

August 17, 2005

Mr. Paul A. Harden  
Site Vice President  
Nuclear Management Company, LLC  
Palisades Nuclear Plant  
27780 Blue Star Memorial Highway  
Covert, MI 49043-9530

SUBJECT: PALISADES PLANT — REVISED VALVE RELIEF REQUESTS 28, 30, AND 31  
FOR THE THIRD 10-YEAR PUMP AND VALVE INSERVICE TESTING  
PROGRAM (TAC NO. MC6545)

Dear Mr. Harden:

Nuclear Management Company, LLC's (NMC's) letter of March 31, 2005, submitted three revised valve relief requests (VRR-28, VRR-30, and VRR-31) for the third 10-year in-service testing program (IST) program interval at Palisades Nuclear Plant. NMC requested relief from certain IST requirements of the 1989 Edition of the American Society of Mechanical Engineers *Boiler and Pressure Vessel Code* (ASME Code), Section XI, related to pressure relief devices. NMC's letter of June 15, 2005, provided additional information in response to the Nuclear Regulatory Commission's (NRC's) request for additional information.

The NRC staff evaluated the above relief requests, and concludes that complying with the ASME Code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. The NRC staff further concludes that NMC's proposed alternative provides reasonable assurance of the operational readiness of the relief valves for which relief was requested. Accordingly, the NRC staff authorizes NMC's proposed alternative in accordance with Title 10 of the *Code of Federal Regulations* Part 50.55a(a)(3)(ii). This relief is authorized until the completion of the fall 2007 refueling outage at Palisades.

Enclosed is our safety evaluation.

Sincerely,

/RA/

L. Raghavan, Chief, Section 1  
Project Directorate III  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-255

Enclosure: Safety Evaluation

cc w/encl: See next page

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*/RA/*  
LRaghavan, Chief, Section 1  
Project Directorate III  
Division of Licensing Project Management  
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Docket No. 50-255

Enclosure: Safety Evaluation

cc w/encl: See next page

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Palisades Plant

cc:

Robert A. Fenech, Senior Vice President  
Nuclear, Fossil, and Hydro Operations  
Consumers Energy Company  
1945 Parnall Rd.  
Jackson, MI 49201

Arunas T. Udryns, Esquire  
Consumers Energy Company  
1 Energy Plaza  
Jackson, MI 49201

Regional Administrator, Region III  
U.S. Nuclear Regulatory Commission  
801 Warrenville Road  
Lisle, IL 60532-4351

Supervisor  
Covert Township  
P. O. Box 35  
Covert, MI 49043

Office of the Governor  
P. O. Box 30013  
Lansing, MI 48909

U.S. Nuclear Regulatory Commission  
Resident Inspector's Office  
Palisades Plant  
27782 Blue Star Memorial Highway  
Covert, MI 49043

Michigan Department of Environmental Quality  
Waste and Hazardous Materials Division  
Hazardous Waste and Radiological  
Protection Section  
Nuclear Facilities Unit  
Constitution Hall, Lower-Level North  
525 West Allegan Street  
P.O. Box 30241  
Lansing, MI 48909-7741

Michigan Department of Attorney General  
Special Litigation Division  
525 West Ottawa St.  
Sixth Floor, G. Mennen Williams Building  
Lansing, MI 48913

Director of Nuclear Assets  
Consumers Energy Company  
Palisades Nuclear Plant  
27780 Blue Star Memorial Highway  
Covert, MI 49043

John Paul Cowan  
Executive Vice President & Chief Nuclear  
Officer  
Nuclear Management Company, LLC  
700 First Street  
Hudson, WI 54016

Jonathan Rogoff, Esquire  
Vice President, Counsel & Secretary  
Nuclear Management Company, LLC  
700 First Street  
Hudson, WI 54016

Douglas E. Cooper  
Senior Vice President - Group Operations  
Palisades Nuclear Plant  
Nuclear Management Company, LLC  
27780 Blue Star Memorial Highway  
Covert, MI 49043

Stephen T. Wawro, Director  
of Nuclear Assets  
Consumers Energy Company  
Palisades Nuclear Plant  
27780 Blue Star Memorial Highway  
Covert, MI 49043

Laurie A. Lahti, Manager  
Regulatory Affairs  
Nuclear Management Company, LLC  
Palisades Nuclear Plant  
27780 Blue Star Memorial Highway  
Covert, MI 49043

