

February 10, 2005

Mr. Lew W. Myers
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Perry Nuclear Power Plant
P.O. Box 97, A290
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Perry, OH 44081

SUBJECT: PERRY NUCLEAR POWER PLANT, UNIT 1 - ISSUANCE OF AMENDMENT RE:
TESTING OF SAFETY/RELIEF VALVES (TAC NO. MC3896)

Dear Mr. Myers:

The Commission has issued the enclosed Amendment No. 133 to Facility Operating License No. NPF-58 for the Perry Nuclear Power Plant, Unit 1. This amendment revises the Technical Specifications (TSs) in response to your application dated March 31, 2004.

This amendment modifies the TS surveillance requirements (SRs) for manual actuation of certain main steam safety/relief valves (S/RVs), including those valves that provide an automatic depressurization system (ADS) and low-low set (LLS) valve function. The specific TS changes revise SR 3.4.4.3 for S/RVs, SR 3.5.1.7 for ADS valves, and SR 3.6.1.6.1 for LLS valves. The changes remove the requirement for the S/RV disks to be lifted from their seats when manually actuated. The revised SRs specify that the actuator is to stroke when manually actuated, without physically lifting the disks off their seats at power.

A copy of the Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice.

Sincerely,

/RA/

William A. Macon, Jr., Project Manager, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-440

Enclosures: 1. Amendment No. 133 to NPF-58
2. Safety Evaluation

cc w/encls: See next page

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TS Pages: ML050450571

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FIRSTENERGY NUCLEAR OPERATING COMPANY

DOCKET NO. 50-440

PERRY NUCLEAR POWER PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 133
License No. NPF-58

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by the FirstEnergy Nuclear Operating Company (the licensee) dated March 31, 2004, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-58 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 133, are hereby incorporated into this license. The FirstEnergy Nuclear Operating Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of its issuance and shall be implemented within 30 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Gene Y. Suh, Chief, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: February 10, 2005

ATTACHMENT TO LICENSE AMENDMENT NO. 133

FACILITY OPERATING LICENSE NO. NPF-58

DOCKET NO. 50-440

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove

3.4-11

3.5-5

3.6-23

Insert

3.4-11

3.5-5

3.6-23

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 133 TO FACILITY OPERATING LICENSE NO. NPF-58
FIRSTENERGY NUCLEAR OPERATING COMPANY
PERRY NUCLEAR POWER PLANT, UNIT 1
DOCKET NO. 50-440

1.0 INTRODUCTION

By application to the U.S. Nuclear Regulatory Commission (NRC or the Commission) dated March 31, 2004 (ML041040023), FirstEnergy Nuclear Operating Company (the licensee) requested changes to the Technical Specifications (TSs) for the Perry Nuclear Power Plant, Unit 1 (PNPP). The proposed changes would modify the TS surveillance requirements (SRs) for manual actuation of certain main steam line safety/relief valves (S/RVs), including those valves that provide an automatic depressurization system (ADS) and low-low set (LLS) valve function. The specific TS changes evaluated herein are for TS SR 3.4.4.3, SR 3.5.1.7, and SR 3.6.1.6.1, to eliminate the requirement that each S/RV open during the manual actuation of the S/RVs.

Specifically, the proposed changes would revise SR 3.4.4.3 for S/RVs, SR 3.5.1.7 for ADS valves, and SR 3.6.1.6.1 for LLS valves. The proposed changes would remove the requirement for the S/RV disks to be lifted from their seats when manually actuated. The SRs would specify that the actuator is to stroke when manually actuated, without physically lifting the disks off their seats at power.

PNPP has 19 Dikkers S/RVs that are exercised every refueling outage with approximately 950 pounds per square inch in the reactor pressure vessel (RPV) using two redundant divisional solenoid valves. The S/RVs are installed to protect the RPV from overpressurization during upset conditions. The size and number of S/RVs are selected such that peak pressure within the nuclear steam system will not exceed American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code*, Section III stress limits.

