

CALVERT CLIFFS NUCLEAR POWER PLANT

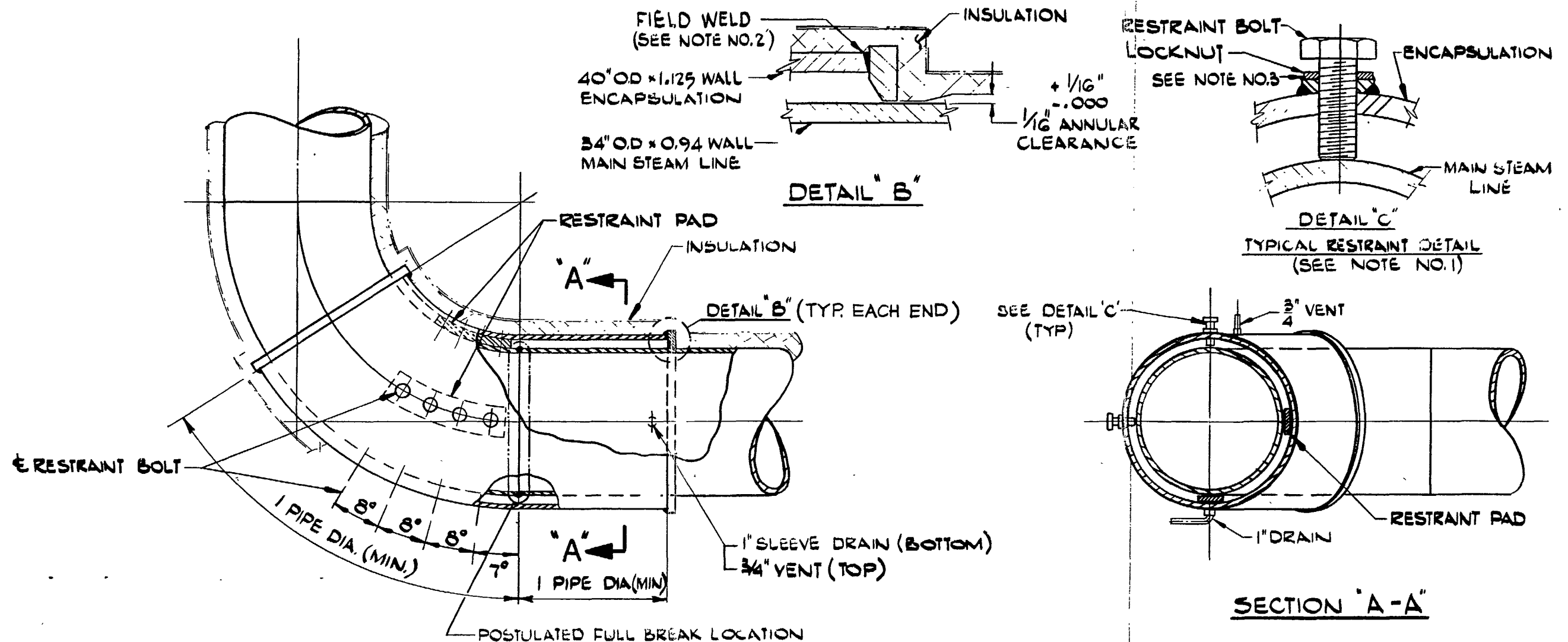
UFSAR FIGURE 10A.1-2

HIGH ENERGY
 MAIN STEAM SYSTEM
 ROUTING PLAN - FLOOR EL. 27'0"

BGE DRAWING N/A

REVISED 4/13/73

Revision 18

**NOTES**

1. PRIOR TO INSTALLATION OF ENCAPSULATION SECTIONS, FIELD MEASUREMENTS ARE TO BE TAKEN OF THE STEAM LINE AT THE POINTS OF CONTACT BY THE END CLOSURE RING.
2. RESTRAINT BOLTS TO BE ADJUSTED TO CENTER THE STEAM LINE IN THE WELDED UP ENCAPSULATION SECTIONS WHILE IN THE COLD CONDITION TO PERMIT FIT-UP OF THE END CLOSURE RINGS. CLOSURE RINGS ARE TO BE SHIMMED BETWEEN RING AND PIPE TO INSURE CLEARANCE AS SHOWN IN DETAIL "B" PRIOR TO WELDING TO 40" DIA. SLEEVE.
3. RESTRAINT BOLTS TO BE MARKED AFTER COLD POSITIONING OF ENCAPSULATION AND BACKED OUT AS REQUIRED (TO PERMIT THERMAL GROWTH OF STEAM LINE) PRIOR TO BLOCKING WITH LOCKNUT

REVISION Δ 31

REVISED 12/9/74 PB

NO SCALE

BALTIMORE GAS & ELECTRIC CO.
ELECTRIC PRODUCTION PLANT
CALVERT CLIFFS UNIT No. 1 & 2

BECHTEL ASSOCIATES
GAITHERSBURG, MARYLAND

ENCAPSULATION DETAILS
MAIN STEAM SYSTEM

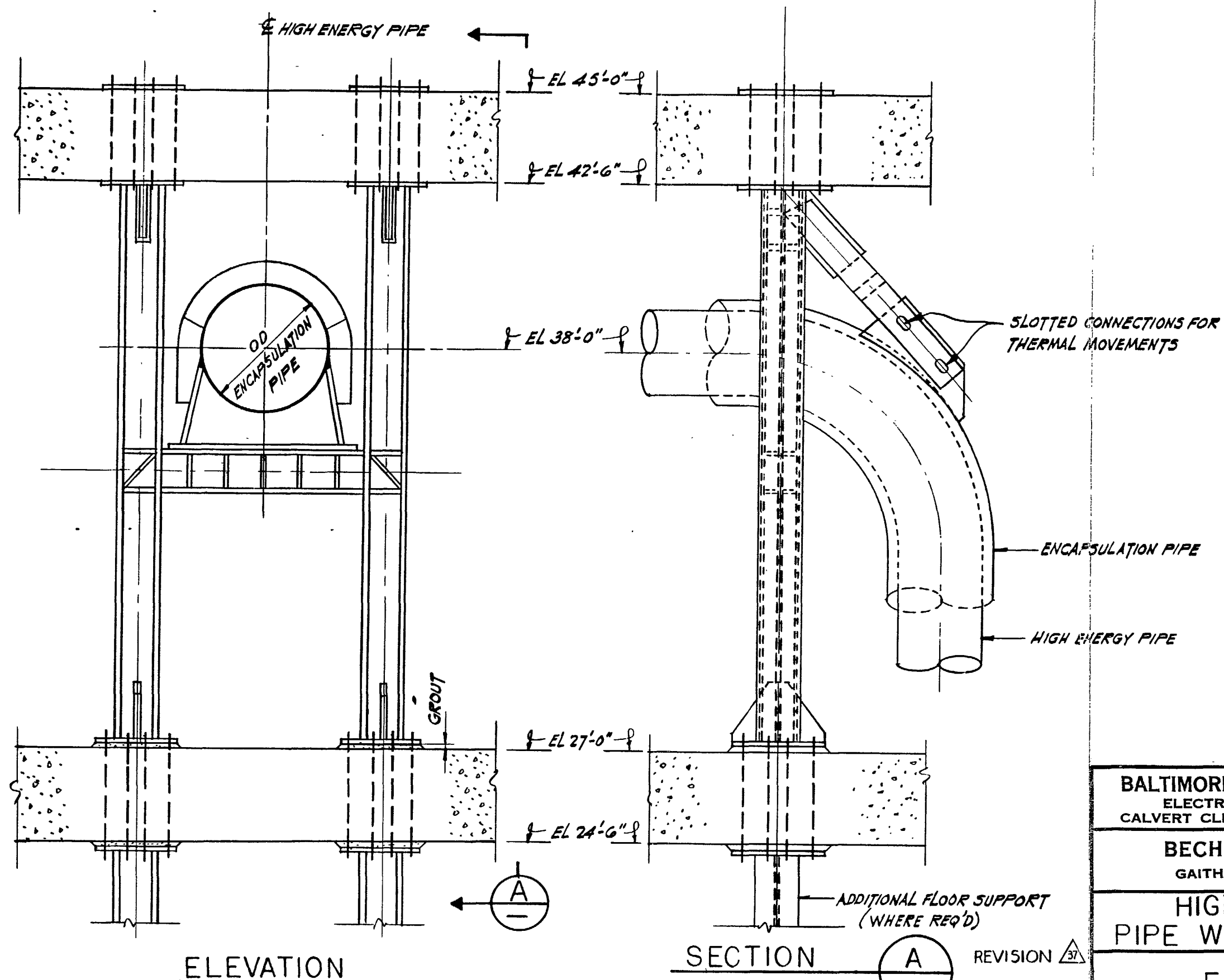
JOB NO.

6750

FIG. 10A.1-3

REV.

D



REVISED 12-6-74

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ELECTRIC PRODUCTION PLANT
CALVERT CLIFFS UNIT No. 1 & 2

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HIGH ENERGY
PIPE WHIP RESTRAINT

FIG. 10A.1-4

REV.
C

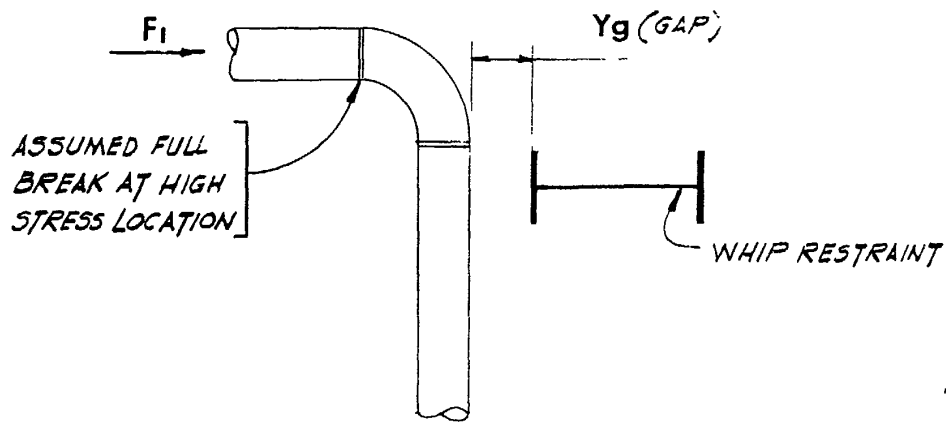
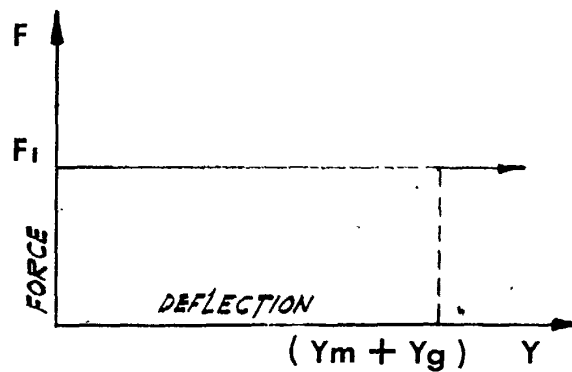
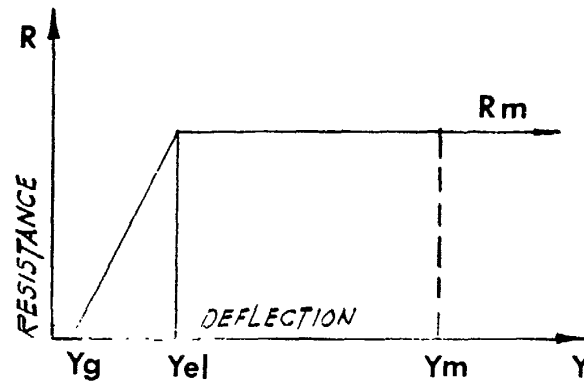


FIGURE 10A.1-5A



FORCING FUNCTION

FIGURE 10A.1-5B



RESISTING FUNCTION

FIGURE 10A.1-5C

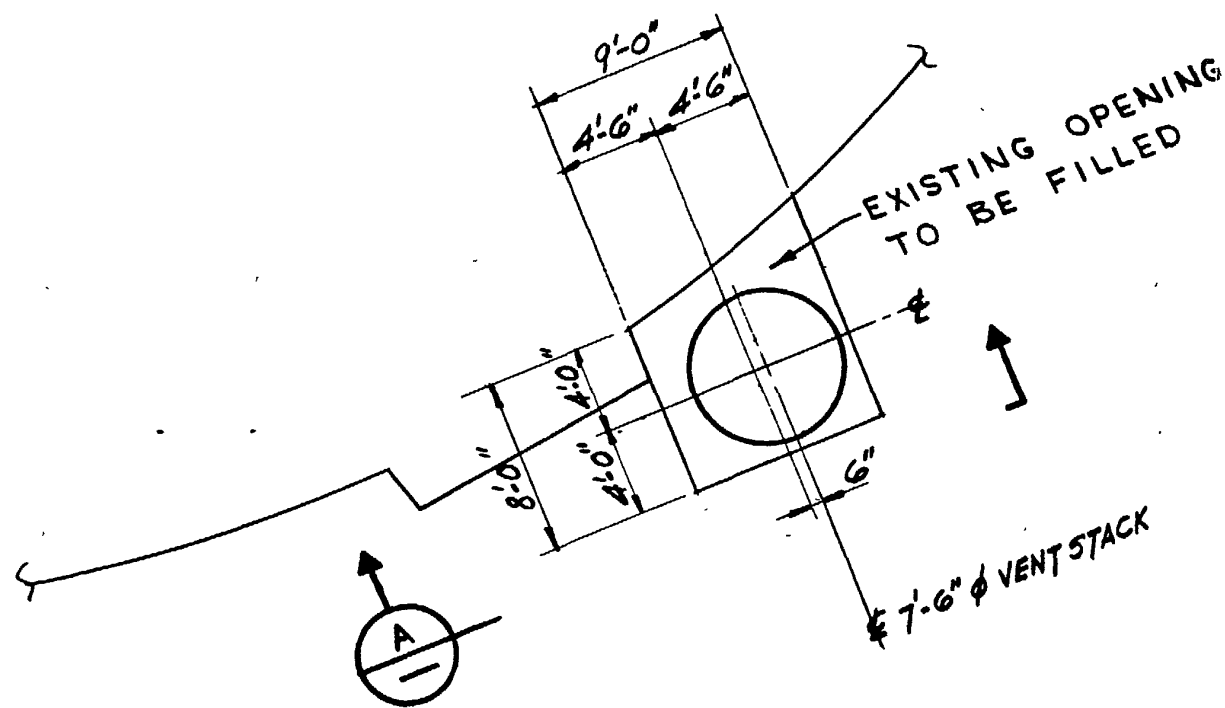
BALTIMORE GAS & ELECTRIC CO.
ELECTRIC PRODUCTION PLANT
CALVERT CLIFFS UNIT No. 1 & 2

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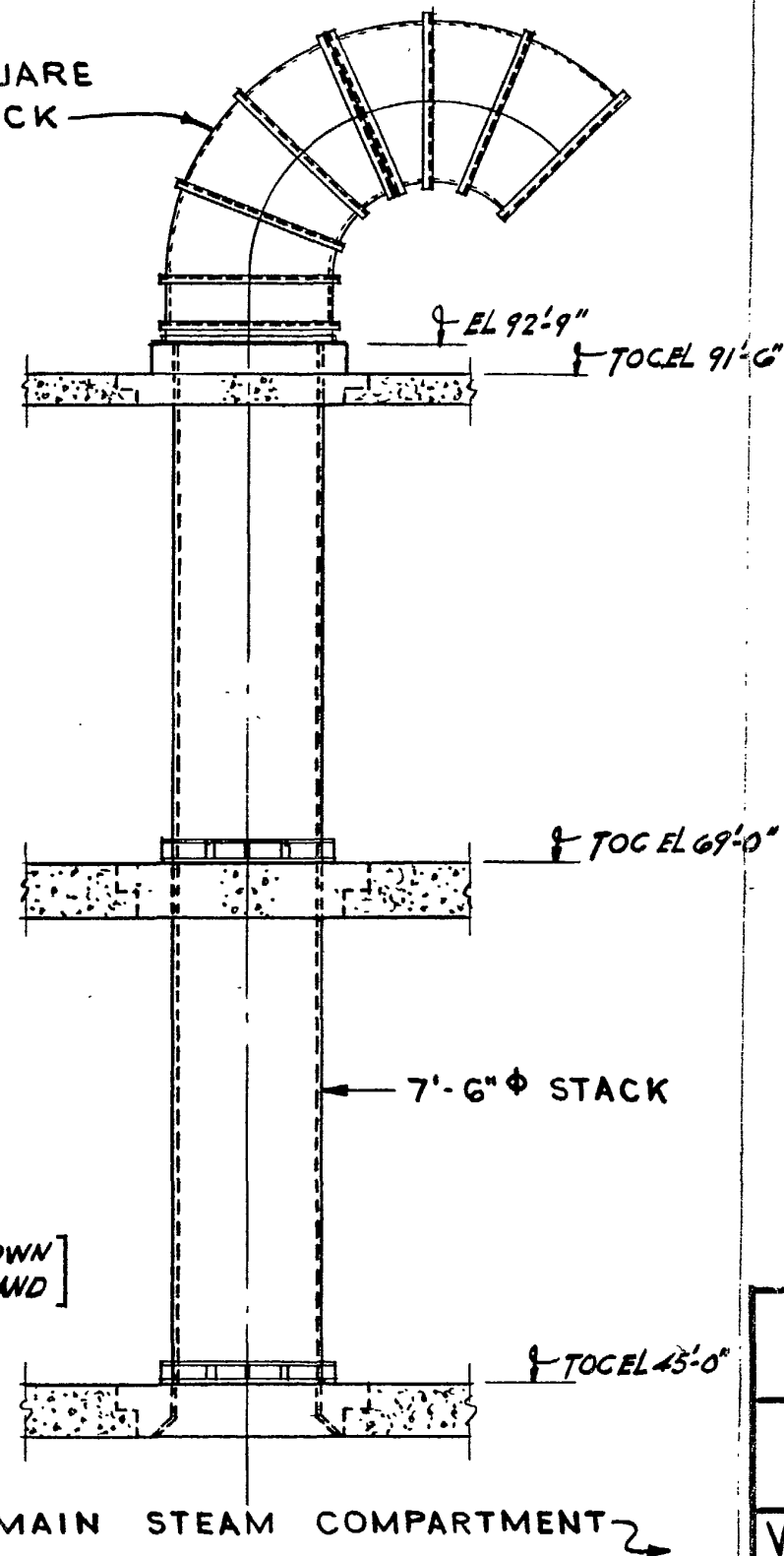
MATHEMATICAL MODEL
FOR PIPE WHIP RESTRAINT

FIGURE 10A.1-5

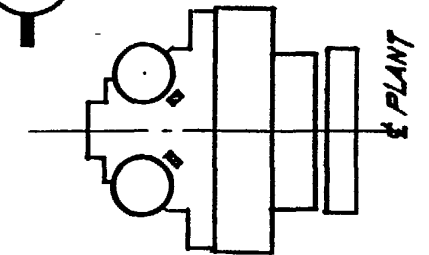
8'-0" SQUARE
GOOSENECK



PLAN AT EL 45'-0" AND EL 69'-0" [UNIT 1 AS SHOWN]
SCALE: 1/8" = 1'-0" [UNIT 2 OPP. HAND]



SECTION A
SCALE: 1/8" = 1'-0"



KEY PLAN

FIG. ADDED 4-13-73

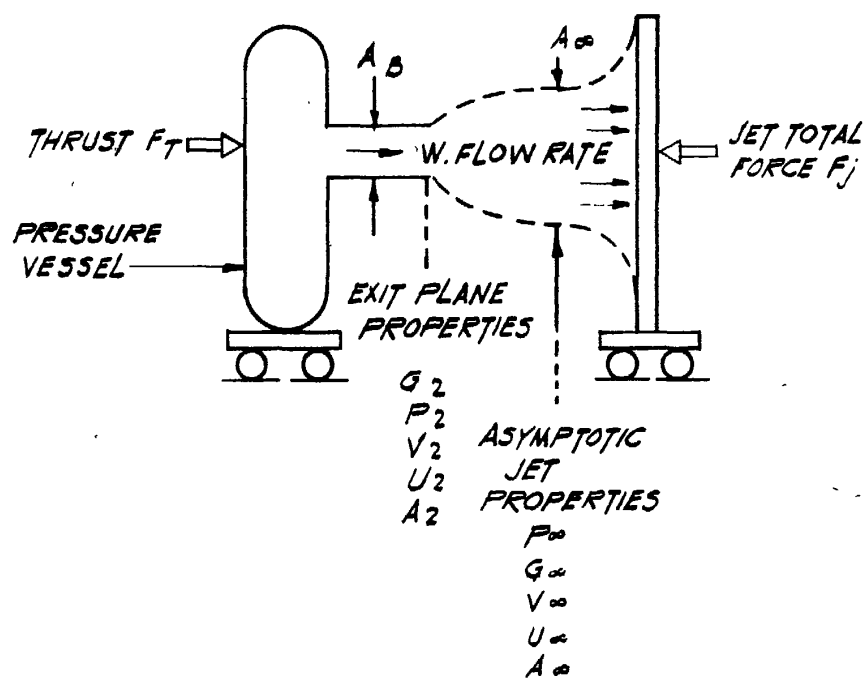
REV
B

BALTIMORE GAS & ELECTRIC CO.
ELECTRIC PRODUCTION PLANT
CALVERT CLIFFS UNIT No. 1 & 2

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VENT STACK FROM MAIN
STEAM COMPARTMENT

