8	PTR	Foxboro	E11GM	Exhibit A
256E	9	PTR	Foxboro	E11GM	Exhibit A
257E	10	FTR	Foxboro	E13DM	Exhibit A
158E	11	LTR	Foxboro	E13DM (MCA)	P
210E	12	SOV	ASCO	8300	Exhibit A
212E	13	SOV	ASCO	8314	P
212E	14	SOV	ASCO	8316	P
212E	15	SOV	ASCO	8317	P
211E	16	SOV	ASCO	8300	P
213E	17	SOV	ASCO	8316	P
215E	18	SOV	Laurence	110114W	Exhibit B
216E	19	SOV	Laurence	629BC85PS	P
110E	20	SOV	ASCO	NP8316A75E	Exhibit C
113E	21	SOV	Skinner	--	P
140E	22	RTD	Sostman	11901B	P
135E	23	LSW	GEMS	LS1900	P
170E	24	ELC	Kerite	--	P
178E	25	ECS	Raychem	--	P
171E	26	ELC	Lewis	--	P
220E	27	EMD	Westinghouse	Frame 509UPZ	P
221E	28	EMD	Westinghouse	Frame 509US	Exhibit A
222E	29	EMD	Westinghouse	Frame 509US	P
120E	30	EMD	Westinghouse	Frame 588.5	P
121E	31	EMD	Westinghouse	69F97009	P
180E	32	EJA	Westinghouse	542247 (805432)	P
290E	35	ICP	Westinghouse	--	P
122E	38	EMD	Westinghouse	--	P
165E	39	FSW	Barksdale	--	P
245E	40	TSW	United Electric	6CS TYPE F110A	Exhibit A
161E	43	ATR	TEC	500	P
230E	46	PSW	NAMCO	EA170	P
232E	47	LSW	NAMCO	SL3	P
233E	48	LSW	NAMCO	D2400	P
235E	49	LSW	Micro Switch	EXAR7313	P
236E	50	LSW	Micro Switch	EXHAR3	P

ELECTRICAL EQUIPMENT ENVIRONMENTAL QUALIFICATION

INDIAN POINT 3

EQ GROUP NO.	TER ITEM NO.	TYPE*	MANUFACTURER	MODEL DESIGNATION	JCO**
101E	52	MVA	Limitorque	SMB (CL. H ins.)	Exhibit D
101E	53	MVA	Limitorque	SMB (CL. H ins.)	Exhibit D
101E	54	MVA	Limitorque	SMB (CL. H ins.)	Exhibit D
--	55+	MVA	Limitorque	SMB	--
200E	62	MVA	Limitorque	SMB (CL. B ins.)	Exhibit D
200E	63	MVA	Limitorque	SMB (CL. B ins.)	Exhibit D
200E	64	MVA	Limitorque	SMB (CL. B ins.)	Exhibit D
200E	65	MVA	Limitorque	SMB (CL. B ins.)	Exhibit D
200E	66	MVA	Limitorque	SMB (CL. B ins.)	Exhibit D
200E	67	MVA	Limitorque	SMB (CL. B ins.)	Exhibit D
102E	68	MVA	Limitorque	SMB (CL. B ins.)	Exhibit D

*Codes for Equipment Type:

ATR:	Acoustic Transmitter	FSW:	Flow Switch
FTR:	Flow Transmitter	LSW:	Limit Switch
LTR:	Level Transmitter	TSW:	Temperature Switch
PTR:	Pressure Transmitter	RTD:	Resistance Temperature Detector
SOV:	Solenoid Operated Valve	ELC:	Electric Cable
MVA:	Motorized Valve Actuator	ECS:	Electric Cable Splice
EMD:	Electric Motor Drive	EJA:	Electrical Junction Assembly
PSW:	Position Switch	ICP:	Instrument & Control Panel

**Justification For Continued Operation
(Note: "P" designates that JCO submitted previously remains unchanged)

+This equipment is no longer installed; it was replaced by TER Item No. 1.

EXHIBIT A

EQUIPMENT LOCATED IN THE AUXILIARY FEEDWATER PUMP ROOM

As is noted in the TER prepared by FRC, the Auxiliary Feedwater Pump (AFP) Room contains both the turbine-driven AFP and the two motor-driven AFPs in addition to instrumentation and valves associated with this equipment and also instrumentation associated with the main steam and main feedwater systems. The concern cited in Appendix D of the TER is that the reliabiity of all this equipment is dependent upon the ability of at least one of the redundant temperature switches (TER Equipment Item No. 40) to operate properly and sense that a break in the AFP steam supply line or AFP turbine has occurred, and to initiate the signal that causes the isolation valves in this steam line to close.

The exhibit presented on the following pages provides a JCO concerning these temperature switches, which thereby justifies the environmental condition parameters on which qualification of the other safety-related equipment in this room is based (TER Equipment Items 8, 9, 10, 12, and 28).

EQ GROUP NO: 245E

EQUIPMENT TYPE: TEMPERATURE SWITCH

MANUFACTURER: UNITED ELECTRIC CONTROLS

BACKGROUND

The Franklin Research Center has prepared and submitted to the NRC a Technical Evaluation Report (TER) titled "Review of Licensee's Resolution of Outstanding Issues From NRC Equipment Environmental Qualification Safety Evaluation Reports," dated June 9, 1982. The NRC used this TER to prepare a Safety Evaluation Report (SER), which was sent to the Authority by letter dated December 30, 1982. The SER and Appendix D of the TER identifies two equipment items for which the Authority's Justification for Continued Operation was judged to be inadequate. This exhibit provides resolution of the concern stated in the SER.

QUALIFICATION DEFICIENCY

The TER identifies the concern that qualification documentation was not provided for the United Electric Control temperature switch, and that operation of this device is necessary in order to prevent the discharge of steam into the room in the event of a HELB involving the steam line supplying the turbine-driven feedpump.

LOCATION AND SAFETY FUNCTION

This equipment is located in the Auxiliary Feedwater Pump Room at Elevation 18'-6". This room is a concrete enclosure housing the three auxiliary feed pumps (AFPs) (two electric-driven and one turbine-driven) with associated piping and controls. Also contained in this area are the main steam feed flow and pressure transmitters, and auxiliary feed system instrumentation.

The high energy line in this room is the main steam line to the AFP turbine. A postulated break in this line could cause a pressure, temperature and humidity buildup in the room.

This line is seismic Class I and was designed to preclude circumferential failures at points of discontinuity and longitudinal failures at any locations including fittings. Pipe whip restraints are provided to prevent whip of this line into lines of smaller diameter or wall thickness or into any safe shutdown equipment. No damage to critical equipment would result from pipe whip.

The environmental conditions in this room are evaluated on the basis of a steam line failure to the AFP turbine. Initial conditions for this break were taken to be 1,100 psia saturated steam. The discharge rate, as found by Napiers formula is approximately 650,000 pounds per hour. Vent area assumed for the pressure/temperature calculations was 21 square feet, which includes a door hinged to open outward when under pressure. Final conditions in the room, based on steady-state calculations, were 0.9 psig and 213°F. This pressure is well within the 9.0 psig limit for the room calculated by maintaining stresses within the requirements of ACI-318 Building Code Limits (Part IVB "Ultimate Strength Design").

For the purpose of evaluating the effects of the environment resulting from such a break on the equipment in this room, the following conditions were originally used:

Average Temperature = 213°F
Maximum Temperature = 320°F (Due to jets)
Humidity = 100%
Pressure = 0.9 psig

It is believed that the equipment in the auxiliary feed system, such as pump motors, controls and instruments within the area, could withstand these conditions for a substantial period of time. No specific test data are available at this time to substantiate this belief. However, loss of all AFP's would not prevent safe shutdown since the ECCS powered from on-site emergency sources would provide emergency core cooling.

A complete failure of the main steam line in this room could cause a plant trip. Only if it is assumed that all three AFP's are disabled and ac power is lost would this event jeopardize safe shutdown. To preclude this unlikely occurrence, the following modification was made prior to initial plant operation:

> Two redundant valves were added in the main steam supply line to the AFP turbine outside this room. Each valve is signaled to close automatically on high temperature by its own temperature switch located in the auxiliary feed pump room. Each valve has control room indication, control and alarm. Each system is completely independent of the other.

