ENCLOSURE 2

SAFETY EVALUATION REPORT

PUMP AND VALVE INSERVICE TESTING PROGRAM

THREE MILE ISLAND NUCLEAR STATION, UNIT 1

FOR THE REMAINDER OF THE SECOND 10-YEAR INTERVAL

ACKNOWLEDGEMENT

This safety evaluation report was prepared with substantial assistance from the Idaho National Engineering Laboratory (EG&G Idaho, Inc.) under contract to the U.S. Nuclear Regulatory Commission.

8610170017 861003
PDR ADOCK 05000289
P PDR

CONTENTS

SAFETY EVALUATION REPORT
PUMP AND VALVE INSERVICE TESTING PROGRAM
THREE MILE ISLAND NUCLEAR STATION, UNIT 1

1. INTRODUCTION

Contained herein is a safety evaluation of the pump and valve inservice testing (IST) program submitted by the General Public Utilities Nuclear Corporation (GPUN) for its Three Mile Island Nuclear Station, Unit 1.

By a letter dated July 10, 1984, GPUN submitted an IST program for Three Mile Island, Unit 1. The working session with GPUN and Three Mile Island, Unit 1, representatives was conducted on September 4 and 5, 1985. The licensee's revised program, as attached to his letter to NRC, dated March 3, 1986, which supercedes all previous submittals, was reviewed to verify compliance of proposed tests of Class 1, 2, and 3 safety-related pumps and valves with the requirements of the ASME Boiler and Pressure Vessel Code (the Code), Section XI, 1980 Edition, through the Winter of 1980 Addenda.

Any program revisions subsequent to those noted above are not approved. Required program changes, such as additional relief requests or the deletion of any components from the IST program, should be submitted to the NRC under separate cover in order to receive prompt attention, but should not be implemented prior to review and approval by the NRC.

In their submittal GPUN has requested relief from the ASME Code testing requirements for specific pumps and valves and these requests have been evaluated individually to determine whether they are indeed impractical. This review was performed utilizing the acceptance criteria of the Standard Review Plan, Section 3.9.6, and the Draft Regulatory Guide and Value/Impact Statement titled "Identification of Valves for Inclusion in Inservice Testing Programs". These IST Program testing requirements apply only to component testing (i.e., pumps and valves) and are not

intended to provide the basis to change the licensee's current Technical Specifications for system test requirements.

Based on the information provided by the licensee, the staff believes that all appropriate pumps and valves have been included in the IST program and are tested in accordance with Section XI except as identified in this report.

The NRC staff's positions and guidelines concerning inservice testing requirements are provided in Appendix A.

Category A, B, and C valves that meet the requirements of the ASME Code, Section XI, and are not exercised quarterly are listed in Appendix B.

A listing of P&IDs used for this review is contained in Appendix C.

Inconsistencies and omissions in the licensee's program noted by the staff in the course of the review are listed in Appendix D. The staff's position is that the licensee must resolve those items in accordance with the evaluations, conclusions, and guidelines presented in this report.

2. PUMP TESTING PROGRAM

The Three Mile Island, Unit 1, IST program submitted by General Public Utilities Nuclear Corporation was examined to verify that all pumps that are included in the program are subjected to the periodic tests required by the ASME Code, Section XI, except for those pumps identified below for which specific relief from testing has been requested and as summarized in Appendix D. Each General Public Utilities Nuclear Corporation basis for requesting relief from the pump testing requirements and the staff's evaluation of that request is summarized below.

2.1 Control Building Chilled Water System

2.1.1 Relief Request

The licensee has requested relief from measuring flow rate on the control building chilled water pumps, AH-P3A and -P3B, in accordance with the requirements of Section XI, Paragraph IWP-3100, and proposed to install flow instrumentation prior to startup for Cycle 7.

2.1.1.1 Licensee's Basis for Requesting Relief. There are no flow meters installed in the flow path of these pumps, therefore, test quantity "Q" cannot be measured. Prior to startup for Cycle 7, GPUN will install flow metering for these pumps.

2.1.1.2 Evaluation. The staff agrees with the licensee's basis and, therefore, relief should be granted from the Section XI requirement to measure flow rate on the control building chilled water pumps until flow instrumentation can be installed during the Cycle 7 refueling outage.

2.1.1.3 Conclusion. The staff concludes that the licensee is required to perform system modifications prior to startup for Cycle 7 as proposed to allow measurement of the flow rate of the control building chilled water pumps. For the balance of the period of the present fuel cycle, interim relief is granted to test these pumps as proposed by the

licensee. Requiring the licensee to make these modifications prior to the Cycle 7 refueling outage would impose unnecessary hardship on the licensee without a compensating increase in the level of safety.

2.1.2 Relief Request

The licensee has requested relief from measuring bearing temperature and observing lubricant level or pressure on the control building chilled water pumps, AH-P3A and -P3B, in accordance with the requirements of Section XI, Paragraph IWP-3100.

2.1.2.1 Licensee's Basis for Requesting Relief. The pump and motor form an integral unit and the pump bearings are located in the motor. There is no lubrication level on the pump that can be checked. Also, yearly bearing temperatures will not be measured since the bearings are deep inside the motor end caps.

2.1.2.2 Evaluation. The staff agrees with the licensee's basis and, therefore, relief should be granted from the Section XI requirement to observe lubricant level or pressure and to measure bearing temperature annually on the control building chilled water pumps. The licensee has demonstrated that, due to pump design, lubricant level or pressure cannot be obtained and that the bearing temperature measurements must be taken some distance from the bearing. The staff agrees that this is an unreliable method of detecting bearing failure because the data obtained is subject to considerable variation due to influences other than bearing condition and that deletion of this measurement and the lubricant observation will not affect the licensee's pump monitoring program.

2.1.2.3 Conclusion. The staff concludes that the licensee's proposal to measure all pump parameters, except bearing temperature, should be sufficient to monitor pump degradation. The staff concludes that the alternate testing proposed will give reasonable assurance of pump operability required by the Code.

2.2 Boric Acid System

2.2.1 Relief Request

The licensee has requested relief from quarterly testing and measuring flow rate, inlet pressure, differential pressure, bearing temperature and the five minute run time on the boric acid pumps, CA-P1A and -P1B, in accordance with the requirements of Section XI, Paragraphs IWP-3100 and -3500, and proposed to test these pumps during refueling outages and to calculate flow rate and inlet pressure at that time.

2.2.1.1 Licensee's Basis for Requesting Relief. For CA-P1A/B, GPUN requests relief from quarterly testing and the measurement of Q, P_i, ΔP, and the five minute run time. The following testing will be conducted.

> Testing CA-P1A/B will be conducted each refueling interval. CA-P1A/B does not have a recirculation flow path. Without recirculation capability, the only method of testing these pumps is to inject into the reactor coolant makeup system. The resulting reactivity changes would affect plant operations adversely and would result in significant volumes of radioactive waste. During normal operation, testing one pump would generate 1,300 gallons of radwaste at the beginning of core life, 3,000 gallons at middle of core life, and 32,000 gallons at end of core life. This much radwaste is generated because injecting concentrated boric acid requires dilution of the RCS. For these reasons, it is impractical to test the subject pumps during operation. The appropriate test interval is each refueling due to the large quantities of liquid radwaste generated.
>
> Flow rate (Q) will be calculated using makeup tank level change over time, since installed flow measuring instruments do not exist.
>
> Inlet pressure is not available. There are no existing pressure gage taps. P_i will be calculated using suction tank level.

For CA-P1A/B pump differential pressure (ΔP) will not be calculated since CA-P1A/B are positive displacement pumps. Relief is requested from the ASME Section XI, IWP-3110, requirement to calculate ΔP for CA-P1A/B. The calculation of ΔP for CA-P1A/B would not be meaningful since the flow rate is fixed solely by the displacement of the cylinder and the speed of the pump, both of which are held constant, while ΔP is only a function of system resistance (backpressure). Therefore, such a calculation would be an unnecessary exercise for the operator.

ASME Section XI, IWP-3500, states that pumps under test should be run for at least five minutes under conditions as stable as the system permits prior to taking data. To minimize radioactive waste, the subject pumps will be run until the system has stabilized and then data will be recorded. GPUN believes this meets the intent of IWP-3500.

In conclusion, the CA-P1A/B test each refueling verifies the required flow rate for CA-P1A/B while pumping to the makeup tank. This demonstrates that CA-P1A/B can perform its safety function by providing the required boric acid capacity at normal makeup tank backpressures. For this test, the makeup tank will be pressurized to its normal operating range. Pump vibration will be measured while pumping to the makeup tank.

2.2.1.2 Evaluation. The staff does not agree with the licensee's basis and will require that system modifications be performed to permit testing these pumps quarterly in accordance with the requirements of Section XI, therefore, permanent relief should not be granted from the requirements of Section XI. It is the staff's opinion that the licensee cannot assure the reasonable operational readiness of these pumps by utilizing a test program conducted at refueling outages due to the time interval between tests. The licensee will be required to install instrumentation to measure flow rate and pump discharge pressure so those parameters can be utilized to monitor pump performance and degradation. The licensee has stated that these are positive displacement pumps,

therefore, the staff feels that inlet and differential pressure measurements are unnecessary because inlet pressure variations have no effect on positive displacement pump operation while discharge pressure and flow rate measurements provide the necessary information to monitor the hydraulic performance of the pump being tested. The staff agrees that the minimum five minute run time is unnecessary if the system can be stable in less time because that requirement of Section XI is to insure that system parameters will be recorded after system conditions have stabilized. The staff also agrees that deletion of the bearing temperature measurement will not affect the licensee's monitoring program for these pumps.

2.2.1.3 Conclusion. The staff concludes that the licensee is required to perform system modifications prior to the end of the next refueling outage to allow obtaining flow rate and discharge pressure during quarterly pump testing. For the balance of the period of the current fuel cycle, interim relief is granted to test the pumps as proposed by the licensee. Requiring the licensee to make these modifications prior to the next refueling outage would impose unnecessary hardship on the licensee without a compensating increase in the level of safety.

2.3 Decay Heat River Water System

2.3.1 Relief Request

The licensee has requested relief from measuring bearing temperature, vibration, and observing lubricant level on the decay heat river water pumps, DR-P1A and -P1B, in accordance with the requirements of Section XI, Paragraph IWP-3100.

2.3.1.1 Licensee's Basis for Requesting Relief. This is a vertical deep well type pump with the pump submerged under water at all times. It is not practical to measure pump vibration in this type of installation. Past operating experience has shown that motor vibration is indicative of pump mechanical problems in this type of installation, therefore, motor vibration will be measured in lieu of pump vibration. The pump bearings are lubricated by the fluid being pumped. There are no installed means of measuring bearing temperature and the pump design and installation make it impractical to measure in any other manner.

2.3.1.2 Evaluation. The staff agrees with the licensee's basis and, therefore, relief should be granted from the requirements of Section XI to measure bearing temperature, vibration, and to observe the lubricant level on the decay heat river water pumps. The licensee has demonstrated that, due to pump design, instrumentation is not installed to allow bearing temperature or vibration measurements. Additionally, these pumps are submerged and inaccessible, therefore, portable temperature and vibration instrumentation cannot be utilized during testing and lubricant level cannot be observed. The licensee has proposed to measure vibration at the motor in lieu of measuring at the pump, however, this measurement may not provide useful information due to the physical separation between the pump and motor.

2.3.1.3 Conclusion. The staff concludes that deletion of the bearing temperature measurement, observation of lubricant levels, and measuring vibration at the motor instead of at the submerged pump will not affect the licensee's monitoring program for these pumps. The staff concludes that the alternate testing proposed will give reasonable assurance of pump operability required by the Code.

2.4 Emergency Feedwater System

2.4.1 Relief Request

The licensee has requested relief from the instrument calibration requirements of Section XI, Paragraph IWV-4120, for the emergency feedwater pump flow instrumentation and proposed to calibrate the instruments at a flow rate that more closely represents test conditions.

2.4.1.1 Licensee's Basis for Requesting Relief. The emergency feedwater pumps (EF-P1 and EF-P2A/B) are tested on recirculation to the condensate storage tanks. Installed orifices limit flow rate to a fixed value of ~190 gpm for EF-P1 and ~90 gpm for EF-P2A and B. Q is the independent variable and ΔP is the dependent variable. For EF-P1, flow rate is read on flow indicating switch 78 (FIS-78). FIS-78 scale range is 0 to 1000 gpm. For EF-P2A and B, flow rate is read on FIS-77 and FIS-79. FIS-77 and 79 scale range is 0 to 500 gpm. FIS-78, 77, and 79 do not meet

ASME Section XI, IWP-4120 which states "The full-scale range of each instrument shall be three times the reference value or less." Relief is requested from IWP-4120, which states that flow instruments are to be calibrated to ±2% of full scale range. The basis for requesting relief is that FIS-78, 77 and 79 will be calibrated such that one of the calibration points will be 200 gpm for FIS-78 and 100 gpm for FIS-77 and 79. This will insure that ±2% accuracy is achieved at the reference value of ~190 gpm for EF-P1 and ~90 gpm for EF-P2A and B. All other code calibration requirements per IWP-4000 will be met. FIS-78, 77, and 79 are located on the suction piping to EF-P1 and EF-P2A/B. It is impractical to reduce the scale range of FIS-78, 77, and 79 since emergency feedwater flow rates when feeding the OTSG(s) are much greater than the IST reference flow rate values. If the FIS scale range were sized for IST testing purposes, the FISs would be over-ranged and damaged when EF-P1 or EF-P2A/B were used to feed the OTSG(s). In conclusion, calibrating such that one of the calibration points is at 200 gpm for FIS-78 and 100 gpm for FIS-77 and 79 insures that the acceptable accuracy of ±2% is achieved for the IST test.

2.4.1.2 Evaluation. The staff agrees with the licensee's basis and, therefore, relief should be granted from the full-scale range requirements of Section XI for the emergency feedwater pump flow instrumentation. The licensee's proposal to calibrate the instruments at a point that represents actual test conditions should provide repeatable data to utilize in the pump monitoring program while at the same time preventing instrument damage caused by overranging of smaller instruments during normal system operation.

2.4.1.3 Conclusion. The staff concludes that the licensee's proposed alternate instrument calibration should be sufficient to provide repeatable data to monitor pump degradation. The staff concludes that the alternate testing proposed will give reasonable assurance of instrument accuracy required by the Code.

2.5 Nuclear Service River Water System

2.5.1 Relief Request

The licensee has requested relief from measuring bearing temperature, vibration, observing lubricant level, and measuring individual pump flow rate on the nuclear service river water pumps, NR-P1A, -P1B, and -P1C, in accordance with the requirements of Section XI, Paragraph IWP-3100, and proposed to measure individual pump flow during refueling outages.

2.5.1.1 Licensee's Basis for Requesting Relief. This is a vertical deep well type pump with the pump submerged under water at all times. It is not practical to measure pump vibration in this type of installation. Past operating experience has shown that motor vibration is indicative of pump mechanical problems in this type of installation, therefore, motor vibration will be measured in lieu of pump vibration. The pump bearings are lubricated by the fluid being pumped. There are no installed means of measuring bearing temperature and the pump design and installation make it impractical to measure in any other manner. Flow metering for this system is located in the common discharge lines from all three pumps. Plant operating heat loads require the operation of at least two nuclear service river water pumps during normal plant operation thereby making it impossible to measure flow for a single pump. Pump flow will be measured for each pump during plant refueling outages when operation of only one pump is required.

2.5.1.2 Evaluation. The staff agrees with the licensee's basis and, therefore, relief should be granted from the requirements of Section XI to measure bearing temperature, vibration, observe lubricant level, and to measure individual pump flow rates quarterly on the nuclear service river water pumps. The licensee has demonstrated that, due to pump design, instrumentation is not installed to allow bearing temperature or vibration measurements. Additionally, these pumps are submerged and inaccessible, therefore, portable temperature and vibration instrumentation cannot be utilized during testing and lubricant level cannot be observed. The licensee has proposed to measure vibration at the motor in lieu of

measuring at the pumps, however, this measurement may not provide useful information due to the physical separation between the pump and motor. The staff also agrees with the licensee's proposal to measure individual pump flow rates during refueling outages because plant heat loads do not permit reducing system flow for pump testing without the possibility of equipment damage due to overheating during normal operation and most cold shutdowns. The staff feels that the hydraulic condition of these pumps can be adequately monitored during normal system operation between refueling outages.

