DRYWELL NOZZLE / PROCESS PIPE

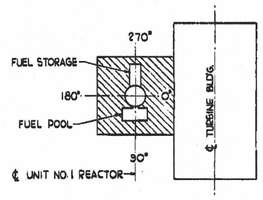
PENE. Nº	Nº REQ'D	NOM. DIA.	I.D. AT NOZZLE END	WALL TK.	TYPE	℄ VESSEL TO NOZZLE END	ELEV.	AZIMUTH	FORCES ON NOZZLE F_A	F_S	M_B	LINE SIZE	SERVICE	REMARKS
X-1	1	12'-0"					762'-0"	135°				—	EQUIP HATCH & PERSONNEL LOCK	DET. "C" M-42
X-2	1	12'-0"					762'-0"	315°				—	EQUIP HATCH	
X-3												—	CONSTR. MANHOLE	DELETED
X-4	1	24"ID					LOC. IN TOP HD.	270°				—	HEAD ACCESS	3'-0" FROM ℄ OF DRYWELL
X-5A|6H	8	3'-0"ID					WR @ 740'-3"	START @ 22.30° BE. 45° APART.				3'-0"ID	VENT LINE	
X-6	1	24"			12	38'-3"	759'-0"	249.30°				—	CRD REMOVAL HATCH	
X-7 A|D	4	36"		T=2"	2	A@ 32'-6" CID 31'-5"	762'-10"	SECT. C-C	23,000	5,500	30,000	20"	STEAM TO TURBINE	
X-8	1	18"		SCH.80	2	37'-9"	759'-0"	0°				3"	CONDENSATE DRAIN	
X-9 A|B	2	36"		T=2"	2	32'-2"	767'-4"	SECT. B-B	23,000	5,500	30,000	16"	RPV FEEDWATER	
X-10	1	18"		SCH.80	2	37'-9"	778'-9"	SECT. B-B				4"	STEAM TO RCIC TURBINE	
X-11	1	28"		T=1.5"	2	37'-9"	774'-0"	SECT. B-B	20,000	4,000	20,000	10"	STEAM TO HPCI TURBINE	
X-12	1	36"		T=2"	2	31'-7"	761'-9½"	SECT. C-C	23,000	5,500	30,000	18"	SHUTDOWN PUMP SUPPLY RHR	
X-13A|B	2	36"		T=2"	2	A 30'-1" B 28'-10"	761'-9½"	SECT. C-C	23,000	5,500	30,000	20"	RHR PUMP DISCHARGE	
X-14	1	20"		T=1.125	2	24'-9"	800'-0"	40°					R.P.V. LEVEL & PRESS.-SPARE (F,J)	
X-15	1	20"		T=1.125	2	24'-9"	800'-0"	125°	16000	1500	7500	4"	RWCU SUPPLY	
X-16A|B	2	20"		T=1.5"	2	24'-9"	800'-0"	SECT. A-A	16,000	2,000	10,000	8"	CORE SPRAY PUMP DISCH.	
X-17	1	20"		T=1.125"	2	23'-9"	807'-0"	190°	16,000	1,500	7,500	4"	RPV HEAD SPRAY	DECOMMISSIONED
