Entergy

Entergy Nuclear Generation Company
Pilgrim Nuclear Power Station
600 Rocky Hill Road
Plymouth, MA 02360

J. F. Alexander
Director
Nuclear Assessment

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

Docket No. 50-293
License No. DPR-35

**Request for Approval of Relief Request Nos. RV-44 and RV-45 to Pilgrim's In-Service Testing Program Concerning Excess Flow Check Valve Testing Frequency**

Reference: NEDO-32977-A, "Excess Flow Check Valve Testing Relaxation," dated June 2000.

Pursuant to the provisions specified in 10CFR50.55a (a)(3)(i), Entergy Nuclear Generation Company (ENGC)-Pilgrim requests relief from the Code requirements for examinations of excess flow check valves (EFCVs). Specifically, Pilgrim requests approval of an alternative to the Operations and Maintenance Standard, Part 10 (OM-10), valve exercising test frequency specified in subsection 4.3.2 and valve leakage test frequency specified in sub-paragraph 4.2.2.3(a) for Category AC valves. Currently, in accordance with Pilgrim's In-Service Testing (IST) Program, each EFCV is required to be exercised once each refueling interval (defined as once per refueling outage not to exceed two years, with a six month grace period allowed) and leak tested once every two years (6 month grace period allowed) The proposed alternative would relax the number tested each refueling outage to a representative sample of EFCVs, such that each EFCV will be tested at least once every 10 years (nominal).

The basis for the alternative testing requirements are contained in NEDO-32977-A, "Excess Flow Check Valve Testing Relaxation," dated June 2000. The NRC reviewed and approved NEDO-32977-A and issued a safety evaluation, dated March 14, 2000. Pilgrim's relief requests and basis are consistent with NEDO-32977-A, and similar to a licensing action that was approved by the NRC for the James A. FitzPatrick Nuclear Power Plant on October 10, 2000. The FitzPatrick licensing action allows a representative sample of reactor instrumentation line EFCVs to be tested every 24 months, instead of testing each valve every 24 months in the context of a change to the FitzPatrick in-service testing (IST) program.

Pilgrim Technical Specification Surveillance Requirement 4.7.A.2.b.2 requires the EFCVs to be tested for proper operation in accordance with Technical Specification 3.1.3; Technical Specification 3.1.3 provides Pilgrim's IST program as the governing surveillance mechanism. Pilgrim will conduct testing of the plant EFCV's using the 1989 edition of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) Section XI. The 1989 ASME Code provides that the rules for IST for valves shall meet the requirements set forth in ASME Operations and Maintenance Standard OMa-1988, Part 10 (OM-10), "Inservice Testing of Valves in Light Water Reactor Power Plants". Use of portions of OM-10 is allowed pursuant to the provisions in 10CFR50.55a(f)(4)(iv) provided all the related requirements are met. This submittal, therefore, requests relief from the OM-10 Code requirements.

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NEDO-32977-A demonstrates, through operating experience, a high degree of reliability with EFCVs and the low consequences of an EFCV failure.

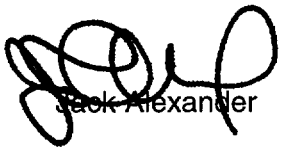
Failure rates listed in the report (Table 4-1) for manufacturers of Pilgrim's EFCVs (Chemiquip and Dragon) were extremely low per year of operation. Their reliability was found to be high within the report. Reliability data for these EFCVs is discussed in the Basis for Relief section of each relief request.

The reactor vessel instrument lines at Pilgrim have a flow-restricting orifice upstream of the EFCVs to limit reactor water leakage in the event of rupture. Previous evaluations contained in the Pilgrim Updated Final Safety Analysis Report (UFSAR) of such a postulated instrument line rupture do not credit the EFCVs for isolating the rupture. Thus, a failure of an EFCV, though not expected as a result of this request, is bounded by the analysis. Therefore, the proposed alternative to the required exercise testing frequency for EFCVs prescribed by OM-10 provides a satisfactory level of quality and safety.

The reduced testing associated with this change will result in dose savings during refuel outages in which the testing is performed. An increase in the availability of instrumentation during the outage reactor pressure vessel system leakage test, in addition to cost savings, are also considered benefits from implementing this request.

