Thomas A. Lynch
Plant General Manager

P.O. Box 63
Lycoming, New York 13093
315.349.5200
315.349.1321 Fax

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NINE MILE POINT
NUCLEAR STATION

September 29, 2010

U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

ATTENTION: Document Control Desk

SUBJECT: Nine Mile Point Nuclear Station
Unit No. 1, Docket No. 50-220

License Amendment Request Pursuant to 10 CFR 50.90 Modifying Surveillance Requirements for Testing of the Main Steam Electromatic Relief Valves (Technical Specification Sections 4.1.5 and 4.2.9) and Associated Inservice Testing 10 CFR 50.55a Request

Pursuant to 10 CFR 50.90, Nine Mile Point Nuclear Station, LLC (NMPNS) hereby requests an amendment to the Nine Mile Point Unit 1 (NMP1) Renewed Facility Operating License DPR-63. The proposed amendment would modify Technical Specification (TS) Sections 3/4.1.5, "Solenoid-Actuated Pressure Relief Valves (Automatic Depressurization System)," and 3/4.2.9, "Pressure Relief Systems - Solenoid-Actuated Pressure Relief Valves (Overpressurization)," to provide for an alternative means of testing the main steam electromatic relief valves (ERVs). The proposed change would allow demonstration of the capability of the valves to perform their safety function without requiring the ERVs to be cycled with reactor steam pressure while installed in the plant.

Enclosure 1 provides a description and technical bases for the proposed amendment, and existing TS pages marked up to show the proposed changes. NMPNS has concluded that the activities associated with the proposed amendment represent no significant hazards consideration under the standards set forth in 10 CFR 50.92.

Additionally, in accordance with 10 CFR 50.55a(a)(3)(i), NMPNS requests NRC authorization of associated 10 CFR 50.55a request number ADS-VR-01 (Enclosure 2) for use at NMP1 for the remainder of the fourth 10-year inservice testing interval. This request provides an alternative to certain

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requirements of the American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (OM Code), 2004 Edition with no addenda, regarding ERV testing. The basis for the request is that the proposed alternative would provide an acceptable level of quality and safety.

Approval of the proposed license amendment and the associated 10 CFR 50.55a request is requested by September 30, 2011, with implementation within 90 days of receipt of the approved amendment. The enclosed submittal contains no regulatory commitments.

Pursuant to 10 CFR 50.91(b)(1), NMPNS has provided a copy of this license amendment request, with Enclosures, to the appropriate state representative.

Should you have any questions regarding the information in this submittal, please contact J. J. Dosa, Licensing Director (Acting), at (315) 349-5219.

Very truly yours,

[signature]

STATE OF NEW YORK :
: **TO WIT:**
COUNTY OF OSWEGO :

I, Thomas A. Lynch, being duly sworn, state that I am the Nine Mile Point Plant General Manager, and that I am duly authorized to execute and file this license amendment request on behalf of Nine Mile Point Nuclear Station, LLC. To the best of my knowledge and belief, the statements contained in this document are true and correct. To the extent that these statements are not based on my personal knowledge, they are based upon information provided by other Nine Mile Point employees and/or consultants. Such information has been reviewed in accordance with company practice and I believe it to be reliable.

[signature]

Subscribed and sworn before me, a Notary Public in and for the State of New York and County of Oswego, this 29 day of September, 2010.

WITNESS my Hand and Notarial Seal: Lisa M. Doran
Notary Public

My Commission Expires:

9/12/2013
Date

Lisa M. Doran
Notary Public in the State of New York
Oswego County Reg. No. 01DO6029220
My Commission Expires 9/12/2013

TAL/DEV

Enclosures:
1. Evaluation of the Proposed Change – License Amendment
2. Nine Mile Point Unit 1 – 10 CFR 50.55a Request Number ADS-VR-01

cc: W. M. Dean, NRC
R. V. Guzman, NRC
Resident Inspector, NRC
A. L. Peterson, NYSERDA

ENCLOSURE 1

EVALUATION OF THE PROPOSED CHANGE -

LICENSE AMENDMENT

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1.0 SUMMARY DESCRIPTION

This evaluation supports a request to amend Renewed Facility Operating License DPR-63 for Nine Mile Point Unit 1 (NMP1).

The proposed amendment would modify Technical Specification (TS) Sections 3/4.1.5, "Solenoid-Actuated Pressure Relief Valves (Automatic Depressurization System)," and 3/4.2.9, "Pressure Relief Systems - Solenoid-Actuated Pressure Relief Valves (Overpressurization)," to provide for an alternative means of testing the main steam electromatic relief valves (ERVs). Specifically, the proposed amendment would revise TS Surveillance Requirements (SRs) 4.1.5.a and 4.2.9.b to verify each ERV actuator strokes when manually actuated at least once each operating cycle. The functional testing requirements for the ERVs would be described in the Inservice Testing (IST) Program and controlled pursuant to TS Administrative Controls Section 6.5.4, "Inservice Testing Program." The proposed amendment would allow demonstration of the capability of the valves to perform their safety function without requiring the ERVs to be cycled with reactor steam pressure while installed in the plant. Currently, ERV testing is typically performed during startup from refueling outages. The in-situ steam pressure testing of the ERVs would be retained as an optional test method.

Experience in the industry and at NMP1 indicates that manually opening the ERVs during plant operation for TS surveillance testing can increase the potential for main disc seat leakage and pilot valve seat leakage. NMP1 experienced main disc seat leakage in March 2001 and pilot valve seat leakage in December 2002, both of which were attributed to debris on the seats caused by testing the valves using reactor steam. Leakage from the main valve disc can cause increases in suppression pool (torus) temperature (water and airspace) and level, requiring more frequent suppression pool cooling and pump-down operations, and diverts steam from the power generation steam cycle. Excessive leakage from the pilot valve can cause inadvertent opening of the main valve and impair its ability to re-close. The proposed alternative testing for the ERVs is expected to reduce the potential for seat leakage and its associated adverse consequences, and will also eliminate a challenge to the ERVs to close after being opened for surveillance testing.

The proposed amendment is consistent with NUREG-0737, "Clarification of TMI Action Item Requirements," Item II.K.3.16, "Reduction of Challenges and Failures of Relief Valves," which recommended that the number of relief valve openings be reduced as much as possible and that unnecessary challenges should be avoided.

2.0 DETAILED DESCRIPTION

2.1 Description of the Proposed Change

The proposed amendment would revise SRs 4.1.5.a and 4.2.9.b to provide for an alternative means of testing the NMP1 main steam ERVs. SRs 4.1.5.a and 4.2.9.b currently require each ERV to be manually stroked open until the downstream acoustic monitors or thermocouples indicate that the valve has opened and steam is flowing from the valve. The proposed amendment would eliminate the TS requirement to demonstrate the capability of the ERVs to open using reactor steam pressure while installed in the plant and would revise SRs 4.1.5.a and 4.2.9.b to each read as follows:

> "At least once during each operating cycle, verify each valve actuator strokes when manually actuated."

The proposed amendment would allow demonstration of the capability of the valves to perform their safety function through a series of tests, inspections, and maintenance activities without requiring the ERVs to be cycled with reactor steam pressure during startup from refueling outages. The details regarding verification and monitoring of proper operation of the ERVs would be described in the Bases for TS Section 3/4.1.5. The functional testing requirements for the valves would be described in the IST Program (as modified by 10 CFR 50.55a Request Number ADS-VR-01 – see Enclosure 2) and controlled pursuant to TS Administrative Controls Section 6.5.4. The frequency of performing SRs 4.1.5.a and 4.2.9.b would remain unchanged.

The TS Bases for 3/4.1.5 currently include text which describes ERV steam testing at nominal reactor pressure. The in-situ steam pressure testing of the ERVs would be retained as an optional test method. Upon approval of the license amendment, the Bases text would be updated to incorporate the appropriate details of the alternative testing methodology consistent with the information provided in this license amendment request. The Bases for TS Section 3/4.2.9 would not be revised, which is consistent with the current Bases format in that the basis information for SR 4.2.9 is given in the Bases for TS Section 3/4.1.5.

Attachment 1 provides the existing TS pages marked-up to show the proposed changes. Marked-up pages showing the associated changes to the TS Bases are provided in Attachment 2 for information only. The TS Bases changes will be processed in accordance with the NMP1 TS Bases Control Program (TS Section 6.5.6).

2.2 Background

2.2.1 System Description

There are six Dresser model 1525VX solenoid-actuated, pilot-operated ERVs installed at NMP1. The ERVs are connected to the main steam lines between the main steam line flow restrictor and the inboard main steam isolation valve. Each ERV has its own discharge pipe that is equipped with an acoustic monitor to detect flow noise and a thermocouple to sense discharge fluid temperature to monitor for valve actuation and/or leakage.

The ERVs have two TS-required functional modes of operation: the automatic depressurization system (ADS) mode and the overpressurization relief mode. In the ADS mode (TS Section 3/4.1.5), the ERVs depressurize the reactor vessel in the event of a small break loss of coolant accident (SBLOCA) by relieving steam to the torus, allowing the core spray system to inject (spray) cooling water into the reactor vessel. The ADS mode actuates on concurrent lo-lo-lo reactor water level and high drywell pressure signals. The six ERVs, three primary valves and three backup valves, are required to be operable for the ADS mode. Operation of three ERVs is sufficient to depressurize the reactor coolant system and permit full core spray system flow. The remaining three ERVs provide full capacity backup. If any of the three primary ERVs fail to open in the ADS mode, the associated back-up valve will open automatically. The ADS function of the ERVs is described in Section VII-A of the NMP1 Updated Final Safety Analysis Report (UFSAR).

The ERVs also provide overpressure protection (relief mode) for the reactor and main steam piping by limiting reactor pressure during transients that result in a pressure increase. In the overpressurization relief mode (TS Section 3/4.2.9), pressure switches that monitor reactor vessel pressure actuate six ERVs at staggered setpoints to ensure sufficient margin between the analyzed peak transient pressure and the lowest setpoint for the reactor head safety valves to prevent safety valve actuation during anticipated transients. Five of the six ERVs are required to be operable for the relief mode to prevent actuation of the safety valves. The overpressurization relief function of the ERVs is described in Section V of the NMP1 UFSAR.

