



**Robert McKeon**  
Assistant Vice President  
and Manager, Operations

Fermi 2  
6400 North Dixie Hwy  
Newport, Michigan 48166  
(313) 586-5249



December 18, 1995  
NRC-95-0135

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D. C. 20555

- References:
- 1) Fermi 2  
NRC Docket No. 50-341  
NRC License No. NPF-43
  - 2) Detroit Edison letter to NRC, "Response to Inspection Follow-up Items 95002-01 and 95002-02," NRC-95-0034, dated April 7, 1995
  - 3) Detroit Edison letter to NRC, "Relief Requests for Inservice Testing Program for Pumps and Valves," NRC-95-0077, dated July 14, 1995

Subject: Information Related to Relief Request PR-7-R1 for Inservice Testing of the Residual Heat Removal Service Water Pumps

This letter confirms the telephone conversation between our Ms. Lynne Goodman, et al and Mr. Timothy G. Colburn of your staff on December 6, 1995, and provides the information requested to supplement Relief Request PR-7-R1 (Reference 3). Detroit Edison submits the following:

1. Enclosure 1: Throttling Capabilities of the RHR Service Water Flow Control Valves F068 A&B, E11-51, EF2-62,910 memorandum dated March 15, 1983.
2. Enclosure 2: E1150F068A Broken Stem History.
3. Enclosure 3: Purpose of Seal-in Feature on Control Valve F068 A&B.

In addition, Detroit Edison is planning to perform testing of the Residual Heat Removal Service Water (RHRSW) single pump operation. This testing may result in

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the need for a revised relief request. If this occurs, the relief request will be submitted to the NRC as required for review and approval.

If you have any questions on this matter, please contact Mr. Hari O. Arora at (313) 586-4213.

Sincerely,

*Robert McKeon*

Enclosures (3)

cc: T. G. Colburn  
M. J. Jordan  
H. J. Miller  
A. Vogel



ENRICO FERMI UNIT 2 PROJECT  
ENGINEERING

March 15, 1983

EF2-62,910

To: C.R. Gelletly  
Supervising Engineer-SUEA

From: J.H. Casiglia *JHC*  
Supervising Engineer-EG44

References: 1. FAST F2S82-4673  
2. Startup Field Report #793

Subject: Throttling Capabilities of the RHR  
Service Water Flow Control Valves  
F068A, B  
E11-51

Per Reference 1 FAST, a detailed hydraulic analysis was performed on the RHR Service Water System to determine the throttling requirements of the system's flow control valve, F068. However, no data as to the actual throttling capabilities of F068 was available from the valve vendor (William Powell) and since the system could not be run without extreme cavitation occurring at F068, the valve's throttling capabilities could not be determined by field testing.

This being the case, EG-44 installed a restricting orifice on the discharge side of F068 in order to reduce the pressure drop requirements at the valve. The orifice was sized to limit the flow to 9000 GPM (2 pump operation) through the tube side of the RHR heat exchanger with F068 100% open.

Soon after the orifice was installed, on 1-18-83, EG-44 in cooperation with SUEA and Startup conducted a field test on the system to determine the throttling capabilities of F068 with the restricting orifice installed. F068 successfully throttled the flow with both one and two pumps operating for the conditions listed below:

Flow Mode		Flow* (GPM)	Pump Discharge Pressure (PSIG)	F068A Conditions		
RHRSW Div. I Pumps	Discharge Flow Path			% Open	Inlet Press. (PSIG)	$\Delta P$ (PSID)
A & C	Cooling Towers	9000	81	25%	47	13
C	Cooling Towers	5250	69	15%	48	40
C	Cold Weather Bypass	5600	60	15%	31	27

March 15, 1983

EF2-62,910

\* The flow was calculated using the pump discharge gauge pressure as read on the permanent plant instrumentation in conjunction with the certified pump curve for these pumps. A reservoir water elevation of 583'-0" was measured and a water temperature of 45°F was estimated.

