

Enclosure 1 to IPN - 84-63

SPECIFIC EQUIPMENT DEFICIENCIES LIST

New York Power Authority
Indian Point 3 Nuclear Power Plant
Docket No. 50-286

Specific Equipment Deficiencies

A. Pressure, D/P and Level Transmitters

<u>TER Item No.</u>	<u>Description</u>	<u>Manufacturer and Model No.</u>	<u>Location</u>	<u>NRC Category</u>	<u>Deficiencies</u>	<u>Resolution</u>
2	FT-946A,B,C,D (RHR Recirc. Flow Transmitters)	Barton 386	Containment	Ib	Documentation	Replaced with Foxboro transmitters qualified to 1971 criteria. (8)
3	PT-455,-456,-457,-474 (Pressurizer Pressure Transmitters)	Foxboro E11GMMCA	Containment	Ib	Similarity Aging, Accuracy Test Sequence	Replaced with Foxboro transmitters qualified to 1971 criteria (8).
4	PT-402,-403 (Reactor Coolant System Pressure Transmitters)	Foxboro E11GH	Containment	Ib	Similarity Aging, Accuracy, Test Sequence	Replaced with Foxboro transmitters qualified to 1971 criteria. (8)
5	FT-924A,-925,-926, -926A,-927,-980, -981,-982,-945A,B (High Head SI Flow Trans.)	Foxboro E13DMMCA	Containment	Ib	Similarity, Aging Accuracy Test Sequence	Replaced with Foxboro transmitters qualified to 1971 criteria. (8)
6	PT-922,-923,-947 (SI Pump Suction and Discharge Pressure Transmitters)	Foxboro E11GM	SI Pump Room	IIa	Similarity Aging	These Units perform their function in a Mild Environment. (1) Transmitters are qualified for Post Accident Radiation WCAP-8541 applies.(3)
7	PT-948A,B,C; PT-949A,B,C (Containment Pressure)	Foxboro E11GM	Pipe Pene- tration Area	IIa	Similarity Aging	Transmitters qualified. WCAP-8541 and WCAP-9157 and NS-TMA-2319 apply. (3)
8	PT-1205 (City Water Pressure) PT-406A,B; PT-1260,-1261,-1262 (AFW Pump Suction Pressure PT-1263,-1264, -1265 (AFW Pump Dis- charge Pressure) PT-1200,-1201,-1202, -1203 (Main Feedwater Pressure)	Foxboro E11GM	Aux. Feed Pump Room	IIa	Similarity Aging	Transmitters Qualified for worst case steam environment. In addition, the harsh environment is precluded by a qualified temperature switch. WCAP-8541 and Westinghouse letter NS-TMA-2319 apply. (2)(3)

Specific Equipment Deficiencies

A. Pressure, D/P and Level Transmitters (continued)

<u>TER Item No.</u>	<u>Description</u>	<u>Manufacturer and Model No.</u>	<u>Location</u>	<u>NRC Category</u>	<u>Deficiencies</u>	<u>Resolution</u>
8 Cont'd	PT-419A,B,C PT-429A,B,C PT-439A,B,C, PT-449A,B,C (Main Steam Pressure)	(See Preceding Page)		IIa	Similarity Aging	See Preceding Page.
9	PT-1163,-1164,-1165, -1166 (AFW Pressure)	Foxboro E11GM	Aux. Feed Pump Room	IIa	Similarity Aging	Transmitters qualified. In addition, the harsh environment is precluded by a qualified temperature switch. WCAP-8541 applies. (3) (2)
10	FT-418A,B,FT-428A,B FT-438A,B,FT-448A,B (Main Feedwater Flow)	Foxboro E13DM	Aux. Feed Pump Room	IIa	Similarity Aging	Transmitters qualified. In addition, the harsh environment is precluded by a qualified temperature switch. WCAP-8541 applies. (2)(3)
11	LT-417A,B,C,D LT-427A,B,C,D LT-437A,B,C,D LT-447A,B,C,D (Steam Generator Level) LT-459,-460,-461 (Pressurizer Level)	Foxboro E13DMMCA	Containment	Ib	Similarity Aging Test Sequence	Replaced with Foxboro transmitters qualified to 1971 criteria. (8) Except LT-459, -460, -461 which will be replaced during cycle 4/5 outage.
23	LT-938,-939,-940,-941 (Cntmnt. and Recir. Sump Level)	GEMS LS1900	Containment	Ib	Documentation	Note 13.
39	Flow transmitter for the H ₂ Recombiner	Barton 386	Containment	Ib	Documentation	Replaced with Foxboro transmitters qualified to 1971 criteria. (8)

Specific Equipment Deficiencies

B. Solenoid Valves for Air Operated Valves

<u>TER Item No.</u>	<u>Description</u>	<u>Manufacturer and Model No.</u>	<u>Location</u>	<u>NRC Category</u>	<u>Deficiencies</u>	<u>Resolution</u>
12	Solenoid for PCV-1121, -1123 (City Water Valves) PCV-1139 (AFW Recirc. Valve) PCV-1187,-1188,-1189 (AFW Pump Steam Pressure Control)	ASCO 8300	Aux. Feed Pump Room	IIa	Documentation Aging, Temperature	Solenoids qualified. Harsh environ- ment is precluded by a qualified temperature switch. 7154-111E applies. (3)(2)
13	Solenoid for 956A, B,C,D (Pressurizer Sample Isolation) 519,552 (Pressurizer Relief Tank Water Makeup Isolation) 1728,1723 (Sump Pump Discharge Isolation) 1702,1705 (Reactor Coolant Drain Pump Discharge Isolation) 1786,1787 (Reactor Coolant Drain Tank Vent Isolation) 1788,1789 (Drain Tank Gas Analyzer Isolation) 548,549 (Pressurizer Relief Tank Gas Analyzer Isolation) 956E,F,G,H (Sample Isolation)	ASCO 8314	Pipe Pene- tration Area	IIa	Documentation Aging, Radiation	Solenoids qualified. The only harsh parameter is radiation. Report 7154-212E applies. (4)

Specific Equipment Deficiencies

B. Solenoid Valves for Air Operated Valves (continued)

<u>TER Item No.</u>	<u>Description</u>	<u>Manufacturer and Model No.</u>	<u>Location</u>	<u>NRC Category</u>	<u>Deficiencies</u>	<u>Resolution</u>
14	Solenoid for 791, 793,796,798 (Excess Letdown HX Isolation) 201,202 (Letdown Isolation)	ASCO 8316	Pipe Pen- etration Area	IIa	Documentation Aging Radiation	Solenoids qualified. The only harsh parameter is radiation. Report 7154-213E applies. (3)(4)
15	Solenoid for LCV-1158 (Condensate Storage Supply to AFW Pumps)	ASCO 8317	Aux. Feed Pump Room	IIa	Documentation Aging Radiation	Solenoids qualified. The TER incorrectly states that this valve is located in the Pipe Penetration Area. It is located in the AFW Pump Room. The harsh environ- ment is precluded by a qualified tempera- ture switch. Report 7154-212E applies. (2)(3)
16	SOV-1534 thru 1541 (Radiation Monitor Isolation) SOV-1271,-1273 (Containment Purge) SOV-1314,1315,1316, 1317, 1523 thru 1526 (SG Blowdown and Sample Isolation)	ASCO 8300	Pipe Pene- tration Area	IIa	Documentation Aging Radiation	Solenoids qualified. The only harsh parameter is radiation. Qualification report 7154-111E applies. (3)
17	SOV-1310A,B (Isolates Steam to AFW Pump Turbine)	ASCO 8316	Steam and Feed Penetration Area	IIa	Documentation Aging Temperature	Not in Scope of 10CFR50.49.(3)(5)
18	Solenoid for MS-1-31, -32,-33,-34	Laurence 110114W	Steam and Feed Penetration Area	Ib	Documentation	To be replaced with qualified units.(9)

Specific Equipment Deficiencies

B. Solenoid Valves for Air Operated Valves (continued)

<u>TER Item No.</u>	<u>Description</u>	<u>Manufacturer and Model No.</u>	<u>Location</u>	<u>NRC Category</u>	<u>Deficiencies</u>	<u>Resolution</u>
19	Solenoid for IV-5A&B, 3A&B,-2A&B	Laurence 629BC85PS	Pipe Pene- tration Area	Ib	Radiation, Aging	These valves are in a mild environment ($< 10^4$ rads) and therefore not within the scope of 10CFR50.49. (10)
20	Solenoid for FCV-1170, -1172,PCV-1190	ASCO HB-8316 NP-8320	Containment	IIa	Spray	Solenoid valves are qualified. AQ521678/TR and F-C4539 apply. 7154-110E applies to HB-8316. (6)
21	Solenoid for Fan Cooler Dampers 31, 32,33,34,35 SOV-1293 thru 1307	Skinner	Containment	Ib	Documentation	Replace with qualified units. Report AQ521678/TR dated March 1978 applies.
41	Solenoids for DW1, DW2,550,1610 (Containment Isolation)	ASCO NP-8316	Pipe Pene- tration Area	Ia	None	Solenoid Valves are qualified units. Report AQ521678/TR applies. (3) Report 7154-110E
51	Solenoid for PCV-1191, -1192 (Containment Pressure Relief)	ASCO NP-8316	Pipe Pene- tration Area	Ia	None	Solenoid Valves are qualified units. Report AQ521678/TR applies. (3) Report 7154-110E

Specific Equipment Deficiencies

C. Motors

<u>TER Item No.</u>	<u>Description</u>	<u>Manufacturer and Model No.</u>	<u>Location</u>	<u>NRC Category</u>	<u>Deficiencies</u>	<u>Resolution</u>
27	Motor for RHR Pump 31 & 32	Westinghouse 509UPZ	RHR Pump Room	IIa	Similarity Aging	Motors are qualified. Qualification report 7154-220E applies. Aging analysis demonstrates 40 year life. (3)
28	Motor for the Aux. Feed Pump 31 & 33	Westinghouse 509US	Aux. Feed Pump Room	IIa	Similarity	Motors are qualified. Qualification report 7154-221E applies. Harsh environ- ment is precluded by qualified tempera- ture switch. (2)(3)
29	Motor for the High Head SI Pump 31,32 & 33	Westinghouse 509US	SI Pump Room	IIa	Similarity Aging	Motors are qualified. Qualification report 7154-222E applies. Aging analysis demonstrates 40 year life. (1)(3)
30	Motor for Safety Injection Recircu- lation Pump 31 & 32	Westinghouse 588.5	Containment	IIa	Similarity	Motors are qualified. Qualification report 7154-120E applies. Beta Plate-out analysis confirms that radiation test envelopes accident radiation conditions. (3)

Specific Equipment Deficiencies

C. Motors (continued)

<u>TER Item No.</u>	<u>Description</u>	<u>Manufacturer and Model No.</u>	<u>Location</u>	<u>NRC Category</u>	<u>Deficiencies</u>	<u>Resolution</u>
31	Motor for Containment Fan Cooler FCU-31 thru FCU-35	Westinghouse 69F97009	Containment	IIa	Similarity	Motors are qualified. Reports 7154-121E dated July 1983 and P801-09-2 dated November 1984 apply. Beta Plate-out analysis confirms that radiation test envelopes accident radiation conditions. (3)
38	Motor for Hydrogen Recombiner Blower	Westinghouse TBDF	Containment	IIa	Similarity	Motors are qualified. Qualification report 7154-122E applies. (3)

Specific Equipment Deficiencies

D. Temperature Measurement Devices

<u>TER Item No.</u>	<u>Description</u>	<u>Manufacturer and Model No.</u>	<u>Location</u>	<u>NRC Category</u>	<u>Deficiencies</u>	<u>Resolution</u>
22	Reactor Coolant System RTD's	Sostman 11901B	Containment	Ib	Aging Temperature Radiation	Narrow range RTD's were replaced with qualified RdF units. WCAP-8587 applies. Wide range RTD's to be replaced with Qualified Units.(9)
37	Hydrogen Recombiner Exhaust Thermocouple	Westinghouse A2092	Containment	Ia	None	Equipment is qualified. WCAP-7709 applies.
40	Temperature Switches in AFW Pump Room	UEC F110A6CS	Aux. Feed Pump Room	Ib	Documentation	Temperature switches are qualified. Report 7154-245E applies. (2)(3)

Specific Equipment Deficiencies

E. Electro-Pneumatic Transducers

<u>TER Item No.</u>	<u>Description</u>	<u>Manufacturer and Model No.</u>	<u>Location</u>	<u>NRC Category</u>	<u>Deficiencies</u>	<u>Resolution</u>
60	Transducer for PCV-1134,-1135, -1136,-1137 Main Steam Atmosph- eric Relief Valves	Fisher 546	Steam and Feed Penetration Area	IIC	Aging	Transducers qualified. Fisher report 4 Problem 12, Project 72AR28 dated 6/12/73 applies. Aging Report 7205 dated April 1984 applies. (3)
61	Transducer for FCV-405A,B,C,D PCV-406A,B,C,D AFW Control Valves	Fisher 546	Aux. Feed	IIC	Aging	Transducers qualified. Fisher report 4, Problem 12, Project 72AR28 dated 6/12/73 applies. Aging report 7205 dated April 1984 applies. (3)

