DCD-016

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

NOV 17 1982

Docket No. 50-289

LICENSEE: GPU Nuclear Corporation (GPUNC)

FACILITY: Three Mile Island Unit No. 1 (TMI-1)

SUBJECT: APPENDIX R FIRE PROTECTION MEETING WITH GPUNC

On November 5, 1982 we met with representatives from GPUNC to discuss Appendix R Fire Protection at TMI-1. A list of meeting attendees is in Enclosure 1. The meeting dealt with: (1) the TMI-1 schedule exemption request, (2) GPUNC's approach to determining TMI-1 Appendix R compliance, (3) TMI-1 alternate shutdown capability, (4) specific CEB and ASB review questions, and (5) submission schedules.

Schedule Exemption Request

We advised GPUNC that, based upon information presently available, we could not approve any of the schedule exemption requests in the July 1, 1982 submittal. We described the types of specific, detailed information that we needed to seriously consider the request and also told GPUNC that we would act on the request, using whatever information was docketed, before the end of the year. We questioned, in general terms, why the schedule exemptions were needed. GPUNC responded that they planned to perform all modifications (shutdown, non-shutdown, pre-approval, and non-pre-approval) at one time, under the same contract and, thus, would not perform any modifications until the last group (presumed to be pre-approval, shutdown modifications) was ready to be performed. We advised GPUNC that that approach was not consistent with the Commission's intent as identified in Appendix R.

GPUNC's Approach to Determining TMI-1 Appendix R Compliance

GPUNC described its approach to determining Appendix R compliance. The presentation outline and methodology flow chart are in Enclosure 2.

TMI-1 Alternate Shutdown Capability

GPUNC briefed us on the alternate shutdown capability and procedural guidelines (Enclosure 3). We had several specific comments:

1. A manual scram from the control room is permitted.
2. If a fire in a single panel can cause two spurious valve actuations which result in a LOCA, we assume the actuations occur.
3. When repairs, or jumpers etc. are needed, we need a description of the repair and a commitment that required parts, tools and procedures will be available onsite.

4. To resolve any potential confusion, GPUNC shall provide a specific statement that cold shutdown will be achieved in 72 hours.

5. Sequence Step #7, and any others requiring unique actions, (mark in "others" column) should clearly state what unique action is required.

6. GPUNC must verify CST volume is sufficient for the number of hours that the plant will be in hot shutdown status and thus permit achieving cold shutdown.

7. GPUNC shall provide a list of all associated circuits requiring protection because they are located within a common enclosure.

Specific CEB and ASB Review Questions

The CEB reviewer requested GPUNC to formally provide additional information and justification concerning permitted valve operation times (time available for valve operation versus the time before that operation must be performed) for seven exemption requests. The CEB reviewer also advised that GPUNC appeared to misinterpret the definition of fire area, fire detection, and fire suppression. This apparent misinterpretation will be addressed in the Safety Evaluation.

The ASB reviewer identified a possible high-low pressure interface problem with DHV-1, 2 and 3 (decay heat removal suction line isolation valves) which could be conceivably open as a result of one fire in a panel common to all three valves. GPU committed to evaluate this potential problem and formally respond.

Schedule

GPUNC committed to provide the remainder of the associated circuit information by December 1, 1982, and other information by November 15, 1982.

"ORIGINAL SIGNED BY:"

James A. Van Vliet, Project Manager
Operating Reactors Branch #2
Division of Licensing

Enclosures:
1. List of Attendees
2. Presentation Outline & Methodology
3. Procedural Guidelines

cc w/enclosures:
See next page

OFFICE						
SURNAME						
DATE						

ORB#4:DL

MEETING SUMMARY DISTRIBUTION

Licensee: GPU Nuclear Corporation

Ed Wallace-(3), without enclosures 2 & 3

* Copies also sent to those people on service (cc) list for subject plant(s).

Docket File
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Meeting Participants Fm. NRC:

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SRichards " " " "
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Enclosure 1

NRC/GPUNC FIRE PROTECTION MEETING

NOVEMBER 5, 1982

NRC

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TMI-1 Plant Engineering

C. E. Hartman

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S. Karimian

Pa. DER/BRP

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TMI-1 APPENDIX R COMPLIANCE

I. INTRODUCTION (F. BARBIERI)

- APPROACH/RATIONALE TO TMI-1 APPENDIX R COMPLIANCE

II. PRESENT REVISED SAFE SHUTDOWN LOGIC DIAGRAMS (J. MATEYCHICK)

- DESCRIBE REVISION TO DIAGRAMS

III. PROCEDURE/VISUAL WALKDOWNS (N. TRIKOUROS/ C. HARTMAN)

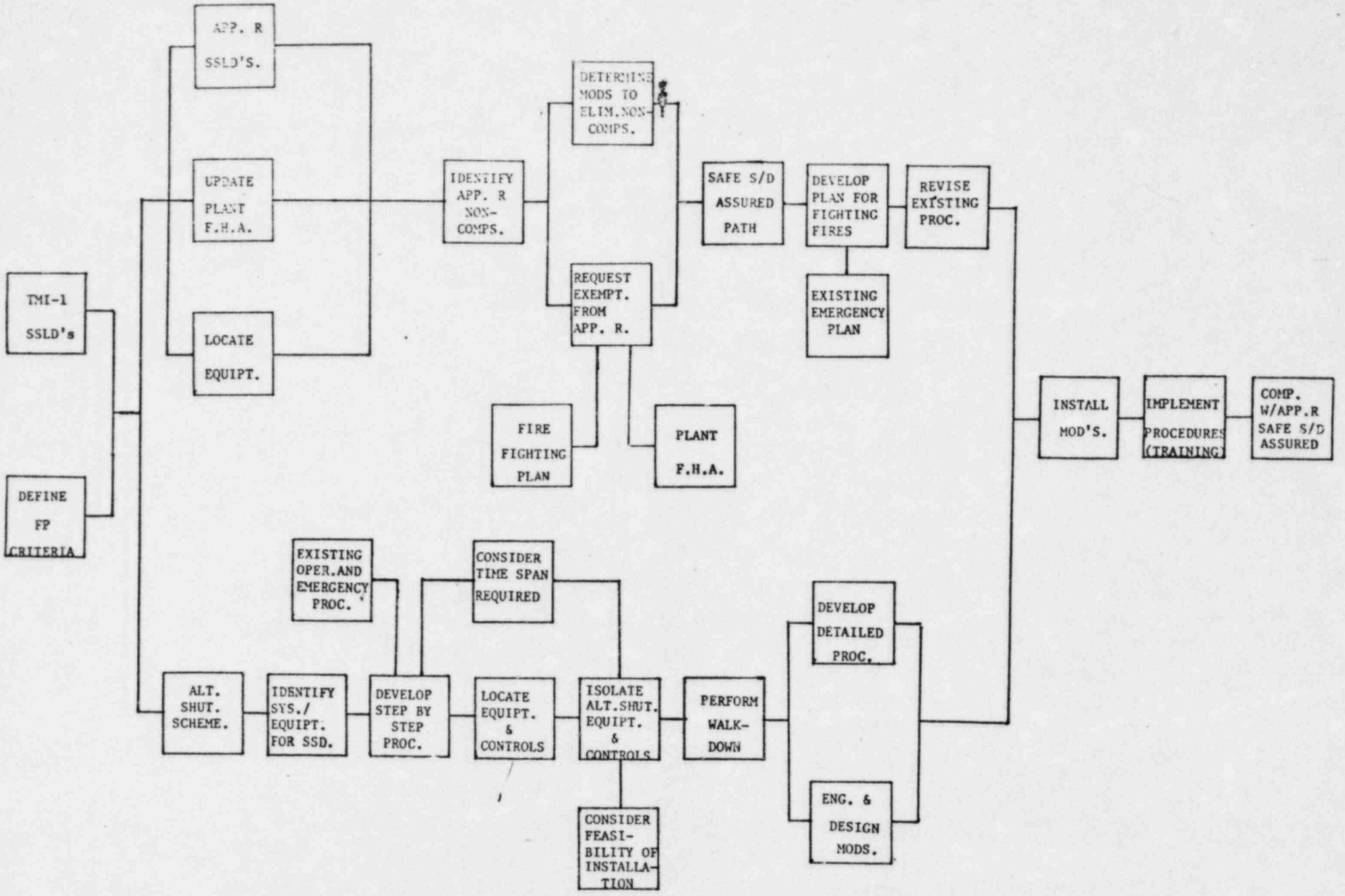
- SHUTDOWN PROCEDURE IN THE EVENT OF A CONTROL ROOM/RELAY ROOM FIRE

IV. PRESENTATION OF ELECTRICAL ONE-LINE DIAGRAMS (B. GAN)

- DESCRIPTION OF POWER SOURCE/SYSTEMS PROTECTED WITH ISOLATION DEVICES

V. STATUS ON COMMON ENCLOSURES (B. GAN)

TMI-1 FIRE PROTECTION PROGRAM PLAN



INTRODUCTION

The attached table provides the actions required to successfully complete the remote shutdown of TMI-1 in the event of a fire in the cable spreading room or control room. The following assumptions were made in the development of this procedural guideline:

1. No credit is taken for any actions from the control room.

2. Prior to manual reactor trip, all RPS function trips would be intact (multiple spurious failures required to disable RPS function).

3. Evolution must be carried out with or without offsite power available. Loss of offsite power may occur at anytime.

4. Any or all automatic signals may fail to actuate.

5. A single spurious actuation may occur at anytime during the evolution.

6. There are five available operations personnel:

   a. Shift supervisor
   b. Two control room operators
   c. Two auxiliary operators

7. Spurious actuations of important components will be assumed and prevented by remote operator action early in the evolution.

8. Spurious actuations which might result in a rapid reactor transient will be dealt with directly from the remote shutdown station.

Diagrams are provided which describe the plant location of the various components discussed in the procedure guideline. Also provided is a single line diagram which describes the electrical power distribution for these components.

