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SORENSEN, G.C. Washington Public Power Supply System
RECIP. NAME RECIPIENT AFFILIATION
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SUBJECT: Responds to IE Bulletin 88-004 re potential safety-related pump loss.

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

P.O. Box 968 • 3000 George Washington Way • Richland, Washington 99352

July 8, 1988
G02-88-150

Docket No. 50-397

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, D.C. 20555

Gentlemen:

Subject: NUCLEAR PLANT NO. 2
OPERATING LICENSE NPF-21
RESPONSE TO IEB 88-04, "POTENTIAL
SAFETY RELATED PUMP LOSS"

Reference: Letter, BWROG-8836, D.N. Grace (BWR Owners
Group Chairman) to US NRC, same subject,
dated July 5, 1988

The subject bulletin requested all licensees to investigate and correct as applicable two minimum flow safety related pump design concerns: dead heading due to pump-to-pump interaction and the adequacy of installed minimum flow capacity for a single pump in operation. With regard to the first concern WNP-2 has no safety related pumps with detrimental pump-to-pump interaction. The second concern, minimum flow line adequacy, is addressed in the attached report. The attached commits to providing additional information on this concern within 75 days of this response.

The Supply System is a participant in the BWR Owners Group and as such endorses the referenced letter submitted by that group to respond generically to the bulletin. The attached report provides additional information on plant specifics detailing both short and long term action and schedule, and endorses the justification for continued operation supplied in the reference by the BWR Owners Group.

Should you have any questions, please contact Mr. A. G. Hosler, Manager, WNP-2 Licensing.

Very truly yours,


G. C. Sorensen, Manager
Regulatory Programs

PLP/bk

cc: JB Martin - NRC RV
NS Reynolds - BCP&R
RB Samworth - NRC
DL Williams - BPA/399
NRC Site Inspector - 901A

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STATE OF WASHINGTON)
COUNTY OF BENTON)

Subject: Response IEB 88-04

I, G. C. Sorensen, being duly sworn, subscribe to and say that I am the Manager, Regulatory Programs for the WASHINGTON PUBLIC POWER SUPPLY SYSTEM, the applicant herein; that I have full authority to execute this oath; that I have reviewed the foregoing; and that to the best of my knowledge, information and belief the statements made in it are true.

DATE July 8, 1988

G. C. Sorensen
G. C. Sorensen, Manager
Regulatory Programs

On this day personally appeared before me G. C. Sorensen to me known to be the individual who executed the foregoing instrument and acknowledged that he signed the same as his free act and deed for the uses and purposes herein mentioned.

GIVEN under my hand and seal this 8th day of July 1988.

S. B. Michaels
Notary Public in and for the STATE
OF WASHINGTON

Residing at Rebland, WA.
Dec 89

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EVALUATION OF POTENTIAL SAFETY RELATED
PUMP LOSS: IEB 88-04

1. Safety Related Pump Evaluation

Table 1 lists 83 pumps at WNP-2 which are considered safety related (Table 1). Of these pumps, 38 are centrifugal pumps which were specifically evaluated for problems related to pump-to-pump interaction and minimum flow operation. The remaining pumps are positive displacement pumps.

The results of the WNP-2 evaluation are presented in Table 2.

In summary, no pump or piping configurations were found which could lead to detrimental pump-to-pump interactions. From the Table 2 list, 24 of the 38 pumps were found to be of no concern and 14 pumps were found which could experience short periods of dead head and/or minimum flow operation during normal pump start up and routine testing. Specific discussion on these pumps is provided below.

2. Short and Long Term Evaluation Program

Of the 14 pumps identified from Table 2, six have been evaluated as not having or not susceptible to concerns related to inadequate minimum flow capacity. Records of these evaluations will be maintained per the guidance of IEB 88-04. The remaining eight, subject to continued evaluation are:

- o Reactor Heat Removal Pumps 2A, 2B, & 2C
- o High Pressure Core Spray Pump 1
- o Low Pressure Core Spray Pump 1
- o Standby Service Water Pump 1A, & 1B
- o Reactor Core Isolation Cooling Pump 1

A description of the continuing evaluation for these pumps is provided below.

