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Docket No. 50-346

License No. NPF-3

Serial No. 468

File Nos. 0017, 1480

November 25, 1978

Director of Nuclear Reactor Regulation
Attention: Mr. Robert W. Reid, Chief
Operating Reactors Branch No. 4
Division of Operating Reactors
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Reid:

In accordance with our commitment made during the October 25, 1978 meeting with the NRC staff on the Davis-Besse Nuclear Power Station Unit 1 Fire Protection Program, enclosed is Revision 4 to our Fire Hazard Analysis Report. Revision 4 provides responses to items 8, 9, 11, 13, 26, 35, 37 and supplemental question no. 2.

Yours very truly,

L.E. Roe/ECN/7KM

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DIRECTIONS FOR INSERTING REVISION 4 OF THE FIRE HAZARD ANALYSIS REPORT

During insertion of the revised pages, a dash (-) in the remove or insert column of the directions means no action is required.

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*Dwgs. M-012A and M-041 follow Dwg. SK-19.

Page	Appendix A Position Section	Davis-Besse Unit 1
3	A6. Fuel Storage Areas Schedule for implementation of modifications, if any, will be established on a case-by-case basis.	Comply - Schedule calls for fire protection system to be fully operational before fuel is stored in the unit. This has been accomplished.
4	A7. Schedule for implementation of modifications, if any, will be established on a case-by-case basis.	Any requirements for future modifications or additions to fire protection systems will be the case exceptions. Note that we comply with the more restrictive guidelines for plants without CP's in that our schedule calls for

Page	Appendix A Position Section	Davis-Besse Unit 1	
		the existing fire protection system to be fully operational before fuel is loaded in reactor.	
4	A8. Multiple-Reactor Sites On multiple-reactor sites where there are operating reactors and construction of remaining units is being completed, the fire protection program should provide continuing evaluation and include additional fire barriers, fire protection capability, and administrative controls necessary to protect the operating units from construction fire hazards. The superintendent of the operating plant should have the lead responsibility for site fire protection.	Not applicable.	
4	A9. Simultaneous Fires Simultaneous fires in more than one reactor need not be postulated, where separation requirements are met. A fire involving more than one reactor unit need not be postulated except for facilities shared between units.	Not applicable.	
4	B1. Administrative Procedures, Controls and Fire Brigade Administrative procedures consistent with the need for maintaining the performance of the fire protection system and personnel in nuclear power plants should be provided. Guidance is contained in the following publications: NFPA 4 - Organization for Fire Services NFPA 4A - Organization for Fire Department	The Fire Protection Administrative Controls and Procedures will use the Vassallo letter dated August 29, 1977 for guidance. Procedures on (a) Fire Brigade Training, (b) Control of Combustibles, and (c) Control of Ignition Sources are planned to be completed by February 1979. Procedures on (d) Fire Fighting Procedures (Preplans) are planned to be completed by October 1979.	4
1			

Page	Appendix A Position Section		Davis-Besse Unit 1
21	D4.	(f) Stairwells should be designed to minimize smoke infiltration during a fire. Staircases should serve as escape routes and access routes for fire fighting. Fire exit routes should be clearly marked. Stairwells, elevators and chutes should be enclosed in masonry towers with minimum fire rating of three hours and automatic fire doors at least equal to the enclosure construction, at each opening into the building. Elevators should not be used during fire emergencies. Where stairwells or elevators cannot be enclosed in three-hour fire rated barrier with equivalent fire doors, escape and access routes should be established by pre-fire plan and practiced in drills by operating and fire brigade personnel.	Comply - See first part of discussion for section D1(j) regarding construction. Fire drills are held once a week on various shifts so that each brigade member participates once a month.
21	D4.	(g) Smoke and heat vents may be useful in specific areas such as cable spreading rooms and diesel fuel oil storage areas and switchgear rooms. When natural-convection ventilation is used, a minimum ratio of 1 sq. foot of venting area per 200 sq. feet of floor area should be provided. If forced-convection ventilation is used, 300 CFM should be provided for every 200 sq. feet of floor area. See NFPA No. 204 for additional guidance on smoke control.	Comply - Smoke venting is discussed in Section 5.
21	D4.	(h) Self-contained breathing apparatus, using full face positive pressure masks, approved by NIOSH (National Institute for Occupational Safety and Health - approval formerly given by the U. S. Bureau of Mines) should be provided for fire brigade, damage control and control room personnel. Control room personnel may be furnished breathing air by a manifold system piped from a storage reservoir if practical. Service or operating life should be a minimum of one half hour for the self-contained units.	Comply - Self-contained breathing apparatus will be the NIOSH approved one half hour, full-face, positive pressure type masks with extra air bottles available on site. At present there are 20 Scott Air Paks with 40 spare air bottles at the plant. The onsite charging system is a cascade system which uses bottled breathing air. Reserve air is limited only by the number of unused supply bottles for the cascade system. Procedures are currently being revised to insure enough supply bottles are available on site to maintain a 6-hour reserve supply of bottled breathing air. 4

Page	Appendix A Position Section	Davis-Besse Unit 1
	At least two extra air bottles should be located onsite for each self-contained breathing unit. In addition, an onsite 6-hour supply of reserve air should be provided and arranged to permit quick and complete replenishment of exhausted supply air bottles as they are returned. If compressors are used as a source of breathing air, only units approved for breathing air should be used. Special care must be taken to locate the compressor in areas free of dust and contaminants.	
22	D4. (i) Where total flooding gas extinguishing systems are used, area intake and exhaust ventilation dampers should close upon initiation of gas flow to maintain necessary gas concentration. (See NFPA 12, "Carbon Dioxide Systems," and 12A, "Halon 1301 Systems.")	Not applicable - No total flooding gas systems are used.
22	D5. Lighting and Communication Lighting and two way voice communication are vital to safe shutdown and emergency response in the event of fire. Suitable fixed and portable emergency lighting and communication devices should be provided to satisfy the following requirements:	Fixed and portable emergency lighting and communication devices are available or will be provided as stated in Section 5.
22	D5. (a) Fixed emergency lighting should consist of sealed beam units with individual 8-hour minimum battery power supplies.	Comply - In the event of loss of offsite power, emergency lighting is powered from the diesel generators. In the unlikely event that both diesel power trains were not available, emergency lighting has a 2 hour battery supply; however, it is through a conduit and not individual battery supplies. In the event of failure of emergency lighting, fixed self-contained lighting consisting of sealed-beam units with individual 8- hour minimum battery power units will be installed in areas utilized to achieve cold shutdown and in routes utilized for access and egress for those areas. 2

Page	Appendix A Position Section	Davis-Besse Unit 1	
	Equivalent protection from portable systems should be provided if it is impractical to install standpipe with hose stations.		
	Adequate self-contained breathing apparatus should be provided near the containment entrances for fire fighting and damage control personnel. These units should be independent of any breating apparatus or air supply systems provided for general plant activities.	There are 20 self-contained breathing apparatus units, available for manual fire fighting use, distributed in various locations throughout the unit. Near the entrance to the containment vessel in Room 426, personnel lock area (see Appendix A, Drawing A-6), there are three self-contained breathing apparatus units mounted on the east wall. Each self-contained air pack, when fully charged, contains 45 cubic feet of breathing air at 2216 psi and is rated at 30 minutes duration. Each air pack provides the user with pure breathing air, precisely regulated to need (demand) from a cylinder carried on the wearer's back in a backpack. The air pack is provided with a built-in alarm which rings and vibrates to warn the wearer of a diminishing air supply. The regulator has two modes of operation. The first mode provides air on demand only; the second mode, with the selector switch in the up position, provides air on demand and maintains a positive pressure within the facepiece above that of the outside atmosphere. This positive pressure is maintained by the exhalation valve under all breathing conditions and totally excludes toxic, external air from the facepiece for the duration of the air pack supply.	2
		Presently, there are 40 spare air pack cylinders. The charging system on site is a cascade system using bottled breathing air. The reserve air supply is limited only by the number of unused supply cylinders for the cascade system. Procedures are currently being revised to insure that enough supply cylinders are available for a 6-hour reserve supply.	4

Page	Appendix A Position Section	Davis-Besse Unit 1
35	F2. Control Room The control room is essential to safe reactor operation. It must be protected against disabling fire damage and should be separated from other areas of the plant by floors, walls and roofs having minimum fire resistance ratings of three hours. Control room cabinets and consoles are subject to damage from two distinct fire hazards: (a) Fire originating within a cabinet or console; and (b) Exposure fire involving combustibles in the general room area. Manual fire fighting capability should be provided for both hazards. Hose stations adjacent to the control room with portable extinguishers in the control room are acceptable.	Comply - Refer to Section 5.FF for the fire hazard evaluation of the control room area. The control room is separated from the turbine building, auxiliary building, from the cable spreading room below, and mechanical equipment room above by reinforced concrete walls, floors and ceiling which meet the required 3-hour fire rating. The suspended acoustical tile ceiling in the control room has been tested in accordance with NFPA No. 251 and has obtained a fire-resistance rating of not less than 1 hour. Doors leading into the control room from the turbine building side are Class "A" rated for 3-hour fire resistance. The door between the control room and the auxiliary building is a watertight metal door. This door is not fire rated. The body of the door is constructed of 5/8-inch thick steel plate. All parts of the door except the heat and oil treated neoprene gasket around the perimeter of the door are noncombustible. The gasket material on the perimeter of the door is required to provide a watertight seal. This door is made watertight to prevent steam and water flooding into the control room from the auxiliary building in the event of a pipe rupture. A 3-hour rated door will be added in series with this watertight door to assure the required fire resistance rating of 3 hours. As discussed in Section 5.FF, the design of the control room is such that a fire in an essential cabinet would

Page	Appendix A Position Section	Davis-Besse Unit 1
	F11. Safety Related Pumps (Cont.)	Therefore, automatic fire suppression and conduit protection is proposed, as discussed below. In the service water pump and valve room, a 1/2-hour fire-rated enclosed barrier will be provided around the entire length of conduits associated with power and control for the service water pumps and the power and control for the service water valves on the return line to the forebay and the cooling tower makeup. The 1/2-hour fire-rated enclosed barrier for these shutdown-related conduits will be achieved by wrapping the respective conduits with a 1-inch blanket of Kaowool. The service water valve motors will also be enclosed with a 1/2-hour fire-rated barrier.

