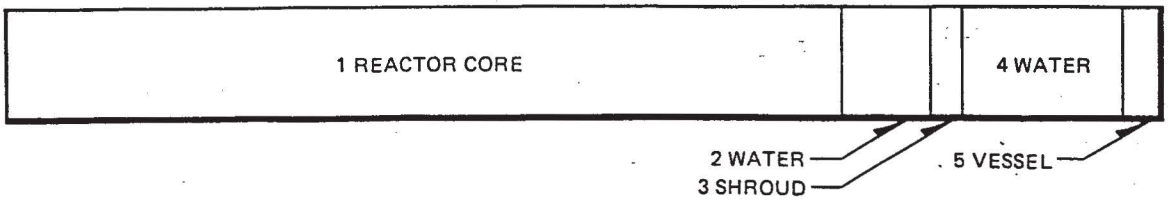


MATERIAL		RADIUS INCHES	MATERIAL	MATERIAL DENSITY
NO.	NAME			
			WATER	0.274 g/cm^3
			UO_2	2.642 g/cm^3
1	REACTOR CORE	93.56	ZIRCONIUM	0.896 g/cm^3
2	WATER	101.4	WATER	0.74 g/cm^3
3	SHROUD	103.4	304L STAINLESS STEEL	FROM ASME SA 240
4	WATER	125.5	WATER	0.74 g/cm^3
5	VESSEL	131.68	CARBON STEEL	FROM ASME 533
6	AIR		AIR	1.3 x 10^{-3} g/cc

FIG. 4.3-1

MODEL FOR ORIGINAL ONE DIMENSIONAL TRANSPORT ANALYSIS OF VESSEL FLUENCE

NINE MILE POINT
NUCLEAR STATION-UNIT 2
SCRIBA, NY
UPDATED SAFETY ANALYSIS REPORT

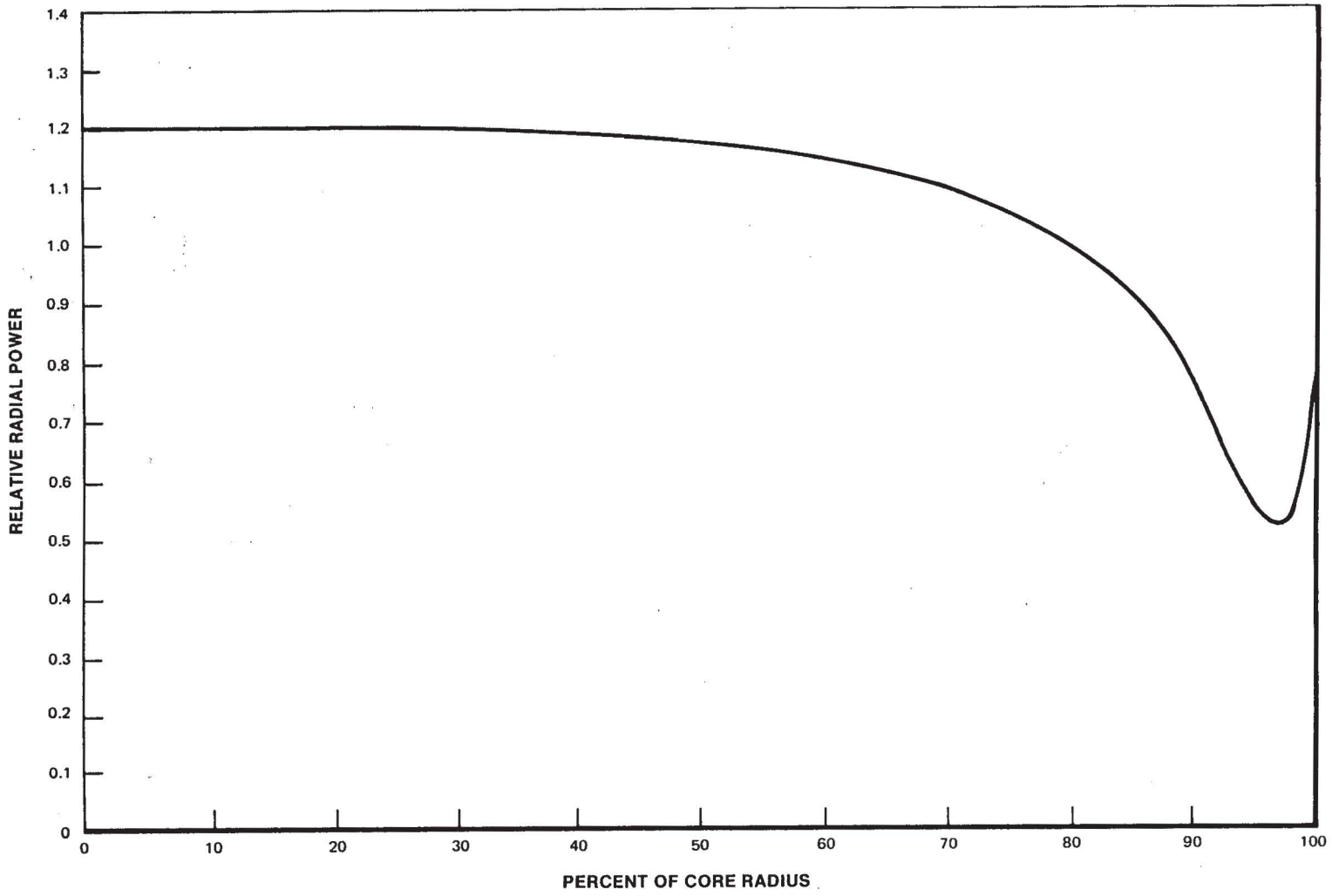


FIG. 4.3-2

RADIAL POWER DISTRIBUTIONS USED IN THE ORIGINAL VESSEL FLUENCE CALC.

NINE MILE POINT
NUCLEAR STATION-UNIT 2
SCRIBA, NY
UPDATED SAFETY ANALYSIS REPORT

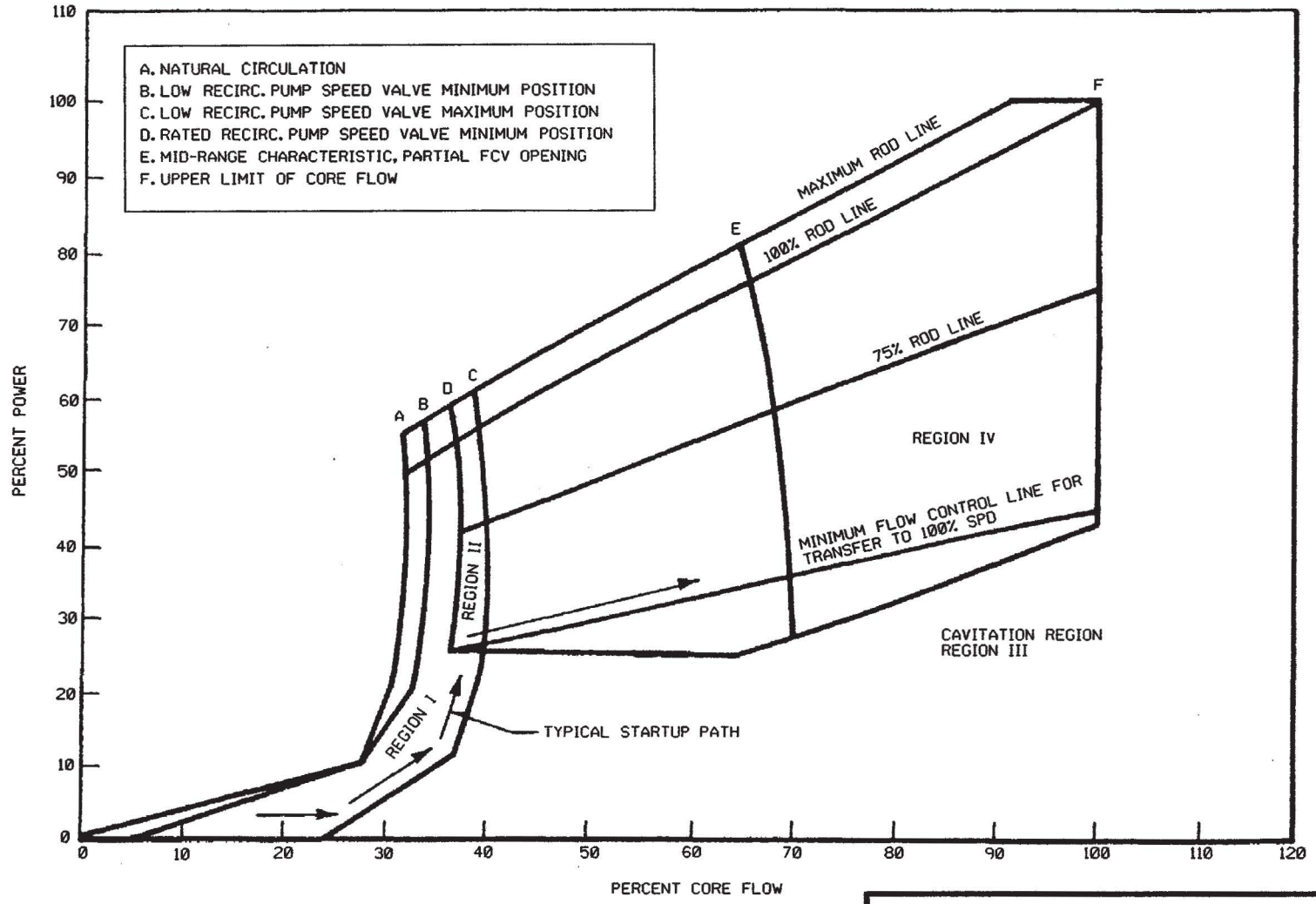


FIGURE 4.4-1

TYPICAL POWER-FLOW OPERATING MAP

THIS DRAWING CREATED ELECTRONICALLY

NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT-UNIT 2
UPDATED SAFETY ANALYSIS REPORT

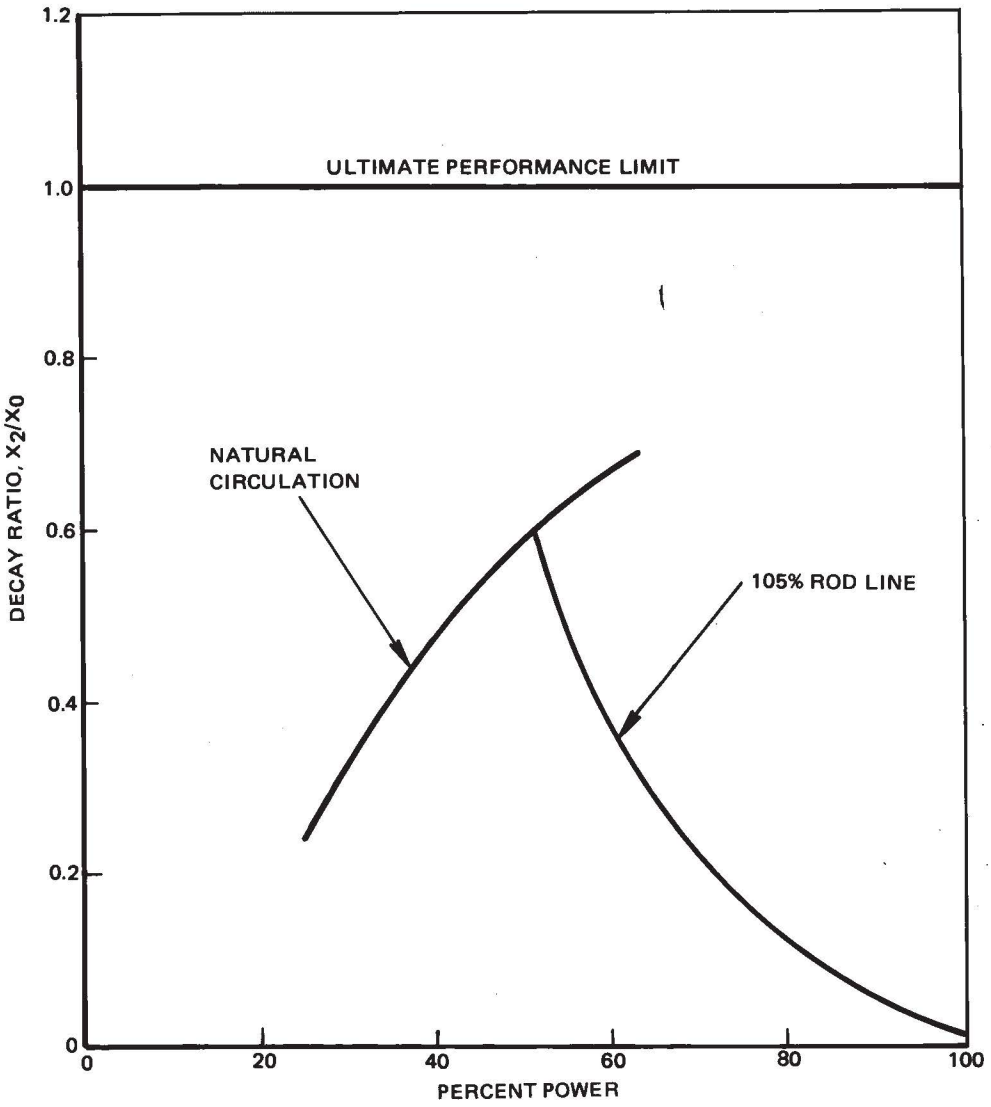
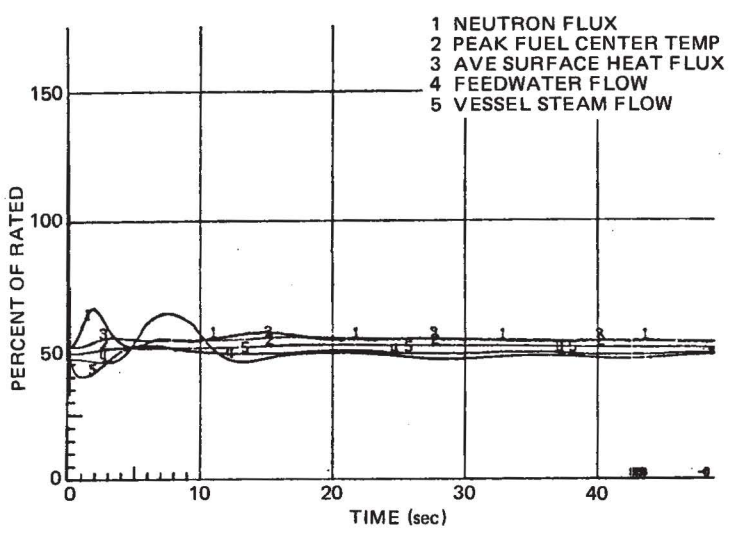
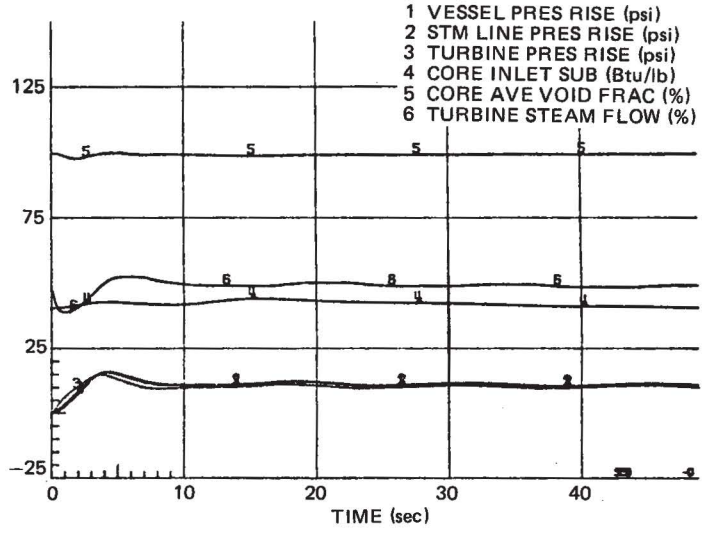


