DUKE POWER COMPANY
P.O. BOX 33189
CHARLOTTE, N.C. 28242

HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
(704) 373-4531

February 4, 1986

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: B.J. Youngblood, Director
PWR Project Directorate #4
Division of PWR Licensing - A

Subject: McGuire Nuclear Station
Docket Nos. 50-369, -370

Dear Mr. Youngblood:

By letter dated November 27, 1985, NRC staff requested additional information regarding elimination of arbitrary intermediate pipe breaks from the McGuire structural design bases.

Accordingly, please find attached the Duke response to this request. If there are any questions please advise through normal licensing channels.

Very truly yours,

Hal B. Tucker

Hal B. Tucker

RLG/jgm

Attachment

xc: Mr. Darl Hood
Project Manager
Division of Licensing
Office of Nuclear Regulatory Commission
Washington, D.C. 20555

Mr. W.T. Orders
NRC Resident Inspector
McGuire Nuclear Station

Dr. J. Nelson Grace
Regional Administrator
U.S. Nuclear Regulatory Commission
Region II
101 Marietta St., NW, Suite 2900
Atlanta, Georgia 30323

A012 Add: Gammill w/ Encl 1 1
1/1 Berlinger 1 1

System Design and Operating Procedures
Implemented at McGuire to Minimize Potential for Waterhammer

A. Feedwater System

Potential waterhammer at McGuire is minimized by the utilization of several startup and normal operational methods along with waterhammer prevention features originally designed into the system. The startup of a feedwater pump is done only after all voids in the piping have been purged. Air voids in the piping upstream of the feedwater regulation valves are removed by filling, venting and pressurizing the system via the hotwell pumps. The hotwell pumps are interlocked with the hotwell pump header isolation valve so that the pump cannot be started if the valve is open. The flow is passed through bypass piping which contains an orifice sized to achieve low flow. Low flows will prevent bubble collapse during filling when significant voids are present. Filling by use of the hotwell pumps is done prior to admitting flow to the steam generators. The remaining piping to the steam generators is purged by use of the auxiliary feedwater nozzle (i.e. steam generator preheater bypass piping). Flow during this phase of purging is provided by the condensate booster pump and is regulated through a 6" feedwater regulation bypass valve. Waterhammer is therefore avoided during the initial phases of startup by filling and venting at low flows and low pressure.

After the initial purging is complete, temperature, pressure and flow are increased. During the time when flow is less than 17% and feedwater temperature is less than 250°F, flow continues to be directed through the preheater bypass piping rather than the main feedwater nozzle. By not introducing cold water to the preheater when significant voids are present, possible pressure transients are avoided.

When flow exceeds 17% and temperature is greater than 250°F, feedwater flow will be transferred to the main nozzle. Prior to transferring to the main nozzle, the cold water betweeen the feedwater isolation valve and the steam generator must be purged. This is accomplished by the reverse flow purge procedure. A controlled rate of hot water is allowed to flow out of the main feedwater nozzle in the reverse direction, around the containment check valve to the main condensers. Fluid temperature is monitored in the main feedwater lines at several locations to ensure that the required temperature is reached before the feedwater isolation valves are opened.

During normal operation, a continuous tempering flow to the upper nozzle is provided. This prevents steam backleakage into the main feedwater piping which could result in void formation. It also serves as coolant for the inner surface of the auxiliary feedwater nozzle.

Several waterhammer prevention features have been designed into the feedwater system. McGuire's steam generators utilize feedwater injection into the feed preheater section rather than the feedring type design. According to Westinghouse, "At low feedwater flows during startup, low power, and accident conditions it is possible the feedwater pipe may drain if steam generator level should drop below the feedwater inlet. Plants with preheat steam generators are not as susceptible as plants with feedring type steam generators to draining the feedline during startup or low power operation; however, feedline draining can be postulated to occur during certain accidents. The draining of the feedline permits steam to enter the drained feedwater piping, thereby establishing conditions conducive to waterhammer. Waterhammer is generated by the acceleration of a water slug along the pipe to fill the void created when the steam bubble collapses. The resultant slug impact causes a pressure pulse to act upon the piping system."

The main feedwater line arrangement at McGuire has been designed in accordance with Westinghouse recommendations in that a 90° elbow is connected directly to the steam generator feedwater nozzle. This tends to minimize the portion of feedwater piping which can drain into the steam generator and become filled with steam. Also, loop seals have been employed to minimize the length of line subject to drainage.

Additional protection for the preheater section is provided by the feedwater isolation valve opening time. It takes approximately 10 minutes for the valve to fully open. This slow opening time will prevent waterhammer in the preheater due to flow initiation.

Based on the procedures and design features discussed above, the potential for condensation induced waterhammer is minimized in the main feedwater piping.

B. Auxiliary Feedwater System

Listed below are the design features utilized at McGuire that minimize the potential for condensation induced waterhammer.

1. Auxiliary feedwater piping around the steam generator nozzle is routed so as to prevent steam voids by a 90° elbow connected immediately to a vertical run of pipe.

2. Tempering flow is provided continuously to prevent steam backleakage into the auxiliary feedwater piping. Backleakage that could create voids can occur only if both check valves leak. Detection of this situation is provided by the thermocouples placed upstream of the check valve closest to the steam generator. If leakage is detected, the associated CA pump is operated at low flow to cool the lines.

3. The steam generator programmed water level is above the auxiliary feedwater nozzles during 100% power operation. If leakage does occur, it would be water, not steam.

4. The auxiliary feedwater system check valves will be maintained to minimize backleakage. We have recently installed check valves in the pump discharge lines which seat under low flow to further enhance their reliability.

5. There are two check valves in each flow path by which backleakage could occur into the auxiliary feedwater system. Therefore, the chance of leakage or a problem due to single failure is minimized.

FEEDWATER STARTUP PROCESS

Cold Startup (See attached flow diagrams)

1) The following valves should be closed:

Hotwell pump header isolation valve 1CM976

Condensate polisher demineralizers outlet valves

Feedwater heater bypass valves

Feedwater pump recirculation valves 1CF76 and 1CF81

Feedwater containment isolation valves

Feedwater regulation valves

Feedwater regulation bypass valves

Feedwater preheater bypass valves

Reverse flow purge containment isolation valve

Steam generator tempering isolation valves

Condensate polisher bypass valves 1CM422 and 1CM423

Reverse purge to condensor isolation valve

2) The following valves should be open:

Cleanup/recirculation control valve 1CM227

High pressure cleanup valve 1CF124 (or close 1CF124 and open 1CM250 if low pressure cleanup is desired)

Feedwater pump discharge valve 1CF2 and 1CF5

Hotwell pump header isolation valve bypass valve

Load rejection bypass valve 1CM420

3) Start one hotwell pump. Open condensate polisher bypass valves.

4) When instrumentation in the 20 inch line to the upper surge tank indicates the system is water solid, open hotwell pump header isolation valve.

5) Set position of 1CM227 to obtain a flowrate of about 4000 gpm.

6) Open 1CF76 and or/1CF81 to increase flow to 5000 gpm.

7) Start second hotwell pump.

8) Increase flow through 1CF76 and/or 1CF81 to 6000 gpm.

9) Draw vacuum in the main condenser, feedwater pump turbine condensers, and upper surge tanks.

10) Place upper surge tank and condensate storage tank heating system into service.

11) Align auxiliary steam to C heaters for heatup.

12) When the condensate has been cleaned sufficiently and proper flow rate has been established, place the condensate polishers in "auto" mode (1CM422 and 1CM423 are under control of the polisher system to maintain pressure drop and the cells are in "filter" mode).