TABLE III

ACTIONS REQUIRED FOR SHUTDOWN

Isolated from control room and relay room

SEQ NO.	ACTION	RSDS	KEY LOCK	OTHER	INDICATION	CONTROL	MANPOWER TIMING	DISCUSSION
1	Isolate Communications system from relay room (Announce fire and dispatch personnel to stations)	X			NA	NA		A. Required quickly B. This capability does not presently exist.
2	Transfer control of EF-V-30 A/B and MS-V-4A/B to RSDS and take manual control (Notes 7, 8 and 9)	X			OTSG level and OTSG pressure on RSDP. Also RCS temp, PZR level and RCS pressure on RSDP	EFW and ADV valve control on RSDP		A. Local switches in vicinity of remote shutdown panel for transfer on one channel and on CB elev. 338 for the other channel. B. Spurious opening of valves will be overridden)
2a	De-energize pressurizer heaters			X	PZR level on RSDP	NA		A. Heaters should be de-energized to prevent damage if auto trip on level fails. B. Open breakers at PNCC on TB elev. 322'.
3	Close valves MS-V-8A and MS-V-8B to deal with stuck open TBP valves	X			OTSG pressure, RCS temp and RCS pressure on RSDP	NA		A. TBP valves open results in rapid overcooling. Isolation required to prevent potential thermal shock.

TABLE III

ACTIONS REQUIRED FOR SHUTDOWN

SEQ NO.	ACTION	RSDS	KEY LOCK	OTHER	INDICATION	CONTROL	MANPOWER TIMING	DISCUSSION
4	TRIP REACTOR (Turbine trip will occur automatically on reactor trip. This will be a protected circuit to assure function) (Turbine normally trips on reactor trip or LOOP)			X	SRM on RSDP	NONE REQ'D		A. Trip rod drive power 1A and 1B breakers on the 1G and 1L SWGR (CB elev 322 B. Assumption that all RPS trips will function. C. Letdown may or may not isolate automatically on reactor trip.
5	TRIP MFW pumps FW-P-1A/B (See Notes 1, 2, 3, 4 and 5)	X			OTSG level on RSDP	NA		A. Verify that turbine driven EFW pump (EF-P-1) has started B. Spurious failure of FW Reg valve would result in rapid overfill of OTSG C. Auto trip on LOOP
6	Verify power available to "D" Bus				Voltage to "D" Bus at 416V SWGR in CB el 338 RSDP panel lights for motor operated valves			A. If indication lights for motor operated valves is lost on the RSDP then verify power to bus at SWGR. B. Loss of motor operated valve indicator lights is indicative of loss of offsite power.

TABLE III

ACTIONS REQUIRED FOR SHUTDOWN

SEQ NO.	ACTION	RSDS	KEY LOCK	OTHER	INDICATION	CONTROL	MANPOWER TIMING	DISCUSSION
6 (cont.)					Signal lights on RSDP will provide positive indication of power to busses: 1D, 1P, 1R, 1C-ESV-MCC and 1A-ES-MCC			C. Pump power monitor lights at RSDS
6a	Start motor driven pumps EF-P-2A/B (If they don't start auto) (Normally start on LOFW) (If offsite power is lost, diesels would be started prior to this step)		X		OTSG level and pressure on RSDP. Also, RCS temp, PZR level and RCS pressure on RSDP	NONE		A. Close breakers on 4160V AC ES-SWGR-1D (CB elev 338) B. Potential spurious failure could prevent EF-P-2A/B from starting
7	Electrically close DH-V-6A and DH-V-6B then verify position and close manually if needed.		X	X (manual)	BWST level on RSPD. Valve position at Valve location			A. Spurious failure of these valves would result in rapid drainage of BWST to Reactor Building sump B. Key locks at 1A-ESV-MCC and 1B-ESV-MCC on AB elev 305 C. Manually close at AB elev. 261 ft.
8	Verify that MU-V-3 has closed (Letdown Isolation) Close MU-V-97B, MU-V-99 and MU-V-109B if required.			X	Pressurizer level and MU tank level on RSDP			A. Manual letdown isolation valves are in auxiliary buildin elevation 281 ft.

TABLE III

ACTIONS REQUIRED FOR SHUTDOWN

SEQ NO.	ACTION	RSDS	KEY LOCK	OTHER	INDICATION	CONTROL	MANPOWER TIMING	DISCUSSION
9	Electrically open MU-V-36 and MU-V-37, then verify and open manually if needed.		X	X (manual)	Valve position at valve location	NA		A. Key locks at 1A and 1B ESV-MCC (AB elev 305 ft.) B. Manually close at AB elev. 281 ft.
10	Electrically close MU-V-217 and Manually close if required		X	X (manual)	Local at valve			A. Open breaker (B. Valve on AB elev. 281 ft. C. Not powered from ES bus
11	Isolate MU-V-17 by closing MU-V-91A or B			X	Local			A. MU-V-17 is an air operated valve which is unprotected. B. Valves on AB elev. 281 ft.
12	Control MU flow with MU-V-16B (Jog Control)	X			PZR level and MU tank level on RSDP	Control PZR level in normal range		A. MU-V-16B is an ES powered valve and is the preferable control for MU (MU-V-16B also minimizes nozzle thermal shock)
	Close MU-V-16A if it opens spuriously	X			PZR level on RSDP			B. Closure of MU-V-16A is required to prevent PZR filling
12a	Start NR-P-1A and NS-P-1A. TRIP RC pumps if req'd after checking Nuclear Services closed cooling water temp.	X	X		Periodically check NSCC temp in AB			A. Manually start pumps from CB elev. 322 B. Pumps provide RC pump motor cooling via nuclear services closed cooling water

TABLE III

ACTIONS REQUIRED FOR SHUTDOWN

SEQ NO.	ACTION	RSDS	KEY LOCK	OTHER	INDICATION	CONTROL	MANPOWER TIMING	DISCUSSION
13	Start D/G: offsite power is unavailable and diesel fails to start automatically				Bus Energized lights at RSDS for busses: ID, IP, IR, IA ES MCC, IA ESV MCC, IC ESV MCC, IA Screenhouse MCC. D/G Status Lamps for "Cranking" "Running" at RSDS			1st sign of LOOSP Bus ID status lamp is not lit. D/G "cranking" or "running" lamps are lit.
a)	Isolate circuits and secure D/G feeder Ckt. breaker in open position		X ID 4160V SWGR Cubicle 1D2					
b)	Isolate ciruits and secure bus ID incoming breaker ISB-D2 in open position		X ID SWGR Cubicle ID2					
c)	Isolate circuit and Secure bus ID incoming breaker ISA-D2 in open position		X ID SWGR Cubicle IDI5					
d)	Isolate External CKTS. and command D/G to start		X at D/G panel (D/G room)					

TABLE III

ACTIONS REQUIRED FOR SHUTDOWN

SEQ NO.	ACTION	RSDS	KEY LOCK	OTHER	INDICATION	CONTROL	MANPOWER TIMING	DISCUSSION
e)	Isolate breaker control circuits for following bus IS load and open breakers:		X at cubicle					
	A EFW pump (EF-P-2A)	X	1D3					
	IP X former feed (P1-02)		1D5					
	IR X former feed (R1-02)		1D11					
	MU-P-1A							
	MU-P-1B		1D8					
	RR-P-1A		1D10					
	DH-P-1A		1D6					
f)	Close D/G breaker		X cubicle 1D2		"ready to load" indication light at ID SWGR Bus IS volts and amps at ID SWGR			Operator observes "ready to load" indicator at SWGR ID prior to closing D/G breaker
g)	Reclose EFW motor breaker		X 4160V SWGR Cubicle ID3					
	Close breakers feeding:							
	Transformer 1P		Cubicle ID5					
	Transformer 1R		Cubicle ID11					NOTE: D/G may start due to spurious signal at any time - see Note 10

TABLE III

ACTIONS REQUIRED FOR SHUTDOWN

SEQ NO.	ACTION	RSDS	KEY LOCK	OTHER	INDICATION	CONTROL	MANPOWER TIMING	DISCUSSION
14	If seal injection is lost, manually trip reactor coolant pumps		X		Indication of seal injection flow on RSDP			A. 6900V SWGR on Turbine Building elev. 322 ft.
15	Reestablish MU flow if LOOP or spurious failure of MU-P-1A:				Local panel will be provided with the following:			A. MU-P-1A or MU-P-1B will be lost on LOOP
	1. Close MU-V-20 and MU-V-32			X	Status for the following valves:	Control for the following:		B. MU-V-20 and 32 closed to prevent RC pump seal damage (AB el 281)
	2. Start MU-P-3A	LOCAL PANEL			MU-V-36	MU-P-1A		
	3. Start DR-P-1A				MU-V-37	MU-P-3A		C. Local flow gauge will be provided for MU-V-32 throttling
	4. Start DC-P-1A				MU-V-12	DR-P-1A		
	5. Start MU-P-1A				MU-V-14A	DC-P-1A		D. Manually control MU-V-20 and 32 on AB elev. 281 ft.
	6. Open MU-V-20			X	MU-V-20	DR-V-1A		
	7. Throttle MU-V-32			X	MU-V-32			
	8. Open and close MU-V-12 and 14A as required	X			DR-V-1A			
					Status for the following pumps:			
					MU-P-1A			
					MU-P-3A			
					DC-P-1A			
					DR-P-1A			
					Status for MU-V-12 and MU-V-14A on RSDP	Control of MU-V-12 and MU-V-14A on RSDP		