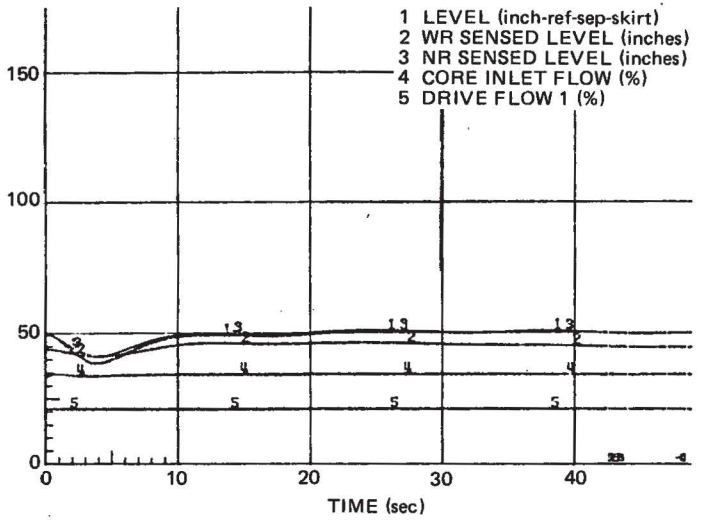
FIGURE 4.4-2

TOTAL CORE STABILITY
(CYCLE 1)

NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT-UNIT 2
FINAL SAFETY ANALYSIS REPORT







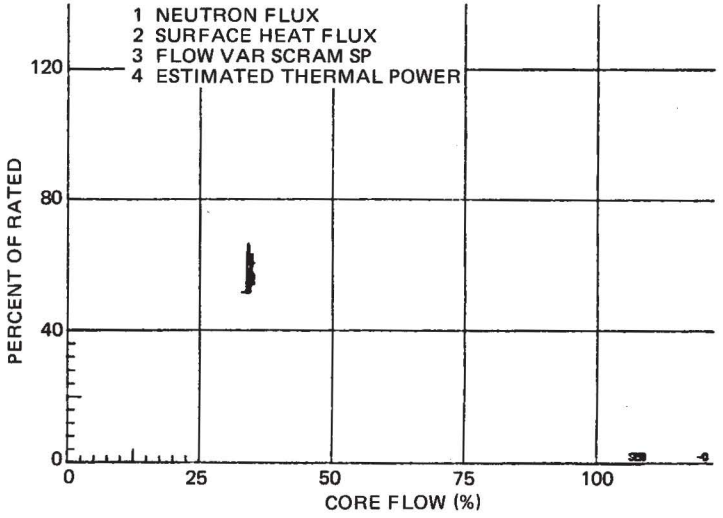
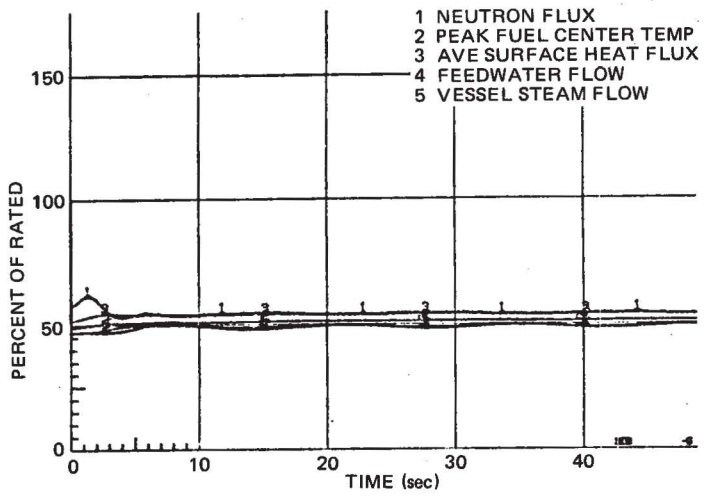
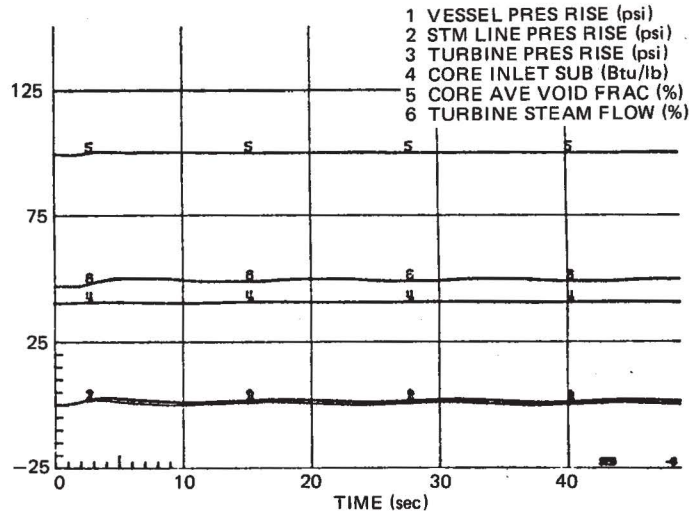


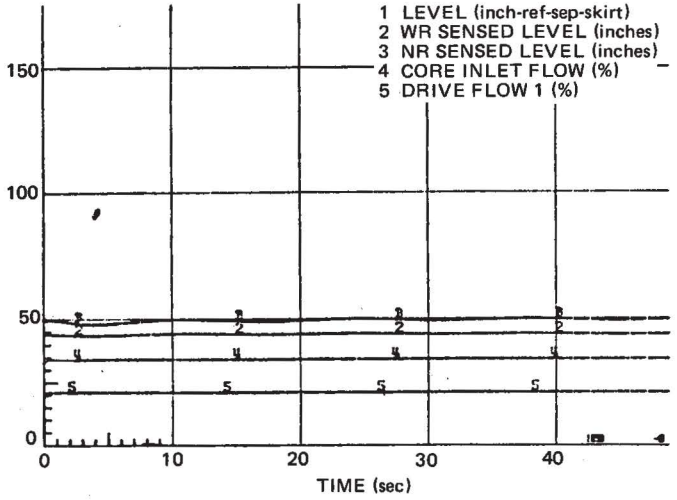
FIGURE 4.4-3

10 PSI PRESSURE REGULATOR
SET POINT STEP AT 51.5% RATED POWER
(NATURAL CIRCULATION)

NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT-UNIT 2
FINAL SAFETY ANALYSIS REPORT







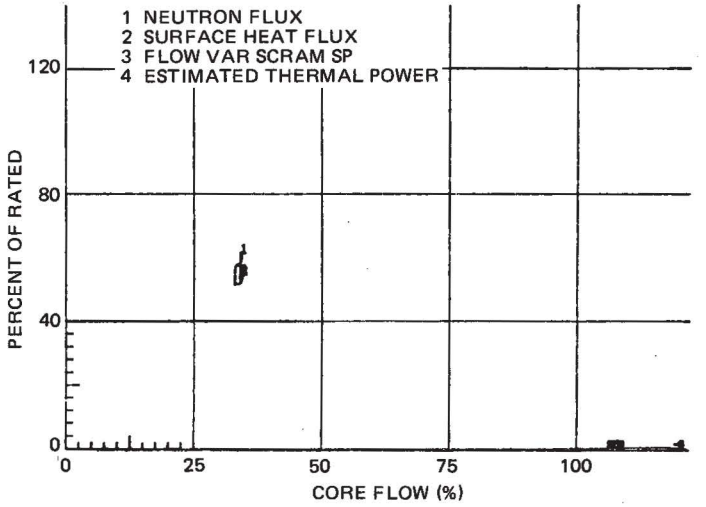
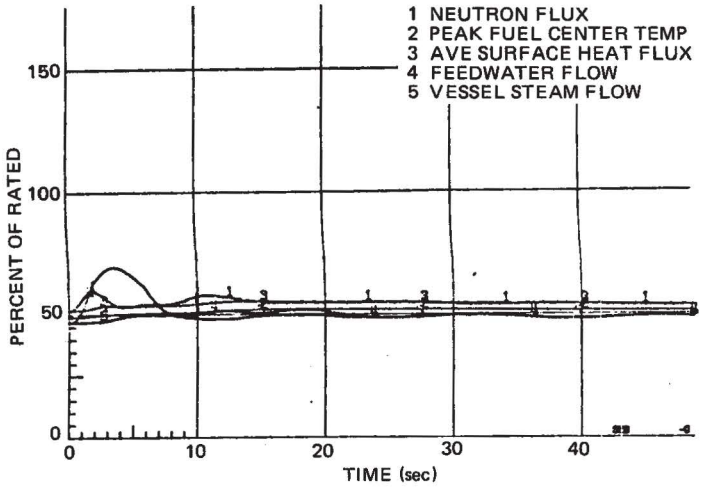
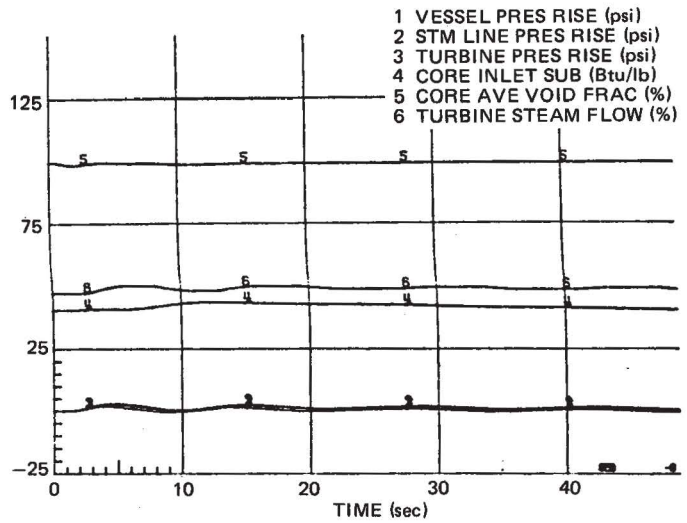


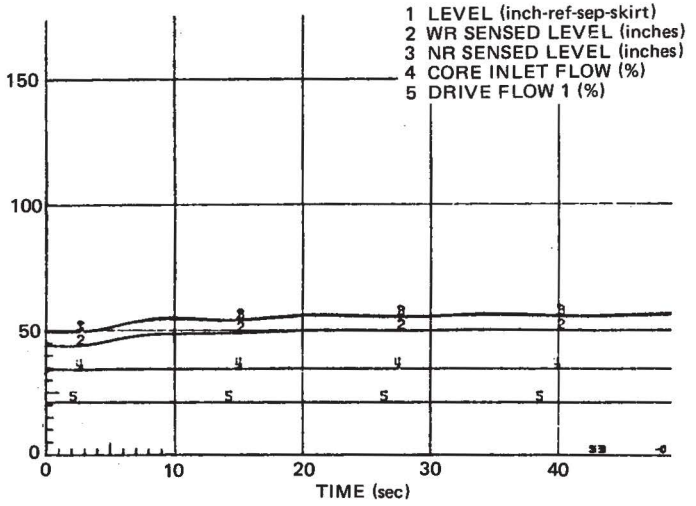
FIGURE 4.4-4

10 CENT ROD REACTIVITY STEP
AT 51.5% RATED POWER
(NATURAL CIRCULATION)

NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT-UNIT 2
FINAL SAFETY ANALYSIS REPORT







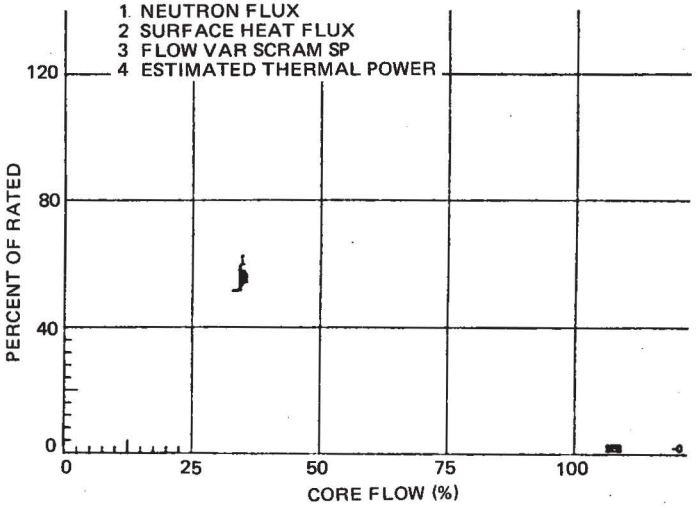


FIGURE 4.4-5

6-INCH WATER LEVEL SET POINT STEP
AT 51.5% RATED POWER
(NATURAL CIRCULATION)

NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT-UNIT 2
FINAL SAFETY ANALYSIS REPORT

(THIS FIGURE HAS BEEN DELETED)

FIGURE 4.4-6

LOOSE PARTS DETECTION SYSTEM
SCHEMATIC DIAGRAM

NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT-UNIT 2
FINAL SAFETY ANALYSIS REPORT

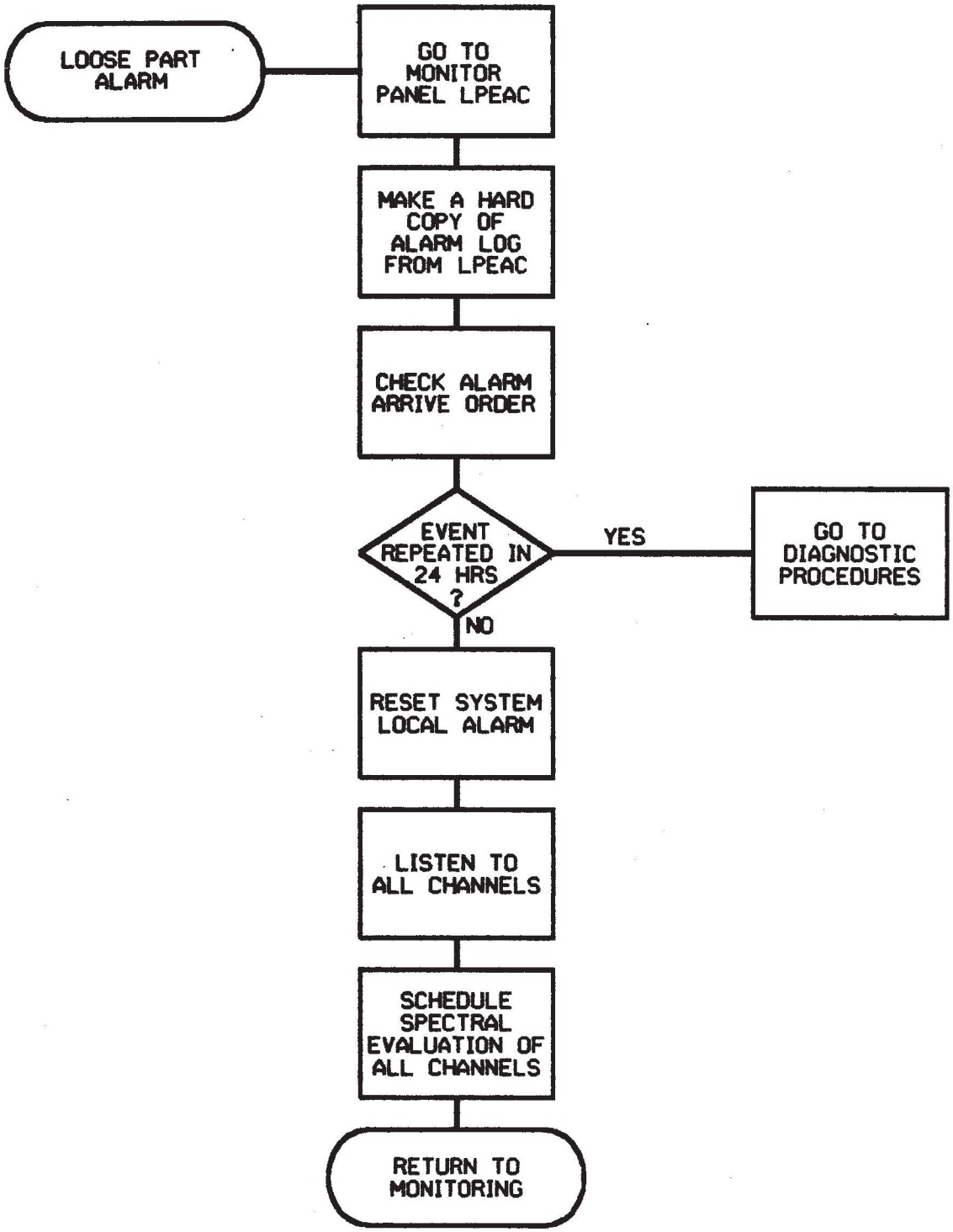


FIGURE 4.4-7

LOOSE PART ALARM LOGIC

NIAGARA MOHAWK POWER CORP.
NINE MILE POINT-UNIT 2
UPDATED SAFETY ANALYSIS REPORT

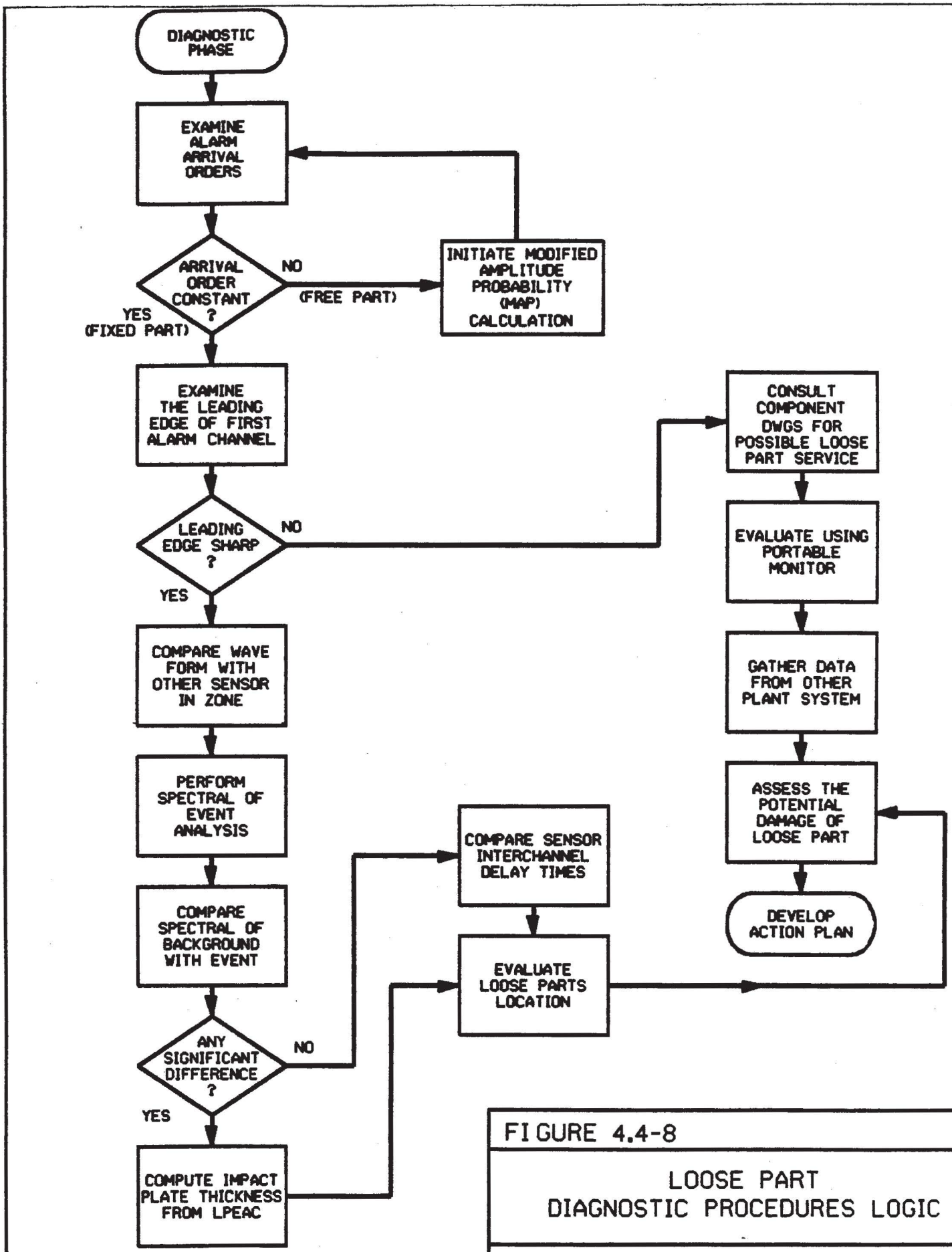


FIGURE 4.4-8

LOOSE PART
DIAGNOSTIC PROCEDURES LOGIC

NIAGARA MOHAWK POWER CORP.
NINE MILE POINT-UNIT 2
UPDATED SAFETY ANALYSIS REPORT

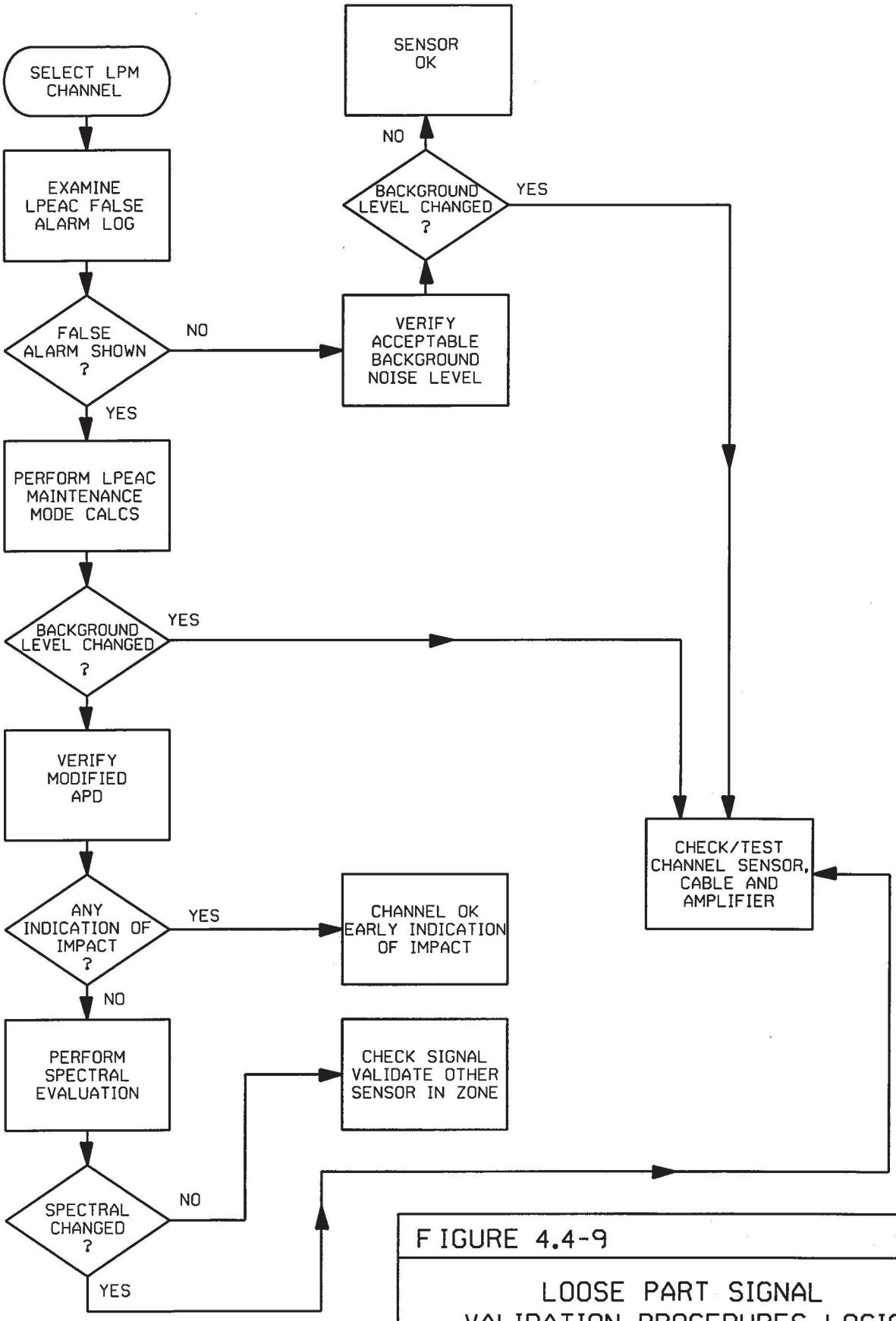
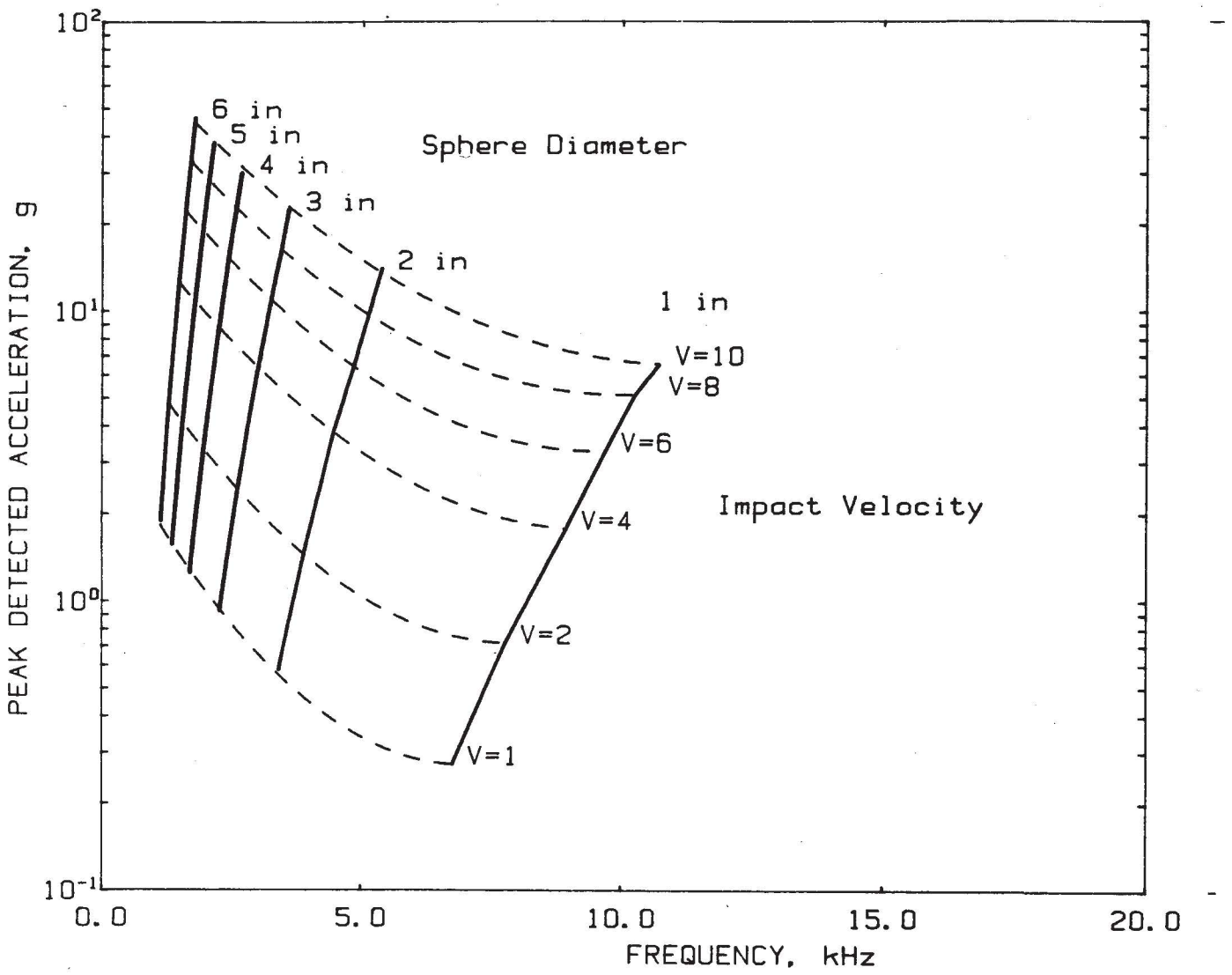


