ASEP
PLANT SURVEY
and
INITIAL PLANT GROUPING
LETTER REPORT
VOLUME 1: MAIN REPORT

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1.0 INTRODUCTION

LWR reactors were surveyed and categorized into groups with similar characteristics. These groups were developed to simplify the ASEP LWR modeling and quantification efforts and to provide consistency in level of detail. Modeling will be done at a "train" level of detail incorporating important sub-train characteristics. The LWR plants that were considered in the analysis and the percentage of each containment type that were surveyed are shown in Tables 1 and 2.

2.0 Development of Plant System Schematics

The first step of the survey was the development of plant system schematics. A general set of rules and assumptions (shown on Table 3) was established to guide the development of the schematics. It needs to be stressed that these rules were strictly a guide and not adhered to in every case; deviation where necessary was performed. P&IDs and system descriptions (when available) were the major source utilized in the drawing of the system schematics. However, before the system schematics could be developed it was necessary to identify, first, the dominant sequences (and their initiating events) to be analyzed and then, second, those systems that were driving the sequences. The dominant sequences were identified from the results and conclusions of the ASEP Interim Reassessment Report and are as follows:

BWR	PWR
TQUV - Transient with Loss of Core Cooling	TML(U) - Transient with Loss of Core Cooling
TW - Transient with Loss of Containment Heat Removal	TMQ-D - Transient with Stuck Open Relief and Loss of Core Cooling
ATWS*	TMLB' - Transient with Loss of Core Core Cooling and Loss of Containment Heat Removal
	ATWS*
	S_2D - Small LOCA with Loss of Core Cooling

*The ATWS sequences are to be handled separately from the other dominant sequences in that they will be discussed in detail qualitatively in the final report and will not have their mitigating systems (such as SLC for BWRs or RPS) developed, modeled in fault trees or quantified.

The mitigating systems relevant for these sequences were identified in the ASEP Catalog of PRA Dominant Accident Sequence Information. For PWRs, the systems surveyed were the HPIS, AFWS, EP and SW. The service water systems that were examined were the DG cooling and pump-motor/room cooling for HPIS and AFWS. For BWRs, the systems surveyed were HPCS/HPCI, RCIC, LPCS, LPCI, RHR (Suppression Pool Cooling), EP and SW. The service water systems that were examined were: 1) DG and RHR HX cooling; 2) room cooling for all the front line systems (HPCS/HPCI, RCIC, LPCS and RHR); and 3) pump-motor cooling for HPCS, LPCS and RHR. See Appendices G and H for the plant system schematics.

3.0 Development of System Composites

Once the system schematics were drawn for each plant, the schematics were examined for "like" characteristics in order to group the plant systems into composites. If a system for a plant with a certain containment type resembled the same system of another plant with a different containment type the plants were grouped in the same system composite. Also, in grouping the system schematics, each system was considered independent of other plant systems. Therefore, the plants represented by a composite for one system are not necessarily the same group of plants represented by a composite for another system.

In determining the initial front line system composites, the success criteria was the first consideration. For example, AFWS schematics were initially grouped by the number of steam generators (SGs). (It was assumed that plants with four SGs and plants with either two or three SGs required two or one SGs, respectively, for successful operation). These groups were then further divided by their basic "train" configurations and any unique quality such as system commonalities. Finally, by inspection or by "back of the envelope" calculations, the system unavailability for each of these groups was determined at this "train" level. Assuming an order of magnitude difference did not exist between the unavailability of these system groups, the groups were again combined. The most conservative schematic was then chosen to represent the group.

Figures 1 through 27 and Tables 4 through 12 present summaries for all the LWR front line systems surveyed. These figures and tables describe the differences between each composite of a system. The figures show the initial major grouping of the system schematics highlighting the subtle differences that further broke down the group into the final composites. The tables, one for each system, summarize both the initial major grouping and the final composites. These descriptions are only for the composite and not for the individual plants that fit into each composite. The major characteristics of the suction side, number and types of pumps, and the discharge side of the fluid flow paths are given for each composite in the summary. The plants that fit into each composite are listed at the bottom. The electric power and service water composite for each plant is also listed. The plant whose schematic is used to represent the composite is denoted by an asterisk. Appendices A and B contain the composites for the BWR and PWR front line systems, respectively.

The service water plant schematics were developed in the same manner as those for the front line systems. However, the survey revealed that where service water was concerned each plant is unique; therefore, there was not any plant grouping into composites for service water. It's dependencies, such as electric power and any unique characteristics are shown on the "composite". Tables 13 and 14 describe all the SW composites, BWR and PWR respectively. It can be noticed on these two tables that some plants have more than one SW composite. This is because many of the plants have more than one service system to cool the loads that require cooling water. Appendices C and D contain all the service water composites for BWR and PWR plants, respectively.

Electric power, since it is not a fluid system, was analyzed differently. The number of emergency diesel generators, the number of electrical "divisions" or "buses", the number of diesels required for each "division/bus" and the load distributions on each "division/bus" are the items of interest for the electric power portions of the survey. The diesel generator division configuration grouped nicely. However, the division load distributions were for the most part unique. Table 15 gives all the electric power configurations being considered for the plants modeled. In this table, the plants are grouped according to the number of electrical divisions (or buses) and how many emergency diesel

generators support each division (or bus). Solid lines from the DGs to the bus means that the DG is normally aligned to that bus. A dotted line means that the DG can swing from the bus it is normally aligned to the other bus. The DG automatically aligns itself to the bus that receives an actuation signal. Appendices E and F contain all the electric power composites for BWR and PWR plants, respectively.

Tables 16 through 21 lists for each plant modeled, by containment type, their applicable system composites. Also included in this table are the service water and electric power dependencies for each front line system (e.g, the appropriate SW composite that performs that function is given).

4.0 DEVELOPMENT OF INITIAL PLANT GROUPS

Once the plant system schematics and the system composites were finished, the "initial plant groups" were developed. This grouping effort identified which composites of one system could be combined with the composites of another system to represent realistic sequences (e.g., a HPCS composite which represents a system unique to BWR 5/6s cannot be combined with the RHR-5 composite when analyzing the loss of decay heat removal sequence, because the RHR-5 composite does not represent any RHR systems from BWR 5 or 6 reactors). To obtain the "initial plant groups", electric power composites were considered but the service water composites were not. This was done because none of the service water systems could be grouped into composites (i.e, as many SW composites as plants). There would therefore be at least as many "initial plant groups" as plants being considered. The "initial plant groups" for BWRs and PWRs are shown in Tables 22 and 23, respectively, along with their appropriate plants and SW composites.

5.0 ACRONYMS, ABBREVIATIONS AND SYMBOLS

5.1 ACRONYMS AND ABBREVIATIONS

AC	-	Alternating Current
AFW, AFWS	-	Auxiliary Feedwater System
ANO	-	Arkansas Nuclear One
AOV	-	Air Operated Valve
APRS	-	Automatic Pressure Relief System
ASEP	-	Accident Sequence Evaluation Program
ASP	-	Accident Sequence Precursor
ATWS	-	Anticipated Transient Without Scram
BCL	-	Battelle Columbus Laboratories
B&W	-	Babcock & Wilcox
BWR	-	Boiling Water Reactor
CE	-	Combustion Engineering
CM	-	Common Mode
CST	-	Condensate Storage Tank
DC	-	Direct Current
DG	-	Diesel Generator
EP	-	Electric Power
EPAC	-	Electric Power AC
EPDC	-	Electric Power DC
FC	-	Fail Closed
FO	-	Fail Open
HPCI	-	High Pressure Coolant Injection
HPCS	-	High Pressure Core Spray
HPI, HPIS	-	High Pressure Injection System
HW	-	Hardware
HX	-	Heat Exchanger
INPO	-	Institute of Nuclear Power Operations
LOCA	-	Loss of Coolant Accident
LOSP	-	Loss of Offsite Power
LPCI	-	Low Pressure Coolant Injection

LPCS	-	Low Pressure Core Spray
LWR	-	Light Water Reactor
NC	-	Normally Closed
NO	-	Normally Open
NRC	-	Nuclear Regulatory Commission
MOV	-	Motor Operated Valve
PCS	-	Power Conversion System
PCT	-	Percent
PL&G	-	Pickard, Lowe, and Garrick
PORV	-	Pressure Operated Relief Valve
PRA	-	Probabilistic Risk Assessment
PWR	-	Pressurized Water Reactor
RCIC	-	Reactor Core Isolation Cooling
RHR	-	Residual Heat Removal
RX	-	Reactor
SARP	-	Severe Accident Research Program
SASA	-	Severe Accident Sequence Analysis
SCG	-	Senior Consultant Group
S_2D	-	Small LOCA with Loss of Core Cooling
SEP	-	SET Evaluation Program
SETS	-	Set Equation Transformation System
SG	-	Steam Generator
SLC	-	Standby Liquid Control
SNL	-	Sandia National Laboratories
SOV	-	Solenoid Operated Valve
SRV	-	Safety Relief Valve
SV	-	Safety Valve
SW, SWS	-	Service Water
TAC/DC	-	Transient without AC/DC
TLOOP	-	Transient with Loss of Offsite Power
T&M	-	Test and Maintenance
TMI	-	Three Mile Island
TMLB'	-	Transient with Loss of Core Cooling and Loss of Containment Heat Removal

TML(U)	-	Transient with Loss of Core Cooling
TMQ-D	-	Transient with Stuck Open Relief Valve and Loss of Core Cooling
TQUV	-	Transient with Loss of Core Cooling
TW	-	Transient with Loss of Containment Heat Removal
VSS	-	Vapor Suppression System
W	-	Westinghouse

5.2 SYMBOLS

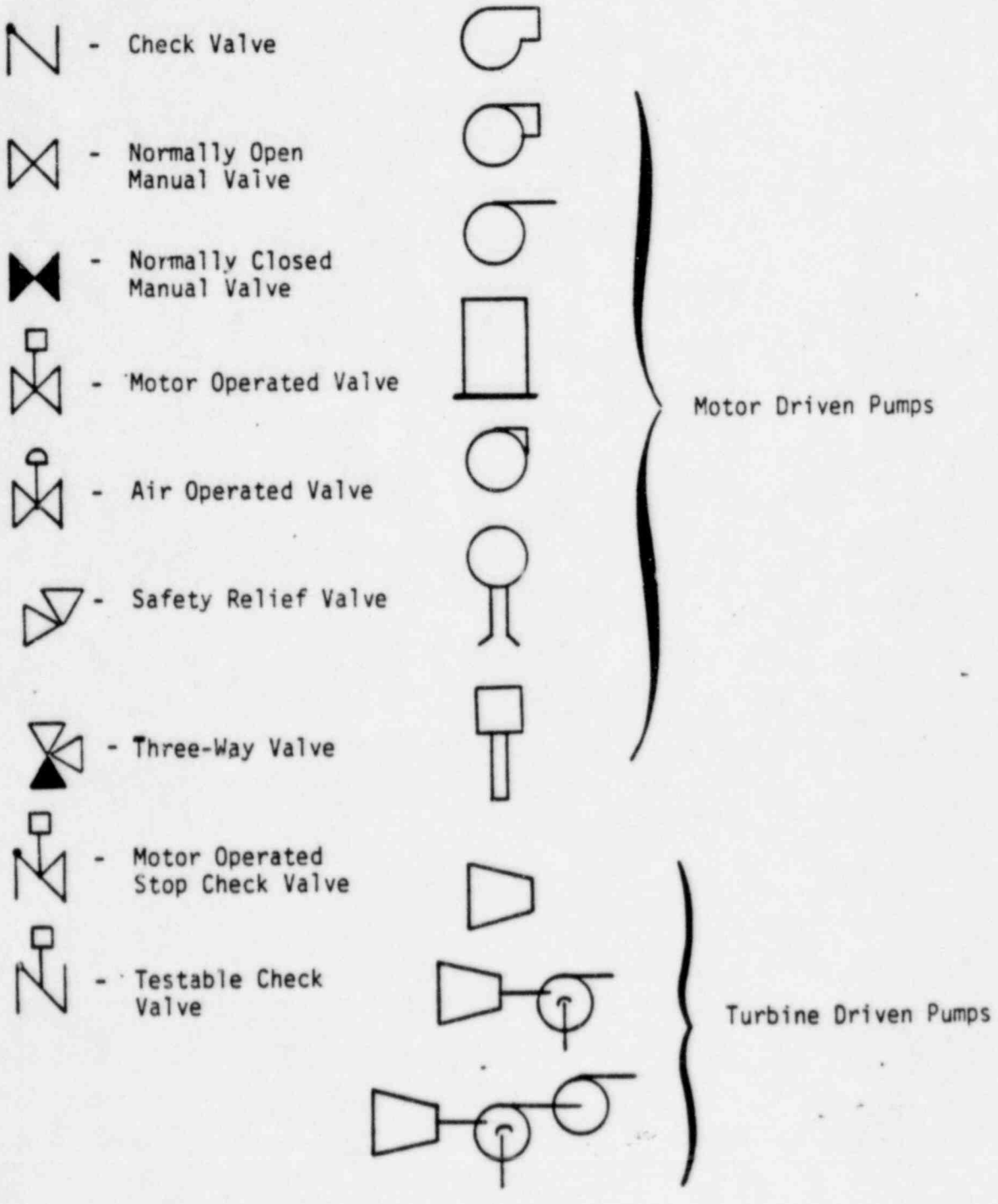

- Check Valve
- Normally Open Manual Valve
- Normally Closed Manual Valve
- Motor Operated Valve
- Air Operated Valve
- Safety Relief Valve
- Three-Way Valve
- Motor Operated Stop Check Valve
- Testable Check Valve
Motor Driven Pumps
Turbine Driven Pumps

Table 1. LWR Plants Modeled and Not Modeled

PWR PLANTS

PLANT	NSSS VENDOR	STATUS
ATMOSPHERIC CONTAINMENTS		
TYPE 1:		
Haddam Neck	W	Not Modeled
Indian Point 2&3	W	Not Modeled
Maine Yankee	CE	Modeled
Salem 1&2	W	Not Modeled
Comanche Peak 1&2	W	Modeled
Diablo Canyon 1&2	W	Modeled
Harris 1,2,3&4	W	Modeled
Seabrook 1&2	W	Modeled
WNP-1&4	B&W	Modeled
Davis Besse 1,2,&3	B&W	Modeled
Kewaunee	W	Not Modeled
Prairie Island 1&2	W	Modeled
St. Lucie 1&2	CE	Modeled
WNP-3&5	CE	Modeled
Waterford 3	CE	Modeled
Indian Point 1	B&W	Not Modeled
San Onofre 1	W	Not Modeled
Yankee Rowe	W	Not Modeled
Cherokee 1&2	CE	Not Modeled
Yellow Creek 1&2	CE	Not Modeled
TYPE 2:		
Ginna	W	Not Modeled
Robinson 2	W	Modeled
TYPE 3:		
Fort Calhoun	CE	Modeled
TYPE 4:		
Trojan	W	Modeled
Calloway 1&2	W	Modeled
Greenwood 2&3	B&W	Not Modeled
Palo Verde 1,2&3	CE	Not Modeled
Pebble Springs 1&2	B&W	Not Modeled
South Texas 1&2	W	Modeled
Sterling	W	Not Modeled
Summer	W	Modeled
Vogtle 1&2	W	Not Modeled
Wolf Creek	W	Modeled

PLANT	NSSS VENDOR	STATUS
ATMOSPHERIC CONTAINMENTS		
TYPE 5:		
ANO-1	B&W	Modeled
ANO-2	CE	Not Modeled
Farley 1&2	W	Modeled
Millstone 2	CE	Modeled
Rancho Seco	B&W	Not Modeled
Braidwood 1&2	W	Modeled
Byron 1&2	W	Modeled
Marble Hill 1&2	W	Modeled
Midland 1&2	B&W	Modeled
San Onofre 2&3	CE	Modeled
TYPE 6:		
Bellefonte 1&2	B&W	Modeled
TYPE 7:		
Calvert Cliffs 1&2	CE	Modeled
Crystal River 3	B&W	Modeled
Oconee 1,2&3	B&W	Modeled
Palisades	CE	Not Modeled
Point Beach 1&2	W	Not Modeled
TMI 1	B&W	Modeled
Turkey Point 3&4	W	Not Modeled
Zion 1&2	W	Modeled
ICE CONDENSER CONTAINMENTS:		
Catawba 1&2	W	Modeled
McGuire 1&2	W	Not Modeled
Offshore Power	W	Not Modeled
Sequoyah 1&2	W	Modeled
Watts Bar 1&2	W	Modeled
Cook 1&2	W	Modeled
SUBATMOSPHERIC CONTAINMENTS:		
Beaver Valley 1&2	W	Modeled
Millstone 3	W	Modeled
North Anna 1&2	W	Modeled
Surry 1&2	W	Modeled

TYPE 1: Performed Bar, Reinforced Concrete Cylinder, Hemispherical Dome, Flat Base, Steel Liner.

TYPE 2: Concrete Vertical Cylinder w/Prestressed Vertical Reinforcement, Deformed Bar, Reinforced Concrete Hemispherical Dome and Flat Base. Complete Steel-lined Structure.

TYPE 3 - 7: Prestressed Post-Tensioned Concrete Vertical Cylinder Dome, Deformed Bar Reinforced Flat Base, Steel Liner.

TYPE 3: No Buttresses, Shallow Dome.

TYPE 4: Three Buttresses, Hemispherical Dome.

TYPE 5: Three Buttresses, Shallow Dome.

TYPE 6: Four Buttresses, Shallow Dome.

TYPE 7: Six Buttresses, Shallow Dome.

BWR PLANTS

PLANT	BWR TYPE	STATUS
MARK I CONTAINMENTS:		
Pilgrim 1	3	Not Modeled
Oyster Creek	2	Not Modeled
Nine Mile Point 1	2	Not Modeled
Millstone 1*	3	Not Modeled
Peachbottom 2&3	4	Modeled
Fitzpatrick	4	Modeled
Hope Creek 1&2	4	Modeled
Vermont Yankee	4	Not Modeled
Dresden 2&3*	3	Not Modeled
Quad Cities 1&2	3	Modeled
Fermi 2	4	Not Modeled
Duane Arnold	4	Not Modeled
Cooper	4	Modeled
Monticello	3	Modeled
Edwin Hatch 1&2	4	Modeled
Browns Ferry 1,2,&3	4	Modeled
Brunswick 1&2	4	Modeled

PLANT	BWR TYPE	STATUS
MARK II CONTAINMENTS:		
Nine Mile Point 2	5	Modeled
Susquehanna 1&2	4	Not Modeled
Limerick 1&2	4	Modeled
Zimmer 1	5	Not Modeled
La Salle 1&2	5	Modeled
WNP-2	5	Modeled
Shoreham	4	Modeled
MARK III CONTAINMENTS:		
Clinton 1&2	6	Modeled
Grand Gulf 1&2	6	Modeled
Skagit-Hanford**	6	Not Modeled
Perry 1&2	6	Modeled
River Bend 1&2	6	Modeled
Hartsville 1,2,3&4**	6	Not Modeled
Phipps Bend 1&2**	6	Not Modeled

*These are early the BWR 3 reactors with isolation condensers.

**These plants have been indefinitely postponed.

Table 2. Percent of LWR Plants Modeled per Containment Type and Reactor

BWR PLANTS

BWR TYPE	MARK I PLANTS			MARK II PLANTS			MARK III PLANTS		
	TOTAL NO/ OF PLANTS	PLANTS MODELED NUMBER	PLANTS MODELED PERCENT	TOTAL NO/ OF PLANTS	PLANTS MODELED NUMBER	PLANTS MODELED PERCENT	TOTAL NO/ OF PLANTS	PLANTS MODELED NUMBER	PLANTS MODELED PERCENT
BWR 2	0	0	0%	-	-	-	-	-	-
BWR 3	5*	2*	40%*	-	-	-	-	-	-
BWR 4	10	6	60%	3	2	67%	-	-	-
BWR 3/4	15	8	53%	-	-	-	-	-	-
BWR 5	-	-	-	4	3	75%	-	-	-
BWR 4/5	-	-	-	7	5	71%	-	-	-
BWR 6	-	-	-	-	-	-	7**	4**	57%**

*These BWR 3s include the isolation condenser plants, without these total plants is two which both are modeled.
**Three of these BWR 6s have been indefinitely postponed; without these total plants is four which all are modeled.

PWR PLANTS

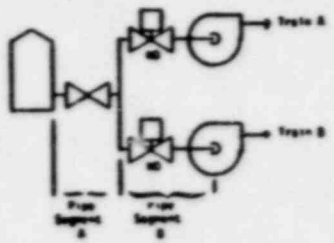
NSSS VENDOR	LARGE DRY ATMOSPHERIC																						SUBATMOSPHERIC			ICE CONDENSER		
	TYPE 1			TYPE 2			TYPE 3			TYPE 4			TYPE 5			TYPE 6			TYPE 7			TOTAL PLANTS	TOTAL MODELED		TOTAL PLANTS	TOTAL MODELED	
	TOTAL PLANTS	MODELED NO.	MODELED PCT	TOTAL PLANTS	MODELED NO.	MODELED PCT	TOTAL PLANTS	MODELED NO.	MODELED PCT	TOTAL PLANTS	MODELED NO.	MODELED PCT	TOTAL PLANTS	MODELED NO.	MODELED PCT	TOTAL PLANTS	MODELED NO.	MODELED PCT	TOTAL PLANTS	MODELED NO.	MODELED PCT		NO.	PCT		NO.	PCT
W	11	5	45%	2	1	50%	-	-	-	7	5	71%	4	4	100%	-	-	-	3	1	33%	4	4	100%	6	5	83%
BW	3	2	67%	-	-	-	-	-	-	2	0	0%	3	2	67%	1	1	100%	3	3	100%	-	-	-	-	-	-
CE	6	4	67%	-	-	-	1	1	100%	1	0	0%	3	2	67%	-	-	-	2	1	50%	-	-	-	-	-	-
ALL	20	11	55%	2	1	50%	1	1	100%	10	5	50%	10	8	80%	1	1	100%	8	5	63%	4	4	100%	6	5	83%

Table 3. Survey Guidelines and Assumptions

1. Show all major components, regardless of state (pumps, heat exchangers, operated valves, etc.)

2. Show any manual and/or check valve in a pipe segment if it is a possible common component and there is not any operated valve in that pipe segment.