Specific Equipment Deficiencies

F. Electrical Distribution Devices

<u>TER Item No.</u>	<u>Description</u>	<u>Manufacturer and Model No.</u>	<u>Location</u>	<u>NRC Category</u>	<u>Deficiencies</u>	<u>Resolution</u>
24	Kerite Cable	Kerite	Inside and Out- side Containment	Ib	Submergence Radiation	Cable qualified. Qualification report 170E applies.(3)
25	Raychem Cable Splice	Raychem WCSF(N)	Inside and Out- side Containment	Ib Radiation	Submergence	Splices qualified. Qualification report 170E applies.(3)
26	Lewis Cable	Lewis Engineer- ing	Inside and Out- side Containment	Ib	Submergence Radiation	Cable qualified. Qualification report 170E applies.(3)
32	Terminal Blocks	Westinghouse 542247	Containment	Ib	Aging, Spray Radiation	Terminal blocks qualified. Qualification report 7154-180E applies. (3)
33	Electrical Penetration	Westinghouse WX-31774,-31775, -31776	Containment	Ia	None	Equipment is qualified. PEN-TR-81-37 and PEN-RLK-3-16-01 apply.(3)
34	Electrical Penetration	Westinghouse WX31892	Containment	Ia	None	Equipment is qualified. PEN-TR-81-37 and PEN-RLK-3-16-01 apply.(3)
35	I and C panel For H ₂ Recombiner	Westinghouse	PAB	Ib	Radiation	Note (10). This equipment is in a mild environment and therefore not within the scope of 10CFR50.49.
44	Rockbestos Cable	Rockbestos Firewall III	Pipe Penetration Area	Ia	None	Equipment is qualified. Rockbestos report dated 7/7/77 applies.(3)
45	Rockbestos Cable	Rockbestos Firewall III	Containment	Ia	None	Equipment is qualified. Rockbestos report dated 7/7/77 and report 170E apply. (3)
59	Conax Connector	Conax N11001-33	Containment	Ia	None	Equipment is qualified. Report IPS409 Rev. A applies.(3)

Specific Equipment Deficiencies

G. Motor Operated Valves

<u>TER Item No.</u>	<u>Description</u>	<u>Manufacturer and Model No.</u>	<u>Location</u>	<u>NRC Category</u>	<u>Deficiencies</u>	<u>Resolution</u>
1 55	HCV-638,-640 RHR Flow Control Valves	Limatorque SMB-00	Containment	IIC	Aging	Equipment is qualified. Report 7154-101E contains an Aging Analysis which demonstrates 40 year life. (3)
52 53 54 62 63 64 65 66 67 68	MOV-880A through H,J, K(Filter Dousing Valves); MOV-856B,C,E,G,H&J (High Head SI Valves) MOV-1802A, B (SI Recirculation Pump Discharge Isolation) MOV-745A,B; (RHR Isola- tion Valves) MOV-889A, B (Recirculation Spray Valves) MOV-746,-747, -899A,B (RHR HX Isolation Valves) MOV-822A,B (RHR HX Cooling Water Supply Valves) MOV-888A,B (High Head Recirculation Valves) MOV-222 (Seal Water Isola- tion Valve) MOV-769,-784, -786,-789,-797,FCV-625 (RCP Cooling Water Supply) MOV-842,-843 (SI Mini-Flow Isolation) MOV-851A,B (SI Discharge Valves) MOV-1810 RWST Discharge Valve) MOV-887A,B (SI Pump Suction Isolation Valves) MOV-744 RHR Isolation Valve) MOV-885A,B (Containment Sump Stop Valve) MOV-1835A,B (BIT Discharge Valves)	Limatorque SMB	Inside and Out- side Containment	IIa	Similarity Aging	Equipment is qualified. Qualification documented in report 7154-101E. Aging Analyses have been completed which demonstrates 40 year life. (3)(11)

Specific Equipment Deficiencies

G. Motor Operated Valves (continued)

<u>TER Item No.</u>	<u>Description</u>	<u>Manufacturer and Model No.</u>	<u>Location</u>	<u>NRC Category</u>	<u>Deficiencies</u>	<u>Resolution</u>
68 (cont'd)	MOV-1852A,B (BIT Injection Valves) MOV-894A,B,C,D Accumulator Discharge Isolation Valves		(See Preceding Page)			

Specific Equipment Deficiencies

H. Valve Limit Switches

<u>TER Item No.</u>	<u>Description</u>	<u>Manufacturer and Model No.</u>	<u>Location</u>	<u>NRC Category</u>	<u>Deficiencies</u>	<u>Resolution</u>
42	Limit Switches for Valves 1610,550,DW-1, DW-2 (Containment Isolation Valves)	NAMCO EA-180	Pipe Penetration Area	Ia	None	Equipment is qualified. ACME Cleveland Report dated 7/7/77 applies. (3)(2)
46	Limit Switches for PCV-1121,-1123 (AFW Recirculation Valves)	NAMCO EA-170	AFW Pump Room	IIa	Documentation	Equipment is qualified. Qualification for worst case environment established in report 7154-230E. Harsh environment is precluded by a qualified temperature switch. (2)(3)
47	Limit Switches for MS-1-31,-32,-33,-34 (Main Steam Isolation Valves)	NAMCO SL3	Steam & Feed Penetration Area	Ib	Documentation	Equipment is qualified. Qualification established by report 7154-232E. (3)
48	Limit Switches for PCV-1214,1214A through 1217,1217A) (SG Blowdown Valves) 956E,G (RCS Sample Iso. Valves) 201,202 (Letdown Isolation Valves) 791,793, 796,798 (Letdown HX Iso. Valves) 519,552 (PRZR Relief Tank Makeup) 956A,B, C,D (PRZR Sample Iso. Valves) 1723,1728 (Cont. Sump Discharge) 1786,1787 (RC Drain Tank Vent Valves) 1702,1705 (RC Drain Tank Discharge) (PCV-1223,1223A through 1226, 1226A (SG Sample Isolation Valves)	NAMCO D2400X	Pipe Penetration Area	Ib	Documentation	Equipment is qualified. The only harsh parameter for these switches is radiation. Report 7154-233E establishes qualification of these limit switches. (3)

Specific Equipment Deficiencies

H. Valve Limit Switches (continued)

<u>TER Item No.</u>	<u>Description</u>	<u>Manufacturer and Model No.</u>	<u>Location</u>	<u>NRC Category</u>	<u>Deficiencies</u>	<u>Resolution</u>
48 (cont'd)	PCV-1234 through 1241 (Radiation Monitor Isolation) 956G,H (Accumulator Sample) PCV-1228 (Inst. Air Isolation) TCV-1104, -1105 (Service Water) 548,549 (PRT Gas Analyzer Iso. Valve) 1788,1789 (RCDT Gas Analyzer Iso. Valve)	NAMCO D2400X	Pipe Penetration Area	IB	Documentation	(See Preceding Page).
49	Limit Switches for PCV-1310A,B	Micro EXAR7313	Steam and Feed Penetration Area	Ib	Documentation	Not within scope of rule.(5)
50	Limit Switches for IV-2A,-2B,-3A,-3B, -5A,-5B (H ₂ Recombiner Isolation)	Micro EXHAR-3	Pipe Penetration Area	Ib	Documentation	Equipment is qualified. Report 7154-236E applies. Switches are in a mild environment (10 ⁴ rads.) and therefore not within the scope of 10 CFR 50.49 (10).
56	Limit Switches for 856B,G (SI Valves) PCV-1190 (Ctmnt. Pressure Relief)	NAMCO EA-180	Containment	IIC	Aging	Equipment is qualified. Aging Analysis has been completed and a qualified life established. Report 7154-130E.(3)(12)
57	Limit Switch for PCV-1191,-1192 (Ctmnt. Pressure Relief)	NAMCO EA-180	Pipe Penetration Area	IIC	Aging	Equipment is qualified. Aging analysis has been completed and a qualified life established. Report 7154-130E.(3)
58	Position Switches for Fan Cooler Dampers (31, 32,33,34,35)	NAMCO EA-740	Containment	IIC	Aging	Equipment is qualified. Aging Analysis has been completed and a qualified life established. Report 7154-131E.(3)

Specific Equipment Deficiencies

I. Miscellaneous Equipment

<u>TER Item No.</u>	<u>Description</u>	<u>Manufacturer and Model No.</u>	<u>Location</u>	<u>NRC Category</u>	<u>Deficiencies</u>	<u>Resolution</u>
36	Igniter Exciter for the H ₂ Recombiner	Westinghouse GLA43737	Containment	Ia	None	Equipment is qualified. WCAP-7410L and WCAP-9001 apply.
43	Relief Valve Acoustic Monitor	TEC 500	Containment	IIa	Similarity Aging Temperature	Unit has been replaced with a qualified TEC system. Report 517-TR-03 Rev. 2 establishes qualification.

Notes for Specific Equipment EQ Deficiencies

1. This equipment performs its function before the environment becomes harsh. A harsh radiation environment can only occur after the safety injection function has been completed and the system is no longer in use. The safety injection pumps take suction from the refueling water storage tank which is not radioactive and no radiation exposure occurs to the equipment. When all of the water has been pumped into the plant the safety injection is no longer used for any break which would cause core damage. Recirculation through the safety injection system would only occur for very small breaks which would not depressurize the reactor coolant system. It is only recirculation through the RHR system after large break LOCA that results in a high radiation area in the pipe penetration area and SI pump room. In addition, test report WCAP-8541, WCAP-8754 and WCAP-7410L establishes qualification of the equipment for the harsh environment so that the equipment would be available for use at any time in the post accident period. Aging analyses and qualification reports are available for all of the SI System Equipment.
2. The temperature switch which was installed to isolate the steam supply to the AFW pump turbine (TER Item 40) was placed in NRC category IB by FRC and a Documentation deficiency was assigned. Manufacturer's data for the switch has been obtained and the Authority has determined that the switch is fully suitable for the conditions which would exist in the AFW pump room at the time the switch is required to function. Report 245E establishes qualification. To preclude the possibility of moisture entering the switch, the units have been sealed with RTV which have been qualified for LOCA exposure. Therefore, the switches are qualified and will function to preclude any harsh environment.
3. Aging evaluations for degradable materials have been completed. Surveillance procedures, maintenance/part replacement/equipment replacement intervals will be determined. The limiting parts in most cases are elastomeric materials. For equipment for which thermal preaging was performed as part of the qualification test program (NUREG-0588 Category 1 IEEE-323-74) the test parameters were used to extrapolate the results to Indian Point Unit No. 3 conditions using the Arrhenius methodology. For equipment for which no preaging was included in the qualification testing, the lifetime of degradable non-metallic materials was determined by the Arrhenius methodology using the activation energy data for the materials involved. In either case, the predicted lifetime will be verified by periodic surveillance and monitoring of the equipment to determine whether degradation which could affect equipment performance (normal and accident) is occurring. Lubricant changeout intervals for motor bearings and Limitorque operators as recommended by the equipment manufacturers, INPO, EPRI and Operating Experience are included in the plant maintenance procedures. The Authority is aware that qualification testing performed by the manufacturer, NSSS supplier or utility groups may indicate that some maintenance operations may be required at intervals different than are contained in vendor technical manuals. Whenever such data is identified, it will be evaluated and factored into the Indian Point Unit No. 3 program as applicable.
4. The solenoids associated with the containment isolation valves in the pipe penetration area perform their safety function (deenergize to shut the air operated isolation valve) early in the accident. However, since the only harsh parameter is radiation, an analysis was performed to establish the ability of the solenoids to withstand the radiation environment for the 1 year post-accident period. These analyses demonstrate that all of the materials are suitable for the radiation level to which they would be exposed. Therefore the solenoid valves are considered qualified.

5. These valves are located in the steam and feedline penetration area. Their function is to isolate a break in the steam line to the AFW pump turbine. The AFW pump room is a sealed room which does not connect to the steam and feedline penetration area so that the valves perform their function in a normal mild environment. The valves are not required to function in the event of a main steam line break in the pipe penetration area. Their failure in the event of a main steam line break would not preclude supplying auxiliary feed water to the steam generators because the 2 motor operated AFW pumps are not affected and will supply an adequate amount of Feedwater to mitigate the accident. Therefore it is concluded that these valves are not within the scope of 10CFR50.49 because they are not affected by the accident they are intended to mitigate and have no mitigating function for the accident to which they are exposed.
6. The results of the testing show that the SOVs operated satisfactorily throughout the testing and only showed reduced insulation resistance which did not preclude the units from functioning. The performance of solenoids during the tests indicate successful operation under all operating conditions. The problems identified in the TER are associated with omission of a megger test by the test laboratory not operation. During the 30 day exposure to chemical spray, the spray solution penetrated the flexible conduit connected to the solenoid enclosure. As a consequence the coil enclosures of the valves being tested were partially filled with the buffered boric acid spray solution. Even though the solenoid coil was directly in contact with spray solution, the valves cycled properly when energized or de-energized in their normal voltage range (+10%, -15%) for the full 30 day test duration. However, because of the presence of boric acid solution in the coil enclosure, it was decided that the 500VDC megger test and the dielectric strength test should not be conducted to avoid damage to the coil. The boric acid solution was baked out of the coil enclosures and the valves were then successfully subjected to the megger and dielectric strength tests. Since neither megger tests nor dielectric strength tests would be conducted on valves installed at Indian Point Unit No. 3 following an accident, the omission of such testing is of no consequence for the actual applications. The solenoids, however, will be sealed with a qualified sealant to preclude entry of any foreign material through the conduit connection in the solenoid enclosure.
7. Certain cables were assigned to NRC Category Ib and cited with a submergence deficiency. These cables have been subjected to LOCA tests which are significantly more severe than that the Indian Point accident condition; to accelerated water absorption tests (194°F demineralized water); Submergence in elevated temperature Hudson River water; and similar cables have been subjected to testing for 8 weeks at 200°F in a solution containing 1800 ppm boric acid, 50 ppm hydrazine, and buffered to a pH of 7-7.5 with trisodium phosphate. The Authority considers that the cables are qualified for post accident submergence as demonstrated in Report 170E.
8. The transmitters installed utilize amplifier assemblies qualified to IEEE-323-1971 criteria. These assemblies will be replaced with ones qualified to the IEEE-323-1974 criteria which will upgrade the transmitter qualification to the 1974 criteria. This will be completed by the end of the cycle 4/5 refueling outage.
9. This item has been scheduled to be completed during the cycle 4/5 refueling outage.
10. The only parameter of concern is low levels of radiation ($\sim 10^3$ rads).