FIGURE 10A.1-7



BLOWDOWN MODEL

FIGURE 10A.1-8

EUGENE DIETZGEN CO.
MADE IN U. S. A.NO. 341-20 DIETZGEN GRAPH PAPER
20 X 20 PER INCH

EFFECT OF PIPE FRICTION OF STEAM-WATER

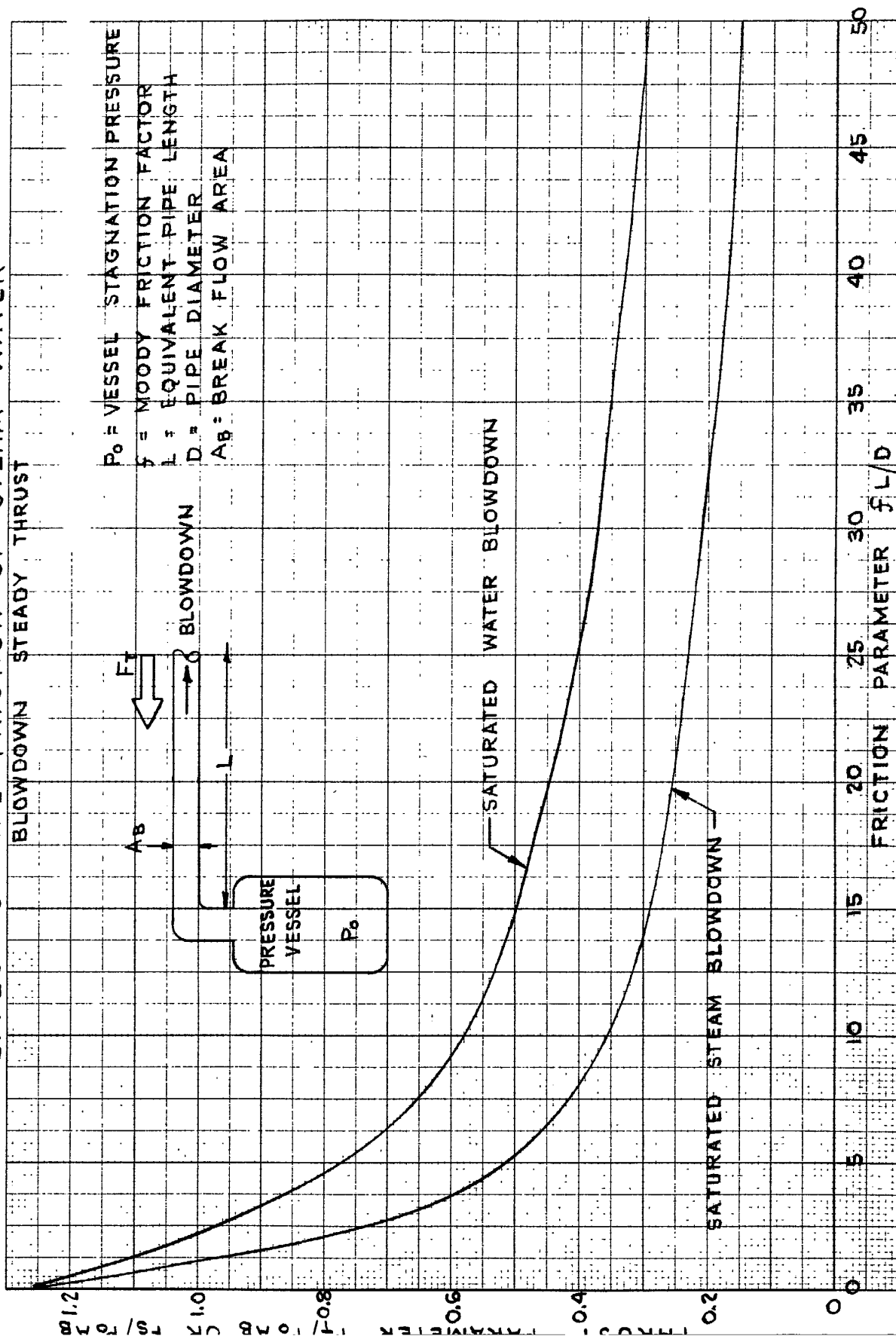


FIGURE 10A.1-9

EUGENE DIETZGEN CO.
MADE IN U. S. A.NO. 341-20 DIETZGEN GRAPH PAPER
20 X 20 PER INCH

EFFECT OF AREA RESTRICTION ON STEAM WATER

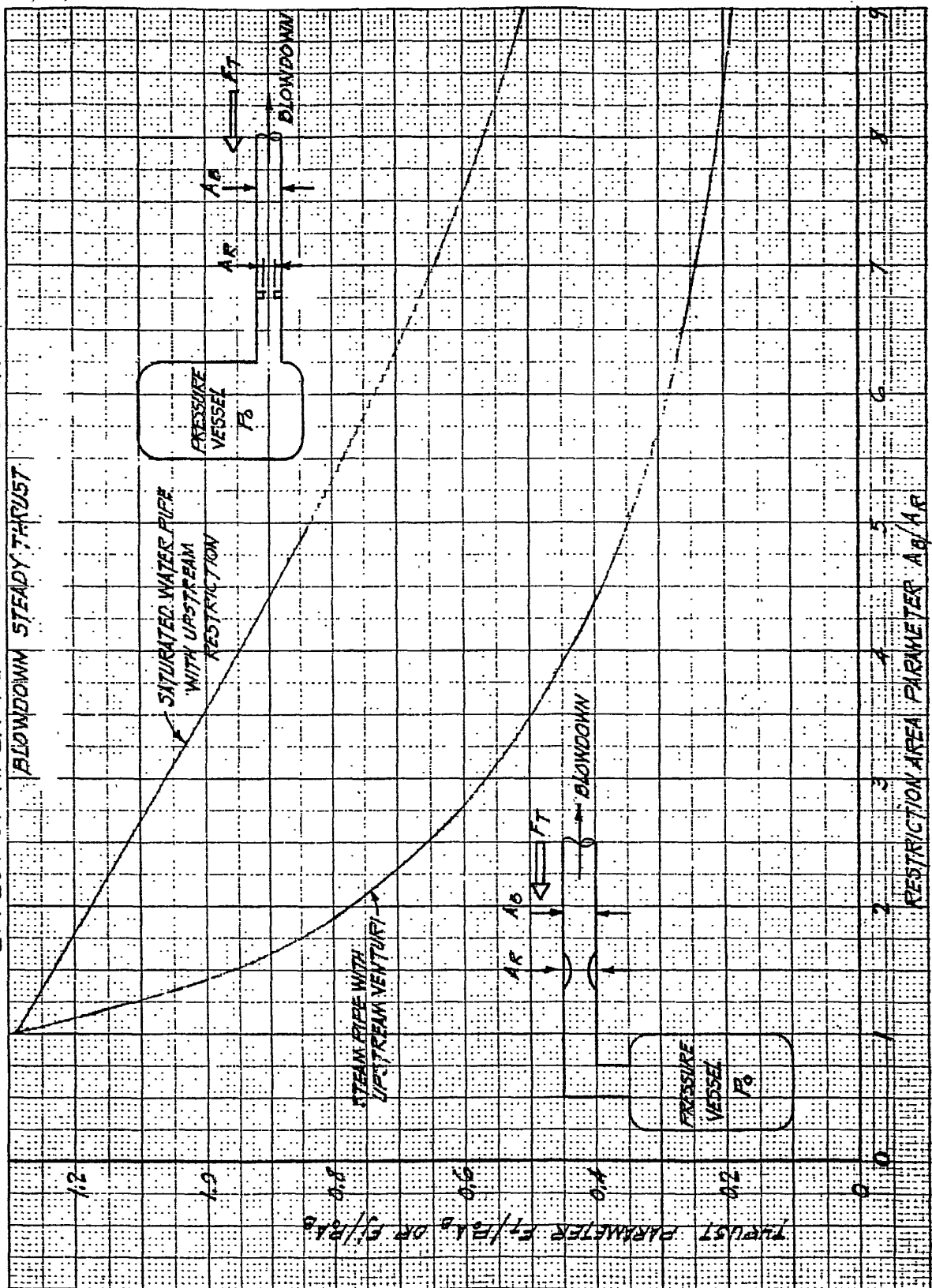


FIGURE 10A.1-10

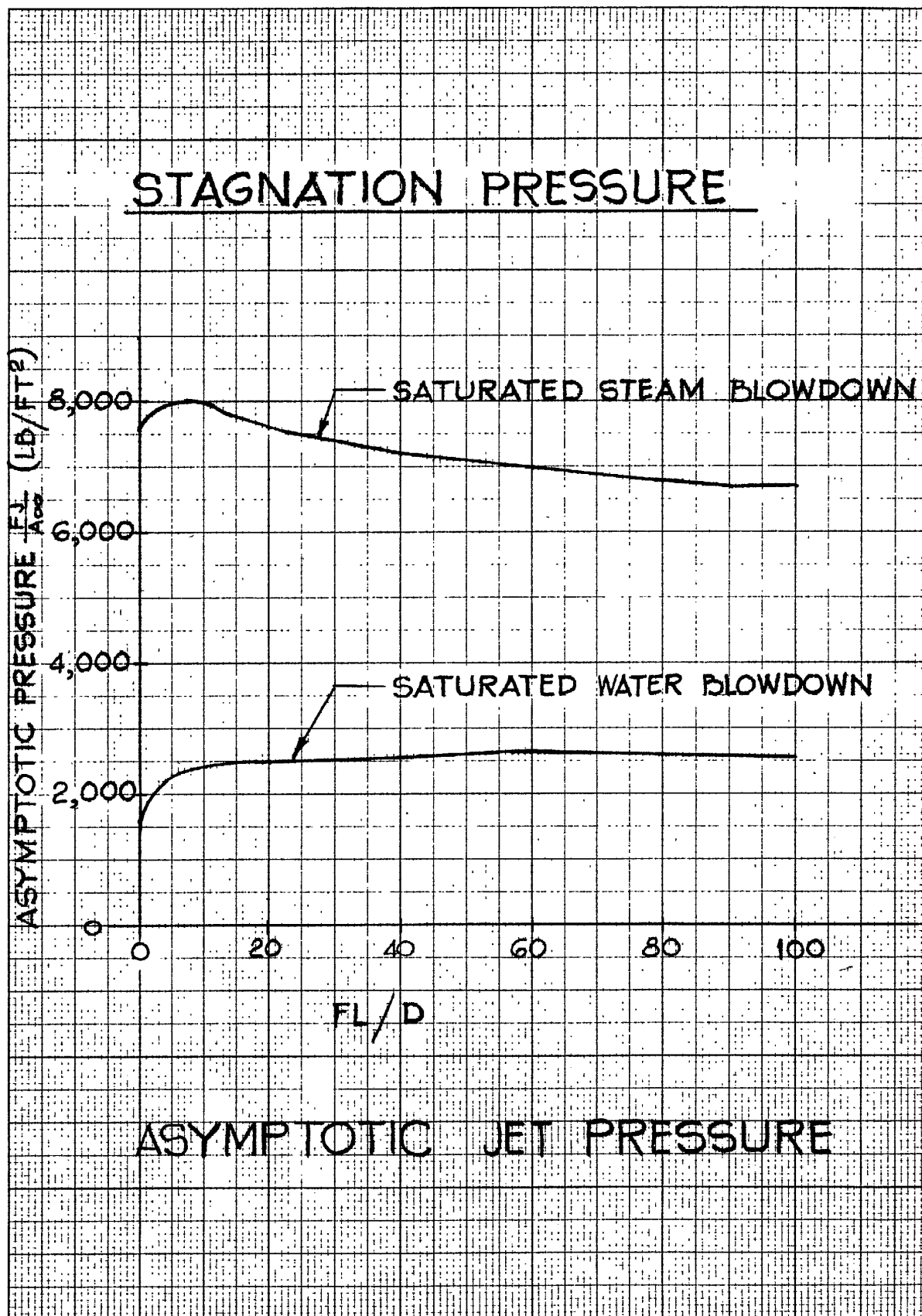


FIG. 10A.1-11

NO. 34 D. 1. STAGNATION PRESSURE - JET ASYMPTOTIC AREA
 SFM 10149-10-10
 5 CYCLES

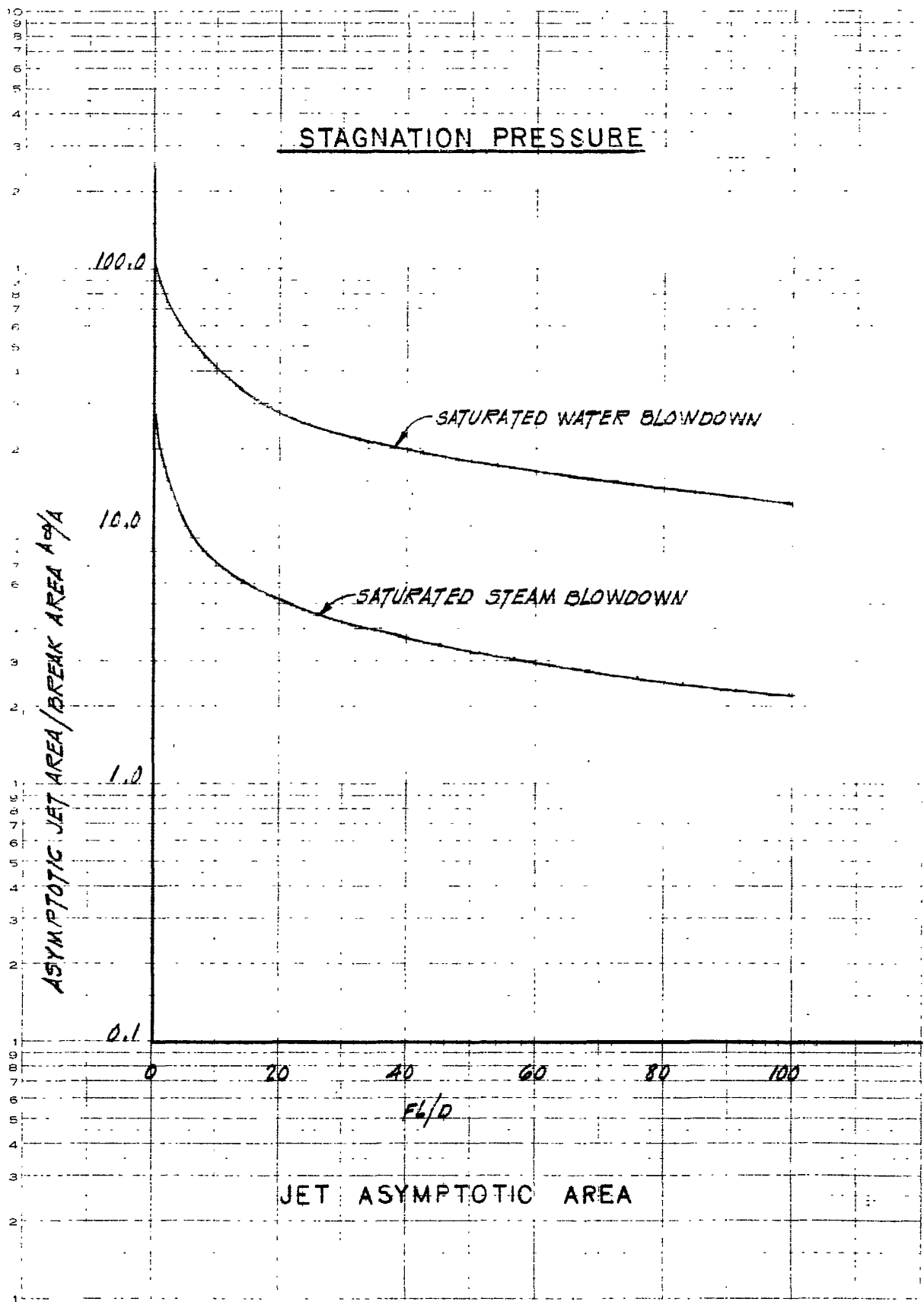


