UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION RELATED TO INSERVICE TESTING PROGRAM RELIEF REQUESTS FOR SOUTHERN NUCLEAR OPERATING COMPANY, INC. JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2 DOCKET NOS. 50-348 AND 50-364

1.0 INTRODUCTION

Title 10 of the Code of Federal Regulations (10 CFR) Section 50.55a, requires that inservice testing (IST) of certain American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (ASME Code) Class 1, 2, and 3, pumps and valves are performed in accordance with Section XI of the ASME Code and applicable addenda, except where alternatives have been authorized or relief has been requested by the Southern Nuclear Operating Company, Inc. (SNC or the licensee) and granted by the Commission pursuant to Sections (a)(3)(i), (a)(3)(ii), or (f)(6)(i) of 10 CFR 50.55a. 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 its facility. Section 50.55a authorizes the Commission to approve alternatives and to grant relief from ASME Code requirements upon making the necessary findings. Guidance related to the development and implementation of IST programs is given in Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," issued April 3, 1989, and its Supplement 1 issued April 4, 1995. Further information may be obtained in NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," and NUREG/CR-6396, "Examples, Clarifications, and Guidance on Preparing Requests for Relief from Pump and Valve Inservice Testing Requirements."

The 1989 Edition of the ASME Code is the latest edition incorporated by reference in Paragraph (b) of Section 50.55a. Subsection IWV of the 1989 Edition, which gives the requirements for IST of valves, references Part 10 of the American National Standards Institute/ASME Operations and Maintenance Standards (OM-10) as the rules for IST of valves. OM-10 replaces specific requirements in previous editions of Section XI, Subsection IWV, of the ASME Code. Subsection IWP of the 1989 Edition, which gives the requirements for IST of pumps, references Part 6 of the American National Standards Institute/ASME OM-6 as the rules for IST of pumps. OM-6 replaces specific requirements in previous editions of Section XI, Subsection IWP, of the ASME Code.

SNC's IST program covers the third 10-year IST interval for the Joseph M. Farley Nuclear Plant (FNP) Unit 1, from December 1, 1997, to November 30, 2007. For FNP Unit 2, the IST program covers the second 10-year interval from December 1, 1997, to July 30, 2001, and a

portion of the third 10-year interval from August 1, 2001, to December 1, 2007. By letter dated March 20, 1997, the NRC approved the use of the ASME OM Code-1990, Subsection ISTB for Pumps and Subsection ISTC for Valves to update the IST programs for both FNP Units 1 and 2.

By letters dated July 3, 1997, and January 22, 1998, SNC submitted its third and second 120-month updates to its IST program (for the interval from December 1, 1997, through November 30, 2007) of pumps and valves for FNP, Units 1 and 2, respectively. In the updated program, SNC submitted five pump relief requests for both Units 1 and 2, five valve relief requests for Unit 1 and seven valve relief requests for Unit 2. The staff and SNC discussed these relief requests on November 18, 1997, and April 28, 1998. In response to the staff's questions and comments, SNC provided additional information in a letter dated January 22, 1998, and indicated that more information would be provided at a later date. In a subsequent letter dated April 6, 1998, SNC withdrew certain relief requests, and revised certain other relief requests. However, in its April 6 letter, SNC submitted three new valve relief requests for both Units 1 and 2. After review of these additional relief requests, a conference call was held on April 28, 1998, to discuss NRC concerns and comments. By letter dated August 7, 1998, SNC withdrew one of the three new relief requests and revised the other two relief requests. The staff has completed its review of all remaining relief requests submitted in conjunction with additional information provided in the previously discussed letters and is providing the following evaluation. The changes in the scope of the IST program, cold shutdown justifications, refueling outage justifications, and IST program commitments have not been reviewed in detail and are subject to NRC inspection.

2.0 PUMP RELIEF REQUEST

2.1 Relief Request (RR) RR-P-1

RR-P-1 requests relief for all pumps of FNP Units 1 and 2 in the IST program from the specific requirements of ISTB 6.1 of ASME OM Code-1990. This Code paragraph requires that when certain deviations fall within the required action range of Table ISTB 5.2-2, the pump will be declared inoperable until the cause of the deviation has been determined and the condition corrected. SNC proposes to meet the requirements or, alternatively, to perform an analysis to demonstrate that the pump will continue to fulfill its function and to establish a new set of reference values for the pump after such analysis.

2.1.1 SNC's Basis for the Relief Request

SNC states:

> The ASME Code Section XI-1983 Edition which was applicable to the last 120-month interval for the IST program and the latest issued ASME OM Code-1995 Edition provide for analysis of pump test data in lieu of arbitrary repair or replacement if the test parameters fall within the required action range. The OM Code-1990 Edition did not include such provisions. Therefore, the fact that the latest published version of the OM Code, Subsection ISTB, includes provisions for evaluation of pump test data which is in the Action Range in lieu of

arbitrary repair or replacement indicates that the ASME OM Code Committee supports such an evaluation as an adequate approach. Additionally, another SNC nuclear facility, E. I. Hatch, requested approval to utilize the later OM Code requirements, relative to evaluation of pump test data (see E. I. Hatch IST program, relief request RR-P-11), and was granted approval in an NRC SER dated April 12, 1996.

2.1.2 Alternative Testing

SNC states:

> Should pump test parameters fall within the required action range of Table ISTB 5.2-2 (OM Code-1990 Edition), then the pump will be declared inoperable until either the cause of the deviation has been determined and the condition is corrected or an analysis of the pump is performed and the pump's continued operation at the changed values is supported in which case new reference values will be established. This analysis will include verification of the pump's operational readiness. The analysis will include both a pump level and a system level evaluation of operational readiness, the cause of change in pump performance, and an evaluation of all trends indicated by available data. The degradation trend will be evaluated to confirm that the degradation mechanism will not cause sufficient further degradation such that it would be predicated that the pump would fail to be able to perform its required safety function before the next pump test or before repairs can be performed. The results of the analysis will be documented in the record of tests. This approach is consistent with that of the ASME OM Code 1995 Edition, Subsection ISTB 6.2.2.

2.1.3 Evaluation

The corrective action requirements of ASME Section XI-1983, IWP3230(c) allowed licensees to perform an analysis to demonstrate that the degraded mechanical or hydraulic performance levels of the pump would not impair the pump operability and that the pump could still perform its safety function. Further, this section also allowed the licensees to establish new reference values. There was a concern that repeated establishment of new reference values would lead the pump to operate in a significantly degraded condition. To address this concern, the requirement was revised. The 1989 Edition of ASME Code Section XI and ISTB 6.1 of ASME OM Code-1990 require that if deviations fall within the required range of Table ISTB 5.2-2, the pump will be declared inoperable until the cause of the deviation has been determined and the condition corrected. This revision does not recognize that there are pumps that have a significant margin over the safety requirements, and that these pumps may degrade to the required action range but still be capable of meeting their safety function. For these pumps, arbitrary repairs or replacements are not necessary. To minimize unnecessary pump repairs, SNC proposes to perform an analysis to monitor the pump's continued operability and verify the pump's operational readiness. The analysis includes both a pump level and a system level evaluation of operational readiness, the cause of change in pump performance, and an evaluation of all trends indicated by available data. The degradation trend will be evaluated to confirm that the degradation mechanism will not cause further degradation such

that the pump would fail to perform its required safety function before the next pump test or before repairs can be performed. Because the intent of IST is to provide reasonable assurance of the operational readiness of pumps, the proposed alternative satisfies this intent and provides a reasonable assurance of continued pump operability.

