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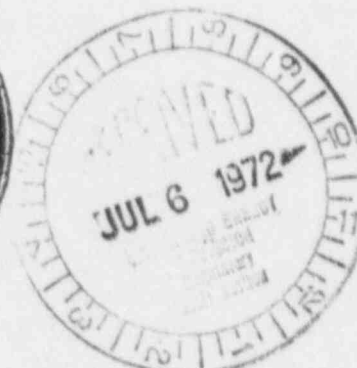
Regulatory

File Cy.  
JUL 10 1972**NORTHERN STATES POWER COMPANY**

MINNEAPOLIS, MINNESOTA 55401

July 3, 1972

Mr. A Giambusso  
Deputy Director for Reactor Projects  
Directorate of Licensing  
United States Atomic Energy Commission  
Washington, D C 20545



Dear Mr. Giambusso:

MONTICELLO NUCLEAR GENERATING PLANT  
Docket No. 50-263 License No. DPR-22

Reporting of Low Discharge Head on "A" Loop  
RHR Service Water Pumps

A condition occurred at the Monticello Nuclear Generating Plant recently which we are reporting in accordance with provisions of 6.6.B.1 of Appendix A, Technical Specifications, of the Provisional Operating License DPR-22. The Region III, Regulatory Operations Office has been notified of the occurrence.

On June 14, 1972 during a regular quarterly surveillance test, verification could not be made that either pump No. 11 or No. 13 on RHR Service Water (RHRSW) loop "A" was able to deliver 3500 gpm at the 550 ft head required by the Technical Specifications. Based on uncorrected pressure gage readings at the pump discharge flange, the maximum head was found to be 5-6% below the required level (517 feet and 520 feet for pumps No. 11 and No. 13 respectively.) As required by Technical Specification 3.5.C.4, the RHRSW pumps were declared inoperable, thus rendering RHRSW loop A inoperable. This condition was reported to AEC Regulatory Operations by telegram on June 14, 1972. RHRSW loop "B" was demonstrated to be operable in accordance with Technical Specification 3.5.C.3.

The minimum RHR Service Water pump head requirement was established to ensure that an adequate differential pressure would be maintained in the RHR heat exchanger to prevent leakage of primary system water to the open-cycle RHR Service Water system. The differential pressure required is given as 20 psid on page 6-2.14 of the Monticello FSAR. At no time has the capability to maintain this limit been threatened.

During the seven day repair period, attention was first focused on possible pump degradation. No. 13 pump was dismantled and completely inspected by the manufacturer's representative. No mechanical problems were detected which would indicate degraded pump performance. All case wearing rings were

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replaced and clearances were machined to manufacturer's specifications. While work was underway on the pump, the flow orifice, 10-97A, was removed for inspection. The orifice utilizes a slip-on instrument flange which is seal welded to the pipe as shown in Figure 1. The seal welds left a beveled edge adjacent to the orifice pressure taps. It was suspected that the orientation of the pressure taps with respect to the beveled edges were upsetting the measurements. Following discussions with the orifice manufacturer, a filler ring was fabricated and installed to provide a smooth transition at the orifice plate. The installation was reviewed and approved by the plant Operations Committee. In the course of this work, accessible sections of line (three feet) upstream and downstream of the orifice were cleaned and painted. Flow tests indicated a net increase in head of approximately 20 feet using either the No. 11 or No. 13 pump. This indicated that the work on the No. 13 pump had no significant effect on its performance.

The only conclusion that can be drawn on the basis of investigations performed to date is that the observed 20 foot head improvement with either pump must be attributed to work performed on the flow metering assembly. As additional verification, system tests will be run at two week intervals until sufficient assurance is attained that system degradation is not taking place.