FIGURE 10A.1 - 12

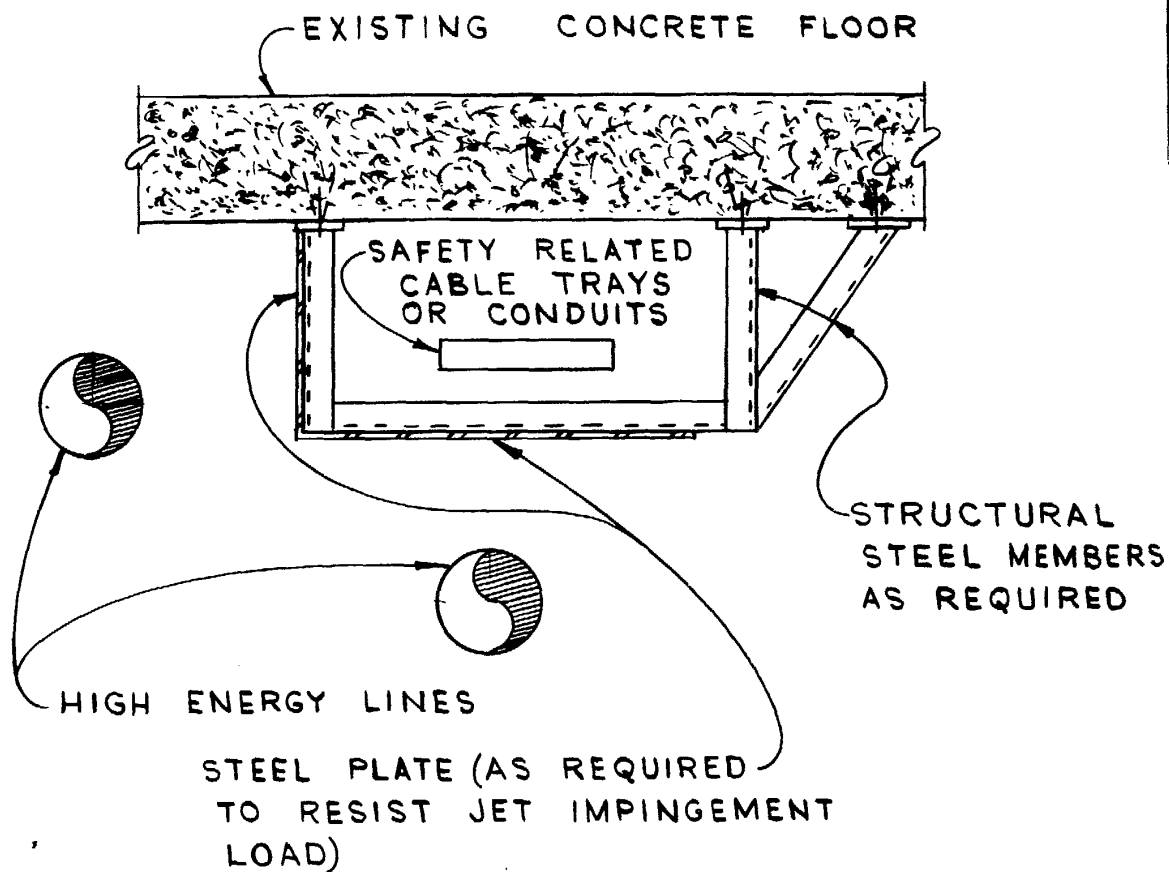


FIGURE ADDED 4-13-73

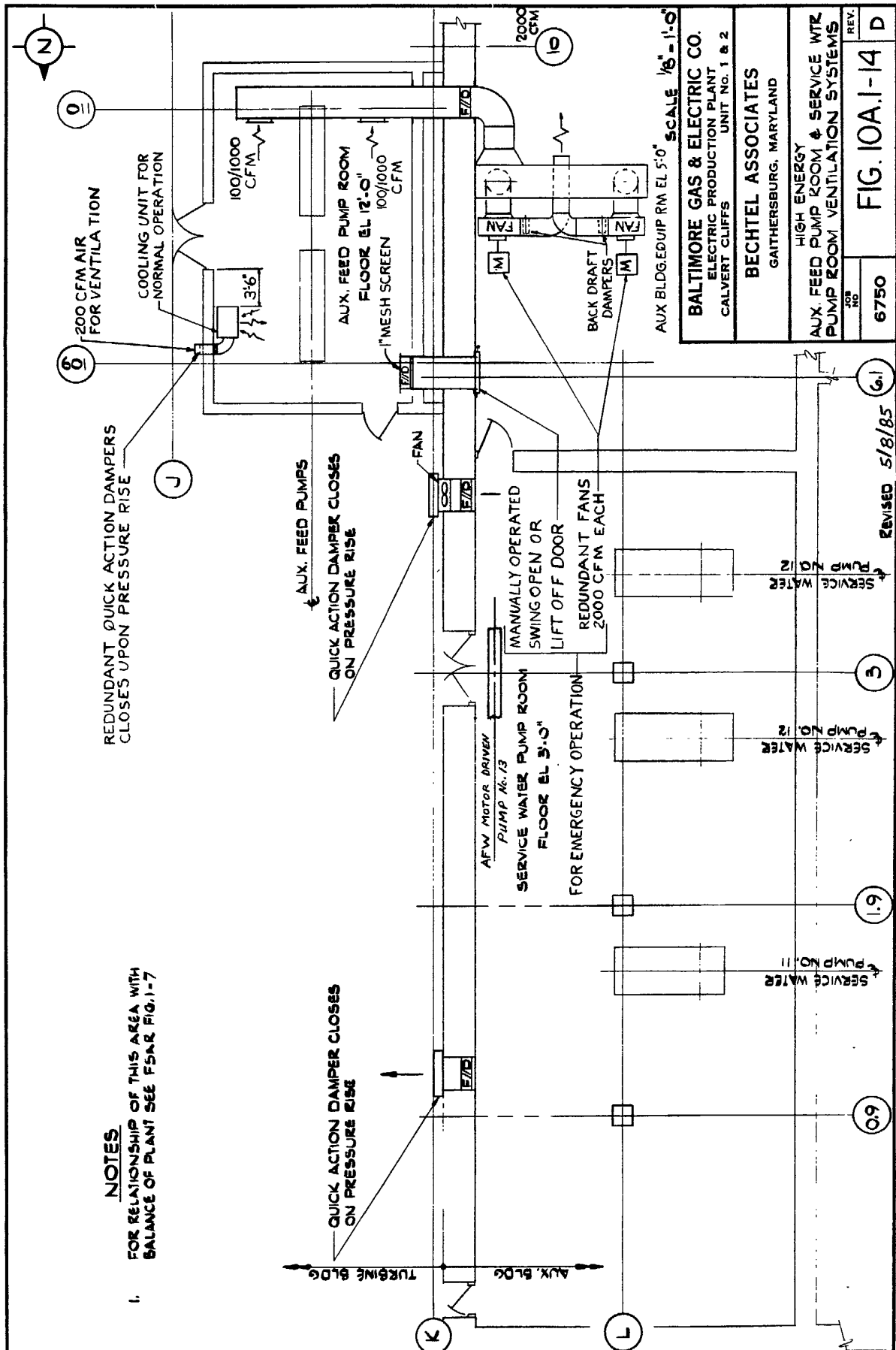
REV.
B

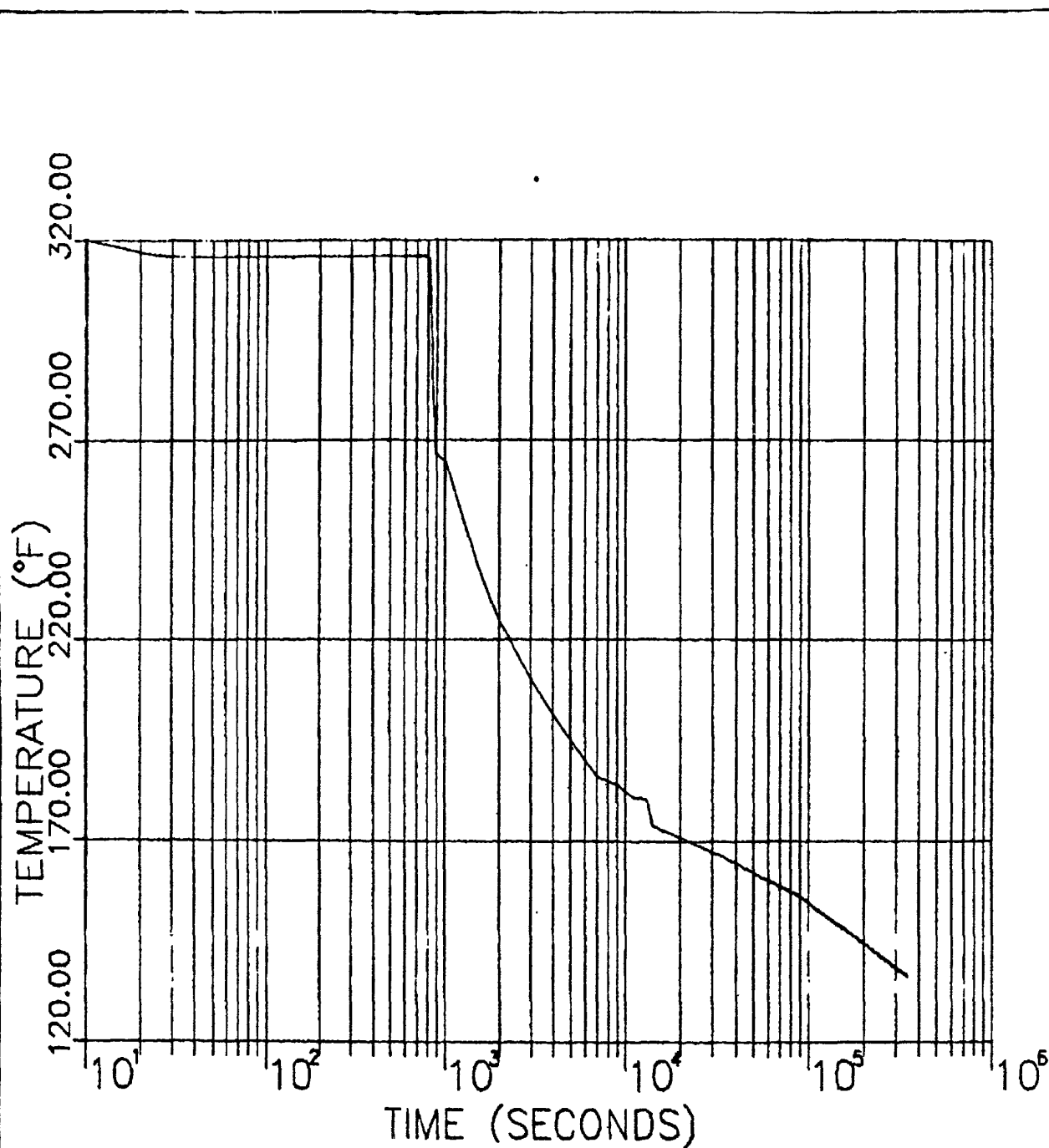
BALTIMORE GAS & ELECTRIC CO.
ELECTRIC PRODUCTION PLANT
CALVERT CLIFFS UNIT No. 1 & 2

**TYP. JET IMPINGEMENT
BARRIER FOR CABLE TRAYS**

BECHTEL ASSOCIATES
GAITHERSBURG, MARYLAND

FIGURE 10A.1-13

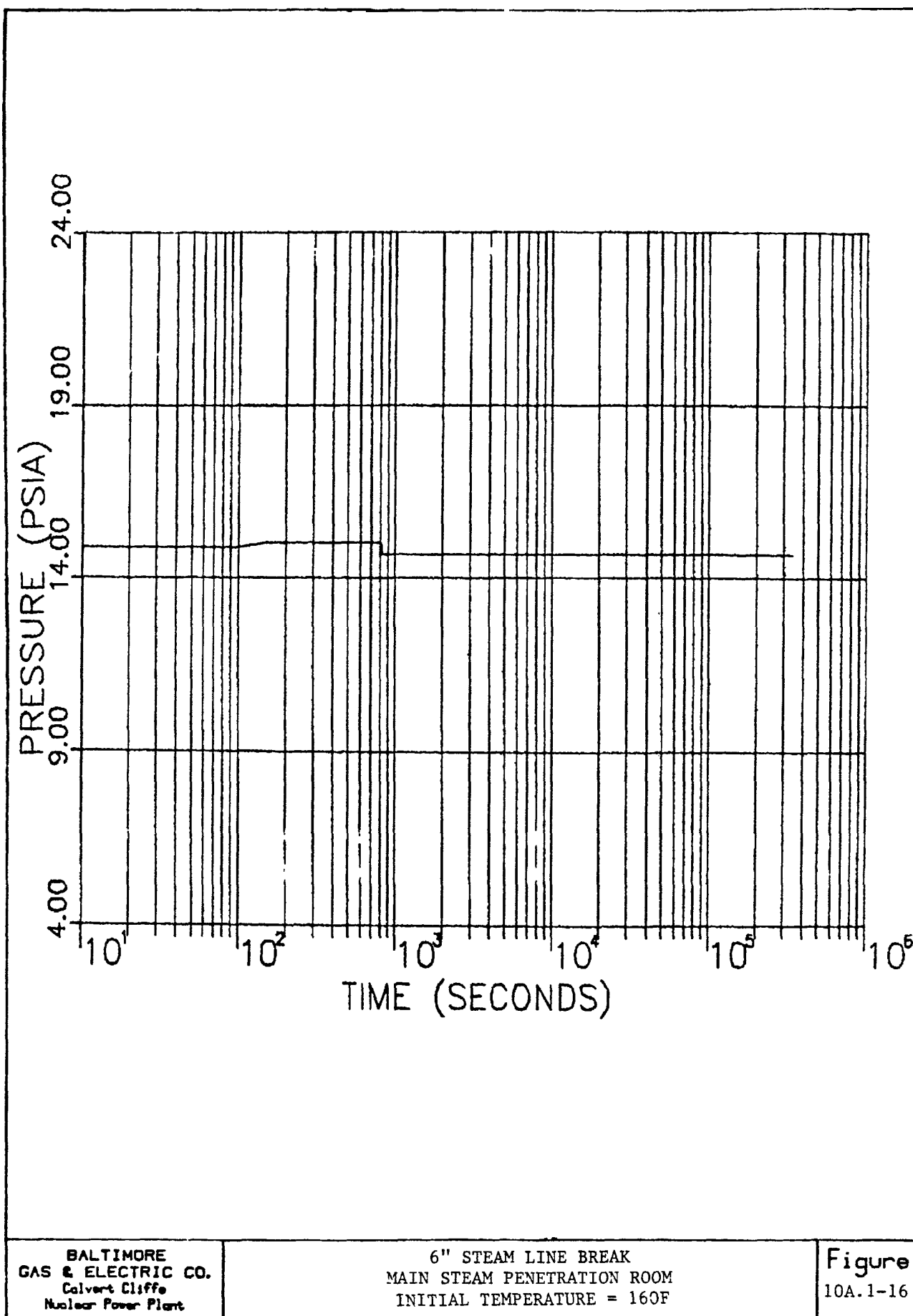


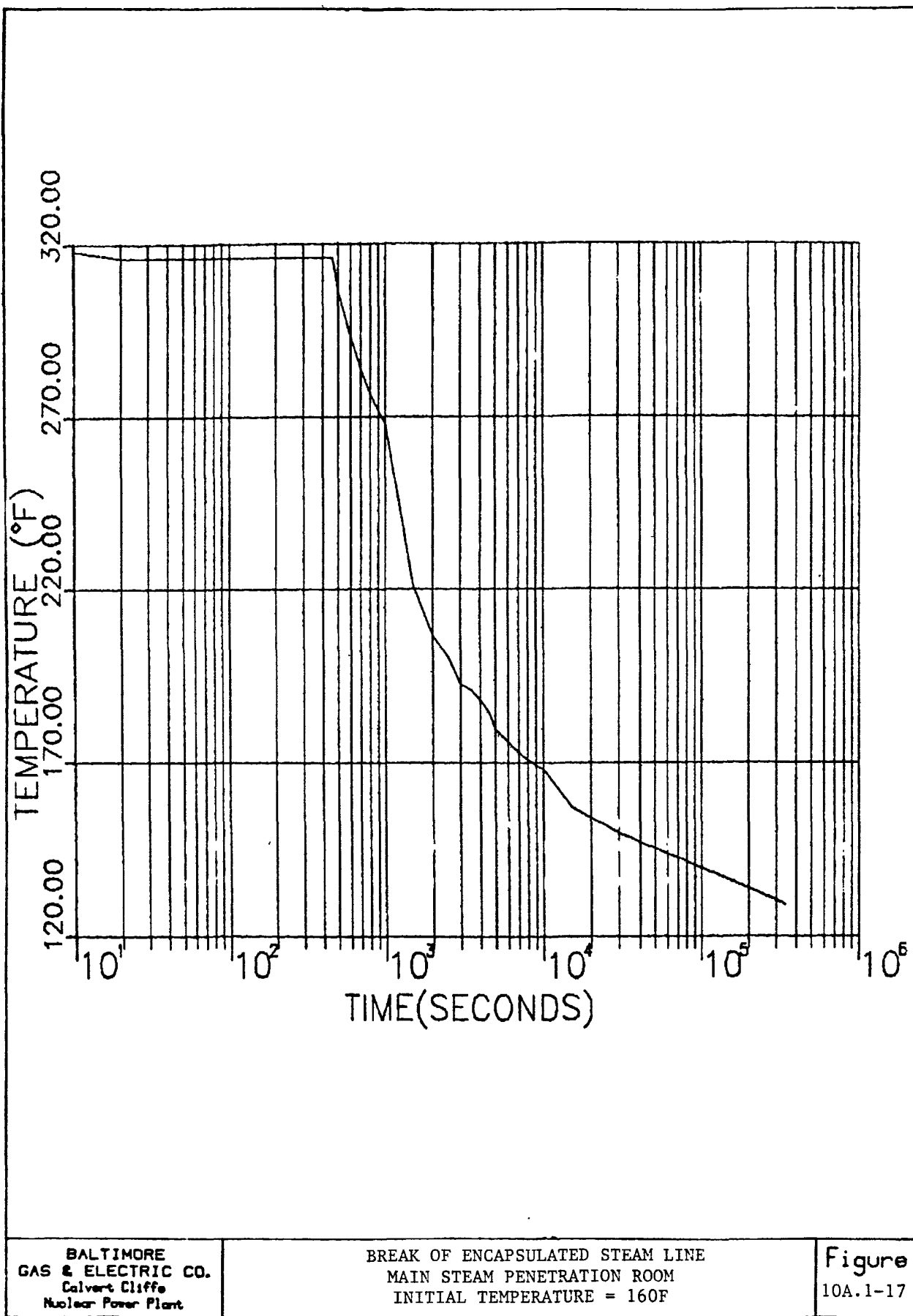


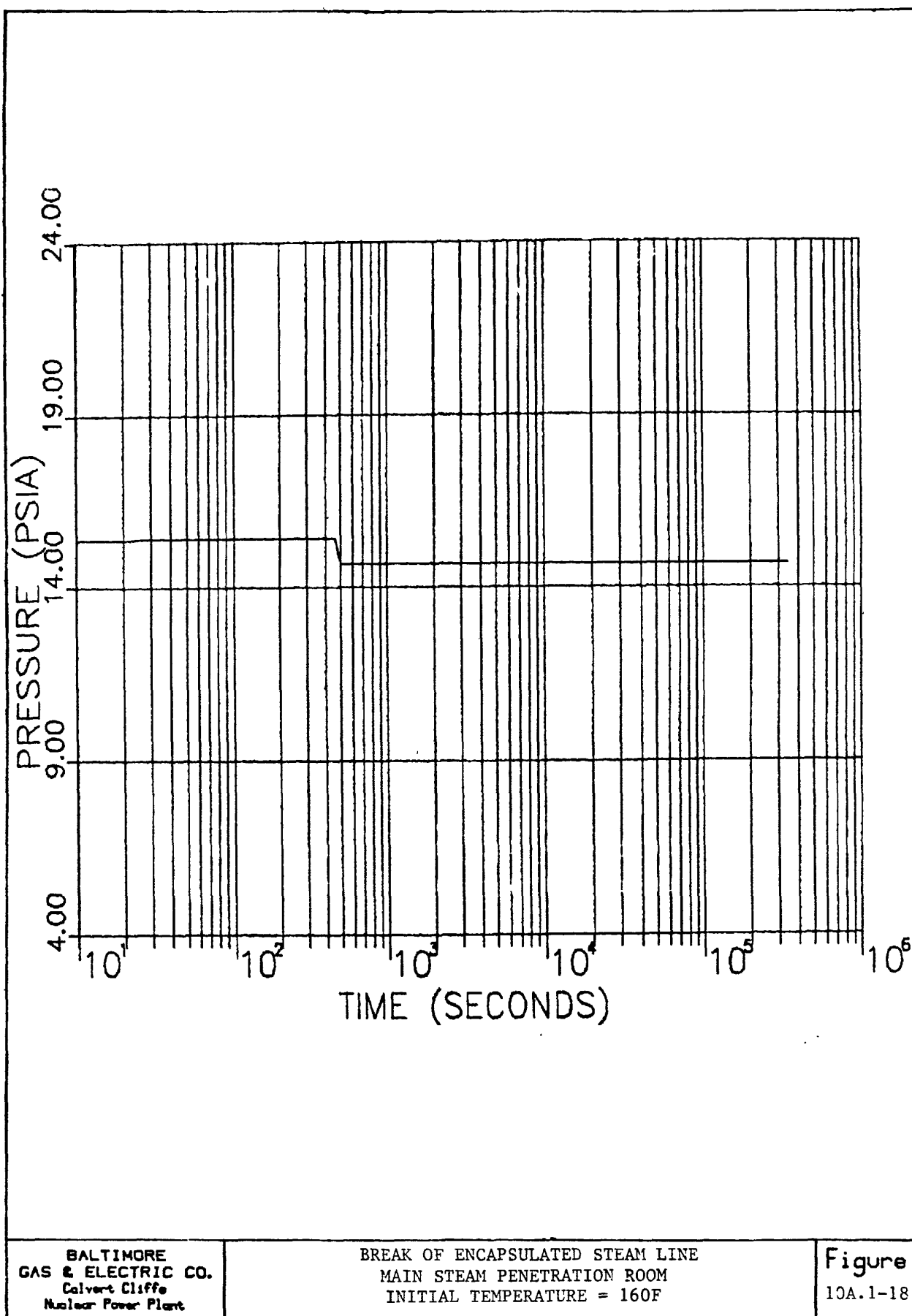
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Nuclear Power Plant