2.1.4 Conclusion

SNC's proposed alternative to perform an analysis to verify the pump's operational readiness until the next pump test, rather than to perform arbitrary repairs and replacements, satisfies the intent of ASME Code, Section XI requirements and provides a reasonable assurance of pump operability. Pursuant to 10 CFR 50.55a(a)(3)(ii), SNC's proposed alternative is authorized on the basis that it provides a reasonable level of quality and safety for monitoring the pump conditions and compliance with the specific Code requirements results in a hardship without a compensating increase in the level of quality and safety.

2.2 Relief Request RR-P-2

RR-P-2 requests relief for service water pumps (P001A, P001B, P001C, P001D, and P001E) of FNP Units 1 and 2 from the specific requirements of ISTB 5.1 of ASME OM Code-1990 that requires a quarterly inservice test on each pump. SNC proposes to perform a quarterly combined pump flow test, while the Code-required individual pump flow test will be performed at each refueling outage and during cold shutdown of sufficient duration.

2.2.1 SNC's Basis for the Relief Request

SNC states:

> The Service Water System is designed so that during normal operation there are two pumps in each of the two trains operating, with a standby pump available to swing to either train. Each pump has pressure gauges, however flow instrumentation is installed only to measure the flow from each of the two trains.
>
> Because flow instrumentation was not provided for each pump, the only viable means of individually testing these pumps is by removal of one pump from service and measuring flow through the train with only one pump aligned. A condition where only one pump is aligned at a time to a train would result in degraded cooling water flow to essential or safety related equipment and is therefore an unacceptable method of operation. Furthermore, removal of one pump from the service water train could lead to an isolation of the turbine building service water supply lines causing a plant trip.
>
> Because hydraulic performance of a degrading pump may be masked by the other pump when service water pumps are tested in pairs, analytical methods are used to determine individual pump flow rate. These methods involve solving three equations involving dual pump flows for three individual pump flow rates. These methods have proven reliable in determining individual pump operational readiness and monitoring for degradation.

2.2.2 Alternative Testing

SNC states:

> Quarterly combined flow, differential pressure and vibration will be measured and compared to referenced values. Whenever combined flow measurements are not in the acceptable range, individual pump evaluations, which consist of performing three pump combination tests at a reference differential pressure and solving analytical equations for individual flows, will be performed. If three pumps are not immediately available to support this testing, tests will be performed as soon as three pumps are available. For the case in which three pumps are not immediately available to support testing and flow is in the ALERT Range, dual pump testing of the two pumps in the ALERT Range will be performed at double the required frequency until three pumps are available. Corrective action will be taken on the individual pumps as a result of the evaluation in accordance with ISTB 6.1 and relief request RR-P-1.
>
> Individual service water pump testing will be performed at each refueling outage and any cold shutdown of sufficient duration to support such testing. Individual pump testing will consist of monitoring pump flow, differential pressure, and vibration and comparison of test data to reference values for each parameters.

2.2.3 Evaluation and Conclusion

RR-P-2 was evaluated by the staff for the previous 120-month interval IST program in NRC's safety evaluations (SEs) dated September 17, 1992, and August 23, 1993. The relief request was granted on the basis that it is not feasible to perform individual quarterly pump testing during plant operation, and that imposing the Code requirements would require major system modifications and to reroute large bore piping and install individual pump flow instrumentation. In lieu of the Code required test, SNC proposes for this 120-month interval the same alternative testing which consists of (1) performing quarterly combined flow tests, (2) if required, three dual pump combination tests, and (3) individual pump test at each refueling outage and any cold shutdown of sufficient duration. Pursuant to 10 CFR 50.55a(a)(3)(ii), the use of the proposed alternative testing is authorized on the basis that the proposed alternative provides reasonable assurance of operational readiness and that imposing the Code requirements would result in extreme hardship without a compensating increase in the level of quality and safety.

2.3 Relief Request RR-P-4

The OM Code, ISTB 5.1 and 5.2, requires measurement of pump flow rate on a quarterly basis. RR-P-4 requests relief from quarterly measurement of pump flow rate for Boric Acid Transfer Pumps P005A and B of FNP, Units 1 and 2.

2.3.1 SNC's Basis for the Relief Request

SNC states:

> Quarterly pump testing is performed using the orificed discharge test line which runs back to the boric acid storage tank. This line does not have any installed flow measuring instrumentation. To utilize the system flow meter would require a test flow path which would transfer highly concentrated boric acid from the boric acid tank into the CVCS and into the RCS through the operating CVCS charging pump. The addition of concentrated boric acid to the RCS during normal operations would adversely affect the boric concentration in the RCS and could cause a forced plant shutdown.

2.3.2 Alternative Testing

SNC states:

> Pump differential pressure and vibration will be measured on a quarterly basis. Pump differential pressure, vibration and flow rate will be measured during cold shutdown.

2.3.3 Evaluation and Conclusion

There are two flow paths that can be used to test the boric acid pumps. One flow path is a recirculation loop from the pump discharge to the boric acid storage tank, and the other is a normal flow path from the pump discharge to the reactor coolant system. Using the normal flow path would result in a reactor shutdown, so that it can only be used for pump tests during cold shutdown or refueling outage. During normal reactor operation, only the recirculation flow path can be used to perform the quarterly pump tests. However, quarterly flow rate cannot be measured due to lack of flow instrumentation in the recirculation loop. Imposing the Code requirements would require system modifications and installation of on-line flow instrumentation. As such, SNC proposes to perform the quarterly pump test using the recirculation flow path without flow measurements and perform the Code-required test during cold shutdown using the normal flow path with flow measurements. The staff finds that it is not feasible to measure the flow rate due to the lack of flow instrumentation in the recirculation line and compliance with the Code requirement will result in hardship for SNC. In lieu of the Code-required test, SNC proposes testing the pumps quarterly without flow measurements but performing additional tests at cold shutdown with flow measurements. The staff finds that this alternative described above would provide reasonable assurance of operational readiness for the affected pumps. Pursuant to 10 CFR 50.55a(a)(3)(ii), SNC's proposed alternative is authorized on the basis that it provides reasonable assurance of operational readiness and that imposing the Code requirements would result in hardship without a compensating increase in the level of quality and safety.

2.4 Relief Request RR-P-5

The OM Code, ISTB 5.1 and 5.2, requires measurement of pump flow rate on a quarterly basis. RR-P-5 requests relief from quarterly measurement of pump flow rate for Auxiliary Feedwater Pumps P001A and B of FNP Units 1 and 2.