The Dikkers S/RVs are direct-acting, spring-loaded, safety valves with an attached pneumatic actuator, which are designed to perform as either a safety valve or as a relief valve. The safety mode of operation is independent and separate from the relief mode. The safety mode of operation is initiated when force produced from the increasing inlet steam pressure overcomes the opposing spring disk/stem weight and frictional forces to move the disk in the opening direction. The relief mode of operation is initiated when an electrical signal is received by one of two solenoid valves located on the pneumatic relief-mode actuator assembly. The manual action of the S/RVs is initiated from the control room. The solenoid and air-control valve opens

to allow an air source to pressurize the lower side of the piston in the pneumatic cylinder to push it upwards. This action is transmitted through a lever arm and pivot mechanism which in turn lifts the valve stem/disk, thereby opening the valve to allow steam to discharge through the valve. Upon de-energizing the solenoid, the air valve repositions to allow the pressurized air in the cylinder to vent to the atmosphere, thus closing the valve.

Eight of the 19 S/RVs fulfill the ADS function. The ADS function provides depressurization of the RPV during a small-break, loss-of-coolant accident if the high pressure core spray system fails or is unable to maintain required water level in RPV. The S/RVs equipped for the ADS function depressurize the RPV to allow the combination of the low pressure coolant Injection system and low pressure core spray system to inject into the RPV. The ADS valves can be opened automatically or manually. SR 3.5.1.7 verifies that the ADS valves can be manually opened and requires the testing to be performed on a staggered basis to ensure that each valve solenoid is alternately tested.

Six of the 19 S/RVs are equipped for the LLS function. To assure that no more than one relief valve reopens following a reactor isolation event, two S/RVs are provided with lower opening and closing pressure setpoints, and four valves are provided with lower closing setpoints. The lower pressure setpoint causes all the LLS valves to stay open longer, such that reopening of more than one S/RV is prevented on subsequent actuations. Therefore, the LLS function prevents excessive short duration S/RV cycles with valve actuation at the relief setpoint. SR 3.6.1.6.1 verifies that the LLS valves can be manually opened and requires the testing to be performed on a staggered basis to ensure that each valve solenoid is alternately tested.

SR 3.4.4.3 verifies that the S/RVs can be manually opened and requires the testing to be performed on a staggered basis to ensure that each valve solenoid is alternatively tested.

The Note associated with each of the referenced SRs ensures that adequate reactor steam pressure is available to perform the manual actuation test (with actuator coupled to valve stem) to avoid damaging the valve. Also, adequate steam flow must be passing through the main turbine or turbine bypass valves to continue to control reactor pressure when the S/RVs divert steam flow upon opening. Therefore, this note allows sufficient time after the required pressure and flow are achieved to perform this test. The proposed license amendment request will not change this Note to allow the option to test the S/RVs via manual actuation from the control room with the actuator coupled to valve stem during power operation.

Currently during each PNPP refueling outage, a minimum of 9 S/RVs shall be tested with all S/RVs tested within a 5-year interval. The S/RVs removed from the plant are tested for lift setpoint and seat leakage at a qualified testing facility. Following refurbishment and re-certification testing of these S/RVs, the test facility tests full operation of the S/RVs, including solenoid valve, air block valve, actuator, and relief valve stem/disk. Upon their return from the test facility and re-installation, all 19 S/RVs are full stroke exercised in accordance with SR 3.4.4.3, SR 3.5.1.7 and SR 3.6.1.6.1 to satisfy the requirements of ASME *Operation and Maintenance of Nuclear Power Plants Code* (OM Code), Appendix I, Paragraph I 3.4.1(d).

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations*, Part 50 (10 CFR 50), Appendix A, General Design Criterion 15, "Reactor coolant system design," requires, "The reactor coolant system and associated auxiliary, control, and protection systems shall be designed with sufficient margin to assure that the design conditions of the reactor coolant pressure boundary are not exceeded during any condition of normal operation, including anticipated operational occurrences." Further, the Commission's regulatory requirements related to the content of TSs are set forth in 10 CFR 50.36, "Technical Specifications." Specifically, 10 CFR 50.36(c)(2)(ii) sets forth four criteria to be used in determining whether a limiting condition for operation (LCO) is required to be included in TSs. These criteria require an LCO for: (1) installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant system pressure boundary; (2) initial plant conditions that are assumed in a design-basis transient and accident analysis; (3) components or systems that are used for mitigating consequences of the design-basis transient and accident; and (4) components or systems which operating experience or probabilistic risk assessment has shown to be significant to public health and safety. The standard technical specifications (STS) were developed based on the criteria in 10 CFR 50.36(c)(2)(ii). Existing LCOs and related SRs included as TS requirements that satisfy any of the criteria specified in 10 CFR 50.36(c)(2)(ii) must be retained in the TSs. The NRC encourages the licensees to upgrade their TSs consistent with those criteria and conforming, to the extent practical and consistent with the licensing basis for the plant, to the current STS.