Page	Appendix A Position Section	Davis-Besse Unit 1
	F11. Safety Related Pumps (Cont.)	The service water pump room and service water valve room will be protected against an exposure fire by an automatic wet pipe-type sprinkler system. The sprinkler piping will be sized hydraulically in accordance with the requirements of NFPA 13 and 15. The sprinkler system design for the service water pump and valve rooms incorporates a fire water sprinkler supply header; an alarm check valve and trim set; OS&Y system control valve; and a typical commercial sprinkler riser, feeder, branch line piping, and sprinkler head arrangement. The sprinkler heads, with installed heat collectors in accordance with NFPA 13, will be distributed immediately below the conduit and above the pump motors and adjacent open areas approximately 7 to 8 feet from the floor. The spacing between heads will be no more than 10 feet and no less than 6 feet on centers. The sprinklers will use fast response heads with a temperature setting of 135F. The OS&Y sprinkler control valves and their associated alarm check valve for the service water pump and valve rooms will be located in the service water valve room. Water will be supplied to OS&Y sprinkler control valves and their associated alarm check valve directly off the 12-inch underground fire water main yard loop, which is fed from two separate directions (see Appendix 1, Dwg. SK-5 for supply piping and control valve layout). If a fire was to become established in the service water pump room or service water valve room, the heat that would be produced would fuse a sprinkler head or heads, depending on the size of the fire, thus causing water to flow directly from the sprinkler head(s)

Page	Appendix A Position Section	Davis-Besse Unit 1
		affected by the fire. Either the service water pump room or valve room alarm check valve clapper, depending in which room the fire exists, will be opened by the flow and allow pressurized water to fill the retarding chamber. The water flow will overcome the retarding chamber's small capacity drain and, thus, fill

Page	Appendix A Position Section	Davis-Besse Unit 1
	F11. Safety Related Pumps (Cont.)	the alarm line which closes the associated alarm check valve's pressure switch. The closing of the pressure switch will activate a local audible fire alarm. The pressure switch closure, which indicates a water flow condition, will be visually and audibly annunciated in the control room. The pressure switch signal contact points and its circuits will be designed and installed so that they cannot be readily tampered with or removed without causing a trouble signal to be produced. This system trouble condition will sound a local, audible alarm and will sound an audible alarm and be visually annunciated in the control room. 3 The OS&Y sprinkler control valves will be electrically supervised to obtain two separate and distinctive signals; one indicating movement of the valve from its normal position and the other indicating restoration of the valve to its normal position. Water-sensitive electrical equipment, located in the service water pump room, will be evaluated in such a manner that baffles will be provided to protect against water coming in contact with such equipment. This assures that both advertant and inadvertant operation of the sprinkler system will not render sensitive electrical equipment inoperable. There is an existing intertie between the service water system and the circulating water system which could be used in the remote instance that the circulating water pumps would be utilized as an alternate to the service water pumps. 4 For long-term backup service water capability, an intertie will be provided from the Unit 2 service water system to the Unit 1 service water system.

The structural features of the above areas are of noncombustible fire resistive type construction. Walls are reinforced concrete or concrete masonry block, floors are concrete, and all structural steel supporting members are protected with a 3-hour, fire-rated, sprayed-on type fire proofing. (Note areas protected with fireproofing. See drawings in Appendix 1.)

The fire is not expected to propagate from the initial area of origin based on the following rationale:

a. All structural features are noncombustible. The structural features and the type of construction will not support combustion, hence the walls, floors, and ceiling are not considered to be media which a fire can consume as a fuel source.

b. Cables routed in conduit are not considered to be a fuel source for externally originated fires.

c. Cable trays are ladder-type with solid 22-gage metal bottoms (see Section 4, item D3(a) on cable tray construction) and are covered with Kaowool blankets. With respect to a fire originating from a cable overload, an overloaded cable will not provide a source of fire nor self-ignite surrounding cables.

As discussed in Section 6, it is shown that such a fire is not credible.

As shown by the fire tests discussed in Section 6, a cable tray covered with a Kaowool blanket revealed the following:

1. There were lower than expected temperatures on the surface of the Kaowool. This was due to the smothering effect of the Kaowool in trapping flame retardant gases from cable and thereby not allowing cable fire to propagate or become well established within the cable tray.

2. Heat transfer through Kaowool will not damage cables in trays or conduit above.

3. Kaowool greatly reduces release of smoke to surrounding atmosphere.

5.A.5 Fire Detection

The Channel 1 decay heat pump, containment spray pump, and high pressure injection pump are located in a room separated from the Channel 2 pumps. The fire detection consists of one ionization area-type fire detector in ECCS Pump Room 115, ECCS Pump Room 105, and Decay Heat Cooler Room 113. The detectors alarm at a local panel and in the control room.

The fire detection for Passage 110 consists of one ionization-type, duct-mounted detector in the HVAC return air duct in Room 105. The distance from air inlet to detector sampling point is approximately 300 feet.

Additional detection will be installed (see Section 5.A.9).

5.A.6 Fire Suppression

Portable fire suppression equipment, in the form of 15-lb CO_2 hand portable extinguishers and standpipe hose line, is accessible to manually fight a fire in each ECCS pump room, the decay heat cooler room, and Passage 110.

Hose Station (HCS) 32 is located in ECCS Pump Room 115 and is capable of reaching all areas of the room. Hose Station (HCS) 33, located in ECCS Pump Room 105, can be used as backup to or as an alternate to Hose Station (HCS) 32 (see Dwg. A-3). ECCS Pump Room 115 has a drainage capacity of 72 gpm. The water is routed to ECCS sump No. 89-3, which is pumped at a rate greater than 75 gpm to the miscellaneous waste drain tank. Hose Station (HCS) 33 is located in ECCS Pump Room 105 and is capable of reaching all areas of the room. If a backup or alternate hose station is required, Hose Station (HCS) 32 can be used (see Dwg. A-3). ECCS Room 105 has a drainage capacity of 72 gpm. The water is routed to ECCS sump No. 89-1, which is pumped at a rate greater than 75 gpm to the miscellaneous waste drain tank.

Hose Station (HCS) 33 can be introduced into the Decay Heat Cooler Room 113. The hose line can be layed down the walkway, which is along the south wall of ECCS Room 105, then down through the floor opening near Door 105 and down the ladder which leads down into the decay heat cooler room. This hose line is accessible to all areas in the decay heat cooler room (see Dwg. A-3).

Hose Station (HCS) 29 is located in Passage 110 and is capable of reaching all areas of the passage. A nozzle and hose line can be connected to the Fire Department connection C-12 in the stairway adjacent to the passage and can be used as a backup or alternate to Hose Station (HCS) 29.

Water could be contained in Room 115 with no effect on the redundant shutdown equipment. Water could be contained in Room 105 and adjoining Rooms 100 (Fire Zone B-2) and 101 (Fire Zone B-1) such that the essential MCC feeding the ECCS room coolers would not be flooded until in excess of 45 minutes. Water contained in Room 113 would have no effect on shutdown capability.

Portable fire suppression equipment in the form of 15-lb CO_2 hand portable fire extinguishers are accessible to the Clean Waste Receive Tank Room 124 from ECCS Pump Room 115 and Detergent Waste Drain and Pump Room 125. A hose line from Hose Station (HCS) 32 in ECCS Pump Room 115 is accessible. The hose line can be layed down the walkway in ECCS Pump Room 115, through Door 108, down the walkway in the Detergent Waste Drain and Pump Room 105 and into Clean Waste Receiver Tank Room 124.

Based on the effects that a postulated fire may have on Room 124, as discussed in Section 5.A.8, sprinklers are proposed to be installed. The system will be an automatic wet pipe-type sprinkler system. The sprinkler piping will be sized hydraulically in accordance with the requirements of NFPA 13 and 15 and will cover the exposed floor area in the vicinity of the cable trays around the clean waste receiver tank, and in each corner of the room. 3

Additional area-type ionization products of combustion detectors are proposed to be installed in this area.

5.T.6 Fire Suppression

Portable fire suppression equipment, in the form of a 15-lb CO_2 hand portable fire extinguisher is mounted on the north wall of the room. Additional 20-lb dry chemical hand portable extinguishers, one extinguisher in the stairway and three extinguishers in the turbine building, are directly accessible to the area. A manual fire fighting water hose line from Hose Station (HR) 4 is accessible to the component cooling water heat exchanger and pump room by laying the hose line through Door 328 into the stairway, then through Door 332 into the component cooling water heat exchanger and pump room area (see Dwg. A-5).

The component cooling water room will be protected against an exposure fire by an automatic wet pipe-type sprinkler system below the conduits and under the mezzanine floor grating under the valves at the opposite end of the room from the pumps. The sprinkler piping will be sized hydraulically in accordance with the requirements of NFPA 13 and 15. 4

A 1/2-hour rated barrier will be provided around the conduits containing control cables for the component cooling water pumps. A 1/2-hour rated barrier will also be provided around the conduits containing control or power cables for CCW crossover valves 5095 and 5096 to prevent both channels from being affected by a fire. These barriers will consist of a 1-inch blanket of Kaowool. The underside of the valve motors will also be protected with 1/2-hour rated barriers. 4

The sprinkler system design incorporates a fire water sprinkler supply header; alarm check valve and trim set; OS&Y system control valve; and a typical commercial sprinkler riser, feeder, branch line piping, and sprinkler head arrangement.

The alarm check and OS&Y sprinkler control valve will be located outside Room 328 in the turbine building on elevation 585'-0", adjacent to Door 332A. 3

The OS&Y sprinkler control valve and its alarm check valve located in the turbine building will be supplied fire water from the 10-inch turbine building fire water loop. The water supply to the 10-inch turbine building fire water loop is fed from two separate directions (see Appendix 1, Dwg SK-2, for supply piping and control valve layout).