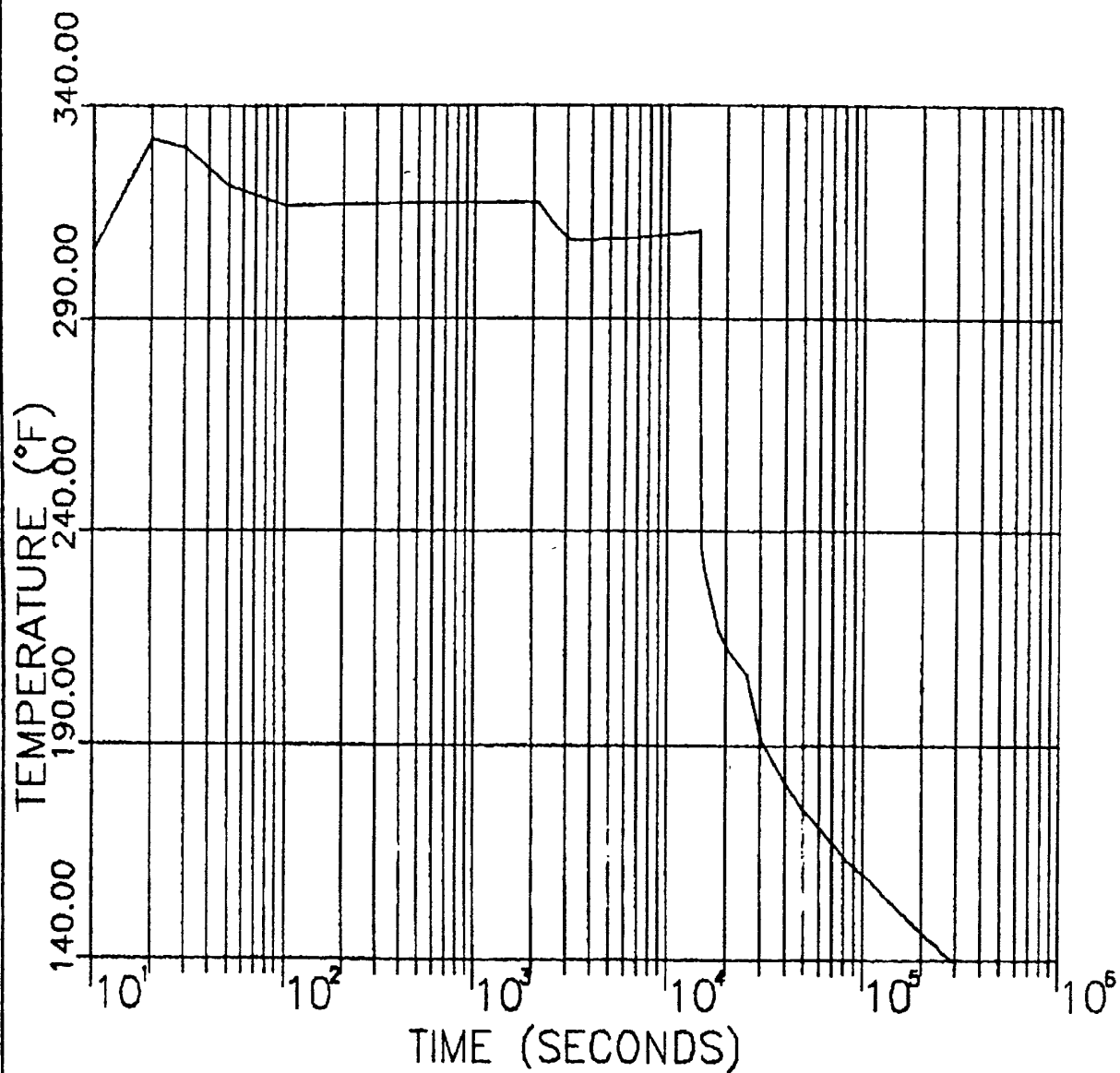
6" STEAM LINE BREAK
MAIN STEAM PENETRATION ROOM
INITIAL TEMPERATURE = 160F

Figure
10A.1-15





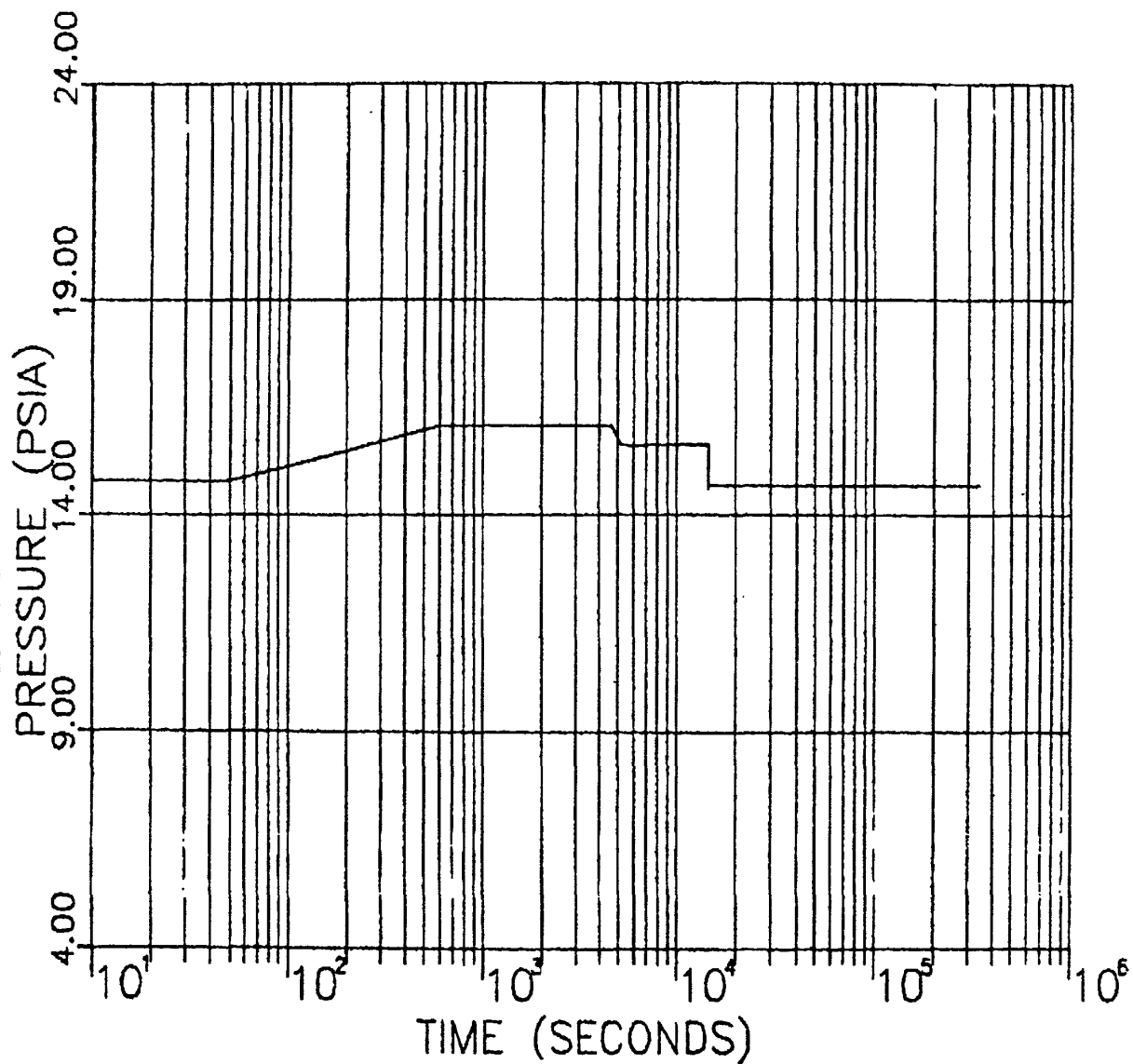




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Calvert Cliffs
Nuclear Power Plant

CRITICAL CRACK IN MAIN STEAM LINE
MAIN STEAM PENETRATION ROOM
INITIAL TEMPERATURE = 160F

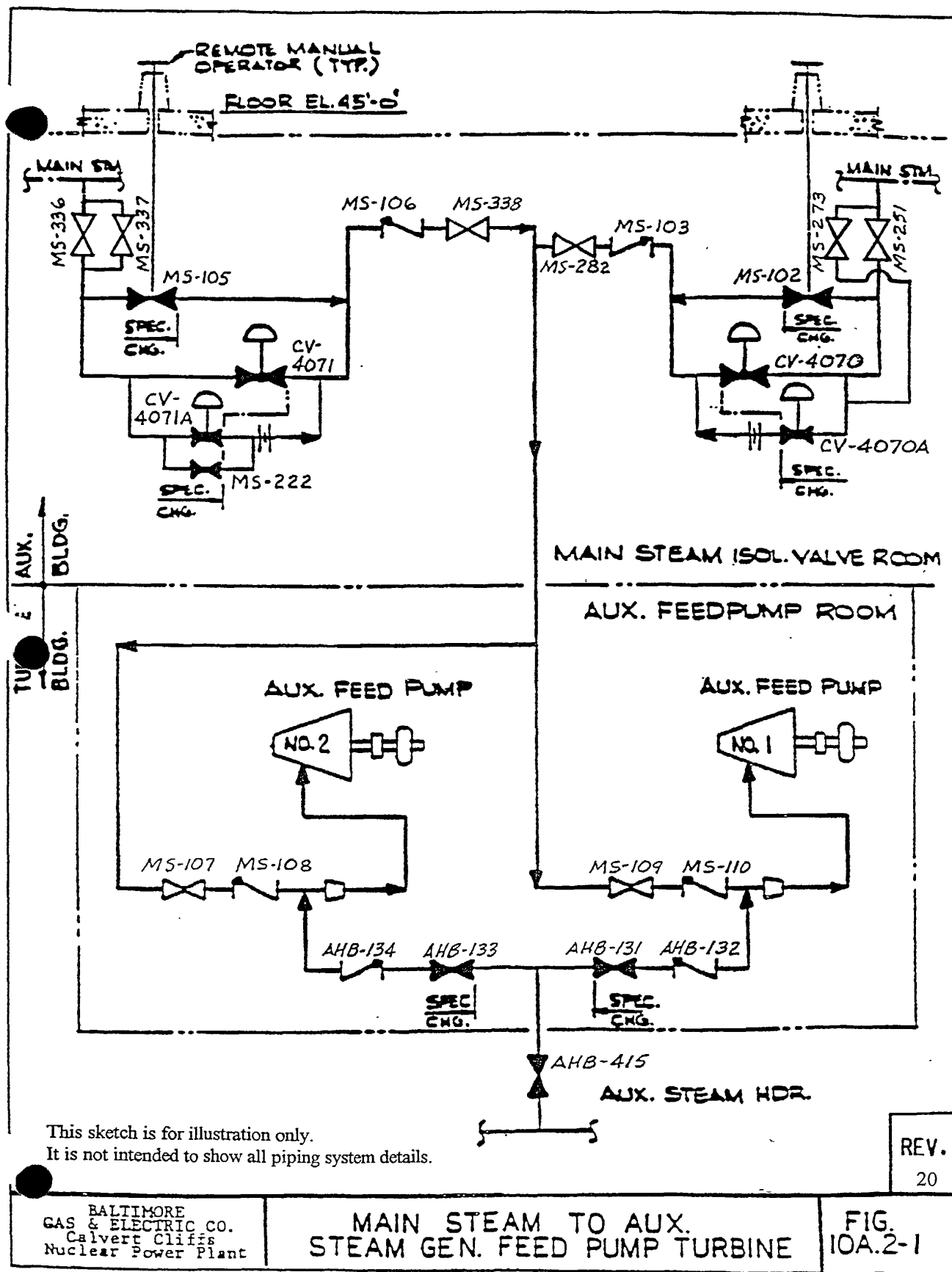
Figure
10A.1-19

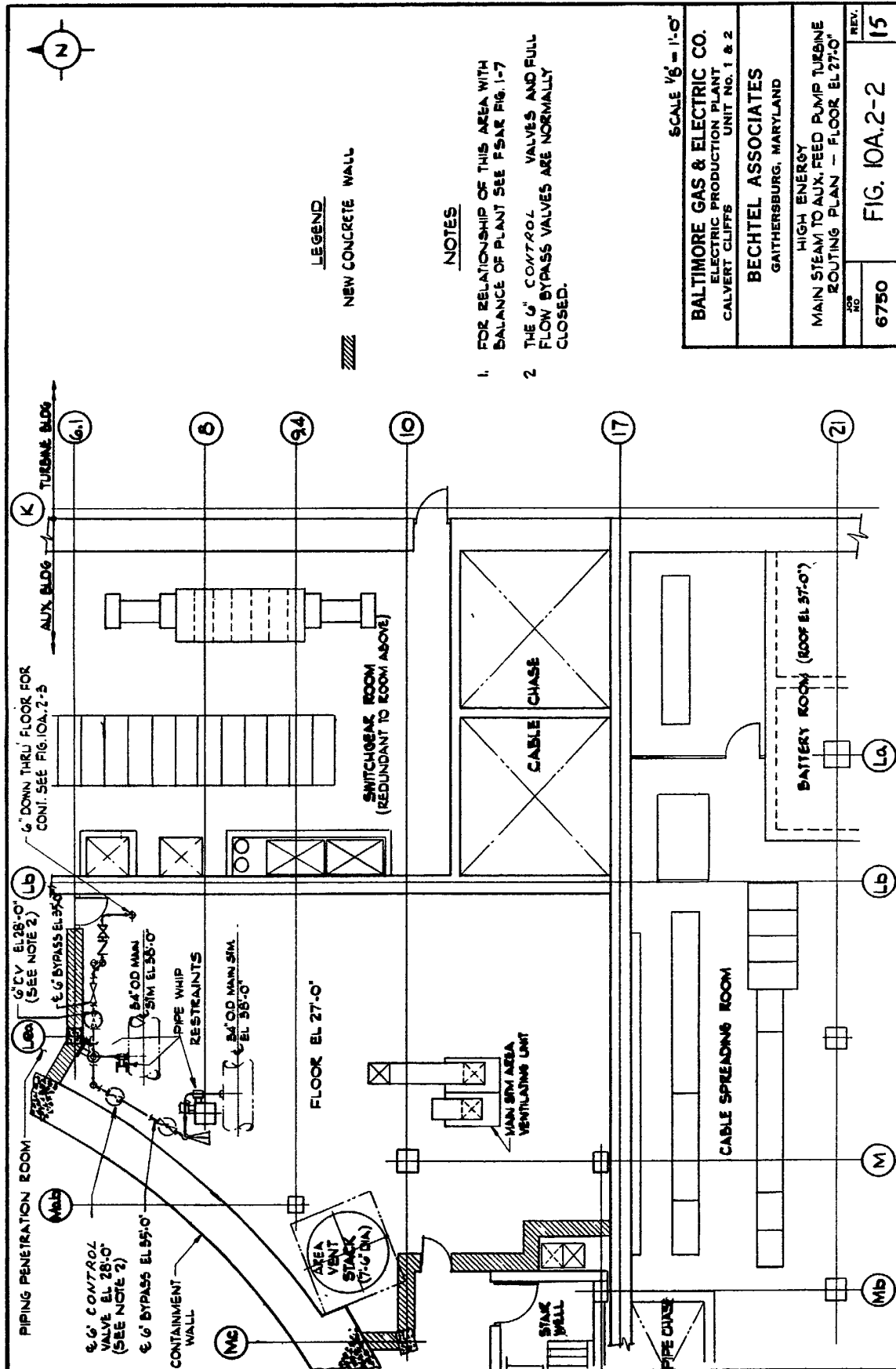


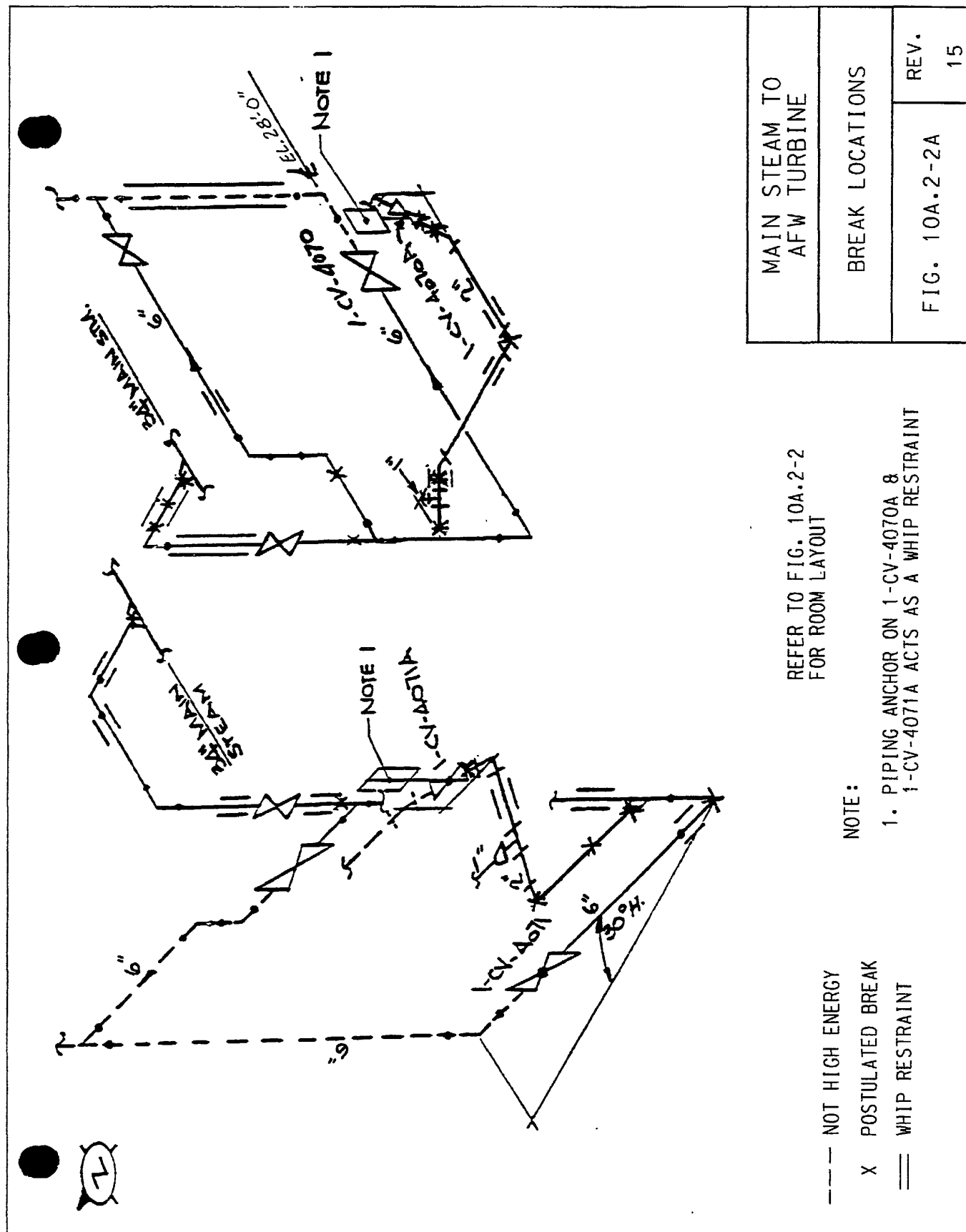
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Nuclear Power Plant

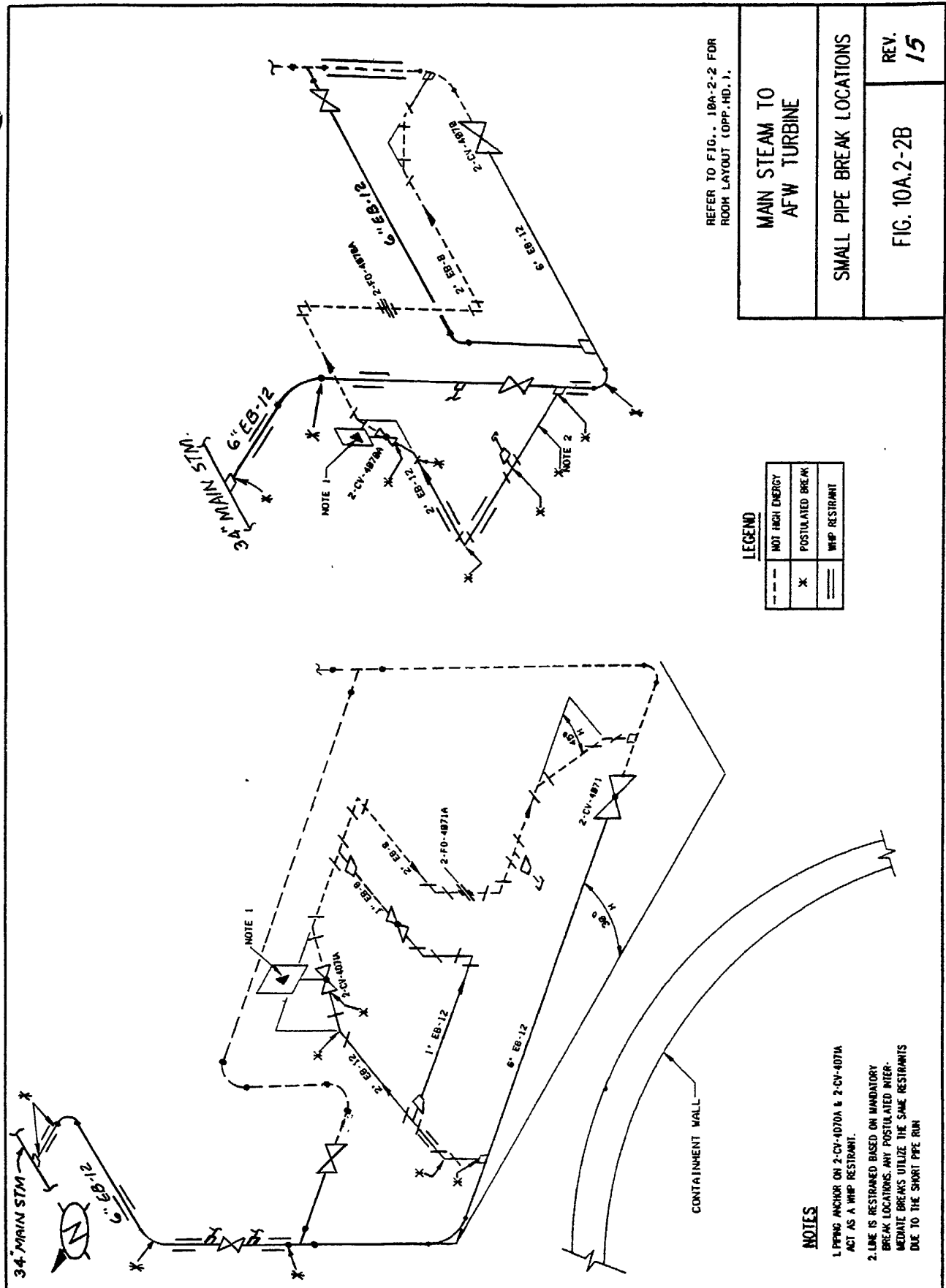
CRITICAL CRACK IN MAIN STEAM LINE
MAIN STEAM PENETRATION ROOM
INITIAL TEMPERATURE = 160F

