TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

October 23, 1979

Director of Nuclear Reactor Regulation
Attention: Mr. L. S. Rubenstein, Acting Chief
Light Water Reactors Branch No. 4
Division of Project Management
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Rubenstein:

In the Matter of the Application of	)	Docket Nos. 50-327
Tennessee Valley Authority	)	50-328

Enclosed is Revision 4 of TVA's response to the Auxiliary Systems Branch (ASB) fire protection review questions for the Sequoyah Nuclear Plant. This information was requested in your letter to N. B. Hughes dated September 1, 1978. The original information, Revision 1, Revision 2, and Revision 3 were submitted by my letters to you dated November 9, 1978, December 19, 1978, January 19, 1979, and March 8, 1979, respectively. This revision includes:

1. Revisions to our responses to ASB questions 1, 3, 7, 9, 15, 18, 20, and 27. These revisions answer open items that remained after your subsequent evaluation of our responses.

2. Revised responses to additional discussion items.

3. Various figures to supplement our responses.

4. Revised commitment schedule.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills, Manager
Nuclear Regulation and Safety

Enclosures

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POOR QUALITY PAGES

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POOR ORIGINAL

AUXILIARY SYSTEMS BRANCH
FIRE PROTECTION REVIEW
SEQUOYAH NUCLEAR PLANT - UNITS 1 AND 2
DOCKET NUMBERS 50-327/328

1. Your submittal provides only part of the information requested in Enclosure 2 to our letter dated September 30, 1976. A fire hazards analysis should be conducted for each plant fire area, and the effects of postulated fire involving permanent and/or transient combustibles on systems, circuits, or equipment required for safe plant cold shutdown should be evaluated. The fire detection and primary and secondary fire suppression systems for each area should also be indicated. In the fire hazards analysis you should identify all the redundant mechanical and electrical systems necessary for safe cold shutdown which are separated only by distance (no fire barriers). The fire hazards analysis should demonstrate that, assuming failure of the primary suppression system, a fire in installed or transient combustibles will not damage redundant trains or divisions of systems required for safe plant cold shutdown. Where this cannot be demonstrated, an alternate means of assuring safe plant shutdown (cold shutdown) should be provided.

TVA Response

Sequoyah Nuclear Plant's fire protection system design was based on the results of a fire hazards analysis covering those areas where an unmitigated fire could affect a unit's ability to reach and maintain a safe cold shutdown. The analysis involved a detailed review of the plant design and an evaluation of the effects of postulated fires.

The results of the analysis are provided in part in the Sequoyah Nuclear Plant Fire Protection Program Reevaluation forwarded to the NRC by letter from J. E. Gilleland to R. S. Boyd dated January 24, 1977. The following discussion supplements the original documentation.

Based upon the fuel loading and compartmentation of fire cells, fire suppression and detection systems have been provided in the various plant areas as identified in Table 1-1. When fixed suppression systems are provided in an area, they are considered the primary systems. Backup protection is provided by standpipe systems or yard hydrants. When manual systems are used exclusively in an area, they are considered the primary systems and are backed up by manual systems in adjacent areas.

Figure 1.1 is a safe shutdown logic diagram for a fire at Sequoyah Nuclear Plant. This figure and its comment sheet identify those plant features necessary to achieve and maintain a safe plant shutdown in the event of a fire. TVA has conducted an analysis of the plant based upon this diagram and its comment sheet assuming a postulated exposure fire with a zone of influence requiring a minimum 20-foot spatial separation of redundant equipment, circuits, or components in all plant areas outside of containment. This analysis has identified where additional protection

and/or separation is required to assure that the hot shutdown condition is reached during a fire using only existing hardware and no extraordinary operating action (i.e., the operator's response will not be required in less than 15 minutes and will consist of plant manipulations typical of those required for normal operation). The analysis does not consider inside primary containment because transient fire loads in this area, when the plant is at power, are not credible, and fixed hazards which pose an exposure threat to equipment components or circuits required for safe shutdown (i.e., reactor coolant pumps) are provided with fixed automatic water suppression systems, automatic detection capability, and an oil collection pan with drains to prevent spilled oil from contacting hot piping. Note that terms such as inadequate separation and unacceptable interaction when used in this discussion refer to the inability to achieve 20-foot spatial separation within a fire cell. These terms do not imply violation of separation as specified in the plant design criteria.

Throughout this discussion an asterisk (*) will be used to identify the title of a function block on the shutdown logic diagram (Figure 1.1). This diagram and its keyed comments are germane and are an integral part of the following discussion.

Hot Shutdown

Each of the six conditions necessary to achieve hot shutdown are discussed separately. Refer to the six conditions which provide input into the AND block that leads to the hot shutdown condition on the shutdown logic diagram.

Secondary Side Pressure Control - The Secondary Safety Valves* and the Secondary Relief Valves* can satisfy this plant condition. The spring-loaded secondary safety valves used for short-term control are considered immune to fire damage. The secondary relief valves used for long-term control are adequately separated so that access to the required two valves for manual actuation can be assured during a fire. The redundant circuits for the steam generator pressure instrumentation were found to be inadequately separated. TVA will provide the required instrumentation integrity in accordance with Table 1.3. Since this satisfies the required condition, TVA has not evaluated control via the Main Steam System* nor remote electrical control of the power-operated secondary relief valves.

Steam Generator Inventory Control - This plant condition requires an auxiliary feedwater pump capable of feeding any two steam generators, level control for these steam generators, and suction to the pump. This analysis has identified areas where the postulated exposure fire described above would affect both the A and B train sections of the Motor-Driven Auxiliary Feedwater Pump* function. Other areas were identified where a separate postulated exposure fire would affect both trains of the Turbine-Driven Auxiliary Feedwater Pump* function. However, no single postulated fire exists which would affect both of these functions.

Interactions also exist for the automatic control of the Steam Generator Level Control* function. These interactions have been deemed acceptable because the control valves themselves are adequately separated and manual control is achievable. Unacceptable interactions were found to exist for the steam generator level signal which is necessary for both manual or automatic level control. TVA will provide the necessary protection of this function in accordance with Table 1.3. Suction from the ERCW* (essential raw cooling water system) was not evaluated because suction from the Condensate Storage Tank* is assured due to the tank being immune to fire damage.

Reactor Coolant System Inventory Control - This condition requires that RCS letdown be controlled, that RCS makeup be provided, and that reactor coolant pump seal integrity be assured. These three conditions are discussed separately.

RCS Letdown Control - This condition can be satisfied by closure of any one of a number of Letdown Isolation Valves* in each of two series strings of valves. Since all of the valves involved are air-operated valves which would fail in the desired position should their control cable be damaged, these control circuits were not evaluated for separation.

RCS Makeup - This condition requires the availability of a charging pump, pump suction, and a flow path into the RCS. Of these, water, via Volume Control Tank Suction* and Refueling Water Storage Tank Suction*, is assured since the tanks themselves perform only a passive function which would not be jeopardized by a fire, and manual handwheel operation of the RWST suction valves is acceptable.

The analysis noted that the single postulated exposure fire described above could cause the loss of both trains of the CVCS Centrifugal Charging Pump* and the Positive Displacement Charging Pump*. TVA will correct this unacceptable condition by rerouting the wiring for the positive displacement charging pump and the positive displacement pump room cooler in accordance with Table 1.2. This pump was chosen for rerouting because it is the pump used in normal operation; hence, its flow path is already properly aligned. The ECCS charging Flow Path* associated with the centrifugal pumps contains interactions which can affect both A and B train sections. These interactions are acceptable because they do not affect the positive displacement charging pump; hence, either the positive displacement pump via the normal charging path or the centrifugal charging pump(s) via the ECCS path(s) are available during any postulated fire.

Control of RCS makeup via either the ECCS (centrifugal) pumps or the normally operating (positive displacement) pumps requires a pressurizer level signal. Unacceptable interactions were found to exist between conduits associated with the required instrumentation wiring. TVA will correct this condition in accordance with Table 1.3. The component cooling water and

essential raw cooling water systems are identified in the keyed comments as being required for RCS makeup. Unacceptable interactions do exist in both of these systems. The CCS mechanical system interactions and how they are resolved are discussed in the response to question 13. The CCS and ERCW electrical system interactions will be protected in accordance with Table 1.4.

RCP Seal Integrity - Seal integrity for the reactor coolant pumps can be assured if either the positive displacement charging pump or the centrifugal charging pump and the associated Charging Flow Control Valve, FCV62-93*, are available to provide injection water to the seals. The modifications proposed to upgrade the system in the preceding paragraph will assure RCP seal integrity. RCP Thermal Barrier Cooling* also would assure this required condition. This path does contain interactions which would affect both its A and B train sections. These interactions are deemed acceptable because RCP seal injection is assured.

Secondary Side Isolation - The Main Steam Isolation Valves* are stored-energy, fail-closed valves which require both A and B control signals to remain in the open position. A postulated fire which would affect the control cables would cause the valves to shut, assuring this function. Hence, these control cables and those for the parallel path, Steam Load Isolation*, were not evaluated.

Analysis of the Main Feedwater Isolation Valves* indicated that at least one of the two valves in each feedwater line could be shut for the postulated fire. Hence, the Main Feedwater Pump* function, a parallel path to feedwater isolation, was not evaluated.

Each steam generator blowdown line contains an A and B train blowdown Isolation Valve* in series. Both valves would fail in the desired, closed position if there was fire damage to the control cables; hence, this feature is considered to be assured and was not evaluated.

RCS Pressure Control - Trained power cables outside primary containment for the Pressurizer Heaters* were found to interact within 20 feet in two locations. Within the reactor building annulus, the two trains are separated by 19 feet for most of their routing, but approach 13 feet at the primary containment penetration. This interaction has been deemed acceptable because of the low probability for transient fire loads within the annulus area and because all exposed surfaces of cable within this area have been provided with a flame-retardant mastic coating.

The second interaction involves opposite trains approaching to within three feet at an orthoganal crossing on elevation 759 of the auxiliary building near the pressurizer transformers and switchgear. The divisional medium-voltage (6900 volts) power cables for the supply to the 6.9-kV/480V stepdown pressurizer heater transformer are routed in cable trays located above power cables of the redundant division. TVA will reroute the unit 1 and unit 2 pressurizer heater 6900V power cables to achieve a minimum 20 feet separation from the redundant division in accordance with Table 1.2. Automatic sprinkler protection will be provided in the area of the power cables in trays.

Instrumentation conduits which contain the pressure signals necessary for control interact within the auxiliary building. TVA will correct this condition in accordance with Table 1.3.

Initial Reactivity Control - The trained Reactor Trip System* which provides this condition is a fail-safe system which will respond to the postulated fire by causing the control rods to be inserted. Thus, no evaluation was considered necessary.

Cold Shutdown

The dashed section of the shutdown logic diagram identifies two additional plant conditions, Long Term Heat Removal and Long Term Reactivity Control, which must be established to place the plant in the cold shutdown condition. This section of the shutdown logic diagram has been analyzed to assure that all required plant conditions can be established within 72 hours of a postulated fire having a zone of influence requiring a minimum 20-foot separation. It should be noted that unlike the hot shutdown analysis, the cold shutdown analysis does take credit for damage control measures which cannot be considered typical of normal plant operation. These extra-ordinary actions are described below.

Long Term Heat Removal - The condition requires the Residual Heat Removal (RHR) system to be operable. It is realized when an RHR Shutdown Cooling Flow Path* is established and the RHR Pumps* are operational. Manual handwheel operation of all required valves is acceptable with no further evaluation. All other features were found to be adequately separated except the cables which supply the RHR pump room coolers. TVA's resolution of this interaction is described in table 1.5. (Note: Unacceptable interactions do exist within the component cooling water--CCS--system. These interactions and their resolutions have been discussed in the hot shutdown analysis above and also in the response to question 13.)

Long Term Reactivity Control - To establish an acceptable shutdown margin under cold conditions, the contents of the boron injection tank (BIT) must be charged into the reactor coolant system. The Flow Path Through the BIT* can be established by manual handwheel operation of the required valves and was not evaluated further. Analysis of RCS Makeup Capability* has been made above as part of RCS INVENTORY CONTROL analysis. Please refer to this discussion for interactions and their resolution.

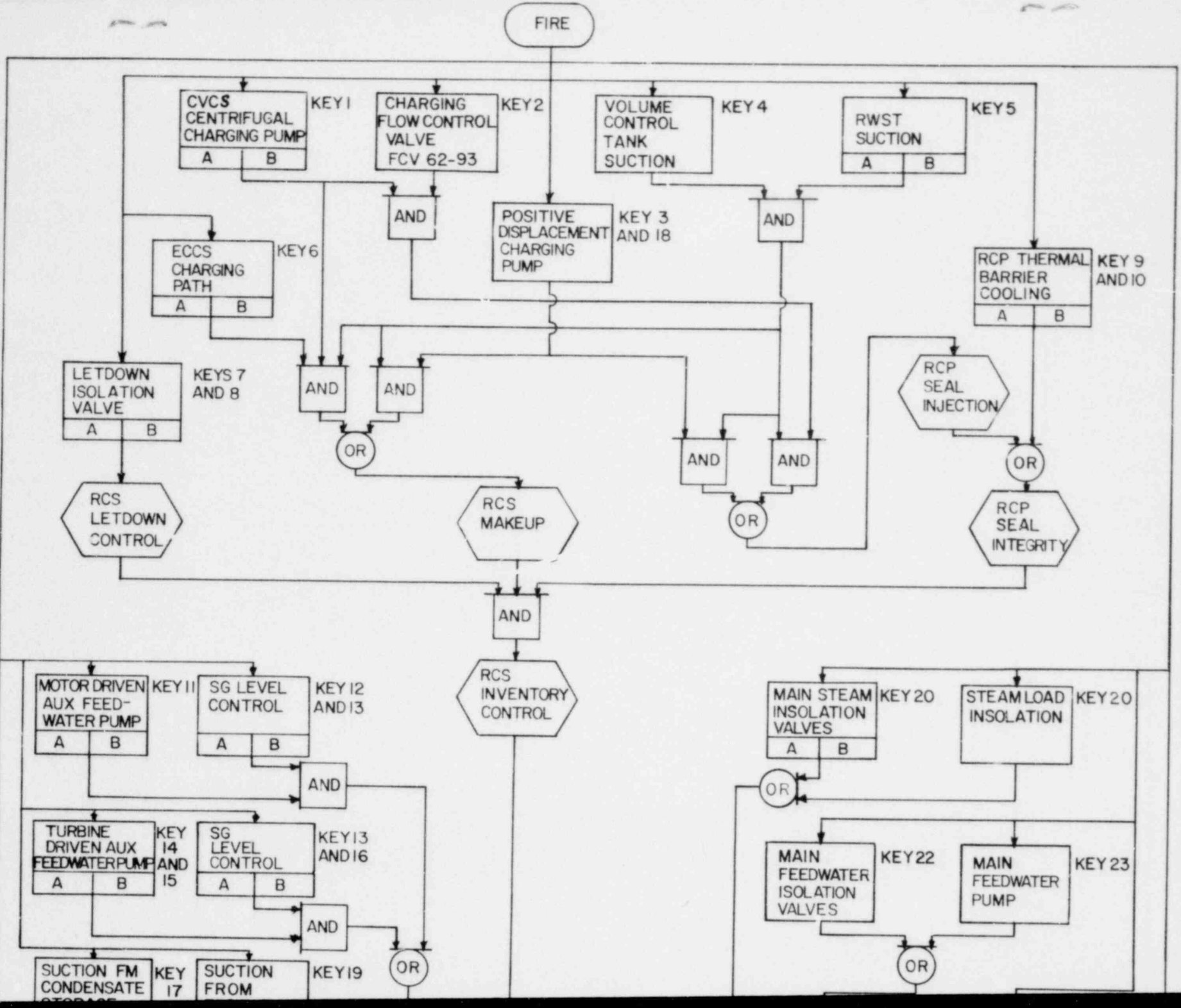
Conclusion

As a result of the preceding analysis and the identification of areas where 20-foot spatial separation of redundant circuits required for safe shutdown within a fire cell has not been achieved, protective measures described in Tables 1.2, 1.3, and 1.4 shall be implemented. TVA has provided by separate submittal, marked drawings showing the new cable routing for relocated cables and conduits listed in Table 1.2 and the relative locations of the redundant counterpart cables and/or conduits. These modifications will assure the ability to achieve the hot shutdown condition as discussed previously in this response. The cold shutdown condition can be achieved within 72 hours through the implementation of temporary damage control measures and extraordinary operator actions described in table 1.5.

Strict administrative procedures have been established to control transient combustibles and are included in the Sequoyah Physical Instruction, PHYSI-13. The procedure requires identification of the routes for transient combustibles and the procedure takes no credit

for the fixed suppression system in regard to its extinguishing capability for transient fire loads. The procedure requires provisions for additional fire protection that is capable of suppressing the transient fire load.

With the defense-in-depth as described above, protection to redundant divisions of systems from installed or transient combustibles has been provided to ensure capability of safe shutdown of the plant.


FIRE
CVCS CENTRIFUGAL CHARGING PUMP
A
B
KEY 1
CHARGING FLOW CONTROL VALVE FCV 62-93
KEY 2
VOLUME CONTROL TANK SUCTION
KEY 4
RWST SUCTION
A
B
KEY 5
AND
POSITIVE DISPLACEMENT CHARGING PUMP
KEY 3 AND 18
AND
ECCS CHARGING PATH
A
B
KEY 6
RCP THERMAL BARRIER COOLING
A
B
KEY 9 AND 10
LETDOWN ISOLATION VALVE
A
B
KEYS 7 AND 8
AND
AND
OR
AND
AND
OR
RCP SEAL INJECTION
OR
RCS LETDOWN CONTROL
RCS MAKEUP
RCP SEAL INTEGRITY
AND
RCS INVENTORY CONTROL
MOTOR DRIVEN AUX FEED-WATER PUMP
A
B
KEY 11
SG LEVEL CONTROL
A
B
KEY 12 AND 13
AND
TURBINE DRIVEN AUX FEEDWATER PUMP
A
B
KEY 14 AND 15
SG LEVEL CONTROL
A
B
KEY 13 AND 16
AND
SUCTION FM CONDENSATE
KEY 17
SUCTION FROM
KEY 19
OR
MAIN STEAM INSOLATION VALVES
A
B
KEY 20
STEAM LOAD INSOLATION
KEY 20
OR
MAIN FEEDWATER ISOLATION VALVES
KEY 22
MAIN FEEDWATER PUMP
KEY 23
OR

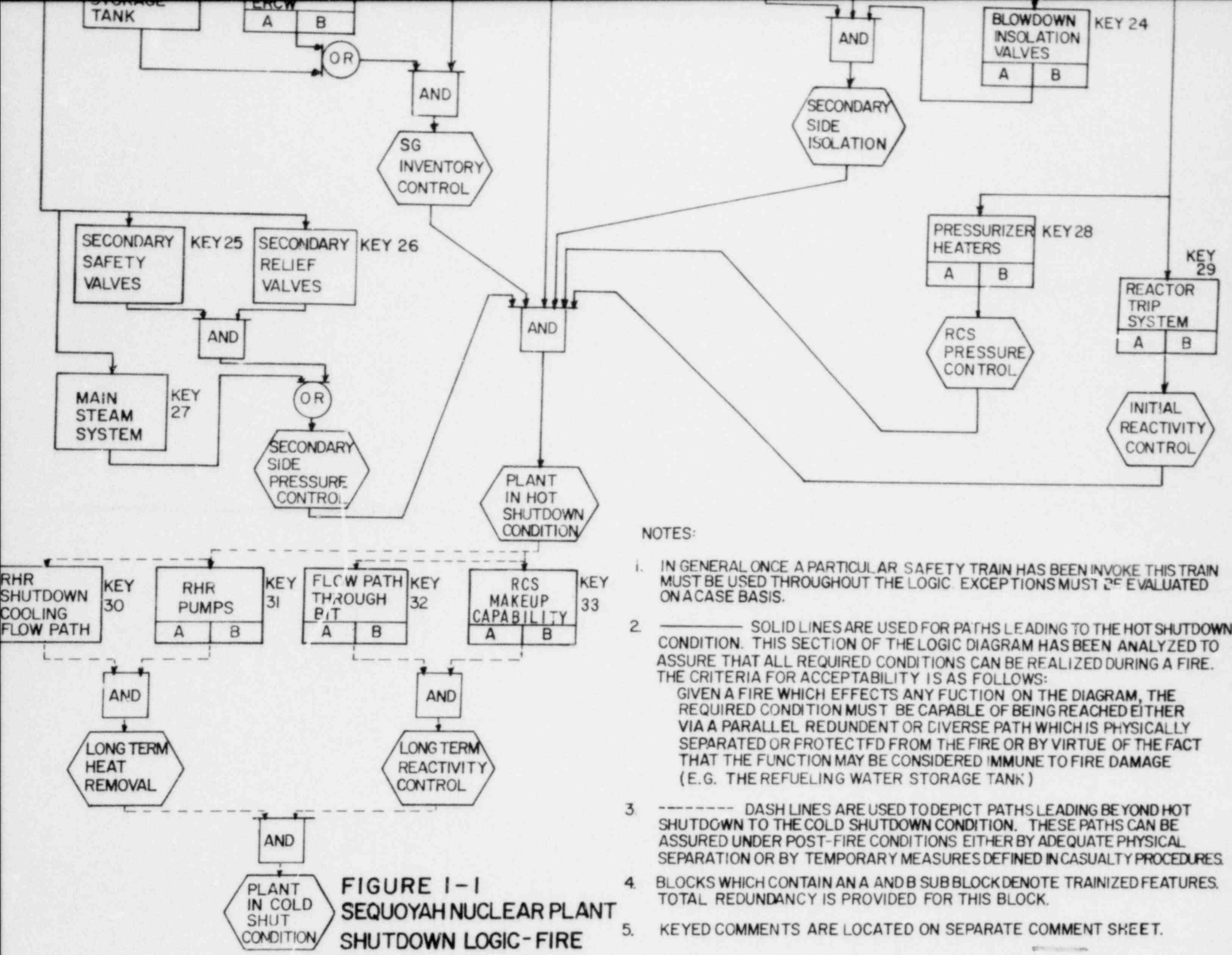


FIGURE 1-1
SEQUOYAH NUCLEAR PLANT
SHUTDOWN LOGIC - FIRE

NOTES:

1. IN GENERAL ONCE A PARTICULAR SAFETY TRAIN HAS BEEN INVOKE THIS TRAIN MUST BE USED THROUGHOUT THE LOGIC. EXCEPTIONS MUST BE EVALUATED ON A CASE BASIS.
2. ———— SOLID LINES ARE USED FOR PATHS LEADING TO THE HOT SHUTDOWN CONDITION. THIS SECTION OF THE LOGIC DIAGRAM HAS BEEN ANALYZED TO ASSURE THAT ALL REQUIRED CONDITIONS CAN BE REALIZED DURING A FIRE. THE CRITERIA FOR ACCEPTABILITY IS AS FOLLOWS:
   GIVEN A FIRE WHICH EFFECTS ANY FUCTION ON THE DIAGRAM, THE REQUIRED CONDITION MUST BE CAPABLE OF BEING REACHED EITHER VIA A PARALLEL REDUNDENT OR DIVERSE PATH WHICH IS PHYSICALLY SEPARATED OR PROTECTED FROM THE FIRE OR BY VIRTUE OF THE FACT THAT THE FUNCTION MAY BE CONSIDERED IMMUNE TO FIRE DAMAGE (E.G. THE REFUELING WATER STORAGE TANK)
3. - - - - - - - DASH LINES ARE USED TO DEPICT PATHS LEADING BEYOND HOT SHUTDOWN TO THE COLD SHUTDOWN CONDITION. THESE PATHS CAN BE ASSURED UNDER POST-FIRE CONDITIONS EITHER BY ADEQUATE PHYSICAL SEPARATION OR BY TEMPORARY MEASURES DEFINED IN CASUALTY PROCEDURES.
4. BLOCKS WHICH CONTAIN AN A AND B SUB BLOCK DENOTE TRAINIZED FEATURES. TOTAL REDUNDANCY IS PROVIDED FOR THIS BLOCK.
5. KEYED COMMENTS ARE LOCATED ON SEPARATE COMMENT SHEET.

KEYED COMMENTS

1. Requires auxiliary lube oil pump AND power to pump room cooler AND ERCW to pump oil cooler AND ERCW to pump room cooler AND CCS water to ERCW heat exchangers.

2. Requires appropriate section of pressurizer level control system AND EITHER B auxiliary air compressor OR station air compressor.

3. Requires ERCW to pump room cooler AND power to pump room cooler AND CCS water to pump oil cooler AND CCS water to pump speed control AND ERCW to CCS exchanger AND EITHER automatic speed control from approrpriate section of pressurizer level control system OR manual speed control using pressurizer level instrumentation.

4. Short-term make up source, normally aligned, no action required.

5. Long-term make up source requires opening of FCV62-135 OR FCV62-136, hand wheel operation acceptable.

6. Flow path requires opening an inlet valve (EITHER FCV63-25 OR FCV63-26) AND an outlet valve (EITHER FCV63-39 OR FCV63-40) for the boron injection tank.

7. Termination of normal letdown requires closure of FCV62-77 OR FCV62-70 OR FCV62-69 OR all three valves FCV62-72, FCV62-73 and FCV62-74.

8. Termination of excess letdown requires closure of FCV62-54 OR FCV62-55 OR FCV62-56.

9. Requires CCS water to thermal barrier booster pump AND ERCW to CCS heat exchangers.

10. IF B train is selected, an additional requirement is opening capability for FCV70-9, FCV70-10, FCV70-195 and FCV70-196.

11. Requires automatic control AND hydraulic motor for back pressure regulating valve (A train PCV3-122, B train PCV3-132).

12. Requires automatic control signal to level control valves (A train LCV3-156 AND LCV3-164, B train LCV3-148 AND LCV3-171) OR steam generator level instrumentation for manual control (A train steam generator 1 AND 2, B train steam generator 3 AND 4). Manual control consists of on/off operation of the pump.

13. IF automatic control is selected, an additional requirement is the appropriate train of auxiliary air compressor OR service air compressor.

14. Not a true A and B train system--the turbine-driven auxiliary feedwater subsystem may be considered to be a separate single train, which can be supplied with control and power from either of the traditional A and B trains.

15. Requires turbine trip and throttle valves (FCV1-51), AND governor valve (FCV1-52).

16. Requires automatic signal to any two level control valves (LCV3-172, LCV3-173, LCV3-174, LCV3-175) OR steam generator level instrumentation for manual control of any two steam generators. Manual operation consists of handwheel operation of the level control valves.

17. Normally aligned, no action required.

18. IF automatic speed control is selected, an additional requirement is B train auxiliary air compressor OR service air compressor.

19. Requires suction valves to open AND ERCW system availability.

20. Requires closure of all main steam isolation AND isolation bypass valves (FCV1-4, FCV1-11, FCV1-22, FCV1-29, FCV1-147, FCV1-148, FCV1-149, FCV1-150).

21. Requires closure of main steam dump valves AND main turbine trip and throttle valve AND main feedwater pump turbine trip and throttle valves.

22. Requires closure of a feedwater isolation valve (FCV3-33, FCV3-47, FCV3-87, FCV3-100) OR closure of a feedwater control and bypass valve pair in each feed line (FCV3-35 AND FCV3-35A, FCV3-48, AND FCV3-48A, FCV3-90 AND FCV3-90A, FCV3-103 AND FCV3-103A).

23. Requires trip of main feedwater pump turbine.

24. Requires closure of one valve in each blowdown line (FCV1-7 OR FCV1-181) AND (FCV1-14 OR FCV1-182) AND (FCV1-25 OR FCV1-183) AND (FCV1-32 OR FCV1-184).

25. Self actuating, short-term control.

26. Long-term control, requires operability of any two relief valves (PCV1-5, PCV1-12, PCV1-23, PCV1-30 manual control acceptable) AND pressure instrumentation for same two steam generators.

27. Requires opening of two main steam isolation OR isolation bypass valves AND control of main steam dump valves AND condenser circulating water.

28. Manual control requires RCS wide range temperature and pressure instrumentation.

29. Requires reactor shutdown by driving in control rods OR manual scram signal OR manual opening of scram breakers OR de-energizing of rod drive motor generator.

30. Requires opening FCV74-1 AND FCV74-2. Handwheel operation is acceptable.

31. Requires RHR pump operability (temporary cables are acceptable) AND CCS water to RHR heat exchanger (handwheel operation of A train valve FCV70-156 or B train valve FCV70-153 is acceptable) AND CCS water to RHR pump seal cooler AND RHR pump room cooling (portable blower is acceptable).

32. Flow path requires opening an inlet valve (EITHER FCV63-25 OR FCV63-26) AND an outlet valve (EITHER FCV63-39 OR FCV63-40) for the boron injection tank. Handwheel operation is acceptable.

33. Requires (water to charging pump via Volume Control Tank Suction* (key 4) or RWST Suction* (key 5)) AND (CVCS Centrifugal Charging Pump* (key 1) OR (Positive Displacement Charging Pump* (key 3) AND Charging Flow Control Valve FCV 62-94*, (this valve may be manually opened by isolating and venting control air from its operator)).

TABLE 1-1

The following table summarizes the fire protection systems provided in the Sequoyah Nuclear Plant. The table covers only those areas where an unmitigated fire could affect a unit's ability to reach and maintain a safe cold shutdown condition.

Notes:

(1) Refer to the SK-1000 series of compartmentation drawings for location of the tabulated areas.

(2) The compartmentation fire rating column identifies the rating of the most limiting component in the compartmentation boundary. Refer to the response to question 3 for additional compartmentation information.

(3) Refer to the response to question 12 for a discussion of the fire retardant coating of exposed cable trays.

(4) Legend:

I - Ionization smoke detector
IR - Infrared flame detector
LT - Linear thermistor
PE - Photoelectric smoke detector
RC - Rate compensated thermal detector
T - Fixed temperature thermal detector

LOCATION						FIRE PROTECTION						
						AUTO						
BUILDING	ELEV.	ROOM NO.	ROOM NAME	COMPARTMENT FIRE RATING	FIRE RETARDANT COATING OF EXPOSED CABLES	PREACTION SPRINKLER SYSTEM	OPEN NOZZLE SPRAY SYSTEM	CARBON DIOXIDE SYSTEM	STANDPIPE SYSTEM	PORTABLE EXTINGUISHERS	YARD HYDRANTS	TYPE OF FIRE DETECTORS
CONTRO_	669.0	C1	MECHANICAL EQUIPMENT	1-1/2 HR.		X			X	X		I, RC
		C2	MECHANICAL EQUIPMENT	1-1/2 HR.		X			X	X		I, RC
		C3	250V BATTERY RM NO. 1	1-1/2 HR.		X			X	X		I, RC
		C4	250V BATTERY BOARD RM NO. 1	1-1/2 HR.					X	X		I
		C5	250V BATTERY BOARD RM NO. 2	1-1/2 HR.					X	X		I
		C6	250V BATTERY RM NO. 2	1-1/2 HR.		X			X	X		I, RC
		C7	24V & 48V BATTERY RM	1-1/2 HR.		X			X	X		I, RC
		C8	24V & 48V BAT. BD. & CHARGER RM	1-1/2 HR.					X	X		I
		C9	COMMUNICATIONS RM	1-1/2 HR		X			X	X		I
		C10	MECHANICAL EQUIPMENT	1-1/2 HR.					X	X		I, RC
		C11	CORRIDOR	1-1/2 HR.		X			X	X		I
		C12	SECONDARY ALARM STATION	1-1/2 HR.		X			X	X		I
		C1	STAIR	1-1/2 HR.					X	X		
		C2	STAIR	1-1/2 HR.					X	X		
	685.0	C1	UNIT 1 AUX. INSTRUMENT RM	1-1/2 HR.	X			X	X	X		I, RC
		C2	CORRIDOR	1-1/2 HR.					X	X		I
		C3	COMPUTER RM	1-1/2 HR.	X			X	X	X		I, RC
		C4	UNIT 2 AUX. INSTRUMENT RM	1-1/2 HR.	X			X	X	X		I, PC
		C1	STAIR	1-1/2 HR.					X	X		
		C2	STAIR	1-1/2 HR.					X	X		
	706.0	C1	CHART STORAGE	1-1/2 HR. *		X		X	X	X		I
		C2	SPREADING RM	1-1/2 HR. *	X	X		X	X	X		I
		C1	STAIR	1-1/2 HR.					X	X		
		C2	STAIR	1-1/2 HR.					X	X		

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*3 hour separation maintained between fire area containing chart storage and spreading room and other plant areas.

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LOCATION						FIRE PROTECTION						
						FIXED						
BUILDING	ELEV.	LOCN NO.	ROOM NAME	COMPARTMENT FIRE RATING	FIRE RETARDANT COATING OF EXPOSED CABLES	PREACTION SPRINKLER SYSTEM	OPEN NOZZLE SPRAY SYSTEM	CARBON DIOXIDE SYSTEM	STANDPIPE SYSTEM	PORTABLE EXTINGUISHERS	YARD HYDRANTS	TYPE OF FIRE DETECTORS
CONTROL	732.0	C1	MECHANICAL EQUIPMENT RM	1-1/2 HR.		X	X***		X	X		I*
		C2	JANITOR'S CLOSET	1-1/2 HR.		X			X	X		I
		C3	CORRIDOR	1-1/2 HR.		X			X	X		I, RC
		C4	KITCHEN	1-1/2 HR.		X			X	X		RC
		C5	TOILET	1-1/2 HR.		X			X	X		I, RC
		C6	LOCKER RM	1-1/2 HR.		X			X	X		I, RC
		C7	SHOWER	1-1/2 HR.					X	X		
		C8	SHOWER	1-1/2 HR.					X	X		
		C9	INST. CALIB.	1-1/2 HR.		X			X	X		I, RC
		C10	SHIFT ENGR. OFFICE	1-1/2 HR.		X			X	X		I, RC
		C11	SHIFT ENGR. OFFICE	1-1/2 HR.		X			X	X		I, RC
		C12	MAIN CONTROL RM.	1-1/2 HR.					X	X		I**
		C13	RELAY RM	1-1/2 HR.					X	X		I
		C14	RECORD STORAGE	1-1/2 HR.		X			X	X		I, RC

*LOCATED IN FILTER DUCTWORK AND GENERAL AREA.
**LOCATED IN CABINETS AND GENERAL AREA
***CLOSED HEAD SPRAY IN CHARCOAL FILTERS.

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LOCATION						FIRE PROTECTION						
BUILDING	ELEV.	ROOM NO.	ROOM NAME	COMPARTMENT FIRE RATING	FIRE RETARDANT COATING OF EXPOSED CABLES	PREACTION SPRINKLER SYSTEM	OPEN NOZZLE SPRAY SYSTEM	CARBON DIOXIDE SYSTEM	STANDPIPE SYSTEM	PORTABLE EXTINGUISHERS	YARD HYDRANTS	TYPE OF FIRE DETECTORS
CONTROL	732.0	C15	CORRIDOR	1-1/2 HR.					X	X		I
		C16	P.S.O. ENGR. SHOP	1-1/2 HR.		X			X	X		I, RC
		C1	STAIR	1-1/2 HR.					X	X		
		C2	STAIR	1-1/2 HR.					X	X		

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POOR ORIGINAL

LOCATION						FIRE PROTECTION SYSTEM						
BUILDING	ELEV.	ROOM NO.	ROOM NAME	COMPARTMENT FIRE RATING	FIRE RETARDANT COATING OF EXPOSED CABLES	PREACTION SPRINKLER SYSTEM	OPEN NOZZLE SPRAY SYSTEM	CARBON DIOXIDE SYSTEM	STANDPIPE SYSTEM	PORTABLE EXTINGUISHERS	YARD HYDRANTS	TYPE OF FIRE DETECTORS
AUXILIARY	651.0	A1	WASTE HOLDUP TANK						X	X		
		A2	WASTE EVAP FEED PUMP						X	X		
	653.0	A1	CORRIDOR						X	X		I
		A2	HOLDUP TANK ROOM A	1-1/2 HR.					X	X		
		A3	HOLDUP TANK ROOM B	1-1/2 HR.					X	X		
		A4	FLOOR DRAIN COLL PUMP & FILTER ROOM						X	X		
		A4A	FLOOR DRAIN COLL TANK ROOM						X	X		
		A5	GAS STRIPPER FEED PUMP						X	X		I
		A6	SUMP PUMP ROOM						X	X		I
		A7	SUMP TANK ROOM						X	X		
		A8	CONTAINMENT SPRAY 1B-B	1-1/2 HR.					X	X		I
		A9	CONTAINMENT SPRAY PUMP 1A-A	1-1/2 HR.					X	X		I
		A10	RHR PUMP ROOM 1B-B	1-1/2 HR.					X	X		I
		A11	RHR PUMP ROOM 1A-A	1-1/2 HR.					X	X		I
		A12	RHR PUMP ROOM 2A-A	1-1/2 HR.					X	X		I
		A13	RHR PUMP ROOM 2B-B	1-1/2 HR.					X	X		I
		A14	CONTAINMENT SPRAY PUMP 2A-A	1-1/2 HR.					X	X		I
		A15	CONTAINMENT SPRAY PUMP 2B-B	1-1/2 HR.					X	X		I
		A16	PIPE GALLERY	1-1/2 HR.					X	X		
		A17	PIPE GALLERY	1-1/2 HR.					X	X		
	669.0	A1	CORRIDOR		X	X			X	X		I
		A2	VALVE GALLERY			X			X	X		
		A3	GAS DECAY ROOM						X	X		

85407

POOR ORIGINAL

LOCATION						FIRE PROTECTION						
BUILDING	ELEV.	ROOM NO.	ROOM NAME	COMPARTMENT FIRE RATING	FIRE RETARDANT COATING OF EXPOSED CABLES	PREACTION SPRINKLER SYSTEM	OPEN NOZZLE SPRAY SYSTEM	CARBON DIOXIDE SYSTEM	STANDPIPE SYSTEM	PORTABLE EXTINGUISHERS	YARD HYDRANTS	TYPE OF FIRE DETECTORS
AUXILIARY	669.0	A4	CHEMICAL DRAIN TANK ROOM			X			X	X		
		A5	GAS DECAY ROOM						X	X		
		A6	AUX FEEDWATER PUMP 1A-A	1-1/2 HR.		X			X	X		I, RC
		A7	PIPE GALLERY	1-1/2 HR.		X			X	X		I
		A8	PIPE GALLERY & CHASE						X	X		
		A9	CHARGING PUMP 1A-A	1-1/2 HR.		X			X	X		I, RC
		A10	CHARGING PUMP 1B-B	1-1/2 HR.		X			X	X		I, RC
		A11	CHARGING PUMP 1C-C	1-1/2 HR.		X			X	X		I, RC
		A12	SAFETY INJECTION PUMP 1B-B	1-1/2 HR.		X			X	X		I, RC
		A13	SAFETY INJECTION PUMP 1A-A	1-1/2 HR.		X			X	X		I, RC
		A14	CASK DECONTN. COLL. TANK ROOM			X			X	X		I
		A15	SPENT RESIN TANK ROOM			X			X	X		I
		A16	VALVE GALLERY			X			X	X		
		A17	WASTE EVAP PACKAGE			X			X	X		I
		A18	AUX WASTE EVAP PACKAGE			X			X	X		I
		A19	SAFETY INJECTION PUMP 2A-A	1-1/2 HR.		X			X	X		I, RC
		A20	SAFETY INJECTION PUMP 2B-B	1-1/2 HR.		X			X	X		I, RC
		A21	CHARGING PUMP 2C-C	1-1/2 HR.		X			X	X		I, RC
		A22	CHARGING PUMP 2B-B	1-1/2 HR.		X			X	X		I, RC
		A23	CHARGING PUMP 2A-A	1-1/2 HR.		X			X	X		I, RC
		A24	PIPE GALLERY & CHASE						X	X		
		A25	PIPE GALLERY	1-1/2 HR.		X			X	X		I
		A26	AUX. FEEDWATER PUMP 2A-A	1-1/2 HR.		X			X	X		I, RC
		A27	CONCENTRATE FILTER						X	X		

85406

POOR ORIGINAL

LOCATION						FIRE PROTECTION						
						FLOOR			WALL			
BUILDING	ELEV.	ROOM NO.	ROOM NAME	COMPARTMENT FIRE RATING	FIRE RETARDANT COATING OF EXPOSED CABLES	PREACTION SPRINKLER SYSTEM	OPEN NOZZLE SPRAY SYSTEM	CARBON DIOXIDE SYSTEM	STANDPIPE SYSTEM	PORTABLE EXTINGUISHER	YARD HYDRANTS	TYPE OF FIRE DETECTORS
AUXILIARY	690.0	A1	CONTROL ROOM	1-1/2 HR.	X	X			X	X		I
		A2	AIR LOCK	****		X			X	X		I
		A3	TITRATION ROOM	****		X			X	X		I
		A4	RADIO CHEM LAB.	****		X			X	X		I
		A5	COUNTING ROOM	****		X			X	X		I
		A6	PIPE GALLERY UNIT 1	1-1/2 HR.		X	X*		X	X		I**, PE***
		A7	VOL CONTROL TANK ROOM	1-1/2 HR.		X			X	X		I
		A8	REACTOR BLDG. ACCESS ROOM	3-HR.					X	X		
		A9	VALVE GALLERY						X	X		
		A10	SEAL WATER HEAT EXCHANGER 1A						X	X		
		A11	HEAT EXCHANGERS 1B	1-1/2 HR.					X	X		
		A12	HEAT EXCHANGERS 1A	1-1/2 HR.					X	X		
		A13	SAMPLE ROOM I	1-1/2 HR.		X			X	X		I
		A14	SAMPLE ROOM II	1-1/2 HR.		X			X	X		I
		A15	HEAT EXCHANGERS 2A	1-1/2 HR.					X	X		
		A16	HEAT EXCHANGERS 2B	1-1/2 HR.					X	X		
		A17	SEAL WATER HEAT EXCHANGER 2A						X	X		
		A18	VALVE GALLERY						X	X		
		A19	PIPE GALLERY UNIT 2	1-1/2 HR.		X			X	X		I
		A20	VOL CONTROL TANK ROOM	1-1/2 HR.		X			X	X		I**, PE***
		A21	REACTOR BLDG. ACCESS RM.	3 HR.					X	X		

*IN CHARCOAL FILTERS
**LOCATED IN GENERAL AREA.
***LOCATED IN CHARCOAL FILTER DUCTS.
****LABORATORY COMPLEX SEPARATED FROM AUXILIARY BLDG BY A 3-HR. FIRE BARRIER.

85405

POOR ORIGINAL

LOCATION						FIRE PROTECTION						
						PLUS						
BUILDING	ELEV.	ROOM NO.	ROOM NAME	COMPARTMENT FIRE RATING	FIRE RETARDANT COATING OF EXPOSED CABLES	PREACTION SPRINKLER SYSTEM	OPEN NOZZLE SPRAY SYSTEM	CARBON DIOXIDE SYSTEM	STANDPIPE SYSTEM	PORTABLE EXTINGUISHERS	YARD HYDRANTS	TYPE OF FIRE DETECTORS
ARY	690.0	A22	VALVE GALLERY						X	X		
		A23	CVCS VALVE GALLERY						X	X		
		A23	CVCS VALVE GALLERY						X	X		
		A2	VALVE GALLERY						X	X		
		A25	WASTE GAS COMP B						X	X		
		A26	WASTE GAS COMP A						X	X		
		A27	DECONTAMINATION ROOM			X			X	X		I
		A28	PIPE CHASE	1-1/2 HR.					X	X		
		A29	PIPE CHASE	1-1/2 HR.					X	X		
		A30	AIR LOCK						X	X		
		A31	WASTE GAS ANALYZER ROOM						X	X		
	706.0	A1	MAIN STEAM VALVE ROOM						X	X		
		A2	MAIN STEAM VALVE ROOM						X	X		
		A3	WASTE PACKAGE AREA	1-1/2 HR.		X			X	X		I
		A4	WASTE PACKAGE AREA			X			X	X		I
		A5	CASK LOADING AREA	1-1/2 HR.		X			X	X		I
		A6	N_2 STORAGE AREA	1-1/2 HR.					X	X		I
	705.0	A7	CASK DECON ROOM						X	X		
	706.0	A8	FUEL TRANSFER VALVE ROOM			X			X	X		I
		A9	FUEL TRANSFER VALVE ROOM			X			X	X		I
		A10	MAIN STEAM VALVE ROOM						X	X		
		A11	MAIN STEAM VALVE ROOM						X	X		
		A12	STEAM VALVE INST. ROOM A						X	X		
		A13	STEAM VALVE INST. ROOM B						X	X		
		A14	UHI EQUIP	1-1/2 HR.	X				X	X		I
85404		A15	UHI EQUIP	1-1/2 HR.	X				X	X		I

POOR ORIGINAL

LOCATION						FIRE PROTECTION						
						FIXED			MANUAL			
BUILDING	ELEV.	ROOM NO.	ROOM NAME	COMPARTMENT FIRE RATING	FIRE RETARDANT COATING OF EXPOSED CABLES	PREACTION SPRINKLER SYSTEM	OPEN NOZZLE SPRAY SYSTEM	CARBON DIOXIDE SYSTEM	STANDPIPE SYSTEM	PORTABLE EXTINGUISHERS	YARD HYDRANTS	TYPE OF FIRE DETECTORS
AUXILIARY	714.0	A1	COMMON AREA	1-1/2 HR.	X	X			X	X		I
		A2	HOT INSTRUMENT SHOP	1-1/2 HR.		X			X	X		I
		A3	HGT. & VENT ROOM	1-1/2 HR.	X	X			X	X		I
		A4	AIR LOCK						X	X		
		A5	VENT. & PURGE AIR ROOM	1-1/2 HR.	X	X	X*		X	X		I, PE***
		A6	AIR LOCK						X	X		
		A7	LETDOWN HEAT EXCHANGER						X	X		
		A8	LETDOWN HEAT EXCHANGER						X	X		
		A9	VENT. & PURGE AIR ROOM	1-1/2 HR.	X	X	X*		X	X		I, PE***
		A10	AIR LOCK						X	X		
		A11	AIR LOCK						X	X		
		A12	HTG. & VENT ROOM	1-1/2 HR.		X			X	X		I
		A13	AIR LOCK						X	X		
		A14	AIR LOCK						X	X		
		A15	FUEL DETECTOR ROOM			X			X	X		I
		A16	FUEL DETECTOR ROOM			X			X	X		I

*CLOSED NOZZLE SPRAY SYSTEM LOCATED IN CHARCOAL FILTERS
**LOCATED IN CHARCOAL FILTER DUCTS AND GENERAL AREA.
***LOCATED IN CHARCOAL FILTER DUCTS.

85402

POOR ORIGINAL

LOCATION						FIRE PROTECTION						
BUILDING	ELEV.	ROOM NO.	ROOM NAME	COMPARTMENT FIRE RATING	FIRE RETARDANT COATING OF EXPOSED CABLES	PREACTION SPRINKLER SYSTEM	OPEN NOZZLE SPRAY SYSTEM	CARBON DIOXIDE SYSTEM	STANDPIPE SYSTEM	PORTABLE EXTINGUISHERS	YARD HYDRANTS	TYPE OF FIRE DETECTORS
AUXILIARY	734.0	A1	AUXILIARY CONTROL ROOM	1-1/2 HR.	X	X			X	X		I
		A2	6.9 KV SHUTDOWN BD. ROOM A	1-1/2 HR.	X	X			X	X		I
		A3	125V VITAL BATT. BD. RM II	1-1/2 HR.	X	X****			X	X		I
		A4	125V VITAL BATT. BD. RM I	1-1/2 HR.	X	X****			X	X		I
		A5	480V SHUTDOWN BD. ROOM 1B2	1-1/2 HR.	X	X			X	X		I
		A6	480V SHUTDOWN BD. ROOM 1B1	1-1/2 HR.	X	X			X	X		I
		A7	480V SHUTDOWN BD. ROOM 1A1	1-1/2 HR.	X	X			X	X		I
		A8	480V SHUTDOWN BD. ROOM 1A2	1-1/2 HR.	X	X			X	X		I
		A9	PERSONNEL & EQUIP ACCESS	1-1/2 HR.	X	X			X	X		I
		A10	STEAM GEN. BLOWDOWN	1-1/2 HR.	X	X			X	X		I
		A11	REACTOR BLDG. EQUIP HATCH	3 HR.		X			X	X		I
		A12	REACTOR BLDG. ACCESS RM.	1-1/2 HR.	X	X			X	X		I
		A13	REFUELING ROOM	1-1/2 HR.					X	X		I
		A14	REACTOR BLDG. ACCESS RM.	1-1/2 HR.	X	X			X	X		I
		A15	REACTOR BLDG. EQUIP. HATCH	3 HR.		X			X	X		I
		A16	EMERGENCY GAS TREATMENT FILTER	1-1/2 HR.	X	X	X*		X	X		I**, PE***
		A17	PERSONNEL & EQUIP. ACCESS	1-1/2 HR.	X	X			X	X		I
		A18	480V SHUTDOWN BD. ROOM 2B2	1-1/2 HR.	X	X			X	X		I
		A19	480V SHUTDOWN BD. ROOM 2B1	1-1/2 HR.	X	X			X	X		I
		A20	480V SHUTDOWN BD. ROOM 2A1	1-1/2 HR.	X	X			X	X		I
		A21	480V SHUTDOWN BD. ROOM 2A2	1-1/2 HR.	X	X			X	X		I

*CLOSED NOZZLE SPRAY IN FILTER
**LOCATED IN FILTER DUCTS AND GENERAL AREA
***LOCATED IN FILTER UNIT
****MANUAL ACTUATION

501386

POOR ORIGINAL

LOCATION						FIRE PROTECTION						
						FIXED			MANUAL			
BUILDING	ELEV.	COMP. NO.	ROOM NAME	COMPARTMENT FIRE RATING	FIRE RETARDANT COATING OF EXPOSED CABLES	PREACTION SPRINKLER SYSTEM	OPEN NOZZLE SPRAY SYSTEM	CARBON DIOXIDE SYSTEM	STANDPIPE SYSTEM	PORTABLE EXTINGUISHERS	YARD HYDRANTS	TYPE OF FIRE DETECTORS
AUXILIARY	734.0	A22	125V VITAL BATT BD. ROOM IV	1-1/2 HR.	X	X*			X	X		I
		A23	125V VITAL BATT BD. ROOM III	1-1/2 HR.	X	X*			X	X		I
		A24	6.9 KV SHUTDOWN BD. RM B	1-1/2 HR.	X	X			X	X		I
		A25	AUX CONTROL INST. RM 1A	1-1/2 HR.	X	X			X	X		I
		A26	AUX CONTROL INST. RM 1B	1-1/2 HR.	X	X			X	X		I
		A27	AUX CONTROL INST. RM 2A	1-1/2 HR.	X	X			X	X		I
		A28	AUX. CONTROL INST. RM 2B	1-1/2 HR.	X	X			X	X		I
	749.0	A1	480V BOARD RM. 1A	1-1/2 HR.	X	X			X	X		I
		A2	480V BOARD RM. 1B	1-1/2 HR.	X	X			X	X		I
		A3	125V VITAL BATT. RM II	1-1/2 HR.		X*			X	X		I
		A4	125V VITAL BATT. RM. I	1-1/2 HR.		X*			X	X		I
		A6	480V TRANSFORMER RM 1B	1-1/2 HR.	X	X			X	X		I
		A7	480V TRANSFORMER RM 1A	1-1/2 HR.	X	X			X	X		I
		A8	MECH. EQUIPMENT RM.	1-1/2 HR.	X	X			X	X		I
		A8A	HEPA FILTER PLENUM RM.	1-1/2 HR.		X			X	X		I
		A9	MECH. EQUIPMENT ROOM	1-1/2 HR.	X	X			X	X		I
		A9A	HEPA FILTER PLENUM RM.	1-1/2 HR.	X	X			X	X		I
		A10	480V TRANSFORMER RM. 2B	1-1/2 HR.	X	X			X	X		I
		A11	480V TRANSFORMER RM. 2A	1-1/2 HR.	X	X			X	X		I
		A13	125V VITAL BATT. RM. IV	1-1/2 HR.		X*			X	X		I
		A14	125V VITAL BATT. RM. III	1-1/2 HR.		X*			X	X		I
		A15	480V BOARD RM. 2B	1-1/2 HR.	X	X			X	X		I

*MANUAL ACTUATION.

501383

POOR ORIGINAL

LOCATION						FIRE PROTECTION						
BUILDING	ELEV.	ROOM NO.	ROOM NAME	COMPARTMENT FIRE RATING	FIRE RETARDANT COATING OF EXPOSED CABLES	PREACTION SPRINKLER SYSTEM	OPEN NOZZLE SPRAY SYSTEM	CARBON DIOXIDE SYSTEM	STANDPIPE SYSTEM	PORTABLE EXTINGUISHERS	YARD HYDRANTS	TYPE OF FIRE DETECTORS
AUXILIARY	749.0	A16	480V BOARD RM. 2A	1-1/2 HR.	X	X			X	X		I
	759.0	A1	CONTROL ROD DRIVE EQUIP. RM.	1-1/2 HR.	X	X			X	X		I
		A2	PRESSURE HTR. TRANSF. ROOM 1	1-1/2 HR.	X	X			X	X		I
		A3	CONTROL ROD DRIVE EQUIP RM	1-1/2 HR.	X	X			X	X		I
		A4	PRESSURE HTR. TRANSF ROOM 2	1-1/2 HR.	X	X			X	X		I
	763.0	A1	FAN ROOM*						X	X		I
		A2	ROOF ACCESS AIR LOCK	3 HR.					X	X		
			*EXTENSION OF RM. 734.0-A13									

87038

POOR ORIGINAL

LOCATION						FIRE PROTECTION						
						FIXED			HOSE			
BUILDING	ELEV.	ROOM NO.	ROOM NAME	COMPARTMENT FIRE RATING	FIRE RETARDANT COATING OF EXPOSED CABLES	PREACTION SPRINKLER SYSTEM	OPEN NOZZLE SPRAY SYSTEM	CARBON DIOXIDE SYSTEM	STANDPIPE SYSTEM	PORTABLE EXTINGUISHERS	YARD HYDRANTS	TYPE OF FIRE DETECTORS
REACTOR			ANNULUS	*	X	**			X	X		PE
			PRIMARY CONTAINMENT EQUIPMENT WITHIN PRIMARY CONTAINMENT REQUIRING FIRE PROTECTION AND/OR DETECTION									
			LOWER COMPARTMENT COOLER A-A	*								PE
			LOWER COMPARTMENT COOLER B-B	*								PE
			LOWER COMPARTMENT COOLER C-A	*								PE
			LOWER COMPARTMENT COOLER D-B	*								PE
			UPPER COMPARTMENT COOLER UNIT A	*								PE
			UPPER COMPARTMENT COOLER UNIT B	*								PE
			UPPER COMPARTMENT COOLER UNIT C	*								PE
			UPPER COMPARTMENT COOLER UNIT D	*								PE
			REACTOR COOLANT PUMP NO. 1	*		X			X	X		RC, IR
			REACTOR COOLANT PUMP NO.	*		X			X	X		RC, IR
			REACTOR COOLANT PUMP NO. 3	*		X			X	X		RC, IR
			REACTOR COOLANT PUMP NO. 4	*		X			X	X		RC, IR
			CABLE TRAYS			**			X	X		

*THE REACTOR BUILDING IS RATED AS A 3-HOUR FIRE AREA, WITH NO INTERNAL FIRE CELLS CONSIDERED
**PREACTION SPRINKLER SYSTEM PROVIDED FOR DIVISIONAL CABLE TRAY INTERACTIONS ONLY

85417

POOR ORIGINAL

LOCATION						FIRE PROTECTION						
						FIXED			MANUAL			
BUILDING	ELEV.	ROOM NO.	ROOM NAME	COMPARTMENT FIRE RATING	FIRE RETARDANT COATING OF EXPOSED CABLES	PREACTION SPRINKLER SYSTEM	OPEN NOZZLE SPRAY SYSTEM	CARBON DIOXIDE SYSTEM	STANDPIPE SYSTEM	PORTABLE EXTINGUISHER	YARD HYDRANTS	TYPE OF FIRE DETECTORS
ADDITIONAL EQUIPMENT	706.5		STORAGE	*	X				X	X		I
	740.5		EQUIPMENT WITHIN THIS FLOOR ELEVATION REQUIRING FIRE PROTECTION AND/OR DETECTION									
		A1	UHI EQUIP RM	*					X	X		I
		A2	ICE BAN EQUIP RM	*					X	X		I
				*								
				*								
	752.25	A1	ICE MACHINE EQUIP. RM	*					X	X		I
	753.0	A1	ELEVATOR MACHINE RM	*					X	X		I
	763.5	A1	PACKAGE CHILLER EQUIP.	*					X	X		I

*THE ADDITIONAL EQUIPMENT BUILDING IS RATED AS A 3-HOUR FIRE AREA WITH NO INTERNAL FIRE CELLS CONSIDERED.

POOR ORIGINAL

LOCATION						FIRE PROTECTION						
BUILDING	ELEV.	ROOM NO.	ROOM NAME	COMPARTMENT FIRE RATING	FIRE RETARDANT COATING OF EXPOSED CABLES	PREACTION SPRINKLER SYSTEM	OPEN NOZZLE SPRAY SYSTEM	CARBON DIOXIDE SYSTEM	STANDPIPE SYSTEM	PORTABLE EXTINGUISHERS	YARD HYDRANTS	TYPE OF FIRE DETECTORS
DIESEL GEN.	722.0	1	CO_2 STORAGE RM.	1-1/2 HR.					X	X		
		2	LUBE OIL STORAGE RM.	3 HR.				X	X	X		RC
		3	TOILET						X	X		
		4	UNIT 1A-A	**				X	X	X		RC, I*
		5	UNIT 2A-A	**				X	X	X		RC, I*
		6	UNIT 1B-B	**				X	X	X		RC, I*
		7	UNIT 2B-B	**				X	X	X		RC, I*
		8	FUEL OIL TRANSFER RM.	1-1/2 HR.				X	X	X		RC
		9	PIPE GALLERY & CORRIDOR	1-1/2 HR.		X			X	X		RC
		D1	STAIR	3 HR.					X	X		
	740.5	1	CORRIDOR	3 HR.					X	X		
		2	RADIATION SHELTER RM.	1-1/2 HR.					X	X		
		3	AIR EXHAUST RM.	**					X	X		RC
		4	480V BOARD RM. 1A	**				X	X	X		I, RC
		5	AIR INTAKE RM.	**					X	X		RC
		6	AIR EXHAUST RM.	**					X	X		RC

*LOCATED IN ELECTRICAL PANELS

** THREE-HOUR FIRE RATED CONSTRUCTION HAS BEEN MAINTAINED BETWEEN REDUNDANT DIESEL GENERATOR UNITS.

85420

POOR ORIGINAL

LOCATION						FIRE PROTECTION						
						FIXED						
BUILDING	ELEV.	ROOM NO.	ROOM NAME	COMPARTMENT FIRE RATING	FIRE RETARDANT COATING OF EXPOSED CABLES	PREACTION SPRINKLER SYSTEM	OPEN NOZZLE SPRAY SYSTEM	CARBON DIOXIDE SYSTEM	STANDPIPE SYSTEM	PORTABLE EXTINGUISHERS	YARD HYDRANTS	TYPE OF FIRE DETECTORS
DIESEL GEN.	740.5	7	480V BOARD RM. 2A	**				X	X	X		I, RC
		8	AIR INTAKE RM.	**					X	X		RC
		9	AIR EXHAUST RM.	**					X	X		RC
		10	480V BOARD RM. 1B	**				X	X	X		I, RC
		11	AIR INTAKE RM.	**					X	X		RC
		12	AIR EXHAUST RM.	**					X	X		RC
		13	480V BOARD RM. 2B	**				X	X	X		I, RC
		14	AIR INTAKE RM.	**					X	X		RC
		D1	STAIR	3 HR.					X	X		

**THREE-HOUR FIRE RATED CONSTRUCTION HAS BEEN MAINTAINED BETWEEN REDUNDANT DIESEL GENERATOR UNITS.

85419

POOR ORIGINAL

LOCATION						FIRE PROTECTION						
BUILDING	ELEV.	ROOM NO.	ROOM NAME	COMPARTMENT FIRE RATING	FIRE RETARDANT COATING OF EXPOSED CABLES	PREACTION SPRINKLER SYSTEM	OPEN NOZZLE SPRAY SYSTEM	CARBON DIOXIDE SYSTEM	STANDPIPE SYSTEM	PORTABLE EXTINGUISHERS	YARD HYDRANTS	TYPE OF FIRE DETECTORS
ERCW PUMPING STATION	625.0	-	ENTIRE ELEVATION	3 HR.					X	X		
	688.0	-	MECHANICAL EQUIP. RM 1A	*					X	X		
		-	MECHANICAL EQUIP. RM 2A	*					X	X		
		-	MECHANICAL EQUIP. RM B	*					X	X		
	704.0	-	ELEC. EQUIP. RM 1A	*					X	X		I
		-	ELEC. EQUIP. RM 2A	*					X	X		I
		-	ELEC. EQUIP. RM B	*					X	X		I
	720.0	-	ENTIRE ELEVATION	*					X	X		RC**

*3-HOUR FIRE RATED CONSTRUCTION HAS BEEN MAINTAINED BETWEEN REDUNDANT EQUIPMENT.
**DETECTORS WITH HEAT COLLECTORS PROVIDED ABOVE EACH ERCW PUMP.

85415

POOR ORIGINAL

LOCATION						FIRE PROTECTION						
						WATER						
BUILDING	ELEV.	ROOM NO.	ROOM NAME	COMPARTMENT FIRE RATING	FIRE RETARDANT COATING OF EXPOSED CABLES	PREACTION SPRINKLER SYSTEM	OPEN NOZZLE SPRAY SYSTEM	CARBON DIOXIDE SYSTEM	STANDPIPE SYSTEM	PORTABLE EXTINGUISHERS	YARD HYDRANTS	TYPE OF FIRE DETECTORS
INTAKE PUMPING STATION	558.0	-	ENTIRE ELEVATION						X	X		
	580.5	-	ENTIRE ELEVATION						X	X		
	590.0	-	ENTIRE ELEVATION						X	X		Y
	705.0	-	ENTIRE ELEVATION	*					X	X		HC**

*3-HOUR COMPARTMENTATION PROVIDED FOR ERCW PUMP TRAINS.

**DETECTORS WITH HEAT COLLECTORS PROVIDED ABOVE EACH ERCW PUMP.

85416

POOR ORIGINAL

LOCATION						FIRE PROTECTION							
						FIXED			HOSE				
BUILDING	ELEV.	ROOM NO.	ROOM NAME	COMPARTMENT FIRE RATING	FIRE RETARDANT COATING OF EXPOSED CABLES	PREACTION SPRINKLER SYSTEM	OPEN NOZZLE SPRAY SYSTEM	CARBON DIOXIDE SYSTEM	STANDPIPE SYSTEM	PORTABLE EXTINGUISHERS	YARD HYDRANTS	TYPE OF FIRE DETECTORS
TURBINE	662.5		ENTIRE FLOOR	*					X	X		RC
			No. 7 HEATER DRAIN PUMPS	*					X	X		RC
			No. 3 HEATER DRAIN PUMPS	*					X	X		RC
			CONDENSATE BOOSTER PUMPS	*					X	X		RC
			HOTWELL PUMPS	*					X	X		RC
			CABLE INSULATION	*					X	X		RC
	685.0		ENTIRE FLOOR	*					X	X		RC
			CABLE INSULATION	*					X	X		RC
			ELEVATOR MACHINERY ROOM	1-1/2 HR.					X	X		RC
			PURIFICATION ROOM	1-1/2 HR.				X	X	X		RC
			DIRTY LUBE OIL TRANSFER PUMP	*					X	X		RC
			STATION AIR COMP.	*					X	X		RC
	690.0		ENTIRE FLOOR	*					X	X		RC
			FEEDWATER PUMP TURBINE	*			X		X	X		RC
	706.0		ENTIRE FLOOR	*					X	X		RC
			CABLE INSULATION	*					X	X		RC
			LUBE OIL DISPENSING ROOM	1-1/2 HR.			X		X	X		RC
			MAIN TURBINE LUBE OIL TANKS	*			X		X	X		RC
			TURBINE LUBE OIL COOLERS	*					X	X		RC
			ELECTRO-HYDRAULIC CONTROL PUMPS	*					X	X		RC
			MAIN OIL PUMPS AND PIPING	*					X	X		RC
			HYDROGEN SEAL OIL UNIT	*			X		X	X		RC
			*THE TURBINE BUILDING IS ONE FIRE AREA WITH 60 INTERNAL FIRE CELLS, EXCEPT THE LUBE OIL DISPENSING ROOM AND THE PURIFICATION ROOM.									

85412

POOR ORIGINAL

LOCATION						FIRE PROTECTION							
						FIXED							
BUILDING	ELEV.	ROOM NO.	ROOM NAME	COMPARTMENT FIRE RATING	FIRE RETARDANT COATING OF EXPOSED CABLES	PREACTION SPRINKLER SYSTEM	OPEN NOZZLE SPRAY SYSTEM	CARBON DIOXIDE SYSTEM	STANDPIPE SYSTEM	PORTABLE EXTINGUISHERS	YARD HYDRANTS	TYPE OF FIRE DETECTORS
TURBINE	732.0		ENTIRE FLOOR	*					X	X		RC
			TURBINE HEAD ENDS	*			X		X	X		RC
			AUXILIARY BOILER	*			X**		X	X		RC

*THE TURBINE BUILDING IS ONE FIRE AREA WITH NO INTERNAL FIRE CELLS, EXCEPT THE LUBE OIL DISPENSING ROOM AND THE PURIFICATION ROOM.

**CLOSED HEAD SPRAY SYSTEM OVER AUXILIARY BOILER.

85411

POOR ORIGINAL

TABLE 1.2

CIRCUITS TO BE RELOCATED FOR UNIT 1 OPERATION

Cable or Conduit No.	Function	Resolution
1PL4742B 1PL4743B	CCS Pump 1B-B Supply	Relocate conduit to provide minimum 20' separation from train A
2PL4742B 2PL4743B	CCS Pump 2B-B Supply	Relocate conduit to provide minimum 20' separation from train A
1PL4748B 2PL4748B	CCS Pump 1B-B Control CCS Pump 2B-B Control	Route in conduit from 480V S/D Brds. to pumps with 20' minimum separation from redundant train A circuits
1PL5025	Reciprocal Charging Pump Supply	Route in conduit from 480V S/D Brd. to pump with 20' minimum separation from redundant train A circuits
1PL5026	Reciprocal Charging Pump Control	Route in conduit from 480V S/D Brd. to pump with 20' minimum separation from redundant train A circuits
1PL3021 1PL3023	Reciprocal Charging Pump Room Cooler	Route in conduit from 480V vent Brd to Room Cooler with 20' minimum separation from redundant train A circuits
1PP800A 2PP800A	Pressurizer Heater Transformer Supplies	Route in conduit from cable trays AT-A and AS-A at elev 759.0 to elev 734.0 out of area containing train B circuits and back up to press. htrs. on elev 759.0.