If a fire were to become established in the component cooling water pump room, the heat that would be produced would fuse a sprinkler head or heads, depending on the size of the fire, thus causing water to flow directly from the sprinkler head(s) affected by the fire. The alarm check valve clapper will open by the flow and allow pressurized water to fill the retarding chamber associated with the valve. The water flow will overcome the retarding chamber's small capacity drain and, thus, fill the alarm line which closes the associated alarm check valve's pressure switch. The closing of the

pressure switch will activate a local, audible fire alarm. The pressure switch closure, which indicates a water flow condition, will be visually and audibly annunciated in the control room. The pressure switch signal contact points and its circuits will be designed and installed so that they cannot be readily tampered with or removed without causing a trouble signal to be produced. This system trouble condition will sound a local, audible alarm and will sound an audible alarm and be visually annunciated in the control room.

The OS&Y sprinkler control valve will be electrically supervised to obtain two separate and distinctive signals; one indicating movement of the valve from its normal position and the other indicating restoration of the valve to its normal position. 3

Water-sensitive electrical equipment, located in the component cooling water pump room, will be evaluated in such a manner that baffles will be provided to protect against water coming in contact with such equipment. This assures that both advertant and inadvertant operation of the sprinkler system will not render sensitive electrical equipment inoperable.

The drainage capacity available to remove fire water runoff in this area is 67 gpm.

In order to maintain the fire resistive integrity of the north wall of the CCW heat exchanger and pump room, an automatic water curtain will be installed to protect the tube-pull openings.

5.T.7 Isolation and Smoke Venting

The component cooling water pump and heat exchanger area (Room 328) is exhausted by two 14,200 cfm capacity cooling fans (C75-1 and 2) and an additional 2000 cfm by turbine building exhaust fan C24-6. All exhaust paths are supplied with 3-hour rated fire dampers. Fans C75-1 and 2 and their controls are located in Room 328. Two motorized inlet dampers admit outside air into the room. Fans C75-1 and 2 discharge to the heater bay area of the turbine building. Fan C24-6 discharges through the roof of the auxiliary building.

Should these fans not be available for smoke removal, portable equipment would be utilized to remove smoke to the turbine building.

5.T.8 Evaluation of Fire and Shutdown Capability

5.T.8.1 Fire Zone T-1, Component Cooling Heat Exchanger and Pump Room, (Room 328)

The following equipment is located in this room:

a. CCW pumps*

b. CCW valving*

c. CCW flow switches for pump discharge headers*

APPENDIX 1

FIRE PROTECTION DRAWINGS

The drawings (listed below) in this appendix indicate the location of the presently installed fire protection system at Davis-Besse. These drawings have been referenced, by drawing number, throughout the Fire Hazards Analysis Report.

The passive components of the fire protection system include: (1) fire rated barriers, (2) areas with sprayed fire proofing, (3) rated louvers and, (4) rated fire doors. All of these components are delineated and indicated on the drawings.

The detection devices of the fire protection system include area type fire detectors and fire detection in ductwork. These detectors are of the following types: (1) ionization, (2) fixed temperature rate copensated, (3) fire water flow, (4) fire water pressure, (5) fixed temperature rate compensated and, (6) flame. They are shown on the drawings where the type of detector is also indicated.

Active and manual fire suppression systems of the fire protection system are indicated on the drawings. These include: (1) automatic sprinklers, (2) manual sprinklers, (3) CO_2 fire extinguishers, (4) dry chemical fire extinguishers, (5) manual hose stations, and (6) the yard loop system.

The fire areas, fire zones, and room numbers referenced throughout this report are indicated on the drawings of this appendix.

Appendix 1 - List of Drawings

Drawing No.

A-3 Fire Protection - Containment and Auxiliary Buildings - Elevation 545 feet

A-4 Fire Protection - Shield, Auxiliary and Turbine Buildings - Elevation 565 feet

A-5 Fire Protection - Shield, Auxiliary and Turbine Buildings - Elevation 585 feet

A-6 Fire Protection - Shield, Auxiliary and Turbine Buildings - Elevation 603 feet

A-7 Fire Protection - Shield, Auxiliary and Turbine Buildings - Elevation 623 feet

A-8 Fire Protection - Shield, Auxiliary and Turbine Buildings - Elevation 643 feet

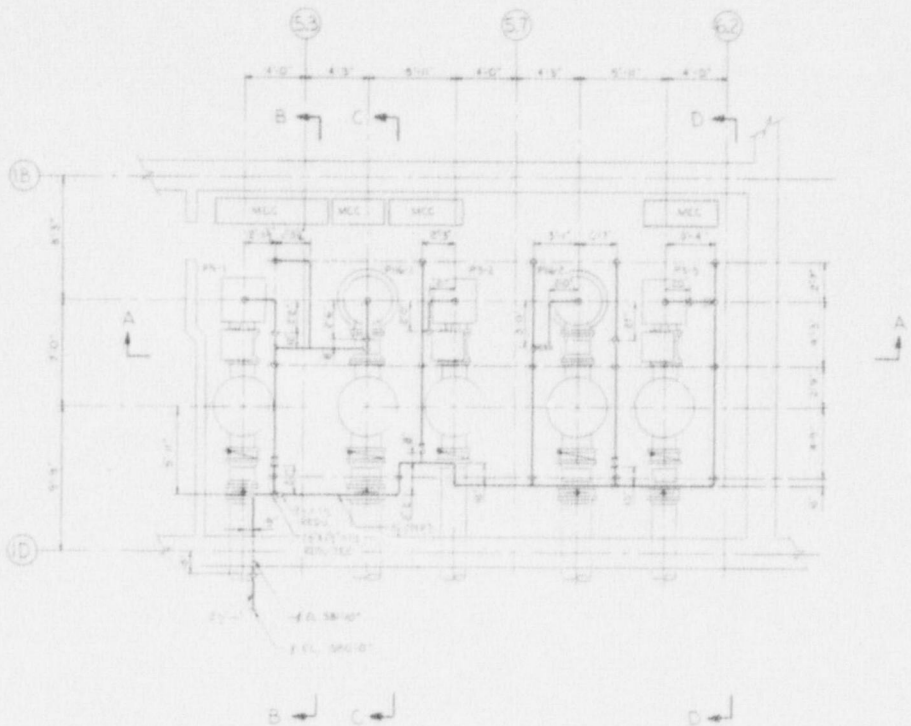
M-016 Fire Protection System P&ID

APPENDIX 1 LIST OF DRAWINGS (Cont'd)

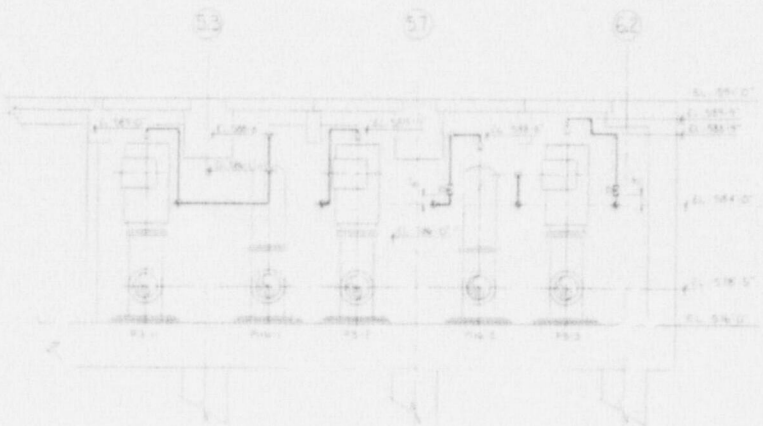
Drawing No.	
SK-1	Wet Pipe Sprinkler System- Elevation 565 feet
SK-2	Wet Pipe Sprinkler System- Elevation 585 feet
SK-3	Wet Pipe Sprinkler System- Elevation 603 feet
SK-4	Wet Pipe Sprinkler System- Elevation 623 feet
SK-5	Fire Protection- Intake Structure
SK-6	Cable Spreading Room Sprinkler System
SK-7A	Blowout Panel Water Curtain Preliminary Design Arrangement (Typical)
SK-7B	Blowout Panel Water Curtain Preliminary Design Arrangement Side View (Typical)
SK-7C	Blowout Panel Water Curtain Preliminary Design Arrangement Overhead View (Typical) 2
SK-8	Clean Waste Receiver Tank Room 124- Cable Tray Layout
SK-9	Fire Detection Arrangement- Mechanical Penetration Rooms 1 and 2 Elevation 565 feet
SK-10	Fire Detection Arrangement- Mechanical Penetration Rooms 3 and 4 Elevation 585 feet
SK-11	Fire Detection Arrangement- Electrical Penetration Rooms 1 and 2 Elevation 603 feet
SK-12	Single Line Diagram-Fire Protection System Power Supply
SK-13	Single Line Diagram-Fire Protection System Power Supply
SK-14	Single Line Diagram-Fire Protection System Power Supply
SK-15	Single Line Diagram-Fire Detection System Power Supply
SK-16	Single Line Diagram-Fire Detection System Power Supply
SK-17	Typical Interconnection Diagram-Fire Alarm System
SK-18	Wet Pipe Sprinkler System Sprinkler Arrangement for Service Water Pump Room 4

APPENDIX 1 LIST OF DRAWINGS (Cont'd)

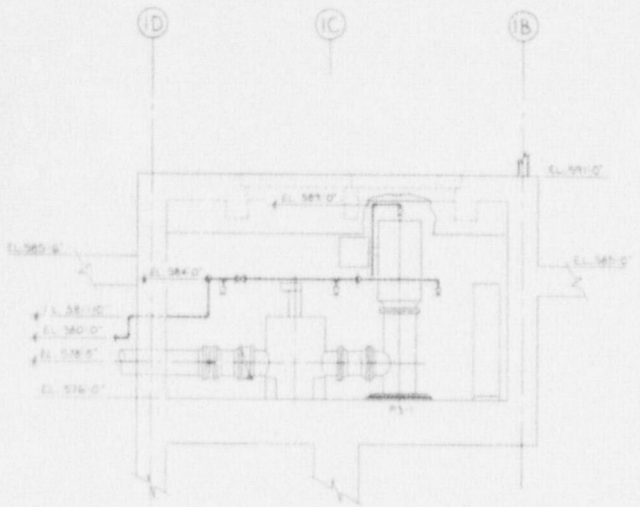
Drawing No.		
SK-19	Crosstie from Unit 2 to Unit 1 Service Water Systems	
M-041	Service Water System P&ID	4
M-012A	Circulating Water System P&ID	