TABLE III

ACTIONS REQUIRED FOR SHUTDOWN

SEQ NO.	ACTION	RSDS	KEY LOCK	OTHER	INDICATION	CONTROL	MANPOWER TIMING	DISCUSSION
16	Transfer Group 8 Heaters to engineered safe-guards bus 1P if offsite power is not available			X	Local indiation at bus	NA		A. Manual at 480V-ES-SWGR (Control Building elevation 322 ft)
17	Spurious HPI Initiation			X	PZR level and RCS pressure on RSDP			A. Trip MU-P-1C at 4160V SWGR 1E (AB elevation 338 ft.)
18	If MU tank level drops to less than 55 inches, open MU-V-14A and close MU-V-12 until MU tank level is greater than 66 inches.	X			MU tank level and BWST level on RSDP			A. This provides MU alignment from BWST

TABLE III

ACTIONS REQUIRED FOR SHUTDOWN

SEQ NO.	ACTION	RSDS	KEY LOCK	OTHER	INDICATION	CONTROL	MANPOWER TIMING	DISCUSSION
19	If RCS pressure decreases to less than 2000 psi and PZR level is increasing or stable, then:				PZR level and RCS pressure on RDSP	NA		A. PORV (RC-RV2) may spuriously fail open. Action to de-energize it will result in closure of valve
	1. De-energize PORV	X						B. Rapid action would be required to prevent RCS saturation and HPI initiation
	If this is not effective, then							
	2. Close spray valve		X					C. Manual control of spray valve at the 480V-EC-CC-1A (CB elev 322 ft.)
								D. Spray valve open depressurization rate of about 1.1 psi/sec.
	NOTE: STABLE HOT SHUTDOWN ACHIEVED AT THIS POINT							

TABLE III

ACTIONS REQUIRED FOR SHUTDOWN

SEQ NO.	ACTION	RSDS	KEY LOCK	OTHER	INDICATION	CONTROL	MANPOWER TIMING	DISCUSSION
20	Reduce number of RC pumps to one per loop. (Trip B & D pumps)		X		Pump power indication adjacent to RSDP	N/A		A. Key lock switch on 6900V SWGR on Turbine Building elevation 322 ft.
21	Proceed with normal cooldown using EFW, ADV and sprays	X (except for spray)	X		RCS pressure, RCS temp, OTSG pressure, OTSG level and PZR level on RSDP	EFW & ADV control on RSDP		A. Manual control of spray valve at the 480V-ES-CC-1A (CB elev 322'
22	De-energize PZR heaters to reduce pressure			X	Local at bus	N/A		A. At 480V-ES SWGR-1P on CB elev. 322'
23	If offsite power is unavailable, load IC-P-1A on Diesel A and re-establish letdown			X				A. Breakers at 480V-ES-CC-1A on CB elev. 322'
24	Establish RB cooling -- Supply Nuclear River Water, Nuclear Service & Reactor River Water & Start RB Fan:							
24a	Open NS-V-52A & NS-V-53A by opening breakers			X				A. Valve NS-V-52A & 53 Open on loss of inst. air. Breakers are on ( )

TABLE III

ACTIONS REQUIRED FOR SHUTDOWN

SEQ NO.	ACTION	RSDS	KEY LOCK	OTHER	INDICATION	CONTROL	MANPOWER TIMING	DISCUSSION
24b	Open breakers for RR-V-3A/4A then manually open valves.			X				B. Breakers on 480V ES CC-1A (CB Elev. 322') Valves at IB elev. 295'
24c	Start RR-P-1A		X					C. Manually start from CB elev. 322
25	Start RB cooling fan (AH-E-1A) and control building recirculation fan (AH-E-18A)			X				A. Manual at 480V-ES-CC 1A (CB Elev. 322')
26	Open CO-V-10A &B (Isolation valves for condensate storage tanks)			X	N/A	N/A		A. Open breakers at 480V-TP-CC-1A and 1A Radwaste CC on TB elev. 322 then locally open valves if closed. This assures that adequate condensate storage tank inventory will be available. B. Complete within 8 hours to assure that both CSTS are available.

TABLE III

ACTIONS REQUIRED FOR SHUTDOWN

SEQ NO.	ACTION	RSDS	KEY LOCK	OTHER	INDICATION	CONTROL	MANPOWER TIMING	DISCUSSION
27	Stop RCP-1C (normal shutdown procedure if offsite power available)		X					A. 6900V SWGR on turbine building elev 322 ft.
28	Bypass HPI injection when primary $\leq$ 1750 psi and $>$ 1650 psi			X				A. Manually close relays on ES channel relay cabinets 1A, B, C and 2A, B, C (CB elev 338')
29	Bypass LPI injection when primary $\leq$ 900 psi and $>$ 500 psi			X				A. Same As above
30	Isolate Core Flood tanks (close valves CF-V-1A,B)			X				A. Breakers at the 480V ES-CC-1C (FH elev 281')
31	Align DH Removal System: a. Open breakers for the following valves: DH-V-4A, 5A, 7A & BS-V-2A			X				A. Breakers at 480V ESV-CC-1A (AB-305)
	b. Open breaker for DH-V-3			X				B. Breaker at 480V ESV-CC-1C (FH-281')
	c. Manually close or check closed DH-V-5A/DH-V-7A/ BS-V-2A			X				C. Aux. Building elevations.

TABLE III

ACTIONS REQUIRED FOR SHUTDOWN

SEQ NO.	ACTION	RSDS	KEY LOCK	OTHER	INDICATION	CONTROL	MANPOWER TIMING	DISCUSSION
	d. Manually open or check open DH-V-3 DH-V-4A DH-V-12			X				D. Aux. Building elevations.
	e. Open valves DH-V-1 & 2 remotely			X				E. Breakers at 480V ESV CC-1C (FH 281')
12	Open RC-V-4 remotely			X				F. Breaker at 480V ESC-CC-1C (FH el. 281)
13	Close DH-V-19A (throttle valve for decay heat removal flow)			X				A. Manual valve on AB (Later)
14	Start Decay Heat removal Pump (DH-P-1A)			X				A . Breaker at 4160V ES-SWGR-1D (CB elev 338')
15	Throttle open DH-V-19A (Control cooldown rate)			X	RCS Temp on RSDP for cooldown rate			A . Manual valve on AB (Later)
16	Throttle open DH-V-64 as desired to decrease RC pressure (spray valve)			X	RCS pressure on RSDP			A. Manual valve on AB elev.

TABLE III

ACTIONS REQUIRED FOR SHUTDOWN

SEQ NO.	ACTION	RSDS	KEY LOCK	OTHER	INDICATION	CONTROL	MANPOWER TIMING	DISCUSSION
37	Stop RC-P-1A		X					A. At 6900V SWGR on TB elev. 322 ft.
38	When RCS Temp is less than 100°F and RCS pressure is less than 100 psia secure makeup system & RC seal injection	X			RCS Temp and pressure on RSDP			
39	Decrease RCS temp to <140°F: Throttle DH-V-19A			X	RCS Temp on RSDP			A. Manual valve on Aux. Building elev.
	-- COLD SHUTDOWN ACHIEVED --							

NOTES ON SPURIOUS ACTUATIONS

1. Spurious stopping at EF-P-1 may occur. This is not a concern since motor driven EFW pumps will be started.

2. Closing of EF-V-1A or B may occur. Only one (1) suction valve is required for the turbine driven EFW pump to function.

3. If EF-V-2A or 2B closes, the unaffected SG is still being fed.

4. MS-V-13A or B are redundant (air operated) steam supply valve to the EFW turbine. Failure of any one in a closed position is inconsequential. Also, MS-V-10A and B would be available.

5. MS-V-10A or B are the motor driven equivalents of MS-V-13A & B. Failure of any one is inconsequential and MS-V-13A and B would be available.

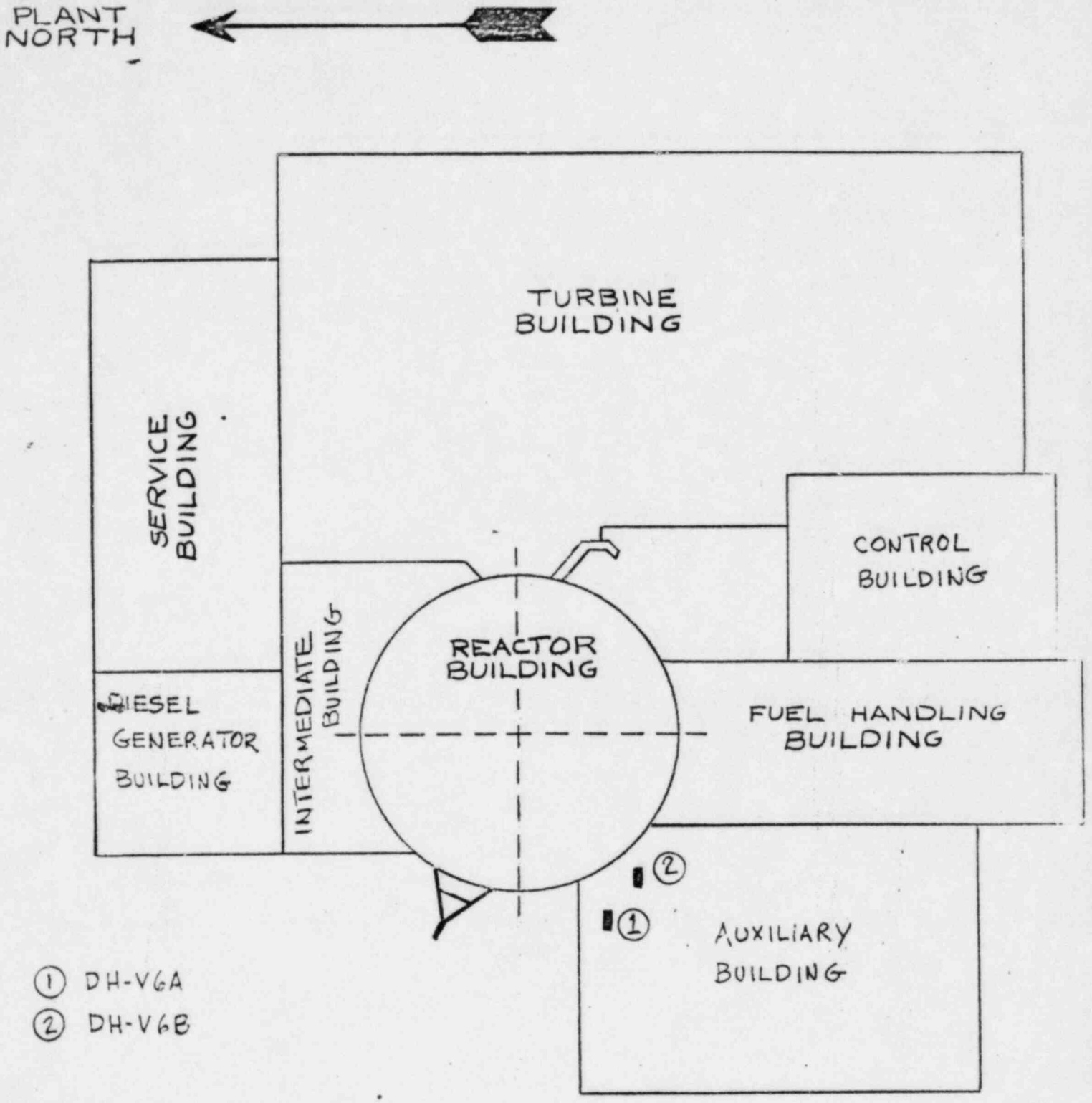
6. MU-V-20 and MU-V-32 may spuriously close. These valves are required to provide seal injection. These valves will be monitored from the RSDS and will be reopened locally if required.