X-18	1	6"		SCH.80	3	39'-3"	750'-3"	50°					SPARE	PITCH DOWN 5°
X-19	1	6"		"	3	39'-3"	750'-3"	42°				8"	DRYWELL FLOOR DRAIN SUMP PUMP DISCH.	FROM DRYWELL
X-20	1	3"		"	3	37'-9"	758'-10"	354°				1"	DEMINERALIZED WATER	
X-21	1	3"		"	3	37'-9"	758'-10"	6°				1"	SERVICE AIR	
X-22	1	10"		"	3	38'-3"	758'-10"	63°				3"	N_2 SUPPLY	
X-23A|B	2	12"		"	3	39'-2"	750'-3"	SECT. C-C				8"	WELL COOLING WATER SUPPLY	PITCH DOWN 5°
X-24A|B	2	12"		"	3	39'-2"	750'-3"	SECT. C-C				8"	WELL COOLING WATER RET.	FROM DRYWELL
X-25	1	18"		"	3	23'-5"	815'-4"	338°				18"	VENT FROM DRYWELL	
X-26	1	18"		"	13	39'-3"	744'-9"	228°				18"	VENT TO DRYWELL	PITCH DOWN 15° TO DRYWELL
X-28	1	12"		"	9	23'-9"	805'-0"	140°				1"	R.P.V. LEVEL (B) SPARE (C,D,E,F) CORE SPRAY (A)	
X-29	1	12"		"	9	23'-9"	805'-0"	323°				1"	DRYWELL PRESS. & AIR FLOW (C,D,E) CORE SPRAY (A) LOW LEVEL (G) R.P.V. LEVEL (F)	SPARE (B)
X-30	1	12"		"	9	37'-9"	766'-0"	SECT. C-C				1"	STM. FLOW MEAS. (A,B,C,D,E,F)	
X-31	1	12"		"	9	39'-3"	745'-10"	135°				1"	DRYWELL (A) RECIRC. PRESS (B,C,D) SPARE (E,F)	
X-32	1	12"		"	9	39'-3"	763'-0"	94°				1"	RECIRC. LOOP FLOW (C,D) N2 (C,D) SPARE (E,G,F)	
X-33	1	12"		"	9	38'-3"	745'-10"	130°				1"	RECIRC. PUMP ΔP (A,B) SEAL WATER (C) SPARE (F)	
X-34	1	12"		"	9	38'-3"	766'-0"	52°				1"	STM. FLOW MEAS. (ABCDEF)	
X-35A|B	4	1½"		"	1	38'-0"	UR @ 766'-0" LR @ 760'-0"	SECT. C-C				⅝"	T.I.P. DRIVES	SEE DWG. M-42 TYPE 12
X-36	1	10"		"	8	37'-9"	761'-11"	SECT. B-B				3"	CRD RETURN	
X-37A|D	90	1"		SCH.80	SEE DRWG.	37'-2¾"	TOP 774'-11" BTM 778'-9"	90° & 270°				1"	CRD INSERT	SEE DETAIL A & B DWG. NO. M-42