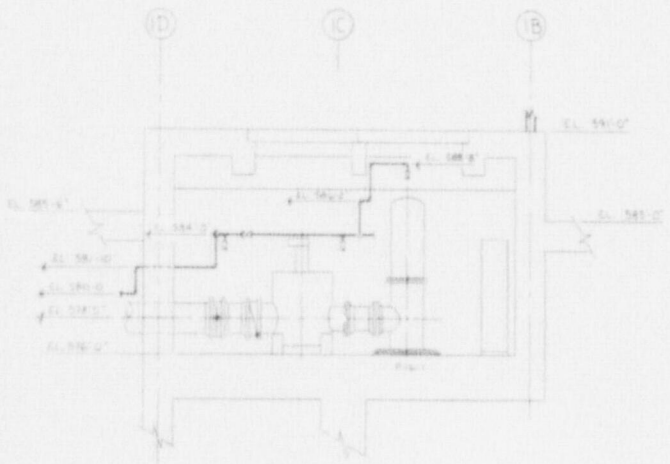
PLAN
ELEVATION STUD



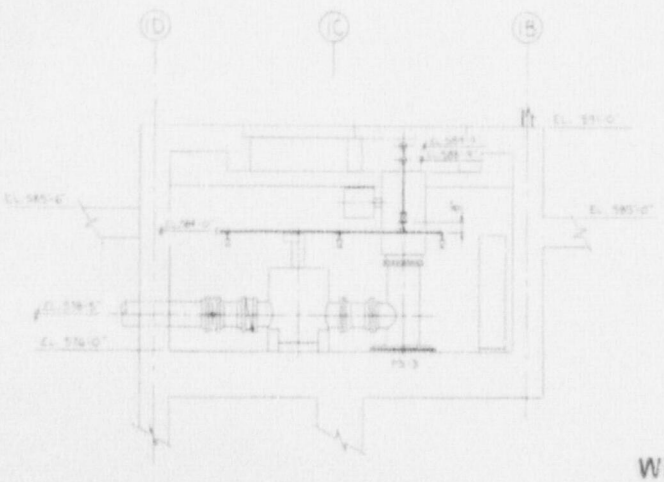
SECTION A-A



SECTION B-B



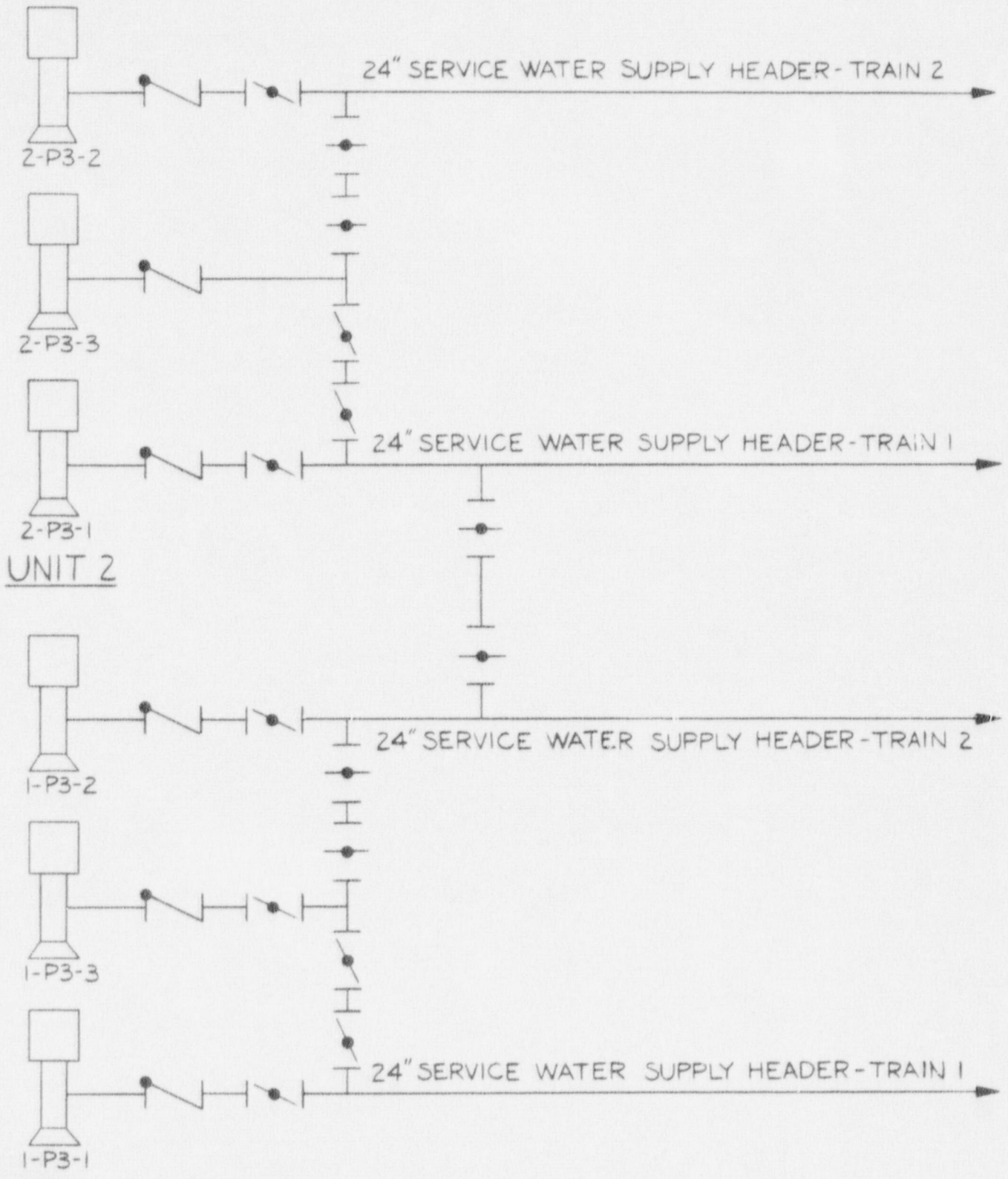
SECTION C-C



SECTION D-D

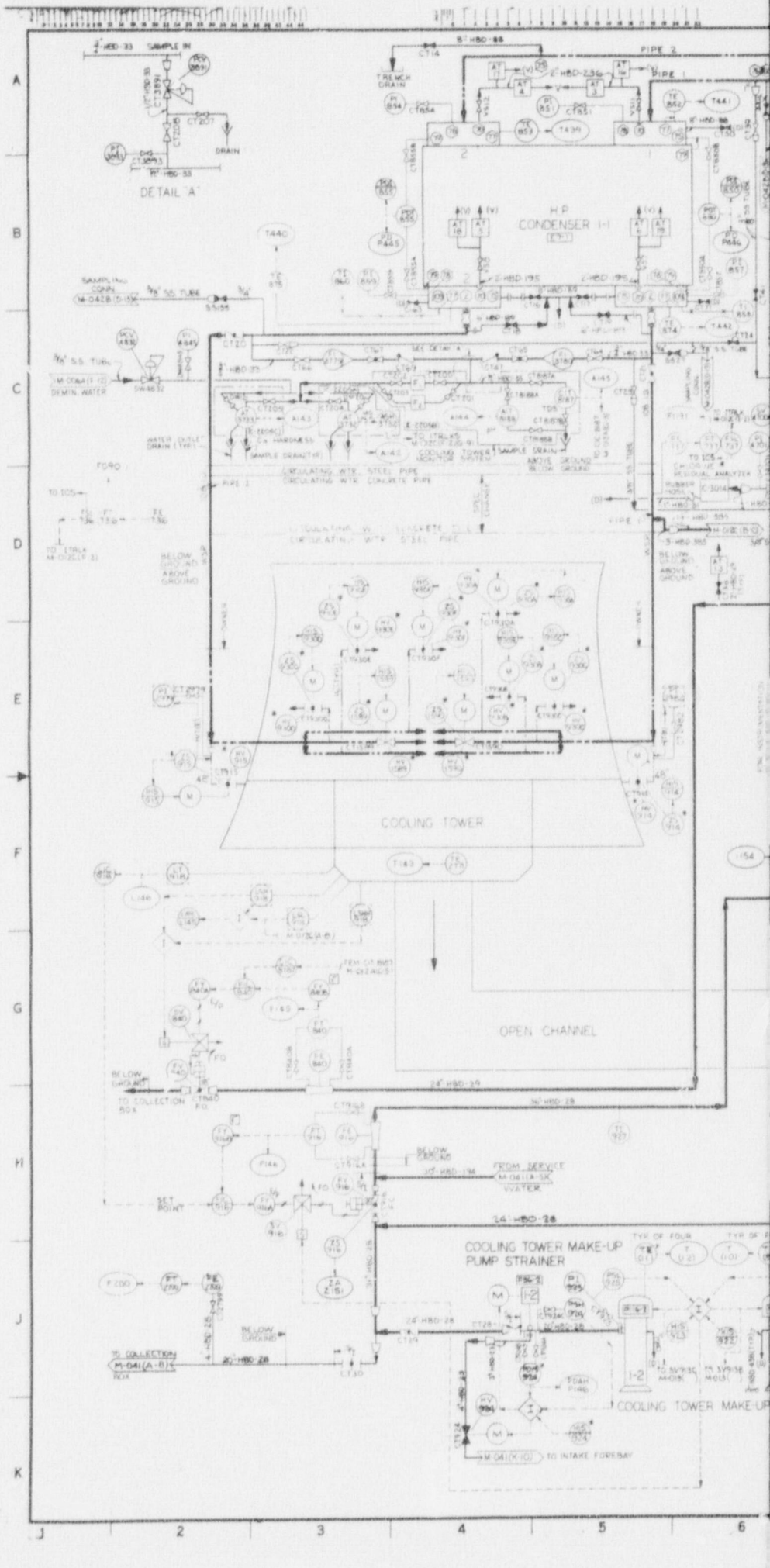
SK-18
WET PIPE SPRINKLER SYSTEM SPRINKLER
ARRANGEMENT FOR SERVICE WATER PUMP ROOM