#### Two Pump Operation

As seen in the first flow mode above, F068 successfully throttled 9000 GPM (design flow) with two pumps operating. Absolutely no cavitation occurred at or near F068.

#### One Pump Operation

It was the concern of Systems Engineering, if in the emergency situation where one pump in a division is inoperable, can F068 successfully throttle the flow of the other pump running by itself in that same division. In the second two flow modes above, F068 successfully throttled the flow of pump C running by itself to 5250 GPM while discharging to the cooling towers and to 5600 GPM while discharging through the cold weather bypass. Again, no cavitation occurred at F068.

Note that for these flows of 5250 and 5600 GPM, this is the corresponding maximum pressure drop that F068 can handle (40 and 27 PSID). If attempts are made to throttle the flow below 5250 and 5600 with F068, extreme cavitation will occur at the valve. In this situation, requiring more pressure drop with F068, the pressure within the valve drops below the vapor pressure of the water, thus causing flashing and cavitation.

Flows greater than 5250 and 5600 GPM can be throttled using F068 with one pump operating. However, it is advisable not to exceed 6500 GPM. This keeps the flow within the safe operating range of the pump.

Therefore, since the RHR Service Water system is fully capable of providing the following flows to the tube side of the RHR heat exchanger:

1. 9000 GPM (design flow) with two pumps operating.
2. 5250-6500 GPM with one pump running discharging to the cooling towers in an emergency situation.
3. 5600-6500 GPM with one pump running discharging to the cold weather bypass in an emergency situation.

EG-44, in concurrence with Systems Engineering believe that no further engineering action regarding the throttling capabilities of F068 is required.

Memo to:  
C.R. Gelletly  
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March 15, 1983

EF2-62,910

If you have any questions, please contact the writer at 649-7262.

Noted by:

T.G. Wallace  
T.G. Wallace  
Task Leader

Approved:

J.W. Nunley  
J.W. Nunley  
Director-Project Design

Written by: D.G. Jax

/pa 3/17/83 ADG 3-2-83

- cc: R.J. Adler
- T.A. Alessi
- R.C. Anderson
- R.W. Barr
- E.R. Bosetti
- J.R. Fenton
- E.P. Griffing
- G. Mookerjee
- S.H. Noetzel
- F.D. Ozdarski
- David Spiers
- R.A. Vance
- Records Center

**E1150F068A BROKEN STEM HISTORY**

**12/27/83, NCR-83-1289, 10CFR50.55(e) #109**

Description: Valve stem and disc (below seat) guide pin failure.

Cause: Fatigue failure caused by throttling vibration.

Corrective Action: Replaced damaged components and examined E1150F068B for similar problems.

Corrective Action To Prevent Recurrence (CATPR) Orifice has been installed.  
System Operating Procedures (SOP) revised to limit throttling outside optimum range.

**7/6/85, DER NP-85-0343**

Description: Valve stem and guide pin failure.

Cause: Fatigue failure caused by throttling vibration accelerated by improper heat treatment. The stem lacked adequate toughness and failed in a brittle mode once the fatigue crack propagated to critical size.

Corrective Action: Replaced damaged components and examined E1150F068B for similar problems.

CATPR: SOP revised to reduce throttling operation  
Valve replacement investigated (PDC-3506) but no modification made.

**PURPOSE OF SEAL-IN FEATURE ON CONTROL VALVE F068A/B**

The seal-in feature is for operational convenience, and is only active in the closing direction. Momentarily depressing the CLOSE pushbutton seals in the close signal, until the valve reaches a minimum position block or until the OPEN pushbutton is momentarily depressed by the operator. As a result, the operator does not have to remain at the control switch while the valve closes. As designed, the control valve can be stopped at any position in the opening mode by releasing the OPEN pushbutton, or in the closing mode by momentary contact of the OPEN pushbutton as the valve is closing.

The seal-in feature could be disabled by a design change to the switch; however, such a change is not considered to be an enhancement to the design or operation of the system.