FIGURE 4.4-9

LOOSE PART SIGNAL VALIDATION PROCEDURES LOGIC

NIAGARA MOHAWK POWER CORP.
NINE MILE POINT-UNIT 2
UPDATED SAFETY ANALYSIS REPORT



NOTE: THIS MAP FURNISHED BY EPRI.

FIGURE 4.4-10

TYPICAL METAL SPHERE IMPACT MAP AT THREE FEET FROM SENSOR

NIAGARA MOHAWK POWER CORP.
NINE MILE POINT-UNIT 2
UPDATED SAFETY ANALYSIS REPORT

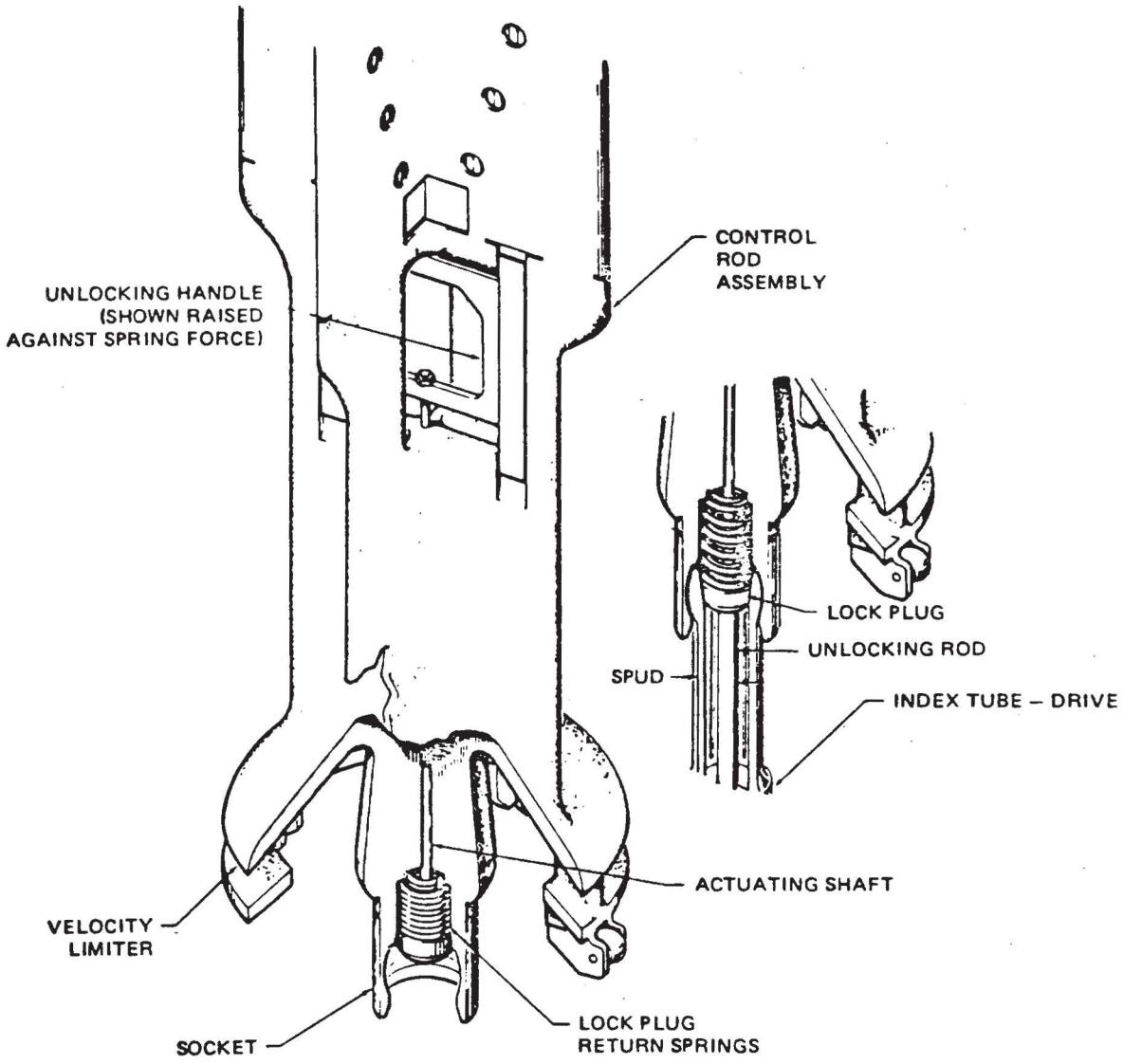


FIGURE 4.6-1

CONTROL ROD TO CONTROL ROD DRIVE COUPLING

NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT-UNIT 2
FINAL SAFETY ANALYSIS REPORT

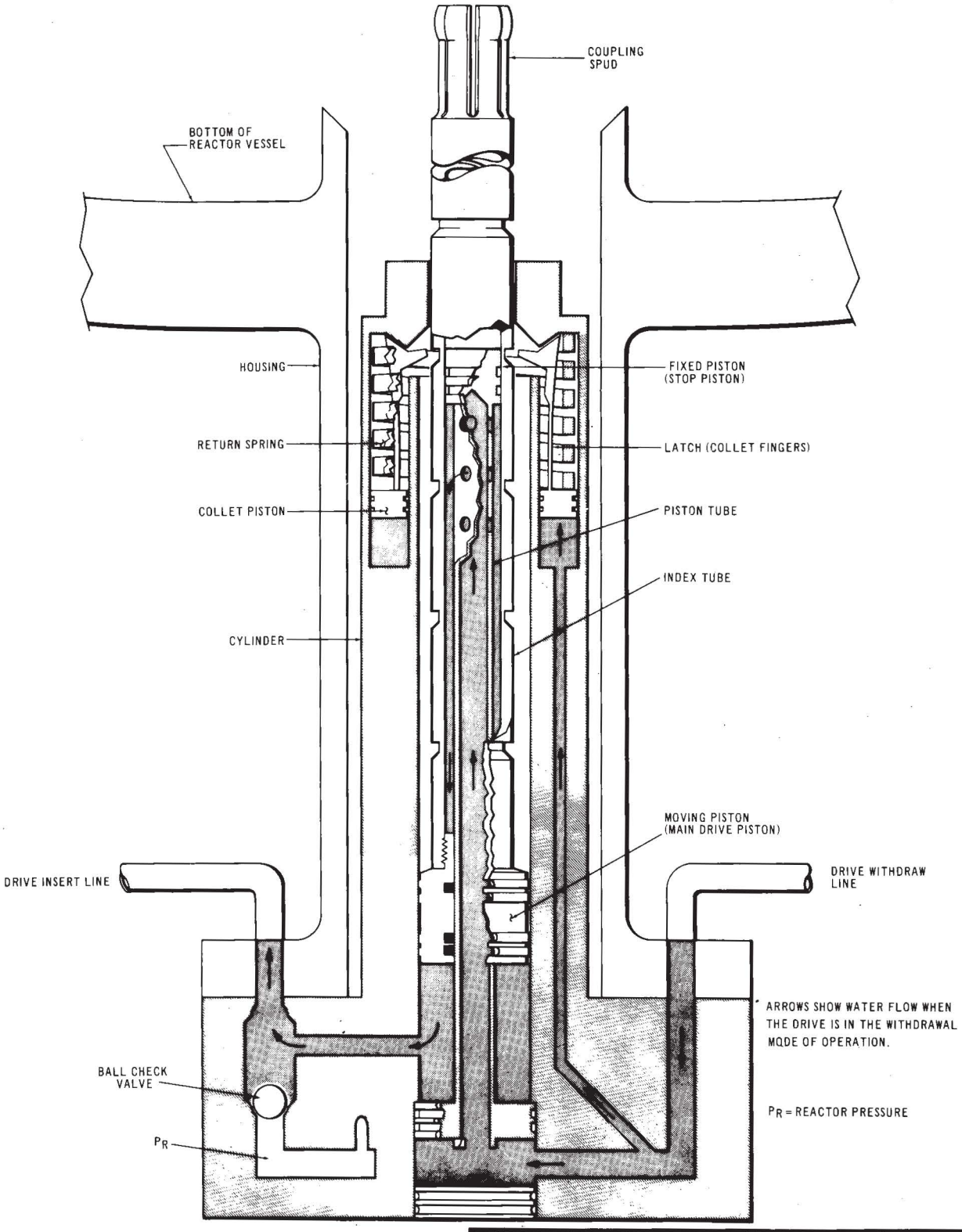


FIGURE 4.6-2

CONTROL ROD DRIVE UNIT

NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT-UNIT 2
FINAL SAFETY ANALYSIS REPORT