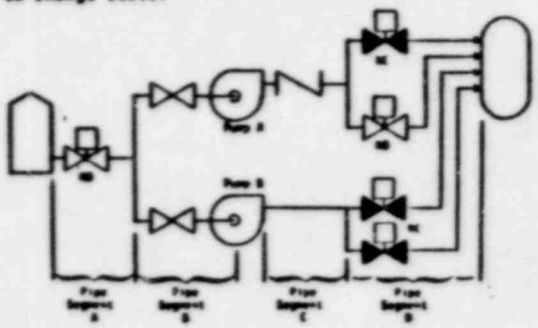
   Example:



   Pipe segment A is a common suction line for the lines of pipe segment B; therefore, any manual/check valves are shown in pipe segment A.

3. Show any manual and/or check valve in a pipe segment that does not have any active valves if:
   (1) the pipe segment lies in between the suction and the pump and there is a pathway in which not any of the operated valves need to change state, or
   (2) the pipe segment lies in between the pump and the discharge and there is a pathway in which not any of the operated valves need to change state.

   Example:



   From the tank (suction) to either pump A or B, there is a NO valve: therefore, in pipe segment B (where there are not any operated valves), all manual/check valves will be shown.

   From Pump A to the reactor (discharge), there are two pathways. One pathway has a NC valve in pipe segment D, but the second pathway has a NO valve in pipe segment D; therefore, pipe segment C will show all manual/check valves.

   From pump B to the reactor (discharge), both pathways of pipe segment D have a NC valve; therefore, pipe segment C does not need to show any manual/check valves.

4. Show all cross-ties lines if line size is of a comparable size. A line is not of a comparable size if it is less than half the size of of the main line. For example, if the main line is a 16" line, a cross-tie of 6" would not be shown.

5. Show all diverting lines if:
   (1) it is of a comparable size (see rule 4 for definition), and
   (2) there is time; i.e., not lengthly searching is required.

6. Do not show miscellaneous lines if they are not of a comparable line size. Example, a 4" recirculation line off a 10" line would not be shown.

7. Put on drawing--support needs and which components need them.

7A. (Analagous steps used for electric systems). Note: Other support systems. besides electric power and service water (Actuation, instrument air, HVAC are eg's.) will be treated as <u>simple</u> train probabilities of failure and a common mode probability of failure without further detailed analysis (values will come from past PRAs)

Table 4. RCIC Composite Summary

Reactor Core Isolation Cooling

- Single turbine driven pump train
- Suction from either CST or suppression pool
- Single injection path to reactor

RCIC-1	RCIC-2	RCIC-3	RCIC-4
• One CST	• One CST • Common suction with HPCI/HPCS	• Two CST • Common suction with HPCI/HPCS • Common diversion both with HPCI/HPCS	• Two CST

PLANTS	EP	SW
1. La Salle 1&2*	8	12
2. Clinton 1&2	1	1
3. Perry 1&2	1	2,3
4. River Bend 1	1	5
5. Nine Mile 2	1	11
6. Hatch 1&2	8	22

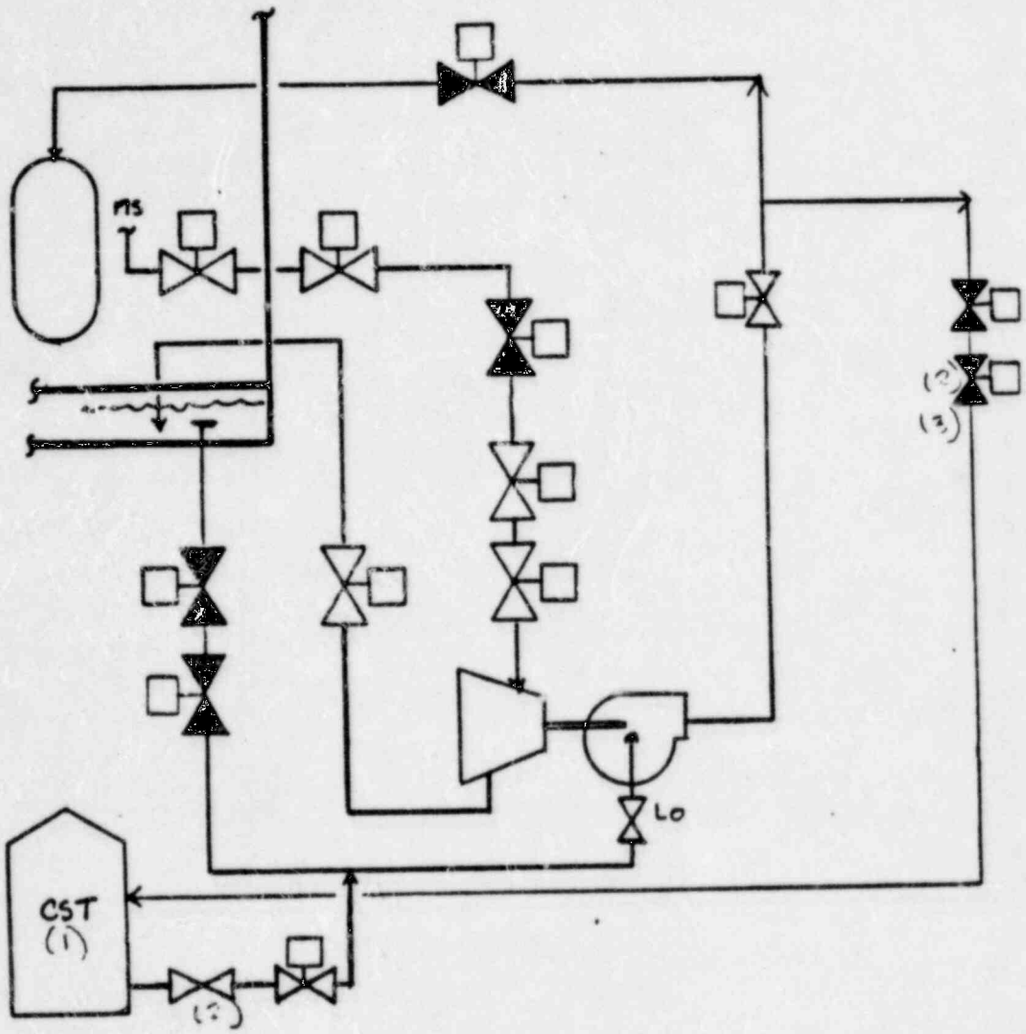
PLANTS	EP	SW
1. Brunswick 1&2*	4	4
2. Shoreham	1	**
3. Quad Cities 1&2	3	25
4. Peach Bottom 2&3	7	14
5. Hope Creek 1&2	2	6,17
6. Browns Ferry 1&2	4	23
7. Browns Ferry 3	4	23
8. Grand Gulf 1&2	1	1
9. Limerick 1&2	2	6

PLANTS	EP	SW
1. Cooper *		8,19
2. Monticello	6	20
3. WNP-2	1	13

PLANTS	EP	SW
1. Fitzpatrick	5	26

*Plant indicated by asterisk represents composite.
**Not required.

Figure 1. RCIC Major Group



APPLICABLE COMPOSITES	COMMENTS
RCIC-1 RCIC-2 RCIC-3 RCIC-4	(1) Cooper, Monticello, WNP and Fitzpatrick have two CSTs in which both provide suction to the pump and discharge (2) These valves are common with ones noted on on HPCI-1 for Shoreham, Quad Cities, Brunswick, Peach Bottom, Browns Ferry; on HPCI-2 for Limerick, Hope Creek; on HPCI-4 for Cooper, Monticello (3) This valve is the same one as noted on HPCI-5 for Fitzpatrick

Table 5. HPCI Composite Summary

High Pressure Coolant Injection

- Single turbine drive pump train
- Suction from either CST or suppression pool
- Single injection path to reactor

HPCI-1	HPCI-2	HPCI-3	HPCI-4	HPCI-5
• One CST • Common suction with RCIC • Common diversion path with RCIC	• One CST • Common suction with RCIC • Common diversion path with RCIC • Common injection path with LPCS	• One CST	• Two CST • Common suction with RCIC • Common diversion path with RCIC	• Two CST • Common diversion path with RCIC

PLANTS	EP	SW
1. Shoreham	1	**
2. Quad Cities 1&2	3	25
3. Brunswick 1&2	4	4
4. Peach Bottom 2&3	7	14
5. Browns Ferry 1&2*	4	23
6. Browns Ferry 3	4	23

PLANTS	EP	SW
1. Limerick 1&2	2	6
2. Hope Creek 1&2 *	2	6,1

PLANTS	EP	SW
1. Hatch 1&2	8	22

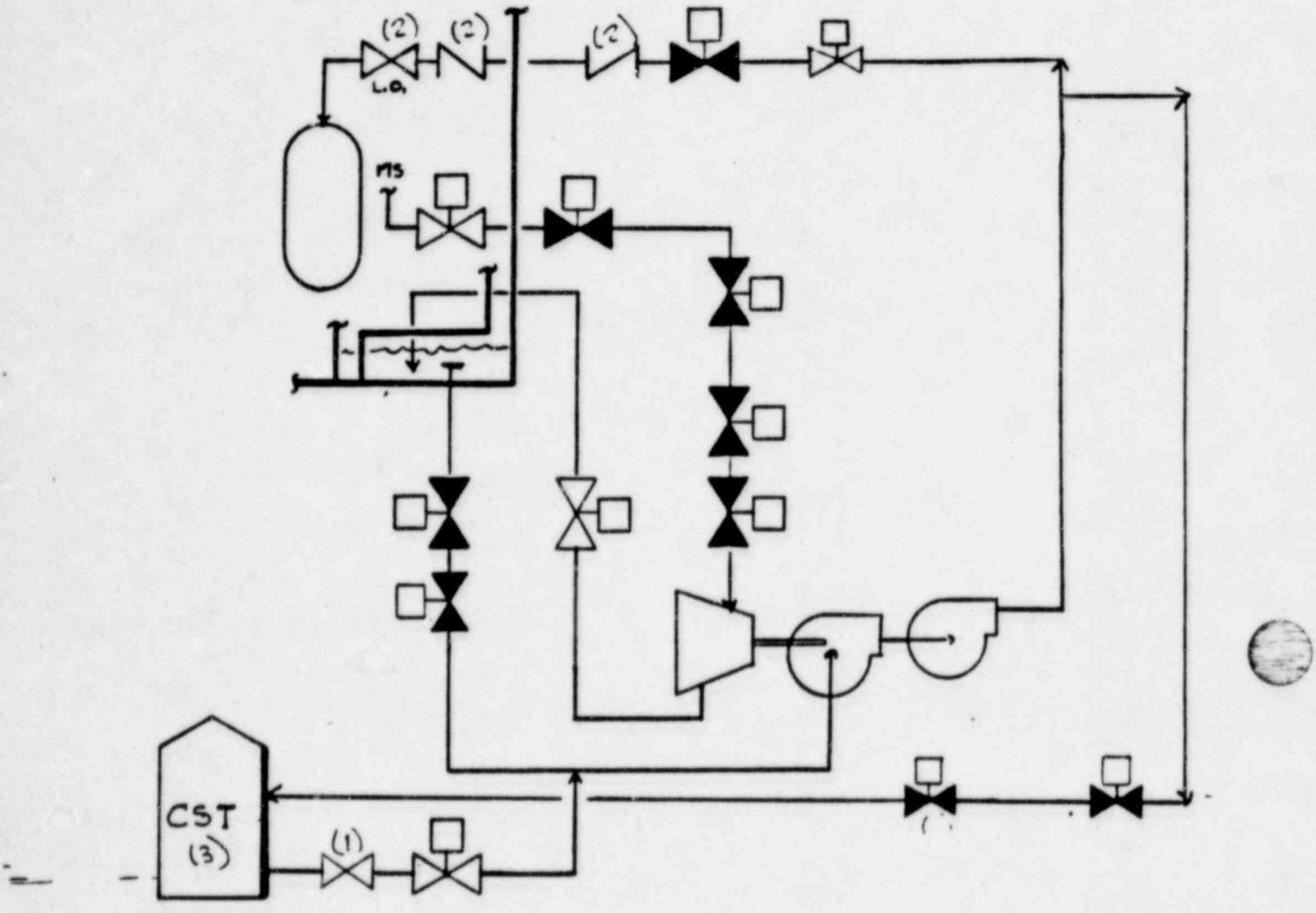
PLANTS	EP	SW
1. Cooper	6	8,1
2. Monticello*	6	20

PLANTS	EP	SW
1. Fitzpatrick	5	26

*Plant indicated by asterisk represents composite.

**Not required.

Figure 2. HPCI Major Group



APPLICABLE COMPOSITES	COMMENTS
HPCI-1 HPCI-2 HPCI-3 HPCI-4 HPCI-5	(1) Valves noted are common to valves noted on RCIC-2 for Limerick and Hope Creek (HPCI-1) and on RCIC-3 for Cooper and Monticello (HPCI-4) (2) Valves noted are common to valves noted on LPCS-3 for Limerick and Hope Creek (HPCI-4) (3) Cooper and Monticello and Fitzpatrick have two CST and they both provide suction to the pump.

Table 7. LPCS Composite Summary

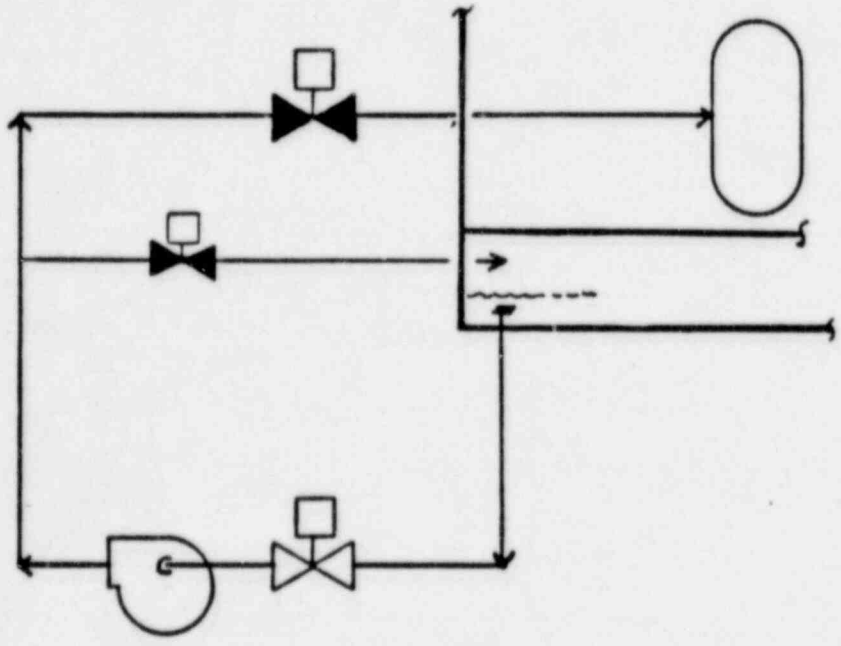
Low Pressure Core Spray-A(1)	Low Pressure Core Spray-B(2)	Low Pressure Core Spray - C
• Single motor driven train • Suction from suppression pool • Single injection path to reactor	• Two trains, single motor driven pump per train • Separate suction from suppression pool per train • Single injection path to reactor per train	• Two trains, two motor driven pumps per train • Single injection path to reactor per train • Suction from suppression pool

LPCS-3	LPCS-4	LPCS-5
• Separate suction per pump of each train • Common injection path with HPCI	• Separate suction per pump of each train	• Common suction for pumps of each train

PLANTS	EP	SW	PLANTS	EP	SW	PLANTS	EP	SW	PLANTS	EP	SW	PLANTS	EP	SW
1. Grand Gulf 1&2 *	1	1	1. Shoreham*	1	9,10	1. Limerick 1&2*	2	6	1. Peach Bottom 2&3	7	14	1. Browns Ferry 1&2*	4	23
2. Clinton 1&2	1	1	2. Monticello	6	20	2. Hope Creek 1&2	2	16,1				2. Browns Ferry 3	4	23
3. Perry 1&2	1	2,3	3. Cooper		18,1									
4. River Bend 1	1	5	4. Hatch 1&2	8	22									
5. Nine Mile 2	1	11	5. Quad Cities 1&2	3	25									
6. La Salle 1&2	8	12	6. Brunswick 1&2	4	4									
7. WNP-2	1	13	7. Fitzpatrick	5	26									

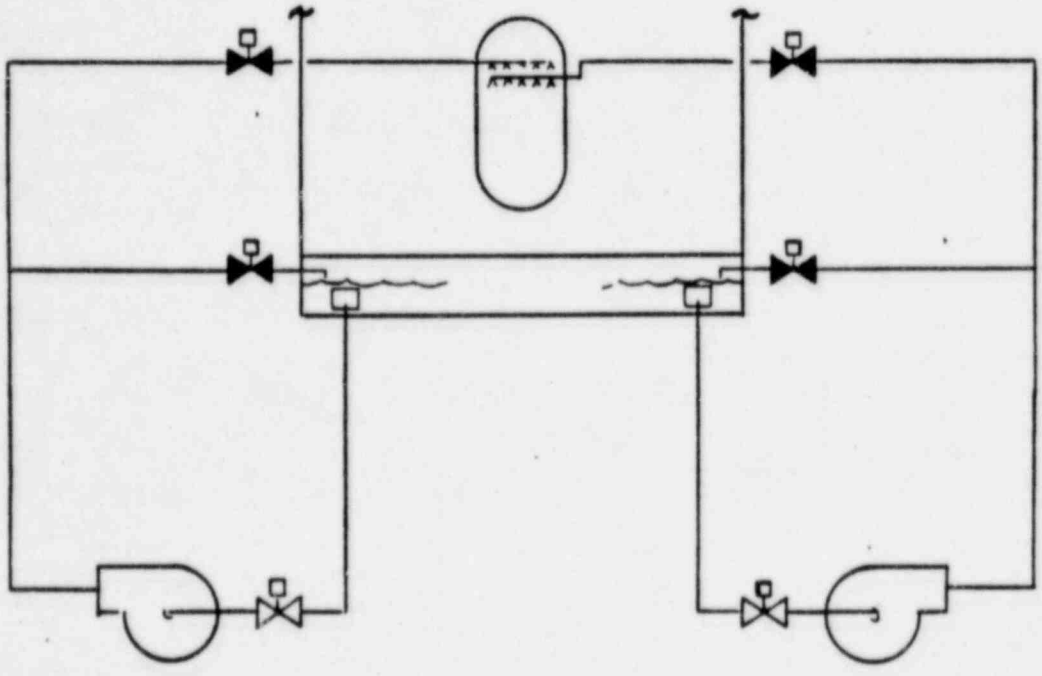
*Plant indicated by asterisk represents composite.

Figure 4. LPCS Major Group A



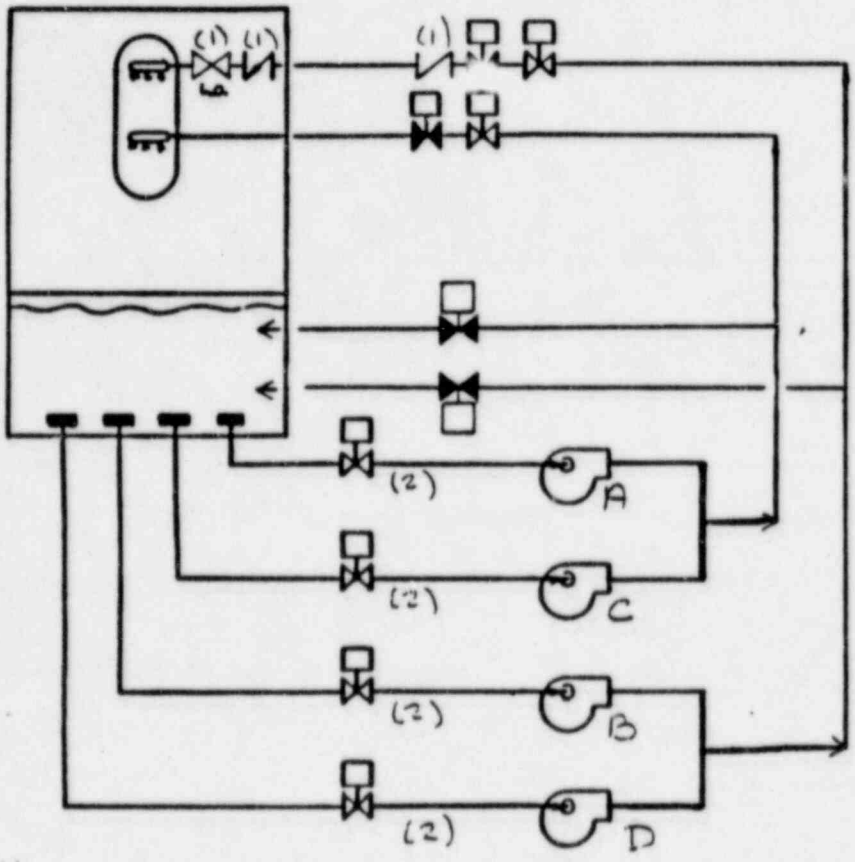
APPLICABLE COMPOSITES	COMMENTS
LPCS - 1	— —

Figure 5. LPCS Major Group B



APPLICABLE COMPOSITES	COMMENTS
LPCS-2	— —

Figure 6. LPCS Major Group C



APPLICABLE COMPOSITES	COMMENTS
LPCS - 3 LPCS - 4 LPCS - 5	(1) These values are common to ones as noted on HPCI - 2 composite for Limerick and Hope Creek. (2) Browns Ferry has a common suction for pumps A/C and for pumps B/D.