2.2.2 ERV Component Configuration and Operation

The ERVs are solenoid-actuated, pilot-operated relief valves. The valves operate in conjunction with actuation instrumentation for both the ADS and overpressurization relief modes and, thus, do not rely on spring setpoints for valve actuation. The three principal ERV components are the main valve, the pilot valve assembly, and the solenoid actuator. Refer to Figure 1 for component configuration.

Steam under pressure from the reactor enters the main valve and passes upward around the disc guide. Steam enters the chamber below the main valve disc through the inlet orifice located in the retainer plate. The inlet steam pressure holds the main valve disc closed. The pilot valve disc is held in the closed position by a pilot valve spring and steam pressure in the chamber below the pilot valve disc. The actuator for the valve is a solenoid and plunger assembly. When the solenoid is energized, the plunger depresses the pilot valve actuating lever. This action opens the pilot valve, allowing the steam in the chamber below the main disc to be vented through the vent tube and pilot valve outlet piping. Since the steam is vented faster than it can be made up via the inlet orifice, the chamber below the main disc depressurizes, thereby allowing the steam pressure above the disc to overcome the pressure below the disc to open the valve. To close the valve, the solenoid is de-energized. This causes the solenoid plunger to release the pilot valve actuating lever, thereby closing the pilot valve and allowing steam pressure to build up under the main disc, forcing the disc to move to the closed position and reseat.

The solenoid for each ERV is controlled by a switch located in the control room which can be placed in either the Open or Automatic position. The valves are manually opened by placing the switch in the Open position. In the Automatic position, the valves operate in conjunction with pressure switches and the ADS initiation logic. The pressure switches are adjusted at staggered (increasing) setpoints to open two valves at a time until all six valves are open. The control logic is set to automatically close the valves (de-energize the solenoids) when the pressure is 35 psig below the lift setpoint. When manually opened, the valves close on spring pressure at approximately 50 psig (i.e., when the spring pressure is sufficient to overcome the steam pressure holding the main valve disc open), or when the control switch is returned to the Automatic position.

Each ERV is equipped with red and green indicating lights which provide control room open and close indication, respectively, by monitoring the solenoid actuator plunger position. A blue indicating light is also provided in the control room which monitors power to the solenoid actuator. The blue light is "On" when the solenoid is de-energized (valve closed) and "Off" when the solenoid is energized (valve open).

A unique design feature of the NMP1 ERVs is that the main valve is housed in a heavy steel enclosure that is attached to the main steam line inlet flange (shown in Figure 1). The pilot valve assembly is installed inside the pilot valve housing, and the housing is mounted on the enclosure and physically separated from the ERV main valve body. Small bore piping is used to extend the main valve vent tube and route it through the enclosure for connection with the pilot valve. The ERV main valve outlet is open-ended such that the steam is discharged inside the steel enclosure and out to the discharge piping through a bellows assembly. The steel enclosures were installed in 1972 for the purpose of providing a pressure boundary for the main valve discharge, while also relieving the mechanical loads from the ERV housing by transferring them to the main steam piping system. These loads were suspected of causing main valve body deflections, which resulted in main steam leakage past the main valve disc seat.

3.0 TECHNICAL EVALUATION

3.1 Current ERV Testing

The ERVs are currently tested in accordance with the TS and the IST Program. TS SRs 4.1.5.a and 4.2.9.b require that at least once during each operating cycle with the reactor at pressure, each ERV shall be manually stroked open until the downstream acoustic monitors or thermocouples indicate that the valve has opened and steam is flowing from the valve. The IST Program is based on the American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (OM Code), 2004 Edition with no Addenda. The ERVs are solenoid-actuated, pilot operated relief valves which operate in conjunction with actuation instrumentation for both the ADS and overpressurization relief modes and, thus, do not rely on spring setpoints for valve actuation. The ERVs are designed to minimize challenges to the reactor head safety valves, but are not credited for overpressure protection. As such, the ERVs are classified as OM Category B power-operated valves and tested accordingly under the rules of the OM Code-2004, Subsection ISTC.

3.2 Proposed Alternative ERV Testing

The proposed amendment will allow an alternative to the current method of ERV in-situ steam pressure testing which is performed during plant startup following a refueling outage. Each ERV solenoid actuator will be verified to stroke when manually actuated at least once each operating cycle, in accordance with TS SRs 4.1.5.a and 4.2.9.b (as revised). In place of in-situ steam stroke testing, a sampling program is proposed that will remove and replace three of the six ERV main valves with pre-tested spare main valves during each refueling outage. The spare main valves will have been exercised, stroke timed, and seat leakage tested at an offsite steam test facility. Thus, each of the six ERV main valves will be stroke-tested with steam at the test facility at least once every 4 years, based on the nominal 24-month NMP1 fuel cycle. A 6-month grace period would be allowed to accommodate variations in fuel cycle length and extended shutdown periods. The combination of these tests and other inspections and maintenance activities that verify the capability of the valves to open provides a complete verification of ERV functional capability, as described in more detail below.

3.2.1 <u>Solenoid Actuator</u>

The proposed changes to TS SRs 4.1.5.a and 4.2.9.b require that the valve actuators stroke when manually actuated. This test will be performed with the pilot valve and solenoid actuator mounted in their normal installed positions inside the drywell, which allows the solenoid actuator to be actuated electrically from the control room by placing the control switch in the Open position. Position indication verification will be performed by locally witnessing solenoid plunger movement and by verifying that control room indicating lights (red and green lights for solenoid plunger position and blue light for solenoid power supply) accurately indicate solenoid actuator operation. The pilot valve operating lever and pilot valve stem will be secured in the open position during this test to prevent damage to the pilot valve assembly which could result from dry-stroking with no backpressure, as further discussed in Section 3.2.2 below. An as-found solenoid actuator stroke test will be performed prior to performing maintenance activities. A final solenoid actuator stroke test is performed after maintenance activities are completed and directly demonstrates operability of the solenoid actuator.

Preventive maintenance is currently, and will continue to be, performed on all six of the ERV solenoid actuators and their associated cutout switches during each refueling outage. NMP1 Licensee Event Report (LER) 03-001 (Reference 1) reported an event involving an ERV that failed to open due to high resistance in the solenoid actuator cutout switch contacts. The high resistance contacts limited the current through the solenoid operating coil, which reduced the force that the plunger applied to the pilot valve operating lever. Further investigation and examination showed that the high contact resistance was due to the tin coating having been worn off the cutout switch contacts, allowing excessive contact oxidation to occur. Preventive maintenance activities now include inspection and cleaning of the cutout switch contacts, as necessary, to assure that the contact surfaces are clean and free of oxidation, corrosion, and discoloration. The contact tin plating is verified to be intact and not worn off exposing the copper base material. Associated springs and mechanisms are inspected, and the as-left contact resistances are verified. Resistance checks are performed on both actuator coils, and actuator operating currents during electrical actuation are verified to be within acceptance limits. These steps provide substantial indication that the solenoid actuator is capable of functioning as designed and producing its full output force.

Degradation of the solenoid actuator is monitored through the preventive maintenance inspections that are performed each refueling outage for each of the six ERV solenoid actuators.

3.2.2 Pilot Valve

As part of the preventive maintenance program, all six of the ERV pilot valve assemblies are removed and replaced with new or refurbished assemblies every refueling outage. Note that the pilot valve housing is permanently welded to the outside of the ERV enclosure located in the drywell (see Figure 1). Removal and re-installation of the pilot valve assembly does not affect the ERV main valve. The maintenance activities include inspections of the pilot valve assembly parts and the pilot valve housing interior to identify any damage or wear that could impair free movement of the stem or proper valve seating. Parts are refurbished or replaced as necessary. Cleanliness of parts and components and absence of foreign material are verified prior to reassembly. NMP1 has experienced a stuck-open ERV event caused by improper maintenance. NMP1 LER 04-001, "Manual Reactor Scram and Cooldown Rate Exceeding Technical Specification Limits Due to Electromatic Relief Valve Failure to Close," (Reference 2) reported an event involving an ERV that stuck open due to a maintenance error in which an extraneous gasket was installed in the pilot valve housing. This condition allowed steam to bypass the pilot valve seat, thereby preventing steam pressure from building up under the main valve disc to close the valve when given the closure signal. Appropriate precautions and instructions have been incorporated into the ERV maintenance procedure to ensure that the correct gasket is used and sufficient torque is applied to prevent steam from bypassing the pilot valve seat.

Prior to re-installing the pilot valve assembly inside the pilot housing, pilot stem/disc leak testing and freedom of movement and reseat functionality are demonstrated. A complete cleanliness inspection must be performed prior to installing the pilot valve assembly back into the housing. The housing is thoroughly cleaned and vacuumed to remove moisture and debris to minimize the potential for debris blocking or hindering pilot valve performance. Following installation of the pilot valve assembly inside the housing, the pilot valve operating lever and pilot valve assembly freedom of movement and clearance adjustments are confirmed, followed by stroking the solenoid actuator plunger by hand to the full extent of travel. This ensures that the solenoid actuator plunger, pilot valve operating lever, and pilot valve assembly function as a unit, while eliminating the risk of damage resulting from electrically stroking the pilot valve in the absence of steam pressure (referred to as dry-stroking). NMP1 LER 00-04, "Manual Reactor Scram and Unusual Event Declaration Due to Stuck Open Electromatic Relief Valve and Failed Vacuum Breaker on Electromatic Relief Valve Discharge Line," (Reference 3) reported an event involving an ERV that unexpectedly opened and would not reclose. This event was also addressed in NRC Inspection Report 2000-008 (Reference 4). The cause was attributed to a bent stem in the pilot valve assembly and partial disengagement of the pilot valve disc from the stem. It was determined that the pilot valve stem-disc separation had occurred as a result of dry-stroking the ERV pilot valve using the solenoid actuator.

Degradation of the pilot valve assemblies is monitored through the preventive maintenance inspections that are performed each refueling outage for each of the six ERV pilot valve assemblies.

3.2.3 Main Valve Testing

The IST Program, as modified by 10 CFR 50.55a Request Number ADS-VR-01 (see Enclosure 2), will specify that three of the six ERV main valves be removed and replaced with pre-tested spare main valves during each refueling outage, such that all six ERV main valves are replaced every two refueling outages (approximately 4 years). Thus, each ERV main valve will be stroke tested once every 4 years (two refueling outages) plus the 6-month grace period, rather than once every refueling outage (approximately 24 months). To satisfy the ASME OM Code-2004, Subsection ISTC testing requirements for Category B power-operated valves, the removed ERV main valves will be exercised, stroke timed, and seat leakage tested prior to plant startup from the refueling outage.