Because of the functioning of this system, the bulk temperature rise in this room would be limited to 135°F. As noted above, the concern cited in the TER is that no qualification documentation is available for the temperature switches.

EQUIPMENT DESCRIPTION (see Figure 1)

The temperature switch consists of a sealed oil filled 304 stainless steel tube, a metal bellows, two on-off snap switches, and a terminal block in an explosion-proof housing. The units are designed for, and have extensive operating experience in ambient temperatures ranging between -40°F and 160°F, and 100% salt, dust and humidity environments.

FAILURE MODE ANALYSIS (see Figure 1)

The only possible mode of failure would be for steam from a break in the AFP turbine steam supply to infiltrate the housing and provide a conducting path between adjacent wires in the terminal block and cause a short circuit which could prevent valve closure. Since the conductor in the wires is not exposed, the distance between the screws is greater than 1/8 inch and steam is a poor conductor, bypassing of the switch is highly unlikely. In addition there is negligible probability that steam could be admitted to the switch internals because threaded joints and conduit paths are highly restrictive and the switch would actuate long before

any steam could enter. Furthermore, steam is not expected to have an effect on the mechanical part of the switch assembly.

JUSTIFICATION FOR CONTINUED OPERATION (Revised)

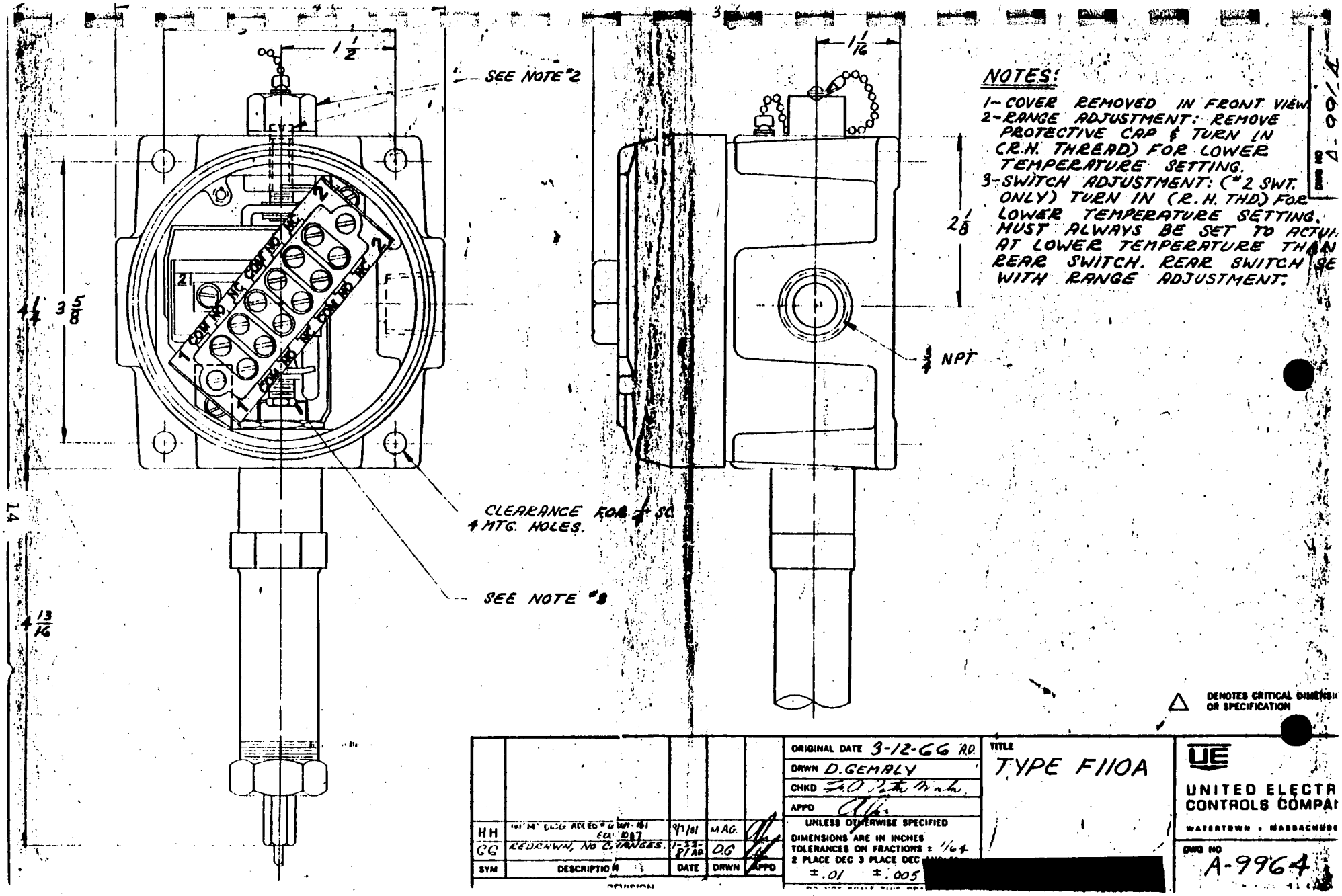
The only way that steam could enter the internals of the switches would be via the housing cover threads, the conduit connection threads, or through the cable end of the conduit. All of these paths are extremely restricted and would require high pressure to force steam into the unit. Because each temperature switch is set to trip one of the isolation valves at 135°F, the steam supply would be isolated before any steam could enter through the threaded connections. Therefore, operation of the devices is assured.

Two independent temperature switches are installed, separated by at least 10 feet; each actuating a separate isolation valve and powered from a separate power source. A single failure in any part of one switch circuit therefore could not prevent the other switch from performing the required safety function of closing the valve.

RESOLUTION OF QUALIFICATION CONCERN

The threaded connections and conduit will be sealed using teflon tape for the housing cover and RTV 77 for the conduit and cable entry areas. Use of teflon tape was qualified by LOCA tests on NAMCO EA 180 and EA 740 limit switches, and RTV was qualified by LOCA tests on conduit outlets sealed with RTV in Wyle test for J. A. Farley Plant (Wyle Report #44354-1, page 6, Test Item 4).

When completely sealed from steam, the devices are qualified for the temperature and humidity and have no materials that will degrade at the normal ambient temperature in the AFP room (104°F max).


1 1/2
SEE NOTE "2
3 5/8
4 1/4
4 13/16
CLEARANCE FOR #8 SC
4 MTG. HOLES.
SEE NOTE "3
1 1/16
2 1/8
3/4 NPT
NOTES:
1-COVER REMOVED IN FRONT VIEW
2-RANGE ADJUSTMENT: REMOVE PROTECTIVE CAP & TURN IN C.R.H. THREAD) FOR LOWER TEMPERATURE SETTING.
3-SWITCH ADJUSTMENT: (*2 SWT. ONLY) TURN IN (R.H. THD) FOR LOWER TEMPERATURE SETTING. MUST ALWAYS BE SET TO ACTU AT LOWER TEMPERATURE TH REAR SWITCH. REAR SWITCH SE WITH RANGE ADJUSTMENT.
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CONTROLS COMPA
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DWG NO
A-9964

Figure 1

EXHIBIT B

EQ GROUP NO: 215E

EQUIPMENT TYPE: SOLENOID OPERATED VALVE

EQUIPMENT MANUFACTURER: LAURENCE

BACKGROUND

The Franklin Research Center has prepared and submitted to the NRC a Technical Evaluation Report (TER) titled "Review of Licensee's Resolution of Outstanding Issues From NRC Equipment Environmental Qualification Safety Evaluation Reports," dated June 9, 1982. The NRC used this TER to prepare a Safety Evaluation Report (SER), which was sent to the Authority by letter dated December 30, 1982. The SER and Appendix D of the TER identifies two equipment items for which the Authority's Justification for Continued Operation was judged to be inadequate. This exhibit provides resolution of the concern addressed in the SER.

QUALIFICATION DEFICIENCY

The concern identified in the TER for the Laurence SOV's is that qualification documentation was not available.