11. MOV-744, MOV-769 and MOV-797 have motor brakes with Class B insulation. WCAP-7410L indicates that the Class B insulated motor brake failed during environmental testing. Although the testing was more severe than the Indian Point Unit 3 accident conditions, and because it cannot be determined at what point the motor brake failed and the exact cause of the failure, the Authority plans to replace the actuators of MOV-744, MOV-769 and MOV-797 with qualified actuators during the cycle 4/5 outage.
12. Note: Deleted
13. As part of the Indian Point Unit 3 TMI action plan program (NUREG-0737) Qualified Barton 764 transmitters were installed to monitor containment water level. The installed GEMS level switches, however, provide signals to indicating lights in the control room. The Authority considers that the indicating lights provide useful information to the operating personnel. Therefore, either bistables will be incorporated into the transmitter circuits or the GEM's level switches will be replaced with qualified units to provide signals to the indicating lights in the control room.

Enclosure 2 to IPN - 84-63

MASTER LIST OF ELECTRICAL EQUIPMENT

New York Power Authority
Indian Point 3 Nuclear Power Plant
Docket No. 50-286

MASTER LIST OF ELECTRICAL EQUIPMENT IMPORTANT
TO SAFETY TO BE ENVIRONMENTALLY QUALIFIED
INDIAN POINT UNIT NO. 3

System I Safety Injection

<u>Plant ID No.</u>	<u>Location</u>	<u>Manufacturer and Model No.</u>	<u>Description</u>	<u>Expected Or Actual Installation Date</u>	<u>Expected or Actual Environmental Qualification Documentation Date</u>
SI Pump 31, 32,33	SI Pump Room	Westinghouse 509US	Motor for High Head SI Pump	Original Installation	Units qualified. Report 7154-222E dated July 1983 applies. (a)
FT-945A,B	Containment	Foxboro NE13DH-HIH1- BE	Flow Transmitter (Recirculation Spray Flow)	1984	Replaced with Foxboro transmitters qualified to 1971 criteria. (f)
FT-924A,-925,-926, -926A,-927,-980, -981,932	Containment	Foxboro NE11DM-HIC1- BE	Flow Transmitter (High Head SI Flow)	1984	Replaced with Foxboro transmitters qualified to 1971 criteria. (f)
PT-922,-923,-947	SI Pump Room	Foxboro E11GM	Pressure Transmitter (SI Pump Suction & Discharge Pressure)	Original Installation	Units qualified. WCAP-8541 and NS-TMA-2139 apply. (a)
Recirc. Pump 31, 32	Containment	Westinghouse 588.5	Motor for SI Recirc. Spray Pump	Original Installation	Units qualified. Report 7154-120E dated July 1983 applies.
MOV-856B,C,E,G, H,J	Containment	Limitorque SMB-00	High Head SI Valves	Original Installation	Units qualified. Report 7154-101E dated August 1983 applies.
MOV-1802A,B	Containment	Limitorque SMB-00	SI Recirc. & Spray Pump Discharge Valves	Original Installation	Units qualified. Report 7154-101E dated August 1983 applies.
Limit Switches for 1851A,B	Pipe Penetr- ation Area	NAMCO D2400X	BIT to Boric Acid Tank (1851A, B)	Original Installation	Units Qualified. Report 7154-233E dated May 1983 applies.
MOV-850A, 850C	SI Pump Room	Limitorque SMB-0	SI Pump Discharge	1983	Units Qualified. Report 7154-110E dated August 1983 applies.

System I, Safety Injection (continued)

<u>Plant ID No.</u>	<u>Location</u>	<u>Manufacturer and Model No.</u>	<u>Description</u>	<u>Expected Or Actual Installation Date</u>	<u>Expected or Actual Environmental Qualification Documentation Date</u>
MOV-889A,B	Containment	Limatorque SMB-0	SI Recirculation & Spray Isolation Valves (Limatorque)	Original Installation	Units qualified. Report 7154-101E dated August 1983 applies.
MOV-888A,B	Pipe Penetration Area	Limatorque SMB-00	High Head SI Recirc. Valves (Limatorque)	Original Installation	Units qualified. Report 7154-101E dated August 1983 applies.(a)
MOV-842,843	SI Pump Room	Limatorque SMB-00	SI Mini-Flow Valves (Limatorque)	Original Installation	Units qualified. Report 7154-101E dated August 1983 applies. (a)
MOV-851A,B	SI Pump Room	Limatorque SMB-00	SI Discharge Valves (Limatorque)	Original Installation	Units qualified. Report 7154-101E dated August 1983 applies. (a)
MOV-1810	SI Pump Room	Limatorque SMB-00	RWST Discharge Valve (Limatorque)	Original Installation	Units qualified. Report 7154-101E dated August 1983 applies. (a)
MOV-887A,B	SI Pump Room	Limatorque SMB-00	SI Pump Suction Isolation Valves (Limatorque)	Original Installation	Units qualified. Report 7154-101E dated August 1983 applies. (a)
MOV-1835A,B	Pipe Penetration Area	Limatorque SMB-0	BIT Discharge Valves (Limatorque)	Original Installation	Units qualified. Report 7154-101E dated August 1983 applies. (a)
MOV-1852A,B	SI Pump Room	Limatorque SMB-0	BIT Injection Valves (Limatorque)	Original Installation	Units qualified. Report 7154-101E dated August 1983 applies.(a)
MOV-894A,B,C,D	Containment	Limatorque SMB-2	Accumulation Discharge Valves (Limatorque)	Original Installation	Units qualified. Report 7154-101E dated August 1983 applies. (a)(h)
Limit Switches for Values 856B,G	Containment	NAMCO EA-180	Limit Switches for Valves 856B,G	1980	Units qualified. Report 7154-130E dated August 1983 applies.
Solenoids for PCV-1851A,B	Pipe Penetration Area	ASCO-8314	BIT to Boric Acid Tanks	Original Installation	Units qualified. Report 7154-212E dated May 1983 applies.

Cables, splices, terminal blocks, electrical penetrations used in safety-related systems are discussed in System XIII, Common Equipment.

System II, Auxiliary Coolant

<u>Plant ID No.</u>	<u>Location</u>	<u>Manufacturer and Model No.</u>	<u>Description</u>	<u>Expected Or Actual Installation Date</u>	<u>Expected or Actual Environmental Qualification Documentation Date</u>
RHR Pump 31, 32	RHR Pump Room	Westinghouse 509UPZ	Motors for RHR Pumps (Westinghouse)	Original Installation	Units qualified. Report 7154-220E dated July 1983 applies.
HCV-638,-640	Containment	Limatorque SMB-00	RHR Flow Control Valves (Limatorque)	1980	Units qualified. Report 7154-101E dated August 1983 applies.
MOV-745A,B	Containment	Limatorque SMB-00	RHR Isolation Valves (Limatorque)	Original Installation	Units qualified. Report 7154-101E dated August 1983 applies.
MOV-1869A,B	Containment	Limatorque SMB	RHR Isolation Valves (Limatorque)	Original Installation	Units qualified. Report 7154-101E dated August 1983 applies.
MOV-746,747, 899A,B	Containment	Limatorque SMB-3	RHR HX Isolation Valves (Limatorque)	Original Installation	Units qualified. Report 7154-101E dated August 1983 applies.
MOV-822A,B	Pipe Penetration Area	Limatorque SMB-00	RHR HX Cooling Water Supply Valves (Limatorque)	Original Installation	Units qualified. Report 7154-101E dated August 1983 applies.
MOV-744	Pipe Penetration Area	Limatorque SMB-1	RHR Isolation Valve (Limatorque)	Original Installation	To be replaced with qualified units. (b)(g)
MOV-885A,B	Pipe Penetration Area	Limatorque SMB-0	Containment Sump Stop Valve	Original Installation	Units qualified. Report 7154-101E dated August 1983 applies.
FT-638,640	Containment	Foxboro N-E13DH HIM2-BE	RHR Flow Transmitters	1984	Replaced with qualified units. Report 45592-4 dated 18 May 1983.
MOV-769,-784, -786,-789,-797; FCV-625	Pipe Penetration Area	Limatorque SMB-00	RCP Cooling Water Isolation (Limatorque)	Original Installation	Units qualified except MOV 769 & 797. Report 7154-101E dated August 1983 applies. (b) (g)

System II, Auxiliary Coolant (continued)

<u>Plant ID No.</u>	<u>Location</u>	<u>Manufacturer and Model No.</u>	<u>Description</u>	<u>Expected Or Actual Installation Date</u>	<u>Expected or Actual Environmental Qualification Documentation Date</u>
FT-946A,B, C,D	Containment	Foxboro N-13DH- HIM1-BE(A&C) N-13DH-HIM1- BE(B&D)	RHR Recirculation Flow Transmitters	1984	Replaced with Foxboro transmitters qualified to 1971 criteria. (f)
LT-938,-939	Containment	GEMS LS1900	Recirculation Sump Level Transmitters	Original Installation	Note k.

Cables, splices, terminal blocks, electrical penetrations
used in safety-related systems are discussed in System XIII,
Common Equipment.

System III, Auxiliary Feedwater

<u>Plant ID No.</u>	<u>Location</u>	<u>Manufacturer and Model No.</u>	<u>Description</u>	<u>Expected Or Actual Installation Date</u>	<u>Expected or Actual Environmental Qualification Documentation Date</u>
ABFP 31,33	AFW Pump Room	Westinghouse	Motor for Auxiliary Feed Pumps	Original Installation	Units qualified. Report 7154-221E dated July 1983 applies. (c)
PT-1205	AFW Pump Room	Foxboro E11GM	Pressure Transmitter City Water Pressure	Original Installation	Units qualified. WCAP-8541 applies. Aging March 1984. (c)
PT-406A,B PT-1260,-1261, -1262	AFW Pump Room	Foxboro E11GM	Pressure Transmitter AFW Pump Suction Pressure	Original Installation	Units qualified. WCAP-8541 applies. Aging March 1984. (c)
PT-1263,-1264, -1265	AFW Pump Room	Foxboro E11GM	Pressure Transmitter AFW Pump Discharge Pressure	Original Installation	Units qualified. WCAP-8541 applies. Aging March 1984. (c)
FT-1200,-1201, 1202, -1203	AFW Pump Room	Foxboro E11GM	Feedwater Flow Transmitter	Original Installation	Units qualified. WCAP-8541 applies. Aging March 1984. (c)
PT-1163,-1164, -1165,-1166	AFW Pump Room	Foxboro E11GM	Pressure Transmitter AFW Pressure	Original Installation	Units qualified. WCAP-8541 applies. Aging March 1984. (c)
Solenoids for PCV-1121,-1123	AFW Pump Room	ASCP 8300	City Water Supply to AFW System	Original Installation	Units qualified. Report 7154-111E dated June 1983 applies. (c)
Solenoid for PCV-1139	AFW Pump Room	ASCO 8300	AFW Recirc. Isolation	Original Installation	Units qualified. Report 7154-111E dated June 1983 applies. (c)
Solenoids for PCV-1187,-1188, -1189	AFW Pump Room	ASCO 8300	AFW Pump Steam Pressure Control	Original Installation	Units qualified. Report 7154-111E dated June 1983 applies. (c)
Solenoids for LCV-1158	AFW Pump Room	ASCO 8317	Condensate Storage Tank Discharge (ASCO)	Original Installation	Units qualified. Report 7154-212E dated May 1983 applies. (c)

Cables, splices, terminal blocks, electrical penetrations used in safety-related systems are discussed in System XIII, Common Equipment.

System III, Auxiliary Feedwater (continued)

<u>Plant ID No.</u>	<u>Location</u>	<u>Manufacturer and Model No.</u>	<u>Description</u>	<u>Expected Or Actual Installation Date</u>	<u>Expected or Actual Environmental Qualification Documentation Date</u>
Limit Switch for PCV-1121, 1123	AFW Pump Room	NAMCO EA-170	Position Indicator for Auxiliary Feed-water Recirculation Valves	Original Installation	Units qualified. Report 7154-233E dated July 1983. (c)
Limit Switch PCV-1187, 1188, -1189	AFW Pump Room	Micro BZE-2RN	AFW Pump Suction Valve Position Indication (Micro)	Original Installation	Note C.
TC-1112S, 1113S	AFW Pump Room	UEC F110A6CS	Temperature Switch In AFW Pump Room	Original Installation	Units qualified. Report 7154-245E dated March 1984. (c)
FCV-405A,B,C,D	AFW Pump Room	Fisher 546	E/P Converter for AFW Flow Control	Original Installation	Units qualified. Report 4, Problem 1531 Proj. 72AR28 applies. Aging Analysis Report No. 7205 dated April 1984 applies. (c)

Cables, splices, terminal blocks, electrical penetrations used in safety-related systems are discussed in System XIII, Common Equipment.

Note - Previous submittals included the Solenoid Valves and Limit Switches for PCV-1310A&B, the Isolation Valves for the steam supply to the AFW Pump Turbines. However, the authority has determined that these valves are located in a mild environment for the accident they are intended to mitigate. These valves are located at different elevations in the Steam and Feedline penetration area. Their function is to isolate a break in the steam line to the AFW pump turbine. The AFW pump room is an isolated room which does not connect to the steam and feedline penetration area so that the valves perform their function in a normal mild environment. The valves are not required to function in the event of a main steam line break in the steam and feedline penetration area. Their failure in the event of a main steam line break would not preclude supplying feedwater to the steam generators because the 2 motor driven AFW pumps are not affected and will supply an adequate amount of feedwater to mitigate the accident. Therefore it is concluded that these valves are not within the Scope of 10CFR50.49 because they are not affected by the accident they are intended to mitigate.

