October 10, 2000

Mr. James Knubel
Chief Nuclear Officer
Power Authority of the State of
New York
123 Main Street
White Plains, NY 10601

SUBJECT: REQUEST FOR RELIEF NO. VRR-007 TO THE JAMES A. FITZPATRICK NUCLEAR POWER PLANT INSERVICE TESTING PROGRAM RE: REVISED EXCESS FLOW CHECK VALVE TESTING FREQUENCY (TAC NO. MA8767)

Dear Mr. Knubel:

By a letter dated April 24, 2000, as supplemented September 6, 2000, pursuant to the provisions specified in 10 CFR 50.55a(a)(3)(i) you requested relief from the American Society of Mechanical Engineers Boiler Pressure and Vessel Code (ASME Code) Section XI inservice examination requirements for examination of Excess Flow Check Valves (EFCVs). Specifically, you requested approval of an alternative to the ASME/American National Standards Institute Operations and Maintenance Standard, Part 10 (OM-10), valve exercising frequency specified in Subsections 4.2 and 4.3 for Category A and C Valves, respectively. Currently, in accordance with the James A. FitzPatrick's Inservice Testing (IST) Program, each EFCV is required to be exercised once per refueling outage. The proposed change is to relax the surveillance frequency by limiting the number of tests to a "representative sample" of EFCVs during each 24-month refueling outage, such that each EFCV will be tested at least every 10 years (nominal). The basis for your request is a high degree of reliability shown by the EFCVs and the low consequences of an EFCV failure.

The supporting analyses for the your conclusion are based on General Electric Nuclear Energy Topical Report B21-00658-01, "Excess Flow Check Valve Testing Relaxation" dated November 1998 and a response to Request for Additional Information (RAI) dated January 8, 2000. The topical report provided: (1) an estimate of steam release frequency (into the reactor building) due to a break in an instrument line concurrent with an EFCV failure to close and (2) an assessment of the radiological consequences of such a release. The NRC staff accepted the topical report by safety evaluation (SE) dated March 14, 2000.

The NRC staff reviewed the proposed changes and finds that you have adequately addressed the conditions set forth in the topical report SE. Based on the acceptability of the methods applied to estimate the release frequency in conjunction with a relatively low release frequency estimate, an unlikely impact on core damage, and negligible consequence of a release in the reactor building, the staff concludes that the increase in risk associated with the James A. FitzPatrick Nuclear Power Plant request for relaxation of EFCV surveillance testing is sufficiently low. On the basis of this information, the staff concludes that the licensee's risk findings and insights support the proposed changes, are in accordance with the referenced topical report and are therefore, acceptable.

The staff concludes that the proposed alternative would provide an acceptable level of quality and safety. The staff's evaluations and conclusions are contained in the enclosed SE. Therefore, the subject request for relief from the Code requirements is granted.

Sincerely,

/RA/

Marsha Gamberoni, Chief, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-333

Enclosure: Safety Evaluation

cc w/encl: See next page

The staff concludes that the proposed alternative would provide an acceptable level of quality and safety. The staff's evaluations and conclusions are contained in the enclosed SE. Therefore, the subject request for relief from the Code requirements is granted.

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/RA/

Marsha Gamberoni, Chief, Section 1
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Office of Nuclear Reactor Regulation

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Enclosure: Safety Evaluation

cc w/encl: See next page

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*See previous concurrence **Safety Evaluation provided - no major changes made

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

FOR

RELIEF REQUEST FOR EXCESS FLOW CHECK VALVE SURVEILLANCE TESTING

PROGRAM PLAN REQUEST FOR RELIEF NO. VRR-007

FOR

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

POWER AUTHORITY OF THE STATE OF NEW YORK

DOCKET NO. 50-333

1.0 INTRODUCTION

By letter dated April 24, 2000, as supplemented September 6, 2000, the Power Authority of the State of New York, the licensee for the James A. FitzPatrick Nuclear Power Plant, pursuant to the provisions specified in 10 CFR 50.55a(a)(3)(i) requested relief from the American Society of Mechanical Engineers Boiler Pressure and Vessel Code (ASME Code) Section XI inservice examination requirements for examination of Excess Flow Check Valves (EFCVs). Specifically, you request approval of an alternative to the ASME/American National Standards Institute Operations and Maintenance Standard, Part 10 (OM-10), valve exercising frequency specified in Subsections 4.2 and 4.3 for Category A and C Valves, respectively. Currently, in accordance with the James A. FitzPatrick's Inservice Testing (IST) Program, each EFCV is required to be exercised once per refueling outage. The proposed change is to relax the surveillance frequency by limiting the number of EFCVs tested to a "representative sample" of EFCVs during each 24-month refueling outage, such that each EFCV will be tested at least every 10 years (nominal). The basis for the request as stated by the licensee is a high degree of reliability shown by the EFCVs and the low consequences of an EFCV failure.