13) Slowly open the recirculation valve, either 1CF76 or 1CF82, of the feedwater pump to be started, while slowly closing 1CM227. When 1CM227 is closed completely, the feedwater pump recirculation valve should be opened fully.

14) Close CF System flush isolation valve 1CM124, or booster pump recirculation isolation valve 1CM250 if low pressure cleanup were used.

15) Start one condensate booster pump. Place all non-operating hotwell and booster pumps in the auto mode.

16) Begin warming feedwater pump turbines by slowly admitting auxiliary steam.

17) Fill steam generators to no-load level through the feedwater control valve bypass valves and the feedwater preheater bypass valves to the auxiliary nozzle by use of one condensate booster pump. Place control valve bypass valves in auto mode via the selector station.

18) Shut off auxiliary steam to the C heaters. The heaters may now rely on steam extracted from the turbine.

19) The feedwater pump should be windmilling. Admit steam to increase turbine speed so that pressure is less than 1335 psig, but high enough to feed the steam generators.

20) Check for voids by surface thermocouple readings. When voids have been eiliminated, close the feedwater control valve bypass valves. Open the main control valves by placing them in the auto mode via the selector station.

21) Open reverse flow purge isolation valves and steam generator tempering isolation valves to pressurize feedwater piping to main nozzle.

22) Open reverse purge to condenser isolation valve to allow flow to the condenser, thus purging the main feedwater line.

23) Monitor thermocouple readings between isolation valves and steam generators.

24) When temperature limits are met on all four steam generators, close reverse purge to condenser isolation valve.

25) Close reverse flow purge isolation valves.

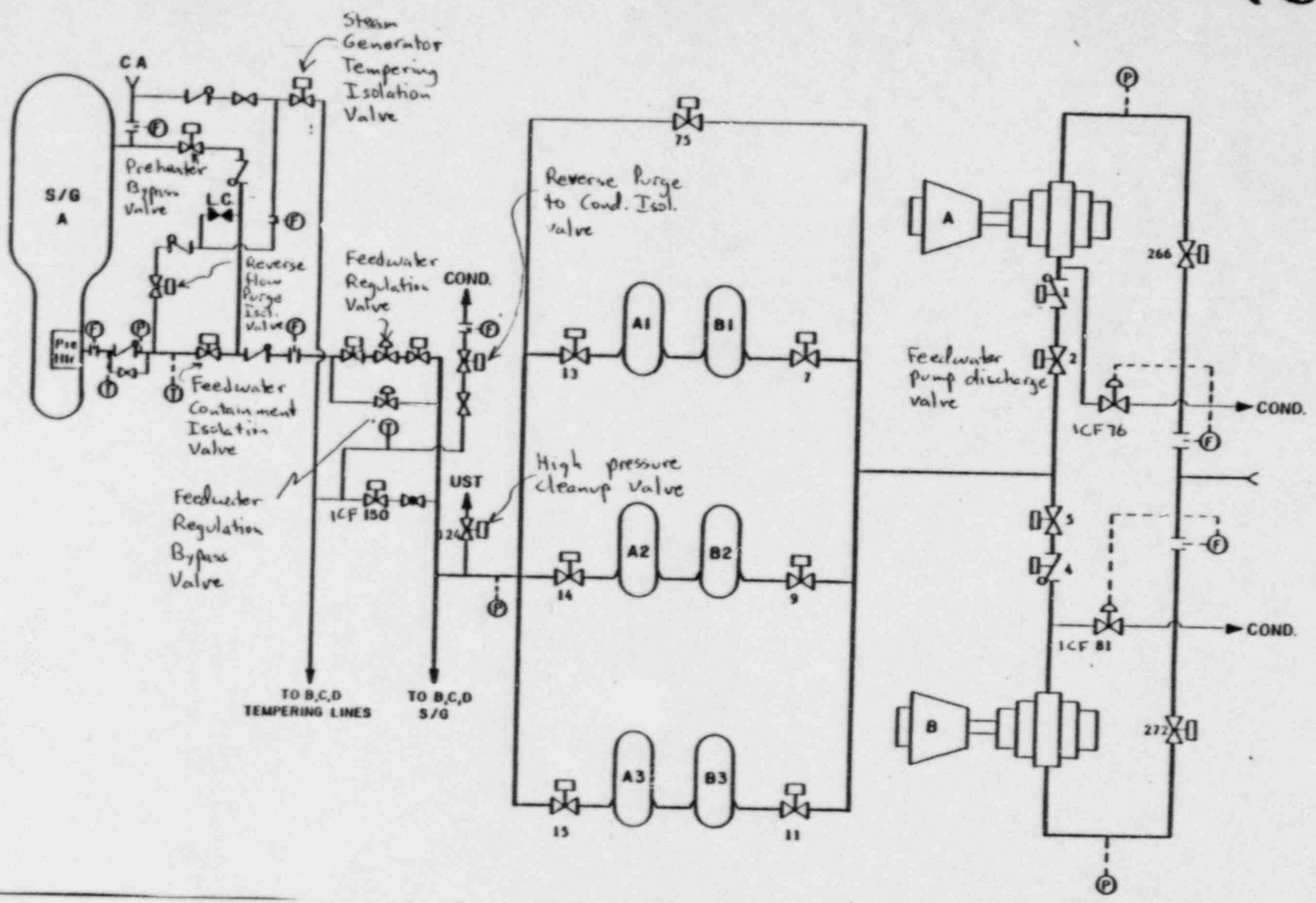
26) Open tempering supply to CA nozzles valve 1CF150 to provide tempering flow to the upper nozzles.

27) When the minimum required power level has been attained, open the feedwater containment isolation valves to allow forward flow to the main nozzle.