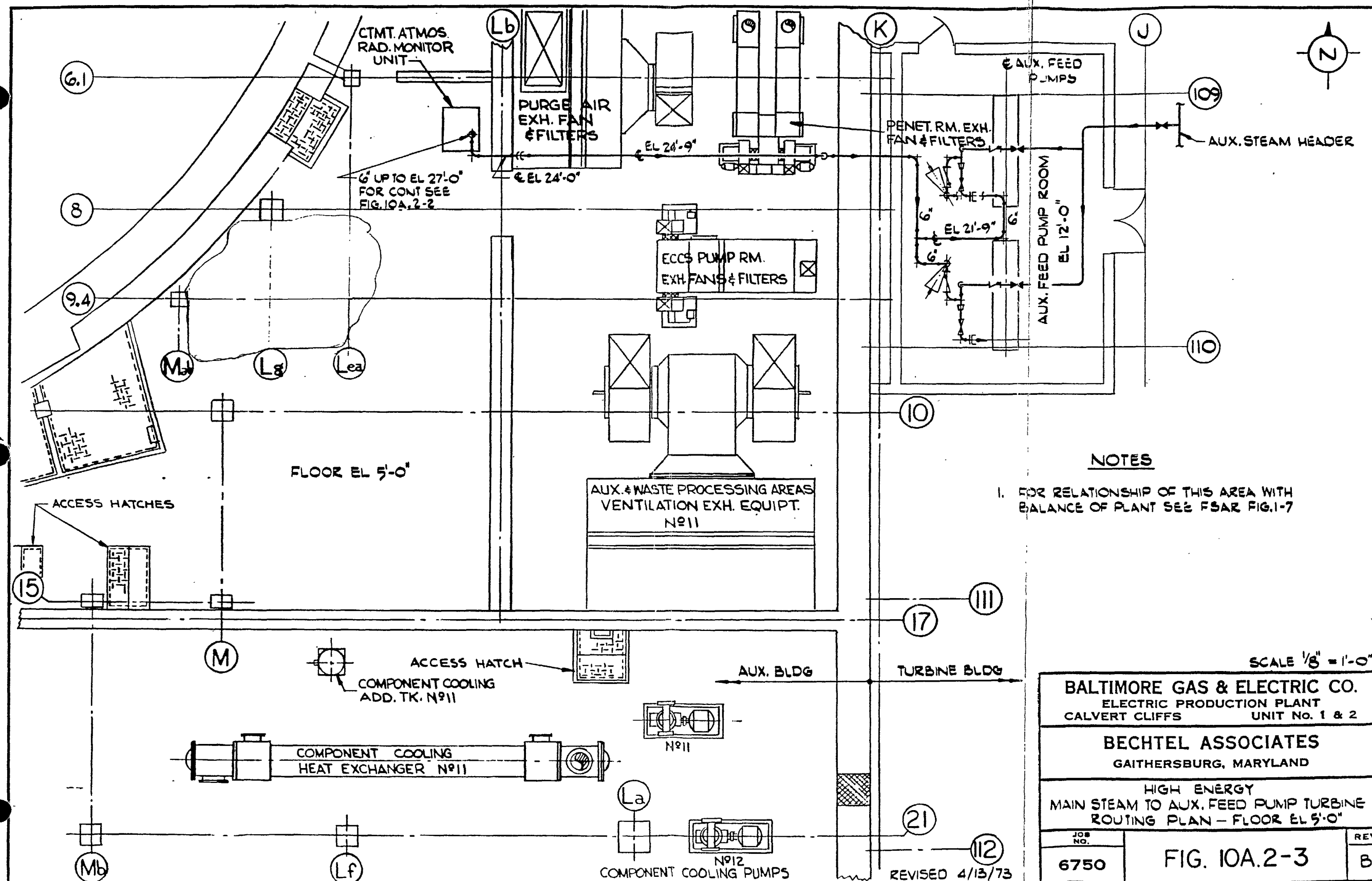
Figure
10A.1-20

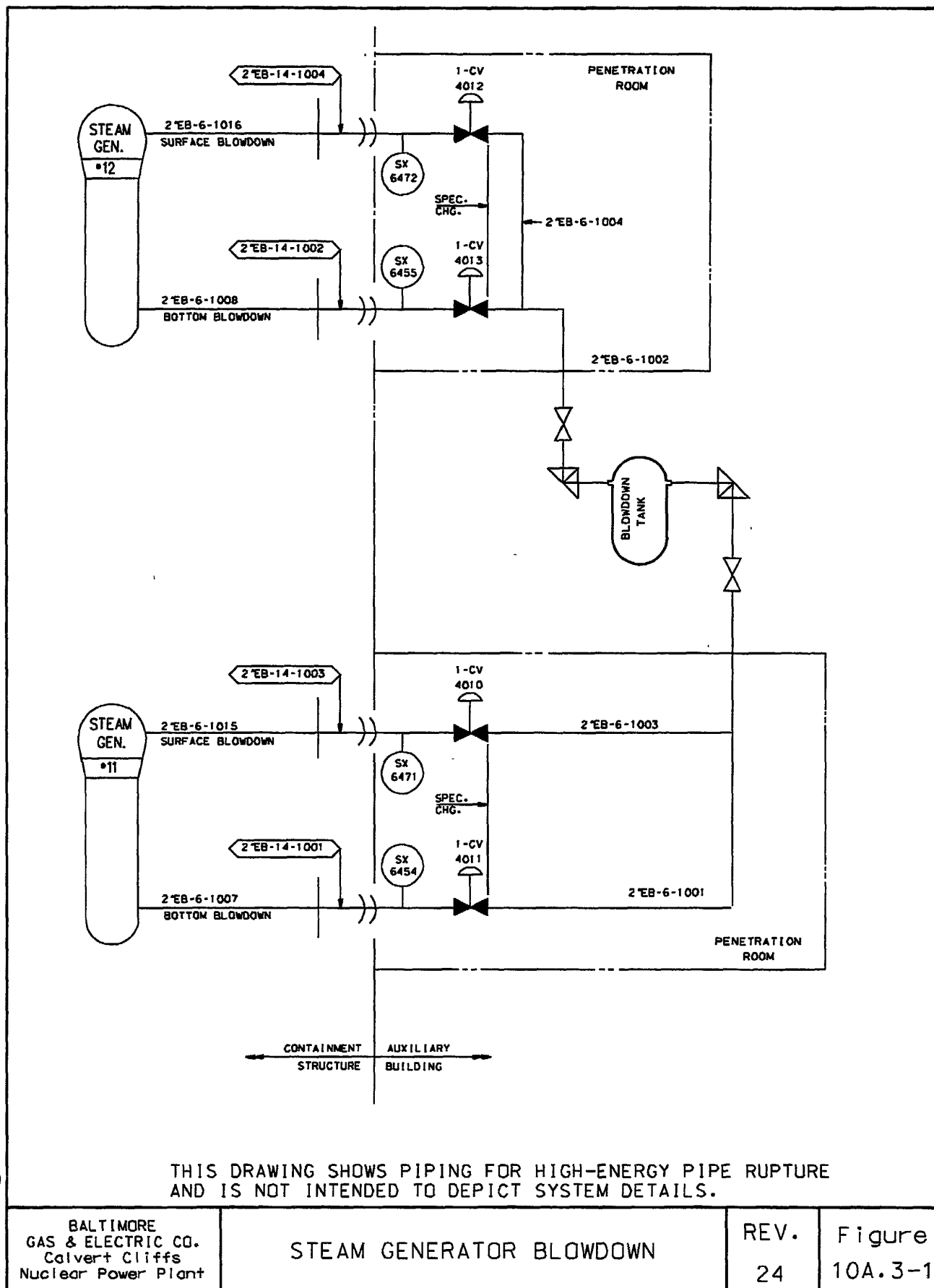












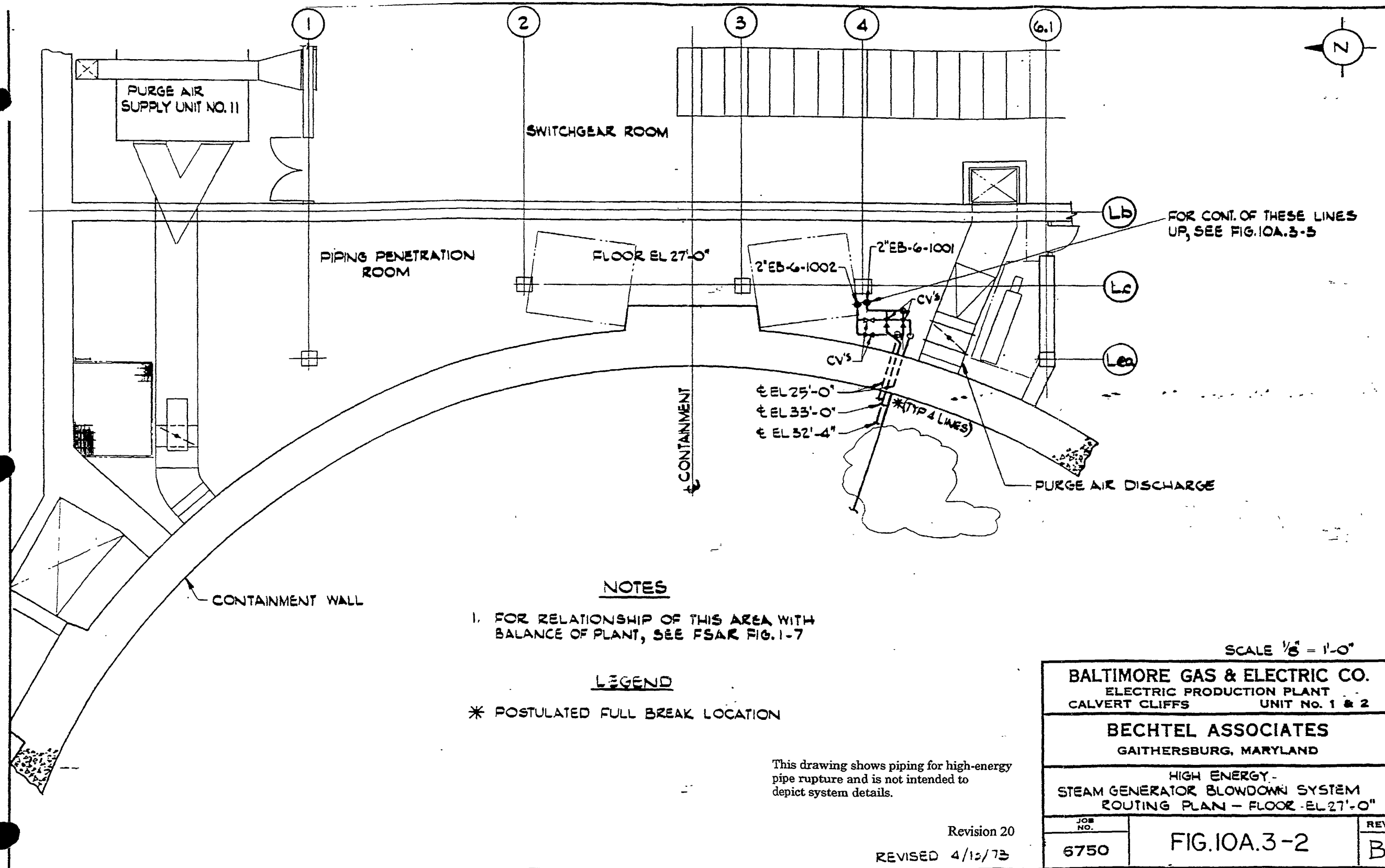
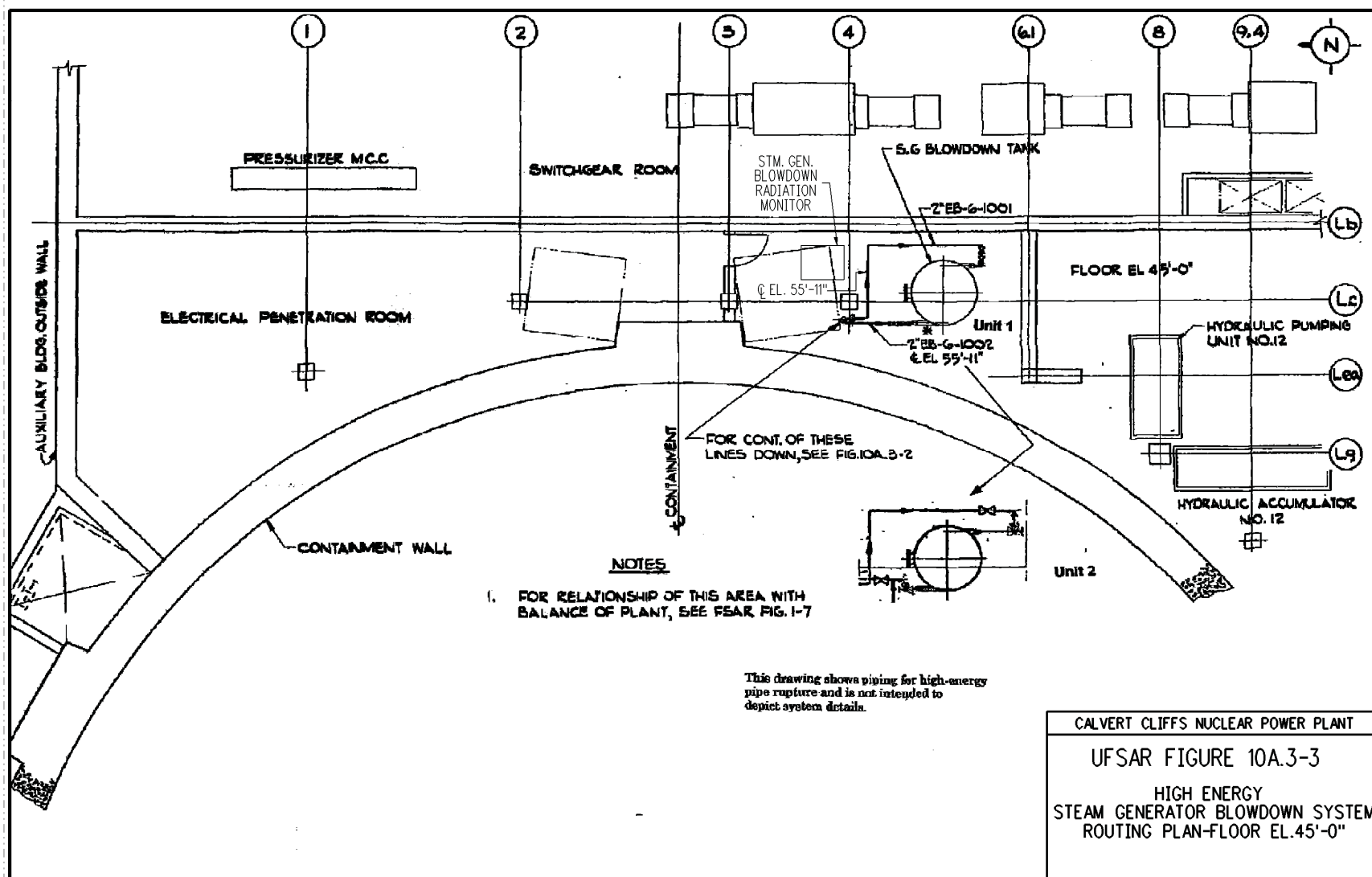
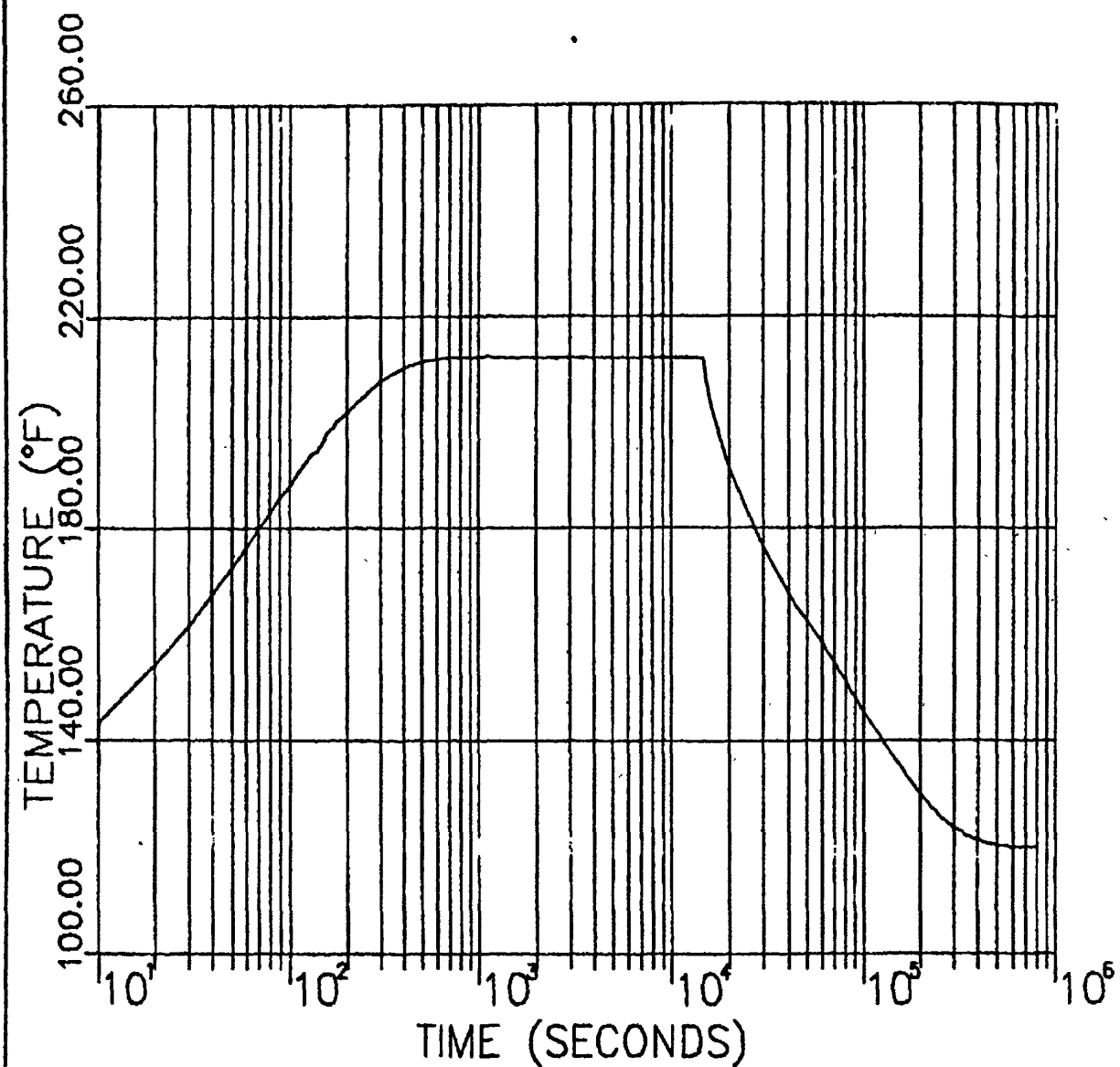


FIGURE 10A.3-3 HIGH ENERGY STEAM GENERATOR BLOWDOWN SYSTEM ROUTING PLAN - FLOOR EL. 45'0"



