Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690

January 5, ~~1981~~ 1982

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Byron Station Units 1 and 2
Braidwood Station Units 1 and 2
Advance FSAR Information
NRC Docket Nos. 50-454/455/456/457

Dear Mr. Denton:

This is to provide advance copies of information which will be included in the Byron/Braidwood FSAR in the next amendment. Attachment A to this letter lists the information enclosed.

One (1) signed original and fifty-nine (59) copies of this letter are provided. Fifteen (15) copies of the enclosures are included for your review and approval.

Please address further questions to this office.

Very truly yours,

T. R. Tramm

T. R. Tramm
Nuclear Licensing Administrator
Pressurized Water Reactors

Attachment

B001
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on shelf

ATTACHMENT A

LIST OF ENCLOSED INFORMATION

I. Responses to FSAR Questions:

New:		Revised:
010.48		010.43
022.11		022.03
022.26		022.06
022.39		022.54
022.40		022.55
022.49		022.62
022.59		022.76
022.72		040.83
031.40		040.131
421.19		110.10
CSB Q6.2.4.1		110.11
CSB Q6.2.4.10		110.14
		110.50
		110.62
		241.4

II. FSAR Text Changes:

pg. 3.9-62, 3.9-111
pg. 4.0-1
Table 6.2-58
pg. 9.5-1, 9.5-1a
pg. 14.2-74, 74a, 14.2-87, 87a
pg. 3/4.7-5

Appendix A Revisions: Reg. Guides 1.6, 1.9, 1.32, 1.73, 1.81, 1.93, 1.106, 1.128

pg. E.19-1
Figures: 3.9-4, 5, 5a, 6, 7, 7a, 7b, 7c, 7d, 8, 8a, 8b, 9, 10, 10a, 10b

Figure: 9.5-3

Figure: Q331.15-2

III. Fire Protection Report Additional Information Request Responses:

Requests 1 through 5

IV. Miscellaneous Items:

RSB Open Items 19 and 20

REQUEST 1

Provide a description of the extent of fire proofing and fire barriers in the Control Building Complex. State whether or not all rooms have two means of exit.

RESPONSE

Except as noted below, all rooms have two means of exit: The HVAC equipment rooms on El. 439'-0" in Cable Rooms A and G; the cable riser areas on El. 439'-0" and 451'-0"; the Records Room, Computer Rooms and Storage Room on El. 451'-0"; the Security Control Center on El. 451'-0", Upper Cable Spreading Areas B and G on El. 463'-9".

Fireproofing of exposed steel in the Control Building complex covers all columns and floor framing steel on El. 439'-0", 451'-0" and 463-'5" except for the following area: Floor framing steel for Upper Cable Spreading areas A and F El. 463'-5". Below these two areas are the Security Control Center and kitchen.

All fire doors are 3 hour fire rated and all walls and floors are three hour fire rated in both directions excluding the interior walls and ceilings of the Rooms underneath Upper Cable Spreading Areas A and F. The stairwells are provided with three hour fire walls and doors.

REQUEST 2

Provide the locations of fire detectors in the control room.

RESPONSE

Main Control Panels (2)1PM01J through 1PM06J are ventilated individually and the exhaust duct from each panel has its own smoke detector. There are eight other ducts exhausting into the control room complex and the return for each of these ducts has a smoke detector in it. These eight ducts are for room air.

There are also smoke detectors installed above the egg crate ceiling.

The remaining panels in the control room are not ventilated and are not provided with smoke detectors.

REQUEST 3

Is the fire detection system provided with a primary and backup power supply? Is this also true of the fire suppression systems? What kind of supervision (Class A, B, or none) is provided for the fire detection and suppression systems?

RESPONSE

The fire detection system is fed off a d-c bus which automatically switches to battery power if the normal power supply fails. This is also true for the fire suppression systems. All fire detection and fire suppression systems are Class B supervised.

REQUEST 4

State that all fire stop penetration seals will have a fire rating equal to the fire barrier they are penetrating.

RESPONSE

All fire stop penetration seals will have a fire rating at least equal to the fire barrier they are installed in.

REQUEST 5

Request to modify the interlocks on 1SI8811 and 1SI8812 so that 1SI8811 may be opened regardless of the position of the other valve.

RESPONSE

The RWST could drain into the containment under these circumstances in a non-emergency situation. In addition, it is possible to cause cavitation damage to the RHR, SI, or CS pumps if both valves are closed.

Reactor Systems Branch Open Item #19

Valves 1MOV-SI8811A and B and 1MOV-SI8816 should be removed from the list of valves with power locked out on page 6.3-2 of the FSAR.

RESPONSE

Page 6.3-2 of the FSAR has been revised to remove valves 1MOV-SI8811A and B from the list of valves with power locked out. Valve 1MOV-SI8816 was not found on the list.

Reactor Systems Branch Open Item #20

Revise item E.19 Reactor Coolant System Vents (II.B.1) of Appendix E to include a commitment by the applicant that procedures to be developed by the Westinghouse Owners Group for use of RCSV system will be followed.

RESPONSE

The sixth paragraph of item E.19 (page E.19-1) already contains a commitment by the applicant to follow guidelines and procedures for use of the RCSV system to be developed by the Westinghouse Owners Group. However, the paragraph has been expanded to clarify the applicant's commitment.

of the nonmandatory Appendix F of Subsection NA as the strength criteria with the exception of shear stress limits for high strength support bolts, which are determined by the requirements of Regulatory Guide 1.124. The stress limits for high strength bolts are detailed in new Table 3.9-18.

3.9.3.4.6 <u>Materials, Quality Control, and Special Construction Techniques</u>

The materials, quality control, and special construction provisions are discussed in Appendix B.

3.9.3.4.7 <u>Testing and Inservice Surveillance Program</u>

Testing and inservice surveillance comply with the requirements of Subsection NF of th ASME Section III Code, Division I.

TABLE 3.9-18

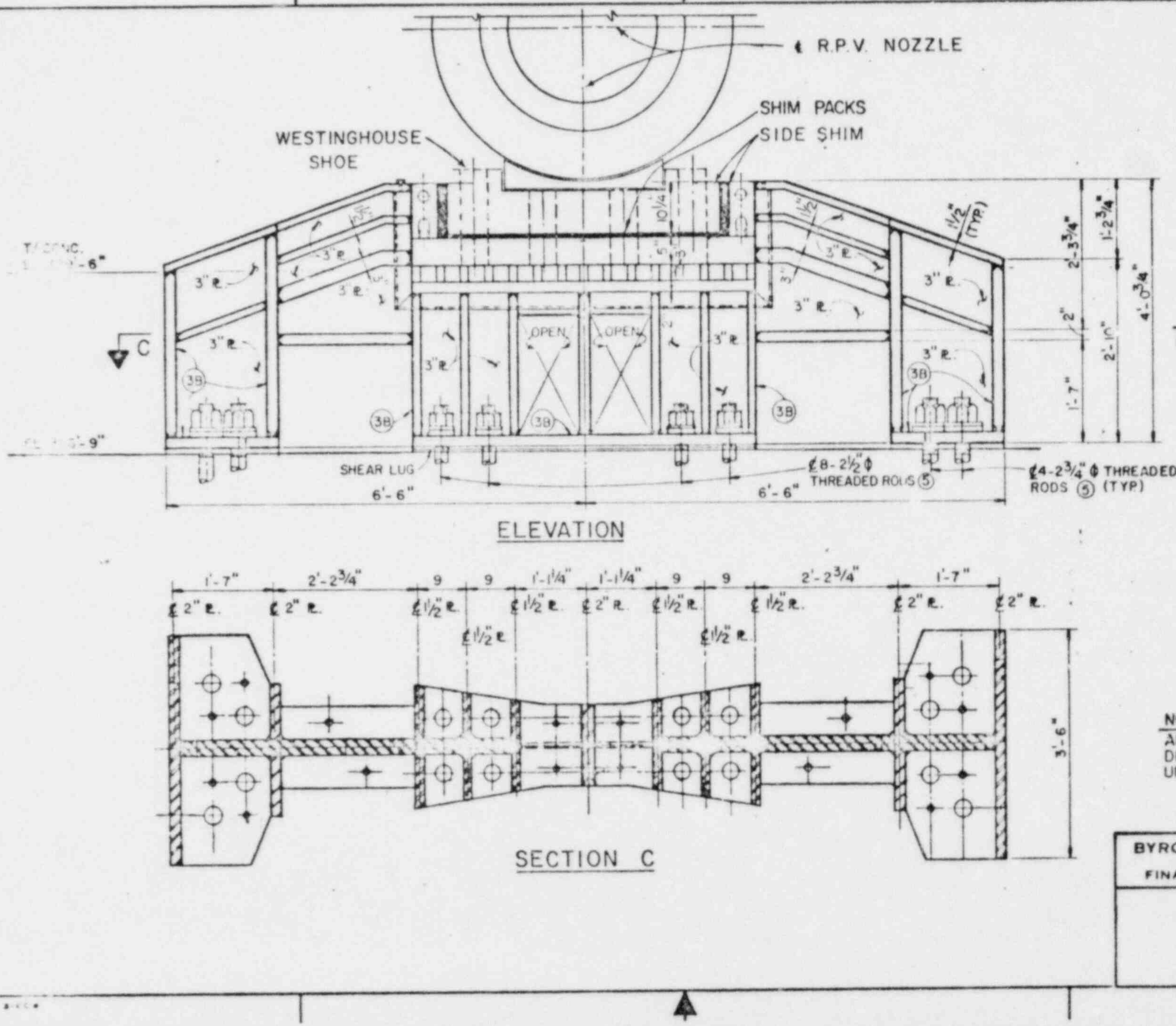
RATIO OF FAULTED ALLOWABLES TO YIELD STRESSES

FOR NSSS SUPPORT BOLT MATERIAL

MATERIAL	RATIO F_t TO S_y	RATIO F_v TO S_y
SA 540, B24 Class 4	.79	.41
SA 540, B24 Class 1	.77	.38
A490	.81	.33

4.0 PROPOSED TECHNICAL SPECIFICATION REVISIONS

Technical Specifications for the fire protection area will be prepared and finalized at the same time all other Technical Specifications are finalized. This is currently expected to be approximately 6 months prior to fuel load, or about October 1982.



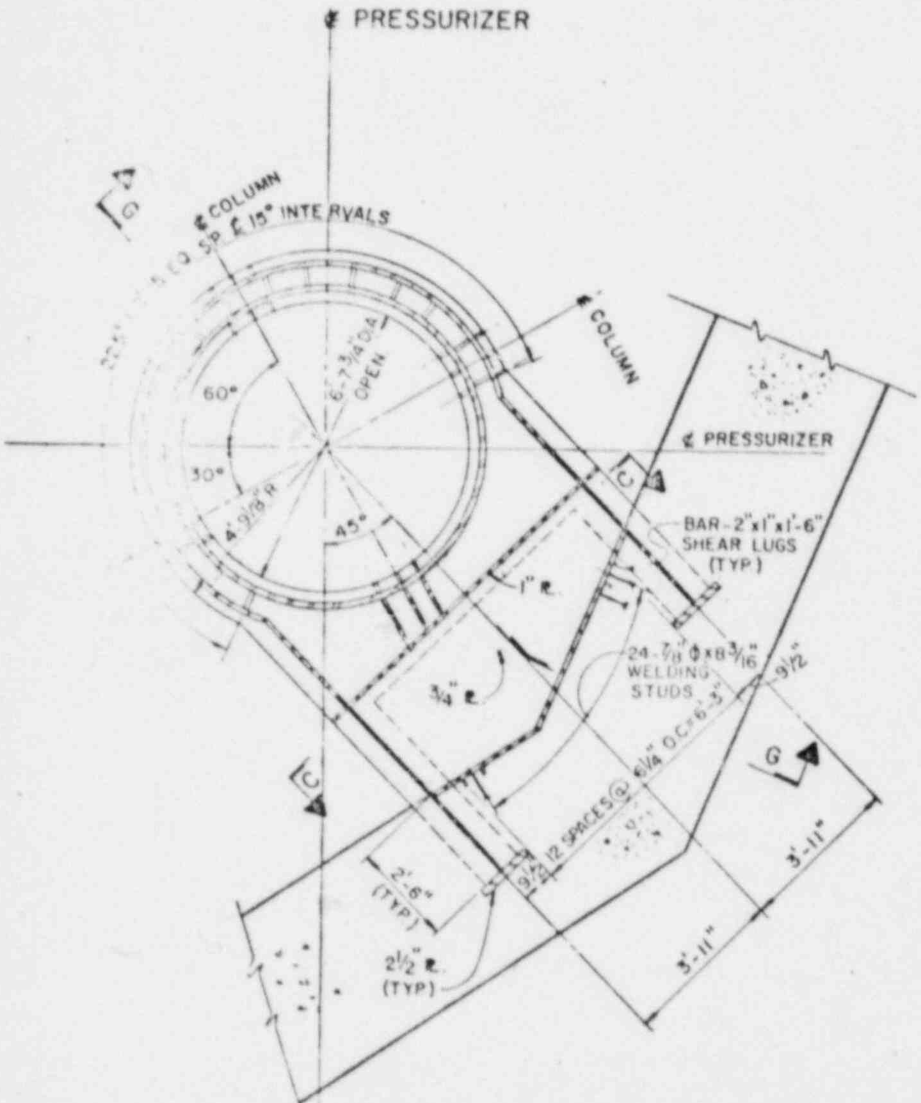
NOTE:
ALL STEEL SHALL BE DESIGNATION 3A, FIGURE 3.9-10b, UNLESS OTHERWISE NOTED.

BYRON/BRAIDWOOD STATIONS

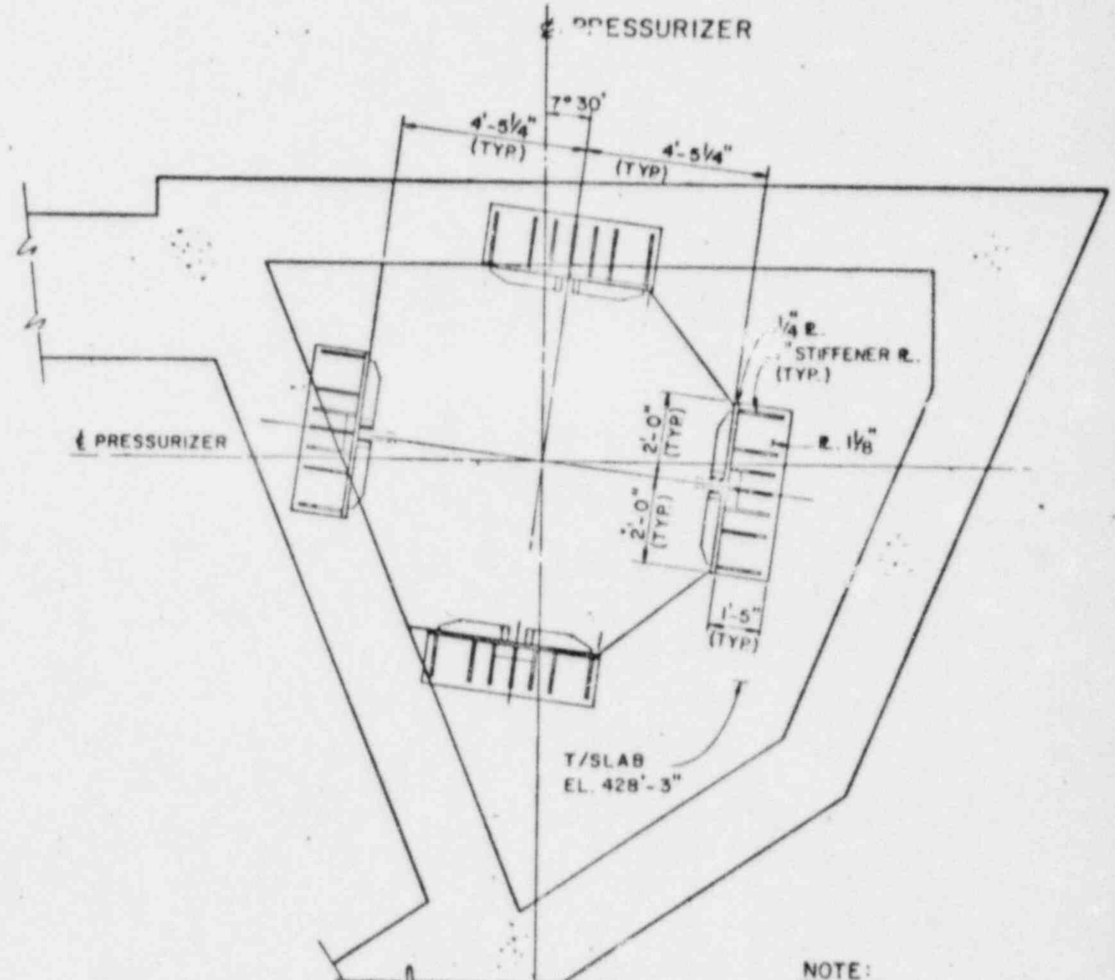
FINAL SAFETY ANALYSIS REPORT

FIGURE 3.9-4

REACTOR VESSEL SUPPORT



LOWER LATERAL SUPPORT



UPPER LATERAL SUPPORT

NOTE:
ALL STEEL SHALL BE DESIGNATION 3A, FIGURE 3.9-10b UNLESS OTHERWISE NOTED.

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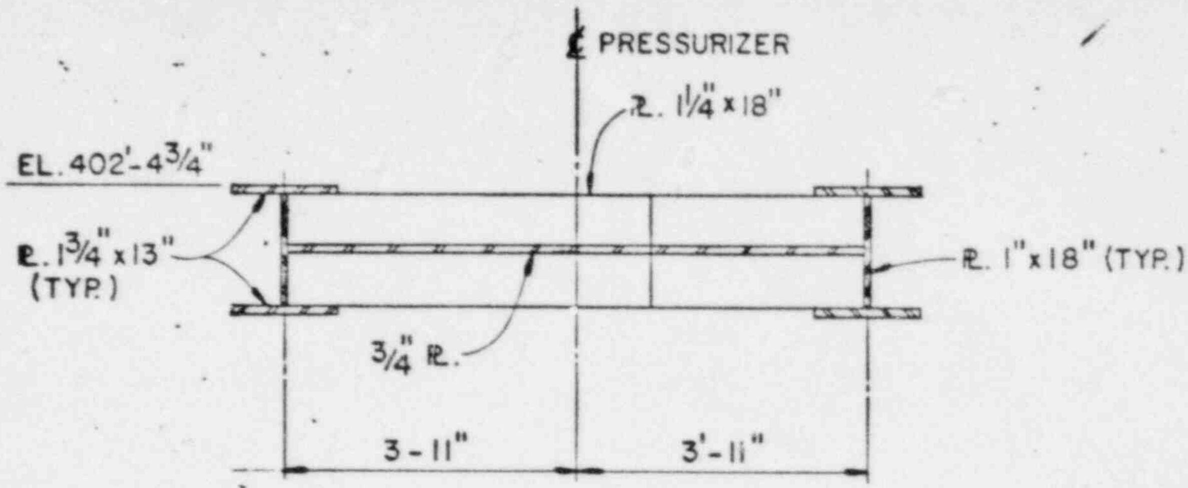
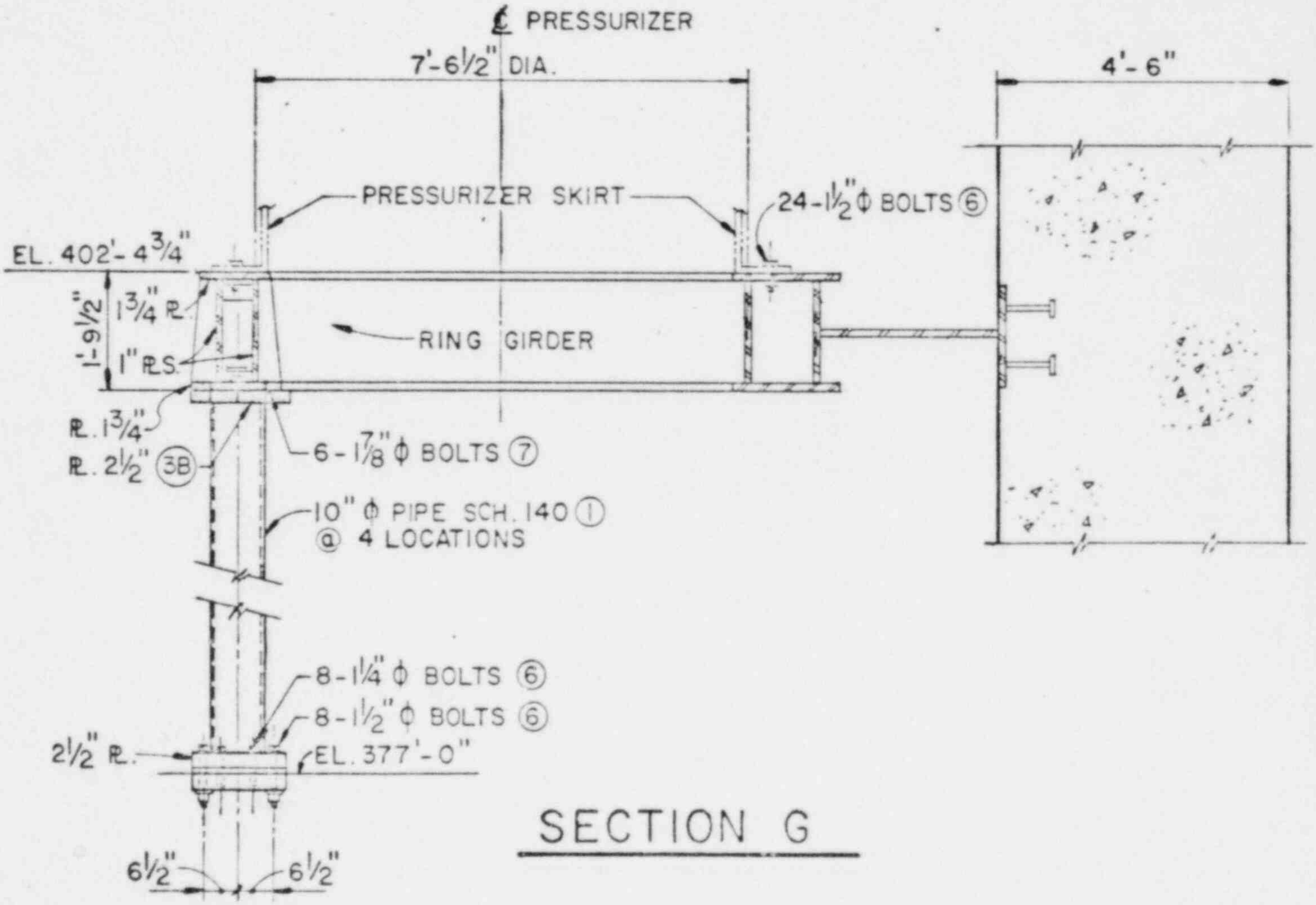
FINAL SAFETY ANALYSIS REPORT

FIGURE 3.9-5

PRESSURIZER SUPPORTS



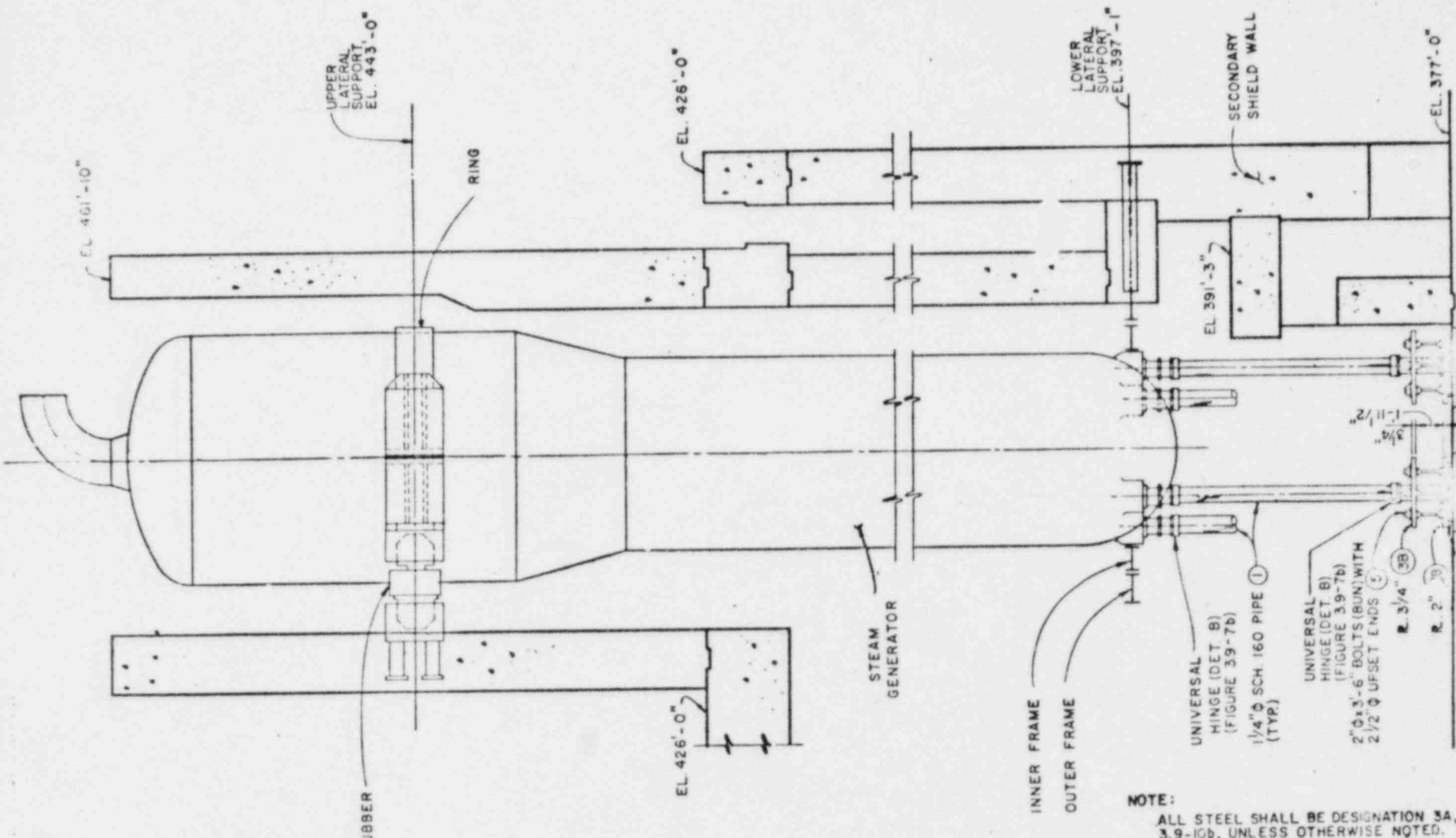
SECTION C



SECTION G

NOTE:
ALL STEEL SHALL BE DESIGNATION 3A, FIGURE 3.9-10b, UNLESS OTHERWISE NOTED.