Main valve testing will be performed at an offsite steam test facility. As described in Section 2.2.2 above, the main valve is housed in a heavy steel enclosure that is attached to the main steam line inlet flange. The pilot valve assembly is installed inside the pilot valve housing, and the housing is welded onto the outside of the enclosure and physically separated from the ERV main valve body. Thus, only the main valve of the ERV can be sent to the test facility. A spare pilot valve assembly and a spare solenoid actuator, both representative of the components used at the plant, will be installed at the test facility to allow testing the main valve. The valve will be installed on a test steam header in the same orientation as the plant installation. The test conditions at the test facility will be similar to those in the plant, including ambient temperature and steam conditions. The main valve will receive an initial seat leak test, a functional test to ensure it is capable of opening and closing, and a final seat leak test. Valve stroke time will be obtained during the exercise test. Valve seat tightness will be verified by a cold bar test, and if not free of fog, leakage will be measured and verified to be below specified acceptance criteria.

After initial testing, the main valves will be completely disassembled, inspected and refurbished, and then retested. The refurbished main valves will be stored at the offsite test facility and returned to the plant prior to the next scheduled use. The offsite test facility's storage requirements will ensure the valves are protected from physical damage. The valves will be stored in an area meeting ANSI/ASME N45.2.2 Class B storage requirements, with the storage area temperature maintained between 50°F and 90°F. Maintaining the ERVs in a controlled environment during storage minimizes the potential for any valve degradation.

Prior to installation at the plant, the spare main valves will be inspected for foreign material and damage. The steam line and ERV discharge line openings will also be inspected to verify cleanliness and absence of foreign material. Procedural requirements ensure that the proper ERV inlet flange gasket separating ring thickness is provided so proper crush of the flexitallic gasket is achieved when the valve is installed. The valves are then installed and necessary connections completed, including connecting the vent tube and installing the enclosure cover and bellows assembly. Proper connections will be verified per procedure.

Review of past surveillance testing and preventive maintenance history indicates that the ERV main valves are highly reliable. During the second 10-year IST interval (1986 to 1999), the ERVs were inspected and refurbished at 48-month intervals (every two refueling outages). From 1999 to 2004, the preventive maintenance interval for the ERV main valves was extended to 6 years, and since 2004, the preventive maintenance interval for the ERV main valves has been 10 years. These preventive maintenance activities have found the ERV main valves in excellent condition with no significant degradation noted. The table below lists the most recent preventive maintenance performed for each ERV main valve:

Valve No.	Date of Last Preventive Maintenance
PSV-01-102A (ERV-111)	4/3/07
PSV-01-102B (ERV-112)	5/9/01
PSV-01-102C (ERV-121)	4/14/07
PSV-01-102D (ERV-122)	4/8/09
PSV-01-102E (ERV-113)	4/8/09
PSV-01-102F (ERV-123)	5/14/04

Even though the preventive maintenance interval was extended to 10 years, TS SRs 4.1.5.a and 4.2.9.b required manual opening of each ERV each operating cycle. Therefore, no TS surveillance test data exists to show how a main valve will perform if not stroked for a period beyond approximately 24 months. As shown in the above table, valve PSV-01-102B has not been refurbished since May 2001 (a period of about 9 years). Performance of this valve during the TS-required surveillance tests has been satisfactory. The only failure of an ERV to open during the last 10 years is the event reported in NMP1 Licensee Event Report (LER) 03-001, "Technical Specification Cooldown Rate Exceeded During Required Cooldown for a Failed Solenoid Actuated Pressure Relief Valve," (Reference 1), which was caused by a problem with the solenoid actuator for ERV-111, not with the main valve.

Although the NMP1 ERVs are tested in accordance with the ASME OM Code-2004, Subsection ISTC, the proposed sampling program whereby three of the six ERV main valves will be removed and replaced with pre-tested spare main valves during each refueling outage is similar to the testing methodology for Class 1 pressure relief devices described in the ASME OM Code-2004, Mandatory Appendix I. Specifically, this appendix specifies that Class 1 pressure relief valves shall be tested at least once every 5 years, that a minimum of 20% of the valves from each valve group shall be tested within any 24-month interval, and that the testing requirements may be satisfied by installing pretested valves to replace valves that have been in service. Extensions of the 5-year test interval have previously been authorized by the NRC. For Nine Mile Point Unit 2 (NMP2), the NRC authorized the alternative described in Relief Request MSS-VR-01 to extend the test interval for Class 1 main steam safety relief valves to 3 refueling cycles (approximately 6 years), as documented in NRC letter dated December 29, 2008 (Reference 5). Also, for the James A. FitzPatrick plant, the NRC authorized the alternative described in Relief Request VRR-06, Revision 1, to extend the test interval for Class 1 main steam safety relief valves to 72 months (6 years) with a 6-month grace period, as documented in NRC letter dated October 1, 2009 (Reference 6), and approved an associated license amendment by letter dated July 21, 2010 (Reference 7).

Based on the above discussion, extending the main valve exercising interval from every refueling outage (approximately 2 years) to every 4 years plus a 6-month grace period is reasonable and is not expected to adversely impact the ability of the valves to perform their safety functions or to result in additional valve failures. The testing and refurbishment activities performed at the off-site test facility on the partial compliment sample (three valves each refueling outage) will ensure that main valve degradation mechanisms are detected in a timely manner. Monitoring of the ERV discharge line temperatures during plant operation also provides an indication of degradation of the installed main valves.

3.2.4 Verification of No ERV Discharge Line Blockage

A potential reason for performing in-situ testing of the ERVs with steam is to verify that the discharge line to the suppression pool is not blocked. The Foreign Material Exclusion (FME) controls implemented at NMP1 (described in Section 3.2.5 below) serve to minimize the potential for debris blocking an ERV discharge line. Considering the size of the ERV discharge pipe (expands to 14 inches downstream of the 8 inch discharge expansion bellows), the energy associated with high pressure steam, and the FME controls, the probability of blocking an ERV discharge line and preventing the valve function is considered to be extremely remote.

3.2.5 Foreign Material Exclusion Controls

Procedural requirements and guidance have been established to prevent and control introduction of foreign materials into plant structures, systems and components. FME controls that are employed during ERV maintenance activities include:

- The external surfaces of equipment and the surrounding area are verified to be free of foreign materials, loose objects, and debris prior to commencing work.
- Suitable temporary covers are used to preclude the entry of foreign materials into the main steam line and the ERV discharge line and to protect sealing surfaces from damage.
- FME and cleanliness of parts and components are verified prior to reassembly.
- The steam line and ERV discharge line openings are inspected to verify cleanliness and absence of foreign material prior to re-installing the main valve.
- A complete cleanliness inspection to verify the absence of foreign material is performed prior to component re-installation (e.g., when re-installing a main valve or re-installing a new or rebuilt pilot valve assembly into the pilot housing).

3.3 Conclusion

The combination of steam testing three ERV main valves at the offsite test facility each refueling outage, and the solenoid actuator and pilot valve assembly testing, inspections, and maintenance activities performed for all six ERVs each refueling outage, will provide a complete check of the capability of the valves to open and close. Therefore, the proposed changes will provide for the demonstration of full functionality of the ERVs without cycling the valves using reactor steam pressure with the valves installed. This approach will reduce the potential for valve seat leakage. The proposed alternative test for the ERVs reflects the recommendations of NUREG-0737, "Clarification of TMI Action Plan Requirements," Item II.K.3.16, "Reduction of Challenges and Failures of Relief Valves," that the number of relief valve openings be reduced as much as possible and unnecessary challenges should be avoided.

As a result of replacing the requirements to perform ERV in-situ steam pressure testing with the proposed ERV actuator TS surveillance requirements, the only change in testing frequency is that the ERV main valves will be stroke tested once every 4 years, plus a 6-month grace period, compared to the current test frequency of once every operating cycle (approximately 2 years). Review of NMP1 ERV preventive maintenance and surveillance test history has identified several events involving ERVs that failed to open or opened and could not be closed. These events were evaluated and appropriate changes have been incorporated into the ERV maintenance procedures to prevent recurrence. Therefore, it is concluded that extending the interval for checking the function of the ERV main valves from every refueling outage (approximately 2 years) to every 4 years plus a 6-month grace period is reasonable and is not expected to adversely impact the ability of the valves to perform their safety function or to result in additional valve failures.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

The regulatory requirements for the content required in a licensee's TSs are provided in 10 CFR 50.36, "Technical specifications." Criterion 3 of 10 CFR 50.36(c)(2)(ii) requires a Limiting Condition for Operation (LCO) to be established for a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. Paragraph (c)(3) of 10 CFR 50.36 specifies that surveillance requirements should ensure that LCOs are met.

The alternative testing methodology described in this proposed amendment will ensure that the ERVs are capable of performing their safety function. Full functionality will be demonstrated through a series of tests, inspections, and maintenance activities, while reducing the potential for ERV leakage due to testing at power. Criterion 3 of 10 CFR 50.36(c)(2)(ii) and paragraph (c)(3) of 10 CFR 50.36(c)(3) will continue to be met with the alternative testing since full functionality of the ERVs will be tested. The functional testing requirements for the ERVs will be described in the IST Program (as modified by 10 CFR 50.55a Request Number ADS-VR-01) and controlled pursuant to TS SRs 4.1.5.a and 4.2.9.b, as revised, and TS Administrative Controls Section 6.5.4.

4.2 Precedent

The NRC has approved similar license amendments to allow an alternative to the current method of ERV in-situ steam pressure testing, as follows:

- Oyster Creek Nuclear Generating Station, License Amendment No. 260 issued by NRC letter dated September 1, 2006 - ADAMS Accession No. ML062200104.

- Dresden Nuclear Power Station, Units 2 and 3, License Amendment Nos. 211 and 203, respectively; and Quad Cities Nuclear Power Station, Units 1 and 2, License Amendment Nos. 222 and 217, respectively; issued by NRC letter dated October 19, 2004 - ADAMS Accession No. ML042600571.