Prior to the issuance of IEB 88-04 all ECCS pump operating procedures were modified to include caution statements to the operator to ensure that the minimum flow valves opened upon starting the pump, and that the amount of time the pump is operated on minimum flow is minimized. These changes adequately address the need for short term modifications to operating procedures as required in the bulletin.

The evaluation programs, short and long term, are as follows:

A. Short Term Program

1. Authorize the pump manufacturers to reevaluate pump parameters and determine if current low and minimum flow operating parameters should be revised.
2. Perform base line vibration testing with temporary equipment at low and minimum flow operations. Analyze the data and determine the rotordynamic effects of the observed vibrations and develop a data base.
3. Based on 1 and 2, determine if any operating or hardware modifications are required, in the interim, prior to completion of the long term program.

These short term actions cannot be completed until the pump manufacturer's evaluations are completed, necessitating a follow-on report to be submitted within 75 days of this response.

B. Long Term Program

1. Complete data collection and analysis confirming the results of the short term program.
2. Based on vendor recommendations and the results of the short term program, future test requirements will be defined and incorporated into the current periodic inspections of the ISI program. Data exchange through the BWROG will enhance the historical data base development and is an integral component of this plan.
3. The results of the short term bases development could lead to hardware and operating mode changes. Among the potential hardware changes are piping modifications, pump internal modifications to adjust A and B gaps to reduce hydraulic instabilities, or use of adjustable speed drives. The long term program and data base development will provide feedback as to the adequacy of any short term modifications and identify any additional areas requiring modification.
4. The interim long term program which embodies the requirements for 10 year inspections per the ASME code will remain in effect until the necessity for modification is determined from the results of this program.

3. Justification For Continued Operation (JCO)

The Supply System endorses the JCO provided in the referenced BWROG submittal and reiterates the following in support of continued operation:

- A. The common minimum flow line design shared by two or more pumps does not exist in any safety related pump design at WNP-2.
- B. The ECCS pumps at WNP-2 were procured to the highest industry standards.
- C. The reliability and history of the ECCS pumps at WNP-2 have been demonstrated to be equal to that addressed in the BWROG JCO and therefore encompassed by that response.

TABLE 1

VNP2 PUMPS IMPORTANT TO SAFETY

TAG NO.	FUNCTION	SAF REL	PUMP TYPE	MANUFACTURER	IEB 88-84 PUMP	COMMENTS
CCH-P-1A	COOLING WATER FOR CONTROL ROOM CHILLERS	YES	CENTRIFUGAL	GOULD	NO	
CCH-P-1B	COOLING WATER FOR CONTROL ROOM CHILLERS	YES	CENTRIFUGAL	GOULD	NO	
CMS-P-1/13	SPARED IN PLACE	NO	POSITIVE DISPLACEMENT	METAL BELLOWS	NO	CLASS I PUMP SPARED IN PLACE FOR FUTURE USE
CMS-P-1/14	SPARED IN PLACE	NO	POSITIVE DISPLACEMENT	METAL BELLOWS	NO	CLASS I PUMP SPARED IN PLACE FOR FUTURE USE
CMS-P-2/13	SPARED IN PLACE	NO	POSITIVE DISPLACEMENT	METAL BELLOWS	NO	CLASS I PUMP SPARED IN PLACE FOR FUTURE USE
CMS-P-2/14	SPARED IN PLACE	NO	POSITIVE DISPLACEMENT	METAL BELLOWS	NO	CLASS I PUMP SPARED IN PLACE FOR FUTURE USE
CMS-P-1301	CONTAINMENT ATMOSPHERE SAMPLE PUMP	YES	POSITIVE DISPLACEMENT	AIR DIMENSIONS INC	NO	
CMS-P-1401	CONTAINMENT ATMOSPHERE SAMPLE PUMP	YES	POSITIVE DISPLACEMENT	AIR DIMENSIONS INC	NO	
CRD-P-1A	CONTROL ROD DRIVE WATER PUMP	NO	CENTRIFUGAL	UNION	YES	
CRD-P-1B	CONTROL ROD DRIVE WATER PUMP	NO	CENTRIFUGAL	UNION	YES	
DCV-P-1A2	DIESEL ENGINE CIRCULATING JACKET COOLING WATER	YES	CENTRIFUGAL	GM-EMD	YES	
DCV-P-1A1	DIESEL ENGINE CIRCULATING JACKET COOLING WATER	YES	CENTRIFUGAL	GM-EMD	YES	
DCV-P-1B1	DIESEL ENGINE CIRCULATING JACKET COOLING WATER	YES	CENTRIFUGAL	GM-EMD	YES	
DCV-P-1B2	DIESEL ENGINE CIRCULATING JACKET COOLING WATER	YES	CENTRIFUGAL	GM-EMD	YES	
DCV-P-1C	DIESEL ENGINE CIRCULATING JACKET COOLING WATER	YES	CENTRIFUGAL	GM-EMD	YES	
DCV-P-2A1	DIESEL ENGINE CIRCULATING JACKET COOLING WATER	YES	CENTRIFUGAL	GM-EMD	YES	
DCV-P-2A2	DIESEL ENGINE CIRCULATING JACKET COOLING WATER	YES	CENTRIFUGAL	GM-EMD	YES	
DCV-P-2B1	DIESEL ENGINE CIRCULATING JACKET COOLING WATER	YES	CENTRIFUGAL	GM-EMD	YES	
DCV-P-2B2	DIESEL ENGINE CIRCULATING JACKET COOLING WATER	YES	CENTRIFUGAL	GM-EMD	YES	
DCV-P-2C	DIESEL ENGINE CIRCULATING JACKET COOLING WATER	YES	CENTRIFUGAL	GM-EMD	YES	
DLO-P-10	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	GM-EMD	NO	
DLO-P-1A1	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	GM-EMD	NO	
DLO-P-1A2	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	GM-EMD	NO	