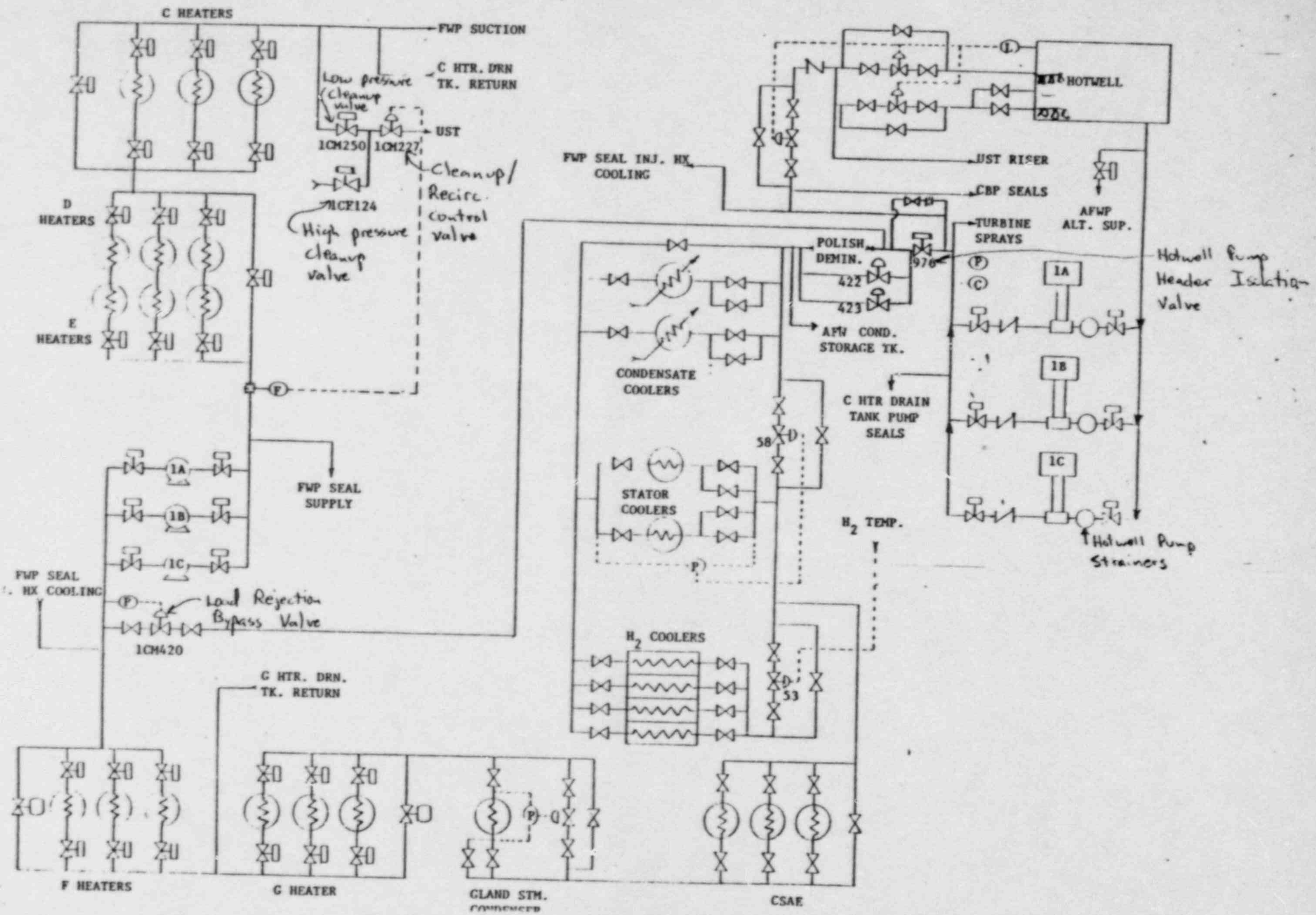
28) Close preheater bypass valves.

29) Start the second condensate booster pump.

30) As load rises to the proper level, start the second feedwater pump.



CA
Steam Generator Tempering Isolation Valve
S/G A
Preheater Bypass Valve
LC
Reverse flow Purge Isol. Valve
Feedwater Regulation Valve
COND.
Reverse Purge to Cond. Isol. Valve
75
A
266
A1
B1
13
7
Feedwater Containment Isolation Valve
Feedwater pump discharge valve
1
2
1CF 76
COND.
Feedwater Regulation Bypass Valve
1CF 150
UST
124
High pressure cleanup Valve
A2
B2
14
9
5
4
1CF 81
COND.
TO B,C,D TEMPERING LINES
TO B,C,D S/G
B
272
A3
B3
15
11


C HEATERS
FWP SUCTION
C HTR. DRN TK. RETURN
Low pressure cleanup valve
UST
1CM250
1CM227
Cleanup/ Recirc control valve
1CF124
High pressure cleanup valve
D HEATERS
E HEATERS
1A
1B
1C
FWP SEAL SUPPLY
FWP SEAL HX COOLING
Load Rejection Bypass Valve
1CM420
G HTR. DRN. TK. RETURN
F HEATERS
G HEATER
GLAND STM.
CSAE
FWP SEAL INJ. HX COOLING
HOTWELL
UST RISER
CBP SEALS
TURBINE SPRAYS
AFWP ALT. SUP.
POLISH DEMIN.
422
423
976
Hotwell Pump Header Isolation Valve
AFW COND. STORAGE TK.
CONDENSATE COOLERS
C HTR DRAIN TANK PUMP SEALS
58
STATOR COOLERS
H_2 TEMP.
H_2 COOLERS
53
Hotwell Pump Strainers

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 8602110070 DOC. DATE: 86/02/04 NOTARIZED: NO DOCKET #
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50-370 William B. McGuire Nuclear Station, Unit 2, Duke Powe 05000370

AUTH. NAME	AUTHOR AFFILIATION
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RECIP. NAME	RECIPIENT AFFILIATION
DENTON, H. R.	Office of Nuclear Reactor Regulation, Director (post 851125
YOUNGBLOOD, B. J.	PWR Project Directorate 4

SUBJECT: Responds to 851127 request for addl info re elimination of arbitrary intermediate pipe breaks from structural design basis. Procedures & design features to minimize potential for waterhammer in feedwater sys discussed.

DISTRIBUTION CODE: A012D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 8
TITLE: OR Submittal: USI A-1 Steam Gen Feedwater Flow Instabl - Water Hammer

NOTES: 05000369
OL: 10/23/81
05000370
OL: 03/03/83

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	PWR-A RSB	1	1			
INTERNAL:	ACRS 11	6	6	ADM/LFMB	1	0
	AEOD 12	1	1	ELD/HDS4 14	1	1
	NRR BWR ADTS	1	1	NRR NEIGHBORS13	1	1
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	NRR/DSRO/SPEB	1	1	NRR/ORAS 10	1	1
	REG FILE 04	1	1	RGN2	1	1
EXTERNAL:	24X	1	1	LPDR 03	1	1
	NRC PDR 02	1	1	NSIC 05	1	1

