Douglas R. Gipson
Senior Vice President, Nuclear Generation

Fermi 2
6400 North Dixie Hwy., Newport, Michigan 48166
Tel: 313.586.5201 Fax: 313.586.4172

Detroit Edison

April 30, 1998
NRC-98-0064

U. S. Nuclear Regulatory Commission
Attention: 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, "Inservice Testing Program (Plan) for Pumps and Valves Relief Requests VR-63 and VR-64," NRC-97-0001, dated February 14, 1997

3) NRC Request for Additional Information Related to Inservice Testing Program Valve Relief Requests VR-63 and VR-64 at Fermi-2 (TAC No. M98009), dated August 27, 1997

4) NRC Letter to Detroit Edison, "Telephone Conference Concerning the Quality of Licensing Submittals for Fermi 2," dated March 5, 1998

5) NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," dated April 1995

Subject: Response to NRC's Request for Additional Information (RAI) Related to the Fermi-2 Inservice Testing Program (Plan) for Pumps and Valves Relief Requests VR-63 and VR-64

In Reference 2, Detroit Edison submitted Relief Requests VR-63 and VR-64, "Service Water Systems Minimum Flow Valves" and "Emergency Cooling Water Temperature Control Valves" respectively, for NRC review. The NRC requested additional information of the subject relief requests in Reference 3. Detroit Edison's responses to Reference 3 are provided in Enclosure 1.

A047
1/1

In summary, Detroit Edison performed an evaluation of the subject relief requests and made the following changes:

- Relief Request VR-63 has been revised to explain the basis for extending the stroke time testing performance to a refueling outage frequency. In response to Reference 4, this relief request is also revised to propose alternate testing. The revision is now in conformance with the guidance contained in NUREG-1482 (Reference 5) both in format and with respect to the basis for justification as it is based on data obtained during the normal quarterly fail safe tests for the minimum flow valves and stroke time data obtained during system outages. The revised Relief Request VR-63 is provided in Enclosure 2.
- Relief Request VR-64 is being withdrawn. An evaluation of this request determined that the EECW temperature control valves can be effectively stroke timed during the fail safe testing conducted as part of the quarterly surveillances for the EESW System. As a result, open stroke time test requirements have been incorporated into the Fermi 2 Pump and Valve Inservice Testing Program for valves P44F400A and P44F400B.

Based on the responses in Enclosures 1 and 2, Detroit Edison requests that the NRC approve and issue this change. Should you have any questions or require additional information, please contact Mr. Norman K. Peterson of my staff at (734) 586-4258.

Sincerely,

Gaudy Bort
for D.R. Gipson

Enclosures

cc: A. B. Beach
B. L. Burgess
G. A. Harris
A. J. Kugler
Supervisor, Electric Operators,
Michigan Public Service Commission

ENCLOSURE 1

RESPONSE TO NRC'S REQUEST FOR ADDITIONAL INFORMATION

RELATED TO INSERVICE TESTING PROGRAM VALVE

RELIEF REQUESTS VR-63 AND VR-64

Response to NRC's Request for Additional Information

Related to Relief Requests VR-63 and VR-64

The following are responses to additional information requested by the NRC as provided in the Enclosure to Reference 3. These responses are addressed primarily to Relief Request VR-63, "Service Water Minimum Flow Valves" because Relief Request VR-64, "Emergency Cooling Water Temperature Control Valves" is being withdrawn. Stroke time testing for Relief Request VR-64 has been incorporated into the Inservice Testing (IST) Pump and Valve Program as a quarterly test.

1. **Since the required quarterly stroke time test has never been performed for the subject valves, Detroit Edison should provide a documented operability determination for these valves.**

   The service water minimum flow valves are considered operable based on current fail safe/full stroke testing where a plant operator observes both position and pneumatic pressures. The operator witnesses the full open and final closed positions during the fail safe stroke. Also, during the same surveillance tests, pump flow data is taken which verifies that the valve is closed if acceptable.

   Stroke time data developed from the past 7 months has demonstrated that repeatable stroke times are not achievable during the normal quarterly fail safe surveillance tests. The Residual Heat Removal Service Water (RHRSW) system minimum flow valves and the Diesel Generator Service Water (DGSW) system minimum flow valves have been stroked closed 5 times in sequence using an alternate, temporary, air source. Using this alternate method, the stroke times were repeatable and consistent. These strokes were conducted during specific system outages. Thus, for eight valves (4 DGSW minimum flow valves and 4 RHRSW minimum flow valves), the testing requirements of the proposed relief request are being met. Relief Request VR-63 has been revised (see Enclosure 2) to be in accordance with the guidance of Reference 5, Sections 2.5, 3.1, and 4.2.9.