This letter's attachment contains Pilgrim's Valve Relief Request for Chemiquip EFCVs, RV-44 and Valve Relief Request for Dragon EFCVs, RV-45, which are a supplement to the Pilgrim Refuel Outage Justification RJO-16. Pilgrim requests approval by March, 2001 to allow planning and implementation prior to the start of the next scheduled refueling outage, which will commence in April, 2000. If you have any questions on this request, please contact P.M. Kahler, at (508) 830-7939.

Very truly yours,



Jack Alexander

Attachments: 1) Refueling Outage Justification RJO-16
2) Relief Request RV-44 (Supplement to Pilgrim Refuel Outage Justification RJO-16)
3) Relief Request RV-45 (Supplement to Pilgrim Refuel Outage Justification RJO-16)

cc: Mr. Alan B. Wang, Project Manager
Project Directorate I-3
Office of Nuclear Reactor Regulation
Mail Stop: OWFN 14B20
1 White Flint North
11855 Rockville Pike
Rockville, MD 20852

U.S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406

Senior Resident Inspector

Mr. Robert Hallisey
Radiation Control Program
Commonwealth of Massachusetts
Exec Offices of Health & Human Services
Dept. of Public Health
174 Portland Street
Boston, MA 02114

Mr. Steven Mc Grail, Director
Mass. Energy Management Agency
400 Worcester Road
P.O. Box 1496
Framingham, MA 01701-0317

# RELIEF REQUEST RV-44

**Supplement to Pilgrim Refuel Outage Justification RJO-16**

## INSERVICE TESTING PROGRAM FOR PUMPS AND VALVES

### SYSTEMS

Core Spray System (1400)
High Pressure Coolant Injection System (2301)
Reactor Core Isolation Cooling System (1301)
Reactor Water Cleanup system (1201)
Recirculation Pump Instrumentation (262)
Nuclear Boiler Instrumentation (261)
Nuclear Boiler Instrumentation (263)

### VALVES

Excess Flow Check Valves manufactured by Chemiquip:

| | | |
|---|---|---|
| 1-CK-17A/B/C/D | 262-26A/B | 263-51 |
| 1-CK-18A/B/C/D | 263-215A/B | 263-53 |
| 12-CK-360 | 263-217A/B | 263-55 |
| 12-CK-361 | 263-219A/B | 263-57 |
| 1301-15A/B | 263-220A/B | 263-59 |
| 2301-26 | 263-223A/B | 263-61 |
| 2301-220 | 263-225 | 263-69 |
| 1400-31A/B | 263-227 | 263-71 |
| 261-19A/B | 263-231A/B | 263-73 |
| 261-20A/B | 263-233 | 263-75 |
| 261-21A/B | 263-237 | 263-77 |
| 261-22A/B | 263-242A/B | 263-79 |
| 261-67A/B/C/D/E/F/G/H | 263-38 | 263-81 |
| 261-110A/B | 263-44 | 263-83 |
| 262-25A/B | 263-45 | 263-90 |
| | | 263-92 |

### CATEGORY

AC

### CLASS:

1, 2

### FUNCTION

Excess flow check valves (EFCV's) are installed within each instrument process line that is part of the reactor coolant pressure boundary and that penetrates primary containment. Each EFCV closes to limit flow within the respective instrument line in the event of an instrument line break downstream of the EFCV.

## TEST REQUIREMENT

Pilgrim Nuclear Power Station (PNPS) will conduct testing to the plant EFCV's using the 1989 Edition of ASME Section XI. The 1989 Edition provides that the rules for IST for valves shall meet the requirements set forth in ASME Operations and Maintenance Standard OMa-1988, Part 10 (OM-10), "Inservice Testing of Valves in Light Water Reactor Power Plants". Use of portions of OM-10 is allowed pusuant to the provisions in 10CFR50.55a(f)(4)(iv) provided all the related requirements are met. The related OM-10 requirements for check valve exercising during a refueling outage are sub-paragraphs 4.3.2.2(e) and 4.3.2.2(h). The related OM-10 requirements for leak rate testing of valves are identified within subsection 4.2.2. This provision to use OM-10 for testing EFCVs is preapproved within the PNPS Inservice Testing Program Safety Evaluation Report, dated June, 23 1993.