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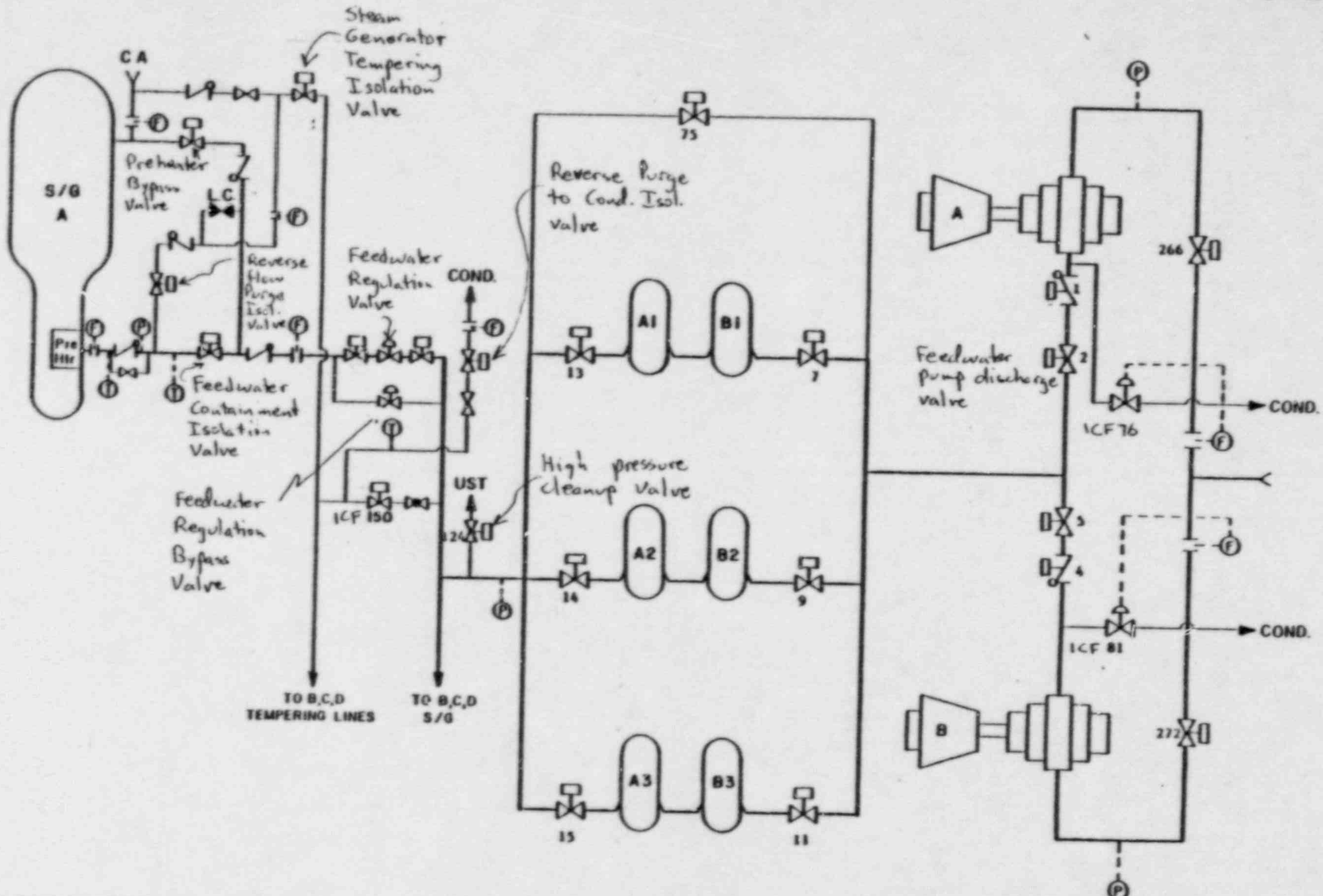
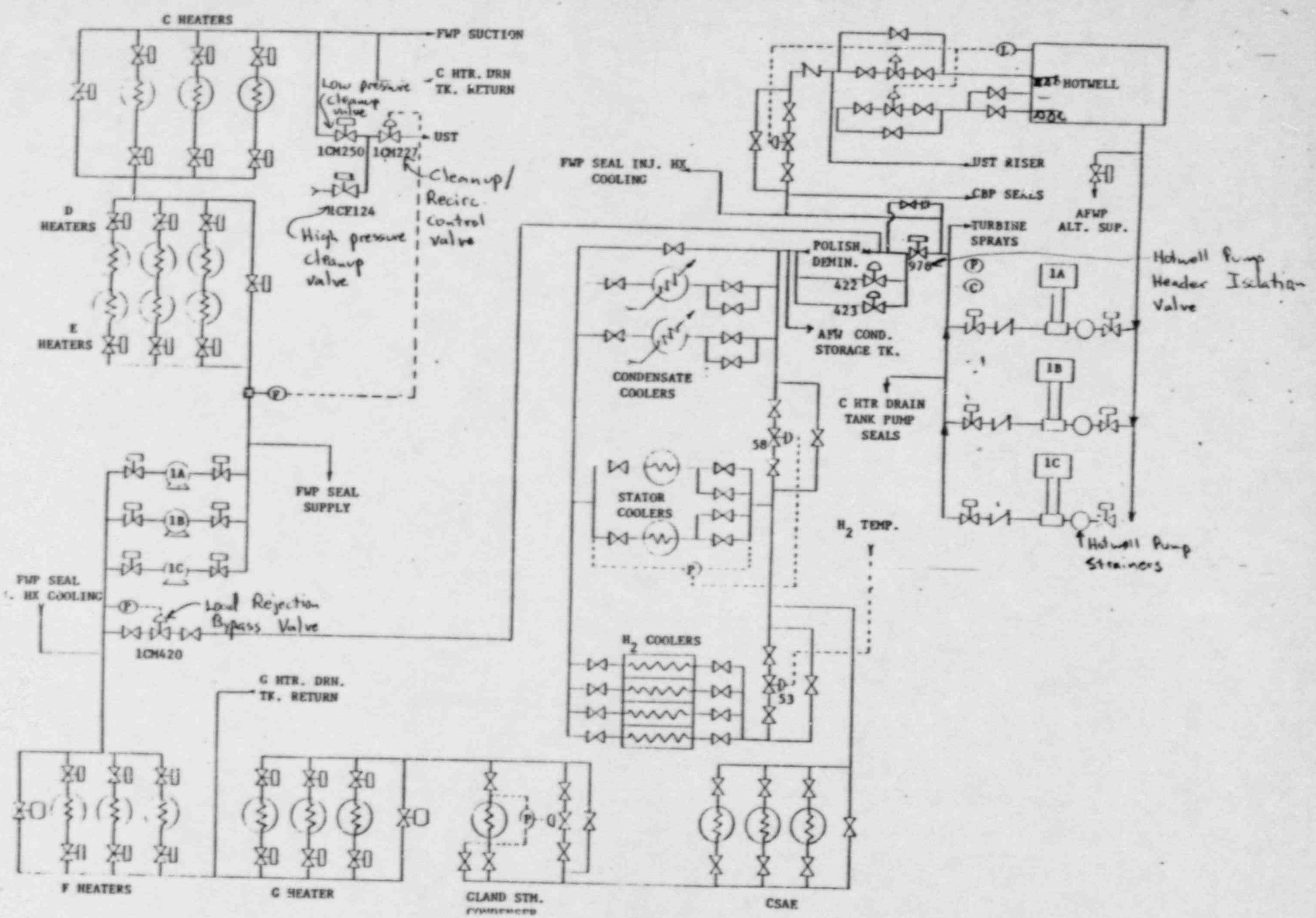


S/G
A
CA
Pre Htr
Preheater Bypass Valve
LC
Reverse Flow Purge Isol. Valve
Steam Generator Tempering Isolation Valve
Feedwater Containment Isolation Valve
Feedwater Regulation Valve
Feedwater Regulation Bypass Valve
ICF 150
COND.
UST
124
Reverse Purge to Cond. Isol. valve
High pressure cleanup Valve
TO B,C,D TEMPERING LINES
TO B,C,D S/G
75
13
A1
B1
7
14
A2
B2
9
15
A3
B3
11
A
B
266
272
1
2
3
4
Feedwater pump discharge valve
ICF 76
ICF 81
COND.
COND.



C HEATERS
FWP SUCTION
C HTR. DRN TK. RETURN
Low pressure cleanup valve
1CM250
1CM227
UST
Cleanup/ Recirc control valve
1CF124
High pressure cleanup valve
D HEATERS
E HEATERS
FWP SEAL SUPPLY
1A
1B
1C
FWP SEAL HX COOLING
Load Rejection Bypass Valve
1CM420
G HTR. DRN. TK. RETURN
F HEATERS
G HEATER
GLAND STM. CONDENSER
CSAE
FWP SEAL INJ. HX COOLING
HOTWELL
UST RISER
CBP SEALS
AFWP ALT. SUP.
TURBINE SPRAYS
POLISH DEMIN.
422
423
978
Hotwell Pump Header Isolation Valve
AFW COND. STORAGE TK.
C HTR DRAIN TANK PUMP SEALS
CONDENSATE COOLERS
STATOR COOLERS
58
H_2 TEMP.
H_2 COOLERS
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Hotwell Pump Strainers

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 8602110070 DOC. DATE: 86/02/04 NOTARIZED: NO DOCKET #
FACIL: 50-369 William B. McGuire Nuclear Station, Unit 1, Duke Powe 05000369
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AUTH. NAME AUTHOR AFFILIATION
TUCKER, H. B. Duke Power Co.
RECIP. NAME RECIPIENT AFFILIATION
DENTON, H. R. Office of Nuclear Reactor Regulation, Director (post 851125
YOUNGBLOOD, B. J. PWR Project Directorate 4