LOCATION AND SAFETY FUNCTION

This equipment is located in the Shield Wall Area at El. 43'0". This enclosure provides weather protection for the main steam and boiler feed piping. Sheet metal paneling similar to that used in other areas of the plant is fastened to stringers which are jointed to the structural steel. Loads of 60 psf (0.42 psi) will cause the panels to fail, allowing steam to escape to the building exterior and preventing further pressure buildup.

High energy lines in this enclosure are the main boiler feed lines upstream and downstream of the check valves, main steam lines upstream and downstream of the main stop valves, and steam supply lines to the AFP turbine. Pipe whip restraints are provided for the seismic Class I portion of these lines where necessary to prevent damage to adjacent Class I steam or feedwater lines. Other safety-related equipment in the area are the main steam isolation and main steam relief valves.

Temperature buildup in the area would not be significant since the exterior wall siding would blow off almost immediately following a break. The main steam isolation valves (MSIVs) are signaled to close immediately upon steam line break.

Main steam isolation valve controls must function to isolate all main steam lines in the event of a full MSLB downstream of the stop valves. The MSIV control SOVs are protected by adequate distance from postulated breaks at locations downstream of the stop valves. Hence, the control circuits would have performed their function before any temperature effects could build-up to impair their operation.

EQUIPMENT DESCRIPTION

The Laurence SOV's are part of a packaged operating system supplied with the main steam isolation valves (MSIVs). Figure 1 shows the configuration and provides a description of the system operation. Figure 2 shows schematically the power supplies for the solenoid valves, demonstrating that the redundant SOV's shown on Figure 1 are powered from separate buses, and that the system therefore is not subject to a single disabling failure.

Figure 3 is an assembly drawing of a Laurence SOV. The configuration corresponds to the supply valve of Figure 1. In normal operation

the lever arm (A) is held in the open position by latch (B). The spring (C) holds one latch in position. In this configuration the solenoid is deenergized and the valve plug (F) is held off the seat against the force of spring (D). When the solenoid coil is energized the plunger (E) is pulled upwards, disengaging the latch (B) from the lever arm (A). Spring (D) then forces the valve plug (F) to the closed position.

The solenoid dump valves function similarly. The only difference is that the spring force causes the valve to open.

FAILURE MODE ANALYSIS

The only failures which would prevent the valves from performing their function (refer to Figure 3) are:

1) Failure of spring (D).

2) Open or short-circuit in solenoid coil or coil connections.

3) Binding or sticking between the lever (A) and latch (B).

1) Failure of Spring (D). The drawing (Figure 3) states that internal parts are type 303 stainless steel (viz., plug (D), spring (F) and washer (G)), and the fluid is air. At normal ambient temperatures, the corrosion of stainless steel in air is negligible. Operating experience with installed valves at Indian Point 3 for a period of about 6 years has shown no spring failures in 16 valves when periodically tested as required by the Technical Specifications. Even if the spring force should be reduced, the weight of the lever arm (A) and the direction of flow would provide the necessary force to move the valves to their proper positions.

2) Open or Short Circuit in Solenoid Coil or Coil Connections. The valve is normally deenergized and located in an area where the

ambient temperature is 105°F (or less). Aging degradation of the Class H coil is negligible (rated for continuous duty at approximately 350°F). As noted for the springs above, no failures or anomalies of the coils or connections have been identified by the periodic testing required by the Technical Specifications. Random failure of a coil would not preclude system operation because the design is "single-failure-proof".

3) Binding or sticking between the lever arm (A) and latch (B). If high friction from metal-to-metal contact between the latch and lever arm (or between the latch and the solenoid plunger) occurred, the coil force to cause valve actuation would increase. If friction forces resulted in binding, the solenoid would not produce sufficient force to actuate the valve. To preclude such events, the moving parts of the operating mechanism are periodically lubricated. They are also tested as required by the Technical Specifications to demonstrate operability.

As noted above, aging of the solenoid coil is not of concern. However, the Buna-N material used in the valve disc is subject to aging. Because there is no data available in the published literature for Buna-N as used in the SOV's, a qualified life cannot be established. Data on Buna-N seals (gaskets and "O" rings) have indicated lifetimes between 6 and 15 years at 135°F. Since, in this valve application, the material is normally unstressed, engineering judgment would indicate that a life of 15 years (the upper bound for stressed materials) could be anticipated. If some degradation occurs it would not prevent the valve from shutting off the air supply, even if some seal leakage occurred. As noted above, periodic testing assures that no significant degradation has occurred.

It is therefore concluded that there is no credible failure mode that would prevent the valves from functioning.

JUSTIFICATION FOR CONTINUED OPERATION (Revised)

Continued operation is justified because:

1) There are no credible failure modes which would prevent the valves from operating.

2) Engineering judgment indicates that qualified life has not been exceeded.

3) The SOVs perform their function very early during a steam line break. The operating time from SOV actuation to MSIV closing is less than 5 seconds. This time is verified by periodic testing. The instrumentation that initiates protective action during the accident is not exposed to the accident environment and thus will function to actuate the solenoids and trip the valves. Furthermore, once the MSIVs are closed, failure of the SOVs would not cause them to open.

4) The temperature and pressure in the area where the solenoids are located would not significantly increase over ambient in the event of a steam line break before isolation of the break could occur.

5) The systems in which the valves are located are "single-failure-proof".

6) The only break that could affect the solenoids is a break in the piping upstream of the MSIV with which the SOVs are associated. Blowdown of other steam generators in such an event is prevented by the check valves installed in the main steam lines upstream of the MSIVs.

RESOLUTION OF QUALIFICATION DEFICIENCY

Additional analysis and or testing will be done to demonstrate qualification of the SOV's. If necessary the valves will be replaced by qualified valves at the first refueling outage following receipt of the replacement units.