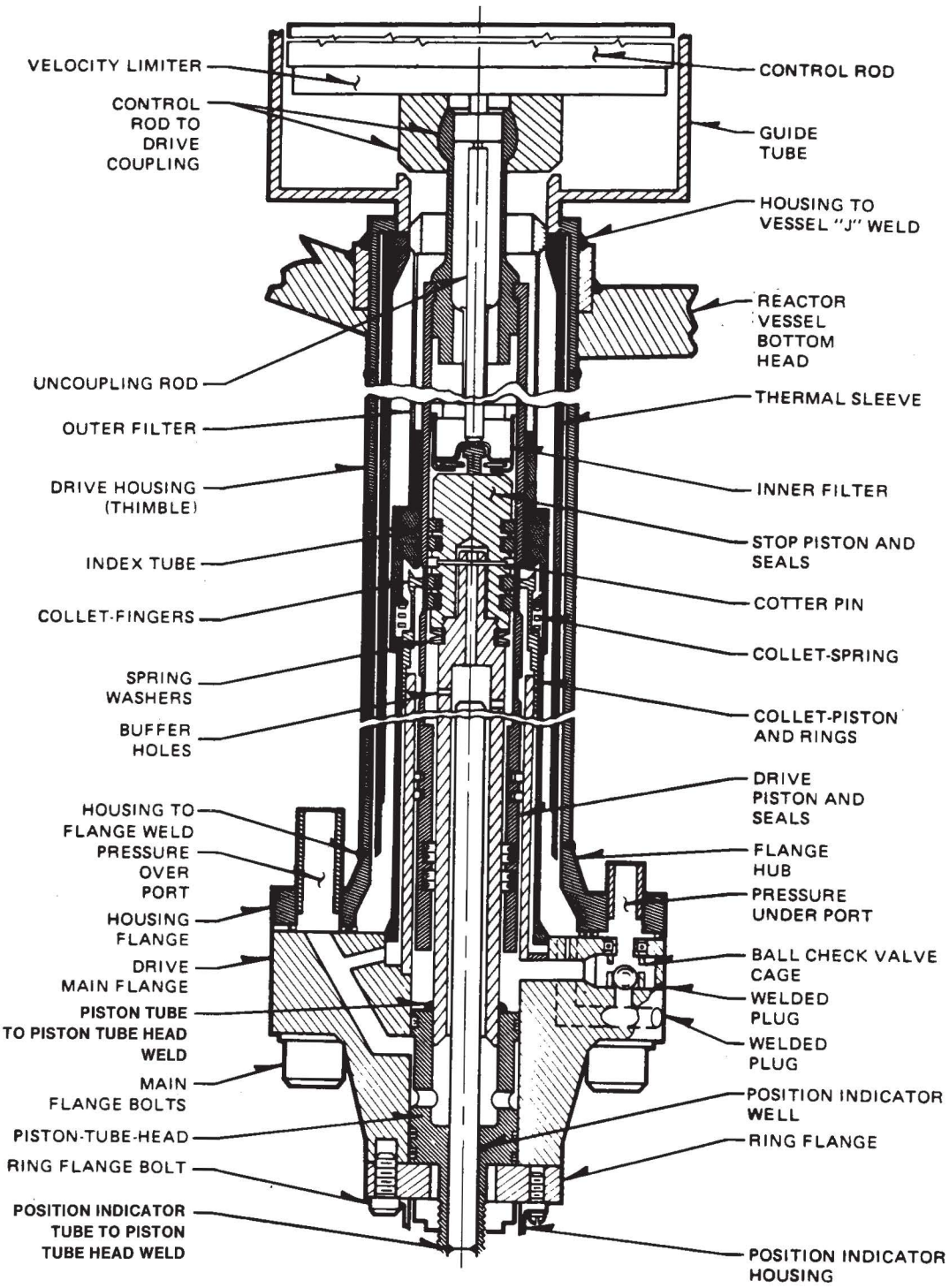


FIGURE 4.6-3

CONTROL ROD DRIVE SCHEMATIC

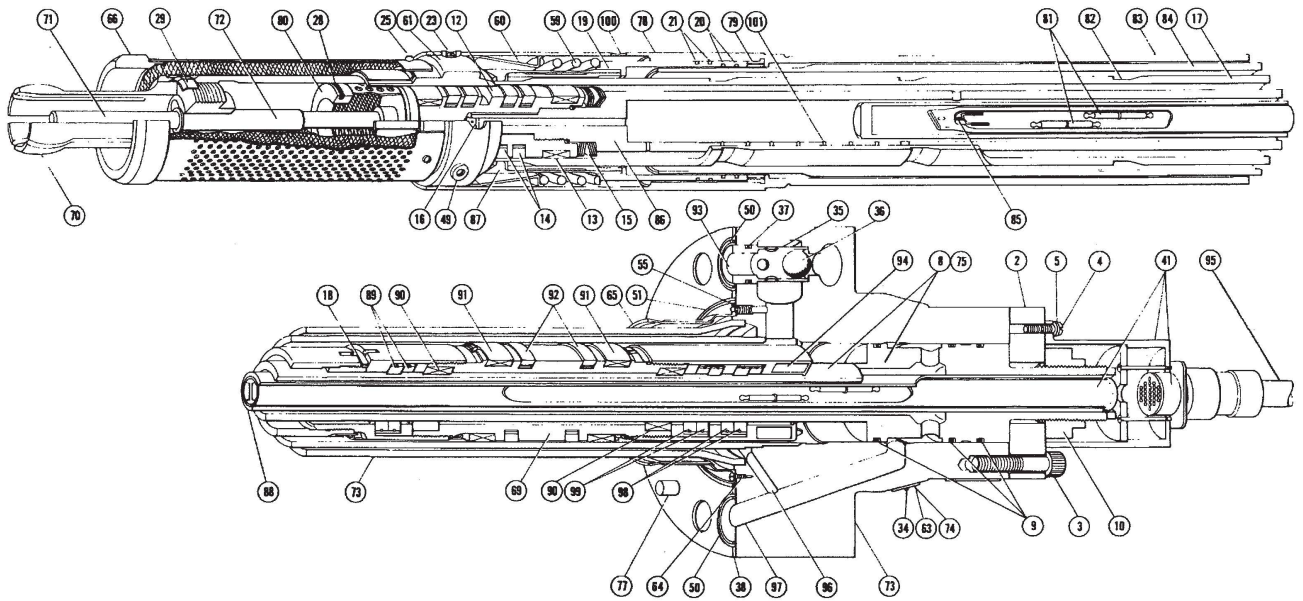
NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT-UNIT 2
FINAL SAFETY ANALYSIS REPORT

BWR 5

2	RING FLANGE
3	SOCKET HEAD CAP SCREW (RING FLANGE MOUNTING)
4	FILLISTER HEAD SCREW (POSITION INDICATOR PROBE MOUNTING)
5	LOCKWASHER (FOR PART 4)
8, 75	PISTON TUBE
9	O-RING (PISTON TUBE)
10	NUT (PISTON TUBE)
12	STOP PISTON
13	SPLIT BUSHING (STOP PISTON)
14	SEAL RING (STOP PISTON)
15	SPRING WASHERS
16	COTTER PIN (STOP PISTON)
17	INDEX TUBE
18	BAND
19	COLLET AND PISTON
20	SEAL RING (COLLET PISTON – INTERNAL)
21	SEAL RING (COLLET PISTON – EXTERNAL)
23	FILLISTER HEAD SCREW (GUIDE CAP PLUG MOUNTING)
25	DRILLED FILISTER HEAD SCREW (OUTER FILTER MOUNTING)
28	SEAL RING (INNER FILTER)
29	BAND
34	DRIVE SCREW (NAMEPLATE MOUNTING)
35	BALL RETAINER
36	BALL (CHECK VALVE)
37	O-RING (BALL RETAINER)
38	O-RING SPACER
41	POSITION INDICATOR PROBE SEE NOTE 2
49	PLUG (GUIDE CAP)
50	O-RING (INSERT AND WITHDRAW PORTS)
51	O-RING (CRD FLANGE FACE)
55	SET SCREW PLUG (COOLING WATER ORIFICE)
57	SCREW (O-RING SPACER MOUNTING) (NOT SHOWN)
59	COLLET SPRING
60	BARREL
61	GUIDE CAP
63, 74	NAMEPLATE
64	FLAT HEAD SCREW (STRAINER MOUNTING)
65	STRAINER
66	OUTER FILTER
69	DRIVE PISTON
70	SPUD
71	ROD (UNCOUPLING) SEE NOTE 1
72	TUBE
73	CYLINDER, TUBE, AND FLANGE
77	DOWEL (ALIGNMENT) PIN
78	COLLET HOUSING (PORTION OF OUTER TUBE)
79	SPACER (PART OF CYLINDER, TUBE, AND FLANGE)
80	INNER FILTER
81	POSITION INDICATOR SWITCHES
82	INDEX TUBE NOTCH
83	OUTER TUBE (PART OF CYLINDER, TUBE, AND FLANGE)
84	INNER CYLINDER (PART OF CYLINDER, TUBE, AND FLANGE)
85	THERMOCOUPLE (PART OF POSITION INDICATOR PROBE)
86	STUD (PORTION OF PISTON TUBE)
87	COLLET FINGER (PART OF COLLET AND PISTON)
88	INDICATOR TUBE (PART OF PISTON TUBE)
89	INNER SEALS (DRIVE PISTON – BUFFER SEALS)
90	INTERNAL BUSHING (DRIVE PISTON)
91	EXTERNAL BUSHING (DRIVE PISTON)
92	OUTER SEALS (DRIVE PISTON)
93	INSERT PORT (INSERT AND SCRAM INLET/WITHDRAW OUTLET)
94	RING MAGNET (PART OF DRIVE PISTON)
95	CABLE (POSITION INDICATOR)
96	PORT TO COLLET PISTON (WITHDRAW PRESSURE TO COLLET PISTON)
97	WITHDRAW PORT (WITHDRAW INLET/INSERT OUTLET AND SCRAM DISCHARGE)
98	INNER SEALS (DRIVE PISTON – DRIVE-DOWN SEALS)
99	INNER SEALS (DRIVE PISTON – DRIVE-UP SEALS)
100	WATER PORTS IN COLLET HOUSING
101	BUFFER ORIFICES IN PISTON TUBE (TYPICAL)

DWG. 761E387 |

DWG. 761E387 |



NOTES:

1. FOR MODEL 7RDB144E ITEMS 71 AND 72 ARE MADE OF A SINGLE PIECE.
2. THE POSITION INDICATOR PROBE (ITEM 41) IS SUPPLIED SEPARATELY FOR MODEL 7RDB144E.
3. MODEL 7RDB144FG007 IS AN ACCEPTABLE REPLACEMENT FOR BWR/2-5 MODELS.

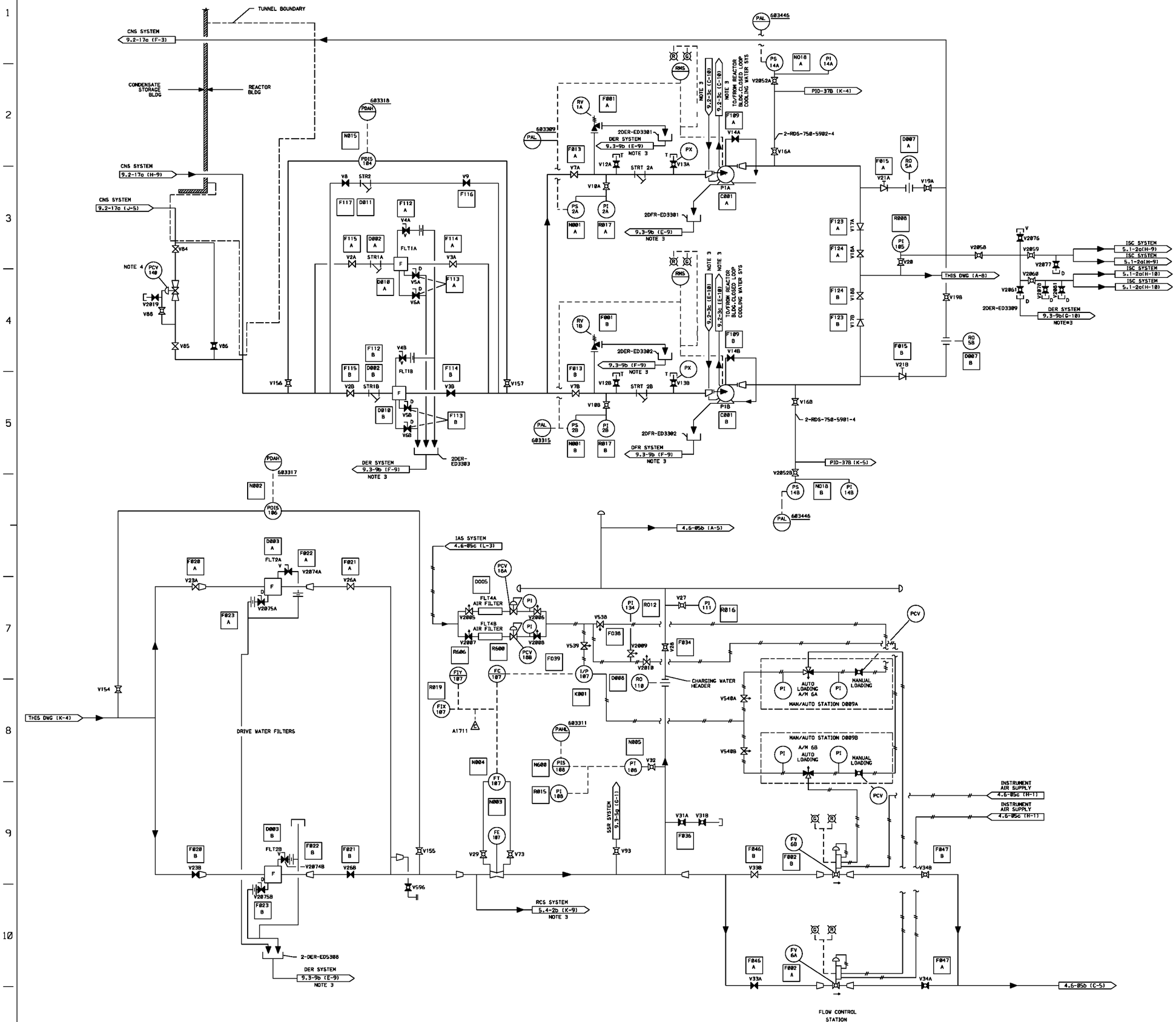
THIS DRAWING WAS PRODUCED ELECTRONICALLY. DO NOT MAKE ANY CHANGES MANUALLY.

FIGURE 4.6-4

MODEL 7RDB144C OR E CONTROL ROD DRIVE (CUTAWAY)

NINE MILE POINT
NUCLEAR STATION - UNIT 2
SCRIBA, N.Y.

UPDATED SAFETY ANALYSIS REPORT



NOTES,

1. ALL S&W INSTRUMENT AND EQUIPMENT NUMBERS TO BE PREFIXED WITH "2RDS-" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN.
2. GE-NESD IDENTIFICATION NUMBERS ARE SHOWN IN SQUARES (TO BE PREFIXED WITH C12).
3. NO FLAG SHOWN ON CORRESPONDING DOCUMENT. COORDINATES PROVIDE INTERFACE LOCATION.
4. 2RDS-PCV14B IS TO BE OPERATED AS A MANUAL PRESSURE CONTROL VALVE. THE AIR SUPPLY TO REGULATOR ISOLATION VALVE IS MAINTAINED IN THE SHUT POSITION.

SOURCE, PID-38A-24
TITLE, CONTROL ROD DRIVE HYDRAULIC SYSTEM

NOTE: THIS DRAWING WAS CREATED USING COMPUTER AIDED DRAFTING DO NOT MAKE MANUAL CHANGES

FIGURE 4.6-05a

CONTROL ROD DRIVE HYDRAULIC SYSTEM

NINE MILE POINT
NUCLEAR STATION - UNIT 2
SCRIBA, N.Y.