7. MS-V-2A or 2B may spuriously close. This will isolate OTSG A or B ADV & TBV. Remaining OTSG can be used for decay heat removal. MS-V-2A or 2B will also isolate OTSG A or B from turbine driven EFW. The remaining valve is sufficient to provide continued turbine driven EFW. Motor driven EFW will be available as well. Further time is available for operator action to open valve.

8. Spurious closure of MS-V-4A or 4B (ADV) will result in adequate decay heat removal capability from the unaffected ADV. Control can be transferred to the remote shutdown panel and the closed valve can be remotely reopened.

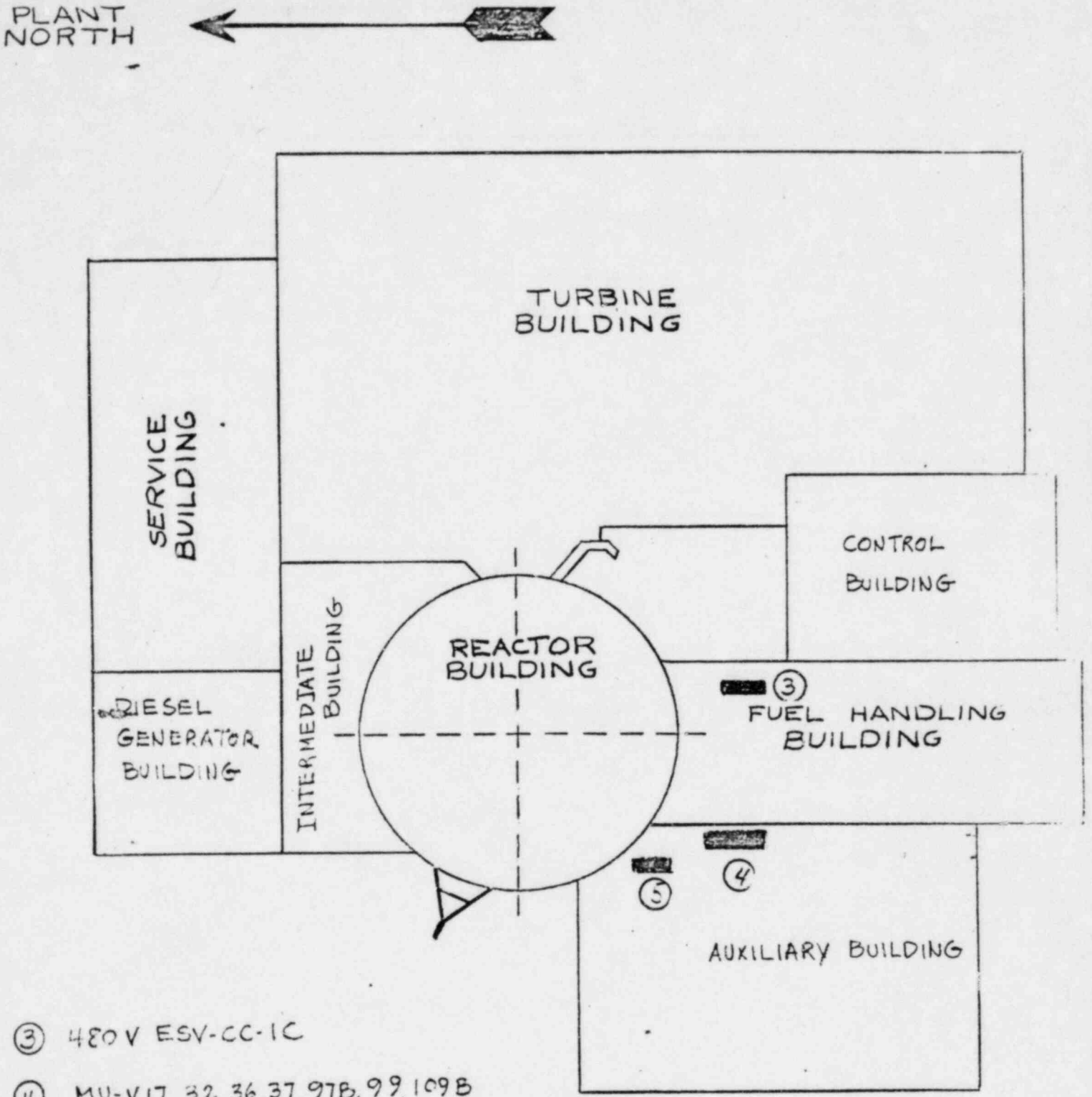
9. If reactor coolant pumps trip spuriously or on LOOP, the EFW System can be used to raise the OTSG level to 50% in a controlled manner and a normal transition to natural circulation will result.

10. Diesel Generator may start due to spurious actuation signal. D/G breaker is interlocked with the incoming feeder breakers which will prevent its closure if incoming breakers are closed. The interlock circuits do not run through the relay or control rooms. D/G may remain operating at idle until loss of offsite powers (LOOSP) confimed. On LOOSP, operator at ID switchgear will take positive control of the incoming and D/G feeder breakers and will manually load the diesel generator.
    If failure of the auto load shedding circuit is concurrent with D/G Start and LOOSP, generator overload protection connected to a separate dedicated set of fuses will trip the D/G breaker. The operator will eventually take manual control of the D/G feeder breakers and of the component feeder breakers and will manually load the diesel generators.



KEY PLAN
TMI-1

ELEVATION 261'-0"



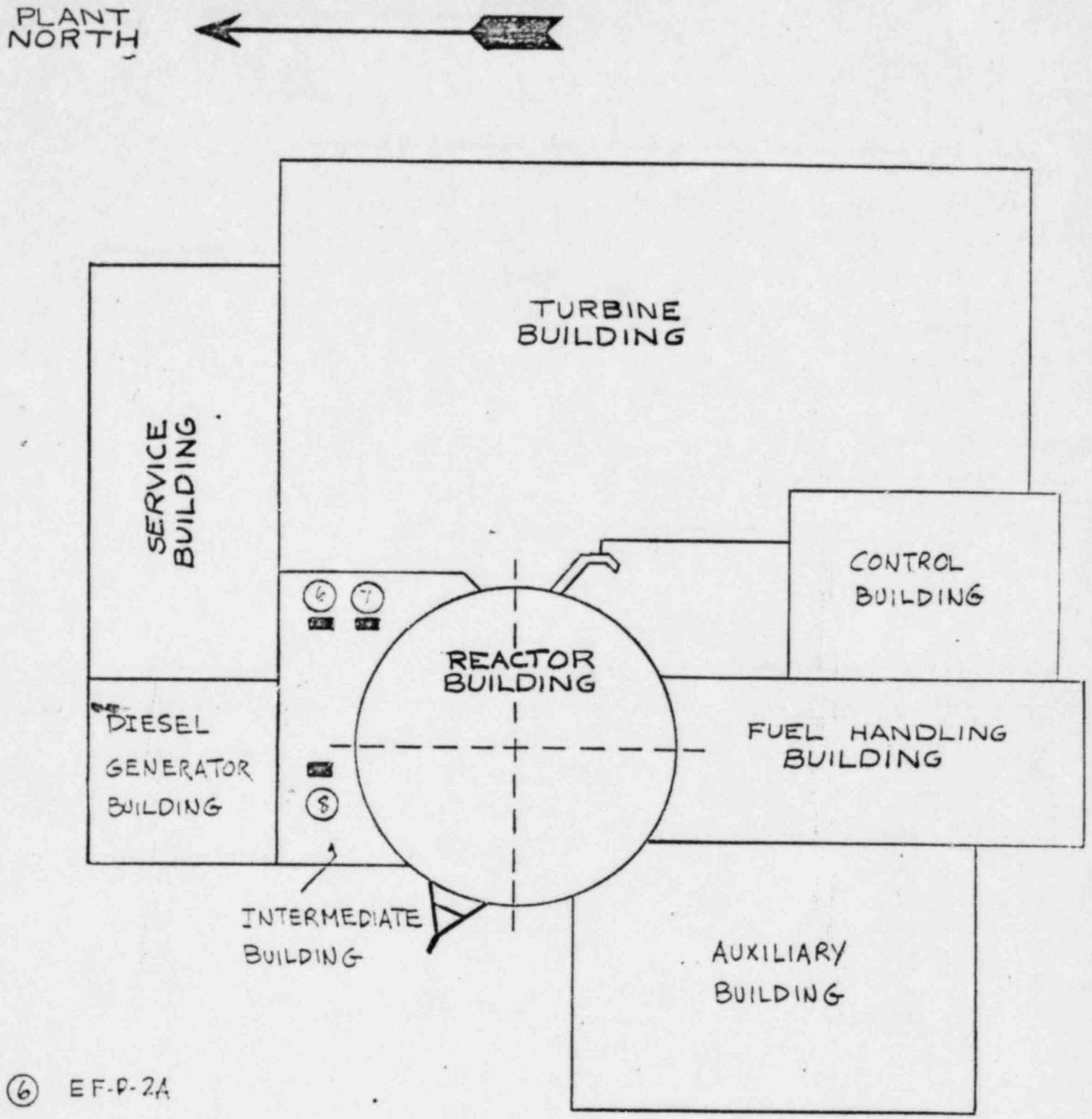
③ 480 V ESV-CC-1C

④ MU-V17, 32, 36, 37, 97B, 99, 109B

⑤ MU-V3, MU-V217

KEY PLAN
TMI-1

ELEVATION 281'-0"