The supporting analysis for the licensee's conclusion are based on General Electric Nuclear Energy Topical Report B21-00658-01, "Excess Flow Check Valve Testing Relaxation" dated November 1998 and a response to Request for Additional Information (RAI) dated January 8, 2000. The staff accepted the topical report by safety evaluation (SE) dated March 14, 2000. This report provided: (1) an estimate of steam release frequency (into the reactor building) due to a break in an instrument line concurrent with an EFCV failure to close and (2) an assessment of the radiological consequences of such a release.

2.0 BACKGROUND

EFCVs are installed on boiling-water reactor (BWR) instrument lines to limit the release of fluid in the event of an instrument line break. Examples of EFCV installations include reactor pressure vessel level and pressure instrumentation, main steam line flow instrumentation, recirculation pump suction pressure, and reactor core isolation cooling steam line flow

instrumentation. EFCVs are not required to close in response to a containment isolation signal and are not required to operate under post loss-of-coolant accident (LOCA) conditions. The Boiling Water Reactor Owners Group (BWROG), in the topical report, stated that EFCVs are not needed to mitigate the consequences of an accident because an instrument line break coincident with the design-basis LOCA would be of a sufficiently low probability to be outside of the design basis.

The standard technical specifications (STS) surveillance requirements currently require verification of the actuation (closing) capability of each reactor instrumentation line EFCV every 18 months (or 24 months depending on the plant refueling schedule). This is typical for most BWR plants. The proposed change by the licensee revises the surveillance frequency by allowing a "representative sample" of EFCVs to be tested every 24 months. The "representative sample" is based on approximately 20 percent of the EFCVs being tested each refueling outage such that each valve is tested at least every 10 years (nominal).

3.0 EVALUATION

The reactor vessel instrument lines at James A. FitzPatrick Nuclear Power Plant include flow restricting orifices upstream of the EFCVs to limit reactor water flow in the event of an instrument line break. As stated by the licensee, in previous evaluations contained in the James A. FitzPatrick Final Safety Analysis Report (FSAR), the EFCVs are not credited for isolating a break such as an instrument line rupture. Thus, a failure of an EFCV is bounded by the previous analysis of an instrument line rupture. Analysis also shows that the resulting offsite doses would be well below regulatory limits. Additionally, reliability data provided by the topical report document zero EFCV failures (failures to close) for the James A. FitzPatrick Plant.

The James A. FitzPatrick TS surveillance requires the EFCVs to be tested for proper operation in accordance with the IST program. The James A. FitzPatrick IST program took exception to the testing requirements based on provisions that if exercising is not practical during plant operation or cold shutdowns, it may be limited to full-stroke testing during refueling outages. Based on the above, each EFCV is currently tested once every refueling outage (24 months).

Although no specific TS amendment is requested for the James A. FitzPatrick Nuclear Power Plant (the TS requirement is for testing in accordance with the IST program, the surveillance interval is not specified) the staff noted that the topical report does not provide a specific failure feedback mechanism, but does state that a plants corrective action program must evaluate equipment failures and establish appropriate corrective actions. The BWROG responded to the staff RAI question concerning failure feedback by stating that each licensee who adopts the relaxed surveillance intervals recommended by the topical report should ensure that an appropriate feedback mechanism responsive to EFCV failures is in place. Additionally, the BWROG referenced Technical Specifications Task Force 334 which includes a revised Basis for the TS EFCV surveillance and includes a failure feedback commitment.

The revised Bases states: "The representative sample consists of an approximately equal number of EFCVs, such that each EFCV is tested at least once every 10 years (nominal). In addition, the EFCVs in the sample are representative of the various plant configurations,

models, sizes and operating environments. This ensures that any potentially common problem with a specific type or application of EFCV is detected at the earliest possible time. The nominal 10-year interval is based on other performance-based testing programs, such as Inservice Testing (snubbers) and Option B to 10 CFR Part 50 Appendix J. Furthermore, any EFCV failures will be evaluated to determine if additional testing in that test interval is warranted to ensure overall reliability is maintained. Operating experience has demonstrated that these components are highly reliable and that failures to isolate are very infrequent. Therefore, testing of a representative sample was concluded to be acceptable from a reliability standpoint."

