

ISI-IST Program
Rev. 3
Change 11

DETROIT EDISON COMPANY
2000 SECOND AVENUE
DETROIT, MICHIGAN 48226

INSERVICE TESTING PROGRAM (PLAN)
FOR PUMPS AND VALVES
FOR FERMII 2 POWER PLANT
DOCUMENT NO. ISI-IST Program

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**Revision 3, Change 11 Summary
LCR-96-101-ISI**

The following major revisions are being made:

#	Change Paper	LCR	Drawing	Description of Change
1.	EDP-28251	96-057-ISI	M-5825-1 M5825-2 M5830-1	<p>Modification adds a manually operated emergency water capability and back-up nitrogen pressurization capability to the Division 1 and Division 2 Emergency Equipment Cooling Water (EECW) Systems.</p> <p>Added the following valves: P4400F974A/B P4400F972A/B P4400F978A/B P4400F979A/B P4400F976A/B P4400F975A/B P4500F178A/B P4500F180A/B P4400F387A/B</p> <p>Deleted the following valves: P4400F125A/B</p> <p>Added new tests AT-12 and BT-OM.</p>
2.	TSR-27648	95-086-ISI	M-5830-1	<p>Revised normal position on valves T4800F416 through T4800F427 from Closed (C) to Locked Closed (LC).</p>
3.	DER-96-0319			<p>Revised VR-48-R2 to R3 by deleting P4400F116B (8 in.) from the other three check valves for group sampling for disassembly and inspection. Added new Relief Request VR-62 for disassembly and inspection of P4400F116B on a refuel outage basis. Reference DER 96-0319, "EECW Check Valve P4400F116B Incorrectly Grouped."</p>
4.	DER 95-0151	95-075-ISI R0 95-075-ISI R1		<p>Revised PR-6 and PR-11 to include the additional information per NRC ltr. dated May 2, 1996, "Fermi 2 - Safety Evaluation of Pump and Valve Relief Requests for the Pump and Valve</p>

Inservice Testing Program."

Cancelled PR-7 for parallel testing of the RHRSW pumps. (Ref. DECo ltr. NRC-96-0005, "Relief Request PR-7-R1, RHP. Service Water.")

Revised VR-51 to indicate interim NRC approval for one year while developing additional alternative testing for the EDG air start solenoids per the May 2, 1996 NRC ltr.

Revised VR-46 to incorporate the additional requirements of OM-10.

Made the following component additions to the Valve Tables as a result of the Service Water Systems Operational Inspection (SWSOI):

1. Service Water Systems Minimum Flow Valves (Ref. DER 96-0408):

RHRSW E11F400A, E11F400B, E11F400C, and E11F400D

EESW P45F400 and P45F401

DGSW R30F400, R30F401, R30F402, and R30F403

2. EECW Temperature Control Valves (Ref. DER 96-0451):

P44F400A and P44F400B

The following minor revisions are being made:

1. "Division 1 and 2 Primary Containment Monitoring System Valve Operability and Indication Test," 24.408.01, was revised into two divisional procedures, Division 1, 24.408.03, and Division 2, 24.408.04.
2. Deleted the EDG air start solenoids from the following surveillance procedures: 24.307.10, 11, 12, and 13.

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PART - A
INSERVICE TESTING PROGRAM
FOR PUMPS

1.0 Applicable Code

This Inservice Testing Program for ISI Class 1, 2, 3 and non-ISI class pumps meets the requirements of Subsection IWP of Section XI of the ASME Boiler and Pressure Vessel Code, 1980 Edition through the Winter 1980 Addenda. Where these requirements are determined to be impractical, specific requests for relief have been written and are included in Section 2.0.

2.0 Relief Requests for Inservice Testing of Pumps

2.1 Relief Request Description Format

Relief requests are included where specific requirements of ASME Section XI are determined to be impractical. The following information has been included in each pump relief request:

- o Description of the pump(s) for which relief is requested.
- o Pump number(s)
- o Class
- o Description of pump function(s)
- o Section XI testing requirement
- o Basis for relief from Section XI requirement
- o Alternate testing

2.2 Relief Request/Index/Listing

Relief Request Number	Subject	Component Affected
PR-1-R2	Vibration Limits	All Pumps excluding RHR pumps and HPCI pumps
PR-2	Bearing Temperatures	All pumps
PR-3	Inlet Pressure Measurement	RHR SW, DGSW and EESW
PR-4	Inlet Pressure Measurement	Standby Liquid Control
PR-6-R1	Parallel Operation of Pumps/ Pump Reference Curves	E21, Core Spray
PR-8-R1	Vibration Limits	RHR Pumps
PR-10-R3	Vibration Limits	HPCI Pumps
PR-11	Pump Reference Curves	EECW Pumps

RELIEF REQUEST NO. PR-1-R2

PUMP: All pumps in the IST program (Except for the RHR Pumps and HPCI Pumps)

PUMP NO: See Inservice Testing Program.
ISI Class 1, 2, 3 and EX Pumps

CLASS: 2, 3, E3 and E4

FUNCTIONS: Reactor shutdown without control rods, emergency core cooling, emergency equipment cooling, supply fuel oil to the diesel.

SECTION XI REQUIREMENTS: Vibration amplitude displacement shall be measured quarterly during inservice testing. (Table IWP-3100-1 and IWP 3400 (a)).

BASIS FOR RELIEF: Enrico Fermi Atomic Power Plant proposes an alternate program which is believed to be more comprehensive than that required by Section XI. The proposed program is based on vibration readings measured in velocity units rather than vibration amplitude in mils displacement. This technique is more sensitive to small changes that are indicative of developing mechanical problems and hence more meaningful. Velocity measurements detect not only high amplitude vibrations that indicates a major mechanical problem, but also the equally harmful low amplitude, high frequency vibrations resulting from misalignment, imbalance, or bearing wear that usually go undetected by simple displacement measurements.

In conclusion, the foregoing reasons demonstrate that the proposed program of vibration measurements is a more practical method of testing which meets the intent of the ASME Code requirements.

ALTERNATE TESTING: Pump vibration measurements will be taken in vibration velocity (in/sec). The evaluation of the readings will be as follows:

<u>Acceptable Range</u>	<u>Alert Range</u>	<u>Required Action Range</u>
≤ 0.235 in/sec	0.236 in/sec to 0.314 in/sec	≥ 0.314 in/sec

Alternate vibration testing for the RHR Pumps (E1102C002 A through D) is given in Relief Request PR-8-Rev. 1, and for the HPCI Pumps (E4101C001A and B) in Relief Request PR-10-R3.

RELIEF REQUEST NO. PR-2

PUMP: All pumps in the IST program.

PUMP NO: See Inservice Testing Program
Class 1, 2, 3 and Ex Pumps

CLASS: 2, 3, E3 and E4

FUNCTIONS: Reactor shutdown without control rods, emergency core cooling emergency equipment cooling, supply fuel oil to the diesel.

SECTION XI REQUIREMENTS: Bearing temperature shall be measured yearly during inservice testing (Table IWP-3100-1 and IWP-3300).

BASIS FOR RELIEF: Enrico Fermi Atomic Power Plant proposes an alternate program which is believed to be more comprehensive than that required by Section XI. The proposed program is based on vibration readings measured in velocity units. This technique is sensitive to small changes that are indicative of developing mechanical problems and hence more meaningful. In addition, these readings go far beyond the capabilities of a bearing temperature monitoring program. A bearing will be seriously degraded prior to the detection of increased heat at the bearing housing. Quarterly vibration velocity readings will achieve a much higher probability of detecting developing problems than annual bearing temperature readings.

Finally, IWP-3500 required "three successive readings taken at ten minute intervals that do not vary more than three percent." Meeting this requirement for pumps having no recirculation test loop would be very difficult because the system water temperature, and consequently the lubricant temperature, are expected to drift more than three percent during 20 minutes. Also, the temperature of the lubricating fluid will vary with ambient conditions and make meaningful data trending impractical.

As described above, a program of bearing temperature trends and the evaluation of the results would in some cases be difficult to analyze. Improper interpretation of results could result in unnecessary pump maintenance. In addition, it is impractical to measure bearing temperatures on many of the pumps in the program. Some specific examples are as follows:

- (1) Core Spray: The pump bearings are lubricated by emergency equipment cooling water flow. Changes in emergency equipment cooling water system temperature would seriously affect the accuracy of trends.
- (2) Residual Heat Removal (RHR): Same as (1) above.

RELIEF REQUEST NO. PR-2 (Continued)

- (3) High Pressure Coolant Injection: This pump is driven by a steam turbine which exhausts steam into the pressure suppression chamber. Extended run times to stabilize bearing temperatures could heat the suppression pool water to a temperature exceeding the Technical Specifications limit of 105°F (Technical Specification paragraph 3.6.2.1.a.2.a).

In conclusion, the foregoing reasons demonstrate that the proposed program of vibration measurements is a more practical method of testing which meets the intent of the ASME Code requirements.

ALTERNATE TESTING: Pump vibrations measurements will be taken in vibration velocity units (in/sec). The evaluation of the readings will be per the ranges given in the Relief Request PR-1. Temperature measurements will not be taken.

RELIEF REQUEST NO. PR-3

PUMP: Residual Heat Removal, Emergency Equipment and Diesel Generator Service Water.

PUMP NO: E1151C001A, E1151C001B, E1151C001C, E1151C001D; Residual Heat Removal Service Water.

P4500C002A, P4500C002B; Emergency Equipment Service Water.

R3001C005, R3001C006, R3001C007, R300C008; Diesel Generator Service Water.

CLASS: 3

FUNCTION: Emergency Equipment, RHR Heat Exchanger, and Diesel Generator Cooling.

SECTION XI REQUIREMENTS: Inlet pressure (P_i) shall be measured quarterly during inservice testing (Table IWP-3100-1 and IWP-3400(a)).

BASIS FOR RELIEF: The pump impellers of the subject pumps are submerged in the RHR reservoir. The inlet pressure at the impeller is simply the hydrostatic head. Because there is no instrumentation at the pump inlet, the hydrostatic head will be computed from the reservoir level.

The inlet pressure measurement, by computation of hydrostatic head developed from the reservoir level, is a practical method of testing given the placement of the impellers in the RHR reservoir.

ALTERNATE TESTING: The inlet pressure measurement will be based on reservoir level.

RELIEF REQUEST NO. PR-4

PUMP: Standby Liquid Control
PUMP NO: C4103C001A, C4103C001B
CLASS: 2

FUNCTION: To provide a method of shutting down the reactor without the use of control rods.

SECTION XI REQUIREMENTS: Differential pressure and suction pressure shall be measured quarterly during inservice testing (Table IWP-3100-1 and IWP-3400(a)).

BASIS FOR RELIEF: No suction tap or inlet pressure instrumentation is provided for the Standby Liquid Control pumps. Suction pressure when testing is small compared to discharge pressure (less than 3 psig compared to 1190 psig). The pumps are positive displacement pumps and since the suction pressure is low, the differential pressure is essentially equal to discharge pressure (1187 psig vs. 1190 psig). The suction pressure is less than one percent of discharge pressure and can be considered insignificant.

ALTERNATE TESTING: Discharge pressure, flow rate and vibration will be measured during inservice testing. Check adequate suction head to ensure safe pump operation by determining liquid level in the storage tank.

Relief Request No. PR-6-R1

SYSTEM: Core Spray System

PUMP NO.:

Pump	Code Class	ISI Drawing
E2101C001A	2	6M721-5814
E2101C001B	2	6M721-5814
E2101C001C	2	6M721-5814
E2101C001D	2	6M721-5814

FUNCTION: The Core Spray (CS) System protects the reactor core in the event of a large break LOCA if the Feedwater, CRD, RCIC, and HPCI Systems are unable to maintain RPV water level.

SECTION XI CODE REQUIREMENTS FOR WHICH RELIEF IS REQUESTED: IWP-1500 and IWP-3100 requires that pump testing be conducted with the pump (singular) operating at nominal motor nameplate conditions. IWP-3100 further requires that the system resistance be varied until either the measured differential pressure or measured flow rate equals the corresponding reference value. The quantities of Table IWP-3100-1 are then measured or observed and compared to the corresponding reference value.

IWP-3110 further defines reference values as one or more fixed sets of values of the quantities shown in Table IWP-3100-1.

IWP-3210 states the allowable ranges of inservice test quantities in relation to the reference values are tabulated in Table IWP-3100-2.

BASIS FOR RELIEF: Relief is requested to deviate from the Code in two areas:

1. To test both Core Spray Pumps in a Division in parallel. That is, both pumps are to be run together and treated as a single component. This implies that differential pressure and developed head reference values represent a combined pump flow characteristic. Vibration data will continue to be monitored on each pump. Since both pumps are run in parallel, acceptance criteria for flow rate and differential pressure (which are more restrictive than the criteria given in Table IWP-3100-2) will be applied.
2. For flow rate and differential pressure, a flow reference curve, rather than a single fixed value of differential pressure and corresponding flow, will be utilized. This reference curve will be developed utilizing linear regression with four or more flow versus differential pressure data sets over a limited range of flow.

RELIEF REQUEST NO. PR-6-R1 (Continued)

Each Core Spray Division is designed to have two pumps operating in parallel in accordance with Technical Specifications Paragraph 3.5.1.a. If one pump is determined to be inoperable, then the division is declared inoperable. The system test line configuration was not designed to allow for single pump testing. It was designed only to accommodate the full flow testing required by Technical Specifications Surveillance Test requirements.

It is not practical to run the Core Spray Pumps one at a time in the test lineup configuration. The test line flow control valves are throttled approximately 13% open (Division 1) and 9% open (division 2) to control two pump test flow (Pumps A and C are in Division 1, and Pumps B and D are in Division 2). The existing flow control valves are not capable of throttling low enough (less than 5% open) to accommodate single pump operation without experiencing unstable operation, cavitation, and severe vibration.

Significant system modification would be required to enable testing of the Core Spray Pumps in accordance with Code requirements. System modifications would be costly, both in terms of resources and increased radiation exposures during installation. Since the system performs adequately, there is little benefit, other than compliance with the Code, for installing any of them.

The use of pump reference curves is also necessitated by the fact that the test line and flow control valves are over sized for single pump testing. The flow control valves are opened to a point in the span of travel in which small changes in valve position result in relatively large changes in flow rate. Thus, it presents an unnecessary challenge to both the equipment and the Plant Operators to attempt to return to a fixed reference value. The combined reference pump curves were developed using four to seven data points over a 600 gpm range of flows (approximately 4% of the operating range). The data was curve fitted using linear regression, which is a sensible method considering that the pump curve is essentially linear over this very small range.

A review of preservice test data and inservice test results obtained prior to establishing the reference curves confirmed that the pumps were in good operating condition when the curves were developed. A review of the test results obtained using the reference curves shows that the data is consistent and trendable. Additionally, the individual pump vibration data is extremely stable and indicates no signs of degradation on any of the Core Spray Pumps. If invalid data were used to generate the pump reference curves, or if the curve fit was poor, the test results would be erratic, and such is not the case in over 10 years of testing experience with these pumps, thus validating data credibility.

RELIEF REQUEST NO. PR-6-R1 (Continued)

ALTERNATE TESTING: As discussed above in the basis for relief section, it is extremely difficult to return to a specific set or sets of fixed reference points. Multiple points could be established per the Code; however, it would be impossible to obtain reference values at every possible point. An alternate to the fixed reference value(s) is a reference curve. Flow rate and differential pressure are measured during surveillance testing and compared to an established reference curve over a small increment of the flow characteristic curve.

The Core Spray System test line is not configured to allow for testing only a single pump in a division. An alternate to single pump testing is to test the two pumps in a division in parallel. This treats the two Core Spray pumps as a single component. This is consistent with the Technical Specifications which consider a Core Spray Division inoperable if one of the pumps in a division is inoperable.