TABLE 1

WNP2 PUMPS IMPORTANT TO SAFETY

TAG NO.	FUNCTION	SAF REL	PUMP TYPE	MANUFACTURER	IEB 88-84 PUMP	COMMENTS
DLO-P-1B1	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	GM-EMD	NO	
DLO-P-1B2	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	GM-EMD	NO	
DLO-P-2A1	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	VIKING	NO	
DLO-P-2A2	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	VIKING	NO	
DLO-P-2B1	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	VIKING	NO	
DLO-P-2B2	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	VIKING	NO	
DLO-P-3A1	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	VIKING	NO	
DLO-P-3A2	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	VIKING	NO	
DLO-P-3A2	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	VIKING	NO	
DLO-P-3B1	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	VIKING	NO	
DLO-P-3B2	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	VIKING	NO	
DLO-P-4A1	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	GM-EMD	NO	
DLO-P-4A2	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	GM-EMD	NO	
DLO-P-4B1	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	GM-EMD	NO	
DLO-P-4B2	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	GM-EMD	NO	
DLO-P-5A1	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	GM-EMD	NO	
DLO-P-5A2	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	GM-EMD	NO	
DLO-P-5B1	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	GM-EMD	NO	
DLO-P-5B2	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	GM-EMD	NO	
DLO-P-6	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	VIKING	NO	
DLO-P-7	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	ALLISON	NO	
DLO-P-8	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	ALLISON	NO	
DLO-P-9	EMERG. DIESEL ENGINE OIL DRIVE PUMP	YES	POSITIVE DISPLACEMENT	GM-EMD	NO	