UPDATED SAFETY ANALYSIS REPORT

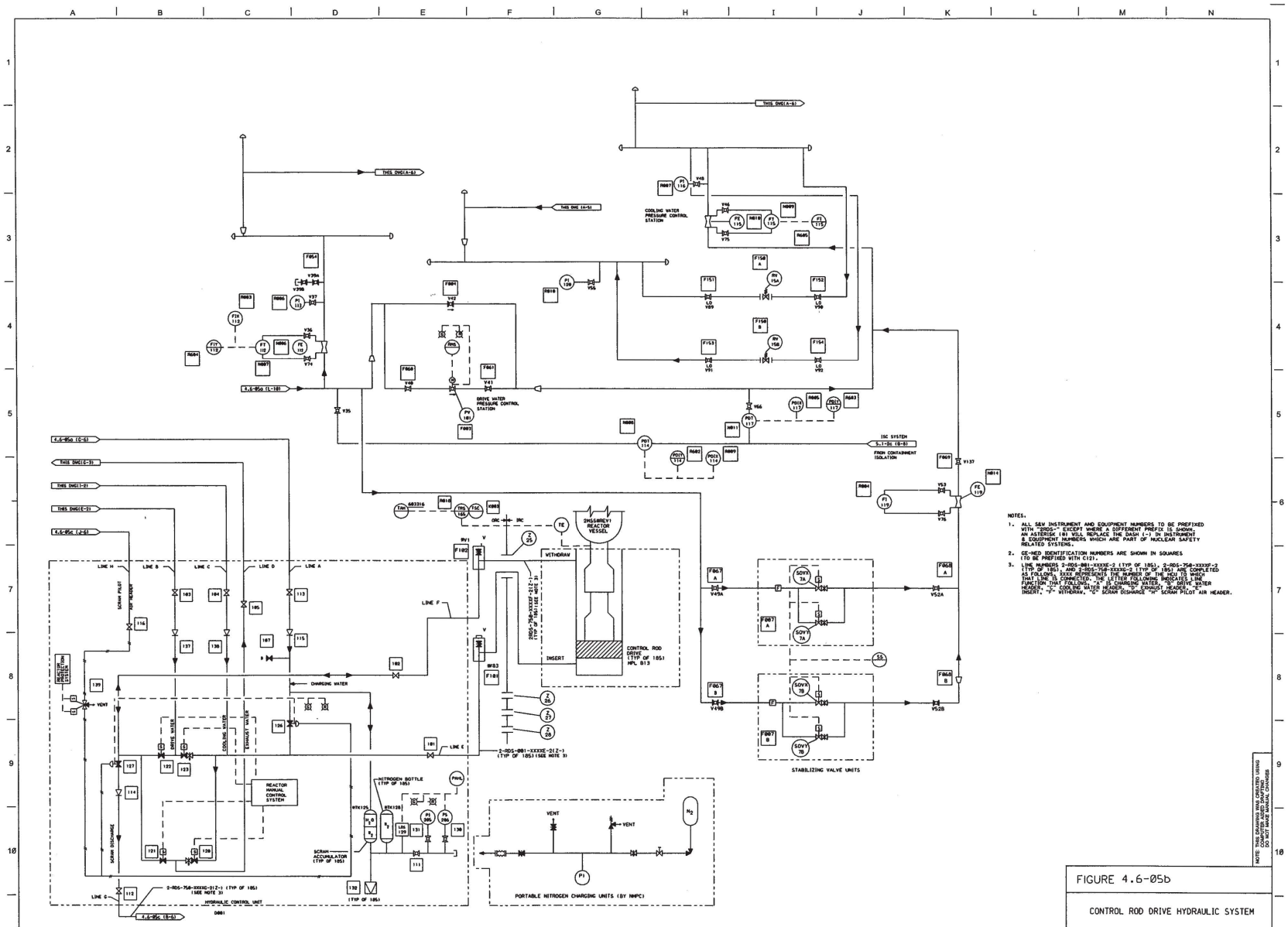
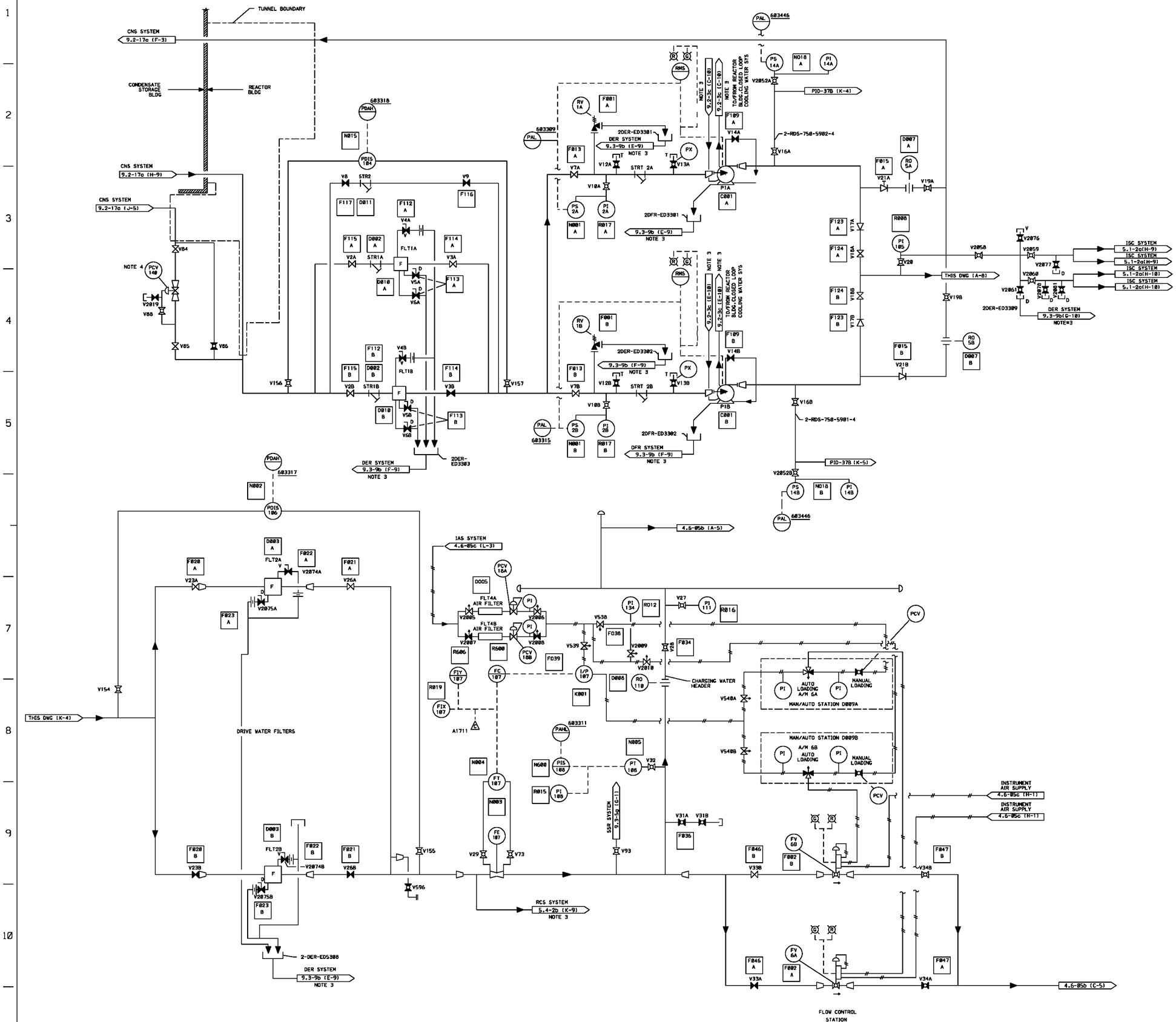


FIGURE 4.6-05b

CONTROL ROD DRIVE HYDRAULIC SYSTEM

NINE MILE POINT
NUCLEAR STATION - UNIT 2
SCRIBA, N.Y.
UPDATED SAFETY ANALYSIS REPORT



NOTES,

1. ALL S&W INSTRUMENT AND EQUIPMENT NUMBERS TO BE PREFIXED WITH "2RDS-" EXCEPT WHERE A DIFFERENT PREFIX IS SHOWN.
2. GE-NESD IDENTIFICATION NUMBERS ARE SHOWN IN SQUARES (TO BE PREFIXED WITH C12).
3. NO FLAG SHOWN ON CORRESPONDING DOCUMENT. COORDINATES PROVIDE INTERFACE LOCATION.
4. 2RDS-PCV14B IS TO BE OPERATED AS A MANUAL PRESSURE CONTROL VALVE. THE AIR SUPPLY TO REGULATOR ISOLATION VALVE IS MAINTAINED IN THE SHUT POSITION.

NOTE: THIS DRAWING WAS CREATED USING COMPUTER AIDED DRAFTING. DO NOT MAKE MANUAL CHANGES

FIGURE 4.6-05a

CONTROL ROD DRIVE HYDRAULIC SYSTEM

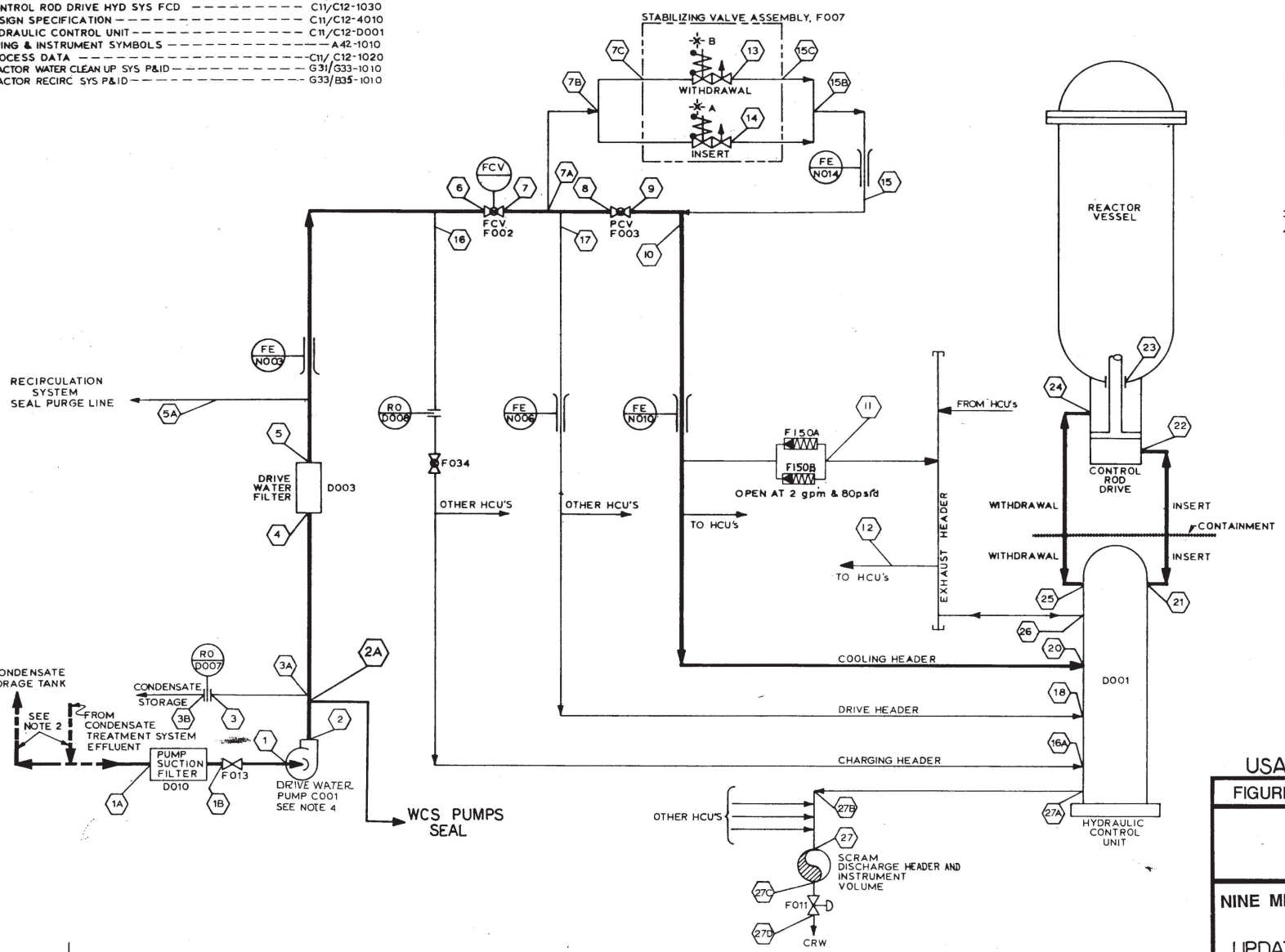
NINE MILE POINT
NUCLEAR STATION - UNIT 2
SCRIBA, N.Y.

UPDATED SAFETY ANALYSIS REPORT

NOTE:

SYSTEM SELECTION OPTIONS ARE INDICATED BY MULTIPLE MPL ITEM NUMBERS

REFERENCE DOCUMENTS:	MPL ITEM No.
1. CONTROL ROD DRIVE HYD SYS P&ID	C11/C12-1010
2. CONTROL ROD DRIVE HYD SYS FCD	C11/C12-1030
3. DESIGN SPECIFICATION	C11/C12-4010
4. HYDRAULIC CONTROL UNIT	C11/C12-D001
5. PIPING & INSTRUMENT SYMBOLS	A42-1010
6. PROCESS DATA	C11/C12-1020
7. REACTOR WATER CLEAN UP SYS P&ID	G31/G33-1010
8. REACTOR RECIRC SYS P&ID	G33/B35-1010



NOTES:

1. FOR DATA PERTAINING TO NUMBERS WITHIN HEXAGONS REFER TO PROCESS DATA FIG. 4.6-7
2. SOURCE OF CRD SYSTEM WATER SHALL BE NORMALLY FROM CONDENSATE TREATMENT SYSTEM. CONDENSATE STORAGE TANK IS THE ALTERNATE SOURCE IF CONDENSATE TREATMENT SYSTEM IS NOT IN OPERATION. FOR DETAILED DESIGN REQUIREMENTS FOR SOURCE AND QUALITY OF WATER, SEE REF 3.
3. DELETED
4. PUMP SUCTION RELIEF VALVES SET AT 150 PSIG.

USAR REVISION 16 OCTOBER 2004

FIGURE 4.6-6

CONTROL ROD DRIVE HYDRAULIC SYSTEM

NINE MILE POINT NUCLEAR STATION-UNIT 2
SCRIBA, NY
UPDATED SAFETY ANALYSIS REPORT

MODE A NORMAL OPERATION

LOCATION ⬡	1A	1	2	2A	3	4	5	5A	6	7	8	9	10	11	12	13
FLOW, GPM	93	93	93	12	20	73	73	10	63	63	57	57	63	0	0	2
PRESSURE PSIG	21	19	1487	1487	1487	1476	1462	1462	1455	PR+260	PR+260	PR+30	PR+30	PR	PR	PR+30

LOCATION ⬡	14	15	16		17	18		20	21	22	23	24	25	26	27	
FLOW, GPM	4	6	0		0	0		.34MAX	.34MAX	.34MAX	.34MAX	0	0	0	0	
PRESSURE PSIG	PR+30	PR+30	1455					SEE NOTE 3C			PR	PR		PR	0	

CONDITIONS:
1. DRIVES LATCHED.
2. REACTOR STEAM DOME PRESSURE AT 1020 PSIG.
3. MAXIMUM COOLING FLOW TO DRIVES, MINIMUM REQUIRED PRESSURE AT POSITION 1A IS 20 FEET OF WATER AT 200 GPM.