System IV, Reactor Coolant

<u>Plant ID No.</u>	<u>Location</u>	<u>Manufacturer and Model No.</u>	<u>Description</u>	<u>Expected Or Actual Installation Date</u>	<u>Expected or Actual Environmental Qualification Documentation Date</u>
PT-455,-456,-457,-474	Containment	Foxboro NE11GM NIE-1-BEL	Pressurizer Pressure Transmitters	1984	Replaced with Foxboro transmitters qualified to 1971 criteria. (f)
LT-459,-460,-461	Containment	Foxboro NE13 DH	Pressurizer Level Transmitters	1985	To be replaced with qualified Foxboro Units. (g)
PT-402,-403	Containment	Foxboro NE11GH-HIM-BE	Reactor Coolant System Transmitters	1984	Replaced with Foxboro transmitters qualified to 1971 criteria. (f)
Solenoids for PCV-956A,B,C,D	Pipe Penetration Area	ASCO 8314	Pressurizer Sample Isolation	Original Installation	Units qualified. Report 7154-212E dated May 1983 applies.
Solenoids for PCV-519,-552	Pipe Penetration Area	ASCO 8314	Pressurizer Relief Tank Make-up Isolation	Original Installation	Units qualified. Report 7154-212E dated May 1983 applies.
Solenoids for PCV-1702,-1705	Pipe Penetration Area	ASCO 8314	R.C. Drain Pump Discharge Valves	Original Installation	Units qualified. Report 7154-212E dated May 1983 applies.
Solenoids for PCV-1786,-1787	Pipe Penetration Area	ASCO 8314	R.C. Drain Tank Vent Valves	Original Installation	Units qualified. Report 7154-212E dated May 1983 applies.
Solenoids for AOV-1788,-1789,-548,-549,-956E,F,G,H	Pipe Penetration Area	ASCO 8314	Sampling Isolation Valves	Original Installation	Units qualified. Report 7154-212E dated May 1983 applies.
SOV-1723,1728	Pipe Penetration Area	ASCO 8314	Sump Pump Discharge Valves	Original Installation	Units qualified. Report 7154-212E dated May 1983 applies.
MOV-222	Pipe Penetration Area	Limitorque SMB-00	RCP Seal Water Isolation	Original Installation	Units qualified. Report 7154-101E dated August 1983 applies.

System IV, Reactor Coolant (continued)

<u>Plant ID No.</u>	<u>Location</u>	<u>Manufacturer and Model No.</u>	<u>Description</u>	<u>Expected Or Actual Installation Date</u>	<u>Expected or Actual Environmental Qualification Documentation Date</u>
Solenoids for AOV-951,-953,-955A,B	Containment	ASCO NP-8320A 182E	Sampling Isolation Valves	1984	Replaced with qualified units. Report AQ521678/TR dated March 1978.
RTD-410A,B, -411A,B, -413A,B,-420A,B, -421A,B,-423A,B, -430A,B,-431A,B, -433A,B,-440A,B, -441A,B,-443A,B	Containment	RdF Sostman	Reactor Coolant Temperature	1983 Original Installation	Units qualified. Narrow range units replaced with qualified RdF Units. WCAP-8587 applies. Wide range units to be replaced with qualified RdF Units.(g)
No Tag No.	Containment	TEC -501	Relief Valve Acoustic Monitor	1982	Units qualified. TEC report 517-TR-03 Rev. 2 applies.
MOV-535,-536	Containment	Limatorque SMB	PORV Block Valves	Original Installation	Units qualified. Report 7154-101E dated August 1983 applies.
Limit Switches for PCV-956A, B,C,D,E,F	Pipe Penetration Area	NAMCO D2400X	Reactor Coolant & Pressurizer Sample Valve Position	Original Installation	Units qualified. Report 7154-233E dated May 1983 applies.
Limit Switches for PCV-1702,-1705	Pipe Penetration Area	NAMCO D2400X	Reactor Coolant Drain Tank Discharge Valve Position	Original Installation	Units qualified. Report 7154-233E dated May 1983 applies.
Limit Switches for PCV-1786,-1787	Pipe Penetration Area	NAMCO D2400X	R.C. Drain Tank Vent Valve Position	Original Installation	Units qualified. Report 7154-233E dated May 1983 applies.

System IV, Reactor Coolant (continued)

<u>Plant ID No.</u>	<u>Location</u>	<u>Manufacturer and Model No.</u>	<u>Description</u>	<u>Expected Or Actual Installation Date</u>	<u>Expected or Actual Environmental Qualification Documentation Date</u>
Limit Switches for AOV-951, -953, -955A,B	Containment	NAMCO EA-180-21302 & EA-180-32302	Sample Isolation Valve Position	1984	Replaced with qualified units. Report QTR-105 Rev. 1.
Limit Switches for AOV-1788, -1789, -548, -549, 956G,H	Pipe Penetration Area	NAMCO D2400X	Sample Isolation Valve Position	Original Installation	Units qualified. Report 7154-233E dated May 1983 applies.

Cables, splices, terminal blocks, electrical penetrations used in safety-related systems are discussed in System XIII, Common Equipment.

System V, Chemical and Volume Control

<u>Plant ID No.</u>	<u>Location</u>	<u>Manufacturer and Model No.</u>	<u>Description</u>	<u>Expected Or Actual Installation Date</u>	<u>Expected or Actual Environmental Qualification Documentation Date</u>
Solenoids for PCV-791,-793,-796,-798	Pipe Penetration Area	ASCO 8316	Let Down HX Isolation Valves	Original Installation	Units qualified. Report 7154-213E dated May 1983 applies.
Solenoids for PCV-201,-202	Pipe Penetration Area	ASCO 8316	Let Down Isolation Valves	Original Installation	Units qualified. Report 7154-213E dated May 1983 applies.
SOV-1314,1314A thru 1317,1317A	Pipe Penetration Area	ASCO-8300	Steam Generator Blowdown Isolation	Original Installation	Units qualified. Report 7154-111 applies.
Limit Switches for PCV-791,-793,-796,-798	Pipe Penetration Area	NAMCO D2400X	Let Down HX Isolation Valve Position Indication	Original Installation	Units qualified. Report 7154-233E dated May 1983 applies.
Limit Switches for PCV-201,-202	Pipe Penetration Area	NAMCO D2400X	Let Down Isolation Valve Position/ Indication	Original Installation	Units qualified. Report 7154-233E dated May 1983 applies.
Limit Switches for PCV-1214,1214A thru 1217,1217A	Pipe Penetration Area	NAMCO D2400X	Steam Generator Blowdown Isolation Position	Original Installation	Units qualified. Report 7154-233E dated May 1983 applies.
Limit Switches for 519 and 552	Pipe Penetration Area	NAMCO D2400X	PZR Relief Tank Make-up Isolation Position	Original Installation	Units qualified. Report 7154-233E dated May 1983 applies.
Limit Switches for Valves 1723 and 1728	Pipe Penetration Area	NAMCO D2400X	Containment Sump Discharge Valves Position	Original Installation	Units qualified. Report 7154-233E dated May 1983 applies.
Limit Switches for Valves 1786 and 1787	Pipe Penetration Area	NAMCO D2400X	Reactor Coolant Drain Tank Vent Position	Original Installation	Units qualified. Report 7154-233E dated May 1983 applies.
Limit Switches for Valves for PCV-1234 thru 1241	Pipe Penetration Area	NAMCO D2400X	Radiation Monitoring Isolation Valves Position	Original Installation	Units qualified. Report 7154-233E dated May 1983 applies.

Cables, splices, terminal blocks, electrical penetrations used in safety-related systems are discussed in System XIII, Common Equipment.

System VI, Heating and Ventilation System (containment)

<u>Plant ID No.</u>	<u>Location</u>	<u>Manufacturer and Model No.</u>	<u>Description</u>	<u>Expected Or Actual Installation Date</u>	<u>Expected or Actual Environmental Qualification Documentation Date</u>
FCU-31,32 33,34,35	Containment	Westinghouse 69F97009	Motors for Containment Fan Coolers	Original Installation	Units qualified. Reports 7154-121E dated July 1983 and P801-09-2 dated November 1984 apply. (e)
SOV-1293, thru 1307	Containment	NPX8320 182E	Solenoids valves for Fan Cooler Damper	1984	Replaced with qualified units. Report AQ521678/TR dated March 1978.
No Tag No.	Containment	NAMCO EA-740	Limit Switches for Fan Cooler Dampers	1980	Units qualified. Report 7154-131E dated May 1983 applies.
Solenoids for PCV-1190, FCV-1170,-1172	Containment	ASCO NP-8316A74E NP-8320A184E	Solenoids for Containment Purge, Pressure Relief Valves	1980	Units qualified. Report 7154-101E dated July 1983 and FC-4539 dated 9/76 apply. AQ521678/TR dated March 1978.
Solenoids for FCV-1171,-1173	Pipe Penetration Area	ASCO 8300	Solenoids for Containment Purge Valves	Original Installation	Units qualified. Report 7154-111E dated June 1983 applies.
MOV-880A,B,C, D,E,F,G,H,J,K	Containment	Limitorque SMB-00	Charcoal Filter Dousing Valves	Original Installation	Units qualified. Report 7154-101E dated August 1983 applies.
No Tag No.	Containment	NAMCO EA180	Limit Switches for Purge Dampers FCV-1170 and 1172	Original Installation	Units Qualified. ACME Cleveland Report dated 7/7/77 applies.
No Tag No.	Pipe Penetration Area	NAMCO EA180	Limit Switches for Purge Dampers FCV-1171 and 1173	Original Installation	Units Qualified. ACME Cleveland Report dated 7/7/77 applies.

Cables, splices, terminal blocks, electrical penetrations used in safety-related systems are discussed in System XIII, Common Equipment.

System VI, Heating and Ventilation System (containment)

Note 2 - In the May 1983 Submittal, the authority incorrectly identified TE-1203-1, 1203-2, 1203-3, 1204-4, 1203-5 and TC-1117, 1135, 1143 and 1155. These items should not have been listed because:

- a) Temperature Detectors Foxboro Model 1502-T (TE-1203-1, -2, -3, -4, -5) Fan cooler outlet temperature. These temperature detectors are used in normal operation to control service water flow to the fan cooler heat exchangers (the temperature detectors provide a signal to the temperature controllers for valves TCV-1103, 1104 and 1105). In the event of a safety injection signal, air is removed from the controllers and the valves move to their full open position. Since the temperature detectors have no accident mitigating function and there is no known failure mode of the valves or the temperature detectors which could affect the safety position of the valves, the temperature detectors are exempt from qualification.
- b) Temperature Detectors Fenwal EL 2717-11 (TC 1117, 1135, 1143 and 1153), Fan Cooler Charcoal Filter fire detectors. The accident which these fire detectors are intended to mitigate is a fire in the fan cooler charcoal filters. They initiate fire suppression water flow in the event of a high temperature ($>325^{\circ}\text{F}$) in the fan cooler charcoal filters. The units are hermetically sealed having a stainless steel shell, metallic temperature element, mica insulation, an epoxy/glass lead seal and TAGT insulated lead wires.

The temperature detectors are not used to mitigate a LOCA or MSLB and because of their hermetically sealed design and set point would not be affected by the accident conditions. The detectors are exempt from qualification because they do not have an accident mitigating (LOCA/MSLB) function.

System VII, Main Steam

<u>Plant ID No.</u>	<u>Location</u>	<u>Manufacturer and Model No.</u>	<u>Description</u>	<u>Expected Or Actual Installation Date</u>	<u>Expected or Actual Environmental Qualification Documentation Date</u>
PT-419A,B,C PT-429A,B,C PT-439A,B,C PT-449A,B,C	AFW Pump Room	Foxboro E11GM	Main Steam Pressure Transmitter	Original Installation	Units qualified. WCAP-8541, and NS-TMA-2319 apply. Aging Report No. 7205N dated May 1984 applies.
FT-419A,B FT-429A,B FT-439A,B FT-449A,B	Containment	Rosemount 1151	Main Steam Flow Transmitters	Original Installation	Train A transmitters qualified. Report 7201-R4 dated August 1984 applies. (j)
LT-417A,B,C,D LT-427A,B,C,D LT-437A,B,C,D LT-447A,B,C,D	Containment	Foxboro N-E13DH-HIH1-BEK	Steam Generator Level Transmitter	1984	Replaced with Foxboro transmitters qualified to 1971 criteria. (f)
Solenoids for MS-1-31,-32,-33,-34	Steam and Feed Penetration Area	Laurence 110114W 125434W	Main Steam Isolation Valves	1985	To be replaced with qualified units. (g)
Limit Switches for MS-1-32,-32,-33,-34	Steam and Feed Penetration Area	NAMCO EA750-50100	Main Steam Isolation Valve Position Indication	1984	Units qualified. Report QTR-110 Rev. 0.
PCV-1134,-1135,-1136,-1137	Steam and Feed Penetration Area	Fisher 546	Main Steam Atmospheric Relief Valves Actuation	Original Installation	Units qualified. Report 4 Problem 1531, Project 72AR28 applies. Aging Report No. 7205 dated April 1984 applies.

Cables, splices, terminal blocks, electrical penetrations used in safety-related systems are discussed in System XIII, Common Equipment.