2.5.1.3 Conclusion. The staff concludes that deletion of the bearing temperature measurement and measuring vibration at the motor instead of at the submerged pump will not affect the licensee's monitoring program for these pumps. The staff also concludes that the licensee's proposal to measure individual pump flow rates during refueling outages when plant heat loads are reduced should be sufficient to monitor pump degradation. The staff concludes that the alternate testing proposed will give reasonable assurance of pump operability required by the Code.

2.6 Nuclear Service Closed Cooling Water System

2.6.1 Relief Request

The licensee has requested relief from measuring individual flow rates on the nuclear service closed cooling water pumps, NS-P1A, -P1B, and -P1C, in accordance with the requirements of Section XI, Paragraph IWP-3100, and proposed to conduct two pump tests during plant operation and to measure individual pump flow rates during refueling outages.

2.6.1.1 Licensee's Basis for Requesting Relief. Flow metering for this system is located in the common discharge lines from all three pumps. Plant operating heat loads require the operation of at least two nuclear services closed cooling water pumps during plant operation thereby making it impossible to measure flow for a single pump. Therefore, two-pump testing will be conducted on a quarterly frequency. Three two-pump tests will be performed as follows: (a) pumps A and B, (b) pumps B and C, and

(c) pumps A and C. Two-pump testing will be conducted in accordance with the requirements of ASME Section XI, Subsection IWP, except that a reference value for Q or ΔP will not be established per IWP-3100 and 3110. Also, Table IWP-3100-2 will not be used for acceptance criteria. Two pump testing will be conducted such that Q will be measured. This data point of ΔP and Q will then be compared to the pump manufacturer's capacity curve. Acceptance criteria will be ±10% of the manufacturer's curve. If the ±10% criteria is not achieved, an analysis will be made to demonstrate that pump operability is not impaired and the pump will still fulfill its safety function. If the analysis cannot support the operability of the pump, the pump will be repaired or replaced.

The two pump test is performed during normal plant operation and it is impractical to establish reference values because the nuclear services closed cooling water system (NS) is a very large system (52 component coolers) that is operated over a range of flow rates. By procedure (OP 1104-11) the NS flow rate is varied to maintain the water temperature >70°F but <95°F. The lower limit is to prevent condensation on the NS piping and the upper limit is to prevent component cooler overheating. River water temperature and outside ambient temperature require the number of NS heat exchangers and component coolers to be throttled or varied. In addition, plant operations such as processing radwaste may require additional NS heat exchangers. These operational conditions make it impractical to establish a reference value since the reference value must be established such that operational parameters are not upset. In addition, several sets of references values may not cover all of the operating modes for the NS system. Testing with several sets of reference values would be cumbersome. Therefore, the above testing will be conducted as an alternative; and technically, this testing is equivalent to the Code requirements. Single pump testing will be performed during each refueling outage using single pump reference values.

2.6.1.2 Evaluation. The staff agrees with the licensee's basis and, therefore, relief should be granted from the requirements of Section XI to measure individual pump flow rates quarterly on the nuclear service closed cooling water pumps. The licensee has demonstrated that plant heat loads do not permit reducing system flow for pump testing without the possibility

of equipment damage due to overheating during normal operation and most cold shutdowns. The staff feels that the licensee's proposed two pump tests conducted quarterly will adequately monitor the hydraulic condition of these pumps between refueling outages.

2.6.1.3 Conclusion. The staff concludes that the proposed alternate testing of conducting pump tests in pairs quarterly and of measuring individual pump flow rates during refueling outages when plant heat loads are reduced should be sufficient to adequately monitor pump degradation. The staff concludes that the alternate testing proposed will give reasonable assurance of pump operability required by the Code.

2.7 Reactor Building Emergency Cooling System

2.7.1 Relief Request

The licensee has requested relief from measuring bearing temperature, vibration, observing lubricant level, and measuring pump flow rate on the reactor building emergency cooling pumps, RR-P1A and -P1B, in accordance with Section XI, Paragraph IWP-3100, and proposed to measure pump flow rate during refueling outages.

2.7.1.1 Licensee's Basis for Requesting Relief. The reactor building cooling water pumps (RR-P1A/B) supply river water to the reactor building emergency cooling coils. These pumps will be tested during normal plant operation using a fixed resistance flow path that bypasses the cooling coils. This test will not measure flow rate. The testing during normal plant operation will not pump river water through the cooling coils because after the test, the cooling coils must be drained and then flushed with nuclear service closed cooling water. The drain and flush water is drained to the reactor building sump and this produces large quantities of water that must be processed through the liquid waste disposal system. However, flow rate will be measured during refueling outages when river water is pumped through the cooling coils in accordance with Technical Specification requirements.

2.7.1.2 Evaluation. The staff agrees with the licensee's basis and, therefore, relief should be granted from the requirements of Section XI to measure bearing temperature, vibration, observe lubricant level, and to measure flow rate quarterly on the reactor building emergency cooling pumps. The licensee has demonstrated that, due to pump design, instrumentation is not installed to allow bearing temperature and vibration measurements. Additionally, these pumps are submerged and inaccessible, therefore, portable temperature and vibration instrumentation cannot be utilized during testing and lubricant level cannot be observed. The licensee has proposed to measure vibration at the motor in lieu of measuring at the pump, however, this measurement may not provide useful information due to the physical separation between the pump and motor. The staff agrees with the licensee's proposal to measure pump flow rate during refueling outages because the flow path that is equipped with flow instrumentation is the normal system flow path and cannot be used due to the need to prevent the introduction of raw river water into the clean nuclear services closed cooling water system thereby reducing fouling and corrosion in the clean system as much as possible. The licensee has proposed to measure pump differential pressure instead of flow rate during the quarterly pump tests to utilize to monitor pump performance and the staff agrees with this proposal. The normal flow path, which is through the reactor building cooling units, cannot be utilized during power operation because the cooling units are inside containment and are inaccessible for draining and flushing. Also, this testing could delay plant startup if performed during cold shutdown because the cooling units drain to the reactor building sump and the large volume of water must then be processed as radioactive waste.

2.7.1.3 Conclusion. The staff concludes that the proposed alternate testing of monitoring pump differential pressure quarterly and measuring flow rate during refueling outages should be sufficient to monitor pump degradation. The staff also concludes that deletion of the bearing temperature measurement and measuring vibration at the motor instead of at the submerged pump will not affect the licensee's monitoring program for these pumps. The staff concludes that the alternate testing proposed will give reasonable assurance of pump operability required by the Code.

2.8 Spent Fuel Cooling System

2.8.1 Relief Request

The licensee has requested relief from measuring bearing temperature on the spent fuel cooling pumps, SF-P1A and -P1B, in accordance with the requirements of Section XI, Paragraph IWP-3100, and has also proposed to calculate inlet and differential pressure during tests.

2.8.1.1 Licensee's Basis for Requesting Relief. For SF-P1A/B there is no pump inlet pressure gage tap. Test quantities P_i and ΔP cannot be measured. SF-P1A(B) take suction from the spent fuel pools. The pool water level is alarmed high at 40 feet (347' elevation) and alarmed low at 38.5 feet (345.5' elevation). This is only a 1.5 foot (0.65 psi) difference. Therefore, SF-P1A/B suction pressure is nearly constant (can vary only by a maximum of 0.65 psig and this maximum difference in level is less than a 1 psig typical minor scale division). Since P_i cannot be measured, it is calculated based on the water level in the pools.

Since suction pressure is relatively constant and can be calculated with reasonable accuracy, a suction pressure gage is not needed to determine the operational readiness of SF-P1A/B.

This method of testing meets the intent of the ASME Code Section XI test requirements and ensures the operational readiness of these components without directly measuring ΔP or P_i. ΔP and P_i will be calculated based on the water level in the pools.

Pump bearing temperature cannot be measured on this pump since the bearings are located deep inside the pump casing and are surrounded by an oil reservoir. An exception is requested per 10 CFR 50.55a(g)(5)(iii) in that measurement of parameter T_b is not practical within the limits of the design of this pump.

2.8.1.2 Evaluation. The staff agrees with the licensee's basis and, therefore, relief should be granted from the requirements of Section XI to measure bearing temperature, inlet, and differential pressure on these pumps. The staff agrees that inlet and differential pressure can be accurately calculated due to the relatively constant pool level and should provide sufficient data to utilize to monitor pump performance. The staff also agrees that the annual bearing temperature measurement is an unrealiable method of detecting bearing failure and that deletion of this measurement will not affect the licensee's pump monitoring program.

2.8.1.3 Conclusion. The staff concludes that calculating inlet and differential pressure and deletion of the bearing temperature measurement should provide sufficient information to utilize to monitor pump degradation. The staff concludes that the alternate testing proposed will give reasonable assurance of pump operability required by the Code.

2.9 Screen House Ventilation Equipment System

2.9.1 Relief Request

The licensee has requested relief from measuring bearing temperature, vibration, observing lubricant level, and measuring flow rate on the screen house ventilation equipment pumps, SW-P2A and -P2B, in accordance with Section XI, Paragraph IWP-3100, and proposed to install flow instrumentation prior to startup for Cycle 7.

2.9.1.1 Licensee's Basis for Requesting Relief. This is a vertical deep well type pump with the pump submerged under water at all times. It is not practical to measure pump vibration in this type of installation. Past operating experience has shown that motor vibration is indicative of pump mechanical problems in this type of installation, therefore, motor vibration will be measured in lieu of pump vibration. The pump bearings are lubricated by the fluid being pumped. There are no installed means of measuring bearing temperature and the pump design and installation make it impractical to measure in any other manner. There are no flow meters installed in the flow path of these pumps, therefore, test quantity "Q"

cannot be measured. Prior to startup for Cycle 7, GPUN will install flow metering for these pumps.

2.9.1.2 Evaluation. The staff agrees with the licensee's basis and, therefore, relief should be granted from the requirements of Section XI to measure bearing temperature, vibration, and to observe the lubricant level on the screen house ventilation equipment pumps. The licensee has demonstrated that, due to pump design, instrumentation is not installed to allow bearing temperature or vibration measurements. Additionally, these pumps are submerged and inaccessible, therefore, portable temperature and vibration instrumentation cannot be utilized during testing and lubricant level cannot be observed. The licensee has proposed to measure vibration at the motor in lieu of measuring at the pump, however, this measurement may not provide useful information due to the physical separation between the pump and motor. The staff also agrees that relief should be granted from the requirement to measure flow rate on the screen house ventilation equipment pumps until flow instrumentation can be installed during the Cycle 7 refueling outage.

2.9.1.3 Conclusion. The staff concludes that deletion of the bearing temperature measurement and measuring vibration at the motor instead of at the submerged pump will not affect the licensee's monitoring program for these pumps. The staff also concludes that the licensee is required to perform system modifications prior to startup for Cycle 7 as proposed to allow measurement of the flow rate of the screen house ventilation equipment pumps. For the balance of the period of the present fuel cycle, interim relief is granted to test these pumps as proposed by the licensee. Requiring the licensee to make these modifications prior to the Cycle 7 refueling outage would impose unnecessary hardship on the licensee without a compensating increase in the level of safety.

2.10 Boric Acid Recycle System

2.10.1 Relief Request

The licensee has requested relief from measuring bearing temperature, flow rate, inlet and differential pressure, and the five minute run

requirement on the boric acid recycle pumps, WDL-P13A and -P13B, in accordance with Section XI, Paragraphs IWP-3100 and -3500, and proposed to calculate inlet and differential pressure quarterly and to calculate flow rate during refueling outages.

2.10.1.2 Licensee's Basis for Requesting Relief. Pump bearing temperature cannot be measured on this pump since the bearings are located deep inside the pump casing and are surrounded by an oil reservoir. An exception is requested per 10 CFR 50.55a(g)(5)(iii) in that measurement of parameter T_b is not practical within the limits of the design of this pump.

ASME Section XI, IWP-1100, states that emergency powered pumps should be included in the IST Program. WDL-P13A/B are not emergency powered, but are included in the IST Program as requested by NRC. The addition of WDL-P13A/B in the program provides further assurance of the capability to supply concentrated boric acid to the reactor coolant makeup system.

For WDL-P13A/B, GPUN requests relief from the measurement of Q, P_i, ΔP, and the five minute run time. Testing will be conducted each refueling interval for the same radwaste concerns expressed for CA-P1A/B.

Flow rate (Q) will be calculated using makeup tank level change over time since installed flow measuring instruments do not exist.

Inlet pressure is not available (there are no existing pressure gage taps). Inlet pressure will be calculated using suction tank level.

WDL-P13A/B's discharge valve is a diaphragm operated valve that is either open or closed. There is no handwheel on the valve. Instead of throttling to a ΔP reference value, WDL-P13A/B will be tested unthrottled while pumping to the pressurized makeup tank. Since WDL-P13A/B is tested while pumping to the pressurized makeup tank, pump ΔP is variable (it increases over pumping time). This makes it impractical to establish a ΔP reference value. WDL-P13A/B's safety

function is to supply concentrated boric acid to the makeup tank. This testing will verify the accident design flow rate.

ASME Section XI, IWP-3500, states that pumps under test should be run for at least five minutes under conditions as stable as the system permits prior to taking data. To minimize radioactive waste, the refueling test will be run until the system has stabilized and then data will be recorded. GPUN believes this meets the intent of IWP-3500.

In addition, WDL-P13A/B will be tested on recirculation only when it is selected for the Technical Specification source of concentrated boric acid:

1. Testing will be quarterly.

2. P_i will be calculated using suction tank level.

3. ΔP will be calculated.

2.10.1.2 Evaluation. The staff agrees with the licensee's basis in part and, therefore, relief should be granted from the requirements of Section XI to measure bearing temperature and the minimum five minute run time on the boric acid recycle pumps. Bearing temperature measurement is an unreliable method of bearing failure detection and the staff feels that deletion of the measurement will not affect the licensee's pump monitoring program. The staff agrees that the minimum five minute run time is unnecessary if the system can be stable in less time because that requirement of Section XI is to insure that system parameters will be recorded after system conditions have stabilized. The staff also agrees that calculating pump inlet pressure is an acceptable alternative to the direct pressure measurement required by Section XI.

The staff does not agree with the licensee's proposal to calculate flow rate of these pumps during refueling outages only because the licensee cannot adequately monitor pump readiness due to the time interval between

tests. The staff will require that the licensee perform system modifications to install flow instrumentation so pump flow rate can be recorded during the quarterly pump tests in addition to the flow rate calculation performed during refueling outages. The licensee will also be required to demonstrate operability of these pumps immediately following their being placed in their safety-related configuration in addition to quarterly testing while they are in that configuration.

2.10.1.3 Conclusion. The staff concludes that the licensee is required to perform system modifications prior to the end of the next refueling outage to allow obtaining flow rate measurements during quarterly pump testing. For the balance of the period of the current fuel cycle, interim relief is granted to test the pumps as proposed by the licensee. Requiring the licensee to make these modifications prior to the next refueling outage would impose unnecessary hardship on the licensee without a compensating increase in the level of safety.

2.11 Makeup and Purification System

2.11.1 Relief Request

The licensee has requested relief from measuring flow rate on the makeup and purification pumps, MU-P1A, -P1B, and -P1C, in accordance with the requirements of Section XI, Paragraph IWP-3100.

2.11.1.2 Licensee's Basis for Requesting Relief. Installed plant instrumentation does not allow measuring the flow rate for each flow path for these pumps. Therefore, testing is performed using a combination of fixed resistance and reference value flow rate. Seal injection is held at 32 gpm. Normal makeup is isolated with 3.5 gpm through MU-V205 and the minimum recirculation line (MU-V36 and 37) is open providing fixed resistance. Q is the independent variable and ΔP is the dependent variable. This testing method is allowable per ASME, Section XI, IWP-3100.