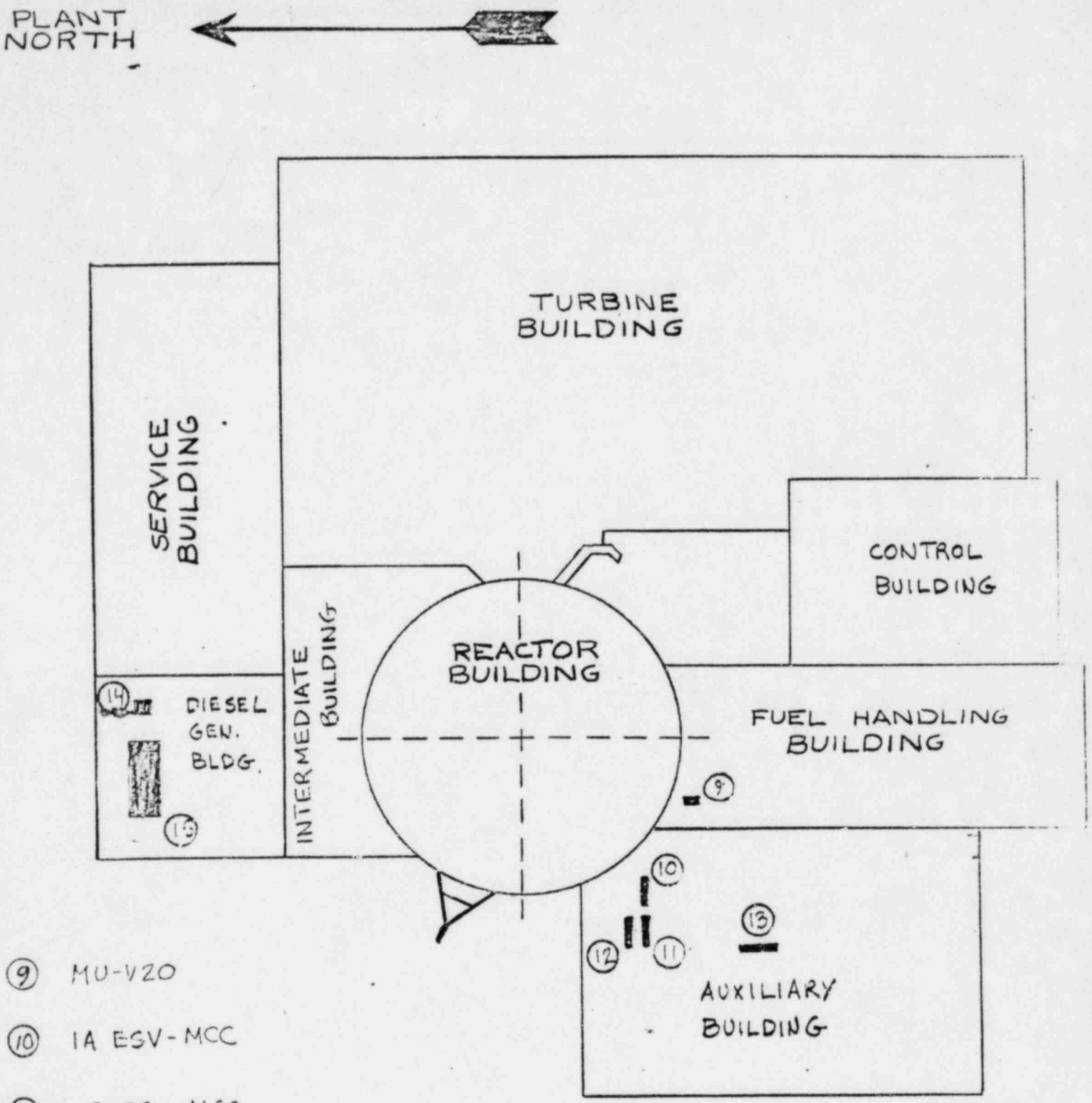
(6) EF-P-2A

(7) EF-P-2B

(8) TURBINE DRIVEN FW PUMP

KEY PLAN
TMI-1

ELEVATION 295'-0"



⑨ MU-V20

⑩ 1A ESV-MCC

⑪ 1B ESV-MCC

⑫ 1A RADWASTE CC

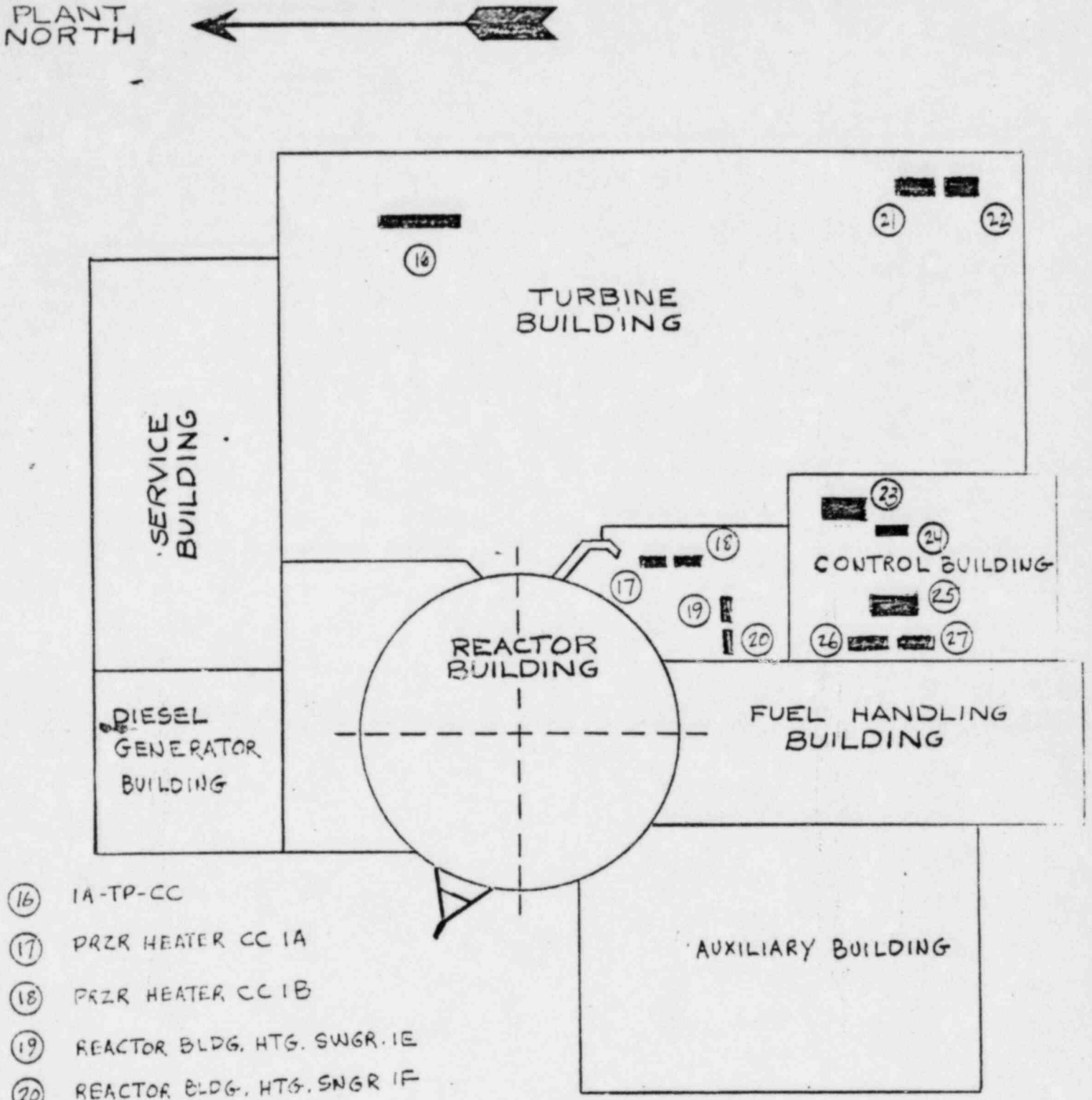
⑬ 1B RADWASTE CC

⑭ DIESEL GENERATOR PANEL

⑮ DIESEL GENERATOR UNIT A

KEY PLAN
TMI-1

ELEVATION 305'-0"



