Entergy Nuclear Northeast
Entergy Nuclear Operations, Inc
James A Fitzpatrick NPP
P O Box 110
Lycoming, NY 13093
Tel 315 349 6024 Fax 315 349 6480

T.A. Sullivan
Vice President, Operations-JAF

December 6, 2002
JAFP-02-0224

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station O-P1-17
Washington, DC 20555-0001

SUBJECT: James A. FitzPatrick Nuclear Power Plant
Docket No. 50-333
Proposed Change to Technical Specifications Regarding Local Power Range Monitor Calibration Frequency (JPTS-02-002)

Dear Sir:

This application for an amendment to the James A. FitzPatrick (JAF) Technical Specifications (TS) proposes a change to Surveillance Requirement (SR) 3.3.1.1.7. The proposed change would allow JAF to increase the interval between Local Power Range Monitor (LPRM) calibrations from 1000 megawatt-days/ton to 2000 megawatt-days/ton. Increasing the frequency interval between required LPRM calibrations is acceptable because of improvements in fuel analytical bases, core monitoring processes, and nuclear instrumentation. In addition, this change will improve safety at JAF by reducing the time Primary Containment Isolation Valves (PCIVs) are opened and reducing wear and tear on the Traversing Incore Probe (TIP) system. The associated Bases will be revised in accordance with the Technical Specification Bases Control Program.

The NRC has previously approved similar amendments to the Technical Specifications for the Vermont Yankee and River Bend Nuclear Power Stations. This amendment request proposes to adopt surveillance testing requirements similar to those discussed in the previously approved amendments.

Attachment 1 contains the proposed new TS page and Attachment 2 is the Safety Evaluation for the proposed change. A markup of the affected TS page is included as Attachment 3, and Attachment 4 provides a draft copy of the marked up TS Bases page. Actual changes to the TS Bases will be made in accordance with the Technical Specification Bases Control Program.

Entergy Nuclear Operations, Inc. has also determined that the proposed change satisfies the criteria for a categorical exclusion in accordance with 10 CFR 51.22(c)(9) and does not require an environmental review. Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment needs to be prepared for this change. A copy of this application and the associated attachments are being provided to the designated New York State official in accordance with 10 CFR 50.91.

A001

There are no new commitments made in this letter. If you have any questions, please contact Mr. Richard Plasse at 315-349-6793.

I declare under penalty of perjury that the forgoing is true and correct.

Very truly yours,

Executed on 12/6/02

for T. Sullivan

T. A. Sullivan
Vice President, Operations-JAF

cc: Regional Administrator
U. S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Office of the Resident Inspector
U. S. Nuclear Regulatory Commission
P.O. Box 136
Lycoming, NY 13093

Mr. G. Vissing, Project Manager
Project Directorate I
Division of Licensing Project Management
U. S. Nuclear Regulatory Commission
Mail Stop OWFN 8C2
Washington, DC 20555

Mr. F. William Valentino, President
New York State Energy Research and Development Authority
Corporate Plaza West
286 Washington Avenue Extension
Albany, NY 12203-6399

Attachment 1 to JAFP-02-0224
(JPTS-02-002)
REVISED TECHNICAL SPECIFICATION PAGE

Proposed Change to the Technical Specifications – LPRM Calibration Frequency

Entergy Nuclear Operations, Inc.
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
Docket No. 50-333
DPR-59

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.1.5	Verify the source range monitor (SRM) and intermediate range monitor (IRM) channels overlap.	Prior to fully withdrawing SRMs
SR 3.3.1.1.6	----------NOTE---------- Only required to be met during entry into MODE 2 from MODE 1. ---------- Verify the IRM and APRM channels overlap.	7 days
SR 3.3.1.1.7	Calibrate the local power range monitors.	2000 MWD/T average core exposure
SR 3.3.1.1.8	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.1.1.9	----------NOTES---------- 1. Neutron detectors are excluded. 2. For Functions 1.a and 2.a, not required to be performed when entering MODE 2 from MODE 1 until 12 hours after entering MODE 2. 3. For Function 2.b, the recirculation loop flow signal portion of the channel is excluded. ---------- Perform CHANNEL CALIBRATION.	92 days

(continued)

Attachment 2 to JAFP-02-0224
(JPTS-02-002)
SAFETY EVALUATION

Proposed Change to the Technical Specifications - LPRM Calibration Frequency

Entergy Nuclear Operations, Inc.
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
Docket No. 50-333
DPR-59