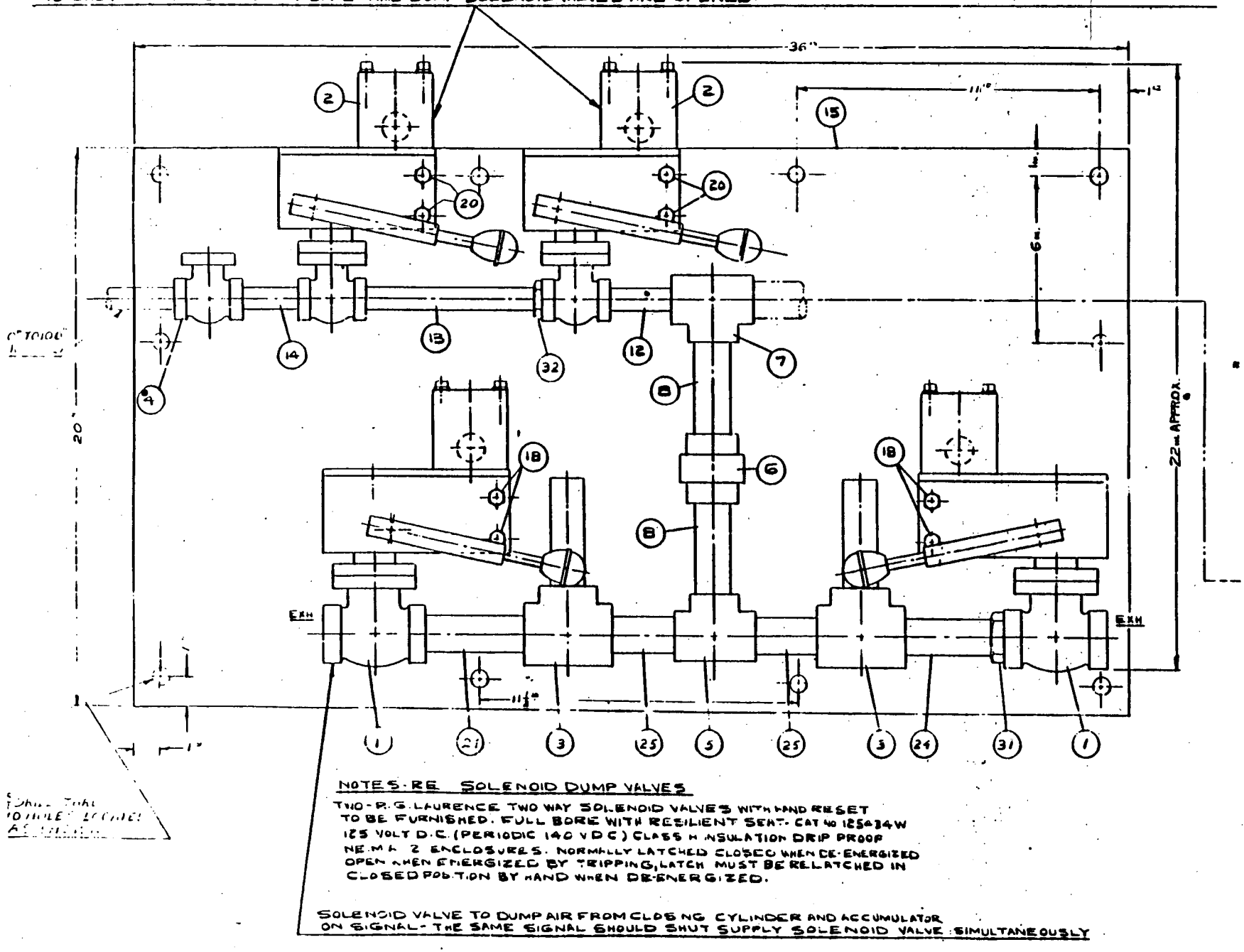

TWO-½" SOLENOID VALVES IN TANDEM EACH SUITABLE FOR 125 VOLTS D.C. (PERIODIC 140 V.D.C.) CLASS H COIL INSULATION DRIP PROOF NEMA 2 ENCLOSURES R.G. LAURENCE #1200 TYPE WITH RESILIENT SEAT - NORMALLY OPEN WHEN DE-ENERGIZED, CLOSE WHEN ENERGIZED FROM SIGNAL. TO SHUT OFF AIR SUPPLY AT SAME TIME DUMP SOLENOID VALVES ARE OPENED.
36"
11"
1"
6"
20"
22" APPROX.
EXH
EXH
11½"
1"
NOTES RE SOLENOID DUMP VALVES
TWO R.G. LAURENCE TWO WAY SOLENOID VALVES WITH HAND RESET TO BE FURNISHED. FULL BORE WITH RESILIENT SEAT. CAT NO 1254 34W 125 VOLT D.C. (PERIODIC 140 V D C) CLASS H INSULATION DRIP PROOF NEMA 2 ENCLOSURES. NORMALLY LATCHED CLOSED WHEN DE-ENERGIZED OPEN WHEN ENERGIZED BY TRIPPING, LATCH MUST BE RELATCHED IN CLOSED POSITION BY HAND WHEN DE-ENERGIZED.
SOLENOID VALVE TO DUMP AIR FROM CLOSING CYLINDER AND ACCUMULATOR ON SIGNAL - THE SAME SIGNAL SHOULD SHUT SUPPLY SOLENOID VALVE SIMULTANEOUSLY

FIGURE 1

INFORMATION ONLY
Not For Installation

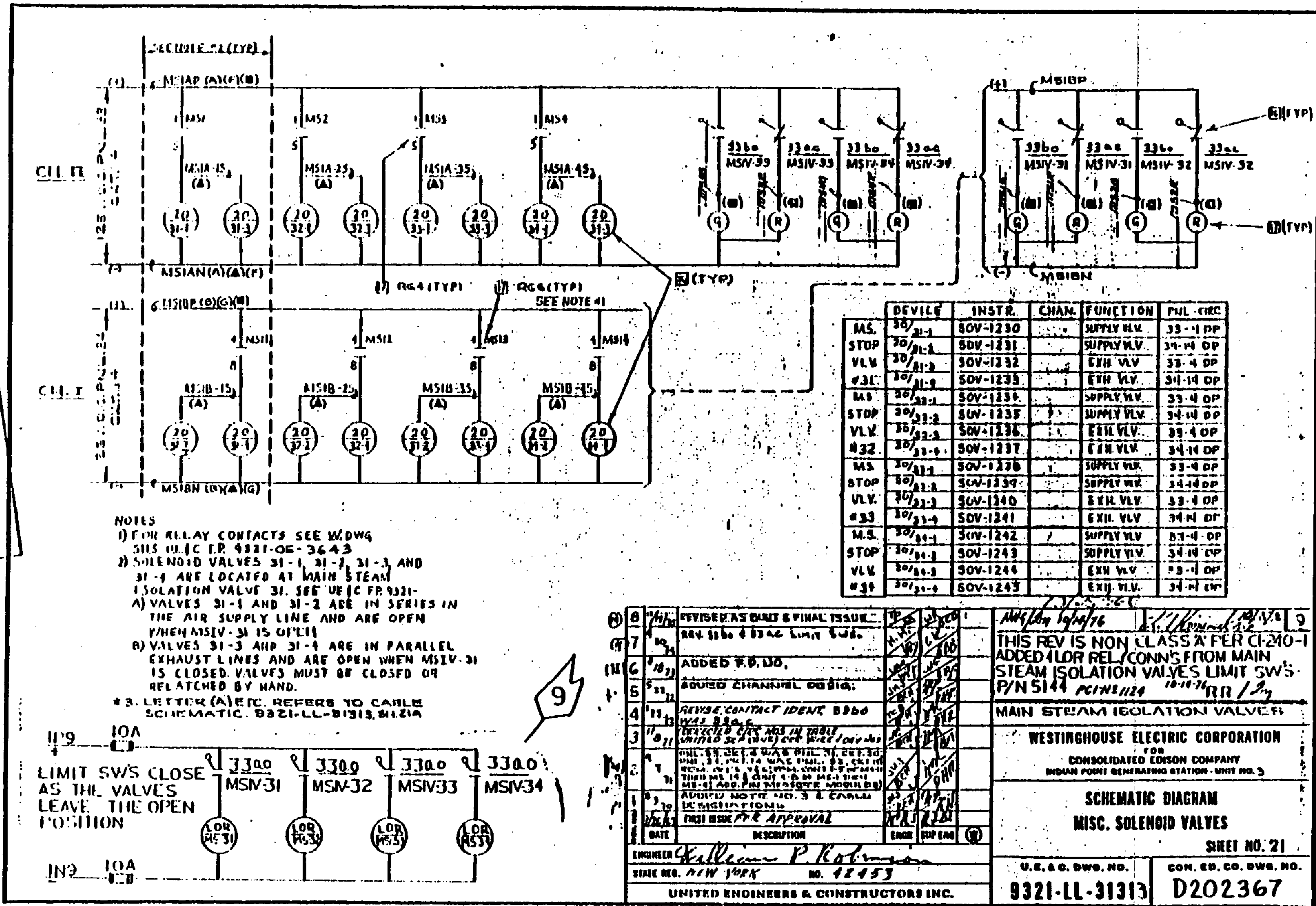
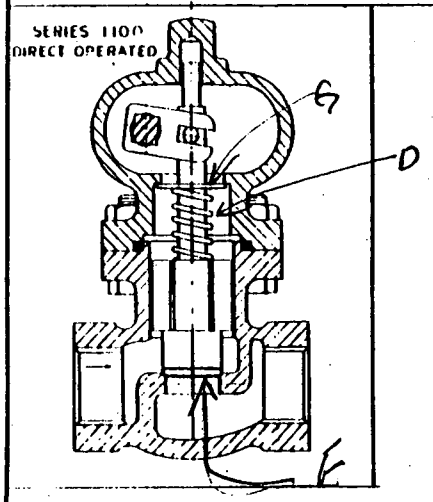
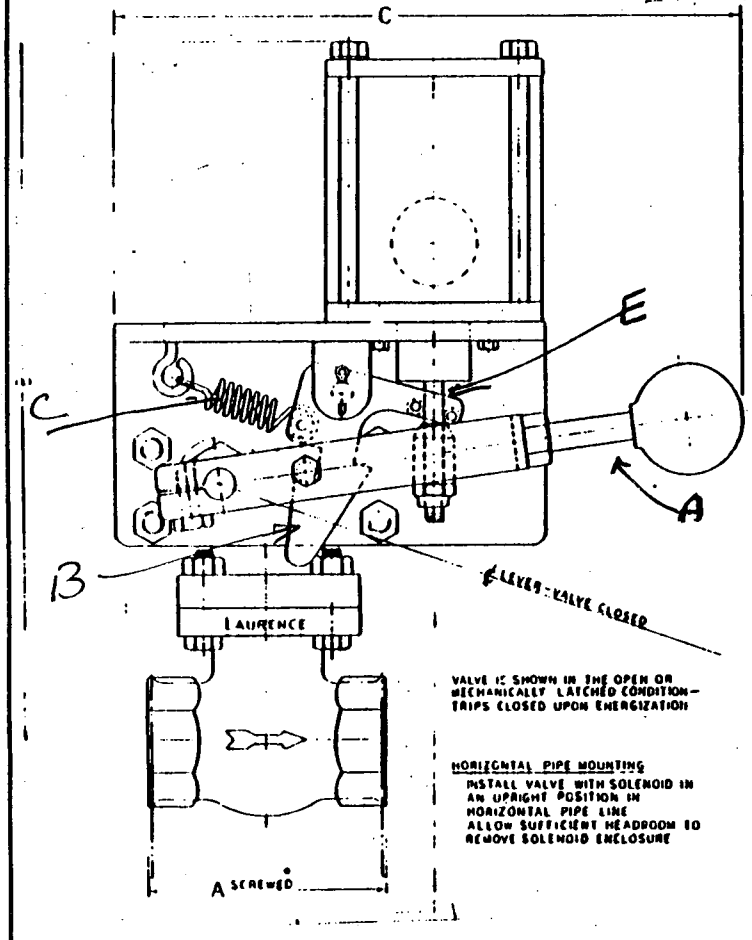