2.4.1 SNC's Basis for the Relief Request

SNC states:

> ASME OM Code Sections ISTB 5.1 and 5.2 require quarterly pump testing to be performed by varying the system resistance until either the measured differential pressure or the measured flow rate equals the corresponding reference value, or by using a fixed system resistance test flow path. Testing the auxiliary feedwater pumps by varying system resistance is not a practical method, because to do so would inject water into the steam generators. The introduction of cold water into hot steam generator would result in a large thermal shock and could result in nozzle cracking. Use of minimum flow line restricts the test flow rate of these 350 gpm pumps to approximately 50 gpm. Consequently, flow rate measurements using the minimum flow path would not provide any useful information to monitor pump operability or degradation. (See SNC letter dated April 6, 1998)

2.4.2 Alternative Testing

SNC states:

> In addition to quarterly pump test measurements of differential pressure and vibration, pump flow rate, differential pressure, and vibration measurements will be taken at cold shutdown.

2.4.3 Evaluation and Conclusion

RR-P-5 was evaluated by the staff for the previous 120-month interval IST program in NRC's SE dated May 23, 1991. The relief request was granted on the basis that it was not feasible to perform the Code-required pump tests during plant operation, because the test would introduce cold water into hot steam generator and would result in a large thermal shock and possible nozzle cracking. In lieu of Code-required quarterly test, SNC proposed to use the minimum flow line for quarterly pump tests and the Code-required tests at cold shutdown when the auxiliary feedwater pumps are also used to perform check valve testing with flow into the steam generators. However, the minimum flow line is not equipped with flow instrumentation and the test flow is restricted to 50 gallons per minute (gpm). The low flow rate using the minimum flow path provides little useful information to monitor pump operability or degradation. Consequently, SNC proposes to perform the quarterly pump test without flow measurements and perform the Code-required test at cold shutdown. The staff finds that SNC's proposal to measure all pump parameters, except flow, quarterly and to measure all pump parameters,

including flow, at cold shutdown is a reasonable alternative to the Code requirements. Pursuant to 10 CFR 50.55a(a)(3)(ii), the staff authorizes the use of the proposed alternative testing on the basis that it provides reasonable assurance of operational readiness for the affected pumps and that imposing the specific Code requirements would result in a hardship without a compensating increase in the level of quality and safety.

3.0 VALVE RELIEF REQUEST

3.1 Relief Request Q2E13-RR-V-1

OM Code, ISTC 4.5.4(c) allows disassembly and inspection of certain check valves on refueling outage basis. Q2E13-RR-V-1 applies to valves QV002A and B of FNP Unit 2 and requests relief from disassembling each check valve every refueling outage. SNC proposes to disassemble one of these valves each refueling outage on a staggered basis.

3.1.1 SNC's Basis for the Relief Request

SNC states:

> There are no system design provisions to verify full valve opening with flow quarterly, at cold shutdown or refueling outage. Therefore, per ISTC 4.5.4(c), these valves will be disassembled and inspected at refueling outages to verify operational readiness. No relief is required for the affected valves per OM ISTC 4.5.4(c) if each valve is disassembled every refueling outage.
>
> These valves are the same design (manufacturer, size, model number and material of construction) and have the same service conditions including valve orientation. Thus, they meet the guidance of NRC GL [Generic Letter] 89-04, Position 2. The alternative testing described below is based on GL 89-04, Position 2, guidance for valve grouping and sample check valve disassembly.
>
> The inspection history of these valves suggests there is no need for disassembly and inspection of each valve each outage. Thus any additional expense in doing so would be an unnecessary burden. The past six inspections for each valve dating back to 1985 have not detected any unsatisfactory conditions. On average, the disassembly and inspection of these valves requires 6 man-hours inside containment. Additional costs associated with planning, scheduling, supervision, documentation, etc. are also required for this task.
>
> Non-intrusive techniques cannot be employed to test these valves. They are located in the normally dry, empty containment spray piping system inside containment. There is no way to open the valves with water flow at any time without risking damage to safety-related equipment in containment. The valves are partial-stroke tested with air but there is not a sufficient volume of air to fully open these 8" check valves for non-intrusive testing purposes.

> The lack of any alternative test method plus the excellent inspection history justifies the staggered disassembly schedule of one valve per outage and makes any testing beyond this level burdensome. (See SNC letter dated January 22, 1998)

3.1.2 Alternative Testing

SNC states:

> The alternate testing described below is based on GL 89-04 guidance for valve grouping and sample disassembly.
>
> One of these valves will be disassembled and manually full stroke exercised at each refueling outage on a staggered basis. The valve internals will be verified to be structurally sound (no loose or corroded parts) and the disk manually exercised to verify full stroke capability. If the disassembled valve is not capable of being full stroke exercised or there is binding or failure of valve internals, the remaining valve will also be disassembled, inspected and manually full stroke exercised during the same outage. The disassembled valve will be part stroked with flow after reassembly. The necessary valve obturator movement for verifying part stroke exercising will be confirmed by changes in system pressure, flow rate, level, temperature, seat leakage testing or other positive means or through the use of ultrasonic (or similar) flow measuring devices.

3.1.3 Evaluation and Conclusion

Paragraph 4.3.2.2(e) of OM-10 requires that if valve exercising is not practicable during plant operation or cold shutdowns, full-stroke exercising is to be performed during refueling outages. Paragraph 4.3.2.4(c) allows disassembly every refueling outage to verify operability of check valves. However, SNC proposes to test these valves on a sampling basis in accordance with the guidance of Position 2 of GL 89-04, i.e., one of the these valves will be disassembled and manually full-stroke exercised at each refueling outage on a staggered basis.

Relief Request Q2E13-RR-V-1 was evaluated by the staff for the last 120-month interval IST program and granted in an NRC SE dated April 1, 1991. Previously, this relief request was granted based on impracticality of performing the test, because the Code of record did not allow disassembly and sampling. However, the current Code of record allows disassembly and inspection each refueling outage, and the relief request is now reviewed as an alternative to the Code requirements using the grouping and sampling guidance provided in GL 89-04 and NUREG-1482.

Position 2 of GL 89-04 states that valve disassembly and inspection can be used as a positive means of determining that a valve's disk will full-stroke exercise open or of verifying closure capability. It further states that where the licensee determines that it is burdensome to disassemble and inspect all applicable valves each refueling outage, a sample disassembly and inspection plan for groups of identical valves in similar applications may be employed. Guidance for grouping of the valves is provided such that each valve is disassembled and

inspected once every 6 years, with a minimum of one valve disassembled and inspected each refueling outage.

SNC states that there are no system design provisions to verify full valve opening with flow quarterly, at cold shutdown or refueling outage, and that nonintrusive techniques cannot be employed to test these valves because they are located in the normally dry containment and there is no way to open the valves with water flow at any time without risking damage to safety-related equipment in the containment. As such, it is impractical to exercise the valve and impose the Code requirements that would require major system modifications to reroute large bore piping. Position 2 of GL 89-04 allows disassembly as an acceptable means of inspecting check valves at each refueling outage, and the extension of test intervals up to 6 years where the licensee can determine that it is burdensome to test all applicable valves each refueling outage. SNC has documented that on average, the disassembly and inspection of each valve requires 6 man-hours inside containment, and additional costs associated with planning, scheduling, supervision, documentation, etc., are also required. For a group of two valves in the relief request, the proposal to test one valve at each refueling outage would extend the test interval to no more than 4 years, and meets the guidance of Position 2 of GL 89-04.