I. DESCRIPTION

The proposed change will revise the calibration frequency requirement for the Local Power Range Monitors (LPRMs) from 1000 MWD/T to 2000 MWD/T average core exposure. By extending the LPRM calibration frequency this surveillance may be better scheduled to coincide with other LPRM testing and control rod sequence exchanges. In addition, this will reduce wear and tear on the Traversing Incore Probe System (TIP) resulting in fewer repairs in a high radiation area. Also, this will further minimize the time Primary Containment Isolation TIP Ball Valves are open (RG 1.97 commitment).

Similar TS changes (increasing the LPRM surveillance interval to 2000 MWD/T) have been approved by the NRC for other boiling water reactors (References 7 and 8).

II. PROPOSED CHANGE

The purpose of this proposed change is to revise the Technical Specifications (TS) Surveillance Requirement (SR) for periodic calibration of the LPRMs. The current requirement is stipulated by SR 3.3.1.1.7 and is contained in TS 3.3.1.1, RPS Instrumentation. SR 3.3.1.1.7 specifies that LPRMs be calibrated at a frequency of every 1000 megawatt-days/ton (MWD/T). The proposed change will revise the frequency of the surveillance to every 2000 megawatt-days/ton (MWD/T).

III. BACKGROUND

The LPRM system consists of 31 LPRM string assemblies, each containing four detectors. The 124 miniature fission chamber-type neutron detectors are positioned at various fixed locations on four horizontal planes throughout the reactor core. The LPRMs provide flux signals to the Average Power Range Monitor (APRM) system, the Rod Block Monitor (RBM) system, and the EPIC process computer. LPRMs are grouped by axial and radial location to provide a representative indication of neutron flux to the six APRM channels. The APRMs provide indication of core average thermal power and input to the Reactor Protection System (RPS). The RBM system receives flux inputs from LPRMs around a selected control rod and prevents withdrawal of that rod when local power is above a preset limit. LPRM inputs to the EPIC computer are used to calculate core thermal limits and ensure operations are within established limits.

Each LPRM detector contains a fission chamber. When neutrons interact with fissile material within the fission chamber, a signal is generated and conditioned, indicating neutron flux intensity, which is related to local power. Each LPRM assembly also contains a calibration tube for a Traversing Incore Probe (TIP). The TIP system is used to calibrate the LPRMs to maintain design accuracy during operations. The TIP system provides a signal proportional to the gamma flux, which correlates to neutron flux at LPRM locations, and this high precision signal is used for adjusting LPRM amplifier gains during calibration.

The TIP signals are used to perform LPRM channel calibrations to compensate for changes in detector sensitivity. LPRM calibrations can only be performed while the reactor is operating at power because of the minimum sensitivity of the LPRM detectors.

LPRMs are calibrated periodically because of flux profile changes and depletion of the fissile detection material. Through this process, instrument uncertainties are properly accounted for in the measurement of core operating parameters. Calibration data is obtained from the TIP system, using the moveable gamma detectors to measure the incore flux distribution for comparison with the LPRM readings.

At rated thermal power (RTP), 1000 MWD/T is about 44 days (i.e., 1000 MWD/T x 111 tons uranium in Cycle 16 ÷ 2536 MWt RTP). The proposed change to the SR frequency will approximately double the effective time interval between successive LPRM calibrations.

The Plant Computer System is used for data storage and to calculate each LPRM signal by comparing TIP scanned signals to current LPRM readings and calculating gain adjustment factors (GAFs). The amount by which the LPRM gains are adjusted is determined by the ratio of the calibrated LPRM signal to actual LPRM signal. GAFs are determined for each of the LPRM detectors. GAFs are derived from the TIP data. GAF adjustments are implemented during LPRM calibrations. The LPRMs are then calibrated by adjusting signal gains based on the calibration current required to produce a standard meter deflection.

The James A. FitzPatrick (JAF) Updated Final Safety Analysis Report (UFSAR) Sections 7.5.6, 7.5.7, 7.5.8 and 7.5.9 provide additional discussions on LPRM, APRM, RBM, and TIP Systems, respectively.

IV. TECHNICAL ANALYSIS

SR 3.3.1.1.7 in TS 3.3.1.1 establishes an LPRM calibration frequency of 1000 MWD/T average core exposure. The proposed change would increase the interval between whole core LPRM calibrations to 2000 MWD/T.