Table 8. LPCI Composite Summary

Low Pressure Coolant Injection - A	Low Pressure Coolant Injection - B
• Three trains, single motor driven pump per train	• Four motor driven pumps
• Separate suction from suppression pool per pump	• Suction from suppression pool
• Two injection trains to reactor, one pump per train	**LPCI-2** • Two injection trains to reactor, two pumps per train • Separate suction for each pump (four separate suction paths)
	LPCI-3 • Two injection trains to reactor, two pumps per train • Separate suction for each pump (four separate suction paths)
	LPCI-4 • Four injection trains to reactor, one pump per train • Common suction between two pumps (two suction paths)
	LPCI-5 • Two injection trains to reactor, two pumps per train • Common suction between two pumps (two suction paths) • Loop selection logic (cross-tie between trains)

PLANTS	EP	SW
1. Grand Gulf 1&2 *	1	1
2. Clinton 1&2	1	1
3. Perry 1&2	1	2,3
4. River Bend 1	1	5
5. La Salle 1&2	8	12
6. Nine Mile 2	1	11
7. WNP-2	1	13

PLANTS	EP	SW
1. Shoreham *	1	8,9
2. Hatch 1&2	8	22
3. Cooper	6	18,1
4. Peach Bottom 2&3	7	

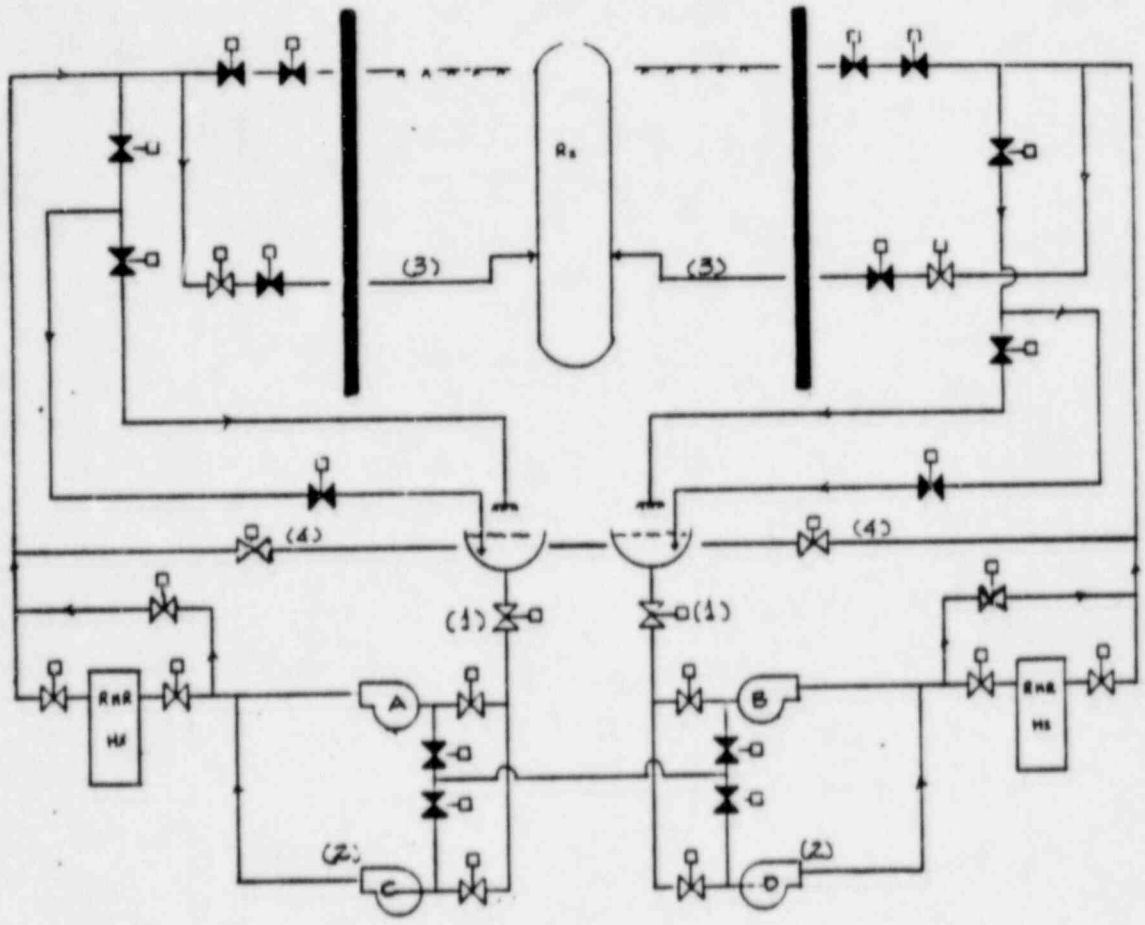
PLANTS	EP	SW
1. Limerick 1&2 *	2	6
2. Hope Creek 1&2	2	16,1

PLANTS	EP	SW
1. Brunswick 1&2*	4	4
2. Fitzpatrick	5	26
3. Browns Ferry 1&2	4	23

PLANTS	EP	SW
1. Quad Cities 1&2*	3	25
2. Monticello	6	20
3. Browns Ferry 3	4	23

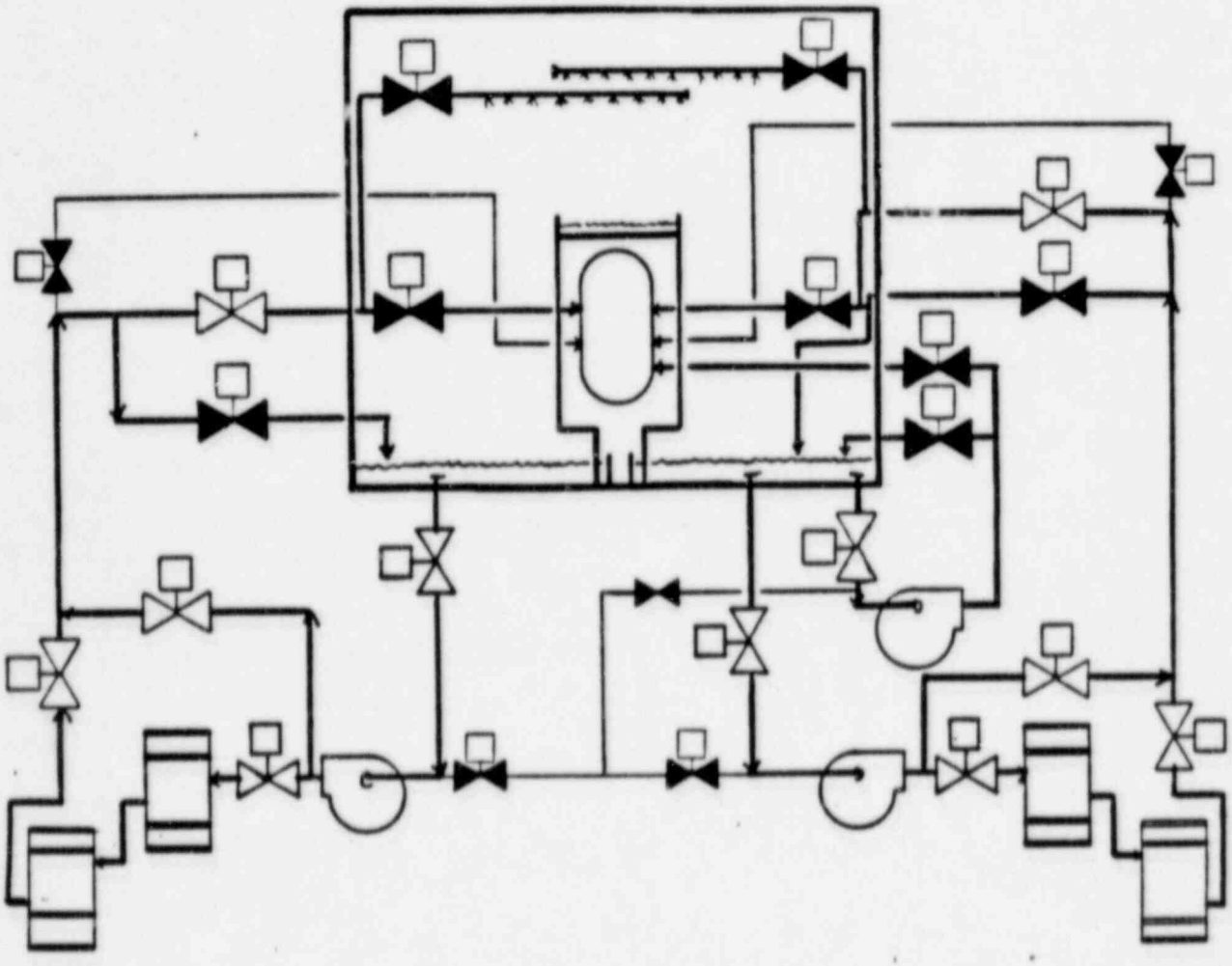
*Plant indicated by asterisk represents composite.

Figure 7. LPCI Major Group A



APPLICABLE COMPOSITES	COMMENTS
LPCI-2 LPCI-3 LPCI-4 LPCI-5	(1) LPCI-2 AND LPCI-3 HAVE SEPARATE SUCTION FOR EACH PUMP. (2) IN LPCI-3, PUMPS C & D INJECT DIRECTLY TO REACTOR AND NOT THROUGH HX. (3) LPCI-2 HAS THREE INJECTION PATHS PER LOOP; TWO VIA PUMPS A & C EACH AND ONE VIA PUMPS C & D. (4) CROSS TIE ONLY APPLICABLE FOR LPCI-6.

Figure 8. LPCI Major Group B



APPLICABLE COMPOSITES	COMMENTS
LPCI - 1	— —

Table 9. RHR Composite Summary

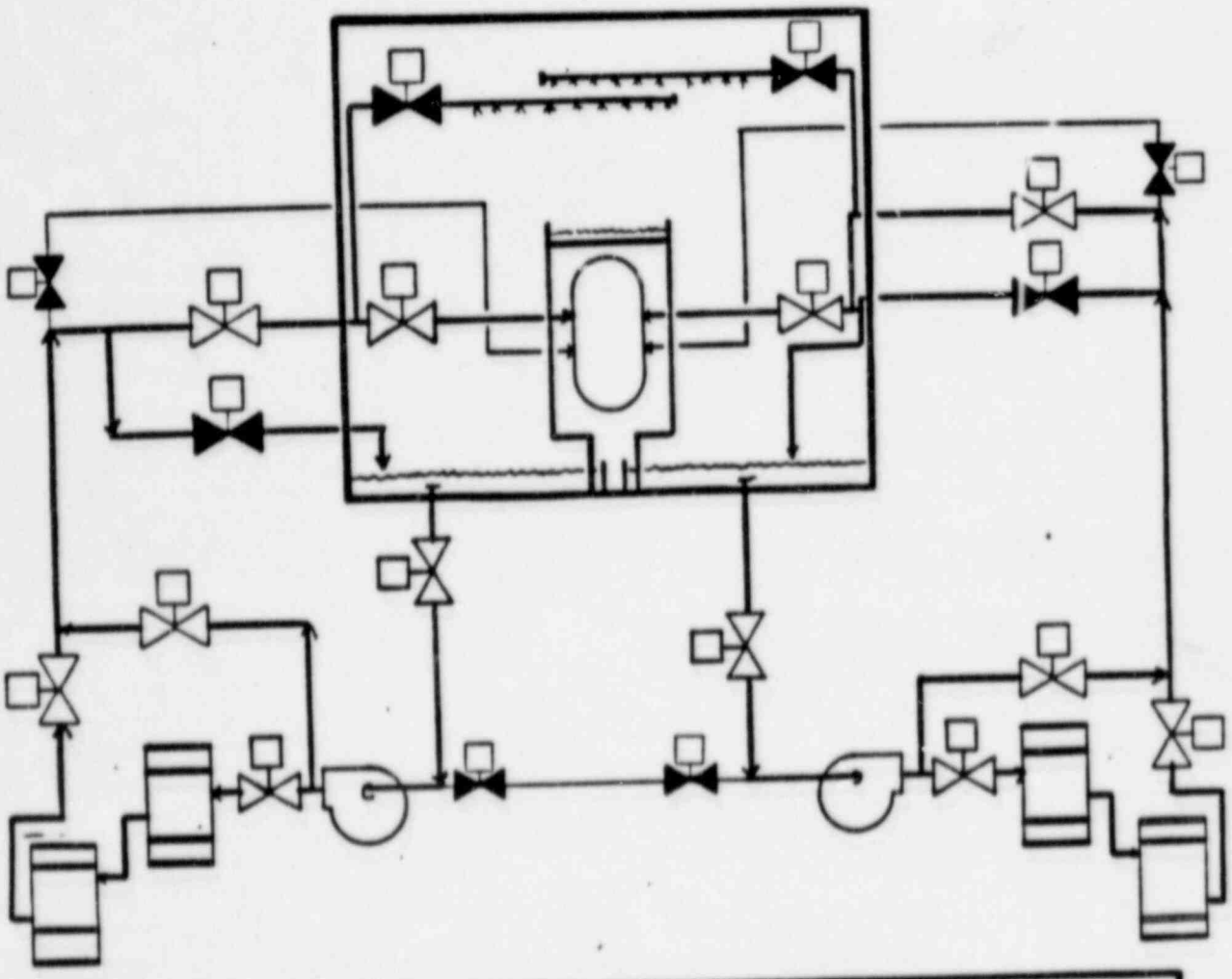
RHR - A (1)	Residual Heat Removal - B	Residual Heat Removal - C
• Two trains, one motor driven pump per train • Two injection trains to reactor or suppression pool, one pump per train • Single Hx per train	• Two trains, two motor driven pumps (in parallel) per train • Suction from suppression pool • Single Hx per train	• Two trains, two motor driven pumps (in parallel) per train • Suction from suppression pool • Two Hxs (in parallel) per train

RHRS-2	RHRS-3	RHRS-4	RHRS-5	RHRS-6	RHRS-7
• Separate suction for each pump (four separate suction paths) • Two injection trains to reactor or suppression pool, two pumps per train	• Common suction between two pumps (two suction paths) • Two injection trains to reactor or suppression pool, two pumps per train	• Common suction between two pumps (two suction paths) • Two injection trains to reactor or suppression pool, two pumps per train • Loop selection logic (cross-tie between trains)	• Common suction between two pumps (two suction paths) • Two injection trains to reactor or suppression pool, two pumps per train	• Common suction between two pumps (two suction paths) • Two injection trains to reactor or suppression pool, two pumps per train • Loop selection logic (cross-tie between trains)	• Separate suction for each pump (four separate suction paths) • Two injection trains to reactor or suppression pool, two pumps per train

PLANTS	EP	SW	PLANTS	EP	SW	PLANTS	EP	SW	PLANTS	EP	SW	PLANTS	EP	SW	PLANTS	EP	SW
1. Grand Gulf 1&2*	1	1	1. Shoreham*	1	9,9,10	1. Brunswick 1&2*	4	4	1. Quad Cities 1&2	3	4,2*	1. Browns Ferry 1&2	4	23	1. Browns Ferry 3	4	23	1. Peach Bottom 2&3	7	14
2. Clinton 1&2	1	1	2. Hatch 1&2	8	22	2. Fitzpatrick	5	26, 27	2. Monticello*	6	20									
3. Perry 1&2	1	2,3	3. Cooper		9,1*															
4. River Bend 1	1	5																		
5. La Salle 1&2	8	12																		
6. Nine Mile 2	1	11																		
7. WNP-2	1	13																		
8. Limerick 1&2	2	6																		
9. Hope Creek 1&2	2	16,1																		

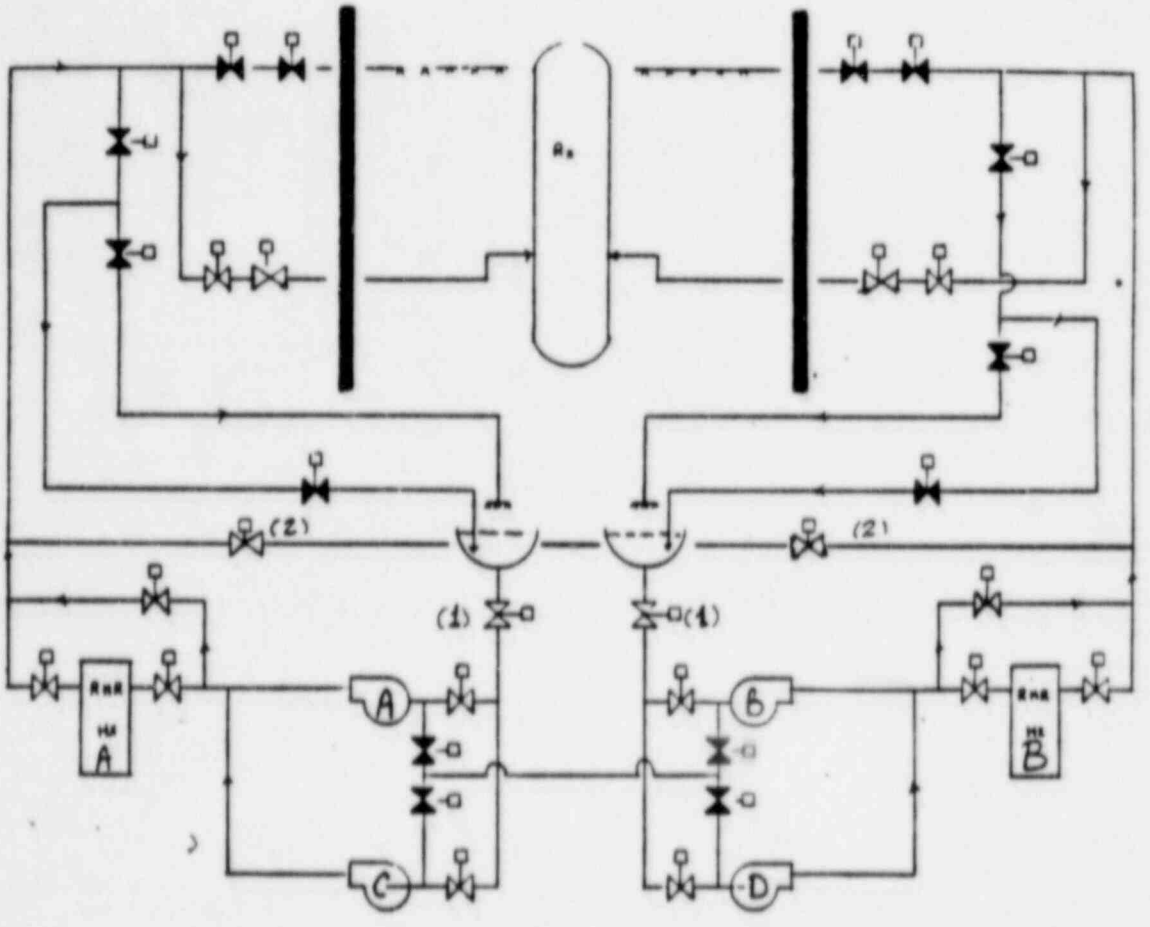
*Plant indicated by asterisk represents composite.

Figure 9. RHRS Major Group A



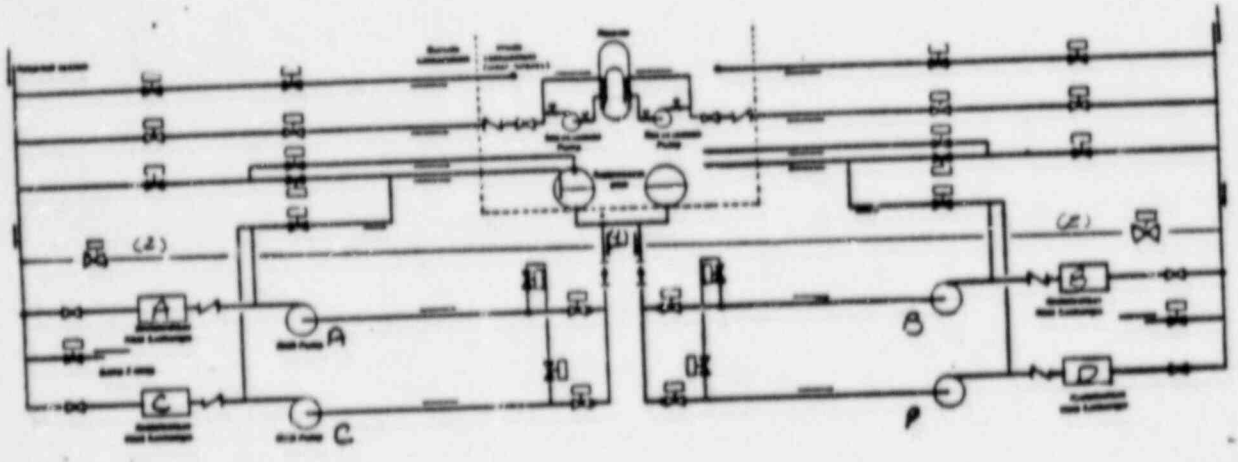
APPLICABLE COMPOSITES	COMMENTS
RHRS-1	— —

Figure 10. RHRS Major Group B



APPLICABLE COMPOSITES	COMMENTS
RHRS-2 RHRS-3 RHRS-4	(1) RHRS-2 HAS SEPARATE SUCTION FOR EACH PUMP (2) CROSS TIE APPLICABLE FOR RHRS-4 ONLY

Figure 11. RHRS Major Group C



APPLICABLE COMPOSITES	COMMENTS
RHRS-5 RHRS-6 RHRS-7	(1) RHRS-7 HAS A SEPARATE SUCTION FOR EACH PUMP. (2) CROSS TIE APPLICABLE FOR RHRS-6 ONLY.