2.11.1.3 Evaluation. The staff does not agree with the licensee's basis and, therefore, relief should not be granted from the requirement of

Section XI to measure flow during testing. The licensee has stated that a "reference value flow rate" is utilized during each pump test but the purpose of this reference value is unclear and the licensee has not adequately explained its use. The staff agrees that Section XI, Paragraph IWP-3100, allows varying system resistance until either the pump flow or the pump differential pressure equals the corresponding reference value, however, that same Paragraph requires that all quantities in Table IWP-3100-1 be measured or observed and recorded during pump tests and pump flow rate is one of those quantities. The staff will require that the licensee perform system modifications to install flow instrumentation so pump flow rate can be recorded during the quarterly pump tests.

2.11.1.3 Conclusion. The staff concludes that the licensee is required to perform system modifications prior to the end of the next refueling outage to allow obtaining flow rate measurements during quarterly pump testing. For the balance of the period of the current fuel cycle, interim relief is granted to test the pumps as proposed by the licensee. Requiring the licensee to make these modifications prior to the next refueling outage would impose unnecessary hardship on the licensee without a compensating increase in the level of safety.

3. VALVE TESTING PROGRAM

The Three Mile Island, Unit 1, IST program submitted by General Public Utilities Corporation was examined to verify that all valves that are included in the program are subjected to the periodic tests required by the ASME Code, Section XI 1980 Edition, through Winter of 1980 Addenda, and the NRC positions and guidelines. The staff's review found that, except as noted in Appendix D or where specific relief from testing has been requested, these valves are tested to the Code requirements and the NRC positions and guidelines summarized in Appendix A. Each General Public Utilities Corporation basis for requesting relief from the valve testing requirements and the staff's evaluation of that request is summarized below and grouped according to system and valve category.

3.1 Core Flooding System

3.1.1 Category A/C Valves

3.1.1.1 Relief Request. The licensee has requested relief from testing valves CF-V4A/B, core flood tank discharge checks, in accordance with the requirements of Section XI, Paragraphs IWV-3400 and -3522, each cold shutdown and proposed to verify closure of these valves during cold shutdown every nine months.

3.1.1.1.1 Licensee's Basis for Requesting Relief--The Reactor Safety Study (RSS), WASH-1400, identified a PWR intersystem loss of coolant accident (LOCA) which is a significant contributor to risk or core melt accidents (Event V). The design examined in the RSS contained in-series check valves isolating the high pressure primary coolant system (PCS) from the low pressure injection (LPI) system piping. The scenario which leads to the Event V accident is initiated by the failure of these check valves to function as a pressure isolation barrier. This causes an overpressurization and rupture of the LPI low pressure piping which results in a LOCA that bypasses containment.

Valves CF-V5A/B and DH-V22A/B are inside containment and are located in the supply line from the LPI pumps to the reactor vessel. Therefore, these two valves are of the Event V configuration. Valves CF-V5A/B and CF-V4A/B are in the line from the core flood tanks to the reactor vessel. A pressure isolation failure of CF-V4A/B does not lead to a LOCA outside containment. Therefore, CF-V4A/B is not included in Technical Specification 3.1.6.10. However, TMI-1 has elected to test these valves for the pressure isolation function on the same frequency as CF-V5A/B and DH-V22A/B.

The NRC's Technical Evaluation Report (TER) prepared by Franklin Institute states that the testing frequency of CF-V5A/B and DH-V22A/B shall be prior to achieving hot shutdown following a cold shutdown of greater than 72 hours duration unless testing has been performed within the previous 9 months, and prior to achieving hot shutdown after returning the valve to service following maintenance, repair, or replacement work.

The TER provides a comprehensive study and evaluation of the specific problem related to pressure isolation. Since the TER has specified and judged adequate the above testing frequency, there is reasonable assurance that these valves will perform their pressure barrier function.

3.1.1.1.2 Evaluation--The staff agrees with the licensee's proposal to verify the pressure boundary isolation function of valves CF-V4A/B at 9 month intervals and, therefore, relief should be granted from the requirement of Section XI that states that in the case of frequent cold shutdowns, these valves need not be exercised more often than once every three months. The staff has previously reviewed and approved the licensee's proposed alternate test frequency.

3.1.1.1.3 Conclusion--The staff concludes that the previously approved alternate testing of verifying the pressure boundary isolation function of these valves at nine month intervals should be sufficient to demonstrate valve integrity. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

3.1.1.2 Relief Request. The licensee has requested relief from exercising valves CF-V4A/B, core flood tank discharge checks, in accordance with the requirements of Section XI, Paragraphs IWV-3400 and -3520, and proposed to partial-stroke exercise these valves each cold shutdown and to utilize a sample disassembly/inspection program for the valve group, CF-V4A/B and CF-V5A/B.

3.1.1.2.1 Licensee's Basis for Requesting Relief--These valves are part-stroke tested each cold shutdown per Surveillance Procedure 1303-11.21. Both CF-V5A/B and CF-V4A/B are of same design and manufacturer. CF-V5A/B are in operation whenever the plant is on decay heat removal and are normally closed during power operation. CF-V4A/B are in operation whenever core flood is required and are normally closed during power operation and during decay heat removal system operation. CF-V5A/B are also in operation whenever core flood is required. Therefore, CF-V5A/B are in operation more than CF-V4A/B and have a greater potential for degradation during operation. The refueling interval full-flow LPI System testing of CF-V5A/B showing no degradation during service can be applied to CF-V4A/B because the service for CF-V4A/B is less severe than that of CF-V5A/B. CF-V5A/B are full stroke tested per the Code and CF-V4A/B are the same valve catalog number as CF-V5A/B. Therefore, we feel confident that our proposal to only part-stroke CF-V4A/B should be adequate. Additionally, one of these valves (CF-V4A/B or CF-V5A/B) will be disassembled for visual examination at or near the end of the 10 year ISI interval per Table IWB-2500.

3.1.1.2.2 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the exercising requirements of Section XI for valves CF-V4A/B. These valves cannot be exercised during power operation because core flood tank pressure is insufficient to overcome reactor coolant system pressure. These valves cannot be full-stroke exercised during cold shutdowns because the only flow path available is into the reactor coolant system and the coolant system cannot provide a sufficient expansion volume to accommodate the flow required. In the October 23, 1984 Supplement SER, the staff agreed to the licensee's proposal of partial-stroke exercising CF-V4A/B at a cold shutdown frequency

and a sample disassembly/inspection program for the valve group CF-V4A/B and CF-V5A/B because all four valves are the same size, manufacturer, and catalog number and also are subjected to essentially identical service conditions. One of these four valves will be disassembled each ten years for inspection and if degradation is found that would make the valve's full-stroke capability questionable, then the remaining three valves in the group will be disassembled and inspected during that same outage. The staff has previously reviewed and approved the licensee's alternate test frequency.

3.1.1.2.3 Conclusions--The staff concludes that the licensee's previously approved exercising and inspection program should be sufficient to demonstrate proper valve operability. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

3.1.1.3 Relief Request. The licensee has requested relief from testing valves CF-V5A/B, combined core flood and low pressure injection checks, in accordance with the requirements of Section XI, Paragraphs IWV-3400 and -3522, each cold shutdown and proposed to verify closure of these valves during cold shutdown every nine months.

3.1.1.3.1 Licensee's Basis for Requesting Relief--The Reactor Safety Study (RSS), WASH-1400, identified a PWR intersystem loss of coolant accident (LOCA) which is a significant contributor to risk or core melt accidents (Events V). The design examined in the RSS contained in-series check valves isolating the high pressure primary coolant system (PCS) from the low pressure injection (LPI) system piping. The scenario which leads to the Event V accident is initiated by the failure of these check valves to function as a pressure isolation barrier. This causes an overpressurization and rupture of the LPI low pressure piping which results in a LOCA that bypasses containment.

Valves CF-V5A/B and DH-V22A/B are inside containment and are located in the supply line from the LPI pumps to the reactor vessel. Therefore, these two valves are of the Event V configuration. Valves CF-V5A/B and

CF-V4A/B are in the line from the core flood tanks to the reactor vessel. A pressure isolation failure of CF-V4A/B does not lead to a LOCA outside containment. Therefore, CF-V4A/B is not included in Technical Specification 3.1.6.10. However, TMI-1 has elected to test these valves for the pressure isolation function on the same frequency as CF-V5A/B and DH-V22A/B.

The NRC's Technical Evaluation Report (TER) prepared by Franklin Institute states that the testing frequency of CF-V5A/B and DH-V22A/B shall be prior to achieving hot shutdown following a cold shutdown of greater than 72 hours duration unless testing has been performed within the previous 9 months, and prior to achieving hot shutdown after returning the valve to service following maintenance, repair, or replacement work.

The TER provides a comprehensive study and evaluation of the specific problem related to pressure isolation. Since the TER has specified and judged adequate the above testing frequency, there is reasonable assurance that these valves will perform their pressure barrier function.

3.1.1.3.2 Evaluation--The staff agrees with the licensee's proposal to verify the pressure boundary isolation function of valves CF-V5A/B at nine month intervals and, therefore, relief should be granted from the requirement of Section XI that states that in the case of frequent cold shutdowns, these valves need not be exercised more often than once every three months. The staff has previously reviewed and approved the licensee's proposed alternate test frequency.

3.1.1.3.3 Conclusion--The staff concludes that the previously approved alternate testing of verifying the pressure boundary isolation function of these valves at nine month intervals should be sufficient to demonstrate valve integrity. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

3.1.1.4 Relief Request. The licensee has requested relief from exercising valves CF-V5A/B, core flood and low pressure injection checks,

in accordance with the requirements of Section XI, Paragraphs IWV-3400 and -3520, and proposed to partial-stroke exercise these valves each cold shutdown and to utilize a sample disassembly/inspection program for the valve group CF-V5A/B and CF-V4A/B.

3.1.1.4.1 Licensee's Basis for Requesting Relief--CF-V5A/B's dual function is to provide LPI and core flooding. Immediately upstream of CF-V5A/B is CF-V4A/B. CF-V4A/B and CF-V5A/B see essentially the same service condition and they are the same size, manufacturer, and catalog number. CF-V4B was disassembled in November 1983 and was found to be in satisfactory condition. This disassembly of CF-V4B provides further evidence that CF-V5A/B can open fully if needed.

CF-V4A or CF-V4B or CF-V5A or CF-V5B (1 of the four) will be disassembled each 10 years for an inspection. If degradation which would make the valve's full-stroke capability questionable is found, then the remaining three valves will be disassembled and inspected during that outage.

3.1.1.4.1 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the exercising requirements of Section XI for valves CF-V5A/B. These valves cannot be exercised during power operation because the decay heat removal pumps cannot overcome reactor coolant system pressure. Additionally, these valves cannot be full-stroke exercised during cold shutdowns or refueling outages utilizing only the decay heat removal pumps because these valves are also required to accommodate the much higher discharge rate from the core flood tanks. In the October 23, 1984 Supplement SER, the staff agreed to the licensee's proposal of partial-stroke exercising CF-V5A/B during cold shutdowns and refueling outages and a sample disassembly/inspection program for the valve group CF-V5A/B and CF-V4A/B because all four valves are the same size, manufacturer, and catalog number and also are subjected to essentially identical service conditions. One of these four valves will be disassembled each ten years for inspection and if degradation is found that would make the valve's full-stroke capability questionable, then the remaining three valves in the group will be disassembled and inspected

during that same outage. The staff has previously reviewed and approved the licensee's alternate test frequency.

3.1.1.4.3 Conclusion--The staff concludes that the licensee's previously approved exercising and inspection program should be sufficient to demonstrate proper valve operability. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

3.2 Chemical Sampling and OTSG Chemical Cleaning System

3.2.1 Category A/C Valves

3.2.1.1 Relief Request. The licensee has requested relief from exercising valve CA-V192, reactor coolant pump seal supply check, in accordance with the requirements of Section XI, Paragraphs IWV-3400 and -3522, and proposed to verify valve closure (its safety position) during each refueling.

3.2.1.1.1 Licensee's Basis for Requesting Relief--During normal plant operation, check valve CA-V192 is open supplying 100 cc/min reclaimed water purge to the No. 3 seal of each reactor coolant pump. This purge supply was provided in the original design to enhance RC pump seal reliability but is not required to maintain seal integrity and is therefore isolated on reactor building containment isolation signals. CA-V192's only safety function is to close to provide containment isolation. The containment isolation function will be verified each refueling by leak testing per SP 1303-11.18.

3.2.1.1.2 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the exercising requirements of Section XI for valve CA-V192. The licensee has demonstrated that, due to plant design, the only method available to verify valve closure (its safety position) is leak testing. This valve is not equipped with valve position indication and some of the required test connections are located inside containment.

3.2.1.1.3 Conclusion--The staff concludes that the proposed alternate testing of verifying valve closure during the performance of leak rate testing at refueling outages should demonstrate proper valve operability. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

3.2.2 Category C Valves

3.2.2.1 Relief Request. The licensee has requested relief from exercising valve CA-V177, makeup pump boric acid suction supply check, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to full-stroke exercise this valve during each refueling outage.

3.2.2.1.1 Licensee's Basis for Requesting Relief--The only method of functionally testing check valve CA-V177 during normal operation is to inject concentrated boric acid into the reactor coolant makeup system producing reactivity changes. This would adversely affect plant operation and result in significant volumes of additional radioactive waste. Testing this valve during each cold shutdown is not warranted because of the radioactive waste generated. The above valve is associated with the concentrated boric acid system. Also the system for this valve is not relied upon for accident mitigation in Chapter 14 of the TMI-1 FSAR. The borated water storage tank is the accident source of borated water via LPI or HPI. However, general design criteria does require a concentrated boric acid injection system. In conclusion, GPUN believes that refueling interval testing will assure the operation alreadiness of the above valve.

3.2.2.1.2 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the exercising requirements of Section XI for valve CA-V177. The licensee has demonstrated that exercising this valve during power operation would require pumping concentrated boric acid through it and from there into the reactor coolant system and would result in reactor power transients and a possible reactor shutdown. Additionally, full-stroke exercising this valve during cold shutdowns could delay reactor startup due to the need to return the primary coolant boron concentration to within the operating limits.

3.2.2.1.3 Conclusion--The staff concludes that the proposed alternate testing of full-stroke exercising this valve during refueling outages should be sufficient to demonstrate proper valve operability. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

3.3 Condensate System

3.3.1 Category C Valves

3.3.1.1 Relief Request. The licensee has requested relief from exercising valves CO-V16A/B, emergency feedwater pumps condensate suction supply checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to partial-stroke exercise these valves quarterly and to full-stroke exercise them each refueling outage and following each cold shutdown that exceeds thirty days in length.

3.3.1.1.1 Licensee's Basis for Requesting Relief--The above valves will be full service tested on a refueling basis in conjunction with Technical Specification 4.9.1.6 in accordance with Surveillance Procedure No. 1303-11.42. This procedure injects oxygenated water from the condensate storage tanks through the emergency feed water pumps to the OTSGs and verifies the accident design flow rate. TMI-1 must limit the exposure of the secondary side of the OTSGs to oxygentated water. It is not acceptable to challenge the OTSG tubes with oxygentated water in order to test the above valves more frequently than the Technical Specification requirement. The Technical Specification testing frequency meets the intent of ASME Section XI requirements. The basis of Technical Specification 4.9.1.6 states that refueling or cold shutdown testing, when the cold shutdown exceeds 30 days, is adequate to insure that overall EFW system functional capability is maintained.

3.3.1.1.2 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the exercising requirements of Section XI for valves CO-V16A/B. The licensee has demonstrated that addition of low quality water to the steam generators must be minimized in

order to limit the effects of oxygen on the steam generator tubes as much as possible. The licensee's full-stroke exercising frequency for these valves is being performed in accordance with the station Technical Specifications and those Technical Specifications have been previously reviewed and approved by the NRC staff.