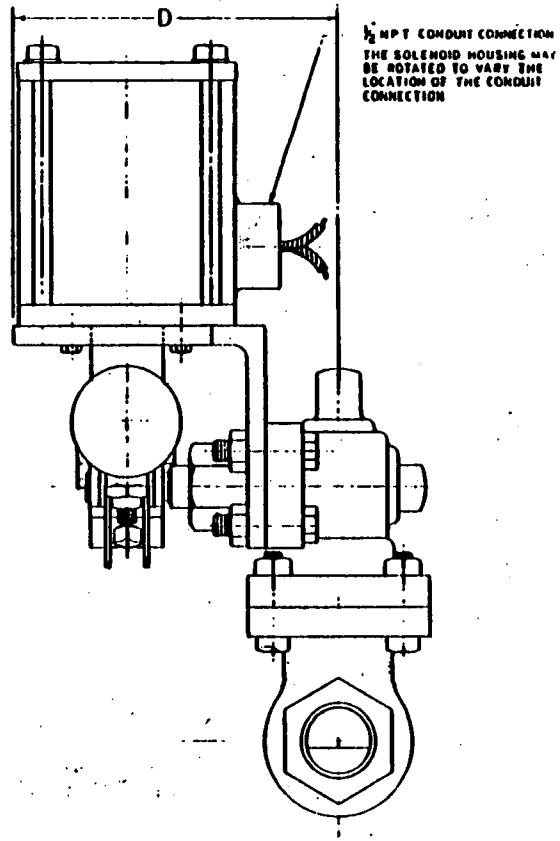
FIGURE 2





VALVE IS SHOWN IN THE OPEN OR MECHANICALLY LATCHED CONDITION — TRIPS CLOSED UPON ENERGIZATION

HORIZONTAL PIPE MOUNTING
INSTALL VALVE WITH SOLENOID IN AN UPRIGHT POSITION IN HORIZONTAL PIPE LINE
ALLOW SUFFICIENT HEADROOM TO REMOVE SOLENOID ENCLOSURE



½ NPT CONDUIT CONNECTION
THE SOLENOID HOUSING MAY BE ROTATED TO VARY THE LOCATION OF THE CONDUIT CONNECTION

VALVE BODY CAN BE ROTATED 90° TO FOUR POSITIONS TO FACILITATE MOUNTING FOR DIRECTION OF FLOW - SEE INSTRUCTION SHEET

ITEM _____ TAG _____

MARK _____

CUSTOMER _____

P.O. _____ REQ _____

USER P.A.S.N.Y.

LOCATION INDIAN POINT #3

SERIES 1100
2-WAY MANUALLY RESET
ROTARY SHAFT SOLENOID VALVE
NORMALLY CLOSED - LATCH TO OPEN
ELECTRICALLY TRIPPED - TRIPS ON ENERGIZATION

( ) LAURENCE CATALOG NO. 110114W

PIPE SIZE 1/2" C_V(APP.) 3.0 PORT DIA. 1/2"

VALVE TYPE DIRECT OPERATED

VALVE BODY BRONZE DISC BUNA N

INNER PARTS TYPE 303 ST. STEEL

FLUID AIR SPEC. GRAVITY

VISCOSITY _____

OTHER PROPERTIES _____

MAX. OPENING PRESSURE DIFFERENTIAL 125 PSI

OPERATING TEMP'S _____ AMBIENT _____

FLOW RATE _____ ΔP _____

TYPE CONNECTIONS CL. 250 SCREWED

SOLENOID ENCLOSURE NEMA 2

125 VOLTS DC CONT. DUTY

COIL INSULATION CLASS H

DIMENSIONS: (APPROX) A- 2½" B- 8¾" C- 8"
D- 4½" NET WEIGHT _____ LBS

CURRENT DATA: (APPROX.) 0.2 AMPS HOLDING
0.2 AMPS INRUSH
AT 125 VOLTS, DC

REFER TO BULLETIN SERIES 1100

LAURENCE SERIAL NO. 21371-2

LAURENCE S.O. NO. 21371

FIG. NO. 1100-F2

R. G. LAURENCE CO. INC
TENAFLY, N. J 07670 U.S.A.
PHONE: 201 568-5471

FIGURE 3

EXHIBIT C

EQ GROUP NO: 110E, TER Item No. 20

EQUIPMENT TYPE: SOLENOID OPERATED VALVE

MANUFACTURER: ASCO

BACKGROUND

The Franklin Research Center has prepared and submitted to the NRC a Technical Evaluation Report (TER) titled "Review of Licensee's Resolution of Outstanding Issues From NRC Equipment Environmental Qualification Safety Evaluation Reports," dated June 9, 1982. The NRC used this TER to prepare a Safety Evaluation Report (SER), which was sent to the Authority by letter dated December 30, 1982. The SER requested that the Justification for Continued Operation be reviewed and revised for any equipment judged to have qualification deficiencies. This exhibit provides resolution of the concern identified in the SER.

QUALIFICATION DEFICIENCY

The concern identified in the TER for these SOVs is that they are not sealed to prevent the intrusion of moisture.

LOCATION AND SAFETY FUNCTION

This equipment is located within the reactor containment. Their safety function is to operate the containment purge valves (FVC-1170 and -1172) and pressure relief valve (PCV-1190).

JUSTIFICATION FOR CONTINUED OPERATION

The TER quotes the result of a test on Sample No. 3, which had an ac coil. In the previous TER, issued on April 16, 1981, FRC stated:

"a. Of the valve models tested, the one with a model number that most closely matches that of the installed equipment is Sample No. 6, Model Number NP-831665E having a dc, Class H coil, NEMA 4, 7, and 9 solenoid enclosure, and normally closed operation. The Guidelines require that the test specimen be the same as the equipment being qualified. The Licensee did not present information describing the installed item; a statement that it is identical to the test sample; or an analysis comparing the impact of deviations between the test specimen's specific design features, materials, and production procedures and those of the installed equipment. Therefore, an independent conclusion cannot be reached regarding the extent to which the results of the test program provide valid evidence of qualification. The Licensee should provide certification that the important features of the installed equipment are the same as those in the test specimen."