The licensee stated that EFCV failures will be documented in the FitzPatrick Corrective Action Program as a surveillance test failure. The failure will be evaluated and corrected. An Equipment Failure Evaluation will be required per the Corrective Action Program. The evaluation will encompass common failure mode identification, industry experience, and review of similar component failure history.

To ensure EFCV performance remains consistent with the extended test interval, minimum acceptance criteria of less than or equal to 1 failure per year on a 3-year rolling average has been established by the licensee. Upon exceeding the minimum acceptance criteria, a root-cause evaluation, an evaluation of the testing interval, and a risk analysis of the effects of the failure on cumulative and instantaneous plant safety is required. Corrective actions and performance goals will be established based on the results of the root-cause analysis. The staff considers the licensee's method to account for potential changes in EFCV failure rates to be acceptable.

The method used by the topical report for assessing the impact of an EFCV surveillance test interval increase to 10 years was found acceptable by the staff. The staff notes that the use of observed industry data for instrument line break and plant-specific EFCV failure data is adequate for assessing the proposed surveillance interval revisions. The James A. FitzPatrick Nuclear Power Plant EFCV failure rates are consistent with the industry average and with the results observed by the staff in the topical report. Based on the topical report results, the staff did not consider the estimated increase in release frequency to be significant.

The topical report also maintained that radiological consequences from reactor coolant pressure boundary instrument line breaks have been evaluated at most plants to show compliance to Regulatory Guide 1.11, "Instrument Lines Penetrating Primary Reactor Containment" and are documented in some FSARs. A typical General Electric (GE) radiological evaluation of the instrument line break with and without a 1/4 inch orifice installed, has been conducted using a GE methodology which has been accepted by the staff in BWR FSAR submittals. The result of this evaluation indicated that even without the 1/4 inch orifice installed, the resulting thyroid dose at the site boundary is about 5 percent of the regulatory limit. The topical report concluded, that the radiological consequence of EFCVs failing to function on demand is sufficiently low to be considered insignificant. Previous evaluations contained in the James A. FitzPatrick Nuclear Power Plant FSAR of such an instrument line rupture do not credit the EFCVs for isolating the rupture. As a result, a failure of an EFCV is bounded by the analysis and consistent with the topical report results.

4.0 CONCLUSION

As demonstrated in BWROG Topical Report B21-00658-01, the impact of an increase in EFCV surveillance test interval to 10 years (including a five-fold increase in the EFCV failure rate) resulted in a change in release frequency considered by the staff to be sufficiently low, especially since the consequences of an EFCV failure is not likely to lead to core damage. The evaluations performed by the licensee and the plant-specific failure data for EFCVs are consistent with the topical report results and are therefore, acceptable to the staff.
The consequences of steam release from the failure of the EFCVs is not significant, as shown by the topical report, and was supported by previous analysis. Based on the acceptability of the methods applied to estimate the release frequency in conjunction with a relatively low release frequency estimate, an unlikely impact on core damage, and negligible consequence of a release in the reactor building, the staff concludes that the increase in risk associated with the James A. FitzPatrick Nuclear Plant request for relaxation of EFCV surveillance testing is sufficiently low and is acceptable.

The topical report established that each plants corrective action program must evaluate equipment failures and establish appropriate corrective actions. These programs ensure that meaningful feedback data is acquired so that appropriate corrective action may be taken with regard to EFCV performance. The licensee provided input on EFCV performance criteria and the EFCV corrective action program. These were found acceptable by the staff.

Based on the above, the staff finds the relaxation of James A. FitzPatrick Nuclear Power Plant EFCV surveillance requirements frequency by allowing a representative sample of EFCVs to be tested every 24 months with all EFCVs being tested at least once every 10 years (nominal) to be acceptable.

On the basis discussed above, the staff concludes that the alternative proposed by the licensee provides an acceptable level of quality and safety. Therefore, the subject request for relief from the Code requirements is authorized pursuant to 10 CFR50.55a(a)(3)(i) on the basis that the alternative proposed by the licensee provides an acceptable level of quality and safety.

Principal Contributor: C. Doutt

Date: October 10, 2000