NMP1, Dresden, Quad Cities, and Oyster Creek all use the same Dresser model 1525VX solenoid-actuated, pilot-operated ERVs. Similarities and differences between the proposed NMP1 license amendment and the approved amendments for Dresden, Quad Cities, and Oyster Creek are summarized below:

Similarities

- The TS surveillance is revised to require verification that each ERV solenoid actuator strokes when manually actuated at least once each operating cycle.
- A partial compliment of the ERV main valves will be removed and replaced with pre-tested spare main valves during each refueling outage. Each ERV main valve will be steam tested at an offsite steam test facility once approximately every 4 years.

- Preventive maintenance is performed on all of the ERV solenoid actuators and their associated cutout switches during each refueling outage.

Differences

- For Dresden, Quad Cities, and Oyster Creek, the offsite testing includes both the main valve and the pilot valve. For NMP1, the pilot valve cannot be tested with the main valve because of the unique heavy steel enclosure that houses the main valve. The pilot valve housing is welded onto the outside of the enclosure and is physically separated from the ERV main valve body.
- For Dresden, Quad Cities, and Oyster Creek, the pilot valve assemblies for the ERVs that are not scheduled for removal and offsite testing are replaced with new or refurbished assemblies each refueling outage. For NMP1, all six of the ERV pilot valve assemblies will be replaced with new or refurbished assemblies each refueling outage.
- For Dresden, Quad Cities, and Oyster Creek, the pilot valve is dry stroked using the solenoid actuator. For NMP1, dry stroking will not be performed due to a past event where dry stroking caused pilot valve damage. Instead, separate testing, inspections, and maintenance will be performed for the solenoid actuators and the pilot valve assemblies.

4.3 Significant Hazards Consideration

Nine Mile Point Nuclear Station, LLC (NMPNS) is requesting an amendment to Renewed Facility Operating License DPR-63 for Nine Mile Point Unit 1 (NMP1). The proposed amendment would modify the Technical Specification (TS) Surveillance Requirements (SRs) to provide for an alternative means of testing the main steam electromatic relief valves (ERVs). The proposed change would allow demonstration of the capability of the valves to perform their automatic depressurization mode and overpressurization relief mode safety functions without requiring the ERVs to be cycled with reactor steam pressure while installed in the plant.

NMPNS has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of Amendment," as discussed below:

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No.

   The proposed amendment revises the TS Surveillance Requirements (SRs) to provide for an alternative means of testing the main steam ERVs. The ERVs perform automatic depressurization system (ADS) and overpressurization relief mode safety functions to mitigate the consequences of a small break loss of coolant accident (SBLOCA) and other accidents and transients. The ERVs are not considered an initiator for any accident previously evaluated except for the stuck-open ERV event, which is evaluated in Section XV-B.3.11 of the NMP1 Updated Final Safety Analysis Report (UFSAR). The proposed amendment would allow demonstration of the capability of the valves to perform their safety function through a series of tests, inspections, and maintenance activities without requiring the ERVs to be cycled with reactor steam pressure while installed in the plant, thereby eliminating the possibility of a stuck-open ERV event due to testing. Thus, the proposed amendment does not increase the probability of a stuck-open ERV event. The testing methodology, comprehensive inspections and preventive maintenance, and associated programmatic controls will provide an equivalent level of assurance that the ERVs are capable of performing their intended accident mitigation safety functions and, as such, will have no effect on the types or amounts of radiation released or the predicted offsite doses in the event of an accident. Accordingly, the proposed amendment does not alter the initial conditions, assumptions, or conclusions of any accident analysis.

Therefore, the proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed amendment does not affect the assumed accident performance of the ERVs, or of any plant structure, system, or component previously evaluated. The proposed amendment does not involve the installation of new equipment, and installed equipment is not being operated in a new or different manner. The proposed amendment provides for an alternative means of testing the ERVs that does not involve opening the valves with reactor steam while installed in the plant. The alternative testing and associated programmatic controls will provide an equivalent level of assurance that the ERVs are capable of performing their accident mitigation safety functions. No setpoints are being changed that would alter the dynamic response of plant equipment. As such, the proposed amendment will not introduce any new failure modes.

Therefore, the proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No.

The proposed amendment provides for an alternative means of testing the ERVs, in that the testing requirements will be satisfied by a combination of required testing in accordance with the Inservice Testing Program (controlled in accordance with TS administrative controls) and the revised TS SRs. The proposed changes will provide a complete verification of the functional capability of the ERVs by performing a series of tests, inspections, and maintenance activities without opening the valves with reactor steam while installed in the plant. The alternative testing and associated programmatic controls will provide an equivalent level of assurance that the ERVs are capable of performing their intended accident mitigation safety functions. The proposed amendment does not affect the valve setpoints or adversely affect any other operational criteria assumed for accident mitigation. No changes are proposed that alter the setpoints at which protective actions are initiated, and there is no change to the operability requirements for equipment assumed to operate for accident mitigation. Moreover, it is expected that the alternative testing methodology will increase the margin of safety by reducing the potential for ERV leakage resulting from testing the ERVs with reactor steam pressure while installed in the plant.

Therefore, the proposed amendment does not involve a significant reduction in a margin of safety.

Based on the above, NMPNS concludes that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

4.4 Conclusions

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.

5.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve: (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 REFERENCES

1. Letter from L. A. Hopkins (NMPC) to Document Control Desk (NRC) dated June 23, 2003, Licensee Event Report 03-001, "Technical Specification Cooldown Rate Exceeded During Required Cooldown for a Failed Solenoid Actuated Pressure Relief Valve"

2. Letter from L. A. Hopkins (NMPC) to Document Control Desk (NRC) dated July 1, 2004, Licensee Event Report 04-001, "Manual Reactor Scram and Cooldown Rate Exceeding Technical Specification Limits Due to Electromatic Relief Valve Failure to Close"

3. Letter from L. A. Hopkins (NMPC) to Document Control Desk (NRC) dated December 6, 2000, submitting Licensee Event Report 00-04, Supplement 1, "Manual Reactor Scram and Unusual Event Declaration Due to Stuck Open Electromatic Relief Valve and Failed Vacuum Breaker on Electromatic Relief Valve Discharge Line"

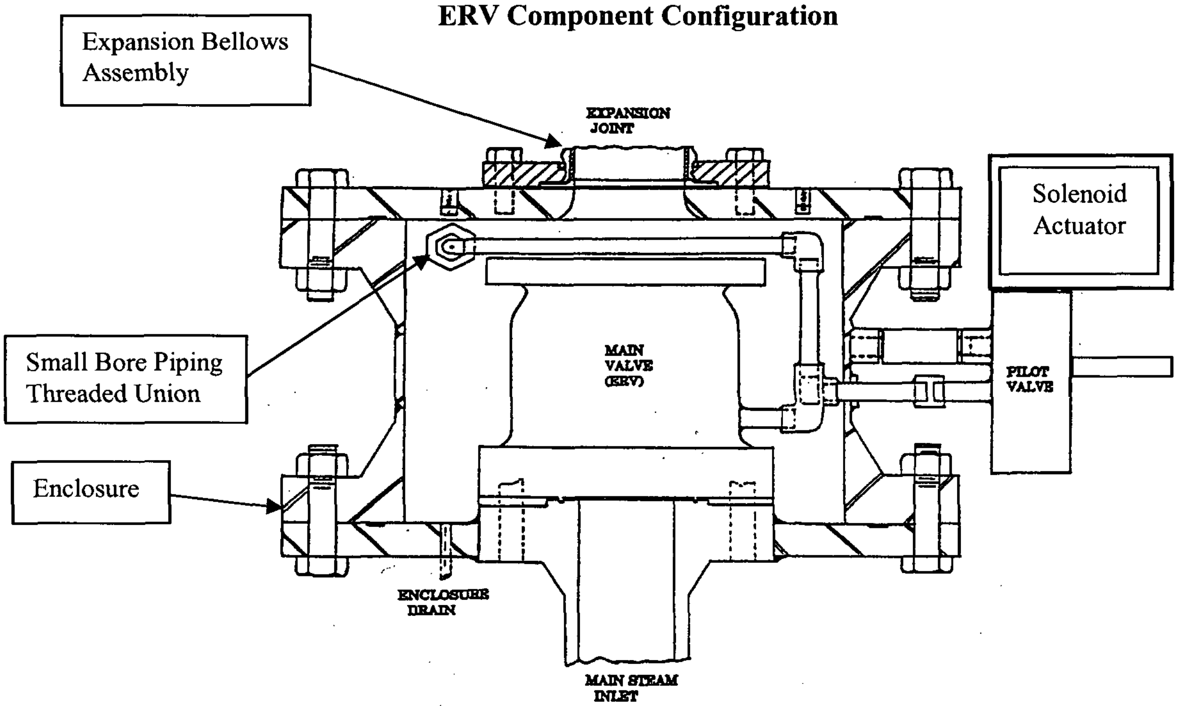
4. Letter from M. G. Evans (NRC) to J. H. Mueller (NMPC) dated December 22, 2000, NRC's Nine Mile Point Inspection Report 05000220/2000-008, 05000410/2000-008

5. Letter from M. G. Kowal (NRC) to K. J. Polson (NMPNS) dated December 29, 2008, Nine Mile Point Nuclear Station – Safety Evaluation of Relief Requests for the Unit No. 1 Fourth 10-Year and Unit 2 Third 10-Year Pump and Valve Inservice Testing Program (TAC Nos. MD9202 and MD9203)