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REVISED VALVE RELIEF REQUESTS 28, 30, AND 31

FOR THE THIRD 10-YEAR PUMP AND VALVE INSERVICE TESTING PROGRAM

NUCLEAR MANAGEMENT COMPANY, LLC

PALISADES PLANT

DOCKET NO. 50-255

1.0 INTRODUCTION

The Nuclear Management Company, LLC's (NMC's), letter of March 31, as supplemented June 15, 2005, submitted three revised relief requests for the third 10-year inservice testing (IST) program interval at Palisades Nuclear Plant. NMC requested relief from certain IST requirements of the 1989 Edition of the American Society of Mechanical Engineers *Boiler and Pressure Vessel Code* (ASME Code), Section XI, related to pressure relief devices. The 1989 ASME Code, Section XI, references ASME *Code for Operation and Maintenance of Nuclear Power Plants* (ASME OM Code), Part 1, "Requirements for Inservice Performance Testing of Nuclear Power Plant Pressure Relief Devices," for periodic testing of pressure relief devices.

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50.55a, requires that IST of certain ASME Code Class 1, 2, and 3 pumps and valves be performed at 120-month (10-year) IST program intervals. The IST is to be performed in accordance with the specified ASME Code incorporated by reference in the regulations, except where alternatives have been authorized or relief has been requested by the licensee, and granted by the Commission, pursuant to paragraphs (a)(3)(i), (a)(3)(ii), or (f)(6)(i) of 10 CFR 50.55a. In accordance with 10 CFR 50.55a(f)(4)(ii), licensees are required to comply with the requirements of the latest edition and addenda of the ASME Code incorporated by reference in the regulations 12 months prior to the start of each 120-month IST program interval. In accordance with 50.55a(f)(4)(iv), IST of pumps and valves may meet the requirements set forth in subsequent editions and addenda that are incorporated by reference in 10 CFR 50.55a(b), subject to Nuclear Regulatory Commission (NRC) approval. Portions of editions or addenda may be used provided that all related requirements of the respective editions and addenda are met. In proposing alternatives or requesting relief, the licensee must demonstrate that: (1) the proposed alternatives provide an acceptable level of quality and safety; (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety; or (3) conformance is impractical for the facility. Section 50.55a authorizes the Commission to approve alternatives and to grant relief from ASME Code requirements upon making necessary findings. NRC guidance contained in Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," provides alternatives to ASME Code requirements which are

acceptable. Further guidance is given in GL 89-04, Supplement 1, and NUREG-1482, "Guidance for Inservice Testing at Nuclear Power Plants."

The Palisades Nuclear Plant third 10-year IST interval began August 21, 1995. NMC developed the program in accordance with the 1989 Edition of the ASME Code, Section XI. The 1989 ASME Code, Section XI, references ASME OM Standards, Part 1 (OM-1), Part 6 (OM-6), "Inservice Testing of Pumps in LWR Plants," and Part 10 (OM-10), "Inservice Testing of Valves in LWR Plants," for its IST requirements. The NRC's findings with respect to granting or denying the IST program relief requests are given below.

### 3.0 TECHNICAL EVALUATION

#### 3.1 Revised Valve Relief Request No. 28

##### 3.1.1 Code Requirements

NMC requested relief from OM-1, paragraph 1.3.4, which requires that all Class 2 relief valves of each type and manufacturer be tested within each subsequent 10-year period, and that a minimum of 20 percent of the valves be tested within any 48-month period. Relief was requested for the following relief valves:

- RV-0402
- RV-0403
- RV-0954
- RV-0955

##### 3.1.2 NMC's Basis for Requesting Relief

The NRC's letter of March 6, 1998, approved multiple relief requests for the Palisades Nuclear Plant, including valve relief requests (VRRs) Nos. 28, 30, and 31, for various thermal relief valves. These relief requests described a hardship associated with testing the subject valves at times other than a full-core offload. The VRRs proposed to complete testing at the conclusion of the third IST interval, which at the time was scheduled for August 2005, and would have required a full-core offload. Palisades Nuclear Plant plans to perform its next full-core offload during the fall 2007 refueling outage. Therefore, NMC concluded it was a hardship to test the subject relief valves by the surveillance due date of August 2005, as explained below.

