



August 29, 2007  
JAFF-07-0107

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555-0001

Subject: Entergy Nuclear Operations, Inc.  
James A. FitzPatrick Nuclear Power Plant  
Docket No. 50-333  
License No. DPR-59

**Response to Request for Additional Information Regarding  
Proposed Relief Request PRR-01 for the James A. FitzPatrick Nuclear  
Power Plant Fourth Interval In-Service Testing Program**

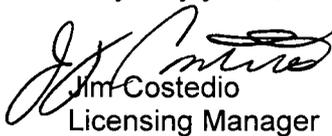
- References:
1. Entergy letter JAFF-07-0050, Proposed Relief Requests for the James A. FitzPatrick Nuclear Power Plant Fourth Interval In-Service Testing Program, dated April 11, 2007.
  2. NRC Request for Additional Information Related to Proposed Relief Request PRR-01 for the James A. FitzPatrick Nuclear Power Plant Fourth Interval In-Service Testing Program, dated August 14, 2007 (Reference NRC TAC No. MD5396).

Dear Sir or Madam:

Entergy Nuclear Operations Inc., (Entergy) submitted Relief Requests for the James A. FitzPatrick Nuclear Power Plant Fourth In-service Testing Interval on April 11, 2007 (Reference 1). On August 14, 2007, Entergy received a request for additional information (RAI) via telephone conference (Reference 2). Attachment 1 to this letter provides a revised PRR-01, as agreed to in that telephone conference.

There are no commitments contained in this letter. If you have any questions, please contact Mr. Jim Costedio at (315) 349-6358.

Very truly yours,

  
Jim Costedio  
Licensing Manager

JC:ed

Attachment 1: Revised Relief Request PRR-01  
cc: Next page

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cc:

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**JAFP-07-0107**

**ATTACHMENT 1**

**Revised Relief Request PRR-01**

# James A. FitzPatrick Station Inservice Testing Program

## 10 CFR 50.55a Request PRR-01

Proposed Alternative In Accordance with 10CFR50.55a(a)(3)(i)

On the basis that the proposed alternative provides an acceptable level of quality and safety.

### **System:**

STANDBY LIQUID CONTROL (SLC)

### **ASME Code Components Affected:**

11P-2A, B

### **Component/System Function:**

These pumps inject borated water into the reactor vessel as an alternate means for negative reactivity addition and reactor shutdown.

### **Applicable Code Edition and Addenda:**

ASME OM Code-2001 including 2003 Addenda

### **OM Code Category:**

Group B

### **Applicable Code Requirement:**

ISTB-3500, "Data Collection", 3510, "General", 3510(e), "Frequency Response", the frequency response range of the vibration measuring transducers and their readout system shall be from one-third minimum pump shaft rotational speed to at least 1000 Hz.

### **Reason for Request:**

The nominal speed of the SLC pumps is 520 RPM, which correlates to a rotational frequency of 8.67 Hz. Table ISTB-3510-1, "Required Instrument Accuracy", requires the frequency response range of the vibration measuring transducers and their readout system to be accurate to +/- 5% full scale over the range of 2.89 - 1000 Hz.

FitzPatrick Nuclear Station has instruments for use during surveillance testing with certified accuracy of +/- 5% full scale over a range of 5-2000 Hz. Calibration is verified accurate using a system test methodology over a range of 10-1000 Hz in units of displacement (mils p-p) and 6.5-1000 Hz in units of velocity (ips peak). The system test verification is limited by the capability of the calibration shaker system to accurately sustain vibration at meaningful amplitudes outside the tested frequencies. The certified calibration +/- 5% range is arrived at through addition of individual transducer and meter inaccuracies over the stated frequency range.

The instrument lower frequency response limits are a result of high-pass filters installed to eliminate low frequency elements associated with the input signal from entering the process of single and double integration. These filters prevent low frequency electronic noise from distorting reading in the resultant units (ips, mils). As a side effect, any actual vibration occurring at low frequencies is filtered out. This is a necessary trade-off, as 1 mv of electronic noise at 2.5 Hz translates to approximately 62.6 mils p-p with the accelerometer used with these instruments, at a nominal sensitivity of 50 mv/g.