The following elements of NUREG-1482, section 5.2, are addressed as follows:

1. The Core Spray pumps were known to be operating acceptably when the test data was recorded. The Division I pumps, A and C, reference curve was developed based on data taken in November, 1993. The curves developed in 1984 were determined to be too low such that some tests resulted in performance being in the Alert Range High. Since the pumps performance would not improve through testing, the curve itself was suspect. The Division II pumps, B and D, reference curve was developed based on preservice data taken in December, 1984 and has not been changed.
2. Flow and discharge pressure gauges meet the range and accuracy requirements of the Code. The suction pressure gauges are 0-15 psig Heise gauges (temporary, M&TE). Nominal test data for suction pressures used to develop the curves is 5 psig. The discharge pressure gauges are 0-600 psig, installed gauges and the nominal reading during testing is 280 psig.
3. The Division I curve is constructed with 7 points and the Division II curve with 4 points. The application of the curve, however, is limited to a 600 gpm range. This range is well within the accuracy limits of the respective linear equations as demonstrated by the r values of > 0.99 in both cases.
4. The combined pump curve for each division is beyond the flat portion of that curve for all data.
5. The acceptance criteria is above the Technical Specifications minimum flow requirements and minimum discharge pressure required for each Core Spray division based on both pumps running.
6. Vibration levels for the four Core Spray Pumps have remained constant over 10 years of testing over the applicable flow ranges.

RELIEF REQUEST NO. PR-6-R1 (Continued)

7. There have been no major repairs or replacements completed on the Core Spray pumps since preservice testing in 1984.

Because the Core Spray pumps in each division are tested in parallel, the following additional limitations are being placed on the acceptance criteria to assure that any degradation in performance is detected and corrected in a timely manner:

1. In order to enhance the ability to detect the equivalent of one pump's degradation to the minimum acceptable level of performance per Table IWP-3100-2, the following acceptance criteria will be utilized, which are more stringent than the Code limits:

Acceptable Range	Alert Range		Required Action Range	
$\Delta P/\Delta P_r$	Low Value	High Value	Low Value	High Value
0.965 to 1.02	0.95 to <0.965	>1.02 to 1.03	<0.95	>1.03

2. If the hydraulic performance of a CS division enters the Alert or Required Action ranges for any reason other than instruments out of calibration, both pumps in that division will be individually verified to have acceptable performance through testing or inspection or will be repaired prior to being returned to service.
3. Use of the provisions of Paragraphs IWP-3112 and IWP-3230(c) that permit an analysis to be performed when the hydraulic performance of a pump train enters the alert or required action range and establish additional reference values will not be made.
4. New reference curves for the Core Spray pumps will be established only after both pumps in the division have been verified to be in good operating condition.

RELIEF REQUEST NO. PR-6-R1 (Continued)

DIVISION I CORE SPRAY PUMPS PERFORMANCE CURVE AND ACCEPTANCE
CRITERIA TABLE FOR PROCEDURE 24.203.02

$$\Delta P_r = 456.8592530 - 0.027306Q_r$$

where: ΔP_r = Reference Differential Pressure, psi

Q_r = Reference Flow, gpm

Acceptable Range: $0.965\Delta P_r \leq \Delta P \leq 1.02\Delta P_r$

Alert Range Low: $0.95\Delta P_r \leq \Delta P < 0.965\Delta P_r$

Alert Range High: $1.02\Delta P_r < \Delta P \leq 1.03\Delta P_r$

Required Action Range: Low $\Delta P < 0.95\Delta P_r$
High $\Delta P > 1.03\Delta P_r$

Table 1 Core Spray Loop A

IST Information only

IST Evaluation 96-025

Ref Test Date: 11/12/93 E2101C001A&C

Flow gpm	Required Action Range Low psi	Alert Range Low psi	Acceptable Range ΔP psi	Alert Range High psi	Required Action Range High psi
6600	<262.9	262.9 to <267.0	267.0 to 282.1	>282.1 to 284.9	>284.9
6650	<261.6	261.6 to <265.7	265.7 to 280.7	>280.7 to 283.5	>283.5
6700	<260.3	260.3 to <264.4	264.4 to 279.3	>279.3 to 282.1	>282.1
6750	<259.0	259.0 to <263.1	263.1 to 277.9	>277.9 to 280.7	>280.7
6800	<257.7	257.7 to <261.7	261.7 to 276.6	>276.6 to 279.3	>279.3
6850	<256.4	256.4 to <260.4	260.4 to 275.2	>275.2 to 277.9	>277.9
6900	<255.1	255.1 to <259.1	259.1 to 273.8	>273.8 to 276.5	>276.5
6950	<253.8	253.8 to <257.8	257.8 to 272.4	>272.4 to 275.0	>275.0
7000	<252.5	252.5 to <256.5	256.5 to 271.0	>271.0 to 273.6	>273.6
7050	<251.2	251.2 to <255.1	255.1 to 269.6	>269.6 to 272.2	>272.2
7100	<249.9	249.9 to <253.8	253.8 to 268.2	>268.2 to 270.8	>270.8
7150	<248.6	248.6 to <252.5	252.5 to 266.8	>266.8 to 269.4	>269.4
7200	<247.3	247.3 to <251.2	251.2 to 265.4	>265.4 to 268.0	>268.0

RELIEF REQUEST NO. PR-6-R1 (Continued)

DIVISION II CORE SPRAY PUMPS PERFORMANCE CURVE AND ACCEPTANCE
CRITERIA TABLE FOR PROCEDURE 24.203.03

$$\Delta P_r = 444.50000 - 0.02500Q_r$$

where: ΔP_r = Reference Differential Pressure, psi

Q_r = Reference Flow, gpm

Acceptable Range: $0.965\Delta P_r \leq \Delta P \leq 1.02\Delta P_r$

Alert Range Low: $0.95\Delta P_r \leq \Delta P < 0.965\Delta P_r$

Alert Range High: $1.02\Delta P_r < \Delta P \leq 1.03\Delta P_r$

Required Action Range: Low $\Delta P < 0.95\Delta P_r$
High $\Delta P > 1.03\Delta P_r$

Table 1 Core Spray Loop B

IST Information only

IST Evaluation 96-025

Ref Test Date: 12/20/84 E2101C001B&D

Flow	Required Action Range Low	Alert Range Low	Acceptable Range ΔP	Alert Range High	Required Action Range High
gpm	psi	psi	psi	psi	psi
6600	<265.6	265.6 to <269.8	269.8 to 285.0	>285.0 to 287.8	>287.8
6650	<264.0	264.0 to <268.6	268.6 to 283.8	>283.8 to 286.5	>286.5
6700	<263.2	263.2 to <267.4	267.4 to 282.5	>282.5 to 285.3	>285.3
6750	<262.0	262.0 to <266.1	266.1 to 281.2	>281.2 to 284.0	>284.0
6800	<260.8	260.8 to <264.9	264.9 to 279.9	>279.9 to 282.7	>282.7
6850	<259.6	259.6 to <263.7	263.7 to 278.7	>278.7 to 281.4	>281.4
6900	<258.4	258.4 to <262.5	262.5 to 277.4	>277.4 to 280.1	>280.1
6950	<257.3	257.3 to <261.3	261.3 to 276.1	>276.1 to 278.8	>278.8
7000	<256.1	256.1 to <260.1	260.1 to 274.8	>274.8 to 277.5	>277.5
7050	<254.9	254.9 to <258.9	258.9 to 273.6	>273.6 to 276.2	>276.2
7100	<253.7	253.7 to <257.7	257.7 to 272.3	>272.3 to 275.0	>275.0
7150	<252.5	252.5 to <256.5	256.5 to 271.0	>271.0 to 273.7	>273.7
7200	<251.2	251.2 to <255.3	255.3 to 269.7	>269.7 to 272.4	>272.4

RELIEF REQUEST PR-8-R1

SYSTEM: Residual Heat Removal System

PUMPS:

Pump	Code Class	ISI Drawing
E1102C002A	2	6M721-5813-2
E1102C002B	2	6M721-5813-1
E1102C002C	2	6M721-5813-2
E1102C002D	2	6M721-5813-1

FUNCTION: The LPCI mode of operation of the RHR System pumps water into the RPV in time to cool the core, in case of low water level in the reactor or high pressure in the containment drywell.

SECTION XI CODE REQUIREMENTS FOR WHICH RELIEF IS REQUESTED: Vibration amplitude displacement shall be measured quarterly during inservice testing (Table IWP-3100-1 and IWP-3400(a)).

BASIS FOR RELIEF: During preoperational testing, the vibration velocity measurements for the RHR pumps were high (.19 to .27 ips) relative to the vibration velocity ranges given in Relief Request PR-1. Three of the four pumps fell into the alert range.

The preoperational vibration velocity measurements were part of a series of vibration tests which included vibration amplitude. The results of the tests are summarized in Detroit Edison Research Report 84D98-2 which concludes:

"The vibration measurements which were taken during the preoperational test indicate that the pumps are operating in a satisfactory condition."

Given that the pumps are operating acceptably at the higher vibration velocities, a new set of vibration velocity ranges were developed with the assistance of the vendor as described in Detroit Edison Engineering Research Report 85D15-5, Revision 1.

Report 85D15-5 recommends the measurement of overall velocity (filter out), overall amplitude (filter out) and running speed amplitude (filter in). All three quantities will be measured at the pump bearing and compared to the ranges given in alternate testing.

Testing data over 10 years using this criteria has revealed that the values for overall velocity have remained constant and that the action levels recommended in Report 85D15-5 are not conservative. Therefore, the vibration limits contained in ASM/ANSI OMa-1988, Part 6, Table 3 (ranges for test parameters) are being adopted as the vibration limits for overall velocity for the RHR pumps.

RELIEF REQUEST PR-8-R1 (Continued)

The methodology of ASME/ANSI Operations and Maintenance Code, Part 6 (OM-6), is to be utilized for RHR pump vibration monitoring. The provisions of ISTB 4.6.1, 4.6.4, 5.2, and 6.1 will be met. The RHR pumps are vertical centrifugal pumps. Since all provisions of OM-6 are being met, no additional approval from the NRC is required per NUREG-1482, paragraph 5.4.

ALTERNATE TESTING: Pump vibration over all velocity will be measured for each RHR pump accessible bearing in accordance with OM-6, paragraph 4.6.4(a). The acceptance criteria will be that of OM-6, Table 3a:

Overall Velocity

Acceptable Range:	≤ 0.325 in/sec
Alert Range:	0.326 in/sec to 0.700 in/sec
Required Action Range:	> 0.700 in/sec

Overall Amplitude and Running Speed Amplitude will continue to be measured with the ranges given in Table IWP-3100-2 applied as acceptance criteria.

RELIEF REQUEST PR-10-R3

PUMP: HPCI Main and Booster Pump
PUMP NO.: E4101C001A and E4101C001B
CLASS: 2

FUNCTION: Provide High Pressure Coolant Injection

SECTION XI REQUIREMENTS: Vibration amplitude displacement shall be measured during inservice testing (Table IWP-3100-1 and IWP-3400 (a)). (Velocity readings are taken in lieu of mils displacement readings per Relief Request PR-1).

BASIS FOR RELIEF: During preoperational testing of the HPCI System, vibration of the HPCI Main and Booster Pump were measured and determined to fall within the Required Action Range of Relief Request PR-1. This high apparent vibration was caused by induced vane passing frequency from the 4 vane booster pump impeller.

Pursuant to this high apparent vibration, Relief Request PR-9-R2 and PR-10-R2 were written requesting relief from the requirements of Relief Request PR-1 until RF01 at which time the HPCI Booster Pump Impeller would be changed from a 4 to a 5 vane impeller, reducing the induced vane passing frequency caused by the 4 vane impeller design.

During RF01, the HPCI Booster Pump Impeller was changed from a 4 to a 5 vane impeller. This eliminated the induced vane passing vibration emanating from the Booster Pump. As part of the post modification testing, vibration data was taken to provide baseline vibration signatures. While vibration levels were reduced significantly, both pumps are still exhibiting vibration levels approaching or exceeding the IST Program Alert level of 0.236 in/sec of Relief Request PR1.

RELIEF REQUEST PR-10-R3 (Continued)

The following table demonstrates the large reduction in vibration achieved when the HPCI Booster Pump Impeller was changed from a 4 to a 5 vane impeller:

HPCI Vibration Reference Values

MAIN PUMP		
	<u>Vertical Vibration (in/sec)</u>	<u>Horizontal Vibration (in/sec)</u>
Before Impeller Changeout	.176	.598
After Impeller Changeout	.185	.230
BOOSTER PUMP		
	<u>Vertical Vibration (in/sec)</u>	<u>Horizontal Vibration (in/sec)</u>
Before Impeller Changeout	.264	.549
After Impeller Changeout	.120	.145

Vertical and Horizontal vibration velocities are frequency dependent with readings being higher for machines operating at higher speeds. HPCI operates at approximately 4000 RPM which is significantly higher than most rotating machinery (Typical machinery operate at 1800 RPM).

The HPCI Main and Booster Pump design is such that the vibration in the horizontal direction is resonant with the normal pump operating speed (approximately 4000 RPM) resulting in higher vibration levels. Vibration levels for the vertical direction will be less than the horizontal direction as pump design provides for a more rigid restraint in the vertical direction.

These higher levels of vibration are not detrimental to the long term operability of the machine and will not prevent early detection of pump degradation as intended by the ASME Section XI Code and the DECO IST Program.

In support of this conclusion it should be noted that if current HPCI vibration levels were taken in mils (as allowed by the ASME Section XI Code), the highest reading would be less than 1.4 mils overall which is well below the upper end of the acceptance range of 2.8 mils as provided by the Code for the specific HPCI Pump.

RELIEF REQUEST PR-10-R3 (Continued)

Given that the pump is operating acceptably at vibration velocities at or approaching the IST Program Lower Alert Level, a new set of vibration velocity ranges have been developed. These new vibration velocity ranges will allow for early detection of pump degradation prior to component failure.

ALTERNATE TESTING: Pump vibration measurement will be taken in vibration velocities (in/sec) with the Acceptable, Alert and Required Action Ranges as follows:

Using the Guidelines contained in ASME/ANSI OMa-1988, Part 6, Table 3, (Ranges for Test Parameters).

Where V_r = Reference Vibration Velocity (in/sec) peak

Acceptable Range	$< \text{ or } = 2.5 V_r$
Alert Range	$> 2.5 V_r \text{ to } 6 V_r \text{ or } > 0.325 \text{ in/sec}$
Required Action Range	$> 6 V_r \text{ or } > 0.70 \text{ in/sec}$

Where Main Pump $V_r = 0.21 \text{ in/sec}$

Where Booster pump $V_r = 0.13 \text{ in/sec}$

By applying the foregoing guidelines, the new HPCI Main and Booster pump vibration acceptance criteria are:

NEW PUMP VIBRATION ACCEPTABLE RANGES

MAIN PUMP

Acceptable Range	Alert Range	Required Action Range
$\leq 0.325 \text{ in/sec}$	0.326 in/sec to 0.700 in/sec	$> .700 \text{ in/sec}$

BOOSTER PUMP

Acceptable Range	Alert Range	Required Action Range
$\leq 0.325 \text{ in/sec}$	0.326 in/sec to 0.700 in/sec	$> .700 \text{ in/sec}$

RELIEF REQUEST NO. PR-11

SYSTEM: Emergency Equipment Cooling Water (EECW) System

PUMPS:

Pump	Code Class	ISI Drawing
P4400C001A	3	6M721-5825-1
P4400C001B	3	6M721-5825-2

FUNCTION: The Emergency Equipment Cooling Water Pumps provide cooling water to ECCS components and other essential equipment in the Reactor Building in the event that RBCCW is lost.

SECTION XI CODE REQUIREMENTS FOR WHICH RELIEF IS REQUESTED: IWP-3110 defines reference values as one or more fixed sets of values of the quantities shown in Table IWP-3100-1. IWP-3100 requires that the system resistance be varied until either the measured differential pressure or measured flow rate equals the corresponding reference value. The quantities of Table IWP-3100-1 are then measured or observed and compared to the corresponding reference value.

BASIS FOR RELIEF: Relief is requested to deviate from the Code requirement for a fixed reference value for flow and differential pressure. For flow rate and differential pressure, a flow reference curve, rather than a single fixed value of differential pressure and corresponding flow, will be utilized. This reference curve will be developed utilizing linear regression with four or more flow versus differential pressure data sets over a limited range of flow.