NMC determined that performing a full-core offload would add an estimated 170 hours to the critical path outage schedule, and result in an estimated 3 rem of additional personnel dose exposure. Such efforts would represent a hardship and unusual difficulty when compared to the relatively small benefit associated with successful valve testing.

Relief valves RV-0402, RV-0403, RV-0954, and RV-0955 are designed to protect the shutdown cooling heat exchangers from thermal expansion of water when the heat exchangers are isolated for maintenance or inspection. These thermal relief valves have no active safety function when the heat exchangers are in service. The associated heat exchangers must be isolated to remove these thermal relief valves. These relief valves are only needed when the associated heat exchanger is isolated. Since the valves are not normally in service, they do not experience significant challenges resulting in wear. Therefore, the useful life of these relief

valves can assumed to be extended and not adversely affect system function.

A review of plant-specific and industry experience for Teledyne-Farris relief valves indicates that the type of relief valves installed for thermal overpressure protection are reliable. Failures are generally associated with test results outside of acceptable set-point ranges, or failure to close sufficiently to assure leak-tight integrity. The thermal protection function of these valves was maintained, even though specific performance criteria were not met.

In order to ensure seat leakage does not impact system operability, Palisades Nuclear Plant will continue to perform examinations in accordance with its ASME Code, Section XI, pressure test program. Additionally, the requirements of Palisades' boric-acid corrosion-control program will be followed to assure leakage does not adversely impact other components that may be in the leak path. These actions will provide reasonable assurance that the relief valves are operationally ready.

### 3.1.3 NMC's Proposed Alternative Testing

The IST interval for the subject relief valves will be extended until the conclusion of the fall 2007 refueling outage. Palisades Nuclear Plant will continue to perform examinations in accordance with its ASME Code, Section XI, pressure test program. Additionally, Palisades will follow the requirements of its boric-acid corrosion-control program to assure leakage does not adversely impact other components that may be in the leak path.

The fourth IST interval will not be extended for these valves. After completing setpoint testing during the 2007 refueling outage, NMC will set the fourth interval start date for these valves at March 24, 2006. Testing intervals, and scope, will be determined on March 24, 2006.

### 3.1.4 Evaluation

OM-1 requires testing of pressure relief devices that provide overpressure protection to components which function to shutdown the reactor, maintain a safe shutdown condition, or mitigate the consequences of an accident. The valves identified in this relief request provide thermal overpressure protection for such components. For Class 2 and 3 pressure relief valves, OM-1, Paragraph 1.3.4, requires testing a minimum of 20 percent of the valves within any 48-month period, and all valves within each subsequent 10-year period. NMC states that these thermal relief valves are needed only when the associated heat exchanger is isolated, and proposes to extend the test interval to the end of the fall 2007 refueling outage. Thermal relief valves are potentially challenged during train or component shutdowns when the component is isolated. In the event that the component is exposed to a prolonged external heat source, or due to in-leakage of high temperature/pressure fluid past an isolation boundary, the thermal relief valve will provide overpressure protection from thermal expansion. Since the affected components are not providing a safety function while they are isolated, the thermal relief valves have limited safety significance during this condition. While the components are in service, the safety function of the thermal relief valves are to remain closed as part of the system pressure boundary. This function is periodically verified during normal operation or system pressure testing.

The NRC's letter of March 6, 1998, authorized relief to test these relief valves on a 10-year interval in lieu of the 10-year and 48-month requirements of the OM Code for Class 2 relief

valves. The proposed extension past the 10-year requirement to test the valves is approximately 25 months. Industry experience indicates that the failure rates of thermal relief valves are low, and additional degradation of these components would not be expected to occur during this additional period. Therefore, the NRC staff finds that NMC's proposed alternative provides reasonable assurance of operational readiness.

Meeting ASME Code requirements would require a full-core offload. NMC chose to delay doing this until the fall 2007 refueling outage when reactor vessel head replacement would be the critical path instead of full-core offload. NMC indicated that performing a full-core offload during the next refueling outage in April 2006 would add an estimated 170 hours to the critical path outage schedule, and result in an estimated 3 rem of additional personnel dose exposure. Such efforts would constitute a hardship or unusual difficulty, when compared to the relatively small benefit associated with successful valve testing.