Based on the consideration that it is not feasible to full-stroke exercise with flow the affected valves during operation, at cold shutdown and at refueling outages, and that the proposed alternative meets the guidance of GL 89-04 and provides reasonable assurance of valve operability, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii), because imposition of the Code requirements would result in hardship without a compensating increase in the level of quality and safety.

3.2 Relief Request Q2E13-RR-V-2

OM Code, ISTC 4.5.4(c) allows disassembly and inspection of certain check valves on a refueling outage basis. Q2E13-RR-V-2 applies to valve QV014 of FNP Unit 2 and requests relief from disassembling the check valve every refueling outage. SNC proposes to disassemble the affected valve once every third refueling outage.

3.2.1 SNC's Basis for the Relief Request

SNC states:

> There are no system design provisions to verify full valve opening with flow quarterly at cold shutdown or refueling outage. Therefore, per ISTC 4.5.4(c) this valve will be disassembled and inspected at refueling outages to verify operational readiness. No relief is required for the above valve per OM ISTC 4.5.4(c) if the valve is disassembled every refueling outage.
>
> The inspection history of this valve suggests there is no need for disassembly and inspection of this valve each outage. Thus any additional expense in doing so would be an unnecessary burden. The past six inspections of this valve dating back to 1985 have not detected any unsatisfactory conditions.

Nonintrusive techniques cannot be successfully employed to test this valve. This valve is located in the 12" Containment Spray (CS) pump suction line from the Refueling Water Storage Tank (RWST). The only normal water flow through this valve is approximately 150 gpm during quarterly CS pump testing. SNC engineers experienced with non-intrusive check valve testing indicate that this application will not be successful because the 12" check valve will not fully open with 150 gpm flow.

Disassembly and inspection of this valve every outage would be an extreme burden. There is no installed valve which can be used to isolate the check valve from the RWST for disassembly. Isolation is accomplished by freeze sealing the line from the RWST. This procedure is done with the assistance of a freeze seal contractor. The process requires considerable planning, scheduling, specialized equipment and a large quantity of liquid nitrogen. Several days are required for completing this procedure. There is also a potential for the freeze seal process to cause pipe cracking or deformation. This requires strict control of freeze rate and pipe temperature. The most recent freeze seal contractor cost exceeded $18,000. On average, 50 FNP man-hours are required to support the contractor and to perform the disassembly and inspection of the valve. Additional costs associated with planning, scheduling, supervision, documentation, etc. are also required for this task.

The lack of any alternative test method, the excellent inspection history and the high cost of the freeze seal procedure justifies disassembly and inspection of this valve once every third refueling outage. (See SNC letter dated January 22, 1998)

3.2.2 Alternative Testing

SNC states:

The valve will be disassembled and manually full stroke exercised once every third refueling outage using the freeze plug method described above. The valve internals will be verified as structurally sound (no loose or corroded parts) and the disk manually exercised to verify full stroke capability. The disassembled valve will be part stroked with flow after reassembly. The necessary valve obturator movement for verifying part stroke exercising will be confirmed by changes in system pressure, flow rate, level, temperature, seat leakage testing or other positive means or through the use of ultrasonic (or similar) flow measuring devices.

Additionally, this check valve is partially exercised quarterly during containment spray pump surveillance testing when flow is recirculated to the RWST.

3.2.3 Evaluation and Conclusion

Paragraph 4.3.2.2(e) of OM-10 requires that if valve exercising is not practicable during plant operation or cold shutdowns, full-stroke exercising is to be performed during refueling outages. Paragraph 4.3.2.4(c) allows disassembly every refueling outage to verify operability of check valves. However, SNC proposes to test this valve once every third refueling outage. RR Q2E13-RR-V-2 was previously evaluated and granted in conjunction with the second 10-year interval IST program in an NRC SE dated April 1, 1991. Previously, this relief request was granted based on the impracticality of performing the test on a quarterly basis, and because the Code of record did not allow disassembly and sampling. However, the current Code of record allows disassembly and inspection each refueling outage, and the relief request is now reviewed as an alternative to the Code requirements using the grouping and sampling guidance provided in GL 89-04 and NUREG-1482.

Position 2 of GL 89-04 states that valve disassembly and inspection can be used as a positive means of determining that a valve's disk will full-stroke exercise open or of verifying closure capability. It further states that where the licensee determines that it is burdensome to disassemble and inspect all applicable valves each refueling outage, a sample disassembly and inspection plan for groups of identical valves in similar applications may be employed. Guidance for grouping of the valves is provided such that each valve is disassembled and inspected once every 6 years, with a minimum of one valve disassembled and inspected each refueling outage. Position 2 further states that extension of the disassembly and inspection interval to one valve every other refueling outage should only be considered in cases of extreme hardship where the extension is supported by actual in-plant data from previous testing. For a plant on a 24-month refueling cycle, the test interval may be extended to 4 years.

SNC states that there are no system design provisions to verify full valve opening with flow quarterly, at cold shutdown or refueling outage, and that nonintrusive techniques cannot be employed to test these valves because the normal water flow through this valve is not sufficient to fully open the valve. As such, it is impractical to exercise the valve and that imposing the Code requirements would require major system modifications and to redesign the valve. Disassembly and inspection is the only viable means of testing this check valve at a refueling outage. However, SNC has identified the following hardship associated with the disassembly and inspection of this valve.

> There is no installed valve which can be used to isolate the check valve from the RWST for disassembly and isolation is accomplished by freeze sealing the line from the RWST. This procedure is done with the assistance of a freeze seal contractor. The process requires considerable planning, scheduling, specialized equipment and a large quantity of liquid nitrogen. Several days are required for completing this procedure. There is also a potential for the freeze seal process to cause pipe cracking or deformation. This requires strict control of freeze rate and pipe temperature. The most recent freeze seal contractor cost exceeded $18,000. On average, 50 man-hours are required to support the contractor and to perform the disassembly and inspection of the valve. Additional costs associated with planning, scheduling, supervision, documentation, etc. are also required for this task.

The previous situation meets the guidance of extreme hardship of GL 89-04, Position 2. However, in lieu of performing the test in accordance with the guidance of GL 89-04, i.e., once every other refueling outage, SNC proposes to test the valve once every third refueling outage. FNP is on an 18-month refueling cycle, the proposed alternative would result in a 54-month test interval, which exceeds, slightly, the 4-year guidance provided in GL 89-04 that would be applicable to plants on a 24-month refueling cycle. In view of the extreme hardship of performing the test and good results of the past six inspections since 1985, the staff finds that SNC's proposal would result in a slight (but acceptable) deviation from the guidance of GL 89-04. The staff approved this relief request in a previous SE dated April 1, 1991, and because FNP is still operating on an 18-month refueling cycle, the staff continues to find it acceptable to test the affected valve every third refueling outage.