The use of pump reference curves is necessitated by the difficulty in adjusting system test flow to the required value using the installed manual gate valve. The ability to control flow using the installed manual gate valve is very limited, and it is difficult to always return to a precise flow value (*i.e.*, not repeatable). Requiring Plant Operations to test the system at such a fixed flow rate represents an undue burden on the Operators and an unnecessary challenge to the EECW system, since it requires the system to remain in an abnormal lineup for a longer period of time. The significance of this is the lack of additional cooling available when in the normal line up.

A review of inservice test results obtained using the reference curves shows that the data is consistent and trendable. Additionally, the individual pump vibration data is extremely stable and indicates that pump performance has not degraded for either of the EECW Pumps. Had invalid data been used to generate the pump reference curves, or if the curve fit was poor, test results would be erratic, and this has not been the experience for these pumps.

RELIEF REQUEST NO. PR-11 (Continued)

ALTERNATE TESTING: As discussed above in the basis for relief section, it is extremely difficult to return to a specific set or sets of fixed reference points. Multiple points could be established per the Code; however, it would still be impossible to obtain reference values at every possible point. An alternate to the fixed reference value(s) is a reference curve. Flow rate and differential pressure are measured during surveillance testing and compared to an established reference curve over a small increment of the flow characteristic curve.

The following elements of NUREG-1482, section 5.2, are addressed as follows:

1. The EECW pumps were known to be operating acceptably when the test data was recorded. The Division I and II pump curves were developed based on data taken in February, 1993. The initial curves developed in 1985 were determined to be inadequate since the test loop was so small. The test loop consisted of only the pump, the heat exchanger, and the EECW differential pressure control valve. This short test loop resulted in cavitation at the control valve with resultant void formation. These voids caused the ultrasonic flow meters to be unreliable. The new test loops use the entire EECW flow network.
2. Flow instrument and the suction pressure and discharge pressure gauges meet the range and accuracy requirements of the Code.
3. The Division I curve is constructed with 12 points and the Division II curve with 9 points. The application of the curves is limited to a 160 gpm range and 150 gpm range for Divisions I and II respectively. This range is well within the accuracy limits of the respective linear equations.
4. The pump curve for each division is beyond the flat portion of that curve for all data.
5. The acceptance criteria is above the minimum acceptable flow limits as determined by Plant Support Engineering Calculations.
6. Vibration levels for the four Core Spray Pumps have remained essentially constant over 10 years of testing over the applicable flow ranges.
7. There have been no major repairs or replacements completed on the EECW pumps since preservice testing in 1984.

**DIVISION I EECW PUMP PERFORMANCE CURVE AND ACCEPTANCE CRITERIA
TABLE FOR PROCEDURE 24.207.08**

$$\Delta P_r = 118.603 - 0.032699998Q_r$$

where: ΔP_r = Reference Differential Pressure, psi

Q_r = Reference Flow, gpm

Acceptable Range: $0.93\Delta P_r \leq \Delta P \leq 1.02\Delta P_r$

Alert Range Low: $0.90\Delta P_r \leq \Delta P < 0.93\Delta P_r$

Alert Range High: $1.02\Delta P_r < \Delta P \leq 1.03\Delta P_r$

Required Action Range: Low $\Delta P < 0.90\Delta P_r$
High $\Delta P > 1.03\Delta P_r$

**DIVISION I EECW PUMP PERFORMANCE CURVE AND ACCEPTANCE CRITERIA
TABLE FOR PROCEDURE 24.207.08 (Continued)**

Table 1 Div I EECW Pump

IST Information only

IST Evaluation 96-026

Ref Test Date: 02/25/93 P4400C001A

Flow gpm	Required Action Range Low psi	Alert Range Low psi	Acceptable Range ΔP psi	Alert Range High psi	Required Action Range High psi
1500	<62.60	62.60 to <64.69	64.69 to 70.93	>70.93 to 71.64	>71.64
1505	<62.45	62.45 to <64.54	64.54 to 70.77	>70.77 to 71.47	>71.47
1510	<62.30	62.30 to <64.39	64.39 to 70.60	>70.60 to 71.30	>71.30
1515	<62.16	62.16 to <64.24	64.24 to 70.43	>70.43 to 71.13	>71.13
1520	<62.01	62.01 to <64.09	64.09 to 70.27	>70.27 to 70.97	>70.97
1525	<61.86	61.86 to <63.93	63.93 to 70.10	>70.10 to 70.80	>70.80
1530	<61.71	61.71 to <63.78	63.78 to 69.93	>69.93 to 70.63	>70.63
1535	<61.57	61.57 to <63.63	63.63 to 69.77	>69.77 to 70.46	>70.46
1540	<61.42	61.42 to <63.48	63.48 to 69.60	>69.60 to 70.29	>70.29
1545	<61.27	61.27 to <63.33	63.33 to 69.43	>69.43 to 70.12	>70.12
1550	<61.13	61.13 to <63.17	63.17 to 69.27	>69.27 to 69.96	>69.96
1555	<60.98	60.98 to <63.02	63.02 to 69.10	>69.10 to 69.79	>69.79
1560	<60.83	60.83 to <62.87	62.87 to 68.93	>68.93 to 69.62	>69.62
1565	<60.68	60.68 to <62.72	62.72 to 68.77	>68.77 to 69.45	>69.45
1570	<60.54	60.54 to <62.57	62.57 to 68.60	>68.60 to 69.28	>69.28
1575	<60.39	60.39 to <62.41	62.41 to 68.43	>68.43 to 69.11	>69.11
1580	<60.24	60.24 to <62.26	62.26 to 68.27	>68.27 to 68.95	>68.95
1585	<60.10	60.10 to <62.11	62.11 to 68.10	>68.10 to 68.78	>68.78
1590	<59.95	59.95 to <61.96	61.96 to 67.93	>67.93 to 68.61	>68.61
1595	<59.80	59.80 to <61.81	61.81 to 67.77	>67.77 to 68.44	>68.44
1600	<59.65	59.65 to <61.65	61.65 to 67.60	>67.60 to 68.27	>68.27
1605	<59.51	59.51 to <61.50	61.50 to 67.43	>67.43 to 68.10	>68.10
1610	<59.36	59.36 to <61.35	61.35 to 67.27	>67.27 to 67.93	>67.93
1615	<59.21	59.21 to <61.20	61.20 to 67.10	>67.10 to 67.77	>67.77
1620	<59.07	59.07 to <61.04	61.04 to 66.93	>66.93 to 67.60	>67.60
1625	<58.92	58.92 to <60.89	60.89 to 66.76	>66.76 to 67.43	>67.43
1630	<58.77	58.77 to <60.74	60.74 to 66.60	>66.60 to 67.26	>67.26
1635	<58.62	58.62 to <60.59	60.59 to 66.43	>66.43 to 67.09	>67.09
1640	<58.48	58.48 to <60.44	60.44 to 66.26	>66.26 to 66.92	>66.92
1645	<58.33	58.33 to <60.28	60.28 to 66.10	>66.10 to 66.76	>66.76
1650	<58.18	58.18 to <60.13	60.13 to 65.93	>65.93 to 66.59	>66.59
1655	<58.04	58.04 to <59.98	59.98 to 65.76	>65.76 to 66.42	>66.42
1660	<57.89	57.89 to <59.83	59.83 to 65.60	>65.60 to 66.25	>66.25

**DIVISION II EECW PUMP PERFORMANCE CURVE AND ACCEPTANCE CRITERIA
TABLE FOR PROCEDURE 24.207.08**

$$\Delta P_r = 115.485 - 0.033215001 Q_r$$

where: ΔP_r = Reference Differential Pressure, psi

Q_r = Reference Flow, gpm

Acceptable Range: $0.93\Delta P_r \leq \Delta P \leq 1.02\Delta P_r$

Alert Range Low: $0.90\Delta P_r \leq \Delta P < 0.93\Delta P_r$

Alert Range High: $1.02\Delta P_r < \Delta P \leq 1.03\Delta P_r$

Required Action Range: Low $\Delta P < 0.90\Delta P_r$
High $\Delta P > 1.03\Delta P_r$

**DIVISION II EECW PUMP PERFORMANCE CURVE AND ACCEPTANCE CRITERIA
TABLE FOR PROCEDURE 24.207.08 (Continued)**

Table 3 Div II EECW

Pump IST Information only

IST Evaluation 96-026

Ref Test Date: 02/19/93 P4400C001B

Flow gpm	Required Action Range Low psi	Alert Range Low psi	Acceptable Range ΔP psi	Alert Range High psi	Required Action Range High psi
1400	<62.09	62.09 to <64.17	64.17 to 70.35	>70.35 to 71.05	>71.05
1405	<61.94	61.94 to <64.01	64.01 to 70.18	>70.18 to 70.88	>70.88
1410	<61.79	61.79 to <63.86	63.86 to 70.01	>70.01 to 70.71	>70.71
1415	<61.64	61.64 to <63.70	63.70 to 69.85	>69.85 to 70.54	>70.54
1420	<61.49	61.49 to <63.55	63.55 to 69.68	>69.68 to 70.37	>70.37
1425	<61.34	61.34 to <63.39	63.39 to 69.51	>69.51 to 70.20	>70.20
1430	<61.19	61.19 to <63.24	63.24 to 69.34	>69.34 to 70.03	>70.03
1435	<61.04	61.04 to <63.08	63.08 to 69.17	>69.17 to 69.86	>69.86
1440	<60.89	60.89 to <62.93	62.93 to 69.00	>69.00 to 69.68	>69.68
1445	<60.74	60.74 to <62.77	62.77 to 68.83	>68.83 to 69.51	>69.51
1450	<60.59	60.59 to <62.62	62.62 to 68.66	>68.66 to 69.34	>69.34
1455	<60.44	60.44 to <62.47	62.47 to 68.49	>68.49 to 69.17	>69.17
1460	<60.29	60.29 to <62.31	62.31 to 68.32	>68.32 to 69.00	>69.00
1465	<60.14	60.14 to <62.16	62.16 to 68.15	>68.15 to 68.83	>68.83
1470	<59.99	59.99 to <62.00	62.00 to 67.98	>67.98 to 68.66	>68.66
1475	<59.84	59.84 to <61.85	61.85 to 67.81	>67.81 to 68.49	>68.49
1480	<59.69	59.69 to <61.69	61.69 to 67.64	>67.64 to 68.32	>68.32
1485	<59.54	59.54 to <61.54	61.54 to 67.47	>67.47 to 68.15	>68.15
1490	<59.40	59.40 to <61.38	61.38 to 67.30	>67.30 to 67.97	>67.97
1495	<59.25	59.25 to <61.23	61.23 to 67.14	>67.14 to 67.80	>67.80
1500	<59.10	59.10 to <61.08	61.08 to 66.97	>66.97 to 67.63	>67.63
1505	<58.95	58.95 to <60.92	60.92 to 66.80	>66.80 to 67.46	>67.46
1510	<58.80	58.80 to <60.77	60.77 to 66.63	>66.63 to 67.29	>67.29
1515	<58.65	58.65 to <60.61	60.61 to 66.46	>66.46 to 67.12	>67.12
1520	<58.50	58.50 to <60.46	60.46 to 66.29	>66.29 to 66.95	>66.95
1525	<58.35	58.35 to <60.30	60.30 to 66.12	>66.12 to 66.78	>66.78
1530	<58.20	58.20 to <60.15	60.15 to 65.95	>65.95 to 66.61	>66.61
1535	<58.05	58.05 to <59.99	59.99 to 65.78	>65.78 to 66.43	>66.43
1540	<57.90	57.90 to <59.84	59.84 to 65.61	>65.61 to 66.26	>66.26
1545	<57.75	57.75 to <59.69	59.69 to 65.44	>65.44 to 66.09	>66.09
1550	<57.60	57.60 to <59.53	59.53 to 65.27	>65.27 to 65.92	>65.92

3.0 Inservice Testing Program - Pump Tables

The tables contained in this Section list all pumps included in the Fermi 2 IST Program. The data contained in these tables identify all pumps subject to inservice testing, the inservice test quantities, the inservice testing interval, and any applicable remarks. The column headings in these tables are listed and explained below:

3.1 Table Description

- o **PUMP NUMBER**: The Plant Identification System (PIS) number
- o **PUMP NAME**
- o **CLASS**: The ISI classification as shown on the color coded classification boundary diagram. For pumps listed on lines with no ISI classification, an E1, E2, E3 or E4 is indicated where the number refers to design Class A, B, C and D, taken from the P&ID's.
- o **SPEED, INLET PRES, DIFF PRES, FLOW RATE, VIBRATION AND BEARING TEMP**: Inservice Test Quantities to be measured in accordance with Table IWP-3100-1
- o **TEST FREQ.**: The frequency of IST as prescribed in IWP-3400
- o **REMARKS**: The data in this column includes the respective test procedure numbers which implement required testing or general information pertaining to the pump. **NOTE: THIS FIELD IS NOT CONTROLLED.**

3.2 "Inservice Test Quantities" Columns

When the letter "Y" appears in a particular test quantity column, that quantity will be measured during inservice testing in accordance with Subsection IWP. If a modified test is planned or if the letter "N" appears in a particular test quantity column, a request for relief number will be referenced. Requests for relief are abbreviated PR-. The actual request for relief is contained in Section 2.

3.3 Measurement of Inservice Test Quantities

- o **Speed**: Per IWP-4400, shaft speed measurement are not applicable (NA) for pumps coupled to synchronous or induction type drivers. For variable speed drives, pump speed shall be set at the reference speed per IWP-3100.

- o Inlet Pressure: For pumps taking suction from a tank or the RHR Service Water Complex basin, inlet pressure will be calculated (using appropriate density corrections) from a measured tank or basin level. Section 2, Relief Request PR-3 addresses pumps whose inlet pressure will be calculated. All other inlet pressure measurements will be taken using pressure instruments at or near the pump inlet unless a relief request states otherwise.
- o Differential Pressure: Most differential pressure measurements will be calculated from inlet and discharge pressure measurements. In some cases, a differential pressure gauge will be used.
- o Flow Rate: Pump discharge flow rate shall be measured.
- o Vibration: In accordance with Section 2, Relief Request No. PR-1, EF2 proposes to measure vibration velocity rather than vibration amplitude. Exceptions are noted in PR-8 and PR-10 for RHR and HPCI, respectively.
- o Bearing Temperature: In accordance with Section 2, Relief Request PR-2, EF2 will not measure bearing temperatures.

3.4 Allowable Ranges of Test Quantities

The allowable ranges specified in Table IWP-3100-2 will be used for differential pressure and flow measurements, except where specific relief has been granted. Should the measured test quantity fall outside the allowable range, the corrective action specified in IWP-3230 will be taken. For more information, see Interpretation XI-1-79-19.

3.5 Bearing Lubricant

As specified in Table IWP-3100-1, the pump bearing lubricant level, pressure, or flow will be observed during inservice testing.

3.6 Exempted Pumps within Systems Classified for ISI

The Reactor Recirculation centrifugal pumps have been exempted from the IST program because they do not perform a safety function. The reactor recirculation jet pumps have been exempted from the IST program because Subsection IWP is applicable to centrifugal and positive displacement pumps only. These pumps have been exempted in accordance with IWP-1100.