The Authority provided the following information in its submittal dated August 21, 1981:

"LICENSEE RESPONSE:

The concern is that the ASCO solenoid valve NP 8316A75E, which was installed, differs from the tested model NP 831665E. The difference between the valves is the size of the pipe connection and the orifice. The concern of aging is on-going; however, since we have data to indicate that the solenoid will perform its function for a minimum of 4 years, a replacement schedule is incorporated. This schedule will be modified as necessary when more data on aging is received." (Recent analyses show lifetimes in excess of 15 years).

The TER further stated:

"1. During the referenced qualification test, there was an excessive amount of water infiltration into the interior of many of the solenoids. This was evidently the result of a poor choice of conduit material and the method of electrical connection used in the test program, which does not appear to represent that used in any power plant. There is the strong implication that the test was to be conducted with the electrical wiring penetration of the solenoid case isolated (sealed) from the test environment. It was this isolation barrier that evidently failed during the test, allowing spray solution to enter and seriously degrade the coil. Although this did not occur with Sample No. 6, which is the one that most

closely matches the installed equipment, there is nothing in the referenced report to indicate that this was not merely a fortuitous result. The results of the test must therefore be regarded as inconclusive until the uncertainties associated with the method of making the wiring interface with the solenoid, both in the plant and in the test, are resolved."

The Authority considers that there is a significance to the results for Sample No. 6 having a dc solenoid coil. The SOVs evidencing difficulty operated satisfactorily throughout the testing and only showed a reduced insulation resistance which did not preclude the units from functioning. In addition, the dc solenoid draws little current and is not subjected to a large temperature rise. The performance of the dc solenoid during the tests indicates successful operation under all test conditions. The problems identified in the TER are associated with test parameters; not operation. Since the test conditions are substantially more severe than the IP-3 accident conditions, operation of the valve is assured. Therefore, continued operation is justified.

RESOLUTION OF QUALIFICATION DEFICIENCY

Steam and spray will be prevented from entering the solenoid enclosure with a suitable seal such as RTV or Conax Connectors. The qualification of RTV has been established and is discussed in Exhibit A.

EXHIBIT D

EQ GROUP NO:	101E, 102E, 200E
EQUIPMENT TYPE:	MOTORIZED VALVE ACTUATOR
MANUFACTURER:	LIMITORQUE

BACKGROUND

The Franklin Research Center has prepared and submitted to the NRC a Technical Evaluation Report (TER) titled "Review of Licensee's Resolution of Outstanding Issues From NRC Equipment Environmental Qualification Safety Evaluation Reports," dated June 9, 1982. The NRC used this TER to prepare a Safety Evaluation Report (SER), which was sent to the Authority by letter dated December 30, 1982. The SER requested that the Justification for Continued Operation be reviewed and revised for any equipment judged to have qualification deficiencies. This exhibit provides resolution of the concern identified in the SER.

QUALIFICATION DEFICIENCY

The deficiency identified in the TER is that documentation from the manufacturer identifying the applicable test reports was not provided. The TER also notes that additional information concerning aging degradation and qualified life is required.

LOCATION AND SAFETY FUNCTION

The MVAs in EQ Group Nos. 101E and 102E are located within the reactor containment, while those in Group No. 200E are located outside containment in the Pipe Penetration Area or Safety Injection Pump Room. The safety function performed by the MVAs is to open and close various valves to control the flow of fluids associated with the ECCS and containment spray systems.

JUSTIFICATION FOR CONTINUED OPERATION

The MVAs included in EQ Group No. 200E (TER Equipment Items 62 through 67) have Class B insulation and are used outside of containment in the Pipe Penetration Area and the Safety Injection Pump Room. The only harsh parameter in these locations is 3.6 Mrad (max.) integrated nuclear radiation dose. None of the Limitorque test reports indicate that radiation dose of this relatively low magnitude would preclude the valves from performing their safety function. Further, the previous TER issued by FRC on April 6, 1981, states:

"FRC EVALUATION:

The Licensee has not established that the cited references are directly applicable to this equipment; this can be done only by obtaining a statement from Limitorque. However, from a general knowledge of this equipment and the fact that the Licensee states that only the radiation exposure increases significantly as a result of an accident, FRC believes that the Licensee will be able to demonstrate conclusively that this equipment is qualified.

FRC recommends that the Licensee review the vendor's data on aging for the electrical components in this equipment and make a conservative estimate of qualified life."

Regarding the MVAs identified as Item 68 (EQ Group No. 102E), the TER stated:

"FRC EVALUATION:

The accumulator discharge valves (MOV-894A,B,C,D) are normally-open motor-operated gate valves. These valves are checked-open by the safety injection signal at the start of the accident. Accumulators are installed to reflood the core following a design basis accident during the initial blowdown while the safety injection pumps are being started and attaining rated capacity. Accumulator injection begins within seconds of the start of the accident, and the dead-band for starting the active safety injection equipment is generally approximately 30 seconds. Once the accumulators have discharged, the discharge valves are shut(as a backup to the check

valves which prevent back-flooding of the accumulators).* Since there are two check valves in each acumulator discharge line, the proper operation of these valves following the injection phase of an accident is of little consequence even if the valves are not promptly shut."

In addition, since these MVAs have Class B insulation and their function is performed early in the accident, there is substantial assurance that the actuators will operate.

The MVAs included in EQ Group No. 101E (TER Items 52, 53 and 54) have Class H motor insulation, which is the type normally furnished by Limitorque for use for safety-related applications inside the reactor containment. Qualification testing of Limitorque MVAs having Class H or RH insulation is comprehensive. Furthermore, this testing has demonstrated that such Limitorques are fully suitable for the Indian Point 3 accident conditions. Class H Limitorques also have an inherently rugged construction that would not be adversely affected by the postulated accident conditions.

In view of the information presented above and because the only deficiencies identified were lack of written evidence of traceability to a specific test report and aging analyses, continued operation is justified.

RESOLUTION OF QUALIFICATION DEFICIENCY

Both Westinghouse and Limitorque have been contacted to ascertain the applicable test report documentation. Analyses of aging degradation will be prepared to establish the qualified life of the units based on information contained in the appropriate test reports.

(*) The discharge valves are closed as a matter of practice and not because of back-flooding since the accumulators have already performed their safety function.

ENCLOSURE 2

ENVIRONMENTAL QUALIFICATION OF ELECTRICAL EQUIPMENT

JUSTIFICATIONS FOR CONTINUED OPERATION
FOR ADDITIONAL EQUIPMENT REQUIRING QUALIFICATION
PURSUANT TO 10CFR50.49

NEW YORK POWER AUTHORITY

INDIAN POINT 3 NUCLEAR POWER PLANT

DOCKET NO. 50-286

JUNE 1983

EQUIPMENT TYPE:	LIMIT SWITCH
MANUFACTURER:	NAMCO-D2400X AND D1200G
FUNCTION:	POSITION INDICATION FOR SAMPLING VALVES
LOCATION:	CONTAINMENT

DISCUSSION

These limit switches provide position indication for normally closed/fail closed valves in lines used to take samples from the Reactor Coolant System during normal operation. The valves would be used for long-term post-accident sampling.

QUALIFICATION DEFICIENCY

Lack of documentation.

LIMIT SWITCH FAILURE MODE

Limit switch failure could result from entry of steam and chemical spray to the switch internals. The failure mode would be either a short curcuit or ground. The result could be either an erroneous position indication or no indication at all.

JUSTIFICATION FOR CONTINUED OPERATION

The sampling lines have isolation valves with position switches outside containment both in the pipe penetration area and outside the Sampling Room in the Primary Auxiliary Building. The only harsh environment in these areas is radiation for which the position switches are qualified. Therefore the operator can assure containment isolation of the sampling lines during an accident.

For post-accident sampling the position indication of the valves located outside containment and the sampling flow measurements provide the operators adequate information to determine the position of the sampling valves located within containment. Therefore continued operation is justified.

FINAL RESOLUTION

The limit switches will be qualified or replaced with qualified switches by March 31, 1985.