Based on the consideration that it is not feasible to full-stroke exercise with flow the affected valve during operation, at cold shutdown and at refueling outages, and that the proposed alternative meets the general guidance of GL 89-04 and provides reasonable assurance of valve operability, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii), on the basis that the proposed alternative provides reasonable assurance of operational readiness and imposition of the Code requirements would result in extreme hardship without a compensating increase in the level of quality and safety. The supporting documentation prepared in accordance with the guidance of GL 89-04 should be retained on site and available for inspection.

3.3 Relief Requests Q1E21-RR-V-1 and Q2E21-RR-V-1

The OM Code, ISTC 4.5.4(c) allows disassembly and inspection of certain check valves on refueling outage basis. Q1E21-RR-V-1 applies to valves QV032A, B, and C (Group 1) and QV037A, B, and C (Group 2) of FNP Unit 1, and Q2E21-RR-V-1 applies to valves QV032A, B, and C (Group 1), and QV037A, B, and C (Group 2) of FNP Unit 2. SNC requests relief from disassembling each check valve every refueling outage, and proposes to disassemble one of these valves each refueling outage on a staggered basis.

3.3.1 SNC's Basis for the Relief Request

SNC states:

> The safety injection system accumulator tanks are isolated from the RCS by these normally closed check valves. Each accumulator is charged with a nitrogen blanket from 600 to 650 psig. This pressure is insufficient during operation to inject into the RCS. If these valves were to be full or part exercised at cold shutdown, the contents of the tank would be dumped into the RCS at the charge pressure of 600 to 650 psig which would result in overpressurization of RHR suction lines resulting in lifting the RHR suction relief valves. Therefore, per ISTC 4.5.4(c) these valves will be disassembled at refueling outages to verify operational readiness. No relief is required for the affected valves per OM ISTC 4.5.4(c) if each valve is disassembled every refueling outage.

The valves within each group are the same design (manufacturer, size, model number and material of construction) and have the same service conditions including valve orientation. Thus, they meet the guidance of NRC Generic Letter 89-04, Position 2 for valve grouping for purposes of implementing a disassembly and inspection sampling plan. The burden and justification for the proposed alternate testing sampling plan is detailed below.

The inspection history of these valves suggests there is no need for disassembly and inspection of all three valves each outage. Thus any additional expense in doing so would be an unnecessary burden. The past ten inspections of these valves (total both units) dating back to 1988 have not detected any unsatisfactory conditions. On average, the disassembly/inspection of these valves requires 22 man-hours. Additional costs associated with planning, scheduling, supervision, documentation, etc. are also required for this task. (See SNC letter dated April 6, 1998)

3.3.2 Alternate Testing

SNC states:

One valve of each group will be disassembled and manually full stroke tested at each refueling outage on a staggered test basis. The valve internals will be verified as structurally sound (no loose or corroded parts) and the disk manually exercised to verify full stroke capability. If the disassembled valve is not capable of being full stroke exercised or there is binding or failure of valve internals, the remaining valves in the group will also be disassembled, inspected, and manually full stroke exercised during the same outage. The valve will be part stroked with flow after reassembly. The necessary valve obturator movement for verifying part stroke exercising will be confirmed by changes in system pressure, flow rate, level, temperature, seat leakage testing or other positive means or through the use of ultrasonic (or similar) flow measuring devices.

3.3.3 Evaluation and Conclusion

Paragraph 4.3.2.2(e) of OM-10 requires that if valve exercising is not practicable during plant operation or cold shutdowns, full-stroke exercising is to be performed during refueling outages. Paragraph 4.3.2.4(c) allows disassembly every refueling outage to verify operability of check valves. However, SNC proposes to test these valves on sampling basis in accordance with the guidance of Position 2 of GL 89-04, i.e., one valve of each group will be disassembled and manually full-stroke exercised at each refueling outage on a staggered basis. Relief Requests Q1E21-RR-V-2 and Q2E21-RR-V-2 were evaluated and granted in an NRC SE dated April 1, 1991. Previously, these relief requests were granted based on impracticality of performing the test, because the Code of record did not allow disassembly and sampling. However, the current Code of record allows disassembly and inspection each refueling outage, and the relief requests are now reviewed as alternatives to the Code requirements using the grouping and sampling guidance provided in GL 89-04 and NUREG-1482.

Position 2 of GL 89-04 states that valve disassembly and inspection can be used as a positive means of determining that a valve's disk will full-stroke exercise open or of verifying closure capability. It further states that where the licensee determines that it is burdensome to disassemble and inspect all applicable valves each refueling outage, a sample disassembly and inspection plan for groups of identical valves in similar applications may be employed. Guidance for grouping of the valves is provided such that each valve is disassembled and inspected once every 6 years, with a minimum of one valve disassembled and inspected each refueling outage.

SNC states that there are no system design provisions to verify full valve opening with flow quarterly, at cold shutdown or refueling outages. As such, it is impractical to exercise the valve and that imposing the Code requirements would require major system modifications and install flow measurement devises. Position 2 of GL 89-04 allows disassembly as an acceptable means of inspecting check valves at each refueling outage, and extension of test intervals up to 6 years where the licensee determines that it is burdensome to test all applicable valves each refueling outage. SNC has documented that on average, the disassembly and inspection of these valves requires 22 man-hours, and additional costs associated with planning, scheduling, supervision, documentation, etc., are also required. For a group of three valves in the relief request, the proposal to test one valve at each refueling outage would extend the test interval to no more than 6 years, and meets the guidance of Position 2 of GL 89-04.

Based on the consideration that it is not feasible to full-stroke exercise with flow the affected valves during operation, at cold shutdown and at refueling outages, and that the proposed alternative meets the guidance of GL-89-04 and provides reasonable assurance of valve operability, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii), because imposition of the Code requirements would result in hardship without a compensating increase in the level of quality and safety.

3.4 Relief Requests Q1E21-RR-V-2 and Q2E21-RR-V-2

OM Code, ISTC 4.5.4(c) allows disassembly and inspection of certain check valves on a refueling outage basis. Q1E21-RR-V-2 applies to valves QV121A, B and C of FNP Unit 1, and Q2E21-RR-V-2 applies to valves QV121A, B, and C of FNP Unit 2. SNC requests relief from disassembling each check valve every refueling outage and proposes to disassemble one of these valves each refueling outage on a staggered basis.

3.4.1 SNC's Basis for the Relief Request

SNC states:

> There are no system design provisions to verify full valve opening with flow quarterly, at cold shutdown or refueling outage. Therefore, per ISTC 4.5.4(c) these valves will be disassembled at refueling outages to verify operational readiness. No relief is required for the affected valves per OM ISTC 4.5.4(c) if each valve is disassembled every refueling outage.

These valves are the same design (manufacturer, size, model number and material of construction) and have the same service conditions including valve orientation. Thus, they meet the guidance of NRC Generic Letter 89-04, Position 2 for valve grouping for purposes of implementing a disassembly and inspection sampling plan. The burden and justification for the proposed alternate testing sampling plan is detailed below.