TABLE 1.2 (Continued)

CIRCUITS TO BE RELOCATED FOR UNIT 2 OPERATION

Conduit No.	Function	Resolution
2PL5025	Reciprocal Charging Pump Supply	Route in conduit from 480V S/D Brd. to pump with 20' minimum separation from redundant train A circuits.
2PL5026	Reciprocal Charging Pump Control	Route in conduit from 480V S/D Brd. to pump with 20' minimum separation from redundant train A circuits.
2PL3021	Reciprocal Charging Pump Room Cooler	Route in conduit from 480V vent Brd. to Room Cooler with 20' minimum separation from redundant train A circuits.

TABLE 1.3

CIRCUITS TO BE PROTECTED BY A 1/2 HOUR FIRE RATED BARRIER

The following conduits for unit 1 operation shall be wrapped in a 1-inch-thick B&W Kaolwool Blanket in the auxiliary building, from the reactor building containment penetrations at auxiliary building EL 734.0 to the control building Q-line wall penetrations at auxiliary building EL 714.0. These conduits are protected by an automatic sprinkler system.

Conduit No.	Function
1PM1001I	Pressurizer level and pressure indication, loops 2 and 3 steam generator instrumentation
1PM1002II	
1PM1003III	
1PM1004IV	
1PM1068I	
1PM850II	
1PM1066III	
1PM1065III	
1PM2142III	
1PM1067I	
1PM2128I	
1PM2111II	
1PM851II	
1PM2145IV	
1PM2080I	
1PM2084I	
1PM2132I	
1PM2136I	
1PM2087II	
1PM2091II	
1PM2104II	
1PM2121II	
1PM2118II	
1PM2107II	
1PM2094III	
1PM2098III	
1PM2100IV	
1PM2103IV	
1PM2124IV	

TABLE 1.3 (Continued)

CIRCUITS TO BE PROTECTED BY A 1/2 HOUR FIRE RATED BARRIER

The following conduits for unit 2 operation shall be wrapped in a 1-inch-thick B&W Kao wool Blanket in the auxiliary building, from the reactor building containment penetrations at auxiliary building El 734.0 to the control building Q-line wall penetrations at auxiliary building El 714.0. These conduits are protected by an automatic sprinkler system.

Conduit No.	Function
2PM1001I	Pressurizer level and pressure indication, loops 2 and 3 steam generator instrumentation
2PM1002II	
2PM1003III	
2PM1004IV	
2PM2080I	
2PM2084I	
2PM2087II	
2PM2091II	
2PM2094III	
2PM2098III	
2PM2100IV	
2PM2103IV	
2PM2107II	
2PM2111II	
2PM2114II	
2PM2124IV	
2PM2128I	
2PM2136I	
2PM2142III	
2PM2145IV	

TABLE 1.4

CIRCUITS TO BE PROTECTED BY 1-1/2 HOUR FIRE RATED BARRIERS

The following conduits shall be enclosed by 1-1/2 hour fire rated barriers utilizing a UL-approved configuration from the junction box at UA1, auxiliary building EL 690.0 to UA6, auxiliary building EL 734.0, or to the point where the conduits transition to cable trays where 20-foot minimum separation between trains is achieved. These enclosures are protected by automatic sprinkler systems.

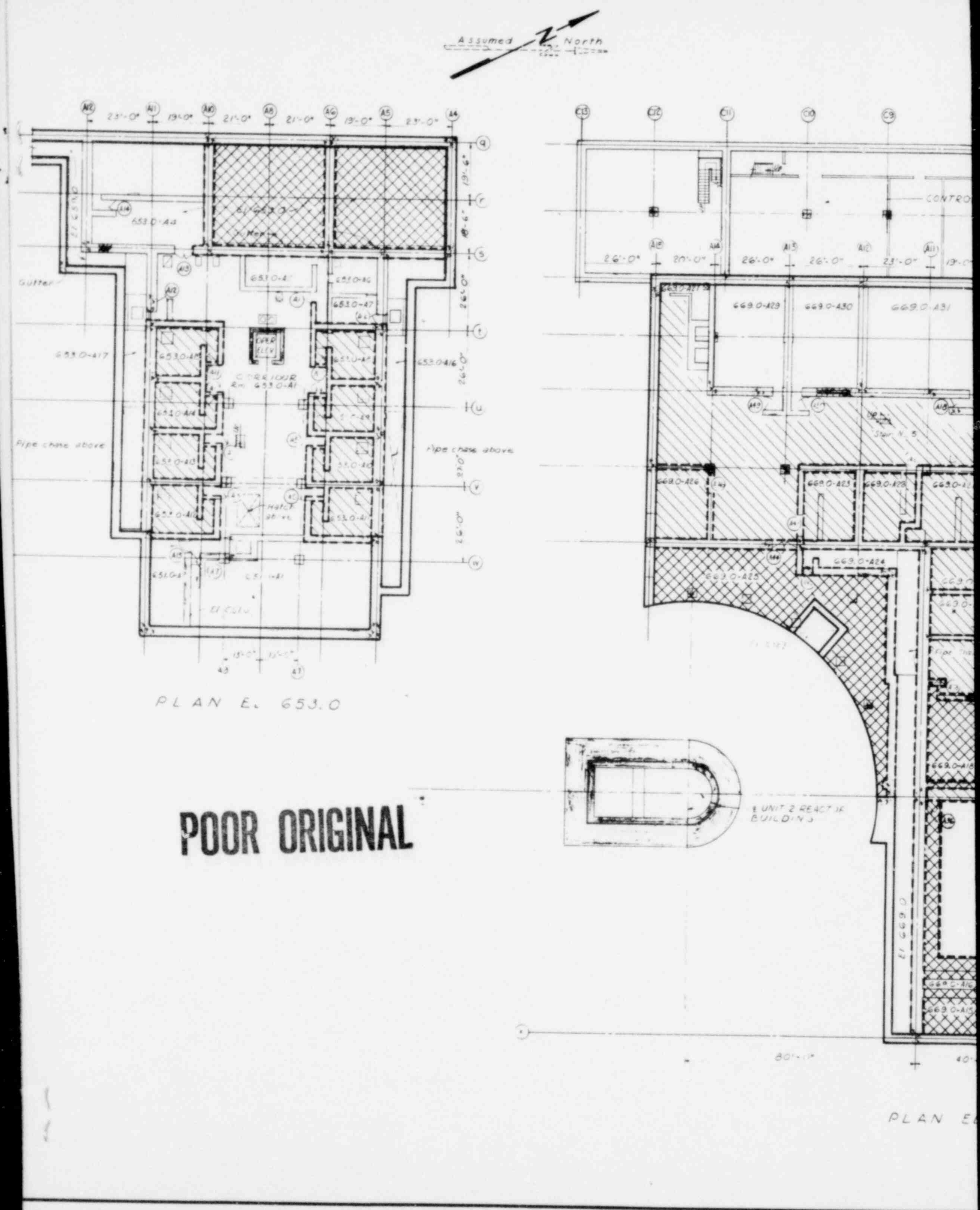
Conduit No.	Function
1PP780A	6900V Power Feed to ERCW 480V XFMR 1A-A
1PP785B	6900V Power Feed to ERCW 480V XFMR 1B-B
2PP780A	6900V Power Feed to ERCW 480V XFMR 2A-A
2PP785B	6900V Power Feed to ERCW 480V XFMR 2B-B
1PP712B	ERCW Pump N-B Supply
1PP700B	ERCW Pump C-B Supply
2PP700B	ERCW Pump M-B Supply
2PP712B	ERCW Pump F-B Supply
1PP675A	ERCW Pump A-A Supply
1PP687A	ERCW Pump Q-A Supply
2PP675A	ERCW K-A Supply
2PP687A	ERCW H-A Supply

TABLE 1.5

INTERACTIONS IDENTIFIED FOR COLD SHUTDOWN

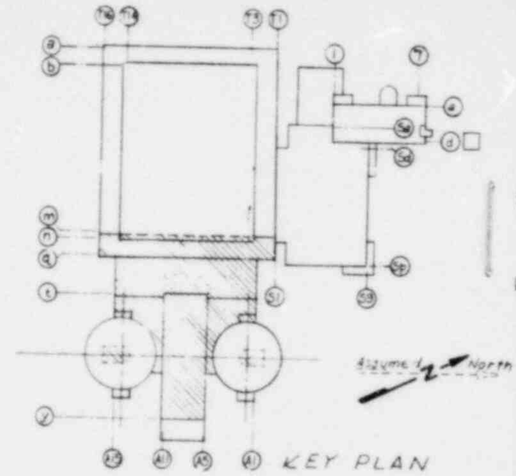
Interaction Location	Redundant Functions Lost	Cable Numbers	Fix Required in the Event of Fire Causing Loss of Redundancy
Col. S,A3 El. 669.0			*Provide portable blower for room cooling
	Power to both RHR pump room coolers	1PL3041B 1PL3031A	
	Automatic and local control to both RHR pump room coolers	1PL3043B 1PL3033B	
Col U,A7 El. 669.0	Power to both RHR pump room coolers	1PL3041B 1PL3031A	
	Automatic and local control to both RHR pump room coolers	1PL3043B 1PL3033A	
Col. Q-S, A3-A8			*Provide portable blower for room cooling
	Automatic and local control for both RHR pump room air coolers	1PL3043B 1PL3033A	

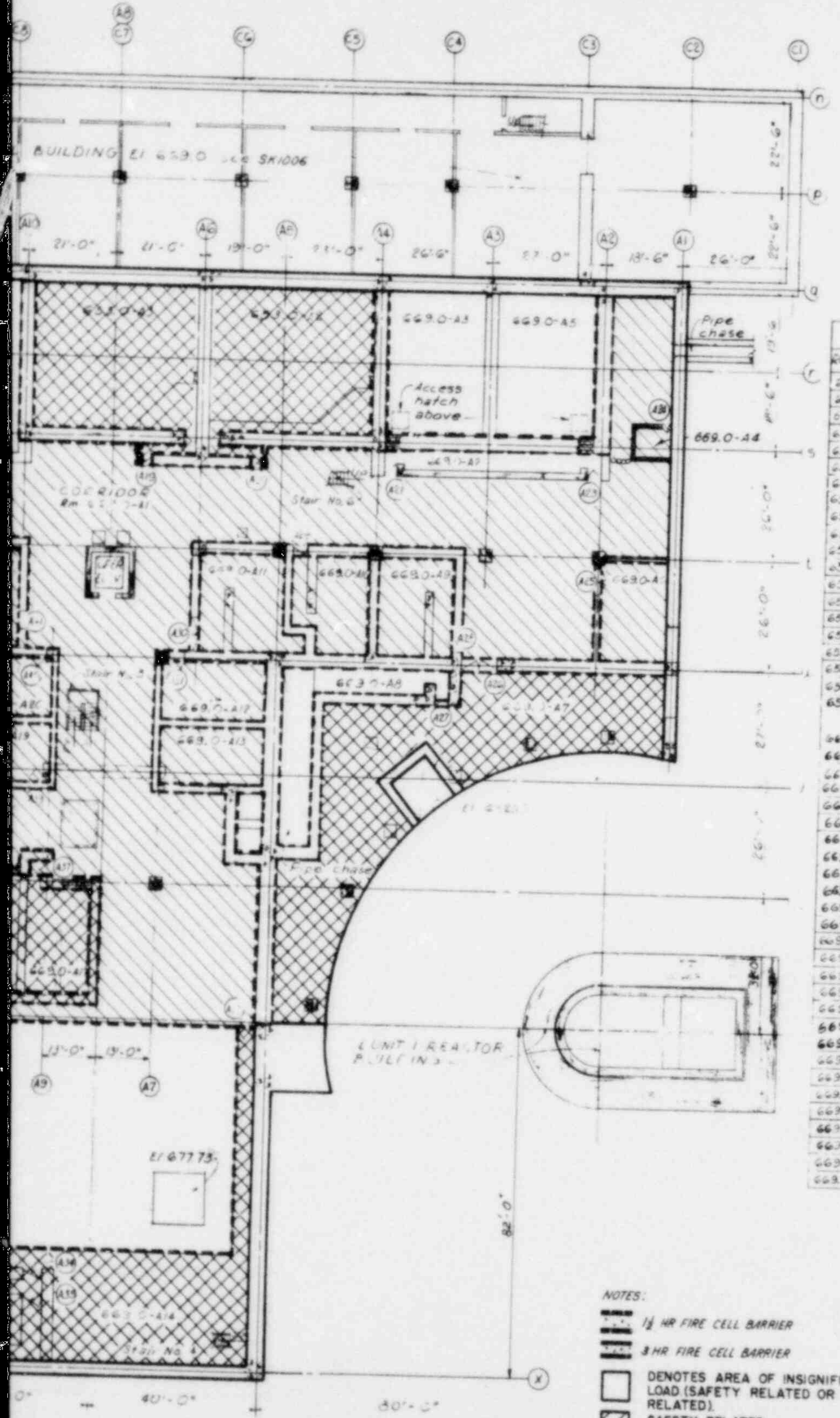
*Attachment A to Emergency Operating Instruction EOI 10 has been written to define procedures for providing and placing into operation a portable blower for room cooling.



POOR ORIGINAL

POOR ORIGINAL





ROOM FINISH SCHEDULE							
ROOM No	ROOM NAME	FLOOR	BASE	WALLS	SUSPD CLG FINISH	SUSPD CLG ELEV	REMARKS
651.0-A1	Waste Hold Up Tank	Conc	—	Conc	—	—	
651.0-A2	Waste Evap Feed Pump	Conc	—	Conc	—	—	
653.0-A1	Corridor	Conc	—	Conc	—	—	
653.0-A2	Hold-Up Tank Rm A	Conc	—	Conc	—	—	
653.0-A3	Hold Up Tank Rm A	Conc	—	Conc	—	—	
653.0-A4	Floor Drain Coll Pump & Filter Rm	Conc	—	Conc	—	—	
653.0-A4a	Floor Drain Coll Tank Room	Conc	—	Conc	—	—	
653.0-A5	Gas Stripper Feed Pump	Conc	—	Conc	—	—	
653.0-A6	Sump Pump Room	Conc	—	Conc	—	—	
653.0-A7	Sump Tank Room	Conc	—	Conc	—	—	
653.0-A8	Containment Spray Pump 1B-B	Conc	—	Conc	—	—	
653.0-A9	Containment Spray Pump 1A-A	Conc	—	Conc	—	—	
653.0-A10	RHR Pump Rm 1B-B	Conc	—	Conc	—	—	
653.0-A11	RHR Pump Rm 1A-A	Conc	—	Conc	—	—	
653.0-A12	RHR Pump Rm 2A-A	Conc	—	Conc	—	—	
653.0-A13	RHR Pump Rm 2B-B	Conc	—	Conc	—	—	
653.0-A14	Containment Spray Pump 2A-A	Conc	—	Conc	—	—	
653.0-A15	Containment Spray Pump 2B-B	Conc	—	Conc	—	—	
653.0-A16	Pipe Gallery	Conc	—	Conc	—	—	
653.0-A17	Pipe Gallery	Conc	—	Conc	—	—	
669.0-A1	Corridor	[illegible]	—	Conc	—	—	
669.0-A2	Valve Gallery	Conc	—	Conc	—	—	
669.0-A3	Gas Decay Tank Rm	[illegible]	—	[illegible]	—	—	
669.0-A4	Chemical Drain Tank Rm	[illegible]		[illegible]			
669.0-A5	Gas Decay Tank Rm	Conc	—	[illegible]	—	—	
669.0-A6	Aux Feedwater Pump 1A-A	[illegible]	—	Conc			
669.0-A7	Pipe Gallery	Conc	—	Conc			
669.0-A8	Pipe Gallery & Chase	Conc	—	Conc			
669.0-A9	Charging Pump 1A-A	Conc	—	Conc	—		
669.0-A10	Charging Pump 1B-B	Conc	—	Conc	—		
669.0-A11	Charging Pump 1C	Conc		Conc			
669.0-A12	Safety Injection Pump 1B-B	Conc		Conc			
669.0-A13	Safety Injection Pump 1A-A	Conc		Conc			
669.0-A14	Cask Decontn Coll Tk Rm	Conc		Conc			
669.0-A15	Spent Resin Tank Rm	Conc	—	Conc			
669.0-A16	Valve Gallery	Conc	—	Conc			
669.0-A17	Waste Evap Package	Conc		Conc			
669.0-A18	Aux Waste Evap Package	Conc	—	Conc			
669.0-A19	Safety Injection Pump 2A-A	Conc		Conc			
669.0-A20	Safety Injection Pump 2B-B	Conc		Conc			
669.0-A21	Charging Pump 2C	Conc		Conc			
669.0-A22	Charging Pump 2B-B	Conc		Conc			
669.0-A23	Charging Pump 2AA	Conc		Conc			
669.0-A24	Pipe Gallery & Chase	Conc	—	Conc			
669.0-A25	Pipe Gallery	Conc	—	Conc			
669.0-A26	Aux Feedwater Pump 2A-A	Conc	—	Conc			
669.0-A27	Concentrate Filter	Conc	—	Conc			

NOTES:

1½ HR FIRE CELL BARRIER

3 HR FIRE CELL BARRIER

DENOTES AREA OF INSIGNIFICANT FIRE LOAD (SAFETY RELATED OR NON SAFETY RELATED).

SAFETY RELATED.

NON SAFETY RELATED.

NOTE:

1. THIS DWG. IDENTIFIES THE COMPARTMENTATION OF FIRE CELLS ONLY.
2. FOR ARCHITECTURAL DRAWING DETAILS REFER TO 46W401-4.
3. THESE FIRE PROTECTION STUDY COMPARTMENTATION – FIRE CELL DRAWINGS ARE TO BE USED AS ENGINEERING AND COORDINATION STUDY DRAWINGS TO IMPLEMENT THE SEQUOYAH NUCLEAR PLANT SUPPLEMENTAL FIRE PROTECTION PROGRAM.
4. ALL PENETRATIONS (ELEC AND MECH) INCLUDING DOORS AND FIRE DOOR DMPRS THRU 3 HR RATED BARRIERS SHALL BE EQUIV. 3 HR RATED PENETRATIONS. ALL PENETRATIONS (ELEC AND MECH) INCLUDING DOORS AND DMPRS THRU 1½ HR RATED BARRIERS SHALL BE MINIMUM EQUIV 1½ HR RATED PENETRATIONS.

(COMPANION DWG - SK-1001 THRU SK-1010)

Scale 1/16" = 1'-0"

REV NO.	ECN NO.	DATE	DSGN	DRWN	CHKD	SUPV	ENGR	INSP	SUBMD	RECM	APPD
2	2121 BOUNDARIES UPDATED PER ECN		GRW	KLM	[illegible]						
1	31 REVISED NOTES	8-12-77	RD	RD	GRW	LF	[illegible]	—	[illegible]	[illegible]	

DSGN G.P. Wiseman
DRWN G.L. Calhoun
CHKD J.L. Fender
SUPV J.L. Fender
INSP R.W. Burnette
ENGINEER James J. [illegible]

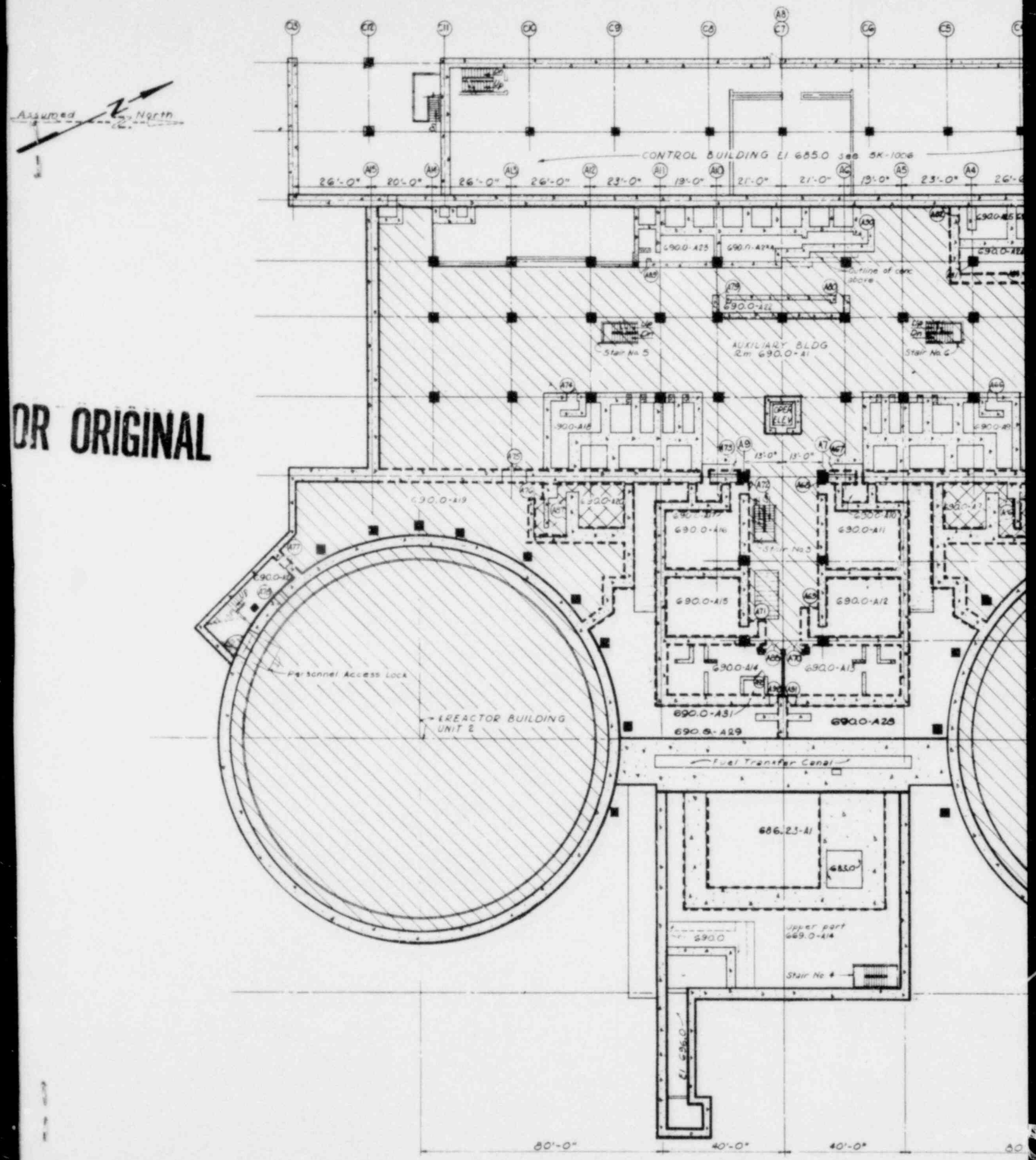
POWERHOUSE
AUXILIARY BLDG. UNITS 1 & 2
FIRE PROTECTION STUDY
COMPARTMENTATION - FIRE CELLS
PLAN EL. 653.0 & 669.0

SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

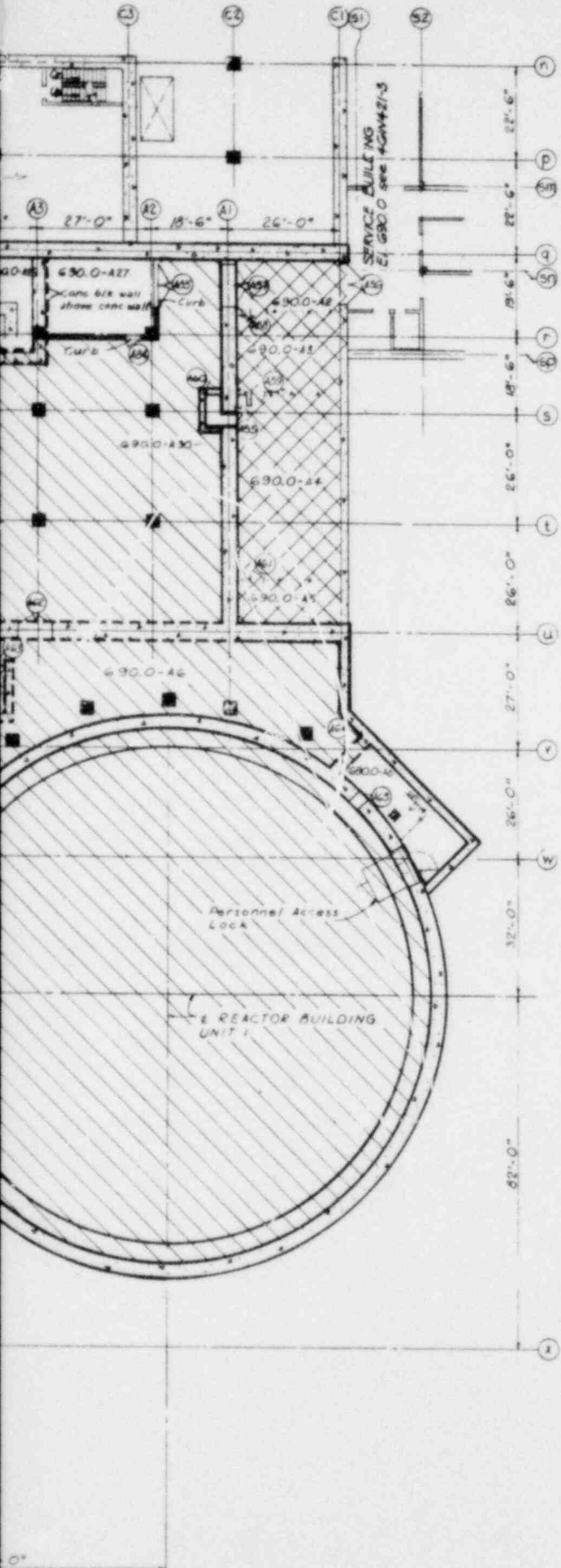
SUBMITTED J.J. Nash RECOMMENDED J.C. Key APPROVED R.M. [illegible]

KNOXVILLE 12-14-76 | 45 | M | SK-1001 R2

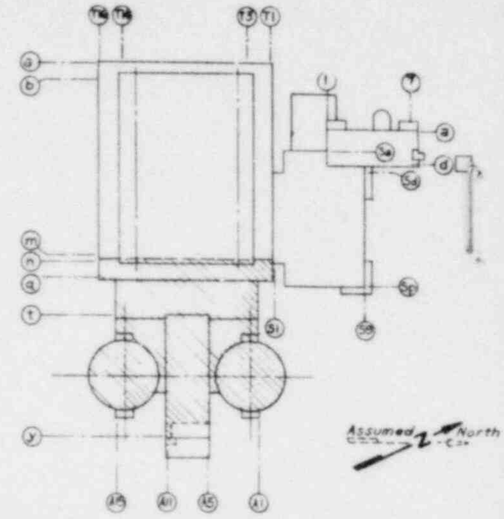
RECORD DRAWING AS CONSTRUCTED


Assumed North
CONTROL BUILDING El 685.0 see SK-1006
26'-0"
80'-0"
26'-0"
26'-0"
23'-0"
13'-0"
21'-0"
21'-0"
13'-0"
23'-0"
690.0-A23
690.0-A22
outline of conc above
690.0-A22
AUXILIARY BLDG
Rm 690.0-A1
Stair No 5
Stair No 6
690.0-A18
690.0-A19
690.0-A16
690.0-A11
Stair No 3
690.0-A15
690.0-A12
690.0-A14
690.0-A13
690.0-A31
690.0-A29
690.0-A28
Personnel Access Lock
REACTOR BUILDING
UNIT 2
Fuel Transfer Canal
686.23-A1
685.0
690.0
Upper part
669.0-A14
Stair No 4
El 636.0
80'-0"
40'-0"
40'-0"

OR ORIGINAL



POOR ORIGINAL



KEY PLAN

ROOM FINISH SCHEDULE							
ROOM No	ROOM NAME	FLOOR	BASE	WALLS	SUSPD CLG FINISH	SUSPD CLG ELEV	REMARKS
686.2&A1	Spent Fuel Pit	Conc	—	Conc	—	—	
690.0-A1	Auxiliary Building	Conc	—	Conc	—	—	
690.0-A2	Air Lock	Conc	—	Conc	—	—	
690.0-A3	Titration Room	Res tile	Vinyl tile	Conc	S.F. plas	699'-0"	46W452-3
690.0-A4	Radiochemical Lab	Res tile	Vinyl tile	Conc	S.F. plas	699'-0"	46W452-3
690.0-A5	Counting Room	Res tile	Vinyl tile	Conc	S.F. plas	698'-0"	46W452-3
690.0-A6	Pipe Gallery	Conc	—	Conc	—	—	
690.0-A7	Vol Control Tank Room	Conc	—	Conc	—	—	
690.0-A8	Reactor Bldg Access Rm	Conc	—	Conc	—	—	
690.0-A9	Valve Gallery	Conc	—	Conc	—	—	
690.0-A10	Seal Water Heat Exchgr 1A	Conc	—	[illegible]	—	—	
690.0-A11	Heat Exchangers 1B	Conc	—	Conc	—	—	
690.0-A12	Heat Exchangers 1A	Conc	—	Conc	—	—	
690.0-A13	Sample Room I	Conc	—	Conc & Conc Blk	—	—	46W405-19 & 46W452-6
690.0-A14	Sample Room II	Conc	—	Conc & Conc Blk	—	—	46W405-19 & 46W452-6
690.0-A15	Heat Exchangers 2A	Conc	—	Conc	—	—	
690.0-A16	Heat Exchangers 2B	Conc	—	Conc	—	—	
690.0-A17	Seal Water Heat Exchgr 2A	Conc	—	Conc	—	—	
690.0-A18	Valve Gallery	Conc	—	Conc	—	—	
690.0-A19	Pipe Gallery	Conc	—	Conc	—	—	
690.0-A20	Vol Control Tank Room	Conc	—	Conc	—	—	
690.0-A21	Reactor Bldg Access Rm	Conc	—	Conc	—	—	
690.0-A22	Valve Gallery	Conc	—	Conc	—	—	
690.0-A23 (A23A)	CVCS Valve Gallery	Conc	—	Conc	—	—	
690.0-A24	WDC Valve Gallery	Conc	—	Conc	—	—	
690.0-A25	Waste Gas Comp B	Conc	—	Conc	—	—	
690.0-A26	Waste Gas Comp A	Conc	—	Conc	—	—	
690.0-A27	Decontamination Rm	Conc	—	Conc & Conc Blk	—	—	46W405-9
690.0-A28	Pipe Chase	Conc	—	Conc	—	—	
690.0-A29	Pipe Chase	Conc	—	Conc	—	—	
690.0-A30	Air Lock	Conc	—	Conc	—	—	
690.0-A31	WASTE GAS ANALYZER RM	CONC	—	CONC	*STEEL	698'-6"	*STL DECK CLG (BY CIVIL [illegible]

NOTES:
1. FOR CEILING AND WALL FINISH SCHEDULE REFER TO 46W401-5
2. FOR ADDITIONAL NOTES SEE SHEET 1

REV NO	ECN NO. / DESCRIPTION	DATE	DSGN	DRWN	CHKD	SUPV	ENGR	INSP	SUBMD	RECM	APPD
2	2121 — BOUNDARIES UPDATED PER ECN										
1	5-1 — ESTABLISHED 3HR RATING ON A-1 WALL	12-19-78									

DSGN G.R. WISEMAN
DRWN C.E. GENTNER
CHKD J.L. FENDER
SUPV J.L. FENDER
INSP P.W. BURNETTE
ENGINEER [signature]

POWERHOUSE
AUXILIARY BLDG. UNITS 1&2

FIRE PROTECTION STUDY
COMPARTMENTATION - FIRE CELLS
PLAN EL. 685.0 & 690.0

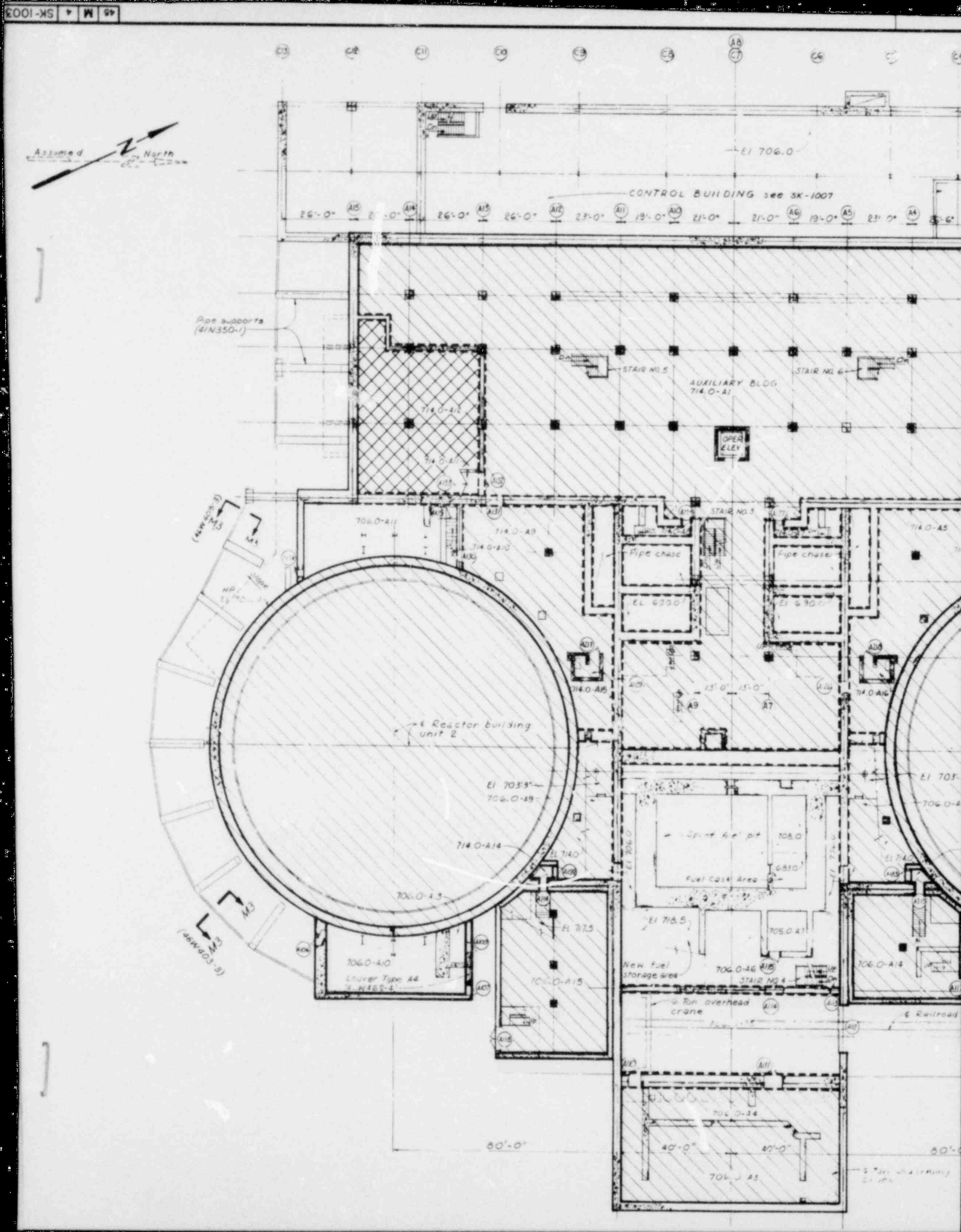
SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

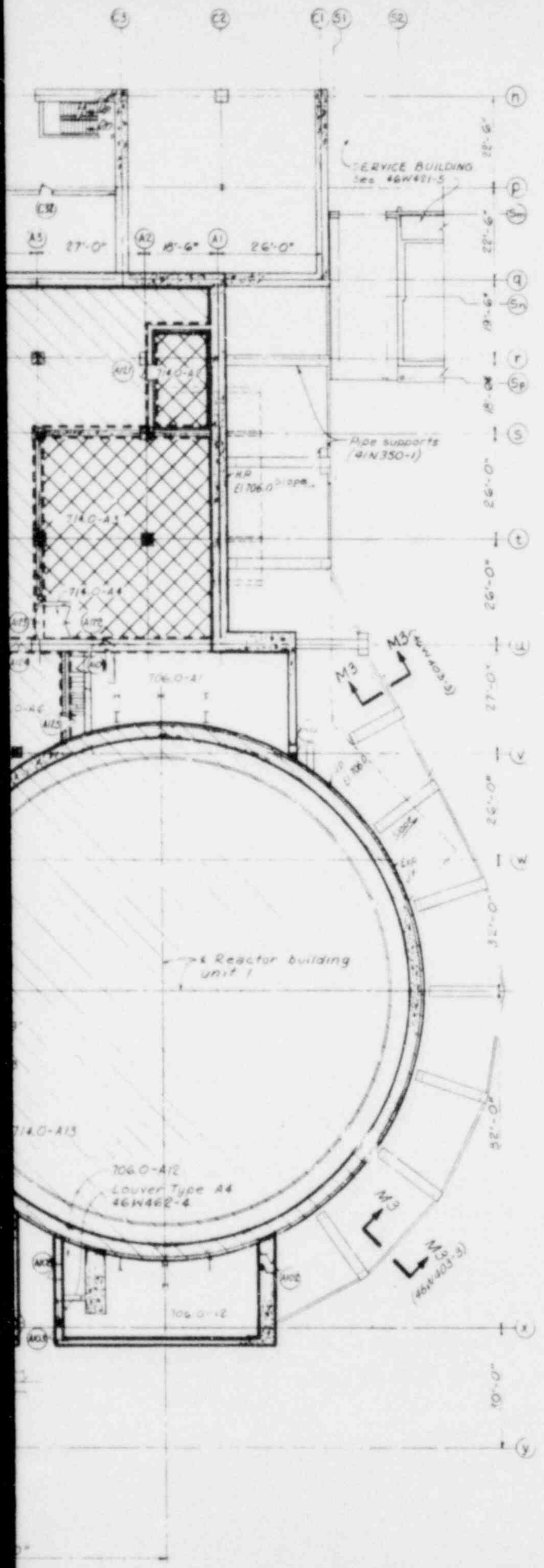
SUBMITTED [signature] RECOMMENDED [signature] APPROVED [signature]

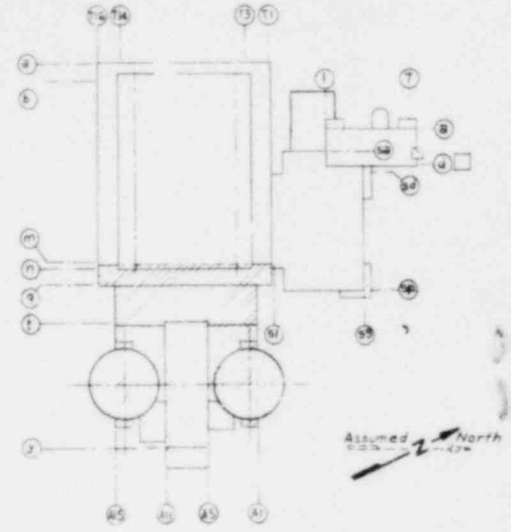
Scale: 1/16"=1'-0"

KNOXVILLE 2-14-76 | 45 | M | 4 | SK-1002 | R2

RECORD DRAWING AS CONSTRUCTED


SK-1003
Assumed North
CONTROL BUILDING see SK-1007
El 706.0
26'-0"
23'-0"
19'-0"
21'-0"
Pipe supports (41N350-1)
STAIR NO.5
STAIR NO.6
AUXILIARY BLDG 714.0-A1
OPER ELEV
714.0-A12
STAIR NO.3
706.0-A11
714.0-A9
714.0-A10
714.0-A5
Pipe chase
EL 690.0'
714.0-A15
714.0-A16
13'-0"
Reactor building unit 2
El 703'9"
706.0-A9
714.0-A14
El 714.0
Spent fuel pit
708.0
Fuel Cask Area
706.0-A3
El 718.5
El 717.5
706.0-A10
Louver Type A4
706.0-A15
New fuel storage area
706.0-A6
705.0 A7
STAIR NO.4
706.0-A14
6 Ton overhead crane
Railroad
80'-0"
40'-0"
706.0-A4
706.0 A3





KEY PLAN

ROOM FINISH SCHEDULE							
ROOM No	ROOM NAME	FLOOR	BASE	WALLS	SUSPD CLG FINISH	SUSPD CLG ELEV	REMARKS
706.0-A1	Main Steam Valve Room	Conc	—	Conc	—	—	
706.0-A2	Main Steam Valve Room	Conc	—	Conc	—	—	
706.0-A3	Waste Package area	Conc	—	Conc	—	—	
706.0-A4	Waste Package area	Conc	—	Conc	—	—	
706.0-A5	Cask Loading Area	Conc	—	Conc	—	—	
706.0-A6	N2 Storage Area	Conc	—	Conc	—	—	
705.0-A7	Cask Decon Rm	Conc	—	Conc	—	—	
706.0-A8	Fuel Transfer Valv Rm	Conc	—	Conc	—	—	
706.0-A9	Fuel Transfer Valve Rm	Conc	—	Conc	—	—	
706.0-A10	Main Steam Valv Room	Conc	—	Conc	—	—	
706.0-A11	Main Steam Valv Room	Conc	—	Conc	—	—	
706.0-A12	Steam Valve Instr Rm A	Conc	—	Conc	—	—	
706.0-A13	Steam Valve Instr Rm B	Conc	—	Conc	—	—	
706.0-A14	UHI Equip	Conc	—	Conc	—	—	
706.0-A15	UHI Equip	Conc	—	Conc			
714.0-A1	Auxiliary Building	Conc	—	Conc	—	—	
714.0-A2	Hot Instrument Shop	Res tile	Fac Tile	Fac Tile	# See note below		46W452-5
714.0-A	Htg & Vent	Conc	—	Conc	—	—	
714.0-A4	Air Lock	Conc	—	Conc	—	—	
714.0-A5	Ventilation & Purge Air	Conc	—	Conc	—	—	
714.0-A6	Air Lock	Conc	—	Conc & Conc blk	—	—	46W405-4
714.0-A7	Let Down Heat Exch	Conc	—	Conc	—	—	
714.0-A8	Let Down Heat Exch	Conc	—	Conc	—	—	
714.0-A9	Ventilation & Purge Air	Conc	—	Conc	—	—	
714.0-A10	Air Lock	Conc	—	Conc & Conc blk	—	—	45W405-4
714.0-A11	Air Lock	Conc	—	Conc	—	—	
714.0-A12	Heating & Vent	Conc	—	Conc	—	—	
714.0-A13	Air Lock	Conc		Conc			
714.0 A14	Air Lock	Conc		Conc			
714.0 A15	Fuel Detector Rm	Conc		Conc			
714.0 A16	Fuel Detector Rm	Conc	—	Conc	—	-	

Ceiling in Hot Instrument Shop to be sand finish plaster over metal lath on concrete ceiling.

NOTES
1. FOR CEILING AND WALL FINISH SCHEDULE REFER TO 46W401-6.
2. FOR ADDITIONAL NOTES SEE SHEET 1.

Scale 1/8" = 1'-0"

REV NO	ECN NO	DATE	DSGN	DRWN	CHKD	SUPV	ENGR	INSP	SUBMD	RECM	APPR
1		2121		GRW	BLM						
BOUNDARIES UPDATED PER ECN											

DSGN G.R. WISEMAN
DRWN G.L. KASTNER
CHKD J.L. LENDER
SUPV J.L. LENDER
INSP P.W. BURNETTE
ENGINEER James J. Nash

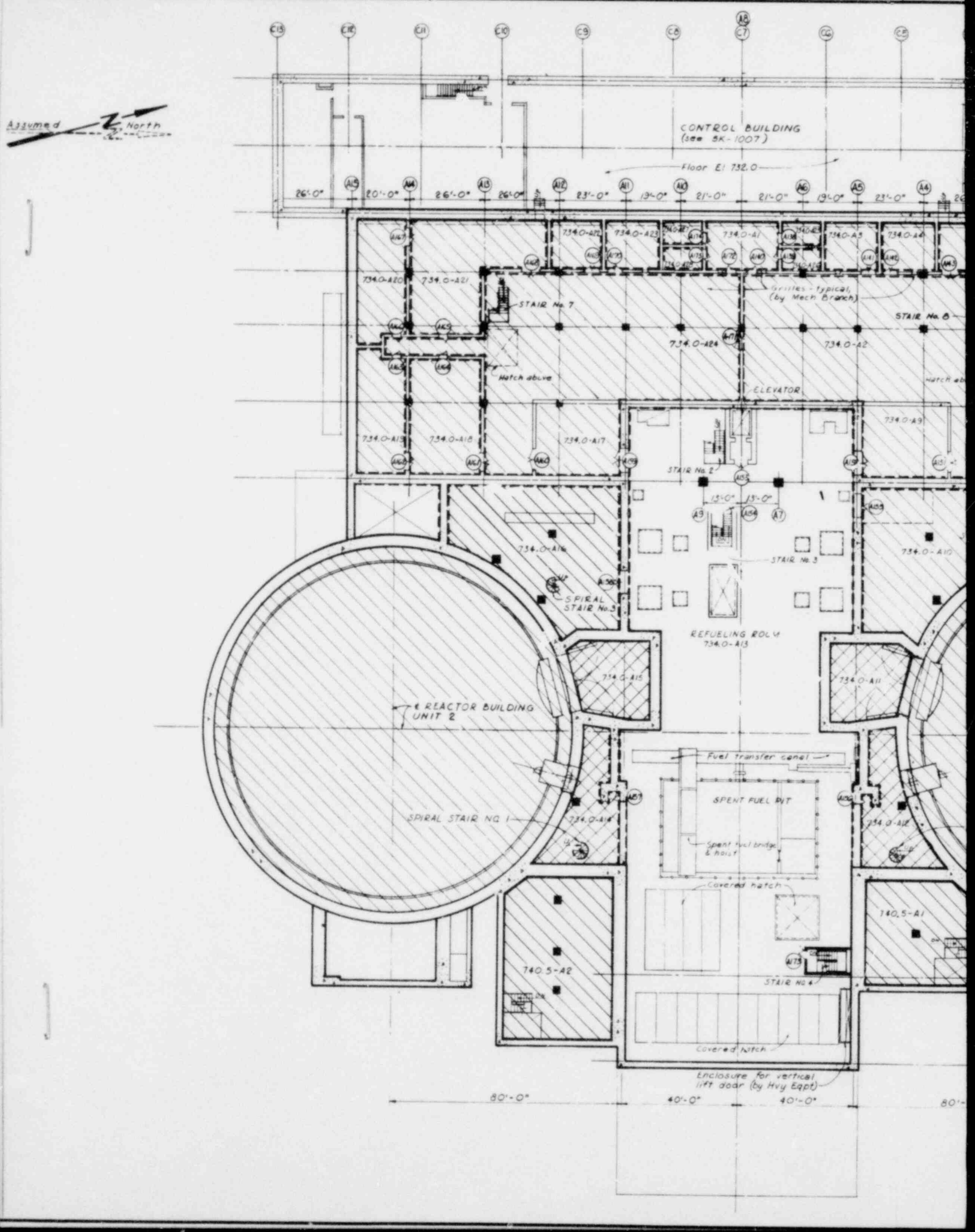
POWERHOUSE
AUXILIARY BLDG. UNITS 1 & 2

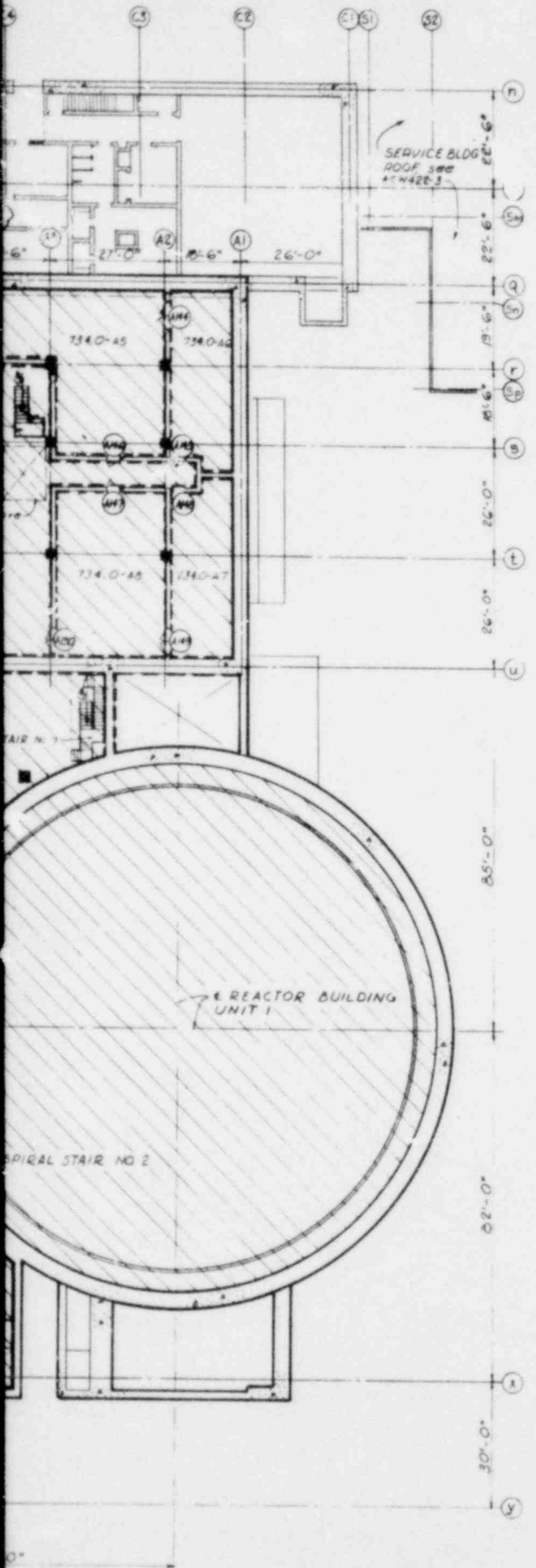
FIRE PROTECTION STUDY
COMPARTMENTATION - FIRE CELLS
PLAN EL. 706.0 & 714.0

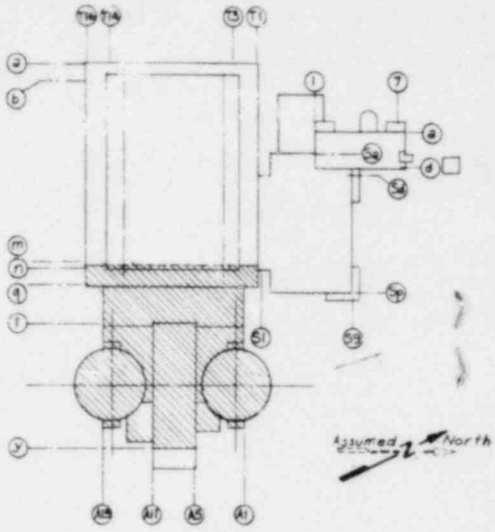
SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED	RECOMMENDED	APPROVED
J.J. Nash	J.C. Cy	R.M. Pierce

KNOXVILLE 12-14-76 45 M 4 SK-1003 R1


Assumed North
CONTROL BUILDING (see SK-1007)
Floor El 732.0
26'-0"
20'-0"
26'-0"
26'-0"
23'-0"
13'-0"
21'-0"
21'-0"
19'-0"
23'-0"
734.0-A20
734.0-A21
734.0-A22
734.0-A23
734.0-A1
734.0-A3
734.0-A4
734.0-A24
734.0-A2
734.0-A19
734.0-A18
734.0-A17
734.0-A9
734.0-A16
734.0-A10
734.0-A15
734.0-A11
734.0-A14
740.5-A1
740.5-A2
STAIR No. 7
STAIR No. 8
STAIR No. 2
STAIR No. 3
STAIR No. 4
SPIRAL STAIR No. 3
SPIRAL STAIR No. 1
ELEVATOR
Hatch above
Grilles - typical, (by Mech Branch)
REFUELING ROOM 734.0-A13
℄ REACTOR BUILDING UNIT 2
Fuel transfer canal
SPENT FUEL PIT
Spent fuel bridge & hoist
Covered hatch
Covered hatch
Enclosure for vertical lift door (by Hvy Eqpt)
80'-0"
40'-0"
40'-0"





KEY PLAN

ROOM FINISH SCHEDULE

ROOM No	ROOM NAME	FLOOR	BASE	WALLS	SUSPD CLG FINISH	SUSPD CLG ELEV	REMARKS
734.0-A1	Auxiliary Control Room	Conc	—	Conc & Conc blk	—	—	46W405-6
734.0-A2	6.9KV Shtdn Bd Rm A	Conc	—	Conc & Conc blk	—	—	46W405-6
734.0-A3	125V Vital Batt Bd Rm II	Conc	—	Conc & Conc blk	—	—	46W405-6
734.0-A4	125V Vital Batt Bd Rm I	Conc	—	Conc & Conc blk	—	—	46W405-6
734.0-A5	480V Shtdn Bd Rm 1B2	Conc	—	Conc & Conc blk	—	—	46W405-6
734.0-A6	480V Shtdn Bd Rm 1B1	Conc	—	Conc & Conc blk	—	—	46W405-6
734.0-A7	480V Shtdn Bd Rm 1A1	Conc	—	Conc & Conc blk	—	—	[illegible]405-6
734.0-A8	480V Shtdn Bd Rm 1A2	Conc	—	Conc & Conc blk	—	—	46W405-6
734.0-A9	Personnel & Equip Access	Conc	—	Conc	—	—	46W405-6
734.0-A10	Steam Gen Blowdown	Conc	—	Conc	—	—	
734.0-A11	Reactor Bldg Equip Hatch	Conc	—	Conc	—	—	
734.0-A12	Reactor Bldg Access Rm	Conc	—	Conc	—	—	
734.0-A13	Refueling Room	Conc	—	Conc	—	—	
734.0-A14	Reactor Bldg Access Rm	Conc	—	Conc	—	—	
734.0-A15	Reactor Bldg Equip Hatch	Conc	—	Conc	—	—	
734.0-A16	Emer Gas Treatment Filter	Conc	—	Conc	—	—	
734.0-A17	Personnel & Equip Access	Conc	—	Conc	—	—	46W405-5
734.0-A18	480V Shtdn Bd Rm 2B2	Conc	—	Conc & Conc blk	—	—	46W405-5
734.0-A19	480V Shtdn Bd Rm 2B1	Conc	—	Conc & Conc blk	—	—	46W405-5
734.0-A20	480V Shtdn Bd Rm 2A1	Conc	—	Conc & Conc blk	—	—	46W405-5
734.0-A21	480V Shtdn Bd Rm 2A2	Conc	—	Conc & Conc blk	—	—	46W405-5
734.0-A22	125V Vital Batt Bd Rm IV	Conc	—	Conc & Conc blk	—	—	46W405-5
734.0-A23	125V Vital Batt Bd Rm III	Conc	—	Conc & Conc blk	—	—	46W405-5
734.0-A24	6.9KV Shtdn Bd Rm B	Conc	—	Conc & Conc blk	—	—	46W405-5
734.0-A25	Aux Control Inst Rm 1A	Conc	—	Conc & Conc blk	—	—	46W405-6
734.0-A26	Aux Control Inst Rm 1B	Conc	—	Conc & Conc blk	—	—	46W405-6
734.0-A27	Aux Control Inst Rm 2A	Conc	—	Conc & Conc blk	—	—	46W405-5
734.0-A28	Aux Control Inst Rm 2B	Conc	—	Conc & Conc blk	—	—	46W405-5
742.5-A1	UHI Equipment Rm	Conc	—	Conc	—	—	
740.5-A2	Ice Bin Equipment Rm	Conc	—	Conc	—	—	

NOTES:

1. FOR CEILING AND WALL FINISH SCHEDULE REFER TO 46W402-2.
2. FOR ADDITIONAL NOTES SEE SHEET 1

Scale 1/8" = 1'-0"
Except as noted

REV NO	ECN NO	DATE							
2	2121								
	BOUNDARIES UPDATED PER ECN								
1	31	8-12-77							
	REVISED NON-SAFETY RELATED AREA								

DSGN G.B. WILLCMAN
DRWN V.E. DEAKE
CHKD J.L. FENDER
SUPV J.L. FENDER
INSP R.W. BURNETT Jr
ENGINEER James J. Neal

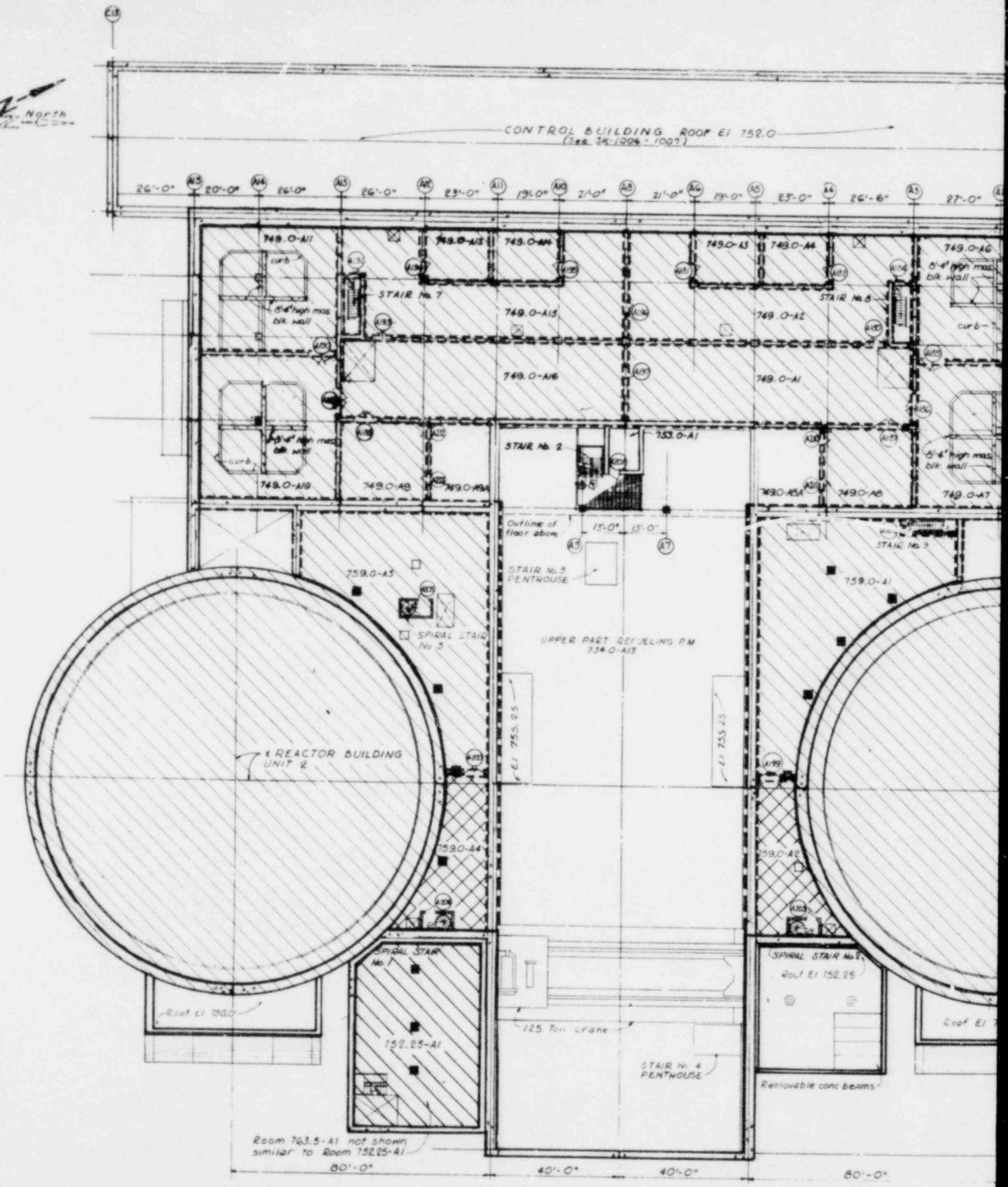
POWERHOUSE
AUXILIARY BLDG UNITS 1 & 2

FIRE PROTECTION STUDY
COMPARTMENTATION - FIRE CELLS
PLAN EL 732.0 & 734.0

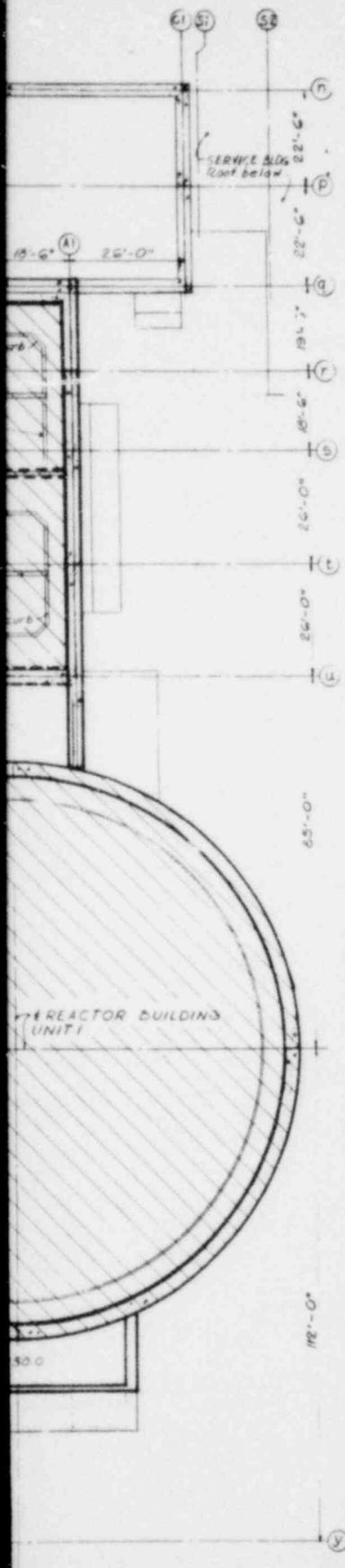
SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

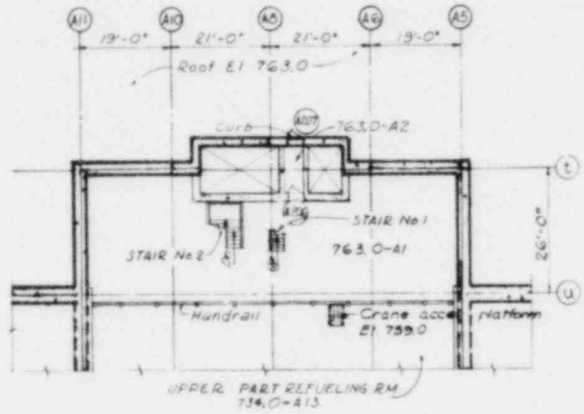
SUBMITTED J.J. Neal
RECOMMENDED J.C. Ley
APPROVED R.M. Pierce

KNOXVILLE 12-14-76 | 45 | M | SK1004 R2

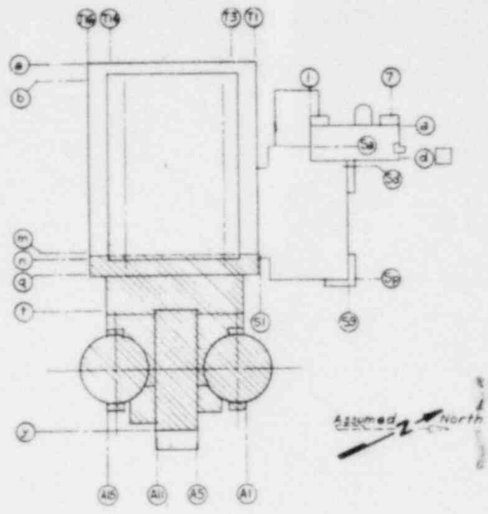

Assumed North
CONTROL BUILDING ROOF El 752.0
(See SK-1096-1007)
26'-0"
20'-0"
26'-0"
26'-0"
23'-0"
19'-0"
21'-0"
21'-0"
19'-0"
23'-0"
26'-6"
27'-0"
749.0-A11
749.0-A13
749.0-A14
749.0-A3
749.0-A4
749.0-A6
STAIR No. 7
STAIR No. 8
749.0-A15
749.0-A2
749.0-A16
749.0-A1
753.0-A1
STAIR No. 2
749.0-A10
749.0-A8
749.0-A9A
749.0-A5A
749.0-A8
749.0-A7
curb
5'-4" high mass blk. wall
Outline of floor above
15'-0"
13'-0"
STAIR No. 3 PENTHOUSE
759.0-A3
759.0-A1
SPIRAL STAIR No. 3
UPPER PART REFUELING P.M. 734.0-A13
El 755.25
El 755.25
REACTOR BUILDING UNIT 2
759.0-A4
759.0-A2
SPIRAL STAIR No. 1
SPIRAL STAIR No. 2
Roof El 752.25
Roof El 750.0
752.25-A1
125 Ton crane
STAIR No. 4 PENTHOUSE
Removable conc beams
Room 763.5-A1 not shown similar to Room 752.25-A1
80'-0"
40'-0"
40'-0"
80'-0"

PLAN EL 749.0





PLAN EL 763.0



KEY PLAN

ROOM FINISH SCHEDULE

ROOM No	ROOM NAME	FLOOR	BASE	WALLS	SUSPD CLG FINISH	SUSPD CLG ELEV	REMARKS
743.0-A1	480 V Board Rm 1A	Conc		Conc			46W405-8
749.0-A2	480 V Board Rm 1B	Conc		Conc			46W405-8
749.0-A3	125 V Vital Batt Rm II	Conc		Conc			46W405-8
749.0-A4	125 V Vital Batt Rm I	Conc		Conc			46W405-8
749.0-A6	480 V Transformer Rm 1B	Conc		Conc			46W405-8
749.0 A7	480 V Transformer Rm 1A	Conc		Conc			46W405-8
749.0-A8	Mech. Equipment Rm.	Conc		Conc			46W405-8
749.0-A8A	HEPA Filter Plenum Rm.	Conc		Conc			46W405-8
749.0-A9	Mech. Equipment Rm	Conc		Conc			46W405-7
749.0-A9A	HEPA Filter Plenum Rm	Conc		Conc			46W405-7
749.0-A10	480 V Transformer Rm 2B	Conc		Conc			46W405-7
749.0-A11	480 V Transformer Rm 2A	Conc		Conc			46W405-7
749.0-A12	125 V Vital Batt Rm II	Conc		Conc			46W405-7
749.0-A14	125 V Vital Batt Rm III	Conc		Conc			46W405-7
749.0-A15	480 V Board Rm 2B	Conc		Conc			46W405-7
749.0-A16	480 V Board Rm 2A	Conc		Conc			46W405-7
752.25-A1	Ice Machine Equip Rm	Conc		Conc			
753.0-A1	Elevator Machine Rm	Conc		Conc			
759.0-A1	Control Rod Drive Equip Rm	Conc		Conc			
759.0-A2	Pressure Htr Transf Rm	Conc		Conc			
759.0-A3	Control Rod Drive Equip Rm	Conc		Conc			
759.0-A4	Pressure Htr Transf Rm	Conc		Conc			
763.0-A1	Fan Room	Conc		Conc			
763.0-A2	Roof Access Air Lock	Conc		Conc			
763.5-A1	Package chiller equip	Conc		Conc			
	STAIR No. 7			Conc			46W405-4
	STAIR No. 8			Conc			46W405-4
	STAIR No. 9			Conc			46W405-4
	SPIRAL STAIR No. 1			Conc			46W405-4
	SPIRAL STAIR No. 2			Conc			46W405-4
	SPIRAL STAIR No. 3			Conc			46W405-4

NOTES:
1. FOR CEILING AND WALL FINISH SCHEDULE REFER TO 46W401-8.
2. FOR ADDITIONAL NOTES SEE SHEET 1.