OM-10, subsection 4.3.2, requires these valves to be tested nominally every 3 months, except as specified by paragraph 4.3.2.2. The Pilgrim IST program takes exception to the testing requirements per sub-paragraph 4.3.2.2(e), which states that if exercising the valve is not practicable during plant operation or cold shutdowns, it may be limited to full-stroke exercising during refueling outages. Therefore, "each" EFCV is exercise tested once every refuel outage. The Pilgrim refueling schedule is a nominally once every two years.

OM-10, sub-paragraph 4.2.2.3(a); Test Frequency – Conduct leakage tests to "each" EFCV at least once every two years.

## RELIEF REQUESTED

Relaxation of the number of EFCVs tested every refuel outage from "each" to a "representative sample" every refuel outage (nominally once every 24 months). The representative sample is based on approximately 20 percent of the valves each two year cycle such that each valve is tested every 10 years (nominal).

## BASIS FOR RELIEF

NEDO-32977-A, and the associated NRC safety evaluation, dated March 14, 2000, provides the basis for this relief. NEDO-32977-A justifies relaxing the EFCV testing frequency from the current testing of each valve once/cycle to a ~20% sample once/cycle such that each valve is tested within a 10 year interval.

NEDO-32977-A demonstrates, through operating experience, a high degree of reliability with EFCVs and the low consequences of an EFCV failure. Reliability data in the report (Tables 4-1 and 4.2) documents two EFCV failures (failure to close) at 4 participating plants (Monticello, Dresden, Vermont Yankee and Oyster Creek), for Chemiquip valves similar to those used at Pilgrim. These two failures were observed over a service time of 5426 operating years (4.75E +07 operating hours). This results in a "Best Estimate Failure Rate" of 4.21 E-08 per hour of operating time and an "Upper Limit Failure Rate" of 1.33 E-07 per hour of operating time. A review of historical test surveillance data, and a test failure component history search at Pilgrim shows zero EFCV failures (failure to close) have been observed (data from 1983 through 1999 RFO #12). In addition, there are no known EFCV failures that occured earlier than 1983.

The instrument lines at Pilgrim have a flow restricting orifice upstream of the EFCVs to limit reactor water leakage in the event of rupture. Previous evaluations contained in Pilgrim's Updated Final Safety Analysis Report (UFSAR) of such an instrument line rupture do not credit the EFCVs for isolating the rupture. Thus a failure of an EFCV, though not expected as a result of this request, is bounded by the analysis. Based on the NEDO-32977-A and the analysis contained in Pilgrim's UFSAR, the proposed alternative to the required exercise testing frequency for EFCVs prescribed by OM-10 provides a satisfactory level of quality and safety.

## ALTERNATIVE TESTING

This relief request proposes to exercise test (FC), by full-stroke to the position required to fulfill its function, a representative sample of EFCVs every refueling outage. During the exercise test, gross valve seat leakage ($LX_{EFC}$) will be measured. The representative sample is based on approximately 20 percent of the valves each cycle such that each valve is tested every 10 years (nominal). An administrative open normal position verification (AP) will be performed on each valve following exercise and leak testing.

EFCV failures will be documented in Pilgrim's Corrective Action Program as a surveillance test failure. The failure will be evaluated and corrected. The Administrative EFCV Sample Test Program procedure will trend EFCV test failures and determine if additional testing is warranted.

The Administrative EFCV Sample Test Program procedure will also establish a minimum acceptance criteria of less than or equal to 1 failure per year on a 3 year rolling average. This requirement will ensure EFCV performance remains consistent with the extended test interval. Upon exceeding the criteria an evaluation will be required which will:

- require a root-cause evaluation to determine cause,
- determine the extent of conditions,
- require an evaluation of the testing interval to ensure reliability of the EFCVs, and
- produce a risk analysis of the effects of the failures on cumulative and instantaneous plant safety.

Corrective actions and performance goals will be established based on the results of the root-cause analysis.

## REFERENCES

NEDO-32977-A, "Excess Flow Check Valve Testing Relaxation," dated June 2000.

Safety Evaluation Report (with attached TER) by the office of Nuclear Reactor Regulation related to the Inservice Test Program and Requests for Relief, Pilgrim Nuclear Power Station Docket No. 50-293, dated June 23, 1993 (TAC No. M85069).