INSERVICE TEST PROGRAM

PUMP TABLES

ISI CLASS 1, 2, 3, and EX PUMPS
FERMI-2 POWER PLANT - Unit 1

PAGE: A-3-1 of 2

----- INSERVICE TEST QUANTITIES -----

PUMP NUMBER	PUMP NAME	CL	SPEED	INLET PRES.	DIFF. PRES.	FLOW RATE	VIBRA.	BEARING TEMP.	TEST FREQ	REMARKS
C4103C001A	Standby Liquid Control	2	NA	N:PR-4	Y:PR-4	Y	Y:PR-1	N:PR-2	OP	24.139.02
C4103C001B	Standby Liquid Control	2	NA	N:PR-4	Y:PR-4	Y	Y:PR-1	N:PR-2	OP	24.139.02
E1102C002A	Residual Heat Removal	2	NA	Y	Y	Y	Y:PR-8	N:PR-2	OP	24.204.01
E1102C002B	Residual Heat Removal	2	NA	Y	Y	Y	Y:PR-8	N:PR-2	OP	24.204.06
E1102C002C	Residual Heat Removal	2	NA	Y	Y	Y	Y:PR-8	N:PR-2	OP	24.204.01
E1102C002D	Residual Heat Removal	2	NA	Y	Y	Y	Y:PR-8	N:PR-2	OP	24.204.06
E1151C001A	RHR Service Water	3	NA	Y:PR-3	Y:	Y:	Y:PR-1	N:PR-2	OP	24.205.05
E1151C001B	RHR Service Water	3	NA	Y:PR-3	Y:	Y:	Y:PR-1	N:PR-2	OP	24.205.06
E1151C001C	RHR Service Water	3	NA	Y:PR-3	Y:	Y:	Y:PR-1	N:PR-2	OP	24.205.05
E1151C001D	RHR Service Water	3	NA	Y:PR-3	Y:	Y:	Y:PR-1	N:PR-2	OP	24.205.06
F2101C001A	Core Spray	2	NA	Y	Y:PR-6	Y:PR-6	Y:PR-1	N:PR-2	OP	24.203.02
F2101C001B	Core Spray	2	NA	Y	Y:PR-6	Y:PR-6	Y:PR-1	N:PR-2	OP	24.203.03
E2101C001C	Core Spray	2	NA	Y	Y:PR-6	Y:PR-6	Y:PR-1	N:PR-2	OP	24.203.02
E2101C001D	Core Spray	2	NA	Y	Y:PR-6	Y:PR-6	Y:PR-1	N:PR-2	OP	24.203.03
E4101C001A	HPCI - Main	2	Y	Y	Y	Y	Y:PR-10	N:PR-2	OP	24.202.01
E4101C001B	HPCI - Booster	2	NA	NA	NA	NA	Y:PR-10	N:PR-2	OP	24.202.01
P4400C001A	Emergency Equip Cooling Water	3	NA	Y	Y:PR-11	Y:PR-11	Y:PR-1	N:PR-2	OP	24.207.08
P4400C001B	Emergency Equip Cooling Water	3	NA	Y	Y:PR-11	Y:PR-11	Y:PR-1	N:PR-2	OP	24.207.08
P4500C002A	Emergency Equip Service Water	3	NA	Y:PR-3	Y	Y	Y:PR-1	N:PR-2	OP	24.208.02
P4500C002B	Emergency Equip Service Water	3	NA	Y:PR-3	Y	Y	Y:PR-1	N:PR-2	OP	24.208.03
R3000C001(A)	Diesel Fuel Oil Xfer - EDG 11	E3	NA	Y	Y	Y	Y:PR-1	N:PR-2	OP	24.307.34
R3000C002(A)	Diesel Fuel Oil Xfer - EDG 12	E3	NA	Y	Y	Y	Y:PR-1	N:PR-2	OP	24.307.35
R3000C003(B)	Diesel Fuel Oil Xfer - EDG 11	E3	NA	Y	Y	Y	Y:PR-1	N:PR-2	OP	24.307.34

----- INSERVICE TEST QUANTITIES -----

PUMP NUMBER	PUMP NAME	CL	SPEED	INLET PRES.	DIFF. PRES.	FLOW RATE	VIBRA.	BEARING TEMP.	TEST FREQ	REMARKS
R3000C004(B)	Diesel Fuel Oil Xfer - EDG 12	E3	NA	Y	Y	Y	Y:PR-1	N:PR-2	OP	24.307.35
R3000C009(A)	Diesel Fuel Oil Xfer - EDG 13	E3	NA	Y	Y	Y	Y:PR-1	N:PR-2	OP	24.307.36
R3000C010(A)	Diesel Fuel Oil Xfer - EDG 14	E3	NA	Y	Y	Y	Y:PR-1	N:PR-2	OP	24.307.37
R3000C011(B)	Diesel Fuel Oil Xfer - EDG 13	E3	NA	Y	Y	Y	Y:PR-1	N:PR-2	OP	24.307.36
R3000C012(B)	Diesel Fuel Oil Xfer - EDG 14	E3	NA	Y	Y	Y	Y:PR-1	N:PR-2	OP	24.307.37
R3001C005(A)	Diesel Generator Svc Water	3	NA	Y:PR-3	Y	Y	Y:PR-1	N:PR-2	OP	24.307.34
R3001C006(C)	Diesel Generator Svc Water	3	NA	Y:PR-3	Y	Y	Y:PR-1	N:PR-2	OP	24.307.35
R3001C007(B)	Diesel Generator Svc Water	3	NA	Y:PR-3	Y	Y	Y:PR-1	N:PR-2	OP	24.307.36
R3001C008(D)	Diesel Generator Svc Water	3	NA	Y:PR-3	Y	Y	Y:PR-1	N:PR-2	OP	24.307.37
T4100C040	Chill Wtr./Cont. Cent. A/C	E4	NA	Y	Y	Y	Y:PR-1	N:PR-2	OP	24.413.01
T4100C041	Chill Wtr./Cont. Cent. A/C	E4	NA	Y	Y	Y	Y:PR-1	N:PR-2	OP	24.413.01

PART - B

INSERVICE TESTING PROGRAM

FOR VALVES

1.0 Applicable Code

This Inservice Testing Program for ISI Class 1, 2, 3 and non-ISI Class Valves meets the requirements of Subsection IWV of Section XI of the ASME Boiler and Pressure Vessel Code, 1980 Edition through the Winter 1980 Addenda. Where these requirements are determined to be impractical, specific requests for relief have been written and included in Section 2.0

2.0 Relief Requests for Valve Inservice Testing Program

2.1 Relief Request Description Format

The following information has been included in each valve relief request:

- o System listing
- o Valve number(s)
- o Category (see Section 3.0 for category description)
- o Valve Function
- o Section XI testing requirement
- o Basis for relief from Section XI requirement
- o Alternate testing

2.2 Relief Request Index/Listing

RELIEF REQUEST NUMBER	SUBJECT	SYSTEM AFFECTED
VR-1	Stroke valves during Cold Shutdown	N11, Main Steam
VR-2-R1	Stroke valves during Cold Shutdown/Refueling	B21, Feedwater
VR-4	Exercise valves during Cold Shutdown	P44, EECW
VR-5	Exercise valves during Cold Shutdown	P44, EECW
VR-6-R1	Solenoid stroke time evaluation	All
VR-7-R1	Exposure of low pressure piping to the RCPB pressure	E11, E21, E41 and E51
VR-8-R3	Exposure of low pressure piping to the RCPB pressure	E11, E21

RELIEF REQUEST NUMBER	SUBJECT	SYSTEM AFFECTED
VR-9	Test excess flow check valves during Refuelings	B21, B31, G33, E51, E21, E41
VR-10	HPCI Torus Suction Check Valve testing methodology	E41
VR-12	Scram Valve testing	C11, CRD Hydraulic
VR-14	Test Valves once per 18 months	B21, S/RV's
VR-15	Testing of MSIV's during Cold Shutdown	B21, MSIV's
VR-16	Test ADS accumulator check valves during Refueling	B21, T49 Accumulator Supply Check Valves
VR-17	Test SRV vacuum breakers during Cold Shutdown	B21, SRV Vacuum Breakers
VR-18	Test valves during Cold Shutdown	B31, Recirc Seal Injection lines
VR-20-R2	Test valves during Refueling	C11, Standby Liquid Control
VR-21	Test valves during Cold Shutdown	B31, Recirc
VR-23	Fail Safe Testing Methodology	All Systems
VR-32	Test Valves during Reactor Refueling	P44, EECW
VR-35	Test valves during Cold Shutdown	E11, RHR
VR-36	Test valves during Cold Shutdown	E41, E51, G11, G33, P44
VR-40	Keep fill system check valve operability testing methodology	E21, Core Spray

RELIEF REQUEST NUMBER	SUBJECT	SYSTEM AFFECTED
VR-41	Keep fill system check valve operability testing methodology	E11, RHR
VR-43	CRD check valve testing once per 18 months	C11, CRD
VR-44	CRD check valve testing once per 7 days	C11, CRD
VR-45-R1	Check valve disassembly and inspection	E21, Core Spray
VR-46-R6	Air Leakage testing of valve groups	See Relief Request
VR-48-R3	Check Valve Disassembly and Inspection	P44, EECW
VR-49-R3	PIV testing of valve groups	E11, RHR
VR-51-R1	Alternate stroke time testing of 3 way solenoid valves @ 6 month intervals	R30, Diesel Air Start Valves
VR-52-R1	Containment Isolation valve testing during Cold Shutdowns	B21, MSIV Leakage Control Systems
VR-53	Group testing of Drywell Vacuum Breakers	T23, Drywell Vacuum Breakers
VR-55	Thermal Relief Valve Testing during Refuelings	E11, RHR
VR-57	Drywell Vacuum Breakers Testing during Cold Shutdowns	T23, Drywell Vacuum Breakers
VR-58	Nuclear Boiler, RPV Water Level Instrumentation Backfill Valves Stroke Testing	B21, Instrument Check Valves
VR-60	Core Spray	E21, CS
VR-62	Check Valve Disassembly and Inspection	P44, EECW

RELIEF REQUEST NO. VR-1

SYSTEM: **MAIN AND REHEAT STEAM AND NUCLEAR BOILER**

COMPONENT: N1100F607 N1100F609
 N1100F608 N1100F610

CATEGORY: B

FUNCTION: These valves are blocking valves for the MSIV Leakage control system. They need to close properly to allow the MSIV leakage control system to function properly.

TEST REQUIREMENT: Exercise and time valves every three months

BASIS FOR RELIEF: Full stroke testing these valves during normal reactor operation requires isolating one of the four main steam lines. Isolation of these lines results in primary system pressure spikes, reactor power fluctuations, and increased flow in the unisolated steam lines. This unstable operation can lead to reactor scram. In addition, pressure transients resulting from stroke testing MSIVs increase the chances of actuating primary system safety/relief valves.

It is proposed that full stroke testing be performed at cold shutdowns. This request also contributes to a reduction of the relief valve challenge rate as recommended in NUREG-0626.

ALTERNATE TESTING: These valves will be full stroked exercised and timed during cold shutdown.

RELIEF REQUEST NO. VR-2-R1

SYSTEM: **FEEDWATER**

COMPONENT: B2100F010A B2100F076A
 B2100F010B B2100F076B

CATEGORY: A/C

FUNCTION: Valves B2100F010A&B and B2100F076A&B close for containment isolation. Valve B2100F010A opens for HPCI injection.

TEST REQUIREMENTS: Exercise check valves every three months.

BASIS FOR RELIEF: These check valves cannot be tested for operability to the closed position during reactor operation because the feedwater system is needed to maintain primary coolant inventory and these check valves can only close with the cessation of feedwater flow. If a feedwater isolation valve was closed during operation, the feedwater nozzle and spargers would undergo a severe thermal shock when feedwater was restored. This thermal shock could cause cracking and possible failure of the spargers and nozzles. Finally, the air operators on the check valves cannot close the valves against feedwater flow. After startup from a cold shutdown, when normal feedwater is established, these valves are confirmed open. Plant Operations records will be available for verification of normal operation. Although the check valves can be tested in the open direction during startup after a cold shutdown, the closed status of these check valves must be tested during reactor refueling. There is no means of confirming closed valve position other than during the AT-1 test.

ALTERNATE TESTING: The check valves will be verified open during plant startup after cold shutdown by the verification of feedwater flow to the Reactor. The check valves will be verified closed during reactor refueling by confirmation of acceptable leak test results (AT-1).

RELIEF REQUEST NO. VR-4

SYSTEM: **CLOSED COOLING WATER AND EMERGENCY EQUIPMENT
COOLING WATER**

COMPONENT: P4400F182 P4400F604

CATEGORY: B: P4400F604
 C: P4400F182

FUNCTION: These valves must close to isolate the non-safety related, non-seismic piping supplying cooling water to the CRD drive pumps from the EECW system.

TEST REQUIREMENTS: Exercise and time valves every three months. Exercise check valve in the close direction every three months.

BASIS FOR RELIEF: During power operation the RBCCW system supplies cooling water to the CRD pumps. Closing the subject valves would interrupt cooling water flow to the CRD pumps. These valves will not be exercised during normal operation because interruption of flow would cause damage to the pumps.

ALTERNATE TESTING: These valves will be exercised and timed during cold shutdown.

RELIEF REQUEST NO. VR-5

SYSTEM: **EMERGENCY EQUIPMENT COOLING WATER**

COMPONENT: P4400F606A P4400F282A
 P4400F606B P4400F282B
 P4400F607A P4400F615
 P4400F607B P4400F616

CATEGORY: A/C: P4400F282A, P4400F282B
 A: all others

FUNCTION: These valves are primary containment isolation valves for the four EECW lines.

TEST REQUIREMENTS: Exercise and time valves every three months. Exercise check valves in the close direction every three months.

BASIS FOR RELIEF: During power operation, the RBCCW system supplies cooling water to components inside the drywell, including the reactor recirculating pumps and motors. Closing the subject valves would interrupt cooling water flow to the reactor recirculating pump and motor bearings. These valves will not be exercised during normal operation because interruption of flow would cause damage to the pump and motor.

ALTERNATE TESTING: These valves will be exercised and timed during cold shutdown except for P4400F282A and B which will be verified to close every 2 years concurrent with Local Leak Rate tests.

RELIEF REQUEST NO. VR-6-R1

SYSTEM: ALL SYSTEMS

COMPONENT: B21F431, B21F432, B21F435, B21F436
C5100F002A, C5100F002B, C5100F002C, C5100F002D, C5100F002E
E11F412, E11F413, E11F414, E11F415, E11F610A, E11F610B
E41F400, E41F401, E41F402, E41F403
P34F401B, P34F402A, P34F402B, P34F403A, P34F403B, P34F404A,
P34F404B, P34F405A, P34F405B, P34F406A, P34F406B, P34F407, P34F408,
P34F409, P34F410
T50F412A, T50F412B T50F450 T50F451, T50F458

CATEGORY: A and B

FUNCTION: System dependent

TEST REQUIREMENTS: Stroke time evaluation per IWV-3413(b)

BASIS FOR RELIEF: It is impractical to apply the requirements of IWV-3413(b) to valves with very short stroke times (i.e. 2 seconds). Solenoid operated valves typically have full stroke times under one second. For these short stroke time valves, variances of 50 percent or more can occur in the measured times for reasons that are in no way related to valve performance, for example, operator reaction times.

In these specific cases, verifying that the valve's stroke time does not exceed 2 seconds would be sufficient to evaluate valve performance.

ALTERNATE TESTING: For solenoid operated valves where position indication is provided, the measured stroke time shall not exceed 2 seconds or the limit established and measured per IWV-3413(b).

RELIEF REQUEST NO. VR-7-R1

SYSTEM: RESIDUAL HEAT REMOVAL, CORE SPRAY, HIGH PRESSURE COOLANT INJECTION, AND REACTOR CORE ISOLATION COOLING.

COMPONENT:

E1150F008	E2150F005A
E1150F009	E2150F005B
E1150F015A	E4150F006
E1150F015B	E5150F013
E1150F608	

CATEGORY: A

FUNCTION: These valves are designated as pressure isolation valves (PIVs). Pressure isolation valves are defined as valves which isolate the portions of a system designed for low pressure service from the portions of a system connected to the Reactor Coolant Pressure Boundary (RCPB) which are designed for high pressure service. For additional information, see NUREG-0677.

TEST REQUIREMENTS: Exercise and time valves during normal operation.

BASIS FOR RELIEF: Inadvertent opening of these valves is prevented by interlocks which require the primary system pressure to be below the secondary system design pressure prior to opening. Routinely stroking these valves during power operation would place the plant in a degraded or unsafe condition by exposing low pressure piping to Reactor Coolant Pressure (Reference: EF2 SER page 3-30).