3.3.1.1.3 Conclusion--The staff concludes that the proposed alternate testing of full-stroke exercising these valves following each cold shutdown of longer than thirty days and during each refueling outage should be sufficient to demonstrate proper valve operability. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

3.4 Decay Heat Removal System

3.4.1 Category A/C Valves

3.4.1.1 Relief Request. The licensee has requested relief from testing valves DH-V22A/B, decay heat removal loop injection checks, in accordance with the requirements of Section XI, Paragraphs IWV-3400 and -3522, and proposed to full-stroke both valves open during each cold shutdown and proposed to verify closure of these valves during cold shutdowns every nine months.

3.4.1.1.1 Licensee's Basis for Requesting Relief--Check valves DH-V22A/B will not be tested on a quarterly frequency during normal plant operations because there is no method of opening DH-V22A/B. These valves are on the discharge side of decay heat removal pumps DH-P1A/B, which produce only approximately 200 psig, therefore, it is not possible to overcome normal RCS pressure (2155 psig) with DH-P1A/B.

The Reactor Safety Study (RSS), WASH-1400, identified a PWR intersystem loss of coolant accident (LOCA) which is a significant contributor to risk or core melt accidents (Event V). The design examined in the RSS contained in-series check valves isolating the high pressure primary coolant system (PCS) from the low pressure injection (LPI) system

piping. The scenario which leads to the Event V accident is initiated by the failure of these check valves to function as a pressure isolation barrier. This causes an overpressurization and rupture of the LPI low pressure piping which results in a LOCA that bypasses containment.

Valves CF-V5A/B and DH-V22A/B are inside containment and are located in the supply line from the LPI pumps to the reactor vessel. Therefore, these two valves are of the Event V configuration. Valves CF-V5A/B and CF-V4A/B are in the line from the core flood tanks to the reactor vessel. A pressure isolation failure of CF-V4A/B does not lead to a LOCA outside containment. Therefore, CF-V4A/B is not included in Technical Specification 3.1.6.10. However, TMI-1 has elected to test these valves for the pressure isolation function on the same frequency as CF-V5A/B and DH-V22A/B.

The NRC's Technical Evaluation Report (TER) prepared by Franklin Institute states that the testing frequency of CF-V5A/B and DH-V22A/B shall be prior to achieving hot shutdown following a cold shutdown of greater than 72 hours duration unless testing has been performed within the previous 9 months, and prior to achieving hot shutdown after returning the valve to service following maintenance, repair, or replacement work.

The TER provides a comprehensive study and evaluation of the specific problem related to pressure isolation. Since the TER has specified and judged adequate the above testing frequency, there is reasonable assurance that these valves will perform their pressure barrier function.

3.4.1.1.2 Evaluation--The staff agrees with the licensee's proposal to full-stroke open valves DH-V22A/B during each cold shutdown and to verify their pressure boundary isolation at nine month intervals and, therefore, relief should be granted from the requirement of Section XI that states that in the case of frequent cold shutdowns, these valves need not be exercised more often than once every three months. These valves are simple check valves and are not equipped with position indication, therefore, the only method available to verify closure is leak testing

which is performed at nine month intervals. The staff has previously reviewed and approved this proposed alternate test frequency.

3.4.1.1.3 Conclusion--The staff concludes that the proposed alternate testing of full-stroking these valves open each cold shutdown and verifying their closure at nine month intervals should be sufficient to demonstrate valve integrity. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

3.4.2 Category B Valves

3.4.2.1 Relief Request. The licensee has requested relief from exercising valves DH-V6A/B in accordance with the requirements of Section XI, Paragraph IWV-3412(a), and proposed to test these valves each refueling outage.

3.4.2.1.1 Licensee's Basis for Requesting Relief--Prior to cycling DH-V6A and B, the reactor building sump must be drained then blank flanges weighing ~140 lbs must be installed in the sump on the piping leading to DH-V6A/B. In order to install the blank flange, considerable time and effort is required (i.e., maintenance personnel must enter the sump to install the blank flanges). After the test, the blank flanges must be removed. There are no isolation valves other than DH-V6A/B that isolate the reactor building sump from the DH System. The blank flanges are installed to prevent water in the DH piping from flooding the reactor building when DH-V6A/B is opened for stroke timing. If the blank flanges were not installed, water would flow through the 14" line for ~140 seconds while DH-V6A/B is opened and then closed. Because of ALARA concerns (~300 MR for installation and removal of the flanges), the proper frequency for stroke timing DH-V6A/B is refueling. Therefore, it is impractical to test DH-V6A/B on a cold shutdown frequency. In addition, a

refueling interval stroke time test since 1978 has not shown any problem with DH-V6A/B.

3.4.2.1.2 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the exercising requirements of Section XI for valves DH-V6A/B. The licensee has demonstrated that much effort is required to align the decay heat removal system to allow exercising these two valves because the pump suction piping cannot be isolated from the reactor building sump and the large volume of water in the piping would cause the sump to overflow into the reactor building when the valves were opened. This test lineup cannot be utilized during power operation because the containment cannot be entered to install the blank flanges. The staff also agrees that this test could delay reactor startup if performed during cold shutdowns.

3.4.2.1.3 Conclusion--The staff concludes that the proposed alternate testing of full-stroke exercising these valves during refueling outages when ample time is available to install and then remove the blank flanges should be sufficient to demonstrate proper valve operability. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

3.4.3 Category C Valves

3.4.3.1 Relief Request. The licensee has requested relief from exercising valves DH-V16A/B, decay heat removal pump discharge checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to partial-stroke exercise these valves quarterly, to full-stroke exercise each valve every other cold shutdown, and to full-stroke both valves each refueling outage.

3.4.3.1.1 Licensee's Basis for Requesting Relief--Either DH-V16A or DH-V16B will be full-stroke tested on a cold shutdown frequency by the normal operation of providing decay heat removal flow of $\geq$3000 gpm. In

addition, both A and B valves will be full-stroke tested each refueling interval.

The full-stroke test for the idle DH-V16 would require a deliberate shift of decay heat removal (DHR) trains. For cold shutdowns of short duration, it is impractical to require a complete system realignment to the opposite DHR system for the sole purpose of cycling this single check valve at design system flow rate. The basis for this conclusion is that:

(A) The system realignment requires manipulation of several large manual valves (DH-V12A and B) inside radiation areas where dose rate could be as high as 500 mR/hr. Stay time in the radiation area to cycle one DH-V12 is 15 minutes for three men. The extra radiation exposure and rad waste generation to cycle this one check valve (DH-V16A or B) is not consistent with ALARA principles.

(B) The system realignment may be critical path time on a recovery from a forced outage. The cost of delaying startup in order to stroke this one check valve makes testing at each cold shutdown impractical.

(C) A requirement to full-stroke this check valve each cold shutdown (if not performed within the last 3 months) would require the start of a large Engineered Safeguards (E.S.) pump and motor for the sole purpose of full-stroking this one check valve. The extra wear on this E.S. system merely to full-stroke one check valve is undesirable.

(D) For normal planned cold shutdowns, routine maintenance activities have and will require that each DHR system be operated while the other is down for maintenance. When this occurs both DH-V16A and B will be full-stroked.

3.4.3.1.2 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the Section XI requirement to full-stroke exercise both DH-V16A/B each cold shutdown. These valves are

partial-stroke exercised during quarterly pump testing and each valve is full-stroke exercised every other cold shutdown because the decay heat removal system used is alternated each shutdown. Additionally, each of these valves is full-stroke exercised during refueling outages. The staff agrees that, due to system design and the manual operations required to shift systems, reactor startup could be delayed if each valve were to be full-stroke exercised each cold shutdown.

3.4.3.1.3 Conclusion--The staff concludes that the proposed alternate testing of partial-stroke exercising these valves quarterly, full-stroke exercising each valve every other cold shutdown, and full-stroke exercising each valve during refueling outages should be sufficient to demonstrate proper valve operability. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

3.4.3.2 Relief Request. The licensee has requested relief from exercising valves DH-V14A/B, decay heat removal and reactor building spray pumps borated water storage tank suction checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to partial-stroke exercise these valves quarterly and to exercise them utilizing the low pressure injection flow rate during refueling outages.

3.4.3.2.1 Licensee's Basis for Requesting Relief--Check valve DH-V14A/B supplies borated water from the borated water storage tank (BWST) to the decay heat removal pumps (DH-VP1A/B) and the reactor building spray pumps (BS-P1A/B). DH-P1A/B are TMI-1's low pressure injection (LPI) pumps. Each refueling, Surveillance Procedure 1303-11.54 verifies LPI flow rate of $\geq$3000 gpm through DH-V14A/B. The accident design flow rate through DH-P1A/B is 3000 gpm and the accident design flow rate for BS-P1A/B is 1500 gpm. Therefore, SP 1303-11.54 verifies that DH-V14A/B can pass 2/3 = 3000 gpm/4500 gpm of total DH and BS flow rate. It is impractical to structure a test where 1.) a DH pump is injecting 3000 gpm from the BWST through DH-V14A/B to the reactor vessel, 2.) a BS pump is recirculating the BWST through DH-V14A/B at 1500 gpm, and 3.) the second DH pump is providing its decay heat removal function by recirculating the reactor vessel. The

complexity of this evolution, time, and effort do not warrant this type of testing. Conceivably, this testing could be accomplished by filling the transfer canal part way then switching to the next loop to be tested. The risk of incorrect valve lineup leading to pump damage and hours spent switching loops and verifying valve lineups do not make such testing desirable. There are ALARA concern when switching loops. An additional concern is refueling water clarity/cleanup due to crud that will be broken loose during the 3000 gpm injection into the reactor vessel. GPUN believes the burden of such testing is not warranted and that such testing is impractical. The refueling (2/3) flow rate test demonstrates that DH-V14A/B has the capability to open fully, if needed.

These valves will be tested each refueling interval per Surveillance Procedure No. 1303-11.54 in accordance with Technical Specification 4.5.2.2b.

The refueling test frequency assures that the LPI System can supply equal or greater flow than the flow assumed in the Safety Analysis. This Technical Specification test frequency should be adequate for ASME Section XI.

3.4.3.2.2 Evaluation--The staff does not agree that the licensee's proposed partial-stroke exercise testing during refueling outages adequately demonstrates the full-stroke capability of valves DH-V14A/B because this test does not move the check valve disk to the full flow position and does not assure that it will move there when required by system demands. The licensee has stated that full-stroke exercising these valves with system flow is too complicated and time consuming to be performed during refueling outages, therefore, the staff will require that a valve sampling disassembly/inspection utilizing a manual full-stroke of the disk be utilized to verify the check valves' full-stroke capability. The sampling technique requires that each valve in the group must be of the same design (manufacturer, size, model number, and materials of construction) and must have the same service conditions. Additionally, at each disassembly it must be verified that the disassembled

valve is capable of full-stroking and that its internals are structurally sound (no loose or corroded parts).

A different valve of each group is required to be disassembled, inspected, and manually full-stroked at each refueling until the entire group has been tested. If it is found that the disassembled valve's full-stroke capability is in question, the remainder of the valves in that group must also be disassembled, inspected, and manually full-stroked at the same outage.

3.4.3.2.3 Conclusion--The staff concludes that a disassembly/inspection utilizing a manual full-stroke is the only method available to full-stroke exercise these valves. The licensee is required to perform these tests at each refueling outage on a sampling basis.

3.5 Emergency Feedwater System

3.5.1 Category B Valves

3.5.1.1 Relief Request. The licensee has requested relief from exercising valves EF-V4 and EF-V5, emergency feedwater pumps river water supply, in accordance with the requirements of Section XI, Paragraph IWV-3412(a), and proposed to full-stroke exercise them during refueling outages.

3.5.1.1.1 Licensee's Basis for Requesting Relief--EF-V4 and EF-V5 supply river water as a last resort to the emergency feedwater pumps (EF-P1, 2A/B). The function of the EFW system is to remove heat from the RCS when the main feedwater system is not available. Per Operating Procedure (OP 1106-6), EF-V4 and 5 are chained and locked shut and the breakers for the motor operators are open at the 480 volt power supply.

EF-V4 and 5 are opened by manual action if; (1) the condensate storage tanks, (2) condenser hotwell, (3) demineralized water storage tank (million gallon tank) are exhausted. The stroking of EF-V4 and 5 introduces river water, silt, and corrosives into the suction of the EF-P1, 2A/B. It is difficult to remove all river water from the suction piping once it has passed through EF-V4 and 5. The flush involves a slow fill and drain procedure using small vent and drain lines and valves. The numerous batch fill and drain operations (fill through EF-V14, drain through EF-V24, and vent through EF-V28A), which are required to minimize river water, silt, and corrosives would not be completely effective in removing the contaminants. The appropriate interval for this evolution is refueling.

3.5.1.1.2 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the exercising requirements of Section XI for valves EF-V4 and EF-V5. The licensee has demonstrated that these valves cannot be exercised during power operation or cold shutdown without introducing service water into the suction piping of the emergency feedwater pumps and from there into the steam generators. The service water contains impurities which would upset the secondary water chemistry and could cause chemical stress damage to the steam generators.

3.5.1.1.3 Conclusion--The staff concludes that the proposed alternate testing of full-stroke exercising these valves during refueling outages when ample time is available to completely flush the service water from the suction of the emergency feedwater pumps should be sufficient to demonstrate proper valve operability. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

3.5.2 Category C Valves

3.5.2.1 Relief Request. The licensee has requested relief from exercising valves EF-V11A/B, motor driven emergency feedwater pump discharge checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to full-stroke exercise these valves each

refueling outage and following each cold shutdown that exceeds thirty days in length.

3.5.2.1.1 Licensee's Basis for Requesting Relief--The above valves will be full service tested on a refueling basis in conjunction with Tech. Spec. 4.9.1.6 in accordance with Surveillance Procedure No. 1303-11.42. This procedure injects oxygenated water from the condensate storage tanks through the emergency feedwater pumps to the OTSGs and verifies the accident design flow rate. TMI-1 must limit the exposure of the secondary side of the OTSGs to oxygenated water. It is not acceptable to challenge the OTSG tubes with oxygenated water in order to test the above valves more frequently than the Technical Specification requirement. The Technical Specification testing frequency meets the intent of ASME Section XI requirements. The basis of Tech. Spec. 4.9.1.6 states that refueling or cold shutdown testing, when the cold shutdown exceeds 30 days, is adequate to insure that overall EFW system functional capability is maintained.

3.5.2.1.2 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the exercising requirements of Section XI for valves EF-V11A/B. The licensee has demonstrated that, due to system design, these valves cannot be partial-stroke exercised during pump testing because the minimum flow line branches off upstream and no flow path exists. Additionally, cold feedwater cannot be injected into the steam generators due to thermal shock to the auxiliary feedwater nozzles. These valves will not be exercised each cold shutdown because addition of low quality water to the steam generators must be minimized in order to limit the effects of oxygen on the steam generator tubes as much as possible. The licensee's full-stroke exercising frequency for these valves is being performed in accordance with the station Technical Specifications and those Technical Specifications have been previously reviewed and approved by the NRC staff.

3.5.2.1.3 Conclusion--The staff concludes that the proposed alternate testing of full-stroke exercising these valves following each cold shutdown of longer than thirty days and during each refueling outage

should be sufficient to demonstrate proper valve operability. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

3.5.2.2 Relief Request. The licensee has requested relief from exercising valves EF-V12A/B, emergency feedwater steam generator injection header checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to full-stroke exercise these valves each refueling outage and following each cold shutdown that exceeds thirty days in length.

3.5.2.2.1 Licensee's Basis for Requesting Relief--The above valves will be full service tested on a refueling basis in conjunction with Tech. Spec. 4.9.1.6 in accordance with Surveillance Procedure No. 1303-11.42. This procedure injects oxygenated water from the condensate storage tanks through the emergency feed water pumps to the OTSGs and verfies the accident design flow rate. TMI-1 must limit the exposure of the secondary side of the OTSGs to oxygenated water. It is not acceptable to challenge the OTSG tubes with oxygenated water in order to test the above valves more frequently than the Technical Specification requirement. The Technical Specification testing frequency meets the intent of ASME Section XI requirements. The basis of Tech. Spec. 4.9.1.6 states that refueling or cold shutdown testing, when the cold shutdown exceeds 30 days, is adequate to insure that overall EFW system functional capability is maintained.