### 3.1.5 Conclusion

Based on the above evaluation, the NRC staff concludes that NMC's alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that compliance with the ASME Code requirements results in hardship or unusual difficulty without a compensating increase in the level of quality and safety. NMC's proposed alternative also provides reasonable assurance of the operational readiness of the identified relief valves. This alternative is authorized until the completion of the fall 2007 refueling outage.

## 3.2 Revised Valve Relief Request No. 30

### 3.2.1 ASME Code Requirements

NMC requested relief from OM-1, paragraph 1.3.3, which requires that all relief valves of each type and manufacturer be tested within each subsequent 5-year period, and that a minimum of 20 percent of the valves be tested within any 24-month period. Relief was requested for relief valve RV-0401.

### 3.2.2 NMC's Basis for Requesting Relief

The NRC's letter of March 6, 1998, approved multiple relief requests for the Palisades Nuclear Plant, including VRR Nos. 28, 30, and 31, for various thermal relief valves. These relief requests described a hardship associated with testing the subject valves at times other than a full-core offload. The relief requests also proposed to complete testing by the end of the third IST interval, which at the time was scheduled for August 2005, and would have included a full-core offload.

Due to extended outages occurring during the third 10-year inservice inspection interval, Palisades Nuclear Plant extended the ISI interval from August 2005, to December 2006, in accordance with the provisions of ASME Code, Section XI, 1989 Edition. The ISI interval extension has resulted in a delay of the next full core offload until the fall 2007 refueling outage. Therefore, it is a hardship to test the subject relief valves by the surveillance due date of August 2005.

Relief valve RV-0401 is located in the letdown piping from the primary coolant system to the shutdown cooling system. Testing cannot be performed with the primary coolant system pressure and temperature at greater than cold shutdown condition, because RV-0401 provides the second isolation barrier for the system. Failure of the first isolation barrier would result in uncontrollable and highly contaminated primary coolant system leakage.

Testing cannot be performed during cold shutdown, with shutdown cooling in service, because the Palisades Nuclear Plant has no alternate letdown paths for shutdown cooling. Shutdown cooling cannot be isolated unless there is a full-core offload.

A historical review of plant-specific setpoint testing for RV-0401 showed that in 1995, the setpoint drifted from 2482 to 2450 psig. This was inside the acceptance range for as-found testing. A review of industry experience for Teledyne-Farris relief valves indicates that the type of relief valve installed for thermal overpressure protection is reliable. Failures are generally associated with test results outside of acceptable setpoint ranges or failure to close sufficiently to assure leak-tight integrity. The thermal protection function of these valves was maintained, even though specific performance criteria were not met.

In order to ensure that potential leakage does not impact system operability, Palisades Nuclear Plant will continue to monitor system parameters, and perform examinations in accordance with the its ASME Code, Section XI, pressure test program. Additionally, NMC will follow the requirements of Palisades boric acid corrosion control program to assure leakage does not adversely impact other components that may be in the leak path. This will provide reasonable assurance that relief valve RV-0401 is operationally ready.

### 3.2.3 NMC's Proposed Alternative Testing

The IST interval for the subject relief valve will be extended until the conclusion of the fall 2007 refueling outage. Palisades Nuclear Plant will continue to perform examinations in accordance with its ASME Code, Section XI, pressure test program. Additionally, the requirements of the site's boric acid corrosion control program will be followed to assure leakage does not adversely impact other components that may be in the leak path.

The fourth IST interval will not be extended for these valves. Upon completing setpoint testing during the 2007 refueling outage, the fourth interval start date for these valves will be set at March 24, 2006. Testing intervals and scope will be determined on March 24, 2006.

### 3.2.4 Evaluation

OM-1 requires testing of pressure relief devices that provide overpressure protection to components which function to shutdown the reactor, maintain a safe shutdown condition, or mitigate the consequences of an accident. For Class 1 pressure relief valves, OM-1,



Paragraph 1.3.3, requires a minimum of 20 percent of the valves to be tested within any 24-month period, and all valves be tested within each subsequent 5-year period.

Relief valve RV-0401 is located in the letdown line from the primary coolant system to the shutdown cooling system, and provides overpressure protection for the shutdown cooling return header between two valves that are closed with the unit at power. This portion of the shutdown cooling system is static except when providing core cooling during cold shutdown or refueling shutdown conditions. Previous setpoint testing in 1995 indicated that the valve lifted at 2450 psig which was within the acceptable range for valve lift.