ALTERNATE TESTING: Exercising and timing test will be performed during cold shutdown.

RELIEF REQUEST NO. VR-8-R3

SYSTEM: RESIDUAL HEAT REMOVAL AND CORE SPRAY.

COMPONENT: E1100F050A E2100F006A
E1100F050B E2100F006B

CATEGORY: A/C

FUNCTION: These valves are designated as pressure isolation valves (PIVs). Pressure isolation valves are defined as valves which isolate the portions of a system designed for low pressure service from the portions of a system connected to the Reactor Coolant Pressure Boundary (RCPB) which are designed for high pressure service.

TEST REQUIREMENTS: Exercise check valves E1100F050A and B and E2100F006A and B in the open and close direction every three months.

BASIS FOR RELIEF: The current design configuration of these valves/systems prohibit fully exercising them through full flow testing. Acceptable alternatives identified in NRC Generic Letter 89-04, Paragraph D, and Attachment 1, Position 2, also address disassembly as a viable alternative.

It is imprudent/impractical to disassemble the valves for inspection or inject full flow through these valves during cold shutdowns because: (1) dead legs of piping flushed into the reactor would seriously impact chemistry requirements which could delay plant start-up significantly; (2) disassembly requires an extensive manpower and resource commitment; (3) exposure to personnel is substantial, approximately 4.7 Man Rem in RF-01; (4) drywell entry is prohibited unless de-inerted.

ALTERNATE TESTING: Check Valves E1100F050A and B and E2100F006A and B will be exercised during Cold Shutdown. E1100F050A and B will be full stroke tested using a full stroke actuator which meets the requirements of ASME Section XI, Paragraph IWV-3522(b). Valves E2100F006A and B will be partial stroke exercised using an actuator.

Additionally, Valves E2100F006A and B will be disassembled and inspected in accordance with the guidelines contained in Generic Letter 89-04, Attachment 1, Position 2. One valve will be disassembled and inspected every refueling outage until sufficient data is accumulated to establish a disassembly/inspection cycle which will adequately monitor valve degradation. The partial stroke test will be accomplished after each disassembly and inspection of the valves.

RELIEF REQUEST NO. VR-9

SYSTEM: NUCLEAR BOILER, REACTOR FEEDWATER, REACTOR RECIRCULATION, REACTOR WATER CLEANUP, REACTOR CORE ISOLATION COOLING, CORE SPRAY, AND HIGH PRESSURE COOLANT INJECTION.

COMPONENT: Excess flow check valves

CATEGORY: C

FUNCTION: Excess flow check valves limit leakage from the Reactor Coolant Pressure Boundary (RCPB) due to instrumentation piping failures and perform a containment isolation function.

TEST REQUIREMENTS: Exercise check valve in the close direction every three months.

BASIS FOR RELIEF: Excess flow check valves cannot be exercised without isolating instrumentation downstream of the excess flow check valve. Isolating instruments during normal operation would produce erroneous instrument readings which could lead to a degraded or unsafe plant condition.

ALTERNATE TESTING: Excess flow check valves will be exercised in the closed direction at each refueling outage.

RELIEF REQUEST NO. VR-10

SYSTEM: HIGH PRESSURE COOLANT INJECTION

COMPONENT: E4100F045

CATEGORY: C

FUNCTION: This valve is designed to prevent backflow into the Torus in the event of pump suction shift from the Condensate Storage Tank (CST) to the Torus. The safety related stroke direction of this valve is in the open direction to provide suction flow to the High Pressure Coolant Injection (HPCI) pump.

TEST REQUIREMENTS: Exercise check valve every three months.

BASIS FOR RELIEF: There is no convenient method for verifying the ability of this valve to swing to the full open position. The system test circuits utilize the CST for pump suction rather than the suppression pool. Taking suction from the suppression pool during testing is undesirable because torus water would be transferred to the condensate storage tank. Since torus water is not demineralized, the entire condensate storage tank inventory would have to be processed after the test.

In lieu of the Code required full stroke test, valve operability will be demonstrated by disassembling the valve and verifying that the valve disk swings freely to the full open position. Since this valve has no function during normal operation, no wear-induced degradation of the valve internals is expected.

ALTERNATE TESTING: Valve disassembly and inspection will occur at every refueling outage until sufficient data can be accumulated to adequately monitor valve degradation. The maximum inspection intervals will be determined based on the results of that data.

RELIEF REQUEST NO. VR-12

SYSTEM: CONTROL ROD DRIVE

COMPONENT: C1103F114
C1103F126
C1103F127

CATEGORY: B and C

FUNCTION: For a scram to occur, check valve C1103F114 opens, and diaphragm operated valves C1103F126 and C1103F127 open.

The valves listed above can be found on each Control Rod Drive (CRD) hydraulic control unit. There are 185 CRD hydraulic control units, one for each CRD.

TEST REQUIREMENTS: Exercise and time valves every three months. Exercise check valves every three months.

BASIS FOR RELIEF: The proper operation of each of these valves is demonstrated during scram testing. During scram testing, each drive's scram insertion time is measured and a fail-safe actuator test is performed. The Technical Specifications provide a limit for individual CRD scram insertion times to specific values (Technical Specification paragraphs 3.1.3.3 and 3.1.3.4). If a particular CRD's scram insertion time is less than the specified limit, the above mentioned valves are functioning properly.

ALTERNATE TESTING: The frequency of individual scram insertion tests is:

1. 100% of control rod drives following core alterations or after a reactor shutdown greater than 120 days with reactor power equal to or less than 40%, and
2. 10% of control rods at least once every 120 days of operations, per Technical Specification paragraph 4.1.3.2.

RELIEF REQUEST NO. VR-14

SYSTEM: NUCLEAR BOILER

COMPONENT: S/RV ADS Valves

B2104F013R
B2104F013E
B2104F013J
B2104F013H
B2104F013P

CATEGORY: B/C

FUNCTION: The functions of the Safety Relief Valves (S/RVs) are: 1) act as a primary system safety valve which actuates on high system pressure; 2) open upon receipt of an auto depressurization signal to blowdown reactor and; 3) act as a primary system relief valve which can be manually actuated from the control room.

TEST REQUIREMENTS: Exercise and time valve every three months.

BASIS FOR RELIEF: Relief is requested from the Section XI required testing frequency of once every three months. These valves will be exercised once every eighteen (18) months as specified in Technical Specification paragraph 4.5.1.d.2.

In addition, relief is requested from the stroke timing requirements of Section XI. It is impractical to measure stroke times for an S/RV since the stroke times are on the order of 100 msec. Steam flow measurements and/or turbine bypass valve position will verify that the S/RVs have performed their function in less than or equal to 2 seconds. Time "zero" for this stroke time measurement corresponds to the instant the S/RV hand switch is aligned in the "open" position.

ALTERNATE TESTING: These valves will be exercised at least once per 18 months when the reactor is operating at sufficient power to a quantity of steam through the turbine bypass valve(s) equal to or greater than the capacity of an S/RV. Since the turbine bypass valves respond automatically to RPV dome pressure, the actuation of a S/RV will result in rapid closure of the turbine bypass valves. Conversely, closing the S/RV will be accommodated by rapid opening of the turbine bypass valves. A change in turbine bypass valve position can be directly associated with a certain steam flow rate. This flow rate would be equal to the quantity of steam discharged by the S/RV.

No stroke time measurements will be performed. An abrupt change in turbine bypass valve position or steam line flow (per Tech. Spec. 4.5.1.d.2) within 2 seconds will be adequate to demonstrate valve operability.

RELIEF REQUEST NO. VR-15

SYSTEM: NUCLEAR BOILER

COMPONENT: B2103F022A
B2103F022B
B2103F022C
B2103F022D
B2103F028A
B2103F028B
B2103F028C
B2103F028D

CATEGORY: A

FUNCTION: These Main Steam Isolation Valves (MSIVs) are the primary containment isolation valves for the main steam lines.

TEST REQUIREMENTS: Exercise and time valves every three months (BTC).

BASIS FOR RELIEF: Full stroke testing these valves during normal reactor operation requires isolating one of the four main steam lines. Isolation of these lines results in primary system pressure spikes, reactor power fluctuations, and increased flow in the unisolated steam lines. This unstable operation can lead to a reactor scram, and as discussed in NUREG-0626, pressure transients resulting from full stroke testing MSIVs increase the chances of actuating primary system safety margins.

This request also contributes to a reduction of the relief valve challenge rate as recommended in NUREG-0626.

ALTERNATE TESTING: These valves will be partial stroke exercised every three months and full stroke exercised during cold shutdown.

RELIEF REQUEST NO. VR-16

SYSTEM: NUCLEAR BOILER, PRIMARY CONTAINMENT PNEUMATIC SUPPLY

<u>COMPONENT:</u>	T4901F034A	B2100F029D
	T4901F034B	T4901F019
	T4901F034C	T4901F022
	T4901F034D	T4901F025
	B2100F029A	T4901F028
	B2100F029B	T4901F031
	B2100F029C	

CATEGORY: C

FUNCTION: These valves must close upon loss of normal air or nitrogen supply to the S/RV ADS accumulators and the MSIV accumulators. These valves will open when the safety related control air system starts up after the loss of normal air or nitrogen supply.

TEST REQUIREMENTS: Exercise valves in the open and closed direction every three months.

BASIS FOR RELIEF: The position of these simple check valves cannot be verified during normal operation or cold shutdown since special testing will be required. In addition, access to these valves is limited since they are inside the drywell.

ALTERNATE TESTING: These valves will be exercised during refueling.

RELIEF REQUEST NO. VR-17

SYSTEM: NUCLEAR BOILER

<u>COMPONENT:</u>	B2100F037A	B2100F037J
	B2100F037B	B2100F037K
	B2100F037C	B2100F037L
	B2100F037D	B2100F037M
	B2100F037E	B2100F037N
	B2100F037F	B2100F037P
	B2100F037G	B2100F037R

CATEGORY: C

FUNCTION: During an S/RV discharge, these valves must be closed. After an S/RV discharge, the steam remaining in the S/RV discharge line will condense and try to draw a vacuum in the line. These check valves (vacuum breakers) open and admit air to the S/RV discharge line thus relieving the vacuum condition.

TEST REQUIREMENTS: Exercise check valve in the open and close direction every three months.

BASIS FOR RELIEF: These check valves have no external means of actuation for exercising. The only practical method for exercising these valves open and closed is by manually pushing the disk from its seat. Since this requires access to the valves, which are located in the drywell, the test must be deferred to cold shutdowns if the primary containment is de-inerted.

ALTERNATE TESTING: These check valves will be verified to be operable during cold shutdowns when the drywell is de-inerted.

RELIEF REQUEST NO. VR-18

SYSTEM: REACTOR RECIRCULATION

COMPONENT: B3100F014A B3100F016A
B3100F014B B3100F016B

CATEGORY A

FUNCTION: These are primary containment isolation valves on the CRD seal water injection lines to the reactor recirculation pumps.

TEST REQUIREMENTS: Exercise and time valves every three months.

BASIS FOR RELIEF: Exercising these valves during normal operation would require isolating the seal water flow to the reactor recirculation pumps. Isolating the seal water flow to these pumps could potentially damage the pump.

ALTERNATE TESTING: These valves will be exercised and timed during cold shutdown.

RELIEF REQUEST NO. VR-20-R2

SYSTEM: STANDBY LIQUID CONTROL (SBLC)

COMPONENT: C4100F006
C4100F007

CATEGORY: A/C

FUNCTION: The safety functions of these check valves are to open upon system injection and close for containment isolation.

TEST REQUIREMENTS: Exercise valves every three (3) months open and closed. Type-C Air Leak Test (10CFR50-App. J) every reactor refueling. These valves serve as Primary Containment Isolation Valves.

BASIS FOR RELIEF: Initially both of these valves had a testability feature which utilized a shaft that penetrated the pressure boundary via a packing and stuffing box arrangement. These packing and stuffing boxes were a major source of leakage when subjected to 10CFR50, App. J Local Leak Rate Testing (LLRT). The design was such that when the packing was tightened to reduce leakage, the friction on the shaft increased so that the disc would not operate freely. Subsequent loosening of the packing to pass the exercise test resulted in failing the LLRT test. The required tightening and loosening of valve packing to satisfy multiple testing requirements resulted in excessive manhours being expended inside primary containment and raised ALARA concerns. In an effort to alleviate this problem and reduce personnel exposure, the air operators on these check valves were removed, and new valve shafts and end bushings were installed. Removal of these air operators neither compromises the operation nor the safety function of the subject check valves. Now that the operators have been removed, the only method of exercising these valves is to inject water through the valves into the reactor vessel via the SBLC pump(s) and perform a leaktest to verify closure.

During plant operation at power, this would require disabling the SBLC system to prevent injection of sodium pentaborate into the reactor and to repair/replace the squib valve which was used for the test.

RELIEF REQUEST VR-20-R2 (Continued)

During cold shutdown periods, the activities associated with this test, subsequent squib valve replacement, and the associated leak test is considered well beyond the scope of a typical short-duration outage and could require unnecessary de-inerting of the primary containment.

These valves are installed in a "dead leg" of piping and, as such, are not subject to conditions or operations that could cause significant degradation of valve internals over the lifetime of the valves.

ALTERNATE TESTING: (Exercise testing of check valves C4100F006 and C4100F007)

These valves will be verified to stroke open by performance of the "SLC Manual initiation and Storage Tank Heater Operability Test". This test will be performed every 18 months. This test injects full flow from one SBLC pump through these valves into the reactor vessel. During the test, the outboard check valve, C4100F006, will be checked locally and by position indication, to be fully open. In addition, since the SBLC pumps are positive displacement pumps, pump operation without lifting a relief valve verifies full flow through the check valves.

These valves will be verified closed by performance of Local Leak Rate Testing (LLRT). These tests pressurize a test volume in which the subject check valves form a pressure boundary. If the valves are not fully closed and seated, the LLRT test will fail. Successful LLRT testing will prove that the subject valves are closed. These LLRTs are performed every 2 years. Both the manual initiation and injection test and the LLRT test should generally occur during refueling outages.

BASIS FOR RELIEF: (Position Indication Test for check valve C4100F007)

Remote position indicator for inboard check valve C4100F007 was removed to reduce personnel exposure during recalibration and repair work on the position switches within primary containment. Remote position indication for inboard check valve C4100F007 is neither required for system operation nor required for plant safety.

ALTERNATE TESTING: (Position Indication Test for check valve C4100F007) Due to the removal of remote position indicators for inboard check valve C4100F007, position indication tests of this valve are no longer required. Via this relief request, remote position indication testing for valve C4100F007 is being deleted. The position indication test requirement for outboard check valve C4100F006 will remain.

RELIEF REQUEST NO. VR-21

SYSTEM: REACTOR RECIRCULATION

COMPONENT: B3105F031A
B3105F031B

CATEGORY: B

FUNCTION: During a reactor recirculation loop pipe break loss of coolant accident, one of these valves will close depending on the location of the pipe break. Low Pressure Coolant Injection (LPCI) loop selection logic determines which valve must close.

TEST REQUIREMENTS: Exercise and time valves for operability every three months.

BASIS FOR RELIEF: These valves cannot be full stroke tested during normal operation since isolation of a recirculation loop would cause a recirculation pump trip. Single loop operation is restricted by Technical Specification paragraph 3.4.1.1.a.

ALTERNATE TESTING: These valves will be full stroke exercised during cold shutdown.

RELIEF REQUEST NO. VR-23

SYSTEM: ALL SYSTEMS

COMPONENT: Valves equipped to fail open or closed.

CATEGORY: A and B

FUNCTION: Upon loss of electrical power, the valve must stroke to its fail-safe position.

TEST REQUIREMENTS: Solenoid valves which control the air supply to air operated valves and direct solenoid operated valves must stroke to their fail-safe position upon interruption of their electrical supply.

BASIS FOR RELIEF: De-energizing the solenoid valve has the same effect as loss of electrical power. Therefore, stroking the valve from the control room to its fail-safe position constitutes a Fail-Safe Test. No additional testing is necessary.