It was the opinion of the manufacturer's representative that the pumps were in excellent running order and no further improvement in discharge head could be anticipated without significantly modifying the pumps. At this point, it was appropriate, in line with other activities, to reexamine our measurement philosophy. The RHRSW pumps are a vertical-centrifugal type with eight stages. The bowl assembly at the last stage discharge is located 15 vertical feet below the nominal discharge flange elevation. The applicable Technical Specification requires that in order for a RHR Service Water pump to be considered operable, it must be capable of delivering "3500 gpm against a head of 550 feet." Normal plant practice in determining this head consisted of taking an uncorrected pressure gage reading at the discharge flange. This practice, though conservative, is inconsistent with "head" definitions generally used by industry and with the pump manufacturer's certification data. In addition, it is unduly restrictive in demonstrating the head capacity of the RHRSW pumps. The 550 foot limit is based in part on what was considered an acceptable margin below the manufacturer's rating. As shown on Figure 2, head capacity measurements taken on three of the four pumps reveal a characteristic significantly different than that shown on the manufacturer's certified pump curve; the head-capacity characteristic for the fourth pump is not expected to differ substantially. Although the pumps are able to meet the required 20 psi heat exchanger differential with ample margin, the Technical Specification head requirement selected from the certified pump curve leaves no operating margin. The pump manufacturer is working with us to explain the test curve-pump performance deviation.

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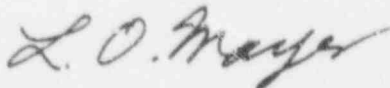
Based on measurements taken during the seven day repair period, the minimum differential pressure of the heat exchanger, with one RHR pump and two RHRSW pump operation at rated flow, is 86 psid. Figure 3 demonstrates the June 14, as-found condition and the subsequent improved condition in relation to the requirements on the system. The minimum discharge head required to maintain the 20 psid differential pressure at the heat exchanger is approximately 460 feet.

Following considerable internal review, including the Operations Committee and the Safety Audit Committee, it was agreed that the apparent low pump head condition did not compromise plant safety. In this context then, it was considered appropriate to define the required head as the total pump developed head rather than the static head measured at the discharge flange. On this basis, the 550 foot requirement was met with some margin. The "A" RHR Service Water loop was declared operational on June 21, 1972 following discussion of our findings with AEC Directorate of Licensing and Regulatory Operations personnel.

It is our intention to submit a request for a change of the Technical Specification minimum head requirement. This change would bring our Technical Specification requirement in line with realistic overall plant requirements.

An Abnormal Occurrence report will be available at the site for the Regulatory Operations inspectors.

Yours very truly,



L O Mayer, P.E.  
Director of Nuclear Support Services

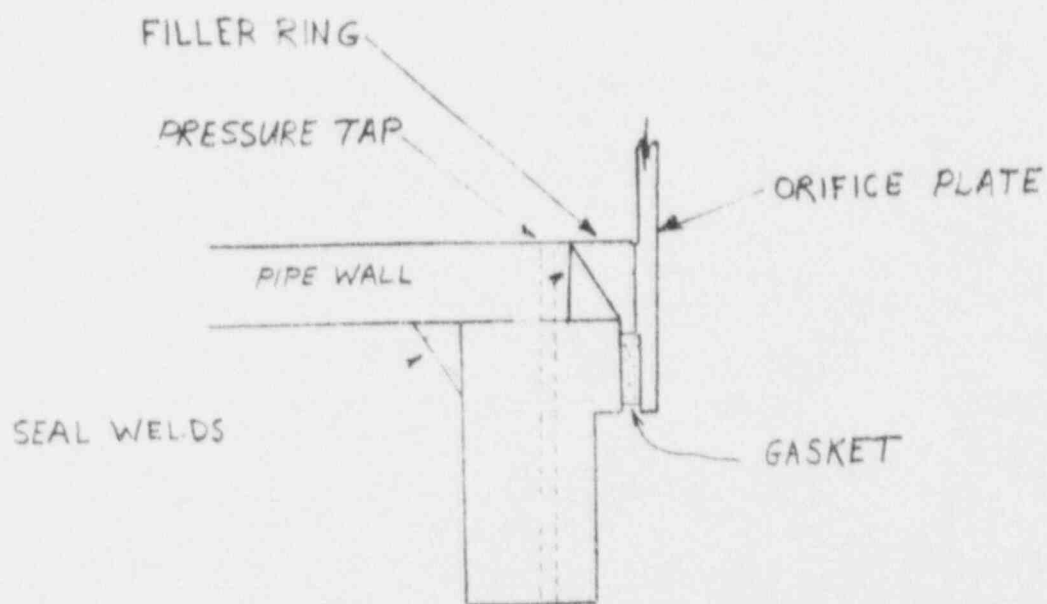
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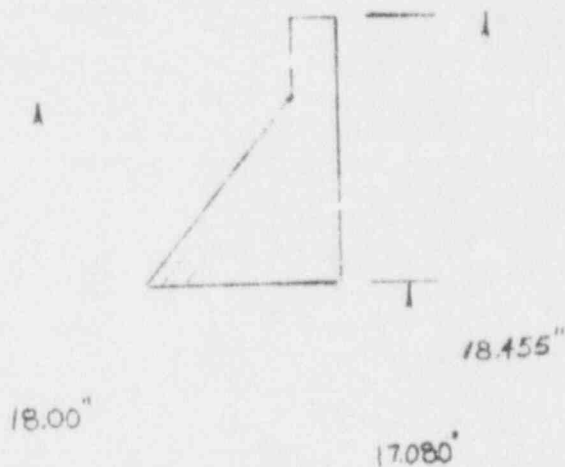
Attachments