3.5.2.2.2 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the exercising requirements of Section XI for valves EF-V12A/B. The licensee has demonstrated that, due to system design, these valves cannot be partial-stroke exercised during pump testing because the minimum flow line branches off upstream and no flow path exists. Additionally, cold feedwater cannot be injected into the steam generators due to thermal shock to the auxiliary feedwater nozzles. These valves will not be exercised each cold shutdown because addition of low quality water to the steam generators must be minimized in order to limit the effects of oxygen on the steam generator tubes as much

as possible. The licensee's full-stroke exercising frequency for these valves is being performed in accordance with the station Technical Specifications and those Technical Specifications have been previously reviewed and approved by the NRC staff.

3.5.2.2.3 Conclusion--The staff concludes that the proposed alternate testing of full-stroke exercising these valves following each cold shutdown of longer than thirty days and during each refueling outage should be sufficient to demonstrate proper valve operability. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

3.5.2.3 Relief Request. The licensee has requested relief from exercising valve EF-V13, turbine driven emergency feedwater pump discharge check, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to partial-stroke exercise this valve quarterly and to full-stroke exercise it each refueling outage and following each cold shutdown that exceeds thirty days in length.

3.5.2.3.1 Licensee's Basis for Requesting Relief--The above valve will be full service tested on a refueling basis in conjunction with Tech. Spec. 4.9.1.6 in accordance with Surveillance Procedure No. 1303-11.42. This procedure injects oxygenated water from the condensate storage tanks through the emergency feedwater pumps to the OTSGs and verifies the accident design flow rate. TMI-1 must limit the exposure of the secondary side of the OTSGs to oxygenated water. It is not acceptable to challenge the OTSG tubes with oxygenated water in order to test the above valve more frequently than the Technical Specification requirement. The Technical Specification testing frequency meets the intent of ASME Section XI requirements. The basis of Tech. Spec. 4.9.1.6 states that refueling or cold shutdown testing, when the cold shutdown exceeds 30 days, is adequate to insure that overall EFW system functional capability is maintained.

3.5.2.3.2 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the exercising requirements of Section XI for valve EF-V13. The licensee has demonstrated that, due to system design, this valve is partial-stroke exercised quarterly during pump testing, however, it cannot be full-stroke exercised at that time because cold feedwater cannot be injected into the steam generators due to thermal shock to the auxiliary feedwater nozzles. This valve cannot be exercised during each cold shutdown because steam is not available to drive the emergency feedwater pump turbine. Additionally, this valve will not be full-stroke exercised following each cold shutdown when steam is available because addition of low quality water to the steam generators must be minimized in order to limit the effects of oxygen on the steam generator tubes as much as possible. The licensee's full-stroke exercising frequency for this valve is being conducted in accordance with the station Technical Specifications and those Technical Specifications have been previously reviewed and approved by the NRC staff.

3.5.2.3.3 Conclusion--The staff concludes that the proposed alternate testing of partial-stroke exercising this valve during pump testing and full-stroke exercising it following each cold shutdown of longer than thirty days and during each refueling outage should be sufficient to demonstrate proper valve operability. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

3.6 Feedwater System

3.6.1 Category C Valves

3.6.1.1 Relief Request. The licensee has requested relief from exercising valves FW-V12A/B, main feedwater header checks, in accordance with the requirements of Section XI, Paragraph IWV-3500, and proposed to develop a test method to utilize to verify closure.

3.6.1.1.1 Licensee's Basis for Requesting Relief--During plant operation, these valves are always open supplying feedwater to the OTSGs. Therefore it is not possible to part-stroke or full-stroke these valves closed during plant operation. Both FW-V12A/B were disassembled in 1980 after approximately four years of service and were found to be in satisfactory and operable condition.

As discussed with NRC in a conference call on May 21, 1984, GPUN will develop and implement a test method(s) to verify the operability (closure capability) of FW-V12A/B before startup from Cycle 6 refueling outage. If the test method which was discussed at that time is not feasible, GPUN will pursue other alternatives. In the interim, results of the 1980 disassembly of both FW-V12A/B provide a reasonable basis for assurance that FW-V12A/B will remain operable.

3.6.1.1.2 Evaluation--The staff does not agree with the licensee's basis and, therefore, relief should not be granted from the exercising requirements of Section XI for valves FW-V12A/B. The staff does agree that these valves cannot be verified to shut quarterly during power operation because a reactor trip would result. The licensee has not addressed testing these valves during cold shutdowns; however, it is the staff's opinion that an alternate method available to verify valve closure is leak testing and that type of testing may delay reactor startup if performed during cold shutdowns. The licensee has not described the test method that may be utilized; therefore, the staff will require that a valve leak testing procedure be developed and implemented to verify closure of these valves during refueling outages.

3.6.1.1.3 Conclusion--The staff concludes that leak testing is an acceptable alternate method to verify closure of these valves. The licensee is required to perform these tests at each refueling outage.

3.7 Intermediate Cooling System

3.7.1 Category A/C Valves

3.7.1.1 Relief Request. The licensee has requested relief from exercising valves IC-V16, control rod drive cooling coil supply check, and IC-V18, letdown coolers and reactor coolant pump coolers supply check, in accordance with the requirements of Section XI, Paragraphs IWV-3400 and -3522, and proposed to verify valve closure (their safety position) during refueling outages.

3.7.1.1.1 Licensee's Basis for Requesting Relief--These check valves are CIVs that remain open during normal plant operation to supply cooling water to the CRD cooling coils and the letdown coolers. It is not possible to stop flow in these lines for a test of IC-V16 and IC-V18 without upsetting the reactor plant. The safety function of IC-V16 and IC-V18 is to close and act as CIVs. Therefore, a leak rate Appendix J test of these valves will be conducted each refueling outage.

3.7.1.1.2 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the exercising requirements of Section XI for valves IC-V16 and IC-V18. These check valves cannot be taken out of service during power operation or cold shutdown because damage could result from loss of cooling flow to the control rod drive mechanisms and the reactor coolant pumps. The licensee has demonstrated that, due to plant design, the only method available to verify valve closure (their safety position) is leak testing. These valves are not equipped with position indication and some of the required test connections are located inside containment.

3.7.1.1.3 Conclusion--The staff concludes that the proposed alternate testing of verifying valve closure during the performance of leak rate testing at refueling outages should demonstrate proper valve operability. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

3.8 Main Steam System

3.8.1 Category B Valves

3.8.1.1 Relief Request. The licensee has requested relief from full-stroke exercising and stroke timing valve MS-V6, emergency feedwater pump turbine steam supply, in accordance with the requirements of Section XI, Paragraph IWV-3412 and -3413, and proposed to verify proper valve operation by verifying proper operation of the emergency feedwater pump turbine.

3.8.1.1.1 Licensee's Basis for Requesting Relief--It is not possible to full-stroke and time MS-V6 since its stroke has been mechanically set to open no more than 65% to protect EF-U1. EF-U1 is the steam drive unit for the emergency feedwater pump (EF-P1). MS-V6 is the steam control supply valve to EF-U1. The only method of opening MS-V6 to 65% open is to change the setpoint of the pressure controller (PC-5) for MS-V6. It is impractical to change the setpoint of an important to safety component on a quarterly frequency. Changing the setpoint of PC-5 could place the plant in an unsafe condition by the loss of EF-P1 if the controller was not returned to the correct setpoint. GPUN believes it impractical to change the setpoint of PC-5 on a quarterly frequency. Therefore, MS-V6 will be part-stroke tested and fail safe tested each quarter when main steam is available to run EF-P1. As an alternative to stroke timing MS-V6, the startup time of EF-P1 will be measured each quarter to assure that the startup time is within the time specified in the FSAR (~40 seconds). This will assure the operational readiness of MS-V6.

3.8.1.1.2 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the full-stroke exercising and stroke timing requirements of Section XI for valve MS-V6. This valve is positioned by the pressure controller to control the steam pressure at the emergency feedwater pump turbine inlet, therefore, the valve position will vary with steam supply pressure. Since the valves' position will vary, valve stroke times would also vary and stroke timing this valve would not provide repeatable information to utilize to monitor valve

degradation. Additionally, this valve cannot be physically full-stroke exercised because it has been mechanically blocked to prevent overspeed of the turbine if the pressure controller attempted to drive it full open. The staff agrees that if the emergency feedwater pump starts within the required time, then valve MS-V6 has performed its safety-related function satisfactorily.

3.8.1.1.3 Conclusion--The staff concludes that the proposed alternate testing of verifying that the emergency feedwater pump turbine starts within the required time limit should be sufficient to demonstrate proper valve operability. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

3.8.2 Category C Valves

3.8.2.1 Relief Request. The licensee has requested relief from exercising valves MS-V9A/B, emergency feedwater pump turbine steam supply checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to partial-stroke exercise these valves quarterly and to disassemble and inspect one valve or the other at ten year intervals.

3.8.2.1.1 Licensee's Basis for Requesting Relief--These check valves supply steam from the OTSGs to EF-U1. EF-U1 is the turbine drive unit for the steam driven emergency feedwater pump (EF-P1). During a cold shutdown, it is impractical to stroke test these valves (full-stroke or partial-stroke) since the steam which would be needed to operate these valves is not available during cold shutdown conditions.

Full-stroke testing of MS-V9A/B is also impractical due to other limitations during plant conditions when steam is available. EF-P1 must be tested using the recirculation line to the condensate storage tank bypassing the OTSG. This is to prevent degradation of the OTSGs by excessive thermal stress cycling of the emergency feedwater nozzles. The number of thermal cycles on the emergency feedwater nozzles is limited to

(40) cycles over the life of the plant. Due to the small size of the recirculation line, EF-P1 cannot be tested at full capacity (MS-V9A/B will not open fully). Urder these restrictions it is only possible to obtain approximately 48% flow which corresponds to about 36% opening of MS-V9A/B.

Plant modifications which would be required to perform full-stroke tests of MS-V9A/B either by piping in auxiliary steam or by replacing the recirculation piping with larger piping capable of recirculating the full EFW pump capacity would introduce exorbitant cost. GPUN has not fully examined the cost and safety impact of modifications which would be required to full-stroke MS-V9A/B, however, does not feel that such modifications would be beneficial.

MS-V9B was disassembled for IST examination purposes in late 1984 and found to be in excellent condition. Since no indication of potential degradation was found, this provides additional assurance of the continued capability of MS-V9A/B to open fully when needed. In addition, MS-V9A will be disassembled and inspected at the next refueling outage (end of cycle 5 refueling outage). Thereafter, either MS-V9A or B will be disassembled/inspected on a 10 year basis (next inspection due ~1994) if the inspection of MS-V9A proves satisfactory. If degradation is found which would make the valve's full-stroke capability questionable, then the other valve (MS-V9A or B) would be disassembled and inspected during that same outage. It is impractical to test MS-V9A/B when steam is not available and it is also impractical to perform a full-stroke test on MS-V9A/B. GPUN concludes that quarterly testing of MS-V9 A/B at 48% flow (36% open) when steam is available and disassembly each 10 years meets the intent of the ASME Code Section XI and the relief which is being requested is therefore justified.

3.8.2.1.2 Evaluation--The staff does not agree with the licensee's proposed alternate testing frequency and, therefore, relief should not be granted from the exercising requirements of Section XI for valves MS-V9A/B. The staff agrees that these valves cannot be full-stroke exercised during power operation because the only full flow path is into the steam generators and the colder water being pumped could damage the

emergency feedwater nozzles. Also, the pump recirculation line cannot accommodate the flow required to full-stroke exercise the steam supply checks. However, the staff does not agree that the licensee's proposed quarterly partial-stroke exercise testing adequately demonstrates the full-stroke capability of these valves because this testing does not move the check valve disk to the full flow position and does not assure that it will move there when required by system demands. The staff agrees that valve disassembly/inspection on a sampling basis is an acceptable alternate method to utilize to demonstrate operability but does not agree with the licensee's proposed ten year inspection frequency and will require that the sample disassembly/inspection be performed at a refueling outage frequency.

3.8.2.1.3 Conclusion--The staff concludes that a disassembly/inspection utilizing a manual full-stroke is the only method available to full-stroke exercise these valves. The licensee is required to perform these tests at each refueling outage on a sampling basis.

3.9 Makeup System

3.9.1 Category A/C Valves

3.9.1.1 Relief Request. The licensee has requested relief from exercising valve MU-V116, reactor coolant pump seal injection supply check, in accordance with the requirements of Section XI, Paragraphs IWV-3400 and -3522, and proposed to verify valve closure (its safety position) during leak testing each refueling outage.

3.9.1.1.1 Licensee's Basis for Requesting Relief--During normal plant operation, check valve MU-V116 is open supplying approximately 32 gpm of seal injection to the four reactor coolant pumps. Reactor coolant pump seal injection cannot be stopped to verify that MU-V116 closes each quarter without damaging the reactor coolant pump seals. MU-V116's only safety function is to close to provide containment isolation. The containment isolation function will be verified each refueling per S.P. 1303-11.18.

3.9.1.1.2 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the exercising requirements of Section XI for valve MU-V116. The licensee has demonstrated that this valve cannot be removed from service during power operation because the reactor coolant pumps must be supplied with seal water to prevent pump seal damage. The licensee also has demonstrated that, due to plant design, the only method available to verify valve closure (its safety position) is leak testing. This valve is not equipped with position indication and some of the required test connections are located inside containment.

3.9.1.1.3 Conclusion--The staff concludes that the proposed alternate testing of verifying valve closure during the performance of leak rate testing at refueling outages should demonstrate proper valve operability. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

3.9.2 Category B/C Valves

3.9.2.1 Relief Request. The licensee has requested relief from full-stroke exercising valves MU-V14A/B, makeup pump borated water storage tank suction stop checks, in accordance with the requirements of Section XI, Paragraphs IWV-3400 and -3522, and proposed to full-stroke exercise these valves during refueling outages.

3.9.2.1.1 Licensee's Basis for Requesting Relief--These valves will be full-stroke exercised on a refueling interval basis in conjunction with Surveillance Procedure No. 1303-11.8 in accordance with Technical Specification 4.5.2.1. The refueling interval test pumps borated water from the BWST to the reactor vessel and verifies accident design flow rate. The refueling test frequency specified by the Technical Specifications should be adequate for ASME Section XI.

3.9.2.1.2 Evaluation--The staff does not agree with the licensee's basis and, therefore, relief should not be granted from the exercising requirements of Section XI for valves MU-V14A/B. The licensee is presently full-stroke exercising the operators on these valves

quarterly; however, since these valves are stop-check valves, this test does not exercise the valve disk. The licensee has supplied no technical information to justify the proposed refueling outage test frequency, therefore, the licensee will be required to full-stroke exercise these valves at least during cold shutdowns. The staff agrees that these valves should not be partial- or full-stroke exercised during power operation because boron addition from the borated water storage tank could upset primary system boron control and could result in a reactor shutdown. In addition to loss of boron control, full-stroke exercising during power operation could result in loss of pressurizer level control and a reactor trip. These conditions should not be a concern during cold shutdowns and these valves can be full-stroke exercised at that time.

3.9.2.1.3 Conclusion--The staff concludes that the licensee should continue to full-stroke exercise the operators on these valves quarterly and should full-stroke exercise the disks of these stop-check valves during cold shutdowns and refueling outages. The licensee should revise the IST program to include this required testing.

3.9.3 Category C Valves

3.9.3.1 Relief Request. The licensee has requested relief from exercising valves MU-V73A/B/C, makeup pump discharge checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to partial-stroke exercise them quarterly and to full-stroke exercise them during refueling outages.