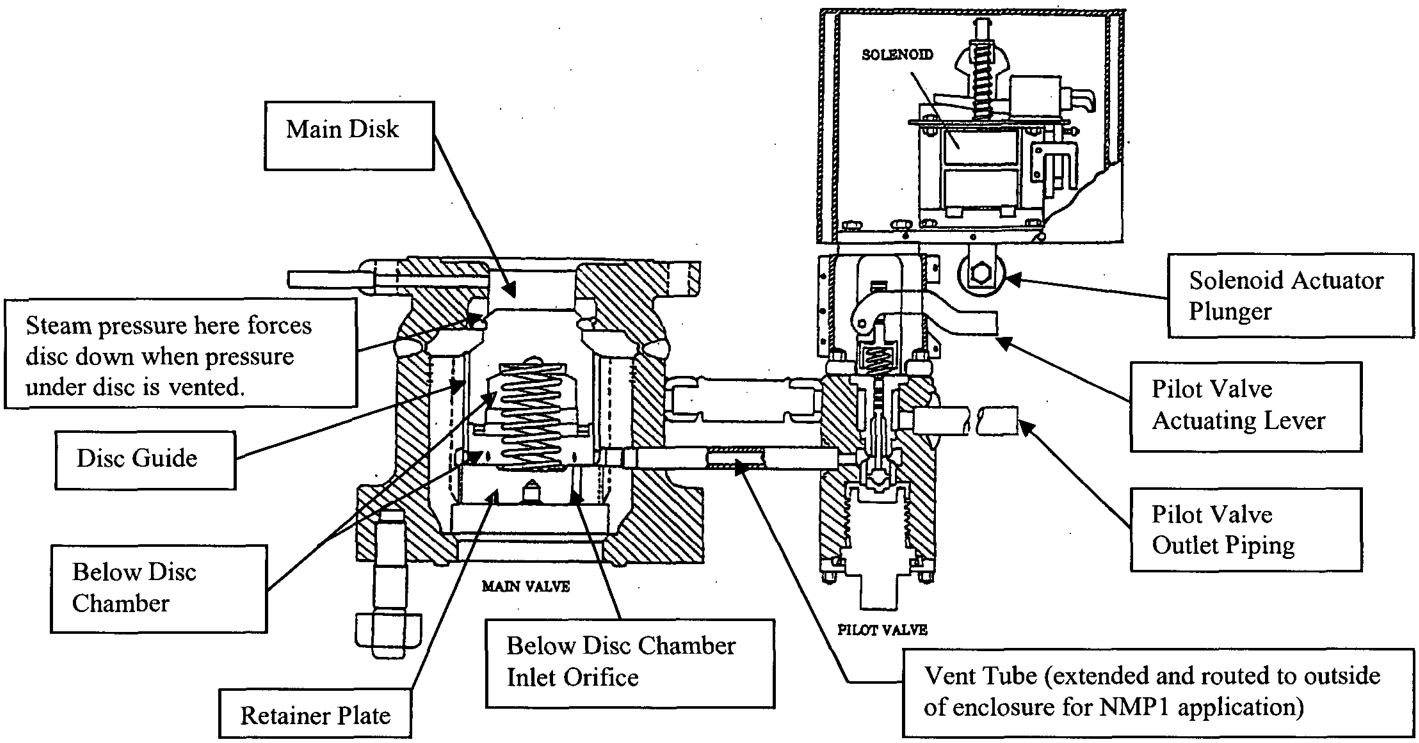
6. Letter from N. L. Salgado (NRC) to Vice President, Operations (Entergy Nuclear Operations, Inc.) dated October 1, 2009, James A. FitzPatrick Nuclear Power Plant – Relief Request VRR-06, Revision 1 from the Requirements of the OM Code Re: Inservice Testing of Safety Relief Valves (TAC No. ME1818)

7. Letter from B. K. Vaidya (NRC) to Vice President, Operations (Entergy Nuclear Operations, Inc.) dated July 21, 2010, James A. FitzPatrick Nuclear Power Plant – Issuance of Amendment Regarding Testing of Safety/Relief Valves (TAC No. ME2810)

Figure 1
ERV Component Configuration



NMP1 ERV with Enclosure



Cutaway View of Standard ERV
(Internals are applicable to NMP1)

ATTACHMENT 1

PROPOSED TECHNICAL SPECIFICATION CHANGES (MARK-UP)

The current versions of NMP1 Technical Specification pages 60 and 121 have been marked-up by hand to reflect the proposed changes.

LIMITING CONDITION FOR OPERATION

3.1.5 SOLENOID-ACTUATED PRESSURE RELIEF VALVES (AUTOMATIC DEPRESSURIZATION SYSTEM)

Applicability:

Applies to the operational status of the solenoid-actuated relief valves.

Objective:

To assure the capability of the solenoid-actuated pressure relief valves to provide a means of depressurizing the reactor in the event of a small line break to allow full flow of the core spray system.

Specification:

a. During power operating condition whenever the reactor coolant pressure is greater than 110 psig and the reactor coolant temperature is greater than saturation temperature, all six solenoid-actuated pressure relief valves shall be operable.

b. If specification 3.1.5a above is not met, the reactor coolant pressure and the reactor coolant temperature shall be reduced to 110 psig or less and saturation temperature or less, respectively, within ten hours.

SURVEILLANCE REQUIREMENT

4.1.5 SOLENOID-ACTUATED PRESSURE RELIEF VALVES (AUTOMATIC DEPRESSURIZATION SYSTEM)

Applicability:

Applies to the periodic testing requirements for the solenoid-actuated pressure relief valves.

Objective:

To assure the operability of the solenoid-actuated pressure relief valves to perform their intended functions.

Specification:

The solenoid-actuated pressure relief valve surveillance shall be performed as indicated below.

a. At least once during each operating cycle, ~~with the reactor at pressure, each valve shall be manually opened until acoustic monitors or thermocouples downstream of the valve indicate that the valve has opened and steam is flowing from the valve.~~

b. At least once during each operating cycle, automatic initiation shall be demonstrated.

verify each valve actuator strokes when manually actuated.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
	b. At least once during each operating cycle, with the reactor at pressure, each valve shall be manually opened until acoustic monitors or thermocouples downstream of the valve indicate that the valve has opened and steam is flowing from the valve.
	c. At least once during each operating cycle, relief valve setpoints shall be verified.
	Verify each valve actuator strokes when manually actuated.

ATTACHMENT 2

CHANGES TO TECHNICAL SPECIFICATION BASES

The current version of NMP1 Technical Specification Bases page 61 has been marked-up by hand to reflect the proposed changes. This Bases page is provided for information only.

Pressure Blowdown

In the event of a small line break, substantial coolant loss could occur from the reactor vessel while it was still at relatively high pressures. A pressure blowdown system is provided which in conjunction with the core spray system will prevent significant fuel damage for all sized line breaks (Appendix E-11.2.0)*.

Operation of three solenoid-actuated pressure relief valves is sufficient to depressurize the primary system to 110 psig which will permit full flow of the core spray system within required time limits (Appendix E-11.2)*. Requiring all six of the relief valves to be operable, therefore, provides twice the minimum number required. Prior to or following refueling at low reactor pressure, each valve will be manually opened to verify valve operability. The malfunction analysis (Section II.XV, "Technical Supplement to Petition to Increase Power Level," dated April 1970) demonstrates that no serious consequences result if one valve fails to close since the resulting blowdown is well within design limits.

In the event of a small line break, considerable time is available for the operator to permit core spray operation by manually depressurizing the vessel using the solenoid-actuated valves. However, to ensure that the depressurization will be accomplished, automatic features are provided. The relief valves shall be capable of automatic initiation from simultaneous low-low-low water level (6 feet, 3 inches below minimum normal water level at Elevation 302'-9", -10 inches indicator scale) and high containment pressure (3.5 psig). The system response to small breaks requiring depressurization is discussed in Section VII-A.3.3* and the time available to take operator action is summarized in Table VII-1*. Additional information is included in the answers to Questions III-1 and III-5 of the First Supplement.

~~Steam from the reactor vessel is discharged to the suppression chamber during valve testing. Conducting the tests with the reactor at nominal operating pressure is appropriate because 1) adequate redundant safety systems are provided to ensure adequate core cooling in the event of a small break loss of feedwater, and multiple relief valve failures, 2) dynamic loads and suppression pool heatups associated with high pressure testing are within allowable limits, and 3) testing at nominal operating pressures enhances plant safety and availability by assuring the relief valves can operate under normal operating conditions.~~

~~The test interval of once per operating cycle results in a system failure probability of 7.0 x 10^{-7} (Fifth Supplement, p. 115)* and is consistent with practical consideration.~~

Insert A

*FSAR

INSERT A (for TS Bases page 61; Bases for TS Sections 3.1.5 and 4.1.5)

The actuator for each solenoid-actuated relief valve is stroked to verify that the actuator is functioning properly. This surveillance, together with the testing performed in accordance with the Inservice Testing (IST) Program, verifies the capability of each relief valve to perform its function. The surveillance can be performed using either one of the following two methods:

1. The first method involves stroking the actuator for each solenoid-actuated relief valve when reactor pressure is not present. The actuator test is performed with the actuator mounted in its normal position in the drywell. The test checks the manual actuation electrical circuitry and the solenoid actuator. The pilot valve operating lever and pilot valve stem will be secured in the open position during this test to prevent damage to the pilot valve assembly which could result from dry-stroking with no backpressure. Thus, the main valve will not stroke during the actuator test. The IST Program contains the specific test requirements for the relief valves and associated sub-components. The combination of these tests and other inspections and maintenance activities provides a complete check such that full functionality of the valves is demonstrated, as follows:

   Solenoid Actuator – Maintenance is performed on the solenoid actuators and their associated cutout switches and operating coils during each refueling outage. The inspections and maintenance activities performed ensure that the solenoid plunger output force is adequate to overcome the pilot spring force.

   Pilot Valve – Maintenance is performed on the pilot valve assemblies during each refueling outage which includes a range of mechanical inspection and leak rate testing criteria. The inspection and maintenance activities include leak rate testing and demonstration of pilot stem/disc freedom of movement and reseat functionality. Following installation of the pilot valve assembly inside the housing, the pilot valve operating lever and pilot valve assembly freedom of movement and clearance adjustments are confirmed, followed by stroking the solenoid actuator plunger by hand to the full extent of travel. This ensures that the solenoid actuator plunger, pilot valve operating lever, and pilot valve assembly function as a unit.

   Main Valve – Main valve testing will be performed at an offsite steam test facility. A spare pilot valve assembly and solenoid actuator, both representative of the components used at the plant, will be installed at the test facility to allow testing the main valve. The valve will be installed on a test steam header in the same orientation as the plant installation. The test conditions in the test facility will be similar to those in the plant, including ambient temperature and steam conditions. The main valve will receive an initial seat leak test, a functional test to ensure it is capable of opening and closing, and a final seat leak test. Valve stroke time will be obtained during the exercise test. Valve seat tightness will be verified by a cold bar test, and if not free of fog, leakage will be measured and verified to be below specified acceptance criteria. After initial testing the main valves will be completely disassembled, inspected and refurbished, and then retested. The refurbished main valves will be stored at the offsite test facility and returned to the plant prior to the next scheduled use.

