

<u>Pump</u>	<u>Quantity</u>	<u>Supplier</u>
Boric Acid Make-up	2	Combustion Engineering
Flash Tank	2	Combustion Engineering
Reactor Drain Tank	1	Combustion Engineering
Equipment Drain Tank	1	Combustion Engineering
Fuel Pool	2	Combustion Engineering
LPSI	2	Combustion Engineering
HPSI	3	Combustion Engineering
TOTAL	34	

The primary concern of Bulletin 88-04 is the potential for dead-heading one or more pumps that have a common mini-flow recirculation line that does not preclude pump-to-pump interaction during mini-flow operation. Upon reviewing the design drawings, this condition is not a concern for the non-Combustion Engineering supplied pumps at Waterford 3. There are no piping configurations that will result in the dead-heading of one or more pumps during mini-flow operation. Except as noted below, the non-Combustion Engineering supplied pumps do not have a common mini-flow line. The Emergency Feedwater, Component Cooling Water Make-Up, and the Containment Spray Pumps have a common mini-flow arrangement. However, the configuration is such that it will prevent the dead-heading of any pump(s). The mini-flow lines are branched off before the first check valve in the discharge line and return to a storage tank, rather than the pump suction lines. The tie-in points to the common line are also downstream of the pressure reducing orifices. Attachment No. 1 provides a tabular summary for each pump. Based on the above discussion, there are no corrective actions required for the non-Combustion Engineering supplied pumps at Waterford 3 for this item.

The second concern involved the adequacy of the mini-flow capacity for single pump operation. The non-Combustion Engineering supplied pumps have been analyzed based on calculations, and their mini-flow rates have been determined to be sufficient with the exception of the Containment Spray, Component Cooling Water Make-Up, Diesel Oil Transfer, and Auxiliary Component Cooling Water Pumps. Calculations indicate that the mini-flow rates for these pumps are below the suppliers mini-flow requirements. Attachment No. 2 provides a tabular summary for each pump analyzed.

As a result of these calculations, Waterford 3 will perform field testing to determine the actual mini-flow rates on those pumps which calculations show are below the suppliers mini-flow requirements.

A review of the maintenance history for the non-Combustion Engineering supplied pumps shows that these pumps have not had a failure or experienced pump damage that can be attributed to cumulative operation or testing in the mini-flow recirculation mode. Problems that would be associated with pump operation below the mini-flow recirculation capacity, such as impeller, shaft or bearing damage, have not been evident at Waterford 3 to date. LP&L will continue to monitor pump maintenance history with particular attention paid to those pumps which calculations show may have lower than expected mini-flow rates.

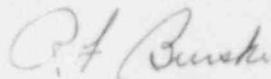
LP&L has contacted all of the above non-Combustion Engineering pump suppliers to determine if the mini-flow rates specified in the original pump manuals are adequate to prevent pump damage. With the possible exception of the Auxiliary Component Cooling Water, Component Cooling Water Make-Up, and the Containment Spray Pumps (the supplier has yet to respond to our request), the mini-flow value originally specified are acceptable. This effort is also summarized in Attachment 2.

A schedule for completion of the evaluations of the Combustion Engineering supplied pumps required by this Bulletin cannot be specified at this time since the magnitude of the required effort has not been established. However, Louisiana Power & Light is participating in the formulation of a Combustion Engineering Owners Group effort. The Owners Group is expected to review design drawings and flow calculations to address the concerns raised in Bulletin 88-04 for the HPSI and LPSI pumps. The remaining pumps supplied by Combustion Engineering will be analyzed by LP&L with assistance from Combustion Engineering if necessary.

Based on the effort of the Combustion Engineering Owners Group, and the need to perform testing on Containment Spray, Component Cooling Water Make-Up, Diesel Oil Transfer, and Auxiliary Component Cooling Water Pumps, Louisiana Power & Light is requesting an extension on the action items required by NRC Bulletin 88-04. Upon completion of testing, LP&L will provide a summary of the test results, subsequent evaluations, and a corrective action schedule, if applicable, to the Staff. In addition, a status of the analysis for the Combustion Engineering supplied pumps will also be provided. LP&L expects to submit the summary to the NRC by November 1, 1988.

Should you have any questions, please feel free to contact me or Larry Laughlin (504) 464-3499.