Table 10. AFWS Composite Summary

Auxiliary Feedwater System - A

- Three steam generators
- Three pumps: two motor and one turbine
- Discharge from any pump to any steam generator

AFWS-1			AFWS-5			AFW-10		
• Common suction for all three pumps • Normally closed discharge valves			• Separate suction for each pump • Normally open discharge valves			• Common suction for motor driven pumps • Separate suction for turbine pump • Normally open discharge valves		
PLANTS	CP	SW	PLANTS	CP	SW	PLANTS	CP	SW
1. V.C. Summer 2. Robinson 2 3. Maine Yankee* 4. Shearon Harris 1,2,3&4	1 4 3 4	— 51 — —	1. Beaver Valley* 1&2 2. North Anna 1&2 3. Surry 1&2	4 4 3	— — —	1. Farley 1&2	3	11

Auxiliary Feedwater System - B

- Four steam generators
- Three pumps: two motor and one turbine
- Turbine driven pump discharges to any steam generator

AFWS-2			AFWS-6			AFWS-7			AFW-12		
• Common suction for motor driven pumps • Separate suction for turbine pump • Each motor driven pump discharges to two steam generators • Normally open discharge valves			• Common suction for all three pumps • Each motor driven pump discharges to two steam generators • Normally closed discharge valves			• Common suction for all three pumps • Each motor driven pump discharges to two steam generators • Normally closed discharge valves			• Common suction for all three pumps • Normally open discharge valves • Two motor driven pumps discharge to any steam generator		
PLANTS	CP	SW	PLANTS	CP	SW	PLANTS	CP	SW	PLANTS	CP	SW
1. Comanche Peak 1&2	6	—	1. Sequoyah 1&2* 2. Watts Bar 1&2 3. Calloway 1&2 4. Wolf Creek	6 6 6 6	— — 27 27	1. Millstone 3 2. Diablo Canyon* 1&2 3. Catawba 1&2 4. Cook 1&2	6 8 6 6	— — — —	1. Zion 1&2	3	4

Auxiliary Feedwater System - C

- Four steam generators
- Two pumps
- Discharge from any pump to any steam generator
- Normally open discharge valves

AFWS-3			AFW-10			AFW-20		
• Separate suction for either pump • One motor and one turbine pump			• Common suction for both pumps • Two diesel and one turbine pump			• Common suction for both pumps • Two diesel and one motor pump		
PLANTS	CP	SW	PLANTS	CP	SW	PLANTS	CP	SW
1. Seabrook 1&2	4	—	1. Trojan	6	31	1. Byron 1&2 2. Braidwood 1&2* 3. Marble Hill 1&2	6 6 6	39 35 36

Auxiliary Feedwater System - D

- Two steam generators
- Two pumps

AFWS-8			AFWS-9			AFWS-14		
• Common suction for both pumps • Two turbine pumps • One normally closed discharge valve to each steam generator			• Common suction for both pumps • One motor and one turbine pump • Two normally closed discharge valves to each steam generator			• Separate suction for either pump • One motor and one turbine pump • Discharge from any pump to any steam generator • One normally closed discharge valve to each steam generator		
PLANTS	CP	SW	PLANTS	CP	SW	PLANTS	CP	SW
1. Davis Besse 1,2&3	6	—	1. Fort Calhoun 1* 2. Prairie Island 1&2 3. Calvert Cliffs 1&2 4. Crystal River 3 5. ANO-2	6 6 3 6 6	— — — — —	1. Midland 1&2	6	19

Auxiliary Feedwater System - E

- Two steam generators
- Three pumps: two motor and one turbine
- Turbine pump discharges to any steam generator

AFWS-4			AFW-11			AFW-13			AFWS-17			AFW-20		
• Common suction for motor driven pumps • Separate suction for turbine pump • Each motor driven pump discharges to one steam generator • Normally closed discharge valve			• Tee suction for all three pumps • Discharge from any motor driven pump to any steam generator • Normally closed discharge valve			• Common suction for all three pumps • Discharge from any motor driven pump to any steam generator • Normally open discharge valve			• Separate suction for each pump • Each motor driven pump discharges to one steam generator • Normally closed discharge valve			• Dual suction for all three pumps • Each motor driven pump discharges to one steam generator • Normally closed discharge valve		
PLANTS	CP	SW	PLANTS	CP	SW	PLANTS	CP	SW	PLANTS	CP	SW	PLANTS	CP	SW
1. St. Lucie 1* 2. St. Lucie 2 3. Ft. St. Vrain	6 6 6	— — —	1. Waterford 3* 2. TMI-1 3. Millstone 2	6 6 6	8,16 — 11,17	1. Bellefonte 1&2	6	72	1. San Onofre 2&3	6	—	1. Oconee 1&2* 2. Oconee 3	10 10	9 10

Aux. FW System - F(SD)

- Two steam generators
- Four pumps: two turbine and two motor driven
- Common suction for each pair of turbine and motor driven pumps
- Discharge from any pump to any steam generator
- Normally closed discharge valves

PLANTS	CP	SW
1. WNP 3&5	4	—

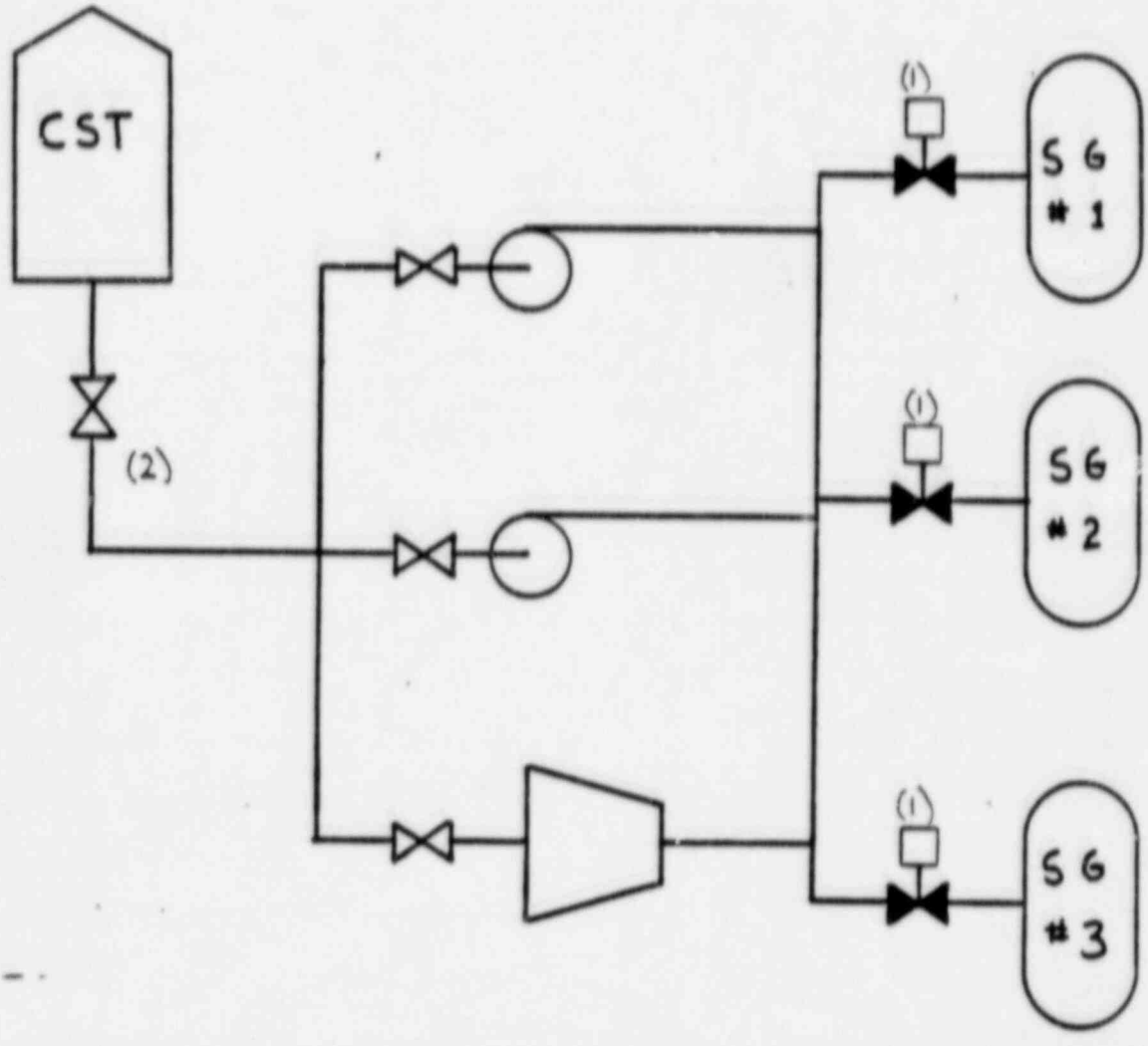
Aux. FW System - G (CE)

- Four steam generators
- Four pumps: three motor driven and one turbine
- Separate suction for each pump
- Discharge from turbine pump to any steam generator
- Discharge from one motor driven pump to one steam generator
- Normally closed discharge valve from turbine pump
- Normally open discharge valves from motor driven pumps

PLANTS	CP	SW
1. South Texas 1&2	3	—

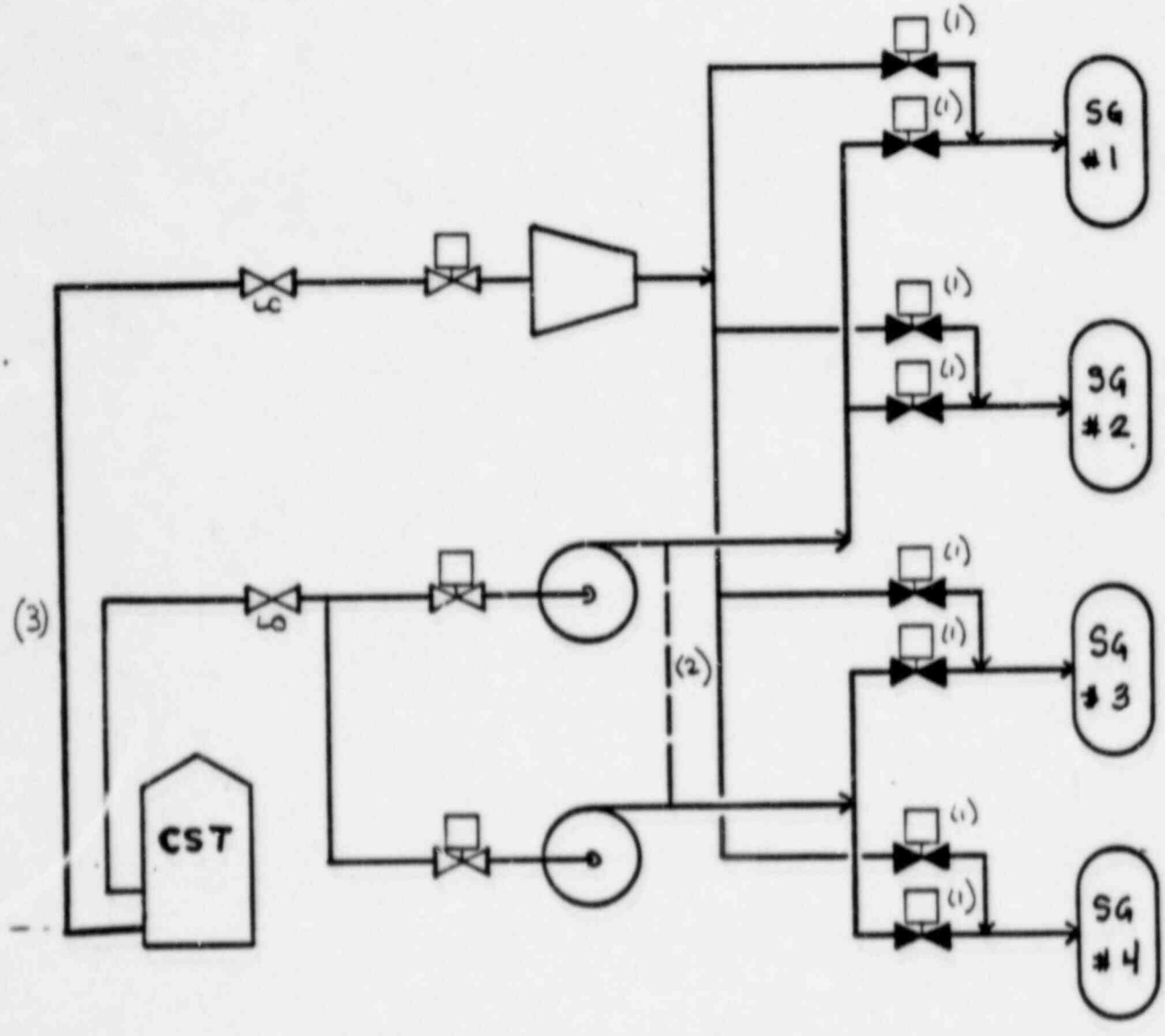
*Plant indicated by asterisk represents composite.

Figure 12. AFWS Major Group A



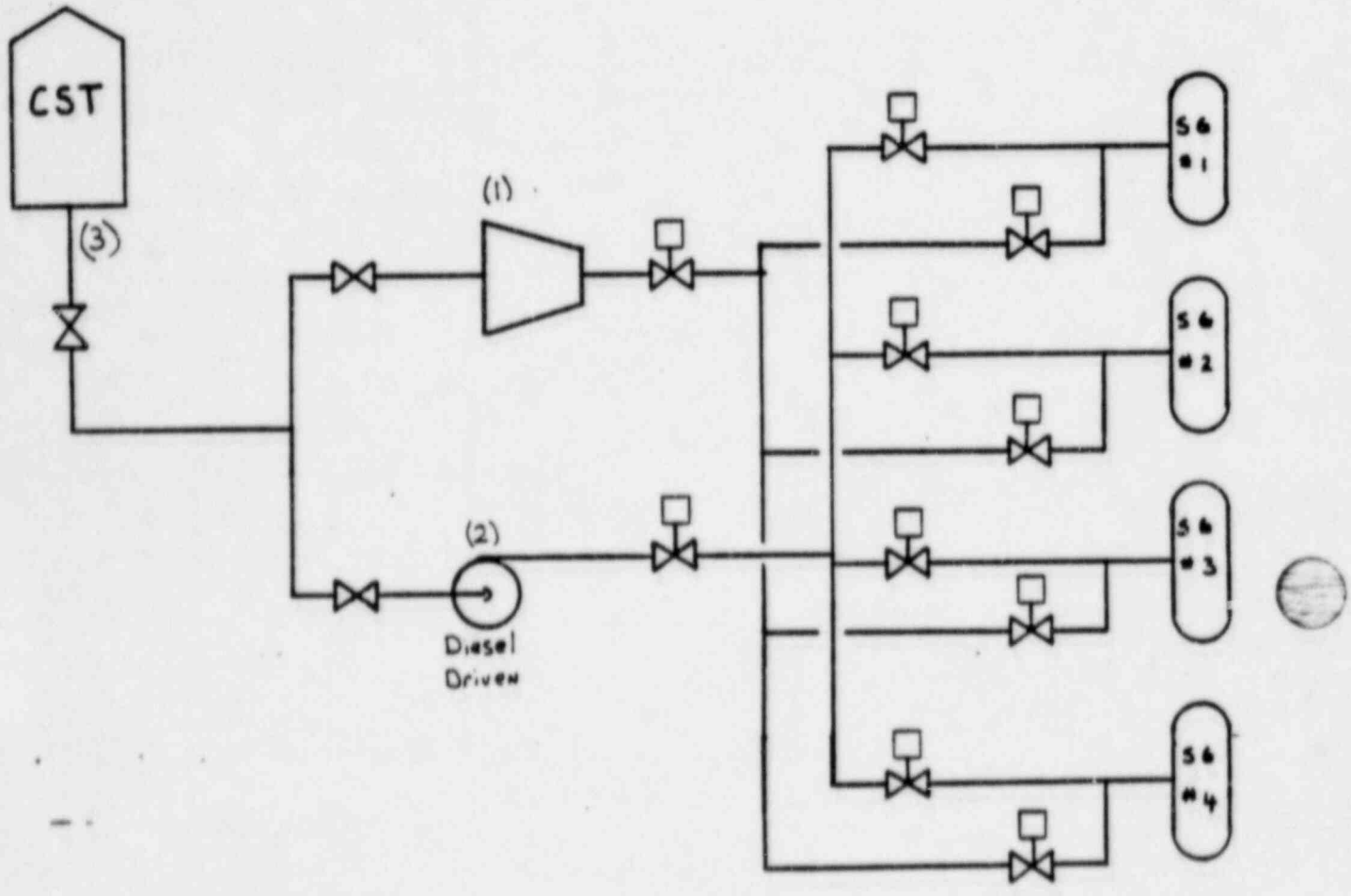
APPLICABLE COMPOSITES	COMMENTS
AFWS-1 AFWS-5 AFW-15	(1) These valves are normally open for AFWS-5 and AFW-15. (2) Separate suction from CST per pump for AFWS-5 Common suction for motor driven pumps and separate suction for turbine pump for AFW-15

Figure 13. AFWS Major Group B



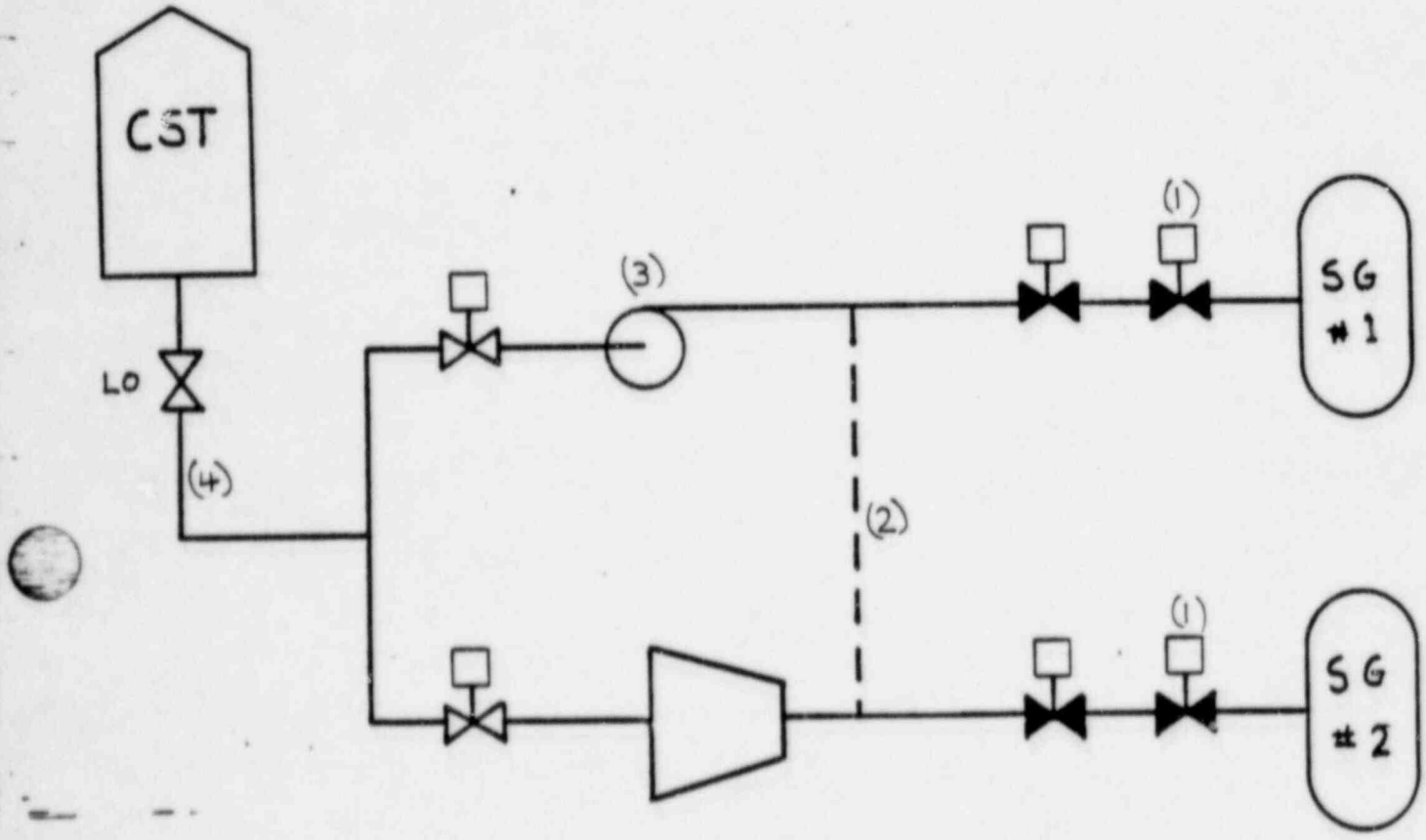
APPLICABLE COMPOSITES	COMMENTS
AFWS-2 AFWS-6 AFWS-7 AFW-18	(1) These valves are normally open for AFWS-2 and AFW-18 composites. (2) Cross-tie only applicable for AFW-18 composite. (3) Common suction from CST to all three pumps for AFWS-6, AFWS-7 and AFW-18.