Scale: 1/4"=1'-0"

REV NO	ECN NO	DATE	DSGN	DRWN	CHKD	SUPV	ENGR	INSP	SUBM	RECM	APPR
	BOUNDARIES UPDATED PER ECN		GRW	KLM	RW						

DSGN G.R. WIREMAN — INSP P.W. BURNETTE
DRWN K.F. DRAKE
CHKD L.L. FENDER
SUPV L.L. FENDER — ENGINEER

POWERHOUSE
AUXILIARY BLDG. UNITS 1 & 2

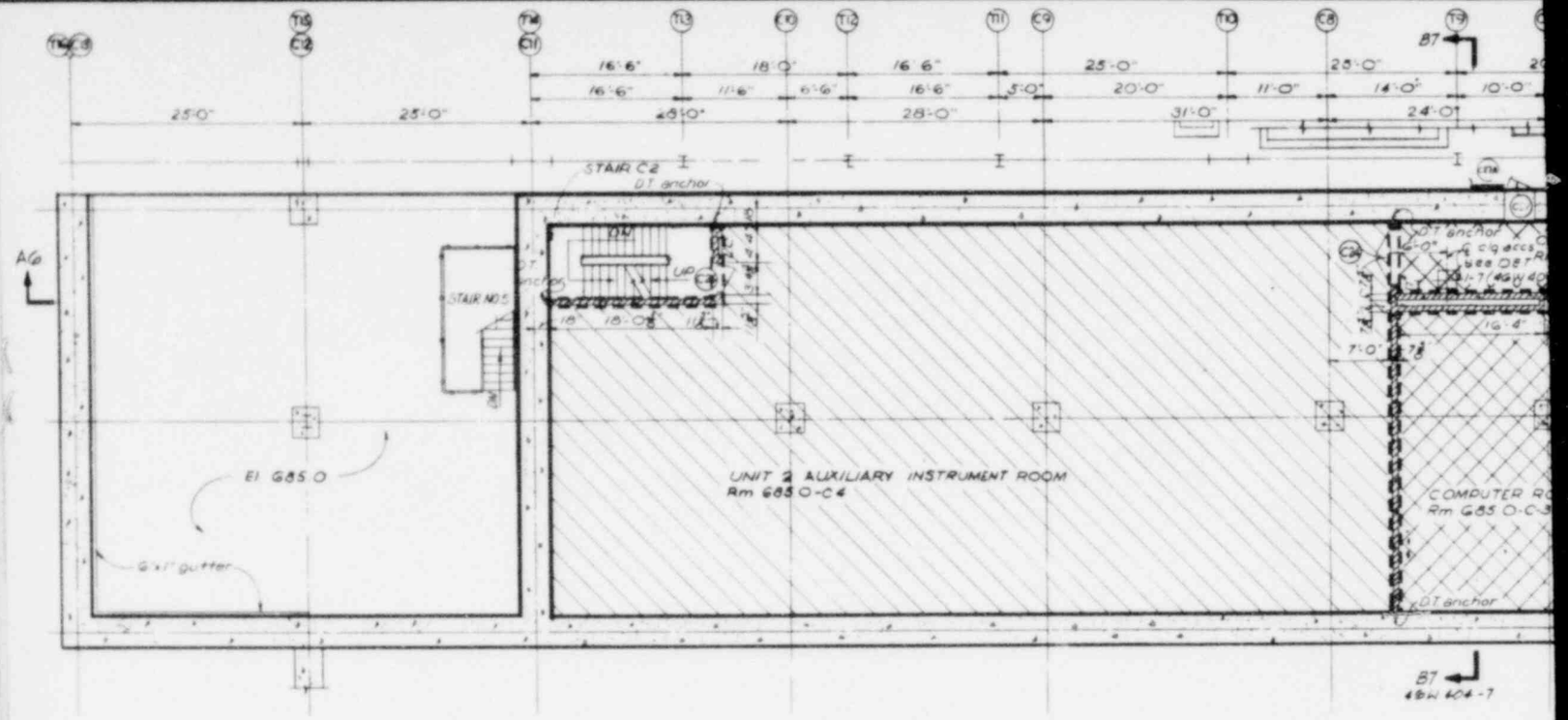
FIRE PROTECTION STUDY
COMPARTMENTATION - FIRE CELLS
PLAN EL. 749.0, 759.0 & 763.0

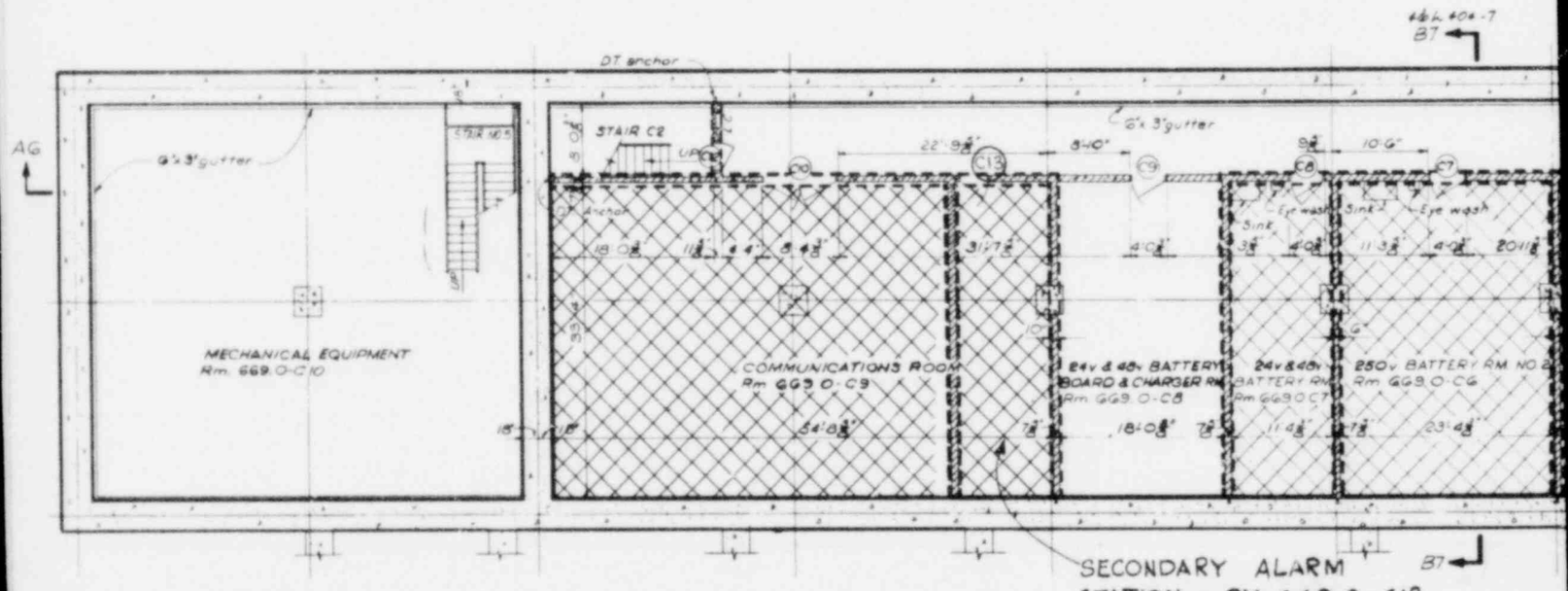
SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED	RECOMMENDED	APPROVED
J.J. Nash	J. C. Key	R.M. Gluck

KNOXVILLE 12-4-76 | 45 | M | 4 | SK-1005 | R1

SK-1006 | N | 45

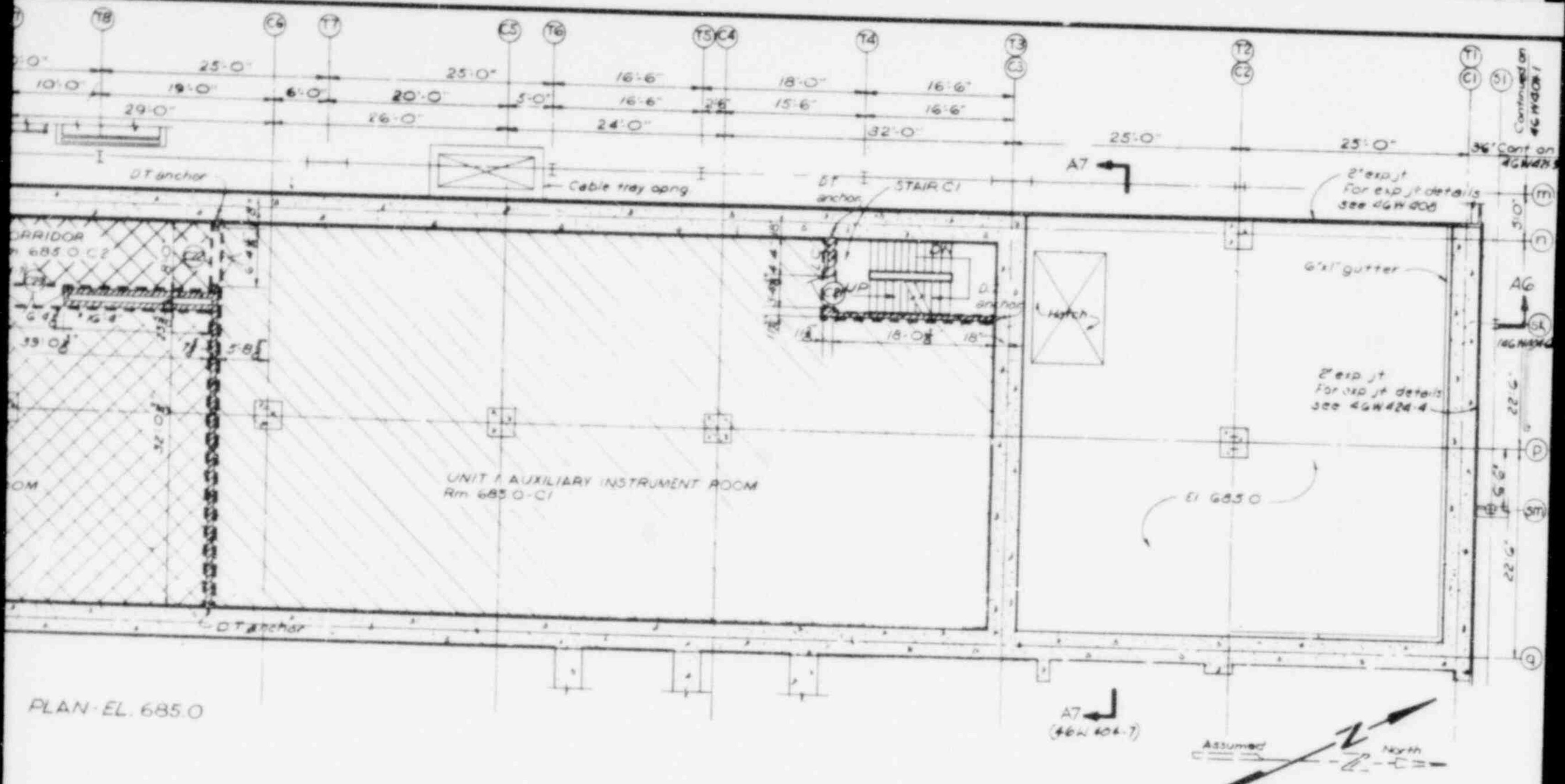




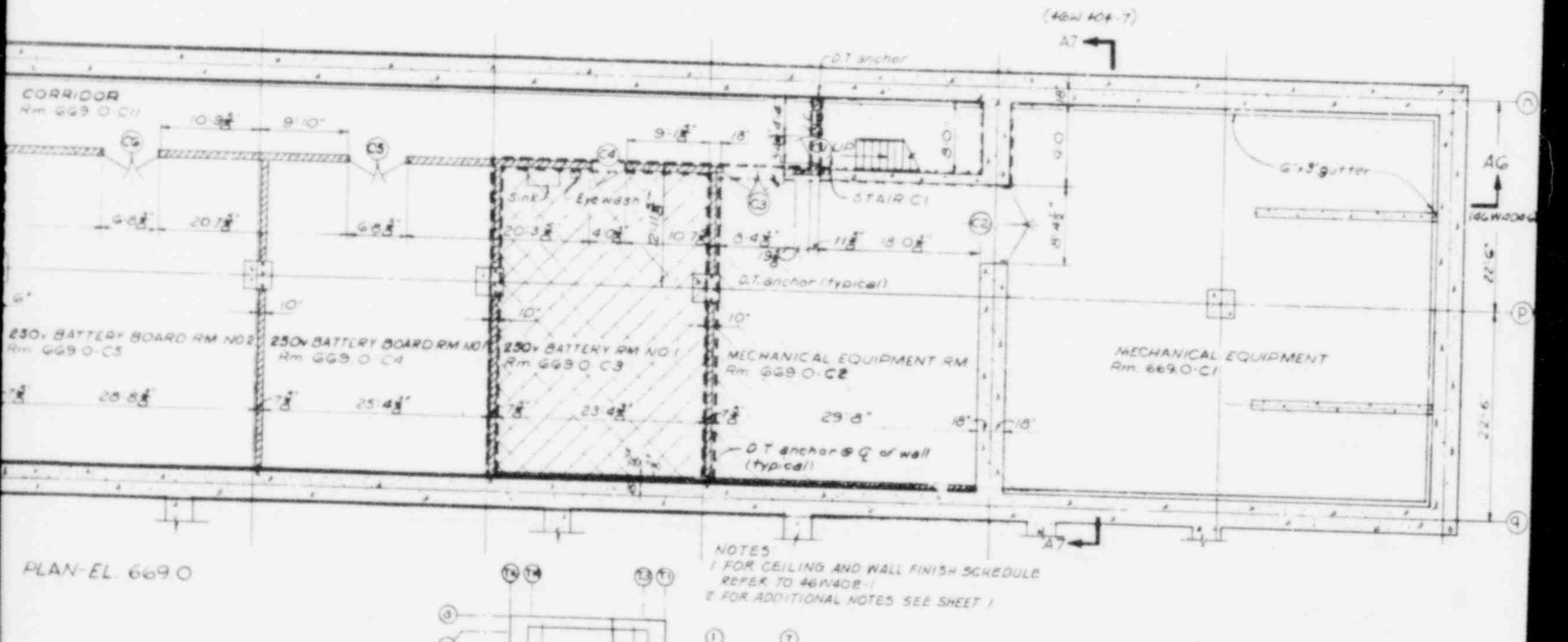
ROOM FINISH SCHEDULE

ROOM NO.	NAME OF ROOM	FLOOR	BASE	WALLS	SUSPD CLG FINISH	SUSPD CLG ELEV	REMARKS
669.0-C1	Mechanical Eqpt	Conc	—	Conc	—	—	
669.0-C2	Mechanical Eqpt	Conc	—	Conc Blk	—	—	
669.0-C3	Battery Room	Conc	—	Conc Blk	—	—	
669.0-C4	250v Battery Rm No 1	Conc	—	Conc & Conc Blk	—	—	
669.0-C5	250v Battery Bd Rm No2	Conc	—	Conc & Conc Blk	—	—	
669.0-C6	250v Battery Rm No 2	Conc	—	Conc & Conc Blk	—	—	
669.0-C7	24v & 48v Battery Rm	Conc	—	Conc & Conc Blk	—	—	
669.0-C8	24v & 48v Bat Bd & Chgr Rm	Conc	—	Conc & Conc Blk	—	—	
669.0-C9	Communications Rm	Res tile	Vinyl	Conc Blk			
669.0-C10	Mechanical Eqpt	Conc	—	Conc	—	—	
669.0-C11	Corridor	Conc	—	Conc & Conc Blk	—	—	
C1	Stair	Conc	—	Conc & Conc Blk	—	—	Cast stone tread & landing
C2	Stair	Conc	—	Conc & Conc Blk	—	—	Cast stone tread & landing
669.0-C12	SEC ALARM STA	Conc		Conc blk			

ROOM NO	NAME OF ROOM	FLOOR	BASE	WALLS
685.0-C1	Unit 1 Auxiliary Inst Rm	Conc	—	Conc & Conc Blk
685.0-C2	Corridor	Conc	—	Conc & Conc Blk
685.0-C3	Computer Room	Res tile	Vinyl	Conc Blk
685.0-C4	Unit 2 Auxiliary Inst Rm	Conc	—	Conc & Conc Blk
C1	Stair	Conc	—	Conc & Conc Blk
C2	Stair	Conc	—	Conc & Conc Blk



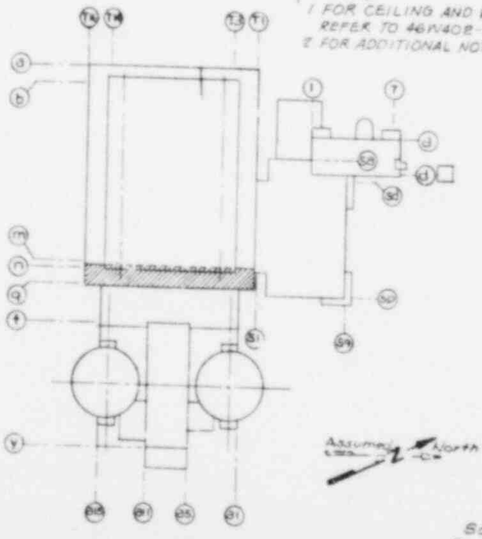
PLAN-EL. 685.0



PLAN-EL. 669.0

NOTES
1. FOR CEILING AND WALL FINISH SCHEDULE REFER TO 46W408-1
2. FOR ADDITIONAL NOTES SEE SHEET 1

SUSPD CLG FINISH	CLG ELEV	REMARKS
[illegible]	693.8'	
		Cast alum tread & landing
		Cast alum tread & landing



KEY PLAN

Scale 1/8" = 1'-0"
Except as noted

REV NO	ECN NO	DATE	DSGN	DRWN	CHKD	SUPV	INSP	SUBM	RECM	APPR
2	2121				KLM					
BOUNDARIES UPDATED PER ECN										
1		8-12-77	RD	RD						
REVISED NON-SAFETY RELATED AREAS										

DSGN G.R. WISEMAN
DRWN C.B. KESTNER
CHKD ... PENDER
SUPV [illegible]
INSP F.A. BURNETTE

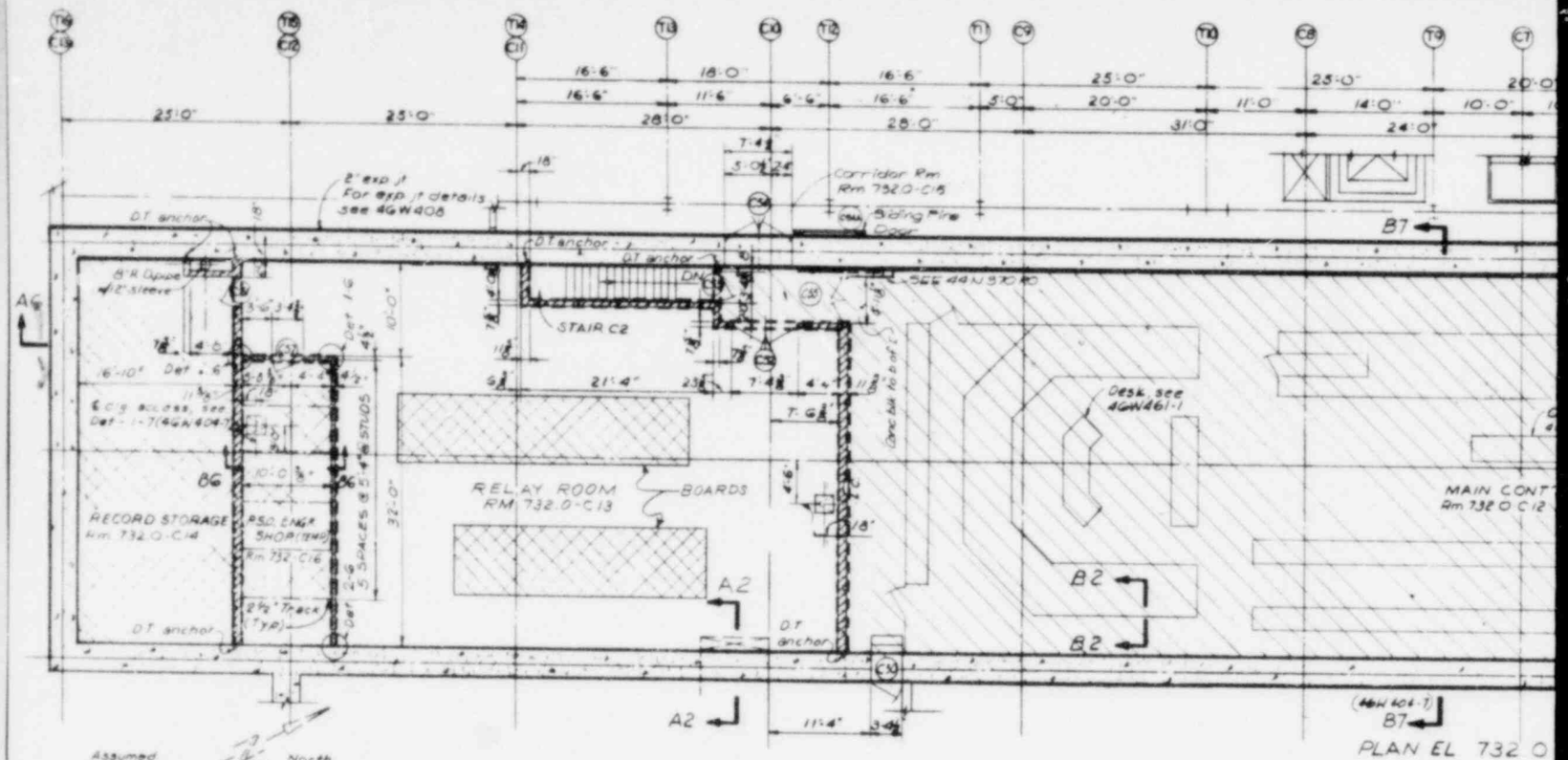
POWERHOUSE
CONTROL BLDG. UNIT 1 & 2

FIRE PROTECTION STUDY
COMPARTMENTATION - FIRE CELLS
PLAN EL. 669.0 & 685.0

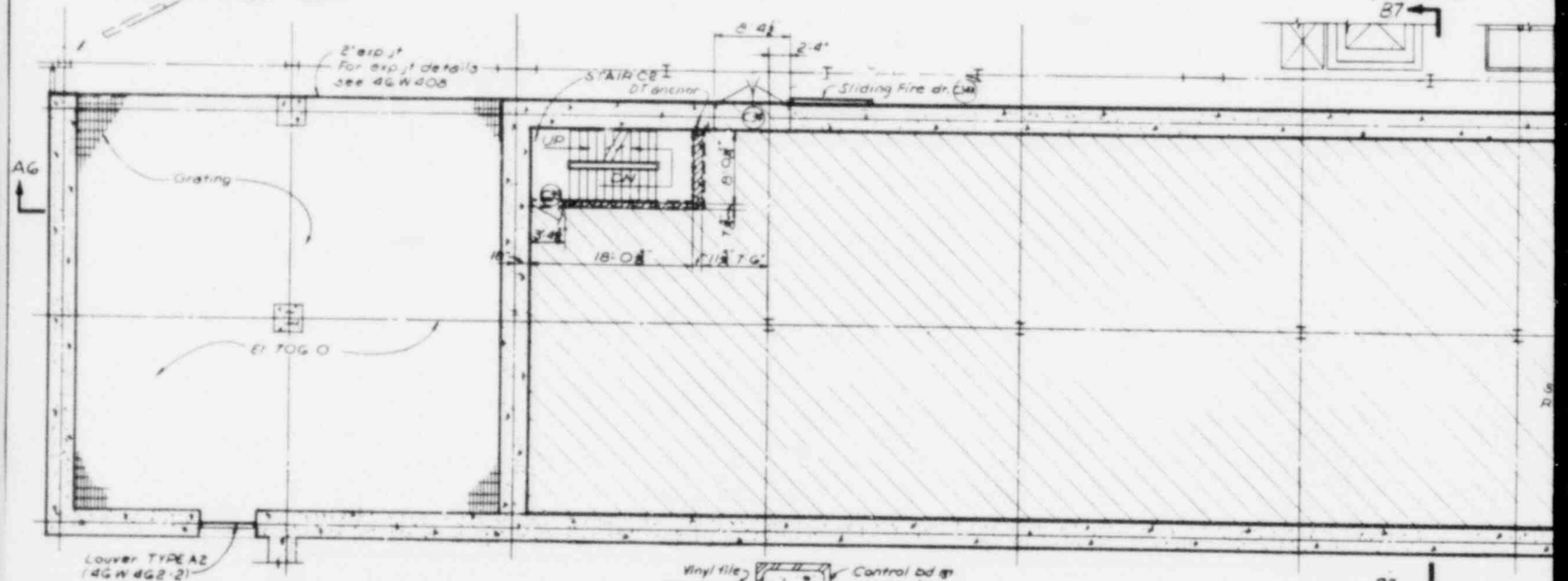
SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED | RECOMMENDED | APPROVED

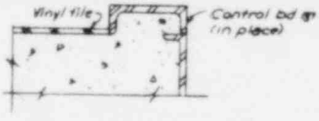
SK-1007



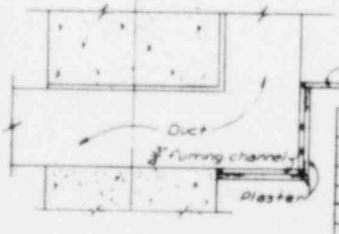
PLAN EL 732 0



PLAN EL 706.0



SECTION B2-B2
Scale 3"=1'-0"

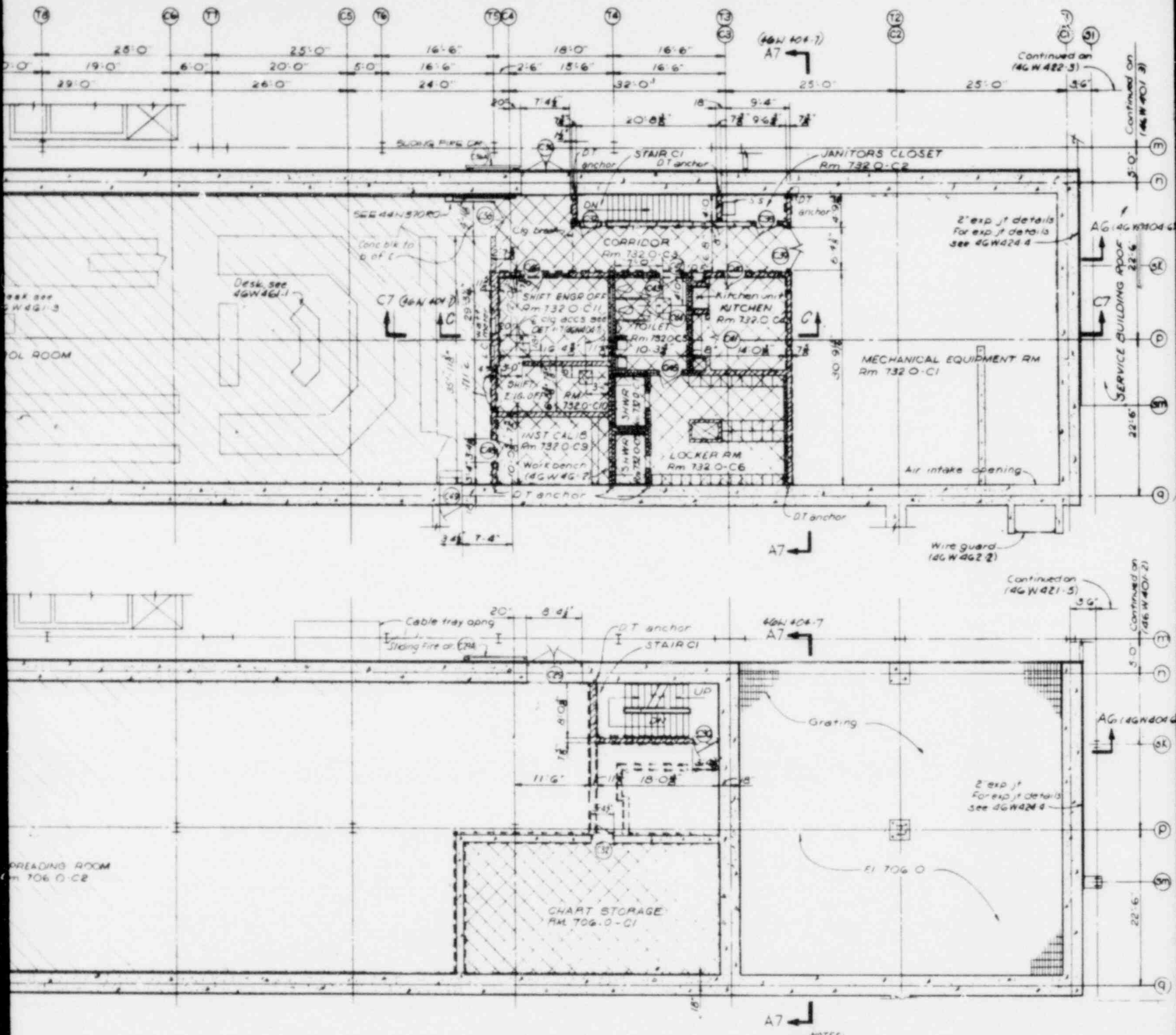


SECTION A2-A2
Scale 3"=1'-0"

ROOM FINISH SCHEDULE

ROOM NUMBER	NAME OF ROOM	FLOOR	BASE	WALLS	SUSPD. CLG. FINISH	SUSPD. CLG. ELEV.	REMARKS
706 0-C1	[illegible]	Res tile	Vinyl	Conc	S.F. plas	715'-0"	
706 0-C2	Spreading Room	Conc	—	Conc	—	—	
C1	Stair	Conc	—	Conc	—	—	
C2	Stair	Conc	—	Conc	—	—	
732 0-C1	Mechanical Eqpt Room	Conc.	—	Conc	—	—	
732 0-C2	Janitors Closet	Res tile	Vinyl	Conc	Cem plas	740'-0"	
732 0-C3	Corridor	Res tile	Vinyl	Conc	S.F. plas	740'-0"	
732 0-C4	Kitchen	Res tile	Vinyl	Conc blk	S.F. plas	740'-0"	See dg W411
732 0-C5	Toilet	Cer T	Facing T	Facing T	Cem plas	740'-0"	See dg W411
732 0-C6	Locker Room	Cer T	Facing T	Facing T	Cem plas	740'-0"	See dg W411
732 0 C7	Shower	Cer T	Cer T	Cer T	Cem plas	740'-0"	See dg W411

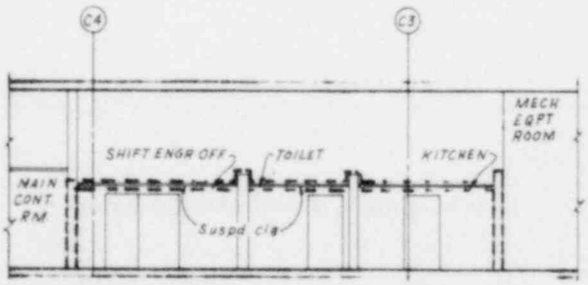
ROOM NUMBER	NAME OF ROOM	FLOOR	BASE	WALLS
732 0-C8	Shower	Cer T	Cer T	Ce
732 0-C9	Inst Calib	Res tile	Vinyl	Conc
732 0-C10	Shift Eng. O.F.P.	Res tile	Vinyl	Conc
732 0-C11	Shift Engr Office	Res tile	Vinyl	Conc
732 0-C12	Main Control Room	Res tile	Vinyl	Conc
732 0-C13	Relay Room	Res tile	Vinyl	Conc
732 0-C14	Record Storage	"	"	"
C1	Stair	Conc	—	Conc
C2	Stair	Conc	—	Conc
732 0-C15	CORRIDOR	Res tile	Vinyl	Conc
732 0-C16	P.S.O. Engr Shop	Res tile	Vinyl	Plas



NOTES:
1. FOR CEILING AND WALL FINISH SCHEDULE REFER TO 46W402-2.
2. FOR ADDITIONAL NOTES SEE SHEET 1.

[illegible]	SUSPD CLG FINISH	EL	REMARKS
[illegible]	Cem plas	740'-0"	See 46W411
[illegible]	SF plas	740'-0"	See 46W411
[illegible]	SF plas	740'-0"	See 46W411
[illegible]	Acst plas	740'-0"	See 46W411
[illegible]	[illegible] SF plas	742'-0"	See 46W402-3
[illegible]	Acst plas	742'-0"	
[illegible]	—	—	See Note "A"
[illegible]	SF plas	740'-0"	[illegible]
[illegible]	SF plas	740'-0"	[illegible]
[illegible]	SF plas	742'-0"	
[illegible]	Acst plas	742'-0"	

Note "A"
Floor, base, & walls in Record Storage, Rm 732.0-C14, to have special protective coating system A(C).



SECTION C-C

Scale 1/8" = 1'-0"
Except as noted

REV NO	ECN NO	DATE	DSGN	DRWN	CHKD	SUPV	ENGR	INSP	SUBM	RECM	APPD
2	2121			KLM							
	BOUNDARIES UPDATED PER ECN										
1	S1	8-12-77	RD	RD							
	REVISED NON-SAFETY RELATED AREA										

DSGN G.R. WISEMAN
DRWN G.E. KESTLER
CHKD J.L. FENDER
SUPV J.L. FENDER
INSP P.W. BURNETTE
ENGINEER James J. Nash

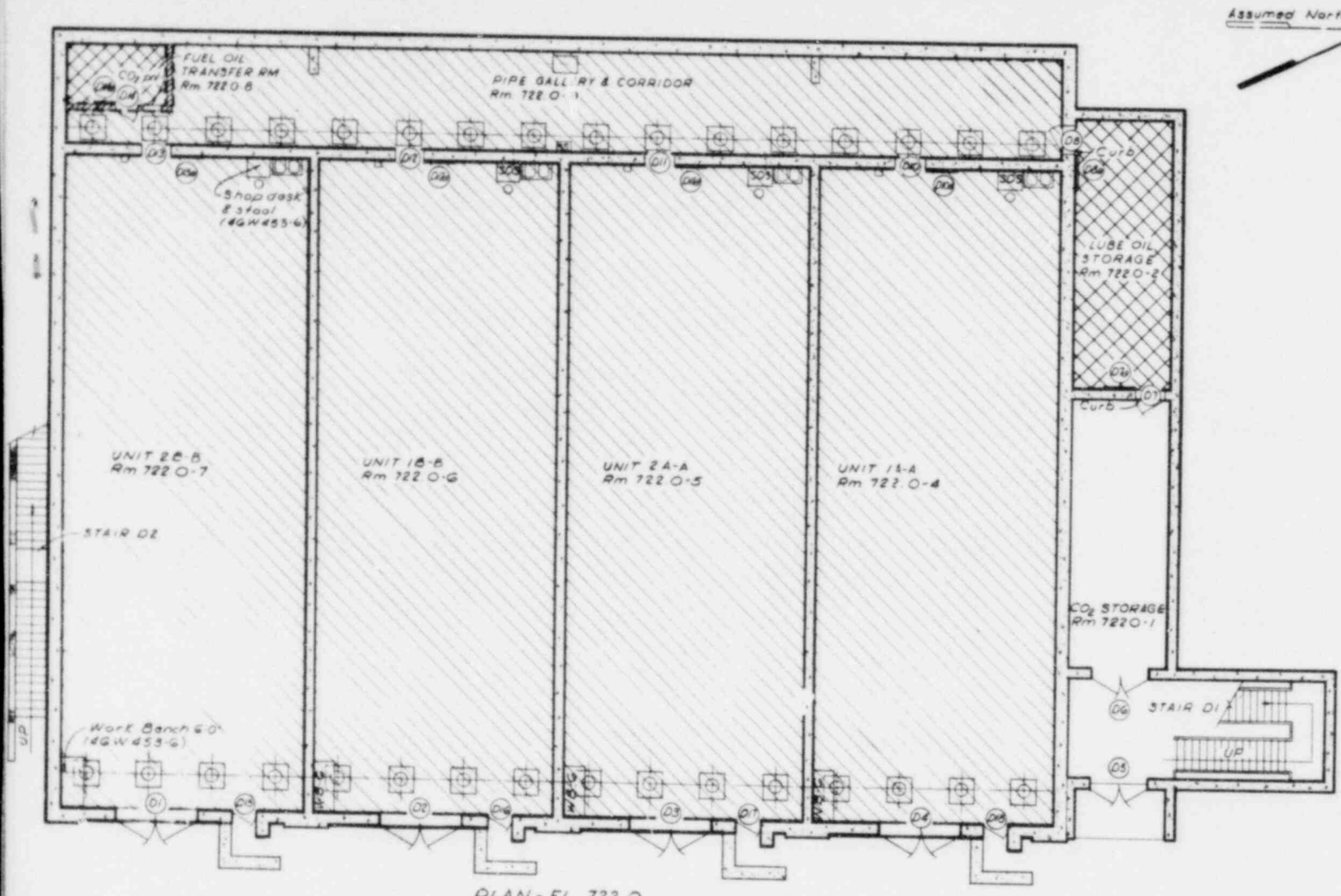
POWERHOUSE
CONTROL BLDG UNIT 1 & 2

FIRE PROTECTION STUDY
COMPARTMENTATION - FIRE CELLS
PLAN EL. 706.0 & 732.0

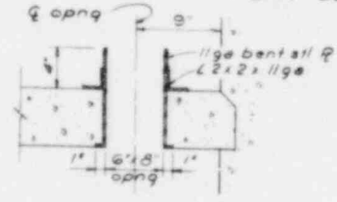
SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED J.J. Nash RECOMMENDED J.C. Key APPROVED R.M. Pierce

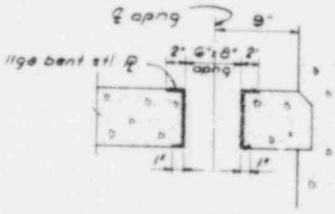
KNOXVILLE 12-14-76 45 M SK-1007 R2



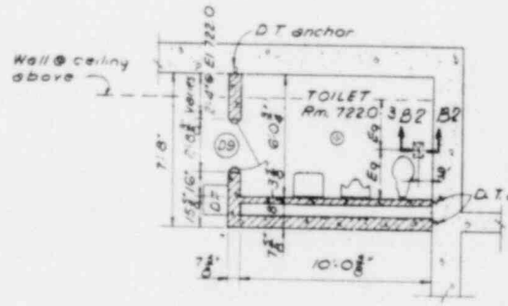
PLAN - EL. 722.0



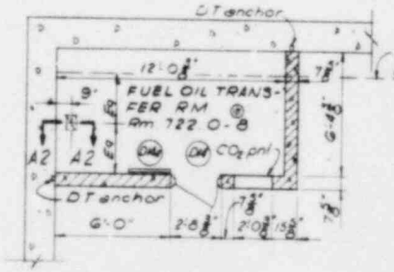
SECTION A2-A2
Scale 1½" = 1'-0"



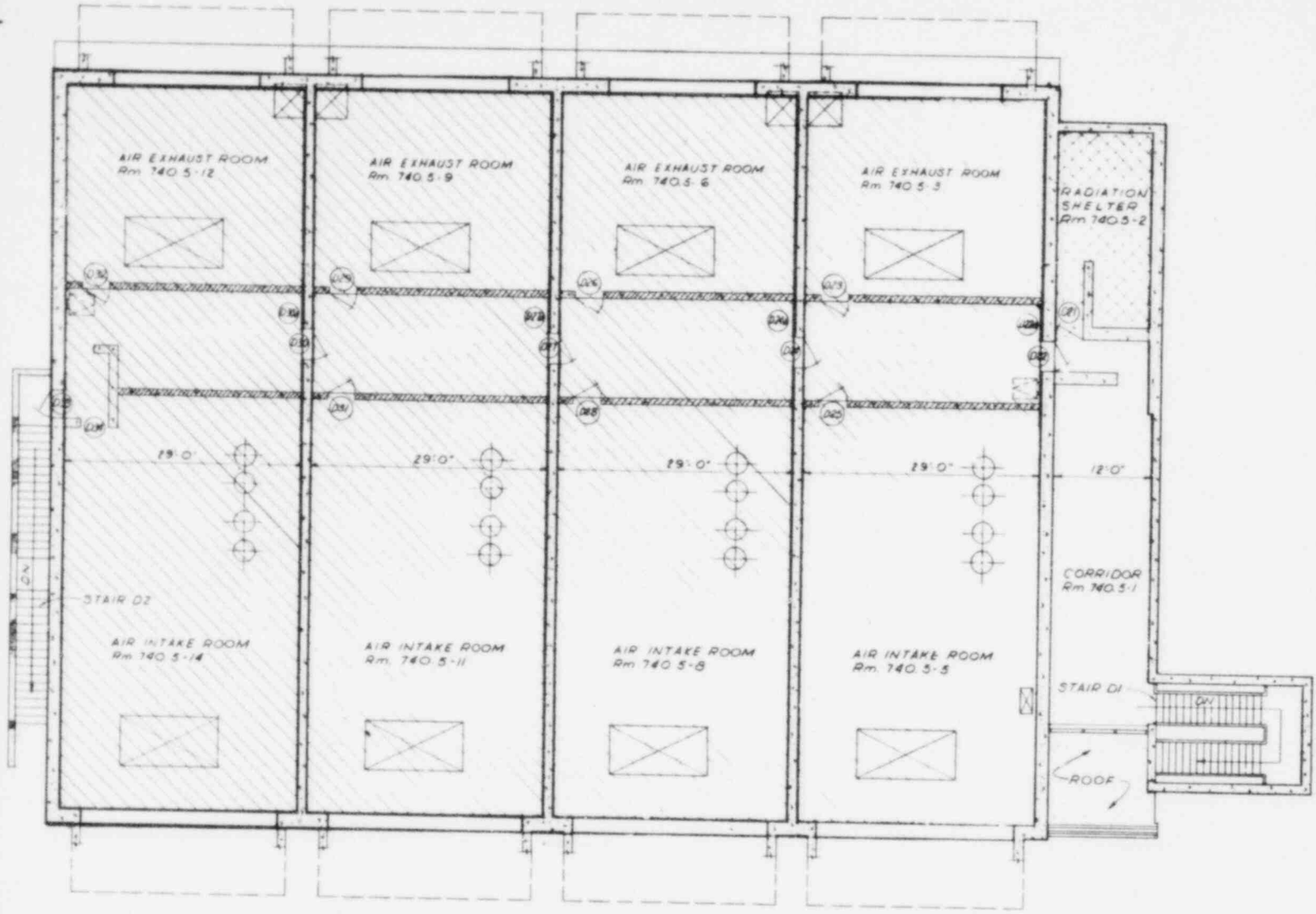
B2-B2
Scale 1½" = 1'-0"



PLAN ROOM 722.0-3
Scale ¾" = 1'-0"



PLAN ROOM 722.0-8
Scale ¾" = 1'-0"



PLAN - EL 740.5

ROOM FINISH SCHEDULE

ROOM NO.	NAME OF ROOM	FLOOR	BASE	WALLS	SUSPD CLG FINISH	SUSPD CLG ELEV.	REMARKS
722.0-1	CO_2 Storage	Conc.	—	Conc.	—	—	
722.0-2	Lube Oil Storage	Conc.	—	Conc.	—	—	
722.0-3	Toilet	Conc.	—	Conc & Conc Blk	—	—	
722.0-4	Unit 1A-A	Conc.	—	Conc.	—	—	
722.0-5	Unit 2A-A	Conc.	—	Conc.	—	—	
722.0-6	Unit 1B-B	Conc.	—	Conc.	—	—	
722.0-7	Unit 2B-B	Conc.	—	Conc.	—	—	
722.0-8	Fuel Oil Transfer Room	Conc.	—	Conc & Conc Blk	—	—	
722.0-9	Pipe Gallery & Corridor	Conc.	—	Conc & Conc Blk	—	—	
D1	Stair	Conc.	—	Conc.	—	—	
740.5-1	Corridor	Conc.	—	Conc & Conc Blk	—	—	
740.5-2	Radiation Shelter	Conc.	—	Conc.	—	—	
740.5-3	Air Exhaust Room	Conc.	—	Conc & Conc Blk	—	—	
740.5-4	480V Board Room 1A	Conc.	—	Conc & Conc Blk	—	—	
740.5-5	Air Intake Room	Conc.	—	Conc & Conc Blk	—	—	
740.5-6	Air Exhaust Room	Conc.	—	Conc & Conc Blk	—	—	
740.5-7	480V Board Room 2A	Conc.	—	Conc & Conc Blk	—	—	
740.5-8	Air Intake Room	Conc.	—	Conc & Conc Blk	—	—	
740.5-9	Air Exhaust Room	Conc.	—	Conc & Conc Blk	—	—	
740.5-10	480V Board Room 1B	Conc.	—	Conc & Conc Blk	—	—	
740.5-11	Air Intake Room	Conc.	—	Conc & Conc Blk	—	—	
740.5-12	Air Exhaust Room	Conc.	—	Conc & Conc Blk	—	—	
740.5-13	480V Board Room 2B	Conc.	—	Conc & Conc Blk	—	—	
740.5-14	Air Intake Room	Conc.	—	Conc & Conc Blk	—	—	
D1	Stair	Conc.	—	Conc.	—	—	

NOTES
1. FOR CEILING AND WALL FINISH SCHEDULE REFER TO 46W418-2.
2. FOR ADDITIONAL NOTES SEE SHEET 1.

SCALE 1/8" = 1'-0" EXCEPT AS NOTED

REV NO.	ECN NO.	DATE	DSGN	DRWN	CHKD	SUPV	ENGR	INSP	SUBM	RECM	APPR
		BOUNDARIES UPDATED PER ECN									

DSGN G.R. WISEMAN — INSP P.W. BURNETTE
DRWN V.E. CRAIG
CHKD J.L. PENDER
SUPV J.L. PENDER
ENGINEER

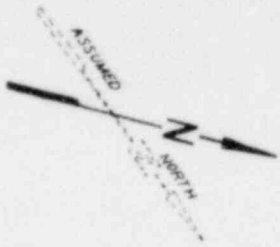
POWERHOUSE
DIESEL GENERATOR BUILDING

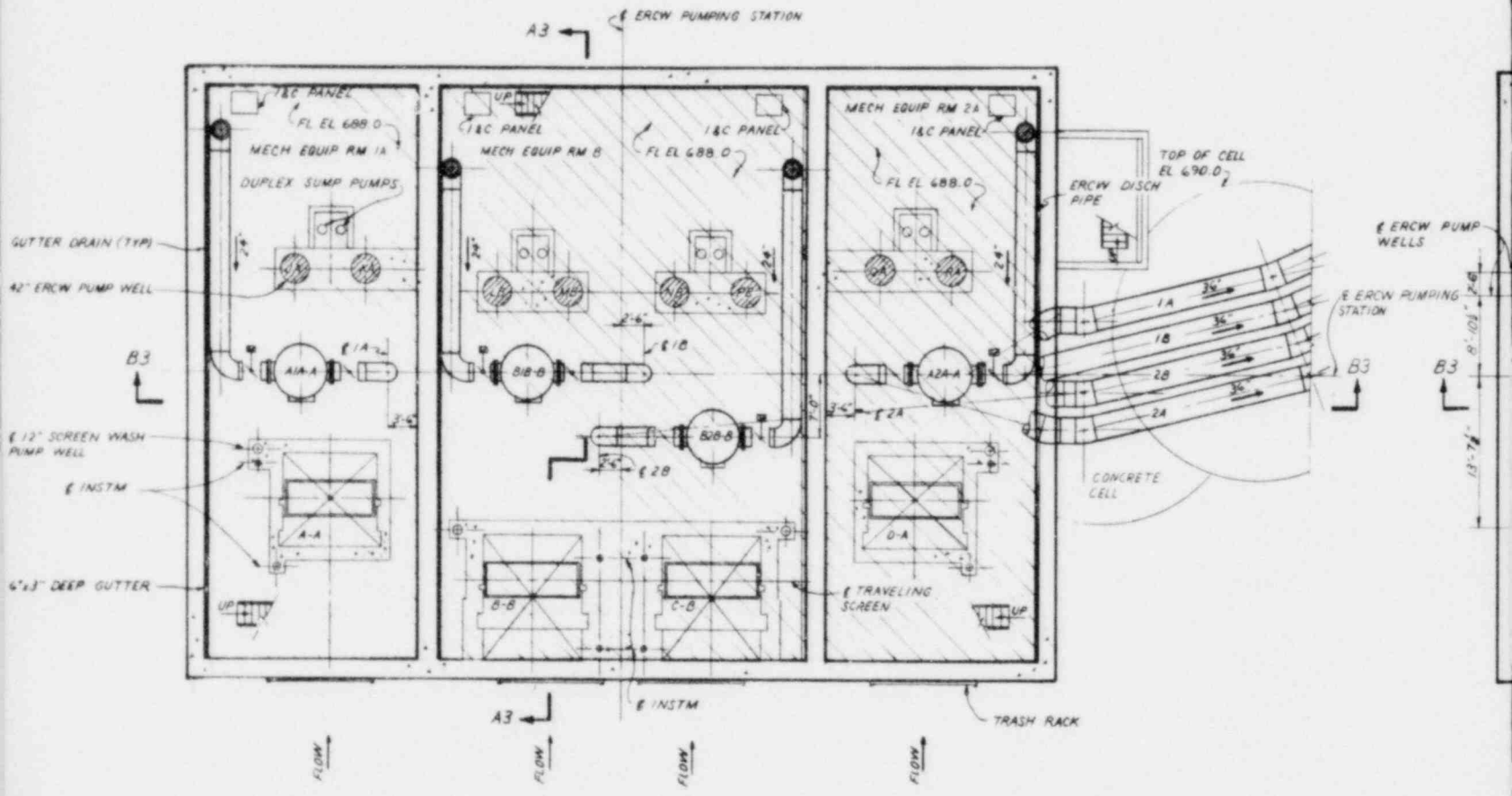
FIRE PROTECTION STUDY
COMPARTMENTATION - FIRE CELLS
PLAN EL. 722.0 & 740.5

SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED — RECOMMENDED — APPROVED

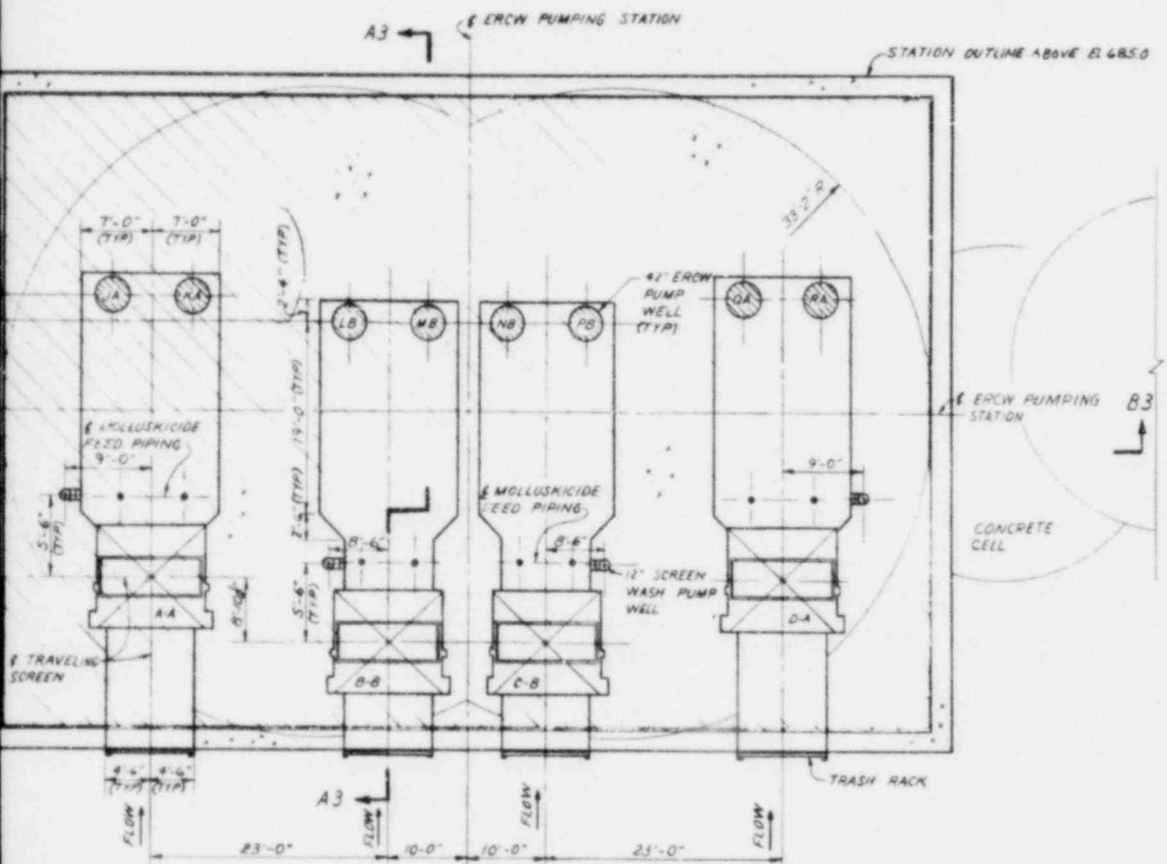
KNOXVILLE 12-14-76 45 M 4 SK-1008 R1





PLAN EL 688.0 AND ABOVE

7 8 9 10 11 12



PLAN EL 625.0 AND ABOVE
NTS

5 0 5 10 15

SCALE 1/8" = 1'-0"

COMPANION DWGS.

SEE SHEET 1.

REV NO.	ECN NO.	DATE	DSGN	DRWN	CHKD	SUPV	ENGR	INSP	SUBM	RECM	APPR
1	2121 BOUNDARIES UPDATED PER ECN										

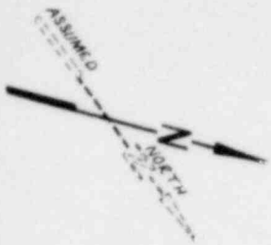
DSGN [illegible]
DRWN J.L. CALHOUN
CHKD J.L. FENDER
SUPV J.L. FENDER
INSP P.W. BURNETTE
ENGINEER James J. Nash

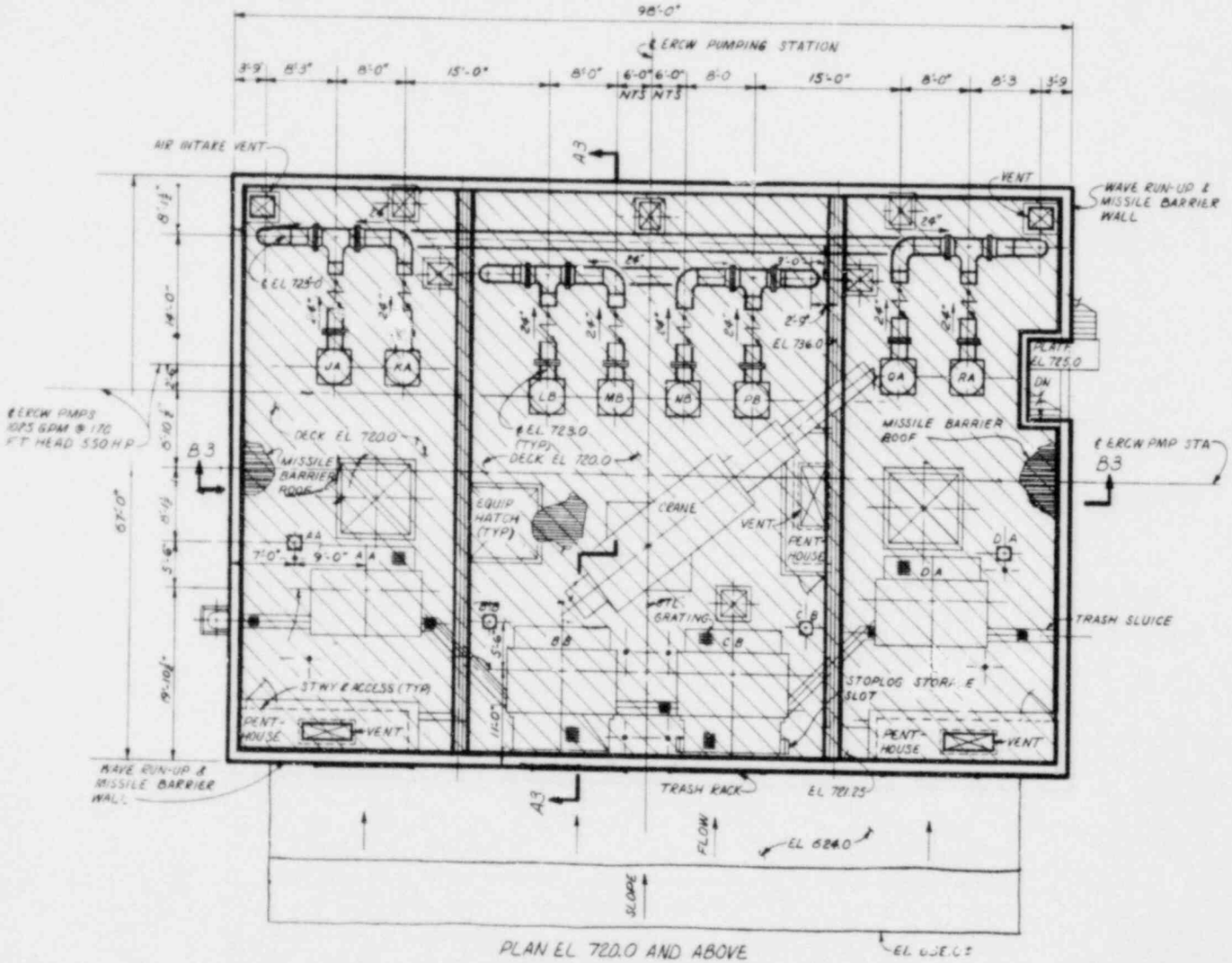
WATER SUPPLY UNITS 1&2
ERCW PUMPING STATION

FIRE PROTECTION STUDY
COMPARTMENTATION-FIRE CELLS
PLAN EL. 625.0 & 688.0

SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

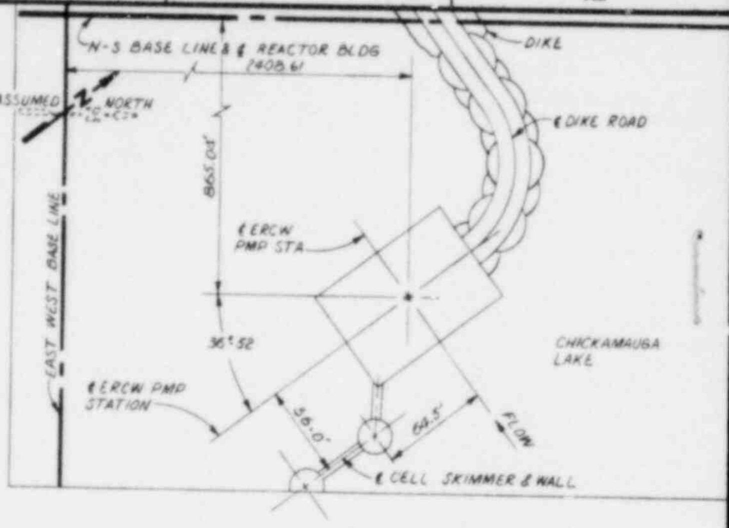
SUBMITTED	RECOMMENDED	APPROVED
J.J. Nash	J.C. Key	R.M. Pierce



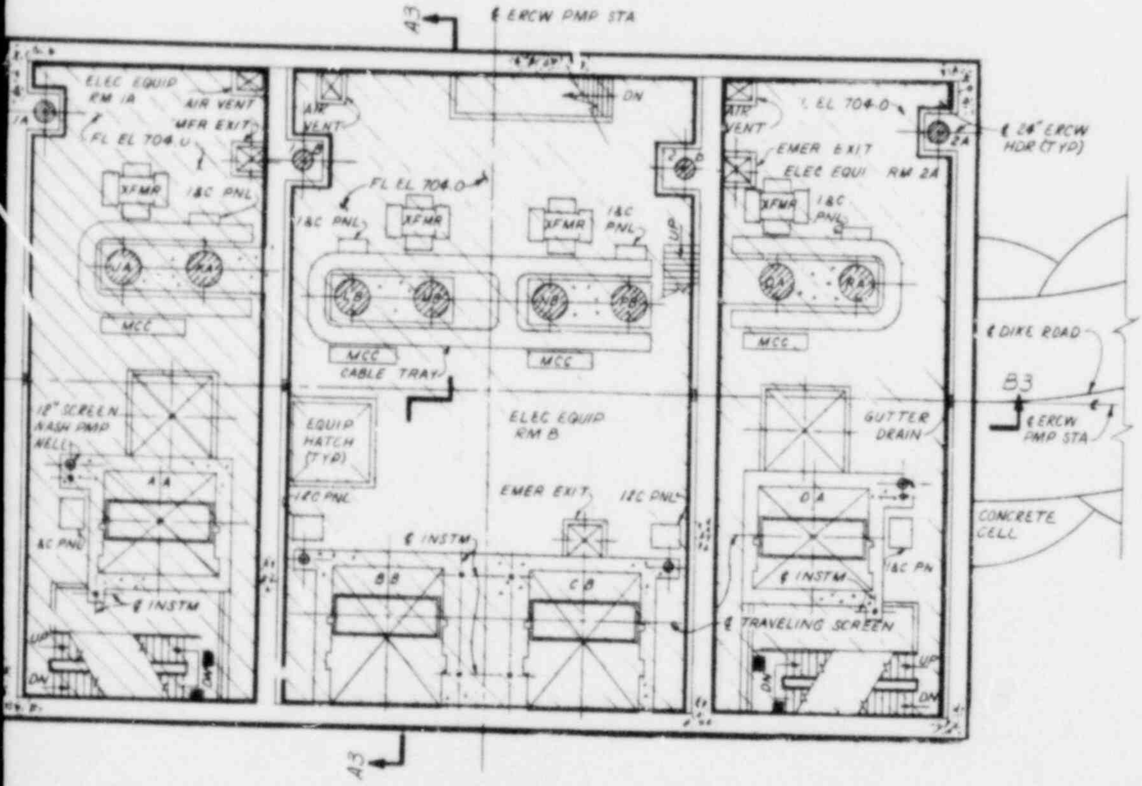


PLAN EL 720.0 AND ABOVE

7	8	9	10	11	12



KEY PLAN
SCALE 1"=50.0'



PLAN EL 704.0

NOTES:
1. FOR CEILING AND WALL FINISH SCHEDULE REFER TO 37W201-1.
2. FOR ADDITIONAL NOTES SEE SHEET 1.