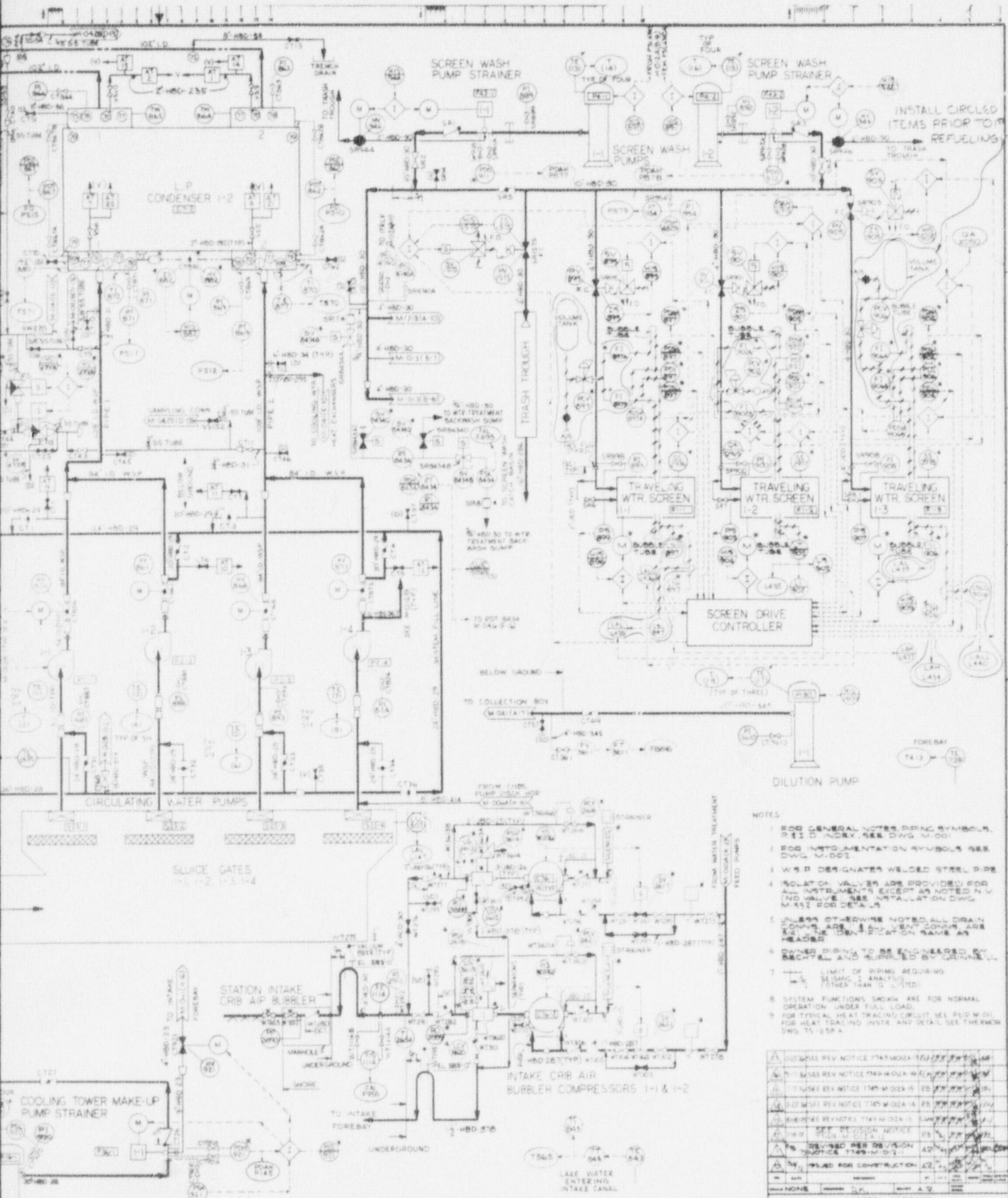
REVISION 4



SK-19
CROSSTIE FROM UNIT 2 TO UNIT 1
SERVICE WATER SYSTEMS

REVISION 4


DETAIL 'A'
H.P. CONDENSER I-1
COOLING TOWER
OPEN CHANNEL
COOLING TOWER MAKE-UP PUMP STRAINER
COOLING TOWER MAKE-UP
TO INTAKE FOREBAY
TO COLLECTION BOX
FROM SERVICE WATER
DRAIN
TRENCH DRAIN
SAMPLE IN
BELOW GROUND
ABOVE GROUND
1 2 3 4 5 6
A B C D E F G H J K



NOTES

1. FOR GENERAL NOTES, PIPING SYMBOLS, P & I. D. INDEX, SEE DWG. M-001
2. FOR INSTRUMENTATION SYMBOLS SEE DWG. M-002.
3. W.S.P. DESIGNATES WELDED STEEL PIPE.
4. ISOLATION VALVES ARE PROVIDED FOR ALL INSTRUMENTS EXCEPT AS NOTED N.V. (NO VALVE). SEE INSTALLATION DWG. M-452 FOR DETAILS.
5. UNLESS OTHERWISE NOTED, ALL DRAIN CONNS. ARE 1" & ALL VENT CONNS. ARE 3/4". LINE IDENTIFICATION SAME AS HEADER.
6. OWNER PIPING TO BE ENGINEERED BY BECHTEL AND SUPPLIED BY GRINNELL.
7. LIMIT OF PIPING REQUIRING SEISMIC I ANALYSIS (OTHER THAN Q LISTED)
8. SYSTEM FUNCTIONS SHOWN ARE FOR NORMAL OPERATION UNDER FULL LOAD.
9. FOR TYPICAL HEAT TRACING CIRCUIT SEE P&ID M-011. FOR HEAT TRACING INSTR. AND DETAIL SEE THERMON DWG. 75-25P-A.

LOCATION	DILUTION PUMP 1-1		CIRCULATING PUMPS 1-1		1-2		1-3		1-4		CLG TOWER MAKE-UP PUMPS 1-1		1-2		SCREEN WASH PUMPS 1-1		1-3	
	TE (17)	T (18)	TE (1)	T (2)	TE (3)	T (4)	TE (5)	T (6)	TE (7)	T (8)	TE (9)	T (10)	TE (11)	T (12)	TE (13)	T (14)	TE (15)	T (16)
MOTOR STATOR	3612A	T974	740A	T110	741A	T118	742A	T127	743A	T135	847A	[illegible]	848A	T150	673A	T861	845A	T866
MOTOR BEARING CT.	3612B	T975	740B	T108	741B	T116	742B	T125	743B	T133	847B	T147	848B	T152	679B	T863	845B	T868
MOTOR BEARING CT. (PUMP END)	3612C	T976	740C	T109	741C	T117	742C	T126	743C	T134								
PUMP BEARING CT. (MOTOR END)			740D	T107	741D	T115	742D	T124	743D	T132								
PUMP BEARING CT.			740E	T111	741E	T119	742E	T128	743E	[illegible]								
THRUST BEARING			740F	T112	741F	T120	742F	T129	743F	[illegible]								

17	SEE REV. NOTICE 7749-M-012A-17		
16	SEE REV. NOTICE 7749-M-012A-16		
15	SEE REV. NOTICE 7749-M-012A-15	RB	
14	SEE REV. NOTICE 7749-M-012A-14	RB	
13	SEE REV. NOTICE 7749-M-012A-13		
12	SEE REVISION NOTICE 7749-M-012A-12	RB	
1	REVISED PER REVISION NOTICE 7749-M-012-1	AZ	
0	ISSUED FOR CONSTRUCTION	AZ	

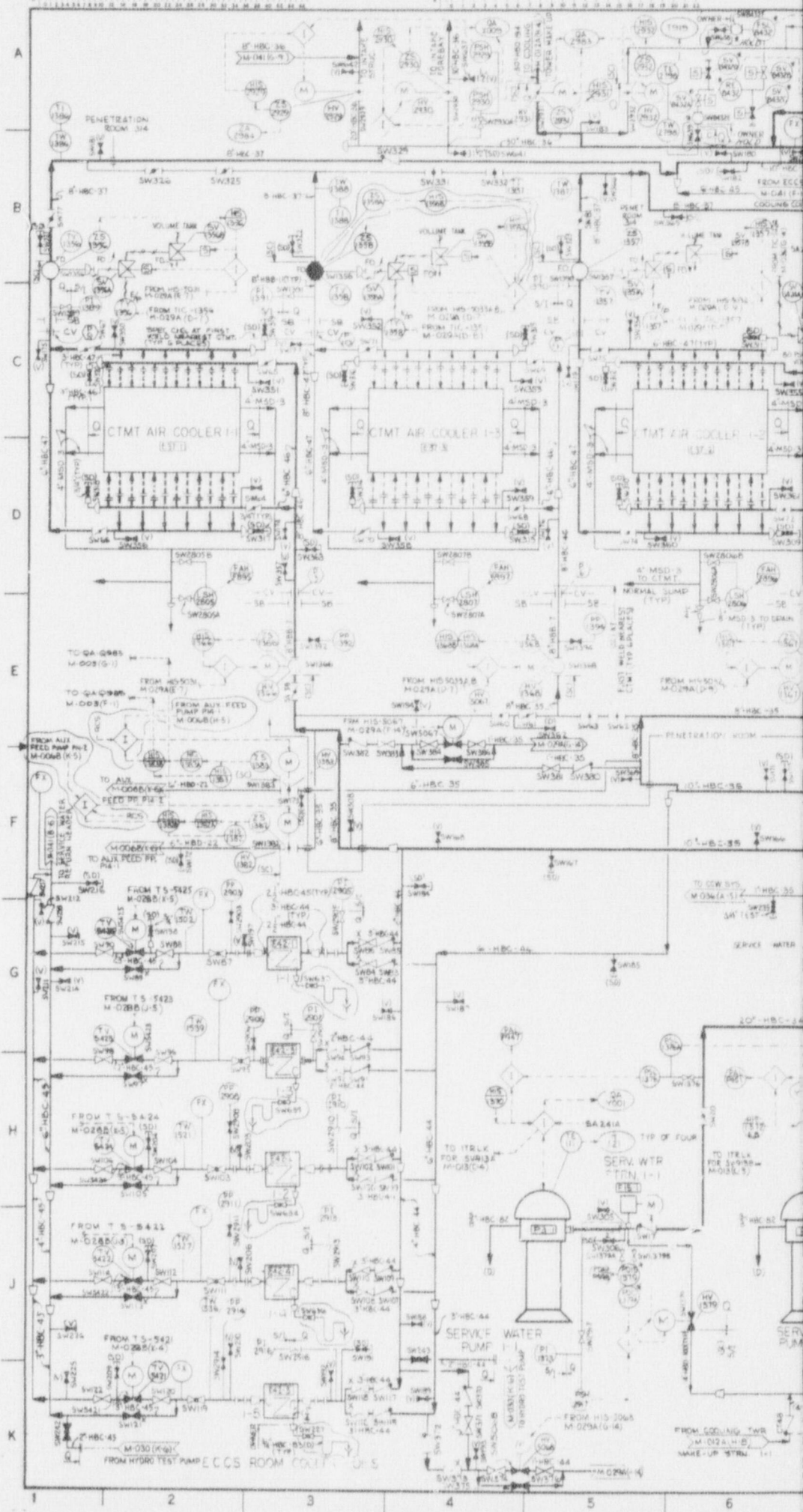
SCALE NONE — DRAWN D.K. — CHECKED A.Z.