B/B - FSAR
Figure 3.9-5a
Pressurizer Lower Support Details

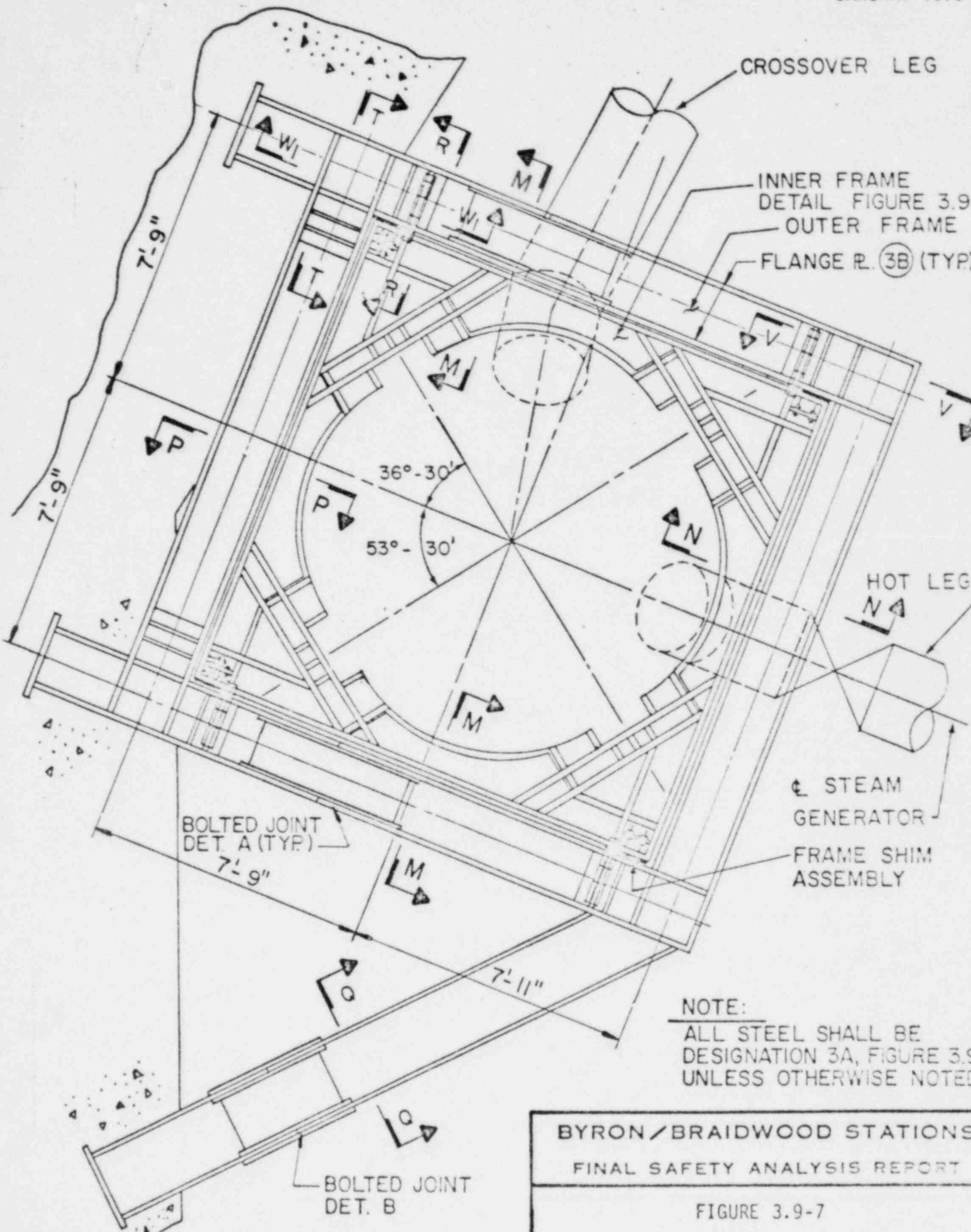


NOTE:
ALL STEEL SHALL BE DESIGNATION 3A, FIGURE 3.9-10b, UNLESS OTHERWISE NOTED.

BYRON/BRAIDWOOD STATIONS
FINAL SAFETY ANALYSIS REPORT

FIGURE 3.9-6

STEAM GENERATOR
TYPICAL ELEVATION AND SUPPORTS



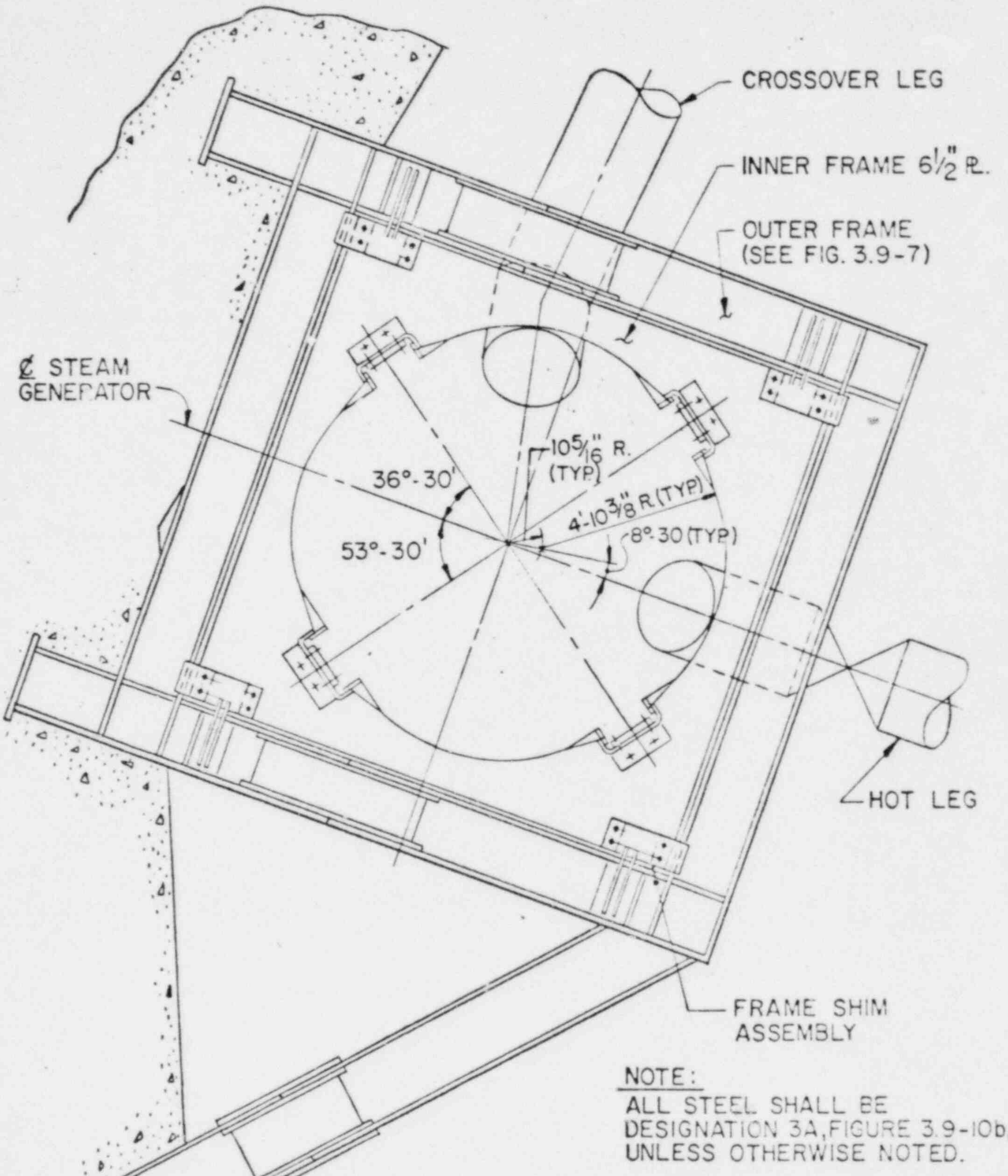
NOTE:
ALL STEEL SHALL BE DESIGNATION 3A, FIGURE 3.9-10b, UNLESS OTHERWISE NOTED.

BYRON/BRAIDWOOD STATIONS

FINAL SAFETY ANALYSIS REPORT

FIGURE 3.9-7

STEAM GENERATOR
LOWER LATERAL SUPPORT
(BYRON UNIT 1 ONLY)



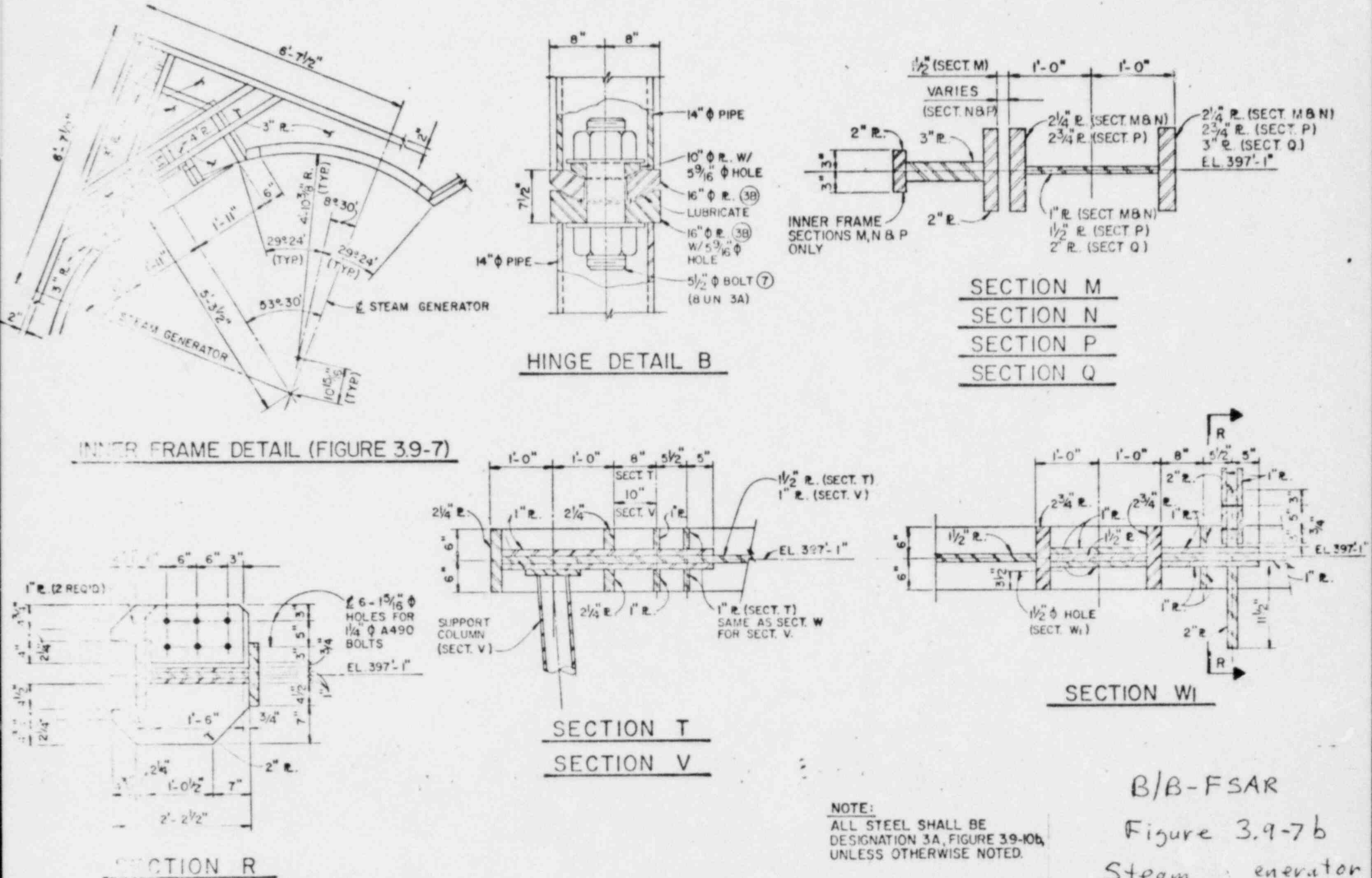
NOTE:
ALL STEEL SHALL BE DESIGNATION 3A, FIGURE 3.9-10b, UNLESS OTHERWISE NOTED.

BYRON/BRAIDWOOD STATIONS

FINAL SAFETY ANALYSIS REPORT

FIGURE 3.9-7a

STEAM GENERATOR LOWER LATERAL SUPPORT (BYRON UNIT 2 AND BRAIDWOOD UNITS 1 & 2)

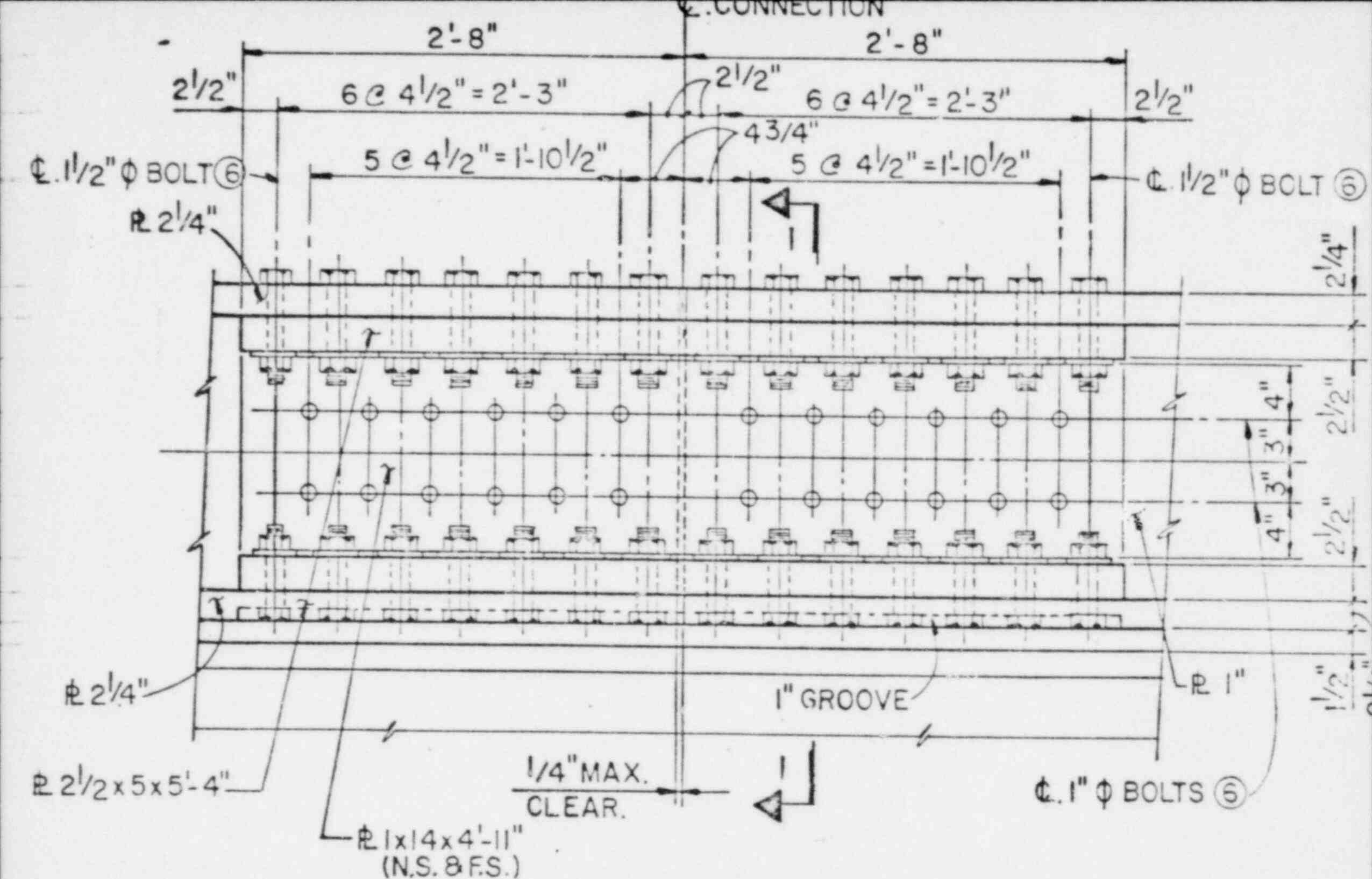


NOTE:
ALL STEEL SHALL BE DESIGNATION 3A, FIGURE 3.9-10b, UNLESS OTHERWISE NOTED.

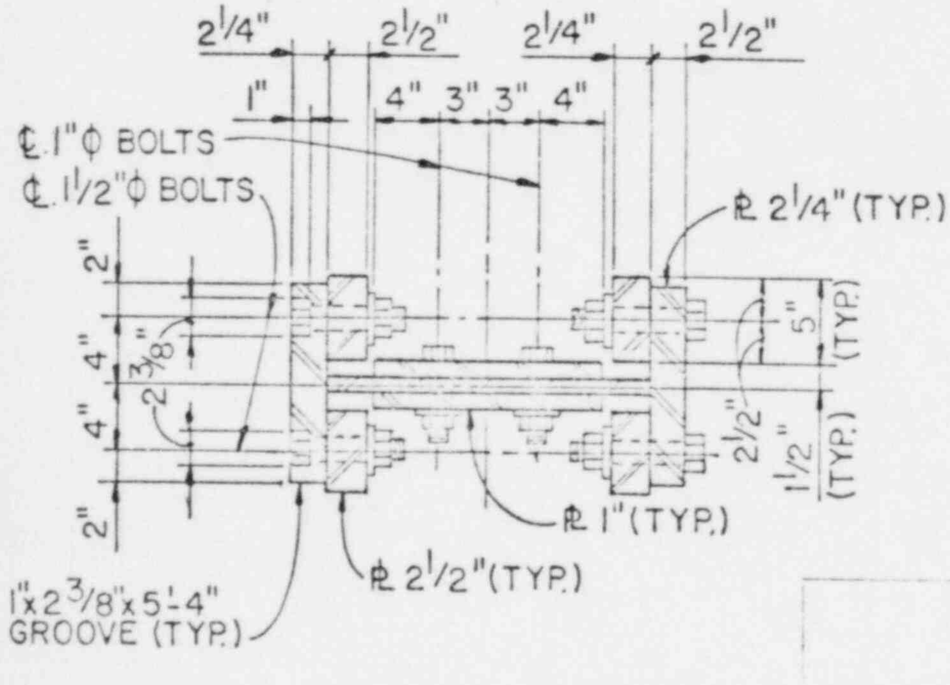
B/B-FSAR

Figure 3.9-7b

Steam Generator Lower Lateral Support



DETAIL A



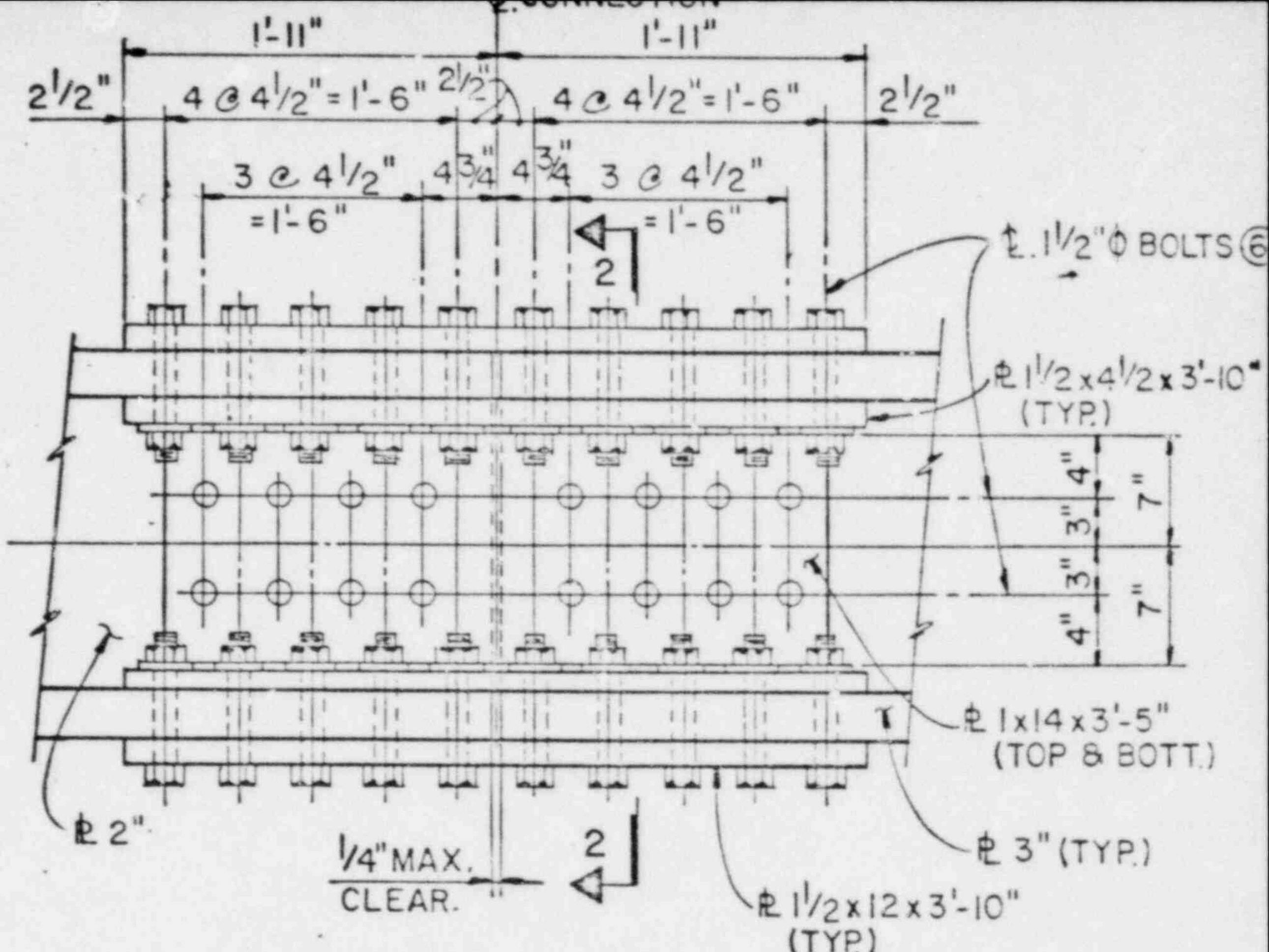
SECTION 1

NOTE:
ALL STEEL SHALL BE DESIGNATION 3A, FIGURE 3.9-10b, UNLESS OTHERWISE NOTED.

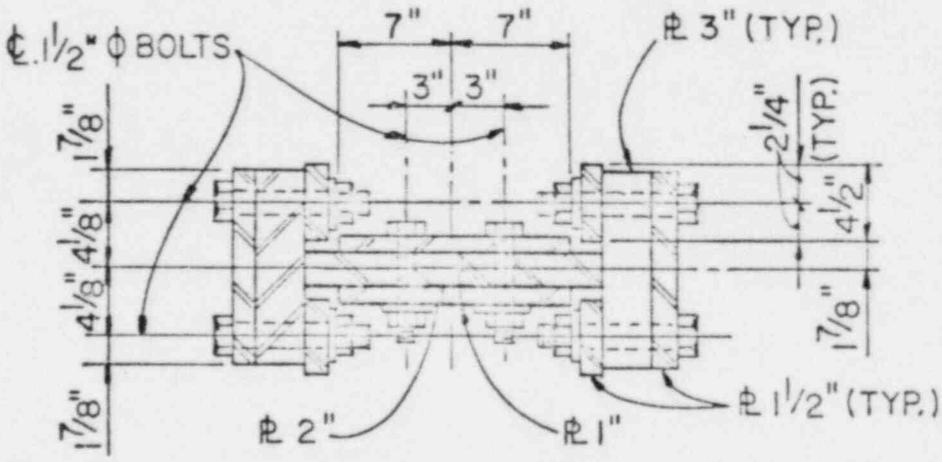
B/B - FSAR

Steam Generator Lower Lateral Support

Figure 3.9-7c



DETAIL B



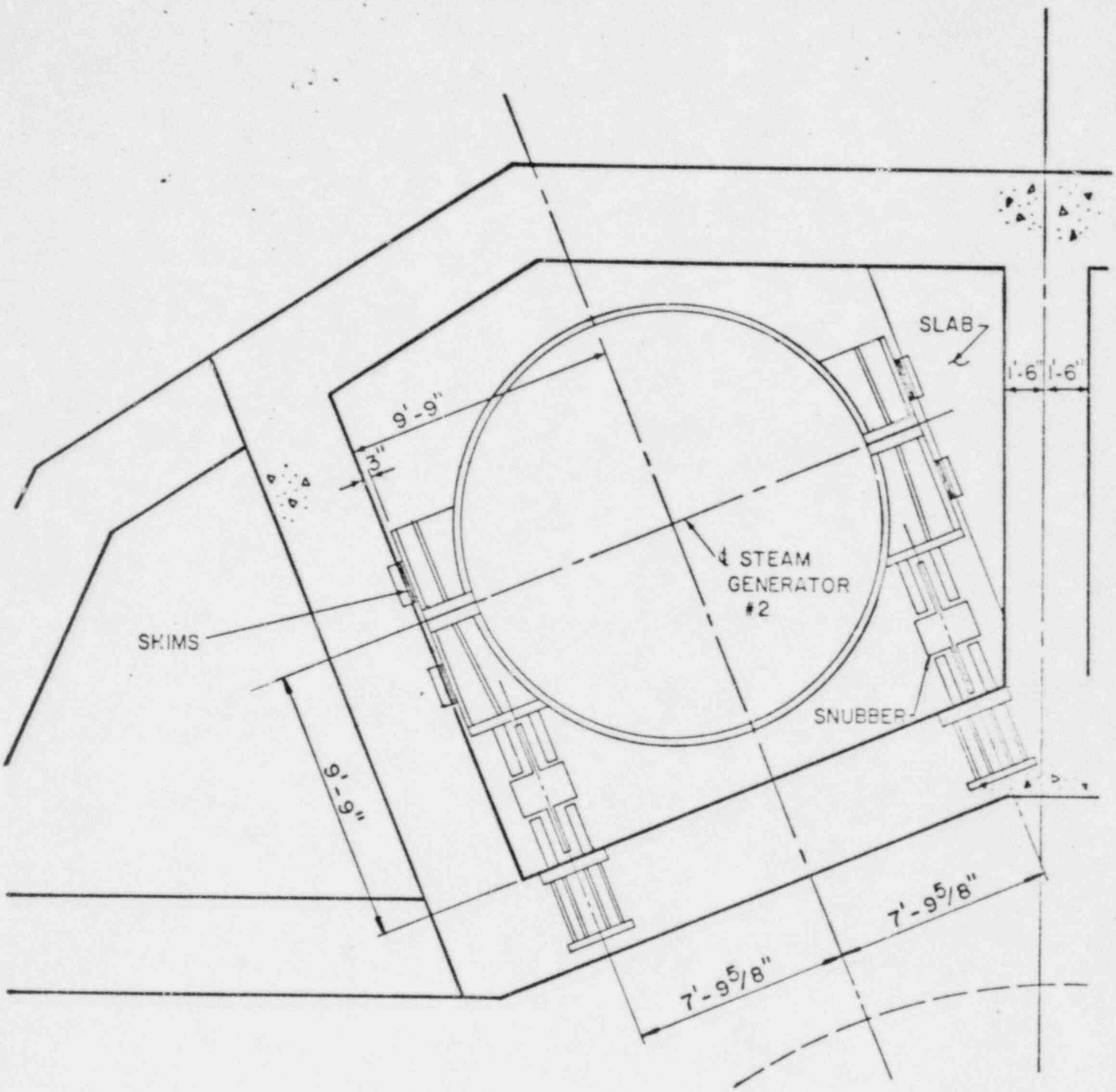
SECTION 2

NOTE:
ALL STEEL SHALL BE DESIGNATION 3A, FIGURE 3.9-10b, UNLESS OTHERWISE NOTED.