SCALE 1/8"=1'-0"

1 BOUNDARIES UPDATED PER ECN	
DSGN G.R. WISEMAN	INSP R.W. BURNETTE
DRWN S.L. CLOUGH	ENGINEER James J. Nash
CHKD J.L. FENDER	
SUPV J.L. FENDER	

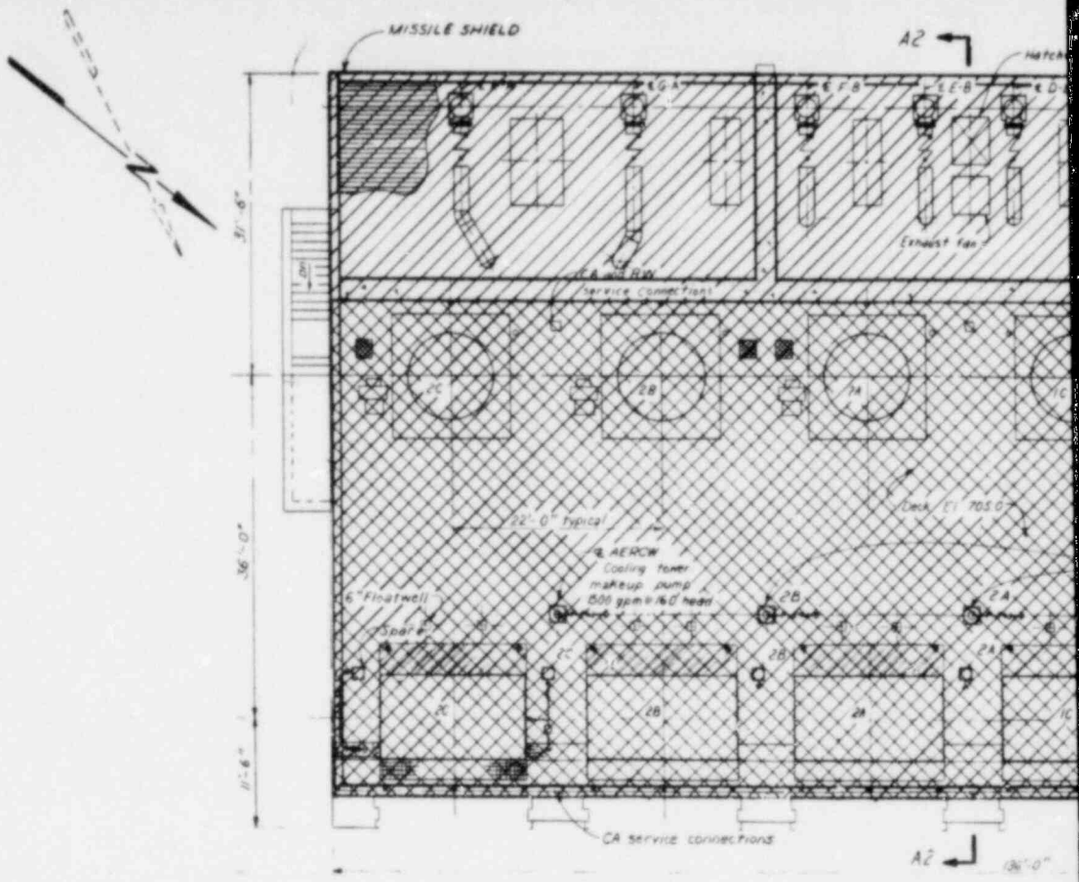
WATER SUPPLY UNIT 1 & 2
ERCW PUMPING STATION

FIRE PROTECTION STUDY
COMPARTMENTATION - FIRE CELLS
PLAN EL. 704.0 & 720.0

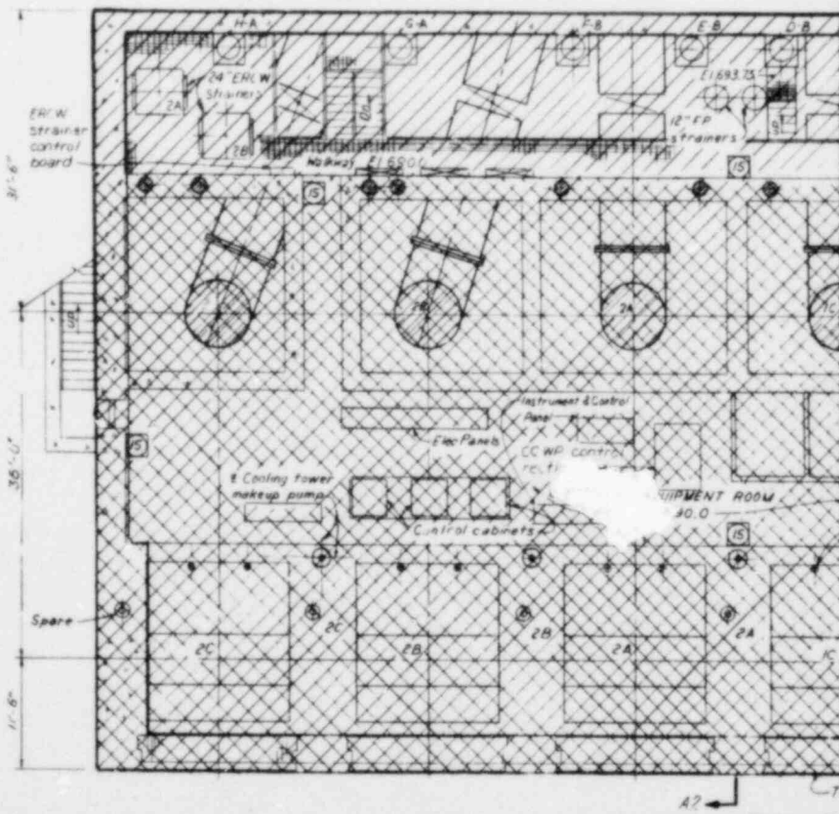
SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

INSPECTED AND APPROVED FOR ISSUE | SUBMITTED JJ Nash | RECOMMENDED J.C. Key | APPROVED R.M. Pierce

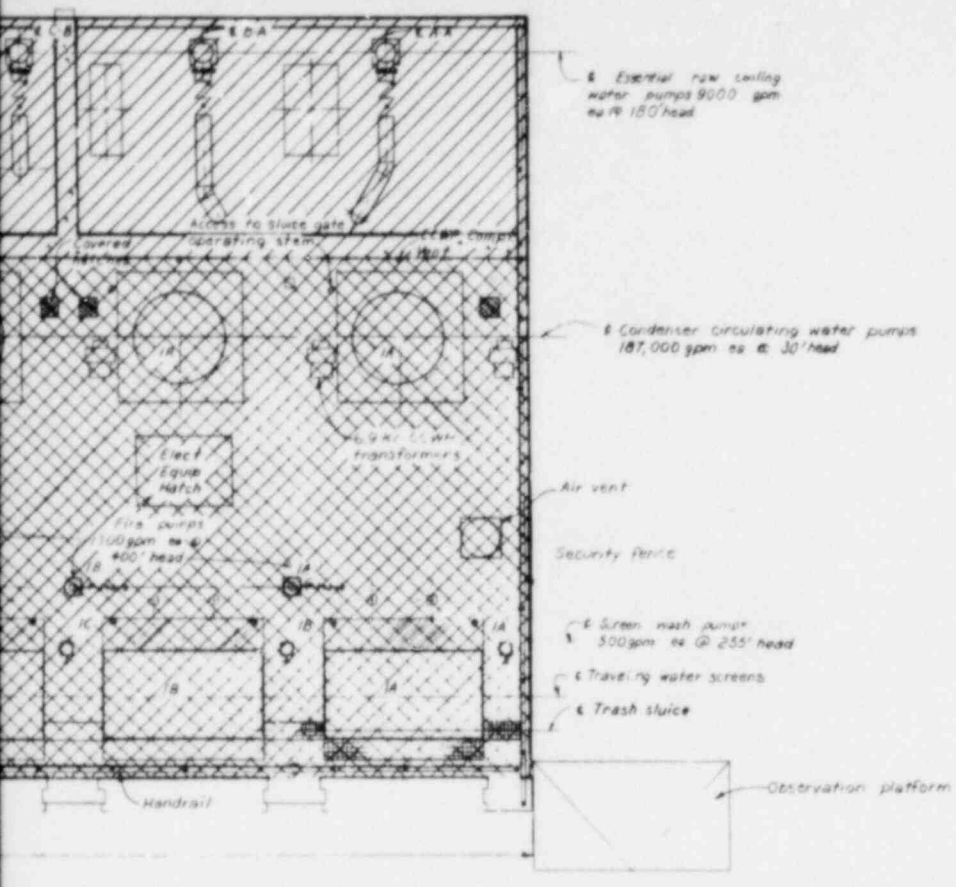
SK 1011

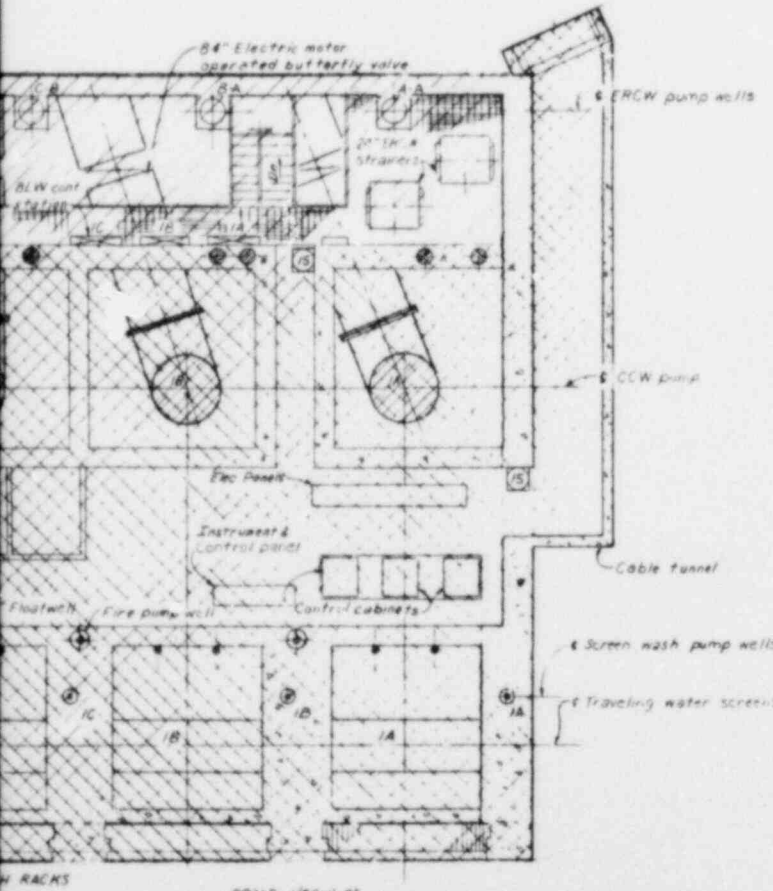


PLAN EI T

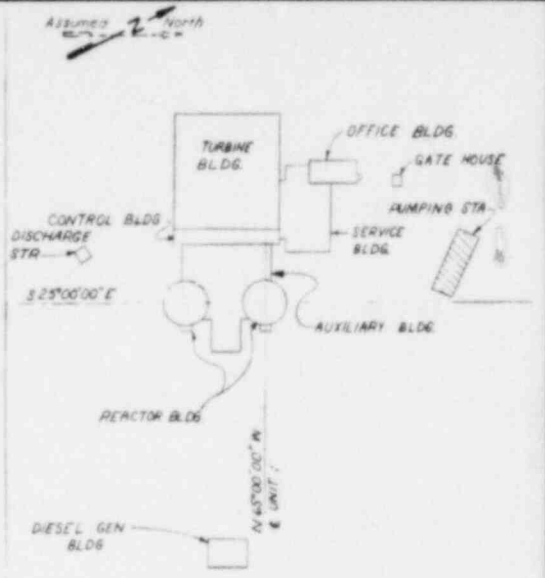


PLAN EI





SCALE 1/8"=1'-0"



KEY PLAN
Scale 1" = 200'

SPECIAL NOTE
THOSE AREAS PERTAINING TO THE ERCW PUMPS SHALL BE DESIGNATED SAFETY RELATED ONLY, DURING THAT INTERIM PERIOD OF ERCW UNIT ONE OPERATION & PRIOR TO UNIT TWO OPERATION AFTER THIS PERIOD THIS PUMPING STATION SHALL BE DESIGNATED NON-SAFETY RELATED. FOR ERCW PUMPING STATION SEE DRWGS SK1009-1010.

COMPANION DRAWING: S. 1001

NO.	ECN NO	DATE	DSGN	DRWN	CHKD	SUPV	ENGR	NSP	SUBM	RECM	APPD
1	8181		BOUNDARIES UPDATED PER ECN								

DSGN G.R. WIGGINS
DRWN J.L. GRAMES
CHKD W.A. FENDER
SUPV T.L. FENDER
MGR P.W. BURNETTE
ENGINEER James J. Nash

WATER SUPPLY UNITS 1 & 2
PUMPING STATION

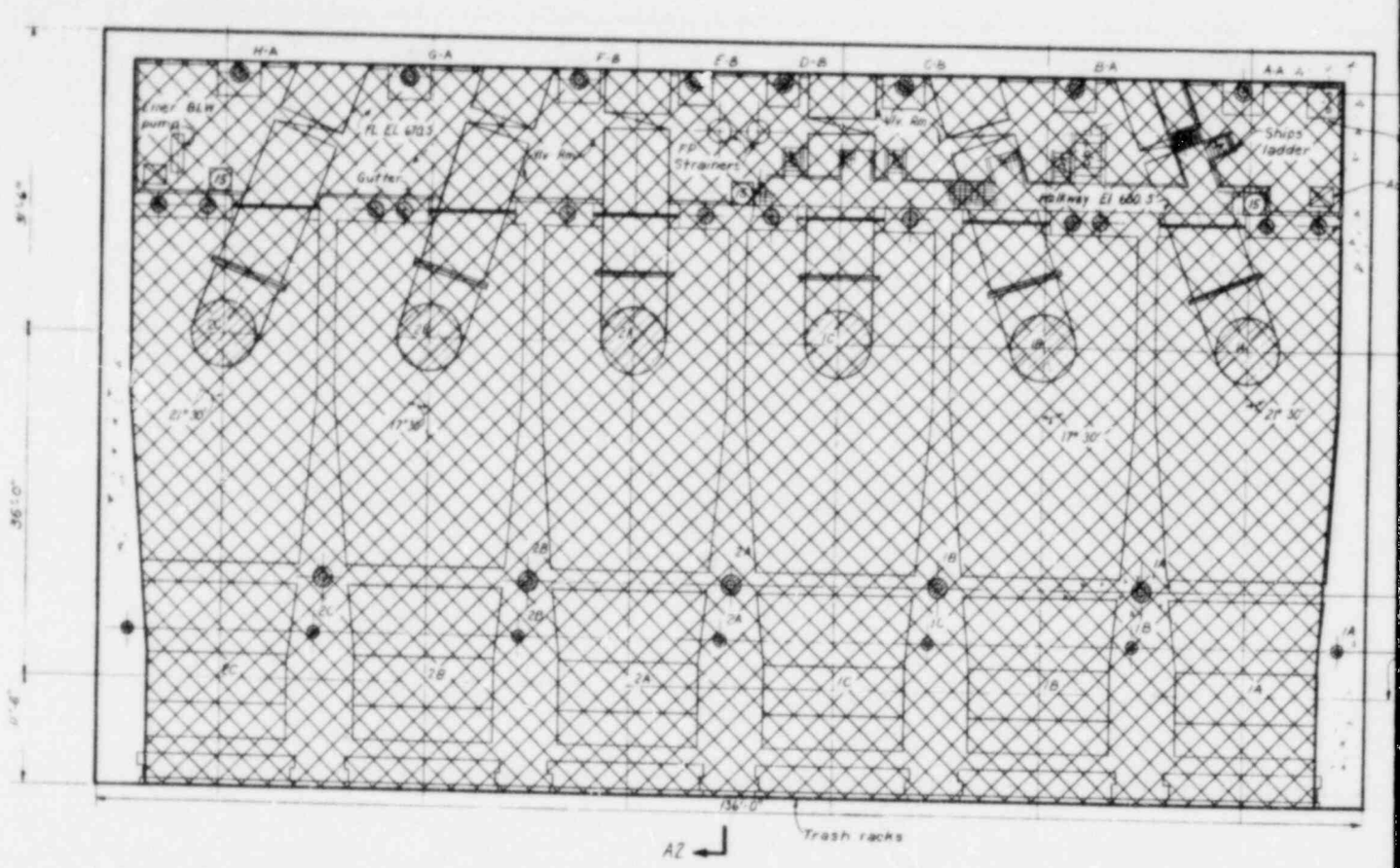
FIRE PROTECTION STUDY
COMPARTMENTATION FIRE CELLS
PLAN EL 690.0 & 705.0

SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

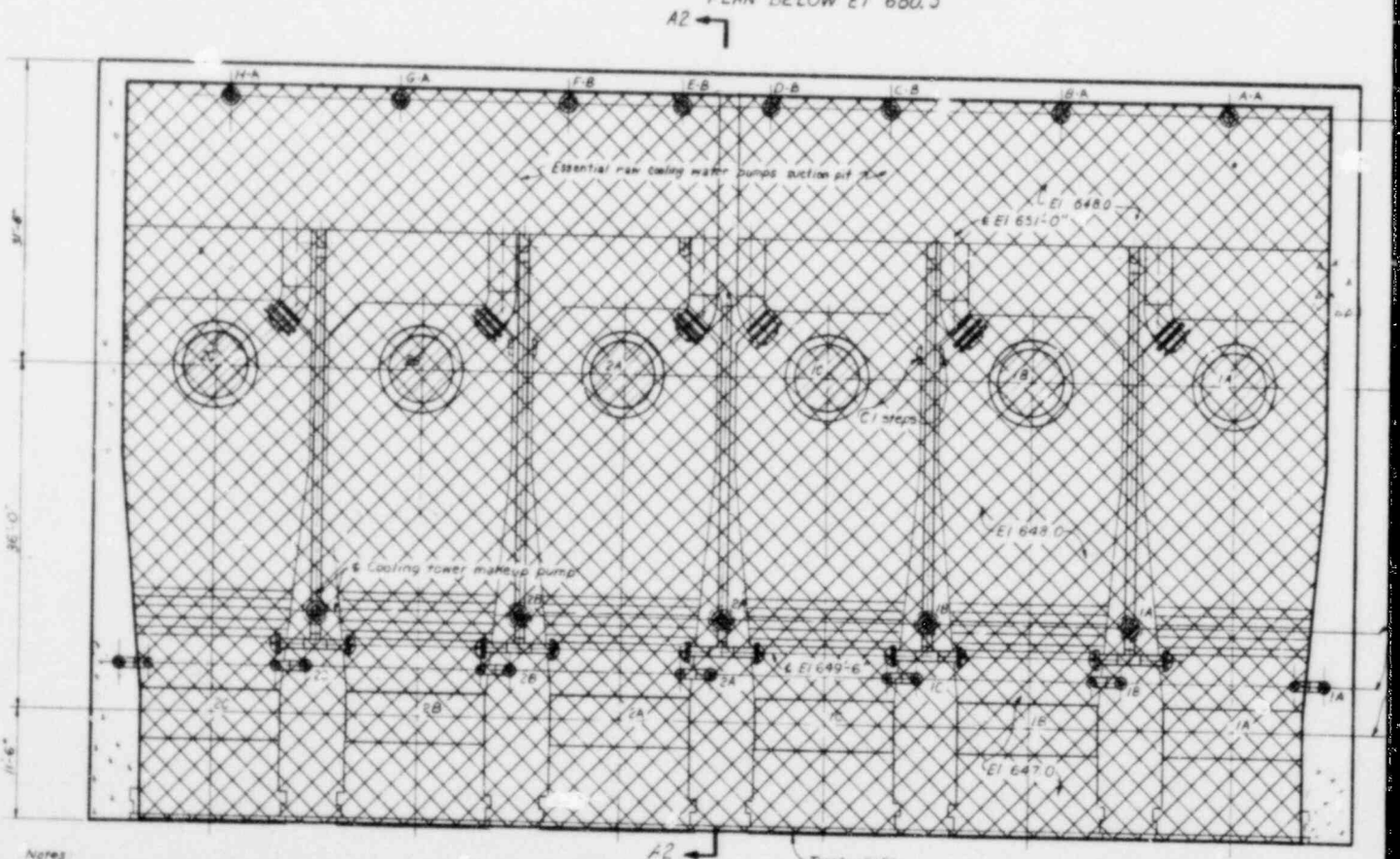
SUBMITTED	RECOMMENDED	APPROVED

KNOXVILLE	12-14-76	45	M	4	SK 1011	R1

SK1012



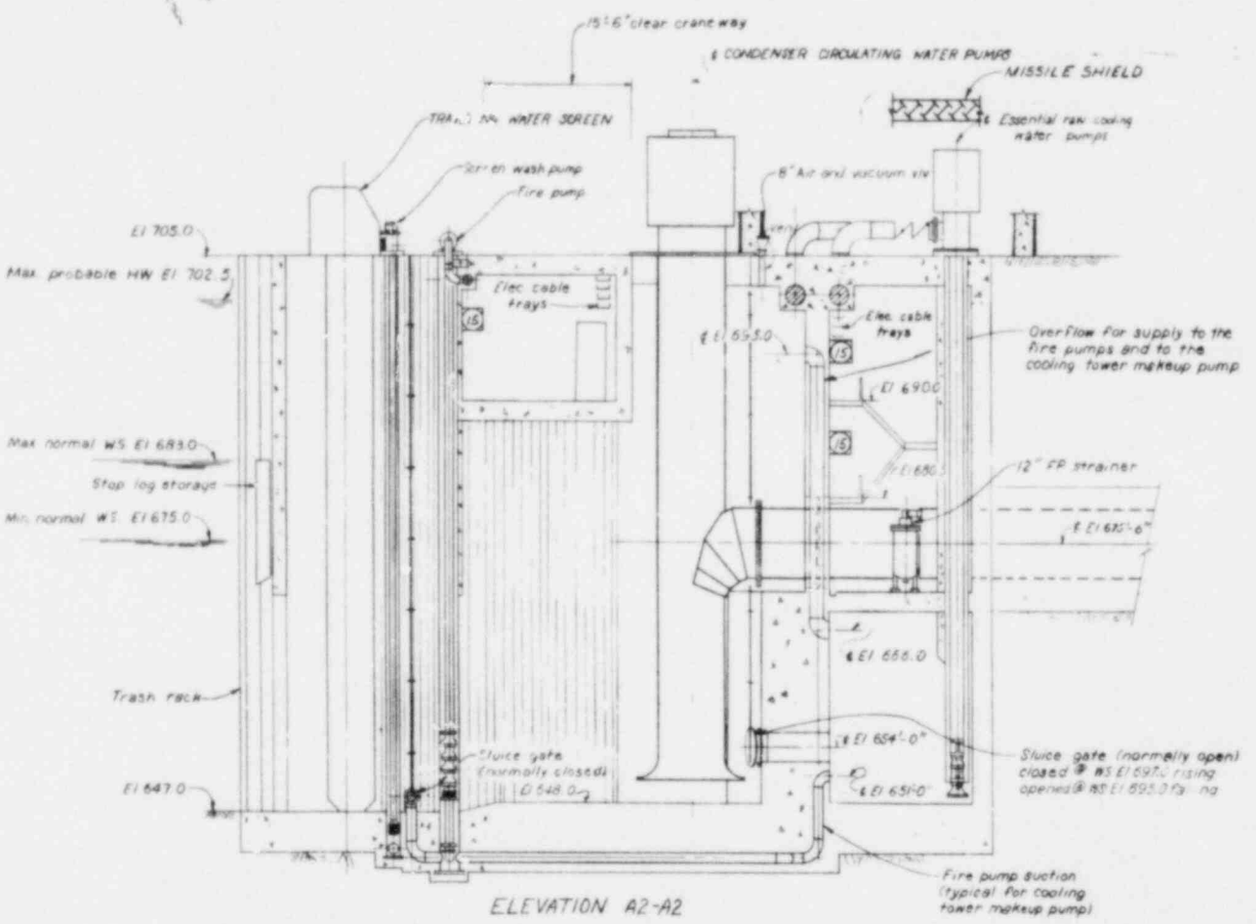
PLAN BELOW EL 680.5



Notes
A. Added fire protection service symbols ECN 1288

Minor Revisions ECN 3-1

PLAN BELOW EL 658.0



ELEVATION A2-A2

℄ ERCW pump wells

Sump pumps

ess MH

℄ CCW pump

℄ Fire pump wells

℄ Screen wash pump wells

℄ Traveling water screens

℄ ERCW pump

℄ CCW pump

℄ Fire pump wells

℄ Screen wash pump wells

℄ Traveling water screens

SPECIAL NOTE:
THOSE AREAS PERTAINING TO THE ERCW PUMPS SHALL BE DESIGNATED SAFETY RELATED ONLY DURING THAT INTERIM PERIOD OF ERCW UNIT ONE OPERATION & PRIOR TO UNIT TWO OPERATION — AFTER THIS PERIOD THIS PUMPING STATION SHALL BE DESIGNATED NON-SAFETY RELATED. FOR ERCW PUMPING STATION SEE DRWGS. 1K1009-1010

REV NO	ECN NO.	DATE	DSGN	DRWN	CHKD	SUPV	ENGR	INSP	SUBMITTED	RECM'D	APPD
1	2-21		SRW	EL 16	JAW						
	BOUNDARIES UPDATED PER ECN										

DSGN G.R. WISEMAN
DRWN S.L. CALHOUN
CHKD T.L. PENDLEY
SUPV T.L. PENDLEY
INSP P.W. BURNETTE
ENGINEER James J. Nash

WATER SUPPLY UNITS 1 & 2
PUMPING STATION

FIRE PROTECTION STUDY
COMPARTMENTATION - FIRE CELLS
PLAN EL. 658.0 & 680.5

SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED	RECOMMENDED	APPROVED
J.J. Nash	J.C. Ley	B.M. Burch

SCALE 1/8"=1'-0"

COMPANION DRAWING: SK1001

2. Item B - Administrative Procedures, Controls, and Fire Brigade - You plan to use administrative procedures, controls, and fire brigade programs previously accepted by the staff for the return to service of Browns Ferry, Units Nos. 1 and 2. We request that you review these procedures against the staff supplemental guidance contained in "Nuclear Plant Fire Protection Function Responsibilities, Administrative Controls, and Quality Assurance," dated June 14, 1977. It is our position that you either (1) confirm that your existing administrative procedures and fire brigade program meet the staff supplement guidelines, or (2) provide a commitment that they will be revised accordingly.

TVA Response

We are presently reviewing our administrative procedures, controls, and fire brigade programs against the staff supplemental guidance contained in "Nuclear Plant Fire Protection Function Responsibilities, Administrative Controls, and Quality Assurance," dated June 14, 1977. We plan to revise these procedures accordingly.

3. Item D, General Guidelines for Plant Protection

A. You state that the majority of the materials used will conform to NFPA definitions of noncombustible or limited combustible material. During our site visit, we noted that some materials such as ventilation duct insulation were not UL listed or FM approved. Therefore, modify your fire hazard analysis to include the limited combustibles or show that these materials will meet the criteria of Section C.4.a(4), BTP ASB 9.5-1, Revision 1.

B. For the following listed items substantiate their fire resistance capabilities as they pertain to safety-related areas or high hazard areas by verifying that their construction will be in accordance with a particular fire tested design. Identify the design, test method, and acceptance criteria.

(i) Rated fire barriers including floor, ceiling, wall systems, structural members and doors. Indicate the type of protective material used and the design number in reference to ASTM E-119.

(ii) Fire dampers and fire doors, including the installation of the same in ventilating ducts penetrating fire barriers of safety related areas; fire door dampers are required in a 3 hr. rated fire barrier penetration.

(iii) Fire barrier penetration seals around ducts, pipes, cables, cable trays, and conduit or any other openings. Verify that the seals will meet the 3 hr. requirements for ASTM E-119. Verify that the inplant cable tray supports are similar to the ones used in the fire tests and that, in case of collapse of the trays, the resultant unsupported load and torque on the penetration seal will not affect the integrity of the seal.

C. It is our position that where the fire loadings exceed a 1-1/2 hr. duration (see Table 6-8A, Fire Protection Handbook) and thus, exposes safety related conduit-cables or equipment that such barriers be upgraded to a 3 hr. fire resistance. Confirm that your design will meet this position.

D. You have not responded to the Appendix A guidelines concerning fire doors being locked and alarmed. Confirm that you will meet this position. In particular, all fire doors used to protect openings in the wall separating the control building from the turbine building be alarmed and annunciated in the control room. These circuits should be electrically supervised.

TVA Response

A. The duct insulation installed in safety-related plant areas has been tested by Underwriters Laboratories and has a flame spread rating of 25 and smoke developed rating of 50. TVA did not require the manufacturer to label the duct insulation.

B. (i) Compartmentation will be provided in accordance with the SK-1000 series compartmentation drawings. These drawings indicate the boundaries where fire-resistive construction and assemblies will be utilized to maintain the integrity of fire areas and fire cells. Additional information is provided in Table 1-1 showing the minimum fire resistive rating of the most limiting structural components in each area or cell.

A minimum three-hour fire resistive rating has been assigned to the construction between the following buildings:

Reactor Building and Auxiliary Building
Control Building and Auxiliary Building
Service Building and Auxiliary Building
Control Building and Turbine Building

The three-hour and 1-1/2-hour rated construction consists of reinforced concrete, reinforced concrete block, or metal lathe and plaster. Construction ratings are assigned based on the equivalency to similar construction denoted by Figure 6-7H of the NFPA Fire Protection Handbook and/or Data Sheet 1-21, Table 2, of Factory Mutual Loss Prevention Data for reinforced concrete and reinforced concrete block walls; and Data Sheet 1-21, Table 4 , of Factory Mutual Loss Prevention Data for plaster partitions.

A minimum three-hour fire rated coating of Pyrocrete 102 is applied to all exposed structural steel within the cable spreading room. Applications are in accordance with UL Design No. X-716 and Code approved design based on Design D-717 (BOCA R.R. 73-42-I-C-1-b).

UL-labeled fire door assemblies are provided in opening in most fire cell and fire area boundaries. The assemblies are tested in accordance with UL Standard 10B and have a fire resistance rating at least equivalent to the designated rating of the boundary. The nonlabeled boundary doors are listed in Tables 3.B.(i)-1, 3.B.(i)-2, and 3.B.(i)-3. These doors are identified by number in the SK-1000 series compartmentation drawings.

Table 3.B.(i)-1 lists Auxiliary Building special purpose doors which are designed to ASME standards and are of heavy welded steel construction. The doors have multiple side hinges and multiple latch points on the sides, top and bottom. TVA has evaluated these doors and determined that they provide an equivalent fire rating commensurate to the fuel loading in the areas or cells they separate.

Table 3.B.(i)-2 lists the security doors in the Main Control Room. The doors are made of bullet-resistant, heavy gauge steel and have not been tested by UL. However, the door manufacturer has certified that the doors are equivalent to UL tested fire doors rated for three hours.

Table 3.B.(i)-3 lists Auxiliary Building fire-rated door assemblies which will be added in fire wall openings presently containing nonrated doors or no doors.

B. (ii) Fire dampers or fire doors will be provided in ventilation ducts when the ducts penetrate fire barriers. The fire dampers/doors will have a fire resistance rating equivalent to the designated rating of the installed barrier as identified on the SK-1000 series compartmentation drawings.

Fire damper/doors provided after the submission of TVA's Fire Protection Program Reevaluation (forwarded to the NRC by letter from J. E. Gilleland to R. S. Boyd dated January 24, 1977) are UL listed and tested in accordance with UL Standards 10B or 555.

Fire dampers procured and installed prior to the submission of TVA's Fire Protection Program Reevaluation are not UL labeled. These dampers are listed in Tables 3.B.(ii)-1 and 3.B.(ii)-2.

The nonlabeled fire dampers identified in Table 3.B.(ii)-1 conform to the standards of the National Fire Protection Association that existed when the dampers were procured. These fire dampers have since been certified by the manufacturer to be equivalent to their presently manufactured UL-listed and labeled models. The location of these dampers is show on flow diagrams 47W866-2, -3, -4, and -11.

The fire dampers identified in Table 3.B.(ii)-2 are nonlabeled fire dampers procured under identical specifications as the fire dampers in Table 3.B.(ii)-1, but provided by a different manufacturer. These fire dampers comply with the 1966-1967 requirements of NFPA No. 90A. A detailed comparison of construction features of these dampers with the certified dampers identified in Table 3.B.(ii)-1 is presented in Table 3.B.(ii)-4. Construction features such as the frame design, blade dimensions, blade shaft and bearings, linkage, and materials compare favorably. Therefore, TVA feels that the dampers identified in Table 3.B.(ii)-2 are adequate in their installed configuration to provide the required compartmentation. The location of these dampers is shown on flow diagrams 47W866-2, -3, -4, and -11.

Table 3.B.(ii)-3 lists fire dampers which will be added in ventilation ducts penetrating fire barriers presently containing nonrated dampers or no dampers. The location of these dampers is shown on flow diagrams 47W866-2, -3, -4, -8, -9, and -11.

As a result of NRC concerns raised during the Sequoyah Nuclear Plant Fire Protection Reivew Meeting of February 12, 1979, additional fire dampers shall be installed in ventilation ducts penetrating the unit 1 auxiliary instrument room in C.B. and the refueling purification filter rooms in the auxiliary building. The installation schedule is indicated in the SCHEDULE FOR COMMITMENTS.

None of the fire dampers or fire doors have been installed in ventilation ducts in strict compliance with UL 555 or manufacturer's instructions. TVA discussed the installation details for these dampers/doors with the NRC Staff on February 12, 1979. It was agreed that the installation details meet the intent of UL 555 with one exception. TVA has installed two dampers, PCO-39-17A and O-31A-148, in ventilation ducts immediately below fire rated ceilings. Each damper will be enclosed in a 1-1/2-hour fire rated barrier that will extend around the ventilation duct to the ceiling.

B. (iii) The design of the Sequoyah electrical penetration fire stops (EPFS) for cables and cable trays and their installation are based on TVA tests of full-scale mockups that must seal against air pressure. The tested design was modified to provide a greater depth of sealant material to give protection equivalent to a 3-hour fire resistance rating. The modification was based on a similar design, using the same type of cables and sealant material, and tests conducted by others to the standard time-temperature curve of ASTM E-119.

The design of the wall and floor electrical penetration fire stops through a fire barrier utilize a separate cable sleeve or slot for each cable tray. The design and installation of these penetration fire stops employ Dow Corning 3-6548 silicone RTV (room temperature vulcanizing) foam as the sealant material and inorganic fire barrier materials. From each side of the wall or floor opening, the cables are separated within the cable sleeve or slot using an inorganic fiber. The sealant material is then installed within the cable sleeve or slot. The cable sleeve opening is covered with a fire barrier board that is cut to fit around the cables and cable tray configuration.

In addition, the exposed surfaces of cables are coated from the fire barrier board for a minimum distance of five feet or to the nearest electrical panel or enclosure with material similar to Flamemastic 77 that is approved by Factory Mutual Research Corporation. Typical electrical penetration firestops through walls and floors are shown in Figures 3.B.(iii)-1 and 3.B.(iii)-2, respectively. The bare metal barrier plate in the cable tray wall penetration shown in Figure 3.B.(iii)-1 will be protected or modified to afford a fire rating at least equivalent to that assigned to the installed fire barrier.

Conduit penetrations, containing cables, through designated fire barriers, utilize RTV silicone rubber as the sealant material. This material is installed around the cables

in either the end of the conduit termination or in the nearest available conduit box on each side of the barrier. Inorganic fiber is used on each side of the sealant material. Spare conduits are plugged or capped until used.

The sealant material used in cable tray penetration fire stops is Dow Corning's 3-6548 silicone RTV foam (components A and B). This material in its cured foam state is noncorrosive and fire resistant. A sample of this material has been tested by an independent laboratory according to ASTM E84, standard method of testing of "Surface Burning Characteristics of Building Materials." The result of the test was that the material has a flame spread rating of 20.

The fire barrier material used in the design and installation of the penetration fire stops employ a combination of inorganic fiber and fiber board similar to Johns-Manville Cerafiber and Cera Form Board. These materials are made from exceptionally high purity alumina and silica constituents and are capable of withstanding continuous exposure to a temperature range of 2000° to 2300° F.

TVA has conducted fire tests on full-scale assemblies of electrical penetration fire stops that must seal against air pressure. The required differential air pressure across the penetration under test was maintained by adjusting a normal damper together with an exhaust fan in the exhaust duct. An external gas burner was located under the cables outside the area of coated cables. The burner was ignited on the fire side of test facility and allowed to burn for 30 minutes before shutoff. The fire was allowed to self-extinguish; therefore, no water spray test was conducted.

The results of the tests were that no fire burned through the penetration onto the cold side of the test facility and pressure seal maintained its integrity. The results from the tests demonstrate that the design provides an effective fire stop and pressure seal under simulated conditions when tested as a completed system.

In addition, fire tests on similar designs using the same type of cables and sealant material have been conducted

by others. Test results are recorded in report serial No. 26543 dated October 28, 1975, of Factory Mutual Research Corporation. TVA has done a comparative study between the Sequoyah design of cable-cable tray penetration fire stops and cable penetration assemblies tested to ASTM E-119 in Factory Mutual (FM) report No. 26543. From this study TVA has determined that the Sequoyah cable penetration fire stops are equivalent to those portions of the FM test No. 26543 that passed a 3-hour ASTM E-119 fire test.

The installed cable tray supports are similar to those used in the fire tests. From a review of the design of the cable trays supports together with post-test observations of the TVA mockup, we have determined that in case of collapse of trays on the fire side of the barrier, no loss of seal integrity will occur.

The design of the inplant cable tray supports are typically shown in Figures 3.B.(iii)-1 and 3.B.(iii)-2 for wall and floor penetrations with cable trays, respectively. During the tests conducted by TVA, warpage of the cable trays and supports was observed to occur outside the cable coated area. No visual distortion of the cable trays or their supports was observed at the wall opening following the test.

The design of the mechanical penetration fire stops are based on similar designs that use the same type of sealant and damming materials and that have been tested by others to the standard time-temperature curve of ASTM E-119.

The design of the mechanical fire stops utilize pipe sleeves for each penetration. Fire stops for pipe and duct penetrations consist of foamed-in-place Dow Corning 3-6548 silicone RTV foam installed to a depth of 12 inches or the thickness of the wall (minimum 8 inches). A typcial pipe penetration fire stop is shown in Figure 3.B.(iii)-4.

In those pipe penetrations where pipe movements are present, a fire stop assembly consisting of a rolled silicone foam coated ceramic fiber blanket is wrapped around the pipe and stuffed into the sleeve on each side of the penetration. Airtight bellows seals are then installed over these fire stops. A typical fire stop of this type is shown in Figure 3.B.(iii)-5.

Fire tests on similar mechanical penetration fire stop designs have been conducted by Factory Mutual Research Corporation.

The results are recorded in Factory Mutual Report Serial No. 26543 dated October 28, 1975. The tests were performed following the procedures for evaluating floor-ceiling assemblies as defined under the Standard for Fire Testing of Building Construction and Materials ASTM E-119 (NFPA 251).

C. The following safety-related fire cells have been identified from the fire hazards analysis as having a fire loading greater than 120,000 Btu/ft^2.

(1) Auxiliary Instrument Rooms (unit 1, 685.0-C1; and unit 2, 685.0-C4).

(2) Cable Spreading Room (706.0-C2).

(3) Diesel Generator Rooms (1A-A, 2A-A, 1B-B, 2B-B).

(4) Diesel Generator Lube Oil Storage Room.

(5) 480V Electrical Board Rooms (1A-A, 2A-A, 1B-B, 2B-B)

(6) Intake Pump Station (El. 705.0 Upper Deck-ERCW Pump Trains)

(7) Additional Equipment Buildings

TVA will provide equivalent three-hour fire rated compartmentation for these fire cells with the exception of the Diesel Generator Rooms and the Auxiliary Instrument Rooms.

The Diesel Generator Rooms and their associated board rooms are not separated by fire barriers. However, the Diesel Generator Room and board room for each diesel generator are separated by three-hour fire rated barriers from the same rooms of other diesel generators.

The unit 1 and unit 2 auxiliary instrument rooms (685.0-C1 and C4) are separated from the Turbine Building and Auxiliary Building by minimum three-hour fire resistant barriers. The Auxiliary Instrument Rooms are separated from each other by two 1-1/2-hour fire resistant barriers, the nonsafety-related computer room, and a corridor. (Refer to compartmentation drawing SK-1006.)

Although the fire loading of each Auxiliary Instrument Room exceeds a 1-1/2-hour duration, the fire loading consists mainly of exposed cable insulation in trays and all exposed cabling within the rooms is coated with a fire retardant material similar to Flamemastic 77.

In addition, each Auxiliary Instrument Room is provided with an automatic total flooding CO_2 system actuated by cross-zoned ionization smoke detectors and rate compensated heat detectors. This is supplemented by a fire hose station located in each stairwell.

As indicated in the response to question 21, loss of either Auxiliary Instrument Room does not prevent the ability to achieve and maintain a safe shutdown condition.

Due to the above considerations, TVA takes the position that the two as-built 1-1/2-hour fire barriers that separate the safety-related Auxiliary Instrument Rooms are adequate.

D. The fire doors listed in Table 3.D-1 are alarmed through the security system's primary alarm station in the gatehouse and secondary alarm station in the control building. Refer to the SK-1000 series of compartmentation drawings for details showing door numbers and column lines. TVA does not propose to supervise the operation of other fire doors.

Doors separating the control building from the turbine building are normally closed, heavy equipment doors which are locked and operated by card readers. Operation of these doors (except for flood-pressure door C27) is alarmed in the main control room.

All of the heavy equipment doors separating the control and turbine buildings are augmented by 3-hour rated sliding fire doors which are held open by fusible links. There is no alarm capability associated with the sliding fire doors.

TABLE 3.B.(i)-1

Door No.	Door Type	Elevation	Column
A55	Flood door	690.0	s-t,A1
A57	Flood-pressure door	690.0	r-q,A1
A60	Pressure door	690.0	r-s,A1-A2
A64	Pressure door	690.0	u-v,A15-C13
A65	Flood door	690.0	v-w,A1-S1
A77	Pressure door	690.0	u-v,A1-S1
A78	Flood door	690.0	v-w,A15-C13
A101	Pressure door	706.0	u-v,A2-A3
A105	Pressure door	706.0	u-v,A13-A14
A112	Flood door	706.0	x-y,A5
A115	Pressure door	706.0	w-x,A6-A8
A123	Pressure door	714.0	t-u,A3
A132	Pressure door	714.0	t-u,A13
A152	Pressure door	734.0	t-u,A5
A153	Pressure door	734.0	t-u,A8
A154	Pressure door	734.0	u-w,A8-A10
A159	Pressure door	734.0	t-u,A11
A173	Pressure door	734.0	u-x,A5-A6
A184	Pressure door	749.0	r-s,A3-A4
A191	Pressure door	749.0	r-s,A12-A13
A214	Pressure door	714.0	w-x,A12-A13
A215	Pressure door	714.0	w-x,A3-A4

TABLE 3.B.(i)-2

Door No.	Door Type	Elevation	Column
C49	Security door	732.0	q,C4-C5
C50	Security door	732.0	q,C9-C10
C55	Security door	732.0	n,C9-C10
C56	Security door	732.0	n,C4

TABLE 3.B.(i)-3

Door No.	Elevation	Column	Remarks (See note)
A19	669.0	s-t,A6-A8	(1)
A20	669.0	s-t,A5-A6	(1)
A37	669.0	w,A8-A10	(1)
A38	669.0	w,A10-A11	(1)
A82	690.0	q,A4-A5	(1)
A83	690.0	r-s,A3-A4	(1)
A127	714.0	u-v,A6-A8	(1)
A128	714.0	u-v,A8-A10	(1)
A183	714.0	w-x,A3-A4	(2)
A192	714.0	w-x,A11-A12	(2)

Notes:

(1) Fire door modifications identified in Nonconformance Report SWP-78-S-2.

(2) Modifications resulting from commitments made in response to question 3.B.(i).

TABLE 3.B.(ii)-1

TVA Damper No.	TVA Drawing No.
0-31A-12	47W866-4
0-31A-20	
0-31A-25	
0-31A-26	
0-31A-8	
0-31A-39	
0-31A-159	
PCO-39-17A	
0-31A-13	
0-31A-21	
1-31C-792	47W866-3
2-31C-818	
1-31C-793	
2-31C-819	
1-31C-796	
2-31C-822	
1-31C-794	
2-31C-820	
1-31C-802	
2-31C-828	
1-31C-829	
2-31C-830	
1-31C-800	
2-31C-826	
1-31C-795	
2-31C-821	
1-31C-781	
2-31C-807	
1-31C-1199	47W866-2
2-31C-1333	47W866-11
1-31C-955	47W866-3
2-31C-955	
1-31C-777	
2-31C-803	
1-31C-957	
2-31C-957	
1-31C-1200	47W866-2
2-31C-1335	47W866-11

TABLE 3.B.(ii)-2

TVA Damper No.	TVA Drawing No.
1-31C-914	47W866-3
2-31C-914	
1-31C-908	
2-31C-908	
1-31C-926	
2-31C-926	
1-31C-913	
2-31C-913	
1-31C-906	
2-31C-906	
1-31C-941	
2-31C-941	
1-31C-949	
2-31C-949	
1-31C-935	
2-31C-935	
1-31C-1204	47W866-2
2-31C-1338	47W866-11
1-31C-1206	47W866-2
2-31C-1337	47W866-11
1-31C-918	47W866-3
2-31C-918	
1-31C-919	
2-31C-919	
1-31C-916	
2-31C-916	
1-31C-921	
2-31C-921	
0-31A-148	47W866-4

TABLE 3.B.(ii)-3

TVA Damper No.	TVA Drawing No.	Remarks (See note)
0-31A-243	47W866-4	(2)
0-31A-231		
0-31A-233		
0-31A-241		
0-31A-242		
0-31A-236		
0-31A-257		(1)
1-31C-1219	47W866-2	
1-31C-1220		
1-31C-1217		
1-31C-1218		
2-31C-1221	47W866-3	
2-31C-1222		
2-31C-1223	47W866-11	
1-31C-611	47W866-8	(2)
2-31C-662		
0-30-613	47W866-9	(1)
0-30-594		(2)

Notes:

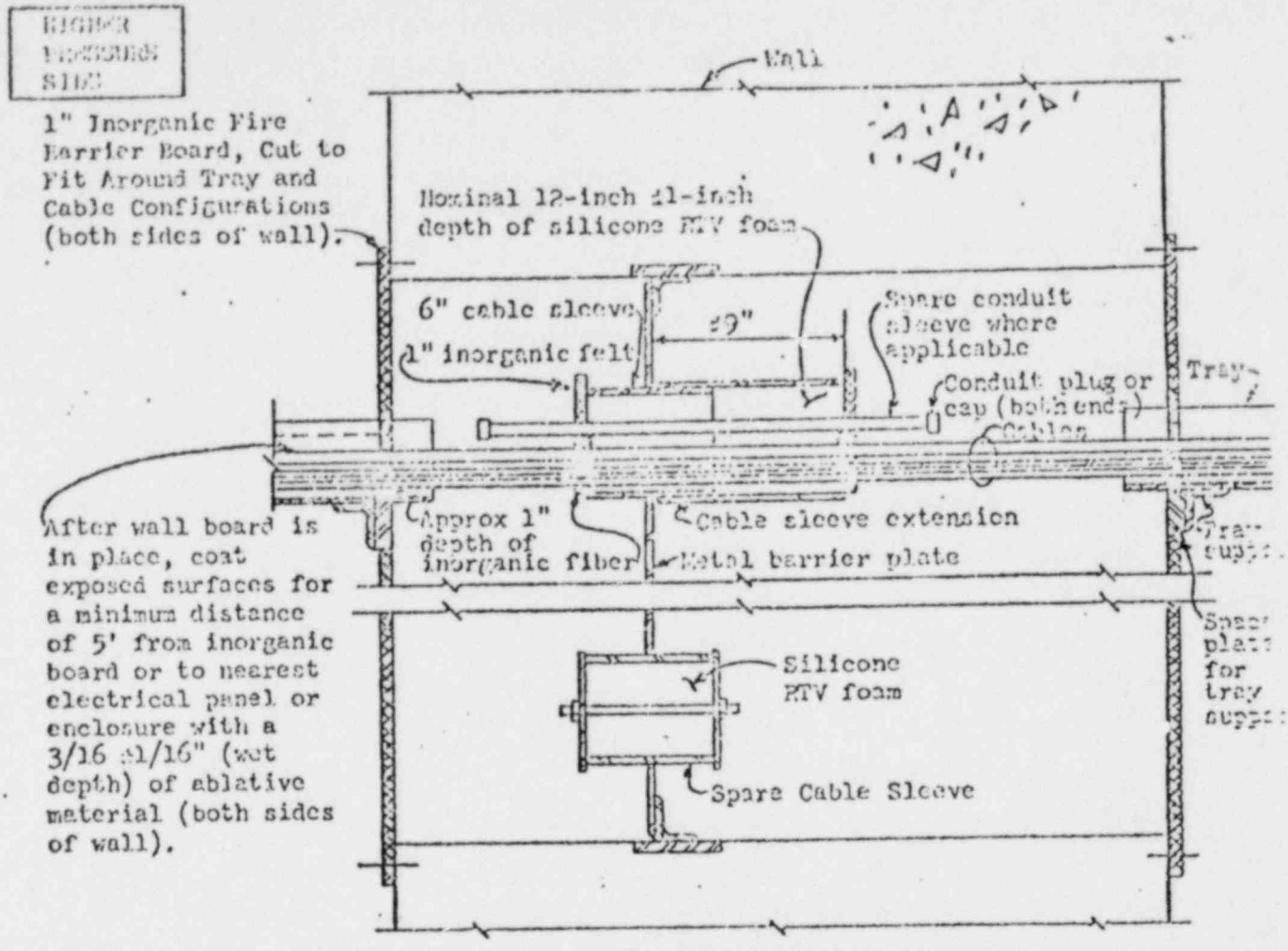
(1) Fire damper modifications identified in Nonconformance Report SWP-78-S-2.
(2) Modifications resulting from commitments made in response to question 3.B.(ii).

TABLE 3.B.(ii)-4

Feature	Dowco Corporation and American Foundry and Furnance Co., Model FNM-2003-16 (Non-Labeled)	Ruskin Manufacturing Company Model FD, FD/SS (Certified)
Frame Design	2" x 1/2" x 1/8" HR steel channel - Braced with 1/8" x 1" steel corner brace	3-1/2" x 7/8" x 16 ga. (1/16") galvanized with internally braced corners
Blade Dimensions	7" wide maximum, 16 ga. galvanized steel	6" wide, 16 ga. galvanized steel
Blade Shaft and Bearings	7/16" cadium steel shaft oil impregnated bearings	1/2" zinc plated shaft oilite bronze bearings
Linkage	1/4' diameter cadium plated CR steel	3/16" x 3/4" steel tiebars
Fusible Link	Yes - 160^{o}	Yes - 160^{o}
Finish	Zincilate-frame mill galvanized	Mill galvanized

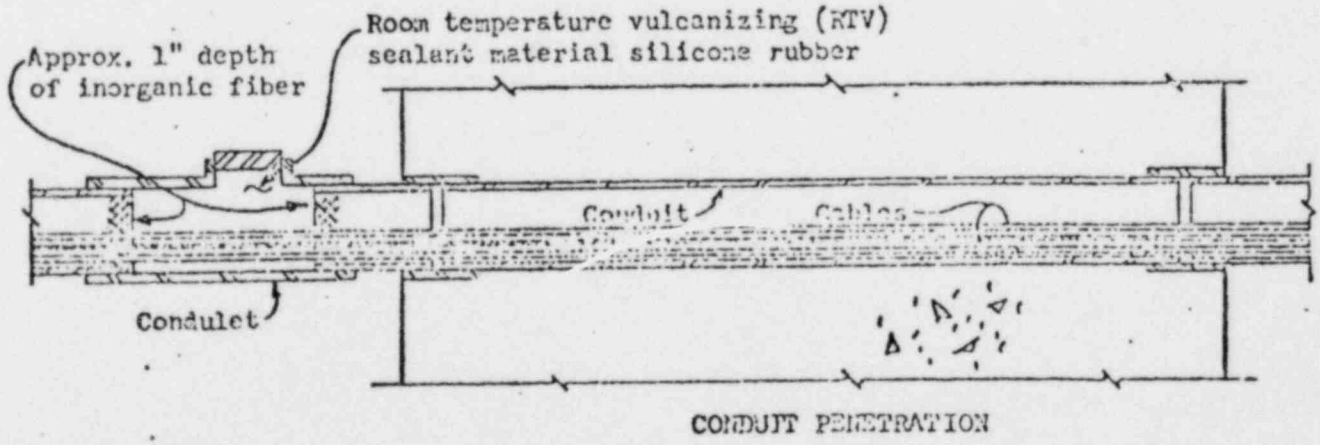
TABLE 3.D-1

Door No.	Building	Elevation	Column
A3	Auxiliary	653.0	t-u,A6-A7
A4	Auxiliary	653.0	t-u,A6-A7
A5	Auxiliary	653.0	u-v,A6-A7
A6	Auxiliary	653.0	v-w,A50A7
A8	Auxiliary	653.0	v-w,A9-A10
A9	Auxiliary	653.0	u-v,A9-A10
A10	Auxiliary	653.0	t-u,A9-A10
A11	Auxiliary	653.0	t-u,A9-A10
A25	Auxiliary	669.0	t-u,A2
A46	Auxiliary	669.0	t-u,A14
A117	Auxiliary	706.0	w-x,A3-A4
A118	Auxiliary	706.0	x-y,A12-A13
A125	Auxiliary	714.0	u-v,A2-A3
A130	Auxiliary	714.0	u-v,A13-A14
A169	Auxiliary	734.0	q-r,A11-A12
A170	Auxiliary	734.0	q-r,A11-A12
A172	Auxiliary	734.0	q-r,A8-A10
A181	Auxiliary	749.0	q-r,A6
A182	Auxiliary	749.0	q-r,A4
A194	Auxiliary	749.0	q-r,A12
A195	Auxiliary	749.0	q-r,A10
A203	Auxiliary	759.0	w-x,A4-A5
A204	Auxiliary	759.0	w-x,A11-A12
A207	Auxiliary	763.0	s-t,A6-A8
C1	Control	669.0	n-p,C3-C4
C10	Control	669.0	n-p,C9-C10
C12	Control	669.0	n-p,C10-C11
C21	Control	685.0	n-p,C3-C4
C22	Control	685.0	n-p,C6-C7
C23	Control	685.0	n-p,C6-C7
C24	Control	685.0	n-p,C7-C8
C25	Control	685.0	n-p,C10-C11
C30	Control	706.0	n-p,C3-C4
C33	Control	706.0	n-p,C10-C11
C49	Control	732.0	q,C4-C5
C50	Control	732.0	q,C9-C10
C51	Control	732.0	n-p,C12-C13
C52	Control	732.0	n-p,C10
C55	Control	732.0	n-p,C9-C10
C56	Control	732.0	n-p,C4-C5



CABLE TRAY PENETRATION

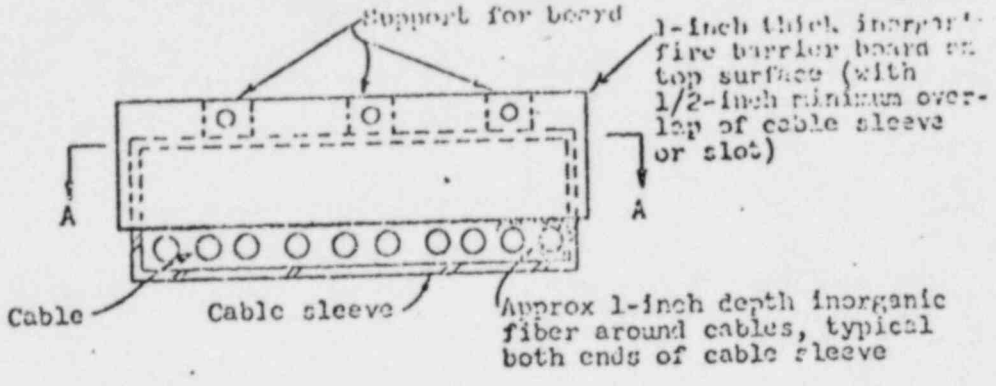
Typical of Wall Opening with Metal Barrier



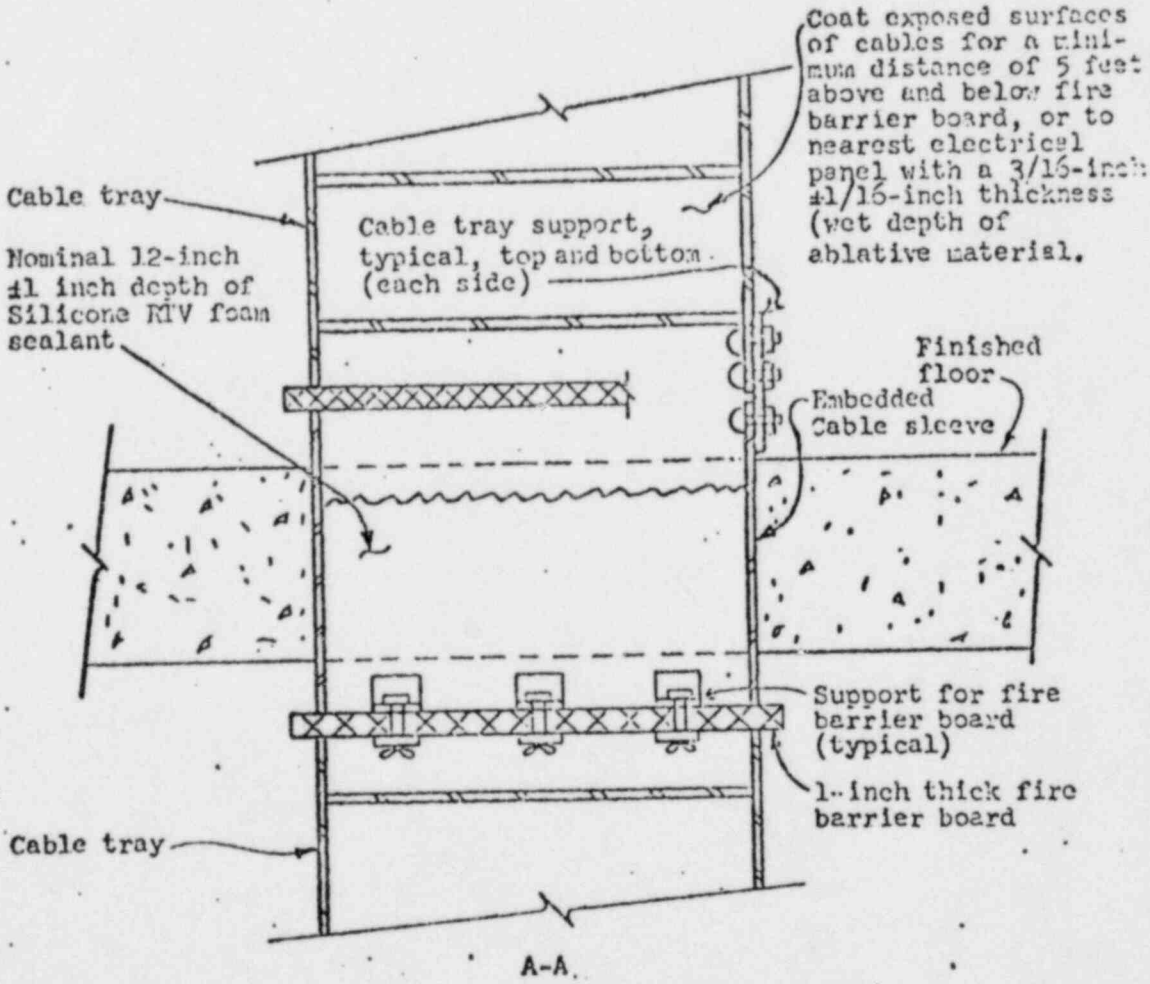
CONDUIT PENETRATION

Figure 3.B.(iii)-1

Typical Horizontal Electrical Penetration Fire Stops through Wall



TOP PLAN VIEW



A-A

ELEVATION

Figure 3.B.(iii)-2

Typical Vertical Electrical Penetration Fire Stop through Floor with Embedded Cable Sleeve

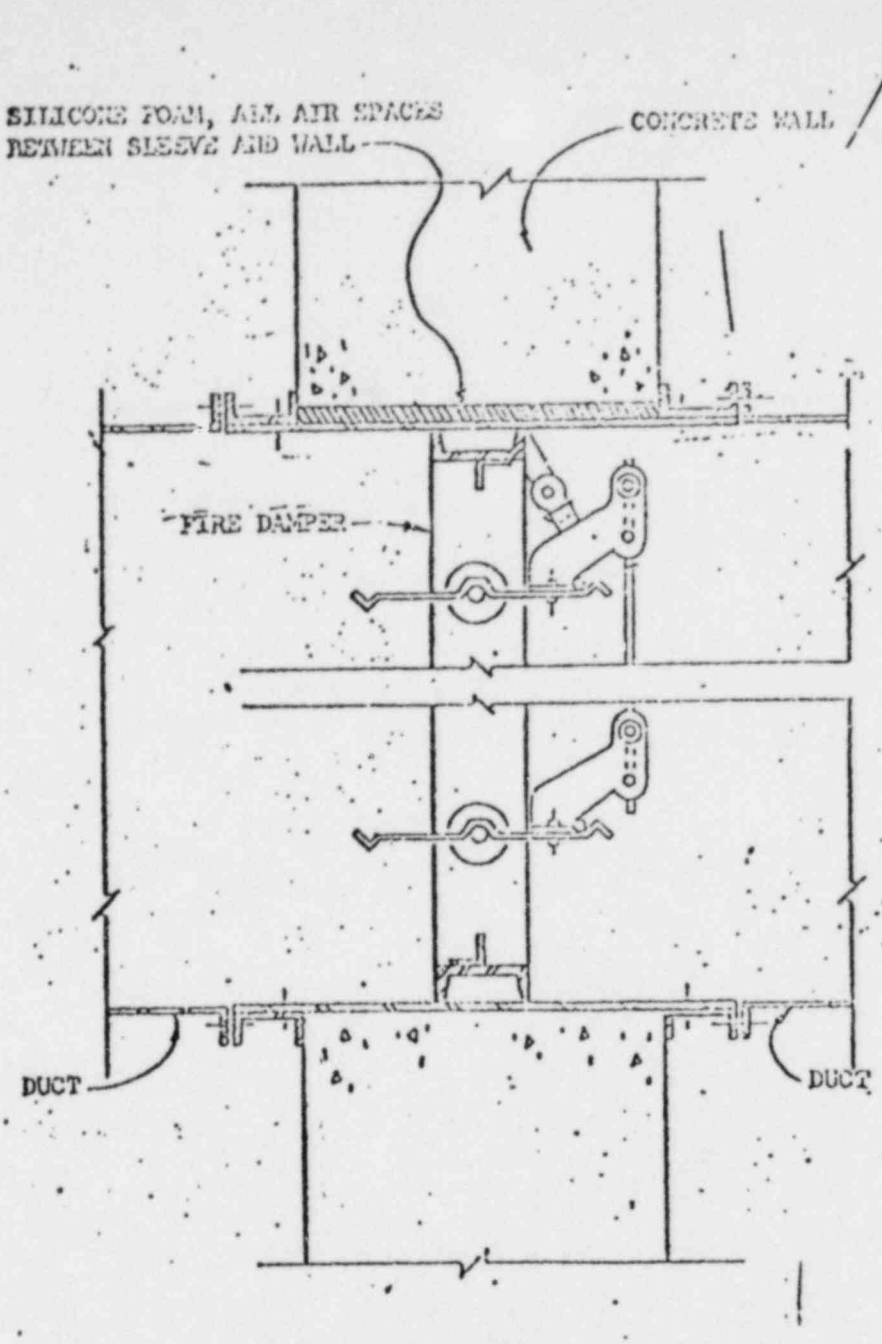


Figure 3.B.(iii)-3
TYPICAL FIRE DAMPER
PENETRATION FIRE STOP

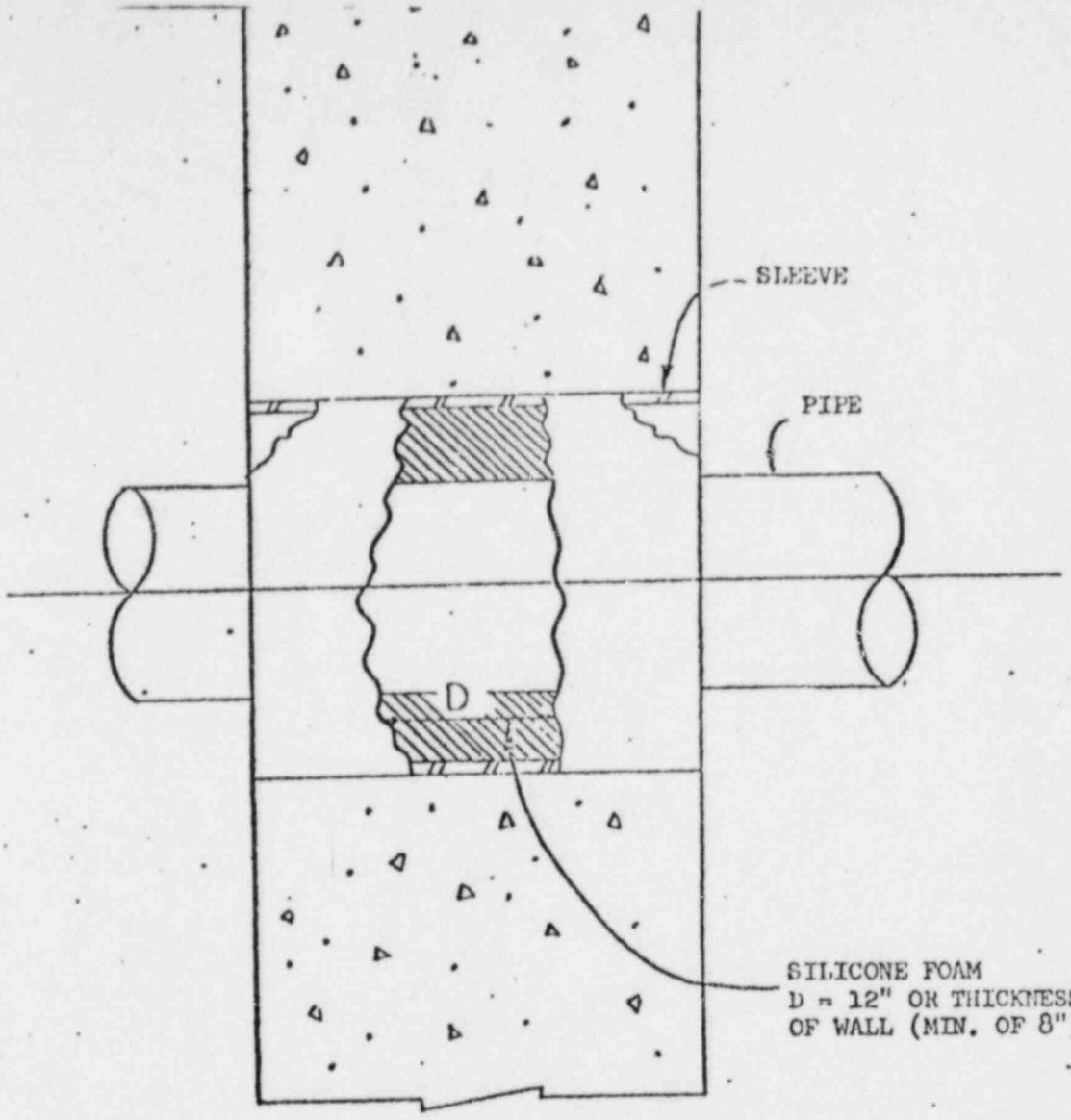


FIGURE 3.B.(iii)-4
TYPICAL PIPE PENETRATION FIRE STOP
(WITHOUT PIPE MOVEMENTS)