   With exception to the above, two EESW minimum flow valves could not be stroke timed during a system outage with the plant operating due to the critical nature of this system. Removal of a division of EESW requires entry into a 16 hour to HOT SHUTDOWN Technical Specification action statement. Therefore, based on acceptable valve performance (quarterly fail safe tests) and limitations of TS, baseline testing will not be performed while the plant is operating, *i.e.,* Modes 1, 2, or 3. The EESW minimum flow valves can also be extended to a refueling outage basis, which is based on current guidance contained in Reference 5. Additionally, cold shutdown is not an option since the periods of cold shutdown during a cycle may be very short

and the minimum flow valve test methodology requires individual Division 1 and 2 system outages. The EESW supports cooling requirements for many other systems, which affect plant responses to operational transients and accidents. It is currently intended that these valves be base line stroke timed during RF06. This also meets the requirements for operability under the proposed alternative of Relief Request VR-63.

2. **During the phone conversation, Detroit Edison described activities that have been performed or are planned to enhance the reliability of these valves based on the position that stroke time testing is not possible. Examples of the actions discussed include enhanced preventive maintenance and the future use of diagnostic equipment. These current and planned activities should be documented in the response to this request.**

The preventive maintenance referred to is primarily the loop calibrations performed by the I&C group as Preventive Maintenance (PM) activities. Basically, these calibrations assure that the valves and control loops properly function together and demonstrates that the valves respond to control air signals. Following these calibrations, fail safe tests are performed as a PM test activity to verify valve operability. For each PM, the appropriate pump and valve surveillance fail safe test is specified as Post Maintenance Testing (PMT). The frequency of these PMs is based on the as-found condition of the loop. The most recent frequencies for the scheduling of these loop calibrations are shown below:

Air Operated Valves Most Recent Controller Calibrations

PUMP PIS	VALVE PIS	PM Event ID	TITLE	Frequency (Days)
E1151C001A	E11F400A	E151	Loop Cal RHRSW Pump "A" Min Flow Valve	366
E1151C001B	E11F400B	E153	Loop Cal RHRSW Pump "B" Min Flow Valve	732
E1151C001C	E11F400C	E152	Loop Cal RHRSW Pump "C" Min Flow Valve	366
E1151C001D	E11F400D	E142	Loop Cal RHRSW Pump "D" Min Flow Valve	366
P4500C002A	P45F401	P451	Cal Check EESW Pump RHR Reservoir Pressure Control Loop Rework/Recal as Required	1098

PUMP PIS	VALVE PIS	PM Event ID	TITLE	Frequency (Days)
P4500C002B	P45F400	P452	Perform Loop Cal Check on Press Cont Vlv EESW Water Pump Min Flow - Rework as Required	1098
R3001C005 (EDG 11)	R30F402	S951	Perform Pres Loop Cal on Diesel Gen Serv Water Pump "A" Min Flow Rework as Required	1098
R3001C006 (EDG 12)	R30F403	R310	Cal Diesel Gen Serv Water Pump "C" Min Flow Pres Cont Loop Rework/Rec as Required	1098
R3001C007 (EDG 13)	R30F400	S941	Cal Diesel Gen Serv Wat Pump "C" Min Flow Pres Cont Loop Rework/Rec as Required	549
R3001C008 (EDG 14)	R30F401	S942	Function Loop Cal Check Pres Ser Water Pump D Min Flow Valve	1098

NOTE: Required frequencies are varied based on as-found calibration data

Thus, with the approval of this relief request, each minimum flow valve will receive a full stroke time test at a refueling outage frequency. In addition, each minimum flow valve will continue to receive a quarterly fail safe test and loop calibration PM.

With respect to planned activities, Detroit Edison is pursuing the use of diagnostic equipment, which will allow a more sophisticated means of stroke time testing to be employed. It will also allow for other testing to be performed for demonstrating other related parameters such as pneumatic responses to variable controller demands.

3. **Detroit Edison has indicated that the valves that are the subject of the relief requests have no remote position indication and, therefore, it isn't possible to perform a repeatable stroke time test. However, it might be possible to develop a procedure to perform repeatable stroke timing locally during the current fail safe test.**

The service water minimum flow valves of Relief Request VR-63 do not have remote position indication. These valves are equipped with a local pointer on the stem, permitting only a gross measure of valve position and making test repeatability impracticable without extensive modification to the valve and its control logic.