3.9.3.1.1 Licensee's Basis for Requesting Relief--During normal operation, makeup pump MU-P1A, B, or C supplies normal makeup to the reactor coolant system, reactor coolant pump seal injection, and recirculation flow. The total of these flow rates is much less than accident design flow rate and this is considered a partial-stroke test of MU-V73A/B/C. No other testing method is practical during normal plant operation because of thermal shock to the injection nozzles. These valves will be full-stroke exercised on a refueling interval basis in conjunction with Surveillance Procedure No. 1303-11.8 in accordance with Technical

Specification 4.5.2.1. The refueling interval test pumps borated water from the BWST to the reactor vessel and verifies accident design flow rate. The refueling test frequency specified by the Technical Specifications should be adequate for ASME Section XI.

3.10.3.1.2 Evaluation--The staff does not agree with the licensee's proposed alternate test frequency because no technical information has been supplied to justify it, therefore, relief should not be granted to full-stroke exercise these valves only during refueling outages. The staff agrees that these valves cannot be full-stroke exercised during power operation because the thermal cycle could damage the injection nozzles. Also, a reactor trip could result if pressurizer level control were lost while full-stroke exercising these valves during power operation. However, the licensee has not provided a technical justification that explains why these valves cannot be full-stroke exercised during cold shutdowns because the conditions discussed above should not be a concern then and the valves could be full-stroke exercised.

3.9.3.1.3 Conclusion--The staff concludes that the licensee should continue to partial-stroke exercise these valves quarterly and should full-stroke exercise them during cold shutdowns in addition to the proposed refueling outage test interval. The licensee should revise the IST program to include this required testing.

3.9.3.2 Relief Request. The licensee has requested relief from exercising valves MU-V86A/B, high pressure injection loop B cold leg injection checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to full-stroke exercise these valves during refueling outages.

3.9.3.2.1 Licensee's Basis for Requesting Relief--Consideration of thermal shock to the injection nozzles prohibits testing these valves each quarter since the piping configuration provides no other flow path except pumping through these check valves to the injection nozzles. These valves will be full-stroke exercised on a refueling interval basis in conjunction with Surveillance Procedure No. 1303-11.8 in accordance with

Technical Specification 4.5.2.1. The refueling interval test pumps borated water from the BWST to the reactor vessel and verifies accident design flow rate. The refueling test frequency specified by the Technical Specifications should be adequate for ASME Section XI.

3.9.3.2.2 Evaluation--The staff does not agree with the licensee's proposed alternate test frequency because no technical information to justify it has been supplied, therefore, relief should not be granted to full-stroke exercise these valves only during refueling outages. The staff agrees that these valves cannot be partial- or full-stroke exercised during power operation because the only flow path available is into the reactor coolant system and the injection nozzles could be damaged. However, the licensee has not provided a technical justification that explains why these valves cannot be full-stroke exercised during cold shutdowns because then thermal stresses should not be a consideration.

3.9.3.2.3 Conclusion--The staff concludes that the licensee should full-stroke exercise these valves during cold shutdowns in addition to the proposed refueling outage test interval. The licensee should revise the IST program to include this required testing.

3.9.3.3 Relief Request. The licensee has requested relief from exercising valve MU-V94, normal makeup header injection check, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to partial-stroke exercise it quarterly and to full-stroke exercise it during refueling outages.

3.9.3.3.1 Licensee's Basis for Requesting Relief--This valve will be full-stroke exercised on a refueling interval basis in conjunction with Surveillance Procedure No. 1303-11.8 in accordance with Technical Specification 4.5.2.1. The refueling interval test pumps borated water from the BWST to the reactor vessel and verifies accident design flow rate. The refueling test frequency specified by the Technical Specifications should be adequate for ASME Section XI.

3.9.3.3.2 Evaluation--The staff does not agree with the licensee's basis and, therefore, relief should not be granted from the exercising requirements of Section XI for valve MU-V94. The licensee has provided no technical information that explains why this valve cannot be full-stroke exercised during power operation or cold shutdown.

3.9.3.3.3 Conclusion--The staff concludes that the licensee should full-stroke exercise this valve in accordance with the requirements of Section XI in addition to the proposed refueling outage test interval. The licensee should revise the IST program to include this required testing.

3.9.3.4 Relief Request. The licensee has requested relief from exercising valve MU-V95, high pressure injection loop A cold leg injection check, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to full-stroke it during refueling outages.

3.9.3.4.1 Licensee's Basis for Requesting Relief--Consideration of thermal shock to the injection nozzles prohibits testing this valve each quarter since the piping configuration provides no other flow path except pumping through this check valve to the injection nozzles. This valve will be full-stroke exercised on a refueling interval basis in conjunction with Surveillance Procedure No. 1303-11.8 in accordance with Technical Specification 4.5.2.1. The refueling interval test pumps borated water from the BWST to the reactor vessel and verifies accident design flow rate. The refueling test frequency specified by the Technical Specifications should be adequate for ASME Section XI.

3.9.3.4.2 Evaluation--The staff does not agree with the licensee's proposed alternate test frequency because no technical information to justify it has been supplied, therefore, relief should not be granted to full-stroke exercise these valves only during refueling outages. The staff agrees that this valve cannot be partial- or full-stroke exercised during power operation because the only flow path available is into the reactor coolant system and the injection nozzles could be damaged. However, the licensee has not provided a technical justification that explains why this valve cannot be full-stroke exercised

during cold shutdowns because then thermal stresses should not be a consideration.

3.9.3.4.3 Conclusion--The staff concludes that the licensee should full-stroke exercise this valve during cold shutdowns in addition to the proposed refueling outage test interval. The licensee should revise the IST program to include this required testing.

3.9.3.5 Relief Request. The licensee has requested relief from exercising valves MU-V107A/B/C/D, high pressure injection loop A and B cold leg injection checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to full-stroke exercise these valves during refueling outages.

3.9.3.5.1 Licensee's Basis for Requesting Relief--Consideration of thermal shock to the injection nozzles prohibits testing these valves each quarter since the piping configuration provides no other flow path except pumping through these check valves to the injection nozzles. These valves will be full-stroke exercised on a refueling interval basis in conjunction with Surveillance Procedure No. 1303-11.8 in accordance with Technical Specification 4.5.2.1. The refueling interval test pumps borated water from the BWST to the reactor vessel and verifies accident design flow rate. The refueling test frequency specified by the Technical Specifications should be adequate for ASME Section XI.

3.9.3.5.2 Evaluation--The staff does not agree with the licensee's proposed alternate test frequency because no technical information to justify it has been supplied, therefore, relief should not be granted to full-stroke exercise these valves only during refueling outages. The staff agrees that these valves cannot be partial- or full-stroke exercised during power operation because the only flow path available is into the reactor coolant system and the injection nozzles could be damaged. However, the licensee has not provided a technical justification that explains why these valves cannot be full-stroke exercised during cold shutdowns because then thermal stresses should not be a consideration.

3.9.3.5.3 Conclusion--The staff concludes that the licensee should full-stroke exercise these valves during cold shutdowns in addition to the proposed refueling outage test interval. The licensee should revise the IST program to include this required testing.

3.9.3.6 Relief Request. The licensee has requested relief from exercising valve MU-V220, high pressure injection loop A cold leg injection check, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to full-stroke exercise it during refueling outages.

3.9.3.6.1 Licensee's Basis for Requesting Relief--Consideration of thermal shock to the injection nozzles prohibits testing these valves each quarter since the piping configuration provides no other flow path except pumping through this check valve to the injection nozzles. This valve will be full-stroke exercised on a refueling interval basis in conjunction with Surveillance Procedure No. 1303-11.8 in accordance with Technical Specification 4.5.2.1. The refueling interval test pumps borated water from the BWST to the reactor vessel and verifies accident design flow rate. The refueling test frequency specified by the Technical Specifications should be adequate for ASME Section XI.

3.9.3.6.2 Evaluation--The staff does not agree with the licensee's proposed alternate test frequency because no technical information to justify it has been supplied, therefore, relief should not be granted to full-stroke exercise these valves only during refueling outages. The staff agrees that this valve cannot be partial- or full-stroke exercised during power operation because the only flow path available is into the reactor coolant system and the injection nozzles could be damaged. However, the licensee has not provided a technical justification that explains why this valve cannot be full-stroke exercised during cold shutdowns because then thermal stresses should not be a consideration.

3.9.3.6.3 Conclusion--The staff concludes that the licensee should full-stroke exercise this valve during cold shutdowns in addition to

the proposed refueling outage test interval. The licensee should revise the IST program to include this required testing.

3.10 Nuclear Service Closed Cooling System

3.10.1 Category A/C Valves

3.10.1.1 Relief Request. The licensee has requested relief from exercising valve NS-V11, reactor coolant pump motor cooling water supply check, in accordance with the requirements of Section XI, Paragraphs IWV-3400 and -3522, and proposed to verify valve closure (its safety position) during each refueling.

3.10.1.1.1 Licensee's Basis for Requesting Relief--During normal plant operation, this valve is open supplying cooling water to the reactor coolant pump motor coolers. Cooling water to the reactor coolant pump motor coolers cannot be isolated to verify NS-V11's closed function because without motor cooling the reactor coolant pump motors would overheat and trip the plant. NS-V11's only safety function is to close to provide containment isolation. The containment isolation function will be verified each refueling per SP 1303-11.18.

3.10.1.1.2 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the exercising requirements of Section XI for valve NS-V11. The licensee has demonstrated that, due to plant design, the only method available to verify valve closure (its safety position) is leak testing. This valve is not equipped with position indication and some of the required test connections are located inside containment.

3.10.1.1.3 Conclusion--The staff concludes that the proposed alternate testing of verifying valve closure during the performance of leak rate testing at refueling outages should be sufficient to demonstrate proper valve operability. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

3.10.2 Category B Valves

3.10.2.1 Relief Request. The licensee has requested relief from stroke timing valves NS-V54A/B, spent fuel pump room cooler outlet, NS-V55A/B, emergency feedpump room cooler outlet, and NS-V56A/B, decay heat removal pump room cooler outlet, in accordance with the requirements of Section XI, Paragraph IWV-3413, and proposed to verify valve operability by verifying proper operation of the respective cooler.

3.10.2.1.1 Licensee's Basis for Requesting Relief--The above valves are control valves and they fail open. They are open when the cooler is idle and they throttle based on the cooling needs of the cooler when the cooler is placed in service. The valves are interconnected with the operation of the coolers and there is no installed mechanism that will allow full-stroking of the valves. It is impractical to add hardware changes that will allow full-stroking of these valves since the increment of safety gained by such a hardware change would be negligible. Stroke timing of these control valves is not relevant to their operability, especially valves that fail open to the coolers. As an alternative to stroke timing, the respective cooler will be placed in service and the control valve function will be demonstrated by acceptable cooler operation.

3.10.2.1.2 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the stroke time measurement requirements of Section XI for valves NS-V54A/B/C, NS-V55A/B/C, and NS-V56A/B/C. These normally open valves are not equipped with control switches and, since their position is determined by the heat loads of the respective cooling unit, stroke times are not repeatable and would provide no meaningful information to utilize to monitor valve degradation.

3.10.2.1.3 Conclusion--The staff concludes that the proposed alternate testing of verifying proper temperature control when the valve is placed in service should be sufficient to demonstrate proper valve operability. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

3.11 Reactor Building Emergency Cooling System

3.11.1 Category B Valves

3.11.1.1 Relief Request. The licensee has requested relief from trending the stroke time of valve RR-V6, reactor building cooling units backpressure control, in accordance with the requirements of Section XI, Paragraph IWV-3417, and proposed to utilize the maximum value of limiting stroke time as the acceptance criteria.

3.11.1.1.1 Licensee's Basis for Requesting Relief--RR-V6 is a control valve which fails open (air is bled from the diaphragm operator and a spring in the operator pushes the valve open). The stroke time is a function of how fast the air is bled from the diaphragm and does not present any meaningful information to assess operational readiness of the valve. Percent increase in stroke time will not be calculated. However, a limiting value for full-stroke time will be specified and used for acceptance criteria.

3.11.1.1.2 Evalution--The staff does not agree with licensee's basis and, therefore, relief should not be granted from the stroke time trending requirements of Section XI for valve RR-V6. This valve is out of service during normal operation, and since the licensee has not identified its normal position, the assumption must be made that it is normally shut. Since the valve must change position, the staff feels that the licensee should measure and trend its stroke time values in order to monitor its continued operability.

3.11.1.1.3 Conclusion--The staff concludes that the licensee should trend the stroke time measurements of this valve in accordance with the requirements of Section XI.

3.11.2 Category C Valves

3.11.2.1 Relief Request. The licensee has requested relief from exercising valves RR-V8A/B, reactor building cooling coils reactor building

cooling water supply checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to full-stroke exercise these valves during refueling outages.

3.11.2.1.1 Licensee's Basis for Requesting Relief--During the functional test of these check valves, river water, silt, and corrosives are introduced into the reactor building emergency cooling coils. After the test, these cooling coils must be first drained and then flushed with nuclear service closed cooling water. The drain and flush water is drained to the reactor building sump and this produces large quantities of water that must be processed through the liquid waste disposal system. Therefore, a quarterly or cold shutdown test is not practical. Per Technical Specification 4.5.2, these check valves will continue to be tested on a refueling frequency (approximately every 12 months).

3.11.2.1.2 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the exercising requirements of Section XI for valves RR-V8A/B. The staff agrees that the licensee should limit the introduction of service water into the reactor building cooling coils to reduce as much as possible corrosion and tube fouling in addition to reducing the amount of liquid waste that must be processed.

3.11.2.1.3 Conclusion--The staff concludes that the proposed alternate testing of full-stroke exercising these valves during refueling outages when ample time is available to flush the service water from the system and to process the waste water generated should demonstrate proper valve operability. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

3.11.2.2 Relief Request. The licensee has requested relief from exercising valves RR-V9A/B/C, reactor building cooling coils reactor building cooling water supply checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to full-stroke exercise these valves during refueling outages.

3.11.2.2.1 Licensee's Basis for Requesting Relief--During the functional test of these check valves, river water, silt, and corrosives are introduced into the reactor building emergency cooling coils. After the test, these cooling coils must be first drained and then flushed with nuclear service closed cooling water. The drain and flush water is drained to the reactor building sump and this produces large quantities of water that must be processed through the liquid waste disposal system. Therefore, a quarterly or cold shutdown test is not practical. Per Technical Specification 4.5.2, these check valves will continue to be tested on a refueling frequency (approximately every 12 months).

3.11.2.2.2 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the exercising requirements of Section XI for valves RR-V9A/B/C. The staff agrees that the licensee should limit the introduction of service water into the reactor building cooling coils to reduce as much as possible corrosion and tube fouling in addition to reducing the amount of liquid waste that must be processed.

3.11.2.2.3 Conclusion--The staff concludes that the proposed alternate testing of full-stroke exercising these valves during refueling outages when ample time is available to flush the service water from the system and to process the waste water generated should demonstrate proper valve operability. The staff concludes that the alternate testing proposed should give reasonable assurance of valve operability required by the Code.

3.12 Reactor Building Spray System

3.12.1 Category C Valves

3.12.1.1 Relief Request. The licensee has requested relief from exercising valves BS-V30A/B, reactor building spray header checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to partial-stroke exercise these valves quarterly and to utilize a sample disassembly/inspection at ten year intervals to demonstrate operability.

3.12.1.1.1 Licensee's Basis for Requesting Relief--The full-stroke of BS-V30A/B would require initiation of reactor building spray. This would entail spraying the reactor building with borated water.

On 6-20-84 (Job Ticket CE-154), BS-V30A was disassembled for visual examination purposes. The examination was satisfactory (no unusual degradation and valve disk was free to open). BS-V30A has approximately 10 years of in-service time and this is the first time that the valve has been opened. GPUN will continue to disassemble either of these static valves (alternating between A and B) during each ten year inspection interval. BS-V30A/B are stainless steel and, therefore, not subject to corrosive attack. GPUN is of the opinion that quarterly partial-stroke testing and disassembly, as described, will provide reasonable assurance that BS-V30A/B would open if needed. In addition, if disassembly/inspection reveals that the full-stroke capability of the disassembled valve may be in question, the other valve will be disassembled and inspected at the same outage.