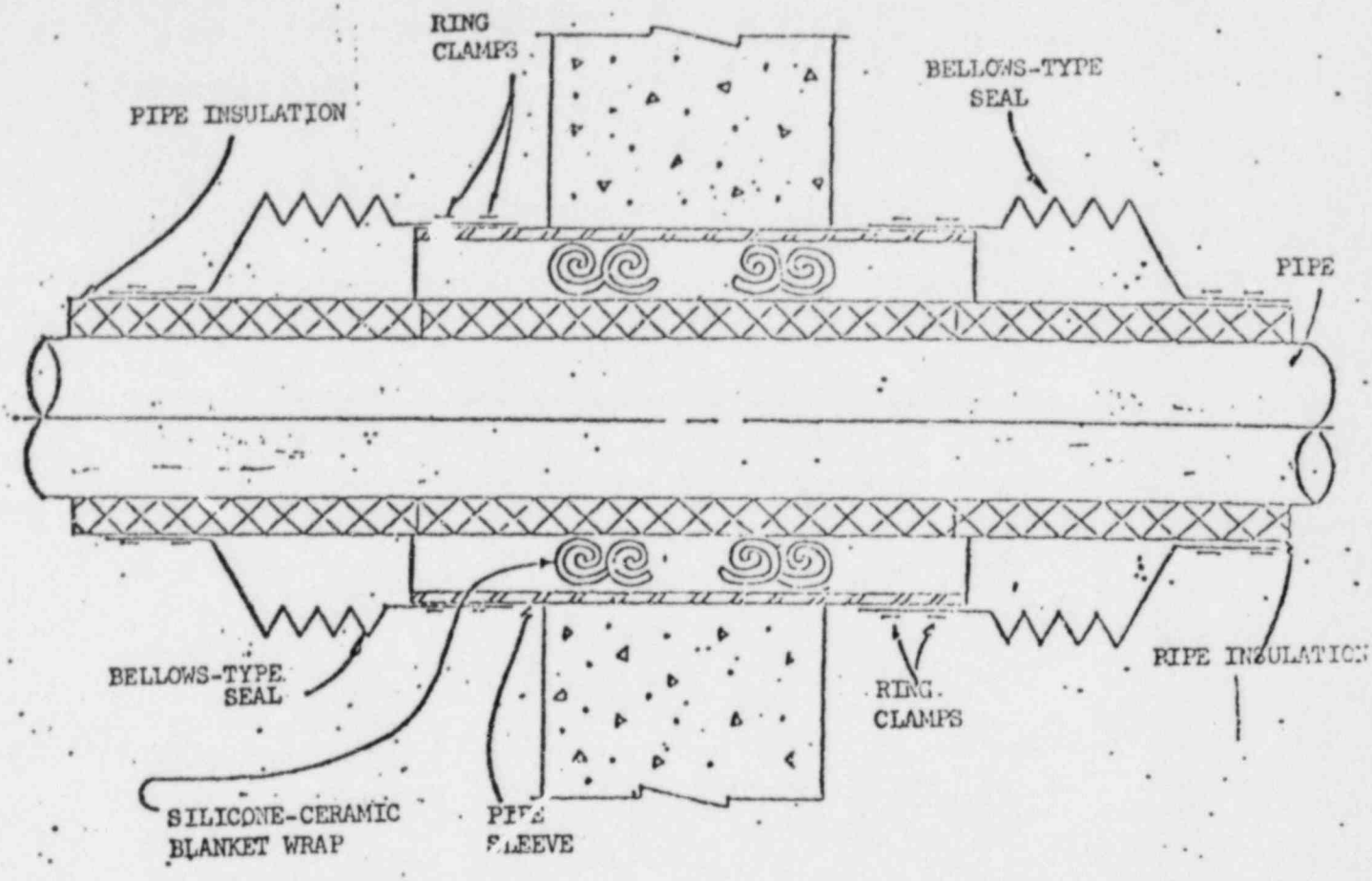
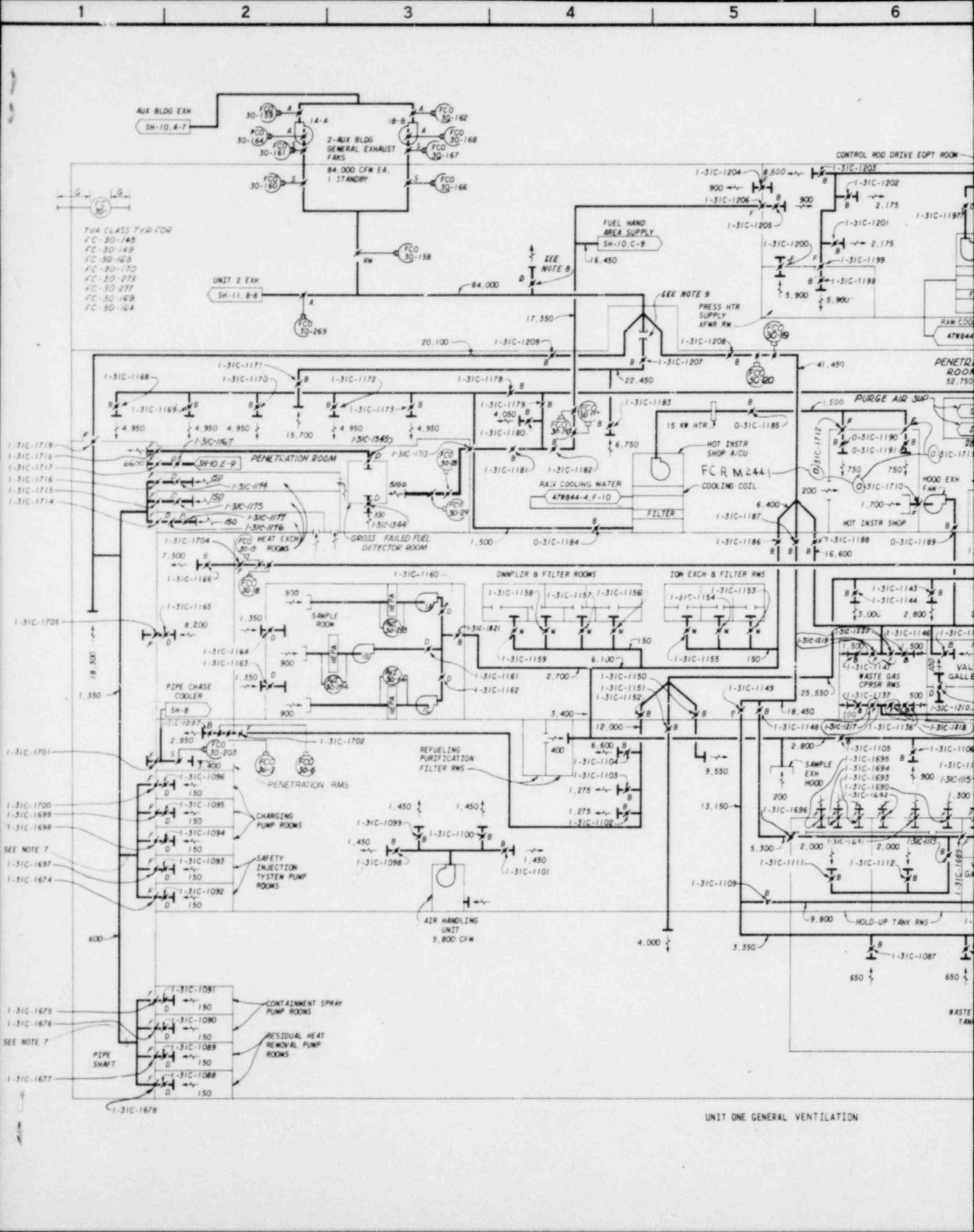
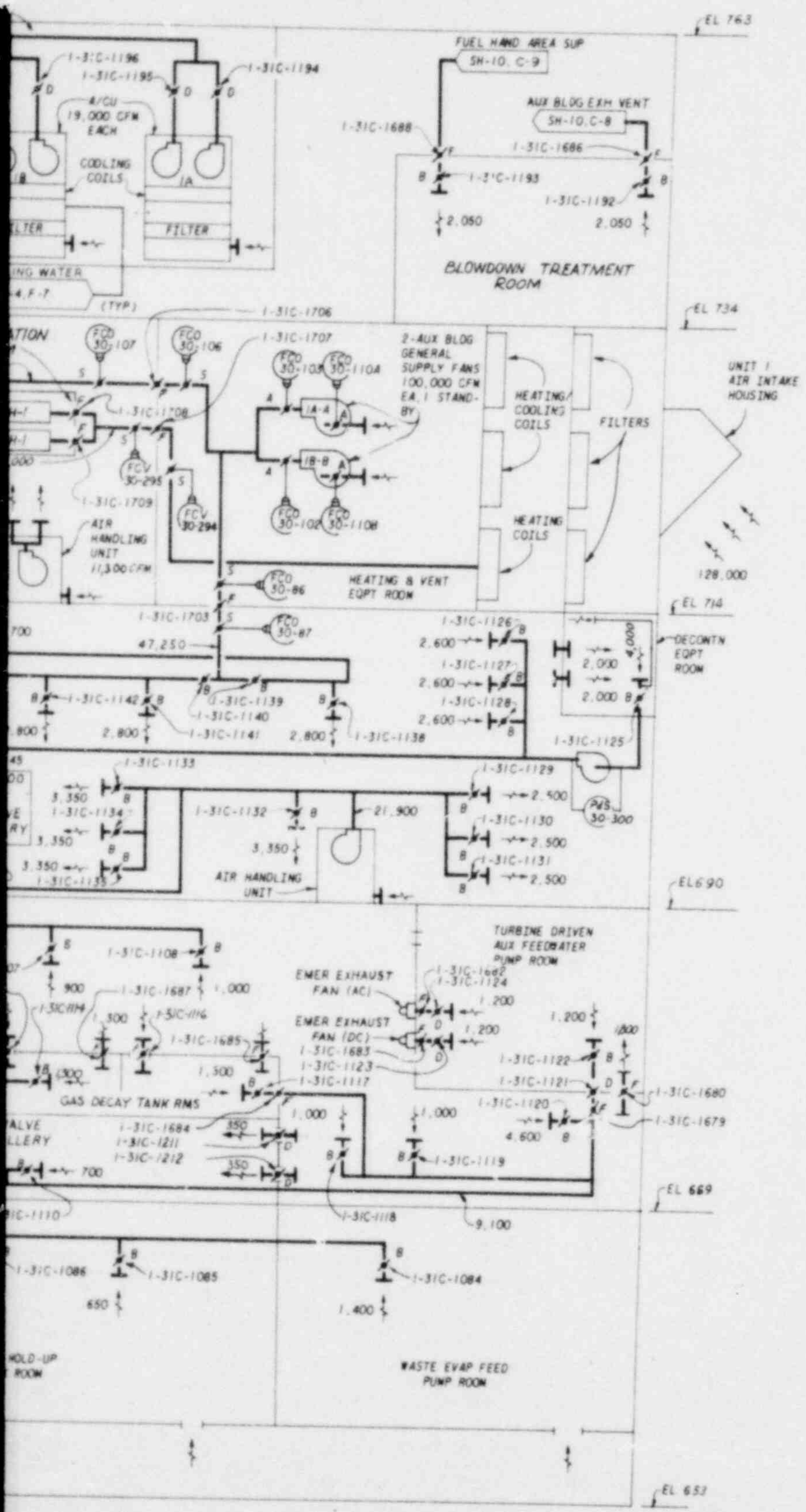


FIGURE 3.B.(iii)-5
TYPICAL PIPE PENETRATION FIRE STOP
(WITH PIPE MOVEMENTS)



UNIT ONE GENERAL VENTILATION

7 | 8 | 9 | 10 | 11 | 12



COMPANION DWGS
47W866-10, -11

NOTES:

1. SYSTEM IDENTIFICATION NUMBERS 30 & 31C.
2. FOR GENERAL NOTES, REFERENCE DRAWINGS, AND DAMPER LEGEND SEE 47W866-1.
3. FOR CHILLED WATER SUPPLY TO AIR HANDLING UNITS, AIR INTAKE COILS, AND HOT WATER SUPPLY TO AIR INTAKE COILS SEE 47W865 SERIES.
4. ALL AIR CONDITIONING DUCTWORK AND DUCTWORK BELOW EL 690.0 SHALL BE TVA CLASS U.
5. ALL DUCTWORK ABOVE EL690.0 SHALL BE TVA CLASS S (RECTANGULAR DUCTS) EXCEPT WHERE MARKED TVA CLASS Q (ROUND DUCTS).
6. DESIGN CRITERIA REFERENCE SQN-DC-7.9.
7. FULL FLOW VENTILATION WILL OCCUR ONLY WHEN PUMP ROOM DOORS ARE OPEN.
8. THIS GRILLE AND BACKDRAFT DAMPER TO BE USED ONLY DURING CONSTRUCTION OF UNIT 2.
9. THIS DUCT TO BE BLANKED OFF DURING UNIT 2 CONSTRUCTION.
10. DESIGN PRESSURE ABOVE ELEVATION 690.0 IS 6 IN-WG IN ACCORDANCE WITH SMACNA HIGH VELOCITY DUCT CONSTRUCTION STANDARDS FOR MEDIUM PRESSURE. DESIGN PRESSURE FOR DUCTWORK BELOW ELEVATION 690.0 IS 2 IN-WG IN ACCORDANCE WITH SMACNA LOW VELOCITY DUCT CONSTRUCTION STANDARDS. DUCTWORK SHALL BE TESTED IN ACCORDANCE WITH TVA GENERAL CONSTRUCTION SPECIFICATION NO. G-37.

REV NO	ECN NO	DATE	DESCRIPTION
16	2121, SI	1-9-79	ADDED FIRE DAMPERS & CHG VALVE TAG NO PER FCR M-2441
15	2006	[illegible]	DELETED HEPA FILTERS PER ECN
14	1934	6-5-78	ADDED TVA CLASS TO INST CONNECTIONS
13	1647	12-5-77	REMOVED FIRE DMPR FROM HOT INSTR SHOP EXHAUST
12	1647, 1634	9-23-77	ADDED FIRE PROT DMPR V NO'S & P&S; DELETED DUCT & FIRE DMPR
11	SI	6-20-77	ADDED BALANCING DAMPER TO SAMPLE ROOM EXHAUST
10	1647, 1634	4-8-77	ADDED FIRE PROT DMPRS & DECONTN EQPT RM EXH FAN
9	SI	8-16-76	REVISED FLOW RATE & MINOR REVISION
8	SI	4-21-76	ADDED NOTE 10.
7	SI, 1571, 1547	2-26-76	ADDED NOTE 7, INT ISOL DMPRS GROSS FAILED FUEL DET RM, MINOR REVISIONS
6	ECN 1466		DELETED MODULATING DMPRS FROM SAMPLE RM. ADDED PRESS DIFF INDICATORS
5	SI		ADDED DMPRS IN DOORS IN VALVE GALLERY.
4	ECN 1262	1-13-75	DRAWING REDRAWN

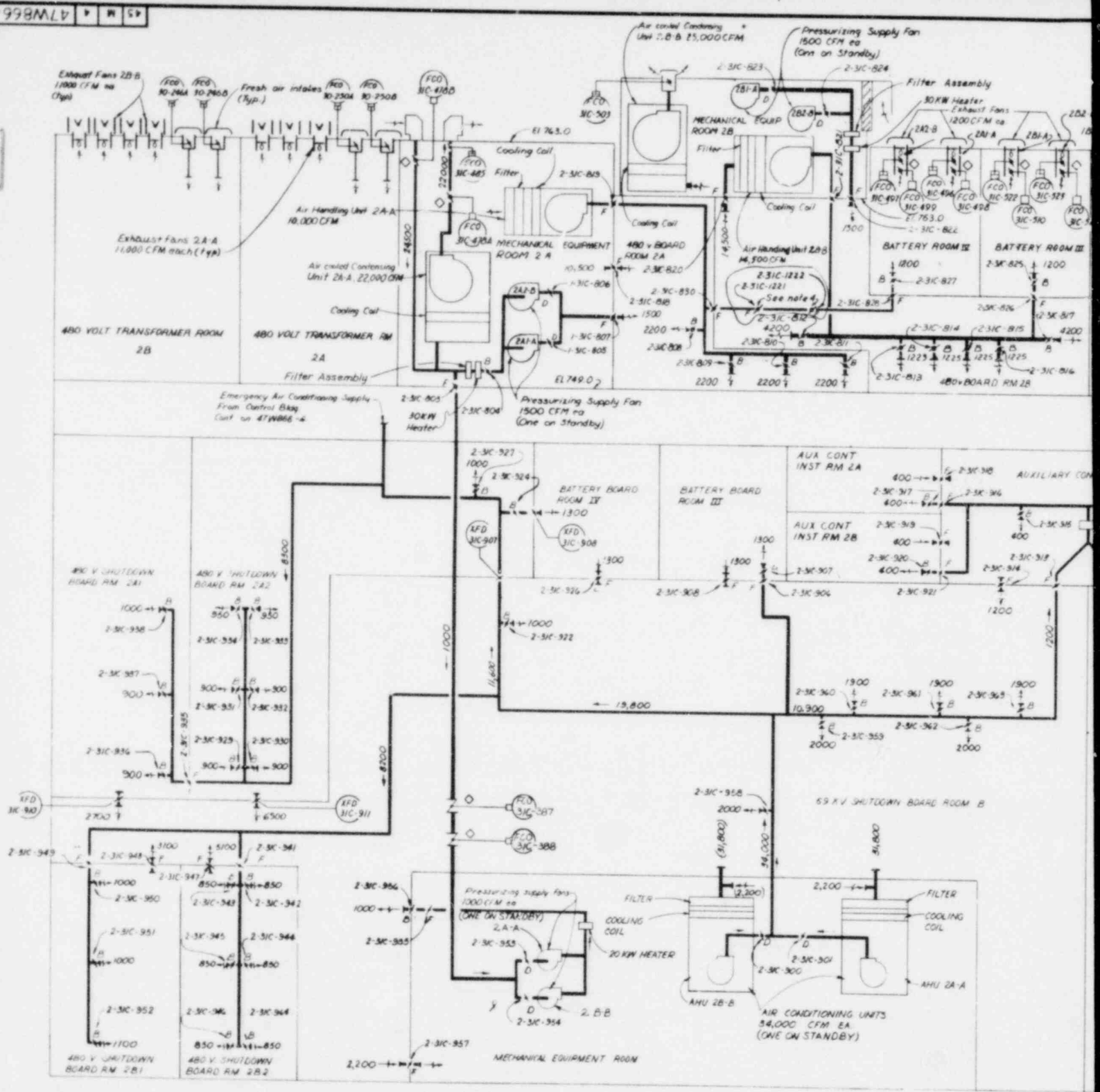
DSGN T.E. COLLINS, R.D. TOLLEY
DRWN C.W. PARKER
CHKD T.E. COLLINS
SUPV B.A. SINGILLI
INSP
ENGINEER Charles E. Bailey

POWERHOUSE
AUXILIARY BUILDING

FLOW DIAGRAM
HEATING & VENTILATING
AIR FLOW

SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED | RECOMMENDED | APPROVED



AIR FLOW
AUXILIARY BOA
SHUTDOWN BOA

NOTES:
1. For notes, ~~abbreviations, symbols~~, and damper legend, see 47W866-1.
2. Design pressure is 6 in-wg in accordance with SMACNA high velocity duct construction standards for medium pressure. Ductwork shall be tested in accordance with TVA General Construction Specification No. G-37.
3. Design Criteria Reference SQN-DC-7.9
4. The duct containing these fire dampers passes through the 480V Board Rm 2A, 480V Trans Rms 2A & 2B AND 480V Bd Rm. 2B to Battery Rm IV. There is a fire damper in each wall.

Reference Drawings:
47B366-31C Series, Instrument Tabulations
47B601-30 Series, Instrument Tabulations
47A366-31C Series, Valve Marker Tag Tabulations
47W865-8, Chilled Water Flow Diagram
47W865-6, Refrigerant Flow Diagram
47W867-5,6 and 7, EL 749 Control Diagram
47W867-8,9, EL 734 Control Diagram

SEE REV BLOCK AT RIGHT

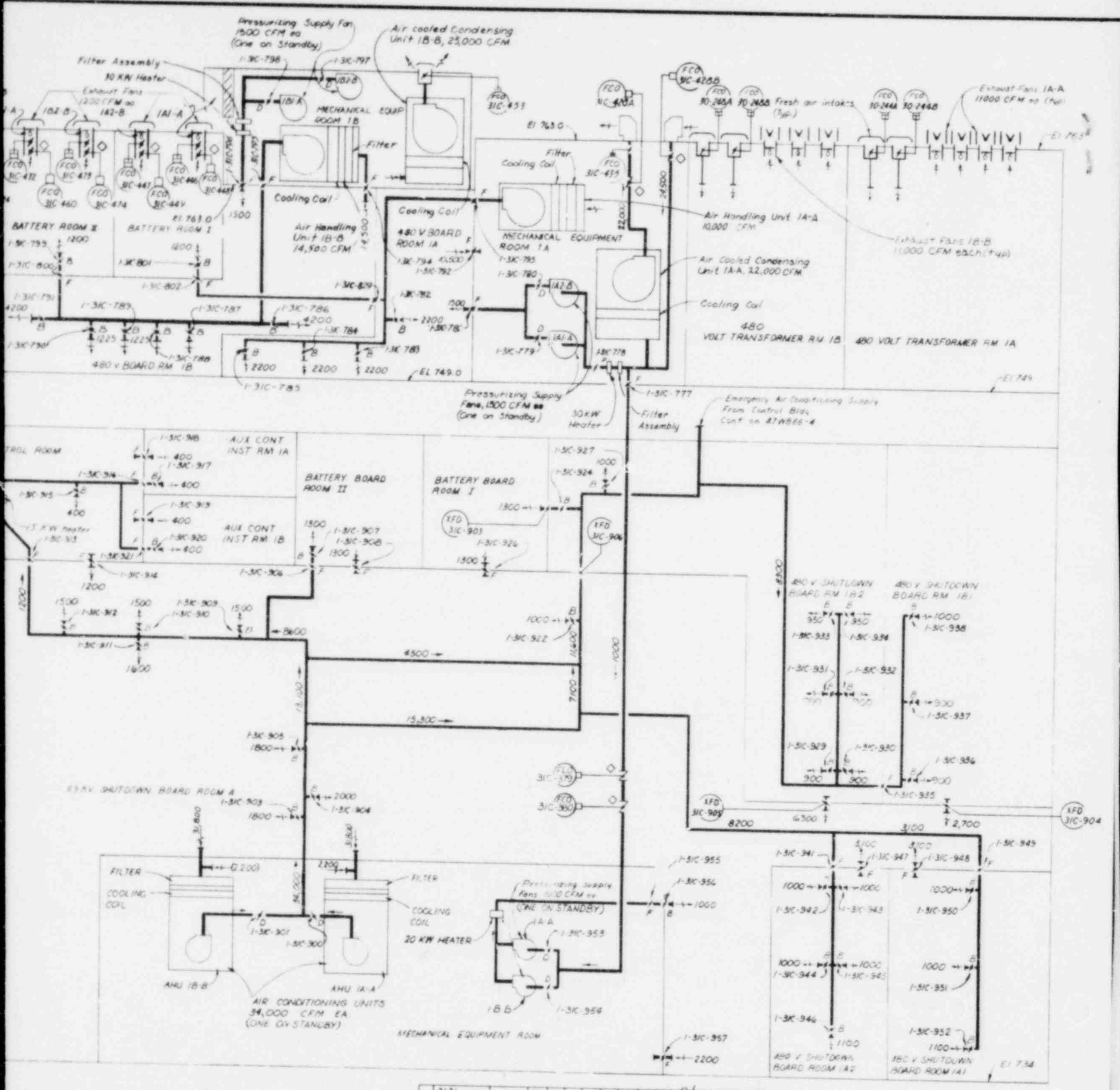


DIAGRAM
RD ROOMS El 749.0
RD ROOMS El 734.0

REV	ECN NO.	DATE	DESCRIPTION
11	2121	1-9-79	ADDED FIRE DAMPERS AND NOTE 4
10	1647	4-23-77	DELETED DAMPERS & CHGD DAMPER NOS
9	SI	6-30-77	CHANGED DAMPER NUMBERS & FAN DESIGNATION
8	1647	4-8-77	ADDED FIRE DAMPERS
7	SI	9-9-76	ADDED DAMPER SYM, CHG D FAN NO
6	SI	7-1-76	ADDED REF DWGS & NOTE 3, VARIOUS REV
5	SI	3-29-76	Added note 2.
4	[illegible]	[illegible]	[illegible]
3	ECN 1405	2-25-75	Installed 20 KW Heaters in Pressurizing Air Supply Ducts
2	[illegible]	[illegible]	Changed AHUs, air flow rates, press fan air supply source, added dampers, deleted hot instrument shop & C&DR room diagram, minor revisions
1	[illegible]	[illegible]	[illegible] minor revisions

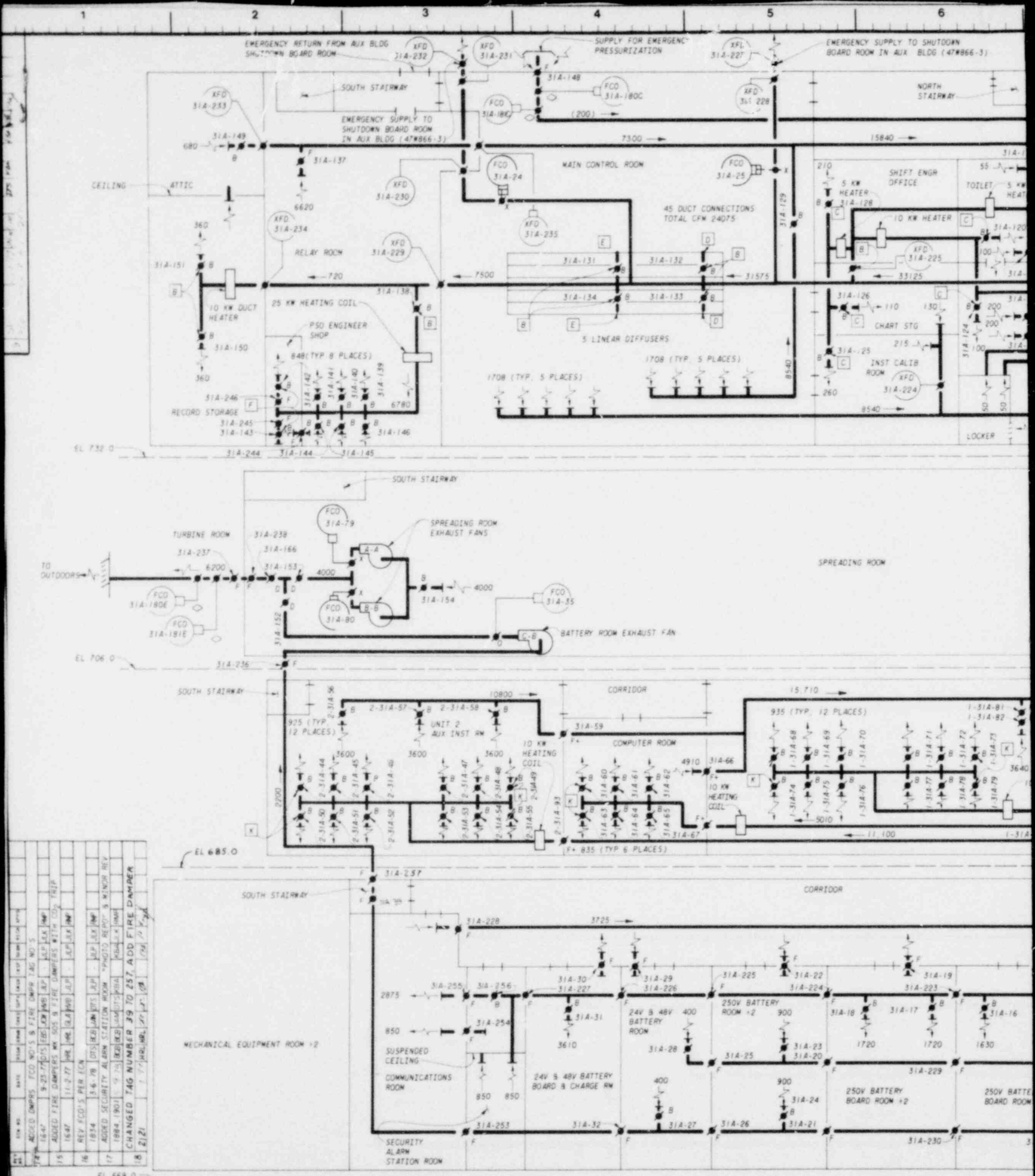
POWERHOUSE
AUXILIARY BUILDING

FLOW DIAGRAM
HEATING VENTILATING & AIR COND
AIR FLOW

SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED | RECOMMENDED | APPROVED

KNOXVILLE 4-27-72 47W866-3



1
2
3
4
5
6
EMERGENCY RETURN FROM AUX BLDG SHUTDOWN BOARD ROOM
SUPPLY FOR EMERGENCY PRESSURIZATION
EMERGENCY SUPPLY TO SHUTDOWN BOARD ROOM IN AUX BLDG (47W866-3)
SOUTH STAIRWAY
NORTH STAIRWAY
EMERGENCY SUPPLY TO SHUTDOWN BOARD ROOM IN AUX BLDG (47W866-3)
MAIN CONTROL ROOM
CEILING
ATTIC
RELAY ROOM
45 DUCT CONNECTIONS TOTAL CFM 24075
SHIFT ENGR OFFICE
TOILET
5 KW HEATER
10 KW HEATER
10 KW DUCT HEATER
25 KW HEATING COIL
PSO ENGINEER SHOP
5 LINEAR DIFFUSERS
CHART STG
INST CALIB ROOM
RECORD STORAGE
LOCKER
848 (TYP 8 PLACES)
1708 (TYP. 5 PLACES)
EL 732.0
SOUTH STAIRWAY
TURBINE ROOM
TO OUTDOORS
SPREADING ROOM EXHAUST FANS
SPREADING ROOM
BATTERY ROOM EXHAUST FAN
EL 706.0
SOUTH STAIRWAY
CORRIDOR
UNIT 2 AUX INST RM
10 KW HEATING COIL
COMPUTER ROOM
925 (TYP 12 PLACES)
935 (TYP. 12 PLACES)
835 (TYP 6 PLACES)
EL 685.0
SOUTH STAIRWAY
CORRIDOR
MECHANICAL EQUIPMENT ROOM +2
SUSPENDED CEILING
COMMUNICATIONS ROOM
24V & 48V BATTERY ROOM
24V & 48V BATTERY BOARD & CHARGE RM
250V BATTERY ROOM +2
250V BATTERY BOARD ROOM +2
SECURITY ALARM STATION ROOM
EL 669.0

14	1647	9-23-77	ADDED DMPRS, FCO NO'S & FIRE DMPR TAG NO'S
15	1647	11-2-77	ADDED FIRE DAMPERS WR 505 & FIRE DAMPERS WITH CO_2 TRIP
16	1834	3-6-78	REV FCO'S PER ECN
17	1884, 1901		ADDED SECURITY ALARM STATION ROOM "PHOTO REPRO & MINOR REV"
18	2121		CHANGED TAG NUMBER 39 TO 257, ADD FIRE DAMPER

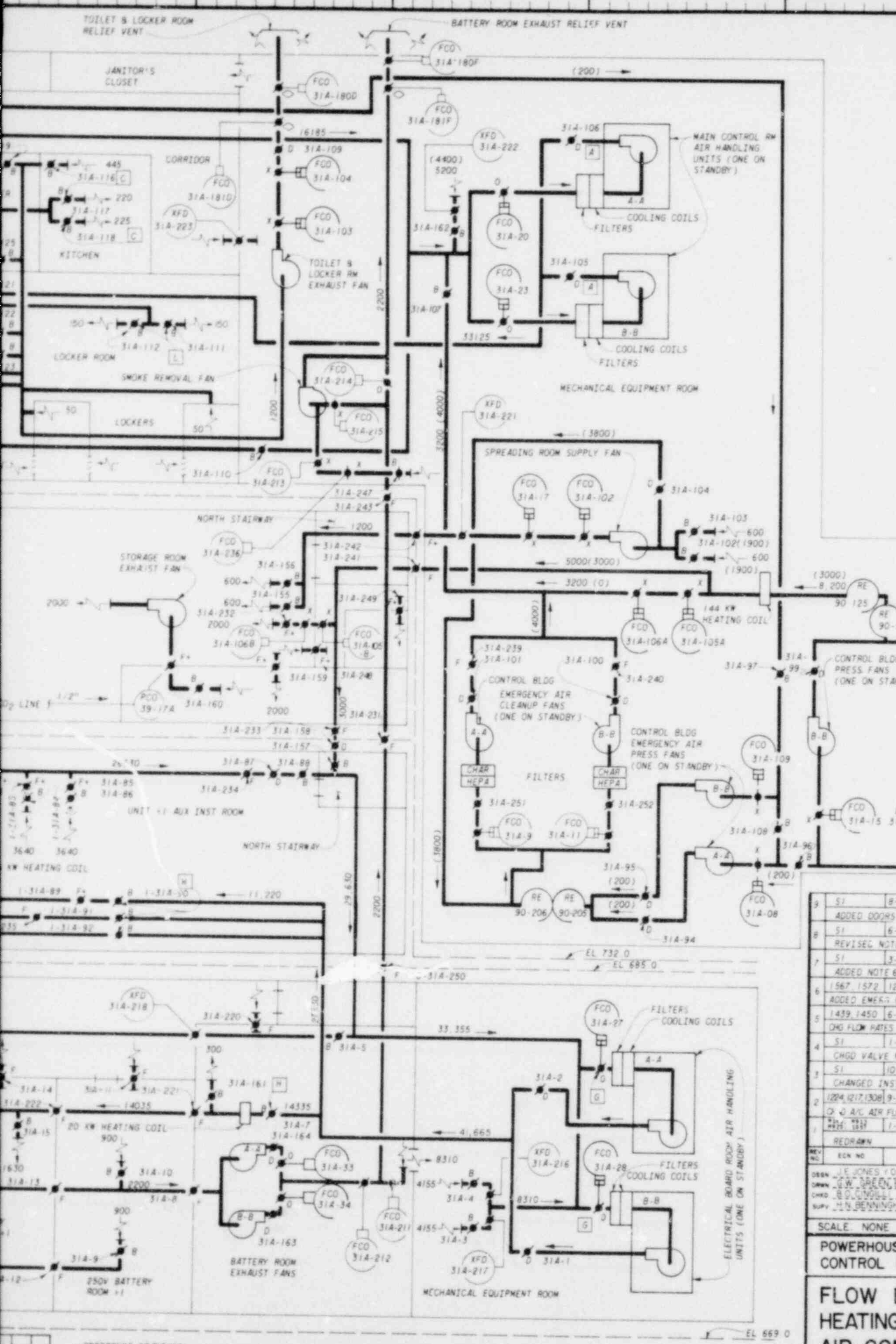
NOTES

1. THE AIR QUANTITIES SUPPLIED AND EXHAUSTED TO AND FROM EACH FLOOR ARE DESIGNED TO PRESSURIZE ALL FLOORS EXCEPT THE SPREADING ROOM
2. ONE BATTERY ROOM EXHAUST FAN SHALL BE IN OPERATION WITH THE OTHER TWO ON STANDBY
3. AIR QUANTITIES INDICATED THUS (200) ARE FLOW QUANTITIES FOR EMERGENCY OPERATION

EQUIPMENT IDENTIFICATION NUMBER, AND THE SECOND LETTER DESIGNATES THE POWER TRAIN ASSIGNMENT.

5. ALL VALVE TAG NUMBERS ARE PREFIXED BY -0- UNLESS OTHERWISE NOTED
6. DESIGN PRESSURE FOR CONTROL BUILDING DUCTWORK IS IN ACCORDANCE WITH TABLE 4. DUCTWORK SHALL BE TESTED IN ACCORDANCE WITH TVA GENERAL CONSTRUCTION SPECIFICATION NO. G-37.

13	51	6-30-77	DTS	EBS	JAM	HVB	JLP	-	JLP	JLX	RMP
	REV SMOKE REMOVAL DUCT, CHGD DMPR NOS. & REM DMPR										
12	1647, 1649	4-8-77	DTS	HRL	JAM	HVB	JLP	-	JLP	JLX	RMP
	ADDED FIRE DAMPERS AND ADDED SMOKE REMOVAL FAN										
11	51	12-20-76	BCJ	BCJ	DTS	HVB	JLP	-	JLP	JLX	RMP
	REMOVED DAMPERS & DUCT										
10	51	9-9-76	DTS	WJA	GLA	HVB	BOC	-	BOC	JLX	RMP
	ADDED REFS, TEIS AND VALVE NO										



DESIGN PRESSURE DUCTWORK WITH CONDITIONED PRESSURIZED AIR	
POINT TO POINT	PRESSURE IN W.G
A - B	1.75
B - C	0.20
B - D	0.25
B - E	0.25
B - F	0.50
G - H	1.80
H - J	0.50
H - K	1.00

TABLE A

REFERENCE DRAWINGS

47W865-3,7- - - - REFRIGERANT FLOW DIAGRAM
47W867-1,2,3- - - CONTROL DIAGRAMS
47A366-314-1 THRU 6 - VALVE MARKER TAG TABULATION
47B866-314-1 THRU 16 - INSTRUMENT TABULATIONS
SQN-DC-V-78 - DESIGN CRITERIA FOR CONTROL BUILDING AIR-CONDITIONING SYSTEM

DAMPER LEGEND

NORMALLY OPEN
NORMALLY CLOSED
FAILS CLOSED
FAILS OPEN
BALANCE
BACKDRAFT
FIRE
FAILS AS IS

REV NO	ECN NO	DATE	DSGN	[illegible]	CHKD	SUPV	ENGR	INSP	SUBM	RECM	APPD				
9	SI	8-12-76	DTS	JLG	GLA	HVB	BOC	-	BOC	JLK	RMP				
	ADDED DOORS, REF DWG, CHGD DUCT														
8	SI	6-.. 76	DTS	HRL	JWW	HVB	BOC		BOC	JLK	RMP				
	REVISED NOTE 6, ADDED TABLE A AND S.P. REF NO'S														
7	SI	3-29-76	RER	RER	[illegible]	HVB	BOC	-	BOC	JLK	RMP				
	ADDED NOTE 6														
6	1567, 1572	12-30-75	DTS	GWG	JWW	HVB	BOC	-	BOC	JLK	RMP				
	ADDED EMERG PRESSURE CROSSOVER, RELOCATED PSO ENGINEER SHOP														
5	1439, 1450	6-19-75	GLA	GWG	DTS	HVB	CLB	-	CLB	JLK	RMP				
	CHG FLOW RATES & RM DES, RELOCATED BATTERY RM EXH FAN REROUTED DUCT														
4	SI	1-13-75	DTS	ADH	BOC	HVB	CLB	-	CLB	JLK	RMP			RHC	
	CHGD VALVE MARKER TAGS, CHGD INST NOS														
3	SI	10-24-74	DLW	DLW	DTS	HVB	CLB	-	CLB	JCK	RMP			RHC	
	CHANGED INST NO'S														
2	1224, 1217, 1308	9-30-74	DTS	GWG	BOC	HVB	CLB	-	CLB	JCK	RMP			RHC	
	CHG A/C AIR FLOW QUANTITIES, CHG PRESS AIR INTAKE, ADDED DMPRS														
1	[illegible]	1-22-74	DTS	GWG	BOC	BOC	CLB	-	CLB	JCK	RMP				
	REDRAWN														

DSGN J.E. JONES / O.T. SOKOL
DRWN G.W. GREEN, B.J. GUTIERREZ
CHKD B.O. CINGILLI
SUPV H.N. BENNINGHOFF
INSP
ENGINEER C.L. BAILEY

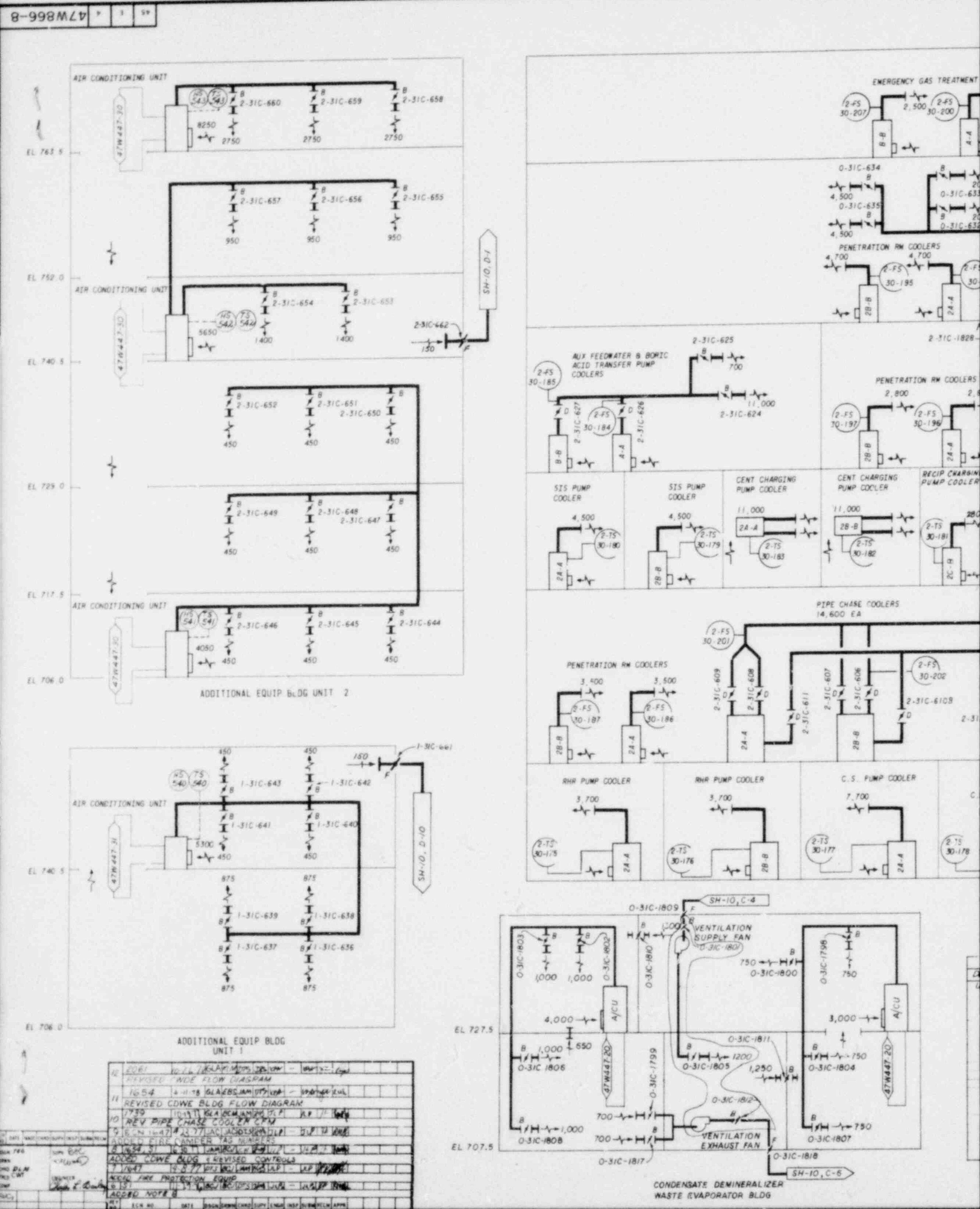
SCALE: NONE EXCEPT AS NOTED

POWERHOUSE
CONTROL BUILDING UNITS 1 & 2

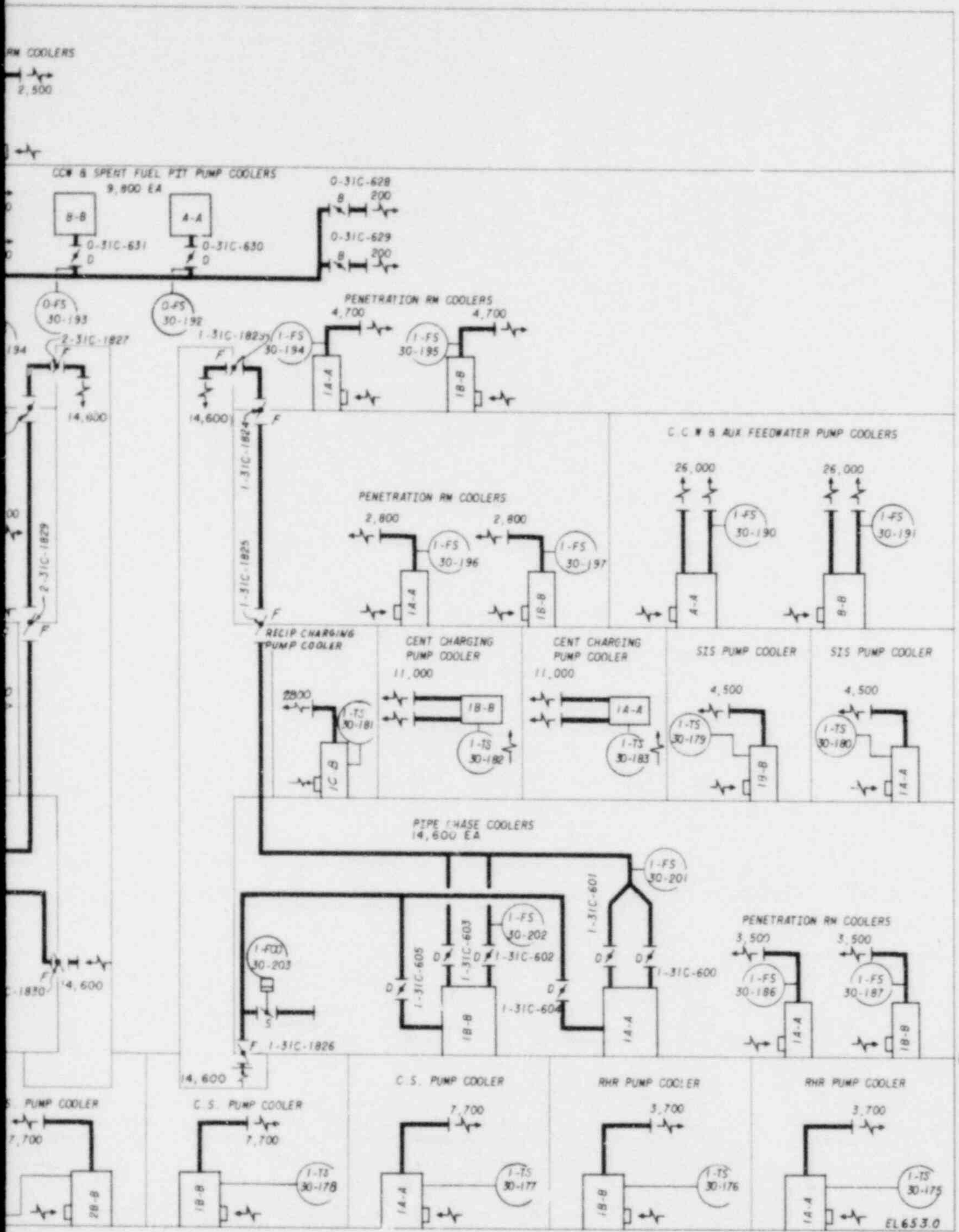
FLOW DIAGRAM
HEATING VENTILATING AND AIR CONDITIONING AIR FLOW

SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

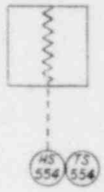
SUBMITTED | RECOMMENDED | APPROVED



47W866-8
AIR CONDITIONING UNIT
47W447-30
2-31C-660
2-31C-659
2-31C-658
8250
2750
EL 763.5
2-31C-657
2-31C-656
2-31C-655
950
EL 752.0
AIR CONDITIONING UNIT
2-31C-654
2-31C-653
5650
1400
2-31C-662
130
SH-10, D-1
EL 740.5
2-31C-652
2-31C-651
2-31C-650
450
EL 729.0
2-31C-649
2-31C-648
2-31C-647
EL 717.5
AIR CONDITIONING UNIT
2-31C-646
2-31C-645
2-31C-644
4050
EL 706.0
ADDITIONAL EQUIP BLDG UNIT 2
1-31C-661
160
1-31C-643
1-31C-642
AIR CONDITIONING UNIT
47W447-31
1-31C-641
1-31C-640
5300
SH-10, D-10
875
1-31C-639
1-31C-638
1-31C-637
1-31C-636
ADDITIONAL EQUIP BLDG UNIT 1
EMERGENCY GAS TREATMENT
2-FS 30-207
2,500
2-FS 30-200
0-31C-634
0-31C-635
0-31C-633
0-31C-632
4,500
PENETRATION RM COOLERS
4,700
2-FS 30-195
2-31C-1828
2-31C-625
AUX FEEDWATER & BORIC ACID TRANSFER PUMP COOLERS
2-FS 30-185
700
11,000
2-31C-624
2-31C-627
2-31C-626
2-FS 30-184
PENETRATION RM COOLERS
2,800
2-FS 30-197
2-FS 30-196
SIS PUMP COOLER
4,500
2-TS 30-180
2-TS 30-179
CENT CHARGING PUMP COOLER
11,000
2-TS 30-183
2-TS 30-182
RECIP CHARGING PUMP COOLER
2-TS 30-181
PIPE CHASE COOLERS
14,600 EA
2-FS 30-201
2-FS 30-202
PENETRATION RM COOLERS
3,500
2-FS 30-187
2-FS 30-186
2-31C-609
2-31C-608
2-31C-611
2-31C-607
2-31C-606
2-31C-6108
RHR PUMP COOLER
3,700
2-TS 30-175
2-TS 30-176
C.S. PUMP COOLER
7,700
2-TS 30-177
2-TS 30-178
0-31C-1809
SH-10, C-4
VENTILATION SUPPLY FAN
0-31C-1801
0-31C-1803
0-31C-1802
0-31C-1810
1,000
750
0-31C-1800
0-31C-1798
A/CU
4,000
3,000
EL 727.5
650
0-31C-1811
0-31C-1806
0-31C-1799
1200
0-31C-1805
1,250
0-31C-1804
47W447-20
0-31C-1812
700
0-31C-1808
VENTILATION EXHAUST FAN
0-31C-1807
EL 707.5
0-31C-1817
0-31C-1818
SH-10, C-5
CONDENSATE DEMINERALIZER WASTE EVAPORATOR BLDG
REVISED CWDE FLOW DIAGRAM
REVISED CDWE BLDG FLOW DIAGRAM
REV PIPE CHASE COOLER CFM
ADDED FIRE DAMPER TAG NUMBERS
ADDED CDWE BLDG & REVISED CONTROLS
ADDED FIRE PROTECTION EQUIP
ADDED NOTE 8



AUXILIARY BLDG



SPACE HEATER
TYPICAL FOR HS-31C-544 & TS-31C-544
THROUGH
HS-31C-558 AND TS-31C-558
SEE CHART

HEATERS & A/C UNITS			INSTRUMENTS		
DESIGNATION	ELEVATION	COL	UNIT	HS	TS
UNIT HEATER	706.0	A4½-Wb		544	544
				545	545
	740.5	A4-Wb		546	546
		A4½-Wb		547	547
	706.0	A11½-Xa	1	548	548
		A11½-Wa		549	549
	717.5	A11½-Xa		550	550
		A11½-Wa		551	551
	740.5	A11½-Xa		552	552
		A11½-Xa		553	553
	752.25	A11½-Wa		554	554
		A11½-Xa		555	555
	763.5	A11½-Xa		556	556
		A11½-Wa		557	557
		A11½-Wa	2	558	558
A/C UNIT	740.5	A5-Wb	1	540	540
	706.0	A11½-X	2	541	541
	740.5	A11½-X		542	542
	763.5	A11½-X		543	543

DAMPER LEGEND

FCO 30-203 S - AUTOMATIC OPERATING FOR ISOLATION

B BALANCING (MANUAL)

D BACK DRAFT DAMPER

GRILLE

REFERENCE DRAWINGS:
47W610-30-5 & 6
47W611-65-1
47W920
47W921-1, 2
47W485-4

NOTES:

1. SYSTEM IDENTIFICATION NUMBERS 30, 31C
2. FOR IDENTIFICATION OF SYMBOLS
   30B617 MECH INSTRUMENTATION SYMBOLS
   30B617 MECH FLOW & CONTROL DIAGRAM
3. FOR VALVE-MARKER-TAG TABULATION SEE 47A356-31C-1, 2
4. NUMBERS SHOWN THUS 1-31C-414 ARE VALVE MARKER TAG NUMBERS FOR UNIT 1. UNIT 2 NUMBERS ARE PREFIXED BY 2
5. NUMBERS SHOWN THUS 3,500 INDICATE FLOW IN CFM
6. TYPICAL INSTRUMENT NUMBERS SHOWN THUS (HS 554) AND (TS 554) ARE ABBREVIATED FORMS OF HS-31C-554 & TS-31C-554
7. DESIGN PRESSURE IN THE ADDITIONAL EQUIPMENT BUILDING IS 2 IN WG IN ACCORDANCE WITH SMACNA LOW VELOCITY DUCT CONSTRUCTION STANDARDS. DESIGN PRESSURE FOR AUXILIARY BUILDING ESF COOLER DUCTWORK IS 6 IN-WG IN ACCORDANCE WITH SMACNA HIGH VELOCITY DUCT CONSTRUCTION STANDARDS. DUCTWORK SHALL BE TESTED IN ACCORDANCE WITH TVA GENERAL CONSTRUCTION SPECIFICATION G-37.
8. ERCW FOR AUXILIARY BUILDING ESF COOLER IS SHOWN ON 47W845-4.

REV NO.	ECN NO.	DATE	DSGN	DRWN	CHKD	SUPV	ENGR	INSP	SUBM	RECM	APPR
5	SI	3-12-76	GLA	HRL	[illegible]	[illegible]	BC	-	[illegible]	[illegible]	[illegible]
	Added pump cooler names & minor revision										
4	SI	3-29-76	RER	RER	GLA	[illegible]	[illegible]	-	BC	[illegible]	[illegible]
	Added note 7.										
3	SI	9-25-75	BC	ABG	[illegible]	[illegible]	[illegible]	-	BC	[illegible]	[illegible]
	ADDED INSTRUMENT NO. 3 (NOT CIRCLED) & REVISED NOTE										
2	ECN 1465	7-28-75	CWP	RER	TEC	[illegible]	[illegible]	-	BC	[illegible]	[illegible]
	ADDED ADD EQPT BLDG EXH.										
1	SI	1-13-75	CWP	CWP	TEC	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]
	ADDED RAW COOLING WATER REFERENCES, TYPICAL DETAIL FOR SPACE HTRS, LOCATION CHART FOR HTRS, A/C UNITS, AND INSTRS. NOTE 7.										

POWERHOUSE

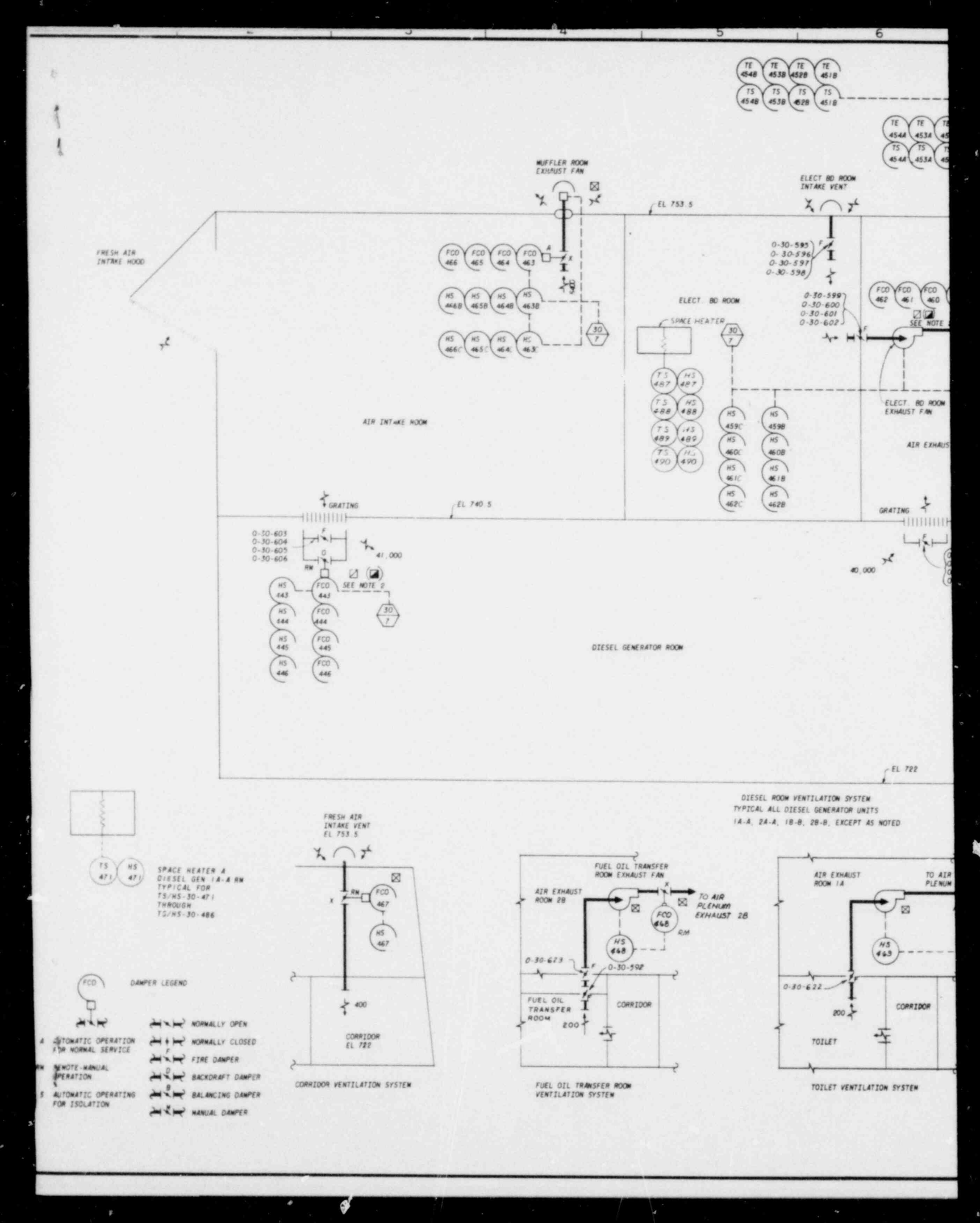
AUX BLDG & ADDITIONAL EQUIP. BLDG

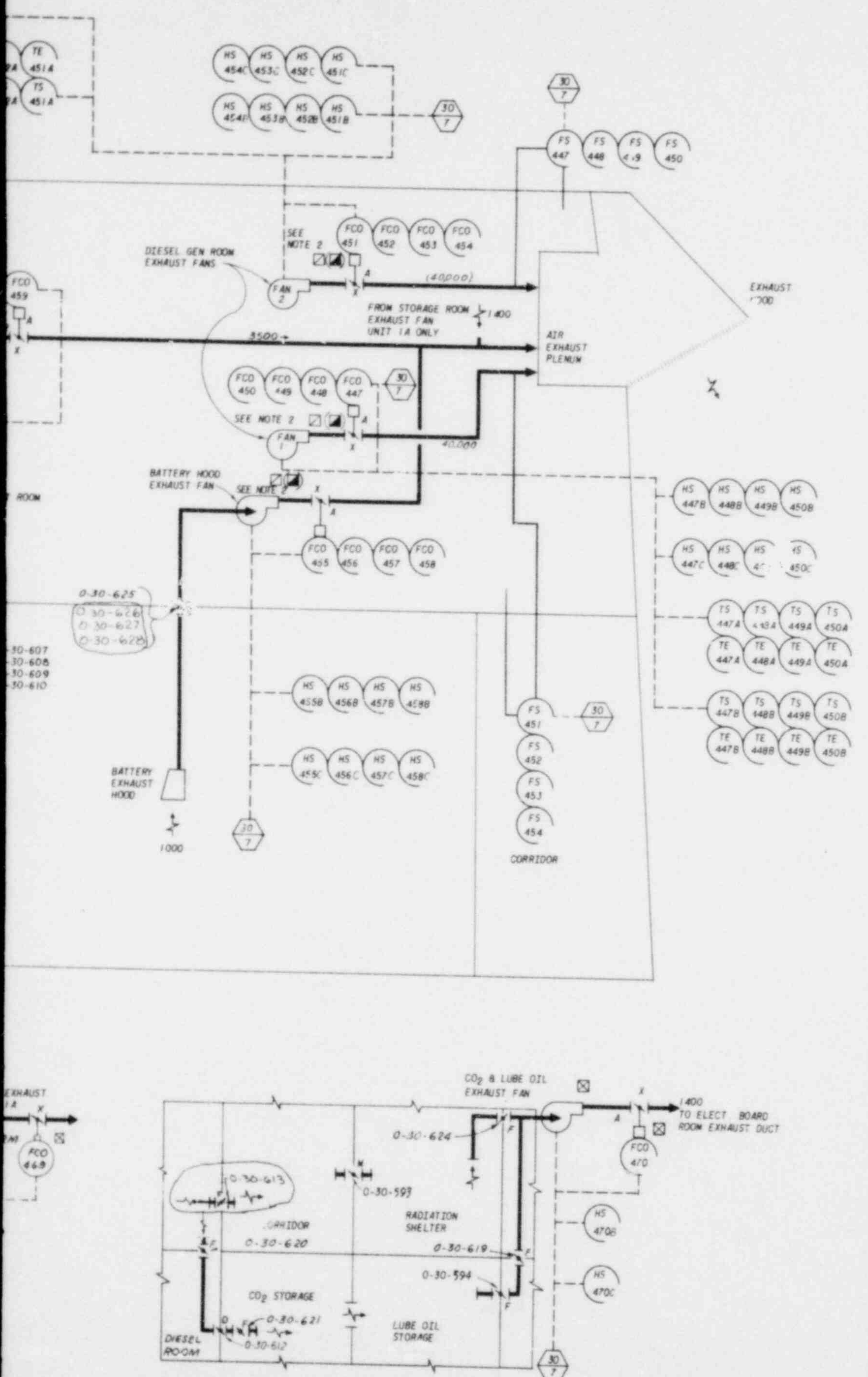
FLOW DIAGRAM
HEATING AND VENTILATING
AIR FLOW

SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED	RECOMMENDED	APPROVED
J. A. Hudson	D. K. Patterson	[illegible]

KNOXVILLE 7-10-73 45 M 4 47W866-8 R12


MUFFLER ROOM EXHAUST FAN
ELECT BD ROOM INTAKE VENT
EL 753.5
FRESH AIR INTAKE HOOD
ELECT. BD ROOM
SPACE HEATER
ELECT. BD ROOM EXHAUST FAN
AIR INTAKE HOOM
AIR EXHAUS
GRATING
EL 740.5
SEE NOTE 2
41,000
40,000
DIESEL GENERATOR ROOM
EL 722
DIESEL ROOM VENTILATION SYSTEM
TYPICAL ALL DIESEL GENERATOR UNITS
1A-A, 2A-A, 1B-B, 2B-B, EXCEPT AS NOTED
SPACE HEATER A
DIESEL GEN 1A-A RM
TYPICAL FOR
TS/HS-30-471
THROUGH
TS/HS-30-486
DAMPER LEGEND
NORMALLY OPEN
NORMALLY CLOSED
FIRE DAMPER
BACKDRAFT DAMPER
BALANCING DAMPER
MANUAL DAMPER
A AUTOMATIC OPERATION FOR NORMAL SERVICE
RM REMOTE-MANUAL OPERATION
S AUTOMATIC OPERATING FOR ISOLATION
FRESH AIR INTAKE VENT EL 753.5
CORRIDOR EL 722
CORRIDOR VENTILATION SYSTEM
FUEL OIL TRANSFER ROOM EXHAUST FAN
AIR EXHAUST ROOM 2B
TO AIR PLENUM EXHAUST 2B
FUEL OIL TRANSFER ROOM
CORRIDOR
FUEL OIL TRANSFER ROOM VENTILATION SYSTEM
AIR EXHAUST ROOM 1A
TO AIR PLENUM
TOILET
TOILET VENTILATION SYSTEM



NOTES:

1. FOR GENERAL NOTES SEE 47W866-1.
2. DIESEL GENERATOR ROOM EXHAUST FANS 1 & 2, BATTERY HOOD EXHAUST FANS AND ELECTRIC BOARD ROOMS EXHAUST FANS SHALL EACH BE CONNECTED TO POWER TRAIN WHICH SUPPLIES THE RESPECTIVE DIESEL GENERATOR UNIT.
3. A TYPICAL INSTRUMENT NUMBER SHOWN THUS (FCO 468) IS ABBREVIATED FORM OF FCO-30-468.
4. INSTRUMENT NUMBERS ARE LISTED FOR DIESEL GENERATOR UNITS 1A-A, 2A-A, 1B-B, 2B-B, AS FOLLOWS

   1A-A 2A-A 1B-B 2B-B

5. DESIGN PRESSURE FOR BATTERY HOOD EXHAUST DUCTWORK IS 6 IN-WG IN ACCORDANCE WITH SMACNA HIGH VELOCITY DUCT CONSTRUCTION STANDARD. DESIGN PRESSURE FOR ALL OTHER DUCTWORK IS 2 IN-WG IN ACCORDANCE WITH SMACNA LOW VELOCITY DUCT CONSTRUCTION STANDARDS. DUCTWORK SHALL BE TESTED IN ACCORDANCE WITH TVA GENERAL CONSTRUCTION SPECIFICATION NO. G-37.
6. FOR DESIGN CRITERIA FOR DIESEL GENERATOR SYSTEM REFER TO SQN-DC-V-11.1.