Stroke time data was developed using two means of determining stroke times. The first method was to attempt to stroke time the valves during the fail safe testing. With the exception of the EECW temperature control valves (Relief Request VR-64 is withdrawn), the stroke times of the minimum flow valves were dependent on plant parameters, which are controlled by operator actions and equipment responses that influence the control loop for the minimum flow valves. For example, when timing the DGSW minimum flow valves, the valves closing times were a measure of the operator's opening rate of a manual valve. That is, the minimum flow valve gradually closed during the rotation of the handwheel/valve position as the operator opened the manual valve. Similarly, the RHRSW valves track the pressure decay of the process fluid as the RHRSW Pump coasts down after the pump was turned off. In only the case of the Emergency Equipment Cooling Water (EECW) temperature control valves, could repeatable results be obtained. The reason for this is that the valves are closed to their minimum closed position using manual override of the valve from the Control Room EECW Temperature Controller. At the time of the fail safe test, the instrument air supply valve is closed to the temperature controller current to pressure (I/P) converter. This causes a step change to a zero pressure signal to the temperature control valve. The temperature control valve then opens as the control air pressure bleeds off; the valve is then stroke timed opened as the valve fails open. Unlike the minimum flow valves, the decrease in signal pressure is essentially independent of other system parameters and repeatable from test to test. As a result of this testing, Relief Request VR-64 is withdrawn. It was further determined that repeatable stroke timing of the minimum flow valves is not achievable during the normal fail safe testing.

4. **Detroit Edison should provide more detailed information describing why repeatable local measurement of the valve stroke times is not possible for quarterly tests. Discussion of this issue should include factors affecting the measured stroke times, potential sources and magnitudes of errors, and evaluation of stroke time data obtained from efforts to take local measurements during the next three or four regularly scheduled quarterly inservice tests of the valves.**

   The design of the minimum flow valves' position indication system precludes the ability of making repeatable local measurements on a quarterly basis of valve stroke times due to the uncertainty of the valve's exact starting position or the travel distance from the open to close positions. The magnitude of errors in repeatable stroking of the minimum flow valves can be anywhere from a factor of greater than an order of magnitude difference (observed for EESW Division 1 minimum flow control valve due to operator difficulty in manipulating the discharge valve) to a low of 7% for RHRSW minimum flow valve E11F400B. The greatest source of error after the impact of process variables is the start of timing by the observer. This is because the minimum flow valves stroke is considerably faster than the temperature control

valves and the beginning of motion as observed by the operator has a greater impact on the observed stroke time. The minimum flow valves also have considerably shorter stroke lengths. All of these contribute to uncertainty and diminish repeatability for stroke timing the minimum flow valves.

Previous stroke time data has demonstrated that repeatable stroke timing is not achievable during normal fail safe testing. Detroit Edison has however successfully stroked the minimum flow valves on a less frequent basis (i.e., at a refueling outage frequency) using an independent, controllable air source and a separate three way valve for charging and venting the valve diaphragms. This is possible because the stroke time begins at the change of position of the three way valve to the vent position, which completely eliminates the impact of the observer on recording the beginning of motion. Additionally, since the controller is not modulating the valves motion, the end of the stroke is much more positive, without any decaying sinusoidal motion at the end of the stroke to impact the observed time. The major disadvantage with this alternate testing is that it requires disconnecting the control air connections to the valve; thereby making the system inoperable. This alternate testing is only proposed at refueling outages.

Detroit Edison maintains that the reliability and dependability of the minimum flow valves is maintained by stroke timing the valves at refueling outage intervals with routine control loop calibrations and quarterly fail safe stroke testing and is comparable to that achieved with a quarterly stroke time test alone. Additionally, by limiting the disassembly required to stroke time these valves consistent with a refueling outage frequency, the potential for damage to the valves are minimized.