INSERT A (continued)

2. The second method is a manual actuation of the relief valve with the reactor at nominal operating pressure. Verification that the relief valve has opened and steam is flowing from the valve is provided by the response of the turbine bypass valves, a change in the measured steam flow, and indications on the acoustic monitor or thermocouple downstream of the valve. Manual actuation of the solenoid actuator during this test or during the maintenance procedures performed prior to this test will satisfy the surveillance requirement. Adequate reactor steam dome pressure must be available to perform the steam test to avoid damaging the valve. Also, adequate steam flow must be passing through the main turbine or main turbine bypass valves to continue to control reactor pressure when the solenoid-actuated relief valve diverts steam flow upon opening. Steam from the reactor vessel is discharged to the suppression pool during valve testing. Conducting the tests with the reactor at nominal operating pressure is appropriate because: (1) adequate redundant safety systems are provided to ensure adequate core cooling in the event of a small break loss of feedwater, and multiple relief valve failures; (2) dynamic loads and suppression pool heatups associated with high pressure testing are within allowable limits; and (3) testing at nominal operating pressure enhances plant safety and availability by assuring the relief valves can operate under normal operating conditions.

ENCLOSURE 2

NINE MILE POINT UNIT 1

10 CFR 50.55a REQUEST NUMBER ADS-VR-01

10 CFR 50.55a Request Number: ADS-VR-01 (Unit 1)

Proposed Alternative
In Accordance with 10 CFR 50.55a(a)(3)(i)

-- Alternative Provides an Acceptable Level of Quality and Safety --

ASME Code Component(s) Affected:

The following Main Steam Electromatic Relief Valves (ERVs) are affected:

Component ID	Class	Category	Label
PSV-01-102A	1	B	Main Steam ERV
PSV-01-102B	1	B	Main Steam ERV
PSV-01-102C	1	B	Main Steam ERV
PSV-01-102D	1	B	Main Steam ERV
PSV-01-102E	1	B	Main Steam ERV
PSV-01-102F	1	B	Main Steam ERV

Applicable Code Edition and Addenda:

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code-2004 Edition, No Addenda

Applicable Code Requirements:

ISTC-3510, Exercising Test Frequency, states:
"Power operated relief valves shall be exercise tested once per fuel cycle."

ISTC-3700, Position Verification Testing, states:
"Valves with remote position indicators shall be observed locally at least once every 2 years to verify that valve operation is accurately indicated."

ISTC-5111, Valve Testing Requirements, states:
"(a) Testing shall be performed in the following sequence or concurrently. If testing in the following sequence is impractical, it may be performed out of sequence, and a justification shall be documented in the record of tests for each test or in the test plan:

(1) leakage testing
(2) stroke testing
(3) position indication testing"

ISTC-5113, Valve Stroke Testing, states:
"(a) Active valves shall have their stroke times measured when exercised in accordance with ISTC-3500."

ISTC-5114, Stroke Test Acceptance Criteria, states:
"Test results shall be compared to reference values established in accordance with ISTC-3300, ISTC-3310, or ISTC-3320."

10 CFR 50.55a Request Number: ADS-VR-01 (Unit 1)

Reason for Request:

There are six ERVs installed on the main steam lines inside the drywell. Each ERV consist of a main valve, a pilot valve assembly, and a solenoid actuator (see Figure 1). The ERVs are opened by either signals from automatic actuation instrumentation or manually and, thus, do not rely on spring setpoints for valve actuation.

Currently, the OM Code-2004 required testing for the six ERVs is satisfied by manually stroking open each ERV with the reactor at pressure once every operating cycle, which is performed during plant startup following a refueling outage. Experience in the industry and at NMP1 indicates that manually opening the ERVs during plant operation can increase the potential for main disc seat leakage and pilot valve seat leakage. NMP1 experienced main disc seat leakage in March 2001 and pilot valve seat leakage in December 2002, both of which were attributed to debris on the seats caused by testing the valves using steam. Leakage from the main valve disc can cause increases in suppression pool (torus) temperature and level, requiring more frequent suppression pool cooling and pump-down operations, and diverts steam from the power generation steam cycle. Excessive leakage from the pilot valve can cause inadvertent opening of the main valve and impair its ability to re-close.

The proposed alternative will allow testing of the ERVs that is appropriate to demonstrate functionality without cycling the valves in place using reactor steam pressure. This is consistent with NUREG-0737, "Clarification of TMI Action Item Requirements," Item II.K.3.16, "Reduction of Challenges and Failures of Relief Valves," which recommended that the number of relief valve openings be reduced as much as possible and that unnecessary challenges should be avoided.

Proposed Alternative and Basis for Use:

Pursuant to 10CFR50.55a, "Codes and Standards," paragraph (a)(3), relief is requested from the listed requirements of the OM Code-2004. This relief request proposes an alternative to performing in-situ ERV steam pressure testing every refueling outage. The proposed alternative consists of a combination of offsite steam testing of the main valves, actuator cycling, and other inspections and maintenance activities. The basis of the request is that the proposed alternative would provide an acceptable level of quality and safety, as further discussed below.

System Description

There are six Dresser model 1525VX solenoid-actuated, pilot-operated ERVs installed at NMP1. The ERVs are connected to the main steam lines between the main steam line flow restrictor and the inboard main steam isolation valve. Each ERV has its own discharge pipe that is equipped with an acoustic monitor to detect flow noise and a thermocouple to sense discharge fluid temperature to monitor for valve actuation and/or leakage.

The ERVs have two functional modes of operation: the automatic depressurization system (ADS) mode and the overpressurization relief mode. In the ADS mode, the ERVs depressurize the reactor vessel in the event of a small break loss of coolant accident (SBLOCA) by relieving steam to the torus, allowing the core spray system to inject (spray) cooling water into the reactor vessel. The ADS mode actuates on concurrent lo-lo-lo reactor water level and high drywell pressure signals. The six ERVs, three primary valves and three backup valves, are required to be operable for the ADS mode. Operation of three ERVs is sufficient to depressurize the reactor coolant system and permit full core spray system flow.

The ERVs also provide overpressure protection (relief mode) for the reactor and main steam piping by limiting reactor pressure during transients that result in a pressure increase. In the overpressurization relief mode, pressure switches that monitor reactor vessel pressure actuate six ERVs at staggered setpoints to ensure sufficient margin between the analyzed peak transient pressure and the lowest setpoint for the reactor head safety valves to prevent safety valve actuation during anticipated transients.

Valve Operation

Steam under pressure from the reactor enters the main valve and passes upward around the disc guide. Steam enters the chamber below the main disc through a small orifice located in the disc retainer plate. Inlet steam pressure holds the main valve disc closed. A main disc spring is provided to keep the main valve disc in the closed position at low pressures or while depressurized. The pilot valve disc is held in the closed position by a pilot valve spring and steam pressure in the chamber below the pilot disc. When the solenoid actuator is energized, the actuator plunger depresses the pilot valve operating lever, thereby opening the pilot valve. When the pilot valve is opened, steam is released through the outlet port at a faster rate than supplied through the inlet orifice. This causes the chamber below the main disc to depressurize, causing the valve to open. To close the valve, the solenoid actuator is de-energized, thereby closing the pilot valve and allowing steam pressure to reseat the main valve.

1. Exercise Test Frequency Alternative to ISTC-3510

The six ERVs are currently exercised once each operating cycle with steam during plant startup, using an OM Code allowed refueling outage justification (ADS-ROJ-01).

For the proposed alternative, all six of the ERV solenoid actuators will be exercised each refueling outage, and three of the six main valves will be replaced with pretested spare valves each refueling outage. Inspections and precision preventive maintenance (described below) will be performed each refueling outage for all six of the solenoid actuators and pilot valve assemblies, with the IST requirements incorporated as part of the preventive maintenance activities. This combination of testing, inspections, and maintenance activities provides an acceptable level of quality and safety without requiring the six ERVs to be stroked with reactor steam during plant startup.

Solenoid Actuator: Each ERV solenoid actuator will be exercised each refueling outage. The closing stroke de-energizes the solenoid and allows the actuator to return to its fail-safe (closed) position. This test will be performed with the pilot valve and solenoid actuator mounted in their normal installed positions inside the drywell, which allows the solenoid actuator to be actuated electrically from the control room by placing the control switch in the Open position. The pilot valve operating lever and pilot valve stem will be secured in the open position during this test to prevent damage to the pilot valve assembly which could result from dry-stroking with no backpressure. The maintenance activities include detailed inspections of the electrical and mechanical components of the solenoid actuator. NMP1 LER 03-001 (Reference 1) reported an event involving an ERV that failed to open due to high resistance in the solenoid actuator cutout switch contacts. The high resistance contacts limited the current through the solenoid operating coil, which reduced the force that the plunger applied to the pilot valve operating lever. Further investigation and examination showed that the high contact resistance was due to the tin coating having been worn off the cutout switch contacts, allowing excessive contact oxidation to occur. Preventive maintenance activities now include inspection and cleaning of the cutout switch contacts, as necessary, to assure that the contact surfaces are clean and free of oxidation, corrosion, and discoloration. The contact tin plating is verified to be intact and not worn off exposing the copper base material. Associated springs and mechanisms are inspected, and the as-left contact resistances are verified. Resistance checks are performed on both actuator coils, and actuator operating currents during electrical actuation are verified to be within acceptance limits. These steps provide substantial indication that the solenoid actuator is capable of functioning as designed and producing its full output force.

Stroke timing of the solenoid actuator is not performed since the actuator is a sub-component of the total ERV. Degradation is monitored through the preventive maintenance inspections in lieu of trending millisecond stroke time variations.

Pilot Valve: Each ERV pilot valve will be exercised each refueling outage when the new/refurbished pilot valve assembly is installed in the pilot housing. Note that the pilot valve housing is permanently welded to the outside of the ERV enclosure located in the drywell (see Figure 1). Removal and re-installation of the pilot valve assembly does not affect the ERV main valve. The maintenance activities include inspections of the pilot valve assembly parts and the pilot valve housing interior to identify any damage or wear that could impair free movement of the stem or proper valve seating. Parts are refurbished or replaced as necessary. Cleanliness of parts and components and absence of foreign material are verified prior to reassembly. NMP1 has experienced a stuck-open ERV event caused by improper maintenance. NMP1 LER 04-001, "Manual Reactor Scram and Cooldown Rate Exceeding Technical Specification Limits Due to Electromatic Relief Valve Failure to Close," (Reference 2) reported an event involving an ERV that stuck open due to a maintenance error in which an extraneous gasket was installed in the pilot valve housing. This condition allowed steam to bypass the pilot valve seat, thereby preventing steam pressure from building up under the main valve disc to close the valve when given the closure signal. Appropriate precautions and instructions have been incorporated into the ERV maintenance procedure to ensure that the correct gasket is used and sufficient torque is applied to prevent steam from bypassing the pilot valve seat.