Figure 14. AFWS Major Group D



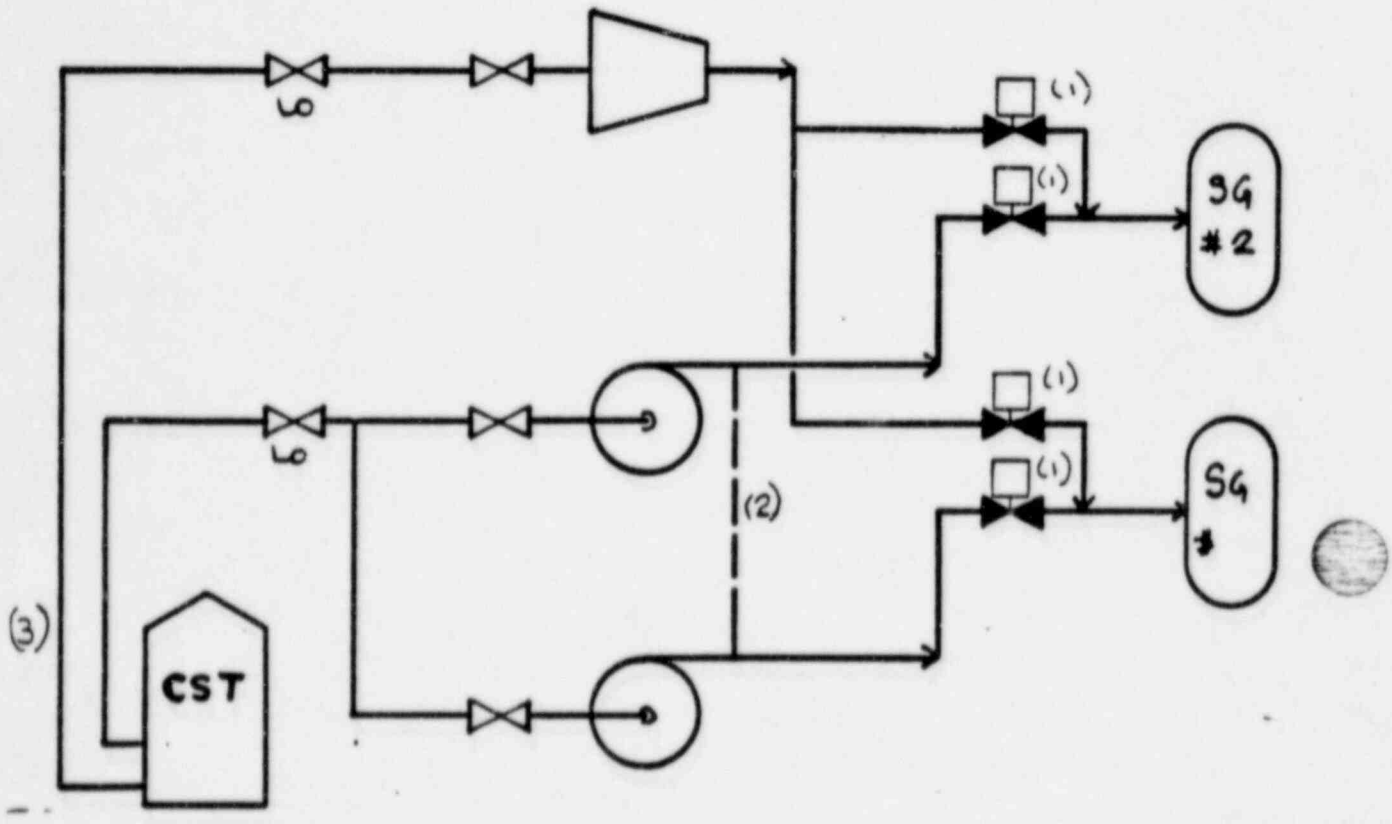
APPLICABLE COMPOSITES	COMMENTS
AFWS-3 AFW-16 AFW-19	(1) Motor driven pump for AFW-19 (2) Motor driven pump for AFWS-3 (3) Separate suction from CST per pump for AFWS-3

Figure 15. AFWS Major Group D



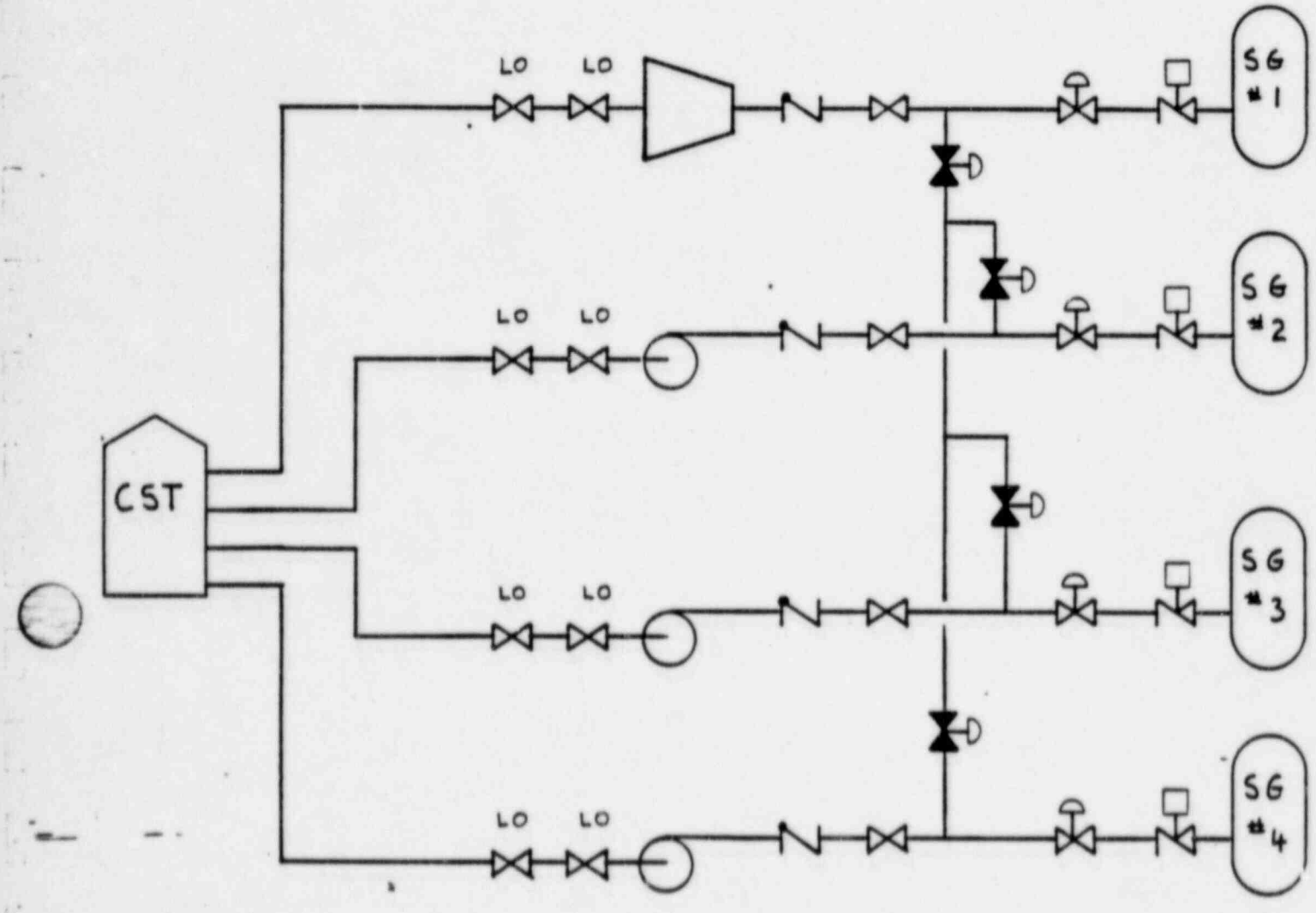
APPLICABLE COMPOSITES	COMMENTS
AFWS-8 AFWS-9 AFW-14	(1) These valves are normally open for AFWS-8 and AFW-14. (2) This crosstie is for AFWS-9 and AFW-14. (3) This pump is turbine driven for AFWS-8. (4) Separate suction from CST per pump for AFW-14.

Figure 16. AFWS Major Group E



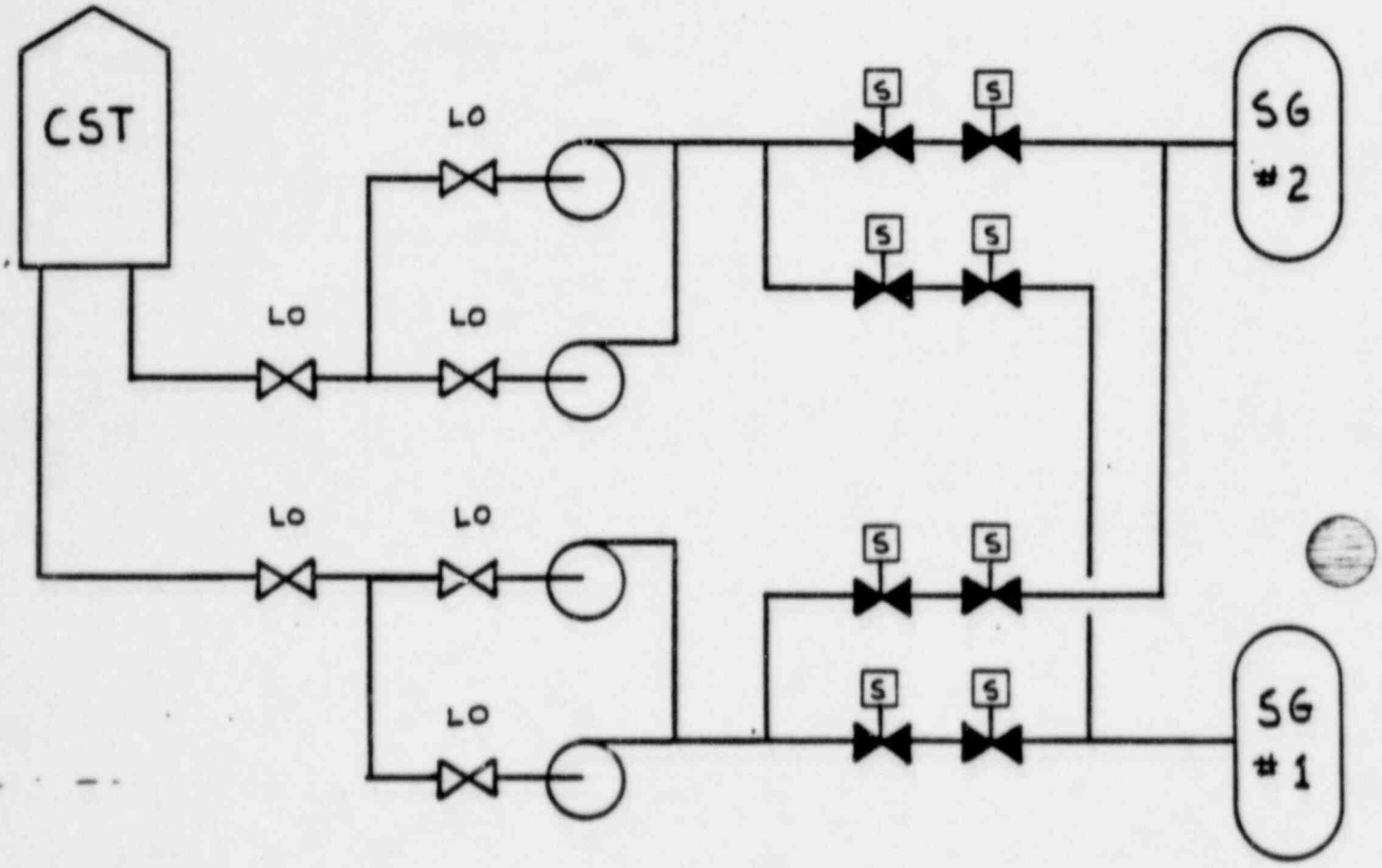
APPLICABLE COMPOSITES	COMMENTS
AFWS-4 AFW-11 AFW-13 AFW-17 AFW-20	(1) These valves are normally open for AFW-13 composite. (2) Cross-tie only applicable for AFWS-4, AFW-11 and AFW-13 composites. (3) Common suction from CST to all pumps for AFW-13 Separate suction from CST per pump for AFW-17

Figure 17. AFWS Major Group 6



APPLICABLE COMPOSITES	COMMENTS
AFW-12	— —

Figure 18. AFWS Major Group F



APPLICABLE COMPOSITES	COMMENTS
AFW-10	— —

Table 11. HPIS Composite Summary

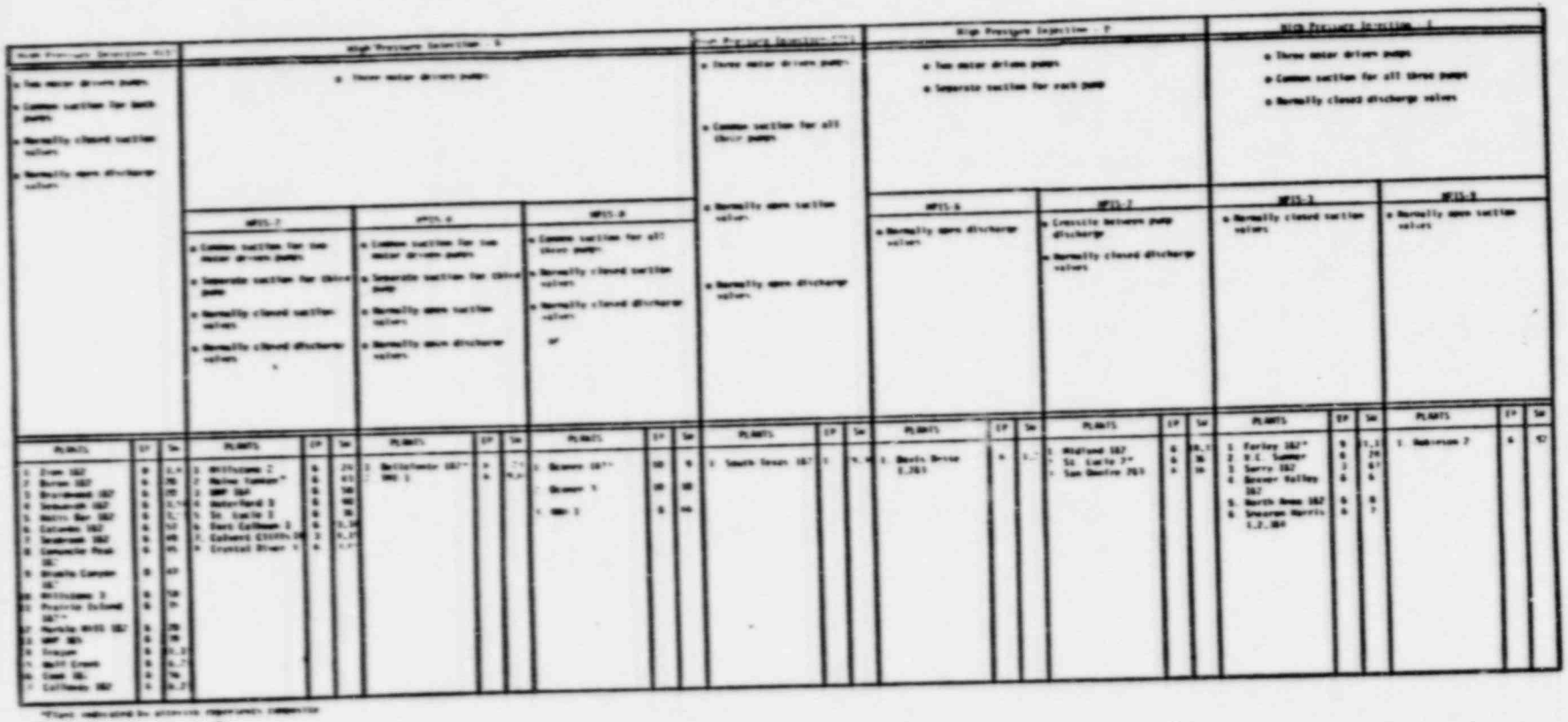
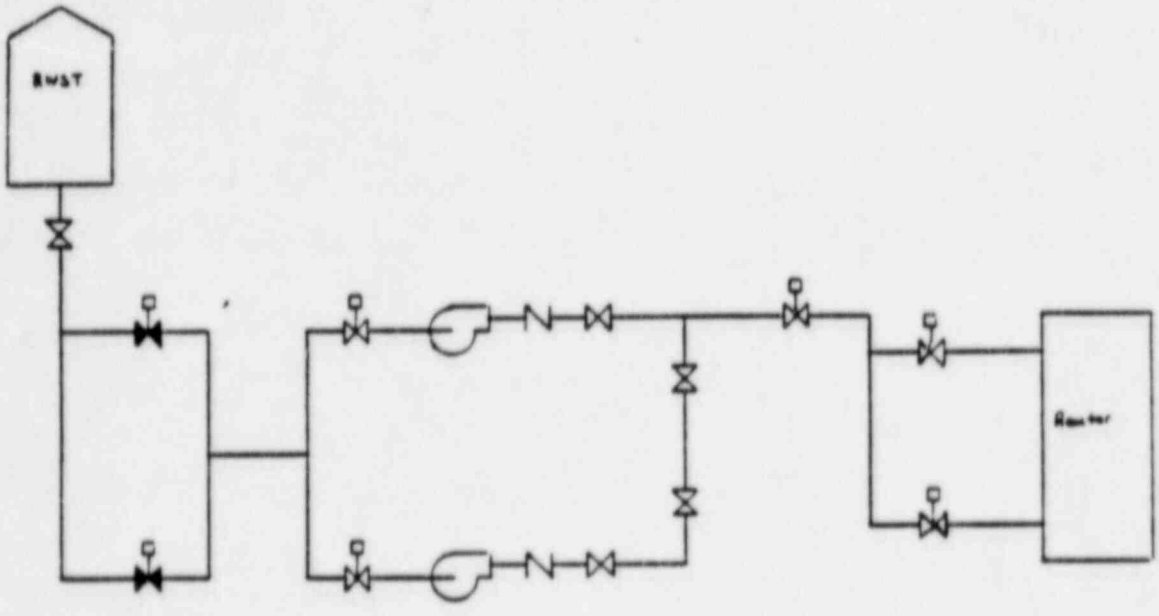
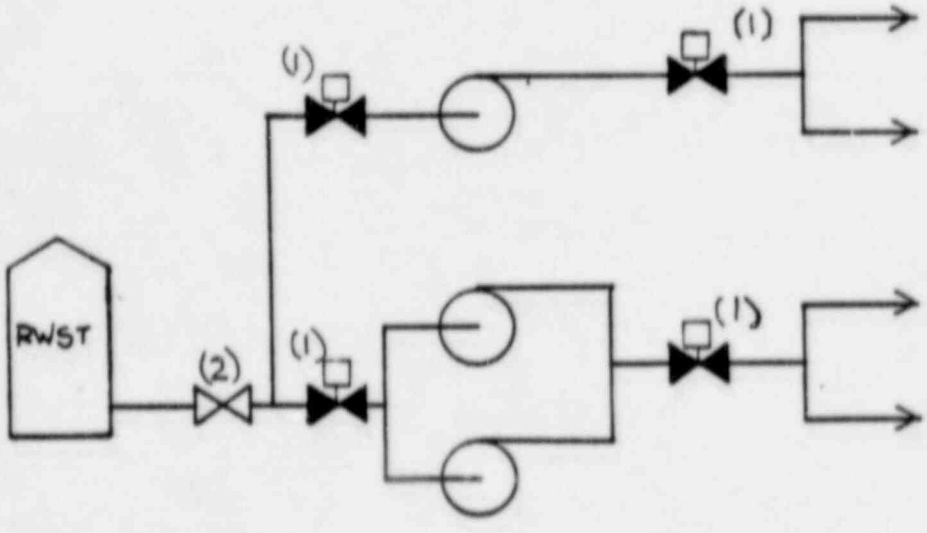


Figure 19. HPIS Major Group A



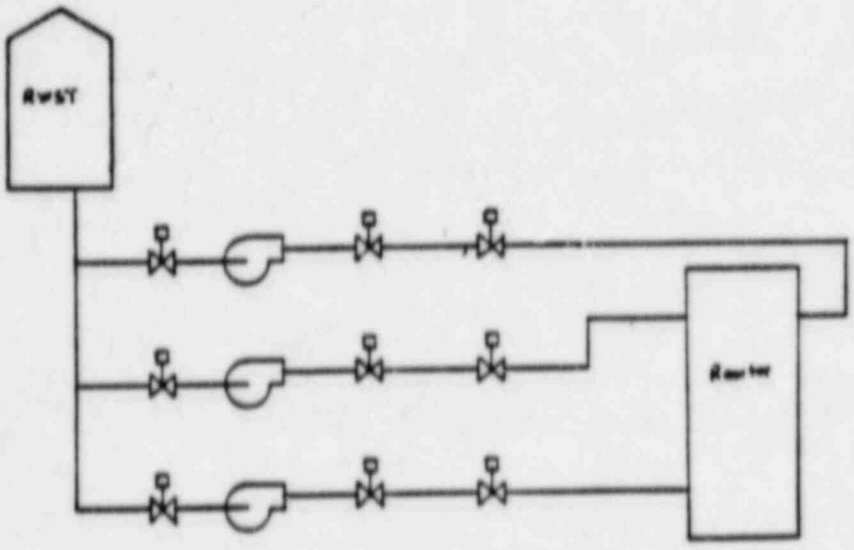
APPLICABLE COMPOSITES	COMMENTS
HPIS-1	— —

Figure 20. HPIS Major Group B



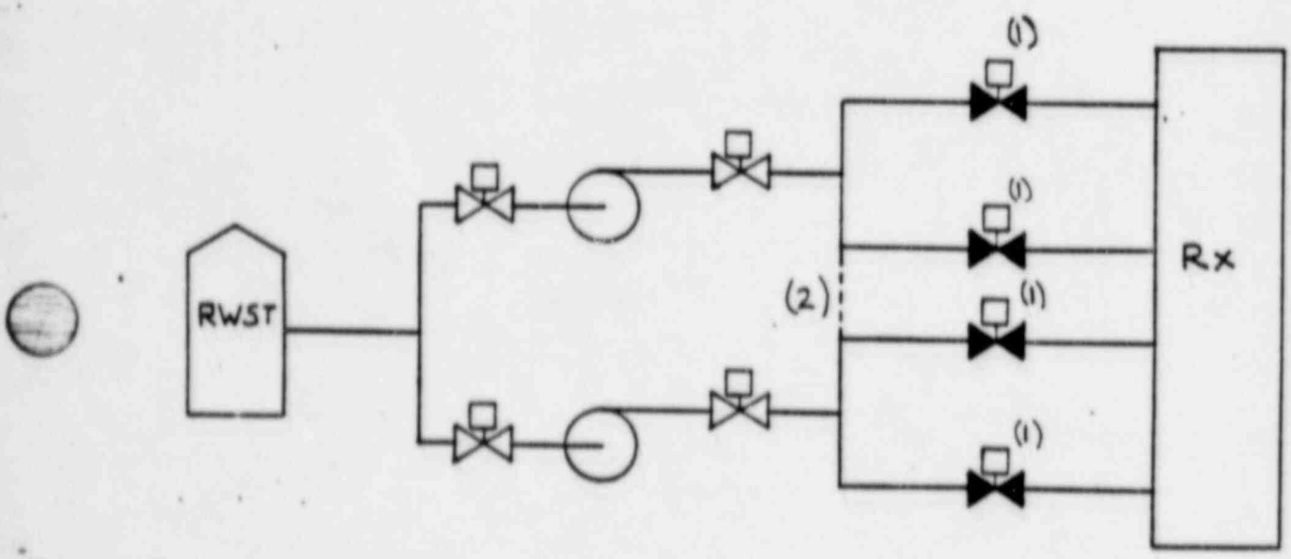
APPLICABLE COMPOSITES	COMMENTS
HPIS-2 HPIS-4 HPIS-8	(1) Normally open for HPIS-4 (2) Only for HPIS-8

Figure 21. HPIS Major Group C



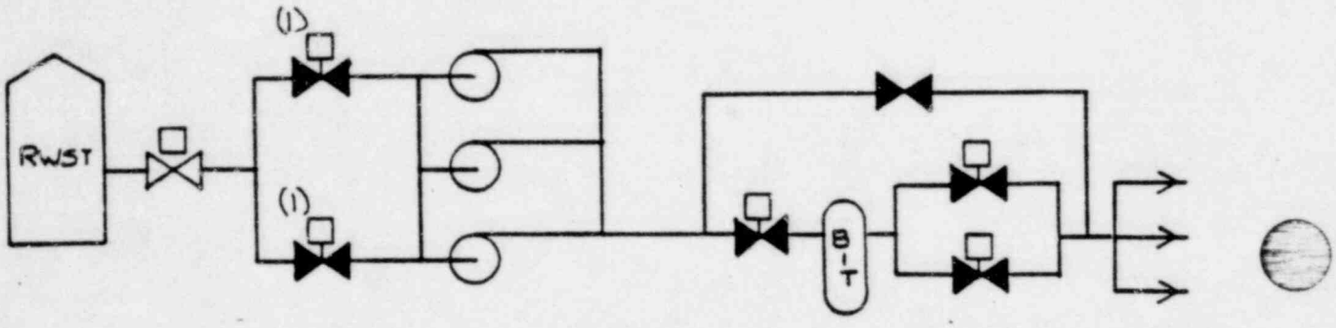
APPLICABLE COMPOSITES	COMMENTS
HPIS-5	— —