TABLE 1

WNP2 PUMPS IMPORTANT TO SAFETY

TAG NO.	FUNCTION	SAF REL	PUMP TYPE	MANUFACTURER	IEB 88-84 PUMP	COMMENTS
DO-P-1A	DIESEL FUEL TRANSFER PUMP	YES	CENTRIFUGAL	CRANE-DEMING	YES	
DO-P-1B	DIESEL FUEL TRANSFER PUMP	YES	CENTRIFUGAL	CRANE-DEMING	YES	
DO-P-2	DIESEL FUEL TRANSFER PUMP	YES	CENTRIFUGAL	CRANE-DEMING	YES	
DO-P-3A1	DIESEL ENGINE FUEL PUMP	YES	POSITIVE DISPLACEMENT	VIKING	YES	
DO-P-3A2	DIESEL ENGINE FUEL PUMP	YES	POSITIVE DISPLACEMENT	VIKING	YES	
DO-P-3B1	DIESEL ENGINE FUEL PUMP	YES	POSITIVE DISPLACEMENT	VIKING	YES	
DO-P-3B2	DIESEL ENGINE FUEL PUMP	YES	POSITIVE DISPLACEMENT	VIKING	YES	
DO-P-4A1	DIESEL ENGINE FUEL PUMP	YES	POSITIVE DISPLACEMENT	GM-EMD	YES	
DO-P-4A2	DIESEL ENGINE FUEL PUMP	YES	POSITIVE DISPLACEMENT	GM-EMD	YES	
DO-P-4B1	DIESEL ENGINE FUEL PUMP	YES	POSITIVE DISPLACEMENT	GM-EMD	YES	
DO-P-4B2	DIESEL ENGINE FUEL PUMP	YES	POSITIVE DISPLACEMENT	GM-EMD	YES	
DO-P-5	DIESEL ENGINE FUEL PUMP	YES	POSITIVE DISPLACEMENT	GM-EMD	YES	
DO-P-6	DIESEL ENGINE FUEL PUMP	YES	POSITIVE DISPLACEMENT	VIKING	YES	
FPC-P-1A	FUEL POOL COOLING WATER SUPPLY PUMP	YES	CENTRIFUGAL	WORTHINGTON	YES	
FPC-P-1B	FUEL POOL COOLING WATER SUPPLY PUMP	YES	CENTRIFUGAL	WORTHINGTON	YES	
HPCS-P-1	HIGH PRESSURE EMERGENCY MAKEUP TO REACTOR	YES	CENTRIFUGAL	INGERSOLL-RAND	YES	
HPCS-P-2	HPCS DIESEL SERVICE WATER PUMP	YES	CENTRIFUGAL	PACIFIC	YES	
HPCS-P-3	HPCS KEEP FILL SYSTEM PUMP	YES	CENTRIFUGAL	CRANE-DEMING	YES	
LPCS-P-1	LOW PRESSURE EMERGENCY MAKEUP TO REACTOR	YES	CENTRIFUGAL	INGERSOLL-RAND	YES	
LPCS-P-2	LPCS KEEP FILL SYSTEM PUMP	YES	CENTRIFUGAL	CRANE-DEMING	YES	
RCIC-P-1	MAKEUP TO REACTOR DURING ISOLATION EVENTS	NO	CENTRIFUGAL	BINGHAM-WILLANET	YES	
RCIC-P-2	GLAND CONDENSER VACUUM PUMP	NO	CENTRIFUGAL	NASH	YES	
RCIC-P-3	RCIC KEEP FILL SYSTEM PUMP	NO	CENTRIFUGAL	CRANE-DEMING	YES	

TABLE 1

WNP2 PUMPS IMPORTANT TO SAFETY

TAG NO.	FUNCTION	SAF REL	PUMP TYPE	MANUFACTURER	IEB 88-04 PUMP	COMMENTS
RCIC-P-4	GLAND CONDENSER CONDENSATE PUMP	NO	CENTRIFUGAL	NASH	YES	
RCIC-P-5	TURBINE OIL PUMP	NO	POSITIVE DISPLACEMENT	TUTHILL	NO	
RFW-P-1A	FEEDWATER PUMP	NO	CENTRIFUGAL	INGERSOLL-RAND	YES	
RFW-P-1B	FEEDWATER PUMP	NO	CENTRIFUGAL	INGERSOLL-RAND	YES	
RHR-P-2A	LOW PRESURE EMERGENCY MAKEUP TO REACTOR	YES	CENTRIFUGAL	INGERSOLL-RAND	YES	
RHR-P-2B	LOW PRESURE EMERGENCY MAKEUP TO REACTOR	YES	CENTRIFUGAL	INGERSOLL-RAND	YES	
RHR-P-2C	LOW PRESURE EMERGENCY MAKEUP TO REACTOR	YES	CENTRIFUGAL	INGERSOLL-RAND	YES	
RHR-P-3	RHR KEEP FILL SYSTEM PUMP	YES	CENTRIFUGAL	CRANE-DEMING	YES	
RRC-P-1A	REACTOR RECIRCULATION PUMP	YES	CENTRIFUGAL	BINGHAM-WILLAMET	YES	
RRC-P-1B	REACTOR RECIRCULATION PUMP	YES	CENTRIFUGAL	BINGHAM-WILLAMET	YES	
SLC-P-1A	STANDBY LIQUID CONTROL INJECTION PUMP	NO	POSTIVE DISPLACEMENT	UNION	NO	
SLC-P-1B	STANDBY LIQUID CONTROL INJECTION PUMP	NO	POSTIVE DISPLACEMENT	UNION	NO	
SV-P-1A	EMERGENCY SERVICE WATER SYSTEM PUMP	YES	CENTRIFUGAL	INGERSOLL-RAND	YES	
SV-P-1B	EMERGENCY SERVICE WATER SYSTEM PUMP	YES	CENTRIFUGAL	INGERSOLL-RAND	YES	