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NOTES: 05000369
OL: 10/23/81
05000370
OL: 03/03/83

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	PWR-A RSB	1	1			
INTERNAL:	ACRS 11	6	6	ADM/LFMB	1	0
	AEOD 12	1	1	ELD/HDS4 14	1	1
	NRR BWR ADTS	1	1	NRR NEIGHBORS13	1	1
	NRR PWR-A ADTS	1	1	NRR PWR-B ADTS	1	1
	NRR/DSRO/SPEB	1	1	NRR/ORAS 10	1	1
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xc: Mr. Darl Hood
Project Manager
Division of Licensing
Office of Nuclear Regulatory Commission
Washington, D.C. 20555

Mr. W.T. Orders
NRC Resident Inspector
McGuire Nuclear Station

Dr. J. Nelson Grace
Regional Administrator
U.S. Nuclear Regulatory Commission
Region II
101 Marietta St., NW, Suite 2900
Atlanta, Georgia 30323

A012 Add: Gammill ltr Encl 1 1, Berlinger 1 1

System Design and Operating Procedures
Implemented at McGuire to Minimize Potential for Waterhammer

A. Feedwater System

Potential waterhammer at McGuire is minimized by the utilization of several startup and normal operational methods along with waterhammer prevention features originally designed into the system. The startup of a feedwater pump is done only after all voids in the piping have been purged. Air voids in the piping upstream of the feedwater regulation valves are removed by filling, venting and pressurizing the system via the hotwell pumps. The hotwell pumps are interlocked with the hotwell pump header isolation valve so that the pump cannot be started if the valve is open. The flow is passed through bypass piping which contains an orifice sized to achieve low flow. Low flows will prevent bubble collapse during filling when significant voids are present. Filling by use of the hotwell pumps is done prior to admitting flow to the steam generators. The remaining piping to the steam generators is purged by use of the auxiliary feedwater nozzle (i.e. steam generator preheater bypass piping). Flow during this phase of purging is provided by the condensate booster pump and is regulated through a 6" feedwater regulation bypass valve. Waterhammer is therefore avoided during the initial phases of startup by filling and venting at low flows and low pressure.

After the initial purging is complete, temperature, pressure and flow are increased. During the time when flow is less than 17% and feedwater temperature is less than 250°F, flow continues to be directed through the preheater bypass piping rather than the main feedwater nozzle. By not introducing cold water to the preheater when significant voids are present, possible pressure transients are avoided.

When flow exceeds 17% and temperature is greater than 250°F, feedwater flow will be transferred to the main nozzle. Prior to transferring to the main nozzle, the cold water betweeen the feedwater isolation valve and the steam generator must be purged. This is accomplished by the reverse flow purge procedure. A controlled rate of hot water is allowed to flow out of the main feedwater nozzle in the reverse direction, around the containment check valve to the main condensers. Fluid temperature is monitored in the main feedwater lines at several locations to ensure that the required temperature is reached before the feedwater isolation valves are opened.

During normal operation, a continuous tempering flow to the upper nozzle is provided. This prevents steam backleakage into the main feedwater piping which could result in void formation. It also serves as coolant for the inner surface of the auxiliary feedwater nozzle.

Several waterhammer prevention features have been designed into the feedwater system. McGuire's steam generators utilize feedwater injection into the feed preheater section rather than the feedring type design. According to Westinghouse, "At low feedwater flows during startup, low power, and accident conditions it is possible the feedwater pipe may drain if steam generator level should drop below the feedwater inlet. Plants with preheat steam generators are not as susceptible as plants with feedring type steam generators to draining the feedline during startup or low power operation; however, feedline draining can be postulated to occur during certain accidents. The draining of the feedline permits steam to enter the drained feedwater piping, thereby establishing conditions conducive to waterhammer. Waterhammer is generated by the acceleration of a water slug along the pipe to fill the void created when the steam bubble collapses. The resultant slug impact causes a pressure pulse to act upon the piping system."

The main feedwater line arrangement at McGuire has been designed in accordance with Westinghouse recommendations in that a 90° elbow is connected directly to the steam generator feedwater nozzle. This tends to minimize the portion of feedwater piping which can drain into the steam generator and become filled with steam. Also, loop seals have been employed to minimize the length of line subject to drainage.

Additional protection for the preheater section is provided by the feedwater isolation valve opening time. It takes approximately 10 minutes for the valve to fully open. This slow opening time will prevent waterhammer in the preheater due to flow initiation.

Based on the procedures and design features discussed above, the potential for condensation induced waterhammer is minimized in the main feedwater piping.

B. Auxiliary Feedwater System

Listed below are the design features utilized at McGuire that minimize the potential for condensation induced waterhammer.

1. Auxiliary feedwater piping around the steam generator nozzle is routed so as to prevent steam voids by a 90° elbow connected immediately to a vertical run of pipe.

2. Tempering flow is provided continuously to prevent steam backleakage into the auxiliary feedwater piping. Backleakage that could create voids can occur only if both check valves leak. Detection of this situation is provided by the thermocouples placed upstream of the check valve closest to the steam generator. If leakage is detected, the associated CA pump is operated at low flow to cool the lines.

3. The steam generator programmed water level is above the auxiliary feedwater nozzles during 100% power operation. If leakage does occur, it would be water, not steam.

4. The auxiliary feedwater system check valves will be maintained to minimize backleakage. We have recently installed check valves in the pump discharge lines which seat under low flow to further enhance their reliability.

5. There are two check valves in each flow path by which backleakage could occur into the auxiliary feedwater system. Therefore, the chance of leakage or a problem due to single failure is minimized.

FEEDWATER STARTUP PROCESS

<u>Cold Startup</u> (See attached flow diagrams)

1) The following valves should be closed:

   Hotwell pump header isolation valve 1CM976

   Condensate polisher demineralizers outlet valves

   Feedwater heater bypass valves

   Feedwater pump recirculation valves 1CF76 and 1CF81

   Feedwater containment isolation valves

   Feedwater regulation valves

   Feedwater regulation bypass valves

   Feedwater preheater bypass valves

   Reverse flow purge containment isolation valve

   Steam generator tempering isolation valves

   Condensate polisher bypass valves 1CM422 and 1CM423

   Reverse purge to condensor isolation valve

2) The following valves should be open:

   Cleanup/recirculation control valve 1CM227

   High pressure cleanup valve 1CF124 (or close 1CF124 and open 1CM250 if low pressure cleanup is desired)

   Feedwater pump discharge valve 1CF2 and 1CF5

   Hotwell pump header isolation valve bypass valve

   Load rejection bypass valve 1CM420

3) Start one hotwell pump. Open condensate polisher bypass valves.

4) When instrumentation in the 20 inch line to the upper surge tank indicates the system is water solid, open hotwell pump header isolation valve.

5) Set position of 1CM227 to obtain a flowrate of about 4000 gpm.

6) Open 1CF76 and or/1CF81 to increase flow to 5000 gpm.

7) Start second hotwell pump.

8) Increase flow through 1CF76 and/or 1CF81 to 6000 gpm.

9) Draw vacuum in the main condenser, feedwater pump turbine condensers, and upper surge tanks.

10) Place upper surge tank and condensate storage tank heating system into service.

11) Align auxiliary steam to C heaters for heatup.