3.12.1.1.2 Evaluation--The staff does not agree with the licensee's proposed alternate testing frequency and, therefore, relief should not be granted from the exercising requirements of Section XI for valves BS-V30A/B. The staff agrees that these valves cannot be full-stroke exercised using flow because no test flow path exists and testing would spray the equipment in the containment which could cause extensive water damage. On this basis, the staff agrees with the licensee's proposal to partial-stroke exercise these valves quarterly utilizing an air test and to disassemble each valve on a sampling basis to demonstrate operability, however, the staff does not agree with the proposed ten year inspection frequency and will require that the sample disassembly/inspection be performed at a refueling outage frequency.

3.12.1.1.3 Conclusion--The staff concludes that a disassembly/inspection utilizing a manual full-stroke is the only method available to full-stroke exercise these valves. The licensee is required to perform these tests at each refueling outage on a sampling basis.

3.12.1.2 Relief Request. The licensee has requested relief from exercising valves BS-V52A/B, sodium hyroxide tank outlet checks, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to utilize a sample disassembly/inspection at ten year intervals to demonstrate operability.

3.12.1.2.1 Licensee's Basis for Requesting Relief--Given the pipe geometry, there is no method of part-stroking or full-stroking these check valves without contaminating the RCS with sodium hydroxide and other chemical contaminants in the dead leg of piping from these valves to the sodium hydroxide tank. During January, 1984 (Surveillance Procedure No. 1300-3P and Job Ticket Nos. CC818 and CC819) these valves were disassembled and visually examined with satisfactory results. The valve internals were found to be in "like new" condition. Disassembling each of these valves at or near the end of the ten year ISI interval provides reasonable assurance of the operational readiness of BS-V52A/B.

3.12.1.2.2 Evaluation--The staff does not agree with the licensee's proposed alternate testing frequency and, therefore, relief should not be granted from the exercising requirements of Section XI for valves BS-V52A/B. The staff does agree that these valves cannot be exercised with flow without spreading sodium hydroxide to the borated water storage tank and from there into the reactor coolant system which could upset the chemistry control of the entire system. Because of this chemical contamination, the staff agrees with the licensee's proposal to disassemble each valve on a sampling basis to demonstrate operability, however, the staff does not agree with the proposed ten year inspection frequency and will require that the sample disassembly/inspection be performed at a refueling outage frequency.

3.12.1.2.3 Conclusion--The staff concludes that a disassembly/inspection utilizing a manual full-stroke is the only method available to full-stroke exercise these valves. The licensee is required to perform these tests at each refueling outage on a sampling basis.

3.13 Screen House Vent System

3.13.1 Category B Valves

3.13.1.1 Relief Request. The licensee has requested relief from stroke timing valves SW-V24A/B, service water screen and pump house ventilation cooler outlets, in accordance with the requirements of Section XI, Paragraph IWV-3413, and proposed to verify valve operability by verifying proper operation of the respective cooler.

3.13.1.1.1 Licensee's Basis for Requesting Relief--The above valves are control valves and they fail open. They are open when the cooler is idle and they throttle based on the cooling needs of the cooler when the cooler is placed inservice. The valves are interconnected with the operation of the coolers and there is no installed mechanism that will allow full-stroking of the valves. It is impractical to add hardware changes that will allow full-stroking of these valves since the increment of safety gained by such a hardware change would be negligible. Stroke timing of these control valves is not relevant to their operability, especially valves that fail open to the coolers. As an alternative to stroke timing, the respective cooler will be placed in service and the control valve function will be demonstrated by acceptable cooler operation.

3.13.1.1.2 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the stroke time measurement requirements of Section XI for valves SW-V24A/B. These normally open valves are not equipped with control switches and, since their position is determined by the heat loads of the respective cooling unit, stroke times are not repeatable and would provide no meaningful information to utilize to monitor valve degradation.

3.13.1.1.3 Conclusion--The staff concludes that the proposed alternate testing of verifying proper temperature control when the valve is placed in service should be sufficient to demonstrate proper valve operability. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

3.14 Waste Disposal Liquid System

3.14.1 Category C Valves

3.14.1.1 Relief Request. The licensee has requested relief from exercising valve WDL-V361, reclaimed boric acid return check, and WDL-V362, deborating demineralizers return check, in accordance with the requirements of Section XI, Paragraph IWV-3522, and proposed to full-stroke exercise these valves during each refueling outage.

3.14.1.1.1 Licensee's Basis for Requesting Relief--The only method of functionally testing check valves WDL-V361 and WDL-V362 during normal operation is to inject concentrated boric acid into the reactor coolant makeup system producing reactivity changes. This would adversely affect plant operation and result in significant volumes of additional radioactive waste. Testing these valves during each cold shutdown is not warranted because of the radioactive waste generated. The above valves are associated with the concentrated boric acid system. Also the system for these valves is not relied upon for accident mitigation in Chapter 14 of the TMI-1 FSAR. The borated water storage tank is the accident source of borated water via LPI or HPI. However, general design criteria does require a concentrated boric acid injection system. In conclusion, GPUN believes that refueling interval testing will assure the operational readiness of the above valves.

3.14.1.1.2 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the exercising requirements of Section XI for valves WDL-361 and WDL-362. The licensee has demonstrated that exercising these valves during power operation would require pumping concentrated boric acid through them and from there into the reactor coolant system and would result in reactor power transients and a possible reactor shutdown. Additionally, full-stroke exercising these valves during cold shutdowns could delay reactor startup due to the need to return the primary coolant boron concentration to within the operating limits and to process the additional radioactive waste generated.

3.14.1.1.3 Conclusion--The staff concludes that the proposed alternate testing of full-stroke exercising these valves during refueling outages should be sufficient to demonstrate proper valve operability. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

3.15 All Systems

3.15.1 Corrective Action

3.15.1.1 Relief Request. The licensee has requested relief for all valves that require corrective action as a result of cold shutdown and refueling outage testing in accordance with the requirements of Section XI, Paragraph IWV-3417(b) and IWV-3523, and proposed to utilize plant Technical Specifications to control whether plant startup is permissible or not.

3.15.1.1.1 Licensee's Basis for Requesting Relief. Constraints and limits on plant startup with an inoperable valve depend on many specific plant design features and conditions. The limiting conditions for startup and operation have been analyzed and are described in the TMI-1 Technical Specifications. Inoperable valves will be evaluated considering the TMI-1 Technical Specifications to determine when an inoperable valve will limit plant startup from a cold shutdown condition.

3.15.1.1.2 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the corrective action requirements of Section XI, IWV-3417(b) and IWV-3523 for valves tested during cold shutdowns and refueling outages. The licensee has demonstrated that the plant Technical Specifications adequately control system and/or valve operability by establishing and defining the Limiting Conditions for Operation. The Limiting Conditions for Operation then allow or require entry into the various modes of operation of the plant.

3.15.1.1.3 Conclusion--The staff concludes that using plant Technical Specifications to determine system availability prior to plant startup reasonably meets the requirements of Section XI and should ensure system operability. The staff concludes that the alternate testing

proposed will give reasonable assurance of valve operability required by the Code.

3.15.2 Containment Isolation Valves

3.15.2.1 Relief Request. The licensee has requested relief from leak testing all primary containment isolation valves in accordance with the requirements of Section XI and proposed to leak test these valves in accordance with 10 CFR 50, Appendix J.

3.15.2.1.1 Licensee's Basis for Requesting Relief--All Appendix J, Type C, valves are included in the IST Program and they are categorized A or A/C. All the ASME Code Category A containment isolation valves (CIVs) will meet Appendix J to 10 CFR Part 50 leak testing requirements in lieu of ASME Code Section XI requirements. CIVs are listed in TMI-1's Technical Specifications and existing requirements and exemptions listed therein shall apply to the IST Valve Program. Appendix J is equivalent to and meets the intent of the Code requirements. Therefore, valve operability is assured. Furthermore, a procedure is in place that meets the requirements of IWV-3426 and IWV-3427 concerning individual valve leakrate limits and trend analysis of leakrate, respectively.

3.15.2.1.2 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the leak testing requirements of Section XI for all primary containment isolation valves. All containment isolation valves that are Appendix J, Type C, leak tested have been included in the IST program as Category A or A/C valves. The staff has concluded that the applicable leak test procedures and requirements for containment isolation valves are determined by 10 CFR 50, Appendix J. Relief from Paragraphs IWV-3420 through -3425 for containment isolation valves presents no safety problems since the requirements of these paragraphs is met by Appendix J requirements. Additionally, the licensee will comply with the Analysis of Leakage Rates and Corrective Action requirements of Paragraph IWV-3426 and -3427 as stated above.

3.15.2.1.3 Conclusion--The staff concludes that relief from the leak rate testing requirements of Paragraphs IWV-3420 through -3425 and

utilizing the leak-rate testing requirements of 10 CFR 50, Appendix J, as an alternate, will give reasonable assurance of the leak tight integrity of the containment isolation valves as required by the Code.

3.15.3 Rapid-Acting Valves

3.15.3.1 Relief Request. The licensee has requested relief from the power operated valve timing requirements of all power operated, rapid-acting valves whose function is safety-related in accordance with the requirements of Section XI, Paragraph IWV-3417(a), and proposed to apply a maximum stroke time limit of 2 seconds to all power operated, rapid-acting valves, i.e., those valves with stroke times of less than 2 seconds.

3.15.3.1.1 Licensee's Basis for Requesting Relief--The rapid-acting valves have actual full-stroke times of less than one second. Thus, the valve stroke time cannot effectively be measured using normal test equipment such as a stopwatch. Also, it is considered impractical to reliably measure changes in valve stroke times for valves which stroke open or closed in less than one (1) second. For very short stroke times, the variation in measured stroke times can be a large fraction of the established stroke time limit. Thus it is not practical to meaningfully identify or evaluate the stroke time changes considering human reaction times and the normal timing equipment used.

In accordance with ASME Section XI IWV-3413, the maximum acceptable full-stroke time value for each of the rapid-acting valves will be specified. This will ensure the operational readiness of these valves.

3.15.3.1.2 Evaluation--The staff agrees with the licensee's basis and, therefore, relief should be granted from the stroke time trending requirements of Section XI for all power operated, rapid-acting valves whose function is safety-related with stroke times of less than 2 seconds. The licensee has demonstrated that rapid-acting valves are difficult to stroke time using presently available methods of measurement and the results are subject to variation due to influences other than valve condition. (Also see Item A.8 of this report).

3.15.3.1.3 Conclusion--The staff concludes that the proposed alternate method of assigning a maximum stroke time of 2 seconds to valves with stroke times of less than 2 seconds meets the requirements of Section XI and should provide meaningful data to adequately monitor valve degradation. The staff concludes that the alternate testing proposed will give reasonable assurance of valve operability required by the Code.

APPENDIX A

NRC STAFF POSITIONS AND GUIDELINES

The Three Mile Island, Unit 1, IST program submitted by General Public Utilities Corporation was examined to verify that valves whose function is safety-related are included in the program and are subjected to the periodic tests required by the ASME Code, Section XI, 1980 Edition, through Winter of 1980 Addenda, and the NRC positions and guidelines. The staff's review found that except as noted in Appendix D or where specific relief from testing has been requested, these valves are tested to the code requirements and the NRC positions and guidelines summarized in this Appendix.

1. Full-Stroke Exercising of Check Valves.

The NRC's position was stated to the licensee that check valves whose safety function is to open are expected to be full-stroke exercised. Since the disk position is not always observable, the NRC staff position is that verification of the maximum flow rate through the check valve identified in any of the plant's safety analyses would be an adequate demonstration of the full-stroke requirement. Any flow rate less than this will be considered partial-stroke exercising unless it can be shown that the check valve's disk position at the lower flow rate would permit maximum flow required through the valve. It is the NRC staff's position that this reduced flow rate method of demonstrating full-stroke capability is the only test that requires measurement of the differential pressure across the valve.

2. Valves Identified for Cold Shutdown Exercising

The Code permits valves to be exercised during cold shutdowns where it is not practical to exercise during plant operation, and these valves are specifically identified by the licensee and are full-stroke exercised during cold shutdowns; therefore, the licensee is meeting the requirements of the ASME Code, Paragraphs IWV-3412 and -3522. Since the licensee is

meeting the requirements of the ASME Code, it is not necessary to grant relief; however, during our review of the licensee's IST program, we have verified that it is not practical to exercise these valves during power operation and that we agree with the licensee's basis.

It should be noted that the NRC differentiates, for valve testing purposes, between the cold shutdown mode and the refueling mode. That is, for valves identified for testing during cold shutdowns, it is expected that the tests will be performed both during cold shutdowns and each refueling outage. However, when relief is granted to perform tests on a refueling outage frequency, testing is expected only during each refueling outage. In addition, for extended outages, tests being performed are expected to be maintained as closely as practical to the Code-specified frequencies.

3. Conditions for Valve Testing During Cold Shutdowns

Cold shutdown testing of valves identified by the licensee is acceptable when the following conditions are met:

a. The licensee is to commence testing as soon as the cold shutdown condition is achieved, but not later than 48 hours after shutdown, and continue until complete or the plant is ready to return to power.

b. Completion of all valve testing is not a prerequisite to return to power.

c. Any testing not completed during one cold shutdown should be performed during any subsequent cold shutdowns starting from the last test performed at the previous cold shutdown.

d. For planned cold shutdowns, where ample time is available and testing all the valves identified for the cold shutdown test frequency in the IST program will be accomplished, exceptions to the 48 hours may be taken.

4. Category A Valve Leak Test Requirements for Containment Isolation Valves (CIVs)

All containment isolation valves that are Appendix J, Type C, leak tested should be included in the IST program as Category A or A/C valves. The NRC has concluded that the applicable leak test procedures and requirements for containment isolation valves are determined by 10 CFR 50, Appendix J. Relief from Paragraphs IWV-3421 through -3425 (1980 Edition through Winter 1980 Addenda) for containment isolation valves presents no safety problem since the intent of these paragraphs is met by Appendix J requirements, however, the licensee must comply with the Analysis of Leakage Rates and Corrective Action Requirements Paragraphs IWV-3426 and -3427 (1980 Edition through Winter 1980 Addenda). Based on the considerations discussed above, the NRC staff has concluded that the alternate testing proposed will give reasonable assurance of valve leak-tight integrity as required by the Code and that the relief thus granted will not endanger life or property or the common defense and security of the public.

5. Application of Appendix J Testing to the IST Program

The Appendix J review for this plant is completely separate from the IST program review. However, the determinations made by that review are directly applicable to the IST program. The licensee has agreed that, should the Appendix J program be amended, they will amend their IST program accordingly.

6. Safety-Related Valves

This review was limited to valves whose function is safety-related. Valves whose function is safety-related are defined as those valves that

are needed to mitigate the consequences of an accident and/or to shut down the reactor to the cold shutdown condition and to maintain the reactor in a cold shutdown condition. Valves in this category would typically include certain ASME Code Class 1, 2, and 3 valves and could include some non-Code class valves. It should be noted that the licensee may have included valves whose function is not safety-related in their IST program as a decision on their part to expand the scope of their program.

7. Active Valves

The NRC staff position is that active valves are those for which changing position may be required to shut down a reactor to the cold shutdown condition or in mitigating the consequences of an accident. Included are valves which respond automatically to an accident signal and valves which may be optionally utilized but are subject to plant operator actions, such as valves utilized to establish long term recirculation following a LOCA.

8. Rapid-Acting Power Operated Valves

The NRC staff has identified rapid-acting power operated valves as those which stroke in 2 seconds or less. Relief from the trending requirements of Section XI (Paragraph IWV-3417(a), 1980 Edition through Winter 1980 Addenda) presents no safety concerns for these valves since variations in stroke times will be affected by slight variations in the response times of the personnel performing the test. However, the staff does require that the licensee assign a maximum limiting stroke time of 2 seconds to these valves in order to obtain this Code relief.

9. Pressurizer Power Operated Relief Valves

The NRC has adopted the position that the pressurizer power operated relief valves should be included in the IST program as Category B valves and tested to the requirements of Section XI. However, since the PORVs have shown a high probability of sticking open and are not needed for

overpressure protection during power operation, the NRC has concluded that routine exercising during power operation is "not practical" and, therefore, not required by IWV-3410.