B/B - FSAR

Figure 3.9-7d

Steam Generator Lower Lateral Support

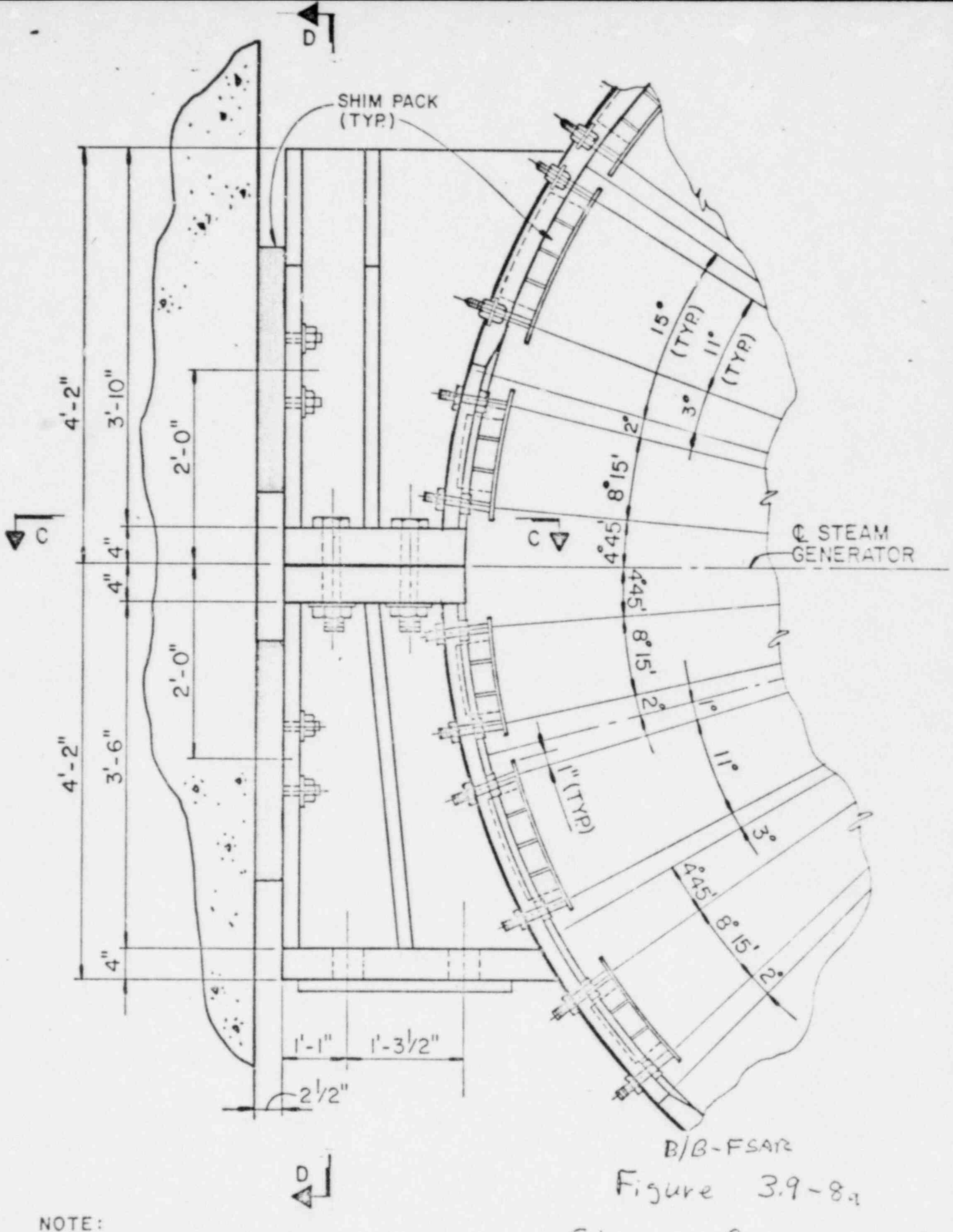


BYRON/BRAIDWOOD STATIONS

FINAL SAFETY ANALYSIS REPORT

FIGURE 3.9-8

STEAM GENERATOR
UPPER LATERAL SUPPORT



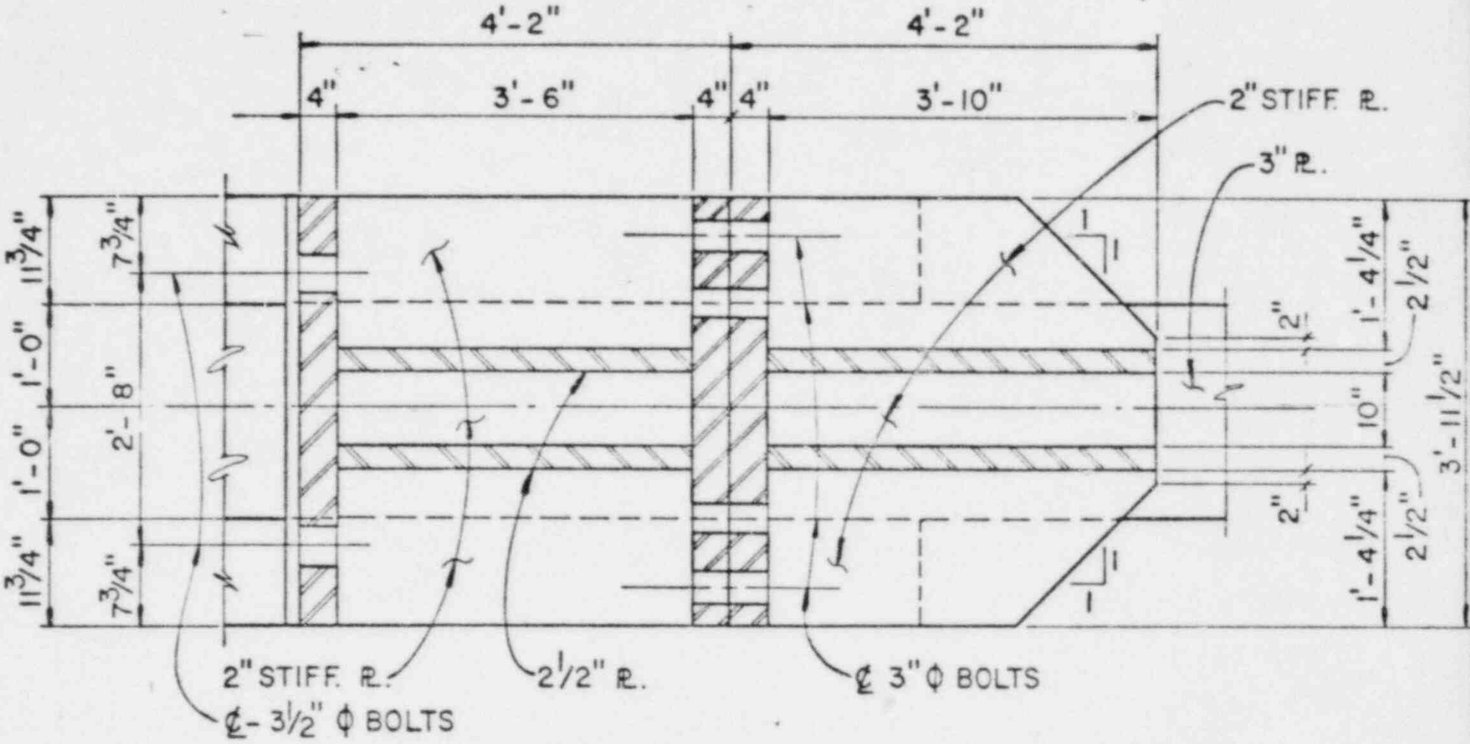
B/B-FSAR

Figure 3.9-8a

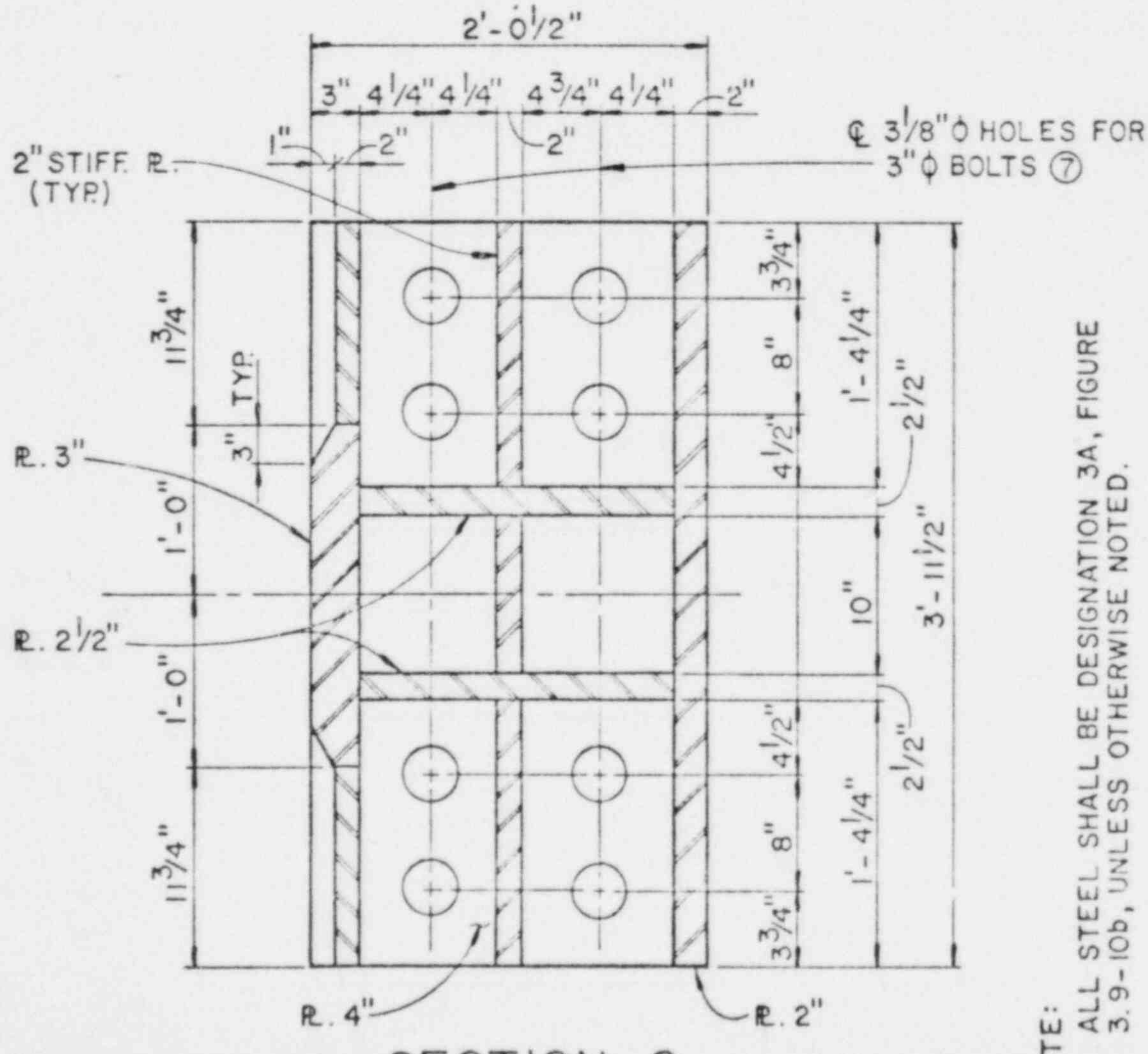
Steam Generator Upper Lateral Support

NOTE:

ALL STEEL SHALL BE DESIGNATION 3A, FIGURE 3.9-10b, UNLESS NOTED.



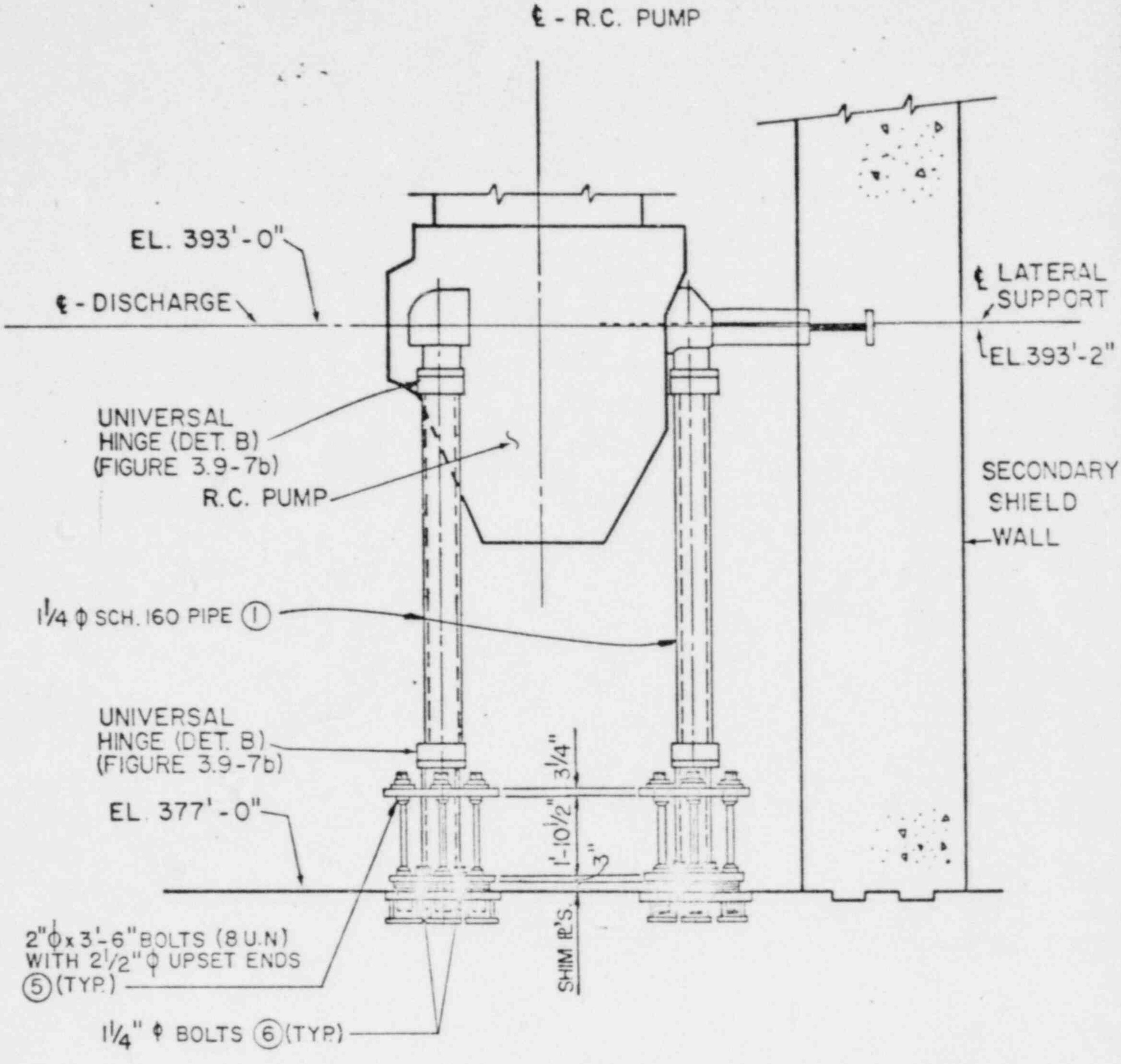
SECTION - D



SECTION - C

NOTE:
ALL STEEL SHALL BE DESIGNATION 3A, FIGURE 3.9-10b, UNLESS OTHERWISE NOTED.

B/B - FSAR
Figure 3.9-8b
Steam Generator
Upper Lateral Support



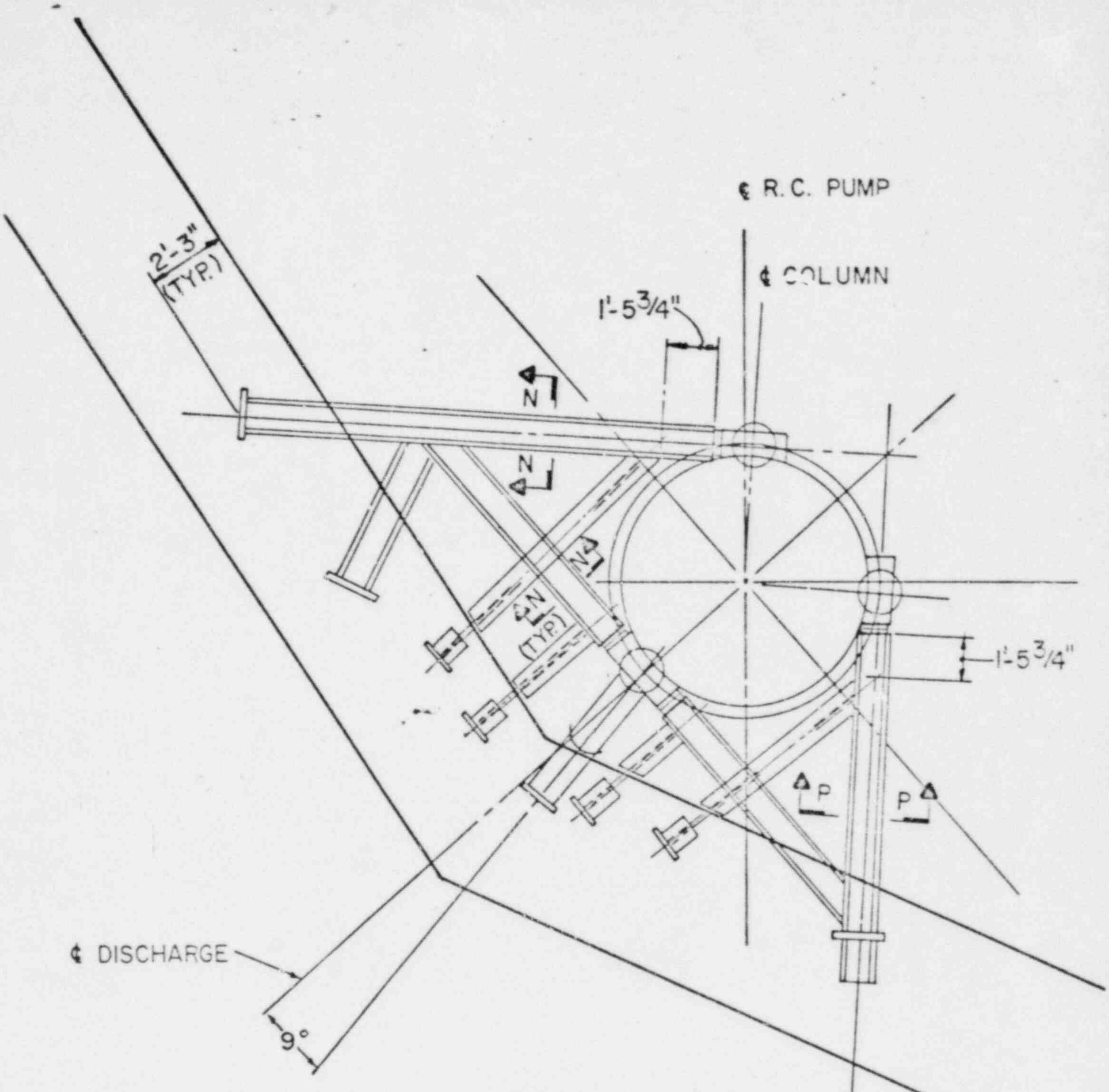
NOTE:
ALL STEEL SHALL BE DESIGNATION 3A, FIGURE 3.9-10b, UNLESS OTHERWISE NOTED.

BYRON/BRAIDWOOD STATIONS

FINAL SAFETY ANALYSIS REPORT

FIGURE 3.9-9

REACTOR COOLANT PUMP
TYPICAL ELEVATION AND SUPPORTS

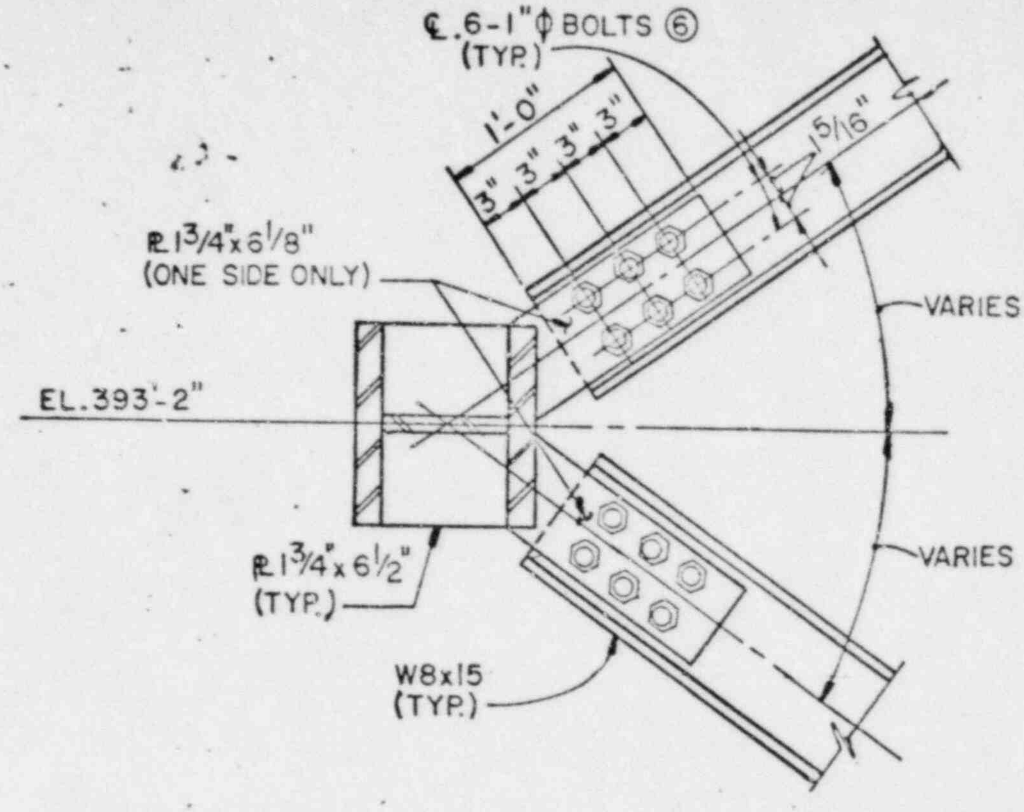


BYRON/BRAIDWOOD STATIONS

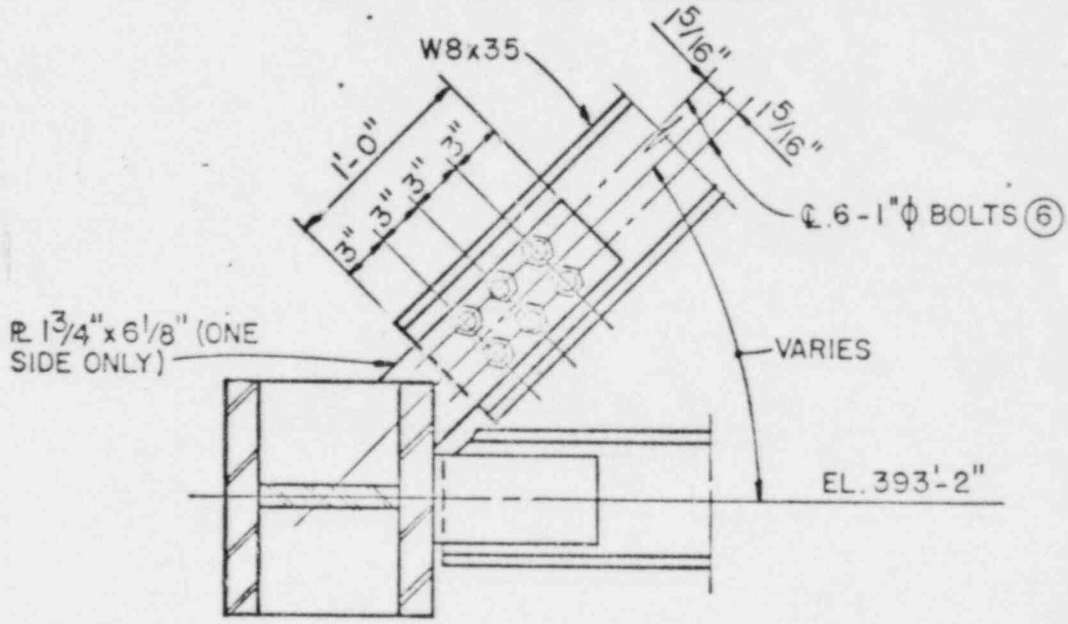
FINAL SAFETY ANALYSIS REPORT

FIGURE 3.9-10

R.C. PUMP - LATERAL SUPPORT



SECTION D



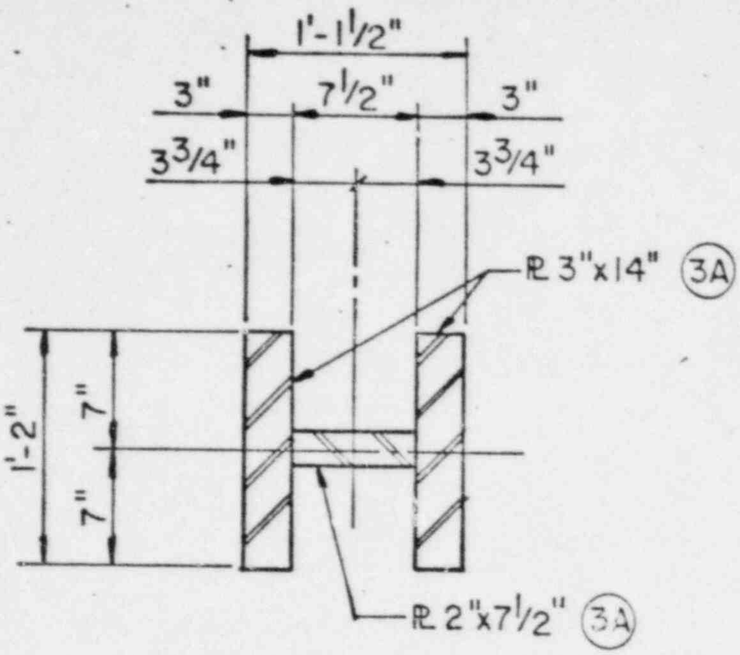
SECTION C1

NOTE:
ALL STEEL SHALL BE
DESIGNATION 3A, FIGURE 3.9-10b,
UNLESS OTHERWISE NOTED.