12) When the condensate has been cleaned sufficiently and proper flow rate has been established, place the condensate polishers in "auto" mode (1CM422 and 1CM423 are under control of the polisher system to maintain pressure drop and the cells are in "filter" mode).

13) Slowly open the recirculation valve, either 1CF76 or 1CF82, of the feedwater pump to be started, while slowly closing 1CM227. When 1CM227 is closed completely, the feedwater pump recirculation valve should be opened fully.

14) Close CF System flush isolation valve 1CM124, or booster pump recirculation isolation valve 1CM250 if low pressure cleanup were used.

15) Start one condensate booster pump. Place all non-operating hotwell and booster pumps in the auto mode.

16) Begin warming feedwater pump turbines by slowly admitting auxiliary steam.

17) Fill steam generators to no-load level through the feedwater control valve bypass valves and the feedwater preheater bypass valves to the auxiliary nozzle by use of one condensate booster pump. Place control valve bypass valves in auto mode via the selector station.

18) Shut off auxiliary steam to the C heaters. The heaters may now rely on steam extracted from the turbine.

19) The feedwater pump should be windmilling. Admit steam to increase turbine speed so that pressure is less than 1335 psig, but high enough to feed the steam generators.

20) Check for voids by surface thermocouple readings. When voids have been eiliminated, close the feedwater control valve bypass valves. Open the main control valves by placing them in the auto mode via the selector station.

21) Open reverse flow purge isolation valves and steam generator tempering isolation valves to pressurize feedwater piping to main nozzle.

22) Open reverse purge to condenser isolation valve to allow flow to the condenser, thus purging the main feedwater line.

23) Monitor thermocouple readings between isolation valves and steam generators.

24) When temperature limits are met on all four steam generators, close reverse purge to condenser isolation valve.

25) Close reverse flow purge isolation valves.

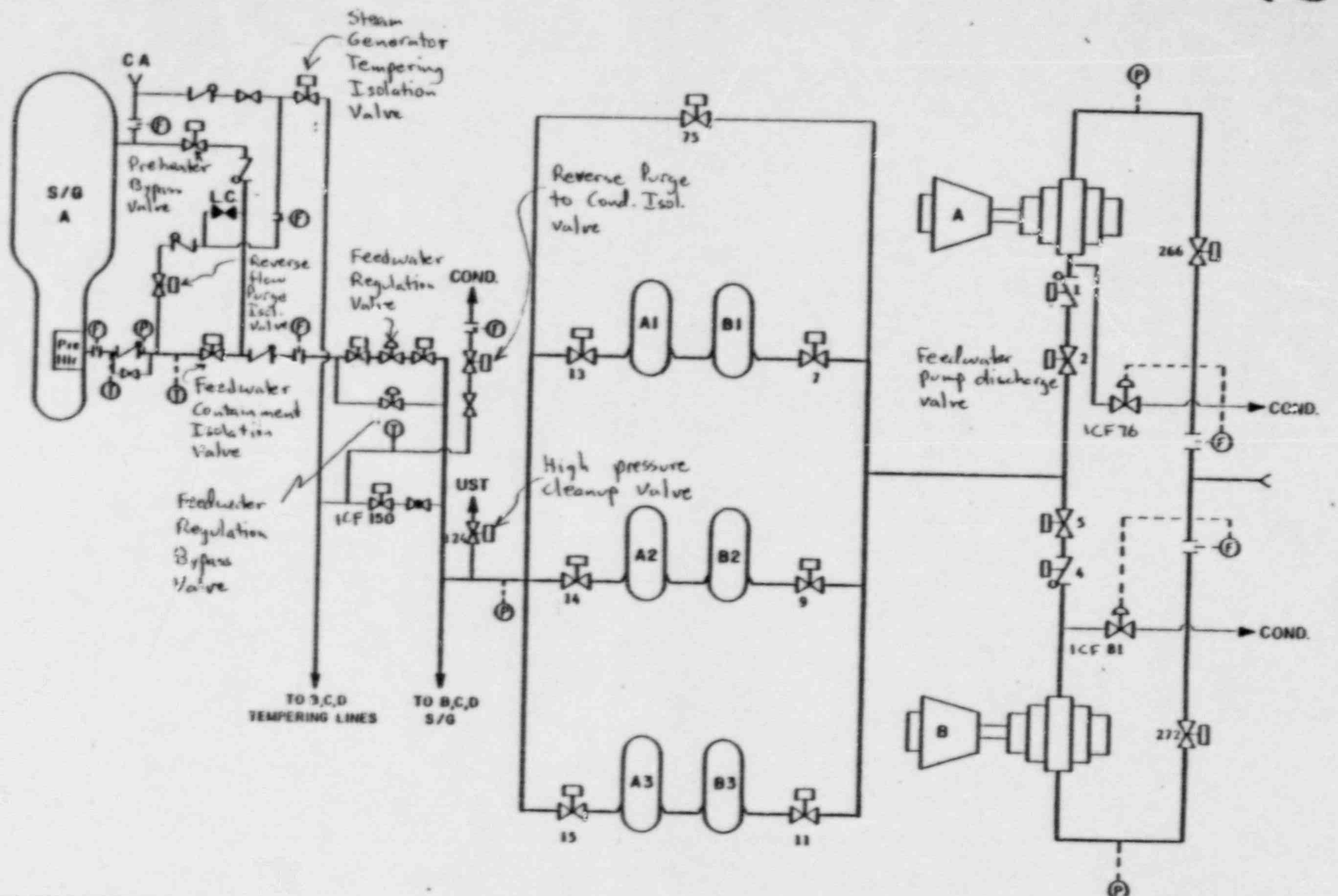
26) Open tempering supply to CA nozzles valve 1CF150 to provide tempering flow to the upper nozzles.

27) When the minimum required power level has been attained, open the feedwater containment isolation valves to allow forward flow to the main nozzle.