EQUIPMENT TYPE:	**LIMIT SWITCH**
MANUFACTURER:	**NAMCO D1200 G(1534-37); MICRO BZE-2RN (1538-41), NAMCO D2400X (AOV 1813)**
FUNCTION:	**POSITION INDICATION FOR CONTAINMENT BUILDING AIR SAMPLING VALVES (1534 THROUGH 1541) AND CONTAINMENT SPRAY TEST ISOLATION VALVE (AOV1813)**
LOCATION:	**PIPE PENETRATION AREA**

DISCUSSION

These limit switches provide position indication for containment isolation valves in the containment building air sampling lines and the containment spray test line. The valves are normally closed and remain closed during an accident. The air sampling valves may be used for long-term post-accident sampling.

QUALIFICAITON DEFICIENCY

Lack of documentation.

LIMIT SWITCH FAILURE MODE

These switches have been tested for radiation and no failures have occured.

JUSTIFICATION FOR CONTINUED OPERATION

These limit switches are expected to operate because they are similar to other limit switches located in the pipe penetration area for which qualification has been established by test and analysis. An analysis of the materials will be performed to establish that the

irradiation test reports apply to these limit switches. In addition the operator can verify valve position from flow. (The safety function of test isolation valve AOV1813 is currently being verified).

Therefore continued operation is justified.

FINAL RESOLUTION

Qualification of these limit switches will be established by March 31, 1985.

EQUIPMENT TYPE:	LIMIT SWITCH
MANUFACTURER:	MICRO MODEL BZE-2RN
FUNCTION:	POSITION INDICATION FOR AFW PUMP SUCTION VALVES (PCV 1187, 1188, 1189)
LOCATION:	AUXILIARY FEED PUMP ROOM

DISCUSSION

These limit switches provide position indication for the pneumatic valves in the suction lines for the Auxiliary Feed Pumps. They are required to function for main steam system line breaks.

QUALIFICATION DEFICIENCY

Lack of documentation.

JUSTIFICATION FOR CONTINUED OPERATION

These limit switches are protected from an adverse environment in the auxiliary feed pump room by the temperature switches described in Exhibit A of Enclosure 1. Since the temperature switches will prevent a harsh steam environment in the auxiliary feed pump room, operation of the limit switches is assured. These limit switches are similar to units for which qualification has already been established and analyses are being performed to establish applicability of the qualification documentation to the AFW pump suction valve limit switches.

In addition the operator can determine that these valves are open using flow indication from flow transmitters.

Therefore continued operation is justified.

FINAL RESOLUTION

Qualification of these limit switches will be established by March 31, 1985.

EQUIPMENT TYPE:	FLOW TRANSMITTER
MANUFACTURER:	ROSEMOUNT 1151DP6B22LMMB
FUNCTION:	MAIN STEAM FLOW MEASUREMENT (FT 419A,B; 429A,B; 439A,B; 449A,B)
LOCATION:	CONTAINMENT

DISCUSSION

The main steam flow transmitters provide a trip signal for reactor scram and main steam isolation valve closure in the event of a main steam line break (MSLB).

QUALIFICATION DEFICIENCY

Similarity between installed and tested equipment must be established.

JUSTIFICATION FOR CONTINUED OPERATION

As noted above the main steam flow transmitters provide a trip signal for reactor scram and main steam isolation valve closure in the event of MSLB. For a MSLB outside containment the transmitters are not exposed to the accident they are intended to mitigate. For a MSLB inside containment the main steam flow trip signal is initiated before the environment can become harsh.

Transmitters (Rosemount 1152) similar to the installed transmitters have been tested satisfactorily for steam environments. The manufacturer has stated:

FEATURES

Rosemount's Model 1152 ALPHALINE® Pressure Transmitters* are designed for precision pressure measurements in nuclear applications requiring reliable performance and safety over an extended service life. These transmitters are qualified per IEEE-323, (1971) and IEEE-344, (1975) to levels of 5×10^6 rads TID gamma radiation, seismic levels of 3g's and for steam-pressure/chemical-spray performance. Stringent quality control during the manufacturing process includes traceability of pressure retaining parts, special nuclear cleaning, and hydrostatic testing.

Model 1152 Transmitters are similar in construction and performance to Rosemount's proven Model 1151 Transmitters. Units are available in Absolute (AP), Gage (GP), Differential (DP) and High-Line Differential (HP) configurations, with a variety of pressure range options.

Direct electronic sensing with the completely sealed δ-CELL™ capacitance sensing element eliminates mechanical force transfer and problems associated with shock and vibration. Installation and commissioning are simplified by compact design, 2-wire system compatibility and external span and zero adjustments. Wiring terminals and electronics are in separate compartments, so the electronics remain sealed during installation.

- Rosemount ——

A similarity analysis is being conducted for the main steam flow transmitters to establish applicability of the test reports and demonstrate qualification of the transmitters.

Therefore continued operation is justified.

FINAL RESOLTUION

It is expected that qualification of the installed transmitters will be established by March 31, 1985.

EQUIPMENT TYPE:	SOLENOID OPERATED VALVE
MANUFACTURER:	ASCO MODEL 8300C58RS
FUNCTION:	POST ACCIDENT SAMPLING (1534 THRU 41)
LOCATION:	PIPE PENETRATION AREA

DISCUSSION

The solenoid valves are normally closed/fail closed valves used for containment air sampling and reactor coolant system sampling. The valves are required for post-accident sampling. The valves are located in the pipe penetration area where the only harsh parameter is radiation.

QUALIFICATION DEFICIENCY

Lack of qualification documentation.

FAILURE MODE EVALUATION

There are no failure modes for these valves for the radiation environment because the valves do not contain materials which are subject to radiation damage at 3.6 Mrad (maximum).

JUSTIFICATION FOR CONTINUED OPERATION

These solenoids are normally closed/fail closed valves and do not change position during an accident. Therefore they perform their accident mitigating function of containment isolation in their normal (deenergized condition) and failure of the solenoid would not cause the valve to change position.

These solenoid valves are similar to other solenoid valves which have been qualified for the post-accident radiation environment in the

pipe penetration area. An analysis of the valve materials compared to radiation test data will be performed to demonstrate qualification for post-accident radiation environment which will demonstrate that the valves will perform their sampling function.

Therefore continued operation is justified.

FINAL RESOLUTION

Qualification documentation for these valves will be provided by March 31, 1985.

EQUIPMENT TYPE:	SOLENOID OPERATED VALVE
MANUFACTURER:	ASCO MODEL LB83146
FUNCTION:	PILOT VALVES FOR SAMPLING SYSTEM (AOV 951, 953, 955A,B)
LOCATION:	CONTAINMENT

DISCUSSION

These valves are normally closed/fail closed valves which supply air to normally closed/fail closed air operated valves in the lines used to take samples from the reactor coolant system. The valves are not required to operate during an accident and do not change position during an accident but are required for sampling.

QUALIFICATION DEFICIENCY

Lack of documentation.

JUSTIFICATION FOR CONTINUED OPERATION

As noted above the valves are normally closed/fail closed and are not required to change position during an accident. If a failure occurred it would not degrade any safety function nor mislead the operator because the valves are not accident mitigating. There is no failure mode which would cause the valves to change position.

For post-accident sampling after the Containment Environment returns to normal (except for radiation and humidity) there is a high degree of assurance that the valves will function. These valves are similar in coil construction (molded coil design) and non-metallic materials (seals, seats, discs, o-rings) to other ASCO solenoids

which have been subjected to LOCA tests (radiation 50 Mrad and steam at 420°F and 113 psig) and have performed successfully. The test valve coils were not sealed and the molded coil was directly subjected to steam exposure.

Therefore continued operation is justified.

FINAL RESOLUTION

The valves will be qualified or replaced with qualified ASCO NP series valves by March 31, 1985.

EQUIPMENT TYPE:	SAMPLING SYSTEM PUMP MOTORS, SOLENOID VALVES AND CAPACITOR
MANUFACTURER:	MOTORS-THOMAS, MILLIPORE, DAYTON CAPACITOR-DAYTON
FUNCTION:	SOLENOID ASCO 8262 POST ACCIDENT SAMPLING SOLENOID (M1 TO M10)
LOCATION:	PRIMARY AUXILIARY BUILDING

DISCUSSION

This equipment is used for reactor coolant system post-accident sampling. The equipment does not provide any direct accident mitigating function. In addition, during an accident the environment is mild.