TABLE 2

PUMPS EVALUATED FOR IEB 88-81

TAG NO.	FUNCTION	SAF REL	PUMP TYPE	MIN FLOW POSS	BEST EFFICIENCY FLOW(BEF)	MIN FLOW/% OF BEF	COMMENTS
CCN-P-1A	COOLING WATER FOR CONTROL ROOM CHILLERS	YES	CENTRIFUGAL	NO	NA	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
CCN-P-1B	COOLING WATER FOR CONTROL ROOM CHILLERS	YES	CENTRIFUGAL	NO	NA	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
CRD-P-1A	CONTROL ROD DRIVE WATER PUMP	NO	CENTRIFUGAL	YES	288 gpm	28 gpm/10%	MIN FLOW OCCURS ONLY DUE OPERATOR ERROR OR FAILURE
CRD-P-1B	CONTROL ROD DRIVE WATER PUMP	NO	CENTRIFUGAL	YES	288 gpm	28 gpm/10%	MIN FLOW OCCURS ONLY DUE OPERATOR ERROR OR FAILURE
DCV-P-1A1	DIESEL ENGINE CIRCULATING JACKET COOLING WATER	YES	CENTRIFUGAL	NO	NA	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
DCV-P-1A2	DIESEL ENGINE CIRCULATING JACKET COOLING WATER	YES	CENTRIFUGAL	NO	NA	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
DCV-P-1B1	DIESEL ENGINE CIRCULATING JACKET COOLING WATER	YES	CENTRIFUGAL	NO	NA	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
DCV-P-1B2	DIESEL ENGINE CIRCULATING JACKET COOLING WATER	YES	CENTRIFUGAL	NO	NA	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
DCV-P-1C	DIESEL ENGINE CIRCULATING JACKET COOLING WATER	YES	CENTRIFUGAL	NO	NA	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
DCV-P-2A1	DIESEL ENGINE CIRCULATING JACKET COOLING WATER	YES	CENTRIFUGAL	NO	NA	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
DCV-P-2A2	DIESEL ENGINE CIRCULATING JACKET COOLING WATER	YES	CENTRIFUGAL	NO	NA	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
DCV-P-2B1	DIESEL ENGINE CIRCULATING JACKET COOLING WATER	YES	CENTRIFUGAL	NO	NA	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
DCV-P-2B2	DIESEL ENGINE CIRCULATING JACKET COOLING WATER	YES	CENTRIFUGAL	NO	NA	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
DCV-P-2C	DIESEL ENGINE CIRCULATING JACKET COOLING WATER	YES	CENTRIFUGAL	NO	NA	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
DO-P-1A	DIESEL FUEL TRANSFER PUMP	YES	CENTRIFUGAL	NO	NA	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
DO-P-1B	DIESEL FUEL TRANSFER PUMP	YES	CENTRIFUGAL	NO	NA	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
DO-P-2	DIESEL FUEL TRANSFER PUMP	YES	CENTRIFUGAL	NO	NA	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
FPC-P-1A	FUEL POOL COOLING WATER SUPPLY PUMP	YES	CENTRIFUGAL	NO	NA	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
FPC-P-1B	FUEL POOL COOLING WATER SUPPLY PUMP	YES	CENTRIFUGAL	NO	NA	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
NPES-P-1	HIGH PRESSURE EMERGENCY MAKEUP TO REACTOR	YES	CENTRIFUGAL	YES	1888 gpm	1158 gpm/29%	MIN FLOW OCCURS DURING TEST AND REACTOR HIGH LEVEL
NPES-P-2	NPES DIESEL SERVICE WATER PUMP	YES	CENTRIFUGAL	NO	NA	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
NPES-P-3	NPES KEEP FILL SYSTEM PUMP	YES	CENTRIFUGAL	NO	NA	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
LPES-P-1	LOW PRESSURE EMERGENCY MAKEUP TO REACTOR	YES	CENTRIFUGAL	YES	5588 gpm	635 gpm/12%	MIN FLOW DURING TESTING AND INIT. LOCA RESPONSE
LPES-P-2	LPES KEEP FILL SYSTEM PUMP	YES	CENTRIFUGAL	NO	NO	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
RCIC-P-1	MAKEUP TO REACTOR DURING ISOLATION EVENTS	NO	CENTRIFUGAL	YES	958 gpm	218 gpm/23%	MIN FLOW DURING TEST OR DUE TO FAILURE OR OPER. ERROR
RCIC-P-2	GLAND CONDENSER VACUUM PUMP	NO	CENTRIFUGAL	NO	NO	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
RCIC-P-3	RCIC KEEP FILL SYSTEM PUMP	NO	CENTRIFUGAL	NO	NO	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
RCIC-P-4	GLAND CONDENSER CONDENSATE PUMP	NO	CENTRIFUGAL	NO	NO	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
RFV-P-1A	FEEDWATER PUMP	NO	CENTRIFUGAL	YES	16888 gpm	4688 gpm/29%	MIN FLOW DURING PLANT STARTUP & SHUTDOWN
RFV-P-1B	FEEDWATER PUMP	NO	CENTRIFUGAL	YES	16888 gpm	4688 gpm/29%	MIN FLOW DURING PLANT STARTUP & SHUTDOWN
RER-P-2A	LOW PRESSURE EMERGENCY MAKEUP TO REACTOR	YES	CENTRIFUGAL	YES	5758 gpm	558 gpm/10%	MIN FLOW DURING TEST AND INIT. LOCA RESPONSE
RER-P-2B	LOW PRESSURE EMERGENCY MAKEUP TO REACTOR	YES	CENTRIFUGAL	YES	5758 gpm	558 gpm/10%	MIN FLOW DURING TEST AND INIT. LOCA RESPONSE
RER-P-2C	LOW PRESSURE EMERGENCY MAKEUP TO REACTOR	YES	CENTRIFUGAL	YES	5758 gpm	558 gpm/10%	MIN FLOW DURING TEST AND INIT. LOCA RESPONSE