The APRM and RBM systems are the only nuclear instrumentation systems, which use LPRM readings. The APRM readings are maintained within +/- 2% of core thermal power by manual calibration against weekly heat balance calculations. Since the LPRM chamber responses are very linear over the interval involved, the LPRM calibration interval extension has no significant effect on the APRM accuracy during the power maneuvers or transients between LPRM calibrations. For the RBM when a rod is selected, the RBM channel readings are automatically calibrated against an APRM reading and the rod block trips are set at approximately 108% of the calibrated reading. Again, since LPRM chamber responses are very linear over the interval involved, the RBM system response during rod withdrawal is not significantly affected by the LPRM calibration interval extension. Therefore it is concluded that the performance of the APRM and RBM systems are not significantly affected by the proposed LPRM surveillance interval increase.

The justification to increase the surveillance interval is based upon maintaining the uncertainty in power distribution within the limits contained in a NRC approved Licensing Topical Report, NEDO-10958-A, General Electric BWR Thermal Analysis Basis (GETAB) Data, Correlation and Design Application, dated January 1977 (Reference 1). The calibration frequency is dependent upon the added uncertainty in the nodal power distribution due to LPRM based operation between successive OD-1 (on-demand computer program, number 1) runs and LPRM calibrations. This added uncertainty is limited by the total uncertainty (8.7%) allowed by reference 1.

LPRM calibration is performed by completing an OD-1 to collect axial neutron flux data and then adjusting the LPRM output signal as required. The original surveillance acceptance criterion was based on using the P-1 (periodic computer program, number 1, for thermal limit calculation) monitoring process and older design LPRM chambers for core monitoring, which experience certain inaccuracies between calibrations. Based on the known behavior of the LPRM chambers, and the monitoring interpolation processes, the allowable uncertainty contribution used to establish the 1000 MWD/T operating limit between successive LPRM calibrations was based primarily on the variations in LPRM sensitivity versus exposure behavior.

Evaluation of data from several plants indicates that the nodal power uncertainty resulting from performing thermal limit calculations in the LPRM mode is not substantially dependent upon the exposure interval between OD-1 runs and LPRM calibrations. This evaluation shows that the total uncertainty based on LPRM calibrations with a 2000 MWD/T surveillance interval is still less than the total uncertainty of 8.7% assumed in reference 1.

The proposed 2000 MWD/T surveillance interval is based on detailed statistical evaluations of the uncertainty in LPRM output exposure specific cases, including a case at nearly 3000 effective full power hours (EFPH) without an OD-1 and LPRM calibration relative to the TIP monitoring cases immediately after OD-1. (1 EFPH is approximately equal to 1 MWD/T.) The calculations are based upon improved core monitoring systems that utilize nodal diffusion theory coupled with plant data, including improved flux instrumentation. The resulting nodal uncertainty combined with the other identified uncertainties (TIP machine out-of-service and LPRM failures) must be less than the total uncertainty allowed by the licensing topical report. The statistical evaluations have been previously reviewed and found acceptable by the NRC Staff (References 2, 3, 4, 5, and 6).

GE has performed detailed statistical evaluations of the uncertainty in LPRM-based monitoring cases at exposure intervals up to 2991 EFPH (2688 MWD/T). Data examination showed that nodal power uncertainty did not significantly deviate with exposure. These evaluations provide the basis that the reference 1 equivalent safety limit of 8.7% would not be exceeded even with a 25% surveillance extension (2500 MWD/T) allowed by TS SR 3.0.2. This is because of improved LPRM chambers (JAF uses NA 200 and 300 series), which exhibit consistent LPRM sensitivity throughout their useful nuclear life (up to 40,000 MWD/T), and improved core monitoring systems. JAF uses GE 3D MONICORE, which utilizes nodal diffusion theory, coupled with plant data and the improved flux instrumentation. The 3D-MONICORE model is based on accepted BWR calculation methods used to monitor on-line core performance.

CONCLUSION

The performance of the APRM and RBM systems are not significantly affected by the proposed LPRM surveillance interval increase. The evaluations show that the equivalent total nodal uncertainty for the increased calibration interval of 2000 MWD/T would be 7.6% for fission chamber TIPs and less than this for the gamma TIPs installed at JAF. For analyzed cases up to 2688 MWD/T, the total nodal uncertainty remains less than the original reference 1 requirement of 8.7%.