System VIII, Main Feedwater

<u>Plant ID No.</u>	<u>Location</u>	<u>Manufacturer and Model No.</u>	<u>Description</u>	<u>Expected Or Actual Installation Date</u>	<u>Expected or Actual Environmental Qualification Documentation Date</u>
FT-418A,B FT-428A,B FT-438A,B FT-448A,B	AFW Pump Room	Foxboro E13DM	Main Feedwater Flow Transmitter	Original Installation	Units qualified. WCAP-8541 applies. Aging Report No. 7205N dated May 1984 applies.
BFD-5-1,5-2, 5-3,5-4	Steam and Feed Penetration Area	Limatorque SMB	Main Feedwater Isolation Valves	Original Installation	Units qualified. Report 7154-100E dated August 1983 applies.
BFD-90-1,90-2, 90-3,90-4	Steam and Feed Penetration Area	Limatorque SMB	Low Flow Feedwater Bypass Isolation Valves	Original Installation	Units qualified. Report 7154-100E dated August 1983 applies.

Cables, splices, terminal blocks, electrical penetrations used in safety-related systems are discussed in System XIII, Common Equipment.

System IX, Containment

<u>Plant ID No.</u>	<u>Location</u>	<u>Manufacturer and Model No.</u>	<u>Description</u>	<u>Expected Or Actual Installation Date</u>	<u>Expected or Actual Environmental Qualification Documentation Date</u>
PT-948A,B,C PT-949A,B,C	Pipe Penetration Area	Foxboro E11GM	Containment Pressure Transmitters	Original Installation	Units qualified. WCAP-8541 applies. Aging March 1984.
Solenoid Valves for PCV-1191, -1192		ASCO NP8316	Actuates Containment Pressure Relief Valves	1980	Units qualified. Report 7154-110E and ASCO report AQ521678/TR apply.
Limit Switches for PCV-1190, -1191, -1192	Containment and Pipe Penetration Area	NAMCO EA-180	Containment Pressure Relief Valve Position Indication	1980	Units qualified. Report 7154-130E applies.
LT-940, -941	Containment	Gems LS1900	Containment Sump Level	Original Installation	Note K.
Solenoids for DW1, DW2, 550, 1610	Pipe Penetration Area	ASCO NP8316	Actuates Containment Isolation Valves	1980	Units qualified. ASCO report AQ521678/TR applies.
Limit Switches for DW1, DW2, 550, 1610	Pipe Penetration Area	NAMCO EA-180	Containment Isolation Valve Position Indication	1980	Units qualified. Report 7154-130E applies.
PT-1421, 1422	Pipe Penetration Area	Barton 763	Containment Pressure Transmitter	1981	Units qualified. Barton report R3-763-6 applies.
LT-1253, 1254	Containment	Barton 764	Containment Level Transmitters	1981	Units qualified. Barton report R3-764-9-0 applies.

Cables, splices, terminal blocks, electrical penetrations used in safety-related systems are discussed in System XIII, Common Equipment.

System X, Instrument Air

<u>Plant ID No.</u>	<u>Location</u>	<u>Manufacturer and Model No.</u>	<u>Description</u>	<u>Expected Or Actual Installation Date</u>	<u>Expected or Actual Environmental Qualification Documentation Date</u>
Solenoid for PCV-1228	Pipe Penetration Area	ASCO 8300	Instrument Air Isolation	Original Installation	Unit Qualified. Report 7154-111E applies.
Limit Switch for PCV-1228	Pipe Penetration Area	NAMCO D2400X	Instrument Air Isolation Valve Position Indication	Original Installation	Unit qualified. Report 7154-233E dated May 1983 applies.

Cables, splices, terminal blocks, electrical penetrations used in safety-related systems are discussed in System XIII, Common Equipment.

System XI, H₂ Recombination

<u>Plant ID No.</u>	<u>Location</u>	<u>Manufacturer and Model No.</u>	<u>Description</u>	<u>Expected Or Actual Installation Date</u>	<u>Expected or Actual Environmental Qualification Documentation Date</u>
No Tag No.	Containment	Westinghouse	Igniter Exciter for H ₂ Recombiner	Original Installation	Qualified. WCAP-7709L applies.
No Tag No.	Containment	Westinghouse	Thermocouple for H ₂ Recombiner Exhaust Temperature	Original Installation	Qualified. WCAP-7709L applies.
No Tag No.	Containment	Westinghouse	H ₂ Recombiner Blower Motor	Original Installation	Motor qualified. Report 7154-122E dated July 1983 applies.
31FS-2A & 32FS-2B	Containment	Foxboro N-E13DM-HI1-BE	Transmitter for H ₂ Recombiner Flow	1984	Replaced with Foxboro transmitters qualified to 1971 criteria. (f)

Cables, splices, terminal blocks, electrical penetrations used in safety-related systems are discussed in System XV Common Equipment.

System XII, Sampling

<u>Plant ID No.</u>	<u>Location</u>	<u>Manufacturer and Model No.</u>	<u>Description</u>	<u>Expected Or Actual Installation Date</u>	<u>Expected or Actual Environmental Qualification Documentation Date</u>
SOV-1534, -1535,-1536, -1537,-1538, -1539,-1540, -1541	Pipe Penetration Area	ASCO 8300	Containment Building Air Sample Isolation	Original Installation	Units qualified. Report 7154-111E dated June 1983 applies.
SOV-1523,1523A thru 1526,1526A	Pipe Penetration Area	ASCO 8300	Solenoids for Steam Generator Sample Isolation	Original Installation	Units qualified. Report 7154-111E dated June 1983 applies.
Limit Switches for PCV-1223, 1223A thru 1226, 1226A	Pipe Penetration Area	NAMCO D2400X	Position Indication for Steam Generator Sample Isolation Valves	Original Installation	Units qualified. Report 7154-233E dated May 1983 applies.
No Tag No.	Pipe Penetration Area	NAMCO D2400X	Position Indication for Containment Building Air Sampling	Original Installation	Units qualified. Report 7154-233E dated May 1983 applies.
M-1 through M-10	None	PAB	ASCO 8262 Sampling System Isolation	1980	Units qualified. Report 1001 dated June 1984 applies.
No Tag No.	PAB	Thomas 727CH33	Sample Pump Motor	1980	Units qualified. Report 7154-1051 dated July 1984 applies.
No Tag No.	PAB	Millipore CN0949	Sample Pump Motor	1980	Units qualified. Report 7154-1051 dated July 1984 applies.
Solenoid for 958	Pipe Penetration Area	ASCO NP8320	RHR Sample	1980	Unit Qualified. Report AQ521678/TR applies.
990A,B; 994A	Pipe Penetration Area	Limatorque SMB-000/-00	SI Recirculation Sample	1980	Units Qualified. Report 7154-101E August 1983 applies.

System XII, Sampling (continued)

<u>Plant ID No.</u>	<u>Location</u>	<u>Manufacturer and Model No.</u>	<u>Description</u>	<u>Expected Or Actual Installation Date</u>	<u>Expected or Actual Environmental Qualification Documentation Date</u>
No Tag No.	PAB	Thomas 707CN50	Sample Pump Motor	1980	Units qualified. Report 7154-1051 dated July 1984 applies.
No Tag No.	PAB	Dayton 2Z830	Sample Pump Motor	1980	Units qualified. Report 7154-1051 dated July 1984 applies.
No Tag No.	PAB	Dayton 4X426A	Capacitor	1980	Units qualified. Report 7154-1051 dated July 1984 applies.
R25,R26	Containment	General Atomic RD-25	High Range Radiation Monitor	1983	Units qualified. Report E-254-960 May 1, 1981 applies.
R27	Fan House	General Atomic	Wide Range Gas Monitor	1983	Unit qualified. Report E255-968 applies.

Cables, splices, terminal blocks, electrical penetrations used in safety-related systems are discussed in System XV, Common Equipment.

System XIII, Common Equipment

<u>Plant ID No.</u>	<u>Location</u>	<u>Manufacturer and Model No.</u>	<u>Description</u>	<u>Expected Or Actual Installation Date</u>	<u>Expected or Actual Environmental Qualification Documentation Date</u>
N/A	Containment	Westinghouse 542247	Terminal Block	Original Installation	Units qualified. Report 7154-180E dated January 1983 applies. (j)
N/A	Containment	Westinghouse WX31774,31775, 31776,31892	Electrical Penetrations	Original Installation	Units qualified. PENTR-81-37 and PENRLK 3-16-01 apply.
N/A	Inside & Outside Contmt.	Rockbestos Firewall III	Rockbestos Cable	1980	Cable qualified. Report 170E applies.
N/A	Inside & Outside Contmt.	Kerite	Kerite Cable	Original Installation	Cable qualified. Report 170E applies.
N/A	Inside & Outside Contmt.	Raychem WCSF(N)	Raychem Cable Splice	Original Installation	Splices qualified. Report 170E applies.
N/A	Inside & Outside Contmt.	Lewis	Lewis Cable	Original Installation	Cable qualified. Report 170E applies.
N/A	Containment	Conax N11001	Connector	1980	Connector qualified. Conax Report IPS-409 applies.

Notes for Master List of Electrical Equipment Important to Safety

a) This equipment performs its function before the environment becomes harsh. A harsh radiation environment can only occur after the safety injection function has been completed and the system is no longer in use. The safety injection pumps take suction from the refueling water storage tank which is not radioactive and no radiation exposure occurs to the equipment. When all of the water has been pumped into the plant the safety injection is no longer used for any break which would cause core damage. Recirculation through the safety injection system would only occur for very small breaks which would not depressurize the reactor coolant system. It is only recirculation through the RHR system after large break LOCA that results in a high radiation area in the pipe penetration area and SI pump room. In addition, test report WCAP-8541, WCAP-8754 and WCAP-7410L establishes qualification of the equipment for the harsh environment so that the equipment would be available for use at any time in the post accident period. Aging analyses and qualification reports are available for all of the SI System Equipment.

b) MOV-744, MOV-769 and MOV-797 have motor brakes with Class B insulation. WCAP-7410L indicates that the Class B insulated motor brake failed during environmental testing. Although the testing was more severe than the Indian Point Unit 3 accident conditions, because it cannot be determined at what point the motor brake failed and the exact cause of the failure, the Authority plans to replace the actuators of MOV-744, MOV-769 and MOV-797 with qualified actuators.

c) As noted in the FRC TER for equipment located in the Auxiliary Feed Pump Room:

"At present, qualification is not established for the redundant temperature switches (see equipment item 40). Once the Licensee has demonstrated a reliable steam line isolation feature initiated by the qualified temperature switches, the safety-related components located in the auxiliary pump room will be excluded from the scope of their review. The Licensee should ensure that the critical components will not be elevated to temperatures that will affect their operability."

The Authority agrees with the FRC evaluation. The temperature switch (TER item 40) has been qualified in Report 245E. Since the temperature switch will preclude a harsh steam environment the equipment is satisfactory.

An evaluation of the effects of a break in the 4" steam supply line to the AFW turbine driven pump has been made and it has been determined that the total duration of the transient is less than one minute. The safety-related equipment located in the AFW pump room has been evaluated for a much more conservative transient (135°F for 1 hour) and it has been concluded that the equipment is qualified and satisfactory for the environment. WCAP-8541 demonstrates that the transmitters are qualified and perform reliably well above the maximum accident temperature. To ensure continued qualification the seals will be replaced as required by the aging analysis.

d) Note Deleted.

e) The stator insulation on one fan cooler motor has been upgraded from Class F to Class H.

f) The transmitters installed utilize amplifier assemblies qualified to IEEE-323 1971 criteria. These assemblies will be replaced with ones qualified to the IEEE-323-1974 criteria which will upgrade the transmitter qualification to the 1974 criteria. This will be completed by the end of the cycle 4/5 refueling outage.

g) This item has been scheduled to be completed during the cycle 4/5 refueling outage.

h) Regarding the accumulator discharge valves, FRC, (in TER-C5257-206) stated the following:

"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 accumulator 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.

FRC Conclusion:

The accumulator discharge valves (Item 7) do not require environmental qualification beyond their short-term function."

The Authority has reviewed the applicable test reports (WCAP-7410L and Limitorque B0003) and has determined that the testing envelopes the Indian Point Unit 3 accident conditions and that the valves are qualified for their required operating time plus 1 hour.

- i) The test reports applicable to the Westinghouse terminal blocks installed at Indian Point Unit No. 3 are F-C4911-1 and F-C4911-2. Insulation resistance measurements were made during the test at 500VDC, 100VDC and 50VDC. The lowest resistance measurement at 500VDC was 6.5×10^5 ohms which corresponds to a leakage current of 0.77 milliamps. The lowest resistance at 100VDC was 6×10^5 ohms which corresponds to a leakage current of 0.17 milliamps. The lowest resistance at 50VDC was 3.5×10^5 ohms which corresponds to a leakage current of 0.14 milliamps. The leakage currents would not adversely affect Indian Point Unit No. 3 instrument circuits.
- j) The transmitter qualified in Report 7201-R4 dated August 1984 was partially encapsulated in RTV to ensure that no steam entered the electronics housing. Four of the installed transmitters were encapsulated in 1984. The remaining four units will be encapsulated during the cycle 4/5 refueling outage or replaced with qualified units.
- k) As part of the Indian Point Unit 3 TMI action plan program (NUREG-0737) Qualified Barton 764 transmitters were installed to monitor containment water level. The installed GEMS level switches, however, provide signals to indicating lights in the control room. The Authority considers that the indicating lights provide useful information to the operating personnel. Therefore, either bistables will be incorporated into the transmitter circuits or the GEM's level switches will be replaced with qualified units to provide signals to the indicating lights in the control room.