QUALIFICAITON DEFICIENCY

Lack of documentation.

JUSTIFICATION FOR CONTINUED OPERATION

The only adverse environment is a result of intermittent radiation from the fluid sampled. Preliminary evaluation indicates that the total integrated dose would be below the threshold for radiation damage of the materials associated with this equipment. Furthermore, this equipment is accessible for replacement or repair.

Therefore continued operation is justified.

FINAL RESOLUTION

Total dose calculations for sampling system equipment due to intermittent fluid flow and deposition of radioactive material on internal surfaces will be finalized and materials damage from radiation will be assessed. Qualification will be established by March 31, 1985.

EQUIPMENT TYPE:	**MOTORIZED VALVE ACTUATOR**
MANUFACTURER:	**LIMITORQUE, SMB WITH CLASS B (MOV535) AND RH (MOV536) INSULATION**
FUNCTION:	**PORV BLOCK VALVES**
LOCATION:	**CONTAINMENT**

DISCUSSION

The function of these Limitorque motor operated valves is to provide positive isolation in the event that a PORV fails to close. The PORV's have been provided with qualified acoustic monitors which would indicate that a PORV is in other than the fully closed position.

QUALIFICATION DEFICIENCY

Traceability to test documentation.

JUSTIFICATION FOR CONTINUED OPERATION

Failure of a PORV to close is detected by the qualified acoustic monitors and by RCS pressure instrumentation and the operator would act to close the motor operated block valves. Thus the harsh environment would be minimized. In the event of any delay in operator action which might cause venting of steam to the containment from the pressurizer relief tank, the environmental parameters are not expected to be as severe as qualification tests sucessfully performed on Limitorque actuators and thus the valves should be able to perform their isolation function.

Therefore continued operation is justified.

FINAL RESOLUTION

Traceability to appropriate qualification documentation will be established by March 31, 1985.

EQUIPMENT TYPE:	FLOW TRANSMITTER
MANUFACTURER:	FOXBORO (E13DH-MCA)
FUNCTION:	RHR SYSTEM FLOW (FT 638, 640)
LOCATION:	CONTAINMENT

DISCUSSION

FT 638 measures the total flow of the individual RHR loop flow transmitters FT 946C,D and FT 640 measures the total flow of the individual RHR loop flow transmitters FT 946A,B. This equipment is used to check the performance of the individual loop flow transmitters.

QUALIFICATION DEFICIENCY

Test sequence and instrument accuracy.

JUSTIFICATION FOR CONTINUED OPERATION

Testing by Westinghouse was performed and documented in letter NS-PLC-5023, T.M. Anderson (Westinghouse) to E.G. Case (Nuclear Regulatory Commission) dated April 26, 1978. Foxboro Model E13-DM-MCA with radiation resistant amplifier (this model transmitter is similar to the E13DH-MCA with radiation resistant amplifiers model) was the subject of the test. The irradiation exposure consisted of an intergrated dose of 1.8×10^7 rads. The output of the test units experienced no change as a result of radiation exposure. The transmitters then underwent autoclave testing at Westinghouse Forest Hills test facility. The profile consisted of chemical spray injection (1.140% boric acid and .17% sodium hydroxide) at the start of the test with a temperature rise to 320°F maintaining 75 psig. At the end of the initial 20 minutes the test conditions were gradually reduced to 220°F and held there for 5 1/2 days (equivalent to 4 weeks) before the first unit became inoperable and exceeded the $\pm$ 25% accuracy limit set for long term monitoring.

Foxboro performed envirnomental tests on the same type of transmitter and documented it in Report Q9-6005. The profile of the test consisted of steam at 318°F and 90 psig for one hour then decreasing to 228°F and 56 psi for an additional 12 hours. The output of the transmitter decreased by a maximum of 9.00% during the 318°F period and to 5.58% during the 228°F period.

In addition, the following tests were performed by Foxboro on a separate effects testing basis:

1. Irradiation testing of various type electronics amplifiers used in transmitters, Report T2-1075.
2. Irradiation testing of variuos electronics amplifiers used in transmitters, Report T3-1097.
3. Loss of coolant environment and chemical spray performed on various transmitters, Report T3-1013.
4. Loss of coolant environment without chemical spray, supplement to Report T3-1013.
5. Irradiation testing of gaskets used in transmitters, Report T4-6045.
6. Transmitter amplifier irradiation, Report T3-1068.
7. Oil bath transmitter test, Report T4-6061.

All of the above mentioned tests were performed at Franklin Institute Research Laboratory except the supplement to Report T3-1013 which was performed by Foxboro.

The testing demonstrates that post-accident degradation of the transmitters is a slow, long term process. The transmitters can be expected to function reliably for accident mitigation and provide valid information to the operators. Therefore continued operation is justified. However, since they perform a long term cooling monitoring function, they will be replaced with fully qualified units.

FINAL RESOLUTION

The transmitters will be qualified or replaced with qualified units by March 31, 1985.

EQUIPMENT TYPE:	MOTORIZED VALVE ACTUATOR
MANUFACTURER:	LIMITORQUE MODEL SMB WITH CLASS B INSULATION
FUNCTION:	ISOLATION VALVES BETWEEN THE RHR HEAT EXCHANGER OUTLET AND THE SAFETY INJECTION PUMP SUCTION (MOV 1869A,B)
LOCATION:	CONTAINMENT

DISCUSSION

These valves are not used for accident mitigation of a large break LOCA. They would be opened in the event of a small break LOCA in which the Reactor Coolant System pressure stays above the discharge pressure of the RHR pumps and coolant must be recirculated thru the safety injection pumps. Another scenario in which the valves would be opened would be for post-accident long term cooling where it may be desireable to recirculate to both the hot and cold legs of the Reactor Coolant System.

JUSTIFICATION FOR CONTINUED OPERATION

Extensive testing has been conducted on Limitorque acuators with both Class B and Class H Insulation. In WCAP-7410L, LOCA testing of Class B insulated units was conducted without irradiation. The temperature, pressure and chemical spray envelope the Indian Point 3 worst case accident conditions. In Limitorque Report B0003, testing of Class B insulated units was conducted at 250°F, 25 psig, and 2 x 10^8 rads without chemical spray. The Indian Point accident conditions exceed the B0003 test temperature by 7°F for less than 4 minutes and the test pressure by 15 psig for less than 8 minutes. From the testing conducted as described above it is expected that the valves will function as required.

Therefore continued operation is justified.

FINAL RESOLUTION

The motors will be qualified or replaced with Class H motors by March 31, 1985.

EQUIPMENT TYPE:	TEMPERATURE DETECTORS
MANUFACTURER:	FENWAL MODEL EL2712-1 AND FOXBORO MODEL 1502-T
FUNCTION:	FAN COOLER OUTLET TEMPERATURE AND FAN COOLER HIGH TEMPERATURE (TC 1117, 1135, 1144, 1153; TE 1203-1,-2, -3,-4,-5)
LOCATION:	CONTAINMENT

DISCUSSION

These temperature detectors are used during normal operation to monitor the outlet air temperature from the containment fan coolers and to monitor the charcoal filter temperature. They may also be used for post-accident temperature monitoring.

QUALIFICATION DEFICIENCY

Lack of documentation.

JUSTIFICATION FOR CONTINUED OPERATION

The temperature detectors are constructed of metal and ceramic and are normally rated at temperatures considerably higher than the LOCA conditions postulated for Indian Point 3. The materials of construction are not susceptible to radiation damage. Thermocouples and resistance temperature elements from many manufacturers (PYCO, Rosemount, Fenwal CONAX and RdF) have been subjected to qualification tests. Although accuracy changes were noted in some tests the units continued to function adequately (except for one PYCO thermocouple). Because the installed units are basically similar to tested units it is expected that the installed units will function properly.

Therefore continued operation is justified.

FINAL RESOLUTION

The function of these temperature detectors to mitigate the accident is under review. Based on this review these units will be qualified or replaced with qualified units by March 31, 1985.