The S/RVs are part of the primary success path and are assumed in the PNPP Updated Safety Analysis Report in the accident and safety analyses to mitigate the effects of the licensing-basis accidents. In accordance with Criterion 3 of 10 CFR 50.36(c)(2)(ii), discussed above, TS LCOs are required for both the S/RV safety and relief modes of operation. Since the SRs for S/RVs are proposed to be changed, the licensee provided acceptable analyses to support the adequacy of the TS changes.

There have been several other similar TS changes approved for other facilities regarding stroke testing. The NRC staff has determined that the proposed changes are acceptable as discussed below.

3.0 TECHNICAL EVALUATION

3.1 Proposed TS SR Changes

The proposed changes to SR 3.4.4.3, SR 3.5.1.7, and SR 3.6.1.6.1 remove the requirement for the S/RV disks to be lifted from their seats when manually actuated. The SRs will specify that the actuator is to stroke when manually actuated. Below are the proposed SR changes with the proposed changes underlined.

SR 3.4.4.3 will state: "Verify each required S/RV actuator strokes when manually actuated." instead of existing wording, "Verify each required S/RV opens when manually actuated."

SR 3.5.1.7 will state: "Verify each required ADS valve actuator strokes when manually actuated." instead of existing wording, "Verify each required ADS valve opens when manually actuated."

SR 3.6.1.6.1 will state: "Verify each required LLS valve actuator strokes when manually actuated." instead of existing wording. "Verify each required LLS valve opens when manually actuated."

Each of the SRs above currently includes the same Note stating: "Not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test." No change to this Note is proposed.

3.2 Licensee's Basis for Proposed S/RV Stroke Testing

The licensee provides the following basis for the proposed TS changes:

The current testing requirement for opening the S/RVs during power operation can result in additional seat leakage or in a stuck open S/RV during power operation. Uncontrolled steam discharge from the S/RVs would be directed to the containment suppression pool, which requires increased operation of the residual heat removal (RHR) system in the suppression pool cooling mode, thereby increasing the unavailability/inoperability time of the RHR system. The RHR system must be periodically re-aligned from its normal safety mode of vessel injection to provide suppression pool cooling. Additional operation of the RHR system to cool the suppression pool due to leaking S/RVs generates additional wear and cycling of the system components. A stuck open S/RV could also force a plant shutdown to repair or replace the valve.

In addition, cycling of the S/RVs during power operation significantly increases the risk of creating undesired seat leakage and/or escalating deterioration of valve seating surfaces due to such leakage.

The proposed LAR [licensing action request] will allow testing of the S/RVs to be performed in two separate stages. The first stage will consist of manual actuation of the valves at the qualified test facility. This will verify the open, and close function of the valve with the actuator coupled to the valve stem, and includes both solenoids and the air block valve. Each solenoid is energized, one at a time, resulting in two separate lifts of the S/RV disk from the seat. The second stage will consist of manual actuation of the S/RVs actuators following installation into the plant with the actuator uncoupled from the valve stem.

The proposed test alternative provides for actual stroking of the S/RV disks after performing the Code required setpoint testing, combined with the stroking of all 19 S/RVs actuators after the population of removed S/RVs have been re-installed. The proposed test alternative provides for stroke testing of the S/RVs at the same frequency as required by the ASME OM Code, Appendix I, Paragraph I 3.4.1(d) and provides for stroke testing of the S/RV actuators, once installed, to assure proper operation.

The proposed test alternative provides verification of proper control connections by requiring the pneumatic and electrical controls to cycle the actuator on each S/RV following installation, without stroking the S/RV itself. The plant installed testing will verify full operation of the electrical circuitry, manual actuation solenoid valve, block valve, and the actuator. In addition, the test population of S/RVs removed each

refueling outage for setpoint testing would also be tested in the relief mode. This setpoint testing provides assurance that the S/RVs would perform as expected when control air pressure is applied to the actuator assembly. Therefore, the proposed test alternative continues to demonstrate full functionality of the S/RVs while minimizing the potential for creating valve seat leakage caused by cycling the valve unnecessarily.