Enclosure 3 to IPN - 84 -63

ENVIRONMENTAL PARAMETERS

New York Power Authority
Indian Point 3 Nuclear Power Plant
Docket No. 50-286

Environmental Parameters

Accident Conditions Inside Containment

- a. LOCA - Figures III-1(B) and III-2 are the accident temperature and pressure profiles developed for the Indian Point Unit No. 3 FSAR. NUREG-0588 Appendix A and Regulatory Guide 1.89, revision 1, Appendix C state that topical report WCAP-8312A is an acceptable method for calculating the mass energy releases to the containment assuming a LOCA. This WCAP was followed in the Indian Point Unit No. 3 analysis that resulted in the peak pressure in figure III-2. The model for heat transfer to the containment heat sinks used in the analysis is in agreement with Appendix B.1 of NUREG-0588.

The references and assumptions are found in WCAP-8312A (non-proprietary) or WCAP-8264 (Proprietary) for the mass and energy release analysis, and in WCAP-7155 for the containment pressure transient analysis.

However, the NRC SER on Environmental Qualification of Safety-Related Electrical Equipment for Indian Point Unit No. 3, dated May 21, 1981, stated:

"The staff has concluded that the minimum temperature profile for equipment qualification purposes should include a margin to account for higher than average temperatures in the upper regions of the containment that can exist due to stratification especially following a postulated MSLB. Use of the steam saturation temperature corresponding to the total building pressure (partial pressure of steam plus partial pressure of air) versus time will provide an acceptable margin for either a postulated LOCA, or MSLB, whichever is controlling as to potential adverse environment effects on equipment.

The licensee's specified temperature (service condition) of 258^oF (the NYPA submittal actually used 271^oF) does not satisfy the above requirements. Furthermore the Licensee's specified pressure is low as compared to the plants of similar design. The Licensee is requested to verify that the pressure profile in the FSAR was calculated based on the code requirements defined in the NUREG-0588. If by using these codes the peak containment pressure is still 40 psig, then a saturation temperature corresponding to the pressure profile should be used."

NYPA in response to the May 21, 1981 NRC SER stated:

"The correct peak pressure is 40.6 psig. The temperature reported is the saturation temperature at the steam partial pressure of 36.9 psig. According to the SER the peak temperature reported should be the saturation temperature corresponding to the total containment pressure to account for margin. The saturation temperature at 55.3 psia (40.6 psig) is 287^oF.

The curve for saturation temperature corresponding to the pressure profile is shown in Figure III-1 A.

The Franklin Research Center (FRC) TER-C5257-456 considered that the NYPA response cited above was satisfactory and the SER dated December 30, 1982 concurred with the FRC TER evaluation.

In order to establish a temperature and pressure profile to be used in LOCA simulation testing it is necessary to ensure that the parameters used meet both the NRC requirements and the requirements of IEEE-323-74. Figures III-3 and III-4 are temperature and pressure profiles which envelop these requirements.

Pressure

The pressure profile is based on the accident pressure profile contained in Figure III-2. A 10 psig pressure margin has been applied to the accident profile for the first 10 hours of the test. IEEE-323-74 recommends a 10% margin on pressure. The IEEE recommendation would add a 4 psig margin to the 40.6 psig peak pressure. Using a different computer code the NRC calculated a peak pressure of 44 psig for the Indian Point Unit No. 3 containment. Adding a 10% margin, 4.4 psig, to the NRC calculated pressure would result in a test pressure of 48.4 psig. The 50 psig pressure shown on Figure III-4 envelopes all of the calculated pressures but does not exceed the 10 psig maximum pressure margin identified in paragraph 6.3.1.5 of IEEE-323-74. The recommended test vessel pressure conservatively simulates the actual accident conditions.

At approximately 7,000 seconds after the incident the containment sump temperatures is less than 170°F, and the containment ambient temperature and vapor temperature is less than 150°F. At this point there is no source of pressurization, and while high humidity conditions exist, containment pressure is essentially atmospheric. This profile is the same as submitted to NRC and accepted by FRC and NRC.

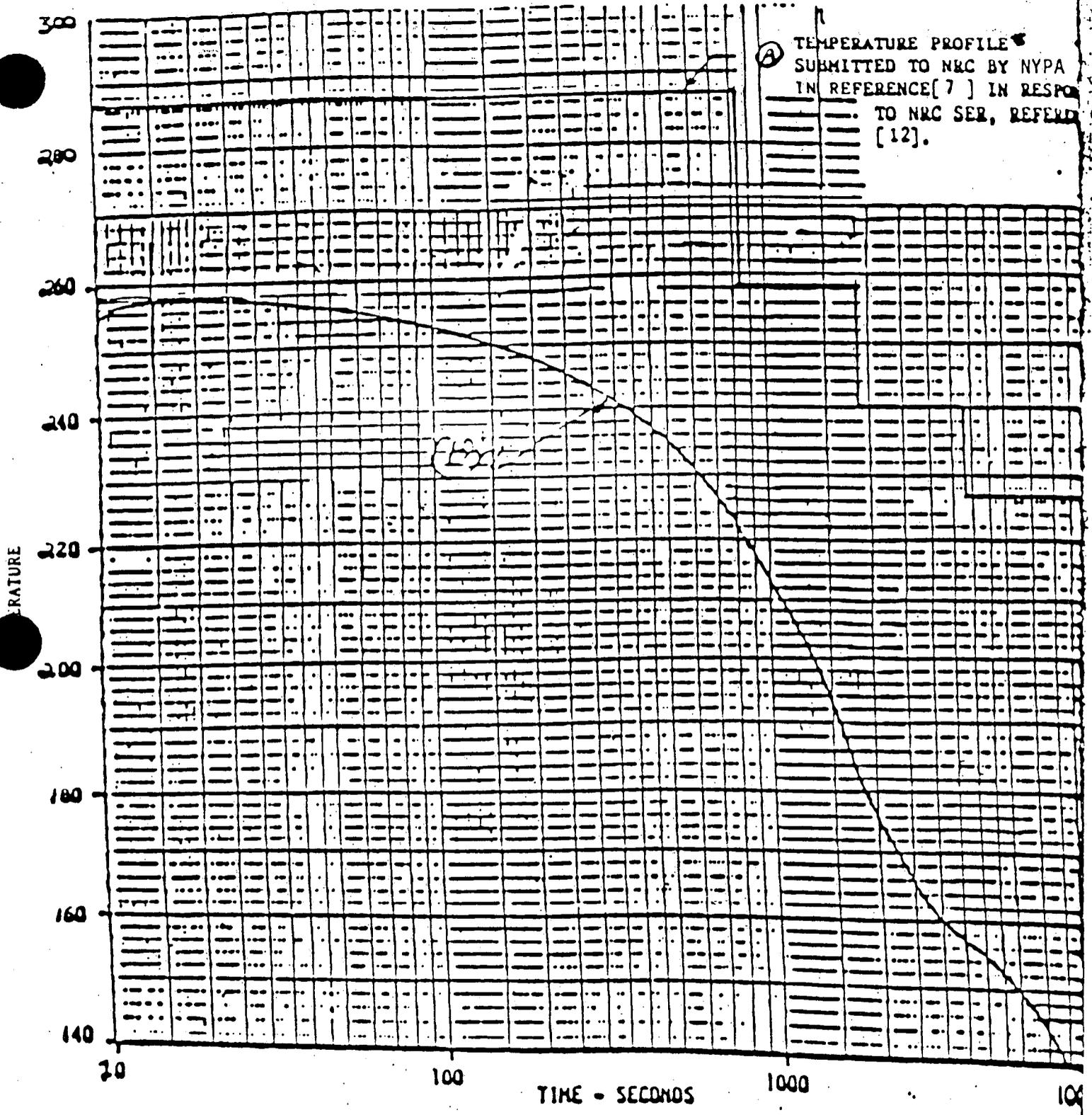


Figure III-1 LOCA Condition Temperature Vs. Time Profile Within Containment

*Saturation temperature corresponding to pressure profile in Figure III-2

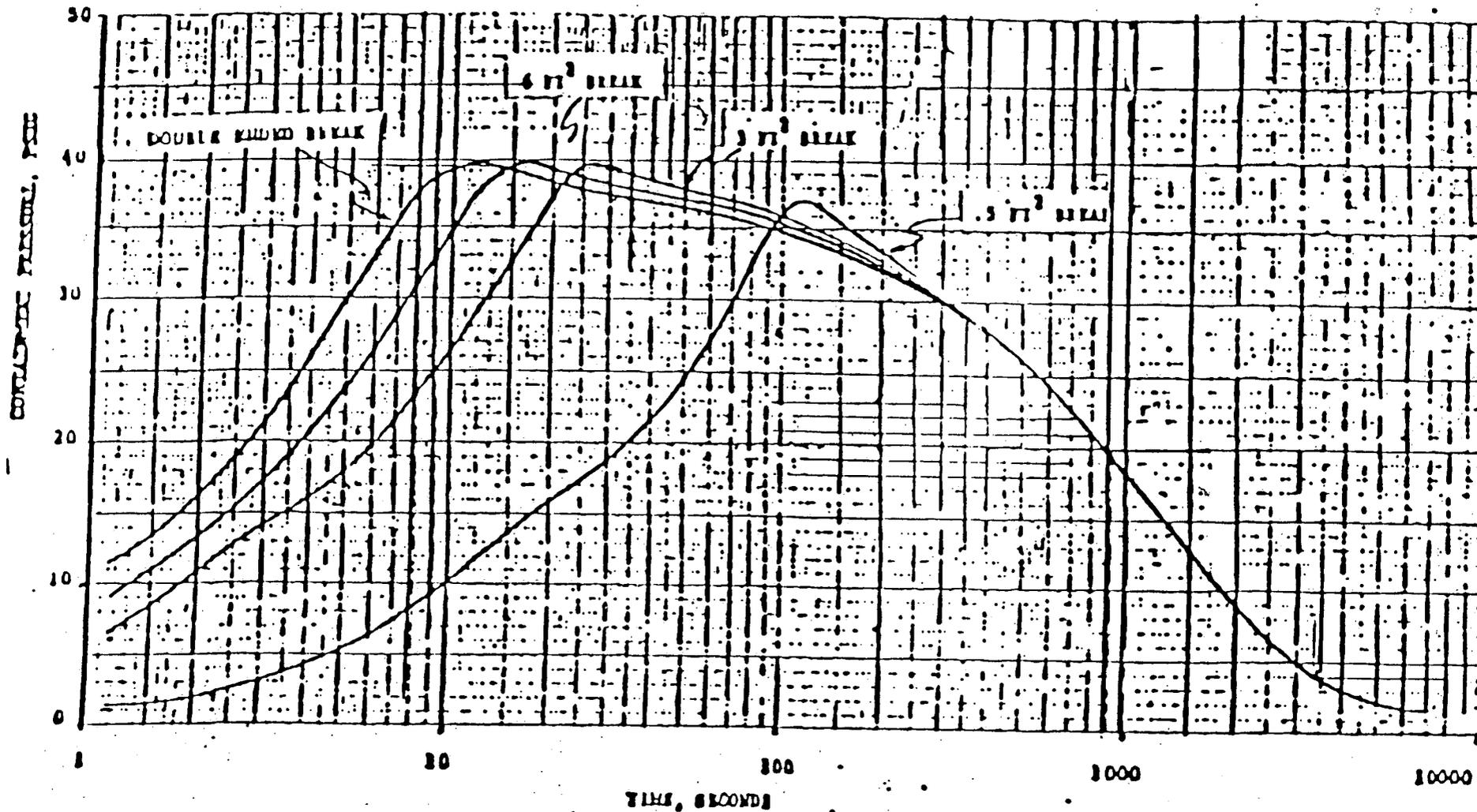


Figure III-2 LOCA Condition Pressure vs. Time Profile Within Containment

Temperature

The temperature profile, Figure III-3, for the first three hours of the test profile is based on the profile contained in Figure III-1 A. No additional margin is required on top of this temperature profile because the temperature is always 29°F higher than the accident temperature profile, Figure III-1 B. IEEE-323-74 recommends a 15°F margin. To comply with the NRC requirements (cited previously) to use a temperature corresponding to saturation at the accident pressure (40.6 psig) a 29°F temperature margin has been applied in the profile shown in Figure III-3. The test temperature therefore envelopes both the IEEE recommendations and the NRC requirements. The test temperature (149°F) between 10 hours and 30 days is determined for the equipment involved using the Arrhenius method to represent a 1 year post accident period at 100°F and 100% relative humidity. The analysis assumes a 1 year plus 10% margin as recommended by IEEE-323-74 (401 days).

Chemical Spray

The spray solution to be used in the test should consist of a solution of boric acid (2000ppm boron) buffered with sodium hydroxide to achieve a pH of 10 at room temperature (20°C). No margin is recommended by IEEE-323-74 (section 6.3.1.5) for chemical spray. Table A-1 of IEEE-323-74 identifies some generic parameters for chemical spray which are intended to envelop the parameters for all plants and notes that the values given may vary from plant to plant. Therefore the spray composition used in LOCA simulation testing is the same as is used in the Indian Point Unit No. 3 plant. The spray duration is shown on Figure III-3.

Time

The total test duration is 30 days. A 10% margin has been applied to all of the dwell times as recommended in IEEE-323-74, and has been included in figures III-3 and III-4. In addition a 10% margin in the conservative direction has been applied to the rise times indicated on the test profiles (figures III-3 and III-4).