The PORVs' function during reactor startup and shutdown is to protect the reactor vessel and coolant system from low-temperature overpressurization conditions and should be exercised prior to initiation of system conditions for which vessel protection is needed.

The following test schedule is required:

a. Full-stroke exercising should be performed at each[a] cold shutdown or, as a minimum, once each refueling cycle.

b. Stroke timing should be performed at each cold shutdown, or as a minimum, once each refueling cycle.

c. Fail-safe actuation testing should be performed at each cold shutdown.

d. The PORV block valves should be included in the IST program and tested quarterly to provide protection against a small break LOCA should a PORV fail open.

The licensee has included valves RC-V2, PORV block, and RC-RV2, PORV, in the IST program and is testing RC-V2 in accordance with Section XI. However, the only testing the licensee has proposed for RC-RV2, the PORV, is to verify the setpoint at five year intervals. That proposed interval is in accordance with the requirements of Section XI concerning relief valve setpoints but is not in accordance with the above guidelines which require full-stroke exercising at least each refueling outage. (The

---

a. The staff position described in Item A.3 regarding cold shutdown testing is not applicable to the PORVs; however, in case of frequent cold shutdowns, testing of the PORVs is not required more often than each three months.

setpoint verification full-stroke exercises the valve and essentially defines the exercising interval as five years.) Therefore, the licensee will be required to test valve RC-RV2, PORV, in accordance with the required test schedule at least once each refueling cycle. (Also see Item D.1.19 of this report.)

10. Valves Which Perform a Pressure Boundary Isolation Function

The following valves have been identified by the licensee as pressure boundary isolation valves and have been categorized accordingly. These valves are individually leak tested in accordance with Technical Specifications.

CF-V4A	-	Core flood tank outlet checks
CF-V4B	-	
CF-V5A	-	Combined core flood tank/low pressure
CF-V5B	-	injection checks
DH-V22A	-	Low pressure injection header checks
DH-V22B	-	

The following valves appear to perform a pressure isolation function, however, they are not categorized A or A/C as appropriate and are not individually leak tested in accordance with NRC staff acceptance criteria for pressure boundary isolation valves. This list of valves was presented to the licensee at the working meeting and is included here for information only because the pressure isolation function of all appropriate valves at Three Mile Island, Unit 1, is presently under consideration by the NRC Committee to Review Generic Requirements.

DH-V1	-	Decay heat removal system reactor coolant suction valves
DH-V2	-	

MU-V107A	-	High pressure injection loop A and B cold leg injection
MU-V107B	-	checks
MU-V107C	-	
MU-V107D	-	
MU-V219	-	Makeup header check
MU-V220	-	High pressure injection loop A cold leg injection check
MU-V94	-	Normal makeup header injection check
MU-V95	-	High pressure injection loop A cold leg injection check
MU-V86A	-	High pressure injection loop B cold leg injection
MU-V86B	-	checks
RC-V4	-	Pressurizer auxiliary spray supply
RC-V23	-	Pressurizer auxiliary spray supply check.

APPENDIX B

The following are Category A, B, and C valves that meet the exercising requirements of the ASME Code, Section XI, and are not full-stroke exercised every three months during plant operation. These valves are specifically identified by the owner in accordance with Paragraph IWV-3412 and -3522, and are full-stroke exercised during cold shutdowns and refueling outages. The staff has reviewed all valves in this Appendix and agrees with the licensee that testing these valves during power operation is not practical due to the valve type, location, or system design. These valves either cannot or should not be exercised during power operation. These valves are listed below and grouped according to the system in which they are located.

System	Valve Identification	Function
Core Flood	CF-V12A/B	Core flood tank fill and nitrogen supply checks.
Decay Heat Removal	DH-V1 DH-V2	Decay heat removal reactor coolant suction valves.
Intermediate Cooling	IC-V2 IC-V3	Containment cooling water return header isolations
	IC-V4	Letdown coolers and reactor coolant pump coolers supply header isolation
	IC-V6	Control rod drive mechanism cooling water supply header isolation

Main Steam	MS-V1A MS-V1B MS-V1C MS-V1D	Main steam isolation valves
	MS-V2A MS-V2B	Emergency feedwater pump turbine, steam dump, and bypass valves steam supply isolations
	MS-V8A MS-V8B	Steam dump and bypass valve steam supply isolations
	MS-V10A MS-V10B	Emergency feedwater pump turbine steam supply
Makeup	MU-V2A MU-V2B	Letdown cooler outlet isolations
	MU-V3	Letdown cooler outlet line isolation
	MU-V18	Makeup header isolation
	MU-V20	Reactor coolant pump seal injection isolation
	MU-V25 MU-V26	Reactor coolant pump seal water return isolations
	MU-V12	Makeup tank outlet isolation

Nuclear Service Closed Cooling	NS-V15	Reactor coolant pump motors cooling water supply
	NS-V4 NS-V35	Reactor coolant pump motors coolant water supply
	NS-V52A NS-V52B NS-V52C	Reactor building fan motor cooling water return
	NS-V53A NS-V53B NS-V53C	Reactor building fan motor cooling water supply
Reactor Coolant System	RC-V4	Pressurizer auxiliary spray supply
	RC-V28 PC-V44	Pressurizer vents
	RC-V42 RC-V43	Reactor vessel head vents
	RC-V40A RC-V40B RC-V41A RC-V41B	Reactor coolant system high point vents
	RC-V23	Pressurizer auxiliary spray supply check

APPENDIX C

The ISI Boundary Drawings listed below were used during the course of this review.

System	Drawing	Revision
Main Steam and Drainage	ISI-FD-001	0
River Water	ISI-FD-002	0
Decay Heat Closed Cycle Cooling	ISI-FD-003	0
Core Flooding	ISI-FD-004	0
Decay Heat Removal	ISI-FD-005	0
Condensate	ISI-FD-008	0
Emergency Feedwater and Feedwater	ISI-FD-009	0
Nuclear Services Closed Cycle Cooling Water	ISI-FD-010	0
Control Building Chilled Water	ISI-FD-011	0
Reactor Building Spray	ISI-FD-012	0
Diesel Generator Jacket, Air, and Gear Box Lube Oil Cooler	ISI-FD-013	0
Screen Wash and Sluice System, River Water Pump Lube	ISI-FD-014	0

Penetration Fluid Block, Penetration Pressurization, and Hydrogen Recombiner	ISI-FD-015	0
Makeup and Purification, Letdown Portion	ISI-FD-016	0
Makeup and Purification, Makeup Portion	ISI-FD-017	0
Spent Fuel Cooling	ISI-FD-018	0
Reactor Coolant	ISI-FD-019	0
Chemical Sampling, and OTSG Chemical Cleaning	ISI-FD-020	0
Chemical Addition and Liquid Waste Disposal	ISI-FD-021	0
Intermediate Cooling	ISI-FD-022	0
Hydrogen Purge and Miscellaneous Penetrations	ISI-FD-023	0

APPENDIX D

Inconsistencies and omissions in the licensee's program noted during the course of this review are listed below. The staff's position is that the licensee must resolve these items in accordance with evaluations, conclusions, and guidelines presented in this report.

D.1 Licensee's Required Action Items

D.1.1 The licensee has proposed to install flow instrumentation on the control building chilled water pumps, AH-P3A and -P3B, prior to startup for Cycle 7. (See Item 2.1.1).

D.1.2 The licensee will be required to perform system modifications in order to test the boric acid pumps, CA-P1A and CA-P1B, in accordance with Section XI. (See Item 2.2.1)

D.1.3 The licensee has proposed to install flow instrumentation on the screen house ventilation equipment pumps, SW-P2A and -P2B, prior to startup for Cycle 7. (See Item 2.9.1).

D.1.4 The licensee will be required to perform system modifications in order to test the boric acid recycle pumps, WDL-P13A and WDL-P13B, in accordance with Section XI. (See Item 2.10.1)

D.1.5 The licensee will be required to perform system modifications in order to test the makeup and purification pumps, MU-P1A, -P1B, and -P1C, in accordance with Section XI. (See Item 2.11.1.)

D.1.6 The licensee will be required to disassemble valves DH-V14A/B, decay heat removal and reactor building spray pumps borated water storage tank suction checks, during refueling outages on a sampling basis to verify valve operability. (See Item 3.4.3.2)

D.1.7 The licensee will be required to leak-rate test valves FW-V12A/B, main feedwater header checks, during refueling outages to verify valve closure capability. (See Item 3.6.1.1)

D.1.8 The licensee will be required to disassemble valves MS-V9A/B, emergency feedwater pump turbine steam supply checks, during refueling outages on a sampling basis to verify valve operability. (See Item 3.8.2.1)

D.1.9 The licensee will be required to full-stroke exercise valves MU-V14A/B, makeup pump borated water storage tank suction stop-checks, during cold shutdowns. Relief to perform testing at a refueling outage frequency was previously approved by the NRC staff for the remainder of the first ten-year inspection interval because of concerns about possible overpressurization of the RCS during cold shutdown full stroke testing. The licensee has not supplied documentation for the current inspection interval which demonstrates that this is in fact a concern; therefore, in absence of such justification, cold shutdown full stroke testing is being required. (See Item 3.9.2.1)

D.1.10 The licensee will be required to full-stroke exercise valves MU-V73A/B/C, makeup pump discharge checks, during cold shutdowns. Relief to perform testing at a refueling outage frequency was previously approved by the NRC staff for the remainder of the first ten-year inspection interval because

of concerns about possible overpressurization of the RCS during cold shutdown full stroke testing. The licensee has not supplied documentation for the current inspection interval which demonstrates that this is in fact a concern; therefore, in absence of such justification, cold shutdown full stroke testing is being required. (See Item 3.9.3.1)

D.1.11 The licensee will be required to full-stroke exercise valves MU-V86A/B, high pressure injection loop B cold leg injection checks, during cold shutdowns. Relief to perform testing at a refueling outage frequency was previously approved by the NRC staff for the remainder of the first ten-year inspection interval because of concerns about possible overpressurization of the RCS during cold shutdown full stroke testing. The licensee has not supplied documentation for the current inspection interval which demonstrates that this is in fact a concern; therefore, in absence of such justification, cold shutdown full stroke testing is being required. (See Item 3.9.3.2)

D.1.12 The licensee will be required to full-stroke exercise valve MU-V94, normal makeup header injection check, quarterly in accordance with the requirements of Section XI. Relief to perform testing at a refueling outage frequency was previously approved by the NRC staff for the remainder of the first ten-year inspection interval because of concerns about possible overpressurization of the RCS during quarterly full stroke testing. The licensee has not supplied documentation for the

current inspection interval which demonstrates that this is in fact a concern; therefore, in absence of such justification, quarterly full stroke testing is being required. (See Item 3.9.3.3)

D.1.13 The licensee will be required to full-stroke exercise valve MU-V95, high pressure injection loop A cold leg injection check, during cold shutdowns. Relief to perform testing at a refueling outage frequency was previously approved by the NRC staff for the remainder of the first ten-year inspection interval because of concerns about possible overpressurization of the RCS during cold shutdown full stroke testing. The licensee has not supplied documentation for the current inspection interval which demonstrates that this is in fact a concern; therefore, in absence of such justification, cold shutdown full stroke testing is being required. (See Item 3.9.3.4)

D.1.14 The licensee will be required to full-stroke exercise valves MU-V107A/B/C/D, high pressure injection loop A and B cold leg injection checks, during cold shutdowns. Relief to perform testing at a refueling outage frequency was previously approved by the NRC staff for the remainder of the first ten-year inspection interval because of concerns about possible overpressurization of the RCS during cold shutdown full stroke testing. The licensee has not supplied documentation for the current inspection interval which demonstrates that this is in fact a concern; therefore, in absence of such justification, cold shutdown full stroke testing is being required. (See Item 3.9.3.5)

D.1.15 The licensee will be required to full-stroke exercise valve MU-V220, high pressure injection loop A cold leg injection check, during cold shutdowns. (See Item 3.9.3.6)

D.1.16 The licensee will be required to trend the stroke time measurements of valve RR-V6, reactor building cooling units backpressure control, in accordance with Section XI. (See Item 3.11.1.1)

D.1.17 The licensee will be required to perform a sample disassembly/inspection of valves BS-V30A/B, reactor building spray header checks, at a refueling outage frequency. Relief to perform disassembly/inspection of one check valve every 10 years was approved by the NRC staff for the remainder of the first ten-year inspection interval because the staff agreed that this alternative testing would provide sufficient assurance of valve operability. However, the staff now considers this testing interval (20 years for each valve) too long to provide such assurance, especially considering the recent industry operating experience with check valves. (See Item 3.12.1.1)

D.1.18 The licensee will be required to perform a sample disassembly/inspection of valves BS-V30A/B, reactor building spray header checks, at a refueling outage frequency. Relief to perform disassembly/inspection of both check valves every 10 years was approved by the NRC staff for the remainder of the

first ten-year inspection interval because the staff agreed that this alternative testing would provide sufficient assurance of valve operability. However, the staff now considers this testing interval (10 years) too long to provide such assurance, especially considering the recent industry operating experience with check valves. (See Item 3.12.1.2)

D.1.19 The licensee will be required to test the PORV, RC-RV2, in accordance with the requirements of Item A.9 of this report at least once each refueling cycle.

D.1.20 Spent Fuel Cooling System During the work meeting, the licensee was requested to consider the safety-related function of the following valves to determine if they should be included in the IST program and tested in accordance with Section XI to demonstrate their capability to provide continued cooling of the spent fuel pool.

SF-V1 - Spent fuel coolant pump 1A suction isolations

SF-V2 -

SF-V3 -

SF-V11 - Spent fuel cooler 1A outlets

SF-V12 -

SF-V13 -

SF-V14 - Spent fuel cooler 1B outlets

SF-V15 -

SF-V16 -

SF-V7 - Spent fuel coolant pump 1A discharge check

SF-V8 - Spent fuel coolant pump 1B discharge check

SF-V50 - Spent fuel pool A inlet check

SF-V51 - Spent fuel pool B inlet check

This item was left open for the staff to determine if these valves and the associated pumps should be included in the IST program. During a subsequent telephone conversation, the staff explained to the licensee that providing a safety grade source of makeup water to the spent fuel pools would be an acceptable alternative to adding this system to the IST program. The licensee is presently investigating a method of providing the safety grade makeup source but has not specified the length of time the investigation will require; therefore, the staff will require that the spent fuel coolant system pumps and associated valves be included in the IST program and tested in accordance with Section XI until the safety grade source of makeup water is installed and operational. It should be noted that the licensee has included the spent fuel pool cooling pumps, SF-P1A and -1B in the IST program. (See Item 2.8.1).

D.1.21 The licensee will be required to include valves MU-V10, acid return from deborating demineralizers, and MU-V11 A/B,makeup and purification filters inlets, in the IST program and test them in accordance with Section XI because these valves are in an emergency boration flow path and the appropriate valves upstream of these three have been included in the program.

D.1.22 The licensee has failed to include nuclear service closed cooling water valves NS-V108A/B, control building air conditioning cooling water outlets, in the IST program. These valves should be included in the program.

D.1.23 The licensee has failed to include the emergency diesel generator fuel oil transfer pumps, and appropriate valves, and the air start system, from the air receivers to the engine, in the IST program. The staff position is that these auxiliary systems should be included in the IST program and tested in accordance with Section XI. Engine mounted pumps are considered to be part of the diesel and need not be tested separately.

D.1.24 The licensee has stated in the IST program that the internals will be removed from valve EF-V3, emergency feedwater pumps river water supply check during the March 1986 outage, and they will then delete this valve from the IST program. This item will require verification because no information has been received that addresses this revision. (See IST Program Table B-1, page 10 of 37)

D.2 Omissions and Errors Observed During Review of the Licensee's Program

D.2.1 The check valves CF-V4A/B do not isolate the reactor coolant system from the decay heat removal system as stated by the licensee in Table B-1, Footnote 3, page 2 of 37. The staff has previously approved a sample disassembly program for these valves. (See Item 3.1.1.2)