ENCLOSURE 2

REVISED RELIEF REQUEST NUMBER VR-63

RELIEF REQUEST NUMBER VR-63

SYSTEM: RHRSW(E11), EDGSW(R30), & EESW(P45)

VALVES:

Valve	Code Class	Category	ISI Drawing
E11F400A	C	B	6M721-5813-3
E11F400B	C	B	6M721-5813-3
E11F400C	C	B	6M721-5813-3
E11F400D	C	B	6M721-5813-3
R30F400	C	B	6M721-5813-3
R30F401	C	B	6M721-5813-3
R30F402	C	B	6M721-5813-3
R30F403	C	B	6M721-5813-3
P45F400	C	B	6M721-5813-3
P45F401	C	B	6M721-5813-3

FUNCTION: Minimum flow valves assure minimum pump flow requirements are maintained for the RHRSW, DGSW and EESW systems and thus assure the pumps are not damaged should the normal flow path be isolated or restricted. The subject valves are air-to-open and spring-to-close valves that fail closed on loss of air. These valves are normally closed and their safety function is to assure primary safety system flow is not diverted through the minimum flow lines. All three systems start against open flow paths so that the minimum flow valve function to open is not required when the pumps are started from their normal valve lineup positions.

SECTION XI CODE REQUIREMENTS FOR WHICH RELIEF IS REQUESTED:
Per paragraph **IWV-3413(b)** of Section XI of the ASME B&PV Code, the stroke time of all power operated valves shall be measured to the nearest second, for stroke times 10 seconds or less, or 10% of the specified limiting stroke time for full stroke times longer that 10 seconds whenever such a valve is full-stroke tested. Per paragraph **IWV-3411**, this exercising is to occur at least once every three months.

BASIS FOR RELIEF: All 10 minimum flow valves have a control logic that does not provide the capability for stroke time testing. These valves automatically open when pump discharge pressure is high and close when pressure decreases. There are no manual

override switches or controls. High discharge pressure indicates that the normal pump flow path is either closed or severely restricted. Normal pressure indicates a viable flow path is available.

Current fail-safe testing of the subject valves is accomplished by actually restricting flow with the appropriate pump running such that the minimum flow valve opens. As flow is restored, the minimum flow valve closes as discharge pressure decreases below the set-point pressure and control air pressure is reduced to zero psig. The valve closes as the control air supply decreases opening pressure on the diaphragm. The spring pressure force then becomes dominant and closes the valve. This testing is accomplished on a quarterly basis.

These valves have no remote position indicating devices and are only equipped with a local pointer on the stem which is, at best, a gross measure of position. From this indicator there is no way of knowing the exact starting open position of the valve or the exact travel distance from open to close. Also, the exact open starting position would vary from test to test as the exact position would be a result of varying pressure within the system. This would make test repeatability difficult without significant modification to the valve and its control logic.

In order to accurately and precisely stroke time these valves, it would be necessary to modify the control circuitry to allow for manual override operation. However, the installation of such controls would not improve system operation or contribute to protecting the health and safety of the public. In fact, it would make operation more complicated by adding additional hardware whose only function is to allow stroke time testing of the valves.

It is not, however, impractical to stroke time these valves on a less frequent basis using a temporary control air source to full stroke the valves. This has been demonstrated to be effective in full stroking these valves. Using a manual three way valve connected to the valves operator with two alternate positions to either supply the operator air or vent the air from the operator, the minimum flow valves are full stroke closed and timed. Results have been repeatable and accurate. The primary drawback is that it requires the breaking of control air connections and thus, causes the system to be inoperable. Because of the time limitations placed on the unavailability of safety systems and the potential damage to the connections after frequent disconnections and reconnections, conformance to the quarterly requirements would result in unusual hardship and difficulty without a

compensating increase in the level of safety and quality. The proposed timed stroking is to be performed only during refueling outages.

The alternatives presented in NUREG-1482, Paragraph 4.2.9, were evaluated for implementation at Fermi for these 10 valves. Fermi intends to stroke time these valves on a refueling outage basis while continuing the untimed strokes on a quarterly basis. This option is discussed in paragraph 4.2.9 as the option of "...stroke timing and fail-safe testing during cold shutdowns or refueling outages that involve bypassing control signals." In this situation, the Fail Safe Test (FST) will continue to be performed on a quarterly basis as well as at the completion of the stroke time test. Both stroke time testing using temporary control air signals and quarterly fail safe testing have been successfully demonstrated on the service water minimum flow valves.

ALTERNATE TESTING:

Stroke time testing in lieu of Paragraphs **IWV-3413(b)** and **IWV-3411** of Section XI of the ASME B&PV Code is to be implemented as follows:

1. Stroke timing will be performed on a refueling outage frequency.

2. A fail-safe full stroke test during system operation will be performed on a quarterly basis and upon completion of each stroke time test.