In addition, GE Nuclear Services recently completed a JAF specific evaluation (Reference 9) including confirmation of LPRM calibration acceptance criteria and has concluded the proposed technical changes are safe and conform to the generic and plant specific Licensing Topical Reports (LTRs).

JAF conforms to the analysis criteria and the acceptance criteria of reference 1; therefore, it is acceptable to change the LPRM calibration frequency from 1000 MWD/T to 2000 MWD/T.

V. REGULATORY SAFETY ANALYSIS

EVALUATION OF SIGNIFICANT HAZARDS CONSIDERATION

Operation of the JAF plant in accordance with the proposed amendment would not involve a significant hazards consideration as defined in 10 CFR 50.92 since it would not:

1. Involve an increase in the probability or consequences of an accident previously evaluated. The revised surveillance interval continues to ensure that the LPRM signal is adequately calibrated. The proposed change results in no change in radiological consequences of the design basis LOCA as currently analyzed for JAF. This change will not alter the basic operation of process variables, structures, systems, or components as described in the JAF UFSAR, and no new equipment is introduced by the change in LPRM surveillance interval. The performance of the APRM and RBM systems are not significantly affected by the proposed LPRM surveillance interval increase. Therefore, the probability of accidents previously evaluated is unchanged.

   The consequences of an accident can be affected by the thermal limits existing at the time of the postulated accident, but LPRM chamber exposure has no significant effect on the calculated thermal limits because LPRM accuracy does not significantly deviate with exposure. For the extended calibration interval, the total nodal power uncertainty remains less than the uncertainty assumed in the thermal analysis basis safety limit, maintaining the accuracy of the thermal limit calculation. Therefore, the thermal limit calculation is not significantly affected by LPRM calibration frequency, and the consequences of an accident previously evaluated are unchanged.

The change does not affect the initiation of any event, nor does it negatively impact the mitigation of any event. Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Create the possibility of a new or different kind of accident from any accident previously evaluated. The proposed change will not physically alter the plant or its mode of operation. The performance of the APRM and RBM systems are not significantly affected by the proposed LPRM surveillance interval increase. As such, no new or different types of equipment will be installed, and the basic operation of installed equipment is unchanged. The methods governing plant operation and testing are consistent with current safety analysis assumptions. Therefore, the proposed change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Involve a significant reduction in a margin of safety. The proposed change has no impact on equipment design or fundamental operation, and there are no changes being made to safety limits or safety system allowable values that would adversely affect plant safety as a result of the proposed change. The performance of the APRM and RBM systems are not significantly affected by the proposed LPRM surveillance interval increase. The margin of safety can be affected by the thermal limits existing prior to an accident; however, uncertainties associated with LPRM chamber exposure have no significant effect on the calculated thermal limits. The thermal limit calculation is not significantly affected because LPRM sensitivity with exposure is well defined. LPRM accuracy remains within the total nodal power uncertainty assumed in the thermal analysis basis, thus maintaining thermal limits and the safety margin.

   Since the proposed change does not affect safety analysis assumptions or initial conditions, the margin of safety in the safety analyses are maintained. Therefore, the proposed change does not involve a significant reduction in a margin of safety.

APPLICABLE REGULATORY REQUIREMENTS / CRITERIA

In conclusion based on the considerations discussed above (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public. No new commitments are made as a result of the proposed change.

VI. ENVIRONMENTAL CONSIDERATIONS

This amendment request meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) as follows:

(i) The amendment involves no significant hazards consideration.

As described in Section V of this evaluation, the proposed change involves no

significant hazards consideration.

(ii) There is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite.

The proposed change does not involve the installation of any new equipment, or the modification of any equipment that may affect the types or amounts of effluents that may be released offsite. Therefore, there is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite.

(iii) There is no significant increase in individual or cumulative occupational radiation exposure.

The proposed change does not involve plant physical changes, or introduce any new mode of plant operation. Therefore, there is no significant increase in individual or cumulative occupational radiation exposure.

Based on the above, Entergy Nuclear Operations, Inc. concludes that the proposed change meets the criteria specified in 10 CFR 51.22 for a categorical exclusion from the requirements of 10 CFR 51.21 relative to requiring a specific environmental assessment by the Commission.