Very truly yours,



R.F. Burski
Manager
Nuclear Safety & Regulatory Affairs

WFB:DDG:ssf

Attachments

cc: NRC, Document Control Desk
J.A. Calvo, NRC-NRR
D.L. Wigginton, NRC-NRR
NRC Resident Inspectors Office
E.L. Blake
W.M. Stevenson

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the matter of)
)
Louisiana Power & Light Company) Docket No. 50-382
Waterford 3 Steam Electric Station)

AFFIDAVIT

R.F. Burski, being duly sworn, hereby deposes and says that he is Nuclear Safety and Regulatory Affairs Manager of Louisiana Power & Light Company; that he is duly authorized to sign and file with the Nuclear Regulatory Commission the attached response to NRC Bulletin No. 88-04; that he is familiar with the content thereof; and that the matters set forth therein are true and correct to the best of his knowledge, information and belief.

R.F. Burski

R.F. Burski
Nuclear Safety & Regulatory Affairs -
Manager

STATE OF LOUISIANA)
) ss
PARISH OF ORLEANS)

Subscribed and sworn to before me, a Notary Public in and for the Parish and State above named this 12th day of July, 1988.

Mary Ann Tucker

Notary Public

My Commission expires life.

Concern 1: Potential for dead-heading one or more pumps that have a common mini-flow recirculation line that does not preclude pump-to-pump interaction during mini-flow operation.

<u>Pump Name</u>	<u>Remark</u>	<u>Recommended Action</u>
<p>Diesel Oil Transfer Pumps: EGF-MPMP-0001A EGF-MPMP-0001B (Individual mini-flow recirculation lines)</p>	<p>The two diesel oil transfer systems are independent of one another; hence no pump interaction. There are no flow control valves in either transfer system that would throttle flow.</p>	None
<p>Diesel Generator Stand-By Jacket Water (Motor Driven) Pumps: EGC-MPMP-0001A EGC-MPMP-0001B (No mini-flow recirculation line)</p>	<p>System design and operating procedures eliminate the need for a mini-flow recirculation line. The pumps discharge to the Jacket Water Circulation system. There are no flow control valves throttling pump flow.</p>	None
<p>Diesel Generator Main Jacket Water (Engine Driven) Pumps: EGC-MPMP-0002A EGC-MPMP-0002B (No mini-flow recirculation line)</p>	<p>System design and operating procedures eliminate the need for a mini-flow recirculation line. The pumps discharge to the Jacket Water Circulation system. There are no flow control valves throttling pump flow.</p>	None
<p>Auxiliary Component Cooling Water Pumps: ACC-MPMP-0001A ACC-MPMP-0001B (Individual Mini-flow Recirculation Lines)</p>	<p>The two auxiliary component cooling water systems are independent of one another hence; no pump interaction. Temperature control valve throttles the system flow in each train.</p>	None
<p>Component Cooling Water Pumps: CC-MPMP-0001A CC-MPMP-0001B CC-MPMP-0001A/B (No mini-flow recirculation line)</p>	<p>These pumps have common suction and discharge headers to "A" and "B" trains of the CCW system. System design and operating procedures eliminate the need for a mini-flow recirculation line. Pumps discharge into a close loop system with no flow control valves.</p>	None
<p>HVAC Chiller Water Pumps: CHW-MPMP-0001A CHW-MPMP-0001B CHW-MPMP-0001A/B (Individual mini-flow recirculation lines)</p>	<p>Each pump has its own mini-flow recirculation line. The recirculation line for each pump/chiller loop contains a flow control valve which automatically opens on decreasing system flow so as to maintain a minimum flow rate of water through the chillers.</p>	None

<u>Pump Name</u>	<u>Remark</u>	<u>Recommended Action</u>
Containment Spray Pumps: CS-MPMP-0001A CS-MPMP-0001B (Common mini-flow recirculation line)	<p>The recirculation line from CS-MPMP-0001A ties into a common return line shared by the recirculation lines from HPSI Pump A and LPSI Pump A. The recirculation line from pump CS-MPMP-0001B ties into a common return line shared by the recirculation lines from HPSI Pump B and LPSI Pump B.</p> <p>During a CSAS, the pumps start and the containment isolation valves open, hence normal spray flow should exist (and minimum flow requirements will be met).</p>	None
Component Cooling Water Make-Up Pumps: CMU-MPMP-0004A CMU-MPMP-0004B (Common mini-flow recirculation line)	<p>The two mini-flow recirculation lines tie into a common return line downstream of the two restriction orifices. The interaction of the recirculation flows in the common return line precludes deadheading of one or more pumps because of this configuration.</p>	None
Emergency Feedwater Pumps: EFW-MPMP-0001A EFW-MPMP-0001B EFW-MPMP-0001A/B (Common mini-flow recirculation line)	<p>The three mini-flow recirculation lines tie into a common return line downstream of the two restriction orifices. The interaction of the recirculation flows in the common return line precludes deadheading of one or more pumps because of this configuration.</p>	None

Concern 2: Adequacy of the mini-flow capacity for single pump operation.