REFERENCE DRAWINGS:

17W910-1 & -2 - - - EQUIPMENT DRAWINGS
47B866-30 SERIES - - INSTRUMENT TABULATION
47A366-30 SERIES - - VALVE MARKER TAG TABULATION
47W611-30-7 - - - VENTILATION SYSTEM LOGIC DIAG

REV NO	ECN NO.	DATE	DESCRIPTION
9	2121	1-4-79	ADDED FIRE DAMPERS
8	1647	9-23-77	ADDED VALVE TAG NO'S
7	SI	6-20-77	ADDED VALVE MARKER NO'S TO ELECT BD RM EXH
6	1647	4-8-77	ADDED FIRE DAMPERS
5	SI	[illegible]	ADDED MARK NUMBERS
4	S-1	5-26-76	REVISED REFERENCE DRAWINGS AND ADDED NOTE 6
3	SI	3-29-76	Added note 5.
2	1382,1428,S-1	3-3-75	REVISED VLV TAG NUMBERS & ADDED DAMPER AND HTRS, MINOR REV
1	S-1	[illegible]	RELOCATED FCO 468 & 469, ADDED FIRE DAMPER 0-30-613

DSGN H. BENNINGHOFE
DRWN H. SPENCER, G. Green
CHKD [illegible]
SUPV [illegible]
INSP [illegible]
ENGINEER Charles L. Bailey

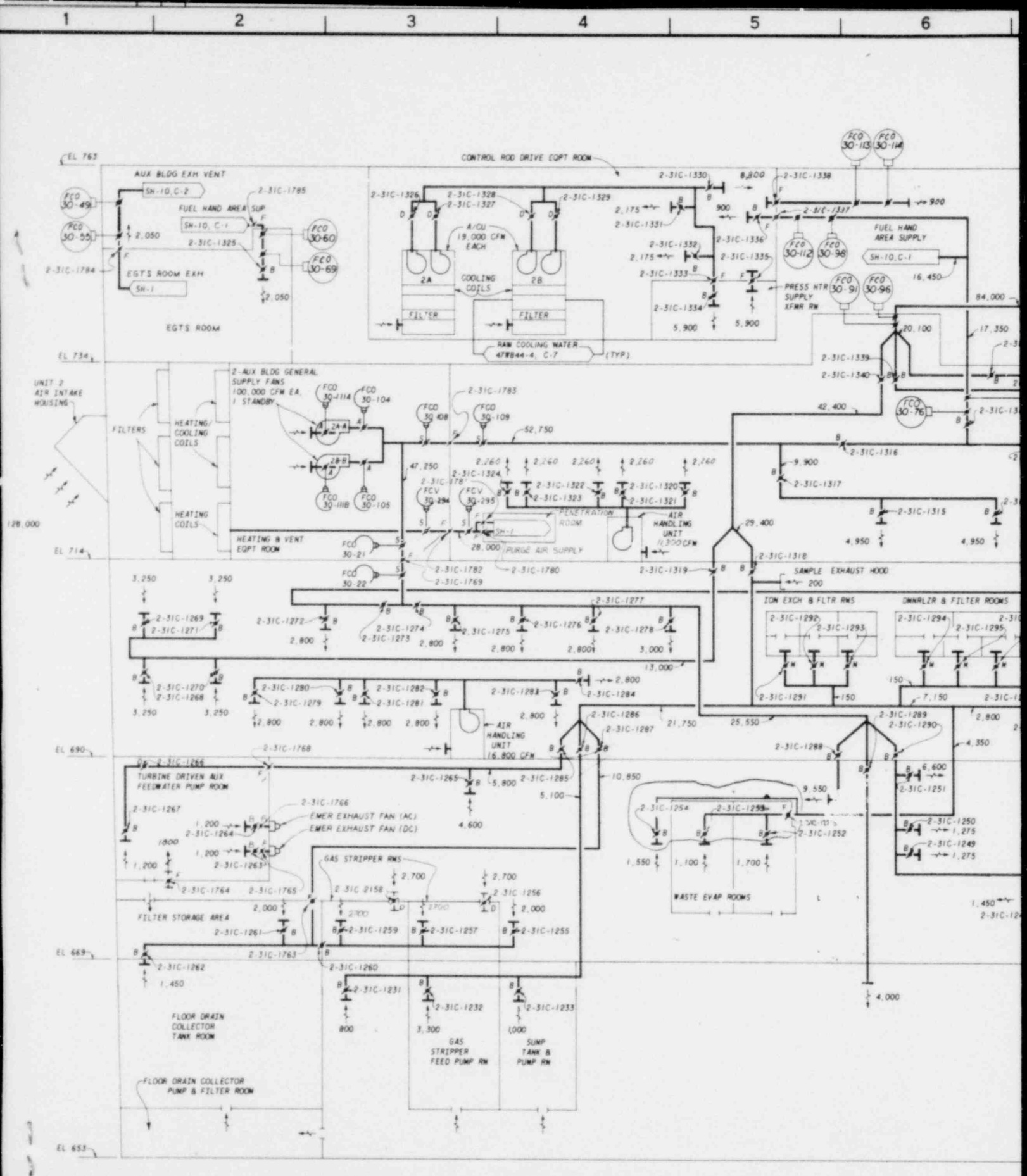
DIESEL GENERATOR BUILDING

FLOW DIAGRAM
HEATING VENTILATING
AIR FLOW

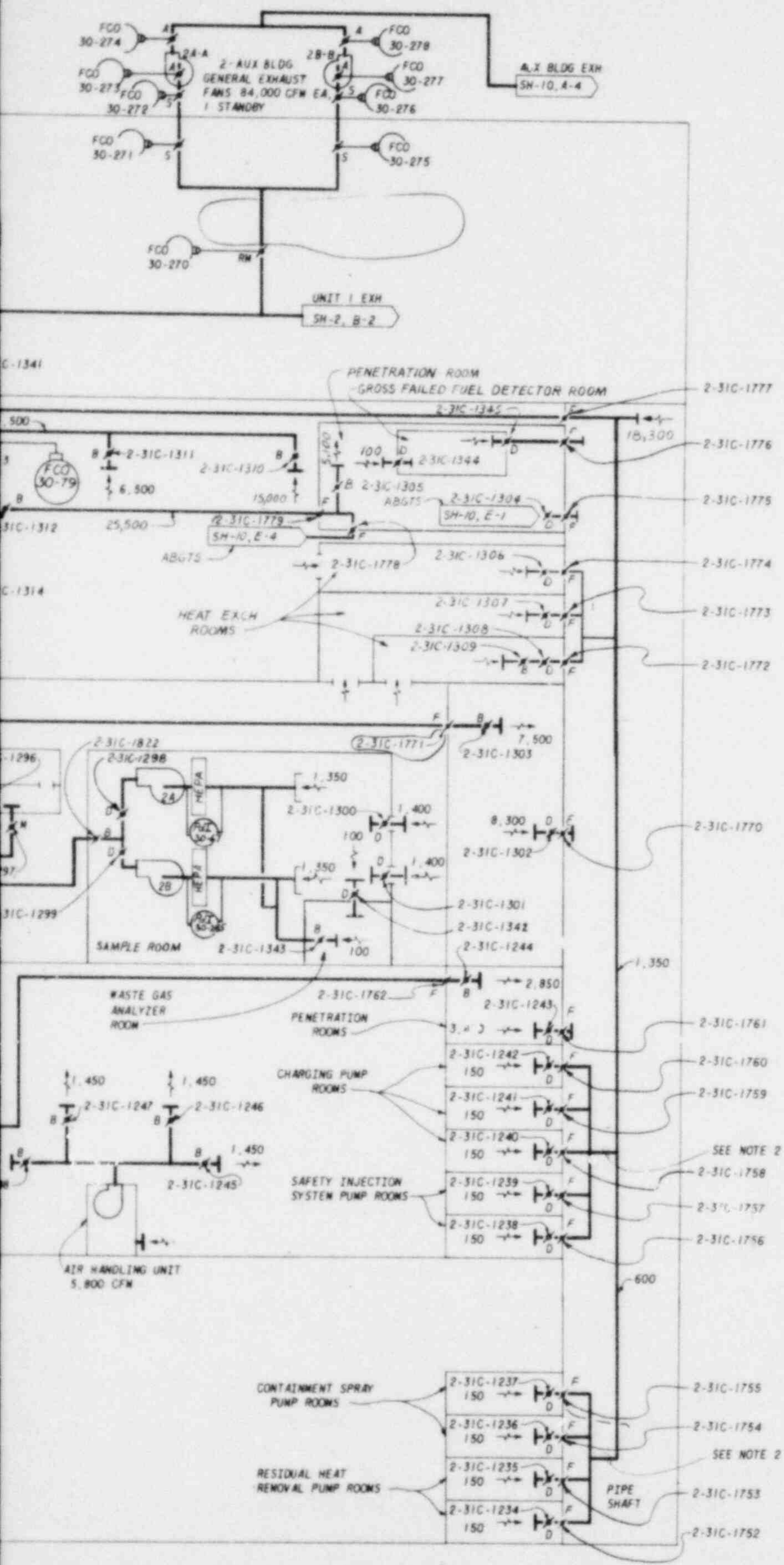
SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED Charles L. Bailey | RECOMMENDED J. C. Key | APPROVED R. M. Pierce

KNOXVILLE 4-1-74 45 W 47W866-9 R9



UNIT TWO GENERAL VENTILATION



NOTES

1. FOR GENERAL NOTES SEE 47W866-2.
2. FULL FLOW VENTILATION WILL OCCUR ONLY WHEN PUMP ROOM DOOR ARE OPEN.
3. DESIGN PRESSURE ABOVE ELEVATION 690.0 IS 6 IN-WG IN ACCORDANCE WITH SMACNA HIGH VELOCITY DUCT CONSTRUCTION STANDARDS FOR MEDIUM PRESSURE. DESIGN PRESSURE FOR DUCTWORK BELOW ELEVATION 690.0 IS 2 IN-WG IN ACCORDANCE WITH SMACNA LOW VELOCITY DUCT CONSTRUCTION STANDARDS. DUCTWORK SHALL BE TESTED IN ACCORDANCE WITH TVA GENERAL CONSTRUCTION SPECIFICATION NO. G-37.
4.

COMPANION DRAWINGS

47W866-2, -10

REV NO.	ECN NO.	DATE	DESCRIPTION
9	2121	[illegible]	ADDED DAMPERS
8	2006	[illegible]	DELETED HEPA FILTERS PER ECN
7	1647	9-23-77	ADDED FIRE DMPR V NO'S., FIRE DMPRS; DELETED DUCT & FIRE DMPR
6	SI	6-30-77	ADDED BALANCING DAMPER TO SAMPLE ROOM EXHAUST
5	1647	4-8-77	ADDED FIRE DAMPERS, AND REVISED FLOW RATES
4	SI	8-16-76	REVISED FLOW RATES
3	SI	4-21-76	ADDED NOTE 3
2	SI, 1571, 1547	2-26-76	ADDED NOTE 2 ADDED ISOLATION DAMPERS & GROSS FAILED DECT RM
1	[illegible]	[illegible]	DELETED FCO-30-67, FCO-30-285 ADDED PRESS DIFF INDICATORS 67 AND 285, WASTE GAS ANALYZER RM & REVISED AIR FLOW RATES.

DSGN T.E. COLLINS, R.D. TOLLEY
DRWN C.W. PARKER
CHKD T.E. COLLINS
SUPV B.O. GINGILL
INSP [signature]
ENGINEER Charles L. Bailey

AUXILIAR, BUILDING

FLOW DIAGRAM
HEATING & VENTILATING
AIR FLOW

SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

SUBMITTED Charles L. Bailey | RECOMMENDED J.C. Key | APPROVED R.M. Pierce

KNOXVILLE 1-12-76 47W866-11

ECN 1262

4. Item 3.e. - It is our position that fire stops be installed every 20 ft. along horizontal uncoated cable routings in areas not protected by automatic water systems. Between levels or in vertical uncoated cable chases, fire stops should be installed at the mid-height if the vertical run is 20 ft. or more but less than 30 ft. or at 15-foot intervals in vertical runs of 30 ft. or more unless such vertical cable routings are protected by automatic water systems directed on the cable trays. Individual fire stop designs should prevent the propagation of a fire for a minimum period of 30 minutes when tested for the largest number of cable routings and maximum cable density. Confirm that your design will meet this position.

TVA Response

In areas outside primary containment containing one or both safety-related divisions, all exposed surfaces of cables in horizontal or vertical routings will be coated with a flame-retardant material such as Flamemastic 77. Thus, the design meets the stated NRC position and no fire stops will be installed at intervals in horizontal or vertical routings.

5. Item D.4, Ventilation - Describe the procedure employed for heat and smoke removal using fixed or portable equipment in areas that house systems or components necessary for cold shutdown of the plant. Describe how these areas can be ventilated for manual firefighting purposes. Include a discussion regarding control accesses to ventilation equipment (including fire dampers) as well as the ability to handle high temperature gases and particulates.

TVA Response

In general, heat and smoke removal capability is provided in areas that house systems or components necessary for cold plant shutdown by the normal ventilation systems discussed in FSAR Section 9.4. A developing fire will cause the isolation of these ventilation systems in the immediate vicinity of the fire through the closing of fusible link or fire detector actuated dampers. Smoke venting at this point will be accomplished by the use of portable smoke ejectors. Two ejectors are provided for the use of the fire brigade and each is rated at 7200 cfm. Smoke will be vented from a fire area to adjacent areas, where it will be removed by the normal ventilation systems.

Those areas of the plant utilizing recirculating ventilation systems will rely upon portable smoke ejectors exclusively.

Due to containment requirements, smoke removal in the reactor building will be provided by the containment purge air system. Should the smoke and fire gas temperautres exceed the capability of the containment purge air system, it will be isolated and smoke removal will be accomplished by the redundant trains of the standy gas treatment systems.

6. Item D.5, Lighting and Communication

A. Item (a). You state that adequate emergency lighting system is provided in safety-related areas of the plant. Power supply for the system is from the plant emergency diesel generator. Your proposed emergency lighting system is unacceptable. It is our position that fixed self-contained lighting consisting of fluorescent or sealed beam units with an individual 8 hr. minimum battery power supply be provided in areas that must be manned for safe cold shutdown and for access and egress routes to and from all fire areas.

B. Item (d). You indicate that fixed repeaters are being installed in the Sequoyah plant to facilitate the use of portable radio equipment. It is our position, however, that the fixed repeaters should be protected against exposure fire damage using 1/2 hour fire rated barriers such as 1" mineral wool. In addition, verify that the portable radio communication system will be tested to demonstrate that its frequencies will not interfere with the actuation of protective relays.

TVA Response

A. Item (a). Fixed self-contained lighting consisting of fluorescent or sealed beam units with an individual 8 hour minimum battery power supply will be provided in areas that must be manned for safe cold shutdown and for access and egress routes to and from all fire areas.

B. Item (d). The protection of fixed radio repeaters by 1/2 hour fire rated barriers such as mineral wool is not feasible since the repeater would be damaged by overheating. It is TVA's position that such protection is not necessary due to the redundancy and physical separation of the repeaters.

There are three independent intraplant radio repeater systems at Sequoyah. Two of these systems known as the inplant repeaters, operate with 26 two-channel portable radios (this group includes the six fire brigade portables). One of these repeaters is located in the turbine building and one is located in the auxiliary building, providing multiple fire barriers between systems. The associated protables can address either of these repeaters.

The third intraplant repeater system (the public safety service repeater system) consists of one repeater located in the turbine building and 18 portable radios. These portable radios have three channels capable of addressing all three intraplant repeater systems. The public safety service repeater is located on a different turbine building elevation from one inplant repeater and in a different building from the other.

The portable radio communication system will be tested during the preoperational test program to demonstrate that its frequencies will not interfere with other plant systems.

7. Item E.1, Fire Detection - Your description of the fire detection system is incomplete. Describe the type of detector provided for each room or area containing safety related equipment or systems. Also, provide a detailed description of the fire detection system, supported where necessary, by diagrams or appropriate prints (include a single line draiwng from the dctection circuits, waterflow alarms, through the subpanels and into the control room).

   It is our position that primary and secondary power be supplied as follows:

   A. Using normal offsiste power as the primary supply with a 4 hr. battery supply as secondary supply; and

   B. Having capability for manual connection to the Class 1E emergency power, but within 4 hrs. of loss of offsite power. Such connection should follow the applicable guidelines in Regulatory Guides 1.6, 1.32, and 1.75. Confirm that your design will meet this position.

TVA Response

The fire detection system complies with the requirements of BTP 9.5-1, Appendix A, and is designed in accordance with NFPA 72D and 72E. The system consists of initiating devices, local control panels, remote transmitter-receivers providing remote multiplex (MUX) functions, and computerized multiplex central control equipment. Refer to Figure 7-1 for a block diagram of the system.

The system's initiating devices consist of fire detectors which are identified as to type and location in Table 1-1 and flow alarm pressure switches which are provided for each fixed suppression system.

A central processor unit (CPU) communicates with the local control panels via the remote MUX units over looped circuits. The MUX equipment allows the processor to interrogate each local control panel in turn and to receive data from the panels. When an initiating device changes from normal to a trouble or alarm status, it is detected at the remote MUX transmitter-receiver and when next interrogated by the central processor will transmit this status change. The change is evaluated by the processor and visual and audible indications provided.

An alarm condition results in the following system responses:

(1) Sounding of audible devices locally and in the main control room.

(2) Illumination of indicating lamps on the local control panel indicating the location of the alarming device.

(3) Actuation of local control panel circuits for the control of automatic suppression systems, fire pumps, fire dampers, fire doors, and ventilation equipment.

(4) Identification of the location and time of receipt of the alarm condition on a cathode ray tube (CRT) display in the main control room and on a line printer in the unit 2 auxiliary instrument room.

The fire detection system is electrically supervised as required in NFPA 72D Article 240, for ground and open wiring faults in the detection, power supply, alarm, and data transmission circuits. Electrical supervision of the supplementary output circuitry that actuates fire suppression systems, fire dampers, fire door holders, and ventilation equipment is not provided. However, TVA will check these supplemental circuits every 18 months for operability. Supervision is Class A in the detection and data transmission circuits and Class B in the local audible alarm circuits. A wiring fault in the supervised circuits results in an audible and visual trouble indication at both the local and control locations. The system is capable of processing and displaying multiple alarm and trouble conditions.

A second CPU is provided in the main control room as an installed spare. Upon failure of the primary processor, the spare can be connected to the system by jumper cables in less than 30 minutes.

The fire detection system is powered from a single 120V ac distribution panel as shown in Figure 7-2. The panel is provided with a manual transfer switch to allow normal or alternate power feed from 480V ac control and auxiliary building ventilation boards 1A1-A and 2A1-A, respectively. Both ventilation boards are automatically connected after 10 seconds to the emergency diesel generators on loss of offsite power. The system's power supply complies with the applicable guidelines in Regulatory Guides 1.6 and 1.32 and partially complies with Regulatory Guide 1.75 as discussed in FSAR section 8.3. The fire protection power distribution panel will be electrically supervised to provide an alarm in the main control room upon loss of power.

The momentary loss of power to the CPU resulting from the transfer to the diesel generators will cause a loss of the CRT display in the main control room. However, when power is restored, all persisting alarm and trouble conditions will be redisplayed.

Fire detection system components are located as identified in Table 7.1. Refer to compartmentation drawing SK-1004 for definition of the column lines.

The Sequoyah Nuclear Plant Technical Specifications will reflect the requirement for six month surveillance testing of detection circuits from the local panel to the actuated devices, i.e., fire dampers, fire door holders, ventilation equipment or preaction valves as agreed in the resolution of open item 7.a during the meeting of February 12, 1979.

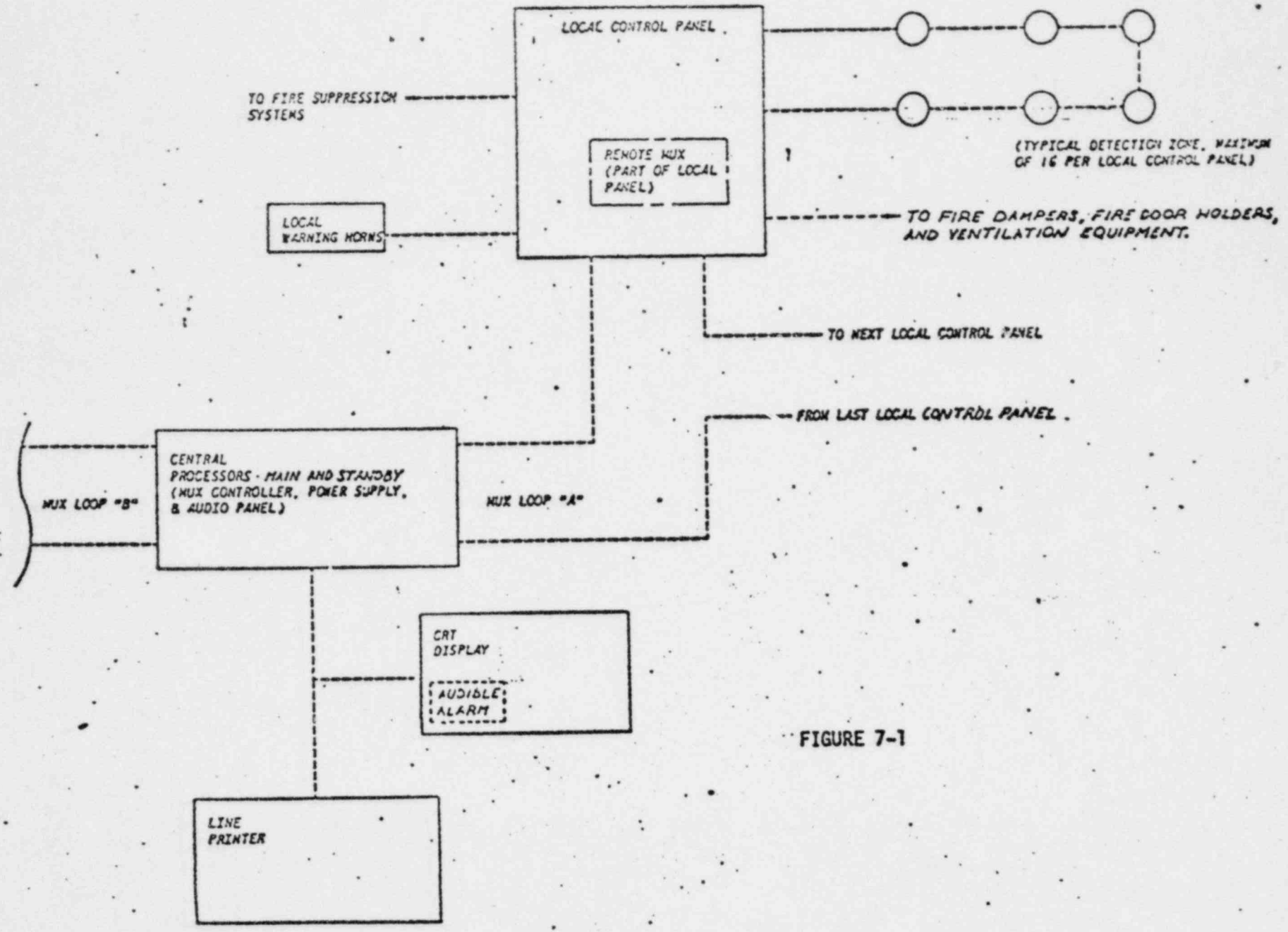

LOCAL CONTROL PANEL
TO FIRE SUPPRESSION SYSTEMS
REMOTE MUX (PART OF LOCAL PANEL)
(TYPICAL DETECTION ZONE, MAXIMUM OF 16 PER LOCAL CONTROL PANEL)
LOCAL WARNING HORNS
TO FIRE DAMPERS, FIRE DOOR HOLDERS, AND VENTILATION EQUIPMENT.
TO NEXT LOCAL CONTROL PANEL
FROM LAST LOCAL CONTROL PANEL.
CENTRAL PROCESSORS - MAIN AND STANDBY (MUX CONTROLLER, POWER SUPPLY, & AUDIO PANEL)
MUX LOOP "B"
MUX LOOP "A"
CRT DISPLAY
AUDIBLE ALARM
LINE PRINTER

FIGURE 7-1

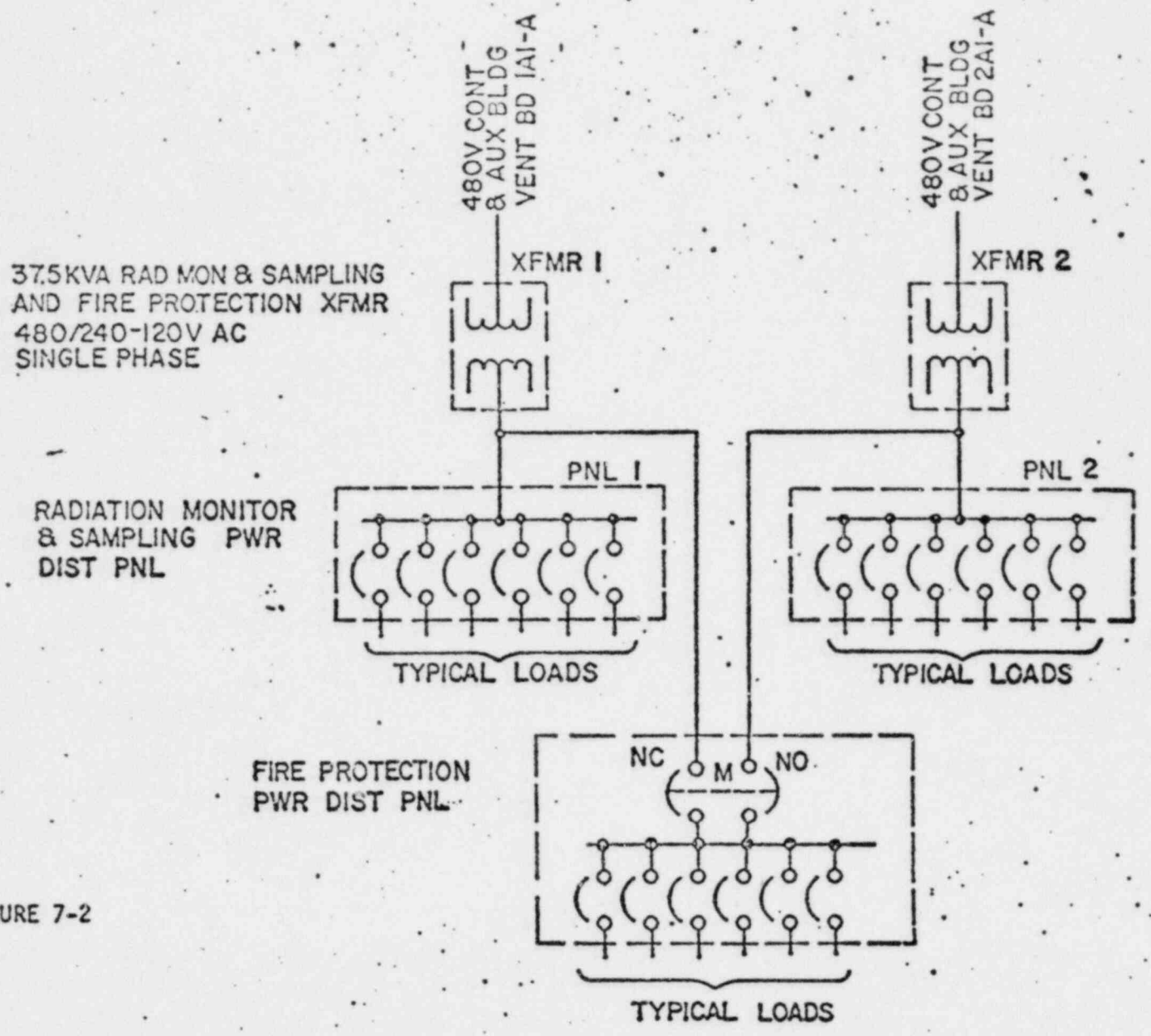

480V CONT & AUX BLDG VENT BD 1A1-A
480V CONT & AUX BLDG VENT BD 2A1-A
37.5KVA RAD MON & SAMPLING AND FIRE PROTECTION XFMR 480/240-120V AC SINGLE PHASE
XFMR 1
XFMR 2
PNL 1
PNL 2
RADIATION MONITOR & SAMPLING PWR DIST PNL
TYPICAL LOADS
TYPICAL LOADS
FIRE PROTECTION PWR DIST PNL
NC
M
NO
TYPICAL LOADS

FIGURE 7-2

TABLE 7.1

Component	Building	Elevation	Column	Room Name
Central processor unit and CRT display	Control	732.0	p,C7	Main control room
Line printer	Control	685.0	p,C10	U2 aux. inst. room
Local control panels	--------- Located throughout plant ----------			
Power distribution panel	Auxiliary	734.0	t,A8	6.9 kV shutdown board room B
480V cont. and aux. bldg. vent board 1A1-A	Auxiliary	734.0	t,A3	480V shutdown board room 1A2-A
Transformer 1	Auxiliary	734.0	u,A2	480V shutdown board room 1A1-A
480V cont. and aux. bldg. vent board 2A1-A	Auxiliary	734.0	r,A13	480V shutdown board room 2A2-A
Transformer 2	Auxiliary	734.0	r,A15	480V shutdown board room 2A1-A

8. Item E.2.c., Fire Protection Water Supply System - In Section E.2.c you state that the fire pumps at the Sequoyah Nuclear Plant are electric motor driven and are connectable to the emergency diesel generators. Confirm that these pump motors will be connected automatically to the 1E bus, upon loss of offsite power. The required alarms and status are annunciated in the main control room. It is not clear that the pump monitoring system meets the guidelines of BTP 9.5-1, Appendix A. Therefore, verify that the fire pumps are individually monitored and the monitoring circuits are electrically supervised. Alarms indicating pump running, driver availability, or failure to start, should be provided in the control room.

TVA Response

The electric motor-driven fire pump motors are powered by the 480V shutdown boards. Upon loss of offsite power, these boards are automatically loaded on the diesels. Two minutes after the power loss, the fire pumps are in turn loaded on the 480V shutdown boards.

Supervised alarm circuits will be provided for loss of line power and motor running condition for the fire pumps and will alarm and annunciate in the MCR.

The fire pumps are not designed or installed in accordance with NFPA 20. The pumps are vertical, submersible, turbine-type, electric motor-driven units that meet ASME Section III and Siesmic Category I requirements.

9. Item E.3, Water Sprinklers and Hose Standpipe Systems

A. Item (a). You state that the fire protection system or plant equipment will be so designed such that a pipe break or a single inadvertent actuation of the fire protection will not prevent the functioning of both trains of the safety-related system. This design arrangement is unacceptable. It is our position that the safety related systems or equipment should be protected against moderate energy line cracks in accordance with BTP APCSB 3-1, by water shields or baffles.

B. Item (d). Verify that the hose station will be able to reach any locations that contain or present a fire hazard to safety related equipment with at least one hose not over 100' long.

C. Your submittal does not indicate the hourly fire rating of the protected openings in the stairwell. Indicate their hourly fire ratings.

D. Throughout your fire hazards analysis, you state that sprinkler systems will be installed in various areas of the plant. We observed during our site visit that the sprinkler systems were installed at the ceiling level. However, no provisions were made to locate sprinkler heads clear of overhead obstructions, especially in areas housing the auxiliary feedwater pumps and the component cooling water pumps. It is our position that where such systems are to be installed that additional sprinkler heads be provided below any obstructions to obtain minimum interference to dishcarge patterns of the sprinkler heads on the floor below.

TVA Response

A. The Sequoyah fire protection systems in safety-related areas are seismically qualified, preaction sprinkler systems. They are charged with water only when cross-zoned detectors (smoke and smoke; smoke and thermal) are actuated. Areas provided with cross-zoned smoke and thermal detection that actuate preaction sprinkler systems are identified in Table 9.1. Due to the inherent tendency of smoke detectors to drift toward their alarm setpoint with time, cross-zoning provides an additional margin of safety against spurious application of water to safety-related equipment. In addition, low pressure air superision of the sprinkler system is provided in areas containing sensitive electrical equipment. If system integrity is not maintained, the supervision air pressure is lost and annunciation is provided in the MCR. Water shields are also provided in areas where actuation of the suppression systems could unacceptably impair safety-related equipment. This design philosophy complies fully with BTP APCSB 3-1, Sections B.1 and B.3a which require protection of essential systems and components against postulated piping failures in high or moderate energy fluid systems that operate during normal plant conditions.

In general, the cross-zoning technique utilizes two detectors in the same area that a single detector would normally occupy if located in accordance with UL spacing guidelines. Based on this

detection zone overlap, TVA is satisfied that preaction valve actuation will be accomplished prior to the fusing of any sprinkler heads.

B. All areas of safety-related structures are within reach of fire hose stations equipped with 100' of hose.

C. The protected stairwells in the control building have equivalent 1-1/2 hour rated reinforced concrete and concrete block construction. The plaster partition assemblies above the fire doors have a fire resistive rating at least equivalent to that assigned the wall construction.

Fire barrier seals around pipe penetrations in the stairwells are in accordance with the designs discussed in 3.B. There are no cable tray or ducts penetrating the stairwells.

D. Additional sprinkler heads shall be provided or existing heads relocated in order to clear overhead obstructions and obtain minimum interference patterns where possible.

TABLE 9.1

CROSS-ZONED SMOKE AND THERMAL DETECTORS

The following areas are provided with cross-zoned smoke and thermal detection that actuates the preaction sprinkler systems. The thermal detector's setpoint temperature is 135° F. Refer to the compartmentation drawings SK-1000 series for room locations.

Protected Area	Building	Elevation	Room No
Auxiliary Feedwater Pump 1A-A Rm	Auxiliary	669.0	A6
Charging Pump 1A-A Rm	Auxiliary	669.0	A9
Charging Pump 1B-B Rm	Auxiliary	669.0	A10
Charging Pump 1C Rm	Auxiliary	669.0	A11
Safety Injection Pump 1B-B Rm	Auxiliary	669.0	A12
Safety Injection Pump 1A-A Rm	Auxiliary	669.0	A13
Safety Injection Pump 2A-A Rm	Auxiliary	669.0	A19
Safety Injection Pump 2B-B Rm	Auxiliary	669.0	A20
Charging Pump 2C Rm	Auxiliary	669.0	A21
Charging Pump 2B-B Rm	Auxiliary	669.0	A22
Charging Pump 2A-A Rm	Auxiliary	669.0	A23
Auxiliary Feedwater Pump 2A-A Rm	Auxiliary	669.0	A26
PSO Engineers' Shop	Control	732.0	C16
Record Storage Rm	Control	732.0	C14
Shift Engineers' Office	Control	732.0	C11
Chart Storage	Control	732.0	C10
Instrument Calibration Rm	Control	732.0	C9
Locker Rm	Control	732.0	C6
Toilet	Control	732.0	C5
Kitchen Area	Control	732.0	C4
Mechanical Equipment Rm	Control	669.0	C10
250V Battery Rm No. 2	Control	669.0	C6
250V Battery Rm No. 1	Control	669.0	C3
Mechanical Equipment Room	Control	669.0	C1

10. Safety related pumps of both trains for both Unit 1 and Unit 2 are contained in the Auxiliary Building elevation 653' and 660' area. Each train is in its own room; however, no fire rated door separates the room from the corridor and adjacent pump rooms. It is our position that each room be provided with a 3-hr. fire rated door, mounted in an approved fire rated frame to properly protect the room. In lieu of fire rated doors, provide a wet pipe sprinkler system to completely cover the corridor separating Unit No. 1 from Unit No. 2. The sprinkler system should alarm and annunciate in the control room.

TVA Response

Three-hour fire doors are provided for each of the eight openings from safety-related pump rooms. At the time of the NRC site visit, these doors had not been installed.

11. On elevation 690' of the auxiliary building at A1 and U, all four power cables (both trains of both units) of the ERCW pump from the yard pump house come into a metal enclosure mounted on the concrete wall approximately 10 ft. above the floor. Each cable within the junction box is separated by a metal baffle. From the enclosure, the cables are run in conduits and go up the wall and through the ceiling. We were informed that at the ceiling, all the conduits are supposed to be buried in concrete back to the switchgear room of the various trains and units.

    It is our position that:

    A. Verify that these conduits are actually buried back to their switchgear rooms from the ceiling level above the junction box.

    B. A 3-hr. fire rated barrier be installed around the metal enclosure as well as around the conduits located on the wall above the enclosure and terminating at the ceiling to protect against potential exposure fires. In addition, we are concerned that the metal enclosure and metal baffles are inadequate to prevent an electrically initiated fire that may damage all power cablings in the enclosure. Revise your design of the metal enclosure and metal baffles to protect the cables such that an electrically initiated fire will cause damage to no more than one power train.

TVA Response

A. The conduits are not buried back to their switchgear rooms from the ceiling level above the junction box. The conduits ascend from the junction box to elevation 734.0 embedded only as they penetrate floor slabs. On elevation 734.0 the conduits terminate in cable trays that extend to the switchgear.

B. In lieu of the 3-hour fire rated barriers, TVA will provide a 1" mineral wool barrier between the redundant power cables in the junction box as protection against an electrically initiated fire. The outside of the junction box and the four redundant power conduits routed between elevation 690' and 734' will be protected by 1-1/2-hour fire rated barriers utilizing a UL-approved configuration.

    As indicated in the response to position 13.C, TVA will provide sprinkler coverage for the area around the component cooling water pumps and the ERCW pump cable junction box.

12. During our site visit we noticed numerous places where redundant safety related cable trays as well as conduits were in close proximity to each other. This was noticed on almost all elevations. Some of these locations are to have flamemastic and preaction sprinkler systems installed at the interaction. At the time of the site visit the function of these various cables-conduit could not be determined at these interactions.

It is our positon that:

A. Identify all such interactions in the areas of both Units 1 and 2 where the redundant safety related trains are within 20 ft. of each other. Also, the consequence of electrically initiated or exposure fires should be evaluated with regard to plant shutdown capability (see item 1).

B. For those areas indicated in item (A) above, where a fire can affect the plant shutdown capability, an area automatic sprinkler system should be provided to afford protection against exposure fires. Also, a 1/2-hr. fire rated barrier such as 1" of mineral wool should be provided to separate one safety related train from the other or from a common exposure fire source. The sprinkler system should alarm and annunciate in the control room.

TVA Response

A. The criteria for the separation of Class 1E equipment and circuits basically meet RG 1.75, revision 0, although it was issued after the Sequoyah design was complete. The criteria used in the design for the separation of redundant cable trays at Sequoyah in general plant areas are as follows. Redundant cable trays are separated a minimum of 3 feet horizontally, and a minimum of 5 feet vertically, except where trays containing cables of different divisions of separation cross. Where redundant cable trays cross, there is a minimum vertical separation of 12 inches (tray top of lower tray to tray bottom of upper tray) with the bottom tray covered with a solid steel cover and the top tray provided with a solid steel bottom for minimum distance of 3 feet on each side of the tray crossing.

In the auxiliary building, each cable tray tier may contain a combination of nondivisional trays together with trays of only one division. As a result of the reevaluation of the Sequoyah fire protection program, it was determined that in most fire cells, containing redundant division of systems, the installed combustibles consisted of cable insulation and jacket materials. New criteria were developed to identify and protect redundant circuits, whether installed in conduits and/or cable trays within a 5-foot radius of the point of interaction. This distance was established as the most credible zone of influence for an electrically initiated fire.

Following this 5-foot criterion, approximately 50 percent of the cable trays in the auxiliary building were identified as needing protection. The areas of divisional interactions are shown as hatched cable trays in figures 12-1 through 12-5. The hatched trays represent both tray-to-tray and tray-to-conduit divisional interactions. In each reactor building annulus there are 15 divisional interactions, in the cable spreading room there are 44 divisional interactions, and in each auxiliary instrument room there are 4 divisional interactions.

Following a 20-foot criterion, between 75 and 80 percent of the trays will be involved in divisional interactions within the reactor building annulus, the auxiliary building, the cable spreading room, and the auxiliary instrument room. For example, in units 1 and 2 areas of the auxiliary building, the divisional interactions of redundant safety-related trains that are within 20 feet of each other are shown shaded in figures 12-6 through 12-10.

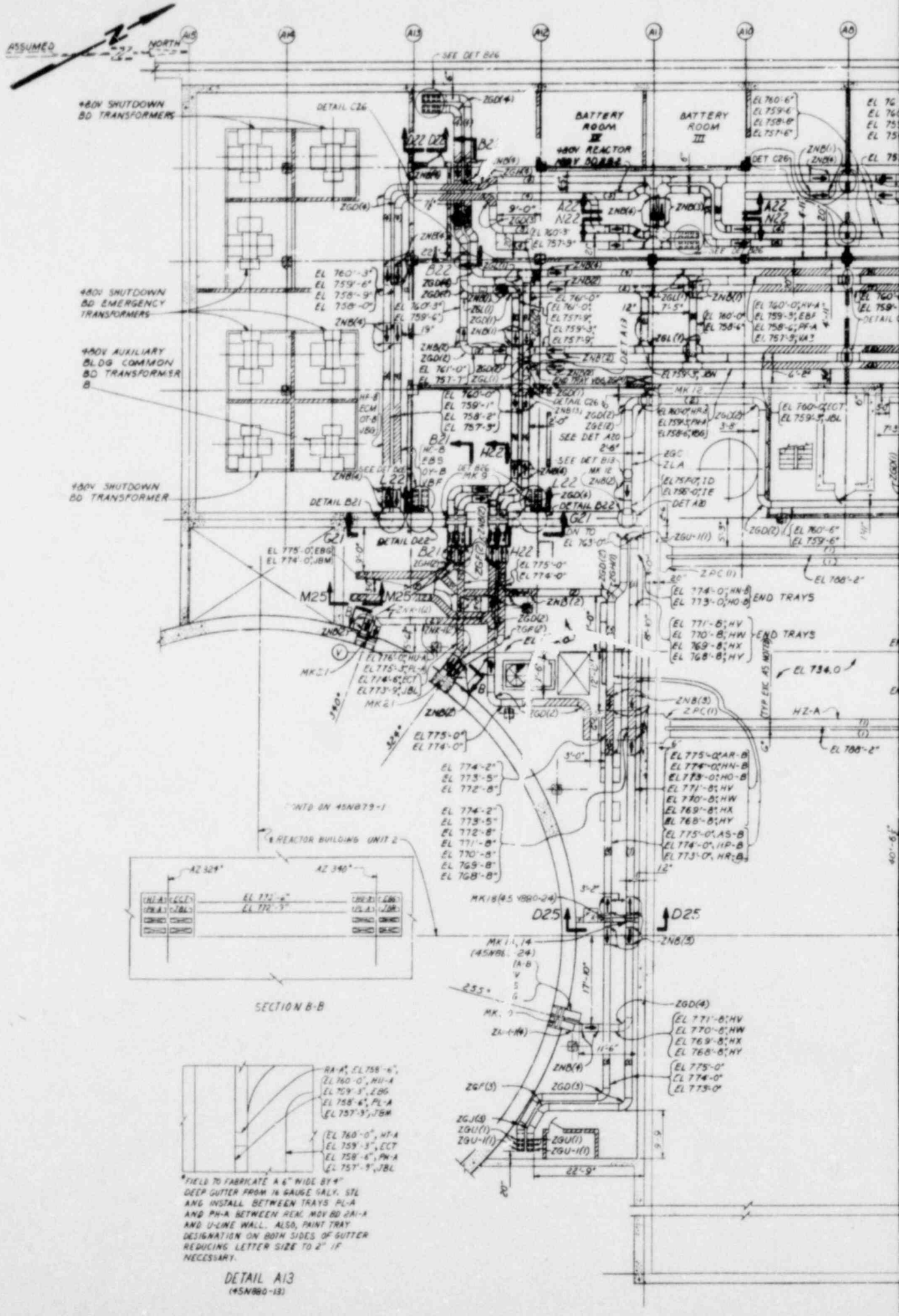
The present design requires that the exposed surfaces of cables in the identified trays (both divisional and nondivisional) be coated with a flame-retardant material such as Flamemastic 77 for a 5-foot radius from the point of interaction (or to the nearest wall, floor, or ceiling). In addition, fixed suppression systems are provided for these interactions.

TVA has evaluated the consequences of fires with regard to plant shutdown capability. Electrically initiated fires are judged to be acceptable based on the results of tests conducted at Sandia Laboratories and the commitment to add a fire-retardant coating to cables as discussed in the response to question 4. The tests demonstrate that a fire initiated in a shorted cable will not propagate to cables in adjacent trays and that cable coatings are effective in restricting fire propagation. The consequences of exposure fires are discussed in the response to question 1.

B. TVA has provided automatic sprinkler systems for the protection of redundant circuits at interaction points based on the 5-foot criterion. Automatic sprinkler coverage is also provided for areas containing fixed combustibles which could impose an exposure fire threat to equipment, components, or circuits necessary to achieve safe plant shutdown. As indicated in the response to question 9.D, additional sprinkler heads shall be provided or existing heads relocated in order to clear overhead obstructions and obtain minimum interference patterns where possible, and additional suppression systems will be provided as described in the responses to questions 1 and 13.

TVA's present design philosophy provides for the alarm and annunciation in the main control room of the operation of all fixed suppression systems.

See the response to question 1 for a discussion of the measures proposed for protection of redundant safety-related circuits required for safe shutdown.



DETAIL A13
(45N880-13)

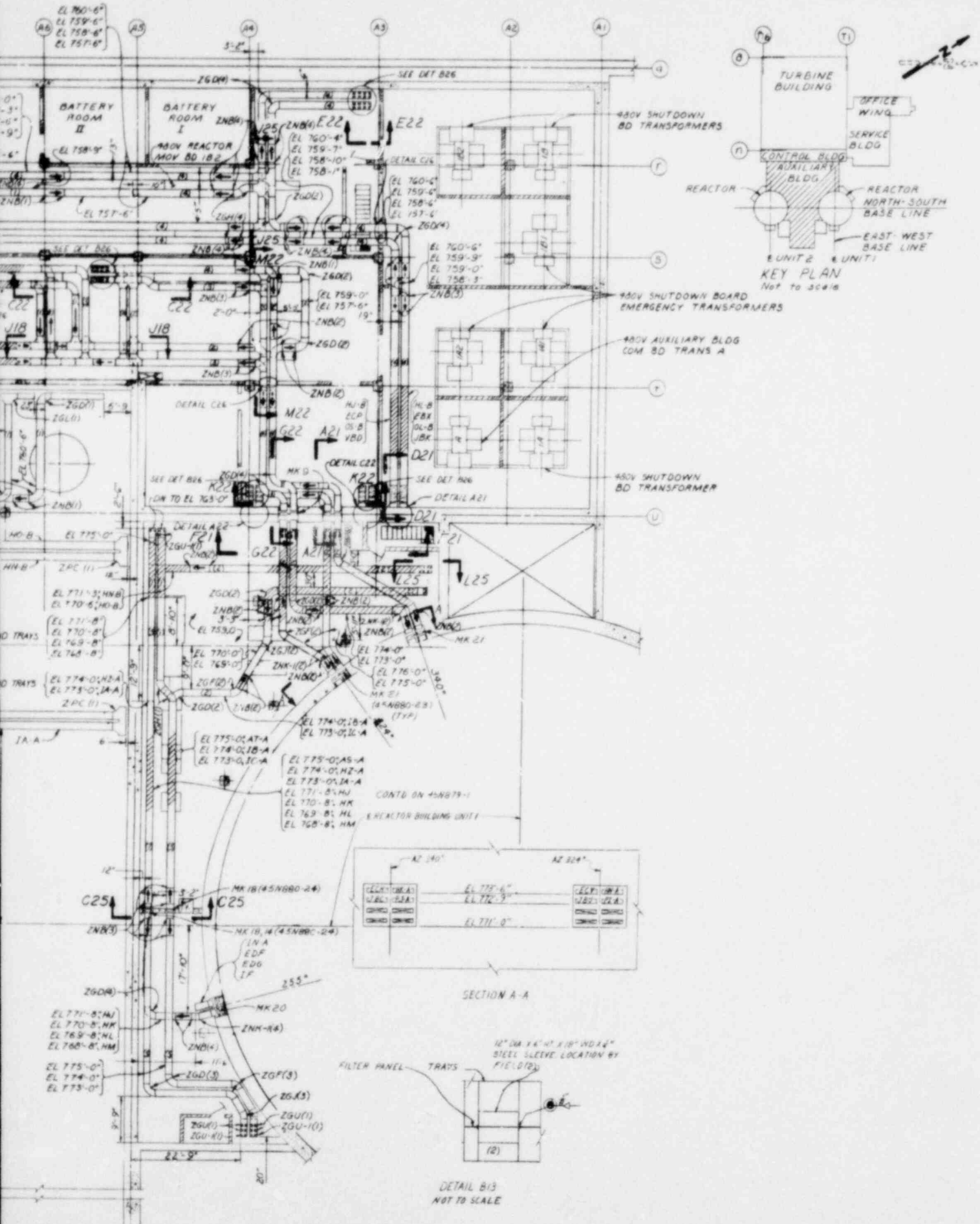
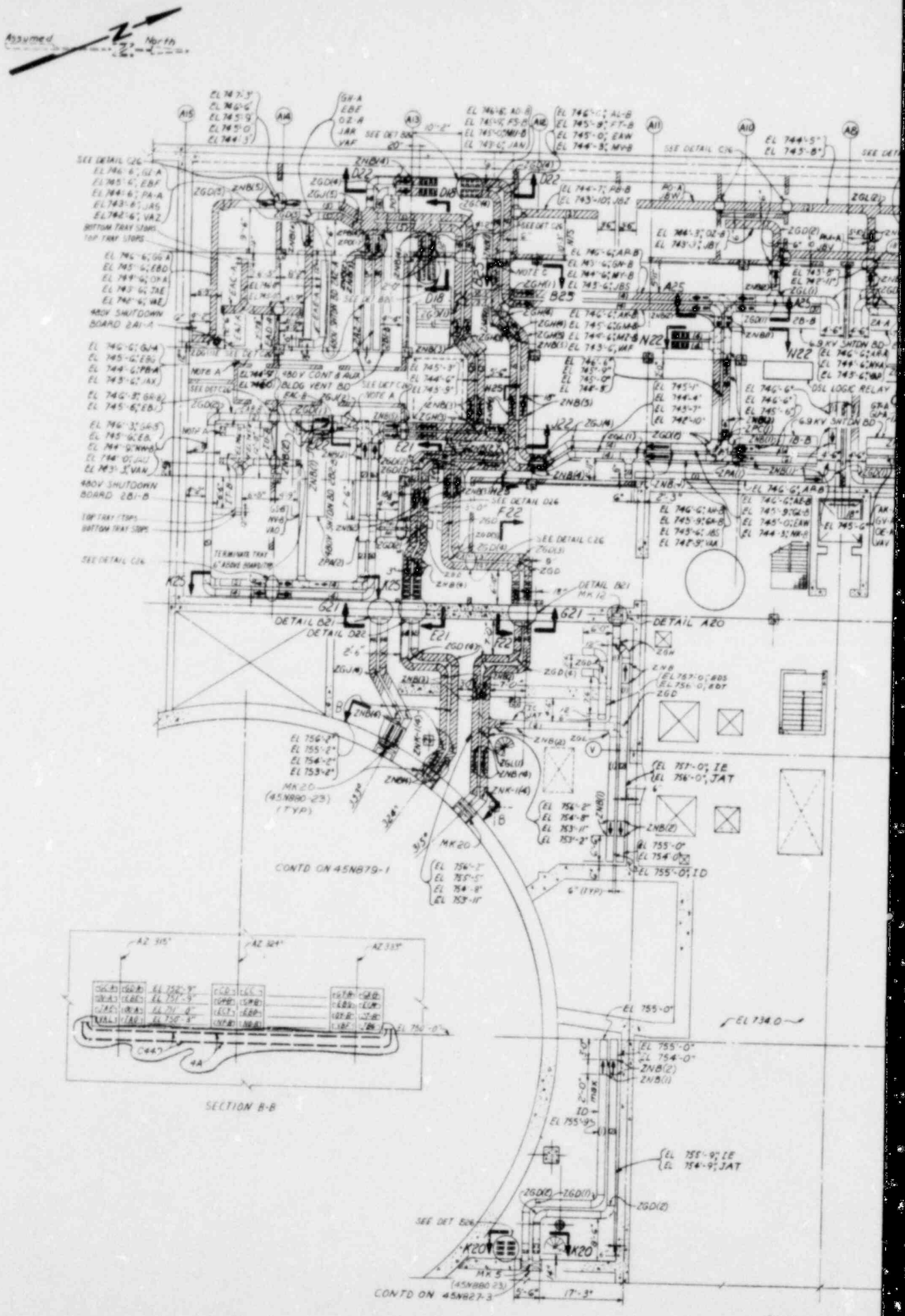

BATTERY ROOM III
BATTERY ROOM I
480V REACTOR MOV BD 1B-2
480V SHUTDOWN BD TRANSFORMERS
480V SHUTDOWN BOARD EMERGENCY TRANSFORMERS
480V AUXILIARY BLDG COM BD TRANS A
480V SHUTDOWN BD TRANSFORMER
SEE DET B26
DETAIL C26
DETAIL C22
DETAIL A22
DETAIL A21
CONTD ON 45NB79-1
SECTION A-A
PLAN EL 749.0
DETAIL B13
NOT TO SCALE
TURBINE BUILDING
OFFICE WING
SERVICE BLDG
CONTROL BLDG
AUXILIARY BLDG
REACTOR
REACTOR
NORTH-SOUTH BASE LINE
EAST-WEST BASE LINE
UNIT 2
UNIT 1
KEY PLAN
Not to Scale

FIGURE 12-1


Assumed North
SEE DETAIL C26
480V SHUTDOWN BOARD 2A1-A
480V SHUTDOWN BOARD 2B1-B
480V CONT & AUX BLDG VENT BD
6.9KV SHTDN BD
DSL LOGIC RELAY
TERMINATE TRAY 6" ABOVE FLOOR
DETAIL B21 MK 12
DETAIL B22
DETAIL A20
MK 20 (45N880-23) (TYP)
CONTD ON 45N879-1
MK 5 (45N880-23)
CONTD ON 45N827-3
SECTION B-B
PLAN EL 73

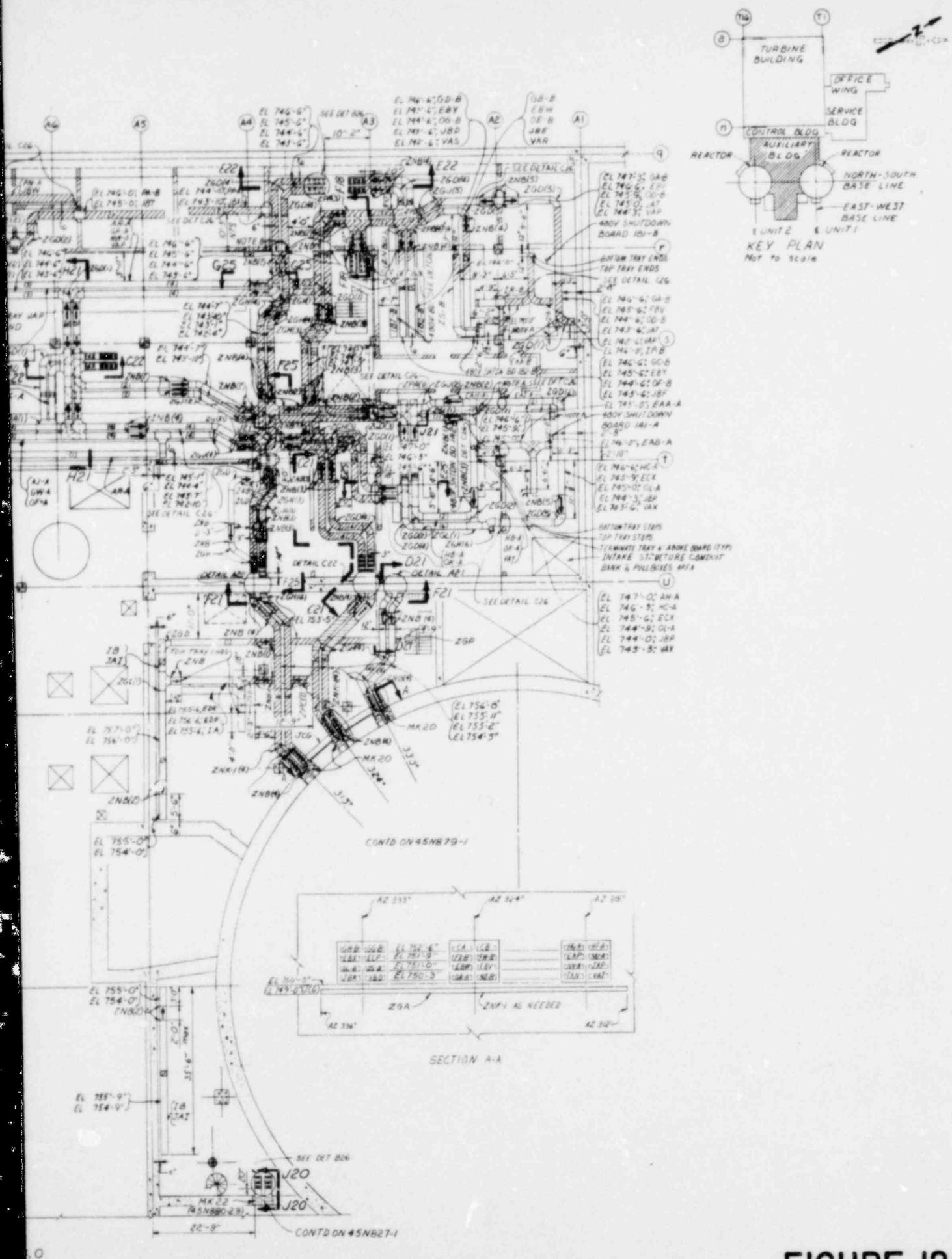
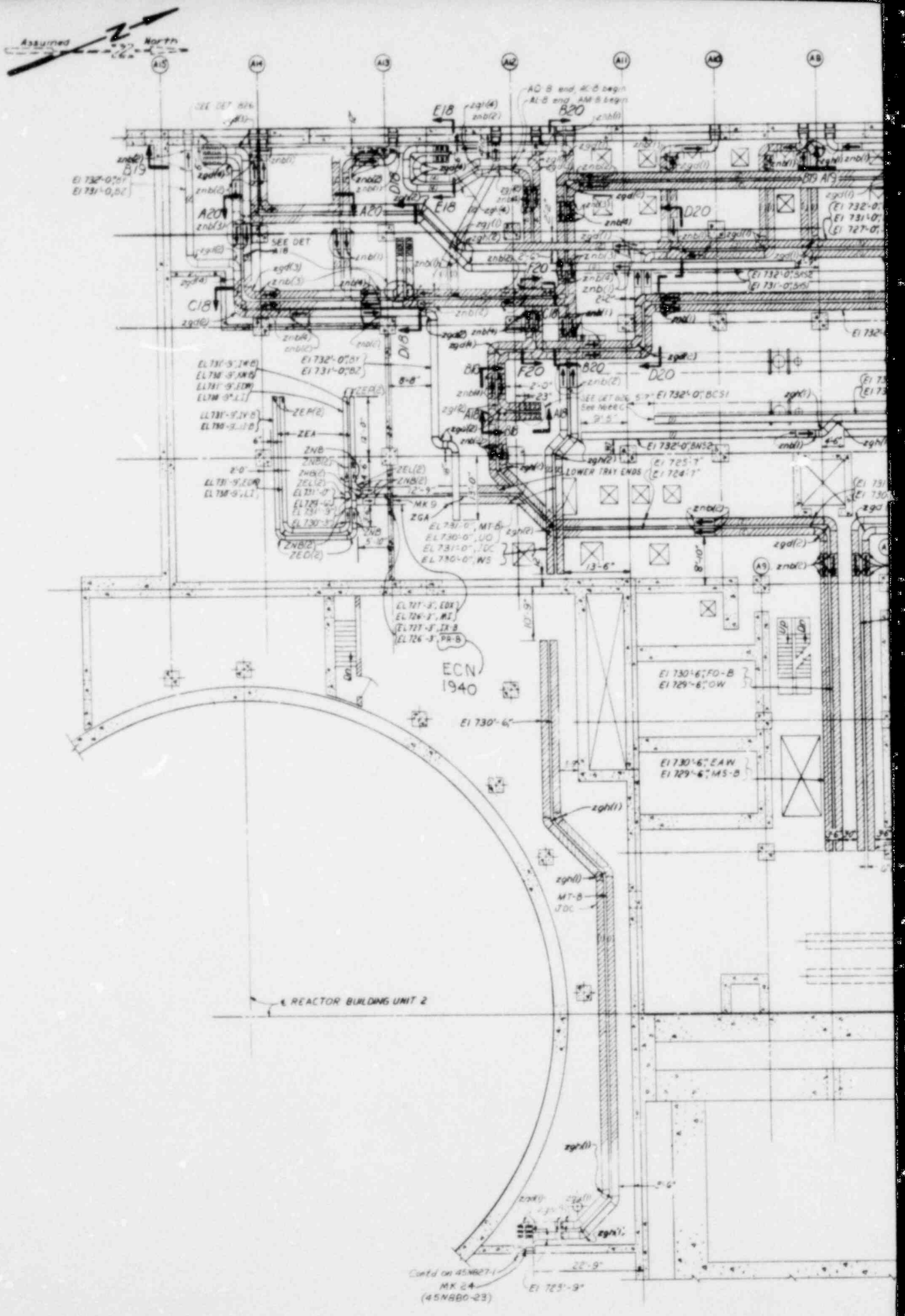

TURBINE BUILDING
OFFICE WING
SERVICE BLDG
CONTROL BLDG
AUXILIARY BLDG
REACTOR
REACTOR
NORTH-SOUTH BASE LINE
EAST-WEST BASE LINE
UNIT 2
UNIT 1
KEY PLAN
Not to scale
CONTD ON 45NB79-1
SECTION A-A
CONTD ON 45NB27-1

FIGURE 12-2


Assumed North
A5
A4
A3
A2
A1
A6
A8
REACTOR BUILDING UNIT 2
ECN 1940
Contd on 45N827-1
MK 24
(45N880-23)
EL 725'-9"
22'-9"
13'-6"
8'-10"
EL 730'-6"
PLAN EL 714'0"

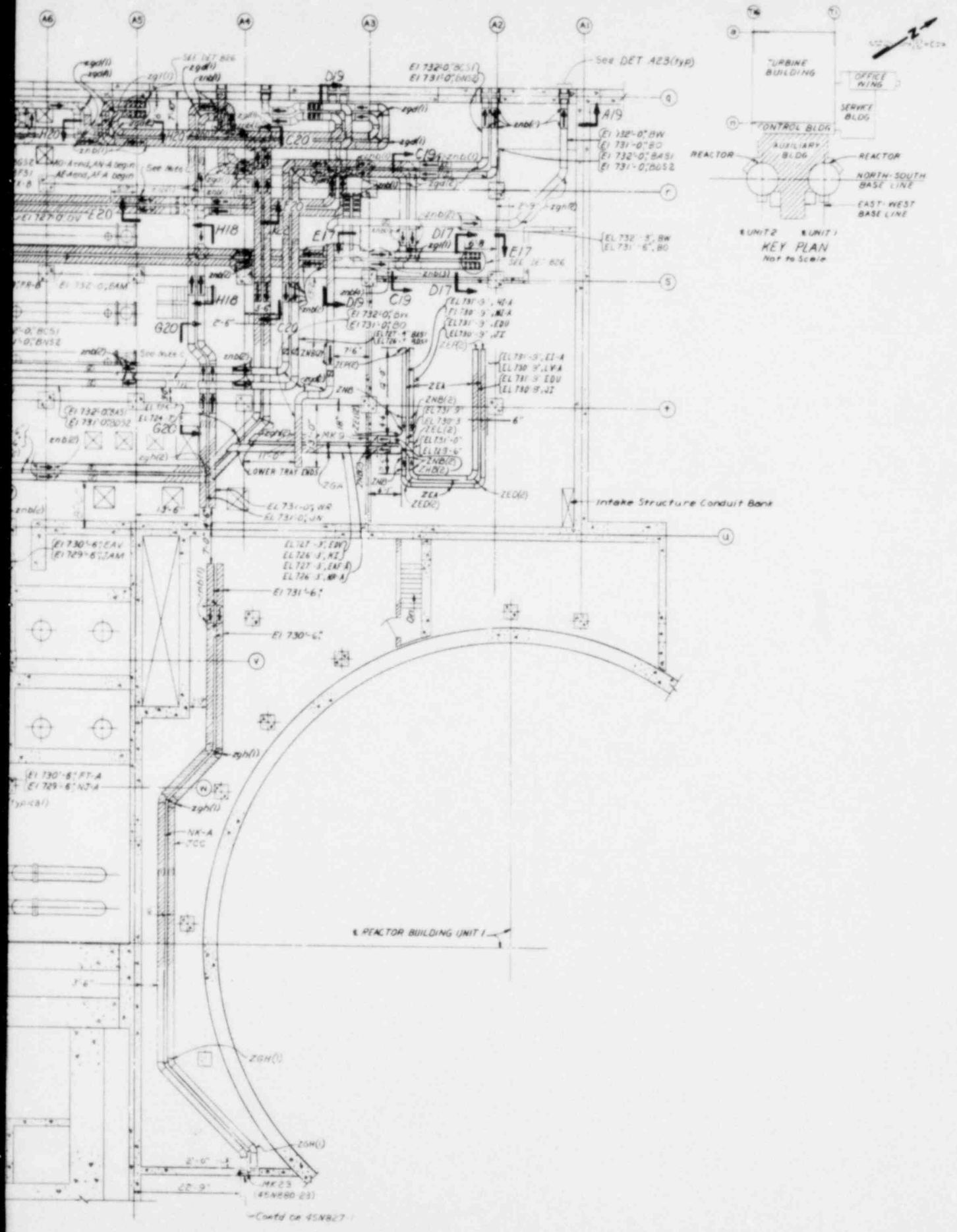
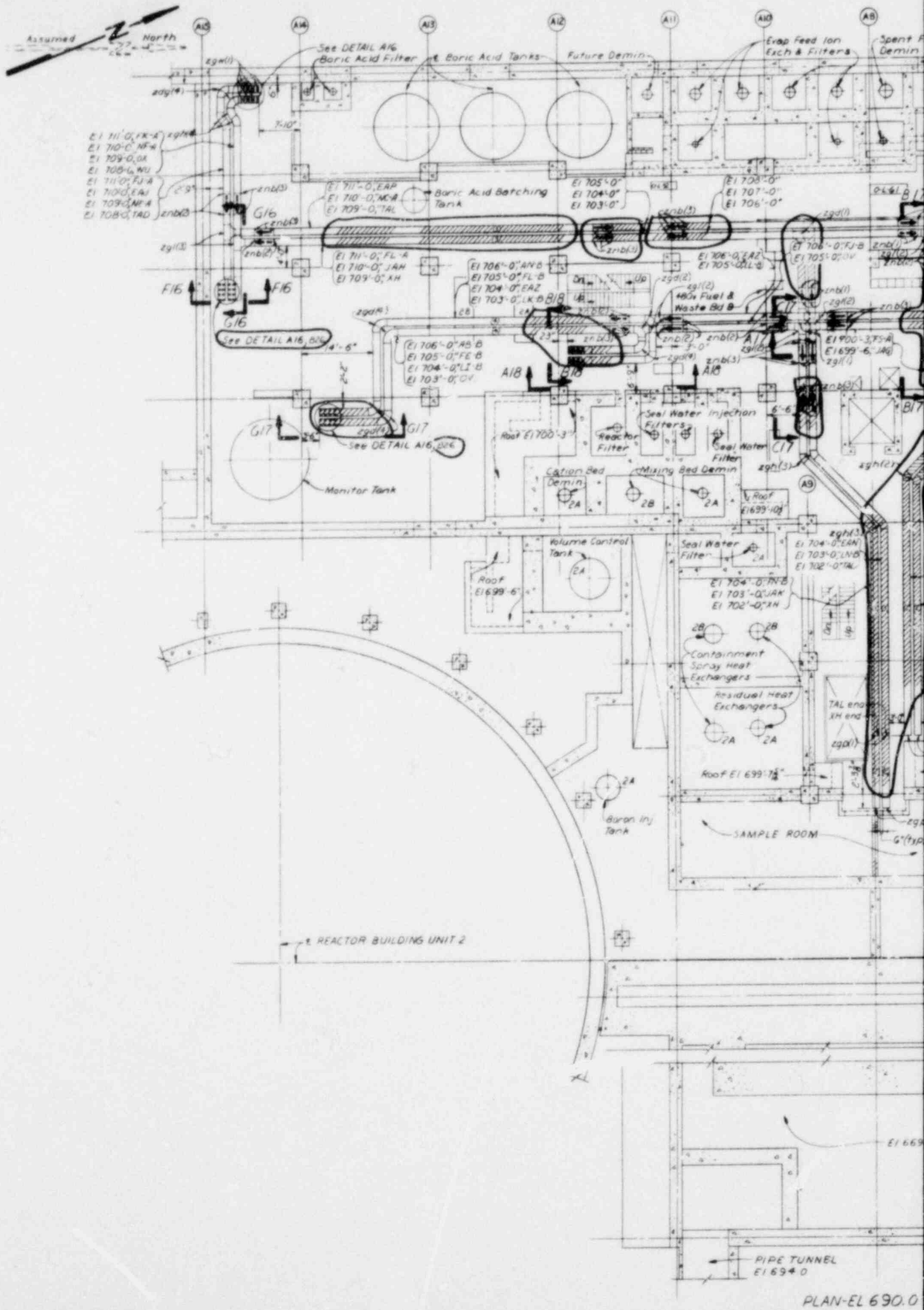