VII. REFERENCES

1. NEDO- 10958-A, General Electric BWR Thermal Analysis Basis (GETAB): Data, Correlation and Design Application, dated January 1977
2. Letter from F. Akstulewicz (NRR) to G.A Watford (GE), Acceptance for Referencing of Licensing Topical Reports NEDC-32601P (TAC No. M97490), dated March 11, 1999
3. NEDC-32601P-A, Methodology and Uncertainties for Safety Limit MCPR Evaluations, dated August 1999
4. NEDC-32694P-A, Power Distribution Uncertainties for Safety Limit MCPR Evaluations, dated August 1999
5. NEDE-24011P-A-14-US, General Electric Standard Application for Reactor Fuel, dated June 2000
6. NEDE-32321, 3D Monicore (RL3D) Performance Evaluation Accuracy, dated January 1994
7. Vermont Yankee Nuclear Power Station, Technical Specification Amendment No. 191, TAC No. MA9053, dated July 18, 2000
8. River Bend Station, Unit 1, Technical Specification Amendment No. 107, TAC No. M98883, dated June 11, 1999
9. LPRM Calibration Interval Increase for James A. FitzPatrick Nuclear Power Plant, GE-NE-0000-0006-7210-01, dated October, 2002

Attachment 3 to JAFP-02-0224
(JPTS-02-002)
MARKED-UP TECHNICAL SPECIFICATION PAGE

Proposed Change to the Technical Specifications - LPRM Calibration Frequency

Entergy Nuclear Operations, Inc.
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
Docket No. 50-333
DPR-59

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.3.1.1.5	Verify the source range monitor (SRM) and intermediate range monitor (IRM) channels overlap.	Prior to fully withdrawing SRMs
SR 3.3.1.1.6	----------NOTE---------- Only required to be met during entry into MODE 2 from MODE 1. ---------- Verify the IRM and APRM channels overlap.	7 days
SR 3.3.1.1.7	Calibrate the local power range monitors.	2000 ~~1000~~ MWD/T average core exposure
SR 3.3.1.1.8	Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.1.1.9	----------NOTES---------- 1. Neutron detectors are excluded. 2. For Functions 1.a and 2.a, not required to be performed when entering MODE 2 from MODE 1 until 12 hours after entering MODE 2. 3. For Function 2.b, the recirculation loop flow signal portion of the channel is excluded. ---------- Perform CHANNEL CALIBRATION.	92 days

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Attachment 4 to JAFP-02-0224
(JPTS-02-002)
DRAFT MARKED-UP TECHNICAL SPECIFICATION BASES PAGE

Entergy Nuclear Operations, Inc.
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
Docket No. 50-333
DPR-59

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.1.5 and SR 3.3.1.1.6 (continued)

increased into a neutron flux region without adequate indication. This is required prior to fully withdrawing SRMs since indication is being transitioned from the SRMs to the IRMs.

The overlap between IRMs and APRMs is of concern when reducing power into the IRM range. On power increases, the system design will prevent further increases (by initiating a rod block) if adequate overlap is not maintained. Overlap between IRMs and APRMs exists when sufficient IRMs and APRMs concurrently have onscale readings such that the transition between MODE 1 and MODE 2 can be made without either APRM downscale rod block, or IRM upscale rod block. Overlap between SRMs and IRMs similarly exists when, prior to fully withdrawing the SRMs, IRMs are above mid-scale on range 1 before SRMs have reached the upscale rod block.

As noted, SR 3.3.1.1.6 is only required to be met during entry into MODE 2 from MODE 1. That is, after the overlap requirement has been met and indication has transitioned to the IRMs, maintaining overlap is not required (APRMs may be reading downscale once in MODE 2).

If overlap for a group of channels is not demonstrated (e.g., IRM/APRM overlap), the reason for the failure of the Surveillance should be determined and the appropriate channel(s) declared inoperable. Only those appropriate channels that are required in the current MODE or condition should be declared inoperable.

A Frequency of 7 days is reasonable based on engineering judgment and the reliability of the IRMs and APRMs.

SR 3.3.1.1.7

LPRM gain settings are determined from the local flux profiles measured by the Traversing Incore Probe (TIP) System. This establishes the relative local flux profile for appropriate representative input to the APRM System. The ~~1000~~ 2000 MWD/T Frequency is based on operating experience with LPRM sensitivity changes.

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