TEMPERATURE PROFILE

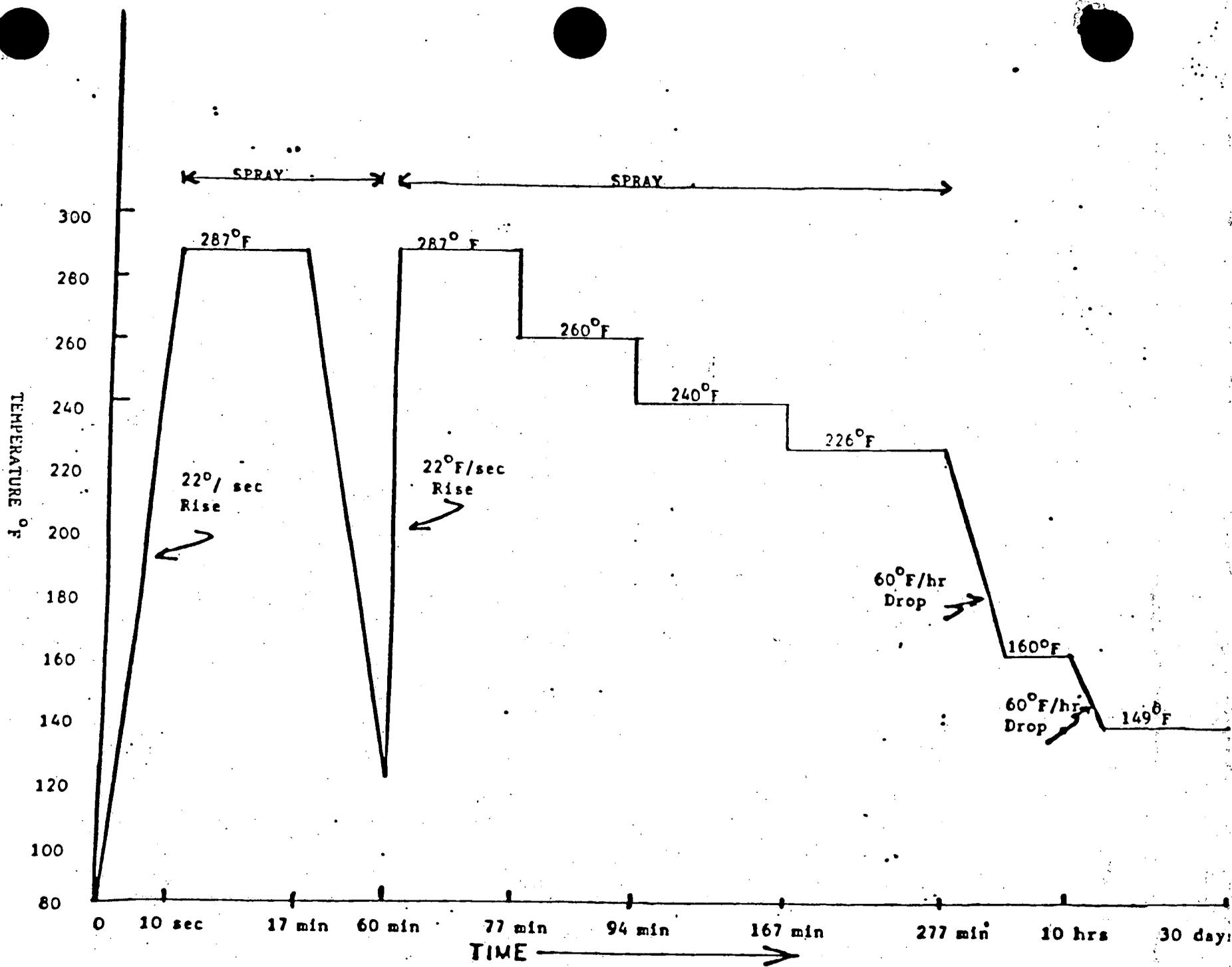


Figure III-3

PRESSURE PROFILE

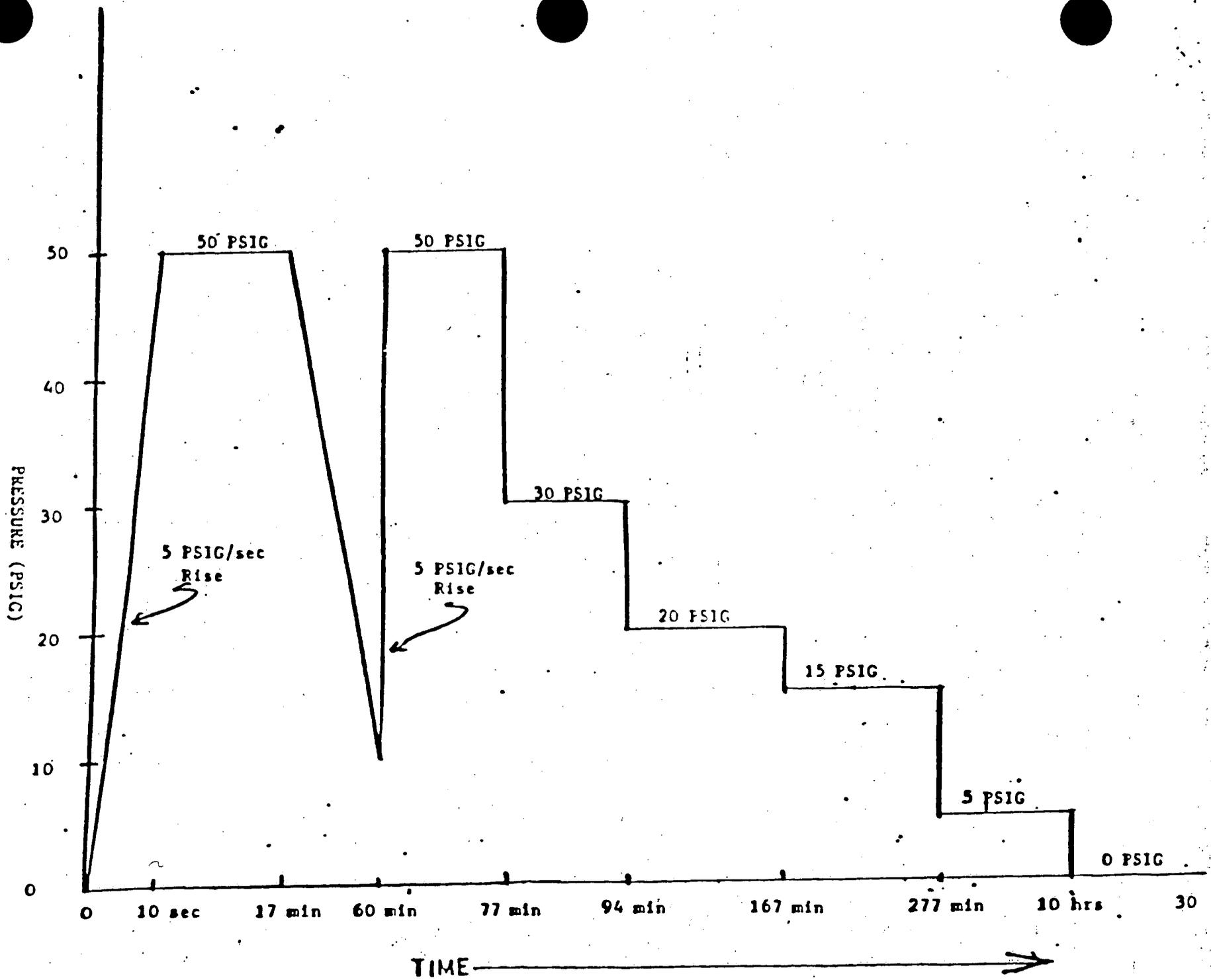


Figure III-4

b. Discussion of MSLB Inside Containment:

Specific analyses of a main steam line break (MSLB) inside of containment have not been performed for Indian Point Unit No. 3. Environmental qualification of electrical equipment has been based on the NRC position contained in paragraph 4.2 of the DOR Guidelines which states:

"4.2 Service conditions for a PWR Main Steam Line Break (MSLB) Inside Containment

Equipment required to function in a steam line break environment must be qualified for the high temperature and pressure that could result. In some cases the environmental stress on exposed equipment may be higher than that resulting from a LOCA, in others it may be no more severe than for a LOCA due to the automatic operation of a containment spray system.

1. Temperature and Pressure Steam Conditions - Equipment qualified for a LOCA environment is considered qualified for a MSLB accident environment in plants with automatic spray systems not subject to disabling single component failures. This position is based on the "Best Estimate" calculation of a typical plant peak temperature and pressure and a thermal analysis of typical components inside containment.¹ The final acceptability of this approach, i.e., use of the "Best Estimate", is pending completion of Task Action Plan A-21, Main Steamline Break Inside Containment.

¹See NUREG-0458, Short Term Safety Assessment of the Environmental Qualification of Safety-Related Electrical Equipment of SEP Operating Reactors, for a more detailed discussion of the best estimate calculation."

In TER-C5257-456, FRC stated:

"Accident Conditions:

For PWR plants, the DOR Guidelines state that the environmental service conditions inside containment for the most severe LOCA be established by the Licensee based on the FSAR analysis. In addition, for plants equipped automatic containment spray systems not subject to single component failure or delayed initiation, the Guidelines state that equipment qualified for the most severe LOCA environment is also qualified for the postulated MSLB. The Design of the Indian Point No. 3 nuclear power plant satisfies these criteria. The environmental conditions resulting from a feedline break are less severe than those from a LOCA".

The NRC in SER dated December 30, 1982 concurred with the FRC conclusions.

In order to verify the conservatism of the LOCA profile for MSLB accident conditions, a comparison was made to calculations performed on a Westinghouse PWR plant of similar power rating and similar containment volume. The plant selected was North Anna Unit 2 which has a power rating of 890 MWe compared to the 965 MWe rating of Indian Point Unit No. 3. The North Anna Unit 2 profiles for MSLB are shown in figures III-5 and III-6. The following points are noted.

- The North Anna plant is a 3 loop design whereas the Indian Point Unit No. 3 plant is a 4 loop design. The Main steam lines and steam generator volume for Indian Point Unit No. 3 are 30% less than the North Anna Plant which would result in lower temperatures and pressures than shown on figures III-5 and III-6. The North Anna Containment Volume is slightly smaller than Indian Point Unit No. 3.
- The peak temperature shown on figures III-5 and III-6 are the result of stratification in the upper third of the containment.
- The North Anna temperature profile shown on figure III-5 exceeds the LOCA temperature for Indian Point Unit No. 3 by 140°F for less than 80 seconds. Transient heat transfer calculations are used to determine the temperature of equipment subjected to MSLB condition.

It has been concluded that if the temperature resulting from a main steam line break (MSLB) were to exceed the Indian Point Unit No. 3 design profile even in some local areas, this would be of no consequence due to the short duration and may therefore be ignored for qualification. This evaluation confirms the DOR Guidelines approach cited previously. Since the LOCA test profiles contained in Figures III-3 and III-4 are more severe than the effects of a conservative MSLB profile, the LOCA test envelopes the MSLB parameters.

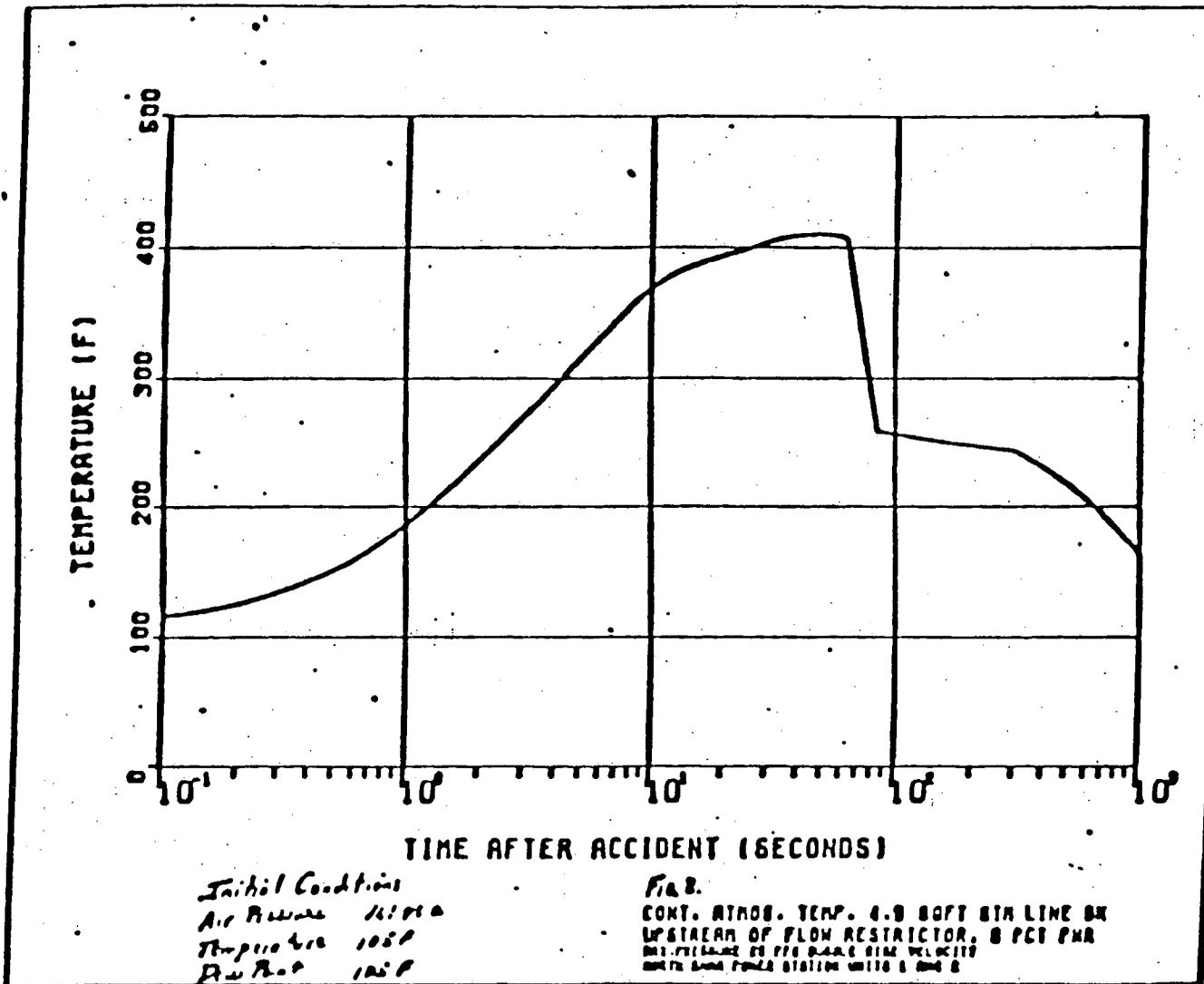


Figure III-5 North Anna Containment Temperature Transient (MSLB)