MODE A SIZES THE COOLING WATER HEADERS.

LINE LOSS FROM LOCATION 10 TO LOCATION 20 SHALL NOT EXCEED 3 PSIG.

MODE B ROD INSERTION

(FOR NOTES SEE SHEET 2.)

LOCATION ⬡	1A	1	2	2A	3	4	5	5A	6	7	8	9	10	11	12	13
FLOW, GPM	93	93	93	12	20	73	73	10	63	63	57	57	59	0	.7	2
PRESSURE PSIG	21	19	1487	1487	1487	1476	1462	1462	1455	PR+260	PR+260	PR+30	PR+30	<PR+8	<PR+8	PR+30

LOCATION ⬡	14	15	16		17	18		20	21	22	23	24	25	26	27	
FLOW, GPM	0	2	0		4	4		0	4	4	1.3	.7	.7	.7	0	
PRESSURE PSIG	PR+30	PR+30	1455		PR+260	PR+250		PR+15	PR+91	PR+90	PR	PR+20 MAX	PR+20 MAX	PR+8 MAX	0	

CONDITIONS:
1. DRIVES INSERTING.
2. REACTOR STEAM DOME PRESSURE AT 1020 PSIG.
3. MAXIMUM DRIVING FLOW TO DRIVES.

MODE B SIZES THE DRIVE WATER HEADERS.

MODE C SCRAM

LOCATION ⬡	1A	1	2	2A	3	4	5	5A	6	7	8	9	10	11	12	13
FLOW, GPM	45	45	45	12	20	25	25	10	15	15	15	15	15	15	14.9	0
PRESSURE PSIG	21	21	1550	1487	1550									SEE NOTE9	SEE NOTE9	

LOCATION ⬡	14	15	16		17	18		20	21	22	23	24	25	26	27	
FLOW, GPM	0	0	0		0	0		0	90	90	-3.6	30	30	0.1, SEE NOTE9	APPROX 5565	
PRESSURE PSIG									1167 MIN	731 MIN	PR	256 MAX	94		65 MAX	
															SEE NOTE10	

CONDITIONS:
1. DRIVES SCRAMMING.
2. REACTOR STEAM DOME PRESSURE AT 1020 PSIG.
3. FLOWS BASED ON MAXIMUM ROD VELOCITY OF 85 INCHES PER SECOND.

MODE C SIZES THE INSERT AND WITHDRAW LINES.

MODE D SCRAM COMPLETED

LOCATION ⬡	1A	1	2	2A	3	4	5	5A	6	7	8	9	10	11	12	13
FLOW, GPM	200	200	200	12	20	180	180	10	15	15	15	15	15	15	14.9	0
PRESSURE PSIG	21	19	1210	1210						> PR	> PR	> PR	> PR	> PR	> PR	

LOCATION ⬡	14	15	16		17	18		20	21	22	23	24	25	26	27	
FLOW, GPM	0	0	155		0	0		0	0.92	0.92	0.92	SEE NOTE9	SEE NOTE9	0.1	0	
PRESSURE PSIG			988						76	76	PR	65 MAX	65 MAX		65 MAX	
												SEE NOTE 10				

CONDITIONS:
1. SCRAMMING OF DRIVES COMPLETED.
2. REACTOR STEAM DOME PRESSURE AT 0 PSIG.
3. MAXIMUM CRD SUPPLY PUMP FLOW.

MODE D SIZES THE PUMP SUCTION LINE.

NOTE: MINIMUM ACCUMULATOR PRECHARGE PRESSURE IS 565 PSIG.

THIS DRAWING CREATED ELECTRONICALLY

FIGURE 4.6-7

CONTROL ROD DRIVE HYDRAULIC
SYSTEM PROCESS DATA
SHEET 1 OF 3

NINE MILE POINT
NUCLEAR STATION-UNIT 2
SCRIBA, NY
UPDATED SAFETY ANALYSIS REPORT

TABLE 1

LOCATION	1A-1B	1B--1	2---6	3A-3B	6--9	7A-7B	7B-7C
DESIGN PRESS. (PSIG)	150	150	1750	1750	1750	1750	1750
DESIGN TEMP. (DEG F)	150	150	150	150	150	150	150
ESTIMATED LINE SIZE (INCHES)	4	4	2	1	1.5	1	0.75

LOCATION	10-20	11-12	15B-15C	15-15B	16-16A	17-18	12-26
DESIGN PRESS. (PSIG)	1750	1750	1750	1750	1750	1750	1750
DESIGN TEMP. (DEG F)	150	150	150	150	150	150	150
ESTIMATED LINE SIZE (INCHES)	2**	1	0.75	1	2	1	1

LOCATION	21-22 (SEE NOTE 13)	24-25 (SEE NOTE 13)	27A-27B (SEE NOTE 13)	27B-27 (SEE NOTE 13)	27-27C (SEE NOTE 14)	27C-27D (SEE NOTE 14)	5A
DESIGN PRESS. (PSIG)	1750	1750	1250	1250	1250	1250	1750
DESIGN TEMP. (DEG F)	150	500 (PEAK)	450 (PEAK)	450 (PEAK)	450 (PEAK)	450 (PEAK)	150
ESTIMATED LINE SIZE (INCHES)	1	0.75	0.75	*	10	2	.75

* SEE CRD SYSTEM DESIGN SPECIFICATION.

** 2 INCH HEADER TO EACH HALF OF THE TOTAL QUANTITY OF HCU'S.

NOTES:

1. DEFINITION OF SYMBOLS
   PR- INDICATES PRESSURE OF THE REACTOR MEASURED IMMEDIATELY ABOVE THE CORE PLATE.
2. MAXIMUM OPERATING TEMPERATURES
   THE MAXIMUM SYSTEM OPERATING TEMPERATURE WILL NOT EXCEED 150 DEG. F. FROM LOCATION 1 THROUGH 27 WITH THE FOLLOWING EXCEPTIONS.

	LOCATION	MAXIMUM TEMP. (DEG. F.)
MODE A- (CRD TEMPNO COOLING FLOW)	23	546
MODE A- (LEAKING SCRAM DISCHARGE VALVE)	24	500
	25	500
	27	280
MODE D-	23	475
	24	475
	25	475
	27	450

3. MODE A-
   A. MAXIMUM CHARGING WATER PRESSURE SHALL BE 1600 PSIG NOMINAL. ACCUMULATOR PRECHARGE PRESSURE SHALL BE 575 PSIG NOMINAL, 580 PSIG MAXIMUM, AT 70° F.
   B. DELETED
   C. LOCATION 20, 21 AND 22- THE ANTICIPATED RANGE OF COOLING WATER DIFFERENTIAL PRESSURE IS FROM APPROXIMATELY 6 PSI TO A MAXIMUM OF 30 PSI. REDUCED DIFFERENTIAL PRESSURE IS ACCEPTABLE SUBJECT TO MAINTAINING THE REQUIRED COOLING WATER FLOW TO THE DEVICES.
   D. LOCATION 23- MAXIMUM DRIVE COOLING REQUIREMENTS WILL NOT EXCEED 0.34 GPM/DRIVE FOR THE CONDITIONS LISTED. MINIMUM DRIVE COOLING REQUIREMENTS WILL NOT BE LESS THAN 0.20 GPM/DRIVE.
4. MODE B-
   A. LOCATION 13 AND 14- INSERT VALVE F007- A CLOSES ON DRIVE INSERT SIGNAL. WITHDRAW VALVE F007-B ON DRIVE WITHDRAW SIGNAL BUT DOES NOT STAY CLOSED DURING SETTLING.
   B. LOCATION 18- THE CRD DRIVE WATER PRESSURE SHALL NOT BE LESS THAN PR+250 PSIG, FOR THE CONDITIONS INDICATED.
5. MODE C-
   A. DELETED
   B. THE TEMPERATURES LISTED IN NOTE 2 FOR POSITION 24, 25 AND 27 MAY BE ASSUMED TO OCCUR LESS THAN 1 PERCENT OF THE OPERATING LIFE OF THE SYSTEM.
   C. LOCATION 21 TO 22- THE PRESSURE DROP FROM LOCATION 21 TO 22 SHALL NOT EXCEED 435 PSI AT 90 GPM FOR ANY CRD.
   D. LOCATION 23- A NEGATIVE FLOW RATE INDICATES FLOW FROM THE REACTOR THROUGH THE DRIVE SEAL, INTO THE CRD. THE MAXIMUM LEAK RATE FROM THE REACTOR CAN REACH 10 GPM PER DRIVE.
   E. LOCATION 24 TO 25- THE PRESSURE DROP FROM LOCATION 24 TO 25 SHALL NOT EXCEED 162 PSI AT 30 GPM FOR ANY CRD.
   F. RESPONSE TIME OF FCV-F002 IS SUCH THAT SCRAM IS COMPLETED BEFORE FCV-F002 STARTS TO CLOSE.
   G. SCRAM DRAIN VALVE F011 AND VENT VALVE F010 CLOSE WITH A SCRAM SIGNAL.
6. MODE D-
   A. DELETED
   B. LOCATION 27- THE SCRAM DISCHARGE VOLUME SHALL BE SIZED SO THAT THE RESULTING PRESSURE AFTER 100 PERCENT STROKE IS LESS THAN 65 PSIG.
7. PUMP SUCTION RELIEF VALVES SET AT 150 PSIG.
8. PROCESS DIAGRAM 11201448 SHALL BE USED WITH AND FORM PART OF THIS PROCESS DATA. IF THERE ARE ANY CONFLICTS BETWEEN THE PROCESS DIAGRAM AND THIS PROCESS DATA, THE PROCESS DATA SHALL GOVERN.
9. DURING SCRAM, THIS FLOW WILL BE DIRECTED INTO THE SCRAM DISCHARGE VOLUME. FOLLOWING SCRAM, THIS FLOW WILL DECLINE AS VALVE F002 CLOSES AND AS THE SCRAM DISCHARGE VOLUME PRESSURIZES TO EQUAL THE REACTOR PRESSURE. AFTER THE SCRAM DISCHARGE VOLUME AND THE REACTOR VESSEL PRESSURE HAVE EQUALIZED, FLOW WILL BE DIVERTED TO THE REACTOR VESSEL VIA THE CRD WITHDRAW LINES AT A FLOW RATE DEPENDENT ON THE REACTOR PRESSURE:
   I.E. (A.) APPROX. 15 GPM AT "0" PSIG. REACTOR PRESSURE.
   (B.) APPROX. 6 GPM AT "1000" PSIG. REACTOR PRESSURE.
10. THIS VALVE APPLIES IMMEDIATELY FOLLOWING COMPLETION OF SCRAM. PRESSURE WILL SUBSEQUENTLY EQUALIZE WITH REACTOR PRESSURE.
11. DESIGN PRESSURE AND TEMPERATURE SHOWN IN "TABLE 1" IS FOR INFORMATION ONLY AND IS THE BASIS FOR DESIGN OF BWRS SUPPLIED EQUIPMENT. ESTIMATED LINE SIZES ARE FOR INFORMATION ONLY. ACTUAL LINE SIZES AS DETERMINED BY THE PIPING DESIGNER SHALL MEET THE PROCESS DATA HYDRAULIC REQUIREMENTS.
12. ALL VALUES SHOWN IN MODES A, B, C, AND D ARE NOMINAL UNLESS OTHERWISE NOTED.
13. INSERT AND WITHDRAWL PIPING SHALL BE DESIGNED FOR HYDRODYNAMIC LOADS AS A RESULT OF A NORMAL SCRAM AT ZERO AND NORMAL REACTOR PRESSURES. SHORT STROKE AND FULL STROKE SCRAM AND A SCRAM WITH FAILED CRD BUFFER. PLANT LOAD COMBINATIONS SHOULD INCLUDE CONSIDERATION OF THOSE SYSTEM HYDRODYNAMIC LOADS.
14. THE SCRAM DISCHARGE VOLUMES (SDV) AND ITS VENT AND DRAIN PIPING DESIGN SHALL CONSIDER THE HYDRODYNAMIC LOADS WHICH MAY OCCUR DUE TO (1) SDV ISOLATION AND (2) SDV VENTING AND DRAINING FOLLOWING A SCRAM COMPLETION AT REACTOR OPERATING PRESSURE.

THIS DRAWING CREATED ELECTRONICALLY

FIGURE 4.6-7

CONTROL ROD DRIVE HYDRAULIC SYSTEM PROCESS DATA SHEET 2 OF 3

NINE MILE POINT NUCLEAR STATION-UNIT 2 SCRIBA, NY

UPDATED SAFETY ANALYSIS REPORT

TABLE 2: THERMAL CYCLES FOR SAFETY RELATED PIPES AND PIPE SUPPORTS

A. PIPE SECTION–WITHDRAWAL LINES (3), (5) & (6), (CRD FLANGE TO HYDRAULIC CONTROL UNIT)

EVENT	PRESSURE (psig)	TEMPERATURE (°F)	EXPECTED FREQUENCY PER PLANT LIFE (9)	DURATION PER EVENT
1. STANDBY OPERATION (ALL LINES AFFECTED)	1250 (2)	CONSTANT TEMP 45 MIN (7)/150 MAX	N/A	40 YEARS
2. SCRAM (ALL OR SINGLE LINES AFFECTED)	1250 (2)	AMBIENT TO 280 (2)	300	20 MINUTES
3. SCRAM–COLD (ALL OR SINGLE LINE AFFECTED)	0	AMBIENT	300	20 MINUTES
4. INSERT AND WITHDRAWAL MOTION (SINGLE LINE AFFECTED)	(PR + 300)	CONSTANT TEMP 45 MIN (7)/150 MAX	31000	<1 MINUTE
5. ABNORMAL SYSTEM CONDITION (SINGLE LINES AFFECTED) (8)	(PR + 300)	(A) AMBIENT TO 45 (8) (B) AMBIENT TO 150	<40	N/A
6. ABNORMAL SYSTEM CONDITIONS (SINGLE LINES AFFECTED) (4)	1510 MAX (10)	AMBIENT TO 150	<25	20 MINUTES
7. DEGRADED SYSTEM CONDITIONS (RANDOM SINGLE LINES OR ALL LINES AFFECTED) (1)	1250	AMBIENT TO 500(1) MAX	<25	<10 HOURS
8. ANTICIPATED TRANSIENT WITHOUT SCRAM (ALL LINES AFFECTED)	1500 (PASSIVE)	AMBIENT TO 400	<1	<30 SECONDS

(EVENT #8 ONLY APPLICABLE TO THOSE PROJECTS THAT PURCHASED THE ATWS 3A OPTION)

NOTES FOR TABLE 2

(1) PIPE SUPPORT INTEGRITY SHOULD BE MAINTAINED FOR THERMAL EXPANSION CONDITIONS. THIS MAY BE DEMONSTRATED BY VISUALLY INSPECTING THE PIPE SUPPORTS FOR DAMAGE FOLLOWING ANY OF THE FOLLOWING RARE EVENTS AT HOT REACTOR CONDITIONS:
- MULTIPLE MANUAL SCRAMS (SINGLE OR FULL CORE) WITH NO TIME BETWEEN SCRAMS FOR PIPE COOL DOWN.
- FAILURE TO ISOLATE THE SDV FOLLOWING A SCRAM
- LEAKING SCRAM VALVE FOR AN EXTENDED PERIOD OF TIME (WITHDRAWAL LINES ONLY).