The inspection history of these valves suggests there is no need for disassembly and inspection of all three valves each outage. Thus any additional expense in doing so would be an unnecessary burden. The past twelve inspections of these valves (total both units) dating back to 1988 have not detected any unsatisfactory conditions. On average, the disassembly and inspection of these valves requires 10 man-hours. Additional costs associated with planning, scheduling, supervision, documentation, etc. are also required for this task.

The lack of any alternative test method plus the excellent inspection history justifies the staggered disassembly and inspection schedule of one valve per outage and makes any testing beyond the proposed level burdensome. (See SNC letter dated January 22, 1998)

3.4.2 Alternative Testing

SNC states:

The alternate testing described below is based on GL 89-04 guidance for valve grouping and sample disassembly.

One of these valves will be disassembled and manually full stroke tested at each refueling on a staggered test basis. The valve internals will be verified as structurally sound (no loose or corroded parts) and the disk manually exercised to verify full stroke capability. If the disassembled valve is not capable of being full stroke exercised or there is binding or failure of valve internals, the remaining valves in the group will also be disassembled, inspected, and manually full stroke exercised during the same outage. The disassembled valve will be part stroked with flow after reassembly. The necessary valve obturator movement for verifying part stroke exercising will be confirmed by changes in system pressure, flow rate, level, temperature, seat leakage testing or other positive means or through the use of ultrasonic (or similar) flow measuring devices.

3.4.3 Evaluation and Conclusion

Paragraph 4.3.2.2(e) of OM-10 requires that if valve exercising is not practicable during plant operation or cold shutdowns, full-stroke exercising is to be performed during refueling outages. Paragraph 4.3.2.4(c) allows disassembly every refueling outage to verify operability of check valves. However, SNC proposes to test these valves on a sampling basis in accordance with the guidance of Position 2 of GL 89-04, i.e., one of the these valves will be disassembled and manually full-stroke exercised at each refueling outage on a staggered basis. Relief Requests

Q1E21-RR-V-2 and Q2E21-RR-V-2 were evaluated and granted in an NRC SE dated April 1, 1991. Previously, these relief requests were granted based on impracticality of performing the test, because the Code of record did not allow disassembly and sampling. However, the current Code of record allows disassembly and inspection each refueling outage, and the relief request is now reviewed as an alternative to the Code requirements using the grouping and sampling guidance provided in GL 89-04 and NUREG-1482.

Position 2 of GL 89-04 states that valve disassembly and inspection can be used as a positive means of determining that a valve's disk will full-stroke exercise open or of verifying closure capability. It further states that where the licensee determines that it is burdensome to disassemble and inspect all applicable valves each refueling outage, a sample disassembly and inspection plan for groups of identical valves in similar applications may be employed. Guidance for grouping of the valves is provided such that each valve is disassembled and inspected once every 6 years, with a minimum of one valve disassembled and inspected each refueling outage.

SNC states that there are no system design provisions to verify full valve opening with flow quarterly, at cold shutdown or refueling outages. As such, it is impractical to exercise the valve and that imposing the Code requirements would require major system modifications and install flow measurement devises. Position 2 of GL 89-04 allows disassembly as an acceptable means of inspecting check valves at each refueling outage, and extension of test intervals up to 6 years where the licensee determines that it is burdensome to test all applicable valves each refueling outage. SNC has documented that on average, the disassembly and inspection of these valves requires 10 man-hours inside containment, and additional costs associated with planning, scheduling, supervision, documentation, etc., are also required. For a group of three valves in the relief request, the proposal to test one valve at each refueling outage would extend the test interval to no more than 6 years, and meets the guidance of Position 2 of GL 89-04.

Based on the consideration that it is not feasible to full-stroke exercise with flow the affected valves during operation, at cold shutdown and at refueling outages and that the proposed alternative meets the guidance of GL-89-04 and provides reasonable assurance of valve operability, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii), because imposition of the Code requirements would result in hardship without a compensating increase in the level of quality and safety.

3.5 Relief Requests Q1N12-RR-V-1 and Q2N12-RR-V-1

OM Code, ISTC 4.5.4(c) allows disassembly and inspection of certain check valves on a refueling outage basis. Q1N12-RR-V-1 applies to valves QV010A and B of FNP Unit 1, and Q2N12-RR-V-1 applies to valves QV010A and B of FNP Unit 2. SNC requests relief from disassembling each check valve every refueling outage and proposes to disassemble one of these valves each refueling outage on a staggered basis.

3.5.1 SNC's Basis for the Relief Request

SNC states:

> There are no system design provisions to verify valve reverse flow closure quarterly, at cold shutdown or refueling outage. Therefore, per ISTC 4.5.4(c), these valves will be disassembled and inspected at refueling outages to verify operational readiness. No relief is required for the affected valves per OM ISTC 4.5.4(c) if each valve is disassembled every refueling outage.
>
> These valves are the same design (manufacturer, size, model number and material of construction) and have the same service conditions including valve orientation. Thus, they meet the guidance of NRC Generic Letter 89-04, Position 2 for valve grouping for purposes of implementing a disassembly and inspection sampling plan. The burden and justification for the proposed alternate testing sampling plan is detailed below.
>
> The inspection history of these valves suggests there is no need for disassembly and inspection of both valves each outage. Thus any additional expense in doing so would be an unnecessary burden. The past seven inspections of these valves dating back to 1990 have not detected any unsatisfactory conditions. In early 1990 an inspection revealed a generic oversized hinge pin problem which restricted the ability of the disc to open fully. This problem was corrected per the vendor[']s recommendations by re-machining the pins. No service induced degradation was found with these valves. On average, the disassembly and inspection of these valves requires 9 man-hours. Additional costs associated with planning, scheduling, supervision, documentation, etc. are also required for this task.
>
> The lack of any alternative test method plus the excellent inspection history justifies the staggered disassembly and inspection schedule of one valve per outage and makes any testing beyond the proposed level burdensome. (See SNC letter dated January 22, 1998)

3.5.2 Alternative Testing

SNC states:

> The alternate testing described below is based on GL 89-04 guidance for valve grouping and sample disassembly.
>
> One of these valves will be disassembled and manually full stroke tested at each refueling on a staggered test basis. The valve internals will be verified as structurally sound (no loose or corroded parts) and the disk manually exercised to verify full stroke capability. If the disassembled valve is not capable of being full stroke exercised or there is binding or failure of valve internals, the remaining

valves in the group will also be disassembled, inspected, and manually full stroke exercised during the same outage. The disassembled valve will be part stroked with flow after reassembly. The necessary valve obturator movement for verifying part stroke exercising will be confirmed by changes in system, pressure, flow rate, level, temperature, seat leakage testing or other positive means or through the use of ultrasonic (or similar) flow measuring devices.