(16) 1A-TP-CC

(17) PRZR HEATER CC 1A

(18) PRZR HEATER CC 1B

(19) REACTOR BLDG. HTG. SWGR. 1E

(20) REACTOR BLDG. HTG. SNGR 1F

(21) 1A 6900 V SWGR

(22) 1B 6900 V SWGR

(23) 1P 480 V SWGR

(24) 1A ES MCC

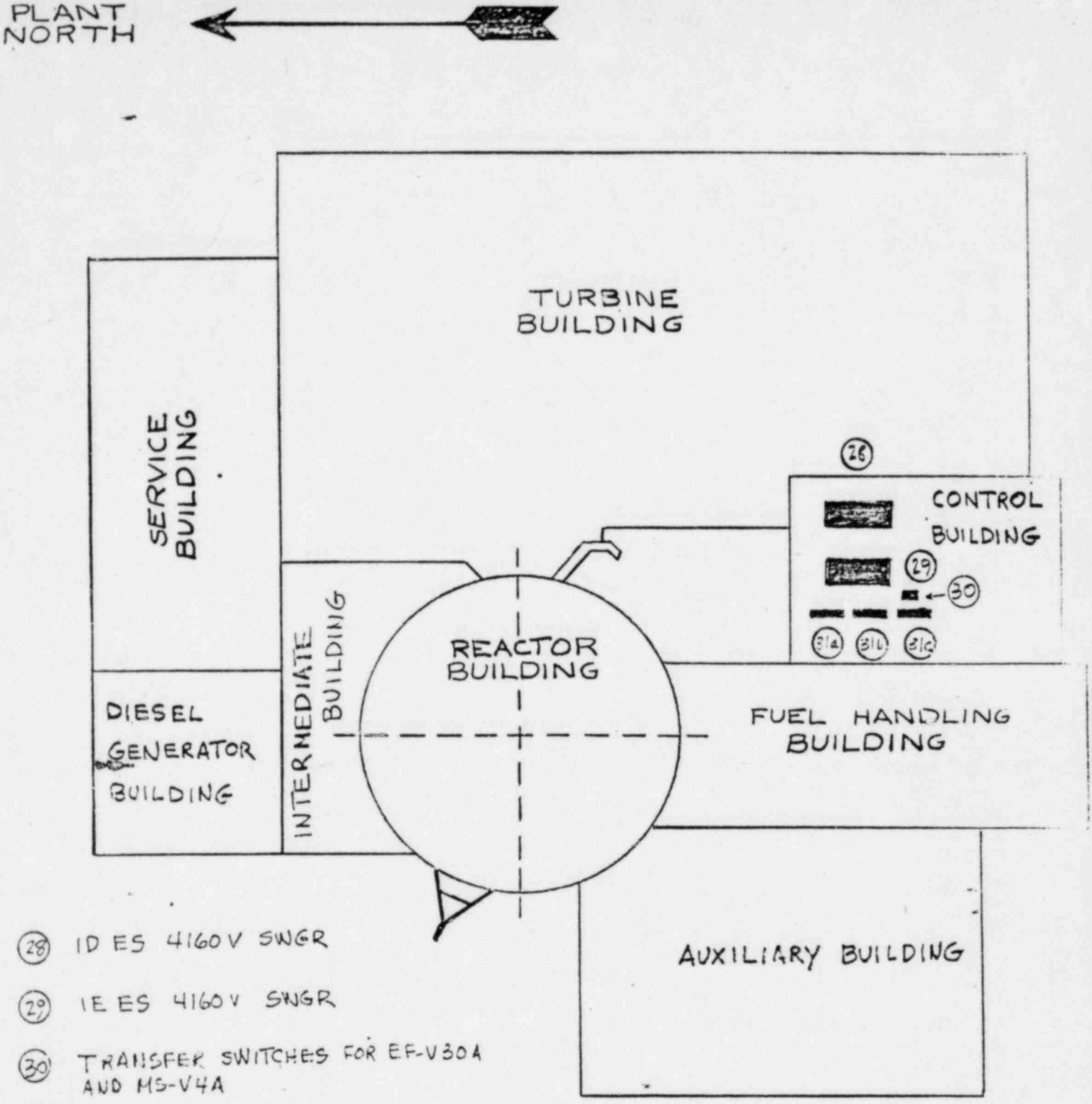
(25) REMOTE SHUTDOWN STATION

(26) 1G REACTOR PLANT 480 V SWGR

(27) 1L REACTOR PLANT 480 V SWGR

KEY PLAN
TMI-1

ELEVATION 322'-0"



(28) 1D ES 4160V SWGR

(29) 1E ES 4160V SWGR

(30) TRANSFER SWITCHES FOR EF-V30A AND MS-V4A

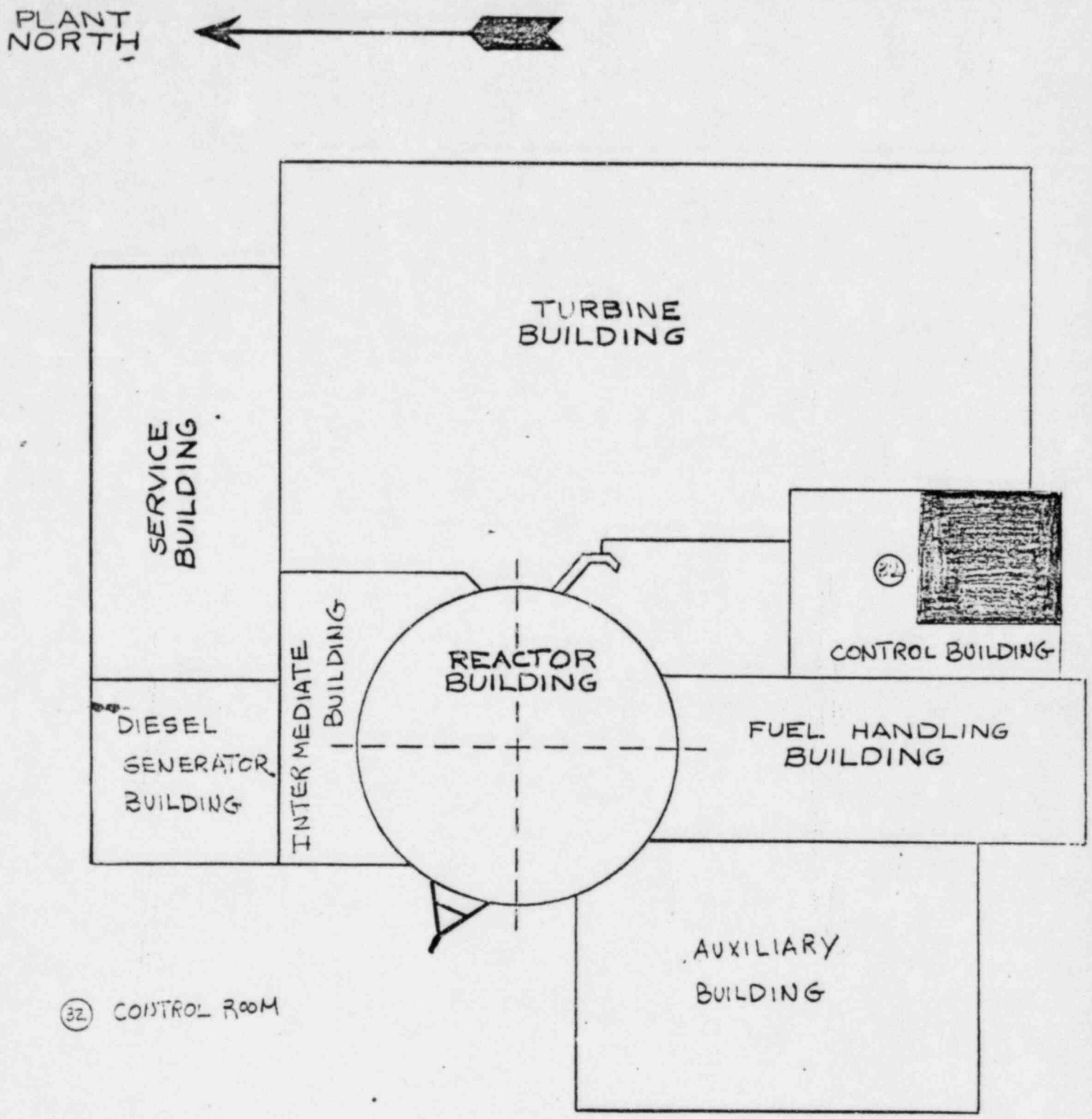
(31a) ENGINEERED SAFEGUARDS RELAY CABINETS

(31b) " " " "

(31c) " "