# RELIEF REQUEST RV-45

**Supplement to Pilgrim Refuel Outage Justification RJO-16**

## INSERVICE TESTING PROGRAM FOR PUMPS AND VALVES

### SYSTEM

Nuclear Boiler Instrumentation (263)

### VALVES

Excess Flow Check Valves manufacured by Dragon

2-CK-125A
2-CK-125B

### CATEGORY

AC

### CLASS:

2

### FUNCTION

Excess flow check valves (EFCV's) are installed within each instrument process line that is part of the reactor coolant pressure boundary and that penetrates primary containment. Each EFCV closes to limit flow within the respective instrument line in the event of an instrument line break downstream of the EFCV.

### TEST REQUIREMENT

Pilgrim Nuclear Power Station (PNPS) will conduct testing to the plant EFCV's using the 1989 Edition of ASME Section XI. The 1989 Edition provides that the rules for IST for valves shall meet the requirements set forth in ASME Operations and Maintenance Standard OMa-1988, Part 10 (OM-10), "Inservice Testing of Valves in Light Water Reactor Power Plants". Use of portions of OM-10 is allowed pusuant to the provisions in 10CFR50.55a(f)(4)(iv) provided all the related requirements are met. The related OM-10 requirements for check valve exercising during a refueling outage are sub-paragraphs 4.3.2.2(e) and 4.3.2.2(h). The related OM-10 requirements for leak rate testing of valves are identified within subsection 4.2.2. This provision to use OM-10 for testing EFCVs is preapproved within the PNPS Inservice Testing Program Safety Evaluation Report, dated June, 23 1993.

OM-10, subsection 4.3.2, requires these valves to be tested nominally every 3 months, except as specified by paragraph 4.3.2.2. The Pilgrim IST program takes exception to the testing requirements per sub-paragraph 4.3.2.2(e), which states that if exercising the valve is not practicable during plant operation or cold shutdowns, it may be limited to full-stroke exercising during refueling outages. Therefore, "each" EFCV is exercise tested once every refuel outage. The Pilgrim refueling schedule is a nominally once every two years.

OM-10, sub-paragraph 4.2.2.3(a); Test Frequency – Conduct leakage tests to "each" EFCV at least once every two years.

## RELIEF REQUESTED

Relaxation of the number of EFCVs tested every refuel outage from "each" to a "representative sample" every refuel outage (nominally once every 24 months). The representative sample is based on approximately 20 percent of the valves (for the case of Dragon EFCVs – one valve) each two year cycle such that each valve is tested at least every 10 years.

## BASIS FOR RELIEF

NEDO-32977-A, and the associated NRC safety evaluation, dated March 14, 2000, provides the basis for this relief. NEDO-32977-A justifies relaxing the EFCV testing frequency from the current testing of each valve once/cycle to a ~20% sample once/cycle such that each valve is tested within a 10 year interval.

NEDO-32977-A demonstrates, through operating experience, a high degree of reliability with EFCVs and the low consequences of an EFCV failure. Reliability data in the report (Tables 4-1 and 4.2) documents two EFCV failures (failure to close) at 3 participating plants (Clinton, Fermi and WNP2), for Dragon valves similar to those used at Pilgrim. These two failures were observed over a service time of 2494 operating years (2.18E +07 operating hours). This results in a "Best Estimate Failure Rate" of 9.2 E-08 per hour of operating time and an "Upper Limit Failure Rate" of 2.89 E-07 per hour of operating time. A review of historical test surveillance data, and a test failure component history search at Pilgrim shows zero EFCV failures (failure to close) have been observed from 1989 through 1999 RFO #12 (these valves were initially installed in 1987, but could not undergo meaningful plant testing until 1989 bcause their intitial design actuation flow rate was greater than available system test flow rate).

The instrument lines at Pilgrim have a flow restricting orifice upstream of the EFCVs to limit reactor water leakage in the event of rupture. Previous evaluations contained in Pilgrim's Updated Final Safety Analysis Report (UFSAR) of such an instrument line rupture do not credit the EFCVs for isolating the rupture. Thus a failure of an EFCV, though not expected as a result of this request, is bounded by the analysis. Based on the NEDO-32977-A and the analysis contained in Pilgrim's UFSAR, the proposed alternative to the required exercise testing frequency for EFCVs prescribed by OM-10 provides a satisfactory level of quality and safety.