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7-5-72



### ORIFICE INSTALLATION DIAGRAM



FILLER RING  
DETAIL

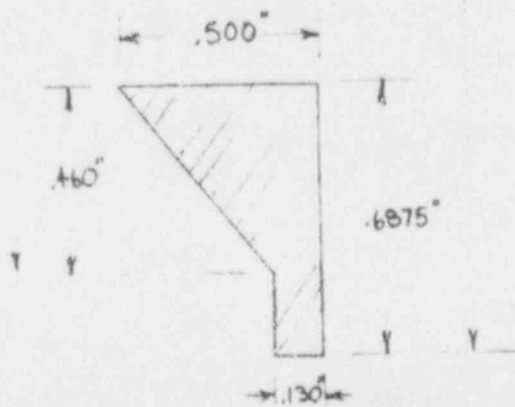


FIGURE 2.

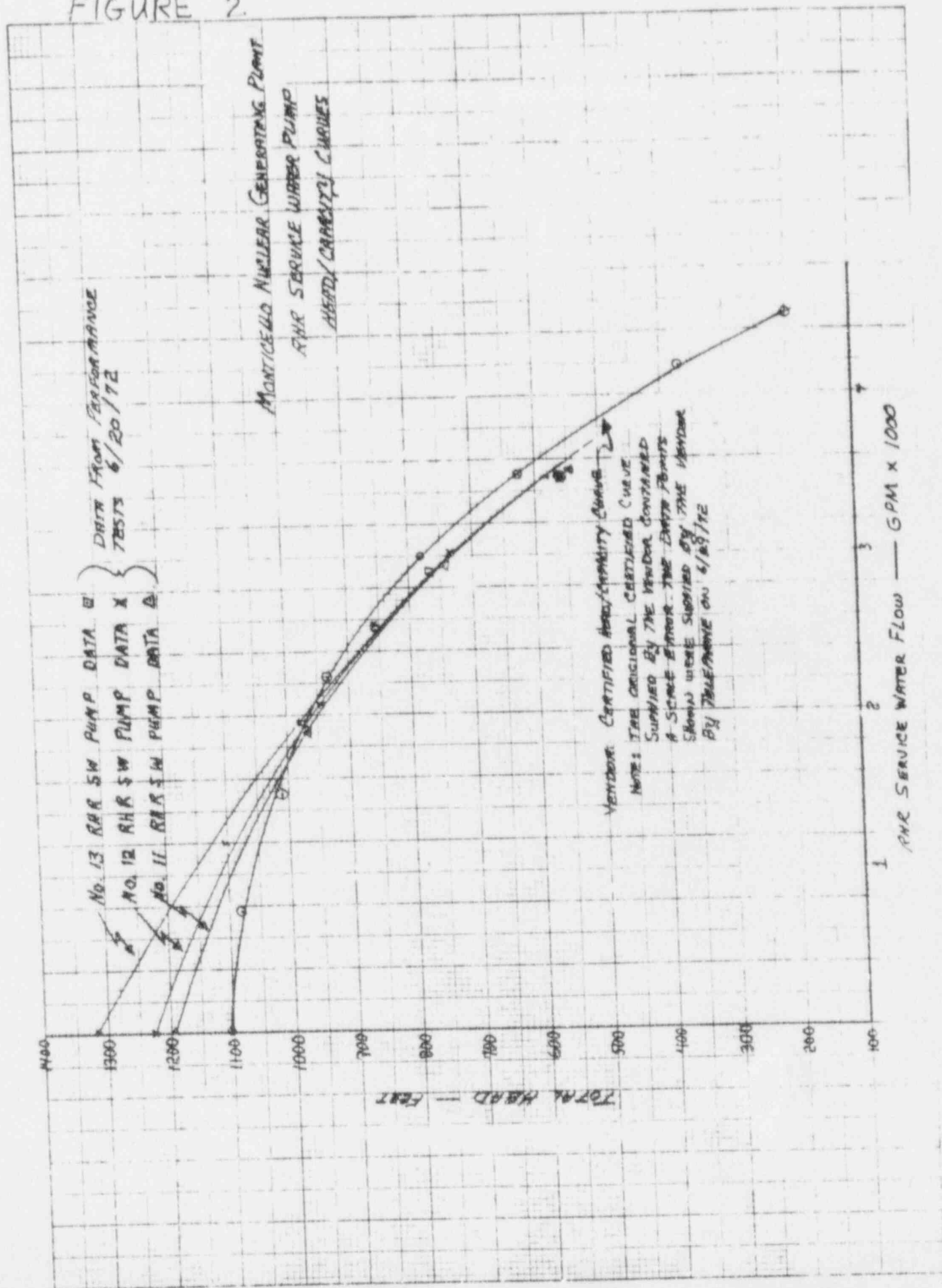
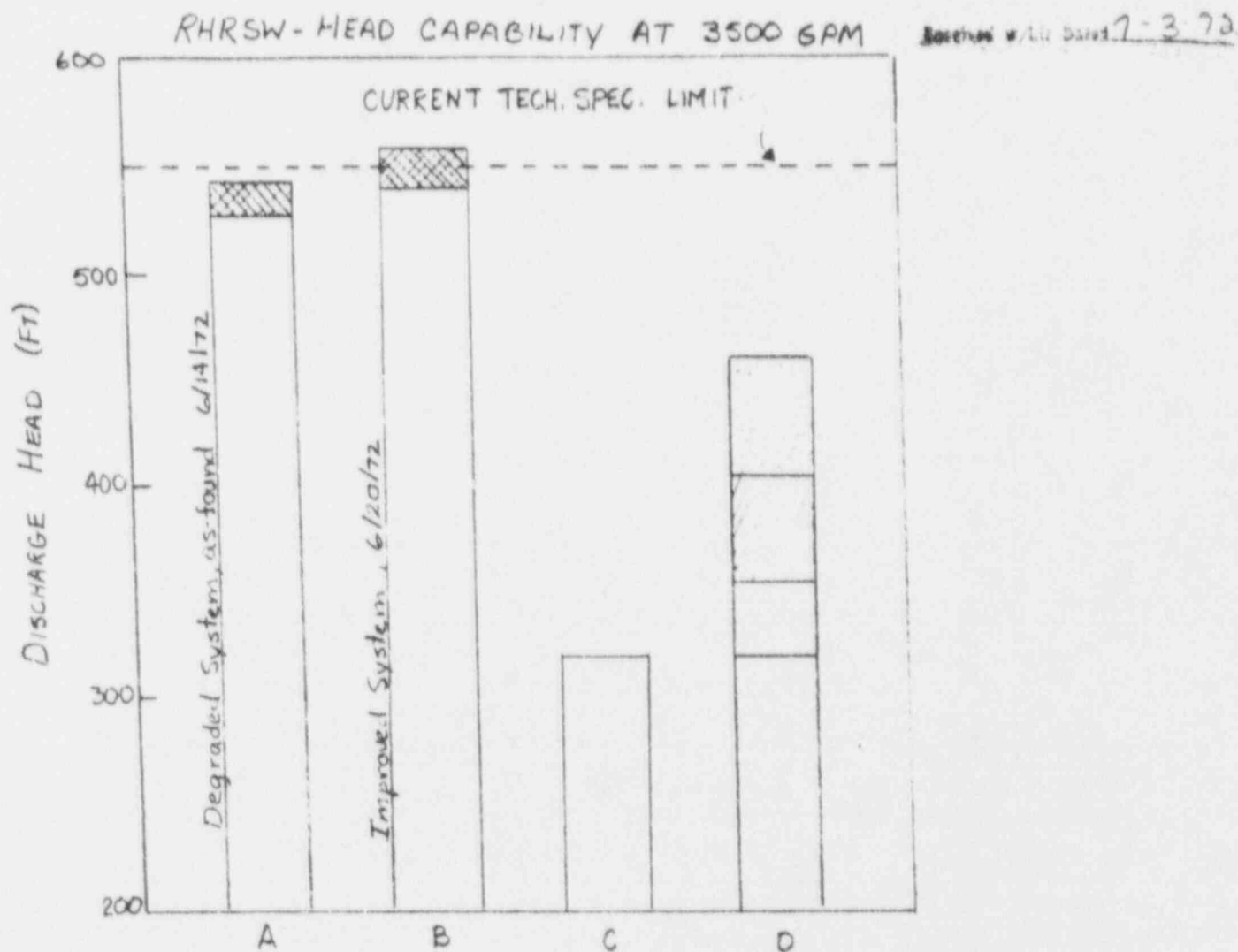