Figure 22. HPIS Major Group D



APPLICABLE COMPOSITES	COMMENTS
HPIS-6 HPIS-7	(1) Valves normally open for HPIS-6 (2) Crosstie only for HPIS-7

Figure 23. HPIS Major Group E



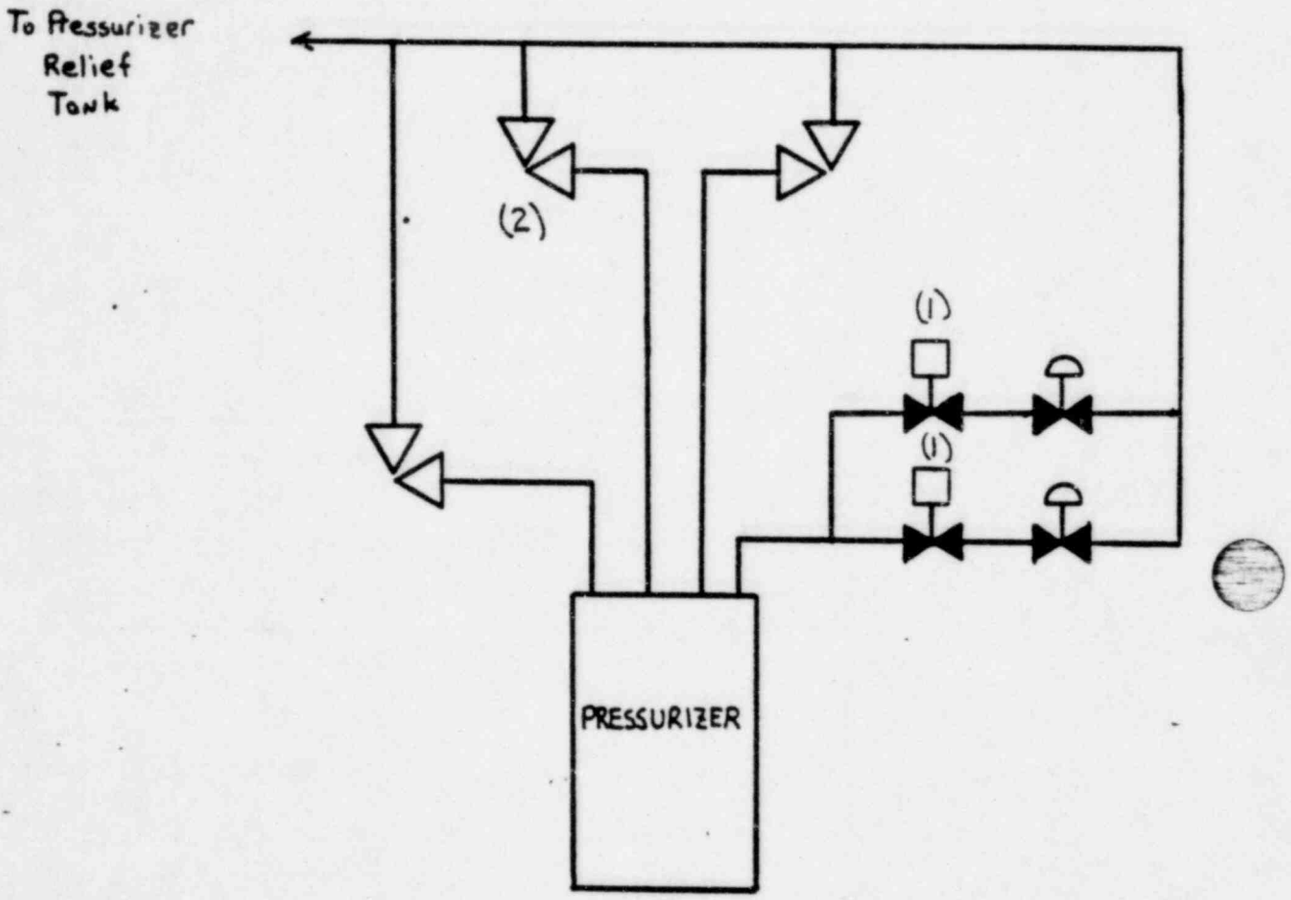
APPLICABLE COMPOSITES	COMMENTS
HPIS-3 HPIS-9	(1) Normally open for HPIS-9

Table 12. PORV Composite Summary

PORV - A						PORV - B (1)		PORV - C		PORV - D			
• Two PORV's with block valves						• Three PORV's with normally open block valves • Three SRV's		• One PORV with normally open block valve • Two SRV's		• No PORVs			
PORV-1		PORV-2		PORV-4				PORV-5		PORV-8		PORV-6		PORV-7	
• Normally closed block valves • Three SRVs		• Normally open block valves • Three SRVs		• Normally open block valves • Two SRVs				• Solenoid valve		• Electro-magnetic valve		• Two SRVs		• Four SRVs	
PLANTS	LP	PLANTS	LP	PLANTS	LP	PLANTS	LP	PLANTS	LP	PLANTS	LP	PLANTS	LP	PLANTS	LP
1. Seaprook 1&2	6	1. South Texas 1&2	1	1. Calvert Cliffs 1&2	3	1. Beaver Valley 1&2	6	1. Bellefonte 1&2	6	1. ANO-1	6	1. Waterford 3*	6	1. WNP 3&5	6
2. Robinson 2*	6	2. Surry 1&2	3	2. Millstone 2	6	2. Cook 1&2*	6	2. Davis Besse 1,2,&3*	6	2. Crystal River 3	6	2. San Onofre 2&3	6		
		3. Byron 1&2	6	3. Prairie Island 1&2*	6	3. Catawba 1&2	6	3. WNP 1&4	6	3. Midland 1&2	6				
		4. Braidwood 1&2	6	4. Fort Calhoun 1	6	4. Shearon Harris 1,2,3&4	6			4. TMI-1	6				
		5. Marble Hill 1&2	6			5. V.C. Summer	6			5. Oconee 1&2*	10				
		6. Sequoyah 1&2*	6			6. Diablo Canyon 1&2	6			6. Oconee 3	10				
		7. Watts Bar 1&2	6												
		8. Trojan	6												
		9. Wolf Creek	6												
		10. Calloway 1&2	6												
		11. Comanche Peak 1&2	6												
		12. Milne Yankee	6												
		13. St. Lucie 1	6												
		14. St. Lucie 2	6												
		15. Millstone 3	6												
		16. North Anna 1&2	6												
		17. Zion 1&2	8												
		18. Farley 1&2	9												

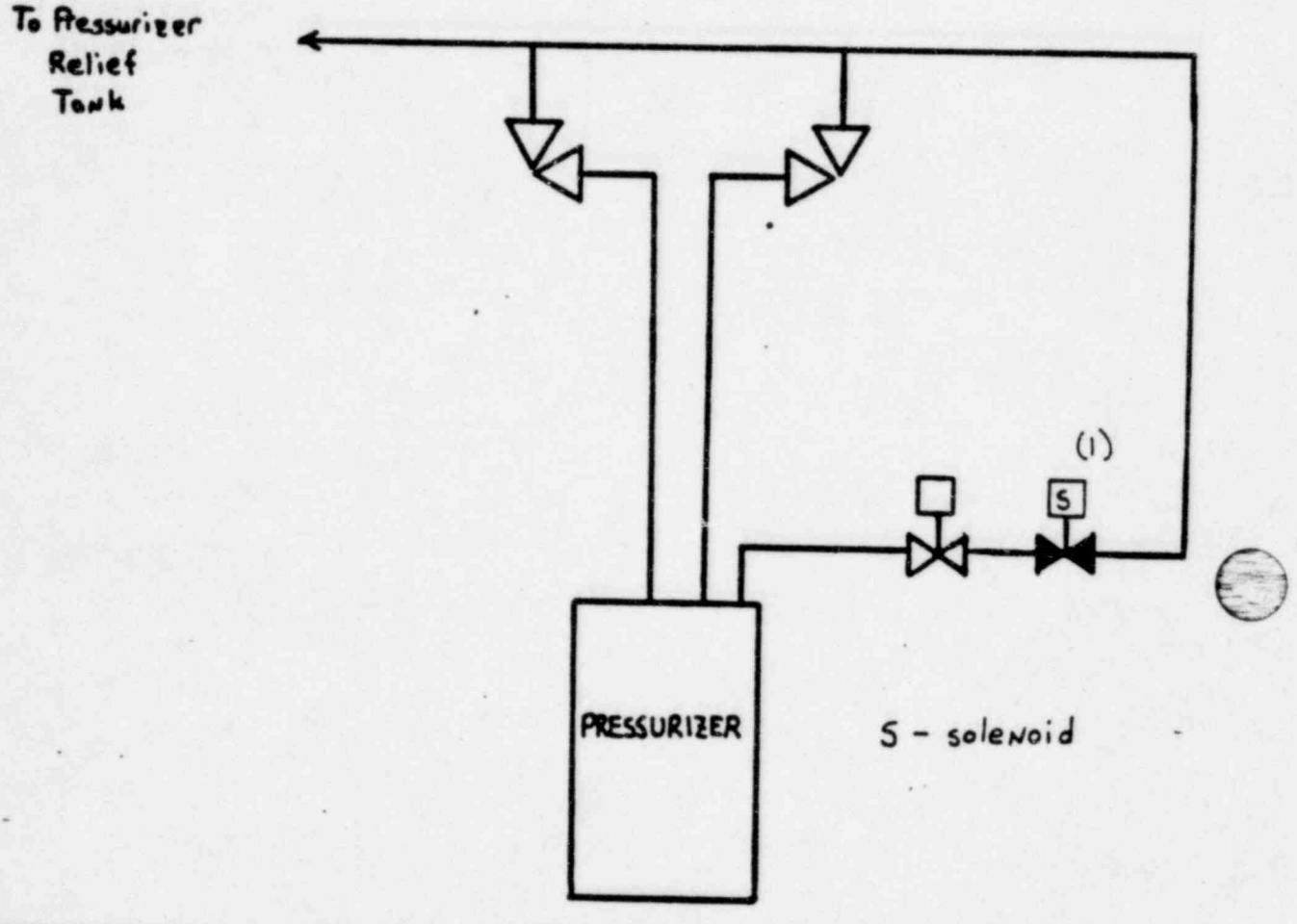
*Plant indicated by asterisk represents composite.

Figure 24. PORV Major Group A



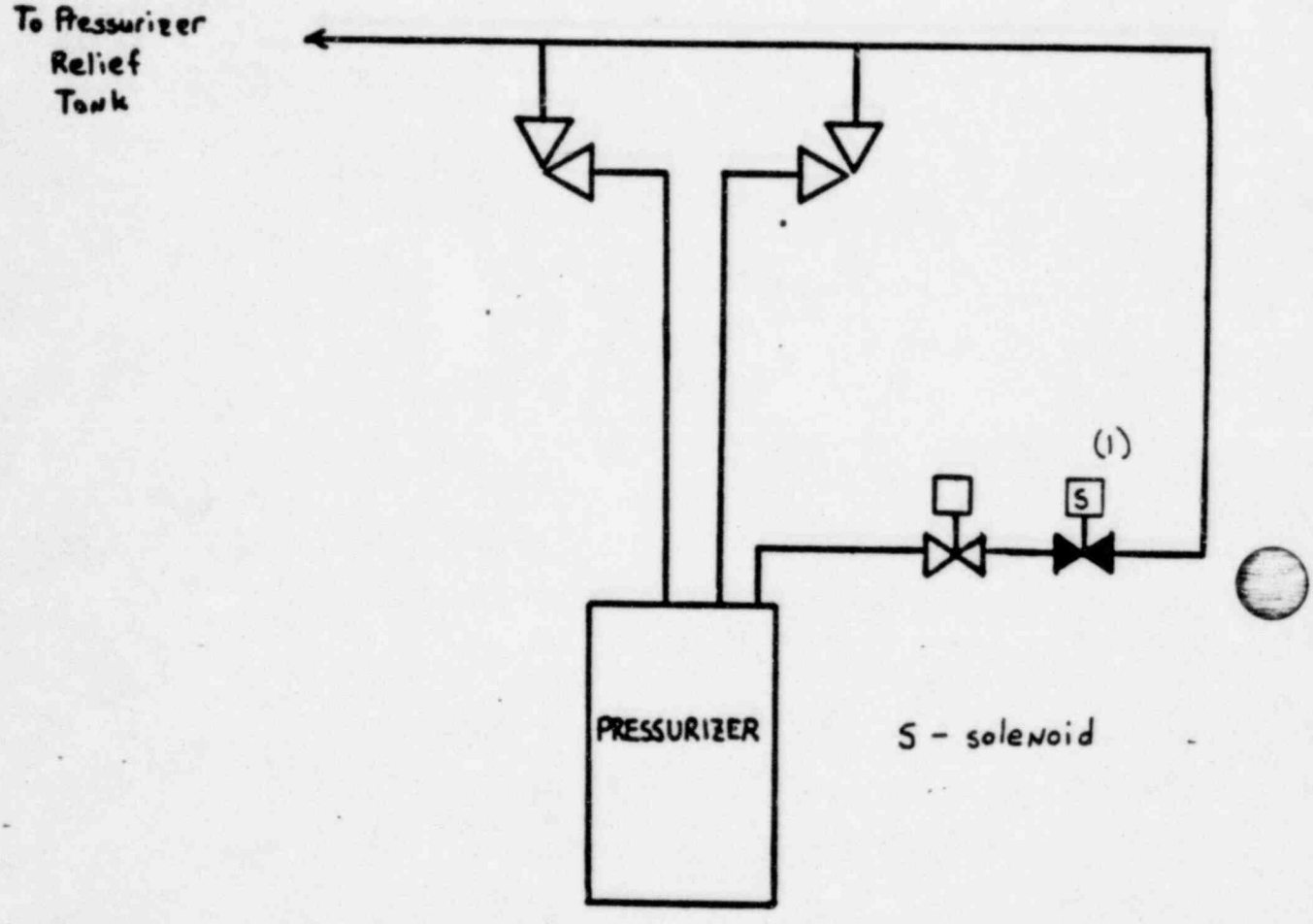
APPLICABLE COMPOSITES	COMMENTS
PORV-1 PORV-2 PORV-4	(1) These valves are open for PORV-2 and PORV-4 (2) PORV-4 has only 2 SRV's.

Figure 26. PORV Major Group C



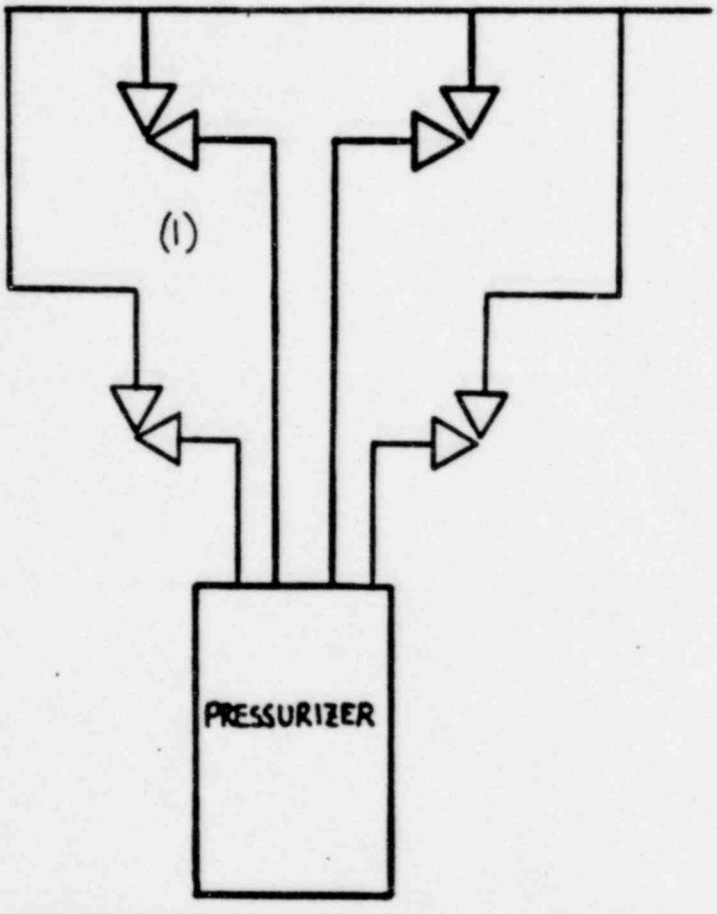
APPLICABLE COMPOSITES	COMMENTS
PORV-5 PORV-8	(1) This valve is an electro magnetic SRV for PORV-8.

Figure 26. PORV Major Group C



APPLICABLE COMPOSITES	COMMENTS
PORV-5 PORV-8	(1) This valve is an electro magnetic SRV for PORV-8.

Figure 27. PORV Major Group D



APPLICABLE COMPOSITES	COMMENTS
PORV-7 PORV-6	(1) PORV-6 has only 2 SRV's

Table 13. BWR SW Composite Summary

PLANT & COMPOSITE	DESCRIPTION
Grand Gulf 1&2 Clinton 1&2 SWS-1	Three pumps (one per train) feeding a three independent train open cooling water system. SWS-1 is for Unit 1 (Unit 2 is identical). Loads: Train 1 - RHR A HX's, DG A, RHR A room and pump/motor cooling, LPCS room cooling, RCIC room cooling; Train 2 - RHR B HXs, DG B, RHR B&C room and pump/motor cooling; Train 3 - HPCS DG, HPCS room cooling
Perry 1&2 SWS-2	Three pumps (one per train) feeding a three train open cooling water system with cross ties downstream of loads. SWS-2 is for Unit 1 (Unit 2 is identical). Loads: Train 1 - RHR A HX, ECC A HX, DG A Train 2 - RHR B HX, ECC B HX, DG B Train 3 - HPCS DG, HPCS room cooling
Perry 1&2 SWS-3	Two pumps feeding a two independent train closed cooling water system. SWS-3 is for Unit 1 (Unit 2 is identical). Loads: Train 1 - RCIC room cooling, LPCS room cooling, RHR A room and pump/motor cooling Train 2 - RHR B&C room and pump/motor cooling
Brunswick 1&2 SWS-4	Nine pumps (two per first train, three per second train, two per third train and two per fourth train) feeding a four train open cooling water system. SWS-4 is for Unit 1 (Unit 2 is identical). Loads: Train 1 - DG A&B&C&D, HPCI room cooling, LPCS B room cooling, RHR B&D room and pump/motor cooling Train 2 - RCIC room cooling, LPCS A room cooling, RHR A&C room and pump/motor cooling Train 3 - RHR A HX Train 4 - RHR B HX

Table 13. BWR SW Composite Summary (Continued)

PLANT & COMPOSITE	DESCRIPTION
River Bend 1 SWS-5	Four pumps feeding an open cooling water system. Loads: RHR A&B HX, DG A&B HPCS, RHR A&B pump/motor cooling, RCIC room cooling, LPCS room cooling, RHR A&B&C room cooling
Limerick 1&2 SWS-6	Four pumps (two per trains) feeding a two independent train open cooling water system. SWS-6 is for Unit 1 (Unit 2 identical). Loads: Train 1 - RCIC room cooling, LPCS A&C room and pump/water cooling, DG A&C Train 2 - HPCI room cooling, LPCS B&D room and pump/motor cooling, DG B&D
Limerick 1&2 SWS-7	Four pumps (two per train) feeding a two independent train open cooling water system. SWS-7 is for Unit 1 (Unit 2 identical). Loads: Train 1 - RHR A HX Train 2 - RHR B HX
Shoreham SWS-8	Four pumps (two per train) feeding a two train open cooling water system. Loads: Train 1 - RHR A HX, RBCLCW A HX, DG A&B&C, RBSVS A Train 2 - RHR B HX, RBCLCW B HX, DG A&B&C, RBSVS B
Shoreham SWS-9	Three pumps feeding a two train closed cooling water system. Loads: Train 1 - RBCLCW A HX, RHR A&C pump/motor cooling Train 2 - RBCLCW B HX, RHR B&D pump/motor cooling

Table 13. BWR SW Composite Summary (Continued)

PLANT & COMPOSITE	DESCRIPTION
Shoreham SWS-10	Eight pumps (two per train) feeding a four train closed cooling water system. Loads: Train 1 - RBSVS A Train 2 - RBSVS B Train 3 - LPCS A&C and RHR A&C room cooling Train 4 - LPCS B&D and RHR B&D room cooling
Nine Mile 2 SWS-11	Six pumps (three per train) feeding a two train open cooling water system. Loads: Train 1 - RHR A room and pump/motor cooling, HPCS room cooling, RCIC room cooling, LPCS room cooling, RHR A HX, DG A&HPCS Train 2 - RHR B&C room and pump/motor cooling, HPCS room cooling, RCIC room cooling, RHR B HX, DG B&HPCS
La Salle 1&2 SWS-12	Seven pumps (two per train for two trains and one per train for three trains) feeding a five independent train open cooling water system. SWS-12 is for Unit 1 (Unit 2 identical). Loads: Train 1 - RHR A HX, RHR A pump/motor cooling Train 2 - LPCS room and pump/motor cooling, RHR A room cooling, DG A Train 3 - DG HPCS, HPCS room cooling Train 4 - DG B, RCIC room cooling, RHR B&C room cooling Train 5 - RHR B HX, RHR B&C pump/motor cooling
WNP 2 SWS-13	Three pump (one per train) feeding a three independent train open cooling water system. Loads: Train 1 - RHR A HX, LPCS room and pump/motor cooling, RHR A room and pump/motor cooling, DG A Train 2 - DG HPCS, HPCS room cooling Train 3 - RHR B HX, RCIC room cooling, RHR B&C room and pump/motor cooling, DG B

Table 13. BWR SW Composite Summary (Continued)

PLANT & COMPOSITE	DESCRIPTION
Peach Bottom 2&3 SWS-14	Two pumps feeding a two train open cooling water system. SWS-14 is for Unit 2 (Unit 3 identical). Loads: Trains 1&2 - RHR A&B&D room and pump/motor cooling, HPCI room cooling, DG A&B&C&D, LPCS A&B&C&D room and pump/motor cooling, RCIC room cooling
Peach Bottom 2&3 SWS-15	Four pumps (two per train) feeding a two independent train open cooling water system. SWS-15 is for Unit 2 (Unit 3 identical). Loads: Train 1 - RHR A&C HX Train 2 - RHR B&D HX
Hope Creek 1&2 SWS-16	Four pumps (two per train) feeding a two train closed cooling water system. SWS-16 is for Unit 1 (Unit 2 identical). Loads: Train 1 - RHR A HX, SACS A&C HX, DG A&C, RCIC room cooling, LPCS A&C room cooling, RHR A&C room and pump/motor cooling Train 2 - RHR B HX, SACS B&D HX, DG B&D, HPCI room cooling, LPCS B&D room cooling, RHR B&D room and pump/motor cooling
Hope Creek 1&2 SWS-17	Four pumps (two per train) feeding a two independent train open cooling water system. SWS-17 is for Unit 1 (Unit 2 identical). Loads: Train 1 - SACS A&C HX Train 2 - SACS B&D HX