SEE NOTE 2

PENE. Nº	Nº REQ'D	NOM. DIA.	I.D. AT NOZZLE END	WALL TK.	TYPE	℄ VESSEL TO NOZZLE END	ELEV.	AZIMUTH	FORCES ON NOZZLE F_A	F_S	M_B	LINE SIZE	SERVICE	REMARKS
X-38A|D	90	1"		SCH.80	SEE DRWG.	37'-2¾"	TOP 774'-11" BTM 778'-9"	90° & 270°				1"	CRD WITHDRAW	SEE DET. A|B, DWG. Nº M-42
X-39A|B	2	10"		"	SEE DRWG.	A = 81'-0" B = 38'-8"	A = 760'-0" B = 760'-0"	A = 155° B = 180°				10"	C.C. SPRAY SYS.	DESIGN BY CB & I
X-40A|D	4	12"		"	9	37'-9"	775'-0"	A=27°, B=263° C=98°, D=278°				1"	JET PUMP INSTR/REACT. SAMPLE ABOVE/BELOW CORE PLATE-DWELL PRESSURE	
X-41	1	3"		"	3	24'-6"	800'-0"	102°				¾"	RECIRC. LOOP SAMPLE	
X-42	1	4"		"	8	38'-3½"	778'-8"	206°				1¼"	STANDBY LIQ. CONTROL	
X-43	1	30"		T=1.5"	3	38'-3"	781'-5"	160°				—	SPARE	
X-44	1	26"		T=1.5"	3	38'-4½"	781'-5"	35°				—	SPARE	
X-45	1	36"		T=2"	3	38'-5½"	781'-5"	202.30°				—	SPARE	
X-46	1	12"		SCH.80	3	38'-1½"	781'-5"	245°				—	R.P.V. LEVEL & PRESS. (A,B,D,E) O_2 ANAL. RETURN (F), SPARE (C)	
X-47	1	10"		"	3	23'-11"	807'-0"	110°				—	SPARE	
X-48	1	10"		"	3	39'-3"	750'-3"	220°				3"	EQUIP DRAIN SUMP	
X-49	1	12"		"	9	38'-3"	767'-0"	250°				1"	RECIRC. LOOP ΔP (A,B,C,D) RCIC STM. SUPPLY (E,F)	
X-50	1	12"		"	9	38'-3"	778'-8"	SECT. B-B				1"	DRYWELL PRESS. (A) SPARE (C,F) O_2 SAMPLE (B,D,E)	22
X-51	1	12"		"	9	38'-3"	768'-0"	102°				1"	HPCI ΔP (A,B) DRYWELL FANS (B) (ON PRESSURE) (D) LOW LEVEL (E) SPARE (C)	
X-52	1	12"		"	9	38'-8"	769'-0"	52°				1"	RECIRC LOOP ΔP (A,B,C,D) HPCI STM. SUPPLY (E,F)	
X-53	1	6"		"	14	38'-3"	769'-0"	250°				—	POWER OPER. TEST	
X-54	1	12"		SCH.80	2	39'-1"	750'-3"	SECT. C-C				4"	HOT WATER FROM DRAIN SUMP COOLER & RECIRC PUMP HT. EXCH.	
X-55	1	12"		SCH.80	2	39'-1"	750'-3"	SECT. C-C				4"	COOLING WATER TO DRAIN SUMP COOLER & RECIRC PUMP HT. EXCH.	
X-56	1	12"		"	9	38'-8"	763'-0"	270°				1"	RECIRC. LOOP FLOW (A,B) RCIC STM. SUPPLY (E,F) O_2 ANAL. (C,D)	22
X-57	1	12"		"	9	39'-3"	745'-10"	315°				1"	RECIRC. PRESS/(A,B,C,D) RECIRC. FLOW (E,F)	
X-100A|G	7	10"		SCH.80	4		A,C,E 707'-0" B,D,F,G 709'-0"	SECT. B-B					NEUTRON MONITORING (B,C,F,G) SPARE (A,D) RPV VIB. MONITOR (G)	
X-101A|D	4	10"		"	4		A|D 707'-0" B|C 709'-0"	" "					RECIRC PUMP POWER (A,C) SPARE (B,D)	
X-102 A|D	1	10"		"	15		709'-0"	" "					MAIN STEAM (A,B,C,D) SPARE (E,F)	INSTRUMENTATION
X-103	1	10"		"	4	SEE DWG SK-M-52	707'-0"	" "					THERMOCOUPLES	
X-104 A|D	4	10"		"	6		B|D 707'-0" A|C 709'-0"	" "					CRD ROD POSITION INDIC.	
X-105A|D	4	10"		"	4		B|D 707'-0" A|C 709'-0"	" "					POWER & CONTROL (B,D) SPARE (A,C)	
X-106A|E	5	10"		"	4		A|C|D|E 709'-0" B 707'-0"	" "					POWER & CONTROL (A,C) SPARE (B,D,E)	
X-58A|H	8	16"	—	—	—	—	826'-11½"	SECT. A-A					MALE STABILIZERS	INSPECTION PORTS
X-107	1	6"		SCH.80	16	23'-0"	818'-6"	202.30°				1"	RPV LEVEL (A) DRYWELL LEVEL (B) SPARE(C)	SEE FSK-10554
X-108	1	6"		SCH.80	16	23'-0"	818'-6"	345°				1"	RPV LEVEL (A) DRYWELL LEVEL (B) SPARE(C)	SEE FSK-10554

SEE NOTE 2

X-37B IS BEING USED FOR ⅛" DCB-LPRM 1C591.