TABLE 2

PUMPS EVALUATED FOR IEB 11-81

TAG NO.	FUNCTION	SAF REL	PUMP TYPE	MIN FLOW POSS	BEST EFFICIENCY FLOW(BEF)	MIN FLOW/% OF BEF	COMMENTS
RHR-P-3	RHR KEEP FILL SYSTEM PUMP	YES	CENTRIFUGAL	NO	NO	NA	SYSTEM OPERATES AT RATED FLOW, NO MIN REQUIRED
RRC-P-1A	REACTOR RECIRCULATION PUMP	YES	CENTRIFUGAL	YES	42500 gpm	12000 gpm/28%	MIN FLOW LIMITED BY FLOW CONTROL VALVE POSITION
RRC-P-1B	REACTOR RECIRCULATION PUMP	YES	CENTRIFUGAL	YES	42500 gpm	12000 gpm/28%	MIN FLOW LIMITED BY FLOW CONTROL VALVE POSITION
SV-P-1A	EMERGENCY SERVICE WATER SYSTEM PUMP	YES	CENTRIFUGAL	YES	10000 gpm	1300 gpm/13%	MIN FLOW DURING INIT. PUMP START FOR 50 SECONDS
SV-P-1B	EMERGENCY SERVICE WATER SYSTEM PUMP	YES	CENTRIFUGAL	YES	10000 gpm	1300 gpm/13%	MIN FLOW DURING INIT. PUMP START FOR 50 SECONDS