Prior to re-installing the pilot valve assembly inside the pilot housing, pilot stem/disc leak testing and freedom of movement and reseat functionality are demonstrated. A complete cleanliness inspection must be performed prior to installing the pilot valve assembly back into the housing. The housing is thoroughly cleaned and vacuumed to remove moisture and debris to minimize the potential for debris blocking or hindering pilot valve performance. Following installation of the pilot valve assembly inside the housing, the pilot valve operating lever and pilot valve assembly freedom of movement and clearance adjustments are confirmed, followed by stroking the solenoid actuator plunger by hand to the full extent of travel. This ensures that the solenoid actuator plunger, pilot valve operating lever, and pilot valve assembly function as a unit, while eliminating the risk of damage resulting from electrically stroking the pilot valve in the absence of steam pressure (referred to as dry-stroking). The pilot valve freedom of movement check allows the pilot valve disc to return to its fail-safe (closed) position. NMP1 LER 00-04, "Manual Reactor Scram and Unusual Event Declaration Due to Stuck Open Electromatic Relief Valve and Failed Vacuum Breaker on Electromatic Relief Valve Discharge Line," (Reference 3) reported an event involving an ERV that unexpectedly opened and would not reclose. This event was also addressed in NRC Inspection Report 2000-008 (Reference 4). The cause was attributed to a bent stem in the pilot valve assembly and partial disengagement of the pilot valve disc from the stem. It was determined that the pilot valve stem-disc separation had occurred as a result of dry-stroking the ERV pilot valve using the solenoid actuator.

Stroke timing of the pilot valve is not practical since the test is performed by hand and the pilot valve is a sub-component of the total ERV. Degradation of the pilot valve assemblies is monitored through the preventive maintenance inspections.

Main Valve: A sampling program is proposed that will remove and replace three of the six ERV main valves with pre-tested spare main valves during each refueling outage, such that all six ERV main valves are replaced every two refueling outages (approximately 4 years). Each ERV main valve will be stroke tested at an offsite steam test facility once every 4 years (two refueling outages) rather than once every refueling outage (approximately 24 months). A 6-month grace period would be allowed to accommodate variations in fuel cycle length and extended shutdown periods. The main valve testing will capture the exercise and stroke time test data required by the OM Code-2004.

Main valve testing will be performed at an offsite steam test facility. As shown in Figure 1, the main valve is housed in a heavy steel enclosure that is attached to the main steam line inlet flange. The pilot valve assembly is installed inside the pilot valve housing, and the housing is welded onto the outside of the enclosure and physically separated from the ERV main valve body. Thus, only the main valve of the ERV can be sent to the test facility. A spare pilot valve assembly and a spare solenoid actuator, both representative of the components used at the plant, will be installed at the test facility to allow testing the main valve. The valve will be installed on a test steam header in the same orientation as the plant installation. The test conditions at the test facility will be similar to those in the plant, including ambient temperature and steam conditions. The main valve will receive an initial seat leak test, a functional test to ensure it is capable of opening and closing, and a final seat leak test. Valve stroke time will be obtained during the exercise test. Valve seat tightness will be verified by a cold bar test, and if not free of fog, leakage will be measured and verified to be below specified acceptance criteria. This initial testing will be completed prior to plant startup from the refueling outage.

After initial testing, the main valves will be completely disassembled, inspected and refurbished, and then retested. The refurbished main valves will be stored at the offsite test facility and returned to the plant prior to the next scheduled use. The offsite test facility's storage requirements will ensure the valves are protected from physical damage. The valves will be stored in an area meeting ANSI/ASME N45.2.2 Class B storage requirements, with the storage area temperature maintained between 50°F and 90°F. Maintaining the ERVs in a controlled environment during storage minimizes the potential for any valve degradation.

Prior to installation at the plant, the spare main valves will be inspected for foreign material and damage. The steam line and ERV discharge line openings will also be inspected to verify cleanliness and absence of foreign material. Procedural requirements ensure that the proper ERV inlet flange gasket separating ring thickness is provided so proper crush of the flexitallic gasket is achieved when the valve is installed. The valves are then installed and necessary connections completed, including connecting the vent tube and installing the enclosure cover and bellows assembly. Proper connections will be verified per procedure.

The three main valve discs that are not exercised during each refueling outage will have inspections and maintenance performed on their solenoid actuators and pilot valve assemblies as described above. Review of past surveillance testing and preventive maintenance history indicates that the ERV main valves are highly reliable. During the second 10-year IST interval (1986 to 1999), the ERVs were inspected and refurbished at 48-month intervals (every two refueling outages). From 1999 to 2004, the preventive maintenance interval for the ERV main valves was extended to 6 years, and since 2004, the preventive maintenance interval for the ERV main valves has been 10 years. These preventive maintenance activities have found the ERV main valves in excellent condition with no significant degradation noted. The table below lists the most recent preventive maintenance performed for each ERV main valve:

Valve No.	Date of Last Preventive Maintenance
PSV-01-102A (ERV-111)	4/3/07
PSV-01-102B (ERV-112)	5/9/01
PSV-01-102C (ERV-121)	4/14/07
PSV-01-102D (ERV-122)	4/8/09
PSV-01-102E (ERV-113)	4/8/09
PSV-01-102F (ERV-123)	5/14/04

Even though the preventive maintenance interval was extended to 10 years, the Technical Specifications (TS) required manual opening of each ERV each operating cycle. Therefore, no TS surveillance test data exists to show how a main valve will perform if not stroked for a period beyond approximately 24 months. As shown in the above table, valve PSV-01-102B has not been refurbished since May 2001 (a period of about 9 years). Performance of this valve during the TS-required surveillance tests has been satisfactory. The only failure of an ERV to open during the last 10 years is the event reported in NMP1 Licensee Event Report (LER) 03-001, "Technical Specification Cooldown Rate Exceeded During Required Cooldown for a Failed Solenoid Actuated Pressure Relief Valve," (Reference 1), which was caused by a problem with the solenoid actuator for ERV-111, not with the main valve.

Although the NMP1 ERVs are tested in accordance with the ASME OM Code-2004, Subsection ISTC, the proposed sampling program whereby three of the six ERV main valves will be removed and replaced with pre-tested spare main valves during each refueling outage is similar to the testing methodology for Class 1 pressure relief devices described in the ASME OM Code-2004, Mandatory Appendix I. Specifically, this appendix specifies that Class 1 pressure relief valves shall be tested at least once every 5 years, that a minimum of 20% of the valves from each valve group shall be tested within any 24-month interval, and that the testing requirements may be satisfied by installing pretested valves to replace valves that have been in service. Extensions of the 5-year test interval have previously been authorized by the NRC. For Nine Mile Point Unit 2 (NMP2), the NRC authorized the alternative described in Relief Request MSS-VR-01 to extend the test interval for Class 1 main steam safety relief valves to 3 refueling cycles (approximately 6 years), as documented in NRC letter dated December 29, 2008 (Reference 5). Also, for the James A. FitzPatrick plant, the NRC authorized the alternative described in Relief Request VRR-06, Revision 1, to extend the test interval for Class 1 main steam safety relief valves to 72 months (6 years) with a 6-month grace period, as documented in NRC letter dated October 1, 2009 (Reference 6), and approved an associated license amendment by letter dated July 21, 2010 (Reference 7).

Based on the above discussion, extending the main valve exercising interval from every refueling outage (approximately 2 years) to every 4 years plus a 6-month grace period is reasonable and is not expected to adversely impact the ability of the valves to perform their safety functions or to result in additional valve failures. The testing and refurbishment activities performed at the off-site test facility on the partial compliment sample (three valves each refueling outage) will ensure that main valve degradation mechanisms are detected in a timely manner. Monitoring of the ERV discharge line temperatures during plant operation also provides an indication of degradation of the installed main valves.

2. Position Indication Verification Alternative to ISTC-3700 and ISTC-5111

This proposed alternative performs position indication verification for the six ERVs by observing the control room position indicating lights during the solenoid actuator test. Each ERV is equipped with red and green indicating lights which provide control room open and close indication, respectively, by monitoring the solenoid actuator plunger position. A blue indicating light is also provided in the control room which monitors power to the solenoid actuator. The blue light is "On" when the solenoid is de-energized (valve closed) and "Off" when the solenoid is energized (valve open). As previously noted, the pilot valve operating lever and pilot valve stem will be secured in the open position during this test to prevent damage to the pilot valve assembly which could result from dry-stroking with no backpressure. Solenoid actuator plunger movement will be observed locally in the drywell and compared to the control room indication to verify that solenoid actuator operation is accurately indicated. The proposed position indication verification alternative provides indirect pilot valve position, which ultimately represents the position of the main valve disc when steam is present, without cycling the ERVs in place with reactor steam pressure. This test is performed every refueling outage for each of the six ERVs.

The proposed position indication verification alternative provides an acceptable level of quality and safety without requiring indication of main valve obturator movement.

3. Stroke Time Testing Alternative to ISTC-5113 and ISTC-5114

Since the ERVs are not being in-situ tested, and since only the main valve is being tested at the offsite test facility (as previously noted), ERV full stroke time from initiating signal to indication of the end of the operating stroke cannot be obtained. Instead, main valve stroke times will be measured at the test facility. Stroke time acceptance criteria will use a pre-established reference value that represents good performance for this valve type. Since the whole valve assembly is not being tested and the test facility cannot duplicate the control circuitry, a simplified valve actuation circuit will be used. Although these differences may result in minor differences in measured stroke time compared to previous test data for in-situ testing of the complete ERV, the stroke times measured at the test facility will be comparable to each other and thus can be used to detect abnormalities in valve performance.

Duration of Proposed Alternative:

This proposed alternative, upon approval, is planned for implementation beginning with the next refueling outage following NRC authorization and extending through the end of the NMP1 Fourth 10-Year IST Interval, which began on January 1, 2009 and is scheduled to end on December 31, 2018.

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Precedent:

The NRC has authorized similar alternatives to the current method of ERV in-situ steam pressure testing, as follows:

- Oyster Creek Nuclear Generating Station, NRC letter dated August 31, 2006 – ADAMS Accession No. ML062220410.