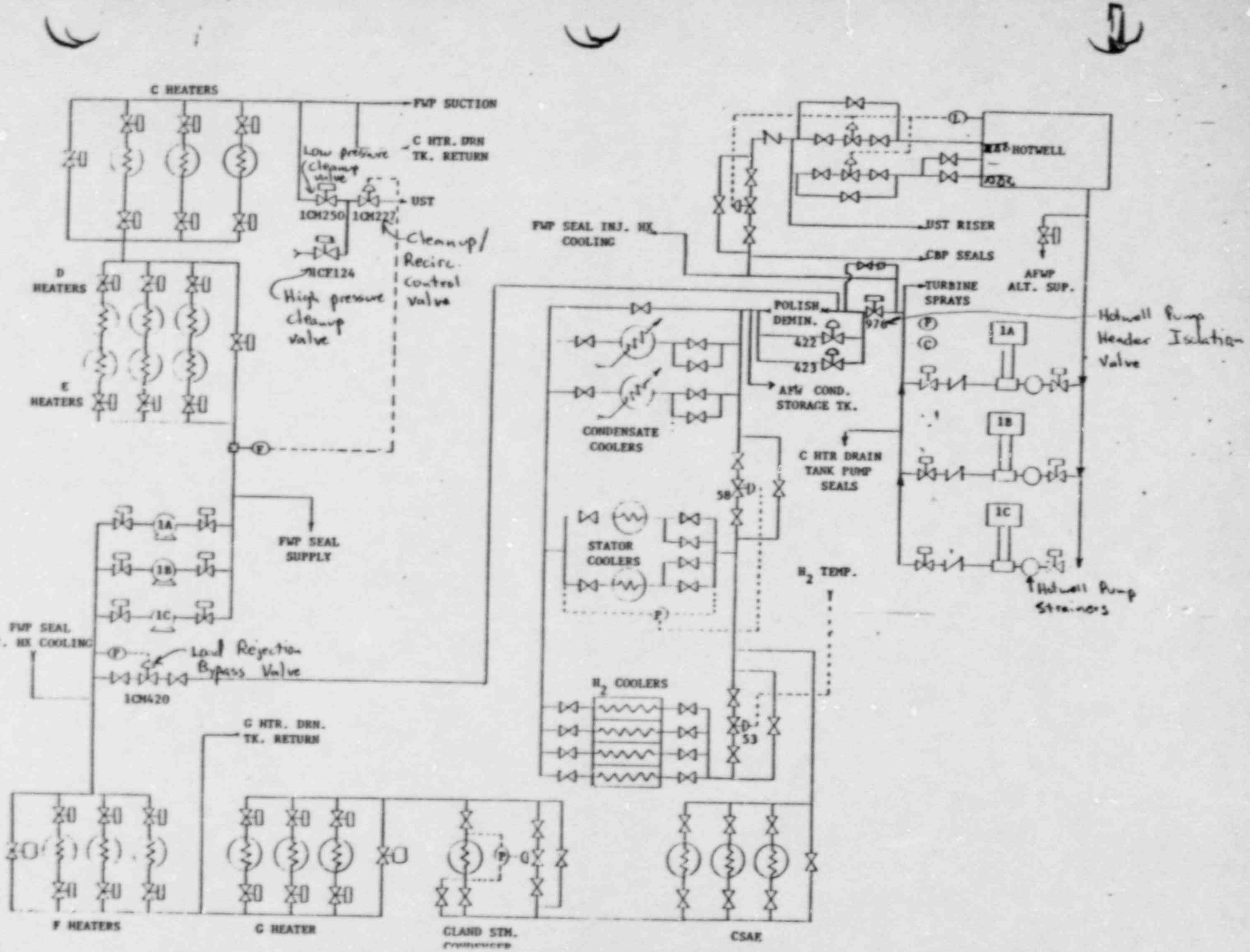
28) Close preheater bypass valves.

29) Start the second condensate booster pump.

30) As load rises to the proper level, start the second feedwater pump.



S/G
A
CA
Preheater Bypass Valve
LC
Steam Generator Tempering Isolation Valve
Reverse Flow Purge Isol. Valve
Feedwater Containment Isolation Valve
Feedwater Regulation Valve
Feedwater Regulation Bypass Valve
1CF 150
COND.
UST
124
TO B,C,D TEMPERING LINES
TO B,C,D S/G
Reverse Purge to Cond. Isol. valve
High pressure cleanup Valve
75
A1
B1
A2
B2
A3
B3
13
7
14
9
15
11
A
B
266
272
1
2
5
4
Feedwater pump discharge valve
1CF 76
1CF 81
COND.



C HEATERS
FWP SUCTION
Low pressure cleanup valve
C HTR. DRN TK. RETURN
1CM250
1CM227
UST
Cleanup/ Recirc. control valve
1CF124
High pressure cleanup valve
D HEATERS
E HEATERS
FWP SEAL SUPPLY
1A
1B
1C
FWP SEAL HX COOLING
Load Rejection Bypass Valve
1CM420
G HTR. DRN. TK. RETURN
F HEATERS
G HEATER
GLAND STM.
CSAE
HOTWELL
UST RISER
CBP SEALS
FWP SEAL INJ. HX COOLING
AFWP ALT. SUP.
TURBINE SPRAYS
POLISH DEMIN.
422
423
978
Hotwell Pump Header Isolation Valve
AFW COND. STORAGE TK.
CONDENSATE COOLERS
C HTR DRAIN TANK PUMP SEALS
58
STATOR COOLERS
H_2 TEMP.
Hotwell Pump Strainers
H_2 COOLERS
53

DUKE POWER COMPANY
P.O. BOX 33189
CHARLOTTE, N.C. 28242

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(704) 373-4531

February 4, 1986

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: B.J. Youngblood, Director
PWR Project Directorate #4
Division of PWR Licensing - A

Subject: McGuire Nuclear Station
Docket Nos. 50-369, -370

Dear Mr. Youngblood:

By letter dated November 27, 1985, NRC staff requested additional information regarding elimination of arbitrary intermediate pipe breaks from the McGuire structural design bases.

Accordingly, please find attached the Duke response to this request. If there are any questions please advise through normal licensing channels.

Very truly yours,

Hal B. Tucker

Hal B. Tucker

RLG/jgm

Attachment

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Berlinger

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Feedwater regulation valves

Feedwater regulation bypass valves

Feedwater preheater bypass valves

Reverse flow purge containment isolation valve

Steam generator tempering isolation valves

Condensate polisher bypass valves 1CM422 and 1CM423

Reverse purge to condensor isolation valve

2) The following valves should be open:

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Hotwell pump header isolation valve bypass valve

Load rejection bypass valve 1CM420

3) Start one hotwell pump. Open condensate polisher bypass valves.

4) When instrumentation in the 20 inch line to the upper surge tank indicates the system is water solid, open hotwell pump header isolation valve.

5) Set position of 1CM227 to obtain a flowrate of about 4000 gpm.

6) Open 1CF76 and or/1CF81 to increase flow to 5000 gpm.

7) Start second hotwell pump.

8) Increase flow through 1CF76 and/or 1CF81 to 6000 gpm.

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10) Place upper surge tank and condensate storage tank heating system into service.

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24) When temperature limits are met on all four steam generators, close reverse purge to condenser isolation valve.

25) Close reverse flow purge isolation valves.