3.5.3 Evaluation and Conclusion

Paragraph 4.3.2.2(e) of OM-10 requires that if valve exercising is not practicable during plant operation or cold shutdowns, full-stroke exercising is to be performed during refueling outages. Paragraph 4.3.2.4(c) allows disassembly every refueling outage to verify operability of check valves. However, SNC proposes to test these valves on a sampling basis in accordance with the guidance of Position 2 of GL 89-04, i.e., one of the these valves will be disassembled and manually full-stroke exercised at each refueling outage on a staggered basis. RRs Q1N12-RR-V-1 and Q2N12-RR-V-1 were evaluated and granted in an NRC SE dated April 1, 1991. Previously, this relief request was granted based on impracticality of performing the test, because the Code of record did not allow disassembly and sampling. However, the current Code of record allows disassembly and inspection at each refueling outage, and the relief request is now reviewed as an alternative to the Code requirements using the grouping and sampling guidance provided in GL 89-04 and NUREG-1482.

Position 2 of GL 89-04 states that valve disassembly and inspection can be used as a positive means of determining that a valve's disk will full-stroke exercise open or of verifying closure capability. It further states that where the licensee determines that it is burdensome to disassemble and inspect all applicable valves each refueling outage, a sample disassembly and inspection plan for groups of identical valves in similar applications may be employed. Guidance for grouping of the valves is provided such that each valve is disassembled and inspected once every 6 years, with a minimum of one valve disassembled and inspected each refueling outage.

SNC states that there are no system design provisions to verify valve reverse flow closure quarterly, at cold shutdown or refueling outages. As such, it is not feasible to verify closure of these valves and that imposing the Code requirements would require major system modifications. Position 2 of GL 89-04 allows disassembly as an acceptable means of inspecting check valves at each refueling outage, and extension of test intervals up to 6 years where the licensee determines that it is burdensome to test all applicable valves each refueling outage. SNC has documented that on average, the disassembly and inspection of these valves requires 9 man-hours inside containment, and additional costs associated with planning, scheduling, supervision, documentation, etc., are also required. For a group of two valves in the relief request, the proposal to test one valve at each refueling outage would extend the test interval to no more than 4 years, and meets the guidance of Position 2 of GL 89-04.

Based on the consideration that it is not feasible to full-stroke exercise with flow the affected valves during operation, at cold shutdown and at refueling outages and that the proposed alternative meets the guidance of GL 89-04 and provides reasonable assurance of valve operability, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii), because

imposition of the Code requirements would result in hardships without a compensating increase in the level of quality and safety.

3.6 Relief Requests Q1P16-RR-V-3 and Q2P16-RR-V-3

OM Code, ISTC 4.5.4(c) allows disassembly and inspection of certain check valves on a refueling outage basis. Q1P16-RR-V-3 applies to valves QV659, QV660, and QV661 of FNP Unit 1, and Q2P16-RR-V-3 applies to valves QV659, QV660, and QV661 of FNP Unit 2. SNC requests relief from disassembling check valves every refueling outage and proposes to disassemble and manually full-stroke exercise the valve at each refueling outage on a staggered train-related basis.

3.6.1 SNC's Basis for the Relief Request

SNC states:

> There are no system design provisions to verify valve reverse flow closure quarterly, at cold shutdown or refueling outage. Therefore, per ISTC 4.5.4(c) these valves will be disassembled during refueling outages to verify operability. No relief is required for the above per OM ISTC 4.5.4(c) if each valve is disassembled every refueling outage.
>
> These valves are the same design (manufacturer, size (with exception stated below), model number and material of construction) and have the same service conditions including valve orientation. Thus, they meet the guidance of NRC Generic Letter 89-04, Position 2 for valve grouping for purposes of implementing a disassembly/inspection sampling plan. Valve QV661 is an 8 inch valve while the remaining valves in the group are 6 inch. Since these valves are identical in all other respects and are installed in the same system, the size difference is inconsequential. The burden justification for the proposed alternate testing sampling plan is detailed below.
>
> The inspection history of these valves suggests there is no need for disassembly and inspection of all three valves each outage, thus any additional expense in doing so would be an unnecessary burden. The past nineteen inspections of these valves (total both units) dating back to 1984 have not detected any unsatisfactory conditions. On average, the disassembly and inspection of these valves requires 6 man hours. Additional costs associated with planning, scheduling, supervision, documentation, etc. are also required for this task.
>
> Without a sampling disassembly and inspection plan, FNP will be required to remove each train of diesel power each outage. This will cause the unavailability of the diesel train and hence the risk to the core to be twice that which would be required with grouping. In light of the good inspection history of these valves, FNP will be increasing risk to the core without a commensurate gain in the reliability of the valves. This is counter to the philosophy of 10 CFR 50.65 of balancing reliability and availability which states that "Adjustments shall be made

where necessary to ensure that the objective of preventing failures of structures, systems and components through maintenance is appropriately balanced against the objective of minimizing unavailability of structures, systems and components due to monitoring or preventive maintenance. (See SNC letter dated August 7, 1998)

3.6.2 Alternative Testing

SNC states:

> The alternate testing described below is based on GL 89-04 guidance for valve grouping and check valve disassembly.
>
> The valves will be disassembled and manually full stroke exercised each refueling outage on a staggered train related basis. Valves V660 and V661 will be inspected together every other outage and V659 will be inspected on the alternating outages. The valve internals will be verified to be structurally sound (no loose or corroded parts) and the disk will be manually exercised to verify full stroke capability. If the disassembled valve is not capable of being full stroke exercised or there is binding or failure of valve internals, the remaining valves in the group will also be disassembled, inspected and manually full stroke exercised during the same outage. The valve will be part stroked with flow after reassembly. The necessary valve operator movement for verifying part stroke exercising will be confirmed by changes in system pressure, flow rate, level, temperature, seat leakage testing or other positive means or through the use of ultrasonic (or similar) flow measuring devices.

3.6.3 Evaluation and Conclusion

Paragraph 4.3.2.2(e) of OM-10 requires that if valve exercising is not practicable during plant operation or cold shutdowns, full-stroke exercising is to be performed during refueling outages. Paragraph 4.3.2.4(c) allows disassembly every refueling outage to verify operability of check valves. However, SNC proposes to test these valves on a sampling basis in accordance with the guidance of Position 2 of GL 89-04. Valves V660 and V661 will be disassembled and inspected every other refueling outage, and valve V659 will be inspected on the alternating outages.

Position 2 of GL 89-04 states that valve disassembly and inspection can be used as a positive means of determining that a valve's disk will full-stroke exercise open or of verifying closure capability. It further states that where the licensee determines that it is burdensome to disassemble and inspect all applicable valves each refueling outage, a sample disassembly and inspection plan for groups of identical valves in similar applications may be employed. Guidance for grouping of the valves is provided such that each valve is disassembled and inspected once every 6 years, with a minimum of one valve disassembled and inspected each refueling outage. However, one of the major criteria for valve grouping is that the size of the valves in the group must be the same.