# James A. FitzPatrick Station Inservice Testing Program

## 10 CFR 50.55a Request PRR-01

Proposed Alternative In Accordance with 10CFR50.55a(a)(3)(i)

On the basis that the proposed alternative provides an acceptable level of quality and safety.

FitzPatrick Nuclear Station has extensively researched this issue concerning Code compliance and intent, and feels that, for these pumps, procurement of equipment capable of meeting the Code required accuracy is impractical with little or no benefit. Instrumentation capable of meeting the Code for these pumps is cumbersome, difficult to operate, prone to human error, costly to purchase and expensive to calibrate. The number of vendors that supply instrumentation accurate at these frequencies is limited, and there are even fewer vendors capable of performing the required calibration services. Most standard qualified calibration laboratories provide calibration services only to a minimum of 10 Hz.

### **Proposed Alternative and Basis for Use:**

In addition to the impracticality of procuring the instruments, FitzPatrick Nuclear Station feels that the instruments presently used are adequate to assess the condition of these pumps. The manufacturer of these pumps, Union Pump Company, Battle Creek, Michigan, has stated that these pumps, being of a simplified reciprocating design, have no failure mechanism that would be revealed at frequencies less than shaft speed. Union Pump has stated that all failure modes of this pump resulting in increasing vibration will be manifested at shaft speed frequency or harmonics thereof. In light of the information provided by Union Pump, monitoring sub-synchronous vibration for these pumps is not needed, but super-synchronous readings will provide meaningful information in the detection of imminent machinery faults.

A search of the EPIX (formerly INPO NPRDS) database has revealed only one failure reported for pumps of this or similar design whose discovery mentioned increased vibration levels. The cited cause of the failure was improper endplay set leading to gearing failure. Failures of this type would normally be detected at running (shaft) speed frequency, harmonics thereof, or non-harmonic super-synchronous bearing defect frequencies. It should also be noted that these are standby pumps that are normally operated only during pump and valve testing. In the unlikely event this system is required to fulfill its design function, only one of the two redundant pumps need operate for a period of 23 to 125 minutes.

In addition to vibration monitoring performed for the IST Program, these pumps are included in the FitzPatrick Nuclear Station Rotating Equipment Monitoring Program. Vibration spectral data is periodically collected and analyzed for the pump and gear motors in addition to those required by the Code. The equipment used by the Rotating Equipment Program is certified accurate to +/- 5% over a frequency range of 5-2000 Hz and is also limited by high-pass integrating filters, but allows for discrete frequency analysis and trending using FFTs (Fast Fourier Transforms). Vendor specifications state that this equipment should provide fairly accurate data down to 2 Hz in units of acceleration (g peak) by using the raw transducer signal, negating the need for integration. Study of low frequency spectra taken in g peak with these instruments has revealed no distinct sub-synchronous peaks above the noise floor acceleration signal.

In light of their rigorous testing and limited design run time, it is not likely that a minor mechanical fault would prevent these pumps from fulfilling their design function and unlikely that development of a major fault would go unnoticed.

# James A. FitzPatrick Station Inservice Testing Program

## 10 CFR 50.55a Request PRR-01

Proposed Alternative In Accordance with 10CFR50.55a(a)(3)(i)

On the basis that the proposed alternative provides an acceptable level of quality and safety.

### **Proposed Alternative Testing:**

The vibration measurements will be taken using instrumentation accurate to +/- 5% full scale over a frequency response range of 6.5 Hz to 1000 Hz. The data will be evaluated in accordance with ISTB-6000, "Monitoring, Evaluation, and Analysis".

### **Duration of Proposed Alternative:**

The proposed alternative identified in this 10CFR50.55a Request shall be utilized during the Fourth Ten Year IST Interval.

### **Precedents:**

This 10CFR50.55a Request was previously approved for the Interval 3 IST Program in NRC SER dated November 17, 1998 (TAC No. MA0096). The circumstances and basis for the previous NRC approval have not changed.

### **References:**

None

### **Interval 4 Authorization:**

Pending Approval