## ALTERNATIVE TESTING

This relief request proposes to exercise test (FC), by full-stroke to the position required to fulfill its function, a representative sample of EFCVs every refueling outage. During the exercise test, gross valve seat leakage ($LX_{EFC}$) will be measured. The representative sample is based on approximately 20 percent of the valves (for the case of Dragon EFCVs – one valve) each cycle such that each valve is tested at least once every 10 years. An administrative open normal position verification (AP) will be performed on each valve following exercise and leak testing.

EFCV failures will be documented in Pilgrim's Corrective Action Program as a surveillance test failure. The failure will be evaluated and corrected. The Administrative EFCV Sample Test Program procedure will trend EFCV test failures and determine if additional testing is warranted.

The Administrative EFCV Sample Test Program procedure will also establish a minimum acceptance criteria of less than or equal to 1 failure per year on a 3 year rolling average. This requirement will ensure EFCV performance remains consistent with the extended test interval. Upon exceeding the criteria an evaluation will be required which will:

- require a root-cause evaluation to determine cause,
- determine the extent of conditions,
- require an evaluation of the testing interval to ensure reliability of the EFCVs, and
- produce a risk analysis of the effects of the failures on cumulative and instantaneous plant safety.

Corrective actions and performance goals will be established based on the results of the root-cause analysis.

## REFERENCES

NEDO-32977-A, "Excess Flow Check Valve Testing Relaxation," dated June 2000.

Safety Evaluation Report (with attached TER) by the office of Nuclear Reactor Regulation related to the Inservice Test Program and Requests for Relief, Pilgrim Nuclear Power Station Docket No. 50-293, dated June 23, 1993 (TAC No. M85069).

# REFUEL OUTAGE JUSTIFICATION RJO-16

[16] (previously relief request RV-22)

SYSTEMS: Core Spray System (1400)
High Pressure Coolant Injection System (2301)
Reactor Core Isolation Cooling System (1301)
Reactor Water Cleanup system (1201)
Recirculation Pump Instrumentation (262)
Nuclear Boiler Instrumentation (261)
Nuclear Boiler Instrumentation (263)

VALVES: All applicable

CATEGORY: AC

CLASS: 1,2

FUNCTION: Excess flow check valves (EFCV's) are installed within each instrument process line that is part of the reactor coolant pressure boundary, and that penetrates primary containment. Each EFCV closes to limit flow within the respective instrument line in the event of an instrument line break downstream of the EFCV. When open, the EFCV's allow system communication between the reactor coolant system and the corresponding plant instrument.

TEST REQUIREMENT: PNPS will conduct testing to the plant EFCV's using the OMa-1988, Part 10 (OM-10) Standard. This provision is preapproved within the PNPS Safety Evaluation Report, dated June 23, 1993 (TAC NO. M85069).

OM-10, paragraph 4.3.2.2; Test Frequency – exercise check valves at least once every three months to verify they fulfill their safety function.

BASIS FOR RELIEF These excess flow check valves are the primary system isolation valves for systems considered as being inservice during plant operation. These normally open instrument isolation check valves require a reverse flow exercise. Valve exercising in the closed direction is verified by conducting a gross leakage test. Following the leak test, an administrative open normal position verification (AP) is performed on each valve.

The gross leakage testing of excess flow check valves requires the reactor to be at a pressure of at least 600 psig. Testing requires valving out instruments which have a high probability of creating spurious signals that can, in turn, cause safety system initiation signals, isolation signals and/or a reactor scram. Therefore, the plant should be in the shutdown mode during testing. During plant shutdowns, the reactor coolant pressure boundary is not under pressure except when conducting the once per refueling outage ASME Boiler and Pressure Vessel Code, Section XI – System Leakage Test. The EFCV leakage testing is conducted during this system leakage pressure test.

This alternate testing is acceptable for implementation in accordance with OM-10 pursuant to 10CFR50.55a(f)(4)(iv) if the related requirements of OM-10 are implemented. The related requirements for check valve exercising during a refueling outage are sub-paragraphs 4.3.2.2(e) and (h). Use of the OM-10 alternate test requirement for check valve exercising is also discussed and approved within NUREG 1482, Section 4.1.4.

ALTERNATE TESTING: Perform check valve reverse flow exercise (FC), and open normal position verification (AP) to these valves during each refueling interval in accordance with the provisions of OM-10 sub-paragraphs 4.3.2.2(e) and (h). The PNPS refueling interval defines that testing will be performed at least once every two years with an allowable extension (grace period) of no more than 25%.