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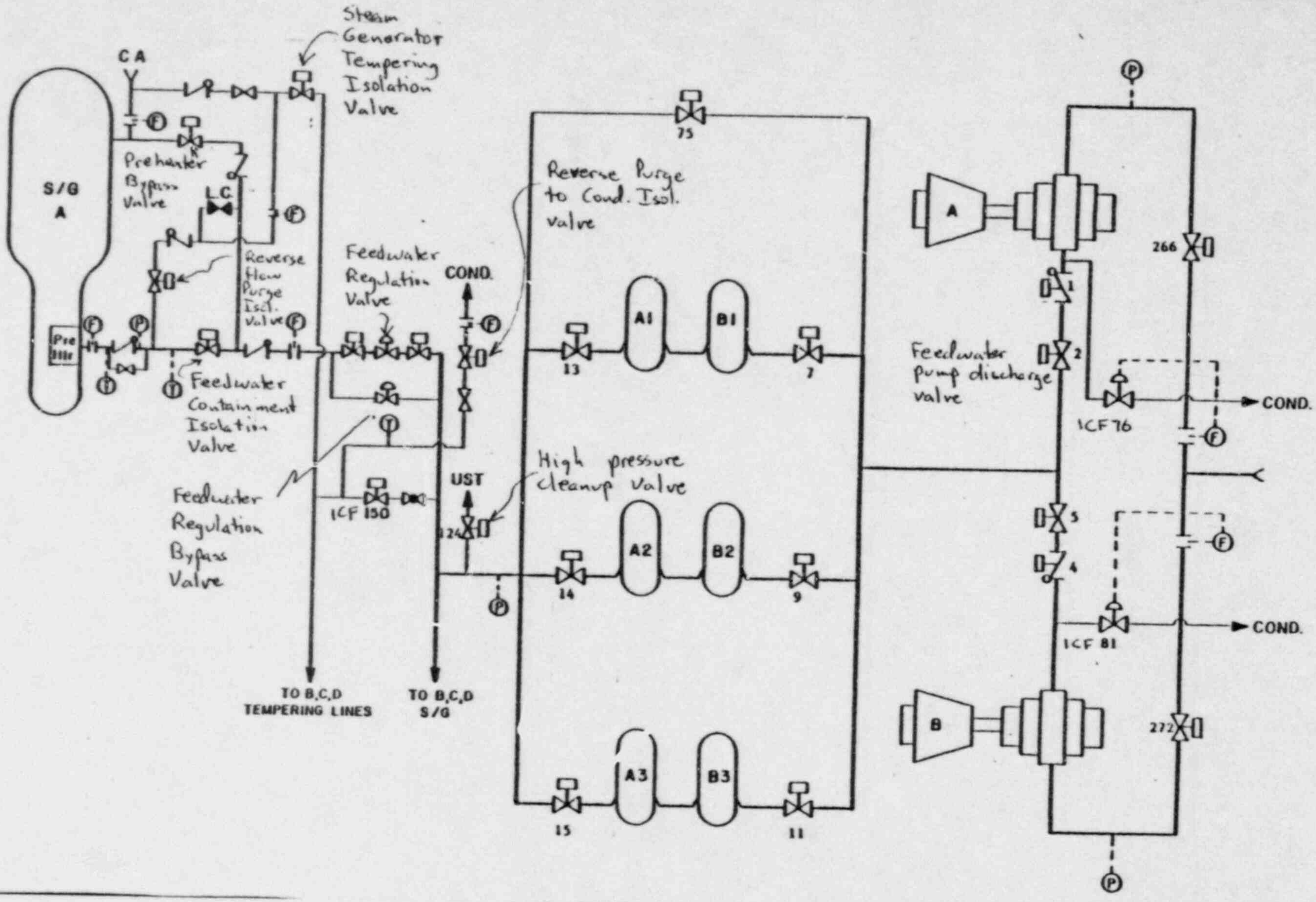
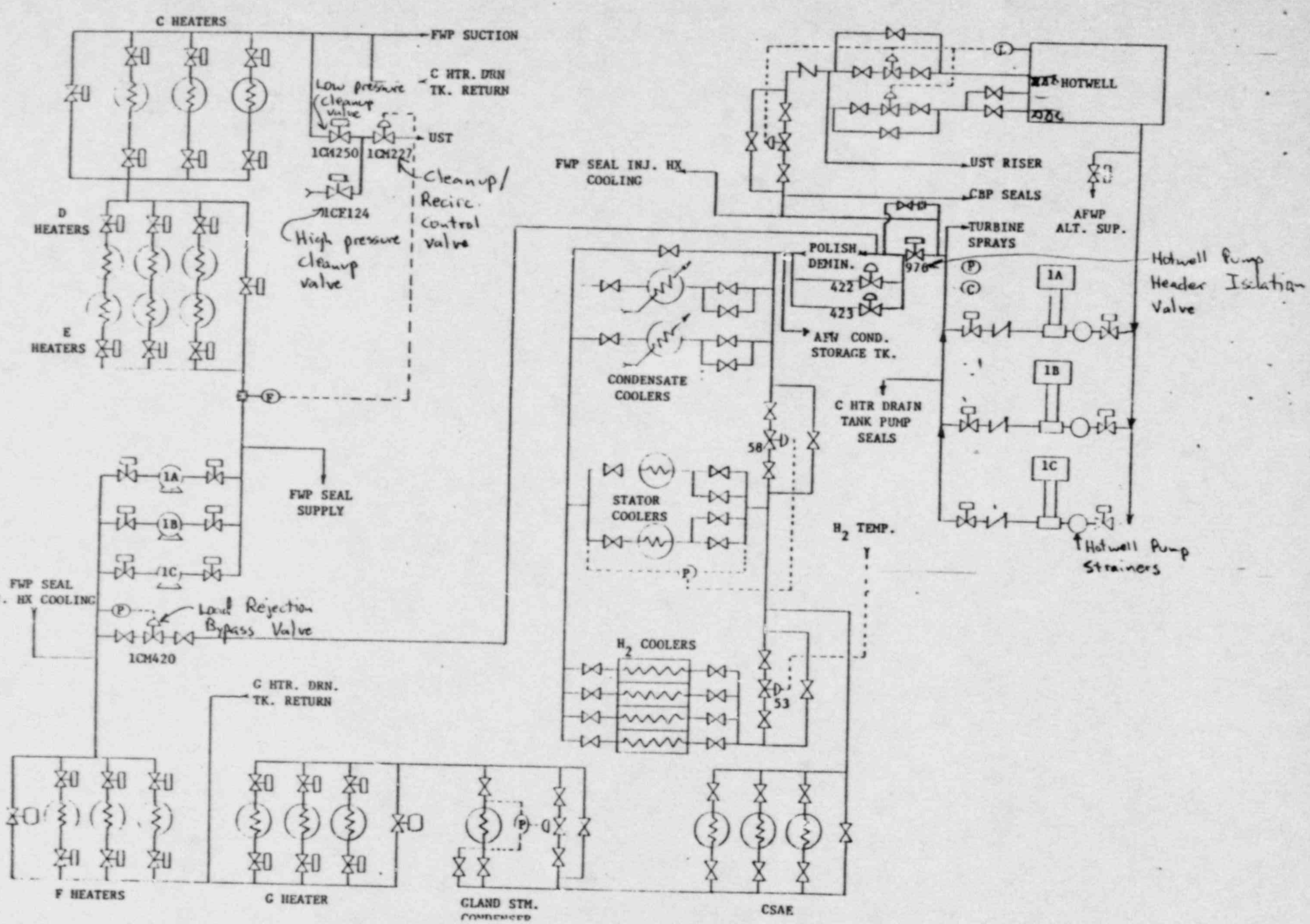

Steam Generator Tempering Isolation Valve
CA
Preheater Bypass Valve
S/G A
LC
Reverse flow Purge Isol. Valve
Pre Htr
Feedwater Containment Isolation Valve
Feedwater Regulation Valve
Feedwater Regulation Bypass Valve
COND.
Reverse Purge to Cond. Isol. valve
ICF 150
UST
124
High pressure cleanup Valve
TO B,C,D TEMPERING LINES
TO B,C,D S/G
75
A1
B1
13
7
A2
B2
14
9
A3
B3
15
11
A
B
266
1
2
Feedwater pump discharge valve
ICF 76
COND.
5
4
ICF 81
COND.
272



C HEATERS
FWP SUCTION
C HTR. DRN
TK. RETURN
Low pressure cleanup valve
1CM250
1CM227
UST
Cleanup/
Recirc
control
valve
1CF124
High pressure
cleanup
valve
D
HEATERS
E
HEATERS
F
1A
1B
1C
FWP SEAL
SUPPLY
FWP SEAL
HX COOLING
P
Load Rejection
Bypass Valve
1CM420
G HTR. DRN.
TK. RETURN
F HEATERS
G HEATER
GLAND STM.
CONDENSER
CSAE
HOTWELL
UST RISER
CBP SEALS
FWP SEAL INJ. HX
COOLING
AFWP
ALT. SUP.
TURBINE
SPRAYS
POLISH
DEMIN.
422
423
978
AFW COND.
STORAGE TK.
Hotwell Pump
Header Isolation
Valve
C HTR DRAIN
TANK PUMP
SEALS
CONDENSATE
COOLERS
58
STATOR
COOLERS
H2 TEMP.
H2 COOLERS
53
Hotwell Pump
Strainers