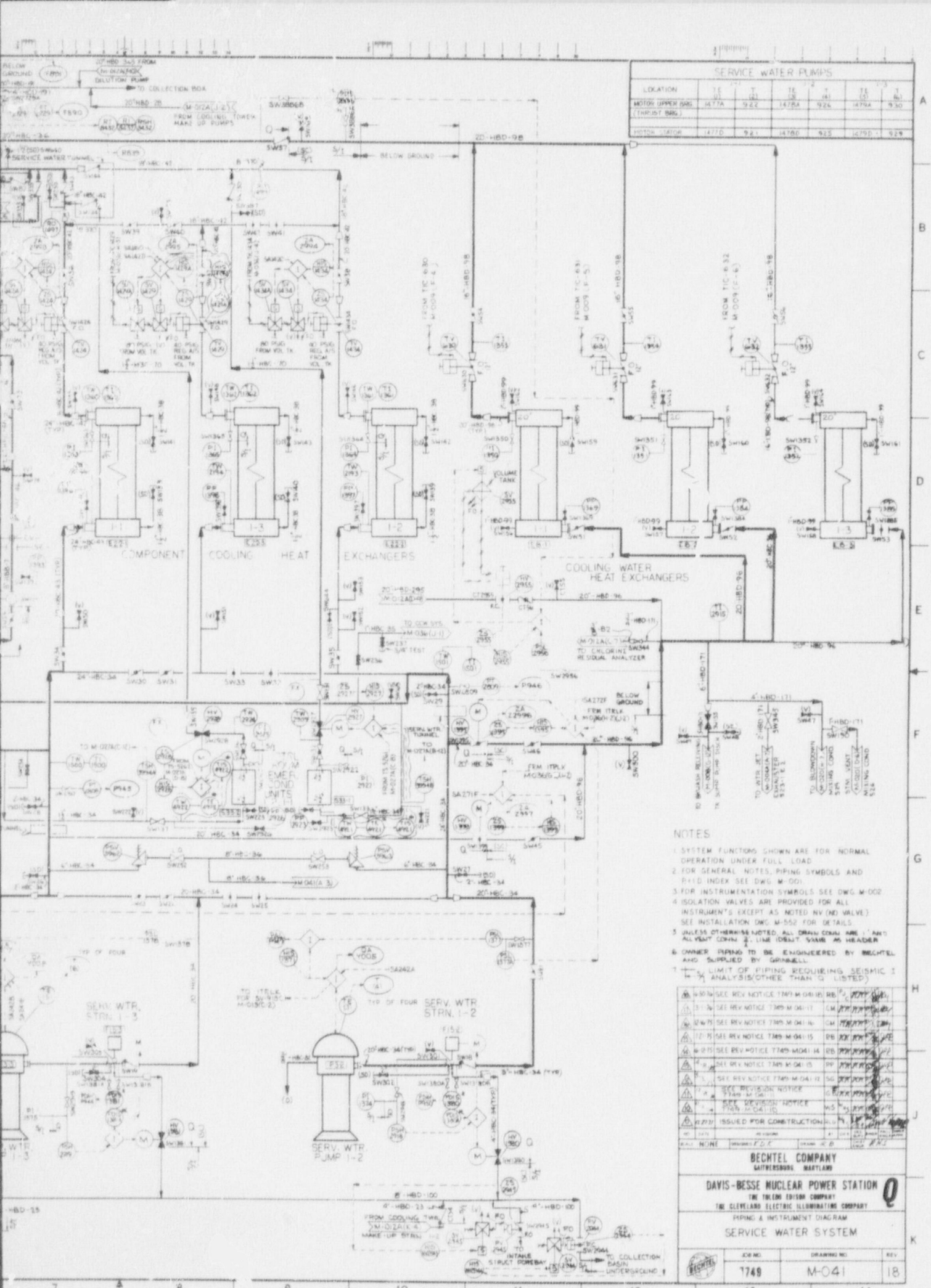
BECHTEL COMPANY
GAITHERSBURG, MARYLAND

DAVIS-BESSE NUCLEAR POWER STATION
THE TOLEDO EDISON COMPANY
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

PIPING & INSTRUMENT DIAGRAM
CIRCULATION WATER AND SCREEN WASH SYSTEMS

JOB NO.	DRAWING NO.	REV.
7749	M-012A	17


CTMT AIR COOLER 1-1
CTMT AIR COOLER 1-3
CTMT AIR COOLER 1-2
PENETRATION ROOM 314
SERV. WTR PUMP 1-1
SERVICE WATER PUMP 1-1
ECCS ROOM COOLERS
FROM HYDRO TEST PUMP
FROM COOLING TWR
SERVICE WATER


SERVICE WATER PUMPS
LOCATION
MOTOR UPPER BRG
(THRUST BRG)
MOTOR STATOR
NOTES
1. SYSTEM FUNCTIONS SHOWN ARE FOR NORMAL OPERATION UNDER FULL LOAD
2. FOR GENERAL NOTES, PIPING SYMBOLS AND P+ID INDEX SEE DWG. M-001
3. FOR INSTRUMENTATION SYMBOLS SEE DWG. M-002
4. ISOLATION VALVES ARE PROVIDED FOR ALL INSTRUMENTS EXCEPT AS NOTED NV (NO VALVE) SEE INSTALLATION DWG. M-552 FOR DETAILS
5. UNLESS OTHERWISE NOTED, ALL DRAIN CONN ARE 1" AND ALL VENT CONN ARE 1" LINE (DRWT SAME AS HEADER
6. OWNER PIPING TO BE ENGINEERED BY BECHTEL AND SUPPLIED BY GRINNELL
7. LIMIT OF PIPING REQUIRING SEISMIC I ANALYSIS(OTHER THAN Q LISTED)
ISSUED FOR CONSTRUCTION
BECHTEL COMPANY
GAITHERSBURG MARYLAND
DAVIS-BESSE NUCLEAR POWER STATION
THE TOLEDO EDISON COMPANY
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
PIPING & INSTRUMENT DIAGRAM
SERVICE WATER SYSTEM
JOB NO. 7749
DRAWING NO. M-041
REV. 18

APPENDIX 5

SHUTDOWN PROCEDURAL INFORMATION

This appendix provides a summary of information which will supplement existing unit procedures to provide the operators with the actions necessary to achieve a hot and subsequent cold shutdown under a postulated fire condition. The normal and alternate components that can be utilized to achieve cold shutdown are listed in Table A5-1. This serves as a basis for alternate actions by the operator.

Each room in which a damaging fire is postulated has been evaluated and the results discussed in Section 5 of this report. Based on these results, alternate actions will be identified and summarized for affected rooms. Each of these room summaries will be developed into an addendum to the existing unit procedures.

Where a damaging fire has been deemed to have the potential to preclude the ability to achieve cold shutdown, modifications, as required, have been proposed and will be implemented to reduce the likelihood of such a damaging fire.

4

8. (RSP) Table 4-1, Item 6c, Cable Spreading Room

Based on our site visit, we consider that the present arrangement of the conduit and cable trays in the cable spreading room make manual fire fighting difficult as entrance cannot be gained into the major area of the room. Both divisions are contained within the room and there is presently no fire suppression system installed. Hose stations and portable fire extinguishers are located near the entrances to this room.

Taking these factors into account and providing a defense-in-depth protection for this room, it is our position that an automatic spray fog system be provided at the ceiling level. Provide preliminary drawings of such a system showing piping and spray head locations.

In addition, we will require the licensee to establish emergency remote shutdown capability and procedures for Davis-Basse, Unit No. 1, to achieve cold shutdown in the event of a cable spreading room fire or a control room cabinet fire, which disables redundant cable divisions of systems necessary for safe shutdown, assuming a turbine generator trip. Use of non-safety related systems may be considered for this purpose. Confirm that you will meet the above positions.

RESPONSE

An automatic water spray (fog)-type sprinkler system will be installed in the cable spreading room. The sprinkler system design will incorporate redundant fire water supply headers, redundant alarm check valves and trim sets, redundant OS&Y system control valves, and a typical commercial sprinkler riser, feeder, branch line piping, and an automatic water spray-type nozzle arrangement. The system will be designed so that a single failure of an alarm check valve, OS&Y system control valve, or a fire water supply header to the system will not adversely affect the operation of the system under emergency fire conditions (see Table 4-1, Section F-3, and Section 5.DD.6 for additional information on the sprinkler design).