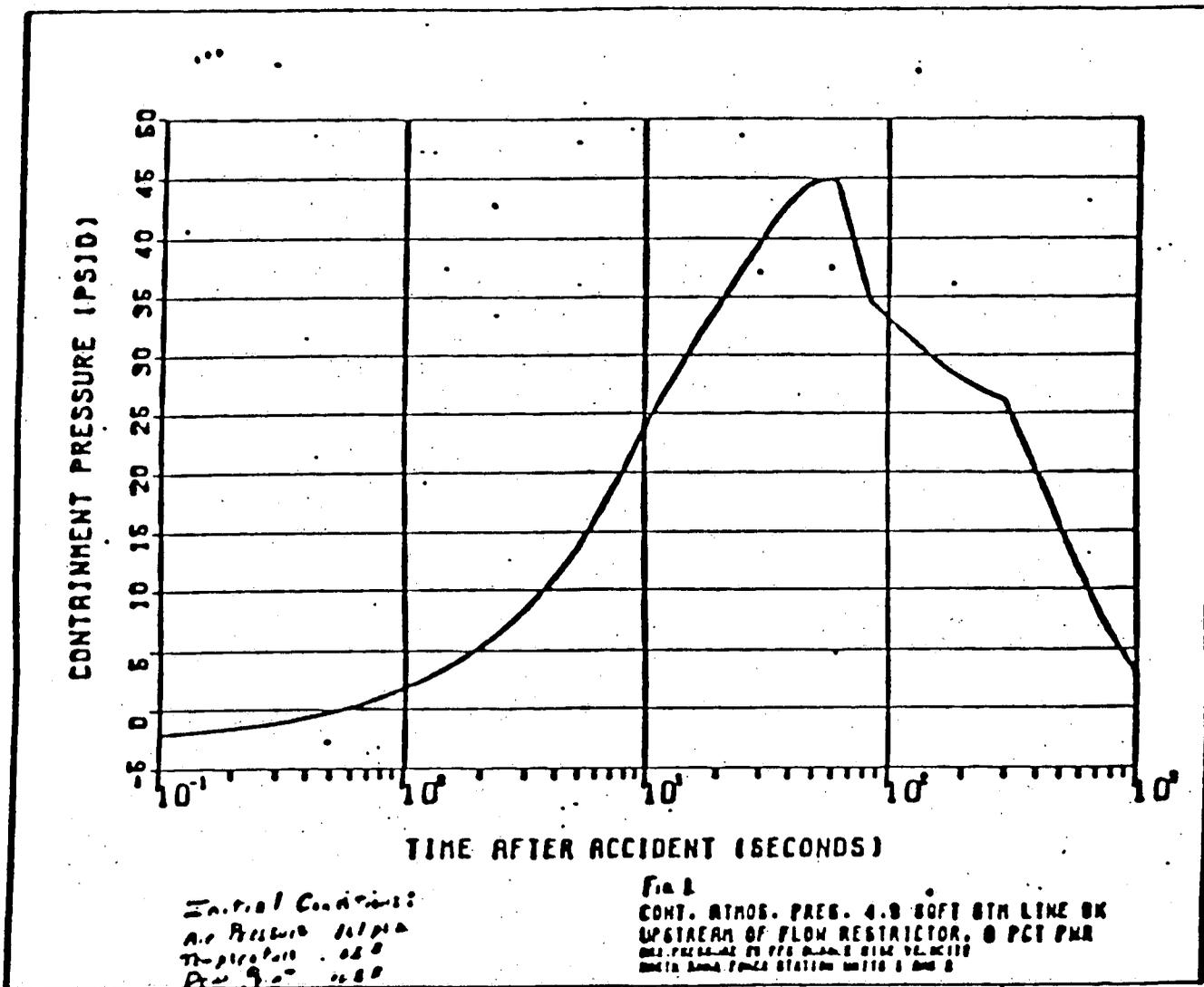


Figure III-6 North Anna Containment Pressure Transient (MSLB)

Radiation Service Conditions - In the August 24, 1981 submittal from NYPA to NRC the following information on radiation doses (40 year plus accident) was provided.

"The integrated beta and gamma radiation doses calculated at the center of the Indian Point Unit 3 containment building for periods of 30 days and 1 year following a design basis LOCA are summarized as follows:

	<u>Gamma Dose</u> (rd)	<u>Beta Dose</u> (rd)
30 days	1.8×10^7	1.4×10^8
1 year	3.0×10^7	2.0×10^8

This data is based on the dose information documented in NUREG-0588 Appendix D and the DOR Guidelines Appendix B. A conservative 30-day gamma dose was derived by use of the nomograms given in the DOR Guidelines. This method was used by assuming a containment volume of 2.6×10^6 ft³ and a reactor power rating of 3025 MW for Indian Point Unit 3. The 30-day beta dose was obtained from the information given in Appendix D of NUREG-0588.

The 1-year beta and gamma doses were predicted by extrapolating the 30-day doses to one year. In order to perform this extrapolation, the information tabulated in Table D-5 and Table D-6 of NUREG-0588 was plotted in order to establish the shape of the curves representing beta and gamma doses with respect to time. These curves were then conservatively extrapolated to 1 year. The shape of the individual curves were then used to extrapolate the plant-specific 30-day doses for beta and gamma radiation to 1 year.

A factor of 2.7 reduction in total gamma dose may be used for equipment outside the crane wall."

The information noted above was reviewed by both the Franklin Research Center (FRC) and the NRC staff. FRC in TER-C5257-456 and NRC in SER dated December 30, 1982 concluded that the radiation values used for evaluation of equipment installed at Indian Point Unit No. 3 were satisfactory and met the requirements of the DOR Guidelines. The radiation dose information cited above was used for evaluation of test parameters.

It is noted that the radiation dose data transmitted to NRC in the August 24, 1981 submittal is very conservative and based on extrapolation of the data provided in NUREG-0588 Appendix D. Since the issuance of NUREG-0588, NRC has performed additional analyses which are contained in Appendix D to Regulatory Guide 1.89, Revision 1. An evaluation of the Indian Point Unit No. 3 radiation doses based on the information contained in Regulatory Guide 1.89 Revision 1 confirms the conservatism of the previous Qualification Test Radiation Parameters.

Table 7-1

SUMMARY TABLE OF ESTIMATES FOR TOTAL AIRBORNE GAMMA DOSE
CONTRIBUTORS IN CONTAINMENT TO A POINT IN THE CONTAINMENT CENTER
INDIAN POINT UNIT NUMBER 3

Time (Hr)	Airborne Iodine Dose (R)	Airborne Noble Gas Dose (R)	Plateout Iodine Dose (R)	Total Dose (R)
0.00	-	-	-	-
0.03	3.55E+4	4.92E+4	1.24E+3	9.10E+4
0.06	6.3E+4	1.02E+5	2.93E+3	1.69E+5
0.09	8.03E+4	1.46E+5	5.32E+3	2.31E+5
0.12	9.22E+4	1.84E+5	8.11E+3	2.85E+5
0.15	1.02E+5	2.21E+5	1.12E+4	3.34E+5
0.18	1.08E+5	2.56E+5	1.45E+4	3.79E+5
0.21	1.14E+5	2.88E+5	1.27E+4	4.21E+5
0.25	1.20E+5	3.31E+5	2.24E+4	4.73E+5
0.38	1.37E+5	4.56E+5	3.72E+4	6.32E+5
0.50	1.49E+5	5.61E+5	5.09E+4	7.60E+5
0.75	1.74E+5	7.60E+5	7.82E+4	1.01E+6
1.00	1.96E+5	8.28E+5	1.03E+5	1.23E+6
2.00	2.66E+5	1.50E+6	1.92E+5	1.96E+6
5.00	4.06E+5	2.62E+6	3.98E+5	3.43E+6
8.00	4.89E+5	3.22E+6	5.51E+5	4.26E+6
24.0	7.44E+5	4.62E+6	1.07E+6	6.43E+6
60.0	9.66E+5	5.27E+6	1.55E+6	7.82E+6
96.0	1.07E+6	5.57E+6	1.76E+6	8.41E+6
192.	1.24E+6	6.12E+6	2.10E+6	9.44E+6
298.	1.36E+6	6.46E+6	2.35E+6	1.01E+7
394.	1.43E+6	6.50E+6	2.51E+6	1.04E+7
560.	1.52E+6	6.67E+6	2.68E+6	1.09E+7
720.	1.57E+6	6.74E+6	2.77E+6	1.11E+7
888.	1.59E+6	6.77E+6	2.82E+6	1.12E+7
1060	1.60E+6	6.77E+6	2.85E+6	1.13E+7
1220	1.61E+6	6.78E+6	2.86E+6	1.13E+7
1390	1.62E+6	6.79E+6	2.87E+6	1.13E+7
1560	1.62E+6	6.80E+6	2.88E+6	1.13E+7
1730	1.62E+6	6.80E+6	2.88E+6	1.13E+7
1900	1.62E+6	6.80E+6	2.89E+6	1.13E+7
2060	1.62E+6	6.80E+6	2.89E+6	1.13E+7
2230	1.62E+6	6.80E+6	2.89E+6	1.13E+7
2950	1.62E+6	6.81E+6	2.89E+6	1.13E+7
3670	1.62E+6	6.82E+6	2.89E+6	1.14E+7
4390	1.62E+6	6.82E+6	2.89E+6	1.14E+7
5110	1.62E+6	6.82E+6	2.89E+6	1.14E+7
5830	1.62E+6	6.82E+6	2.89E+6	1.14E+7
6550	1.62E+6	6.82E+6	2.89E+6	1.14E+7
7270	1.62E+6	6.82E+6	2.89E+6	1.14E+7
8000	1.62E+6	6.82E+6	2.89E+6	1.14E+7
8710	1.62E+6	6.82E+6	2.89E+6	1.14E+7
				Total 1.14E+7

Table 7-2

SUMMARY TABLE OF ESTIMATES FOR TOTAL AIRBORNE BETA DOSE
CONTRIBUTORS IN CONTAINMENT TO A POINT IN THE CONTAINMENT CENTER
INDIAN POINT UNIT NUMBER 3

Time (Hr)	Airborne Iodine Dose (rads)*	Airborne Noble Gas Dose (rads)*	Total Dose (rads)*
0.00	-		
0.03	1.68E+5	4.03E+5	5.12E+5
0.06	1.93E+5	7.27E+5	9.22E+5
0.09	2.45E+5	9.95E+5	1.24E+6
0.12	2.82E+5	1.20E+6	1.49E+6
0.15	3.09E+5	1.40E+6	1.69E+6
0.18	3.31E+5	1.58E+6	1.91E+6
0.21	2.48E+5	1.73E+6	2.07E+6
0.25	3.68E+5	1.92E+6	2.28E+6
0.38	4.18E+5	2.43E+6	2.85E+6
0.50	4.54E+5	2.84E+6	3.30E+6
0.75	5.25E+5	3.61E+6	4.12E+6
1.00	5.90E+5	4.29E+6	4.87E+6
2.00	7.89E+5	6.65E+6	7.45E+6
5.00	1.16E+6	1.22E+7	1.13E+7
8.00	1.38E+6	1.62E+7	1.75E+7
24.0	3.72E+6	3.00E+7	3.22E+7
60.0	2.86E+6	4.54E+7	4.82E+7
96.0	3.22E+6	5.51E+7	5.84E+7
192.	3.78E+6	7.38E+7	7.74E+7
298.	4.15E+6	8.63E+7	9.07E+7
394.	4.42E+6	9.22E+7	9.66E+7
560.	4.67E+6	9.88E+7	1.03E+8
720.	4.81E+6	1.02E+8	1.07E+8
888.	4.89E+6	1.05E+8	1.09E+8
1060	4.93E+6	1.06E+8	1.10E+8
1220	4.96E+6	1.07E+8	1.12E+8
1390	4.98E+6	1.08E+8	1.13E+8
1560	4.98E+6	1.09E+8	1.15E+8
1730	4.98E+6	1.12E+8	1.16E+8
1900	4.98E+6	1.12E+8	1.17E+8
2060	4.98E+6	1.13E+8	1.18E+8
2230	4.99E+6	1.14E+8	1.19E+8
2950	4.99E+6	1.19E+8	1.24E+8
3670	4.99E+6	1.24E+8	1.29E+8
4390	4.99E+6	1.29E+8	1.35E+8
5110	4.99E+6	1.35E+8	1.39E+8
5830	4.99E+6	1.39E+8	1.45E+8
6550	4.99E+6	1.43E+8	1.49E+8
7270	4.99E+6	1.49E+8	1.54E+8
8000	4.99E+6	1.53E+8	1.59E+8
8710	4.99E+6	1.59E+8	1.64E+8
			Total 1.64E+8

Enclosure 4 to IPN - 84 - 63

STEAMLINE BREAK ANALYSES

New York Power Authority
Indian Point 3 Nuclear Power Plant
Docket No. 50-286