KEY PLAN

NOTES

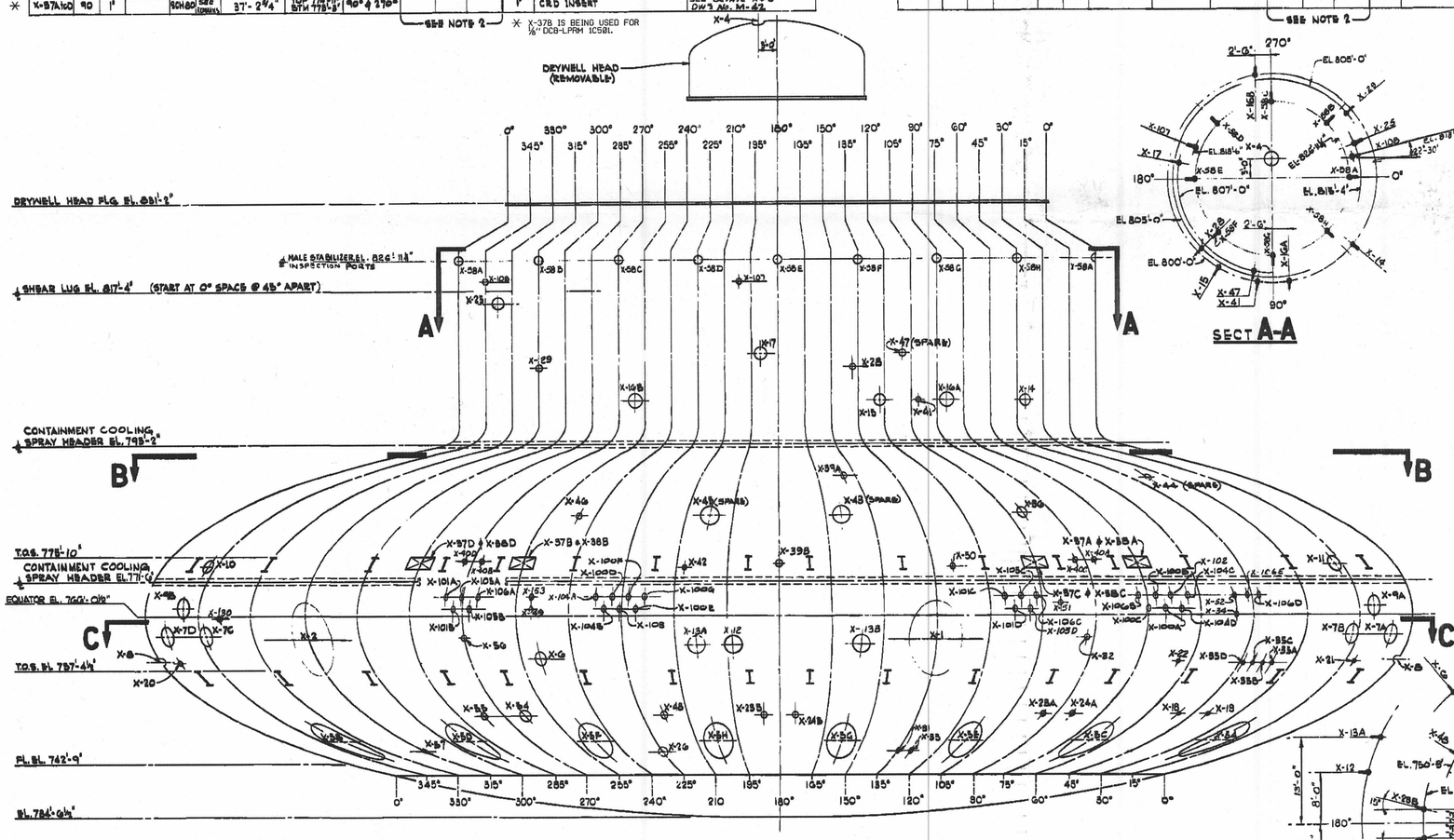
1. PENETRATIONS ARE HORIZONTAL IN ELEVATION AND RADIAL IN PLAN UNLESS NOTED.
2. FORCES ON NOZZLES:
   F_A IS AXIAL _____ (LBS.)
   F_S IS IN SHEAR _____ (LBS.)
   M_B IS IN BENDING ____ (FT. LBS.)
3. SEE NOZZLE LOAD SKETCH ON DWG M-42
4. CHANGED DRAWING Nº FROM L-101, REV 3 TO SK-M-51, REV 4.
5. EXTERNAL NOZZLE WELD END PREP PER DETAIL ON M-43

GENERAL NOTE

THIS DWG. TO BE USED FOR REF. ONLY. C. B. & I. DRAWING'S MUST BE USED FOR ALL DIMENSION'S.