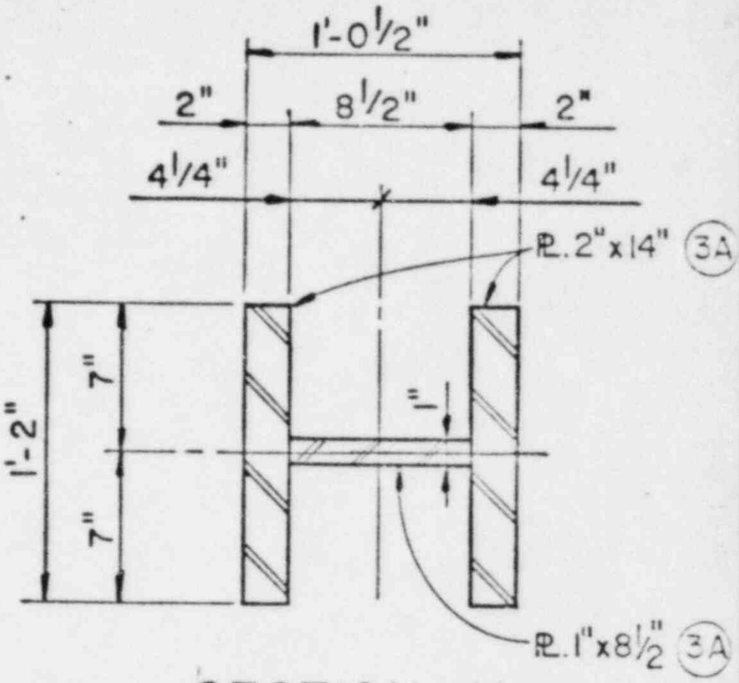
B/B-FSAR

Figure 3.9-10a

R.C. Pump - Lateral Support



SECTION P



SECTION N

STEEL MATERIALS		
NO. ON DWG.	ASME SPEC. NO.	MATERIAL AND MATERIAL THICKNESS GROUP
1	A618 GR. III	TUBE
2	SA36(TO FINE GRAIN PRACTICE)	PLATES BARS SHAPES TO 8 IN.
3	A588 GR. A OR B	STRUCTURAL SHAPES
3A	A588 GR. A OR B	PLATE & BARS (TO 5 IN.)
3B	A588 GR. A OR B	ULTRASONICALLY TESTED PLATE (TO 5 IN.)
4	SA540 GR. B24 CLASS 1	BOLTS, PINS & NUTS
5	A588 GR. A OR B SA194 GR. 7	RODS & PINS NUTS
6	A-490 SA-194 GR. 7	BOLTS NUTS
7	SA540 GR. B24 CLASS 4	BOLTS & NUTS

B/B - FSAR

Figure 3.9-10b

R.C. Pump - Lateral Support

TABLE 6.2-58 CONTAINMENT ISOLATION PROVISIONS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
SYSTEM NAME	GDC REQUIREMENT MET	PENETRATION NUMBER	FLUID	LINE SIZE (INCHES)	ESSENTIAL *	REFERENCE DRAWING	ISOLATION VALVE NUMBER *	VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	TYPE C LEAK TEST (YES OR NO)	DISTANCE TO OUTERMOST ISOLATION VALVE (FEET)	VALVE TYPE	VALVE OPERATOR	NORMAL POSITION	SHUTDOWN POSITION	POST ACCIDENT POSITION	POWER FAILURE POSITION	CLOSURE TIME (SECS.)	ISOLATION SIGNAL S	PRIMARY MODE OF ACTUATION	SECONDARY MODE OF ACTUATION	POWER SOURCE	ISOLATION VALVE CONFIGURATION
CVCS	55	28	RC	2	YES	M-64-2	1CV8100	Outside	Yes	2.5	Globe	MO	Open	Open	Closed	As Is		T	A	RM	1E	1,5
	55	28	RC	2	YES	M-64-2	1CV8112	Inside	Yes	N/A	Globe	MO	Open	Open	Closed	As Is		T	A	RM	1E	1
	55	53	RC	2		M-64-2	1CV8355C	Outside	No	4.0	Globe	MO	Open	Open	Open	As Is		N/A	RM	M	Non 1E	5
	55	53	RC	2		M-64-2	1CV8368C	Inside	No	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	55	33	RC	2		M-64-2	1CV8355D	Outside	No	4.0	Globe	MO	Open	Open	Open	As Is		N/A	RM	M	Non 1E	5
	55	33	RC	2		M-64-2	1CV8368D	Inside	No	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	55	33	RC	2		M-64-1	1CV8355A	Outside	No	4.0	Globe	MO	Open	Open	Open	As Is		N/A	RM	M	Non 1E	5
	55	33	RC	2		M-64-1	1CV8368A	Inside	No	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	55	53	RC	2		M-64-1	1CV8355B	Outside	No	4.0	Globe	MO	Open	Open	Open	As Is		N/A	Rm	M	Non 1E	5
	55	53	RC	2		M-64-1	1CV8368B	Inside	No	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	55	71	RC	3	YES	M-64-3	1CV8105	Outside	No	2.9	Gate	MO	Open	Open	Closed	As Is		S	A	RM	1E	5
	55	71	RC	3	YES	M-64-3	1CV8106	Outside	No	4.75	Gate	MO	Open	Open	Closed	As Is		S	A	RM	1E	5
	55	71	RC	3		M-64-5	1CV8381	Inside	No	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	55	37	RC	2		M-64-3	1CV8346	Outside	No	3.[illegible]	Globe	M	Closed	Closed	Closed	N/A		N/A	M	M	N/A	7
	55	37	RC	2		M-64-3	1CV8348	Inside	No	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7
	55	N/A	RC	2	YES	M-64-3	1CV8110	Outside	No	N/A	Globe	MO	Open	Closed	Closed	As Is		S	A	RM	1E	N/A
	55	N/A	RC	2	YES	M-64-3	1CV8111	Outside	No	N/A	Globe	MO	Open	Closed	Closed	As Is		S	A	RM	1E	N/A
	55	41	RC	3	YES	M-64-5	1CV8152	Outside	Yes	2.5	Globe	AO/S	Open	Open	Closed	Closed		T	A	RM	1E	2
	55	41	RC	3	YES	M-64-5	1CV8160	Inside	Yes	N/A	Globe	AO/S	Open	Open	Closed	Closed		T	A	RM	1E	2
	55	28	RC	3/4		M-64-2	1CV8113	Inside	Yes	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5

2

1 SYSTEM NAME	2 GDC REQUIREMENT MET	3 PENETRATION NUMBER	4 FLUID	5 LINE SIZE (INCHES)	6 ESSENTIAL*	7 REFERENCE DRAWING	8 ISOLATION VALVE NUMBER*	9 VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	10 TYPE C LEAK TEST (YES OR NO)	11 DISTANCE TO OUTERMOST ISOLATION VALVE (FEET)	12 VALVE TYPE	13 VALVE OPERATOR	14 NORMAL POSITION	15 SHUTDOWN POSITION	16 POST ACCIDENT POSITION	17 POWER FAILURE POSITION	18 CLOSURE TIME (SECS.)	19 ISOLATION SIGNALS	20 PRIMARY MODE OF ACTUATION	21 SECONDARY MODE OF ACTUATION	22 POWER SOURCE	23 ISOLATION VALVE CONFIGURATION
Chilled Water	57	5	Water	10	YES	M-118-5	1WØ020A	Outside	Yes	3.0	Gate	MO	Closed	Open	Closed	As Is		T	A	RM	1E	12
	57	6	Water	10	YES	M-118-5	1WØ006A	Outside	Yes	3.[illegible]	Gate	MO	Closed	Open	Closed	As Is		T	A	RM	1E	12
	57	8	Water	10	YES	M-118-5	1WØ020B	Outside	Yes	3.3	Gate	MO	Closed	Open	Closed	As Is		T	A	RM	1E	12
	57	10	Water	10	YES	M-118-5	1WO006B	Outside	Yes	3.[illegible]	Gate	MO	Closed	Open	Closed	As Is		T	A	RM	1E	12

3

1 SYSTEM NAME	2 GDC REQUIREMENT MET	3 PENETRATION NUMBER	4 FLUID	5 LINE SIZE (INCHES)	6 ESSENTIAL*	7 REFERENCE DRAWING	8 ISOLATION VALVE NUMBER *	9 VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	10 TYPE C LEAK TEST (YES OR NO)	11 DISTANCE TO OUTERMOST ISOLATION VALVE (FEET)	12 VALVE TYPE	13 VALVE OPERATOR	14 NORMAL POSITION	15 SHUTDOWN POSITION	16 POST ACCIDENT POSITION	17 POWER FAILURE POSITION	18 CLOSURE TIME (SECS.)	19 ISOLATION SIGNALS	20 PRIMARY MODE OF ACTUATION	21 SECONDARY MODE OF ACTUATION	22 POWER SOURCE	23 ISOLATION VALVE CONFIGURATION
Component Cooling	56	21	CCW	6	YES	M-66-1	1CC9414	Outside	Yes	2.9	Gate	MO	Open	Open	Closed	As Is		P/MS	A	RM	1E	1,5
	56	21	CCW	6	YES	M-66-1	1CC9416	Inside	Yes	N/A	Gate	MO	Open	Open	Closed	As Is		P/MS	A	RM	1E	1
	56	21	CCW	3/4		M-56-1	1CC9534	Inside	Yes	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	57	22	CCW	3	YES	M-66-1	1CC9437B	Outside	Yes	3.1	Globe	AO/S	Open	Closed	Closed	Closed		T	A	RM	1E	11
	56	24	CCW	4	YES	M-66-1	1CC685	Outside	Yes	3.1	Gate	MO	Open	Open	Closed	As Is		P/MS	A	RM	1E	1,5
	56	24	CCW	4	YES	M-66-1	1CC9438	Inside	Yes	N/A	Gate	MO	Open	Open	Closed	As Is		P/MS	A	RM	1E	1
	56	24	CCW	3/4	YES	M-66-1	1CC9518	Inside	Yes	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	56	25	CCW	6		M-66-1	1CC9486	Inside	Yes	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	56	25	CCW	6	YES	M-66-1	1CC9413A	Outside	Yes	4.9	Gate	MO	Open	Open	Closed	As Is		P/MS	A	RM	1E	11
	57	25	CCW	6	YES	M-66-1	1CC9413B	Outside	Yes	6.8	Gate	MO	Open	Open	Closed	As is		P/MS	A	RM	1E	11
	57	48	CCW	3	YES	M-66-1	1CC9437A	Outside	Yes	6.8	Globe	AO/S	Closed	Closed	Closed	Closed		T	A	RM	1E	11

4

1 STSTEM NAME	2 GDC REQUIREMENT MET	3 PENETRATION NUMBER	4 FLUID	5 LINE SIZE (INCHES)	6 ESSENTIAL*	7 REFERENCE DRAWING	8 ISOLATION VALVE NUMBER	9 VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	10 TYPE C LEAK TEST (YES OR NO)	11 DISTANCE TO OUTERMOST ISOLATION VALVE (FEET)	12 VALVE TYPE	13 VALVE OPERATOR	14 NORMAL POSITION	15 SHUTDOWN POSITION	16 POST ACCIDENT POSITION	17 POWER FAILURE POSITION	18 CLOSURE TIME (SECS.)	19 ISOLATION SIGNALS	20 PRIMARY MODE OF ACTUATION	21 SECONDARY MODE OF ACTUATION	22 POWER SOURCE	23 ISOLATION VALVE CONFIGURATION
Containment Purge	56	94	Air	8	YES	M-105-1	1VQ005A	Inside	Yes	N/A	But.fly	AO/S	Closed	Closed	Closed	Closed		T2	A	RM	1E	2
	56	94	Air	8	YES	M-105-1	1VQ005C	Outside	Yes	6.0	But.fly	AO/S	Closed	Closed	Closed	Closed		T2	A	RM	1E	2
	56	94	Air	8	YES	M-105-1	1VQ003	Outside	Yes	9.0	But.fly	AO/S	Closed	Closed	Closed	Closed		T2	A	RM	1E	2
	56	95	Air	48	YES	M-105-1	1VQ002A	Inside	Yes	N/A	But.fly	HO	Closed	Open	Closed	Closed		T2	A	RM	1E	
	56	95	Air	48	YES	M-105-1	1VQ002B	Outside	Yes	2.9	But.fly	HO	Closed	Open	Closed	Closed		T2	A	RM	1E	
	56	96	Air	8	YES	M-105-1	1VQ004A	Inside	Yes	N/A	But.fly	AO/S	Closed	Closed	Closed	Closed		T2	A	RM	1E	2
	56	96	Air	8	YES	M-105-1	1VQ004B	Outside	Yes	2.0	But.fly	AO/S	Closed	Closed	Closed	Closed		T2	A	RM	1E	2
	56	97	Air	48	YES	M-105-1	1VQ001A	Inside	Yes	N/A	But.fly	HO	Closed	Open	Closed	Closed		T2	A	RM	1E	
	56	97	Air	48	YES	M-105-1	1VQ001B	Outside	Yes	2.9	But.fly	HO	Closed	Open	Closed	Closed		T2	A	RM	1E	

5

1 SYSTEM NAME	2 GDC REQUIREMENT MET	3 PENETRATION NUMBER	4 FLUID	5 LINE SIZE (INCHES)	6 ESSENTIAL*	7 REFERENCE DRAWING	8 ISOLATION VALVE NUMBER*	9 VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	10 TYPE C LEAK TEST (YES OR NO)	11 DISTANCE TO OUTERMOST ISOLATION VALVE (FEET)	12 VALVE TYPE	13 VALVE OPERATOR	14 NORMAL POSITION	15 SHUTDOWN POSITION	16 POST ACCIDENT POSITION	17 POWER FAILURE POSITION	18 CLOSURE TIME (SECS.)	19 ISOLATION SIGNALS	20 PRIMARY MODE OF ACTUATION	21 SECONDARY MODE OF ACTUATION	22 POWER SOURCE	23 ISOLATION VALVE CONFIGURATION
Containment Spray	56	1	NaOH+B.W.	10	YES	M-46-1	1CS007A	Outside	Yes	3.3	Gate	MO	Closed	Closed	Closed	As Is		T1	A	RM	1E	5
	56	1	NaOH+B.W.	10		M-46-1	1CS008A	Inside	Yes	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	56	16	NaOH+B.W.	10	YES	M-46-1	1CS007B	Outside	Yes	3.8	Gate	MO	Closed	Closed	Closed	As Is		T1	A	RM	1E	5
	56	16	NaOH+B.W.	10		M-46-1	1CS008B	Inside	Yes	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	56	92	NaOH+B.W.	16	YES	M-61-4	1CS009A	Outside	No	52.3	Gate	MO	Closed	Closed	Closed	As Is		N/A	A	RM	1E	1
	56	93	NaOH+B.W.	16	YES	M-61-4	1CS009B	Outside	No	58.6	Gate	MO	Closed	Closed	Closed	As Is		N/A	A	RM	1E	1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
SYSTEM NAME	GDC REQUIREMENT MET	PENETRATION NUMBER	FLUID	LINE SIZE (INCHES)	ESSENTIAL*	REFERENCE DRAWING	ISOLATION VALVE NUMBER *	VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	TYPE C LEAK TEST (YES OR NO)	DISTANCE TO OUTERMOST ISOLATION VALVE (FEET)	VALVE TYPE	VALVE OPERATOR	NORMAL POSITION	SHUTDOWN POSITION	POST ACCIDENT POSITION	POWER FAILURE POSITION	CLOSURE TIME (SECS.)	ISOLATION SIGNALS	PRIMARY MODE OF ACTUATION	SECONDARY MODE OF ACTUATION	POWER SOURCE	ISOLATION VALVE CONFIGURATION
Essential	57	7	Water	16	YES	M-42-5	1SX016B	Outside	NO	3.2	But.fly	MO	OPEN	OPEN	OPEN	AS IS		S(OPEN)	A	RM	1E	10
Service	57	9	Water	16	YES	M-42-5	1SX027B	Outside	NO	3.2	But.fly	MO	OPEN	OPEN	OPEN	AS IS		S(OPEN)	A	RM	1E	10
Water	57	14	Water	16	YES	M-42-5	1SX027A	Outside	NO	2.8	But.fly	MO	OPEN	OPEN	OPEN	AS IS		S(OPEN)	A	RM	1E	10
	57	15	Water	16	YES	M-42-5	1SX016A	Outside	NO	2.8	But.fly	MO	OPEN	OPEN	OPEN	AS IS		S(OPEN)	A	RM	1E	10
	57																					

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
SYSTEM NAME	GDC REQUIREMENT MET	PENETRATION NUMBER	FLUID	LINE SIZE (INCHES)	ESSENTIAL*	REFERENCE DRAWING	ISOLATION VALVE NUMBER *	VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	TYPE C LEAK TEST (YES OR NO)	DISTANCE TO OUTER-MOST ISOLATION VALVE (FEET)	VALVE TYPE	VALVE OPERATOR	NORMAL POSITION	SHUTDOWN POSITION	POST ACCIDENT POSITION	POWER FAILURE POSITION	CLOSURE TIME (SECS.)	ISOLATION SIGNALS	PRIMARY MODE OF ACTUATION	SECONDARY MODE OF ACTUATION	POWER SOURCE	ISOLATION VALVE CONFIGURATION
Fire	56	34	Water	4	YES	M-52-1	1FP010	Outside	Yes	3.3	Gate	AO/S	OPEN	CLOSED	CLOSED	CLOSED		T	A	RM	1E	2
Protection	56	34	Water	4	YES	M-52-1	1FP011	Inside	Yes	N/A	Gate	AO/S	OPEN	CLOSED	CLOSED	CLOSED		T	A	RM	1E	2

1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
SYSTEM NAME	GDC REQUIREMENT MET	PENETRATION NUMBER	FLUID	LINE SIZE (INCHES)	ESSENTIAL*	REFERENCE DRAWING	ISOLATION VALVE NUMBER	VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	TYPE C LEAK TEST (YES OR NO)	DISTANCE TO OUTERMOST ISOLATION VALVE (FEET)	VALVE TYPE	VALVE OPERATOR	NORMAL POSITION	SHUTDOWN POSITION	POST ACCIDENT POSITION	POWER FAILURE POSITION	CLOSURE TIME (SECS.)	ISOLATION SIGNALS	PRIMARY MODE OF ACTUATION	SECONDARY MODE OF ACTUATION	POWER SOURCE	ISOLATION VALVE CONFIGURATION
Instrument Air	56	39	Air	3	YES	M-55-2	1IA065	Outside	Yes	3.3	Globe	AO/S	Open	OPEN	CLOSED	CLOSED		T	A	RM	1E	2,4
	56	39	Air	3	YES	M-55-2	1IA066	Inside	Yes	N/A	Globe	AO/S	Open	OPEN	CLOSED	CLOSED		T	A	RM	1E	2
	56	39	Air	3/4		M-55-2	1IA088	Inside	Yes	N/A	Globe	M	CLOSED	CLOSED	CLOSED	CLOSED	N/A	N/A	N/A	N/A	N/A	4

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1 SYSTEM NAME	2 GDC REQUIREMENT MET	3 PENETRATION NUMBER	4 FLUID	5 LINE SIZE (INCHES)	6 ESSENTIAL*	7 REFERENCE DRAWING	8 ISOLATION VALVE NUMBER •	9 VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	10 TYPE C LEAK TEST (YES OR NO)	11 DISTANCE TO OUTER-MOST ISOLATION VALVE (FEET)	12 VALVE TYPE	13 VALVE OPERATOR	14 NORMAL POSITION	15 SHUTDOWN POSITION	16 POST ACCIDENT POSITION	17 POWER FAILURE POSITION	18 CLOSURE TIME (SECS.)	19 ISOLATION SIGNALS	20 PRIMARY MODE OF ACTUATION	21 SECONDARY MODE OF ACTUATION	22 POWER SOURCE	23 ISOLATION VALVE CONFIGURATION
Instrument Penetration	54	3	Air	1/2		M-105-3	1VQ016	Inside	Yes	N/A	Globe	M	Closed	Closed	Closed	N/A	N/A	N/A	M	M	N/A	4
	54	3	Air	1/2		M-105-3	1VQ017	Inside	Yes	N/A	Globe	M	Closed	Closed	Closed	N/A	N/A	N/A	M	M	N/A	4
	54	3	Air	1/2		M-105-3	1VQ013	Outside	Yes	MIN.	Globe	M	Closed	Closed	Closed	N/A	N/A	N/A	M	M	N/A	4
	54	3	Air	1/2		M-105-3	1VQ019	Outside	Yes	MIN.	Globe	M	Closed	Closed	Closed	N/A	N/A	N/A	M	M	N/A	4