REVISION 21

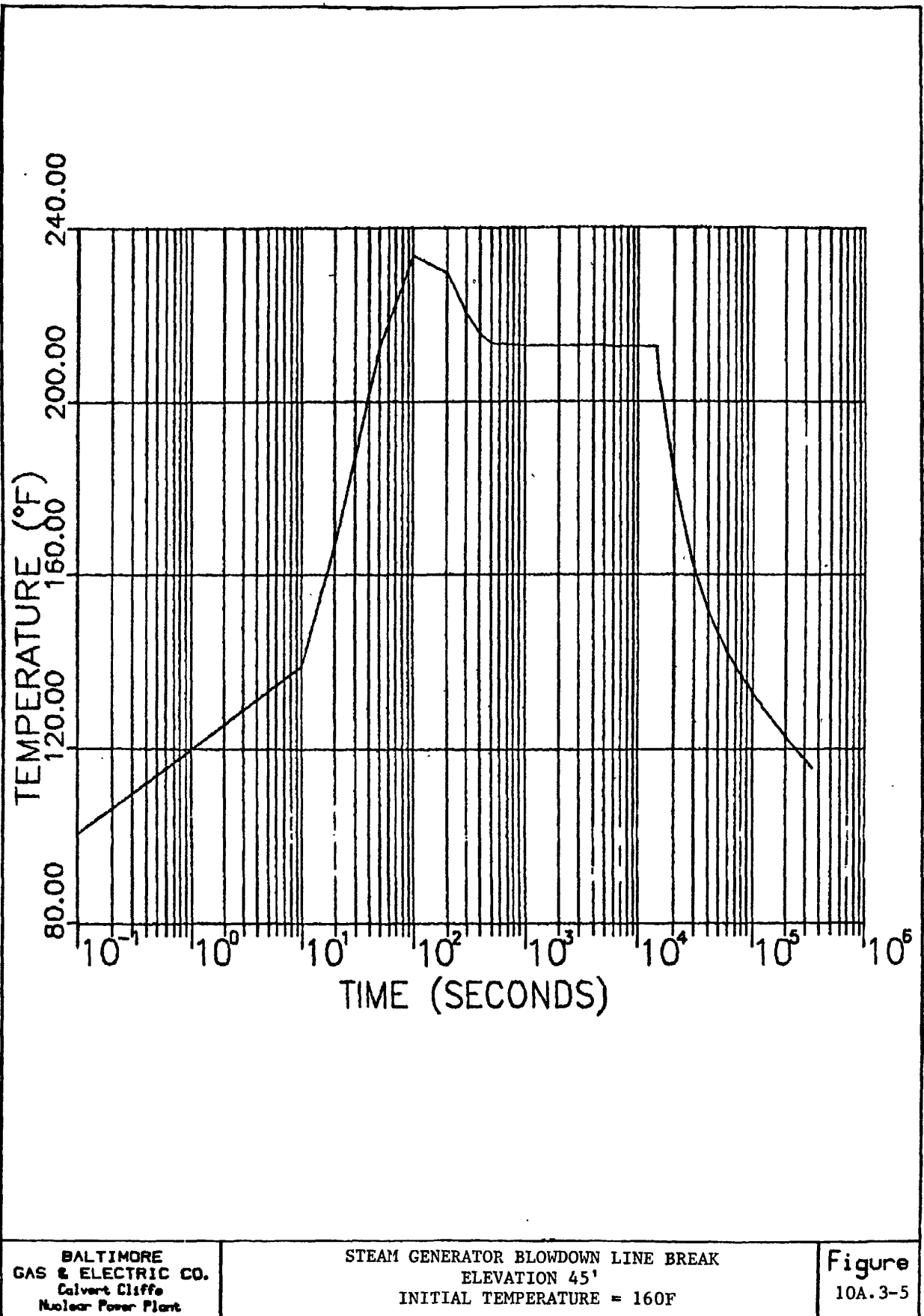
Revision 46

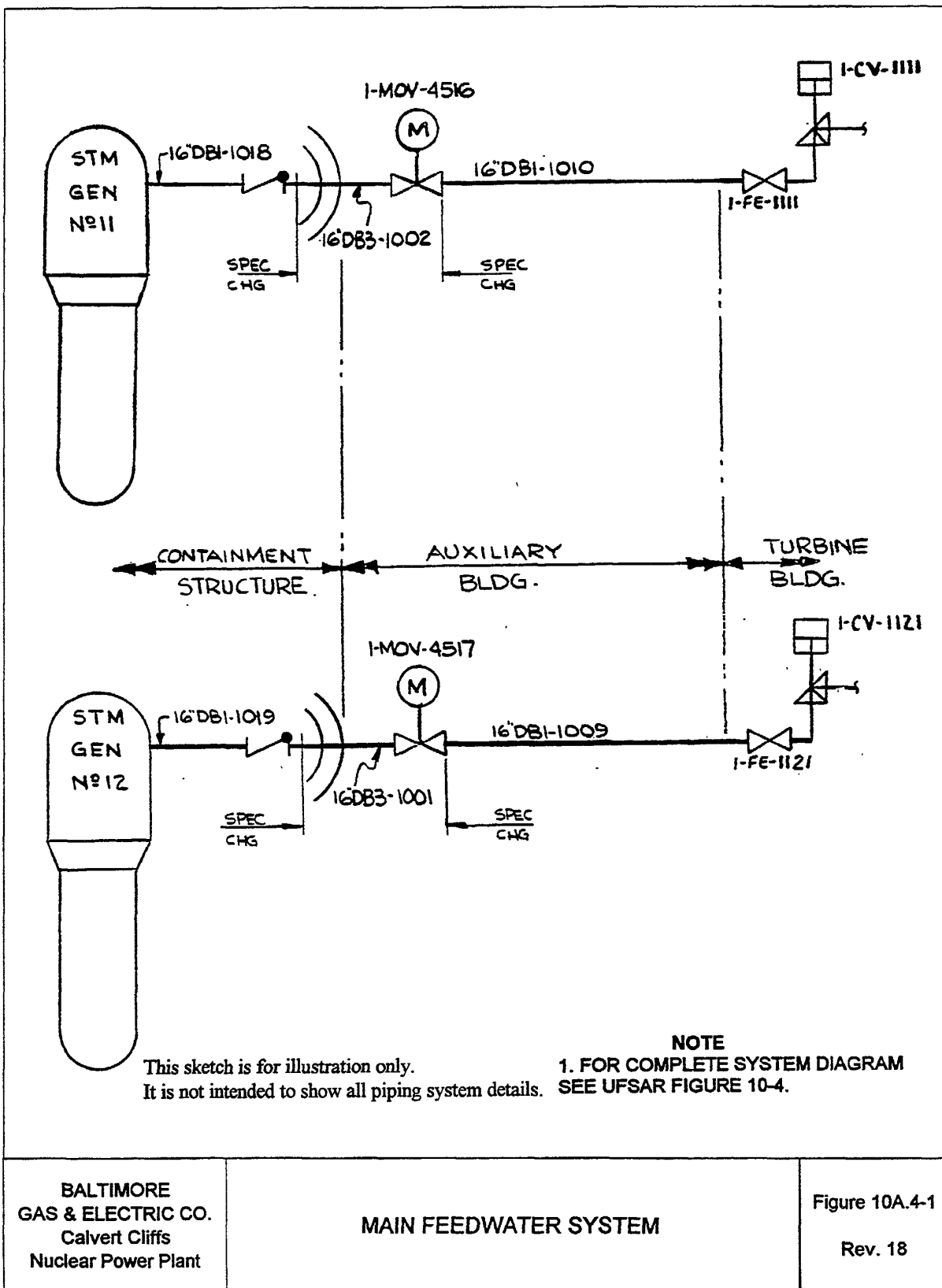


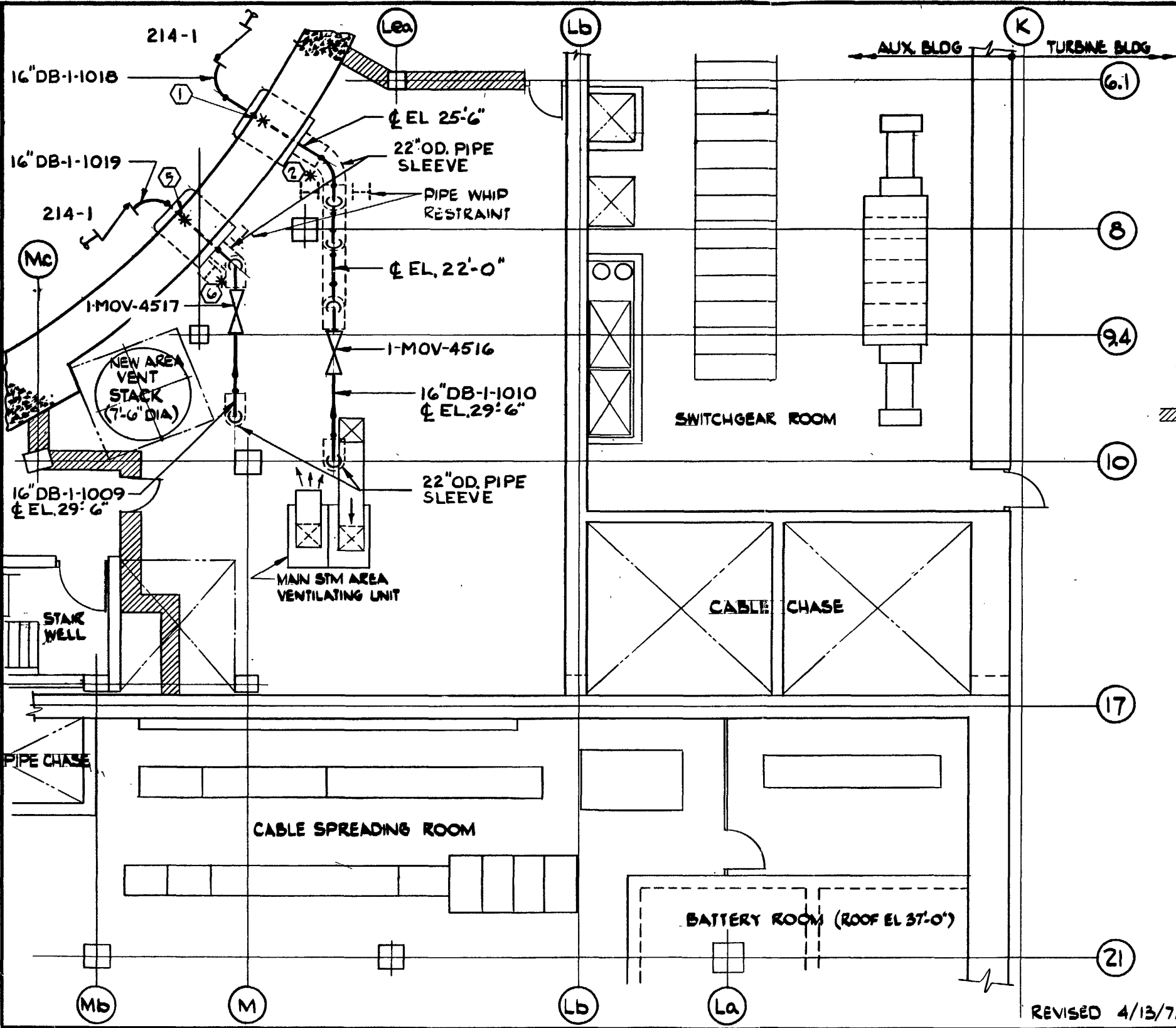
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Calvert Cliffs
Nuclear Power Plant

STEAM GENERATOR BLOWDOWN LINE BREAK
EAST PIPING PENETRATION ROOM
INITIAL TEMPERATURE = 160F

Figure
10A.3-4







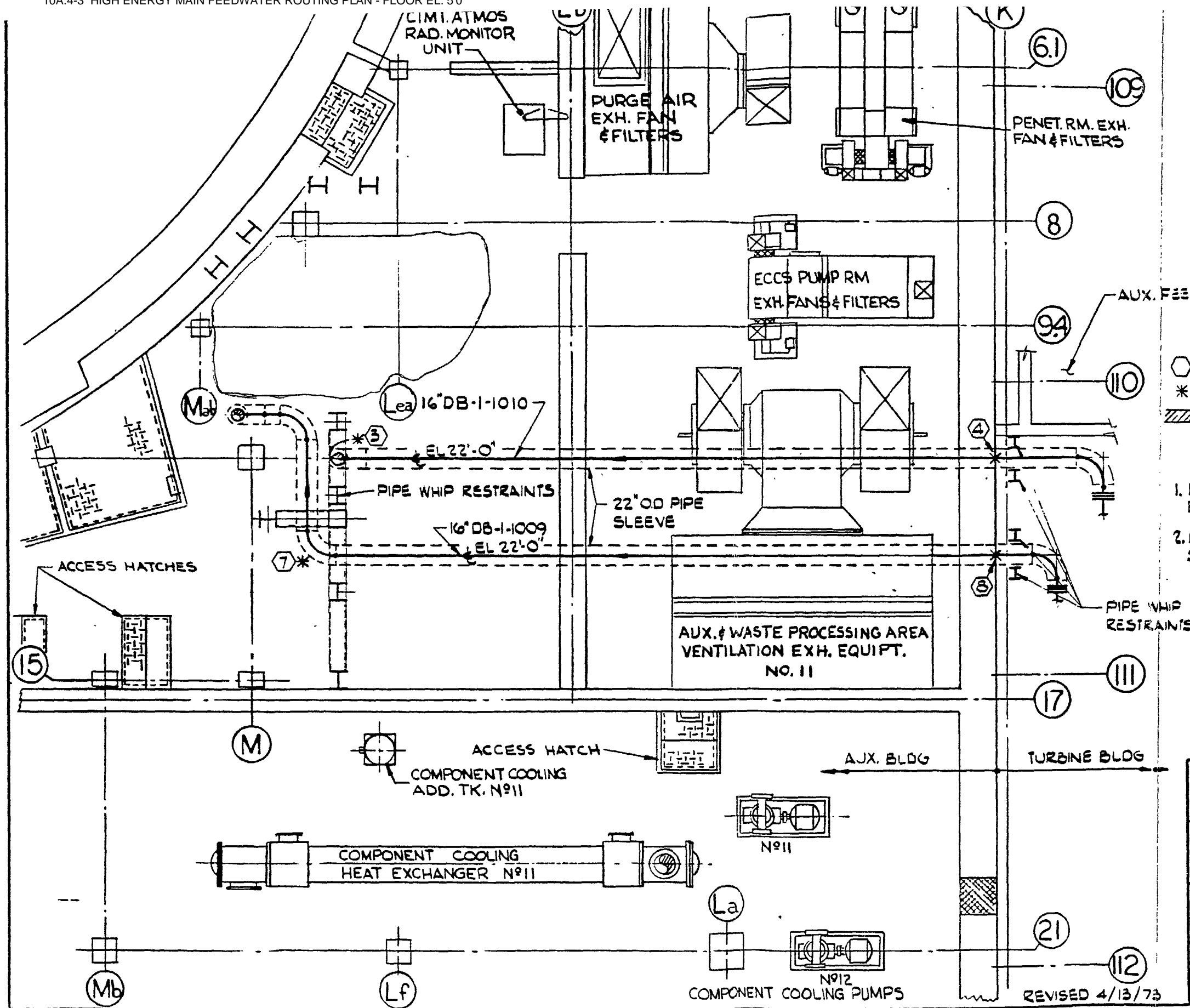
- LEGEND**
- PIPE BREAK IDENTIFICATION NUMBER
 - * POSTULATED FULL BREAK LOCATION
 - ▨ NEW CONCRETE WALL

- NOTES**
- FOR RELATIONSHIP OF THIS AREA WITH BALANCE OF PLANT, SEE FSAR FIG. 1-7
 - FOR DETAILS OF A PIPE WHIP RESTRAINT SEE FIG. 10A.1-4

SCALE 1/8"=1'-0"

BALTIMORE GAS & ELECTRIC CO. ELECTRIC PRODUCTION PLANT CALVERT CLIFFS UNIT No. 1 & 2		
BECHTEL ASSOCIATES GAITHERSBURG, MARYLAND		
HIGH ENERGY MAIN FEEDWATER ROUTING PLAN - FLOOR EL. 27'-0"		
JOB NO.	FIG. 10A. 4-2	REV.
6750		B

REVISED 4/13/73



LEGEND

- = PIPE BREAK IDENTIFICATION NUMBER
- * = POSTULATED FULL BREAK LOCATION
- /// = NEW CONCRETE WALL

NOTES

1. FOR RELATIONSHIP OF THIS AREA WITH BALANCE OF PLANT, SEE FSAR FIG. 1-7
2. FOR DETAILS OF A PIPE WHIP RESTRAINT SEE FIG. 10A.1-4

SCALE 1/8" = 1'-0"

BALTIMORE GAS & ELECTRIC CO
ELECTRIC PRODUCTION PLANT
CALVERT CLIFFS UNIT No. 1 & 2

BECHTEL ASSOCIATES
GAITHERSBURG, MARYLAND

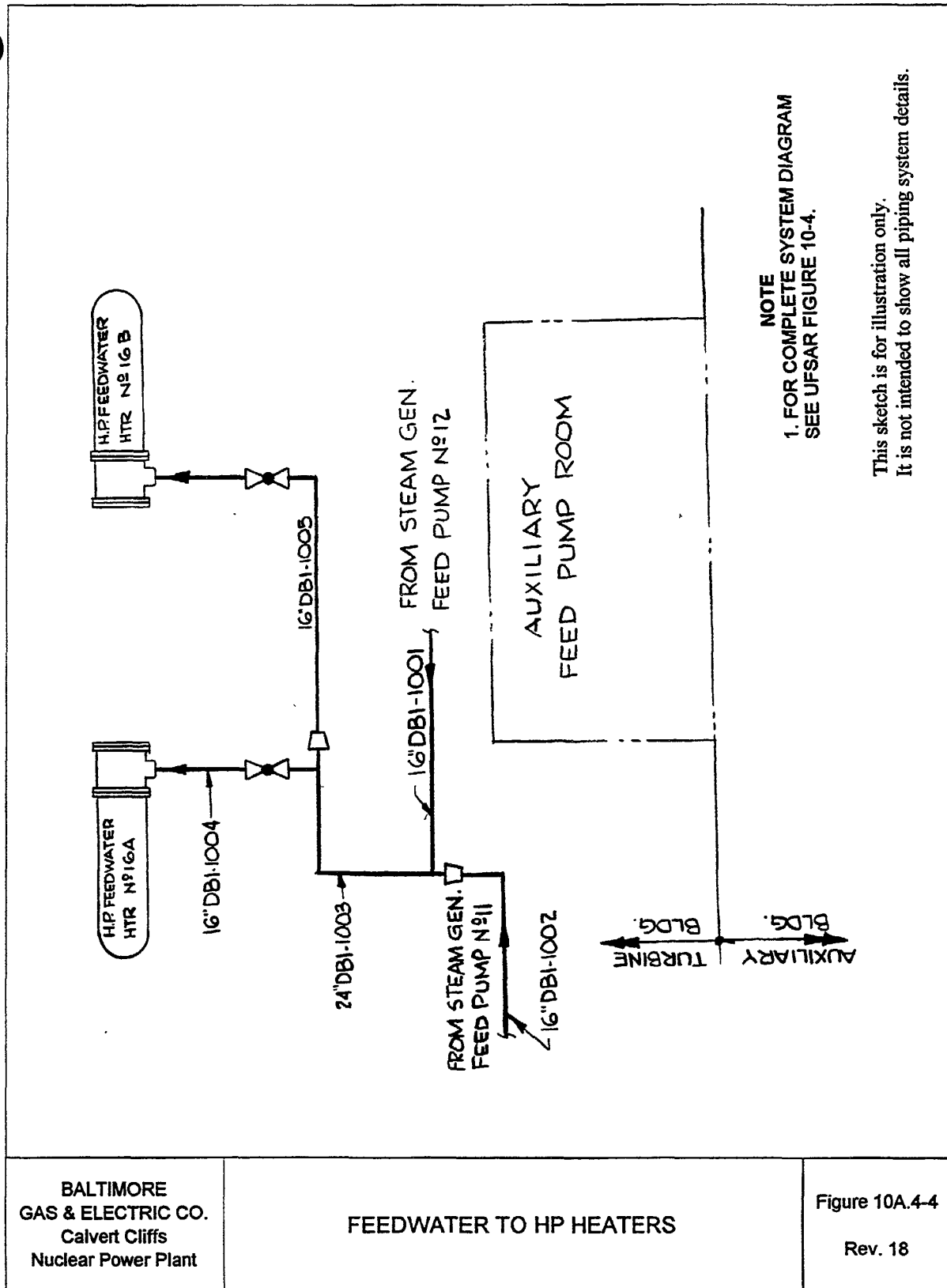
HIGH ENERGY
MAIN FEEDWATER
ROUTING PLAN - FLOOR EL. 5'-0"