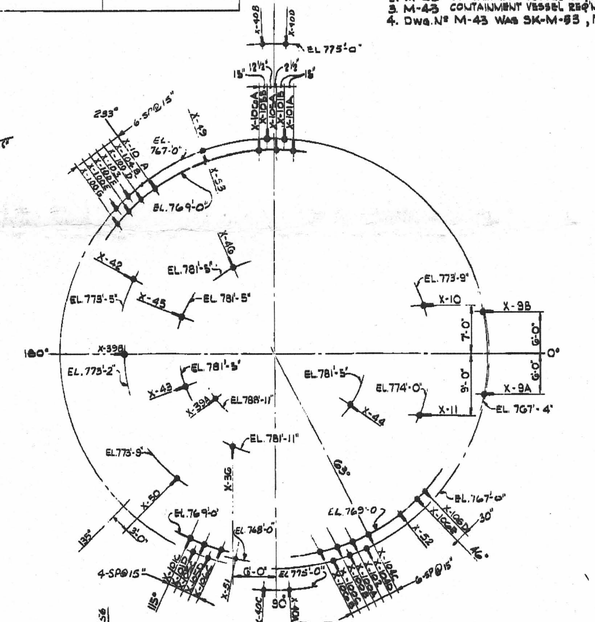
REFERENCE DWG'S

1. SK-M-90 CONTAINMENT VESSEL REQ'MTS-DRYWELL-PLANS & SECTIONS
2. M-42 CONTAINMENT VESSEL REQ'MTS-PENETRATION DETAILS
3. M-43 CONTAINMENT VESSEL REQ'MTS-TORUS PENETRATIONS
4. DWG. Nº M-43 WAS SK-M-53, M-42 WAS SK-M-52,

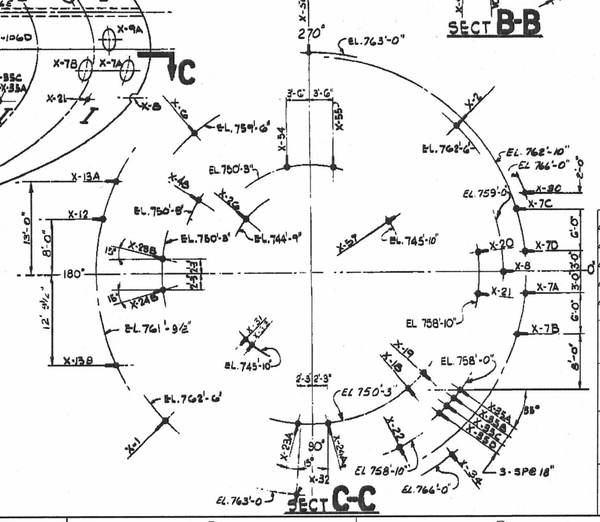


EXPANDED VIEW-OUTSIDE OF DRYWELL

SECT A-A



SECT B-B



SECT C-C

ABBREVIATIONS

CRD ____ CONTROL ROD DRIVE
RPV ____ REACTOR PRESSURE VESSEL
TIP ____ TRAVERSING INCORE PROBE SYSTEM
CC ____ CONTAINMENT COOLING
RCIC ____ REACTOR CORE ISOLATION COOLING
RWCU ____ REACTOR WATER CLEAN-UP
RHR ____ RESIDUAL HEAT REMOVAL
HPCI ____ HIGH PRESSURE COOLANT INJECTION
LPCI ____ LOW PRESSURE COOLANT INJECTION

D-02

NO.	DATE	REVISION	DRFTR.	CHKD	ENGR.	VER.
22	8-24-06	REVISED PER DDC-4975	DA	SD	SD	TWS
21	3/17/97	REV. PER ECP-1573	JW	TAK	FJG	MW
20	10-31-95	REV. PER DCP-1545	JM	TAK	SCP	WTA
19	2-4-94	REV. PER DCP-1531	JM	TAK	B	TH
18	3/29/89	REV. PER DCP-1404	DE	JAH	DL	MM

BECHTEL
SAN FRANCISCO

DUANE ARNOLD ENERGY CENTER-UNIT NO 1
IOWA ELECTRIC LIGHT AND POWER COMPANY
CEDAR RAPIDS, IOWA

CONTAINMENT VESSELS REQUIREMENTS DRYWELL PENETRATIONS

DRAWING NO. BECH-M041 REV. 22