SNC states that valve QV661 is an 8-inch valve while the remaining valves in the group are 6-inch. Although these valves are identical in all other respects, and are similar in system application, they do not meet the size criteria of valve grouping. Therefore, use of grouping for valve QV661 is denied and should be excluded from the proposed relief requests Q1P16-RR-V-3 and Q2P16-RR-V-3. However, the staff finds acceptable the grouping of the remaining two valves QV659 and QV660 acceptable and the proposed testing of these two valves at each refueling outage on a staggered basis is reviewed as follows:

SNC states that there are no system design provisions to verify valve reverse flow closure quarterly, at cold shutdown or refueling outages. Position 2 of GL 89-04 allows disassembly as an acceptable means of inspecting check valves at each refueling outage, and extension of test intervals up to 6 years where the licensee determines that it is burdensome to test all applicable valves each refueling outage. SNC has documented that on average, the disassembly and inspection of these valves requires 6 man-hours, and additional costs associated with planning, scheduling, supervision, documentation, etc., are also required. For a group of 2 valves (excluding valve QV661) in the relief request, the proposal to test one valve at each refueling outage would extend the test interval to no more than 4 years, and meets the guidance of Position 2 of GL 89-04.

Based on the consideration that it is not feasible to full-stroke exercise with flow the affected valves during operation, at cold shutdown and at refueling outages and that the proposed alternative meets the guidance of GL-89-04 and provides reasonable assurance of vaive operability, the proposed alternative (excluding valve QV661) is authorized pursuant to 10 CFR 50.55a(a)(3)(ii), because imposition of the Code requirements would result in hardships without a compensating increase in the level of quality and safety.

3.7 Relief Requests Q1P16-RR-V-4 and Q2P16-RR-V-4

OM Code, ISTC 4.5.4(c) allows disassembly and inspection of certain check valves on a refueling outage basis. Q1P16-RR-V-4 applies to valves QV564 and QV565 of FNP Unit 1, and Q2P16-RR-V-4 applies to valves QV564 and QV565 of FNP Unit 2. SNC requests relief from disassembling the check valves every refueling outage, and proposes to disassemble and manually full-stroke exercise the valves each refueling outage on a staggered basis.

3.7.1 SNC's Basis for the Relief Request

SNC states:

> There are no system design provisions to verify valve full forward flow quarterly, at cold shutdown or refueling outage. Therefore, per ISTC 4.5.4(c) these valves will be disassembled during refueling outages to verify operability. No relief is required for the above per OM ISTC 4.5.4(c) if each valve is disassembled every refueling outage.
>
> These valves are the same design (manufacturer, size, model number and material of construction) and have the same service conditions including valve orientation. Thus, they meet the guidance of NRC Generic Letter 89-04,

Position 2 for valve grouping for purposes of implementing a disassembly and inspection sampling plan. The burden justification for the proposed alternate testing sampling plan is detailed below.

The inspection history of these valves suggests there is no need for disassembly and inspection of both valves each outage, thus any additional expense in doing so would be an unnecessary burden. The past twelve inspections of these valves (total both units) dating back to 1989 have not detected any unsatisfactory conditions. On average, the disassembly and inspection of these valves requires 13 man-hours. Additional costs associated with planning, scheduling, supervision, documentation, etc. are also required for this task.

Without a sampling disassembly and inspection plan, FNP will be required to remove each train of diesel power each outage. This will cause the unavailability of the diesel train and hence the risk to the core to be twice that which would be required with grouping. In light of the good inspection history of these valves, FNP will be increasing risk to the core without a commensurate gain in the reliability of the valves. This is counter to the philosophy of 10 CFR 50.65 of balancing reliability and availability which states that "Adjustments shall be made where necessary to ensure that the objective of preventing failures of structures, systems and components through maintenance is appropriately balanced against the objective of minimizing unavailability of structures, systems and components due to monitoring or preventive maintenance. (See SNC letter dated August 7, 1998)

3.7.2 Alternative Testing

SNC states:

The alternate testing described below is based on GL 89-04 guidance for valve grouping and check valve disassembly.

One valve will be disassembled and manually full stroke exercised each refueling outage on a staggered basis. The valve internals will be verified to be structurally sound (no loose or corroded parts) and the disk will be manually exercised to verify full stroke capability. If the disassembled valve is not capable of being full stroke exercised or there is binding or failure of valve internals, the remaining valve in the group will also be disassembled, inspected and manually full stroke exercised during the same outage. The valve will be part stroked with flow after reassembly. The necessary valve operator movement for verifying part stroke exercising will be confirmed by changes in system pressure, flow rate, level, temperature, seat leakage testing or other positive means or through the use of ultrasonic (or similar) flow measuring devices.

3.7.3 Evaluation and Conclusion

Paragraph 4.3.2.2(e) of OM-10 requires that if valve exercising is not practicable during plant operation or cold shutdowns, full-stroke exercising is to be performed during refueling outages. Paragraph 4.3.2.4(c) allows disassembly every refueling outage to verify operability of check valves. However, SNC proposes to test these valves on a sampling basis in accordance with the guidance of Position 2 of GL 89-04, i.e., one of these valves will be disassembled and manually full-stroke exercised at each refueling outage on a staggered basis.

Position 2 of GL 89-04 states that valve disassembly and inspection can be used as a positive means of determining that a valve's disk will full-stroke exercise open or of verifying closure capability. It further states that where the licensee determines that it is burdensome to disassemble and inspect all applicable valves each refueling outage, a sample disassembly and inspection plan for groups of identical valves in similar applications may be employed. Guidance for grouping of the valves is provided such that each valve is disassembled and inspected once every 6 years, with a minimum of one valve disassembled and inspected each refueling outage.

SNC states that there are no system design provisions to verify full forward flow quarterly, at cold shutdown or refueling outage. As such, imposing the Code requirements would require major system modifications and installing flow measurement devices. Position 2 of GL 89-04 allows disassembly as an acceptable means of inspecting check valves at each refueling outage, and extension of test intervals up to 6 years where the licensee determines that it is burdensome to test all applicable valves at each refueling outage. SNC has documented that on average, the disassembly and inspection of these valves requires 13 man-hours, and additional costs associated with planning, scheduling, supervision, documentation, etc., are also required. For a group of valves in the relief request, the proposal to test one valve at each refueling outage would extend the test interval to no more than 4 years, and meets the guidance of Position 2 of GL 89-04.

Based on the consideration that it is not feasible to full-stroke exercise with flow the affected valves during operation, at cold shutdown and at refueling outages and that the proposed alternative meets the guidance of GL 89-04 and provides reasonable assurance of valve operability, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii), because imposition of the Code requirements would result in hardships without a compensating increase in the level of quality and safety.

4.0 CONCLUSION

With the exception of relief requests Q1P16-RR-V-3 and Q2P16-RR-V-3, the proposed alternatives described in the other remaining relief requests are authorized pursuant to 10 CFR 50.55a(a)(3)(ii), on the basis that SNC's proposed alternatives provide reasonable assurance of operational readiness for the affected pumps and valves and that imposition of the Code requirements would result in hardship without a compensating increase in the level of quality and safety. With respect to relief requests Q1P16-RR-V-3 and Q2P16-RR-V-3, the use of

grouping and sampling approach for valve QV661 is denied because the valve does not the meet the size requirement of GL 89-04, Position 2. As such, valve QV661 should be removed from RRs Q1P16-RR-V-3 and Q2P16-RR-V-3.

Principal Contributor: Y. S. Huang

Date: October 29, 1998