Table 13. BWR SW Composite Summary (Continued)

PLANT & COMPOSITE	DESCRIPTION
Cooper SWS-18	Eight pumps (two normal SWS and two booster RHRSW per train) feeding a two train open cooling water system. Loads: Train 1 - RHR A HX, RBCCWS A HX, DG A&B Train 2 - RHR A HX, RBCCWS B HX, DG A&B
Cooper SWS-19	Four pumps (two per train) feeding a two train closed cooling water system. Loads: Train 1 - RBCCWS A HX, RHR A&C room and pump/motor cooling, LPCS A room cooling, RCIC room cooling Train 2 - RBCCWS B HX, RHR B&D room and pump/motor cooling, LPCS B room cooling, HPCI room cooling
Monticello SWS-20	Nine pumps (two per train for two trains, one per train for two trains and three per one train) feeding a five train open cooling water system. Loads: Train 1 - RHR A HX Train 2 - RHR B HX Train 3 - HPCI room cooling, LPCS B room and pump/mtor cooling, RHR B&D room and pump/motor cooling, DG B Train 4 - HPCI room cooling, LPCS A room and pump/motor cooling, RHR A&C room and pump/motor cooling, DG A Train 5 - RCIC room cooling
Hatch 1&2 SWS-21	Four pumps (two per train) feeding a two independent train open cooling water system. SWS-21 is for Unit 1 (Unit 2 identical). Loads: Train 1 - RHR A HX Train 2 - RHR B HX

Table 13. BWR SW Composite Summary (Continued)

PLANT & COMPOSITE	DESCRIPTION
Hatch 1&2	Five pumps (two per train for two trains and one per train for one train) feeding a three train open cooling water system. SWS-22 is for Unit 1 (Unit 2 identical).
	Loads:
SWS-22	Train 1 - RCIC room cooling, RHR A&C room and pump/motor cooling, LPCS A&C room cooling, DG A Train 2 - HPCI room cooling, RHR B&D room and pump/motor cooling, LPCS B&D room cooling, DG B Train 3 - DG C
Browns Ferry 1,2&3	Twelve pumps (three per train) feeding a four train open loop cooling water system. SWS-23 is for all three units.
	Loads:
SWS-23	Trains 1,2,3&4 - LPCS A&B&C&D room cooling (all units), RCIC room cooling (all units), RHR A&B&C&D room and pump/motor cooling (all units), DG A&B&C&D (all units) Train 1 only - RHR A HX (all units) Train 2 only - RHR B HX (all units) Train 3 only - RHR C HX (all units) Train 4 only - RHR D HX (all units)
Quad Cities 1&2	Eight pumps (four per train) feeding a two independent train open cooling water. SWS-24 is for Unit 1 (Unit 2 identical).
	Loads:
SWS-24	Train 1 - RHR A HX Train 2 - RHR B HX
Quad Cities 1&2	Two pumps (one per train) feeding a two independent train open cooling water system. SWS-25 is for Unit 1 (Unit 2 identical).
	Loads:
SWS-25	Train 1 - DG A, LPCS A&B room cooling, RCIC room cooling, HPCI room cooling, RHR A&B&C&D room and pump/motor cooling Train 2 - DG B

Table 13. BWR SW Composite Summary (Concluded)

PLANT & COMPOSITE	DESCRIPTION
Fitzpatrick SWS-26	Two pumps (one per train) feeding a two train open cooling water system. Loads: Train 1 - DG A&C, RCIC room cooling, RHR A&C room and pump/motor cooling, LPCS A room cooling Train 2 - DG B&D, HPCI room cooling, RHR B&D room and pump/motor cooling, LPCS B room cooling
Fitzpatrick SWS-27	Four pumps (two per train) feeding a two independent train open cooling water system. Loads: Train 1 - RHR A HX Train 2 - RHR B HX

Table 14. PWR SW Composite Summary

PLANT & COMPOSITE	DESCRIPTION
Davis-Besse 1, 2 & 3	Three pumps feeding an open cooling water system. SWS-1 is for Unit 1 (other units are identical).
	Loads:
SWS-1	HPIS A&B room cooling, CCW A B&C HX
Davis-Besse 1, 2 & 3	Three pumps feeding a closed cooling water system. SWS-2 is for Unit 1 (other units are identical).
	Loads:
SWS-2	CCW A&B&C HX, DG A&B
Zion 1 & 2	Five pumps (two per one train and three per one train) feeding a three train closed cooling water system. SWS-3 is for Units 1 and 2.
	Loads:
SWS-3	Train 1 - CCW A HX, HPIS (Unit 1) pump cooling Train 2 - CCW B HX, HPIS A (Unit 2) pump cooling
Zion 1 & 2	Six pumps feeding an open cooling water system. SWS-4 is for Units 1 and 2.
	Loads:
SWS-4	DG A&B&C&D&E, HPIS A&B (both units) room cooling, AFW A&B&C(both units) pump cooling, CCW A&B HX
Farley 1 & 2	Ten pumps (five per train) feeding a two train open cooling water system. SWS-5 is for Units 1 and 2.
	Loads:
SWS-5	Train 1 - SWS(11) pit Train 2 - SWS(11) pit

Table 14. PWR SW Composite Summary (Continued)

PLANT & COMPOSITE	DESCRIPTION
Beaver Valley 1 & 2	Three pumps feeding an open cooling water system. SWS-6 is for Unit 1 (other Unit is identical).
	Loads:
SWS-6	HPIS A&B&C pump and room cooling, diesel generators A&B
Shearon Harris 1, 2, 3, & 4	Two pumps feeding an open cooling water system. SWS-7 is for Unit 1 (other Units are identical).
	Loads:
SWS-7	HPIS A&B&C pump and room cooling, diesel generators A&B
North Anna	Four pumps feeding an open cooling water system. SWS-8 is for Units 1 and 2 (Unit 2 loads not shown).
	Loads:
SWS-8	HPIS A&B&C pump and room cooling.
Oconee 1 & 2	Three pumps feeding an open cooling water system. SWS-9 is for Units 1 and 2.
	Loads:
SWS-9	HPIS A&B&C (both units) pump and room cooling, AFW A&B&C (both units) pump cooling
Oconee 3	Two pumps feeding an open cooling water system.
	Loads:
SWS-10	HPIS A&B&C pump and room cooling, AFW A&B&C pump cooling

Table 14. PWR SW Composite Summary (Continued)

PLANT & COMPOSITE	DESCRIPTION
Farley 1 & 2 SWS-11	Five pumps (two per train, fifth pump spare) feeding a two train open cooling water system. SWS-11 is for Unit 1 (other Unit is identical). Loads: Train 1 - HPIS A&C room cooling, AFWA room cooling, DG, CCW A&C HX Train 2 - HPIS B room cooling, AFW B room cooling, CCW B HX
Farley 1 & 2 SWS-12	Three pumps feeding a closed cooling water system. SWS-12 is for Unit 1 (other Unit is identical). Loads: HPIS A&B&C pump cooling, CCW A&B&C HX
Calvert Cliffs 1 & 2 SWS-13	Three pumps feeding a two train closed cooling water system. SWS-13 is for Unit 1 (other Unit is identical). Loads: Train A - DG A, SW AHX Train B - DG B, SW BHX
Calvert Cliffs 1 & 2 SWS-14	Three pumps feeding a closed cooling water system. SWS-14 is for Unit 1 (other Unit is identical). Loads: HPIS A&B&C pump cooling, CCW A&B HX
Calvert Cliffs 1 & 2 SWS-15	Three pumps feeding a two train open cooling water system. SWS-15 is for Unit 1 (other Unit is identical). Loads: Train 1 - CCW AHX, SWA HX, HPI A room cooling Train 2 - CCW BHX, SWB HX, HPI B room cooling

Table 14. PWR SW Composite Summary (Continued)

PLANT & COMPOSITE	DESCRIPTION
San Onofre 2 & 3 SWS-16	Three pumps feeding a two train closed cooling water system. SWS-16 is for Unit 2 (other Unit is identical). Loads: Train 1 - CCW AHX, HPI A room and pump/motor cooling Train 2 - CCW BHX, HPI B room and pump/motor cooling
San Onofre 2 & 3 SWS-17	Four pumps (two per train) feeding a two independent train open cooling water system. SWS-17 is for Unit 2 (other Unit is identical). Loads: Train 1 - CCW A HX Train 2 - CCW B HX
Midland 1 & 2 SWS-18	Five pumps (two per train with a third swing pump) feeding a two train open cooling water system. SWS-18 is for Units 1 and 2. Loads: Train 1 - HPIS A room cooling Unit 1&2 AFWP A room cooling Unit 1&2 CCW A HX Unit 1&2 DG A Unit 1&2 Train 2 - HPIS B room cooling Unit 1&2 AFWP B room cooling Unit 1&2 CCW B HX Unit 1&2 DG B Unit 1&2
Midland 1 & 2 SWS-19	Five pumps (two per train with a third swing pump) feeding a two train closed cooling water system. SWS-19 is for Units 1 and 2. Loads: Train 1 - Unit 1: HPIS A&B&C pump cooling, CCW A&B HX Train 2 - Unit 2: HPIS A&B&C pump cooling, CCW A&B HX

Table 14. PWR SW Composite Summary (Continued)

PLANT & COMPOSITE	DESCRIPTION
Byron 1 & 2 Braidwood 1 & 2 Marble Hill 1 & 2 SWS-20	Two pumps feeding a two train open cooling water system. SWS-20 is for Unit 1 (other unit is identical). Loads: Train 1 - Motor driven AFW pump/motor cooling HPIS A room and pump/motor cooling DG A Train 2 - Diesel driven AFW pump/motor cooling HPIS B room and pump/motor cooling DG B
Prairie Island 1 & 2 SWS-21	Five pumps feeding a two train open cooling water system. SWS-21 is for Units 1 and 2. Loads: Train 1 - DG A&B (Unit 1) CCW A HX Train 2 - DG A&B (Unit 2) CCW A HX
Bellefonte 1 & 2 SWS-22	Four pumps (two per train) feeding a two train open cooling water system. SWS-22 is for Unit 1 (other Unit is identical). Loads: Train 1 - DG A, AFW A&C room cooling, CCW A HX Train 2 - DG B, AFW B room cooling, CCW B HX
Bellefonte 1 & 2 SWS-23	Three pumps (two per one train and one per second train) feeding a two train closed cooling water system. SWS-23 is for Unit 1 (other Unit is identical). Loads: Train 1 - CCW A HX, HPIS A&C room and pump cooling Train 2 - CCW B HX, HPIS B room and pump cooling
Millstone 2 SWS-24	Three pumps feeding a two train closed cooling water system. Loads: Train 1 - HPIS A&C room and pump cooling, AFW A&C room cooling, RBCCW A&B HX Train 2 - HPIS B room and pump cooling, AFW B room cooling, RBCCW B&C HX

Table 14. PWR SW Composite Summary (Continued)

PLANT & COMPOSITE	DESCRIPTION
Millstone 2 SWS-25	Three pumps feeding a two train open cooling water system. Loads: Train 1 - DG A, RBCCW A&C HX Train 2 - DG B, RBCCW B&C HX
Wolf Creek Calloway 1 & 2 SWS-26	Four pumps (two per train) feeding a two independent train closed cooling water system. SWS-26 is for Unit 1 (other Unit is identical). Loads: Train 1 - CCW A HX, HPIS A pump cooling Train 2 - CCW B HX, HPIS B pump cooling
Wolf Creek Calloway 1 & 2 SWS-27	Two pumps (one per train) feeding a two independent train open cooling water system. SWS-27 is for Unit 1 (other Unit is identical). Loads: Train 1 - CCW A HX, DG A, HPIS A room cooling, AFW A&C room cooling Train 2 - CCW B HX, DG B, HPIS B room cooling, AFW B room cooling
V.C. Summer SWS-28	Three pumps feeding a two train open cooling water system. Loads: Train 1 - DG A, HPIS A&C pump and room cooling Train 2 - DG B, HPIS B pump and room cooling
South Texas 1 & 2 SWS-29	Three pumps (one per train) feeding a three independent train open cooling water system. SWS-29 is for Unit 1 (other unit is identical). Loads: Train 1 - DG A, CCW A HX, HPIS A room cooling Train 2 - DG B, CCW B HX, HPIS B room cooling Train 3 - DG C, CCW C HX, HPIS C room cooling

Table 14. PWR SW Composite Summary (Continued)

PLANT & COMPOSITE	DESCRIPTION
South Texas 1 & 2 SWS-30	Three pumps (one per train) feeding a three independent train closed cooling water system. SWS-30 is for Unit 1 (other Unit is identical). Loads: Train 1 - CCW A HX, HPIS A pump cooling Train 2 - CCW B HX, HPIS B pump cooling Train 3 - CCW C HX, HPIS C pump cooling
Trojan SWS-31	Seven pumps (two per train plus remaining three for both trains) feeding a two train open cooling water system. Loads: Train 1 - CCW A HX, DG A, HPIS A room cooling, AFW A pump cooling Train 2 - CCW B HX, DG B, HPIS B room cooling
Trojan SWS-32	Three pumps feeding a two train closed cooling water system. Loads: Train 1 - CCW A HX, HPIS A pump cooling Train 2 - CCW B HX, HPIS B pump cooling
Fort Calhoun 1 SWS-33	Three pumps feeding a closed cooling water system. Loads: HPIS A&B&C room and pump cooling, CCW A&B&C&D HX
Fort Calhoun 1 SWS-34	Four pumps feeding a two train open cooling water system. Loads: Train 1 - CCW A&C HX, Train 2 - CCW B&D HX,

Table 14. PWR SW Composite Summary (Continued)

PLANT & COMPOSITE	DESCRIPTION
Prairie Island 1 & 2 SWS-35	Two pumps (one per train) feeding a two train closed cooling water system. SWS-35 is for Unit 1 (other Unit is identical). Loads: Train 1 - CCW A HX, HPIS A pump and room cooling Train 2 - CCW B HX, HPIS B pump and room cooling
St. Lucie 1 St. Lucie 2 SWS-36	Three pumps feeding a two train closed cooling water system. SWS-36 is for Unit 1 (other Unit is identical). Loads: Train 1 - CCW A HX, HPIS A&C (pump C Unit 1 only) pump and room cooling Train 2 - CCW B HX, HPIS B pump and room cooling
St. Lucie 1 & 2 SWS-37	Three pumps feeding a two train open cooling water system. SWS-37 is for Unit 1 (other Unit is identical). Loads: Train 1 - CCW A HX Train 2 - CCW B HX
WNP 3 & 5 SWS-38	Four pumps (two per train) feeding a two train closed cooling water system. SWS-38 is for Unit 3 (other Unit is identical). Loads: Train 1 - DG A, CCW A HX Train 2 - DG B, CCW B HX
WNP 3 & 5 SWS-39	Six pumps feeding an open cooling water system. SWS-39 is for Unit 3 (other Unit is identical). Loads: HPIS A&B pump and room cooling, CCW A&B HX

Table 14. PWR SW Composite Summary (Continued)

PLANT & COMPOSITE	DESCRIPTION
Waterford 3 SWS-40	Three pumps feeding a two train closed cooling water system. Loads: Train 1 - DG A, CCW A HX, HPIS A&C pump and room cooling Train 2 - DG B, CCW B HX, HPIS B pump and room cooling
Waterford 3 SWS-41	Two pumps (one per train) feeding a two independent train open cooling water system. Loads: Train 1 - CCW A HX Train 2 - CCW B HX
Maine Yankee SWS-42	Four pumps feeding a open cooling water system. Loads: Secondary and Primary CCW A&B HX
Maine Yankee SWS-43	Two pumps feeding a closed cooling water system. Loads: Primary CCW A&B HX, HPIS A&B&C pump and room cooling
Maine Yankee SWS-44	Two pumps feeding a closed cooling water system. Loads: Secondary CCW A&B HX, DG A&B
Comanche Peak 1 & 2 SWS-45	Two pumps feeding a two train open cooling water system. SWS-45 is for Unit 1 (other Unit is identical). Loads: Train 1 - CCW A HX, DG A, HPIS A room and pump cooling Train 2 - CCW B HX, DG B, HPIS B room and pump cooling

Table 14. PWR SW Composite Summary (Continued)

PLANT & COMPOSITE	DESCRIPTION
Diablo Canyon 1 & 2 SWS-46	Four pumps (two per unit and one per train) feeding a two train open cooling water system. SWS-46 is for Unit 1 (other Unit is identical). Loads: Train 1 - CCW A HX Train 2 - CCW B HX
Diablo Canyon SWS-47	Three pumps feeding a two train closed cooling water system. SWS-47 is for Unit 1 (other Unit is identical). Loads: Train 1 - CCW A HX, HPIS A pump and room cooling Train 2 - CCW B HX, HPIS B pump and room cooling
Seabrook 1 & 2 SWS-48	Four pumps (two per train) feeding a two train open cooling water system. SWS-48 is for Unit 1 (other Unit is identical). Loads: Train 1 - CCW A HX, DG A Train 2 - CCW B HX, DG B
Seabrook 1 & 2 SWS-49	Four pumps (two per train) feeding a two train closed cooling water system. SWS-49 is for Unit 1 (other Unit is identical). Loads: Train 1 - CCW A HX, HPIS A pump and room cooling Train 2 - CCW B HX, HPIS B Pump and room cooling
WNP 1 & 4 SWS-50	Two pumps (one per train) feeding a two train open cooling water system. SWS-50 is for Unit 1 (other Unit is identical). Loads: Train 1 - DG A, HPIS A&C pump and room cooling Train 2 - DG B, HPIS B pump and room cooling

Table 14. PWR SW Composite Summary (Continued)

PLANT & COMPOSITE	DESCRIPTION
Robinson 2 SWS-51	Four pumps feeding a two train open cooling water system. Loads: Train 1 - CCW A HX, DG A, AFW A&C pump cooling Train 2 - CCW B HX, DG B, AFW B pump cooling
Robinson 2 SWS-52	Three pumps feeding a closed cooling water system. Loads: HPIS A&B&C room and pump cooling, CCW A&B HX
Sequoyah 1 & 2, Watts Bar 1 & 2 SWS-53	Eight pumps (four per unit) feeding an open cooling water system. SWS-53 is for Units 1 and 2. Loads: DG A&B (Units 1&2), CCW A&B&C
Sequoyah 1 & 2, Watts Bar 1 &2 SWS-54	Five pumps feeding a four train open cooling water system. SWS-54 is for Unit 1 and 2. Loads: Train 1 - CCW A HX, HPIS A (Unit 1) pump and motor cooling Train 2 - CCW C HX, HPIS B (Unit 1) pump and motor cooling Train 3 - CCW C HX, HPIS B (Unit 2) pump and motor cooling Train 4 - CCW B HX, HPIS A (Unit 2) pump and motor cooling
Cook 1 & 2 SWS-55	Two pumps feeding a two train open cooling water system. SWS-55 is for Unit 1 (other Unit is identical). Loads: Train 1 - DG A, CCW A HX Train 2 - DG B, CCW B HX

Table 14. PWR SW Composite Summary (Continued)

PLANT & COMPOSITE	DESCRIPTION
Cook 1 & 2 SWS-56	Three pumps feeding a two train closed cooling water system. SWS-56 is for Unit 1 (other Unit is identical). Loads: Train 1 - CCW A HX, HPIS A room and pump cooling Train 2 - CCW B HX, HPIS B room and pump cooling
Catawba 1 & 2 SWS-57	Four pumps (two per train) feeding a two train open cooling water system. SWS-57 is for Units 1 and 2. Loads: Train 1 - DG A (Unit 1&2) CCW A HX, HPIS A pump and room cooling Train 2 - DG B (Unit 1&2) CCW A HX, HPIS B pump and room cooling
Millstone 3 SWS-58	Four pumps (two per train) feeding a two train open cooling water system. Loads: Train 1 - DG A, HPIS A room and pump cooling Train 2 - DG B, HPIS B room and pump cooling
TMI-1 SWS-59	Three pumps feeding a closed cooling water system. Loads: HPIS B pump and room cooling, AFW A&B&C room cooling, DG A&B, NSW A&B&C&D HX
TMI-1 SWS-60	Five pumps (three per one train and one per train for two remaining trains) feeding a independent train open cooling water system. Loads: Train 1 - NSW A&B&C&D HX Train 2 - DHR A HX Train 3 - DHR B HX

Table 14. PWR SW Composite Summary (Continued)

PLANT & COMPOSITE	DESCRIPTION
TMI-1 SWS-61	Two pumps (one per train) feeding a two independent train closed cooling water system. Loads: Train 1 - HPIS A pump and room cooling, DHR A HX Train 2 - HPIS C pump and room cooling, DHR B HX
Crystal River 3 SWS-62	Two pumps (one per train) feeding a two independent train closed cooling water system. Loads: Train 1 - DHC A HX Train 2 - DHC B HX
Crystal River 3 SWS-63	Two pumps (one per train) feeding a two independent train closed cooling water system. Loads: Train 1 - DHC A HX Train 2 - HPIS C pump and room cooling, DHC B HX
Crystal River 3 SWS-64	Three pumps feeding a two train open cooling water system. Loads: Train 1 - SWS A&B HX Train 2 - SWS C&D HX
Crystal River 3 SWS-65	Three pumps feeding a closed cooling water system. Loads: HPIS B pump and room cooling, SWS A&B&C&D HX
ANO-1 SWS-66	Three pumps feeding a two train open cooling water system. Loads: Train 1 - HPIS A&B pump and room cooling, DG A Train 2 - HPIS C pump and room cooling, DG B

Table 14. PWR SW Composite Summary (Concluded)

PLANT & COMPOSITE	DESCRIPTION
Surry 1 & 2	Two pumps feeding an open cooling water system. SWS-67 is for Unit 1 (other Unit is identical).
	Loads:
SWS-67	HPIS A&B&C pump and room cooling, DG A&B