TURBINE BUILDING
OFFICE WING
SERVICE BLDG
CONTROL BLDG
AUXILIARY BLDG
REACTOR
REACTOR
NORTH-SOUTH BASE LINE
EAST-WEST BASE LINE
UNIT 2
UNIT 1
KEY PLAN
Not to Scale
See DET A23(typ)
Intake Structure Conduit Bank
REACTOR BUILDING UNIT 1

FIGURE 12-3


Assumed North
See DETAIL A16 Boric Acid Filter
Boric Acid Tanks
Future Demin
Evap Feed Ion Exch & Filters
Boric Acid Batching Tank
Monitor Tank
Cation Bed Demin
Mixing Bed Demin
Volume Control Tank
Seal Water Injection Filters
Reactor Filter
Seal Water Filter
Containment Spray Heat Exchangers
Residual Heat Exchangers
Boron Inj Tank
SAMPLE ROOM
REACTOR BUILDING UNIT 2
PIPE TUNNEL
PLAN-EL 690.0

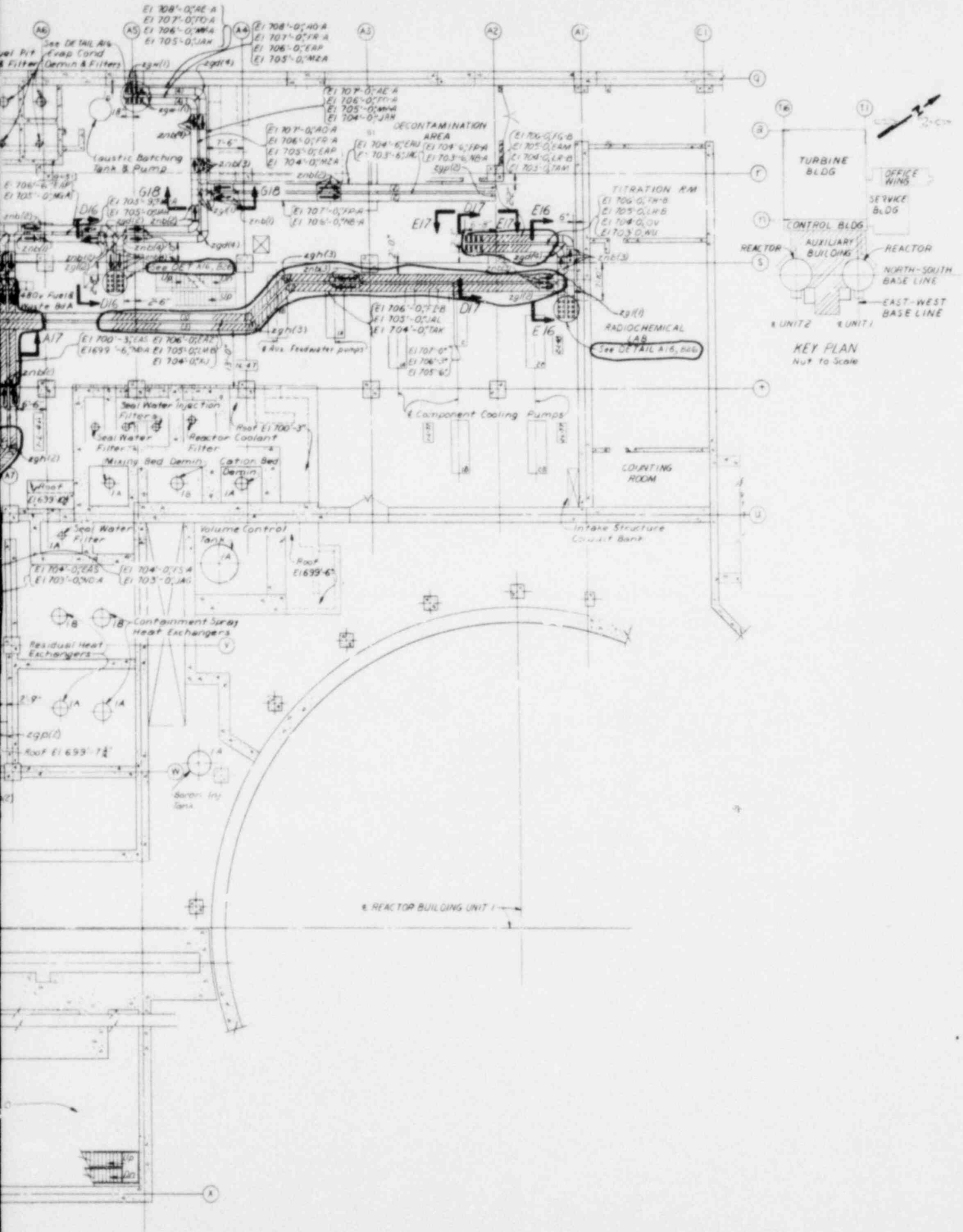
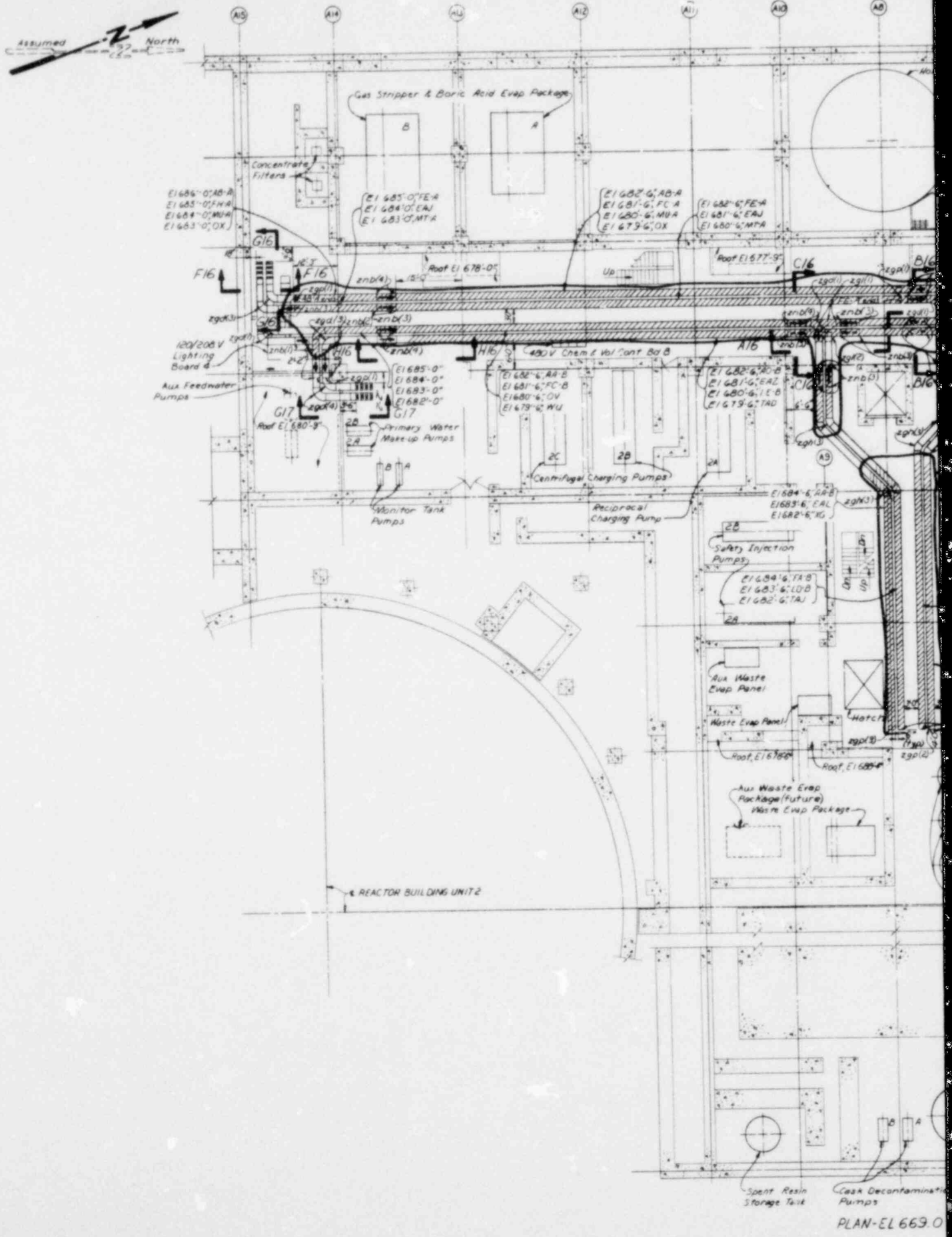

DECONTAMINATION AREA
TITRATION RM
RADIOCHEMICAL LAB
See DETAIL A16, B6G
Caustic Batching Tank & Pump
Seal Water Injection Filters
Seal Water Filter
Reactor Coolant Filter
Mixing Bed Demin
Cation Bed Demin
Volume Control Tank
Containment Spray Heat Exchangers
Residual Heat Exchangers
Boron Inj Tank
4 Component Cooling Pumps
COUNTING ROOM
Intake Structure Conduit Bank
4 REACTOR BUILDING UNIT 1
TURBINE BLDG
OFFICE WING
SERVICE BLDG
CONTROL BLDG
AUXILIARY BUILDING
REACTOR
NORTH-SOUTH BASE LINE
EAST-WEST BASE LINE
4 UNIT 2
4 UNIT 1
KEY PLAN
Not to Scale

FIGURE 12-4


Assumed North
A15
A14
A13
A12
A11
A10
A8
Gas Stripper & Boric Acid Evap Package
B
A
Concentrate Filters
E1 686'-0" AB:A
E1 685'-0" FH:A
E1 684'-0" MH:A
E1 683'-0" OX
E1 683'-0" FE:A
E1 684'-0" EA:I
E1 683'-0" MT:A
E1 682'-6" AB:A
E1 681'-6" FC:A
E1 680'-6" MH:A
E1 679'-6" OX
E1 682'-6" FE:A
E1 681'-6" EA:I
E1 680'-6" MT:A
G16
F16
E16
Roof E1 678'-0"
Up
Roof E1 677'-9"
C16
B16
A16
H16
G17
Roof E1 680'-9"
120/208 V Lighting Board A
Aux Feedwater Pumps
E1 685'-0"
E1 684'-0"
E1 683'-0"
E1 682'-0"
480 V Chem & Vol Cont Bd B
E1 682'-6" AA:B
E1 681'-6" FC:B
E1 680'-6" OV
E1 679'-6" WU
E1 682'-6" FC:B
E1 681'-6" EA:I
E1 680'-6" LE:B
E1 679'-6" TA:D
2B
2A
2C
Primary Water Make-up Pumps
Centrifugal Charging Pumps
Reciprocal Charging Pump
Monitor Tank Pumps
E1 684'-6" AA:B
E1 683'-6" EA:L
E1 682'-6" XG
Safety Injection Pumps
E1 684'-6" TA:B
E1 683'-6" LO:B
E1 682'-6" TA:I
Aux Waste Evap Panel
Waste Evap Panel
Hatch
Roof E1 687'-6"
Roof E1 688'-6"
Aux Waste Evap Package (Future)
Waste Evap Package
REACTOR BUILDING UNIT 2
Spent Resin Storage Tank
Cask Decontamination Pumps

PLAN-EL 669.0

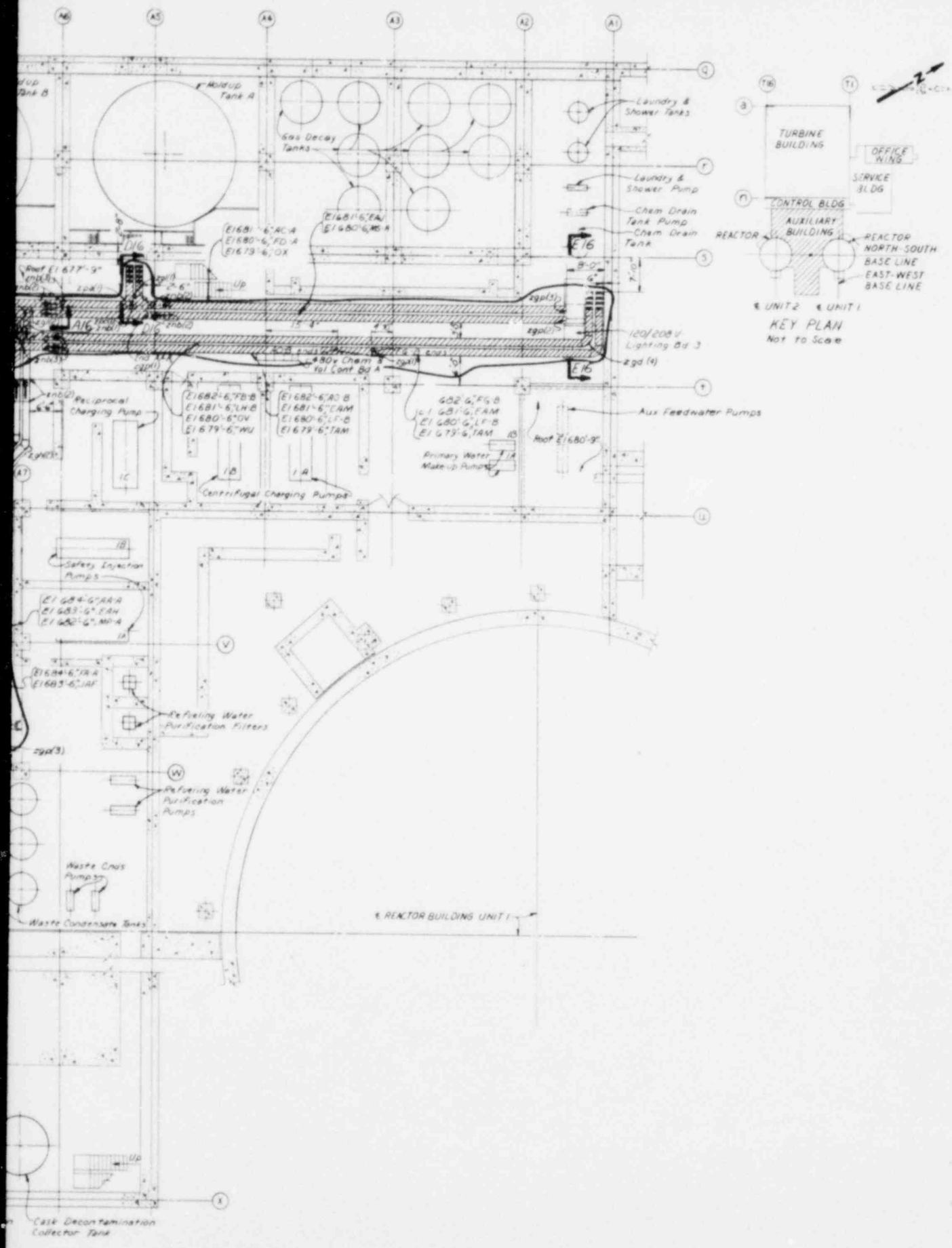
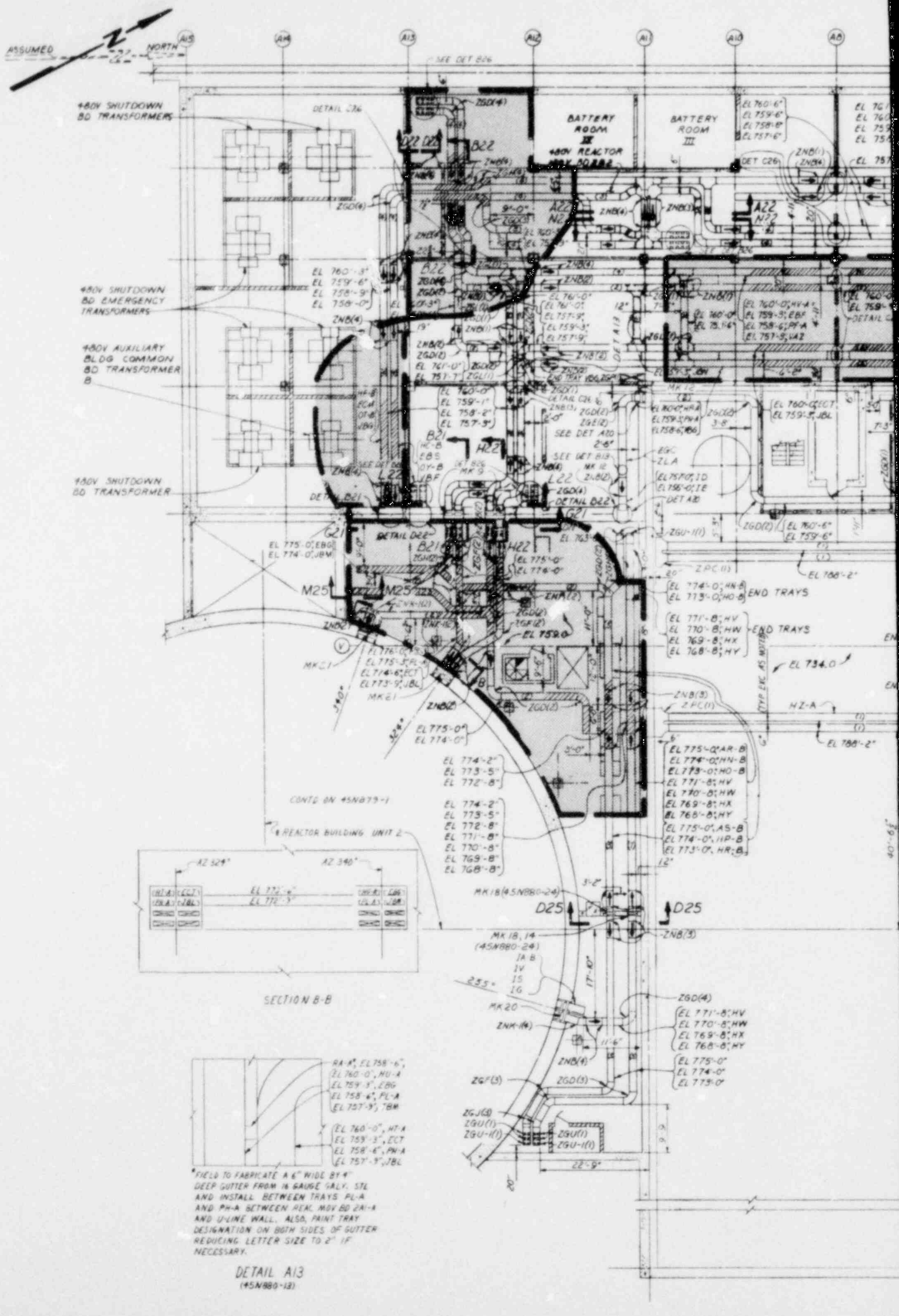

Hold up Tank B
Hold up Tank A
Gas Decay Tanks
Laundry & Shower Tanks
Laundry & Shower Pump
Chem Drain Tank Pump
Chem Drain Tank
120/208 V. Lighting Bd. 3
480 v Chem & Vol Cont Bd A
Reciprocal Charging Pump
Centrifugal Charging Pumps
Aux Feedwater Pumps
Primary Water Make-up Pumps
Roof El 680'-9"
Safety Injection Pumps
Refueling Water Purification Filters
Refueling Water Purification Pumps
Waste Gas Pumps
Waste Condensate Tanks
Cask Decontamination Collector Tank
℄ REACTOR BUILDING UNIT 1
TURBINE BUILDING
OFFICE WING
SERVICE BLDG
CONTROL BLDG
AUXILIARY BUILDING
REACTOR
REACTOR NORTH-SOUTH BASE LINE
EAST-WEST BASE LINE
℄ UNIT 2
℄ UNIT 1
KEY PLAN
Not to Scale

FIGURE 12-5


ASSUMED NORTH
A15
A14
A13
A12
A11
A10
A8
SEE DET B26
480V SHUTDOWN BD TRANSFORMERS
DETAIL C26
BATTERY ROOM IV
BATTERY ROOM III
480V REACTOR MOV BD 2B2
480V SHUTDOWN BD EMERGENCY TRANSFORMERS
480V AUXILIARY BLDG COMMON BD TRANSFORMER B
480V SHUTDOWN BD TRANSFORMER
DETAIL B22
DETAIL D22
END TRAYS
EL 734.0
EL 788'-2"
EL 759.0
CONTD ON 45N879-1
℄ REACTOR BUILDING UNIT 2
AZ 324°
AZ 340°
SECTION B-B
MK 18 (45N880-24)
D25
MK 20
*FIELD TO FABRICATE A 6" WIDE BY 4" DEEP GUTTER FROM 16 GAUGE GALV. STL AND INSTALL BETWEEN TRAYS PL-A AND PH-A BETWEEN REAC. MOV BD 2A1-A AND U-LINE WALL. ALSO, PAINT TRAY DESIGNATION ON BOTH SIDES OF GUTTER REDUCING LETTER SIZE TO 2" IF NECESSARY.
DETAIL A13
(45N880-13)

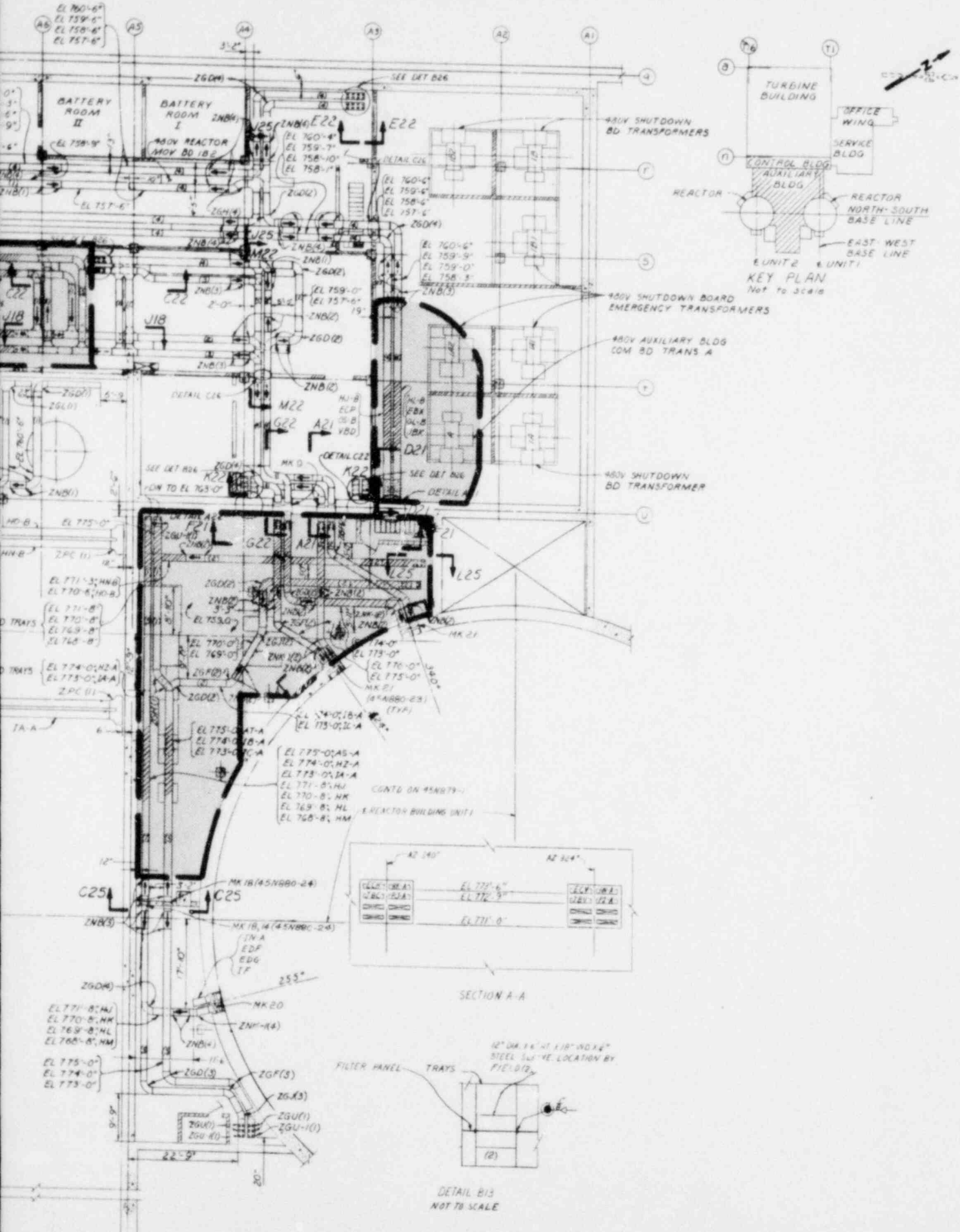
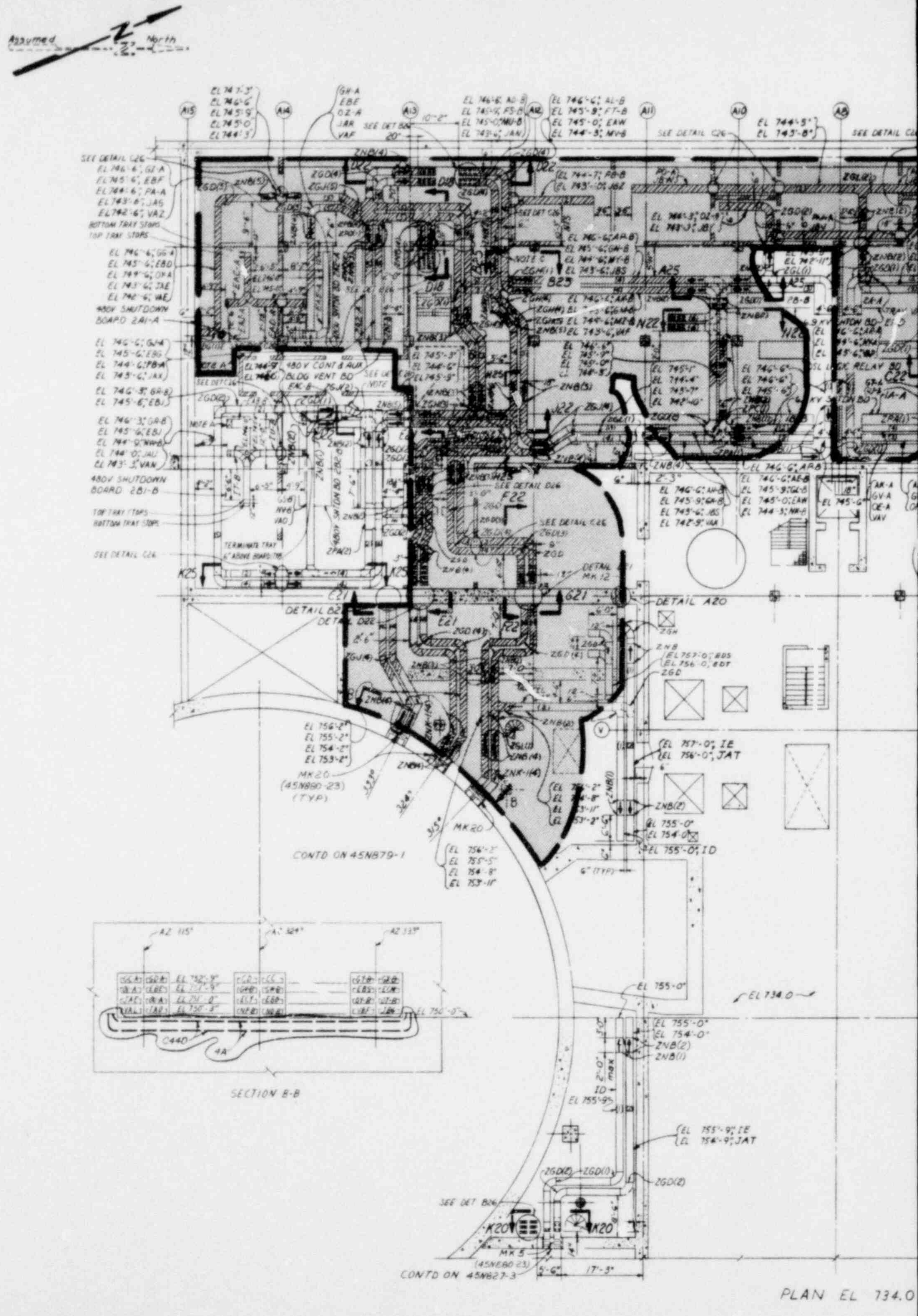

BATTERY ROOM II
BATTERY ROOM I
480V REACTOR MOV BD 1B2
480V SHUTDOWN BD TRANSFORMERS
480V SHUTDOWN BOARD EMERGENCY TRANSFORMERS
480V AUXILIARY BLDG COM BD TRANS A
480V SHUTDOWN BD TRANSFORMER
SEE DET B26
DETAIL C26
DETAIL C22
SEE DET B26
CONT TO EL 763'-0"
CONTD ON 45NB79-1
FROM REACTOR BUILDING UNIT 1
MK 18(45NB80-24)
MK 18, 14 (45NB80-24)
MK 20
MK 21
MK 21 (45NB80-23) (TYP)
SECTION A-A
FILTER PANEL
TRAYS
DETAIL B13
NOT TO SCALE
TURBINE BUILDING
OFFICE WING
SERVICE BLDG
CONTROL BLDG
AUXILIARY BLDG
REACTOR
REACTOR NORTH-SOUTH BASE LINE
EAST-WEST BASE LINE
UNIT 2
UNIT 1
KEY PLAN
Not to scale
PLAN EL 749.0

FIGURE 12-6


Assumed North
SEE DETAIL C26
480V SHUTDOWN BOARD 2A1-A
480V SHUTDOWN BOARD 2B1-B
480 V CONT & AUX BLDG VENT BD
BOTTOM TRAY STOPS
TOP TRAY STOPS
SEE DETAIL D26
DETAIL A20
DETAIL B22
DETAIL D22
MK 20
(45N880-23)
(TYP)
CONTD ON 45N879-1
SECTION B-B
EL 734.0
EL 755'-0"
EL 755'-0"; ID
EL 757'-0"; IE
EL 756'-0"; JAT
EL 755'-9"; IE
EL 754'-9"; JAT
SEE DET B26
MK 5
(45N880-23)
CONTD ON 45N827-3
17'-3"
5'-6"

PLAN EL 734.0

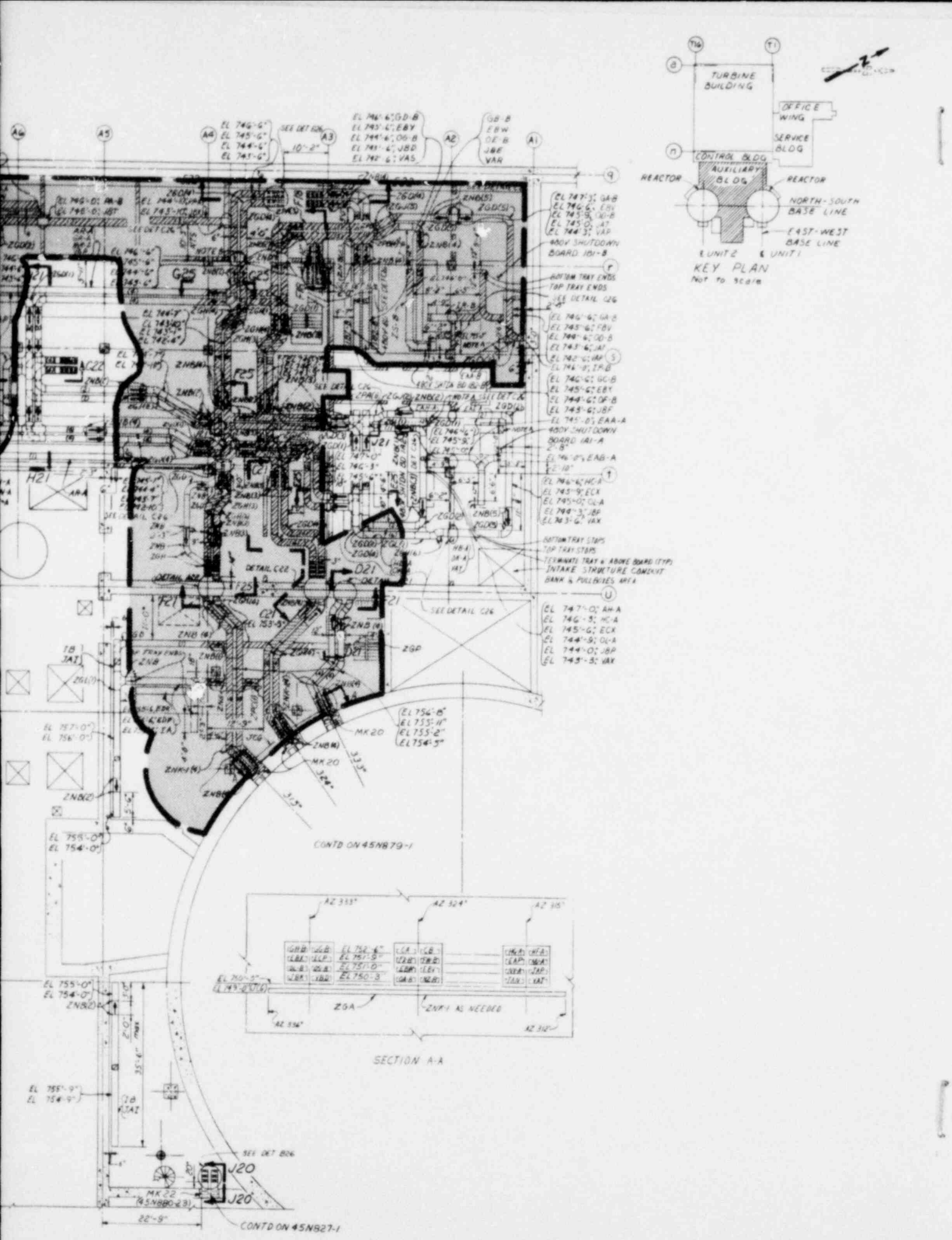
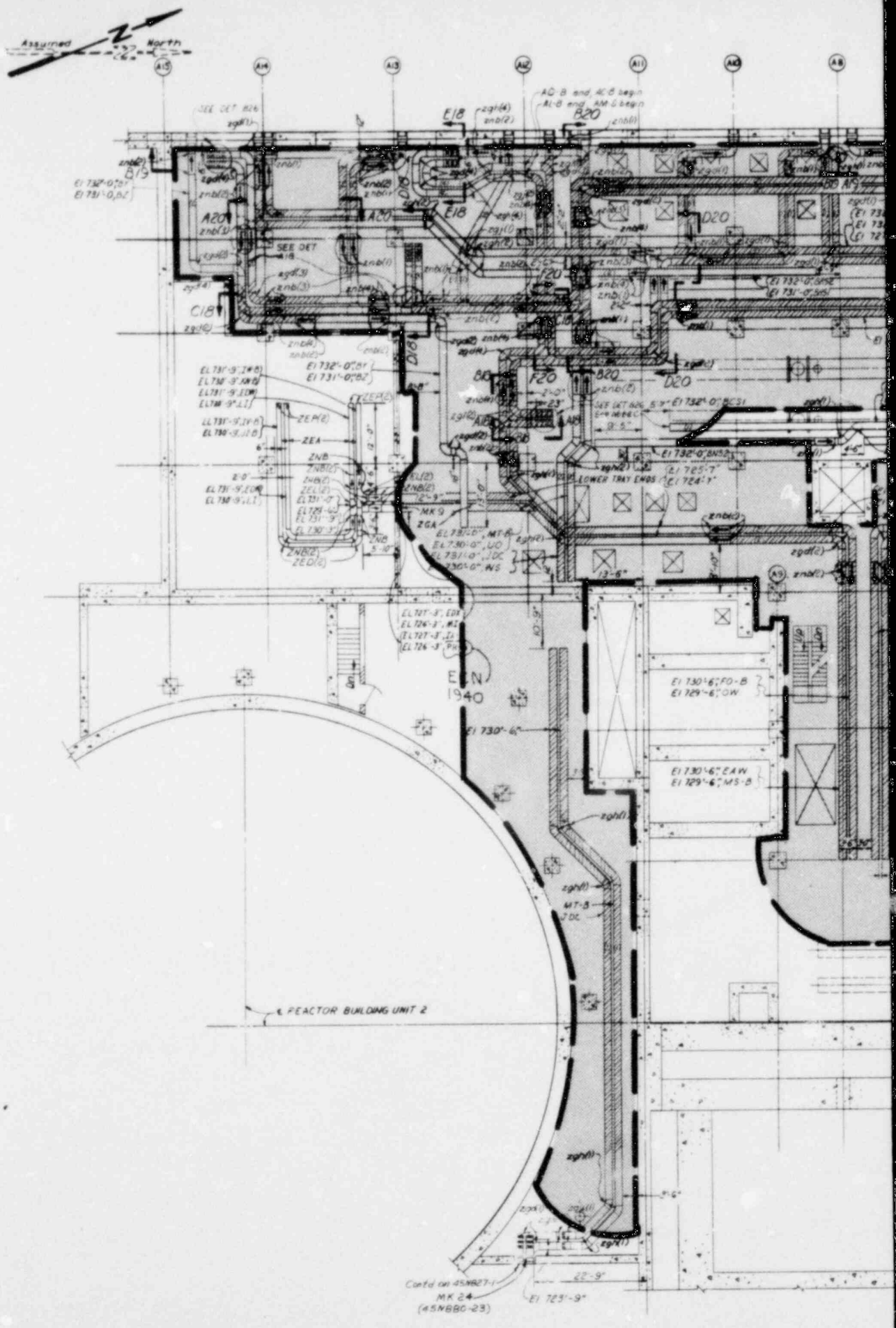

TURBINE BUILDING
OFFICE WING
SERVICE BLDG
CONTROL BLDG
AUXILIARY BLDG
REACTOR
REACTOR
NORTH - SOUTH BASE LINE
EAST - WEST BASE LINE
℄ UNIT 2
℄ UNIT 1
KEY PLAN
Not to scale
SECTION A-A
CONTD ON 45N879-1
CONTD ON 45N827-1

FIGURE 12-7


Assumed North
A15
A14
A13
A12
A11
A10
A8
REACTOR BUILDING UNIT 2
Contd on 45NB27-1
MK 24
(45NB80-23)
EL 725'-9"
22'-9"
PLAN EL 714'

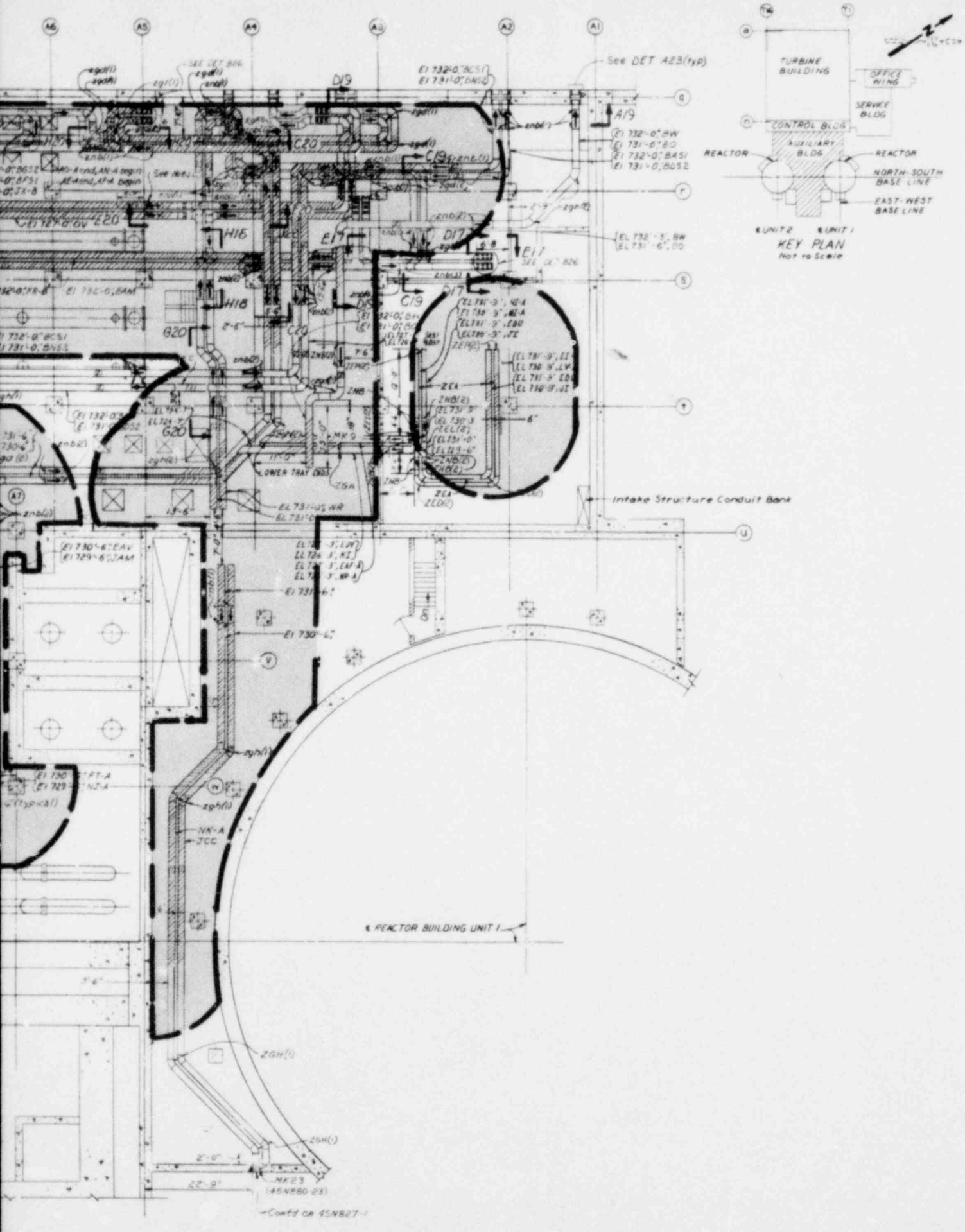
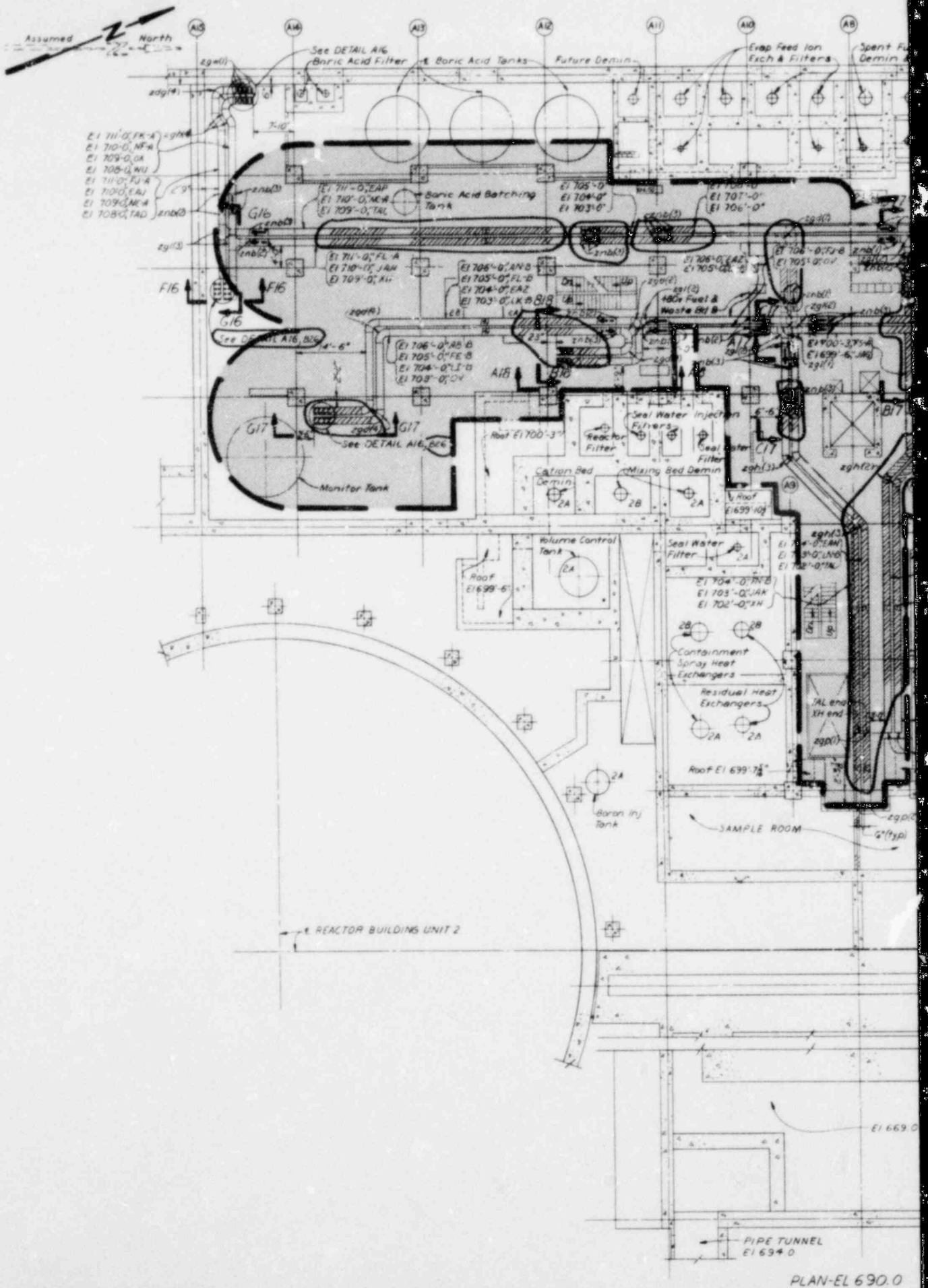

TURBINE BUILDING
OFFICE WING
SERVICE BLDG
CONTROL BLDG
AUXILIARY BLDG
REACTOR
REACTOR
NORTH-SOUTH BASE LINE
EAST-WEST BASE LINE
℄ UNIT 2
℄ UNIT 1
KEY PLAN
Not to Scale
See DET. AZ3 (typ)
Intake Structure Conduit Bank
℄ REACTOR BUILDING UNIT 1
Contd on 45N827-1

FIGURE 12-8


Assumed North
See DETAIL A16
Boric Acid Filter
Boric Acid Tanks
Future Demin.
Evap Feed Ion Exch & Filters
Spent Fuel Demin
Boric Acid Batching Tank
Monitor Tank
Seal Water Injection Filters
Reactor Filter
Seal Water Filter
Cation Bed Demin
Mixing Bed Demin
Volume Control Tank
Containment Spray Heat Exchangers
Residual Heat Exchangers
Boron Inj Tank
SAMPLE ROOM
REACTOR BUILDING UNIT 2
PIPE TUNNEL
EL 694.0
PLAN-EL 690.0

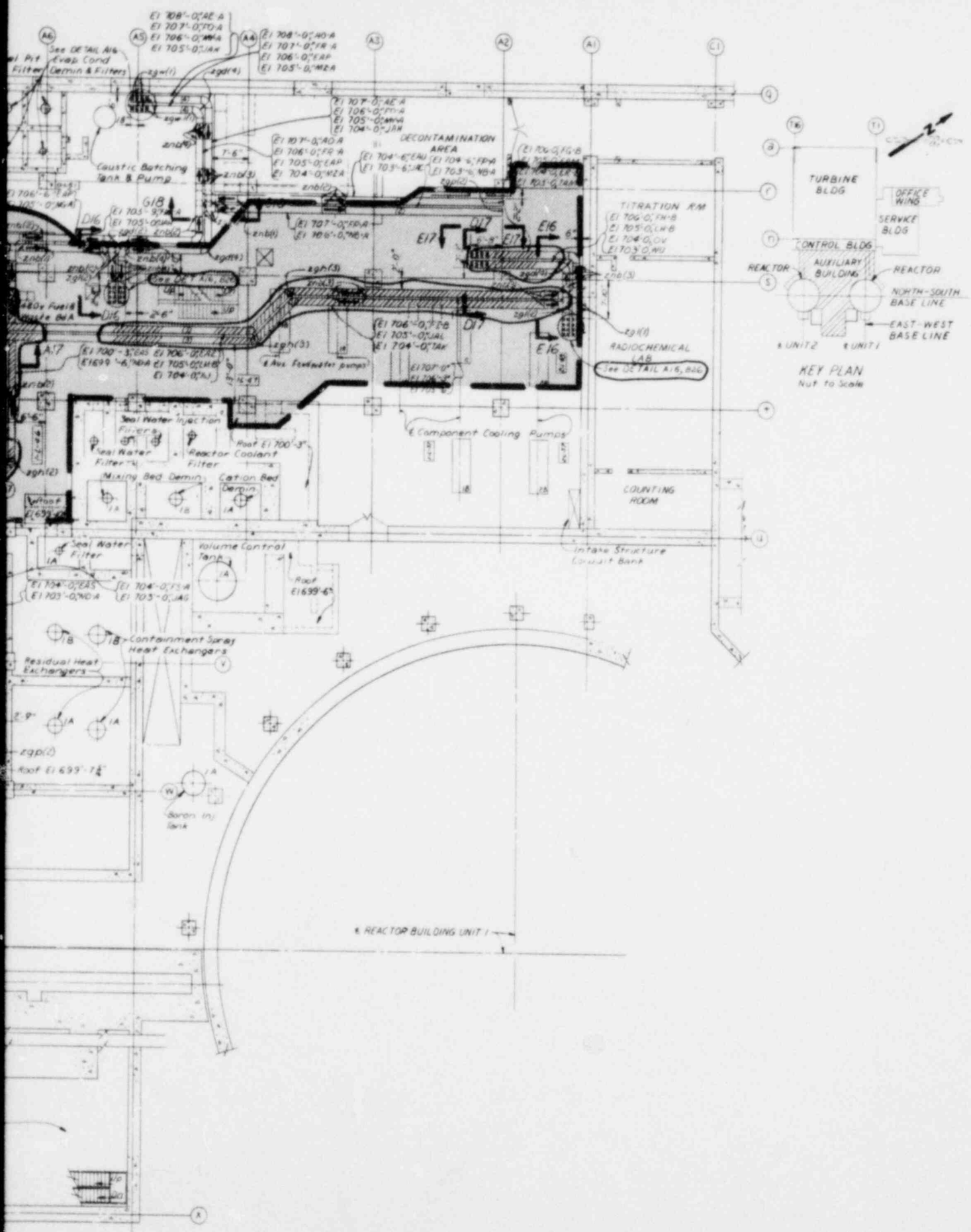
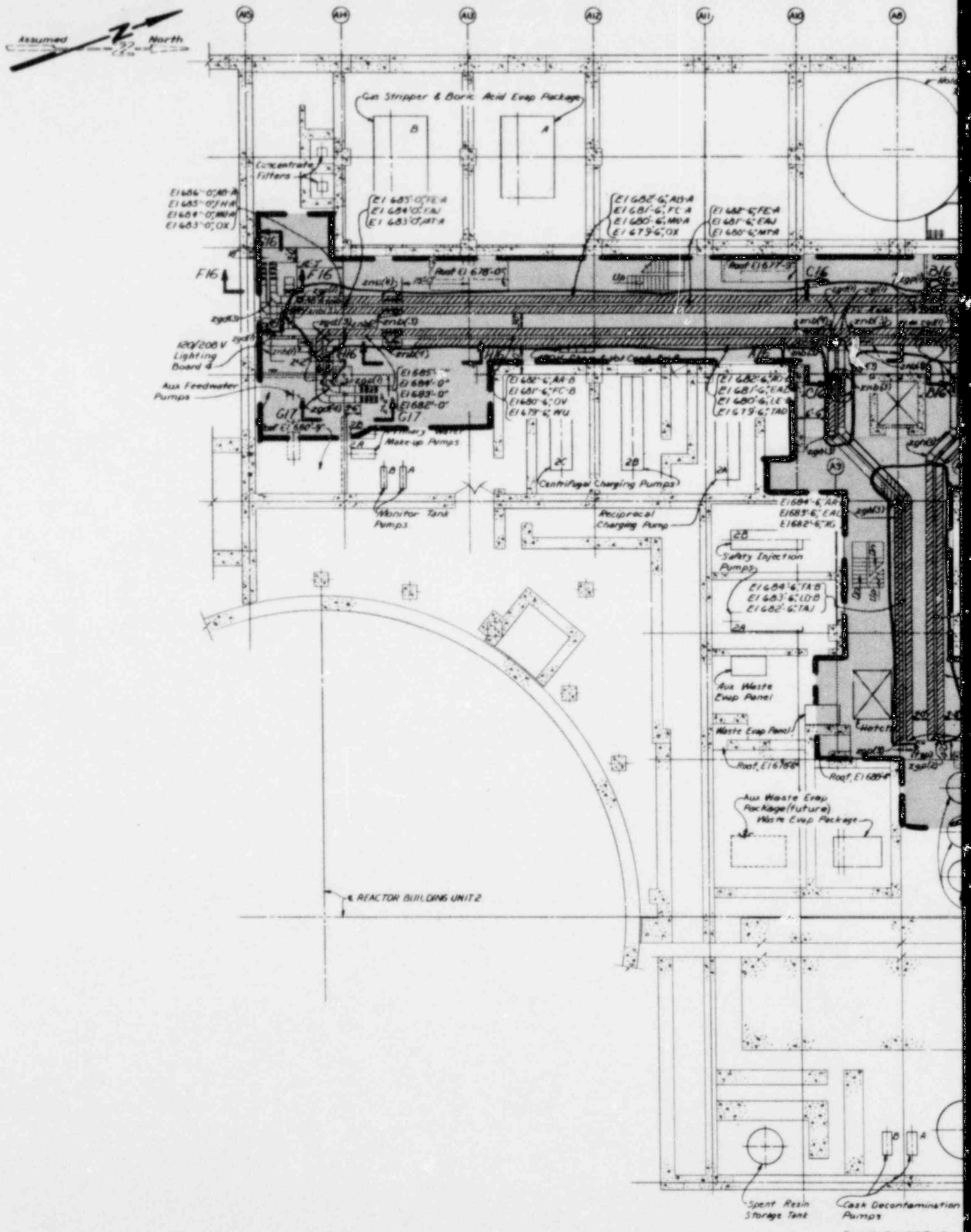

DECONTAMINATION AREA
TITRATION RM
RADIOCHEMICAL LAB
See DETAIL A16, B26
Caustic Batching Tank & Pump
Seal Water Injection Filters
Seal Water Filter
Reactor Coolant Filter
Mixing Bed Demin.
Cation Bed Demin.
Seal Water Filter
Volume Control Tank
Containment Spray Heat Exchangers
Residual Heat Exchangers
Boron Inj. Tank
4 Component Cooling Pumps
COUNTING ROOM
Intake Structure Conduit Bank
4 REACTOR BUILDING UNIT 1
TURBINE BLDG
OFFICE WING
SERVICE BLDG
CONTROL BLDG
AUXILIARY BUILDING
REACTOR
REACTOR
NORTH-SOUTH BASE LINE
EAST-WEST BASE LINE
4 UNIT 2
4 UNIT 1
KEY PLAN
Not to Scale

FIGURE 12-9


Assumed North
Gas Stripper & Boric Acid Evap Package
Concentrate Filters
Roof El 678'-0"
Roof El 677'-3"
120/208 V Lighting Board 4
Aux Feedwater Pumps
Boric Acid Makeup Pumps
Monitor Tank Pumps
Centrifugal Charging Pumps
Reciprocal Charging Pump
Safety Injection Pumps
Aux Waste Evap Panel
Waste Evap Panel
Hatch
Roof, El 676'6"
Roof, El 680'4"
Aux Waste Evap Package (future)
Waste Evap Package
REACTOR BUILDING UNIT 2
Spent Resin Storage Tank
Cask Decontamination Pumps

PLAN-EL 669.0

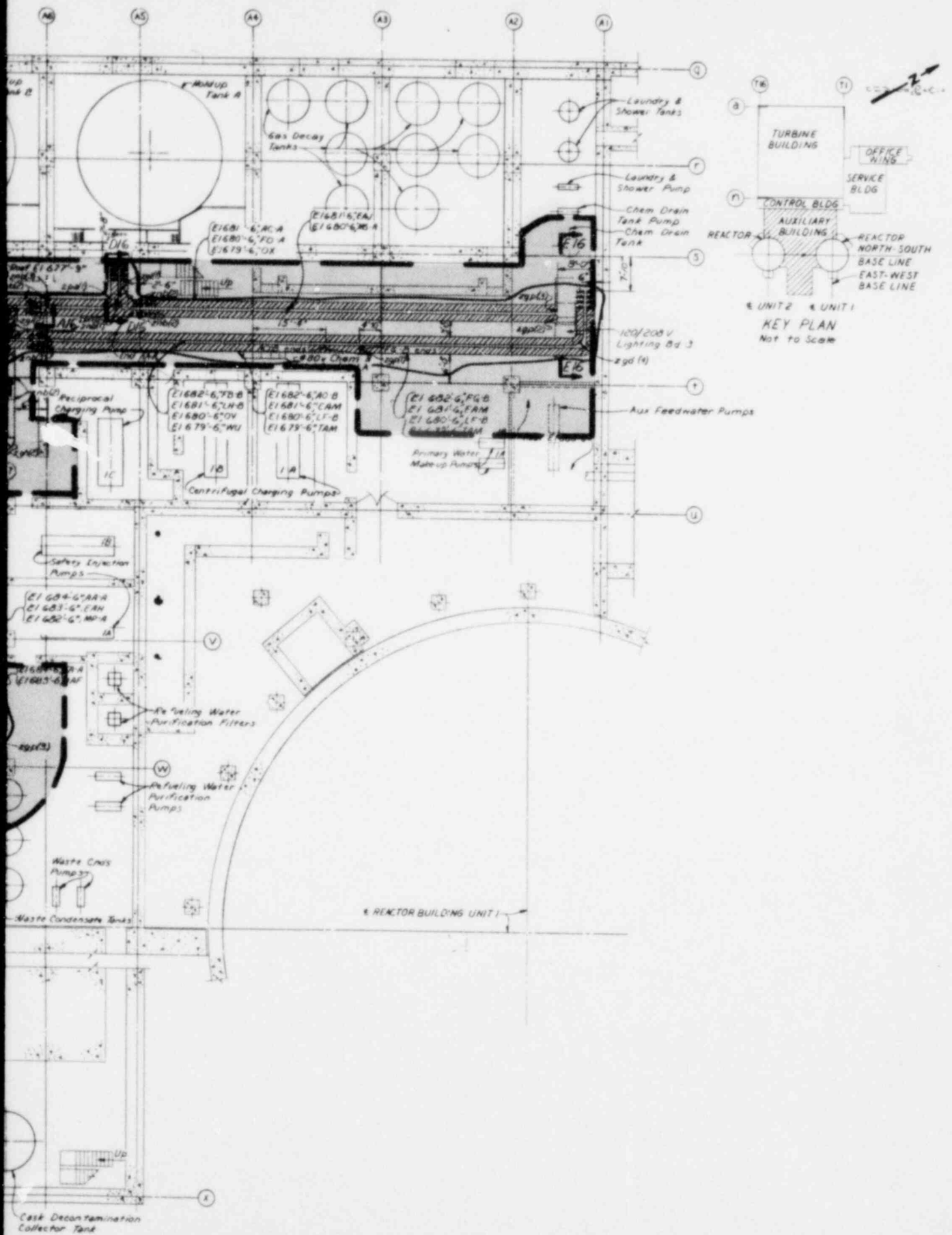

Laundry & Shower Tanks
Gas Decay Tanks
Laundry & Shower Pump
Chem Drain Tank Pump
Chem Drain Tank
100/208 V Lighting Bd 3
Aux Feedwater Pumps
Primary Water Make-up Pumps
Reciprocal Charging Pump
Centrifugal Charging Pumps
Safety Injection Pumps
Refueling Water Purification Filters
Refueling Water Purification Pumps
Waste Cncs Pumps
Waste Condensate Tanks
℄ REACTOR BUILDING UNIT 1
Cask Decontamination Collector Tank
TURBINE BUILDING
OFFICE WING
SERVICE BLDG
CONTROL BLDG
AUXILIARY BUILDING
REACTOR
REACTOR NORTH-SOUTH BASE LINE
EAST-WEST BASE LINE
℄ UNIT 2
℄ UNIT 1
KEY PLAN
Not to Scale

FIGURE 12-10

13. On elevation 690' of the auxiliary building at coordinate A-3 and T, all five (two from each unit and one swing) component cooling water pumps are located together. Adjacent to these safety related pumps are the two motor driven auxiliary feedwater pumps (both trains), of Unit 1, which are also safety related. Both Unit No. 2 auxiliary feedwater pumps are located approximately 125' away down the corridor at coordinates A-12 and S. Power operated control valves for the component cooling water (CCW) pumps are located immediately above the CCW pumps on an open grating mezzanine. Various safety related cable trays are also located in the area. A preaction sprinkler system is proposed for the ceiling level only and would offer very little protection against an exposure fire due to the many obstructions between the ceiling level sprinkler and the floor below.

    It is our position that:

    A. A half hour fire rated barrier be provided between the redundant auxiliary feedwater pumps and extend up to the mezzanine above these pumps. At present, a metal decking barrier is used to partially separate each auxiliary feedwater pumps. This applies to both Unit 1 and 2 pumps.

    B. Provide automatic sprinkler protection under the partition above the auxiliary feedwater pumps of both Unit 1 and 2. Activation of the system should alarm and annunciate in the control room.

    C. Provide automatic sprinklers over all five component cooling water pumps under the mezzanine above them.

    D. Provide a 1/2-hr. fire rated barrier separating each component cooling water pump from each other. The barrier should extend to the underside of the mezzanine above. Also provide a 1/2-hr fire rated barrier for the mezzanine floor above these pumps. The 1/2-hr. fire rating should protect against a fire from either side of the barrier.

    E. Provide a 1/2-hr. fire rated barrier protection (1" mineral wool or equivalent) for the control and power supplies to the various valves on the mezzanine level above the component cooling water pumps.

    F. Provide additional smoke detection throughout the area for early detection. Detection should be tied into the existing fire alarm system and alarm and annunciate in the control room.

    G. Verify that the existing hose station location will be sufficient with the above fire rated barriers in place for protection of all pumps and valves.

TVA Response

A. The auxiliary feedwater system contains two motor-driven pumps (those described in the above question) and a steam turbine-driven pump (located on elevation 669). Since any one of these pumps has sufficient capacity to establish and maintain a safe shutdown, the loss of both motor-driven pumps to a fire is an acceptable event. Hence, fire rated barriers between pumps are not required. See discussion of steam generator inventory control in response to question 1.

B. Automatic sprinkler protection will be provided under the pipe break barrier for the units 1 and 2 motor-driven auxiliary feedwater pumps.

C. Automatic sprinkler coverage will be provided under the mezzanine for all five component cooling water pumps. Sprinkler heads will be a fast-response type and tested according to UL 199. Heat collectors will be provided for each sprinkler head. Sufficient heads will be provided to cover the entire general area at the mezzanine level with the maximum distance between heads of eight feet.

D. A single fire barrier will be provided between train A and train B component cooling water pumps. The fire barrier will extend approximately three feet above the highest point on the pumps and have a minimum 1/2-hour fire resistance rating.

E. Control and power supply cables that are required for safe shutdown and that are located on the mezzanine level above the component cooling water pumps will be protected as discussed in the response to question 1.

F. Additional smoke detection will be provided to actuate the proposed sprinkler systems and to ensure early warning of a fire. Detection circuits will be Class A supervised in accordance with NFPA 72D.

G. Existing fire hose capability is sufficient to reach all equipment within the area of the component cooling water pumps and motor-driven auxiliary feedwater pumps with no more than 100 feet of hose.

14. The emergency raw cooling water pump house is separated into three compartments with train A of both units located on either end and train B of both units located together in the middle compartment. It is our position that the following be provided for the ERCW pump house.

A. Provide a 3 hr. fire rated door to separate the center compartment from the south compartment. The door should be alarmed and annunciated in the control room.

B. Provide a 1/2-hr. fire rated partial barrier to separate the two B trains in the center compartment. Barriers should be at least 6" high.

TVA Response

A. A 3-hour rated fire door is provided between the center and south compartments of the intake pumping station containing the ERCW pumps. At the time of the NRC site visit, the door had not been installed.

The door shall be locked in its normally closed position with the keys administratively controlled. Therefore, alarm and annunciation of the door is not necessary.

B. It is TVA's position that the present compartmentation in the CCW intake pumping station is adequate based on the following discussion.

The NRC's understanding of the ERCW system appears to be incomplete. Sequoyah's ERCW system is a two-train, nonunitized system. Each of the two trains contains four 50-percent capacity pumps in the CCW intake pumping station and four 50-percent capacity pumps in the ERCW pumping station. Figure 14.1 is a single-line drawing of the two supply headers and the pumping stations. Note that in each pumping station, all pumps of a given train feed a common header. For distribution purposes, two headers do branch off of each common header, both of these are required for operation of either unit (with single failure capability) as each serves not only unit loads but also essential common plant loads.

For unit one operation, all ERCW loads will be supplied by four pumps located at the CCW intake pumping station. The other four pumps at this station will never be used. When construction of the new ERCW pumping station is completed, some time before unit two operation, all ERCW pumps at the CCW intake pumping station will be abandoned. See Figures 14.1 and 14.2 to identify which pumps will be in service and to which diesel they may be loaded. Figure 14.3 depicts the pump and header arrangement for the new ERCW pumping station.