- Dresden Nuclear Power Station, Units 2 and 3, NRC letter dated October 19, 2004 – ADAMS Accession No. ML042600571.

NMP1, Dresden, Quad Cities, and Oyster Creek all use the same Dresser model 1525VX solenoid-actuated, pilot-operated ERVs. Similarities and differences between the proposed NMP1 alternative and the authorized alternatives for Dresden, Quad Cities, and Oyster Creek are summarized below:

Similarities

- A partial compliment of the ERV main valves will be removed and replaced with pre-tested spare main valves during each refueling outage. Each ERV main valve will be steam tested at an offsite steam test facility once approximately every 4 years.
- Preventive maintenance is performed on all of the ERV solenoid actuators and their associated cutout switches during each refueling outage.

Differences

- NMP1 classifies the ERVs as OM Category B power-operated valves and tests the ERVs in accordance with the OM Code-2004, Subsection ISTC. The Dresden and Quad Cities relief requests cite both Subsection ISTC and Appendix I of the OM Code for ERV testing requirements, and the Oyster Creek relief request cites only Appendix I of the OM Code.
- The proposed change for NMP1 includes a 6-month grace period on the 4-year interval for steam-testing the ERVs at the offsite test facility. For Dresden, Quad Cities, and Oyster Creek, the ERV main valve testing is in accordance with Appendix I of the OM Code, which specifies a test interval of five years.
- For Dresden, Quad Cities, and Oyster Creek, the offsite testing includes both the main valve and the pilot valve. For NMP1, the pilot valve cannot be tested with the main valve because of the unique heavy steel enclosure that houses the main valve. The pilot valve housing is welded onto the outside of the enclosure and is physically separated from the ERV main valve body.
- For Dresden, Quad Cities, and Oyster Creek, the pilot valve assemblies for the ERVs that are not scheduled for removal and offsite testing are replaced with new or refurbished assemblies each refueling outage. For NMP1, all six of the ERV pilot valve assemblies will be replaced with new or refurbished assemblies each refueling outage.
- For Dresden, Quad Cities, and Oyster Creek, the pilot valve is dry stroked using the solenoid actuator. For NMP1, dry stroking will not be performed due to a past event where dry stroking caused pilot valve damage. Instead, separate testing, inspections, and maintenance will be performed for the solenoid actuators and the pilot valve assemblies.

References:

1. Letter from L. A. Hopkins (NMPC) to Document Control Desk (NRC) dated June 23, 2003, Licensee Event Report 03-001, "Technical Specification Cooldown Rate Exceeded During Required Cooldown for a Failed Solenoid Actuated Pressure Relief Valve"

2. Letter from L. A. Hopkins (NMPC) to Document Control Desk (NRC) dated July 1, 2004, Licensee Event Report 04-001, "Manual Reactor Scram and Cooldown Rate Exceeding Technical Specification Limits Due to Electromatic Relief Valve Failure to Close"

3. Letter from L. A. Hopkins (NMPC) to Document Control Desk (NRC) dated December 6, 2000, submitting Licensee Event Report 00-04, Supplement 1, "Manual Reactor Scram and Unusual Event Declaration Due to Stuck Open Electromatic Relief Valve and Failed Vacuum Breaker on Electromatic Relief Valve Discharge Line"

4. Letter from M. G. Evans (NRC) to J. H. Mueller (NMPC) dated December 22, 2000, NRC's Nine Mile Point Inspection Report 05000220/2000-008, 05000410/2000-008

5. Letter from M. G. Kowal (NRC) to K. J. Polson (NMPNS) dated December 29, 2008, Nine Mile Point Nuclear Station – Safety Evaluation of Relief Requests for the Unit No. 1 Fourth 10-Year and Unit 2 Third 10-Year Pump and Valve Inservice Testing Program (TAC Nos. MD9202 and MD9203)

6. Letter from N. L. Salgado (NRC) to Vice President, Operations (Entergy Nuclear Operations, Inc.) dated October 1, 2009, James A. FitzPatrick Nuclear Power Plant – Relief Request VRR-06, Revision 1 from the Requirements of the OM Code Re: Inservice Testing of Safety Relief Valves (TAC No. ME1818)

7. Letter from B. K. Vaidya (NRC) to Vice President, Operations (Entergy Nuclear Operations, Inc.) dated July 21, 2010, James A. FitzPatrick Nuclear Power Plant – Issuance of Amendment Regarding Testing of Safety/Relief Valves (TAC No. ME2810)

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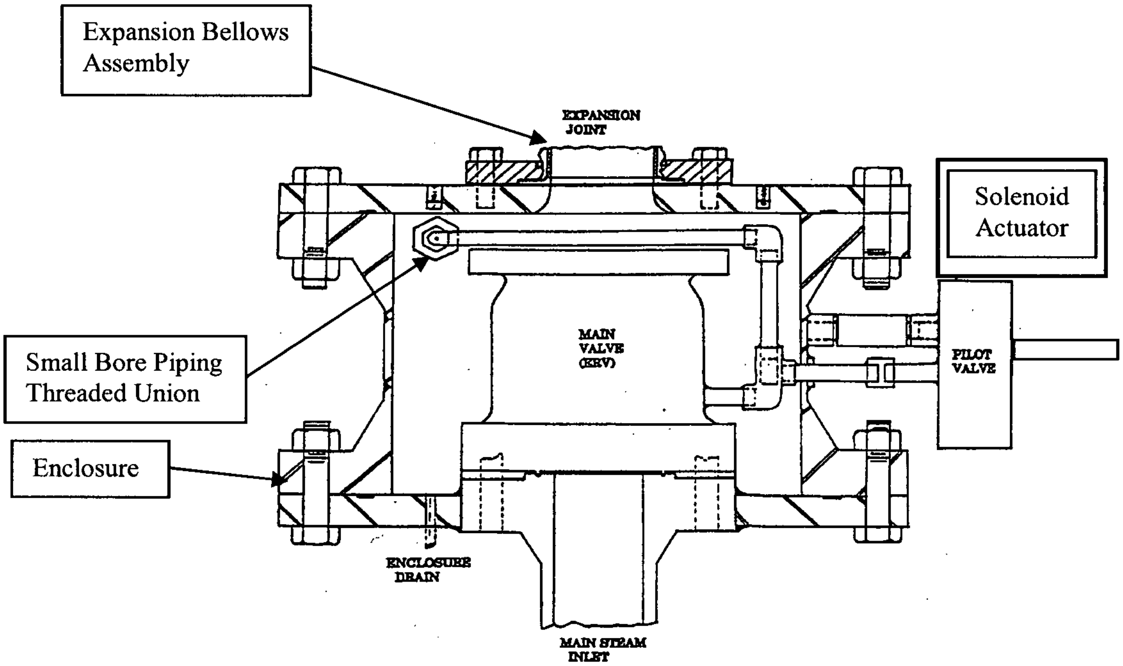
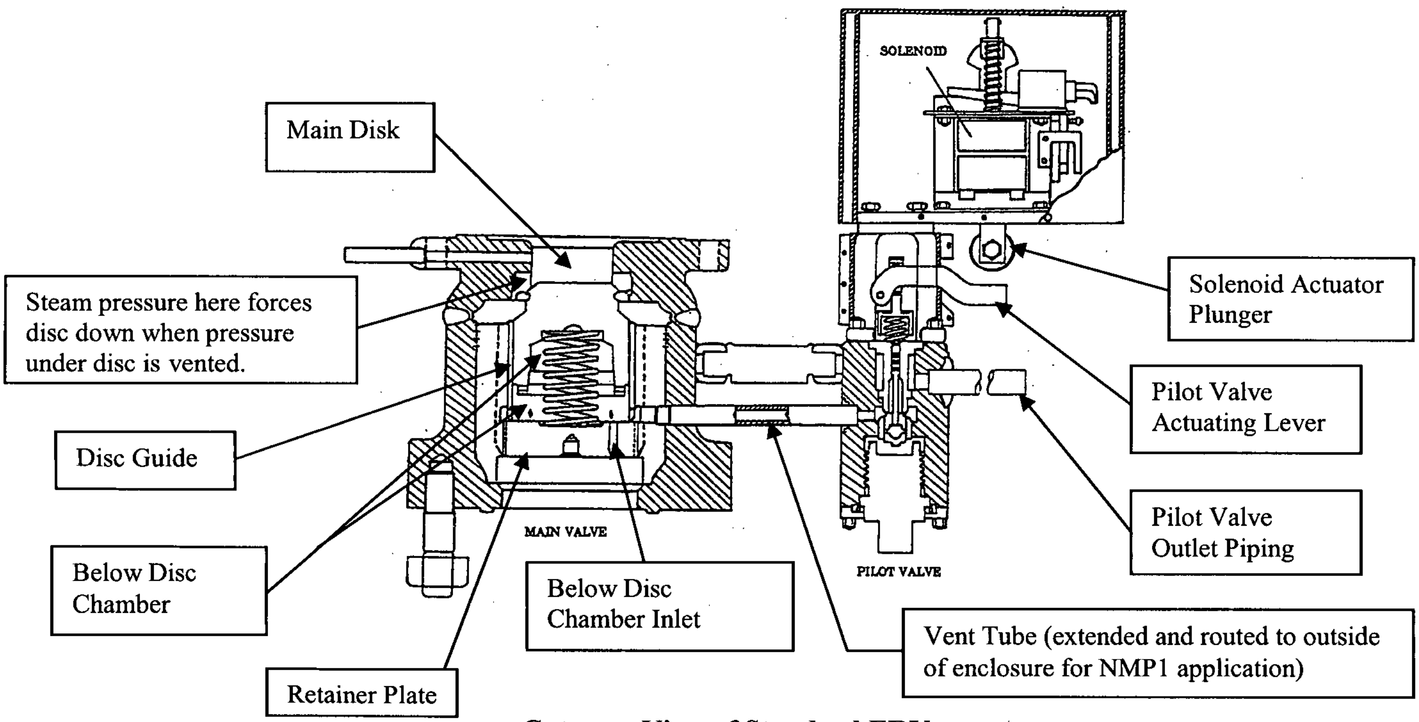
Figure 1
ERV Component Configuration



NMP1 ERV with Enclosure



Cutaway View of Standard ERV
(Internals are applicable to NMP1