(2) DESIGN PRESSURE AND TEMPERATURE CONDITIONS. HOT REACTOR CONDITIONS ASSUMED.

(3) THE PIPING SHOULD BE SIZED AS A MINIMUM TO SCHEDULE 80.

(4) THIS EVENT INCLUDES: STUCK CRD MAINTENANCE, AND PRESSURE CONTROL VALVE CLOSURE.

(5) INSERT AND WITHDRAWAL PIPING SHOULD BE DESIGNED FOR HYDRO-DYNAMIC LOADS AS A RESULT OF A NORMAL SCRAM AT ZERO AND NORMAL REACTOR PRESSURES, SHORT STROKE AND FULL STROKE SCRAMS, AND A SCRAM WITH A FAILED CRD BUFFER. PLANT LOAD COMBINATIONS SHOULD INCLUDE CONSIDERATION OF THESE SYSTEM HYDRO-DYNAMIC LOADS.

(6) THE SCRAM DISCHARGE VOLUME (SDV) AND WITHDRAWAL PIPING DESIGN SHOULD CONSIDER THE HYDRO-DYNAMIC LOADS WHICH MAY OCCUR DUE TO 1) SDV ISOLATION AND 2) SDV VENTING AND DRAINING FOLLOWING SCRAM COMPLETION.

(7) FOR DESIGN OF CRD PIPING 45 °F MIN. IS REFLECTIVE OF THE MINIMUM CONDENSATE STORAGE TANK (CST) TEMPERATURE AND CAN BE REVISED TO AGREE WITH CST ENVIRONMENTAL CONDITIONS OR MINIMUM CRD PIPING AMBIENT CONDITIONS, WHICHEVER IS LIMITING.

(8) CRD PUMP SUCTION FROM EITHER A COLD CONDENSATE STORAGE TANK OR HOT CONDENSATE TREATMENT SYSTEM.

(9) THE EVENT FREQUENCIES GIVEN ARE NOT REFLECTIVE OF THE NUMBER OF STRESS CYCLES ASSOCIATED WITH EACH EVENT.

(10) DESIGN PRESSURE AND TEMPERATURE CONDITIONS. HOT AND COLD REACTOR CONDITIONS ASSUMED.

TABLE 2: (CONTINUED)

B. PIPE SECTION–SCRAM DISCHARGE VOLUME (6) & (3), (HYDRAULIC CONTROL UNITS TO THE SCRAM DISCHARGE VOLUME VENT AND DRAIN VALVES)

EVENT	PRESSURE (psig)	TEMPERATURE (°F)	EXPECTED FREQUENCY PER PLANT LIFE (9)	DURATION PER EVENT
1. STAND-BY OPERATION	0	AMBIENT	N/A	40 YEARS
2. SCRAM	1250 (2)	AMBIENT TO 280 (2)	300	20 MINUTES
3. DEGRADED SYSTEM CONDITIONS	1250 (2)	AMBIENT TO 450 (10) (MAX)	<20	20 MINUTES
4. ANTICIPATED TRANSIENT WITHOUT SCRAM	1500 (PASSIVE)	AMBIENT TO 400	<1	<30 SECONDS

(EVENT #4 ONLY APPLICABLE TO THOSE PROJECTS WHICH PURCHASED THE ATWS 3A OPTION)

TABLE 2 (CONTINUED)

C. PIPE SECTION–INSERT LINES (5) & (3), (CRD FLANGE TO HYDRAULIC CONTROL UNIT)

EVENT	PRESSURE (psig)	TEMPERATURE (°F)	EXPECTED FREQUENCY PER PLANT LIFE (9)	DURATION PER EVENT
1. STANDBY OPERATION (ALL LINES AFFECTED)	(PR+14)	CONSTANT TEMP 45 MIN (7)/150 MAX	N/A	40 YEARS
2. ABNORMAL SYSTEM CONDITIONS (ALL LINES AFFECTED) (8)	(PR+14)	(A) AMBIENT TO 45 (8) (B) AMBIENT TO 150	<40	N/A
3. SCRAM (ALL OR SINGLE LINES AFFECTED)	1510 MAX (10)	CONSTANT TEMP (10) 45 MIN (7)/150 MAX	600 (10)	<1 MINUTE
4. INSERT AND WITHDRAWAL MOTION (SINGLE LINE AFFECTED)	(PR+300)	CONSTANT TEMP 45 MIN (7)/150 MAX	31000	<1 MINUTE
5. ABNORMAL SYSTEM CONDITIONS (ALL OR RANDOM SINGLE LINES AFFECTED) (4)	1510 MAX (10)	AMBIENT TO 150	<25	20 MINUTES

FIGURE 4.6-7

CONTROL ROD DRIVE HYDRAULIC SYSTEM PROCESS DATA
SHEET 3 OF 3

NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT-UNIT 2
FINAL SAFETY ANALYSIS REPORT

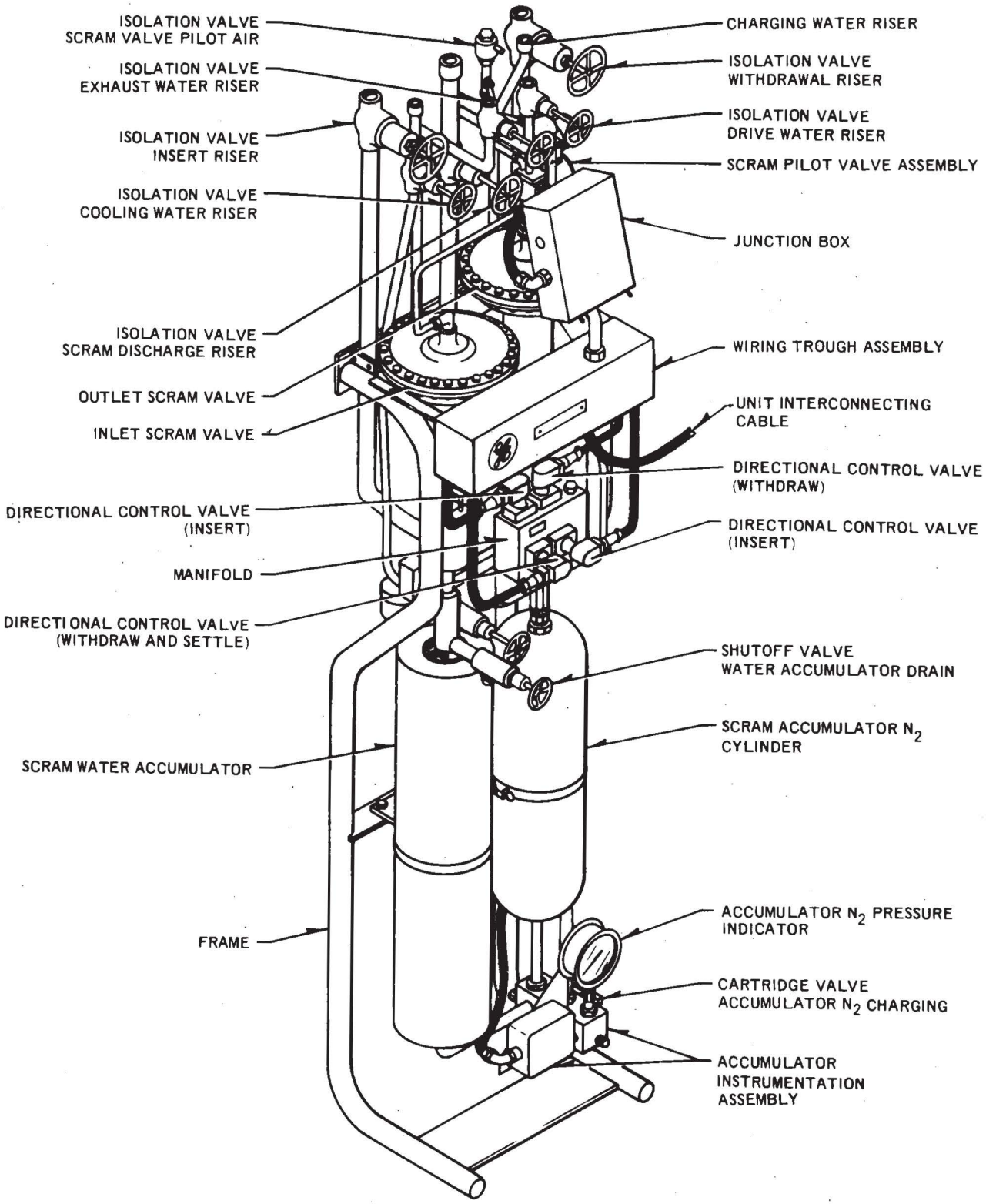


FIGURE 4.6-8

CONTROL ROD DRIVE HYDRAULIC CONTROL UNIT

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NINE MILE POINT-UNIT 2
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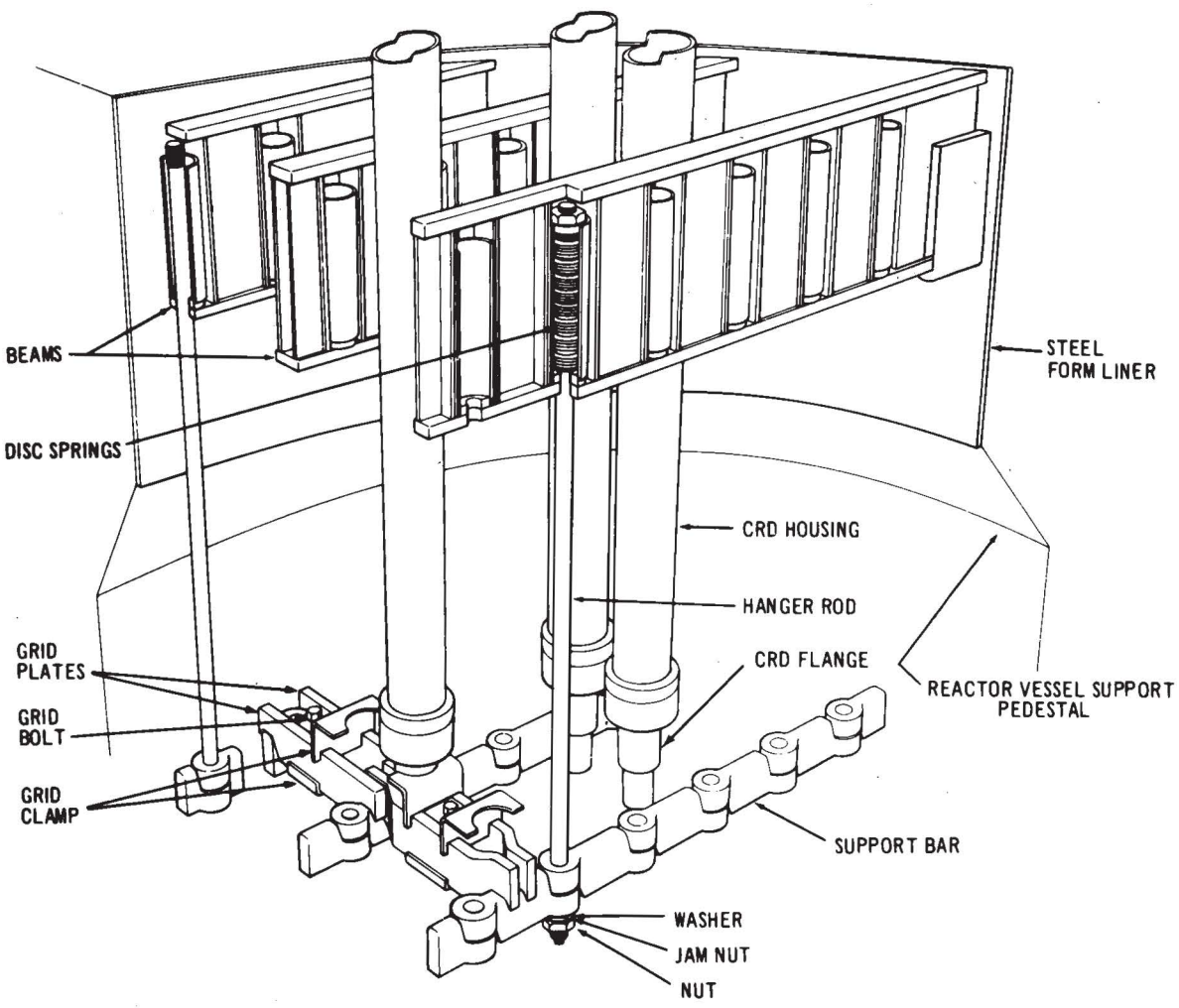

FIGURE 4.6-9

CONTROL ROD DRIVE HOUSING SUPPORT

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