Sequoyah's two-train, nonunitized system is more fully described in Section 9.2.2 of the FSAR (see Figures 9.2-11, 9.2-15a, 9.2-20, and 9.2-20a). It has been reviewed and found to be acceptable by the NRC's APCSB Branch.

Additionally, the two required B train pumps in the central compartment of the CCW intake pumping station are located approximately 30 feet apart. This special separation precludes the need for any barrier.

Thermal spot detectors and heat collectors will be provided immediately above each ERCW pump in both the CCW intake pumping station and the ERCW pumping station to provide early warning fire detection capability.

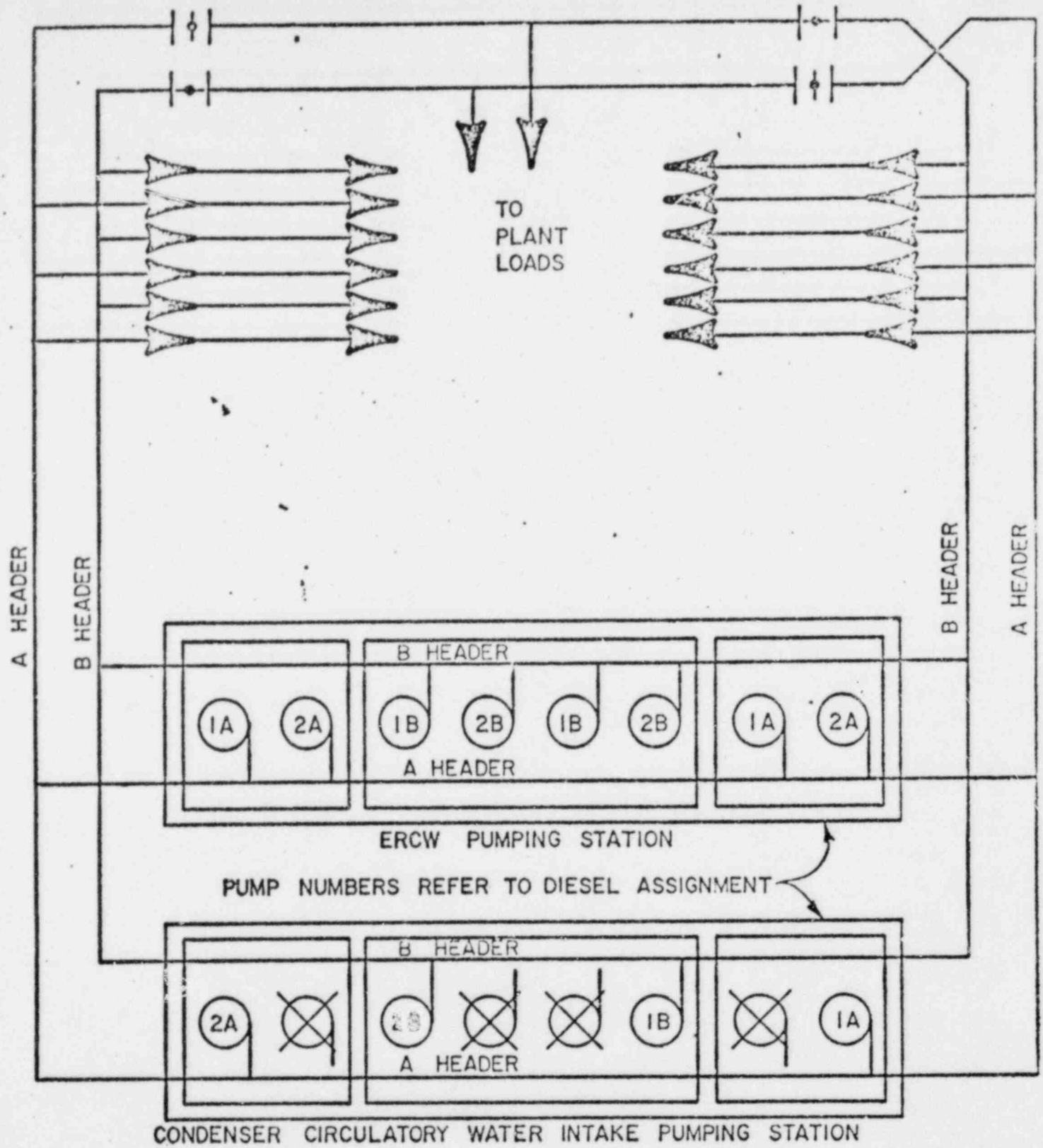
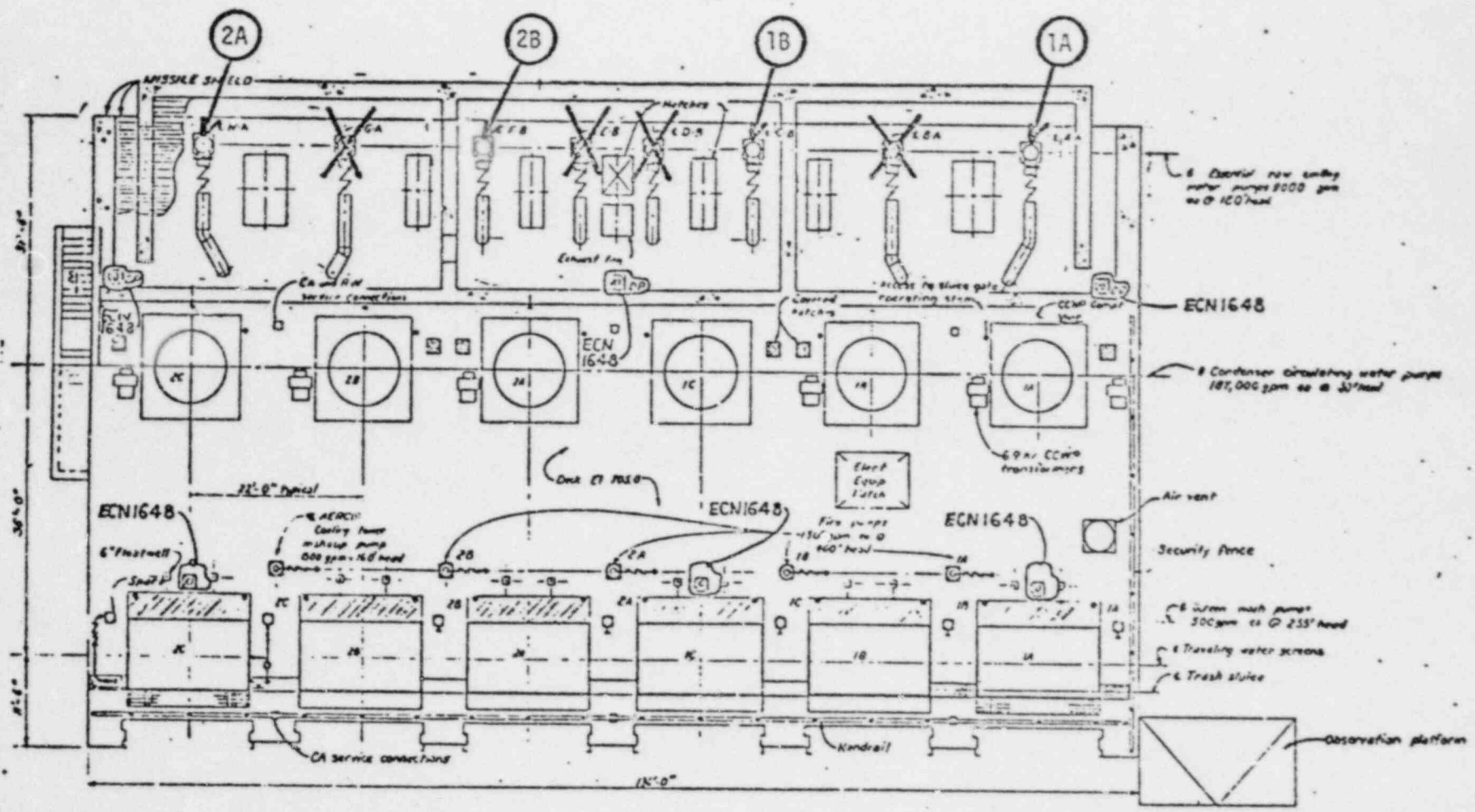


FIGURE 14.1
ERCW SUPPLY
HEADER ARRANGEMENT
SEQUOYAH NUCLEAR PLANT



X These pumps are not and will not ever be wired up.

O These pumps will be disconnected prior to startup of unit 2. Number in circle is diesel pump is assigned to.

Figure 14.2

Condenser Circulating Water Intake Pumping Station Sequoyah Nuclear Plant

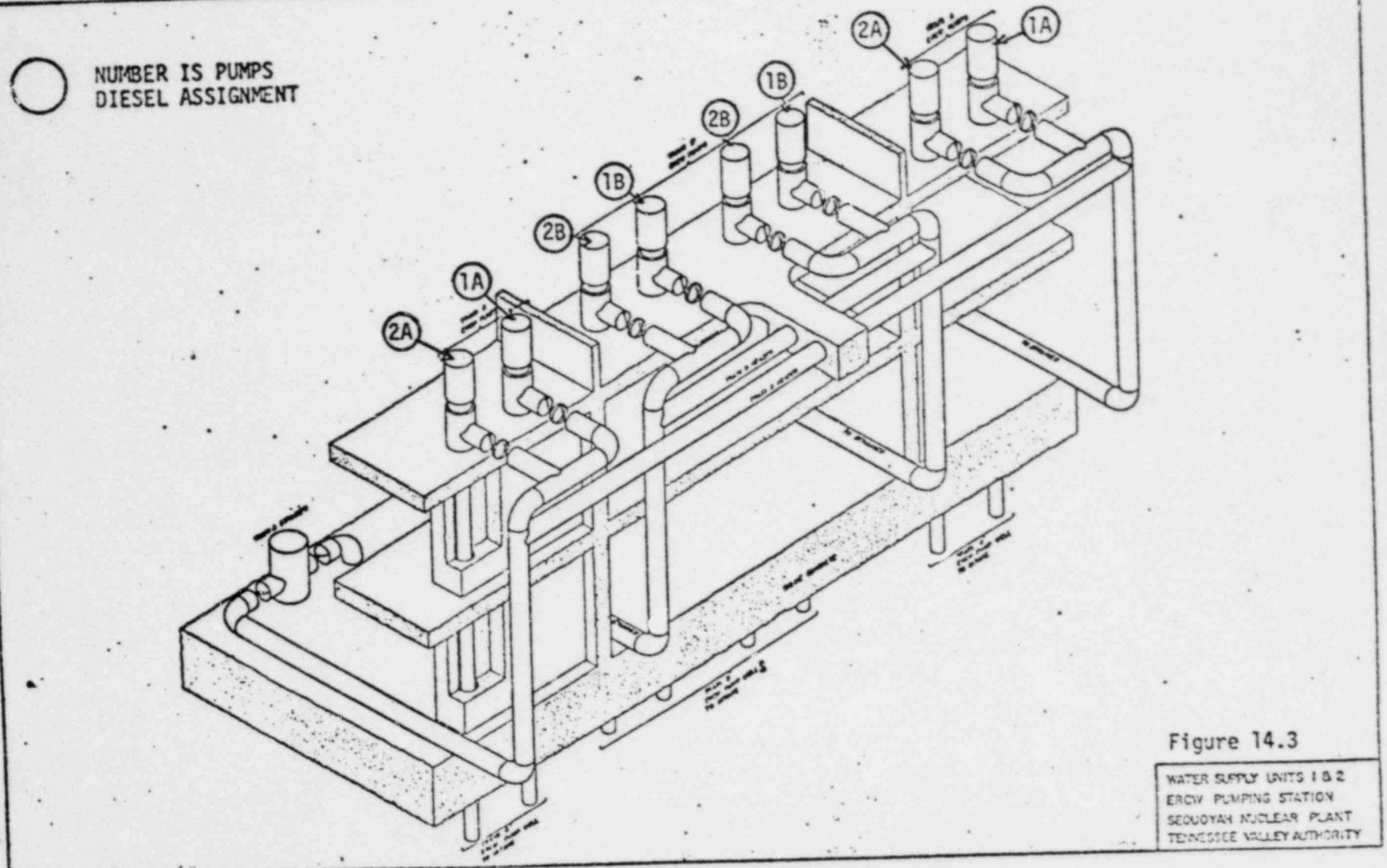


Figure 14.3

WATER SUPPLY UNITS 1 & 2
ERCW PUMPING STATION
SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY

15. All four wood and PVC cooling towers for the Auxiliary Essential Raw Cooling Water System are located within 50 ft. of the emergency diesel generator building and approximately within 50 ft. from the two large diesel fuel oil storage tanks (also located approximately within 50 ft. from the emergency diesel generator building and approximately 50 ft. from the AERCW pumps). These cooling towers are not protected by a deluge system. We are concerned that a fire in the cooling towers can threaten the diesel generator building, the diesel storage tanks, and the auxiliary essential raw cooling water pumps. It is our position that the cooling towers be protected in accordance with Section D.18 of Appendix A, i.e., providing deluge system, hydrants, and hose stations.

TVA Response

TVA is not providing a deluge system or hose stations for the four auxiliary essential raw cooling water (AERCW) cooling towers for the following reasons:

A. The AERCW system will also serve as interim backup to the ERCW system until the permanent modifications discussed the response to questions 1 (table 1.4) for protection of circuits within the ERCW junction box on auxiliary building floor El. 690.0 and conduits exiting the junction box to El. 734.0 are completed and until completion of the new ERCW pumping station discussed in the response to question 14. The AERCW system (pumps and cooling towers) is required to shutdown the plant only upon loss of Chicamauga Dam (the downstream dam). The safety feature will be transferred to the new ERCW station when it is completed (prior to unit 2 operation).

B. The diesel genrator building is about 50 feet from the closest tower (the distances of the other towers are 120, 200, and 280 feet). This distance is great enough so that an AERCW cooling tower fire would not constitute a hazard to this structure. The diesel generator building is a seismic 1A structure, designed to be tornado and missile resistant and its exterior walls are equivalent to at least a 3-hour rated fire barrier.

C. The yard storage fuel oil tanks are 70 feet away from the closest cooling tower (distances to remaining towers are 75, 120, and 180 feet). This separation distance is sufficient such that an AERCW cooling tower fire would not constitute an exposure hazard to these tanks (see table 4-4, NFPA 30). The fuel oil tanks are diked and yard hydrant and hose/equipment capabilities are provided for the entire area. Further, the yard fuel oil tanks serve no safety function. The safety-related diesel seven-day tanks are embedded in concrete under the diesel generator building.

D. Salient features of the cooling tower design are as follows:

   a. The use of fire retardant, corrugated fiberglass casing and louvers.

   b. Fire retardant glass reinforced polyester fan cylinder.

   c. PVC fill and eliminators with a flame spread rating of 25 or less.

16. It is our position that when the CO_2 total flooding system is locked out locally in any emergency diesel generator room that the operator in the control room receives an alarm and annunciator indicating that the system is inoperative.

TVA Response

A common MCR alarm and annunciation will be provided for the train A Emergency Diesel Generator Room and 480V Board Room CO_2 systems to indicate when any system is locked out locally. Identical alarm and annunciation capability will be provided for the train B Emergency Diesel Generator Room and 480V Board Room CO_2 systems.

17. A. The corridor outside each diesel generator room of the emergency diesel generator building has a preaction sprinkler system. Power conduits from each diesel run up the west wall of the corridor. A concrete barrier extending out approximately 3 ft. from the west wall separates the redundant power trains. Unit No. 1 power conduit is located at one end of the corridor and Unit No. 2 at the opposite end. It is our position that a 1-1/2 hr. fire rated barrier separate each redundant train of each unit from each other in the corridor for protection against an exposure fire in the event of failure of the sprinkler system.

It is also our position that the doors leading to each emergency diesel generator from the corridor be kept in the closed positon (at all times) and alarmed and annunciated in the control room.

B. Also verify that a fire in any one of the four switchgear rooms above the corridor of the diesel generator building, elevation 740 ft., will not involve cables and/or conduit for any other safety related train or unit.

TVA Response

A. The NRC understanding of the conduit assignment is in error. Unit 1 and unit 2 train A power conduits are located on the north end of the corridor, and unit 1 and unit 2 train B conduits are located on the south end of the corridor. There is approximately 50 feet separation between train A and train B conduits. TVA considers the spacial separation to be adequate for fixed and transient fire hazards located in the area.

Lubricating oil with a flash point of 465^{o} F will be transported between the lube oil storage room and the diesel generator rooms in 55-gallon drums. If the contents of one or more drums were spilled in the corridor, the oil would run to the center of the corridor and out of the building through a 24-inch drain line. In the unlikely event that this oil were to ignite, the fire could affect the conduits of one train only, approaching the conduits of the second train by no closer than 25 feet.

A flammable liquid fire in the lube oil storage room, fuel oil transfer pump room, or any diesel generator room would present minimum danger to the conduits since each room is provided with a carbon dioxide suppression system, 3-hour fire rated compartmentation, floor drains, and curbs across the door's opening into the corridor. The hazard from the fuel oil transfer pump room is further minimized by the transfer pump's local control station which must be manned continuously when the pump is in service.

Normally closed, 3-hour rated fire doors will be provided for the opening leading to each emergency diesel generator room from the corridor. The sliding fire doors presently installed will be removed.

It is TVA's position that the fire doors require no supervision.

B. There are no cable trays and/or conduit that penetrate switchgear rooms of opposite divisions.

18. We were informed at the time of the site visit that an alternative means of achieving cold shutdown if both redundant trains of conduit-cable trays (of both units) are lost due to a fire in the control room, or cable spreading room or remote shutdown panel room. In order to evaluate this alternative, we require a description of how the alternate shutdown method for each area will be carried out, system modifications associated with the shutdown method, and confirmation that written procedures have been established for immediate use by responsible individuals. The staff position with respect to providing alternate or dedicated shutdown methods for fire protection is stated in Enclosure 1. Provide information that demonstrates that the requirements of Enclosure 1 will be satisfied.

TVA Response

Emergency Operating Instruction EOI-7, Control Room Inaccessibility, provides for safe plant shutdown from the auxiliary control room should the main control room become inaccessible due to a fire (or for other reasons such as toxic gas, etc.) in either it, the spreading room, or Auxiliary Instrument Room. This instruction provides a discussion of symptoms, automatic actions, immediate operator action, subsequent operator action, and recovery for: (a) control room inaccessibility at power or hot standby; (b) control room inaccessibility at hot shutdown, cold shutdown, or refueling shutdown; (c) hot standby to cold shutdown in the auxiliary control mode; and (d) return to main control rrom operation from test of EOI-7. EOI-7 and all EOI's have been submitted to NRC Region 2 Office of Inspection and Enforcement for review.

The auxiliary control room has been divided into five independent compartments (a central control area and four transfer switch rooms) which are separated from each other by 1-1/2 hour fire rated barriers. The central control area is the only room where a fire could affect both safety trains. Panels and cables in the central area are normally inactive and their loss would have no effect upon plant control. A fire in one of the other four rooms could affect only a single train and would not prevent safe shutdown from the main control room.

TVA will comply fully with all Staff positions in enclosure 1. Compliance with Sections 1.1 through 1.7 will be provided by dedicated shutdown methods or repair procedures for fires located in any area of the plant except the Main Control Room, the Cable Spreading Room, or the Auxiliary Instrument Rooms. Compliance for these areas is provided by alternate shutdown methods and EOI-7. Fire protection equipment and features will be provided that will meet the requirements of Sections 2.1 and 2.2.

Standard Operating Instruction SOI 67.2 has been written to incorporate procedures for placing the AERCW system into operation in the event of loss of normal ERCW system function. These procedures satisfy the requirements for interim protective measures specified in section 2.3.

19. It is our position that the ventilation system of each safety-related battery room be alarmed and annunciated in the control room upon failure of such systems. Confirm that you will meet this position.

TVA Response

Redundant ventilation systems are provided for each safety-related battery room. Failure of one system results in an alarm and annunciation in the main control room and the automatic starting of the second system.

20. Control Room Complex

A. Provide the flamespread, smoke developed, and fuel contributed test results as per E-84 of the dropped plastic ceiling in the control room. We were informed at the time of the site visit that this ceiling was a UL-approved dropout ceiling. Verify that the ceiling material meets the guidelines of Section C.4.a(4) of Revision 1 to BTP 9.5-1 or replace it with a ceiling material that does.

B. It is our position that you provide a 3-hour fire rated barrier at T5 and T12 on the ends of the control room. Present doors are not labeled as well as openings are above the suspended ceiling into the corridor. Verify that the doors are of 3-hour fire rated construction and that 3-hour fire doors/dampers are used in all ventilation duct penetrations where they penetrate the 3-hour barrier.

C. The main safety-related consoles actually extend through the floor three to four feet into the cable spreading room. These are completely enclosed with metal walls and floor. A 3-hour fire rated coating is to be applied to the sides and bottom of these consoles from the cable spreading room side only. There is no fire rating from the control room side. The consoles are congested with cables (all non-IEEE-383 rated) and would make manual firefighting difficult.

It is our position that taking the above factors into consideration and providing a defense-in-depth protection that an automatic or local manual operated gas suppression system (either high or low pressure CO_2 or halon) be provided for protection of these consoles.

D. Verify that the sprinkler system for protection in the records storage area conforms to NFPA 13. It was noted that the riser nipples appear to be 1/2-inch pipe, which is not permitted by NFPA 13. Also, verify that the wall separating the records storage room from the relay room is of 3-hour fire rated construction, including protection of all duct penetrations.

TVA Response

A. The dropped plastic ceiling in the main control room is constructed of molded prismatic acrylic plastic (plexiglas G) panels. These panels have not been tested under ASTM E84 test and are not listed by UL in the Building Materials Directory.

The following test results are based on tests conducted on plexiglas G according to the designated standards:

1. Flammability rate of 1.9 inches per minute in accordance with ASTM D 635.

2. Minimum self-ignition temperature of 450 C in accordance with ASTM D 1929-68.

3. Maximum smoke density of 10 in accordance with ASTM D 2843-70.

4. Deflection temperature of 75 C in accordance with ASTM D 648-56.

5. Plexiglas G is listed as a slow burning plastic material by UL as designated on UL cards MH4833A and 3, and Guide QLZQ2 dated March 18, 1971.

There are no safety-related equipment or cabling located above the dropped ceiling.

B. The control room complex is separated from the other plant areas by minimum 3-hour fire rated construction. Within the complex, the peripheral rooms are generally separated from the main control room by 1-1/2-hour fire rated construction. One-and-one-half hour fire separation between the main control room and the remainder of the control room complex satisfies the requirements of section C.6.b of Regulatory Guide 1.120, Revision 1.

Refer to control building elevation 732.0 on compartmentation drawing SK-1007 for the layout of the control room complex.

The Sequoyah Nuclear Plant Fire Protection Program Reevaluation indicates that the fire load in the kitchen area exceeds the fire rating of its enclosure. This docomentation is in error since it is based on the use of wooden cabinets which have been replaced by metal cabinets.

The mechanical equipment room on elevation 732.0 contains ventilation equipment that is essential for continued operation of the main control room. Therefore, the equipment room is considered an extension of the main control room fire cell. The two rooms are connected by ventilation ducts located above the suspended ceiling for the housekeeping area between columns C2 and C4. These ducts do not penetrate a fire barrier and are not provided with fire dampers. The housekeeping area is separated from the main control room, the mechanical equipment room, and the essential ventilation ducts for the main control room by 1-1/2-hour rated suspended ceilings and fire walls. The ventilation supply ducts penetrating the ceiling of the housekeeping area consisting of the shift engineer's office, instrument calibration shop, toilet and locker area, and the kitchen area are not provided with fire dampers at the ceiling penetration. Smoke dampers actuated by ionization smoke detectors are provided in the main supply trunk above the 1-1/2-hour fire rated ceiling for each of these areas. These dampers are UL listed and have a 1-1/2-hour fire rating. Upon detection of smoke in any of the housekeeping area rooms, the dampers in the main supply trunk to the affected room or rooms will be isolated thereby closing off supply air to the room or rooms without interrupting essential ventilation supply to the main control room.

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Return air ducts from the chart storage room and instrument calibration room are also provided with a rated smoke detector actuated damper in the main return trunk above the suspended ceiling. Isolation of this damper will prevent smoke in these rooms from returning to the control room complex air-handling units thereby preventing contamination of the main control room.

Return ventilation from the shift engineer's office is through a louver in the wall to the corridor and back to the mechanical equipment room. The louver in the wall between the shift engineer's office and the corridor is provided with a 1-1/2-hour fire rated damper. A glass window between the shift engineer's office and the corridor is provided with a 1-1/2-hour rated roll-up fire shutter which is released by a fusible link.

Exhaust ventilation for the kitchen area and the toilet and locker rooms is through an exhaust fan located in the mechanical equipment room exhausting to the outside through the control building roof. No fire dampers are provided for these ducts.

Additional detector-actuated rated fire dampers are provided between the corridor and the mechanical equipment room to prevent smoke present in the corridor from entering the mechanical equipment room, and in the return air duct within the mechanical equipment room supplying 5200 cfm makeup air to the main control room air-handling units to prevent smoke present in the mechanical equipment room from entering the main control room.

The relay room is separated from the main control room by 1-1/2-hour rated fire wall that extends through the suspended ceilings. Refer to part D. of this response for a discussion of the separation between the relay room and the record storage room.

All fire barrier openings are provided with appropriately rated, UL-labeled assemblies except the previously mentioned housekeeping area ventilation supply ducts and door openings C55 and C56 (refer to drawing SK-1007) which contain special purpose security doors. These doors are made of bullet-resistant, heavy gauge steel and have not been tested by UL. However, the manufacturer has certified that the two doors are equivalent to UL-tested fire doors rated for three hours.

The above-described fire rated separation and smoke control provide adequate protection of the main control room from a fire originating in the peripherial areas of the control room complex. As described in the response to question 20.C, loss of the main control room is an acceptable event since reactor shutdown can be accomplished from the backup control room located in the auxiliary building.

C. Automatic smoke detection is provided within the control room consoles to provide the earliest possible indication of a fire. Portable halon and pressurized water fire extinguishers are provided within the main control room and manual fire hose backup capability is provided immediately outside the room in accordance with the requirements of BTP 9.5-1, Appendix A.

The control room consoles contain only low-voltage cable, which minimizes the possibility of internally generated fires. The consoles are provided with full access doors on the rear of the panels which afford access to the lower recessed portions of the consoles with an extinguisher or fire hose nozzle.

With early detection capability in the control room consoles, a fire can be detected and extinguished in the incipient stage with minimal effect on equipment and electrical circuits.

Should a fire occur that develops beyond the capability of the extinguishing equipment, the main control room can be abandoned and reactor shutdown accomplished from the backup control room located in the auxiliary building.

It is TVA's position that a gaseous suppression system is not necessary for the main control room consoles. Access inside the consoles for manual firefighting would be no better for a gaseous hose system than for a water system. In addition, a gaseous system would not be particularly effective against a deep-seated fire which is the most likely fire condition to occur in the consoles. In order to make a gaseous system effective, excessive amounts of the gas would be required and could result in the unnecessary evacuation of the Main Control Room.

D. The 1/2-inch riser nipples will be replaced with 1-inch nipples to conform to NFPA 13 in the records storage area. The wall separating the records storage room from the relay room is of 1-1/2-hour fire rated construction including 1-1/2-hour rated fire dampers in duct penetrations.

21. In the control building on elevation 685 ft. in both Units 1 and 2, auxiliary instrument rooms, both safety related divisions of one unit are located in each room. The consequence of electrically initiated or exposure fires should be evaluated with regard to plant shutdown capability. In the event that the plant shutdown capability cannot be maintained, an alternate shutdown method should be provided.

TVA Response

The auxiliary instrument room(s) located on elevation 685.0 of the control building are considered an extension of the main control room for the sake of the design of the backup control system. Hence, Sequoyah can establish and maintain a safe shutdown with a total loss of an auxiliary instrument room. See response to question 18.

22. In the cable spreading room of the control building, a preaction sprinkler system is used for protection with one layer of sprinklers located at the ceiling and an intermediate level located approximately half way between the floor and the ceiling. Provide heat collectors for the lower sprinkler heads to prevent ceiling level sprinklers from cold soldering the lower layer of sprinklers.

TVA Response

Heat collectors are provided for lower level sprinkler heads in the spreading room. At the time of the NRC site visit the heat collectors had not been installed.

23. Verify that the controllers of the four fire pumps are separated such that an exposure fire will not jeopardize more than one controller. List the location of each such controller.

TVA Response

The four fire pumps are controlled by switchgear located in separate 480V shutdown board rooms. Refer to compartmentation drawing SK-1004 and Table 23-1 for the switchgear locations.

Table 23-1

Fire Pump	480V Shutdown Board	Room Number
1A-A	1A2-A	734.0-A8
1B-B	1B2-B	734.0-A5
2A-A	2A2-B	734.0-A21
2B-B	2B2-B	734.0-A18

24. Verify that the main control valve of the CO_2 system used for protection of safety related equipment in various rooms is supervised and alarmed and annunciated in the control room.

TVA Response

The CO_2 system provides three valves between the storage tanks and the protected areas--a storage tank shutoff valve, a master selector valve, and a hazard selector valve. The tank shutoff valve is normally locked open and is administratively controlled. The master selector valve is a normally closed, pressure-operated piston valve controlled by a normally energized solenoid pilot valve. The hazard selector valve is identical to the master valve except it is controlled by a normally de-energized solenoid pilot valve. Upon system actuation, the master and hazard selector valves open releasing CO_2 to the hazard area. On loss of power the master selector valve fails open but the hazard selector valve remains closed.

Neither the master nor hazard selector valves can be supervised directly. However, TVA has provided an electrically supervised pressure switch downstream of the hazard selector valves to provide Main Control Room alarm and annunciation when CO_2 is being released in a hazard area.

All fire detection circuits associated with the CO_2 protected areas which transmit alarm signals to the Main Control Room are electrically supervised. However, the automatic actuation logic for the CO_2 systems is not supervised.

The CO_2 system meets the requirements of NFPA 12 and 72D for equipment supervision. It is TVA's position that the present design is adequate.

25. The information obtained as the result of the site visit was that the cable used at the Sequoyah Nuclear Plant will not pass the flame test in the current IEEE Standard 383. We were informed that some testing had been performed on this cable. Provide the information on the test used as well as the necessary data and criteria.

TVA Response

Table 25.1 contains the requested data for the purchased electrical cable. A description of the various flame tests is given in table 25.2.

TABLE 25.1

TVA Cable Type[1]	Flame Tests	Cable Description
WB, WC[2]	IPCEA S-19-81	Single conductor, stranded, nylon jacket, polyethylene insulation
WV, WW	IEEE 383-1974 IPCEA S-19-81 IPCEA S-61-402 MILW-22759/16 UL-44	Multi-conductor, twisted, stranded, shielded, chlorosulfonated polyethylene jacket, crosslinked, polyethylene insulation
WX, WD[2]	IPCEA S-19-81 IEEE 383-1974	Single conductor, PVC jacket, crosslinked polyethylene insulation
WT	IPCEA S-61-402	Telephone and coaxial cable
WL, WM	IPCEA S-19-81	Multi-conductor, singles - crosslinked polyethylene PVC jacket, PVC overall jacket
WP	IPCEA S-19-81 VTFT[3]	Single conductor, asbestos braid jacket, silicone rubber insulation
WF, WG, WH	IPCEA S-19-81 IPCEA S-61-402	Multi-conductor, singles - polyethylene PVC jacket, overall PVC jacket
WR	VTFT	Multi-conductor, singles silicone rubber with glass braid, overall jacket asbestos braid
WU	IPCEA S-19-81 MILW 22759/16	Thermocouple cable

POOR ORIGINAL

1 The TVA cable type is actually a three letter designation. The third letter was dropped for table brevity as the cable description remains unchanged.

2 Single conductors smaller than No. 8 AWG are installed in conduits

3 TVA Vertical Tray Flame Test

TABLE 25.2

IEEE 383-1974

1. An eight foot cable tray was erected vertically and loaded with multiple lengths of cables arranged in a single layer.

2. The flame source was a ribbon gas burner placed very near the bottom of the vertical tray.

3. The criteria for failure was a propagating fire in the tray above the flame source for the total length of the tray.

UL-44

1. A three sided metal enclosure was erected vertically and loaded with a single conductor.

2. The flame source was a Turrill gas burner placed approximately near the center of the cable specimen.

3. The following is the criteria for failure:

   A. A single conductor wire that flamed longer than 1 minute following any of the five 15-second applications of the flame.

   B. The wire igniting any combustible material in its vicinity during, between, or after the various applications of the flame.

   C. A damage of more than 25 percent of the indicator material during, between, or after the various applications of the flame.

TVA Vertical Tray Flame Test

1. An eight foot ladder type metal cable tray was erected vertically and loaded with several conductors from end to end on a single level.

2. A 120/240-volt ac test circuit was used to monitor circuit integrity during the test.

3. The flame source was crumpled burlap soaked with transformer insulating oil and placed several inches above the lower cable end.

4. The following was the criteria for failure:

   A. Propagating fire results.

   B. Circuit integrity loss in less than 15 seconds after ignition.

   C. Excessive smoke appearing from cable.

   D. Hot drippings from cable that may ignite fire in lower areas.

POOR ORIGINAL

TABLE 25.2 (Continued)

ICEA S-19-81/ICEA S-61-402 (Flame Resisting Test)

1. The flame resisting tests of the above are exactly the same as the previously described test of UL-44(1976) except part B of the failure criteria which is not adhered to.

MIL-22759/16

1. A three-sided metal enclosure was erected vertically and loaded with a single wire.

2. The flame source was a Bunsen burner applied approximately near the center of the cable specimen.

3. The following is the criteria for failure:

   A. A single conductor that flamed longer than five seconds after the flame is withdrawn.

   B. A flame travel of more than 0.25 inch from flame mark on cable after the flame is removed.

26. Verify that hose houses equipped with hose and combination nozzle and other auxiliary equipment recommended in NFPA 24, "Outside Protection," is spaced not more than 1000 ft. apart.

TVA Response

Hose houses are spaced less than 1000 feet apart. However, they are not completely furnished with the equipment listed in NFPA 24. The following will be provided:

250 ft - 2-1/2" hose (on wheeled cart)
150 ft - 1-1/2" hose
2 - 2-1/2" variable fog nozzles
2 - 1-1/2" variable fog nozzles
1 - Fire axe
1 - Crow bar
2 - Hydrant wrenches
4 - Coupling spanners
2 - Hose and ladder straps
1 - 2-1/2" by 2-1/2" by 2-1/2" gated wye
1 - 2-1/2" by 1-1/2" by 1-1/2" gated wye
2 - 2-1/2" by 1-1/2" reducers
2 - 2-1/2" adapters (female to male)
2 - 1-1/2" adapters (female to male)
2 - 2-1/2" adapters (double male)
2 - 1-1/2" adapters (double male)
2 - 2-1/2" adapters (double female)
2 - 1-1/2" adapters (double female)
1 - Wheeled fire extinguisher (rated 320 B:C)
1 - Tee handle wrench
1 - Portable hand lantern (battery operated)

27. Provide a description on the operation and sequencing of the station fire pumps including isolation of the RWST valves, pushbutton stations located next to fire hose stations including supervision of the circuits and how they are connected to the fire alarm control panel as well as the fire pump controllers. Consideration should be given to failure of any of the above circuits and its affect on the fire protection system.

TVA Response

The four station fire pumps are capable of three modes of operation--automatic, manual, and standby. In normal operation, two pumps are placed in automatic mode and two in standby. Upon receipt of an automatic start signal, one automatic pump starts immediately and the second starts three seconds later. If the fire protection system pressure cannot be maintained above 130 psig because of high system demand, the two standby pumps start ten seconds after the receipt of the initial signal. Manual operation of the pumps is also provided from the main control room and the individual pump switchgear.

The automatic start signals are originated in the circuits shown in block diagram form in Figure 27-1. Local control panels are provided for each fixed suppression system to actuate the system and to transmit a signal to start the fire pumps. These panels receive initiation inputs from the fire detection system and/or from handswitches located in the protected areas. Additional fire pump start signals are generated by pushbuttons near fire hose stations located throughout the plant. All the start signals are processed through the centralized automatic start logic located in three panels in the unit 1 and 2 auxiliary instrument rooms. From this logic, the start signals are transmitted simultaneously through separation relays to the individual pump switchgear. The pump sequencing is controlled by the switchgear as determined by the position of the handswitches located in the main control room. Refer to Table 27-1 for the location of the major system components and the SK-1000 series compartmentation drawings for definition of the column lines.

Upon starting a fire pump in any mode, its switchgear provides an output to close the raw service water head tank isolation valves.

The pushbutton stations located next to the fire hose stations are provided to start the fire pumps only. They are not connected to the fire detection system and they are not supervised.

No single failure in the circuits shown in Figure 27-1 or their power supplies will result in an unacceptable loss of firefighting capability. A failure in a local control panel could prevent the automatic initiation of the associated suppression system and the fire pumps during a fire. However, the failure would not affect the detection system's annunciation capability so the unit operator can manually start one or more fire pumps and can dispatch the fire brigade to manually initiate the suppression system. Automatic start logic failures can prevent the automatic actuation of all fire

pumps. This would not affect the suppression system operation, but would require manual starting of pumps from the main control room upon receipt of a detection system annunciation. A failure in the separation relays, 480V switchgear, or fire pumps would affect one pump only. The remaining three pumps would be operable in any mode. Failures in the handswitches, pilot valves, pushbuttons, and the system's connecting circuits are no more restrictive than those failures discussed above.

The consequences of an exposure fire are no more restrictive than the failures addressed above except in the case of the separation relays. This relay logic will be separated by 20 feet to ensure that the MCR control functions for no more than one fire pump can be affected by an exposure fire.

The fire pumps are assigned trained designations with two pumps in train A and two in train B. The manual control circuits (main control room switch, 480V switchgear, power supply, and connecting circuits) for the pumps are separated per the requirements for Class 1E electrical components.

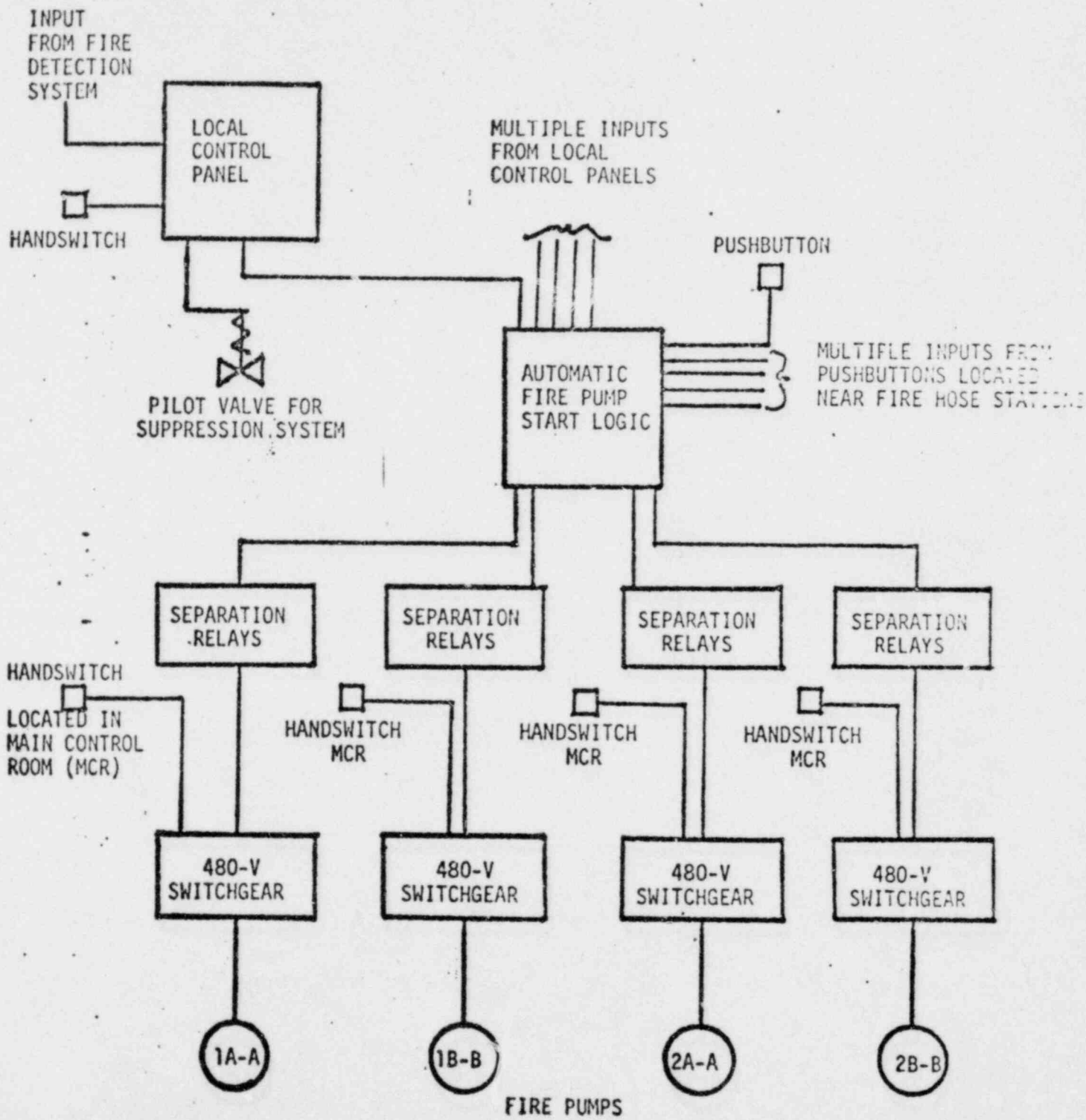

INPUT FROM FIRE DETECTION SYSTEM
LOCAL CONTROL PANEL
HANDSWITCH
MULTIPLE INPUTS FROM LOCAL CONTROL PANELS
PUSHBUTTON
PILOT VALVE FOR SUPPRESSION SYSTEM
AUTOMATIC FIRE PUMP START LOGIC
MULTIPLE INPUTS FROM PUSHBUTTONS LOCATED NEAR FIRE HOSE STATIONS
SEPARATION RELAYS
SEPARATION RELAYS
SEPARATION RELAYS
SEPARATION RELAYS
HANDSWITCH LOCATED IN MAIN CONTROL ROOM (MCR)
HANDSWITCH MCR
HANDSWITCH MCR
HANDSWITCH MCR
480-V SWITCHGEAR
480-V SWITCHGEAR
480-V SWITCHGEAR
480-V SWITCHGEAR
1A-A
1B-B
2A-A
2B-B
FIRE PUMPS

FIGURE 27-1

TABLE 27.1

Component	Building	Elevation	Column	Room Name
Local control panels	--------Located Throughout the Plant----------			
Automatic fire pump start logic	Control	685.0	p,C5 p,C9	Units 1&2 Aux. Instr.
Fire pump 1A-A	Intake Pumping Station	705.0	-	-
1A-A separation relays*	Control	685.0		Unit 1 Aux. Instr.
1A-A 480V switch-gear	Auxiliary	734.0	t,A2	480V Shutdown Bd. Rm. 1A2
Fire Pump 1B-B	Intake Pumping Station	705.0	-	-
1B-B separation relays	Control	685.0		Unit 1 Aux. Instr.
1B-B 480V switch-gear	Auxiliary	734.0	r,A3	480V Shutdown Bd. Rm. 1B2
Fire pump 2A-A	Intake Pumping Station	705.0	-	-
2A-A separation relays	Control	685.0		Unit 1 Aux. Instr.
2A-A 480V switch-gear	Auxiliary	734.0	r,A13	480V Shutdown Bd. Rm. 2A2
Fire Pump 2B-B	Intake Pumping Station	705.0	-	-
2B-B separation relays	Control	685.0		Unit 1 Aux. Instr.
2B-B 480V switch-gear	Auxiliary	734.0	t,A14	480V Shutdown Bd. Rm. 2B2

Quality Assurance Branch
Request for Additional Information

Your description in Sections A.1 and B.5 of your submittals relative to your compliance with the "Guidelines in Appendix A of BTP 9.5-1" does not provide adequate information on your fire protection organization for us to complete our review. Therefore, please provide the following information:

1. Describe the upper level management position that has the overall responsibility for the formulation, implementation, and assessment of the effectiveness of the fire protection program.

2. Describe the offsite position(s) that has direct responsibility for formulating, implementing, and periodically assessing the effectiveness of the fire protection program for the nuclear plant, including fire drills and fire protection training.

3. While the Plant Superintendent is generally responsible for all activities at the facility, describe any further delegation of these responsibilities for the fire protection program such as training, maintenance of fire protection systems, testing of fire protection equipment, fire safety inspections, fire fighting procedures, and fire drills.

4. Describe the authority of your fire brigade leader relative to that of your Shift Engineer.

TVA Response

1. In the TVA organization structure, the General Manager has overall responsibility for the formulation, implementation, and assessment of the effectiveness of the fire protection program. In accordance with the TVA policy of management accountability, the General Manager has delegated these fire protection program responsibilities through the respective managers of offices to the Director of Engineering Design, the Director of Construction, and the Director of Power Production within their respective areas. To fulfill these responsibilities, these directors maintain qualified staffs to ensure that all aspects of the fire protection program are, at a minimum, consistent with applicable regulatory requirements. To ensure that an integrated program is maintained, TVA has established a fire protection panel composed of key management representatives from each of these three divisions for review and coordination of program policies and application in interface areas.

2. The offsite position(s) that has direct responsibility for formulating implementing, and periodically assessing the effectiveness of the fire protection program for the nuclear plant, including fire drills and fire protection training is the Fire Protection Section of Safety Engineering Services. The program is formulated and implemented through Division Procedures Manual N7852. Section F8 of this manual establishes the requirement for an annual fire audit of each nuclear facility.

3. Delegation of responsibilities for the fire protection program such as training, maintenance of fire protection systems, testing of fire protection equipment, fire inspections, firefighting procedures, and fire drills is contained in Division Procedures Manual N78S2.

4. The authority of the fire brigade leader relative to that of the shift engineer is contained in Sequoyah Nuclear Plant Physical Security Instruction Physi-13, Section 1.0.

   This instruction states in part that the duty assistant shift engineer, unit 1, shall be the fire brigade leader. He shall remain the leader unless relieved by his inline supervisor (the shift engineer). It further states that he shall keep the control room informed as to the fire conditions.

REQUEST FOR ADDITICNAL INFORMATION

QA FOR FIRE PROTECTION FOR SEQUOYAH (AND WATTS BAR) NUCLEAR PLANTS

F421.1 TVA's letter of January 24, 1977, to NRC regarding fire protection for Sequoyah (and Watts Bar) does not indicate whether the QA program for fire protection during design and construction is under the management control of the QA organization. This control consists of (1) formulating and/or verifying that the fire protection QA program incorporates suitable requirements and is acceptable to the management responsible for fire protection and (2) verifying the effectiveness of the QA program for fire protection through review, surveillance, and audits. Performance of other QA program functions for meeting the fire protection program requirements may be performed by personnel outside of the QA organization. The QA program for fire protection should be part of the overall plant QA program. These QA criteria apply to those items within the scope of the fire protection program, such as fire protection systems, emergency lighting, communciation, and emergency breathing apparatus as well as the fire protection requirements of applicable safety-related equipment.

We find that the letter does not describe sufficient detail to address the ten specific quality assurance criteria in Branch Technical Position APCSB 9.5-1 during design and construciton. In order for the QAB to fully evaluate your plan to meet these criteria, additional detailed description is necessary. Examples of the detail we would expect TVA to provide are given in Attachment 6 to Mr. D. B. Vassallo's letter of August 29, 1977. If, however, you choose not to provide this detail, you may apply the same controls to each criterion that are commensurate with the controls described in your QA program description, Section 17.1A. These controls would apply to the remaining design and construction activities of Unit Nos. 1 and 2. If you select this method, a statement to this effect would be adequate for our review of the QA program for fire protection.

TVA Response

The QA program fire protection has been reviewed by appropriate TVA management including the QA organization to verify that the program incorporates suitable requirements and is acceptable. The appropriate QA personnel are responsible for verifying the effectiveness of the program through periodic audits.

The QA criteria apply to all fire protection related systems equipment and components within the scope of the fire protection program including fire protection systems, emergency lighting, communication, and emergency breathing apparatus, to the extent that they may affect the fire

protection for nuclear safety-related plant features. Our submittal of January 24, 1977, to the NRC will be revised as follows to reflect a more detailed discussion of the existing procedures and programs within the Office of Enginering Design and Construction (OEDC) that are required for fire protection related systems:

C. Quality Assurance

TVA Compliance

As indicated in the response to item A.1, Personnel, and as amplified in our response to Quality Assurance Branch question 1, TVA has delegated the responsibilities associated with the various aspects of fire prevention and protection to organizations which have personnel qualified to handle those functions.

The responsibility for the operational aspects of fire protection has been delegated to the Division of Power Production in TVA's Office of Power. The Office of Power utilizes TVA's established QA program designed to meet the requirements of Appendix B to 10CFR Part 50. This program applies, for the operational phase of TVA's nuclear power plants, to the activities affecting the quality of those critical structures, systems, and components (CSSC) whose satisfactory performance is required for safe plant operations; to prevent accidents that could cause undue risk to the health and safety of the public; and to mitigate the consequences of such accidents in the unlikely event that they should occur. Those fire protection features protecting critical structures or areas will be included in the CSSC list and as such will fall under TVA's operational QA program. The operational QA program is described in the Sequoyah Nuclear Plant Final Safety Analysis Report (FSAR), Chapter 17. Responsibility for the design and construction aspects of fire protection has been delegated to the Office of Engineering Design and Construction (OEDC). OEDC has documented procedures and specifications which govern its activities and which apply to all systems for which OEDC has responsibility. These procedures are aimed at ensuring that the design and construction of TVA facilities result in a reliable and quality product. As applied to fire protection, these documents will require, in part, that the actions required in C.1 through C.10 below be accomplished.

C.1 Design Control and Procurement Document Control

TVA Compliance

All fire protection related design criteria and procurement documents be reviewed by appropriate qualified individuals to ensure that applicable regulatory and design requirements are properly and adequately specified and, as appropriate, quality standards such as fire

protection codes and independent laboratory testing are included. All changes to these documents and deviations therefrom, including requests for field changes, are reviewed in a similar manner. The above includes appropriate design reviews to verify separation and isolation requirements as they relate to fire protection.

C.2 Instructions, Procedures, and Drawings

TVA Compliance

The design, installation, and tests associated with fire protection related systems be accomplished in accordance with written and approved instructions, procedures, and drawings. These documents must be reviewed by qualified personnel to ensure that applicable regulatory and design requirements are properly and adequately specified. This documentation includes any specialized training requirements for installation.

C.3 Control of Purchased Material and Equipment

TVA Compliance

The procurement of fire protection related material and equipment require either an inspection at the manufacturer's facility or a receiving inspection to verify conformance to procurement requirements.

C.4 Inspection

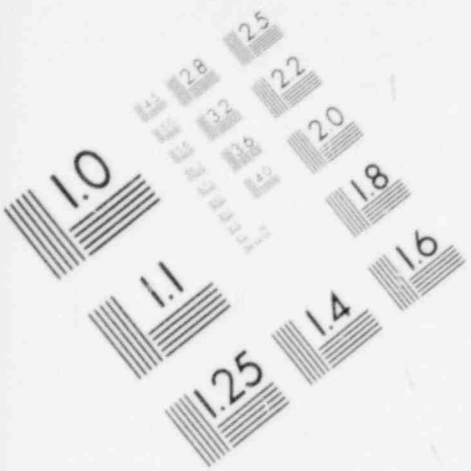
TVA Compliance

The installation of fire protection related systems be verified by independent inspection to ensure that it meets the specified requirements and conforms to installation drawings and procedures. The inspection must be conducted in accordance with documented procedures. The procedures controlling inspection activity require that the inspection procedures or instructions shall be available with necessary drawings and specifications to use prior to performing inspection operations. Further, the procedures, instructions, and/or drawings, including revisions, supporting the inspection activities shall be documented. The results of these inspections shall be recorded.

C.5 Test and Test Control

TVA Compliance

Fire protection systems be tested under TVA's preoperational test program. This program requires that tests be conducted in accordance with written test instructions which are reviewed to ensure that applicable regulatory and design requirements are properly and adequately specified. The acceptance criteria shall be evaluated and documented and all exceptions documented and controlled.



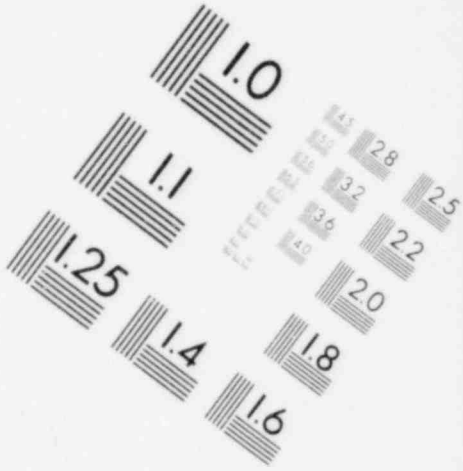
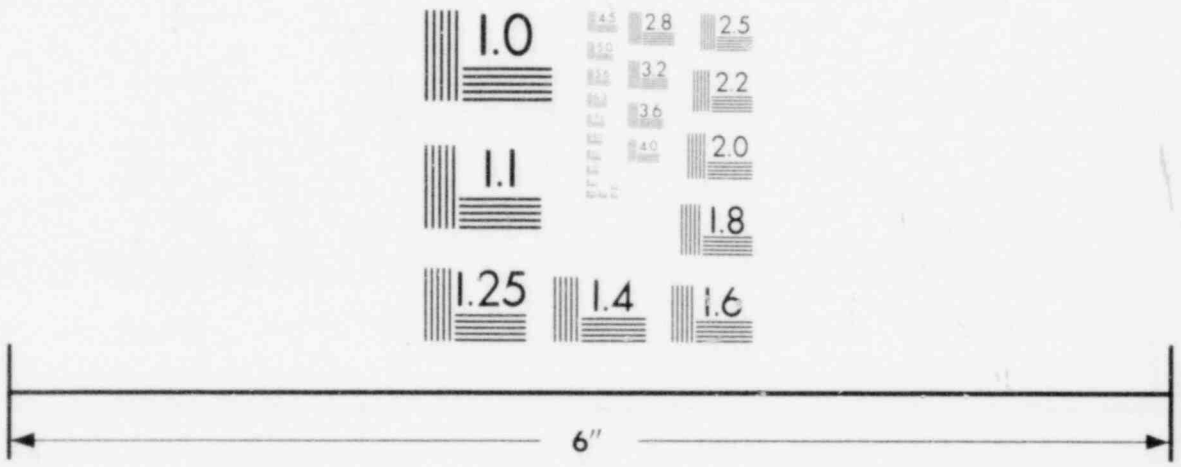
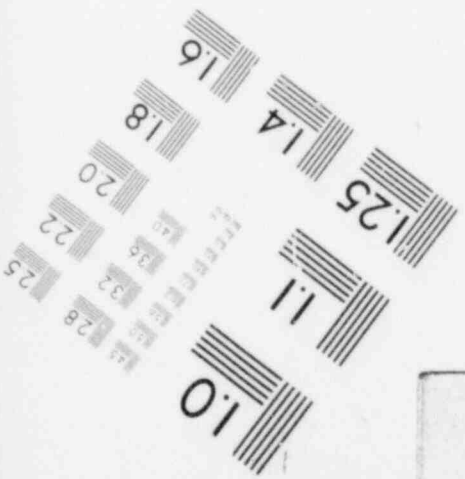
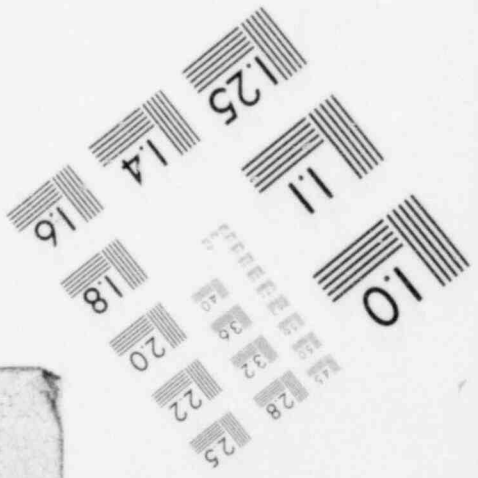


IMAGE EVALUATION
TEST TARGET (MT-3)



MICROCOPY RESOLUTION TEST CHART





C.6 Inspection, Test, and Operating Status

TVA Compliance

Items that have satisfactorily completed tests or inspections be identified by appropriate means.

C.7 Nonconforming Items

TVA Compliance

Nonconforming items be identified and controlled to prevent inadvertent use or installation. This includes documentation of the disposition of the nonconformance. The Thermal Power Engineering (TPE) Design Project shall review all nonconformance reports and may request review by other branches within EN DES as appropriate. The TPE Design Project Manager shall approve the disposition of the nonconformance.

C.8 Corrective Action

TVA Compliance

Significant and repetitive conditions adverse to fire protection such as nonconformances with installation drawings and deviations from specifications be controlled and appropriate corrective action taken and documented. Conditions involving fire incidents and the corrective actions taken shall be promptly reported to a cognizant level of management for review and assessment.

C.9 Records

TVA Compliance

Records be maintained for fire protection systems to document conformance to the prescribed criteria. These records must include review of criteria, procurement documents and drawings, inspections, test results, nonconformances, and modification records.

C.10 Audits

TVA Compliance

Independent audits by QA personnel be conducted annually in accordance with written procedures to ensure conformance to procedural requirements applicable to fire protection related systems. The audits must be documented along with the corrective action taken and reviewed by the appropriate level of management to ensure that the program is effective.

Additional Discussion Items

The following items have been discussed informally with the NRC Staff and are included as additional information.

1. No air-cooled transformers are located such that fires resulting from their failure would affect equipment or circuits identified in the response to question 1 that are required to achieve hot shutdown.

2. There is no fixed equipment containing flammable liquids in the vicinity of the entrance to the central room of the auxiliary control area. However, TVA will provide curbs at the doors between the auxiliary control area's central room and transfer switch rooms as protection against transient flammable liquid hazards. The curbs will ensure that a flammable liquid fire in any one of the five rooms will not jeopardize safe shutdown capability from the MCR.

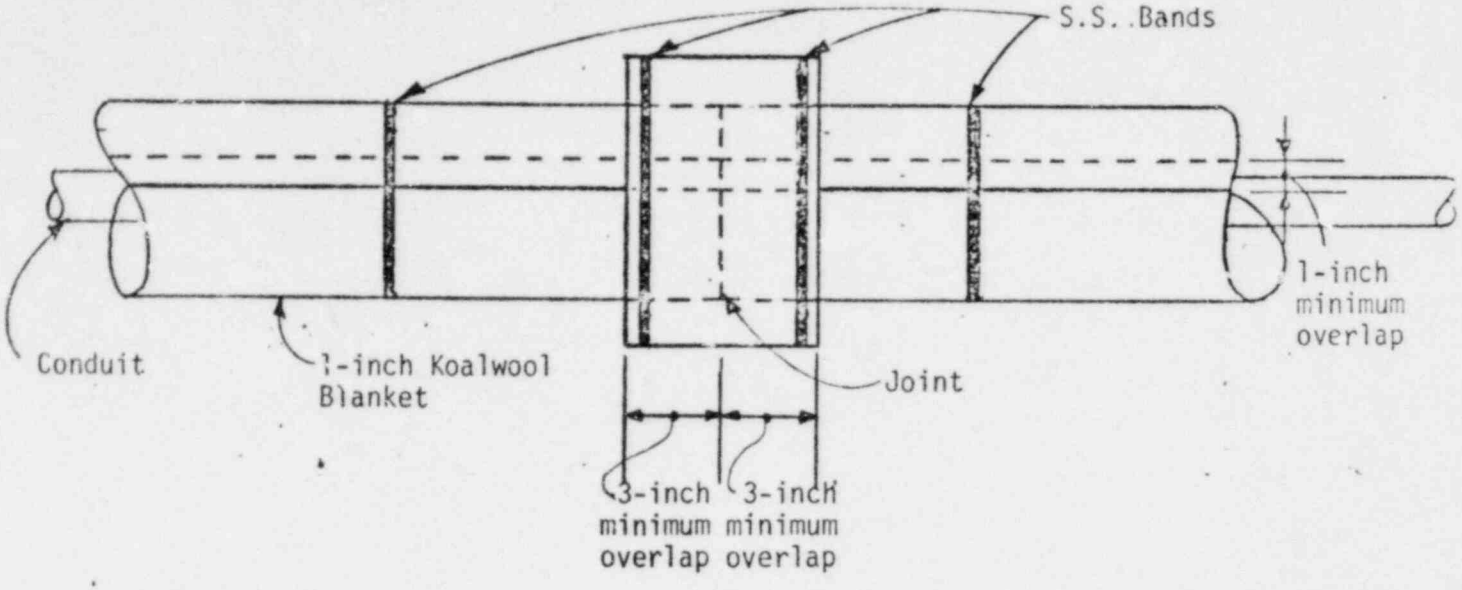
3. Spray shields are provided for the reactor coolant pumps and all associated external lubricating oil piping and lift pumps such that the rupture of any oil-containing component will be contained. An oil collection basin is provided at the access platform elevation of each pump to collect and drain away any combustible liquid and/or suppression system discharge. Each reactor coolant pump is provided with a separate heat collection hood structure located approximately six feet above the pump designed to reduce the response time of the thermal detectors and thermal actuated water spray nozzles below the hood.

   Neither the heat collector hood above, nor the collection system below the reactor coolant pump motor will jeopradize the ventilation air flow to the pump motor.

   The above modifies TVA's description provided in Item F1 of the Sequoyah Nuclear Plant Fire Protection Program reevaluation forwarded to the NRC by letter from J. E. Gilleland to R. S. Boyd dated January 24, 1977.

4. During the NRC site visit, September 4 and 5, 1979, some concern was expressed by the NRC reviewers about the butt joint installation of the 1-inch Kaolwool blanket conduit wrap noted in Table 1.3.

   Discussions in subsequent telecons resulted in TVA's commitment to modify the butt joints of the wrap as shown in the following figure. This modification will be complete on conduits associated with unit 1 by January 1, 1980. The 1-inch Kaowool installation for conduits associated with unit 2 will be in accordance with the following figure and will be complete prior to initial fuel loading for unit 2.



MODIFICATION TO 1-INCH KAOLWOOL BLANKET
WRAP BUTT JOINT INSTALLATION

SCHEDULE FOR COMMITMENTS

All modifications resulting from commitments made in our submittal of January 24, 1977, shall be implemented prior to the initial fuel loading of the associated unit.

TVA proposes to implement modifications resulting from Nonconformance Report SWP-78-S-2 and from commitments made in this document per the following schedule:

ASB Question No.	Action or Modification Required	Design Completion Date	Construction Completion Date
1	Reroute conduit and cable identified in Table 1.2.	7/9/79 (unit 1) 7/9/79 (unit 2)	10/5/79 See note 1
	Wrap instrumentation conduit identified in Table 1.3 with 1-inch-thick Kaowool Blanket.	5/9/79 (unit 1) 7/9/79 (unit 2)	10/5/79 See note 1
	Enclose exposed conduit identified in Table 1.4 with a 1-1/2-hour fire barrier.	12/1/79	4/1/80
	Reroute units 1 and 2 pressurizer htr 6900V power cables to achieve 20 feet spatial separation.	5/7/79	10/5/79
3B(i)	Install additional fire doors identified in Nonconformance Report SWP-78-S-2.	3/6/79	See note 1
	Install remaining fire doors identified in Table 3B(i)-3.	3/6/79	See note 1
3B(ii)	Install additional fire dampers identifed in Nonconformace Report SWP-78-S-2.	3/6/79	See note 1
	Install remaining fire dampers identified in Table 3B(ii)-3.	6/26/79	10/5/79
	Add pyrocrete to fire dampers PCO-39-17A and O-31A-148.	3/7/79	10/5/79
	Install additional fire dampers required as result of NRC concerns of February 12, 1979, meeting.	12/31/79	See note 2

ASB Question No.	Action or Modification Required	Design Completion Date	Construction Completion Date
3B(iii)	Coat the metal barrier plate in cable tray penetrations with pyrocrete.	12/1/79	4/1/79
4	Coat exposed surfaces of cables with flame retardant material in areas outside primary containment containing one or both safety-related divisions.	12/1/79	See note 2,3
6	Install fixed self-contained lighting in areas that must be manned for safe cold shutdown and for access and egress routes to and from all fire areas.	7/10/79	10/5/79
7	Electrically supervise the fire protection power distribution panel for loss of power.	7/9/79	11/7/79
8	Electrically supervise the fire pumps for loss of line power and motor running condition.	7/9/79	11/7/79
9D	Provide additional sprinkler heads or relocate existing heads to clear overhead obstructions.	3/31/80	See note 2
11B	Enclose ERCW junction box with 1-1/2-hour fire barrier.	12/1/79	2/1/80
	Provide a 1/2-hour fire barrier of 1-inch Kaowool Blanket between redundant power cables in the ERCW junction box.	6/29/79	10/5/79
13B	Provide automatic sprinkler protection under the pipe break barrier for the auxiliary feedwater pumps.	7/9/79	10/5/79
13C	Provide automatic sprinkler protection under the mezzanine for all component cooling water pumps.	7/17/79	10/5/79
13D	Provide a 1/2-hour fire barrier between train A and B component cooling water pumps.	7/9/79	10/5/79
13F	Provide additional smoke detectors to actuate the sprinkler systems in TVA responses to questions 13B and 13C.	7/9/79	10/5/79

ASB Question No.	Action or Modification Required	Design Completion Date	Construction Completion Date
16	Provide M.R alarm and annunciation for lock-out of diesel generator room and board room CO_2 systems.	7/9/79	10/5/79
17A	Remove sliding fire doors for diesel generator rooms and replace with normally closed fire doors.	12/1/79	2/1/80
20D	Replace the existing 1/2-inch riser nipples with 1-inch nipples in the records storage area.	6/21/79	9/21/79
26	Provide additional equipment for fire equipment houses.	8/10/79	10/16/79
27	Relocate fire pump separation relays to achieve 20-foot spatial separation.	7/9/79	11/7/79
-	Install curbs at doors to transfer switch rooms of the auxiliary control complex.	6/20/79	10/5/79

Notes:

1. Prior to initial fuel loading of the associated unit.

2. End of first refueling outage for unit 1.

3. Cable coating is progressing. Areas identified in submittal of January 4, 1977, will be completed prior to initial fuel loading of the associated unit.