ALTERNATE TESTING: Normal stroking to the fail-safe position of valves equipped to fail open or closed constitutes a Fail-Safe Test. No additional testing is necessary.

RELIEF REQUEST NO. VR-32

SYSTEM: EMERGENCY EQUIPMENT COOLING WATER

COMPONENT: P4400F246
P4400F274

CATEGORY: C

FUNCTION: These valves isolate the Quality Group D (non-class) penetration cooling jackets and the drywell sump heat exchanger from the balance of the system.

TEST REQUIREMENTS: Exercise valves to the full closed position every quarter.

BASIS FOR RELIEF: Because these valves are non-testable check valves inside primary containment, they can only be verified closed by a leak test. This test can only be performed during reactor refueling.

ALTERNATE TESTING: These valves will be leak tested during reactor refueling to confirm their close position.

RELIEF REQUEST NO. VR-35

SYSTEM: RESIDUAL HEAT REMOVAL

COMPONENT: E11F412
E11F413
E11F414
E11F415

CATEGORY: A

FUNCTION: These valves isolate the Reactor Protection System from Primary Containment Atmosphere.

TEST REQUIREMENTS: Exercise and time valves in the close direction every three months.

BASIS FOR RELIEF: The valves cannot be full stroke tested during normal operation since isolation of these lines could cause a reactor scram and Emergency Core Cooling System (ECCS) initiation. See Relief Request VR-6 for stroke time information.

ALTERNATE TESTING: These valves will be full stroke exercised during cold shutdown.

RELIEF REQUEST NO. VR-36

SYSTEM: SUMP PUMP - RADWASTE (G11)
REACTOR CORE ISOLATION COOLING (E51)
HIGH PRESSURE COOLANT INJECTION (E41)
REACTOR WATER CLEANUP (G33)
EMERGENCY EQUIPMENT COOLING WATER (E14)

COMPONENT: G1154F018 P4400F608
G1154F600 P4400F614
E4150F002
G3352F001
E5150F007

CATEGORY: A and B

FUNCTION: These valves serve as inboard containment isolation valves, Emergency Equipment Cooling Water (EECW) drywell sump cooling and EECW penetration jacket isolation valves.

TEST REQUIREMENTS: Exercise and time valves in the close direction every three months.

BASIS FOR RELIEF: These valves cannot be full-stroke tested during normal operation since failure of these valves during exercising at power operation would result in a plant shutdown to correct the problem.

ALTERNATE TESTING: These valves will be full stroke exercised during cold shutdown.

RELIEF REQUEST NO. VR-40

SYSTEM: CORE SPRAY

COMPONENT: E2100F029A E2100F029B
E2100F030A E2100F030B

CATEGORY: C

FUNCTION: These check valves prevent back flow into the keep fill system.

TEST REQUIREMENTS: Exercise check valve in the close direction every three months.

BASIS FOR RELIEF: The E2100F029A and E2100F030A valves are placed in series as are the E2100F029B and E2100F030B valves. There are no taps between these valves and no manual lifting levers to indicate disc position. The only way to verify valve closure is to check for reverse flow leakage, which will confirm that one out of two valves closed. The valves are exercised to the open position during the vent and fill portion of the core spray system operability tests.

ALTERNATE TESTING: One of the two valves will be confirmed closed by the absence of reverse flow.

RELIEF REQUEST NO. VR-41

SYSTEM: RESIDUAL HEAT REMOVAL

COMPONENT: E1100F089 E1100F184
E1100F090 E1100F185

CATEGORY: C

FUNCTION: These check valves prevent back flow into the keep fill system.

TEST REQUIREMENTS: Exercise check valve in the close direction every three months.

BASIS FOR RELIEF: The E1100F089 and E1100F090 valves are placed in series as are the E1100F184 and E1100F185 valves. There are no taps between these valves and no manual actuating levels to indicate disk position. The only way to verify closure is to check for reverse flow leakage, which will confirm that one out of two valves closed. The valves are exercised to the open position during the vent and fill portion of the residual heat removal system operability tests.

ALTERNATE TESTING: One of the two valves will be confirmed closed by the absence of reverse flow.

RELIEF REQUEST NO. VR-43

SYSTEM: CONTROL ROD DRIVE

COMPONENT: C1103F115 (Typical of 185 valves)

CATEGORY: C

FUNCTION: For a scram to occur, C1103F115 must close to prevent back flow into the charging water header.

TEST REQUIREMENTS: Exercise check valve in the close direction every three months.

BASIS FOR RELIEF: During normal operation, the drive water pumps supply drive water and cooling water to the control rods. In order to test C1103F115 in the close position, the drive water pumps must be shut down, thus interrupting the supply of cooling water to the control rods. Interruption of cooling water would cause excessive temperature in the control rods.

ALTERNATE TESTING: The check valve will be exercised once every 18 months during the CRD accumulator system integrity test. Normal pressure level in the accumulator verifies that the check valve opens properly.

RELIEF REQUEST NO. VR-44

SYSTEM: CONTROL ROD DRIVE

COMPONENT: C1103F138 (Typical of 185 valves)

CATEGORY: C

FUNCTION: For a scram to occur, C1103F138 must close to prevent back flow into the cooling water header.

TEST REQUIREMENTS: Exercise check valve in the close direction every three months.

BASIS FOR RELIEF: Due to system configuration, direct verification that the check valve closes is not practical. Indirect verification of valve closure is provided each time a control rod is moved. If C1103F138 fails to close properly, the rod will fail to insert because drive water at a pressure between 90 psi and 260 psi above reactor pressure will flow into the cooling water header which operates at approximately 20 psi above reactor pressure.

ALTERNATE TESTING: When the reactor is in either Operation Condition 1 or 2 and the thermal power is above the preset power level of the rod worth minimizer and the rod sequence control system, all operable and withdrawn control rods will be moved at least one notch once per seven days per Technical Specification paragraph 4.1.3.1.2.

RELIEF REQUEST NO. VR-45-R1

SYSTEM: CORE SPRAY

COMPONENT: E2100F038A E2100F038C
E2100F038B E2100F038D

CATEGORY: C

FUNCTION: These valves are designed to close to prevent backflow through core spray pumps that fail to start, thus preventing loss of core spray inventory. The valves must also open during pump startup to meet minimum flow requirements of the pumps.

TEST REQUIREMENTS: Exercise check valve every three months.

BASIS FOR RELIEF: As described in Relief Request PR-6, both Core Spray pumps in each division must be operating during surveillance testing. Therefore, detection of flow through the minimum flow line will only show that one out of two valves is open. Also, the ability to verify that the check valves close upon reversal of flow is lost during two pump testing.

In lieu of the Code required exercise test, one valve of each type will be demonstrated operable by disassembling the valve and verifying that the valve disk swings freely from and to the seat each refueling outage. All of the above valves are 3 inch, swing check type valves manufactured by Powell. Since Core Spray Pumps are tested together in each Division, a partial stroke test is not possible and will not be specified for these valves. This complies with Position 2 of GL 89-04.

ALTERNATE TESTING: Valve disassembly and inspection will occur at every refueling outage until sufficient data can be accumulated to adequately monitor valve degradation. The maximum inspection intervals will be determined based on an evaluation of that data.

RELIEF REQUEST NO. VR-46-R6

SYSTEM: SYSTEMS PENETRATING PRIMARY CONTAINMENT

COMPONENT: Valves subject to ASME Section XI, Category A Containment Isolation Air Leakage Tests. See Table VR-46-R6 for list of valves.

CATEGORY: A and A/C

FUNCTION: The subject valves perform a containment isolation function as defined in 10CFR50, Appendix A, Criteria 55 and 56.

TEST REQUIREMENTS: Measure valve seat leakage and compare the measured leakage to a specific maximum leakage for each valve (IWV-3426).

BASIS FOR RELIEF: Due to system configuration, the valves listed in Table VR-46-R6 cannot be individually leak tested. Table VR-46-R6 identifies the Containment Isolation Valves (CIV's) which must be collectively leak tested in valve groups. This table also provides the corresponding primary containment penetration number and valve sizes.

ALTERNATE TESTING: The Containment Isolation Valves listed in Table VR-46-R6 will be collectively leak tested according to their associated valve groups given in the table. The test leakage will be compared to the maximum leakage assigned to each group.

If the test leakage exceeds the criteria required by IWV-3426, valves in the affected group will be evaluated on a valve by valve basis consistent with the requirements of IWV-3427(a) and the related requirements of OM-10, including Sections 4.2.2.1 and 4.2.2.3. The valve most likely to be the leaker will be repaired first and the group retested. If the test leakage is within the criteria, no further testing will be performed. In accordance to the guidance contained in Generic Letter 89-04 Paragraph D and Attachment 1, Position 10, exception will be taken to the requirements contained in Section IWV-3427(b).

RELIEF REQUEST NO. VR-46-R6 (Continued)

Table VR-46-R6

Containment Isolation Valves Which Must
Be Tested by Group

<u>Penetration Number</u>	<u>ID Numbers of Valves in Grouping</u>	<u>Valve Size (in)</u>
X-7A	B2100F022A	26
	B2100F028A	26
X-7B	B2100F022B	26
	B2100F028B	26
X-7C	B2100F022C	26
	B2100F028C	26
X-7D	B2100F022D	26
	B2100F028D	26
X-9A	B2100F076A	20
	E4150F006	14
X-9B	B2100F076B	20
	E5150F013	6
	G3352F220	4
X-11	E4150F003	10
	E4150F600	1
X-12	E1100F009	20
	E1100F608	20
X-15	T4804F603A	4
	T4804F605A	4
X-22	T4901F601	1.5
	T4901F465	1.5
	T4901F007	1.5

RELIEF REQUEST NO. VR-46-R6 (Continued)

Table VR-46-R6 (Continued)

**Containment Isolation Valves Which Must
Be Tested by Group**

<u>Penetration Number</u>	<u>ID Numbers of Valves in Grouping</u>	<u>Valve Size (in)</u>
X-25	T4803F602	24
	T4600F402	24
	T4600F411	6
X-26	T4803F601	24
	T4800F407	24
	T4800F408	10
X-27a	T5000F401B	1
X-27c	T5000F403B	1
X-27d	T5000F404B	1
X-27e	T5000F405B	1
X-27b	T5000F402B	1
	P34F404A	0.75
X-27b	T5000F402B	1
	P34F403A	0.75
X-31B	T4800F453	1
	T4800F454	1
	T4800F455	1
X-36	T4901F602	1.5
	T4901F468	1.5
	T4901F016	1.5
X-44	T4804F603B	4
	T4808F605B	4
X-48a	T5000F401A	1
X-48b	T5000F402A	1
X-48c	T5000F403A	1
X-48d	T5000F404A	1
X-48e	T5000F405A	1

RELIEF REQUEST NO. VR-46-R6 (Continued)

Table VR-46-R6 (Continued)

**Containment Isolation Valves Which Must
Be Tested by Group**

<u>Penetration Number</u>	<u>ID Numbers of Valves in Grouping</u>	<u>Valve Size (in)</u>
X-205A	T2300F450B	20
	T2300F410	20
X-205B	T2300F450A	20
	T2300F409	20
X-205C	T4800F404	20
	T4800F405	20
	T4800F409	6
X-205D	T4600F400	20
	T4600F401	20
	T4600F412	6
	T4600F410	6
X-205D	T4800F456	1
	T4800F457	1
	T4800F458	1
X-211A	E1150F024B	18
	E1150F027B	6
	E1150F028B	18
X-211B	E1150F024A	18
	E1150F027A	6
	E1150F028A	18
X-215	T4804F602A	4
	T4804F606A	4
X-218	T4804F601A	8
	T4804F604A	8
X-218	T4804F601B	8
	T4804F604B	8
X-219	T4804F602B	4
	T4804F606B	4

RELIEF REQUEST NO. VR-48-R3

SYSTEM: EMERGENCY EQUIPMENT COOLING WATER

COMPONENT: P4400F051
P4400F116A P4400F165

CATEGORY: C

FUNCTION: These valves are designed to close to prevent backflow in the Emergency Equipment Cooling Water System.

TEST REQUIREMENTS: Exercise check valve every three months to the open position.

BASIS FOR RELIEF: The current system configuration does not allow for direct or indirect verification that the check valve disk moves from its seat to the open position upon initiation of flow.

In lieu of the Code required exercise test, valve operability will be demonstrated by disassembling the valve and verifying that the valve disk swings freely from and to the seat.

ALTERNATE TESTING: Valve disassembly and inspection will occur at every refueling outage until sufficient data can be accumulated to adequately monitor valve degradation. The maximum inspection intervals will be determined based on an evaluation of that data.

Each check valve is also partial stroke exercised during the quarterly Emergency Equipment Cooling Water Surveillance test.

ADDENDUM: This addendum specifies the maximum inspection intervals as determined by evaluation of inspection history over three refueling outages.

Based upon these inspection results, the maximum inspection frequency of 54 months (one valve each refueling outage) is justified. Generic Letter (GL) 89-04, Position 2, identifies the NRC staff position for adopting acceptable alternatives to full flow testing of these check valves. These positions are addressed as identified below:

**GL 89-04, Position 2
Paragraph**

**Fermi Basis for
Meeting the Position**

- a. During valve testing by disassembly, the valve internals should be visually inspected for worn or corroded parts, and the valve disk should be manually exercised.

- a. All three valves have been disassembled and inspected in each of three refueling outages completed prior to RF-04. No worn or corroded parts have been identified. Reference IST Evaluation 93-037

RELIEF REQUEST NO. VR-48-R3 (Continued)

**GL 89-04, Position 2
Paragraph**

- b. Due to the scope of this testing, the personnel hazards involved and system operating restrictions, valve disassembly and inspection may be performed during reactor refueling outages. Since this frequency differs from the Code required frequency, this deviation must be specifically noted in the IST program.
- c. Where the licensee determines that it is burdensome to disassemble and inspect all applicable valves each refueling outage, a sample disassembly and inspection plan for groups of identical valves in similar applications may be employed. The NRC guidelines for this plan are explained below:
 - o The sample disassembly and inspection program involves grouping similar valves and testing one valve in each group during each refueling outage. The sampling technique requires that each valve in the group be the same design (manufacturer, size, model number, and materials of construction) and have the same service conditions including valve orientation. Additionally, at each disassembly the licensee must verify that the disassembled valve is capable of full-stroking and that the internals of the valve are structurally sound (no loose or corroded parts). Also, if the disassembly is to verify the full-stroke capability of the valve, the disk should be manually exercised.

**Fermi Basis for
Meeting the Position**

- b. This addendum to Relief Request No. VR-48 extends the frequency to the maximum inspection interval of 1 valve per refueling outage, based upon an 18 month operating cycle. Evaluation of data collected over three refueling outages indicates that minimal erosion and corrosion occur in these valves. Reference IST Evaluation 93-037.
- c. Having determined that it is indeed burdensome to disassemble and inspect 3 identical check valves in the same system each refuel outage. NRC guidelines are hereby implemented and met as follows:
 - o All three valves are Powell Model #3061 AWE 6" Swing Check Valves of identical material and construction.
 - o All have the same service conditions. Ref. IST Evaluation 93-037.
 - o Physical orientation is similar for all three valves in that they are horizontally mounted in similar configuration arrangements.

RELIEF REQUEST NO. VR-48-R3 (Continued)

GL 89-04, Position 2
Paragraph

- o A different valve of each group is required to be disassembled, inspected, and manually full-stroke exercised at each successive refueling outage, until the entire group has been tested. If the disassembled valve is not capable of being full-stroke exercised or there is binding or failure of valve internals, the remaining valves in that group must also be disassembled, inspected, and manually full-stroke exercised during the same outage. Once this is completed, the sequence of disassembly must be repeated unless extension of the interval can be justified.

Fermi Basis for
Meeting the Position

- o The valves have been manually exercised to verify full-stroke capability in accordance with surveillance procedure 43.000.010 during the three prior refueling outages. The new frequency of one valve per outage, completing all three in three outages, meets these requirements.