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
SYSTEM NAME	GDC REQUIREMENT MET	PENETRATION NUMBER	FLUID	LINE SIZE (INCHES)	ESSENTIAL*	REFERENCE DRAWING	ISOLATION VALVE NUMBER •	VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	TYPE C LEAK TEST (YES OR NO)	DISTANCE TO OUTER-MOST ISOLATION VALVE (FEET)	VALVE TYPE	VALVE OPERATOR	NORMAL POSITION	SHUTDOWN POSITION	POST ACCIDENT POSITION	POWER FAILURE POSITION	CLOSURE TIME (SECS.)	ISOLATION SIGNALS	PRIMARY MODE OF ACTUATION	SECONDARY MODE OF ACTUATION	POWER SOURCE	ISOLATION VALVE CONFIGURATION
Make-Up Deminera-lizer	55	30	Water	2		M-49-1	1WM190	Outside	Yes	1.6	Globe	M	Closed	Open	Closed	N/A	N/A	N/A	M	M	N/A	7
	55	30	Water	2		M-49-1	1WM191	Inside	Yes	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
SYSTEM NAME	GDC REQUIREMENT MET	PENETRATION NUMBER	FLUID	LINE SIZE (INCHES)	ESSENTIAL*	REFERENCE DRAWING	ISOLATION VALVE NUMBER *	VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	TYPE C LEAK TEST (YES OR NO)	DISTANCE TO OUTER-MOST ISOLATION VALVE (FEET)	VALVE TYPE	VALVE OPERATOR	NORMAL POSITION	SHUTDOWN POSITION	POST ACCIDENT POSITION	POWER FAILURE POSITION	CLOSURE TIME (SECS.)	ISOLATION SIGNALS	PRIMARY MODE OF ACTUATION	SECONDARY MODE OF ACTUATION	POWER SOURCE	ISOLATION VALVE CONFIGURATION
Main Steam	57	77	Steam	30.25	YES	M-35-1	1MS001D	Outside	NO	14.8	Gate	HO	Open	Closed	Closed	Closed		S/MS	A	RM	1E	10
	57	77	Steam	4	YES	M-35-1	1MS101D	Outside	NO	20.0	Gate	AO/S	Closed	Closed	Closed	Closed		S/MS	A	RM	1E	11
	57	77	Steam	3		M-35-1	1MS021D	Outside	NO	15.4	Globe	M	Closed	Closed	Closed	N/A	N/A	N/A	M	M	N/A	14
	57	77	Steam	6	YES	M-35-1	1MS018D	Outside	NO	32.1	Relief	HO	Closed	Closed	Closed	Closed		N/A	A	RM	1E	13
	57	77	Steam	6		M-35-1	1MS013D	Outside	NO	39.1	Relief	N/A	Closed	Closed	Closed	N/A	N/A	N/A	N/A	N/A	N/A	13
	57	77	Steam	6		M-35-1	1MS014D	Outside	NO	36.6	Relief	N/A	Closed	Closed	Closed	N/A	N/A	N/A	N/A	N/A	N/A	13
	57	77	Steam	6		M-35-1	1MS015D	Outside	NO	34.1	Relief	N/A	Closed	Closed	Closed	N/A	N/A	N/A	N/A	N/A	N/A	13
	57	77	Steam	6		M-35-1	1MS016D	Outside	NO	31.6	Relief	N/A	Closed	Closed	Closed	N/A	N/A	N/A	N/A	N/A	N/A	13
	57	77	Steam	6		M-35-1	1MS017D	Outside	NO	29.1	Relief	N/A	Closed	Closed	Closed	N/A	N/A	N/A	N/A	N/A	N/A	13
	57	85	Steam	32.75	YES	M-35-1	1MS001B	Outside	NO	10.0	Gate	HO	Open	Closed	Closed	Closed		S/MS	A	RM	1E	10
	57	85	Steam	4	YES	M-35-1	1MS101B	Outside	NO	17.7	Gate	AO/S	Closed	Closed	Closed	Closed		S/MS	A	RM	1E	11
	57	85	Steam	3		M-35-1	1MS021B	Outside	NO	11.0	Globe	M	Closed	Closed	Closed	N/A	N/A	N/A	M	M	N/A	14
	57	85	Steam	6	YES	M-35-1	1MS018B	Outside	NO	16.5	Relief	HO	Closed	Closed	Closed	Closed	N/A	N/A	A	RM	1E	13
	57	85	Steam	6		M-35-1	1MS013B	Outside	NO	38.8	Relief	N/A	Closed	Closed	Closed	N/A	N/A	N/A	N/A	N/A	N/A	13
	57	85	Steam	6		M-35-1	1MS014B	Outside	NO	36.3	Relief	N/A	Closed	Closed	Closed	N/A	N/A	N/A	N/A	N/A	N/A	13
	57	85	Steam	6		M-35-1	1MS015B	Outside	NO	33.8	Relief	N/A	Closed	Closed	Closed	N/A	N/A	N/A	N/A	N/A	N/A	13
	57	85	Steam	6		M-35-1	1MS016B	Outside	NO	31.3	Relief	N/A	Closed	Closed	Closed	N/A	N/A	N/A	N/A	N/A	N/A	13
	57	85	Steam	6		M-35-1	1MS017B	Outside	NO	28.8	Relief	N/A	Closed	Closed	Closed	N/A	N/A	N/A	N/A	N/A	N/A	13
	57	78	Steam	30.25	YES	M-35-2	1MS001A	Outside	NO	14.8	Gate	HO	Open	Closed	Closed	Closed		S/MS	A	RM	1E	10
	57	78	Steam	4	YES	M-35-2	1MS101A	Outside	NO	20.0	Gate	AO/S	Closed	Closed	Closed	Closed		S/MS	A	RM	1E	11
	57	78	Steam	3		M-35-2	1MS021A	Outside	NO	15.4	Globe	M	Closed	Closed	Closed	N/A	N/A	N/A	M	M	N/A	14
	57	78	Steam	6	YES	M-35-2	1MS018A	Outside	NO	32.1	Relief	HO	Closed	Closed	Closed	Closed	N/A	N/A	A	RM	1E	13
	57	78	Steam	6		M-35-2	1MS013A	Outside	NO	39.1	Relief	N/A	Closed	Closed	Closed	N/A	N/A	N/A	N/A	N/A	N/A	13
	57	78	Steam	6		M-35-2	1MS014A	Outside	NO	36.6	Relief	N/A	Closed	Closed	Closed	N/A	N/A	N/A	N/A	N/A	N/A	13
	57	78	Steam	6		M-35-2	1MS015A	Outside	NO	34.1	Relief	N/A	Closed	Closed	Closed	N/A	N/A	N/A	N/A	N/A	N/A	13
	57	78	Steam	6		M-35-2	1MS016A	Outside	NO	31.6	Relief	N/A	Closed	Closed	Closed	N/A	N/A	N/A	N/A	N/A	N/A	13
	57	78	Steam	6		M-35-2	1MS017A	Outside	NO	29.1	Relief	N/A	Closed	Closed	Closed	N/A	N/A	N/A	N/A	N/A	N/A	13
	57	86	Steam	32.75	YES	M-35-2	1MS001C	Outside	NO	10.0	Gate	HO	Open	Closed	Closed	Closed		S/MS	A	RM	1E	10
	57	86	Steam	4		M-35-2	1MS101C	Outside	NO	17.7	Gate	AO/S	Closed	Closed	Closed	Closed		S/MS	A	RM	1E	11
	57	86	Steam	3		M-35-2	1MS021C	Outside	NO	11.0	Globe	M	Closed	Closed	Closed	N/A	N/A	N/A	M	M	N/A	14
	57	86	Steam	6		M-35-2	1MS018C	Outside	NO	16.5	Relief	HO	Closed	Closed	Closed	Closed		N/A	A	RM	1E	13
	57	86	Steam	6		M-35-2	1MS013C	Outside	NO	38.8	Relief	N/A	Closed	Closed	Closed	N/A	N/A	N/A	N/A	N/A	N/A	13
	57	86	Steam	6		M-35-2	1MS014C	Outside	NO	36.3	Relief	N/A	Closed	Closed	Closed	N/A	N/A	N/A	N/A	N/A	N/A	13
	57	86	Steam	6		M-35-2	1MS015C	Outside	NO	33.8	Relief	N/A	Closed	Closed	Closed	N/A	N/A	N/A	N/A	N/A	N/A	13
	57	86	Steam	6		M-35-2	1MS016C	Outside	NO	31.3	Relief	N/A	Closed	Closed	Closed	N/A	N/A	N/A	N/A	N/A	N/A	13
	57	86	Steam	6		M-35-2	1MS017C	Outside	NO	28.8	Relief	N/A	Closed	Closed	Closed	N/A	N/A	N/A	N/A	N/A	N/A	13

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
SYSTEM NAME	GDC REQUIREMENT MET	PENETRATION NUMBER	FLUID	LINE SIZE (INCHES)	ESSENTIAL*	REFERENCE DRAWING	ISOLATION VALVE NUMBER •	VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	TYPE C LEAK TEST (YES OR NO)	DISTANCE TO OUTER-MOST ISOLATION VALVE (FEET)	VALVE TYPE	VALVE OPERATOR	NORMAL POSITION	SHUTDOWN POSITION	POST ACCIDENT POSITION	POWER FAILURE POSITION	CLOSURE TIME (SECS.)	ISOLATION SIGNALS	PRIMARY MODE OF ACTUATION	SECONDARY MODE OF ACTUATION	POWER SOURCE	ISOLATION VALVE CONFIGURATION
Off Gas	56	69	Air & H_2	3	YES	M-47-2	1ØG057A	INSIDE	YES	N/A	But. Fl.	MO	CLOSED	CLOSED	CLOSED	AS IS		T	A	RM	1E	1
	56	69	Air & H_2	3	YES	M-47-2	ØØG060	OUTSIDE	YES	86.0	But. Fl.	MO	CLOSED	CLOSED	CLOSED	AS IS		T	A	RM	1E	1
	56	69	Air & H_2	3	YES	M-47-2	ØØG061	OUTSIDE	YES	87.0	But. Fl.	MO	CLOSED	CLOSED	CLOSED	AS IS		T	A	RM	1E	1
	56	69	Air & H_2	3	YES	M-47-2	ØØG062	OUTSIDE	YES	262.0	But. Fl.	MO	CLOSED	CLOSED	CLOSED	AS IS		T	A	RM	1E	1
	56	23	Air & H_2	3	YES	M-47-2	ØØG063	OUTSIDE	YES	54.0	But. Fl.	MO	CLOSED	CLOSED	CLOSED	AS IS		T	A	RM	1E	1
	56	23	Air & H_2	3	YES	M-47-2	ØØG064	OUTSIDE	YES	290.0	But. Fl.	MO	CLOSED	CLOSED	CLOSED	AS IS		T	A	RM	1E	1
	56	23	Air & H_2	3	YES	M-47-2	ØØG059	OUTSIDE	YES	53.0	But. Fl.	MO	CLOSED	CLOSED	CLOSED	AS IS		T	A	RM	1E	1
	56	13	Air & H_2	3	YES	M-47-2	1ØG079	INSIDE	YES	N/A	But. Fl.	MO	CLOSED	CLOSED	CLOSED	AS IS		T	A	RM	1E	1
	56	13	Air & H_2	3	YES	M-47-2	1ØG080	INSIDE	YES	N/A	But. Fl.	MO	CLOSED	CLOSED	CLOSED	AS IS		T	A	RM	1E	1
	56	23	Air & H_2	3	YES	M-47-2	1ØG081	INSIDE	YES	N/A	But. Fl.	MO	CLOSED	CLOSED	CLOSED	AS IS		T	A	RM	1E	1

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
SYSTEM NAME	GDC REQUIREMENT MET	PENETRATION NUMBER	FLUID	LINE SIZE (INCHES)	ESSENTIAL*	REFERENCE DRAWING	ISOLATION VALVE NUMBER *	VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	TYPE C LEAK TEST (YES OR NO)	DISTANCE TO OUTER-MOST ISOLATION VALVE (FEET)	VALVE TYPE	VALVE OPERATOR	NORMAL POSITION	SHUTDOWN POSITION	POST ACCIDENT POSITION	POWER FAILURE POSITION	CLOSURE TIME (SECS.)	ISOLATION SIGNALS	PRIMARY MODE OF ACTUATION	SECONDARY MODE OF ACTUATION	POWER SOURCE	ISOLATION VALVE CONFIGURATION
PROCESS		52		1		M-78-10	1PR001A	Outside		1.4	Globe	MO	Open	Closed	Open	Closed		T	A	M	IE	8
RADIATION		52		1		M-78-10	1PR001B	Outside		3.5	Globe	MO	Open	Closed	Open	Closed		T	A	M	IE	8
(FUTURE)		52		1		M-78-10	1PR031	Outside		2.3	Globe	AO/S	Open	Closed	Open	Closed		T	A	M	Non-1E	5
		52		1		M-78-10	1PR032	Inside		N/A	Check	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	5

1 SYSTEM NAME	2 GDC REQUIREMENT MET	3 PENETRATION NUMBER	4 FLUID	5 LINE SIZE (INCHES)	6 ESSENTIAL*	7 REFERENCE DRAWING	8 ISOLATION VALVE NUMBER	9 VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	10 TYPE C LEAK TEST (YES OR NO)	11 DISTANCE TO OUTERMOST ISOLATION VALVE (FEET)	12 VALVE TYPE	13 VALVE OPERATOR	14 NORMAL POSITION	15 SHUTDOWN POSITION	16 POST ACCIDENT POSITION	17 POWER FAILURE POSITION	18 CLOSURE TIME (SECS.)	19 ISOLATION SIGNALS	20 PRIMARY MODE OF ACTUATION	21 SECONDARY MODE OF ACTUATION	22 POWER SOURCE	23 ISOLATION VALVE CONFIGURATION
PROCESS	55	70	RC	3/8	YES	M-68-1	1PS9354A	INSIDE	YES	N/A	GLOBE	AO/S	CLOSED	CLOSED	CLOSED	CLOSED		T	A	RM	1E	2
SAMPLING	55	70	RC	3/8	YES	M-68-1	1PS9354B	OUTSIDE	YES	MIN.	GLOBE	AO/S	CLOSED	CLOSED	CLOSED	CLOSED		T	A	RM	1E	2
	55	70	RC	3/8	YES	M-68-1	1PS9355A	INSIDE	YES	N/A	GLOBE	AO/S	CLOSED	CLOSED	CLOSED	CLOSED		T	A	RM	1E	2
	55	70	RC	3/8	YES	M-68-1	1PS9355B	OUTSIDE	YES	MIN.	GLOBE	AO/S	CLOSED	CLOSED	CLOSED	CLOSED		T	A	RM	1E	2
	55	70	RC	3/8	YES	M-68-1	1PS9356A	INSIDE	YES	N/A	GLOBE	AO/S	CLOSED	CLOSED	CLOSED	CLOSED		T	A	RM	1E	2
	55	70	RC	3/8	YES	M-68-1	1PS9356B	OUTSIDE	YES	MIN.	GLOBE	AO/S	CLOSED	CLOSED	CLOSED	CLOSED		T	A	RM	1E	2
	55	70	RC	3/8	YES	M-68-1	1PS9357A	INSIDE	YES	N/A	GLOBE	AO/S	CLOSED	CLOSED	CLOSED	CLOSED		T	A	RM	1E	2
	55	70	RC	3/8	YES	M-68-1	1PS9357B	OUTSIDE	YES	MIN.	GLOBE	AO/S	CLOSED	CLOSED	CLOSED	CLOSED		T	A	RM	1E	2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
SYSTEM NAME	GDC REQUIREMENT MET	PENETRATION NUMBER	FLUID	LINE SIZE (INCHES)	ESSENTIAL*	REFERENCE DRAWING	ISOLATION VALVE NUMBER	VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	TYPE C LEAK TEST (YES OR NO)	DISTANCE TO OUTERMOST ISOLATION VALVE (FEET)	VALVE TYPE	VALVE OPERATOR	NORMAL POSITION	SHUTDOWN POSITION	POST ACCIDENT POSITION	POWER FAILURE POSITION	CLOSURE TIME (SECS.)	ISOLATION SIGNALS	PRIMARY MODE OF ACTUATION	SECONDARY MODE OF ACTUATION	POWER SOURCE	ISOLATION VALVE CONFIGURATION
REACTOR &	55	65	Gas	1	YES	M-70-1	1RE9157	OUTSIDE	YES	2.5	DIAPH	AO/S	OPEN	OPEN	CLOSED	CLOSED		T	A	RM	1E	2
CONTAINMENT	55	65	Gas	3/4	YES	M-70-1	1RE9159A	INSIDE	YES	N/A	DIAPH	AO/S	OPEN	OPEN	CLOSED	CLOSED		T	A	RM	1E	2
DRAINS TO	55	65	Gas	3/4	YES	M-70-1	1RE9159B	OUTSIDE	YES	1.0	DIAPH	AO/S	CLOSED	CLOSED	CLOSED	CLOSED		T	A	RM	1E	2
RADWASTE	55	65	Gas	1	YES	M-70-1	1RE9160A	INSIDE	YES	N/A	DIAPH	AO/S	OPEN	OPEN	CLOSED	CLOSED		T	A	RM	1E	2
	55	65	Gas	1	YES	M-70-1	1RE9160B	OUTSIDE	YES	1.5	DIAPH	AO/S	OPEN	OPEN	CLOSED	CLOSED		T	A	RM	1E	2
	55	11	Water	3	YES	M-70-1	1RE1003	INSIDE	YES	N/A	DIAPH	AO/S	CLOSED	CLOSED	CLOSED	CLOSED		T	A	RM	1E	2
	55	11	Water	3	YES	M-70-1	1RE9170	OUTSIDE	YES	1.0	DIAPH	AO/S	OPEN	OPEN	CLOSED	CLOSED		T	A	RM	1E	2

16

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
SYSTEM NAME	GDC REQUIREMENT MET	PENETRATION NUMBER	FLUID	LINE SIZE (INCHES)	ESSENTIAL*	REFERENCE DRAWING	ISOLATION VALVE NUMBER •	VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	TYPE C LEAK TEST (YES OR NO)	DISTANCE TO OUTER-MOST ISOLATION VALVE (FEET)	VALVE TYPE	VALVE OPERATOR	NORMAL POSITION	SHUTDOWN POSITION	POST ACCIDENT POSITION	POWER FAILURE POSITION	CLOSURE TIME (SECS.)	ISOLATION SIGNALS	PRIMARY MODE OF ACTUATION	SECONDARY MODE OF ACTUATION	POWER SOURCE	ISOLATION VALVE CONFIGURATION
REACTOR	56	27	Nitrogen	3/8	YES	M-60-6	1RY8025	OUTSIDE	YES	1.3	GLOBE	AO/S	CLOSED	CLOSED	CLOSED	CLOSED		T	[illegible]	[illegible]	1E	2
COOLANT	56	27	Nitrogen	3/8	YES	M-60-6	1RY8026	INSIDE	YES	N/A	GLOBE	AO/S	OPEN	OPEN	CLOSED	CLOSED		T	A	RM	1E	2
PRESSURIZER	56	27	Nitrogen	3/4	YES	M-60-6	1RY8033	OUTSIDE	YES	1.3	DIAPH	AO/S	OPEN	OPEN	CLOSED	CLOSED		T	A	RM	1E	6
	56	27	Nitrogen	3/4		M-60-6	1RY8047	INSIDE	YES	N/A	CHECK	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6
	56	44	Water	3	YES	M-60-6	1RY8028	OUTSIDE	YES	1.0	DIAPH	AO/S	OPEN	OPEN	CLOSED	CLOSED		T	A	RM	1E	6
	56	44	Water	3		M-60-6	1RY8046	INSIDE	YES	N/A	CHECK	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6

17

1 SYSTEM NAME	2 GDC REQUIREMENT MET	3 PENETRATION NUMBER	4 FLUID	5 LINE SIZE (INCHES)	6 ESSENTIAL*	7 REFERENCE DRAWING	8 ISOLATION VALVE NUMBER	9 VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	10 TYPE C LEAK TEST (YES OR NO)	11 DISTANCE TO OUTERMOST ISOLATION VALVE (FEET)	12 VALVE TYPE	13 VALVE OPERATOR	14 NORMAL POSITION	15 SHUTDOWN POSITION	16 POST ACCIDENT POSITION	17 POWER FAILURE POSITION	18 CLOSURE TIME (SECS.)	19 ISOLATION SIGNALS	20 PRIMARY MODE OF ACTUATION	21 SECONDARY MODE OF ACTUATION	22 POWER SOURCE	23 ISOLATION VALVE CONFIGURATION
RESIDUAL	55	68	RC	12	YES	M-62	1RH8701A	INSIDE	NO	N/A	GATE	MO	CLOSED	CLOSED	CLOSED	AS IS		N/A	RM	M	1E	9
HEAT	55	68	RC	12	YES	M-62	1RH8701B	INSIDE	NO	N/A	GATE	MO	CLOSED	CLOSED	CLOSED	AS IS		N/A	RM	M	1E	9
REMOVAL	55	75	RC	12	YES	M-62	1RH8702A	INSIDE	NO	N/A	GATE	MO	CLOSED	CLOSED	CLOSED	AS IS		N/A	RM	M	1E	9
	55	75	RC	12	YES	M-62	1RH8702B	INSIDE	NO	N/A	GATE	MO	CLOSED	CLOSED	CLOSED	AS IS		N/A	RM	M	1E	9

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
SYSTEM NAME	GDC REQUIREMENT MET	PENETRATION NUMBER	FLUID	LINE SIZE (INCHES)	ESSENTIAL**	REFERENCE DRAWING	ISOLATION VALVE NUMBER*	VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	TYPE C LEAK TEST (YES OR NO)	DISTANCE TO OUTER-MOST ISOLATION VALVE (FEET)	VALVE TYPE	VALVE OPERATOR	NORMAL POSITION	SHUTDOWN POSITION	POST ACCIDENT POSITION	POWER FAILURE POSITION	CLOSURE TIME (SEC.)	ISOLATION SIGNALS	PRIMARY MODE OF ACTUATION	SECONDARY MODE OF ACTUATION	POWER SOURCE	ISOLATION VALVE CONFIGURATION
	57	[illegible]	Steam	2	YES	M-48-5	1SD002C	Outside	Yes	53.95	Globe	AO/S	Open	Closed	Closed	Closed		T	A	RM	1E	11
Steam Gen-	57	80	Steam	3/8	YES	M-48-5	1SD005B	Outside	Yes	61.50	Globe	AO/S	Closed	Closed	Closed	Closed		T	A	RM	1E	11
erator	57	81	Steam	2	YES	M-48-5	1SD002D	Outside	Yes	58.39	Globe	AO/S	Open	Closed	Closed	Closed		T	A	RM	1E	11
Blowdown	57	82	Steam	2	YES	M-48-5	1SD002A	Outside	Yes	12.86	Globe	AO/S	Open	Closed	Closed	Closed		T	A	RM	1E	11
	57	82	Steam	3/8	YES	M-48-5	1SD005A	Outside	Yes	20.50	Globe	AO/S	Closed	Closed	Closed	Closed		T	A	RM	1E	11
	57	83	Steam	2	YES	M-48-5	1SD002B	Outside	Yes	11.25	Globe	AO/S	Open	Closed	Closed	Closed		T	A	RM	1E	11
	57	88	Steam	2	YES	M-48-5	1SD002E	Outside	Yes	52.32	Globe	AO/S	Open	Closed	Closed	Closed		T	A	RM	1E	11
	57	88	Steam	3/8	YES	M-48-5	1SD005C	Outside	Yes	67.29	Globe	AO/S	Closed	Closed	Closed	Closed		T	A	RM	1E	11
	57	89	Steam	2	YES	M-48-5	1SD002F	Outside	Yes	46.18	Globe	AO/S	Open	Closed	Closed	Closed		T	A	RM	1E	11
	57	90	Steam	2	YES	M-48-5	1SD002G	Outside	Yes	6.0	Globe	AO/S	Open	Closed	Closed	Closed		T	A	RM	1E	11
	57	90	Steam	3/8	YES	M-48-5	1SD005D	Outside	Yes	12.0	Globe	AO/S	Closed	Closed	Closed	Closed		T	A	RM	1E	11
	57	91	Steam	2	YES	M-48-5	1SD002H	Outside	Yes	13.69	Globe	AO/S	Open	Closed	Closed	Closed		T	A	RM	1E	11

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
SYSTEM NAME	GDC REQUIREMENT MET	PENETRATION NUMBER	FLUID	LINE SIZE (INCHES)	ESSENTIAL*	REFERENCE DRAWING	ISOLATION VALVE NUMBER*	VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	TYPE C LEAK TEST (YES OR NO)	DISTANCE TO OUTERMOST ISOLATION VALVE (FEET)	VALVE TYPE	VALVE OPERATOR	NORMAL POSITION	SHUTDOWN POSITION	POST ACCIDENT POSITION	POWER FAILURE POSITION	CLOSURE TIME (SECS.)	ISOLATION SIGNALS	PRIMARY MODE OF ACTUATION	SECONDARY MODE OF ACTUATION	POWER SOURCE	ISOLATION VALVE CONFIGURATION
SERVICE	56	56	Air	1.50	YES	M-54-2	1SA032	OUTSIDE	YES	4.4	GATE	AO/S	OPEN	OPEN	CLOSED	CLOSED		T	A	RM	1E	2
AIR	56	56	Air	1.50	YES	M-54-2	1SA033	INSIDE	YES	N/A	GATE	AO/S	OPEN	OPEN	CLOSED	CLOSED		T	A	RM	1E	2

21

1 SYSTEM NAME	2 GDC REQUIREMENT MET	3 PENETRATION NUMBER	4 FLUID	5 LINE SIZE (INCHES)	6 ESSENTIAL*	7 REFERENCE DRAWING	8 ISOLATION VALVE NUMBER	9 VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	10 TYPE C LEAK TEST (YES OR NO)	11 DISTANCE TO OUTERMOST ISOLATION VALVE (FEET)	12 VALVE TYPE	13 VALVE OPERATOR	14 NORMAL POSITION	15 SHUTDOWN POSITION	16 POST ACCIDENT POSITION	17 POWER FAILURE POSITION	18 CLOSURE TIME (SECS.)	19 ISOLATION SIGNALS	20 PRIMARY MODE OF ACTUATION	21 SECONDARY MODE OF ACTUATION	22 POWER SOURCE	23 ISOLATION VALVE CONFIGURATION
SPENT FUEL	56	57	Water	4		M-63	1FC009	INSIDE	YES	N/A	PLUG	M	CLOSED	OPEN	CLOSED	N/A	N/A	N/A	M	M	N/A	4
POOL	56	57	Water	4		M-63	1FC010	OUTSIDE	YES	3.3	PLUG	M	CLOSED	OPEN	CLOSED	N/A	N/A	N/A	M	M	N/A	4
CLEANING	56	32	Water	3		M-63	1FC011	OUTSIDE	YES	2.0	PLUG	M	CLOSED	OPEN	CLOSED	N/A	N/A	N/A	M	M	N/A	4
	56	32	Water	3		M-63	1FC012	INSIDE	YES	N/A	PLUG	M	CLOSED	OPEN	CLOSED	N/A	N/A	N/A	M	M	N/A	4