Section 5.DD describes the cable spreading room design characteristics that provide protection against fires of either electrical or other than electrical origin. As discussed above, the original design will be supplemented with an automatic spray fog system. Section 5.FF describes the control room complex design characteristics that provide protection against a fire. 4

Refer to the response to Question 37 and Appendix 5 for a discussion of procedures. 4

11. (RSP) Table 4-1, Item 6h, Related Safety Pumps

All three service water pumps and two cooling tower makeup pumps are located in one room of the intake structure. It is our position that a noncombustible 1/2-hour rated barrier separate each service water pump and motor from its redundant train (two barriers required). The barriers should be extended from floor to ceiling. Also provide a preaction sprinkler system to cover the entire room, except the motor control center with alarm and annunciation in the control room. Any redundant cabling or conduit from one train within the barrier of the other should be totally enclosed in Kaowool or other suitable material to give at least a half hour fire rating.

All openings in the wall separating this room from the diesel fire pump room should be sealed with a material to achieve a 3-hour fire rating. Also provide a curb around the entrance to the SW pump area on the fire pump side to prohibit a liquid from running under the door separating the two rooms.

It is also our position that you provide a 1-1/2 inch hose station in the immediate area of the service water pump room within the intake structure to cover all portions of any area containing safety related equipment.

RESPONSE

The fire protection provisions at the intake structure are shown on Dwg. SK-5 in Appendix 1. The intake structure is divided into three fire areas. The service water pump room is denoted as Fire Area RR. The diesel fire pump room is denoted as Fire Area SS. The service water valve room is denoted as Fire Area TT. All openings in the wall separating fire areas RR and SS will be sealed with a material to achieve a 3-hour fire rating. A curb will be provided at the entrance to the service water pump area on the diesel fire pump side to preclude a liquid from running under the door separating the two fire areas.

The requirement to provide a noncombustible 1/2-hour rated barrier from floor to ceiling separating each service water pump and motor from its redundant train is not required on the basis that the proposed sprinkler system and conduit protection discussed below is adequate for fire protection. Such barriers are also not physically feasible due to space limitations and seismic requirements. Fire-rated barriers between the pumps would not be desirable, even if physically feasible, due to the resulting severe operational and maintenance restrictions. Additionally, the creation of three "rooms" would adversely affect the ventilation of the area which is designed for one common area. Substantial ventilation redesign would not be possible within the as-built room configuration.

The sprinkler system will be designed to spray each pump and motor. Each of the service water pump motors will be baffled to protect it from impingement of water other than in the vertical direction. The motor is protected from water impinging vertically due to its drip proof design. The system will also cover the room floor area for protection from an exposure fire. (Water-sensitive components such as MCC's will be protected.) The sprinkler heads, with installed heat collectors in accordance with NFPA 13, will be distributed immediately below the conduit and above the pump motors and adjacent open areas approximately 7 to 8 feet from the floor. The spacing between heads will be no more than 10 feet nor less than 6 feet on centers. A preliminary arrangement is provided in Appendix 1 as Drawing SK-18.

The sprinklers will use fast-response heads with a temperature setting of 135F. These are Grinnell Model F931-type sprinklers which consist of a Duraspeed-type head and a quick-response actuator. They are designed for rapid thermal detection of a fire and do not impair normal operation or water discharge characteristics of the sprinkler. When tested by Underwriters Laboratories (listed under the "Sprinklers, Quick-Response Sprinkler Assemblies (VORQ)" classification), the average mean time of actuation, when subjected to the Laboratory's sprinkler air-oven operation test, was 33.9 seconds at an average operating temperature of 186.7F. 4

As noted above, the automatic sprinkler system coverage will be sufficient to protect the service water pumps from a postulated fire without having to rely on floor to ceiling 1/2-hour fire-rated barriers.

The floor around each service water pump will be sloped or curbed sufficiently so that oil leaking from any one pump or motor or a flammable liquid spill at the pump motor will be confined to the immediate pump area.

In order to provide manual fire-fighting back up, a 1-1/2-inch hose station will be provided in the area of the service water pump room within the intake structure.

A 1/2-hour fire-rated barrier will be provided around the conduits associated with power and control for the service water pumps and power and control for the service water valves on the return line to the forebay and the cooling tower makeup. The 1/2-hour fire-rated enclosed barrier for these shutdown-related conduits will be achieved by wrapping the respective conduits with a 1-inch blanket of Kaowool. These service water valve motors will be enclosed with a 1/2-hour fire-rated barrier also. 4

It should be noted that the cables in conduit have the ability to withstand heat from external sources for a significant period without loss of circuit integrity. This is discussed more fully in Appendix 3, Test 7.

It should also be noted that the circulating water system is intertied with the service water system connecting the discharge of the circulating water pumps to the service water system and returning to the circulating water pumps' suction. The circulating water system intertie is shown on Drawings M-041 (Service Water System P&ID) and M-012A (Circulating Water System P&ID) in Appendix 1. Each circulating water pump discharge flow rate is 120,000 gpm. The service water flow capacity per pump is 10,250 gpm. This small flow could be diverted to the service water system by operator action from the control room through intertie 20"-HBD-295. The service water return would flow through cooling tower makeup line 30"-HBD-194 to 36"-HBD-28 to the circulating water pump suction. The elevation head requirement is 35 feet. The pump head of 105 feet is adequate to overcome line losses. Therefore, both head and flow characteristics of the circulating water pumps are such that they can be utilized as an alternate to the service water pumps. Each circulating water pump is a 4500 hp pump fed from the 13.8 kV distribution system. This load could not be powered from the emergency diesel. However, the circulating water pumps could be utilized as an alternate to the service water pumps, since a fire in the service water pump room would not cause a loss of offsite power. This was agreed at the meeting with the NRC staff on October 25, 1978. The conduit in the pump room, associated with the service water isolation valve separating the safety grade and nonsafety grade portions of service water, will be enclosed with a 1/2-hour fire-rated barrier such that the valve can be opened (or remain open) in the remote instance that the circulating water pumps would be utilized as an alternate to the service water pumps. 4

For long-term backup service water capability, an intertie will be provided from the Unit 2 service water system to the Unit 1 service water system. The schematic of this design is provided in Appendix 1 as Drawing SK-19 There will be a connection from one loop of the Unit 2 service water system to one loop of the Unit 1 service water system. This connection will be Seismic Category I and will include one manually operable, normally closed isolation valve at each end. The specific physical routing of the connection has not been finalized. However, there will be sufficient time for operator action to open the valves since they need not be opened for well in excess of 20 minutes, based on the following: 4

a. A fire in the Unit 1 service water pump room would not cause failure of the cable in conduit for at least 30 minutes. The conduit will be protected with a 1/2-hour fire barrier. This does not even take credit for the time to failure for circuits in conduit based on Test 7 in Appendix 3. These tests showed that unprotected circuits in conduit did not fail for at least 13.6 minutes. Additionally, if all service water was lost, the Unit 1 shutdown equipment would not be adversely affected for a time period of 11 minutes. This is based on an analysis of the cooling water requirements of shutdown equipment, including the emergency diesel generator. Therefore, there is sufficient time for operator action to justify the use of manual isolation valves on the connection between the Unit 1 and Unit 2 service water systems.

b. This design meets the requirements of General Design Criterion 5, Sharing of Structures, Systems, and Components, of 10 CFR 50 Appendix A. Connecting the two systems will not impair the ability of either system to perform its safety function including, in the event of an accident in one unit, an orderly shutdown and cooldown of the other unit. This requirement will be met assuming a single failure.

c. The surveillance requirements of the Unit Technical Specifications, Section 4.7.4.1, will be applied to the valving in that, at least once per 31 days, the correct position of the manual valving will be verified. 4

Additional information is provided in Table 4-1, Section F11.

13. (RSP) Item 5.A.3.5, Fire Zone A-3, Clean Waste Receiver Tank Room 124, Auxiliary Building

At present, both cable trains in fire area A-3, clean waste receiver tank room 124, elevation 545, are separated from each other by 30 feet and are approximately 31 feet above the floor of this room. One of the redundant trains contains cables for the component cooling water pumps, diesel generator, and 4.16 KV feeder breakers of the substation. It is our position that the trays of each train be protected from an exposure fire on the floor by a 1/2 hour fire rated barrier. In addition, provide automatic sprinkler system to cover the area between the cable divisions.

RESPONSE

As discussed in Section 5.A.8.6, a fire in this room should not preclude the ability to shutdown. There is no source of ignition in the room, the fire tests show that an overloaded cable will not provide a source of fire to surrounding cable, and the 30-foot distance between the redundant cable trays is considered more than adequate to preclude the other division from being affected. Additionally, the vast majority of the room and, thus, the space between the redundant divisions, is taken up by the huge clean waste receiver tank, as shown in Appendix !, Dwg. SK-8.

Due to the above, and as resolved with the NRC staff on September 7, 1978, no 1/2-hour fire-rated barrier will be necessary, but an automatic wet pipe sprinkler system will be provided under the cable trays to spray the exposed floor area in the vicinity of the trays around the tank and will also be extended to cover the open floor area in each corner of the room. 4

26. (RSP) Item 5.1.3-1, Fire Zone T-1, Component Cooling Water Heat Exchanger and Pump Room 328, Auxiliary Building

It is our position that automatic sprinklers be provided in the area of the three component cooling water exchanger and pump room 328, fire zone T-1, elevation 585 feet of the auxiliary building for protection against an exposure fire. Also provide a noncombustible barrier of at least 1/2 hour rated from the floor to the ceiling to separate each pump from the other. Activation of the sprinkler system should alarm and annunciate in the control room.

It is our position that the hydrogen line passing through this area be relocated to another location not containing safety related equipment. Verify that no piped hydrogen lines are located through or exposes any other safety related equipment or conduit cable. For any areas where such condition exists, these lines should be relocated to a safe distance away, or demonstrate that the hydrogen can be safety vented.

RESPONSE

The requirement to provide a noncombustible, 1/2-hour rated barrier from floor to ceiling separating each component cooling water pump in Room 328 from its redundant train is not required on the basis that the proposed sprinkler system and conduit protection discussed below is adequate for fire protection. Such barriers are also not physically feasible due to space limitations and seismic requirements. Fire-rated barriers between the pumps would not be desirable, even if physically feasible, due to the resulting severe operational and maintenance restrictions. Additionally, the creation of three "rooms" would adversely affect the ventilation of the area which is designed for one common area. Substantial ventilation redesign would not be possible within the as-built room configuration.