The NRC's letter of March 6, 1998, authorized relief to permit testing this relief valve on a 10-year interval in lieu of the 5-year and 24-month requirements of the OM Code for Class 1 relief valves. The proposed extension past the 10-year test interval previously authorized is approximately 25 months. Industry experience indicates that relief valves installed for overpressure protection are reliable, and additional degradation of the relief valve would not be expected to occur during this additional period. Failures are generally associated with test results outside of acceptable setpoint ranges, or failure to close sufficiently to assure leak tight integrity. The overpressure protection function of these valves was maintained, even though specific performance criteria were not met. Therefore, the NMC staff finds that NMC's proposed alternative provides reasonable assurance of operational readiness.

Meeting ASME Code requirements would require a full-core offload for the sole purpose of testing these relief valves. Performing a full-core offload would add an estimated 170 hours to the critical path outage schedule and result in an estimated 3 rem of additional personnel dose exposure. Such efforts would constitute a hardship or unusual difficulty, when compared to the relatively small benefit associated with successful valve testing.

### 3.2.5 Conclusion

Meeting ASME Code requirements would require a full-core offload. NMC chose to delay doing this until the fall 2007 refueling outage when reactor vessel head replacement would be the critical path instead of full-core offload. NMC indicated that performing a full-core offload during the next refueling outage in April 2006 would add an estimated 170 hours to the critical path outage schedule, and result in an estimated 3 rem of additional personnel dose exposure. Such efforts would constitute a hardship or unusual difficulty, when compared to the relatively small benefit associated with successful valve testing.

## 3.3 Revised Valve Relief Request No. 31

### 3.3.1 ASME Code Requirements

NMC requested relief from OM-1, paragraph 1.3.4, which requires that all Class 2 relief valves of each type and manufacture be tested within each subsequent 10-year period, and that a minimum of 20 percent of the valves be tested within any 48-month period. NMC requested relief for relief valves RV-3162 and RV-3164.

### 3.3.2 NMC's Basis for Requesting Relief

The NRC's letter of March 6, 1998, approved multiple relief requests for the Palisades Nuclear Plant, including VRR Nos. 28, 30, and 31, for various thermal relief valves. These relief requests described a hardship associated with testing the subject valves at times other than a full core offload. The relief requests also proposed completing testing at the end of the third IST interval, which at the time was scheduled for August 2005, and would have included a full core offload.

Due to extended outages occurring during the third 10-year inservice inspection interval, Palisades Nuclear Plant has extended the ISI interval from August 2005, to December 2006, in accordance with the provisions of ASME Section XI, 1989 Edition. The ISI interval extension has resulted in a delay of the next full core offload until the fall 2007 refueling outage. Therefore, it is a hardship to test the subject relief valves by the surveillance due date of August 2005.

Relief valve RV-3162 has a safety function to provide overpressure protection for the shutdown cooling discharge header. Overpressure protection is required due to small amounts of back leakage from the primary coolant system. Relief valve RV-3164 has a function to provide overpressure protection for the shutdown cooling supply line. Overpressure protection is required during plant heatup, and failure in this operating scenario could render the line inoperable during plant cooldown.

Maintenance and testing of RV-3162 located on the common low-pressure safety injection discharge header, would require the function associated with this system to be removed from service. Presently, there are no allowances in Technical Specifications that would provide a window for this work at any plant operating mode. Testing during the period between cold shutdown and reactor critical requires the draining of a safety system and the removal of the relief valve for setpoint testing. Testing cannot be performed during cold shutdown with shutdown cooling in service, because this valve is located in a non-redundant portion of the shutdown cooling system. Palisades has no alternate discharge paths for shutdown cooling, and the relief valve cannot be isolated unless there is a full core offload.

Maintenance and testing of RV-3164, located on the common low-pressure safety injection header, would require the functions associated with shutdown cooling to be removed from service. This valve can be isolated from the primary cooling system, however, it discharges to the primary system drain tank, from which it cannot be isolated.

The portions of the shutdown cooling system where RV-3162 and RV-3164 are located are static except during periodic inservice testing and when providing core cooling. Therefore, RV-3162 and RV-3164 are not exposed to excessive system vibration or pressure fluctuations, which contribute to valve wear and setpoint fluctuation.