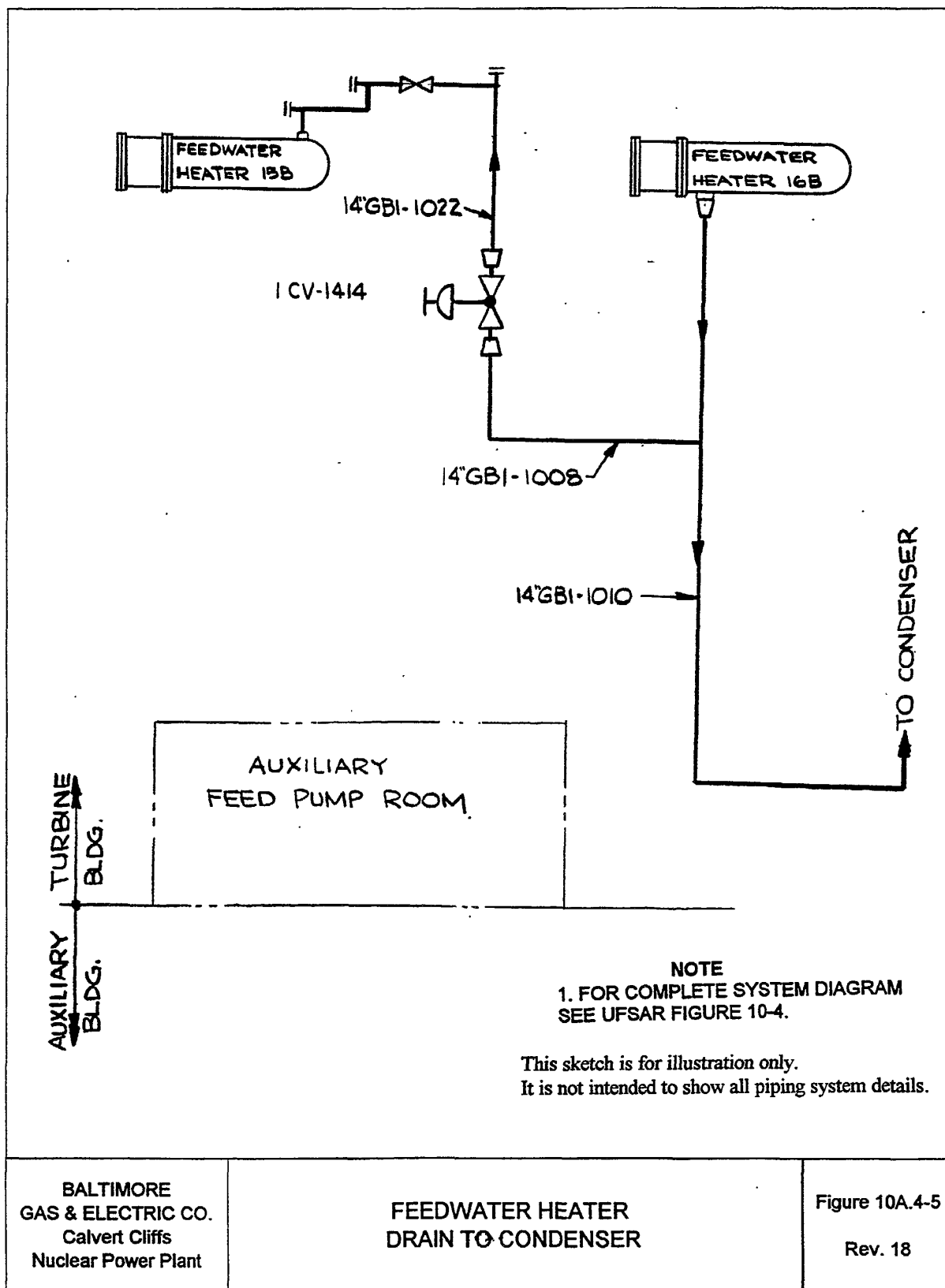
JOB NO.
6750

FIG. 10 A.4-3

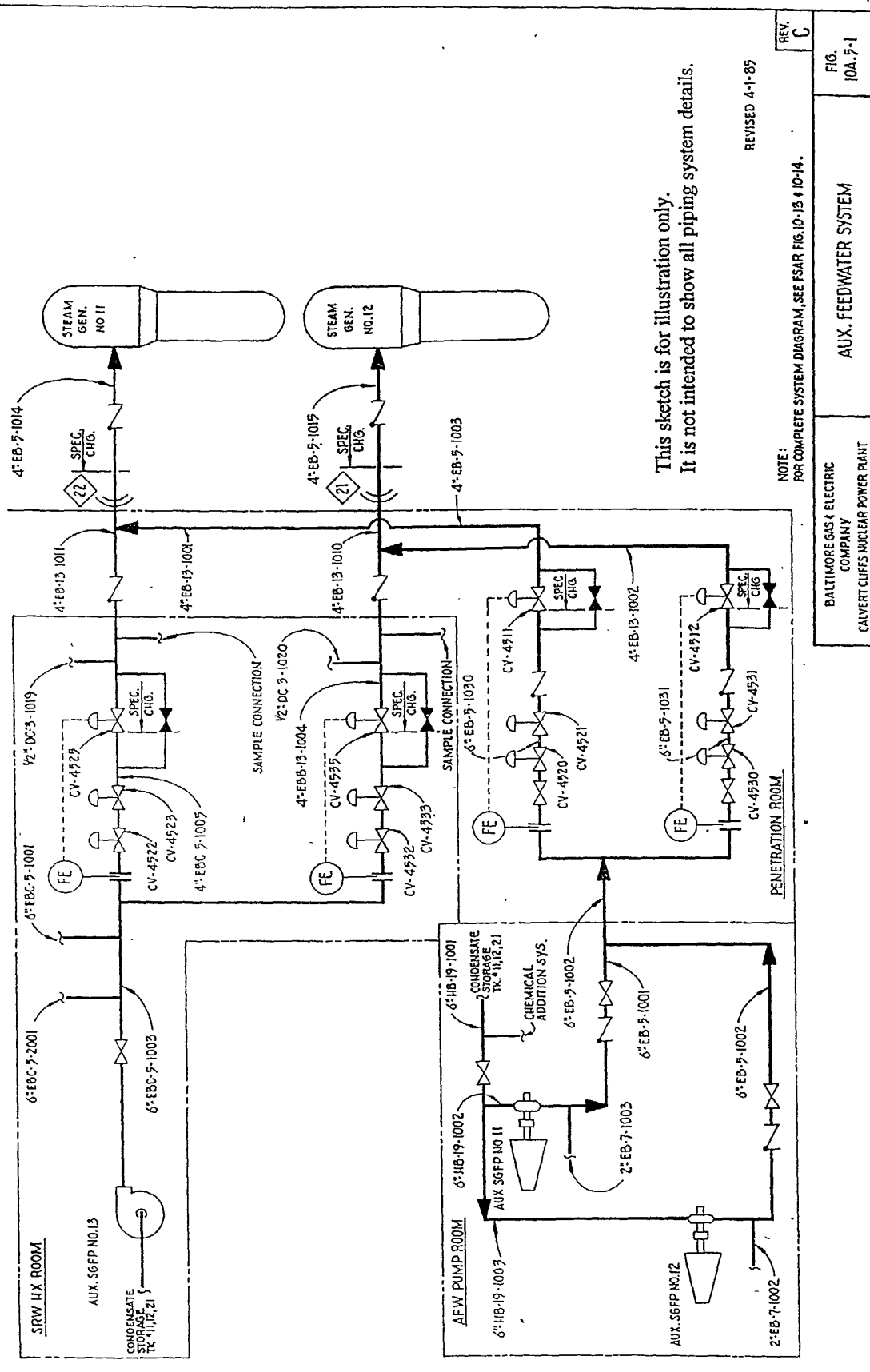
REVISED 4/13/73

REV. 6









Revision 20

SECURITY RELATED INFORMATION
WITHHELD UNDER 10 CFR 2.390

SECURITY RELATED INFORMATION
WITHHELD UNDER 10 CFR 2.390

SECURITY RELATED INFORMATION
WITHHELD UNDER 10 CFR 2.390

SECURITY RELATED INFORMATION
WITHHELD UNDER 10 CFR 2.390

SECURITY RELATED INFORMATION
WITHHELD UNDER 10 CFR 2.390

UNIT 1

POSTULATED PIPE CRACK "B", PIPE NO. 4" EBB-13-1004
C: 4" EBB-13-1002

POSTULATED PIPE CRACK "A"
PIPE NO. 4" EBC-5-1005, DWG NO. SK-ME-105 SH 1

ITEM	TUBING	INST	CONDUITS	LOCATION FROM TO	INCLUDES CABLES	CABLE DESIGNATION	FORCE ON TARGET
1			BIA2253-1/2" C (FROM H-LS-1651)	PB 1-LS-1651	BIK52EL	1J236-1-LS-1651	
2							
3	1/2" COPPER INST AIR TO F-CV-5150		BIA2256-3/4" C (FROM 1-PS-2256)	1-PS-1600 PB	BIK11BV	1K01-1-PS-1600	23" SEE NOTE 3 (TYP)
4			AIA2238-1" C (FROM 1-PS-5152)	1-PS-5152 PB	AIN5152A	2C24A-1-PS-5152	42"
5			EIAA2297-1" C (FROM F-CV-5150)	1-PS-5150 PB	EAIV5210C	2C24A-1-PS-5150	23"
6			EIAA4252 (NEW AFW)		SEE NOTE 2 (TYPICAL)		
7							
8			EIAA2259-1" C (FROM 1-CV-5153)	1-PS-5153 PB	EIV5212G	1J459-1-PS-5153	42"
9			EIAA4251 (NEW AFW)				
10			EIAA4237 (NEW AFW)				

DWG NO. SK-ME-105 SH 1

ITEM	TUBING	INST	CONDUITS	LOCATION FROM TO	INCLUDES CABLES	CABLE DESIGNATION	FORCE ON TARGET
1			JUNCTION BOX 1J575				
2			AIA4232- (NEW AFW)				
3			BIA9323-1/2" C (FINE PROT. CONDUIT)	1-PS-2266 PB	BIK2266	1K01-1-PS-2266	10"
4	1/2" COPPER INST AIR TO F-CV-5150						

POSTULATED PIPE CRACK "D", PIPE NO. 6" EBC-5-1001
E: 6" EBC-5-2001
F: 6" EBC-5-2001

DWG NO. SK-ME-105 SH 1

ITEM	TUBING	INST	CONDUITS	LOCATION FROM TO	INCLUDES CABLES	CABLE DESIGNATION	FORCE ON TARGET
1			AIA3849-1/2" C (1AAS1)	TEE 1AAS1	AIB0333P	1B003-1M0333	
2			AIA3828-1/2" C (1C107)	IC107 PB	AIB0336B	1C107-1PS4080	
3			BIA3844-2" C (1C107)	IC107 PB	BIV4087A	1C107-1PS4087	
4			BIA3833-3/4" C (1FT-4089)	1FT-4089 PB	BIF4089A	1C107-1FT4089	
5			BIA3840-1" C (2AC26)	1AAS1	BIRAD23A	1C22D-1RE4095	
6			AIA0398-1/2" C	TEE 1AAS1	AIF1581A	1FT1581-1R01A	
7			BIA0388-1/2" C	TEE 1AAS1	BIF1589A	1FT1589-1R01A	
8			EIAA1547-1" C (FROM 1-MOV-6579)	1-MOV-6579	EIA1547	1B014-1MOV6579	75"
9			EIAA1546-1" C (FROM 1-MOV-6579)	1-MOV-6579	EIA1546	1B014-1MOV6579	75"
10			EIAA0380-2 1/2" C	TEE 1AAS1	EIA1400P	1B014-1MOV625	86"
11			EIAA0383-2 1/2" C	TEE 1AAS1	EIA1407B	1B014-1MOV625	86"
12			EIAA1631-1" C (1AAS1)	1AAS1	EIA1416P	1B014-1MOV617	35"
13			EIAA1632-1 1/2" C	1-MOV-617	EIA1416B	1B014-1MOV617	53"
14			EIAA1634-1 1/2" C	1-MOV-617	EIB0416C	1B004-1MOV616	52"
15			EIAA1635-1" C (1AAS1)	1AAS1	EIB0416P	1B004-1MOV616	43"
16	1/2" AIR SUPPLY FROM C-24 LINE						17"
17	TUBING FOR HPS1 FLOW TO 1-PS-5150						21"
18	1/2" COPPER INST AIR FROM AFW ACCON A4B						48"

POSTULATED PIPE CRACK "J", PIPE NO. 6" EBC-5-1001
K: 6" EBC-5-2001

DWG NO. SK-ME-105 SH 2

ITEM	TUBING	INST	CONDUITS	LOCATION FROM TO	INCLUDES CABLES	CABLE DESIGNATION	FORCE ON TARGET
1	1/2" AIR SUPPLY FROM C-24 LINE		AIA3863-1" C (BREATHING AIR)	1AAS1	AIP0331P	1B003-1HS2026	76"
2			AIA3916-3" C	1B003	AIB0333A	1B003-1C107	
3					AIB0334A	1B003-1M0336	

UNIT 2

POSTULATED PIPE CRACK "L", PIPE NO. 6" EBC-5-1001
M: 6" EBC-5-2001

DWG NO. SK-ME-106 SH 2

ITEM	TUBING	INST	CONDUITS	LOCATION FROM TO	INCLUDES CABLES	CABLE DESIGNATION	FORCE ON TARGET
1			BIA0326-1/2" C	2AAS1	BIB321P	2B003-2C107	
2			AIA3404-3" C	2AAS1	AIB0330P	2B003-2C107	
3					AIB0332A	2B003-2M0332	
4			AIA0774-1/2" C	2B003	AIB0333P	2B003-2M0333	
5			AIA0745-1 1/2" C	2B003	AIB0333P	2B003-2M0333	
6			BIA3429-1 1/2" C	2AAS1	BIV4015C	1C107-2J497	
7			AIA3098-1/2" C	2AAS1	AIB0333P	1C107-2J497	
8			EIAA3054-1/2" C	2AAS1	EIV5210C	2C24A-1-PS-5150	
9			EIAA3055-1/2" C	2AAS1	EIV5210C	2C24A-1-PS-5150	
10	SAFETY INJECTION TUBING POST-ACCIDENT SAMPLING 1-1/2" U-102						

POSTULATED PIPE CRACK "N"
PIPE NO. 4" EBC-5-2002, DWG NO. SK-ME-106 SH 1

ITEM	TUBING	INST	CONDUITS	LOCATION FROM TO	INCLUDES CABLES	CABLE DESIGNATION	FORCE ON TARGET
1	1/2" COPPER FOR 1-PS-5210						14"
2							
3			EIAA1312-1" C	PB 2-6V	AIV5212D	2C24A-2PS5210	
4			EIAA2169-1/2" C (CONDUIT FROM 1-PS-5210)	PB 2-5V	AIV5212B	2C24A-2PS5210	
5	1/2" COPPER TO 1-PS-5210						
6			EIAA1457-1/2" C	2-1/2" PB	AIV5210A	2C24A-2PS5210	
7	1/2" COPPER TO 1-PS-5210						23"
8							
9							
10	1/2" AIR SUPPLY TO 1-PS-5210						

POSTULATED PIPE CRACK "P"
PIPE NO. 6" EBC-5-1001, DWG NO. SK-ME-106 SH 2

ITEM	TUBING	INST	CONDUITS	LOCATION FROM TO	INCLUDES CABLES	CABLE DESIGNATION	FORCE ON TARGET
1			AIA2824-2" C	2J290	AIB1459A	2B014-2J290	
2			AIA2821-1/2" C	2J290	AIB1459C	2J290-2J409	
3							
4							
5							
6			AIA2817-1 1/2" C	2AAS1	AIB1459P	2B014-2M1459	
7			BIA2818-1 1/2" C	2AAS1	BIB0456P	2B004-2M0456	
8			AIA2816-1 1/2" C	2AAS1	AIB1461P	2B014-2M1461	
9	1/2" AIR SUPPLY TO 1-PS-5210						28.5"

POSTULATED PIPE CRACK "R", PIPE NO. 6" EBC-5-1001
S: 6" EBC-5-2001

DWG NO. SK-ME-106 SH 1

ITEM	TUBING	INST	CONDUITS	LOCATION FROM TO	INCLUDES CABLES	CABLE DESIGNATION	FORCE ON TARGET
1			EIAA2815-1/2" C	2AAS1	EIA2P1459A	1C100-2FT6901	23"
2	1/2" AIR SUPPLY TO 1-PS-5210						44"
3							
4							
5							

POSTULATED PIPE CRACK "T"
PIPE NO. 4" EBB-13-2004, DWG NO. SK-ME-106 SH 1

DWG NO. SK-ME-106 SH 1

ITEM	TUBING	INST	CONDUITS	LOCATION FROM TO	INCLUDES CABLES	CABLE DESIGNATION	FORCE ON TARGET
1							
2							
3							
4							
5							

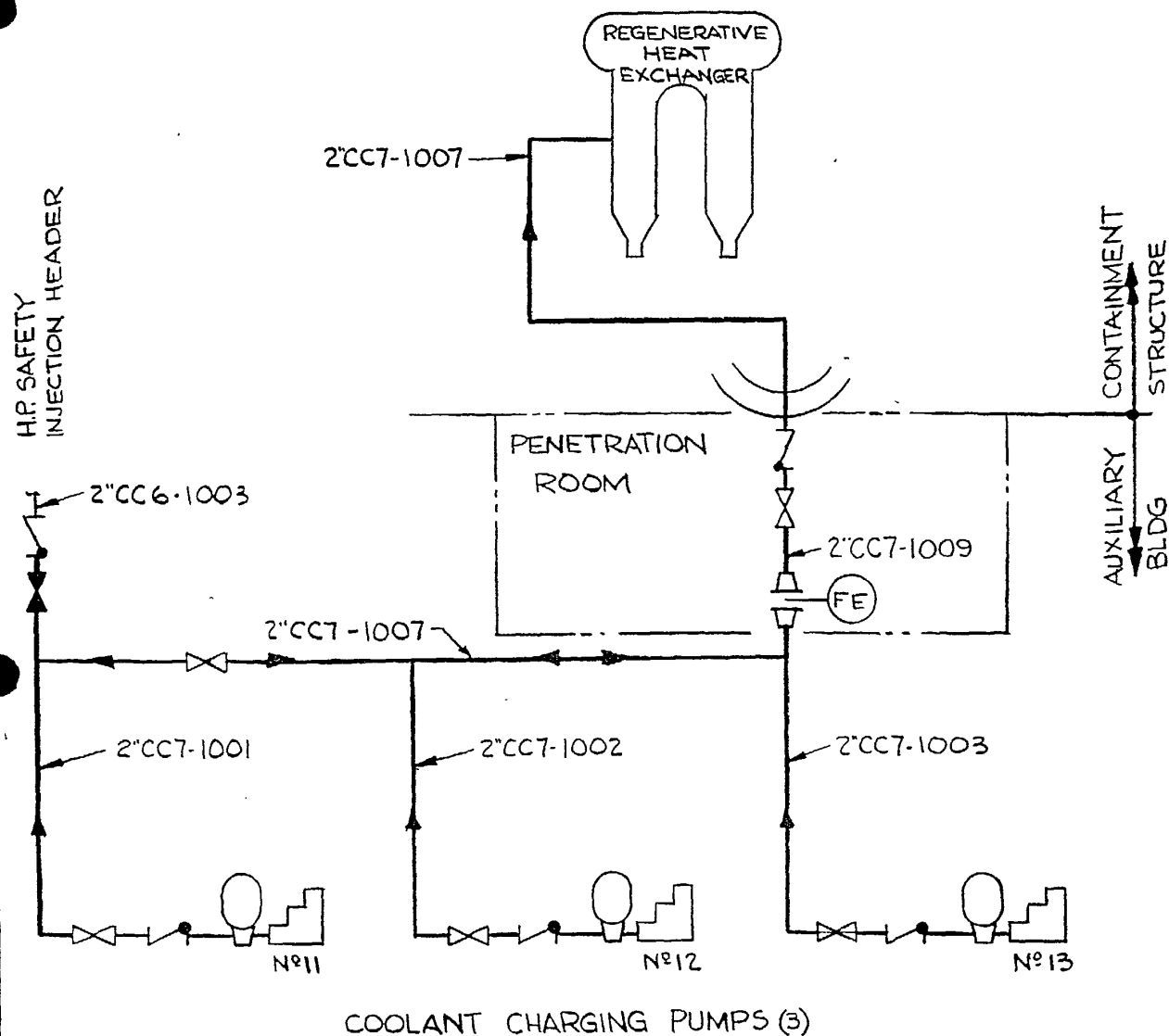
ONLY AFW (MOTOR DRIVEN TRAIN) INSTRUMENT AIR TUBING LOCATED IN THIS AREA IS AFFECTED

- NOTES:
- 1. ASTERISKS RELATE TARGETS TO ASSOCIATED CRACK POINTS
 - 2. NO DETAILED CABLE LISTING INDICATED AS CONDUITS FOR NEW AFW (MOTOR DRIVEN TRAIN) INCLUDE CABLES FOR ONLY NEW AFW
 - 3. WHERE FORCES ARE LISTED, TARGETS ARE SAFETY-RELATED & ARE TO BE INCLUDED IN THE "AUXILIARY FEEDWATER SYSTEM POSTULATED PIPE CRACK ANALYSIS REPORT"

CALVERT CLIFFS NUCLEAR POWER PLANT
UPDATED FINAL SAFETY ANALYSIS REPORT

UFSAR FIGURE 10A.5-5

POSTULATED PIPE CRACK TARGETS
AUX FEEDWATER SYSTEM
UNITS 1 & 2

NOTES

1. FOR COMPLETE SYSTEM DIAGRAM SEE FSAR FIG. 9-3.

This sketch is for illustration only.
It is not intended to show all piping system details.