The sprinkler system will be designed to spray each pump and motor. Each of the component cooling water pump motors will be baffled to protect it from impingement of water other than in the vertical direction. The motor is protected from water impinging vertically due to its drip proof design. The system will also cover the floor area of the room for protection from an exposure fire. This will include sprinklers under the mezzanine floor grating under the valves at the opposite end of the room from the pumps. 4

As noted above, the automatic sprinkler system coverage will be sufficient to protect the CCW pumps from a postulated fire without having to rely on floor to ceiling 1/2-hour fire rated barriers.

The floor around each component cooling water pump will be sloped or curbed sufficiently so that oil leaking from any one pump or motor or a flammable liquid spill at the pump motor will be confined to the immediate pump area. The leak or spill will not pool across the floor and accumulate around the base of the redundant component cooling water pump.

A 1/2-hour rated barrier will be provided around the conduits associated with control for the component cooling water pumps and power or control for the CCW crossover valves. The underside of the valve motors will also be protected with 1/2-hour rated barriers. 4

Additional information if provided in revised Section 5.T.6.

The hydrogen line passing through this area will be relocated to another location not containing safety-related equipment. Further, the hydrogen supply piping which passes through areas containing safety-related equipment or which exposes safety-related equipment (including cable) will be relocated so as not to potentially affect such equipment.

35. State whether the collapse of the turbine building roof due to a fire would effect the integrity of safe shutdown or associated equipment in the area or adjacent to the turbine building. Demonstrate that safe shutdown can be accomplished in the event of the turbine building roof collapse.

RESPONSE

The turbine building is constructed of noncombustible materials. This type of construction does not contribute fuel to a fire originating in the contents of the building. A fire safety advantage of noncombustible construction is its freedom from the spread of fire throughout the roof and intermediate floor structures.

The clean and used turbine lube oil storage tanks are enclosed in 3-hour fire-rated enclosures. These room enclosures are designed to hold the entire contents of the tank in the event of a tank rupture. The tank enclosure opening is provided with a self-closing Class A fire door. The door opening is protected by a sill which is high enough to contain the entire contents of the tank within the room. The sill has been built to withstand the lateral pressure due to the liquid head, and the walls and floor are waterproof. Automatic wet pipe sprinklers are installed in the clean and used Turbine Lube Oil Tank Rooms 249 and 432.

The various lubricants are dispensed from Oil Drum Storage Room 337, as required, to perform routine maintenance. The walls, floor, and ceiling are fire rated for 3 hours. Automatic wet pipe-type sprinklers are installed in, and provide primary fire suppression for, the oil drum storage room.

Based on the fire tests discussed in Section 6 of the Fire Hazards Analysis Report, an overloaded cable in a tray or conduit will not provide a source of fire to surrounding external cables, thus surrounding cables will not self-ignite. Therefore, a cable fire is considered not credible in the turbine building.

Based on data accumulated from 1970 to 1974 by the National Fire Protection Association (NFPA), 92 percent of all fires reported in sprinklered buildings were controlled by 20 sprinkler heads or less.

Therefore if an event, such as an exposure-type fire, were to occur from a transient fire load on floor elevations under the turbine operating floor, there is a high probability that the sprinkler system would control and suppress the fire before it reached a temperature magnitude that could cause structural deformation to turbine building steel.

Turbine building elevations 565'-0", 585'-0", and 603'-0" are sprinklered (see Appendix 1, Dwgs. A1 through A6 for sprinklered areas). The three sprinkler systems protecting the turbine building are preaction-type systems.

Each of the systems' piping is sized hydraulically in accordance with the requirements of NFPA 13. During non-fire or normal conditions the system piping is dry and is supervised by air. Should a sprinkler head be fused or the system piping damaged, the loss of supervisory air pressure will affect a pressure switch. This system condition sounds a local trouble alarm and, concurrently, this system condition is alarmed and annunciated in the control room. The preaction deluge control valves will not trip (activate) on a loss of supervisory air pressure.

Each preaction deluge control valve is actuated by its own thermal detection and actuation circuit. The rate-compensated type heat detectors are installed in accordance with the requirements of NFPA 72E and the manufacturer's recommended installation instructions. These detectors also activate a local, audible fire alarm.

During emergency fire conditions the heat generated by the fire condition will be sensed by the rate-compensated thermal detectors. Once the thermal set point of the rate-compensated thermal detector is reached the circuit is completed and the system control panel activates the preaction deluge system control valve. The activation of this valve will admit water into the sprinkler system piping. If the temperature continues to increase the fusible link will drop out of the affected sprinkler head, thus, allowing water to be sprayed directly on the fire by the affected sprinkler head(s).

The sprinkler systems incorporated in the turbine building design provide a density of 0.3 gpm per sq. ft. of floor area for any (including the most remote 3,000-sq. ft.) area and, at the same time, provide essentially a density of 0.2 gpm per sq. ft. for any 10,000-sq. ft. of floor area under the turbine operating floor.

Manual, backup fire fighting is distributed throughout the turbine building in the form of portable CO_2 and multipurpose dry chemical fire extinguishers and hose rack stations (see Dwgs. A4 through A7 in Appendix 1 for manual fire suppression equipment locations).

Each hose rack station is equipped with 75 feet of 1 1/2-inch rubber covered fire hose, with an adjustable nozzle. Adjacent to each hose rack station is a separate 2 1/2-inch hose connection for fire department use.

The main turbine bearings including the exciter bearings are protected by a manual deluge water spray system.

Additionally, the turbine building has smoke and heat vents installed in the roof which are equipped with 165 F fusible links. When the turbine building ceiling temperature exceeds 165 F, the vents open automatically assuring the release of smoke and heat with a resultant decrease in ceiling temperatures making the collapse of the turbine building roof unlikely.

4

The turbine building has a finite free expansion capability before it could possibly impose forces on the adjoining auxiliary building wall. Since the fire is assumed transient, the resulting combination of expansion and possible failures could result in adverse effects on the auxiliary building. We, therefore, will perform a detailed analysis of the various combinations and provide the necessary fire protection via fire proofing for those structural members that could pose a potential problem. The analysis and resulting protection will be such that structural collapse in the turbine building will not be sufficient enough to cause damage to the auxiliary building. This evaluation will be completed by February 28, 1979. 4

37. General Design Criterion 19 requires that control room be provided to control operation of the reactor during normal conditions and to maintain it in a safe condition under accident conditions. The criterion also requires remote capability (outside of the control room) for prompt hot shutdown and the potential capability for subsequent cold shutdown of the reactor.

From our site visit it was not clear how the Davis Besse design satisfies GDC 19 in the event of fire. Therefore, we require that complete descriptions for safely shutting down the reactor be provided as follows:

(a) 1. Safely shutting down the reactor from the main control room when fire disables any safe shutdown equipment controlled from remote locations.

2. Safely shutting down the reactor from remote locations when the main control room is uninhabitable and when fire disables safe shutdown equipment controlled from the main control room or the cable spreading room.

(b) These descriptions should include:

1. A list of all instrumentation and controls required by and which will be available to the operator to safely shutdown the plant from the main control room.

2. A list of all instrumentation, controls and communications equipment required by and available to the operators to safely shutdown the plant from locations that are remote from the control room. Also identify the location of each instrument, each control components and the communications equipment available to the operators for remote safe shutdown of the plant.

3. The design provisions made to preclude a fire at any location from preventing safe shutdown of the plant.

4. Procedures to achieve hot shutdown and also to achieve cold shutdown for each case of item A above.

RESPONSE

As discussed in Section 5 of the Fire Hazard Analysis Report, each fire area of the unit has been evaluated to determine the affects of a fire on the ability to achieve cold shutdown. The evaluation criteria utilized is discussed in Section 2, Evaluation Criteria. As noted in Section 3, Method of Evaluation, where it cannot be shown as a result of this in-depth evaluation that the unit can be shut down, given a fire in the area, then modifications have been proposed to decrease the probability of such a fire occurring.

Table A5-1 in Appendix 5 lists the components, including instrumentation and controls, utilized for achieving cold shutdown. Alternate equipment is listed should the primary equipment not be available due to the fire. The location of the major primary and alternate equipment is also provided in the table. This information was utilized in the Section 5 evaluation of shutdown capability and it will be utilized in developing procedural modifications. Alternate actions will be identified by room. Addenda to the existing procedures will be developed to define these alternate actions. These procedures addressing hot shutdown will be available for I & E Region III inspection by February 28, 1979. Preparation and implementation of the remaining procedures for cold shutdown will continue, with all expected to be completed by October 30, 1979. 4

The location of communications equipment is not finalized at this time. However, communications equipment will be available where required based on the evaluation of Section 5 and the specific needs as defined by the procedures.

The design provisions that preclude a fire from preventing shutdown are already discussed in Section 5. Each fire area of the unit is discussed, including reference to a description of fire barriers, the fire propagation control features for fire containment, fire detection, and fire suppression.

2. Mr. Vassallo's letter of August 29, 1977 on fire protection provides supplemental guidance on QA. Modify your submittal contained in Revision 1 to the Fire Hazard Analysis Report for the Davis Besse Station to be responsive to the latest supplemental guidance on QA for fire protection or provide an alternative for the Staff's evaluation. We note that if the fire protection QA program criteria are met as part of the QA program (Chapter 17 of FSAR) which meets Appendix B to 10 CFR 50, it is not necessary to submit a detailed description for NRC review.

SUPPLEMENTAL QUESTION #2

Confirm that your fire protection administrative controls procedures follow the NRC staff supplemental guidelines (Vassallo letter dated August 29, 1977) for:

a) Fire Brigade Training
b) Control of Combustibles
c) Control of Ignition Sources
d) Fire Fighting Procedures

RESPONSE

Table 4-1 (Sheets 4 and 10) of the Davis-Besse Nuclear Power Station Fire Hazard Analysis Report has been revised to address the NRC (Vassallo) 8-29-77 letter. 4

Revision 4