<u>Pump Name</u>	<u>Supplier Recommended Mini-flow Rate</u>	<u>Calculated Mini-flow Rate</u>	<u>Recommended Action</u>
Diesel Oil Transfer Pumps: EGF-MPMP-0001A EGF-MPMP-0001B (Individual mini-flow recirculation lines)	Original Recommendation: 20 GPM Latest Recommendation: 20 GPM	Calculations indicates line will pass 18 GPM if discharge header isolation valve is inadvertently closed.	1. Test to determine actual mini-flow rate during recirculation and evaluate for corrective action, if applicable.
Diesel Generator Stand-By Jacket Water (Motor Driven) Pumps: EGC-MPMP-0001A EGC-MPMP-0001B (No mini-flow recirculation line)	Original Recommendation: No mini-flow recirculation lines	Not Applicable	None
Diesel Generator Main Jacket Water (Engine Driven) Pumps: EGC-MPMP-0002A EGC-MPMP-0002B (No mini-flow recirculation line)	Original Recommendation: No mini-flow recirculation lines	Not Applicable	None
Auxiliary Component Cooling Water Pumps: ACC-MPMP-0001A ACC-MPMP-0001B (Individual mini-flow recirculation lines)	Original Recommendation: 150 GPM Latest Recommendation: Awaiting Supplier confirmation	Calculations indicates the mini-flow recirculation will pass 135 GPM when discharge header or temperature control valve is closed.	1. Test to determine actual mini-flow rate during recirculation and evaluate for corrective action, if applicable.

<u>Pump Name</u>	<u>Supplier Recommended Mini-flow Rate</u>	<u>Calculated Mini-flow Rate</u>	<u>Recommended Action</u>
<p>Component Cooling Water Pumps: CC-MPMP-0001A CC-MPMP-0001B CC-MPMP-0001A/B (No mini-flow recirculation lines)</p>	<p>Original Recommendation: No mini-flow recirculation lines</p>	<p>Not Applicable</p>	<p>None</p>
<p>HVAC Chiller Water Pumps: CHW-MPMP-0001A CHW-MPMP-0001B CHW-MPMP-0001A/B (Individual mini-flow recirculation lines)</p>	<p>Original Recommendation: 5 GPM Latest Recommendation: 5 GPM</p>	<p>The recirculation for each pump/chiller loop is designed to maintain a minimum flow through the chiller. The chiller's minimum flow requirements are greater than 5 GPM.</p>	<p>None</p>
<p>Containment Spray Pumps: CS-MPMP-0001A CS-MPMP-0001B (Common mini-flow recirculation line)</p>	<p>Original Recommendation: 60 GPM Latest Recommendation: Awaiting Supplier confirmation</p>	<p>Calculations indicate that each pump will pass 59 GPM through its mini-flow recirculation line when pump is running with a closed discharge valve.</p>	<p>1. Test to determine actual mini- flow rate during recirculation and evaluate for corrective action, if applicable.</p>

<u>Pump Name</u>	<u>Supplier Recommended Mini-flow Rate</u>	<u>Calculated Mini-flow Rate</u>	<u>Recommended Action</u>
Component Cooling Water Make-Up Pumps: CMM-MPMP-0004A CMM-MPMP-0004B (Common mini-flow recirculation line)	Original Recommendation: 30 GPM Latest Recommendation: Awaiting Supplier confirmation	Calculations indicate that each pump will pass 24 GPM through its mini- flow recirculation line when one pump is running with a closed discharge valve, or each will pass 23 GPM through its mini-flow recirculation line when both pumps are running with closed discharge valves.	1. Test to determine actual mini- flow rate during recirculation and evaluate for corrective action, if applicable.
Emergency Feedwater Pumps: EFW-MPMP-0001A (Motor Driven) EFW-MPMP-0001B (Motor Driven) EFW-MPMP-0001A/B (Turbine Driven) (Common mini-flow recirculation lines)	Original Recommendation: Motor Driven - 45 GPM Turbine Driven - 80 GPM Latest Recommendation: Motor Driven - 45 GPM Turbine Driven - 80 GPM	Calculations of the mini- flow recirculation lines indicate that all three pumps will provide greater than their required mini- flow rates when all three pumps are running.	None