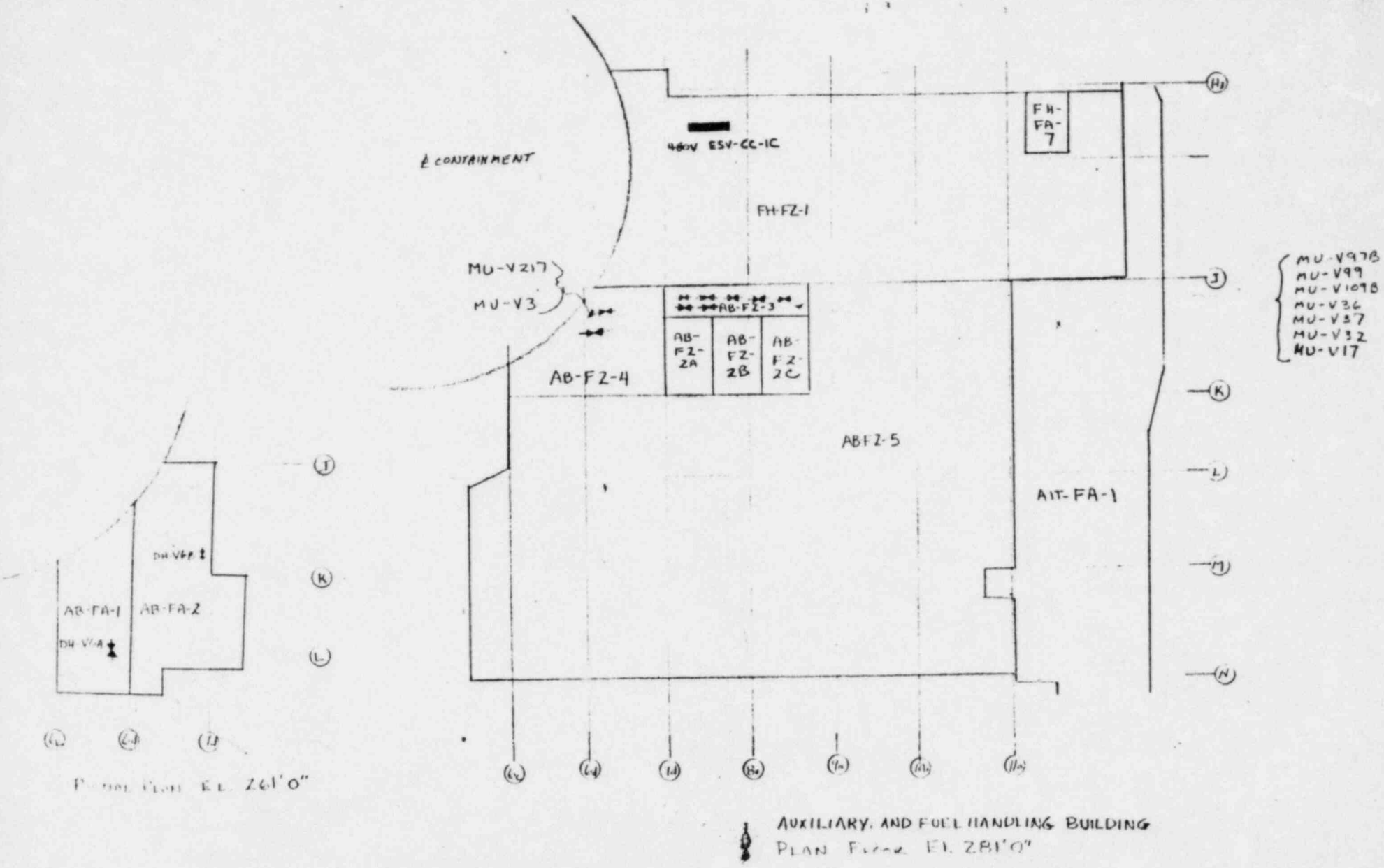
KEY PLAN
TMI-1

ELEVATION 338'-6"

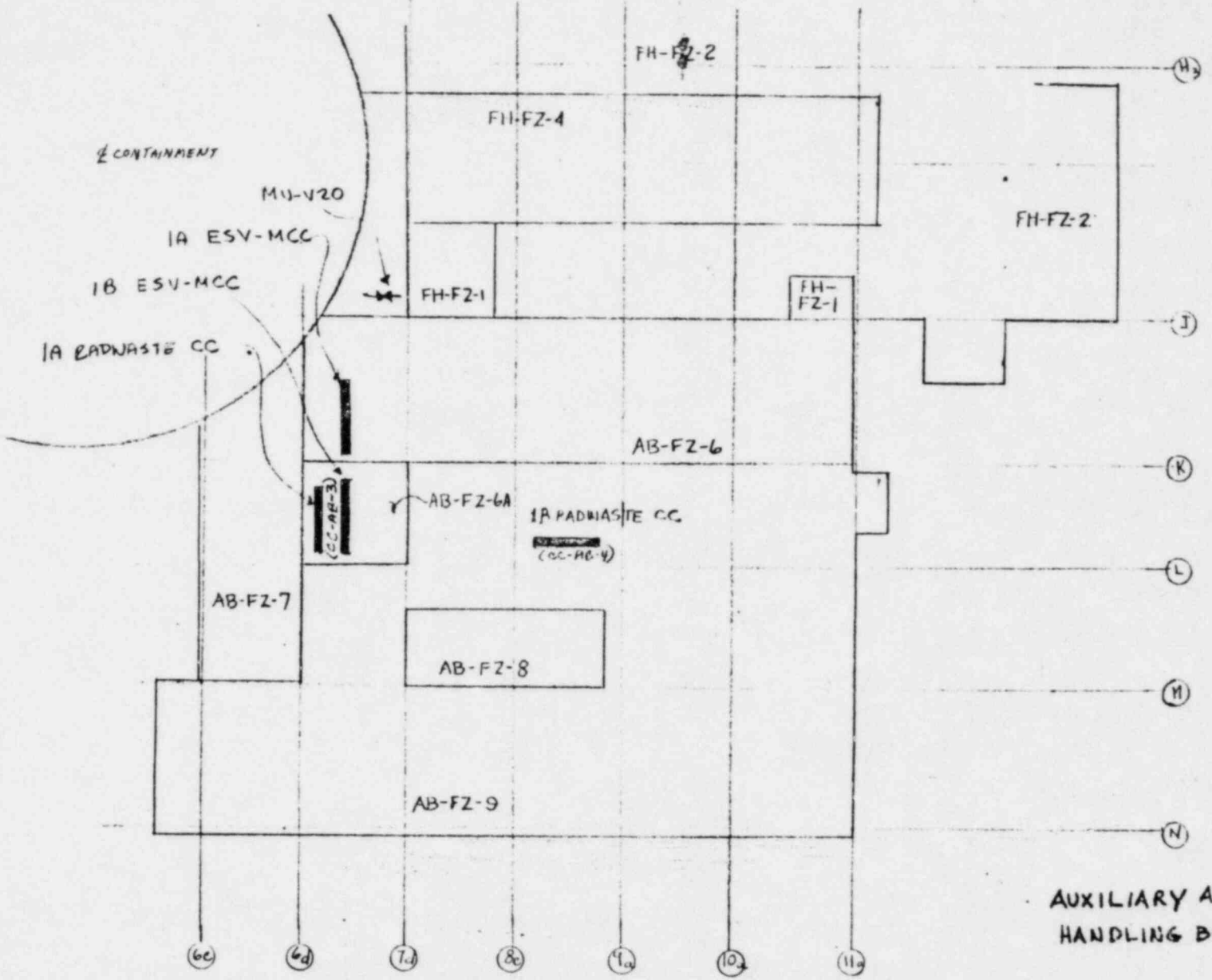


KEY PLAN
TMI-1

ELEVATION 355'-0"

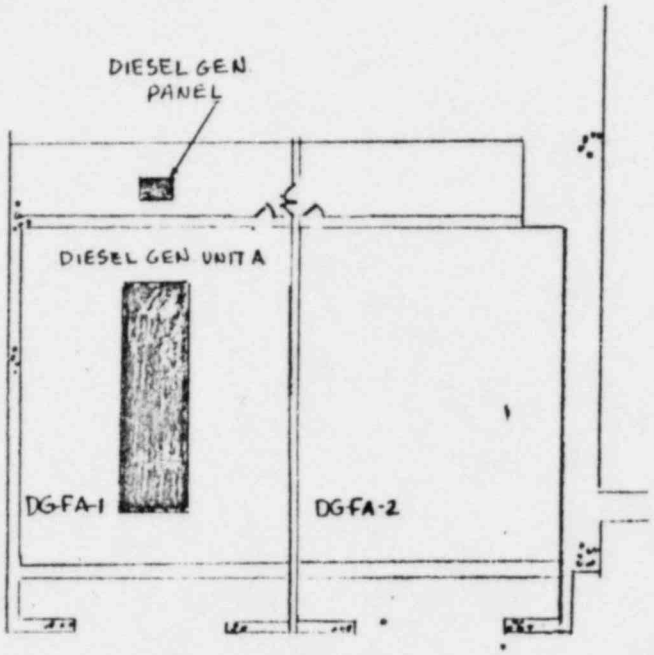


PLAN FLOOR EL. 261'0"