1 SYSTEM NAME	2 GDC REQUIREMENT MET	3 PENETRATION NUMBER	4 FLUID	5 LINE SIZE (INCHES)	6 ESSENTIAL*	7 REFERENCE DRAWING	8 ISOLATION VALVE NUMBER •	9 VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	10 TYPE C LEAK TEST (YES OR NO)	11 DISTANCE TO OUTERMOST ISOLATION VALVE (FEET)	12 VALVE TYPE	13 VALVE OPERATOR	14 NORMAL POSITION	15 SHUTDOWN POSITION	16 POST ACCIDENT POSITION	17 POWER FAILURE POSITION	18 CLOSURE TIME (SECS.)	19 ISOLATION SIGNALS	20 PRIMARY MODE OF ACTUATION	21 SECONDARY MODE OF ACTUATION	22 POWER SOURCE	23 ISOLATION VALVE CONFIGURATION
Steam Generator Feedwater	57	79	WATER	16	YES	M-36-1	1FW009A	Outside	No	13.75	Gate	HO	OPEN	CLOSED	CLOSED	CLOSED		FW	A	RM	1E	10
	57	100	WATER	4	YES	M-37	1AF013A	Outside	No	66.75	Globe	MO	OPEN	CLOSED	OPEN	As is		FW	RM	M	1E	10
	57	100	WATER	4	YES	M-37	1AF013E	Outside	No	62.5	Globe	MO	OPEN	CLOSED	OPEN	As is		FW	RM	M	1E	10
	57	100	WATER	3/4		M-36-1	1FW015A	Outside	No	46.75	Globe	M	CLOSED	CLOSED	CLOSED	N/A	N/A	N/A	M	M	N/A	14
	57	84	WATER	16	YES	M-36-1	1FW009B	Outside	No	13.75	Gate	HO	OPEN	CLOSED	CLOSED	CLOSED		FW	A	RM	1E	10
	57	101	WATER	4	YES	M-37	1AF013B	Outside	No	57.66	Globe	MO	OPEN	CLOSED	OPEN	As is		FW	RM	M	1E	10
	57	101	WATER	4	YES	M-37	1AF013F	Outside	No	53.0	Globe	MO	OPEN	CLOSED	OPEN	As is		FW	RM	M	1E	10
	57	101	WATER	3/4		M-36-1	1FW015B	Outside	No	46.75	Globe	M	CLOSED	CLOSED	CLOSED	N/A	N/A	N/A	M	M	N/A	14
	57	87	WATER	16	YES	M-36-1	1FW009C	Outside	No	13.75	Gate	HO	OPEN	CLOSED	CLOSED	CLOSED		FW	A	RM	1E	10
	57	102	WATER	4	YES	M-37	1AF013C	Outside	No	55.75	Globe	MO	OPEN	CLOSED	OPEN	As is		FW	RM	M	1E	10
	57	102	WATER	4	YES	M-37	1AF013G	Outside	No	52.25	Globe	MO	OPEN	CLOSED	OPEN	As is		FW	RM	M	1E	10
	57	102	WATER	3/4		M-36-1	1FW015C	Outside	No	46.75	Globe	M	CLOSED	CLOSED	CLOSED	N/A	N/A	N/A	M	M	N/A	14
	57	76	WATER	16	YES	M-36-1	1FW009D	Outside	No	13.75	Gate	HO	OPEN	CLOSED	CLOSED	CLOSED		FW	A	RM	1E	10
	57	99	WATER	4	YES	M-37	1AF013D	Outside	No	57.75	Globe	MO	OPEN	CLOSED	OPEN	As is		FW	PM	M	1E	10
	57	99	WATER	4	YES	M-37	1AF013H	Outside	No	54.25	Globe	MO	OPEN	CLOSED	OPEN	As is		FW	RM	M	1E	10
	57	99	WATER	3/4		M-36-1	1FW015D	Outside	No	46.75	Globe	M	CLOSED	CLOSED	CLOSED	N/A	N/A	N/A	M	M	N/A	14
	57	100	WATER	3	YES	M-36-1	1FW035A	Outside	No	29.0	Globe	AO/S	OPEN	CLOSED	CLOSED	CLOSED		FW	A	RM	1E	11
	57	101	WATER	3	YES	M-36-1	1FW035B	Outside	No	29.0	Globe	AO/S	OPEN	CLOSED	CLOSED	CLOSED		FW	A	RM	1E	11
	57	102	WATER	3	YES	M-36-1	1FW035C	Outside	No	32.5	Globe	AO/S	OPEN	CLOSED	CLOSED	CLOSED		FW	A	RM	1E	11
	57	99	WATER	3	YES	M-36-1	1FW035D	Outside	No	32.5	Globe	AO/S	OPEN	CLOSED	CLOSED	CLOSED		FW	A	RM	1E	11
	57	100	WATER	6	YES	M-36-1	1FW040A	Outside	No	16.25	Gate	AO/S	CLOSED	CLOSED	CLOSED	CLOSED		FW	A	RM	1E	11
	57	101	WATER	6	YES	M-36-1	1FW040B	Outside	No	16.25	Gate	AO/S	CLOSED	CLOSED	CLOSED	CLOSED		FW	A	RM	1E	11
	57	102	WATER	6	YES	M-36-1	1FW040C	Outside	No	16.25	Gate	AO/S	CLOSED	CLOSED	CLOSED	CLOSED		FW	A	RM	1E	11
	57	99	WATER	6	YES	M-36-1	1FW040D	Outside	No	16.25	Gate	AO/S	CLOSED	CLOSED	CLOSED	CLOSED		FW	A	RM	1E	11
	57	79	WATER	3	YES	M-36-1	1FW043A	Outside	No	27.25	Globe	AO/S	CLOSED	CLOSED	CLOSED	CLOSED		FW	A	RM	1E	11
	57	84	WATER	3	YES	M-36-1	1FW043B	Outside	No	27.25	Globe	AO/S	CLOSED	CLOSED	CLOSED	CLOSED		FW	A	RM	1E	11
	57	87	WATER	3	YES	M-36-1	1FW043C	Outside	No	27.25	Globe	AO/S	CLOSED	CLOSED	CLOSED	CLOSED		FW	A	RM	1E	11
	57	76	WATER	3	YES	M-36-1	1FW043D	Outside	No	27.25	Globe	AO/S	CLOSED	CLOSED	CLOSED	CLOSED		FW	A	RM	1E	11

1 SYSTEM NAME	2 GDC REQUIREMENT MET	3 PENETRATION NUMBER	4 FLUID	5 LINE SIZE (INCHES)	6 ESSENTIAL*	7 REFERENCE DRAWING	8 ISOLATION VALVE NUMBER	9 VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	10 TYPE C LEAK TEST (YES OR NO)	11 DISTANCE TO OUTERMOST ISOLATION VALVE (FEET)	12 VALVE TYPE	13 VALVE OPERATOR	14 NORMAL POSITION	15 SHUTDOWN POSITION	16 POST ACCIDENT POSITION	17 POWER FAILURE POSITION	18 CLOSURE TIME (SECS.)	19 ISOLATION SIGNALS	20 PRIMARY MODE OF ACTUATION	21 SECONDARY MODE OF ACTUATION	22 POWER SOURCE	23 ISOLATION VALVE CONFIGURATION
Safety Injection	55	26	BW	4	YES	M-61-2	1SI8801A	Outside	Yes	4.8	Gate	MO	Closed	Closed	Closed	As Is		S	A	RM	1E	5
	55	26	BW	4	YES	M-61-2	1SI8801B	Outside	Yes	8.9	Gate	MO	Closed	Closed	Closed	As Is		S	A	RM	1E	5
	55	26	BW	3		M-61-2	1SI8815	Inside	Yes	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	55	55	Nitrogen	1	YES	M-61-6	1SI8880	Outside	Yes	15.5	Globe	AO/S	Closed	Closed	Closed	Closed		T	A	RM	1E	6
	55	55	Nitrogen	1		M-61-6	1SI8968	Inside	Yes	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6
	55	55	BW	3/4	YES	M-61-6	1SI8964	Outside	Yes	17.8	Globe	AO/S	Closed	Closed	Closed	Closed		T	A	RM	1E	2
	55	55	BW	3/4	YES	M-61-6	1SI8871	Inside	Yes	N/A	Globe	AO/S	Closed	Closed	Closed	Closed		T	A	RM	1E	2
	55	59	Water	4	YES	M-61-3	1SI8802A	Outside	Yes	3.7	Gate	MO	Closed	Closed	Closed	As Is		N/A	RM	M	1E	5
	55	59	Water	2		M-61-3	1SI8905A	Inside	No	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	55	59	Water	2		M-61-3	1SI8905D	Inside	No	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	55	73	Water	4	YES	M-61-3	1SI8802B	Outside	Yes	2.7	Gate	MO	Closed	Closed	Closed	As Is		N/A	RM	M	1E	5
	55	73	Water	2		M-61-3	1SI8905C	Inside	No	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	55	73	Water	2		M-61-3	1SI8905B	Inside	No	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	55	60	Water	4	YES	M-61-3	1SI8835	Outside	Yes	3.3	Gate	MO	Closed	Closed	Closed	As Is		N/A	RM	M	1E	5
	55	60	Water	2		M-61-3	1SI8819A	Inside	No	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	55	60	Water	2		M-61-3	1SI8819B	Inside	No	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	55	60	Water	2		M-61-3	1SI8819C	Inside	No	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	55	60	Water	2		M-61-3	1SI8819D	Inside	No	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	55	50	Water	8	YES	M-61-4	1SI8809A	Outside	No	3.7	Gate	MO	Closed	Closed	Closed	As Is		N/A	RM	M	1E	5
	55	50	Water	6		M-61-4	1SI8818A	Inside	No	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	55	50	Water	6		M-61-4	1SI8818D	Inside	No	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	55	51	Water	8	YES	M-61-4	1SI8809B	Outside	No	3.3	Gate	MO	Closed	Closed	Closed	As Is		N/A	RM	M	1E	5
	55	51	Water	6		M-61-4	1SI8818B	Inside	No	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	55	51	Water	6		M-61-4	1SI8818C	Inside	No	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	56	92	N_aOH+BW	24	YES	M-61-4	1SI8811A	Outside	No	1.8	Gate	MO	Closed	Closed	Closed	As Is		S	A	RM	1E	1
	56	92	N_aOH+BW	12	YES	M-61-4	1SI8812A	Outside	No	55.3	Gate	MO	Open	Closed	Closed	As Is		N/A	RM	M	1E	1
	56	93	N_aOH+BW	24	YES	M-61-4	1SI8811B	Outside	No	1.8	Gate	MO	Closed	Closed	Closed	As Is		S	A	RM	1E	1
	56	93	N_aOH+BW	12	YES	M-61-4	1SI8812B	Outside	No	63.4	Gate	MO	Open	Closed	Closed	As Is		N/A	RM	M	1E	1
	55	50	Water	3/4		M-61-4	1SI8890A	Inside	No	N/A	Globe	AO/S	Closed	Closed	Closed	Closed		N/A	RM	M	Non 1E	
	55	51	Water	3/4		M-61-4	1SI8890B	Inside	No	N/A	Globe	AO/S	Closed	Closed	Closed	Closed		N/A	RM	M	Non 1E	
	55	55	Water	3/4	YES	M-61-3	1SI8888	Outside	Yes	14.7	Globe	AO/S	Closed	Closed	Closed	Closed		T	A	RM	1E	2
	55	59	Water	3/4		M-61-3	1SI8881	Inside	Yes	N/A	Globe	AO/S	Closed	Closed	Closed	Closed		N/A	RM	M	Non 1E	
	55	66	Water	12	YES	M-61-3	1SI8840	Outside	Yes	3.8	Gate	MO	Closed	Closed	Closed	As Is		N/A	RM	M	1E	5
	55	73	Water	3/4		M-61-3	1SI8824	Inside	No	N/A	Globe	AO/S	Closed	Closed	Closed	Closed		N/A	RM	M	Non 1E	
	55	60	Water	3/4		M-61-3	1SI8823	Inside	No	N/A	Globe	AO/S	Closed	Closed	Closed	Closed		N/A	RM	M	Non 1E	
	55	66	Water	8		M-61-3	1SI8841A	Inside	No	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	55	66	Water	8		M-61-3	1SI8841B	Inside	No	N/A	Check	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5
	55	66	Water	3/4		M-61-3	1SI8825	Inside	No	N/A	Globe	AO/S	Closed	Closed	Closed	Closed		N/A	RM	M	Non 1E	
	55	26	BW	3/4		M-61-2	1SI8843	Inside	Yes	N/A	Globe	AO/S	Closed	Closed	Closed	Closed		N/A	RM	M	Non 1E	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
SYSTEM NAME	GDC REQUIREMENT MET	PENETRATION NUMBER	FLUID	LINE SIZE (INCHES)	ESSENTIAL**	REFERENCE DRAWING	ISOLATION VALVE NUMBER *	VALVE LOCATION (INSIDE OR OUTSIDE CONTAINMENT)	TYPE C LEAK TEST (YES OR NO)	DISTANCE TO OUTERMOST ISOLATION VALVE (FEET)	VALVE TYPE	VALVE OPERATOR	NORMAL POSITION	SHUTDOWN POSITION	POST ACCIDENT POSITION	POWER FAILURE POSITION	CLOSURE TIME (SECS.)	ISOLATION SIGNALS	PRIMARY MODE OF ACTUATION	SECONDARY MODE OF ACTUATION	POWER SOURCE	ISOLATION VALVE CONFIGURATION
WASTE	56	47	WATER	2	YES	M-48-6	1RF026	INSIDE	YES	5.8	PLUG	AO/S	OPEN	OPEN	CLOSED	CLOSED		T	A	RM	1E	2
DISPOSAL	56	47	WATER	3	YES	M-48-6	1RF027	OUTSIDE	YES	4.6	PLUG	AO/S	OPEN	OPEN	CLOSED	CLOSED		T	A	RM	1E	2

LEGEND

COLUMN NO.		EXPLANATION
4	R.C.	= Reactor Coolant
	B.W.	= Borated Water
	C.C.W.	= Component Cooling Water
6	ESSENTIAL	= **
13	M	= Manual
	MO	= Motor Operated
	HO	= Hydraulic Operated
	AO	= Air Operated
	AO/S	= Air Operated with Solenoid Accessory
17	"AS IS"	is the Safe Position
19	S	= Actuates on Safety Injection
	T	= Actuates on Phase A Containment Isolation
	P	= Actuates on Phase B Containment Isolation
	MS	= Actuates on Main Steam Isolation
	FW	= Actuates on Main Feedwater Isolation
	T1	= Actuates on Containment Spray Actuation
	T2	= Actuates on Containment Vent. Isolation
20/21	A	= Automatic (Air, Hydraulic or Electrical) Operation
	M	= Manual Operation
	RM	= Remote Manual Operation
22	IA	= Instrument Air
23	See Figure 6.2-29.	
11	MIN.	= Valves will be placed as close to the containment as practical.

*NOTE - Although the data listed is only given for Unit 1 valves, the data applies to Unit 2 valves as well.

** Essential systems are those systems which may be used following a containment isolation signal. Essential systems may be isolated on containment isolation signals as noted in Column 19, but their isolation valves are supplied with 1E power to permit manual reopening if required.

9.5 OTHER AUXILIARY SYSTEMS

9.5.1 Fire Protection Systems

The design bases, system descriptions, safety evaluation, inspection and testing requirements, personnel qualification, and training is described in Reference 1.

9.5.2 Communication Systems

9.5.2.1 Design Bases

The plant communications systems are designed to provide reliable internal and external communications during normal as well as abnormal operating conditions.

The following communications systems are normally available:

a. a public address system which includes the assembly alarm system,

b. a telephone system which includes "code call" system,

c. a sound-powered telephone system,

d. an intraplant radio system,

e. a plant-to-offsite radio system, and

f. a microwave system.

The public address system is designed so that it provides effective communication between plant personnel in all vital areas during the full spectrum of accident or incident conditions under maximum potential noise levels. However, actual demonstrations of the installed system will check for effective communication between plant personnel in all vital areas during maximum potential noise levels. The outcome of these high noise level tests may result in some modification to the installation.

The dial telephone system shall consist of local telephone company PBX equipment and telephone stations located throughout the plant and main control room. The power supply to the telephone PBX equipment shall be obtained from a non-safety-related power supply with backup power being provided by the security diesel generator.

A "code call" system for locating personnel by phone throughout the plant shall be furnished in conjunction with the dial telephone system. The "code call" system ac power supply shall be obtained from a non-safety-related power supply with backup power being provided by the security diesel generator.

established for ECCS performance. Redundant sources of the ECCS actuation signal are available so that the proper and timely operation of the ECCS will not be inhibited. Sufficient instrumentation is available so that a failure of an instrument will not impair readiness of the system. The active components of the ECCS are powered from separate buses which are energized from offsite power supplies.

In addition, redundant sources of auxiliary onsite power are available through the use of the emergency diesel-generators to ensure adequate power for all ECCS requirements. Each diesel is capable of driving all pumps, valves, and necessary instruments associated with one train of the ECCS.

Spurious movement of a motor-operated valve due to the actuation of its positioning device coincident with a Loss-of-Coolant Accident (LOCA) has been analyzed and found not to be credible for consideration in design. The following valves are blocked from inadvertent operation as described in Subsection 8.1.10: 1MOV-SI8802 A&B, 1MOV-SI8806, 1MOV-SI8808 A, B, C, & D, 1MOV-SI8809 A & B, 1MOV-SI8812 A&B, 1MOV-SI8813, 1MOV-SI8814, 1MOV-SI8820, 1MOV-SI8835, and 1MOV-SI8840.

The elevated temperature of the sump solution during recirculation is well within the design temperature of all ECCS components. Consideration has been given to the potential for corrosion of various types of metals exposed to the fluid conditions prevalent immediately after the accident or during long-term recirculation operations.

Environmental testing of ECCS equipment inside the containment, which is required to operate following a LOCA, is discussed in Section 3.11.

6.3.2 System Design

The Emergency Core Cooling System (ECCS) components are designed in order that a minimum of three accumulators, one charging pump, one safety injection pump, and one residual heat removal pump together with their associated valves and piping will ensure adequate core cooling in the event of a design-basis LOCA. The redundant onsite emergency diesels ensure adequate emergency power to all electrically-operated components in the event that a loss of offsite power occurs simultaneously with a LOCA, even assuming a single failure in the emergency power system such as the failure of one diesel to start.

6.3.2.1 Schematic Piping and Instrumentation Diagrams

Flow diagrams of the ECCS are shown in Figures 6.3-1 and 6.3-2. Pertinent design and operating parameters for the components of the ECCS are given in Table 6.3-1. The codes and standards to which the individual components of the ECCS are designed are listed in Table 3.2-1.

Sound-powered telephones shall be used in special areas where instrumentation racks and controls are installed. This type of communication is to aid the instrument mechanics when testing and adjusting instrumentation and controls.

The intraplant radio system shall be designed to provide radio communications from a control point (base station) to various "Handie-Talkie" units throughout the plant, and to provide direct radio communications from "Handie-Talkie" to "Handie-Talkie" via a repeater system. It shall be an independent subsystem of the plant communications system.

Locations for the fixed repeaters installed to permit use of portable radio communication units will be determined after plant construction to ensure adequacy of coverage.

Emergency offsite backup communication facilities will be provided through a licensed emergency two-way radio transmitter and receiver. The power supply to the emergency radio equipment shall be obtained from a non-safety-related power supply with backup power being provided by the security diesel generator.

The microwave system shall consist of solid-state, battery-powered equipment designed and engineered primarily for the protective relaying of the transmission system. However, a voice channel shall also be provided which will serve as an additional offsite communication medium. The tones received via this channel shall have volume, fidelity, and freedom from extraneous noises comparable with the quality normally obtained on a commercial telephone.

Together with the dial telephone system and the emergency two-way radio transmitter and receiver, the microwave system provides the plant communications system with three diverse offsite communication types, of which a loss of any two types will not jeopardize the total offsite communications system of the plant. This three-system redundancy, therefore, satisfies the compliance to the single-failure criterion.

9.5.2.2 Inspection and Testing Requirements

The inspection and testing requirements for the communication systems are provided as follows:

a. The plant-to-offsite radio is checked once per day in accordance with the requirements for testing of communications equipment used for security and will be frequency-checked once a year in accordance with the Federal Communication Commission's requirements.

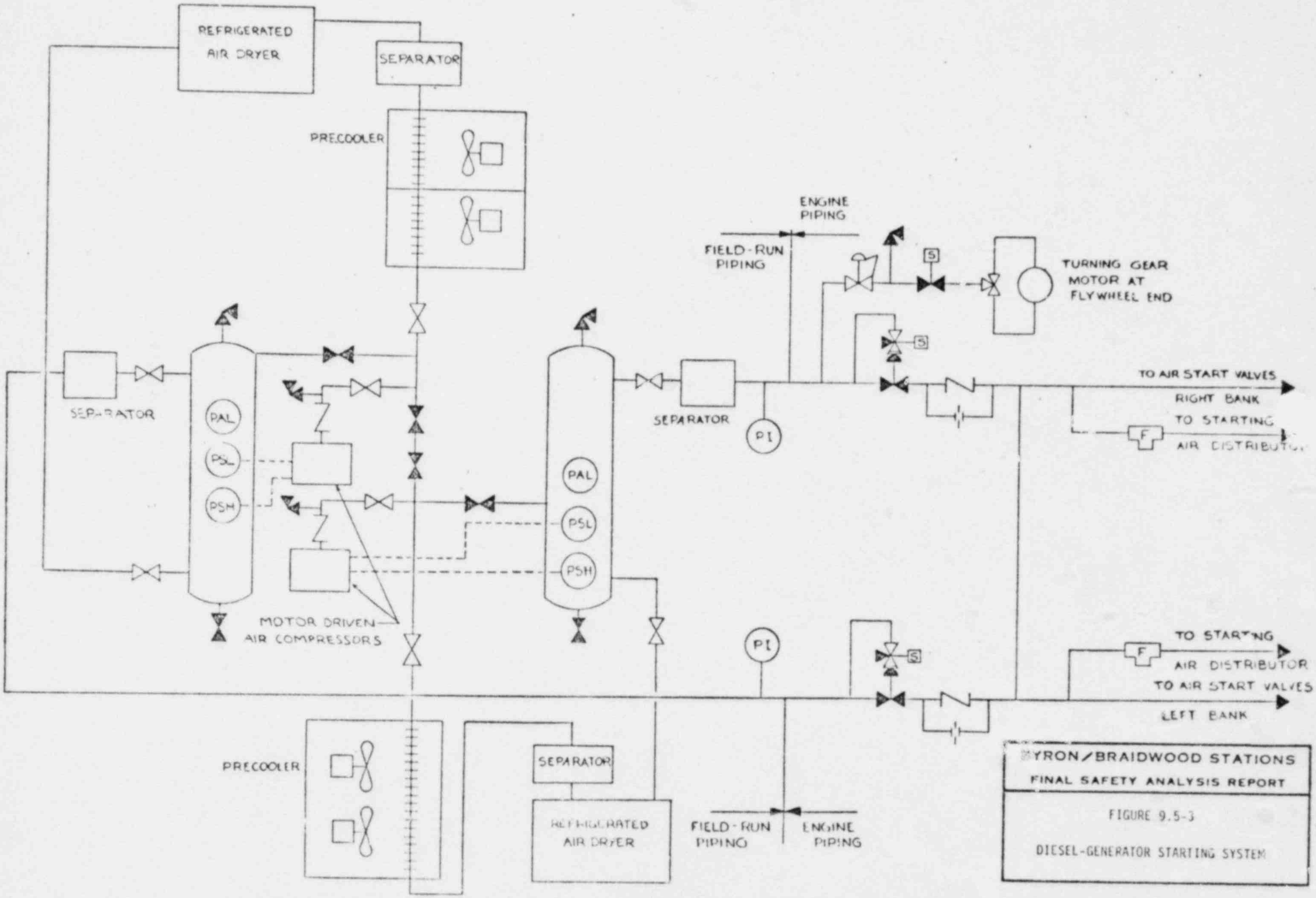

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FIGURE 9.5-3

DIESEL-GENERATOR STARTING SYSTEM

TABLE 14.2-62

INITIAL CORE LOAD

(Startup Test)

Plant Condition or Prerequisites

All prerequisite preoperational tests completed, reviewed, and approved.

Test Objective

To assemble the reactor core in the vessel in a cautious and deliberate manner to preclude inadvertent criticality.

Test Summary

Initial fuel loading will be conducted as described in Subsection 14.2.10.1.

In addition to the summary offered in Subsection 14.2.10.1 the following items will be carried out prior to or during the performance of the test:

a. A response check of the nuclear instruments to a neutron source will be conducted within 8 hours of fuel loading.

b. Boron samples to determine boron concentration will be taken at least once every 4 hours throughout the core loading program.

c. Continuous voice communication links will be maintained between the control room and fuel loading personnel throughout the core loading program.

d. Prior to core loading the radiation monitoring system and associated ventilation interlocks will be aligned, calibrated and placed in service. Prior to core loading the plant nuclear instrumentation will be calibrated and placed in service. Prior to core loading containment evacuation alarms will be installed and satisfactorily tested, evacuation procedures will be explained and alarms demonstrated to all personnel involved. Throughout core loading containment evacuation alarms will be verified operable at least once per 8 hours.

e. RCS boron concentration shall be increased immediately in accordance with Plant Emergency Procedures if the RCS boron concentration decreases to a value lower than that required by Technical Specifications, or if after fuel movement has ceased, the nuclear monitoring channels indicate that the reactor is critical or continues to approach criticality. Concentrated boric acid from the boric acid tanks shall be added to the vessel through the emergency boration valve and the RCS charging pumps. Boration shall continue until the required shutdown status is achieved. Containment evacuation will be carried out in accordance with evacuation procedures.

Acceptance Criteria

The initial core loading is completed in accordance with the applicable procedures and as specified in core design studies made in advance of fuel load.

TABLE 14.2-75

INITIAL CRITICALITY

(Startup Test)

Plant Condition or Prerequisites

Plant at hot shutdown. Nuclear instrumentation aligned, and conse vative reactor trip setpoints made.

Test Objective

To bring the reactor critical for the first time.

Test Summary

All rods will be withdrawn except the last controlling bank, which is left partially inserted for control after criticality is achieved. The all-rods-out boron concentration will be measured.

The following procedure limitations will be observed prior to and during the performance of the approach to critical test:

a. A neutron count rate of at least 1/2 count per second must be observed on the source range instrumentation channels with a signal-to-noise ratio greater than 2.

b. Predictions of critical boron concentration and control rod positions will be provided by the vendor in the initial core loading nuclear design report.

During the approach to initial criticality, RCC bank withdrawal and RCS boron concentration reduction will be accompanied by nuclear monitoring using inverse count rate ratio plots through which criticality can be predicted.

If nuclear monitoring data indicate that criticality will be achieved before the RCC banks are fully withdrawn, further bank withdrawal will be terminated. Bank withdrawal may be resumed after it has been verified that a continuation will not result in reducing the shutdown margin to a value less than Technical Specifications requirements.

If, during RCS boron dilution, the nuclear monitoring data indicate a significant departure from expected response, dilution will be terminated until the source of the unexpected response is corrected, or understood and considered not to adversely affect the safety of continued operations.

c. The following reactivity addition sequence will be used to assure that criticality will not be passed through on a period shorter than approximately 30 seconds:

   Nuclear monitoring data will be analyzed concurrent with RCS boron dilution to permit accurate predictions of the conditions under which criticality is expected to occur.

   If, during RCS boron dilution, the nuclear monitoring data indicate a significant departure from expected response, dilution will be terminated until the source of the unexpected response is corrected, or understood and considered not to adversely affect the safety of continued operations.

   When the Inverse Count Rate Ratio (ICRR) from any nuclear monitoring channel reaches approximately 0.1, the RCS dilution rate will be reduced to approximately 30 gpm, and nuclear monitoring ICRR data will be obtained and renormalized to 1.0. Dilution at this new rate will be continued until criticality is achieved.

   If criticality will be achieved by withdrawing control rods, the following will be followed: When the ICRR reaches approximately 0.3 (after renormalization), the dilution will be terminated and approximately 15-30 minutes of waiting will be undertaken to permit RCS mixing. Control bank D will then be withdrawn incrementally until criticality is achieved.

Acceptance Criteria

The plant is made critical in accordance with applicable procedures and criteria established from the safety analysis report or core design.