A review of plant specific and industry experience for Teledyne-Farris relief valves indicates that the type of relief valves installed for thermal overpressure protection are reliable. Failures are generally associated with test results outside of acceptable set point ranges, or failure to close sufficiently to assure leak tight integrity. The thermal protection function of these valves was maintained, even though specific performance criteria were not met.

A historical review of plant specific setpoint testing data for RV-3162 and RV-3164 was conducted. This review showed that RV-3162 and RV-3164 remained within setpoint tolerance from the time of initial installation until performance of setpoint testing in 1995. RV-3164 was replaced in 2001 due to signs of degradation. The degraded valve was setpoint tested and continued to meet the acceptance criteria. System operability and safety requirements were maintained with no reduction in safety margin.

In order to ensure the leakage does not impact system operability, Palisades Nuclear Plant will continue to monitor system parameters and perform examinations in accordance with the site's ASME Section XI pressure test program. Additionally, the requirements of the site's boric acid corrosion control program will be followed to assure leakage does not adversely impact other components that may be in the leak path. This will provide reasonable assurance that relief valves are operationally ready.

### 3.3.3 NMC's Proposed Alternative Testing

The IST interval for the subject relief valve will be extended until the conclusion of the fall 2007 refueling outage. Palisades Nuclear Plant will continue to perform examinations in accordance with the site's ASME Section XI pressure test program. Additionally, the requirements of the site's boric acid corrosion control program will be followed to assure leakage does not adversely impact other components that may be in the leak path.

The fourth IST interval will not be extended for these valves. Upon completion of setpoint testing requirements during the 2007 refueling outage, the fourth interval start date for these valves will be set at March 24, 2006. Testing intervals and scope will be determined on the March 24, 2006, date.

### 3.3.4 Evaluation

OM-1 requires testing of pressure relief devices that provide overpressure protection to components which function to shutdown the reactor, maintain a safe shutdown condition, or mitigate the consequences of an accident. The valves identified in this relief request provide overpressure protection for such components. For Class 2 and 3 pressure relief valves, OM-1, Paragraph 1.3.4, requires a minimum of 20 percent of the valves be tested within any 48-month period, and all valves be tested within each subsequent 10-year period.

Relief valve RV-3162 is located on the common low-pressure safety injection discharge header, and relief valve RV-3164 is located on the shutdown cooling system inlet supply line. The relief valves provide overpressure protection for the discharge and supply piping. The portion of the shutdown cooling system where the valves are located are static except during periodic inservice testing and when the shutdown cooling system is in service providing decay heat removal.

The NRC's letter of March 6, 1998, authorized relief to test these relief valves on a 10-year interval in lieu of the 10-year and 48-month requirements of the ASME OM Code for Class 2 relief valves. The proposed extension past the 10-year test interval previously authorized is approximately 25 months. Industry experience indicates that relief valves installed for overpressure protection are reliable and additional degradation of the relief valves would not be expected to occur during this additional period. Failures are generally associated with test

results outside of acceptable setpoint ranges or failure to close sufficiently to assure leak tight integrity. The overpressure protection function of these valves was maintained, even though specific performance criteria were not met. Therefore, the NRC staff finds that NMC's proposed alternative provides reasonable assurance of operational readiness.

Meeting ASME Code requirements would require a full-core offload. NMC chose to delay doing this until the fall 2007 refueling outage when reactor vessel head replacement would be the critical path instead of full-core offload. NMC indicated that performing a full-core offload during the next refueling outage in April 2006 would add an estimated 170 hours to the critical path outage schedule, and result in an estimated 3 rem of additional personnel dose exposure. Such efforts would constitute a hardship or unusual difficulty, when compared to the relatively small benefit associated with successful valve testing.

### 3.3.5 Conclusion

Based on the above evaluation, the NRC staff concludes that NMC's alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that compliance with the ASME Code requirements results in hardship or unusual difficulty without a compensating increase in the level of quality and safety. NMC's proposed alternative provides reasonable assurance of the operational readiness of the identified relief valves. This alternative is authorized until the completion of the fall 2007 refueling outage.

Principal Contributor: W. Poertner

Date: August 17, 2005