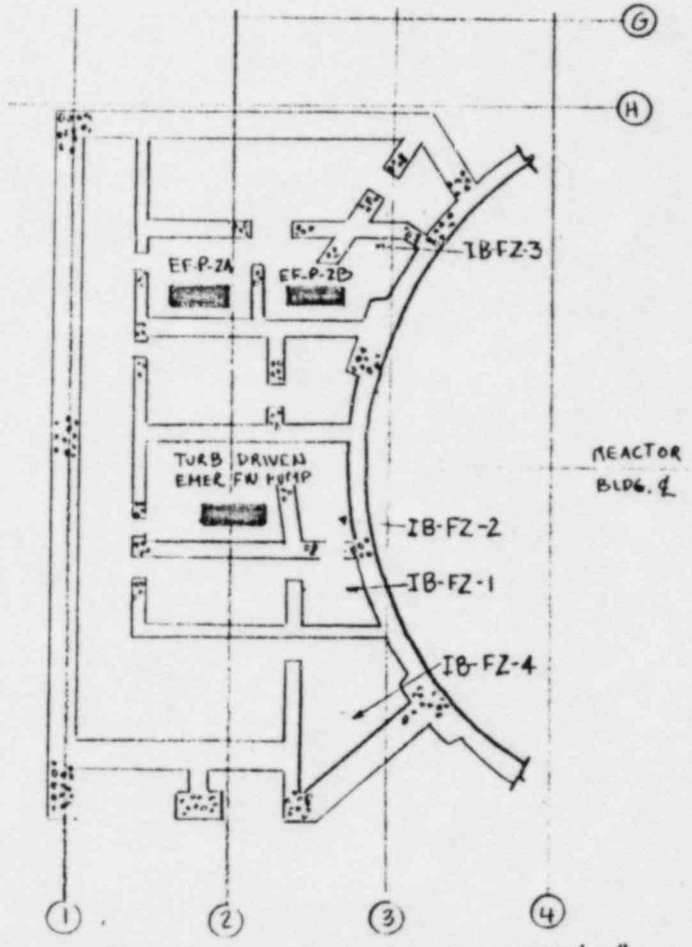


AUXILIARY AND FUEL HANDLING BUILDING

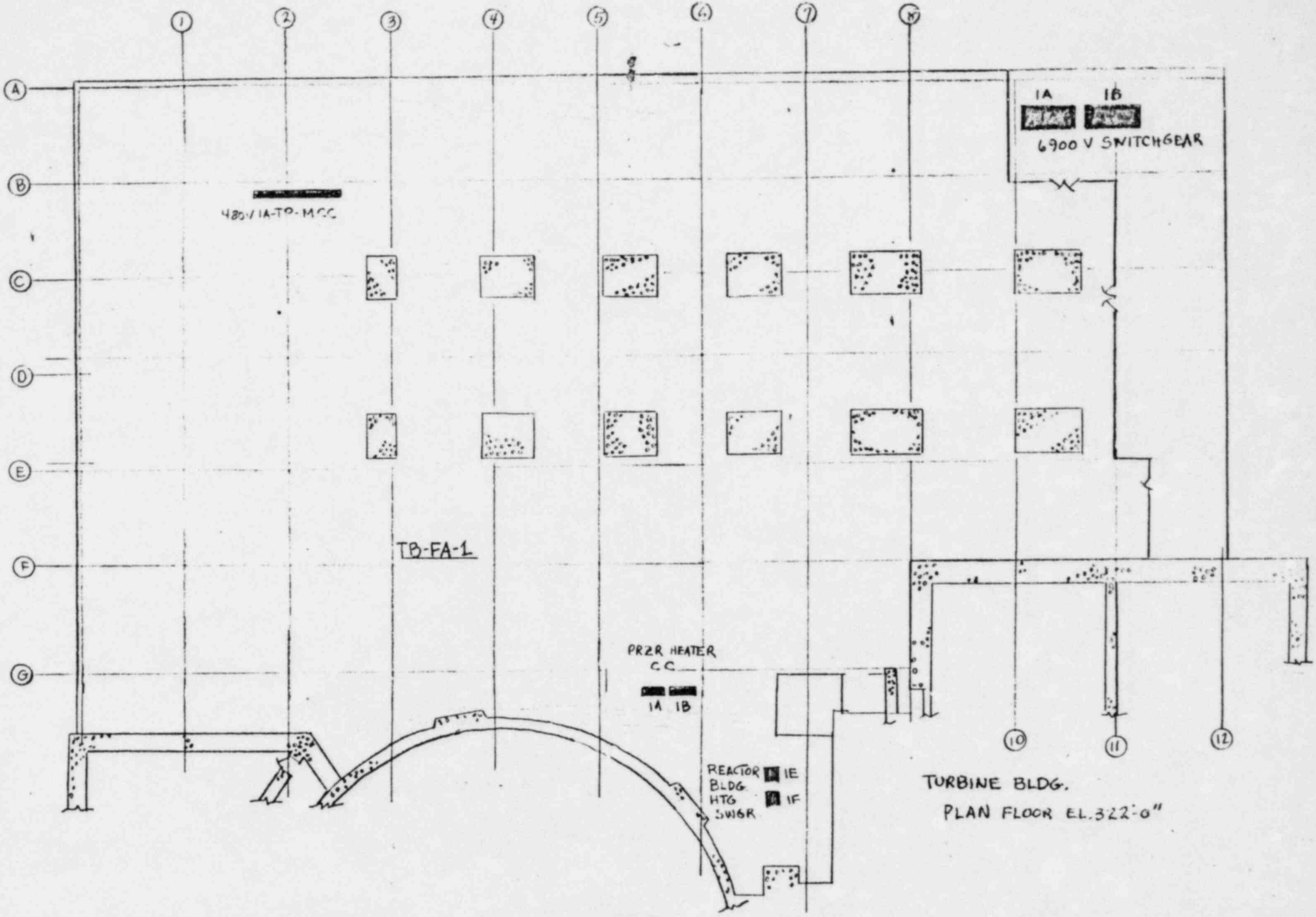
PLAN FLOOR EL. 305'0"

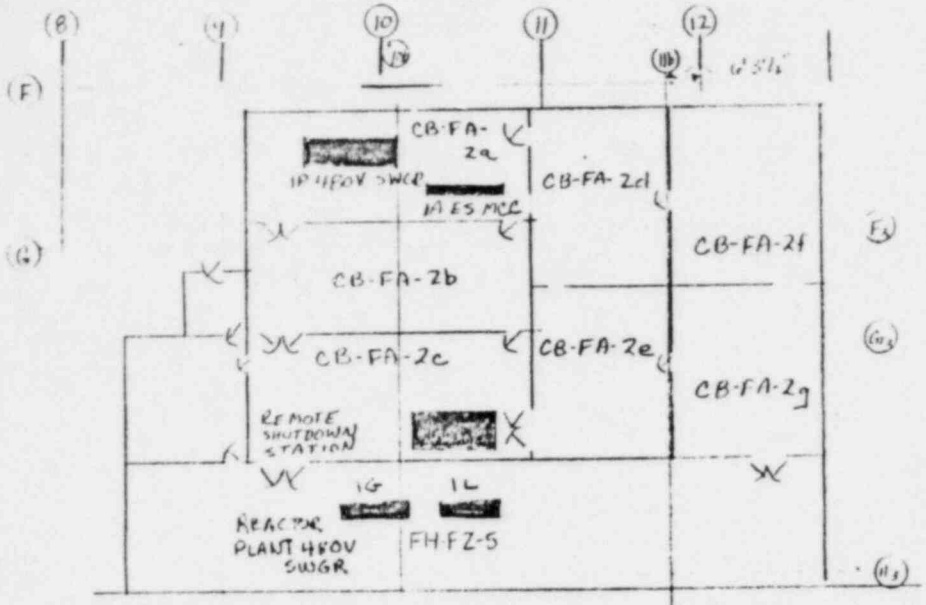


DIESEL GENERATOR BLDG.
EL. 305'-0"

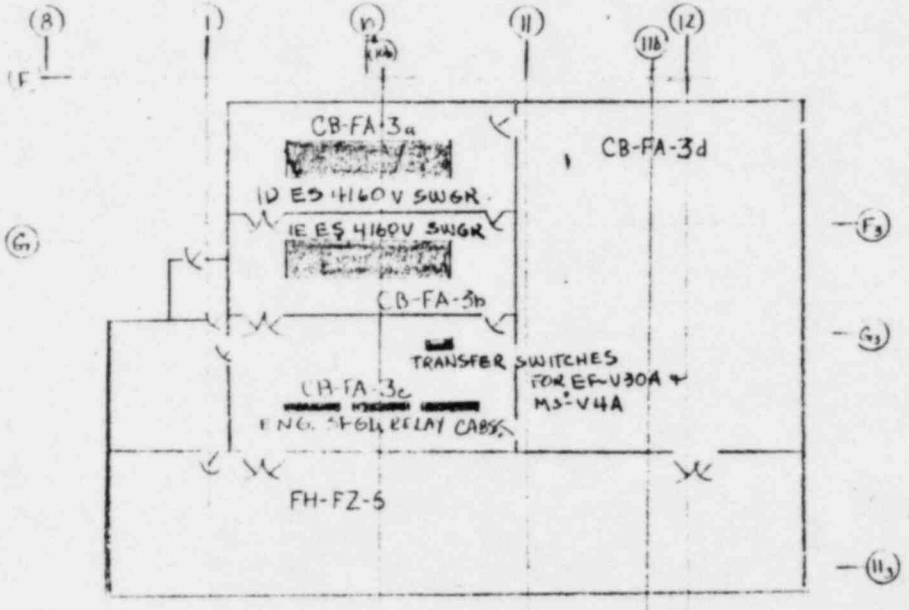


INTERMEDIATE BUILDING EL. 295'-0"

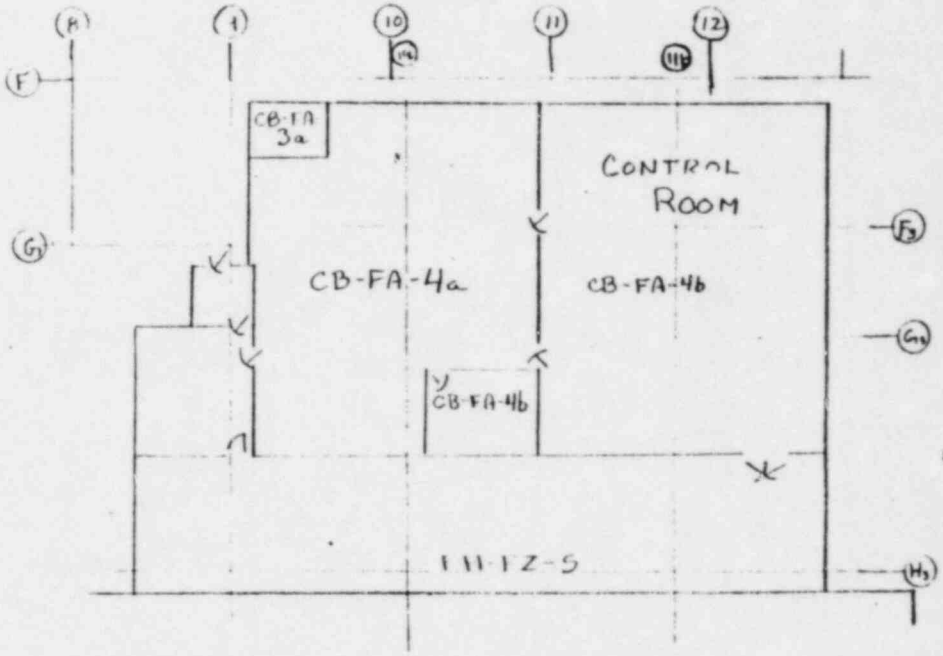

1
2
3
4
5
6
7
8
A
B
C
D
E
F
G
10
11
12
1A
1B
6900 V SWITCHGEAR
480V 1A-T2-MCC
TB-FA-1
PRZR HEATER
CC
1A 1B
REACTOR BLDG HTG SWGR
1E
1F
TURBINE BLDG.
PLAN FLOOR EL. 322'-0"



PLAN FLOOR ELEV. 322'0"



PLAN FLOOR ELEV. 338'6"



PLAN FLOOR ELEV. 355'0"

CONTROL BUILDING

SINGLE LINE DIAGRAM FOR 10 CFR 50 APPENDIX R ALTERNATE SHUTDOWN FACILITY