RELIEF REQUEST NUMBER VR-49-R3

SYSTEM: RESIDUAL HEAT REMOVAL SYSTEM

COMPONENT: E1150F009 E1150F608

CATEGORY: A

FUNCTION: The subject valve isolates low pressure piping from adjacent high pressure piping.

TEST REQUIREMENT: Measure valve seat leakage and compare the measured leakage to a specific maximum leakage for each valve.

BASIS FOR RELIEF: Due to system configuration, the above pressure isolation valves cannot be individually leak tested. Both valves must be tested within the same test volume with pressure being applied in the accident direction for both valves.

According to Technical Specification paragraph 3.4.3.2.d, the leakage shall be limited to one gpm (3785 ml/min) at a reactor coolant pressure 1045 +/- 10 psig from any reactor coolant system pressure isolation valve.

ALTERNATE TESTING: Pressure isolation valves E1150F009 and E1150F608 will be leak tested together. The test leakage will be compared to a maximum leakage of one gpm (3785 ml/min).

If the test leakage exceeds the one gpm limit as specified by Technical Specification Paragraph 3.4.3.2.d, the valves will be evaluated consistent with the requirements of IWV-3427(a). The valve most likely to be the leaker will be repaired first and both valves retested. If the test leakage is within one gpm, no further testing will be performed. In accordance with the guidance contained in Generic Letter 89-04 Paragraph D and Attachment 1, Position 10, exception will be taken to the requirements contained in Section IWV-3427(b).

RELIEF REQUEST NO. VR-51-R1

SYSTEM: DIESEL GENERATOR

COMPONENTS: R30FA04A R30FA04B R30FA04C R30FA04D
R30FA05A R30FA05B R30FA05C R30FA05D

CATEGORY: B

FUNCTION: Normally closed valves which must open to supply air to the Air Start System of the Diesel Generator.

TEST REQUIREMENTS: Per IWV-3413(b) exercise testing, verified by stroke time measurements, will be performed to confirm full stroke capability of each valve. The stroke direction tested and timed will be based on the direction the valve disk must travel to fulfill its safety function.

The test frequency required is once every 92 days during power operation.

BASIS FOR RELIEF: It is impractical to apply the requirements of IWV-3413(b) to valves with very short stroke times (i.e. 2 seconds). Solenoid operated valves typically have full stroke times under one second. For these short stroke time valves, variances of 50 percent or more can occur in the measured times for reasons that are in no way related to valve performance; for example, operator reaction times. In this specific case verifying that the valve's stroke time satisfies system operating requirements is sufficient to evaluate valve performance.

To satisfy the test frequency requirements would require additional diesel starts which would be detrimental to overall diesel operation and reliability.

ALTERNATE TESTING: For the subject valves, a successful start of the diesel generator within the required Technical Specifications requirement of achieving speed and voltage level (Ref. Tech Spec. Paragraph 4.8.1.1.2.a.4) within 10 seconds, shall be sufficient to demonstrate that the 3-way solenoid valves have opened in the required time.

The test frequency shall be once every 6 months.

This Relief Request has been granted interim approval for a period of 1 year from the date of May 2, 1996 per NRC letter dated May 2, 1996, Subject: Fermi 2-Safety Evaluation of Pump and Valve Relief Requests for the Pump and Valve Inservice Testing Program. Additional alternate testing will be proposed and implemented within this 1 year period.

RELIEF REQUEST NO. VR-52-R1

SYSTEM: MSIV LEAKAGE CONTROL

COMPONENT: B2100F434 and B2100F437

CATEGORY: B2100F434 (Category - A) and B2100F437 (Category - B)

FUNCTION: Close for primary containment isolation and open to operate the Main Steam Isolation Valve Leakage Control System (MSIVLCS).

TEST REQUIREMENT: Exercise and time valves every three months to the open and closed position.

BASIS FOR RELIEF: Stroking the inboard isolation valves B2100F434 (Division 1) and B2100F437 (Division 2) during normal reactor operation causes the drain valve, and the air injector valve to cycle open. This evolution results in the potential release of radioactive steam to the atmosphere inside the steam tunnel and challenges the secondary isolation valve with a potential for primary reactor coolant release. It also allows steam to enter the control air system causing valve position indication problems in the control room. Also, this system is not designed to operate at pressures greater than 50 psig. System interlocks are designed to prevent the isolation valves from opening unless in the test mode and even then only one isolation valve at a time can be opened.

ALTERNATE TESTING: These valves will be full stroked, exercised, and timed during cold shutdown.

RELIEF REQUEST NO. VR-53

SYSTEM: NITROGEN INERTING

COMPONENTS: T2300F400 A thru H
T2300F400 J thru M

CATEGORY: A/C

FUNCTION: These valves open to prevent a differential pressure buildup between the torus and the drywell and close when drywell pressure is greater than torus pressure to prevent bypass of drywell atmosphere directly to the torus air volume.

TEST REQUIREMENTS: For Category A valves, seat leakage shall be measured and compared to a specified maximum allowable leakage (IWV-3426).

For valves 6 inches NPS and larger, individual valve leakrates shall be trended and evaluated per IWV-3427.

BASIS FOR RELIEF: These are exposed check valves bolted to open flanges on the downcomer header in the suppression chamber. There is no practical way of applying pressure behind the valves in the downcomer header, and testing from the torus side using a vacuum fitting would require considerable disassembly of valve components.

The requirements for leak testing these valves is derived from Technical Specifications, Section 4.6.2.1.h that establishes a limit for drywell to torus bypass leakage - that is leakage from the drywell to the torus that is not ducted through the torus downcomers into the torus water. In this section, only a limit for aggregate leakage from all sources is imposed and individual valve leakage is considered insignificant from quantitative perspective.

In consideration of the foregoing, analysis of test results per IWV-3427 is not considered applicable or meaningful.

ALTERNATE TESTING: Drywell - Torus bypass leakage will be measured in accordance with Fermi Technical Specification, Section 4.6.2.1.h. Individual seat leakage measurements of the subject valves will not be made nor will test results be analyzed in accordance with IWV-3427.

RELIEF REQUEST NUMBER VR-55

SYSTEM: RESIDUAL HEAT REMOVAL SYSTEM (RHR) DIVISION II

COMPONENT: E1100F408 and E1100F409

CATEGORY: A/C and C

FUNCTION: These valves function to provide thermal relief between E1150F009, E1150F608, and E1150F008.

TEST REQUIREMENT: Check Valves will be exercised fully open every three months.

BASIS FOR RELIEF: Both of these valves are non-testable check valves located inside primary containment and have no remote flow or position indication. Disassembly of these valves for inspection is impractical due to them having seal welded bonnets. Testing these valves inside the drywell with the reactor operating would result in significant radiation doses to test personnel inconsistent with the concept of ALARA in addition to imposing unacceptable personnel hazards associated with entering a nitrogen inerted containment/drywell. Additional problems associated with testing these valves during operations involve the potential exposure of test personnel to reactor pressure when the vent valves are opened and potentially decreasing RHR system reliability by taking the system out of service by closing a normally locked open maintenance valve, E1100F067, isolating that portion of the system.

It is proposed that these check valves be exercised while the penetration is isolated for the required 10 CFR Part 50, Appendix J leak rate tests. Testing these check valves at this time would accomplish the following:

1. Maximize RHR availability.
2. Minimize time spent in the drywell consistent with the concept of ALARA.
3. Existing leak rate test procedures would easily facilitate the air testing/exercising of these check valves.
4. Minimize personnel hazards associated with the test.
5. Provide a large pressure drop across the valves insuring the valves will perform their design function and virtually assuring the valves are exercised fully open.

RELIEF REQUEST NUMBER VR-55 (Continued)

ALTERNATE TESTING: These valves serve as a thermal relief path and as such have no design flow. All that is required is that they open to relieve the hydraulic pressure between E1150F009, E1150F008 and E1150F608 (approximate volume of 280 gallons) produced by the thermal expansion of water in an isolated volume.

Since these valves are designed such that they begin to unseat at approximately 1 psid and are fully open at 4 psid, the application of Type C pressure/flow across the valves (56.5 psig) provides assurance that the valves are exercised fully open and insures these valves are capable of performing their design function.

Specifically these valves will be tested by applying Type C pressure upstream of the check valves and verifying flow when their associated vent valves (E1100F425, E1100F091) are opened.

These valves will be tested open during Refueling, or at other convenient intervals, but in no case at intervals greater than two years.

RELIEF REQUEST NUMBER VR-57

SYSTEM: PRIMARY CONTAINMENT, DRYWELL VACUUM BREAKERS

COMPONENT: T2300F400A through H
T2300F400J through M

CATEGORY: A/C

FUNCTION: These valves open to prevent a positive differential pressure buildup from the torus to the drywell and close when drywell pressure becomes greater than torus pressure to prevent bypass of drywell atmosphere directly to the torus air volume.

TEST REQUIREMENT: Per paragraphs IWV-3521 and IWV-3522 of the ASME B&PV Code, Section XI, these check valves require full stroke exercising every three months, unless exercising is impractical during power operations.

BASIS FOR RELIEF: Amendment 96 of Fermi Technical Specifications revised the surveillance frequency requirements for the suppression chamber to drywell vacuum breakers from monthly to cold shutdown (Ref. LCR 92-124-OPL). Recognizing a potential conflict between the Technical Specifications and the Inservice Testing Program for Pumps and Valves, it was noted that Section XI testing requirements were impractical for the same reasons that monthly testing is. Therefore, approval of relief from the code testing requirements was issued by the NRC with the approval of the amendment.

ALTERNATE TESTING: These valves will be full stroke exercised during Cold Shutdown (CS).

RELIEF REQUEST NUMBER VR-58

SYSTEM: NUCLEAR BOILER, RPV WATER LEVEL INSTRUMENTATION BACKFILL VALVES

COMPONENT: B2100F248A B2100F248B
B2100F249A B2100F249B

CATEGORY: A/C

FUNCTION: The backfill check valves function to provide continuous flow to the Reactor Pressure Vessel (RPV) Water Level Instrumentation from the Control Rod Drive (CRD) System. Since this cross connect provides a path from the containment to the CRD System, these check valves serve to isolate the non-Q (CRD) portion of the system from the Q portion of the system and thereby prevent flow from the reference legs in the event of a line break or leak.

TEST REQUIREMENT: Check valves are to be exercised every three months, per ASME Section XI Code paragraphs IVW-3521 and IWV-3522. Category A valves are required to be seat leak tested every 2 years, per IWV-3422.

BASIS FOR RELIEF: These check valves cannot be tested for operability to the closed position during reactor operation because the flow is needed to prevent reactor water level indication errors during depressurization transients. The method of stroke testing is to conduct a seat leakage test, which complies with NRC Staff Position 3 of GL-89-04. IWV-3522 allows extension of the quarterly testing to cold shutdown. Current NRC policy as documented in Draft NUREG-1482, paragraph 4.1.3, further allows this testing to be extended to refueling outages and requires only that this position be documented in the IST Program. This relief request, therefore, does not require NRC approval but serves as documentation of this Code deviation in the IST Program.

The use of the leakage test at refueling outages to satisfy both the leakage requirements and closing stroke requirements has previously been approved by the NRC for valves with similar testing conditions in the EF-2 IST Pump and Valve Program.

These check valves were added to the Reactor Pressure Vessel (RPV) level instrumentation system in a flow path from the CRD hydraulic supply system to the level instrumentation reference legs in order to enhance the reliability of the water level instrumentation. This was required by NRC Bulletin 93-03. These are new components being added to an already approved IST Program and the testing requirements are consistent with those now approved in the program for check valves with similar operational requirements. GL 89-04, Question #62, also affirms that, in this case, no further NRC approval is necessary.

ALTERNATE TESTING: The bypass Leakage Valve Leak Test, AT-4, and the Check Valve Exercise Test to the CLOSE Position, will be conducted during refueling outages under the leak test procedure.

RELIEF REQUEST NUMBER VR-60

SYSTEM: CORE SPRAY

COMPONENT: E2100F003A, E2100F003B, E2100F003C, E2100F003D

CATEGORY: C

FUNCTION: Core Spray Pump Discharge Check Valves maintain the Core Spray discharge lines filled in the standby mode. They also prevent backflow to the Torus when one pump in a division is idle and the other is running.

TEST REQUIREMENT: Valves are to be exercised to the position required to fulfill their safety function at least once every three months (IWV-3521 and IWV-3522).

BASIS FOR RELIEF: The Core Spray Pumps in each Division are tested in parallel. Thus, Division 1 pumps, E2101C001A and E2101C001C (Check Valves E2100F003A and E2100F003C, respectively), are tested in parallel; and the Division 2 pumps, E2101C001B and E2101C001D (Check Valves E2100F003B and E2100F003D, respectively), are tested in parallel. The pump check valves are stroke tested in the open direction during pump operation. Because of this parallel pump operation, the degradation of a single check valve cannot be distinguished from the degradation of either the pumps themselves or the other check valve. Consequently, the current test can only be considered a partial stroke test in the open direction.

Because of the personnel hazards involved and the operating restrictions imposed, testing for full stroke capability of these check valves is to be accomplished on a refueling outage basis by disassembly and inspection. These check valves are 12 inch swing checks located in radiation areas. Draining and preparing the valves for disassembly and inspection is a long and arduous process, followed by reassembly, filling and venting of the system, and acceptance testing. All of these operations result in the accumulation of personal dose, outage time extension, and increased unavailability of a safety system. The disassembly and inspection of the valves will be scheduled so that one valve will be so tested each refueling outage as described in NRC GL 89-04, Position 2(c). Because this testing methodology conforms with GL 89-04, Position 2, prior NRC approval is not required. This Relief Request, as with similar such requests in the IST Pump and Valve Program, is a Cold Shutdown/Refueling Outage justification. However, it is placed in the program in the Relief Request format for program consistency.

ALTERNATE TESTING: One of the four check valves will be disassembled and inspected each refueling outage such that all four are disassembled and inspected over four outages. A partial stroke in the open direction will be completed prior to return to service of the appropriate Core Spray Division.

The Core Spray Discharge Check Valves will be exercised every three months with a partial stroke in the open direction.

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RELIEF REQUEST NUMBER VR-62

SYSTEM: Emergency Equipment Cooling Water

COMPONENT: P4400F116B

CATEGORY: C

FUNCTION: Check valve prevents backflow in the Emergency Equipment Cooling Water System, Division II

TEST REQUIREMENTS: Exercise check valve every three months to the open position.

BASIS FOR RELIEF: The current system configuration does not allow for direct or indirect verification that the check valve disc moves from its seat to the open position upon initiation of flow.

ALTERNATE TESTING: In lieu of the Code required exercise test, Paragraphs IWV-3521 and 3522, valve operability will be demonstrated by disassembling the valve and verifying that the valve disc swings freely from the seat.

Disassembly and inspection is currently allowed per GL 89-04, Position 2. This valve is similar in all respects to the check valves addressed in Relief Request VR-48, except that the P4400F116B valve is an 8" valve and the three addressed in VR-48 are 6" valves.

Since there are no other 8" check valves in the EECW System with which to form a grouping as defined in GL 89-04, this valve is to be treated as a group of one and will be disassembled and inspected every refueling outage. This is in conformance with GL 89-04, Position 2 and is acceptable as a refueling outage inspection.

3.0 In-service Testing Program - Valve Tables

The tables in Section 3.3 list all ISI Class 1, 2, 3 and non-ISI Class valves that have been assigned valve categories. Valves exempt per IWB-1200 are not listed. The following information is included for each valve:

3.1 Table Description

- o **VALVE NUMBER**: The valve identification numbers. Two identification numbers are shown for each valve: the first number utilizes a Plant Identification System (PIS) prefix; the second has a Detroit Edison procurement prefix which is not controlled. In most cases, both identification numbers are shown on the P&ID's.
- o **CLASS**: The ISI Classification of the valve. For valves located on lines with no ISI classification, an E1, E2, E3 or E4 is indicated where the number refers to design Class A, B, C or D taken from the P&ID's and the Central Component Data Base.
- o **VALVE CATEGORY**: The category(s) assigned to the valve is based on the definitions of IWB-2200. Four (4) separate categories are defined in the Code.
- o **CATEGORY A** - Valves for which seat leakage is limited to a specific maximum amount in the closed position for fulfillment of their safety function.
- o **CATEGORY B** - Valves for which a specific amount of leakage in the closed position is not measured but which require stroke testing to verify their ability to fulfill their safety function.
- o **CATEGORY C** - Valves which are self-actuating in response to some system characteristic, such as pressure (relief valves) or flow direction (check valves).
- o **CATEGORY D** - Valves which are actuated by an energy source capable of only one operation, such as explosive-actuated valves.
- o **VALVE SIZE**: The nominal pipe size of the valve in inches.