Table 15. LWR Electric Power Matrix

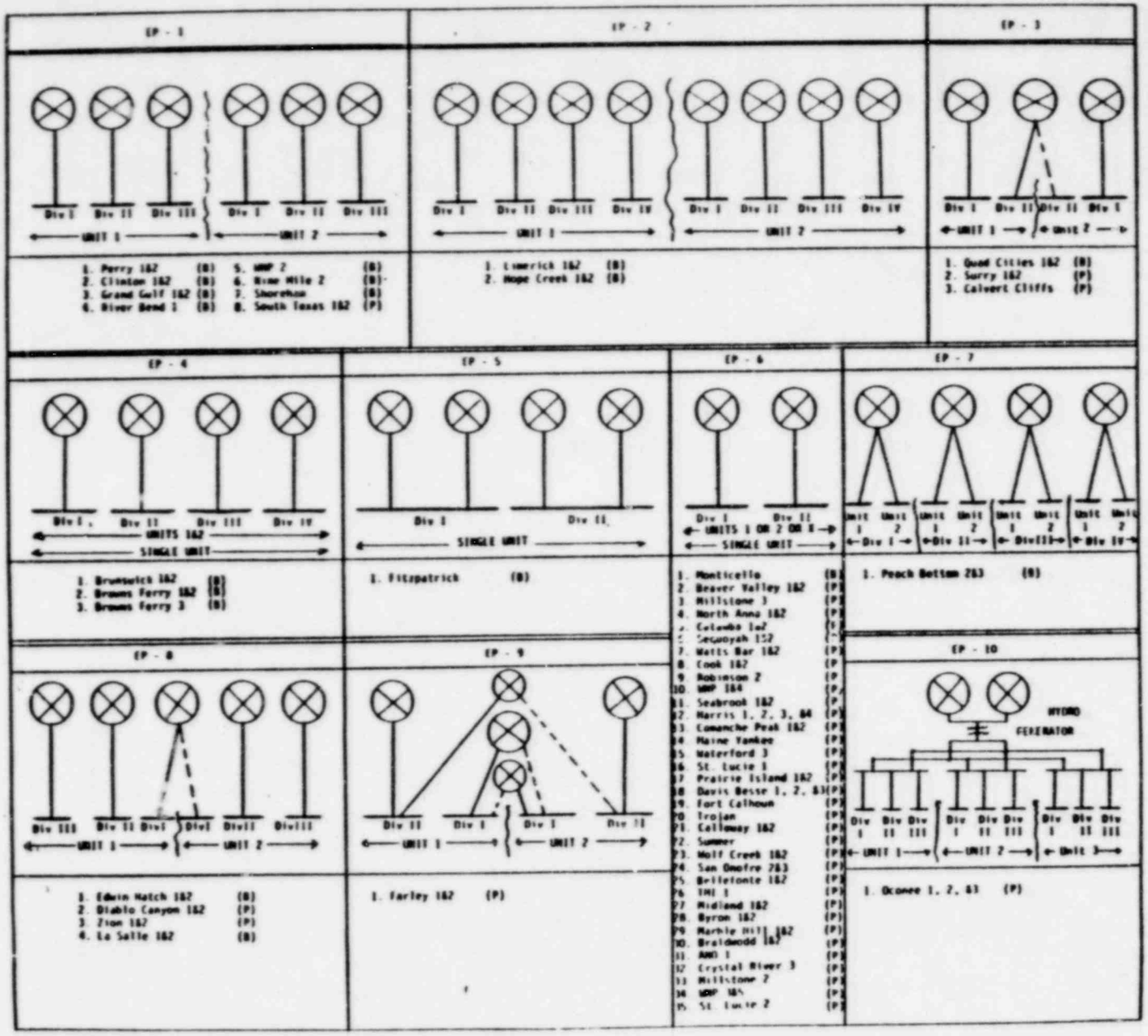


Table 16. BWR Mark I Plants System Matrix

PLANTS	EP	HPCI	RCIC	LPCS	LPCI	RHR	RHR COOLING	DG COOLING	ROOM COOLING				PUMP/MOTOR COOLING			
									HPCI	RCIC	LPCS	LPCI/RHR	HPCI	RCIC	LPCS	LPCI/RHR
Peach Bottom 2&3	EP-7	HPCI-1	RCIC-2	LPCS-4	LPCI-2	RHRS-7	SWS-15	SWS-14	SWS-14	SWS-14	SWS-14	SWS-14	--	--	SWS-14	SWS-14
Fitzpatrick	EP-5	HPCI-5	RCIC-4	LPCS-2	LPCI-4	RHRS-3	SWS-27	SWS-26	SWS-26	SWS-26	SWS-26	SWS-26	--	--	**	SWS-26
Hope Creek 1&2	EP-2	HPCI-2	RCIC-2	LPCS-3	LPCI-3	RHRS-1	SWS-17, 16	SWS-17,16	SWS-17,16	SWS-17,16	SWS-17, 16	SWS-17,16	--	--	**	SWS-17,16
Quad Cities 1&2	EP-3	HPCI-1	RCIC-2	LPCS-2	LPCI-5	RHRS-4	SWS-24	SWS-25	SWS-25	SWS-25	SWS- 25	SWS-25	--	--	**	SWS-25
Cooper	EP-6	HPCI-4	RCIC-3	LPCS-2	LPCI-2	RHRS-2	SWS-18	SWS-18	SWS-18, 19	SWS-18,19	SWS-18,19	SWS-18,19	--	--	**	SWS-18,19
Monticello	EP-6	HPCI-4	RCIC-3	LPCS-2	LPCI-5	RHRS-4	SWS-20	SWS-20	SWS-20	SWS-20	SWS-20	SWS-20	--	--	SWS-20	SWS-20
Hatch 1&2	EP-8	HPCI-3	RCIC-1	LPCS-2	LPCI-2	RHRS-2	SWS-21	SWS-22	SWS-22	SWS-22	SWS-22	SWS-22	--	--	**	SWS-22
Browns Ferry 1&2	EP-4	HPCI-1	RCIC-2	LPCS-5	LPCI-4	RHRS-5	SWS-23	SWS-23	SWS-23	SWS-23	SWS-23	SWS-23	--	--	**	SWS-23
Browns Ferry 3	EP-4	HPCI-1	RCIC-2	LPCS-5	LPCI-5	RHRS-6	SWS-23	SWS-23	SWS-23	SWS-23	SWS-23	SWS-23	--	--	**	SWS-23
Brunswick 1&2	EP-4	HPCI-1	RCIC-2	LPCS-1	LPCI-4	RHRS-3	SWS-4	SWS-4	SWS-4	SWS-4	SWS-4	SWS-4	--	--	**	SWS-4

** NOT REQUIRED.

Table 17. BWR Mark II plants System Matrix

PLANTS	EP	HPCI / HPCS	RCIC	LPCS	LPCI	RHR	RHR COOLING	DG COOLING	ROOM COOLING				PUMP/MOTOR COOLING			
									HPCI/HPCS	RCIC	LPCS	LPCI/RHR	HPCI/HPCS	RCIC	LPCS	LPCI/RHR
Nine Mile Point 2	EP-1	HPCS-1	RCIC-1	LPCS-1	LPCI-1	RHRS-1	SWS-11	SWS-11	SWS-11	SWS-11	SWS-11	SWS-11	**	--	**	SWS-11
Limerick 1&2	EP-2	HPCS-2	RCIC-2	LPCS-3	LPCI-3	RHRS-1	SWS-7	SWS-6	SWS-6	SWS-6	SWS-6	SWS-6	--	--	**	SWS-6
La Salle 1&2	EP-2	HPCS-1	RCIC-1	LPCS-1	LPCI-1	RHRS-1	SWS-12	SWS-12	SWS-12	SWS-12	SWS-12	SWS-12	**	--	SWS-12	SWS-12
WNP 2	EP-1	HPCS-2	RCIC-3	LPCS-1	LPCI-1	RHRS-1	SWS-13	SWS-13	SWS-13	SWS-13	SWS-13	SWS-13	**	--	SWS-13	SWS-13
Shoreham	EP-1	HPCI-1	RCIC-2	LPCS-2	LPCI-2	RHRS-2	SWS-8	SWS-8	**	**	SWS-8,10	SWS-8,10	--	--	**	SWS-8,9

**NOT REQUIRED.

Table 18. BWR Mark III Plants System Matrix

PLANTS	EP	HPCS	RCIC	LPCS	LPCI	RHR	RHR COOLING	DG COOLING	ROOM COOLING				PUMP/MOTOR COOLING			
									HPCS	RCIC	LPCS	LPCI/RHR	HPCS	RCIC	LPCS	LPCI/RHR
Grand Gulf 1&2	EP-1	HPCS-3	RCIC-2	LPCS-1	LPCI-1	RHRS-1	SWS-1	SWS-1	SWS-1	SWS-1	SWS-1	SWS-1	**	--	**	SWS-1
Clinton 1&2	EP-1	HPCS-1	RCIC-1	LPCS-1	LPCI-1	RHRS-1	SWS-1	SWS-1	SWS-1	SWS-1	SWS-1	SWS-1	**	--	**	SWS-1
Perry 1&2	EP-1	HPCS-1	RCIC-1	LPCS-1	LPCI-1	RHRS-1	SWS-2	SWS-2	SWS-2	SWS-2,3	SWS-2,3	SWS-2,3	**	--	**	SWS-2,3
River Bend 1	EP-1	HPCS-1	RCIC-1	LPCS-1	LPCI-1	RHRS-1	SWS-5	SWS-5	SWS-5	SWS-5	SWS-5	SWS-5	**	--	**	SWS-5

** NOT REQUIRED.

Table 19. PWR Atmospheric Plants System Matrix

PLANTS	Electric Power	Auxiliary Feedwater	High Pressure Injection	Pressure Op. Valves	Room Cooling		Pump/Motor Cooling		Diesel Generator Cooling
					HPIS	AFWS	HPIS	AFWS	
TYPE 1:									
Robinson 2	EP-6	AFWS-1	HPIS-9	PORV-1	SWS-52, 51	**	SWS-52,51	SWS-51	SWS-51
TYPE 2:									
Maine Yankee	EP-6	AFWS-1	HPIS-2	PORV-2	SWS-43, 42	**	SWS-43, 42	**	SWS-44,42
Comanche Peak 1&2	EP-6	AFWS-2	HPIS-1	PORV-2	SWS-45	**	SWS-45	**	
Diable Canyon 1&2	EP-8	AFWS-7	HPIS-1	PORV-3	SWS-47,46	**	SWS-47, 46	**	Self Cooled
Shearon Harris 1,2, 3 &4	EP-6	AFWS-1	HPIS-3	PORV-3	SWS-7	**	SWS-7	**	SWS-7
Seabrook 1&2	EP-6	AFWS-3	HPIS-1	PORV-1	SWS-49,48	**	SWS-49, 48	**	SWS-48
WNP 1&4	EP-6	AFWS-4	HPIS-2	PORV-5	SWS-50	**	SWS-50	**	SWS-50
TYPE 3:									
Davis Besse 1,2 &3	EP-6	AFWS-8	HPIS-6	PORV-5	SWS-1		SWS-1, 2	**	SWS-1, 2
Prairie Island 1&2	EP-6	AFWS-9	HPIS-1	PORV-4	SWS-35, 21	**	SWS-35, 21	**	SWS-21
St. Lucie 1	EP-6	AFWS-4	HPIS-2	PORV-2	SWS-36,37	**	SWS-36, 37	**	Self Cooled
St. Lucie 2	EP-6	AFWS-4	HPIS-7	PORV-2	SWS-36,37	**	SWS-36, 37	**	Self Cooled
WNP 3&5	EP-6	AFW-10	HPIS-1	PORV-7	SWS-39	**	SWS-39	**	SWS-38, 39
Waterford 3	EP-6	AFW-11	HPIS-2	PORV-6	SWS-40,41	**	SWS-40,41	**	SWS-40, 41
TYPE 4:									
Fort Calhoun	EP-6	AFWS-9	HPIS-2	PORV-4	SWS-33, 34	**	SWS-33, 34	**	Self Cooled

**Not Required

Table 19. PWR Atmospheric Plants System Matrix (Concluded)

PLANTS	Electric Power	Auxiliary Feedwater	High Pressure Injection	Pressure Op. Valves	Room Cooling		Pump/Motor Cooling		Diesel Generator Cooling
					HPIS	AFWS	HPIS	AFWS	
TYPE B:									
Calvert Cliffs 1&2	EP-3	AFWS-9	HPIS-2	PORV-4	SWS-15	**	SWS-14, 15	**	SWS-13, 15
Crystal River 3	EP-6	AFWS-9	HPIS-2	PORV-8	SWS-63, 62, 65, 64	**	SWS-63, 62, 65, 64	**	Self Cooled
Oconee 1&2	EP-10	AFW- 20	HPIS-8	PORV-8	SWS-9	**	SWS-9	SWS-9	**
Oconee 3	EP-10	AFW- 20	HPIS-8	PORV-8	SWS-10	**	SWS-10	SWS-10	**
TMI 1	EP-6	AFW-11	HPIS-4	PORV-8	SWS-59, 60, 61	SWS-59, 60	SWS-59, 60, 61	**	SWS-59, 60
Zion 1&2	EP-8	AFW-18	HPIS-1	PORV-2	SWS-4	**	SWS-4,3	SWS-4	SWS-4

**Not Required

Table 20. PWR Subatmospheric Plants System Matrix

PLANTS	Electric Power	Auxiliary Feedwater	High Pressure Injection	Pressure Op. Valves	Room Cooling		Pump/Motor Cooling		Diesel Generator Cooling
					HPIS	AFWS	HPIS	AFWS	
Beaver Valley 1&2	EP-6	AFWS-5	HPIS-3	PORV-3	SWS-6	**	SWS-6	**	SWS-6
Millstone 3	EP-6	AFWS-7	HPIS-1	PORV-2	SWS-58	**	SWS-58	**	SWS-58
North Anna 1&2	EP-6	AFWS-5	HPIS-3	PORV-2	SWS-8	**	SWS- 8	**	SWS-8
Surry 1&2	EP-3	AFWS-5	HPIS-3	PORV-2	SWS-67	**	SWS-67	**	SWS-67

**Not Required

Table 21. PWR Ice Condenser Plants System Matrix

PLANTS	Electric Power	Auxiliary Feedwater	High Pressure Injection	Pressure Op. Valves	Room Cooling		Pump/Motor Cooling		Diesel Generator Cooling
					HPIS	AFWS	HPIS	AFWS	
Catawba 1&2	EP-6	AFWS-7	HPIS-1	PORV-3	SWS-57	**	SWS-57	**	SWS-57
Sequoyah 1&2	EP-6	AFWS-6	HPIS-1	PORV-2	SWS-53, 54	**	SWS-53, 54	**	SWS-53
Watts Bar 1&2	EP-6	AFWS-6	HPIS-1	PORV-2	SWS-53, 54	**	SWS-53, 54	**	SWS-53
Cook 1&2	EP-6	AFWS-7	HPIS-1	PORV-3	SWS-56, 55	**	SWS-56, 55	**	SWS-55

**Not Required

Table 22. BWR Initial Plant Groups

PLANT GROUPS	GROUP 1	GROUP 2	GROUP 3	GROUP 4	GROUP 5	GROUP 6	GROUP 7	GROUP 8	GROUP 9	GROUP 10	GROUP 11	GROUP 12	GROUP 13	GROUP 14	GROUP 15
APPLICABLE COMPOSITES	HPCI-1 RCIC-2 LPCS-2 LPCI-2 RHRS-2 EP-1 SWS-8 SWS-9 SWS-10	HPCI-1 RCIC-2 LPCS-2 LPCI-4 RHRS-3 EP-4 SWS-4	HPCI-1 RCIC-2 LPCS-2 LPCI-5 RHRS-4 EP-3 SWS-24 SWS-25	HPCI-1 RCIC-2 LPCS-4 LPCI-2 RHRS-7 EP-7 SWS-14 SWS-15	HPCI-1 RCIC-2 LPCS-5 LPCI-4 RHRS-5 EP-4 SWS-23	HPCI-1 RCIC-2 LPCS-5 LPCI-5 RHRS-6 EP-4 SWS-23	HPCI-2 RCIC-2 LPCS-3 LPCI-3 RHRS-1 EP-2 SWS-6(LM) SWS-7(LM) SWS-16(HC) SWS-17(HC)	HPCI-3 RCIC-1 LPCS-2 LPCI-2 RHRS-2 EP-8 SWS-21 SWS-22	HPCI-4 RCIC-3 LPCS-2 LPCI-2 RHRS-2 EP-6 SWS-18 SWS-19	HPCI-4 RCIC-3 LPCS-2 LPCI-5 RHRS-4 EP-6 SWS-20	HPCI-5 RCIC-4 LPCS-2 LPCI-4 RHRS-3 EP-5 SWS-26 SWS-27	HPCS-1 RCIC-1 LPCS-1 LPCI-1 RHRS-1 EP-1 SWS-1(CL) SWS-2(PY) SWS-3(PY) SWS-5(RB) SWS-11(NM	HPCS-1 RCIC-1 LPCS-1 LPCI-1 RHRS-1 EP-8 SWS-12	HPCS-2 RCIC-3 LPCS-1 LPCI-1 RHRS-1 EP-1 SWS-13	HPCS-3 RCIC-2 LPCS-1 LPCI-1 RHRS-1 EP-1 SWS-1
PLANTS	1. Shoreham	1. Brunswick 1&2	1. Quad Cities 1&2	1. Peach Bottom 2&3	1. Browns Ferry 1&2	1. Browns Ferry 3	1. Limerick 1&2 (LM) 2. Hope Creek 1&2(HC)	1. Hatch 1&2	1. Cooper	1. Monti-cello	1. Fitz-patrick	1. Clinton 1&2(CL) 2. Perry 1&2(PY) 3. River Bend 1&2 (RB) 4. Nine Mile Point 2 (NM)	1. La Salle 1&2	1. WNP 2	1. Grand Gulf 1&2

Table 23. PWR Initial Plant Groups

PLANT GROUPS	GROUP 1	GROUP 2	GROUP 3	GROUP 4	GROUP 5	GROUP 6	GROUP 7	GROUP 8	GROUP 9	GROUP 10	GROUP 11	GROUP 12	GROUP 13	GROUP 14	GROUP 15
APPLICABLE COMPOSITES	AFWS-1 HPIS-2 EP-6	AFWS-1 HPIS-3 EP-6	AFWS-1 HPIS-9 EP-6	AFWS-2 HPIS-1 EP-6	AFWS-3 HPIS-1 EP-6	AFWS-4 HPIS-2 EP-6	AFWS-4 HPIS-7 EP-6	AFWS-5 HPIS-3 EP-6	AFWS-5 HPIS-3 EP-3	AFWS-6 HPIS-1 EP-6	AFWS-7 HPIS-1 EP-6	AFWS-7 HPIS-1 EP-8	AFWS-8 HPIS-6 EP-6	AFWS-9 HPIS-1 EP-6	AFWS-9 HPIS-2 EP-3
	PORV-2	PORV-3 (SH, SM)	PORV-1	PORV-2	PORV-1	PORV-5 (WNP) PORV-2 (SL)	PORV-2	PORV-3(BY) PORV-2(NA)	PORV-2	PORV-2(WC, CL, ST, WB)	PORV-2 (MS) PORV-3(CB, CK)	PORV-3	PORV-5	PORV-4	PORV-4
	SWS-42 SWS-43	SWS-7 (SH) SWS-28(SM)	SWS-51 SWS-52	SWS-45	SWS-48 SWS-49	SWS-50(WNP) SWS-36(SL) SWS-37(SL)	SWS-36 SWS-37	SWS-6(BY) SWS-8(NA)	SWS-67	SWS-26(WC, CL) SWS-27(WC, CL) SWS-53(ST, WB), SWS-54(ST, WB)	SWS-58(MS) SWS-57(CB) SWS-55(CK) SWS-56(CK)	SWS-46 SWS-47	SWS-1 SWS-2	SWS-21 SWS-35	SWS-13 SWS-14 SWS-15
PLANTS	1. Maine Yankee	1. Shearon Harris (SH) 1,2,3&4 2. V.C. Summer (SM)	1. Robinson 2	1. Comanche Peak 1&2	1. Seabrook 1&2	1. WNP 1&4 2. St. Lucie 1 (SL)	1. St. Lucie 2	1. Beaver Valley (BY) 1&2 2. North Anna(NA) 1&2	1. Surry 1&2	1. Wolf Creek(WC) 2. Callaway (CL) 1&2 3. Sequoyah (SY) 1&2 4. Watts Bar(WB) 1&2	1. Millstone (MS) 3 2. Catawba (CB) 1&2 3. Cook(CK) 1&2	1. Diablo Canyon 1&2	1. Davis Besse 1,2&3	1. Prairie Island 1&2	1. Calvert Cliffs 1&2

PLANT GROUPS	GROUP 16	GROUP 17	GROUP 18	GROUP 19	GROUP 20	GROUP 21	GROUP 22	GROUP 23	GROUP 24	GROUP 25	GROUP 26	GROUP 27	GROUP 28	GROUP 29
APPLICABLE COMPOSITES	AFWS-9 HPIS-2 EP-6	AFWS-9 HPIS-8 EP-6	AFW-10 HPIS-1 EP-6	AFWS-11 HPIS-2 EP-6	AFW-11 HPIS-4 EP-6	AFW-12 HPIS-5 EP-1	AFW-13 HPIS-4 EP-6	AFW-14 HPIS-7 EP-6	AFW-15 HPIS-3 EP-9	AFW-16 HPIS-1 EP-6	AFW-17 HPIS-7 EP-6	AFWS-18 HPIS-1 EP-8	AFWS-19 HPIS-1 EP-6	AFWS-20 HPIS-8 EP-10
	PORV-4(FC) PORV-8 (CR)	PORV-8	PORV-7	PORV-4 PORV-6	PORV-8	PORV-2	PORV-5	PORV-8	PORV-2	PORV-2	PORV-6	PORV-2	PORV-2 (BY, BW, MH)	PORV-8
	SWS-33(FC) SWS-34(FC) SWS-62(CR) SWS-63(CR) SWS-64(CR) SWS-65(CR)	SWS-66	SWS-38 SWS-39	SWS-24 SWS-25 SWS-40 SWS-41	SWS-59 SWS-60 SWS-61	SWS-29 SWS-30	SWS-22 SWS-23	SWS-18 SWS-19	SWS-5 SWS-11 SWS-12	SWS-31 SWS-32	SWS-16 SWS-17	SWS-3 SWS-4	SWS-20(BY, BW, MH)	SWS-9(1&2) SWS-10(3)