FIGURE 3.

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ASSUMPTIONS:

- Pump #11, as-found, 6/14/72. Represents  $h_{d,qage}$  plus correction to water level above last stage from discharge flange elevation, plus 4' correction for column and discharge elbow friction.
- Pump #11, following line cleaning and improvement of FE-10-97A.
- Head developed by RHR primary system pumps at rated flow, conservatively used as Heat exchanger shell-side pressure with no corrections.
- Maximum discharge head required for RHRSW pump #11, includes 16 psig margin for system losses, 20 psig margin to preclude primary to secondary leakage, and 25 psig margin for containment pressure at start of containment cooling mode.

AEC DISTRIBUTION FOR PART 50 DOCKET MATERIAL  
(TEMPORARY FORM)

CONTROL NO: 3673

FROM: Northern States Power Co. Minneapolis, Minn. 55401 L.O. Mayer	DATE OF DOC: 7-3-72	DATE REC'D 7-6-72	LTR X	MEMO	RPT	OTHER
TO: Mr. A. Giambusso	ORIG 3 signed	CC 37	OTHER	SENT AEC PDR <input checked="" type="checkbox"/> SENT LOCAL PDR <input checked="" type="checkbox"/>		
CLASS: <input checked="" type="radio"/> PROP INFO	INFUT	NO CYS REC'D 40	DOCKET NO: 50-263			

DESCRIPTION: Ltr rpt a condition which occurred on 6-14-72 involving low discharge head on "A" loop RHR service water pumps w/attchd Fig. 1,2 & 3.....

ENCLOSURES:

PLANT NAMES: Monticello Plant

FOR ACTION/INFORMATION DL 7-6-72

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<input checked="" type="checkbox"/> 16 CYS ACRS-HOLDING	1-DR. GERALD S. LELLOUCHE	
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