AUXILIARY FEEDWATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.1.2 At least two independent steam generator auxiliary feedwater pumps and associated flow paths shall be OPERABLE with:

a. One auxiliary feedwater pump capable of being powered from an emergency power bus.

b. One auxiliary feedwater pump capable of being powered from a direct-drive diesel engine and an OPERABLE diesel fuel supply system consisting of a day tank containing a minimum of 420 gallons of fuel.

APPLICABILITY: MODES 1, 2 and 3.

ACTION:

With one auxiliary feedwater pump inoperable, restore the inoperable auxiliary feedwater pump to operable status within 7 days or be in hot shutdown within 12 hours.

SURVEILLANCE REQUIREMENTS

4.7.1.2.1 The motor-driven auxiliary feedwater pump shall be demonstrated OPERABLE per the requirements of Specification 4.0.5.

4.7.1.2.2 The diesel-driven auxiliary feedwater pump shall be demonstrated OPERABLE:

a. At least once per 31 days by:

1. Verifying that the diesel-driven pump develops a discharge pressure of at least 93% for the applicable flow rate as determined from the manufacturer's pump performance curve.

2. Verifying by flow or position check that each valve (manual, power-operated or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

4.7.1.2.3 At least once per 18 months during studown:

1. Verify that the motor-driven pump and the diesel-driven pumps start automatically upon receipt of each of the following test signals:

a) Safeguard actuation signal.

REGULATORY GUIDE 1.9

Applicable Issue: Revision 2, December 1979

SELECTION, DESIGN, AND QUALIFICATION OF DIESEL-GENERATOR UNITS USED AS STANDBY (ONSITE) ELECTRIC POWER SYSTEMS AT NUCLEAR POWER PLANTS

The applicant complies with the Regulatory Position with the following clarification regarding paragraph C.4:

> Due to high transformer inrush current, the voltage may dip below the required limit of 75% of nominal upon energizing the 480 Volt substation transformers and their auxiliary loads. However, this dip is of a very short duration (.2 - .5 seconds) and will occur immediately after the diesel generator breaker is closed. Since the diesel breaker is expected to close 8.5 to 9 seconds following a loss of offsite power (LOOP) and the first motor load (Centrifugal Charging Pump motor) is sequenced on 10 seconds after a LOOP, the voltage will have recovered to the required limits prior to beginning the load sequence.

Compliance with the requirements of this guide is described further in Subsections 8.1.2, 8.1.20, 8.3.1.1.1 and 8.3.1.2. Therefore, the applicant meets the objectives set forth in this regulatory guide.

REGULATORY GUIDE 1.32

Current Issue: Revision 2, February 1977

CRITERIA FOR SAFETY-RELATED ELECTRIC POWER SYSTEMS FOR NUCLEAR POWER PLANTS

The Applicant complies with the Regulatory Positions of this guide with the following exceptions/clarifications:

Regulatory Position C.1.a.

See Applicant's Position on Regulatory Guide 1.93.

Regulatory Position C.1.d.

See Applicant's Position on Regulatory Guides 1.6 and 1.75.

Regulatory Position C.1.e.

See Applicant's Position on Regulatory Guide 1.75.

Regulatory Position C.1.f.

See Applicant's Position on Regulatory Guide 1.9.

Regulatory Position C.2.a.

See Applicant's Position on Regulatory Guide 1.81.

Regulatory Position C.2.b.

See Applicant's Position on Regulatory Guide 1.93.

REGULATORY GUIDE 1.73

Applicable Issue: Revision 0, January 1974

QUALIFICATION TESTS OF ELECTRIC VALVE OPERATORS INSTALLED INSIDE THE CONTAINMENT OF NUCLEAR POWER PLANTS

This regulatory guide indicates the NRC acceptance (with certain qualifications) of the requirements of IEEE-382-1972, "IEEE Trial-Use Guide for Type Test of Class I Electric Valve Operators for Nuclear Power Generating Stations". The applicant complies with the objectives set forth in this regulatory guide as indicated in Subsections 6.2.4.2 and 8.1.13.

REGULATORY GUIDE 1.81

Current Issue: Revision 1, January, 1975

SHARED EMERGENCY AND SHUTDOWN ELECTRIC SYSTEMS FOR MULTIUNIT NUCLEAR POWER PLANTS

The Byron/Braidwood design complies with the requirements of this regulatory guide (which indicates the acceptable methods of compliance with General Design Criterion 5). The independence of each unit's onsite electrical systems is further discussed in Subsection 8.1.15.

REGULATORY GUIDE 1.93

Current Issue: Revision 0, December 1974

AVAILABILITY OF ELECTRIC POWER SOURCES

Availability of electric power sources is discussed in Subsection 16.3/4.8.

The Applicant complies with the requirements of this guide with the following exception:

Regulatory Positions C.1, C.2 and C.4 refer to a 72-hour time interval for power operation when the available power sources are less than the "Limiting Conditions for Operation". The Applicant uses a 7-day time interval in place of the 72-hour time interval contained in this guide.

REGULATORY GUIDE 1.106

Current Issue: Revision 1, March 1977

THERMAL OVERLOAD PROTECTION FOR ELECTRIC MOTORS ON MOTOR-OPERATED VALVES

The Applicant complies with the requirements of this Regulatory Guide. The Applicant has selected the method described in Regulatory Position C.2.

REGULATORY GUIDE 1.128

Current Issue: Revision 1, October, 1978

INSTALLATION DESIGN AND INSTALLATION OF LARGE LEAD STORAGE BATTERIES FOR NUCLEAR POWER PLANTS

The Applicant complies with the requirements of this guide with the exceptions and/or clarifications to the Regulatory Positions identified and justified below:

Regulatory Position C-1

In Subsection 4.1.4, "Ventilation," instead of the second sentence, the following should be used:

> "The ventilation system shall limit hydrogen concentration to less than two percent by volume at any location within the battery area."

Applicant's Position

The ventilation requirements set forth in IEEE Std. 484-1975 are adequate.

Justification of Applicant's Position

IEEE Std. 484-1975 requires that the ventilation system limit hydrogen accumulation to less than 2% of the total volume of the battery area. This Regulatory Position would require that hydrogen accumulation be limited to less than 2% at any location within the battery area. The ventilation requirements as set forth in IEEE Std. 484-1975 are entirely adequate. The "2% at any location" requirement would be almost impossible to verify and might even require the installation of ducts, vanes, and/or auxiliary fans so as to ensure that every "nook and cranny" is thoroughly purged.

The battery area ventilation system is designed to maintain the hydrogen concentration below 2% with a "run-away" charger (i.e., a charger delivering its full-rated output into a fully-charged battery, thereby causing gasing of all cells). Thus, any significant hydrogen build-up in the battery area would require two failures (a failure of the ventilation system, and a failure of the charger), both of which will be annunciated in the main control room.

Regulatory Position C-2

In Subsection 4.2.1, "Location," Item 1, the general requirement that the battery be protected against fire should be supplemented with the applicable recommendations in Regulatory Guide 1.120, "Fire Protection Guidelines for Nuclear Power Plants."

Applicant's Position

The reference to Regulatory Guide 1.120 is inappropriate because this Regulatory Guide is presently only in the "comment" stage.

Justification of Applicant's Position

The battery location and protection against fire will be described in the Fire Protection Report in Response to Branch Technical Position APCSB 9.5.1 in lieu of Regulatory Guide 1.120. The location and fire protection requirements set forth in IEEE Std. 484-1975 are adequate.

In reference to Regulatory Guide 1.120, Revision 1, (November, 1977), Section C.6(g), Page 20, "Safety-Related Battery Rooms", our comments are as follows:

(a) This paragraph seems to imply that all Safety-Related batteries are to be located in separately-enclosed rooms. It is Applicant's position that it should not be necessary that battery rooms be separated from other areas of the plant by barriers having a minimum fire rating of three hours. Such barriers would be necessary only if the batteries were in a separate fire protection zone. There is nothing wrong with a design wherein the battery is located in an open area so long as the battery is protected from mechanical damage; e.g., the battery may be located in an Electrical Equipment Room but protected by an enclosing fence.

(b) The location of dc switchgear and inverters in the Electrical Equipment Room described above is a satisfactory arrangement.

Regulatory Position C-3

Items 1 through 5 of Subsection 4.2.2, "Mounting," should be supplemented with the following:

> "6. Restraining channel beams and tie rods shall be electrically insulated from the cell case and shall also be in conformance with Item 2 above regarding moisture and acid resistance."

In addition, the general requirement in Item 5 to use IEEE Standard 344-1975 should be supplemented by Regulatory Guide 1.100, "Seismic Qualification of Electric Equipment for Nuclear Power Plants."

Applicant's Position

Restraining channel beams and tie rods need not be electrically insulated from the cell case.

Justification of Applicant's Position

The expense for the addition of electrical insulation to the restraining channel beams and tie rods is unwarranted. Heat from an accident that can damage lead plates and vaporize electrolyte could also melt insulation on restraining channels and tie rods. In addition, rubber or plastic for insulation purposes will significantly increase the combustible fuel loading in the battery area and thus add to the fire hazard.

E.19 REACTOR COOLANT SYSTEM VENTS (II.B.1)

POSITION:

The reactor coolant system vent (RCSV) line is located at the top of the reactor integrated head. This 0.5 inch diameter schedule 160 line contains four safety grade solenoid-operated valves which are powered by emergency buses. Being located at a high point permits this line to vent the reactor coolant system normally connected to the reactor pressure vessel. The RCSV is remotely operated and monitored from the main control room. Since the RCSV line is a 0.5 inch pipe, it is smaller than the size for which a LOCA analysis would be required.

The RCSV line was designed and installed as ASME Section III, Class 1 piping to applicable codes. Final positioning of the discharge of the RCSV minimizes possible impingement on equipment or obstructions. (See Figure E.19-1, RCSV ISOMETRIC DRAWING.)

Seismic and environmentally (IEEE 323-1974) qualified ASME Section III Class 1 solenoid-operated valves (1(2) RC014A-D) are installed in parallel sets of two, supplied by redundant emergency buses. Positive indication of valve position is provided, from valve operator limit switches, to the control switch lights in the main control room.

A main control room alarm is also provided in conjunction with valve position indication to alarm when any vent valve is open. In addition, surface mounted resistance temperature detectors with main control room alarms are provided downstream of the solenoid-operated valves for leak detection.

These valves are designed to pass steam, steam/water, water, and non-condensible gases. The RCS vents directly to the containment. Possible hydrogen concentration will be controlled by the containment hydrogen recombiners.

The Westinghouse Owners' Group, of which the Commonwealth Edison Company is a member, is working on guidelines and procedures for use of the RCSV system. The guidelines and procedures developed will be incorporated into the Byron/ Braidwood plant operating procedures.

Complete analysis of the RCSV system is not yet completed.

Human factor analysis will be taken into account in finalizing the Byron and Braidwood Stations emergency procedures and monitoring equipment with respect to the use of the reactor coolant vent system.

New Question (6.2.4.1)

Revision K to P&ID M-55-2 which added a normally open manual valve, 1IA088, between the inboard and outboard containment isolation valves is unacceptable. To meet containment isolation requirements, this new valve would need to be normally closed and under administrative control, or the connected piping and solenoid valve would have to satisfy all requirements for a closed system inside containment, including seismic Category I Quality Group B.

RESPONSE

Revision M to P&ID M-55-2 shows the manual valve 1IA088 as being normally closed. Table 6.2-58 will be revised to indicate this change. This valve will be put under administrative control per the requirements of ANSI N271-1976.

New Question (6.2.4.10)

Provide the required information requested in FSAR Table 6.2-58 for the new process radiation lines penetrating containment.

RESPONSE

This information has been added to Table 6.2-58.

QUESTION 010.43

"Your response to Q010.7 is not complete. You have not provided a sufficient description of the precise methods, crane interlocks, administrative controls, structures, etc. to restrict the fuel handling building crane hook travel over the spent fuel pool. It is our position that administrative controls alone are an inadequate means to restrict movement to a particular position. Provide a description of the design used to prevent movement of the spent fuel cask laterally over the spent fuel pool while the fuel handling building crane bridge is positioned longitudinally to handle the spent fuel cask within the spent fuel cask storage area. Also provide this same information for movement of the fuel handling building crane hook when transferring new fuel to the new fuel elevator."

RESPONSE

During new fuel loading the 15 ton auxiliary hook is used to remove the new fuel from the transport vehicle to the new fuel storage racks or new fuel elevator. It is required to have full freedom of travel horizontally to perform this task, so there are no interlocks or stops to prevent hook movement during this period. The auxiliary hook can travel up to 5 feet 6 inches into the spent fuel pool. This additional travel capability may be required for future new fuel transfer operation.

End stops installed on the bridge physically prevent the main hook of the crane from traveling into the spent fuel storage area when handling a spent fuel cask. These end stops are removed during the periods that spent fuel cask handling operations are not in progress or anticipated.

New fuel operations and cask handling will not be performed simultaneously, thus minimizing the possibility of improper movement of the cask.

The main hook is not used for any operations over the spent fuel pool. Therefore, it is very unlikely that the main hook and lower load block could be dropped on the spent fuel. Even if such an event were to occur, the resulting damage to the fuel would not result in a release which exceeds the limits of 10CFR100. This can be seen by extrapolation of the results of a postulated single fuel element drop in Chapter 15. This shows that a large number of elements must be damaged to exceed the 10CFR100 limits. The lower load block is not large enough to cause this damage.

All potential accidents involving lifting and transporting of loads heavier than a fuel element will be addressed in a report to be submitted in response to NUREG-0612. The fuel handling building crane and loads are included in this report.

The consequences of the drop of loads lighter than a fuel element will be less than the drop of a single fuel element as reported in Chapter 15 of the FSAR. The design of the tools and the fuel building cranes prevents the tools from dropping onto the fuel from a great height. The heaviest of these loads is the RCC Change Tool which weighs less than 1100 lbs. This tool is over 30 feet long. Because of the height of the fuel building crane, the RCC Change Tool can only be carried a few feet above the fuel. With the short vertical drop distance and the low weight per foot of length involved, there is no real probability of damage to the fuel. The Burnable Poison Assembly Handling Tool, the Thimble Plug Handling Tool, and the Spent Fuel Assembly Handling Tool all have weights under 30 lbs. per foot and are not carried high above the fuel. All other tools have gross weights under 100 lbs. The single fuel assembly drop accident in Chapter 15 is the maximum credible accident involving dropped loads and spent fuel damage.

QUESTION 010.48

"Provide an analysis of the minimum temperature conditions which will be reached in the Byron river screen house following prolonged loss of the building unit heaters or loss of offsite power during extreme cold weather. Define the minimum operating temperature conditions at the essential service water makeup pump diesel drive units, the diesel oil supply system, and the essential service water lines as a function of time from heating system failure and of ambient temperature. State the reliability of starting the diesel drive units and of provisions to prevent freezing in stagnant water lines during the minimum temperature period."

RESPONSE

An analysis was perforemd to determine the minimum temperature conditions which will be reached in the Byron river screen house following a prolonged loss of the building heaters during extremely cold weather due to loss of power. The analysis is based on ambient conditions of -10° F, a 15 mph windspeed, and a 65° F inside temperature. The results of the analysis show that the river screen house will reach a temperature of 40° F in approximately 30 minutes. This is a sufficient amount of time for plant personnel to be sent to the screen house and start the diesels (loss of power at the RSH is annunciated in the control room by the telemetry system powered by a backup DC battery). The diesels will be qualified to start at 40° F with no loss in reliability.

Byron station procedures will specify starting the essential service water makeup pumps upon a River Screen House HVAC trouble annunciator coincident with ambient temperatures below 40° F.

(h) The pressure (psia) and differential pressure (psi) responses as functions of time for each node are graphically shown in Figures 6.2-19 through 6.2-23oo for all the cases analyzed.

(i) The design differential pressure is uniformaly applied to compartment structures within each node. The differential pressure applied to compartment structures varies for each node away from the node in which the pipe break occurs. The analysis of these compartments is included in the secondary shield wall analysis, which is discussed in Subsection 3.8.3.

(j) Refer to the response to Question 022.15.

supplier has qualified the valves for mechanical and seismic loading by analysis, and has proven the operability of the valves through normal and emergency environmental conditions by actual test.

B.1.d: The containment isolation provision for the purge system lines are designed to Section III, Class 2, and Category IE electrical requirements. Inboard and outboard isolation valves (redundant valves) are supplied by Division 11 and 12 power respectively. Operators are of an air/spring design, fail the valve to the closed position upon loss of air or power, and are testable from the Control Room. The containment isolation provisions of the purge system therefore, meet all standards appropriate to Engineered Safety Features.

B.1.e: The purge system isolation valves close automatically on receipt of an ESF actuation signal. No external energy source is required to close the containment isolation valves. They are of a spring return design and will fail to the closed position upon loss of air pressure or electric power.

B.1.f: The specified maximum closure time for the containment purge isolation valves is 5 seconds.

B.1.g: The containment mini-flow purge exhaust intake is 8 inches in diameter, located 73 feet above the operating floor and approximately 2 feet 6 inches from the face of the containment wall. Due to this distance, it is unlikely that following an accident, any debris would blow as high as the mini-flow exhaust intake.

The containment purge supply duct discharge through 27 outlets at the periphery of the fuel pool at elevation 426 feet 0 inch. These outlets are connected to a duct header located at elevation 414 feet 0 inch which in turn connects to the main isolation valve at elevation 462 feet 4 inches. The 8 inch diameter mini-flow purge supply duct connects to the main purge duct approximately 12 feet 0 inch from the containment wall at elevation 462 feet 4 inches within this run of ductwork there are a minimum of 6 elbows. Therefore, it is unlikely that following an accident, any debris would be blown through this convoluted duct run.

B.2 and B.3: The system is designed to purge the containment in order to keep maintenance personnel exposures to ALARA levels and not used for containment temperature and humidity control. The concentration of fission products in the containment are also reduced by charcoal filter units provided within the containment, thus minimizing the need for purging the containment.

B.2.b and c: The minipurge system has one purge line and one vent line of 8 inch size.

B.4: Provisions are made to meet the Type C leak test requirement of 10 CFR 50, Appendix J, for isolation valve leak testing.

B.5.a and b: The minipurge system is provided with an 8 inch line and isolation valves which close in 5 seconds. Thus the system complies with BTP 6-4 and the dose to the public determined under the terms of Appendix K to 10 CFR 50 are well below the limits in 10 CFR 100.

B.5.c: Based upon both ECCS trains operating concurrent with minimum spray water and service water temperature, an analysis was performed which maximizes mass and energy release. Minimum containment pressure of -0.1 psig was used in the analysis.

B.5.d: The containment purge isolation valves are supplied to bubble-tight seat leakage requirements with pressure differential of 110% of design shut-off pressure across the seat. This would apply to all the containment purge isolation valves.

QUESTION 022.11

"Describe the conservatisms in the passive heat sink data provided in Table 6.2-4 which tend to maximize the calculated containment temperature and pressure in the containment functional analysis and in Table 6.2-55 which tend to minimize heat transfer for the minimum containment pressure analysis for performance capability studies of ECCS."

RESPONSE

Both Table 6.2-4 and 6.2-55 were generated from the same data base. A complete and detailed list of surface areas and thicknesses of structures and equipment in the containment was compiled. An uncertainty of from 0 to $\pm$ 25% was assigned to each calculated area. To generate the values in Table 6.2-4, items such as the containment wall area, which was assumed to have 0% uncertainty were used as calculated and all other areas were reduced to the minimum value in the uncertainty range specified. Thicknesses were reduced to give conservatively small total volumes when several items of varying thickness were combined into one table entry. This procedure resulted in a conservatively small estimate of the available heat sinks. Table 6.2-55 was generated by calculating the conservatively large areas and thicknesses. The procedure used was analogous to the procedure used to generate Table 6.2-4 except that 0% uncertainty items such as the containment wall were increased by 10% in order to insure conservatism. The values in Table 6.2-55 provide a conservative (high) estimate of the containment heat sinks for use in the minimum containment pressure analysis.

QUESTION 022.26

"In Appendix A of the FSAR, it is stated that the applicant complies with Regulatory Guide 1.82 with comments and clarifications keyed only to Paragraphs 2.4 and 7 in the Position. Using engineering drawings as appropriate, describe specifically how each paragraph of the Regulatory Guide 1.82 Position has been satisfied, and expand the already provided comments and clarifications as follows:

2) Provide the measures taken to preclude damage to the containment recirculation sump intake filters by whipping pipes or high-velocity jets of water or steam resulting from high-energy piping breaks outside the primary coolant pressure boundary.

4) Describe the design measures taken to preclude heavy pieces of debris from accumulation, near the containment recirculation sump.

7) Provide the design data and calculations used to determine the design coolant velocity at the vertical inner screen. Verify that the available surface area used in determining the design coolant velocity is based on one-half of the free surface area of the inner screen to conservatively account for partial blockage by slowly settling debris. Since your reported coolant velocity at the vertical inner screen (approximately 0.5 ft/sec) is greater than the recommended value of 0.2 ft/sec, provide test results or an analysis demonstrating that your design coolant velocity at the vertical inner screen will allow debris with a specific gravity of 1.05 or more to settle behind the baffle walls versus on the vertical screen surface."

RESPONSE

According to Regulatory Guide 1.82, reactor building pumps should meet the following criteria:

1) A minimum of two sumps should be provided, each with sufficient capacity to serve one of the redundant halves of the ECCS and CSS systems.

   Two sumps are provided per unit; each having sufficient capacity to serve one of the redundant halves of the ECCS and CSS system.

2) The redundant sumps should be physically separated from each other and from high energy systems by structural barriers, to the extent practical to preclude damage to the sump intake filters by whipping pipes or high-velocity jets of water or steam.

   The redundant sumps are located approximately 15 feet apart and are physically separated. No high energy lines are located within 12 feet of the sumps. This precludes damage to the sump intake filters by whipping pipes or high-velocity jets of water or steam.

3) The sumps should be located on the lowest floor elevation in the containment exclusive of the reactor cavity. At a minimum, the sump intake should be protected by two screens: (1) an outer trash rack, and, (2) a fine inner screen. The sump screens should not be depressed below the floor elevation.

   The sumps are located on elevation 377' in the containment, the lowest floor elevation in the containment exclusive of the reactor cavity. Each sump intake is protected by an outer and inner screen. The outer screen is located above elevation 377'.

4) The floor level in the vicinity of the coolant sump location should slope gradually down away from the sumps.

   As stated in Appendix A, the water level in the containment at the end of safety injection will be 5 feet above the floor level. Sloping the floor would provide little protection against debris at these levels. Redundant outer screens have been provided at each sump. If one outer screen is totally blocked by debris, the other will still emit water into the sump.

5) All drains from the upper regions of the reactor building should terminate in such a manner that direct streams of water, which may contain entrained debris, will not

impinge on the filter assemblies.

The filters are located such that direct streams of water which may contain entrained debris will not impinge on the filter assemblies.

6) A vertically mounted outer trash rack should be provided to prevent larger debris from reaching the fine inner screen. The strengths of the trash rack should be considered in protecting the inner screen from missiles and large debris.

The outer screen on the recirculation sumps is 1/4 inch square wire mesh.

7) The design coolant velocity based on one-half of the free surface area of the fine inner screen is 1.0 ft./sec. The suggested Reg. Guide velocity of 0.2 ft./sec. would result in an unreasonably large screen area (250 $ft.^2$ as opposed to the 50 $ft.^2$ now in place), and provide for a specific gravity of 1.05, lower than that of any debris expected. Particles will settle out before reaching the sump entrance at a much greater rate than the regulatory position assumes; therefore, higher velocities are justified.

8) A solid top deck is preferable, and the top deck should be designed to be fully submerged after a LOCA and completion of the safety injection.

The top deck is 1/4 inch stainless steel checkered plate.

9) The trash rack and screens should be designed to withstand the vibration motion of seismic events without loss of structural integrity.

All of the screen mountings and the sump itself are Category I and are designed to withstand an SSE event.

10) The restriction upon the containment spray system is the particles be less than 1000 microns in size. The maximum particle size capable of passing through the fine vertical inner screen is less than 750 microns.

11) Pump intake locations in the sump should be carefully considered to prevent degrading effects such as vortexing on the pump performance.

    The pump intake is located off the side of the sump near the bottom. This location should prevent degrading effects on the pump performance.

12) Material for trash racks and screens should be selected to avoid degradation during periods of inactivity and operation and should have a low sensitivity to adverse effects such as stress-assisted corrosion that may be induced by the chemically reactive spray during LOCA conditions.

    The screens on the recirculation sump are 316 stainless steel.

13) The trash rack and screen structure should include access openings to facilitate inspection of the structure and pump suction intake.

    A manway has been provided for inspection of the sump internals.

14) Inservice inspection requirements for coolant sump components (trash racks, screens, and pump suction inlets) should include the following:

    a) Coolant sump components should be inspected during every refueling period down time, and,
    b) The inspection should be a visual examination of the components for evidence of structural distress or corrosion.

    This requirement will be adhered to.

QUESTION 022.39

"Provide in FSAR Table 6.2-58 the missing distances to the outside containment isolation valves (Column II). Additionally, provide evidence that all containment isolation valves located outside containment have been placed as close to the containment as practical, as required by GDC 55, 56, and 57, since some of the distances listed in FSAR Table 6.2-58 appear to be excessive."

RESPONSE

Revised FSAR Table 6.2-58 lists the distances from the containment to the outer isolation valve on a particular line. The valves were placed as close as practical to the containment with respect to the physical arrangements of the plant, barriers, and obstacles. The larger distances associated with the off-gas system are the result of these valves being used to isolate Unit 1 from the Unit 2.

QUESTION 022.40

"State which signal automatically isolates the waste disposal line, Penetration P-47, and the instrument air line, Penetration P-39."

RESPONSE

The waste disposal line that utilizes Penetration P-47 and the instrument air line that utilizes Penetration P-39 are isolated on a Phase A signal as indicated in revised FSAR Table 6.2-58.

QUESTION 022.49

"Branch Technical Position CSB 6-4 pertains to system lines which can provide an open path from the containment to the environs during normal plant operation; e.g., miniflow purge system. Describe specifically how each paragraph of the Branch Technical Position is satisfied. Concerning Paragraph B.1.g, provide engineering drawings showing the materials and dimensions of the purge and vent system debris screens, and demonstrate compliance with the following criteria:

a. The debris screen should be Seismic Category I design and installed about one pipe diameter away from the inner side of the inboard isolation valve.

b. The piping between the debris screen and the isolation valve should also be Seismic Category I design.

c. The debris screen should be designed to withstand the LOCA differential pressure.