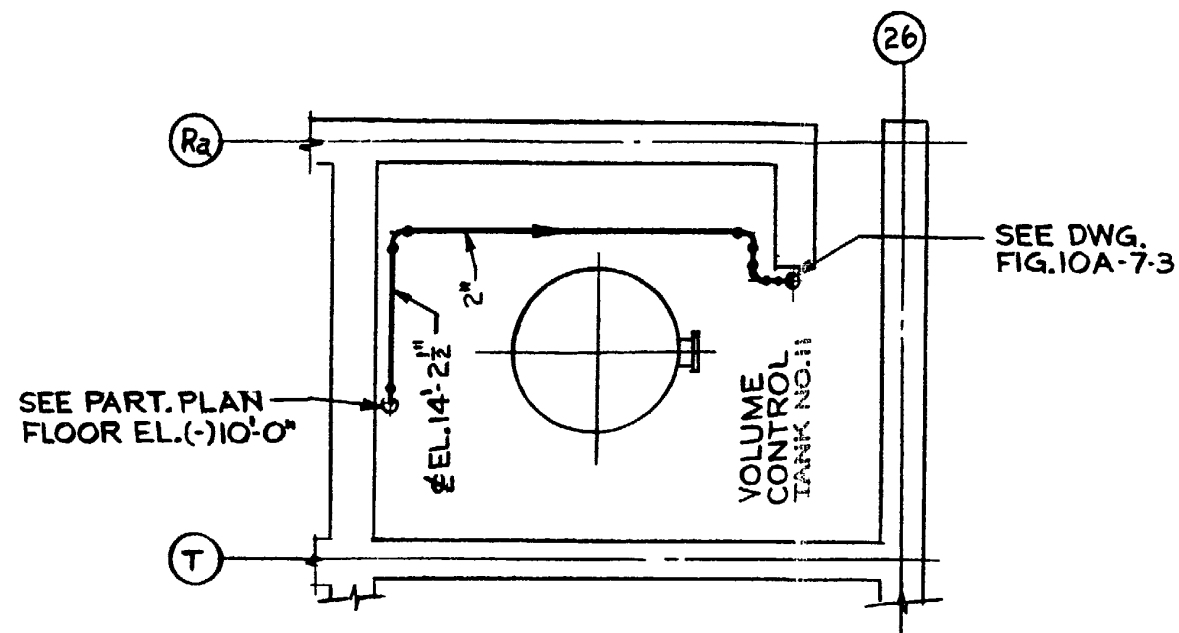
Revision 20

BALTIMORE GAS AND
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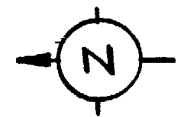
CVC SYSTEM
REACTOR COOL. CHARGING LINE

FIG. 10A.7-1

10
A
11

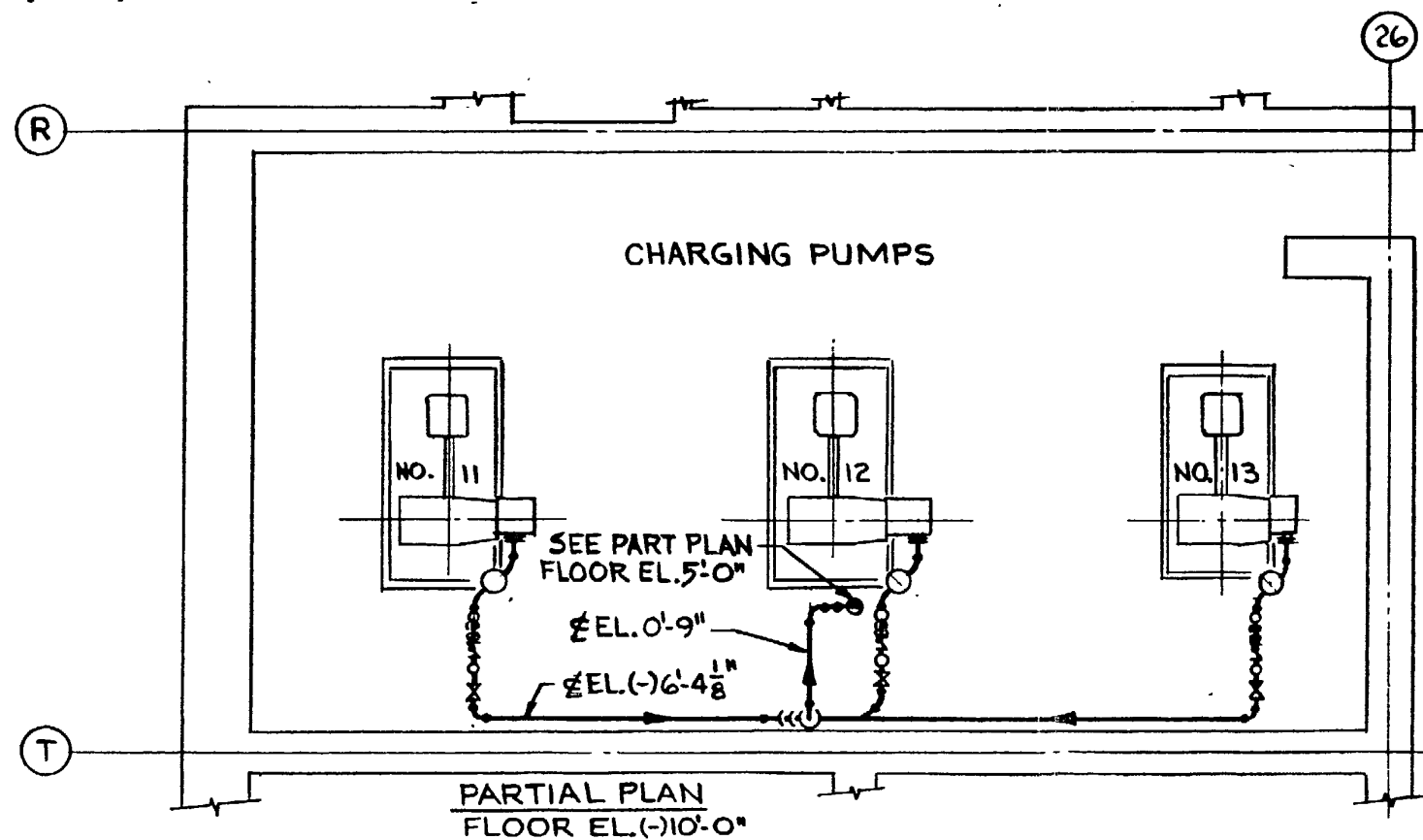


PARTIAL PLAN
FLOOR EL. 5'0"



NOTES

1. FOR RELATIONSHIP OF THIS AREA WITH BALANCE OF PLANT, SEE FSAR FIG. 1-5 & 1-6



PARTIAL PLAN
FLOOR EL. (-)10'0"

REVISED 4-13-73

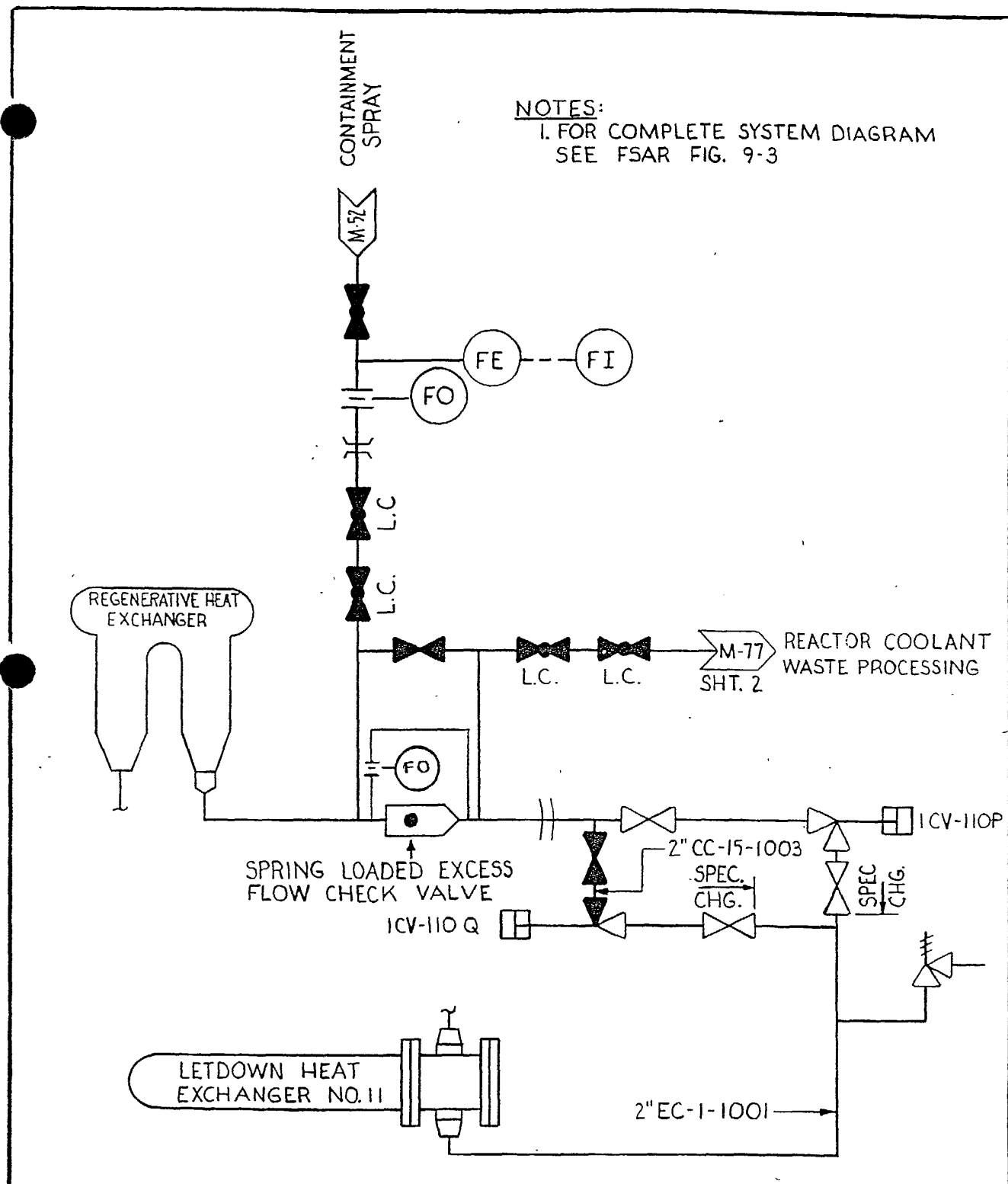
BALTIMORE GAS & ELECTRIC CO.
ELECTRIC PRODUCTION PLANT
CALVERT CLIFFS UNIT NO. 1 & 2

BECHTEL ASSOCIATES
GAITHERSBURG, MARYLAND

HIGH ENERGY
R.C. CHARGING LINE - ROUTING
PARTIAL PLANS @ FLOOR EL. 5'0" & (-)10'0"

JOB NO.	B.G. & E. DRAWING NO.	BECHTEL DRAWING NO.	REV.
6750		FIG. 10A-7-2	B

SECURITY RELATED INFORMATION
WITHHELD UNDER 10 CFR 2.390



This sketch is for illustration only.
It is not intended to show all piping system details.

Revision 20

REVISED 10-1-76

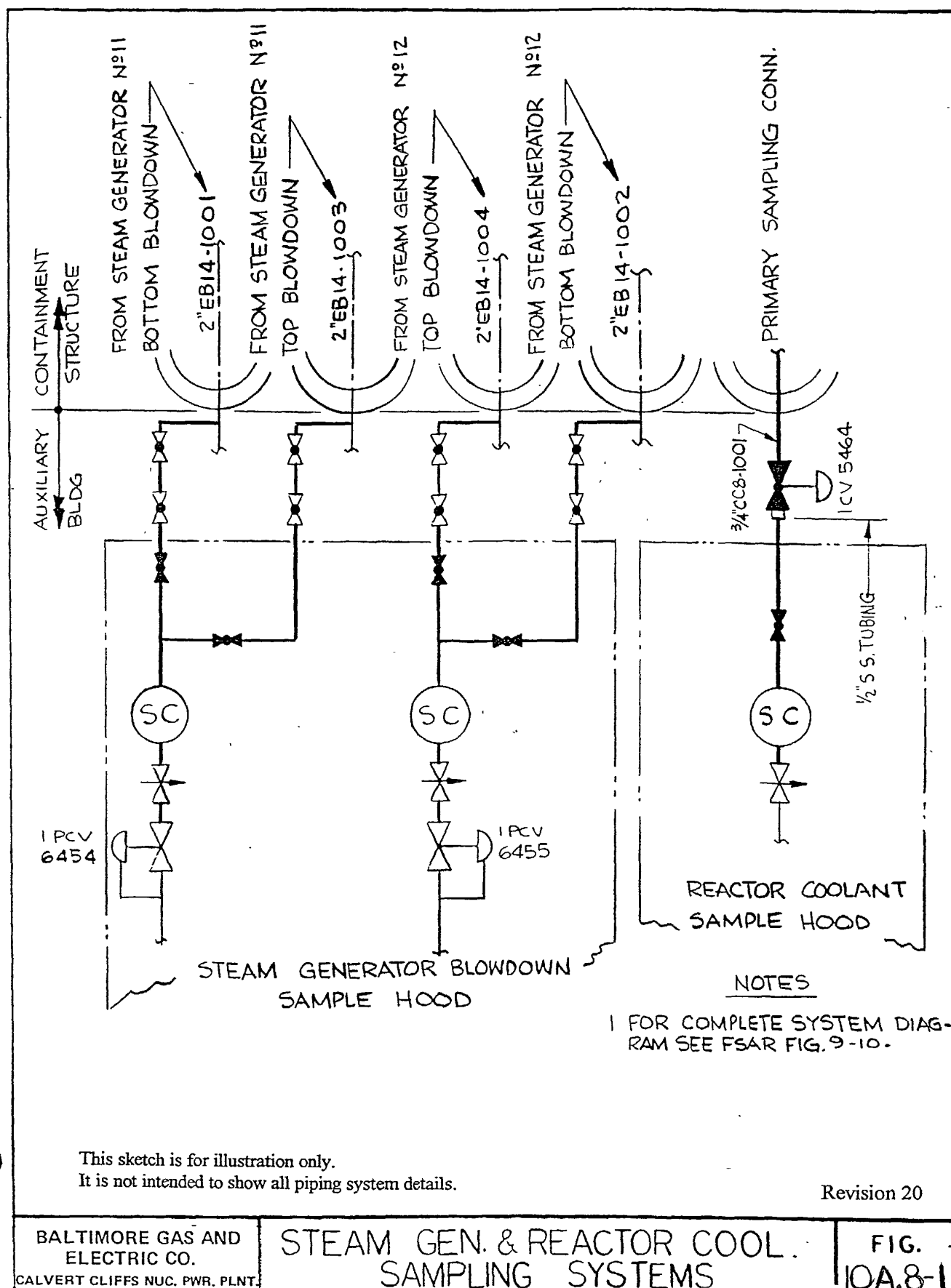
REV.
D

BALTIMORE GAS AND
ELECTRIC CO.
CALVERT CLIFFS NUC. PWR. PLNT

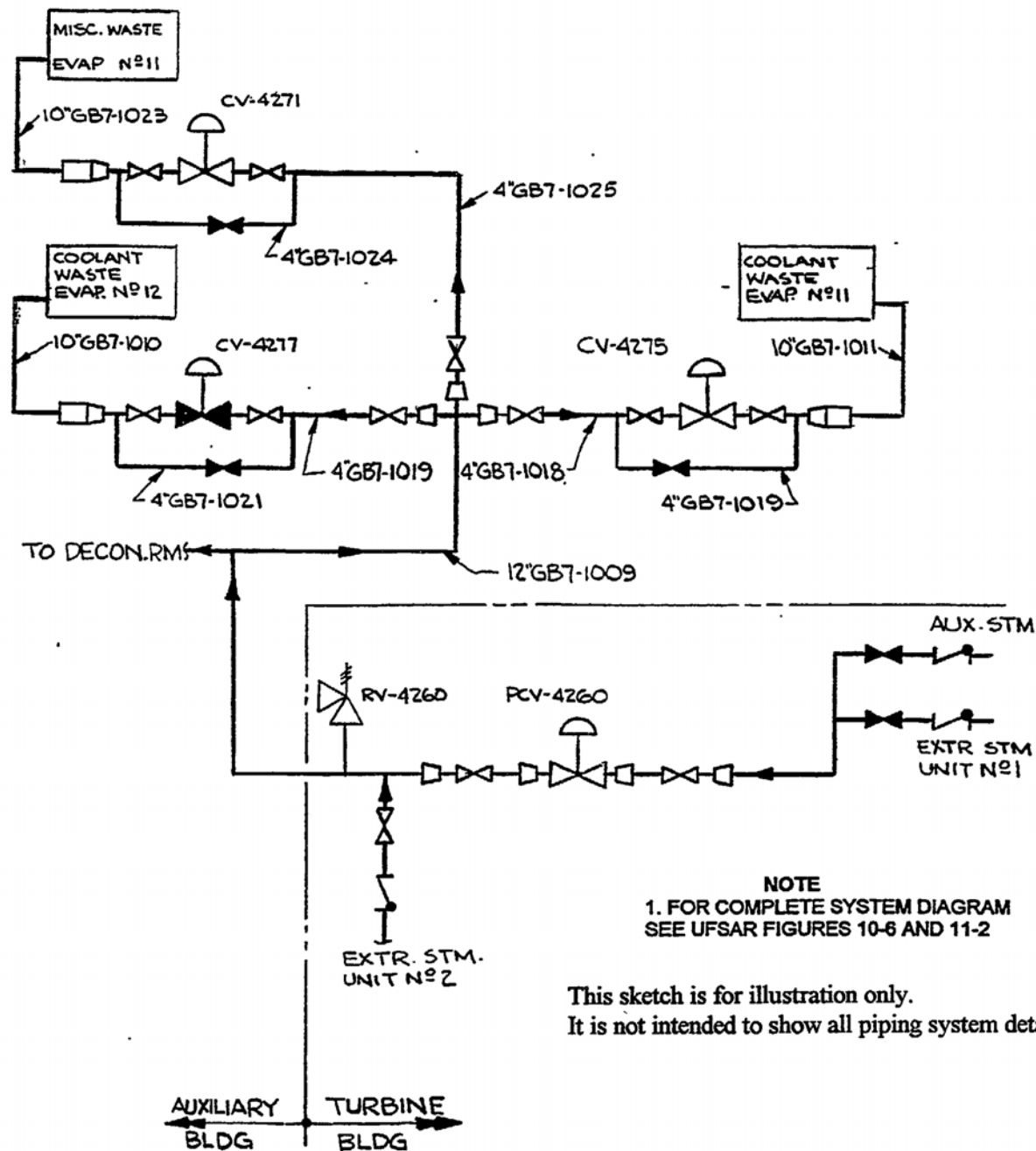
CVC SYSTEM
REACTOR COOLANT LETDOWN LINE

FIG.
10A.7-4

SECURITY RELATED INFORMATION
WITHHELD UNDER 10 CFR 2.390



SECURITY RELATED INFORMATION
WITHHELD UNDER 10 CFR 2.390



BALTIMORE
GAS & ELECTRIC CO.
Calvert Cliffs
Nuclear Power Plant

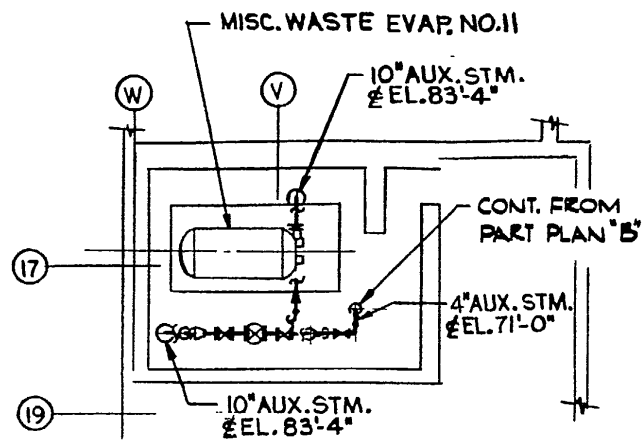
AUX. STEAM TO WASTE EVAPORATORS

Figure 10A.9-1

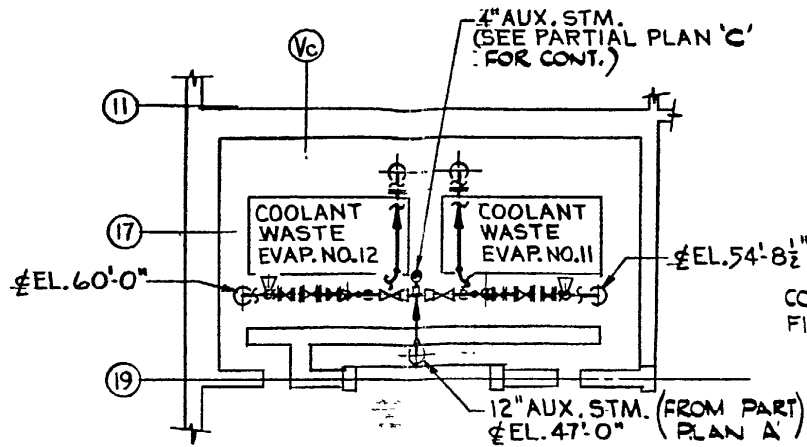
Rev. 18

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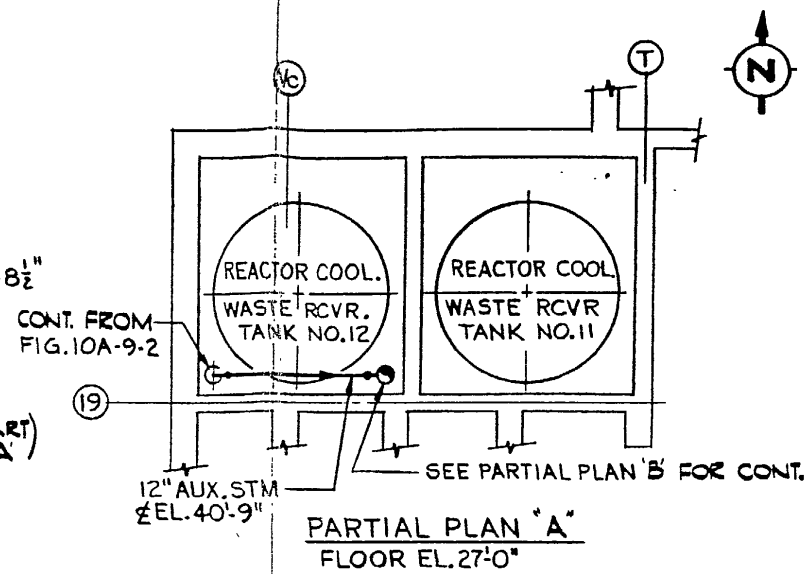
14
A
16



PARTIAL PLAN 'C'
FLOOR EL. 69'0"



PARTIAL PLAN 'B'
FLOOR EL. 45'0"



BALTIMORE GAS & ELECTRIC CO.
ELECTRIC PRODUCTION PLANT
CALVERT CLIFFS UNIT No. 1 & 2

BECHTEL ASSOCIATES
GAITHERSBURG, MARYLAND

HIGH ENERGY
AUXILIARY STEAM - PARTIAL PLANS
FLOOR EL. 27'0", 45'0", & 69'0"

JOB NO.	B.G. & E. DRAWING NO.	BECHTEL DRAWING NO.	REV
6750		FIG. 10A. 9-3	