Nuclear industry experience has shown that repeated manual actuation of the S/RVs and ADS valves can lead to valve through seat leakage during plant operation. This experience is substantiated within NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," and NUREG-0626, "Generic Evaluation of Feedwater Transients and Small Break Loss-of-Coolant Accidents in GE-Designed Operating Plants and Near Term Operating License Applications," which recommend reducing the number of challenges to the ADS valves.

A difference between the current SR testing and the licensee's proposed alternative is that since the S/RVs will no longer be stroke tested to discharge steam flow, the S/RV discharge lines would not be verified to be unblocked by steam flow. Existing Foreign Material Exclusion (FME) program controls require covers be placed on all system openings when each S/RV is removed. The FME program controls applicable to the S/RVs are the same that exist for the reactor vessel and its support systems. Also, the horizontal orientation of the S/RV piping discharge lines minimizes the potential for unwanted material from entering into the lines. Therefore, the controls provided by the existing FME program along with the horizontal orientation of the pipelines provide reasonable assurance that the discharge lines will remain unblocked by foreign material. As part of the implementation of the proposed change, a discussion of the need for implementing effective FME program controls applicable to the S/RVs will be added to the TS bases. It is also recognized that there is the potential for valve/component damage upon re-installation of the actuator after it has been uncoupled from the valve. However, this potential is considered small considering this task is completed by qualified maintenance personnel that re-install the actuator per the test facility configuration using normal work control processes, such as approved procedures, mock-up training and pre-job briefs.

After each S/RV has been removed for testing, a re-certified valve is transported to the drywell and placed in the appropriate main steam line. Pursuant to the valve manufacturer's recommendations, the valve is stored and transported in the vertical position at all times, with the exception of transportation within the containment and drywell for re-installation. The valve is horizontally oriented for short periods when hoisted and moved through locations in the containment and drywell. The lifting and rigging of the valves during transport and re-installation is accomplished by qualified maintenance personnel. Also, the components most susceptible to damage during storage and transport are the relief mode components, which per the proposed changes will be adequately tested prior to plant start-up. The safety mode components are encased entirely within the S/RV bonnet, and the exposed stem of the relief actuator attachment is protected by the S/RV bonnet and lifting attachment. In the plant's operating history, PNPP has repeatedly removed and installed all 19 S/RVs with no occurrences of S/RV damage.

Appendix I of the ASME OM Code has evolved over the past decade such that it is now a Code

requirement (ASME OM Code -1995 Appendix I), as opposed to a standard (ASME/ANSI [American National Standards Institute] OM Part 1-1987). It now provides requirements for establishing acceptance criteria, grouping of valves, and additional testing. PNPP Valve Relief Request VR-6, approved per NRC Safety Evaluation dated August 9, 1999 (TAC No. MA3328), allows the use of the 1995 Edition of the ASME OM Code for the performance of inservice testing of pressure relief devices instead of the ASME/ANSI OM standard, 1987 Edition, 1988 Addenda.

3.3 Evaluation of Proposed S/RV Stroke Testing

The NRC staff has reviewed the licensee's proposed changes to the S/RV stroke testing SRs and finds that the current requirements can result in additional seat leakage of the S/RVs during power operation. Such leakage would be directed to the primary containment suppression chamber, causing a need to increase cooling to the suppression pool water, and potentially increases radiation exposure to plant personnel. The proposed alternative testing provides for actual stroking of the S/RVs after performing the ASME OM Code setpoint testing on a sample of valves combined with stroking only the S/RV actuators after the S/RVs have been installed.

The NRC staff has reviewed the licensee's technical analysis and finds that the proposed TS changes satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii). Therefore, the NRC staff finds that the proposed changes for S/RV stroke testing are acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Ohio State official was notified of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

This amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or changes a SR. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluent that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding (69 FR 26188). Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

6.0 CONCLUSION

The NRC staff has concluded, based on the considerations discussed above, that: (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 this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: G. Bedi, NRR

Date: February 10, 2005

Perry Nuclear Power Plant, Unit 1

cc:

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