RESPONSE

The response to Question 022.06 describes how each paragraph of Branch Technical Position 6-4 is satisfied. The response has been updated to discuss the need for debris screens in more detail.

QUESTION 022.54

"Verify that the normal containment purge system isolation valves (1VQ001A,B, and 1VQ002A,B) and post-LOCA purge system isolation valve (1VQ003) will be sealed closed (as defined in SRP Section 6.2.4 II.3.f) during the operational modes of power operation, startup, hot standby, and hot shutdown."

RESPONSE

The containment purge valves will be locked closed by the administrative procedure of interrupting power to the valve at the circuit breaker and tagging the breaker out of service. Inadvertant operation of the purge valves requires violation of procedures prohibiting both the operation of tagged out equipment and the containment purge system. Tagging out at the breaker is considered equivalent to a mechanical lock because in both instances positive action is used to prevent the valve from receiving power and an administrative procedure is required to return the breaker to service.

QUESTION 022.55

"Provide information demonstrating how SRP Section 6.2.4 II.7 will be met. This criterion concerns how system lines which provide an open path from the containment to the environs should be equipped with radiation monitors that are capable of isolating these lines upon a high radiation signal."

RESPONSE

Area radiation detectors 1RE-AR011 and 1RE-AR012 are interlocked with containment purge isolation valves 1VQ001A and B, and 1VQ002A and B, and containment mini-purge isolation valves 1VQ004A and B, and 1VQ005A and B. Upon detection of high radiation levels, the containment ventilation isolation signal will be initiated and the above mentioned valves closed. It should be noted that the containment ventilation isolation signal is separate from either the Phase A or Phase B Containment isolation signal as shown on Page 24 of FSAR Table 6.2-58.

QUESTION 022.59

"Provide information demonstrating that adequate shielding provisions are provided to allow personnel access to activate, maintain, and operate the hydrogen recombiner system, the hydrogen monitoring system, and the post-LOCA purge system following a LOCA. (Note: Reference the response to NUREG-0737 Item 11.B.2, 'Plant Shielding Review'.)"

RESPONSE

Figure Q331.15-2 has been revised to include the required information.

c. The portions of the hydrogen monitoring piping system which form the containment atmosphere isolation barrier are designated Seismic Category I, Quality Group B. The remainder of the system outside the containment is Seismic Category I and classified as ANSI B31.1 piping supplied with material manufacturer's and supplier's certifications. For this application (low pressure, normally isolated, redundant system external to the containment, Seismic Category I design to B31.1 allowables is an adequately conservative design basis.

d. Refer to c above.

Samples of the containment atmosphere will be taken at or near the containment penetration through which the sample piping passes. The samples taken are representative of the containment atmosphere due to the mixing system effects which is discussed in Subsection 6.2.5.2.3.

The mechanical piping penetrations used for the hydrogen monitoring system are 1PC-12 and 1PC-31 for Unit 1 and 2PC-12 and 2PC-31 for Unit 2. Penetrations 1PC-12 and 2PC-12 will be for the Train A monitors and 1PC-31 and 2PC-31 are for the Train B monitors. Additional information concerning the mechanical penetration's elevations and azimuths are listed in Table 3.8-1.

QUESTION 022.72

"Concerning the containment isolation design of the hydrogen recombiner lines to and from containment:

a) Verify that the following containment isolation valves have positive position indication in the control room and are remote manually operable from the control room in accordance with SRP Section 6.2.4 11.5.c and ANSI N271-1976 Paragraph 4.2.2 and 4.2.3:

0OG059	0OG063
0OG061	0OG064
0OG062	0OG065

b) Describe the isolation provisions for the hydrogen recombiner discharge lines (0OG45B 3 and 0OG43B 3). Although the normally open valves (0OG060 and 0OG066) in these lines are supplied with power from emergency buses, they must receive an automatic containment isolation signal, be remote manually operable from the control room, and have positive position indication in the control room to be acceptable as containment isolation barriers."

RESPONSE

The following valves make up part of the containment isolation barriers for the hydrogen recombiner and have positive position indicators locally mounted in the auxiliary building: 0OG059, 0OG061,0OG062,0OG063, 0OG064, 0OG065. These valves are also remote manually operable. The revised P&ID for the hydrogen recombiner indicates compliance for the valves (0OG060 and 0OG066) to serve as isolation barriers. The hydrogen recombiner is not operated during modes 1 through 4. Therefore, there is no need to have positive indication in the main control room. Specific operator action following an accident is required to utilize a hydrogen recombiner.

QUESTION 022.76

"FSAR Table 6.2-66 states that La (maximum allowable leakage rate for Type A test at pressure Pa) is 0.267% per 24 hours. Section 6.2.6.1 states that La equals 0.16% per day. Provide the correct value and revise the FSAR accordingly."

RESPONSE

The correct La (maximum allowable leakage rate for Type A test pressure Pa) is 0.16% per 24 hours. The FSAR will be revised accordingly.

QUESTION 31.040

"If reactor controls and vital instruments derive power from common electrical distribution systems, the failure of such electrical distribution systems may result in an event requiring operator action concurrent with failure of important instrumentation upon which these operator actions should be based. This concern was addressed in IE Bulletin 79-27 (Attachment 1). On November 30, 1979, IE Bulletin 79-27 was sent to operating license (OL) holders, the near term OL applicants (North Anna 2, Diablo Canyon, McGuire, Salem 2, Sequoyah, and Zimmer), and other holders of construction permits (CP), including Byron/Braidwood. Of these recipients, the CP holders were not given explicit direction for making a submittal as part of the licensing review. However, they were informed that the issue would be addressed later.

"You are requested to address this issue by taking IE Bulletin 79-27 Actions 1 thru 3 under 'Actions to be Taken by Licensees.' Within the response time called for in the attached transmittal letter, complete the review and evaluation required by Actions 1 thru 3 and provide a written response describing your reviews and actions. This report should be in the form of an amendment to your FSAR."

RESPONSE

79-27 Action, Item 1

Review the Class 1E and non-Class 1E buses supplying power to safety and non-safety-related instrumentation and control systems which could affect the ability to achieve a cold shutdown condition using existing procedures or procedures developed under Item 2 below. For each bus:

a) identify and review the alarm and/or indication provided in the control room to alert the operator to the loss of power to the bus.

b) identify the instrument and control system loads connected to the bus and evaluate the effects of loss of power to these loads including the ability to achieve a cold shutdown condition.

c) describe any proposed design modifications resulting from these reviews and evaluations, and your proposed schedule for implementing those modifications.

Response to 79-27 Action, Item 1

a) an alarm or indication of loss of power is provided in the control room either directly or indirectly for each instrumentation and control bus.

Each 120-Vac instrument bus in provided with an "Inverter Trouble" (including loss of power) alarm. Each 125-Vdc bus is provided with a "Voltage Low" alarm. The identification number (name) of each motor control center is keyed to the substation from which it is supplied. Loss of power to a motor control center bus is provided by a "Feed Breaker Trip" alarm and by "Feed Breaker Trip," "Control Power Failure," and "Low Voltage" alarms as well as bus energized lights on the main control board mimic bus for the associated buses which supply the motor control center.

In addition, each of the following cabinets is provided with a "Power Failure" or "Power Supply Trouble" alarm: auxiliary relay cabinets, safeguards test cabinets, ESF sequencing and actuation cabinets, process I&C cabinets, reactor protection (solid-state) cabinets, transmitter power supply cabinets, MCB panels, Equipment Status Display (ESD) console, sequence-of-events recorder (main and reserve supply), and annunciator input cabinets (main and reserve supply).

b) The instrument and control system loads required to achieve a cold shutdown condition and the buses to which these loads are connected have been identified. The effects of a loss of power to each bus have been analyzed. It has been determined that for any single loss of power event, a redundant power supply or redundant equipment is available to achieve a cold shutdown condition.

c) As a result of the above, reviews, and evaluations, no design modifications are deemed necessary.

79-27 Action, Item 2

Prepare emergency procedures or review existing ones that will be used by control room operators, including procedures required to achieve a cold shutdown condition, upon loss of power to each Class 1E and non-Class 1E bus supplying power to safety and non-safety-related instrument and control systems. The emergency procedures should include:

a) the diagnostics/alarms/indicators/symptom resulting from the review and evaluation conducted per Item 1 above.

b) the use of alternate indication and/or control circuits which may be powered from other non-Class 1E or Class 1E instrumentation and control buses.

c) methods for restoring power to the bus.

Describe any proposed design modification or administrative controls to be implemented resulting from these procedures, and your proposed schedule for implementing the changes.

Response to 79-27 Action, Item 2

Byron Station will incorporate into the Byron Annunciator Response procedures all instruments that will be affected upon the loss of one of these buses.

When a condition arises, such that instrumentation or control is lost, the operator will be aware of failed channels and will use redundant instrumentation. The method for restoring power to the bus will be the same as generic restoration procedures.

79-27 Action, Item 3

Re-review IE Circular No. 79-02, Failure of 120 Volt Vital AC Power Supplies, dated January 11, 1979, to include both Class 1E and non-Class 1E safety-related power supply inverters. Based on a review of operating experience and your re-review of IE Circular No. 79-02, describe any proposed design modifications or administrative controls to be implemented as a result of the re-review.

Response to 79-27 Action, Item 3

IE Circular No. 79-02 has been reviewed with respect to this bulletin. No design modifications or administrative controls are deemed necessary.

QUESTION 040.83

"Your response to Q040.61 is not acceptable. We require that the system design include automatic emergency override of the test mode which would require disconnecting the D/G from the bus while it is on test at full load. Demonstrate proper operation during D/G load shedding including a test of loss of the largest single load and of complete loss of load per RG 1.108 position C.2.a(4)."

RESPONSE

Refer to the response to Question 040.181.

QUESTION 040.131

"Your response to request 040.30 is unacceptable. A tornado missile could damage all the diesel engine exhaust piping so that the exhaust systems for all engines become restricted or blocked. This is an unacceptable situation. Provide tornado missile protection for the exposed sections of the diesel engine exhaust system."

RESPONSE

Figure Q040.131-1 more clearly illustrates the diesel exhaust stacks arrangement. All horizontal piping including silencer is protected by concrete. The vertical portion of the stack outside along the wall is not missile protected.

The diesel generator exhausts are completely protected up to the point where they penetrate the tornado proof concrete enclosure on the auxiliary building roof. Above this point, they are exposed for about 35 feet as they travel vertically. Analysis has established that the stacks can be damaged to the extent that the flow area is reduced to 50% of the original flow area without reducing the diesel power output.

To prevent the stacks from being damaged to the extent that diesel performance is reduced, positive action will be taken to insure operability in spite of tornado missile impact. Two alternatives are being investigated. The stacks may be strengthened to insure that the postulated tornado missiles will not cause unacceptable damage. If this approach proves to not be feasible, exhaust relief will be provided via a tornado proof weighted damper system.

QUESTION 110.10

"The Staff's Position concerning Class 1 linear and plate and shell component supports is that such items should meet the following criterion consistent with Appendix F-1370 of the ASME Code and Regulatory Guides 1.124 and 1.130:

> Whenever the design of components supports permits loads in excess of 0.67 times the critical buckling strength, verification of the support functional adequacy shall be established by a combination of experimental testing and analysis. The program for verification and the results shall be submitted for NRC review on an individual case basis. Alternatively, it is the Staff's understanding that the design criteria for component supports in Appendix F of the ASME Code are currently being reevaluated by the applicable code committee and that some changes to the existing criteria may be made. As an alternative to full-scale testing, the Staff will consider any revised criteria after approval by the ASME for inclusion in Appendix F."

RESPONSE

The NSSS component supports have been assessed considering the 2/3 critical buckling stress limitation and the effects of asymmetric loadings due to subcompartment pressurization caused by loss-of-coolant accidents, as well as the combined effects of LOCA and SSE, and the supports have been determined to be acceptable.

An explanation of the analysis procedures used previously as well as the assessment and the controlling component support stresses from the assessment are given in the response to Question 110.62.

QUESTION 110.11

"Address all positions in Regulatory Guides 1.124 and 1.130, and provide justification for not complying with any of the positions."

RESPONSE

The design of the Byron/Braidwood NSSS component supports are in compliance with all of the applicable regulatory positions contained in Regulatory Guides 1.124 and 1.130.

The NSSS component supports have been assessed considering the 2/3 critical buckling limitation and the effects of asymmetric loadings due to subcompartment pressurization caused by loss-of-coolant accidents, as well as the combined effects of LOCA and SSE, and the supports have been determined to be acceptable.

An explanation of the analysis procedures used in the assessment are given in the response to Question 110.62.

QUESTION 110.14

"Specifically address the consideration of asymmetric load effects in the design of reactor coolant system components and supports which could result from postulated reactor coolant pipe breaks within component cavities inside containment. Asymmetric loads have been discussed only for reactor vessel supports. Enclosure 1 describes the type of information required to enable us to complete our evaluation."

RESPONSE

This question is similar to Question 110.62, which responds in detail to the effects of asymmeteric loads upon the design of reactor coolant system components and supports. Question 130.35 addresses the effect of asymmetric loads on the containment concrete internal structures.

QUESTION 110.50

"The responses to Questions 110.10 and 110.11 are not totally acceptable.

"Expand the response to clearly show how the two conservatisms incorporated in the analysis (namely, (1) using a response spectrum which is correct for the steam generator upper lateral supports and (2) using the absolute sum method of load combination) compensate for the lack of conservatism associated with the use of stresses 50% over the normal allowable limits for the faulted condition.

"Similar statements are contained in the discussions of Regulatory Guides 1.124 and 1.130 (pages A1.124-1 and A1.130-1, respectively) in Appendix A1."

RESPONSE

The response to Questions 110.10 and 110.11 have been revised to indicate conformance to the applicable regulatory positions contained in Regulatory Guides 1.124 and 1.130.

The NSSS component supports have been assessed considering the 2/3 critical buckling limitation and the effects of asymmetric loadings due to subcompartment pressurization caused by loss-of-coolant accidents, as well as the combined effects of LOCA and SSE, and the supports have been determined to be acceptable.

An explanation of the analysis procedures used in the assessment are given in the response to Question 110.62.

1/ Postulated steam line breaks may control the design of certain steam generator supports and therefore must also be considered in support design.

2/ Blowdown jet forces at the location of the rupture (reaction forces), transient differential pressures in the annular region between the component and the wall, and transient differential pressures across the core barrel within the reactor vessel."

RESPONSE

The information requested by the NRC in Question 110.62 is as follows:

(1) The general arrangement of the NSSS component support systems under reassessment are provided in Figures 3.9-4 through 3.9-10.

(2) A plant specific analysis was performed for Byron/Braidwood, as described in revised Section 3.9.

(3) Revised Subsection 3.9.1.4.5 describes breaks which were postulated in the RCS.

(4) The NSSS component supports have been assessed for faulted condition loads which include the effects of subcompartment pressurization and have been found to be within the allowables described in Subsection 3.9.3.4 and Regulatory Guides 1.124 and 1.130, which include the 2/3 critical buckling stress limitations.

The design of the Byron/Braidwood NSSS component supports was originally based on conservative procedures for calculating and combining forces. The forces due to earthquake were calculated on the basis of bounding SSE spectrum which is correct for the steam generator upper lateral supports but conservative for the remainder of the system. Peak values of the LOCA forces were considered to act simultaneously even though they occur at different times in the time history of the LOCA. The earthquake induced forces were then absolutely summed with the forces due to LOCA, etc., where the sign on the earthquake force was chosen to give the worst effect possible on the support.

The reassessment of the supports for asymmetric pressurization and a limitation of stresses to 2/3 critical buckling stress utilized the following refinements in the determination of the design loads to obtain a more accurate estimate of these loads:

(a) A time history analysis of the NSSS components coupled to the inner structure was used to generate the support earthquake forces.

(b) The actual values of the force components (F_x, F_y, F_z) due to LOCA at the time steps which control the design were utilized in the analysis.

(c) The effect of the earthquake was combined with the effect of LOCA by the SRSS method per NUREG-0484.

In addition to these refinements, the steam generator lower lateral support was modified by the addition of a brace to reduce weak axis bending affects.

(5) The NSSS component supports are within design allowables, therefore, inelastic action is not a conern. This item falls within Westinghouse's scope for the components themselves.

(6) The analysis of the supports was performed using the methods of analysis, computer codes and models described in Subsection 3.9.3.4 and in Figures 3.9-11 through 3.9-15. The maximum stress conditions from the component support analyses are given in Table Q110.62-1.

The critical buckling stresses and the allowable stresses used were obtained from the ASME Code and Regulatory Guides 1.124 and 1.130.

(7) See revised Subsection 3.9.1.4.6.

(8) See new Subsection 3.9.1.4.8.

TABLE Q110.62-1

MAXIMUM STRESS CONDITIONS FROM

COMPONENT SUPPORT ANALYSES

NSSS COMPONENT SUPPORT	MATERIAL	RATIO OF MAX. STRESS TO CRITICAL BUCKLING STRESS	RATIO OF MAXIMUM STRESS TO ALLOW. STRESS
Reactor Pressure Vessel Support	A588	0.53	0.73
Steam Generator Upper Lateral Support	A588	0.53	0.92
Steam Generator Lower Lateral Support	A588	0.67	1.00
Reactor Coolant Pump Support	A588	0.67	1.00
SG & RCP Component Support Columns	A618	0.64	0.86
Pressurizer Upper Lateral Support	A588	0.52	0.77
Pressurizer Lower Lateral Support	A588	0.54	0.79
Pressurizer Component Support Columns	A618	0.48	0.83

to be 0.1 inch or less. This will have no effect on the site structures.

REFERENCES:

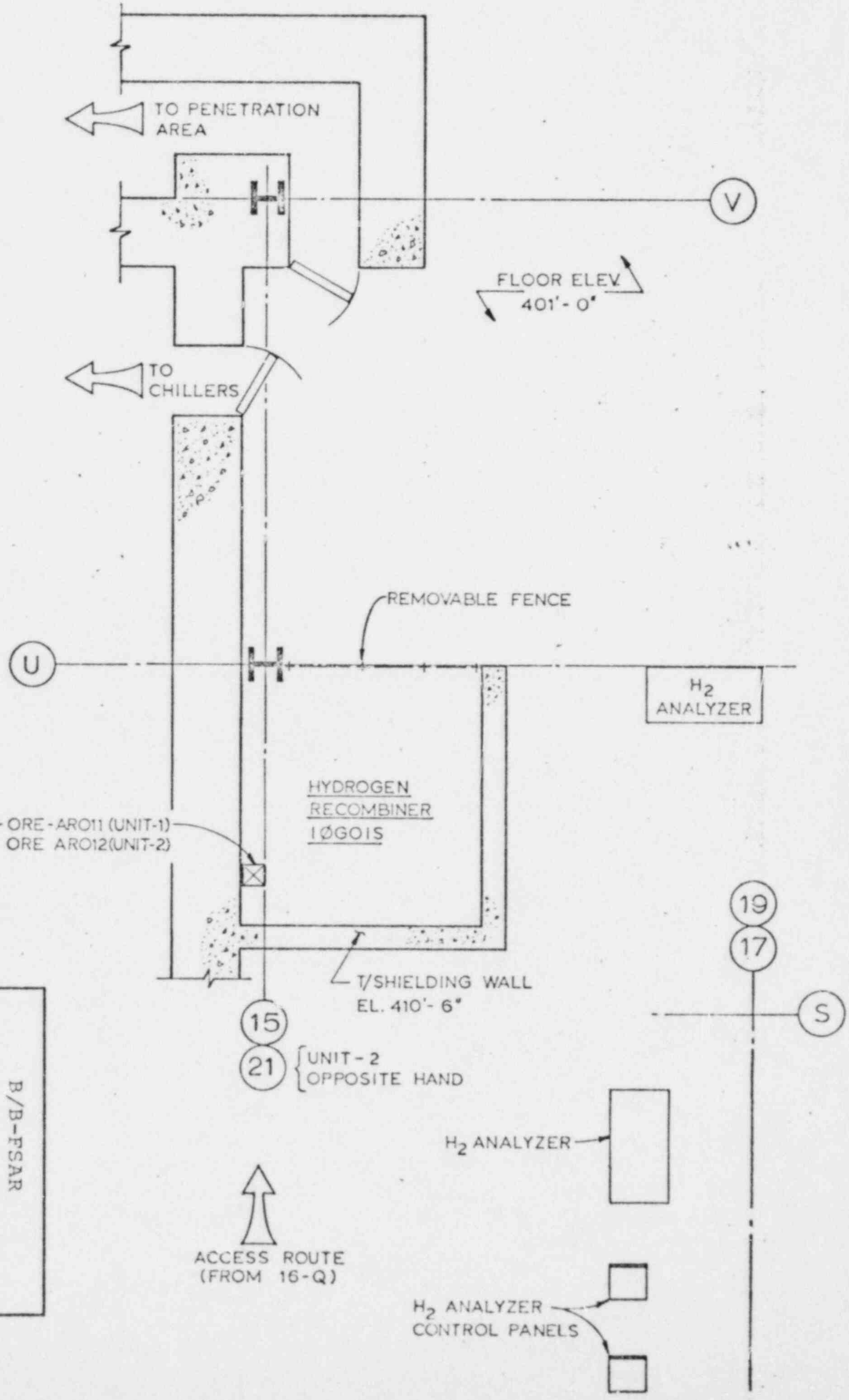
Faiz I. Makdisi, H. B. Seed, and H. Bolton, "Simplified Procedure for Estimated Dam and Embankment Earthquake - Induced Deformations," Journal of the Geotechnical Engineering Division, Volume 104, No. GT7, American Society of Civil Engineers, pp. 849-867, 1978.

N. M. Newmark, "Effects of Earthquakes on Dams and Embankments," Geotechnique, Volume 15, No. 2, pp. 139-160, 1965.

H. B. Seed, et al., "Dynamic Analysis of the Slide in the Lower San Fernando Dam During the Earthquake of February 9, 1971," Journal of the Geotechnical Engineering Division, Volume 101, No. GT9, American Society of Civil Engineers, pp. 889-911, 1975.

4. According to the liquefaction analysis based on an artificial earthquake scaled to 0.12g and two real earthquakes scaled to 0.2g (Tables 2.5-25 and 2.5-26, respectively) it may be seen that by extrapolating the factors of safety for the interval between 50 and 65 feet in Table 2.5-26 based on the values presented in Table 2.5-25, the factor of safety against liquefaction in this depth interval exceeds 2.0.

   Area 11 occurs approximately half way between the 820 and 830 foot (MSL) contours on the piezometric surface map for the Galena-Platteville aquifer (see Figure 2.4-24). This indicates the water level at Area 11 was approximately 825 feet (MSL) on the date of the readings used to prepare the piezometric map, July 1, 1974. Borings IB-16, SF-5, SF-6, and SF-7 show the top of the bedrock surface in Area 11 range sin elevation from approximately 833 to 837 feet (MSL). This indicates that on July 1, 1974, the piezometric surface was 7 to 12 feet below the soil-bedrock contact. An examination of the precipitation date indicates that for 1973 and the first six months of 1974 the amount of precipitation was above the average mean. The Byron-ER (p. 2.6-5) indicates the total 1931-1960 mean precipitation amount for Rockford was 35.62 inches and the January through June mean precipitation was 17.06 inches. The 1931-1960 yearly totals varied from 24.29 to 49.45 inches. The 1973 Rockford precipitation was 56.48 inches or 21.36 inches greater than the mean and 7.03 inches greater than any 1931-1960 yearly total. The precipitation data for January through June 1974 indicates the amount of precipitation recorded during this period was 23.92 inches or 6.86 inches greater than the 1931-1960 January through June mean. Based on this data, 1973 and the first six months of 1974 was an exceptionally wet period. As the Galena-Platteville aquifer is recharged by infiltration of precipitation through the soil overburden, the piezometric surface as shown in Figure 2.4-24 is near the all time groundwater high. Therefore, the groundwater is always below the top of the bedrock surface and the soils above the bedrock are unsaturated.



B/B-FSAR

Figure Q331.15-2
Hydrogen Recombiner

QUESTION 421.19

"We have reviewed Appendices A and B to the Byron/Braidwood FSAR. Although Appendix A states full compliance with the requirements of the Regulatory Guide 1.94, its Supplement, Appendix B contains several deviations from the present positions of the Regulatory staff. Examples of these deviations are:

Appendix B	Regulatory Staff
Section B.1.2.6	
The contents of chloride ion in mixing water and ice did not exceed 500 ppm.	ASME Boiler and Pressure Vessel Code Section III Division 2, CC-2223.1 states that maximum chlorides as CL should be 250 ppm.
Table B.1-4	
Frequency of testing of concrete for compressive strength for Category I structures other than containment was one from every 150 cu. yd. or each day of less than 150 cu. yd.	R.G. 1.142 refers to ANSI Standard N45.2.5-74 which requires that the tests be performed every 100 cu. yd. or a minimum 1 set/day for each class of concrete.

Section B.1.3.3

It appears that the adjustment of design mixtures is not in accordance with the commonly accepted method specified in the ACI-214. The applicant should be requested to provide a reference which contains the two equations used and relate these equations to those contained in the ACI-214.

"As stated, the above paragraphs are only examples of deviations we have noted. Regulatory Guide 1.94 states the NRC position relative to the accepted industry standard ANSI N45.2.5-1974. Please identify all deviations from Regualtory Guide 1.94 and modify Appendices A and B of the FSAR to demonstrate compliance. Should you elect to adopt an alternative method of complying with any part of the above, we request you specifically identify the particular section of the regulatory guide or ANSI standard you are taking exception to and describe your alternatives in sufficient supporting detail to provide a basis for acceptance and for review by the staff."

RESPONSE

In accordance with Regulatory Guide 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants," Revision 2, FSAR Appendix B provides the materials that are used in the construction of the containment and describes the quality control material testing used during fabrication and construction. Since this question relates to the post-operating license stage, concrete placement and structural steel installation at that stage will comply with the latest issues of ANSI Standards, ASTM Specifications, ACE and AISC Codes for performing this type of work.