- o **VALVE TYPE:** The valve body design as indicated by the following abbreviations:

BALL	BAL
BUTTERFLY	BTF
CHECK	CK
EXCESS FLOW CHECK	XFC
GATE	GA
GLOBE	GL
RELIEF	RV
RUPTURE DISC	RD
SAFETY/RELIEF	SRV
SHEAR	SH
STOP CHECK	SCK
3-WAY	3WY

- o **ACTUATOR TYPE:** The type of valve actuator as indicated by the following abbreviations:

AIR OPERATOR	AO
DIAPHRAGM OPERATOR	DO
EXPLOSIVE ACTUATOR	EXP
HYDRAULIC OPERATOR	HO
MANUAL	M
MOTOR OPERATOR	MO
SELF ACTUATED	SA
SELF ACTUATED & MOTOR OPERATED	SAM
SELF ACTUATED & PILOT OPERATED	SAP
SELF ACTUATED, SPRING ASSISTED, CHECK	SAS
SELF ACTUATED, TESTABLE CHECK	SAT
SOLENOID OPERATOR	SO

- o **NORMAL POSITION**: The normal position of the valve during plant operation. This is specified as follows:

OPEN	O
CLOSED	C
FAIL CLOSED	FC
FAIL OPEN	FO
KEY LOCKED, FAIL CLOSED	KC
KEY LOCKED	KL
LOCKED OPEN	LO
LOCKED CLOSED	LC
SYSTEM DEPENDENT	S

- o **STROKE DIRECTION**: The direction which an active valve must stroke to perform its safety function. This is the direction in which the valve will be stroked to satisfy the exercising requirements of IWV-3412 or IWV-3522. This may be specified as:

C - Close

O - Open

O&C - Open & Close

PAS - Passive (This valve does not have to change position to fulfill its safety function.)

- o **TEST**: The test(s) that will be performed to fulfill the requirements of Subsection IWV. The test definitions and abbreviations used are identified in Section 3.2.
- o **TEST FREQUENCY**: The frequency at which the above mentioned tests will be performed. Test frequencies are defined in Section 3.3.

- o **MAXIMUM STROKE TIME**: The limiting full stroke time (in seconds) for power operated valves as required by IWV-3413. The Maximum Stroke Time represents the maximum full stroke time that is acceptable before corrective actions are required pursuant to IWV-3417. Maximum Stroke Times are established to represent a time which is indicative of a potentially degraded valve. Maximum stroke time changes are administratively controlled within site procedures. Maximum Stroke Times are always less than, or equal to, the stroke times which are required to satisfy plant Technical Specifications, safety analysis or system operability.

NOTE: THIS FIELD IS NOT CONTROLLED.

- o **RELIEF REQUEST**: The reference to a Relief Request as defined in Section 3.2 for valve testing that is considered impractical to implement. Relief requests are also provided to justify valve testing at a frequency other than that specified in Section XI.
- o **REMARKS**: The remarks column provides the respective surveillance procedure numbers which implement required testing.

NOTE: THIS FIELD IS NOT CONTROLLED.

3.2 Inservice Valve Tests

The inservice test descriptions are given below along with corresponding test abbreviations:

<u>TEST</u>	<u>TEST NAME</u>	<u>TEST DESCRIPTION</u>
AT-1	Type C Air Leak Test	The containment isolation valves on lines which connect directly to containment atmosphere and on lines which enter primary containment in the drywell or torus airspace (except lines which terminate below the torus minimum water level) will be seat leak tested with air in accordance with Technical Specification 3.6.1.2.b and 10CFR50, Appendix J. In accordance with the guidance contained in Generic Letter 89-04 Paragraph D and Attachment 1, Position 10, exception will be taken to the requirements contained in Section IWV-3427(b).
AT-2	Type C Water Leak Test	<p>The containment isolation valves on lines which connect directly to the torus below torus minimum water level and on lines which penetrate the torus in the airspace but terminate below the torus minimum water level will be seat leak tested with water in accordance with Technical Specification 3.6.1.2.d and 10CFR50, Appendix J.</p> <p>36 Water Tested Containment Isolation Valves are no longer leak rate tested. They were deleted based on the fact that containment by-pass leakage is prevented since the line terminates below the minimum water level in the suppression chamber and the system is a Closed System outside of Primary Containment (i.e., Safety Evaluation 95-004).</p>
AT-3	Gross Leakage Test	A leakage test performed on non Appendix J valves to ensure the valve can perform its intended safety function.
AT-4	Bypass Leakage Valve Leak Test	Bypass leakage valves will be tested to verify that the total potential bypass leakage does not exceed 4% of the design primary containment leakage. For further information, see UFSAR Section 6.2.1.2.2.3.

<u>TEST</u>	<u>TEST NAME</u>	<u>TEST DESCRIPTION</u>
AT-8	Purge/Vent Isolation Valve Leak Test	In addition to Type C tests for the purge/vent isolation valves, leakage integrity tests are required every 92 days by Branch Technical Position CSB 6-4 and the EF2 Safety Evaluation Report (NUREG-0798), Supplement 1, Page 6-3. For further information, see Technical Specifications Paragraph 4.6.1.8.2.
AT-9	MSIV Leak Test	The main steam isolation valves (MSIV) are exempted from Type C tests because EF2 has a pressurized seal system, MSIV Leakage Control (Refer to 10CFR50, Appendix J, Section III.C.3). The allowable combined leak rate for all four main steam lines shall be in accordance with Technical Specification 3.6.1.2.c. Test frequency shall be in accordance with Technical Specification 4.6.1.2.d.
AT-10	Pressure Isolation Valve Leak Test	Pressure isolation valves (PIVs) will receive periodic leakage tests in accordance with Technical Specification requirements.
AT-11	Drywell to Suppression Chamber Bypass Leak Test	Drywell to Torus Vacuum Breakers will receive periodic leakage tests in accordance with Technical Specification 4.6.2.1.h requirements.
AT-12	System Operability Gross Leakage Test	An integrated leakage test of the Emergency Equipment Cooling Water System Makeup Water Surge Tank and associated piping, valves and instruments to ensure system operability following a design basis event.

<u>TEST</u>	<u>TEST NAME</u>	<u>TEST DESCRIPTION</u>
BTC	Full Stroke Exercise Test to the CLOSE position	Exercise testing, verified by stroke time measurements, will be performed to confirm the full stroke capability of each valve. The stroke direction tested and timed will be based on the direction the valve disk must travel to fulfill its safety function. Where this test is prescribed for stop/check valves, it is intended to be an exercise only of the operator and valve stem since the valve disk is presumed to be in its normally closed position prior to exercising.
BTC-1	Full Stroke Exercise Test to the CLOSED position	Exercise testing will be performed to measure the stroke time for the MSIVs and compared with the maximum and minimum Technical Specification requirements.
BTO	Full Stroke Exercise Test to the OPEN position	Exercise testing, verified by stroke time measurements, will be performed to confirm the full stroke capability of each valve. The stroke direction tested and timed will be based on the direction the valve disk must travel to fulfill its safety function.
BT-OM	Full Stroke Exercise Test to the OPEN position for a manual valve.	Exercise test for a manual valve which verifies that the valve is capable of stroking from the full closed position to the full open position. This test is accomplished by fully opening the valve to either the back seat or other mechanical stop and then reclosing it.
BTP	Partial Stroke Exercise Test (IWV-3412)	Partial stroke exercise tests will be performed, when possible, for valves that cannot be full stroke exercised during normal operation.
CT-C	Check Valve Exercise Test to the CLOSE position	Check valves will be exercised closed based on the safety function of the valve. The disk movement shall be sufficient to prove that the disk moves freely to the seat from the open position.
CT-D	Check Valve Exercise by disassembly	Check valves will be disassembled and internals inspected to verify valve operability and to monitor for degradation in accordance with NRC Generic Letter 89-04.

<u>TEST</u>	<u>TEST NAME</u>	<u>TEST DESCRIPTION</u>
CT-EF	Excess Flow Check Valve Test	Excess flow check valves will be tested in accordance with Technical Specification Paragraph 4.6.3.4.
CT-F	Check Valve Exercise Force Measurement	Check valves will be checked for freedom of operation in the open and closed position by measurement of the force required to open the check valve (Ref. Relief Request VR-17).
CT-O	Check Valve Exercise Test to the OPEN position	Check valves will be exercised open based on the safety function of the valve. The disk movement shall be sufficient to prove that the disk moves freely off the seat from the closed position. Verification of acceptable system flow through a check valve shall be adequate demonstration that the valve is full open.
CT-OP	Partial Check Valve Exercise to the OPEN Position	The check valve cannot be exercised in such a manner as to demonstrate full stroke capability to the open position. However, it can be stroked sufficiently to demonstrate that some motion of the obturator has occurred as evidenced by an observed change in a parameter such as flow, temperature, etc.
CT-SP	Relief Valve Set Point	Relief and safety/relief valve set points will be verified in accordance with IWV-3510.
DT	Rupture Disk and Explosive Valve Test	Explosive valves will be tested in accordance with IWV-3610. Rupture disks will be replaced on a periodic cycle in accordance with manufacturer's instructions.
FST	Fail-Safe Test	All valves with fail-safe actuators will be tested to verify proper fail-safe operation upon loss of actuator power

<u>TEST</u>	<u>TEST NAME</u>	<u>TEST DESCRIPTION</u>																														
GL 8910	Valve Diagnostic Test	<p>Upon completion of the GL 89-10 MOV Design Basis Verification Program, all GL 89-10 gate and globe valves (129) were incorporated into an MOV Thrust Testing Periodic Verification Plan. They were then grouped based upon a ranking derived from four factors. These factors are Performance Margin, Risk (developed from PRA data, where PRA data was available), Accessibility, and Plant Impact (developed based on TS LCO information). Using these four factors, a "ranking factor" was derived by calculation for each valve. The 129 MOVs were then divided into 7 groups, with group 1 having the most adverse characteristics based on the "ranking factor" and group 7 the least adverse characteristics. For these 129 valves, the following test parameters are trended:</p> <table><tr><th>Exam</th><th>Description</th></tr><tr><td>AVERFC</td><td>Average Running Force, Closing-lbs</td></tr><tr><td>AVERFO</td><td>Average Running Force, Opening-lbs</td></tr><tr><td>CLTSS</td><td>Torque Switch Setting, Closing</td></tr><tr><td>DPOFO</td><td>Disc Pullout Force-lbs</td></tr><tr><td>MAXRFC</td><td>Maximum Running Force, Closing-lbs</td></tr><tr><td>MAXRFO</td><td>Maximum Running Force, Opening-lbs</td></tr><tr><td>MAXTHR</td><td>Maximum Thrust-lbs</td></tr><tr><td>OPTSS</td><td>Torque Switch Setting, Opening</td></tr><tr><td>PCURC</td><td>Peak Current, Closing-amps</td></tr><tr><td>PCURO</td><td>Peak Current, Opening-amps</td></tr><tr><td>RCURC</td><td>Average Running Current, Closing-amps</td></tr><tr><td>RCURO</td><td>Average Running Current, Opening-amps</td></tr><tr><td>THRUCST</td><td>Close Torque Bypass Switch Opens-lbs</td></tr><tr><td>VCLRAT</td><td>Valve Condition Load Ratio-%</td></tr></table> <p>There are also 18 quarter-turn valves (ball and butterfly valves). Program requirements are being developed separately. They are identified in the Valve Tables as GL 89-10 valves but have no test frequency or procedure (Remarks) identified for them.</p>	Exam	Description	AVERFC	Average Running Force, Closing-lbs	AVERFO	Average Running Force, Opening-lbs	CLTSS	Torque Switch Setting, Closing	DPOFO	Disc Pullout Force-lbs	MAXRFC	Maximum Running Force, Closing-lbs	MAXRFO	Maximum Running Force, Opening-lbs	MAXTHR	Maximum Thrust-lbs	OPTSS	Torque Switch Setting, Opening	PCURC	Peak Current, Closing-amps	PCURO	Peak Current, Opening-amps	RCURC	Average Running Current, Closing-amps	RCURO	Average Running Current, Opening-amps	THRUCST	Close Torque Bypass Switch Opens-lbs	VCLRAT	Valve Condition Load Ratio-%
Exam	Description																															
AVERFC	Average Running Force, Closing-lbs																															
AVERFO	Average Running Force, Opening-lbs																															
CLTSS	Torque Switch Setting, Closing																															
DPOFO	Disc Pullout Force-lbs																															
MAXRFC	Maximum Running Force, Closing-lbs																															
MAXRFO	Maximum Running Force, Opening-lbs																															
MAXTHR	Maximum Thrust-lbs																															
OPTSS	Torque Switch Setting, Opening																															
PCURC	Peak Current, Closing-amps																															
PCURO	Peak Current, Opening-amps																															
RCURC	Average Running Current, Closing-amps																															
RCURO	Average Running Current, Opening-amps																															
THRUCST	Close Torque Bypass Switch Opens-lbs																															
VCLRAT	Valve Condition Load Ratio-%																															
PIT	Position Indication Check (IWV-3300)	All valves with position indicators will be checked to verify that remote valve indicators accurately reflect valve operation.																														
PIT-RS	Position Indication for Remote Shutdown Valves	Valves with position indication on the Remote Shutdown Panel will be checked to verify that remote valve indicators accurately reflect valve operation.																														

3.3 Valve Test Frequency

The valve test frequency descriptions are given below along with the corresponding operational condition and frequency abbreviation used in the valve tables:

<u>TEST FREQUENCY</u>	<u>TEST FREQUENCY DESCRIPTION</u>
OP	- At least once every calendar quarter (i.e., 92 days or 3 months) when valve operability is required.
CS	- During periods of plant cold shutdowns. See Note.
RR	- At least once every reactor refueling outage.
2R	- All valves tested in 2 refueling outages.
SP	- Special test frequency as described in applicable Relief Requests.
2Y	- At least once every 2 years (See Articles IWV-3300 and IWV-3422).
GP	- A group sampling plan for GL 89-10 MOVs. 20 to 25 GL 89-10 MOVs are tested per outage cycle. A representative percentage of each of the 7 groups is selected each cycle. The per-cycle group percentages range from 33% to 10% for groups 1 through 7, respectively.
6Q	- At least once every 6 calendar quarters (i.e., once every 18 months).

NOTE: Inservice valve testing at cold shutdown is valve testing which commences within 48 hours after cold shutdown is reached. This testing continues until all valves are tested or the unit is ready for start-up. Completion of all testing is not a prerequisite to plant start-up. Valve testing which is not completed during a cold shutdown shall be completed during subsequent cold shutdowns that may occur before refueling to meet the specified testing frequency. In the case of frequent cold shutdowns, valve testing need not be performed more often than once every three months for category A, B, and C valves.

In the case of longer planned cold shutdowns, the testing need not be started within the 48 hour limitation. However, in these instances, all valve testing must be completed prior to start-up.

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 shutdown 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 refueling outages, tests being performed are expected to be maintained as closely as practical to the Code-specified frequencies.

It is expected that the required testing will normally be completed in 96 hours following cold shutdown. However, completion of all valve testing during cold shutdown is not required if plant operating conditions will not permit the testing of specific valves.

INSERVICE TEST PROGRAM

VALVE TABLES

ISI CLASS 1, 2, 3, and EX VALVES
FERMI-2 POWER PLANT - Unit 1

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PI# No: B21

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	REQ.	REMARKS
B2100F010A (V12-2008)	1	A/C	20.000	CK	SAT	S	O&C	AT-1 AT-4 CT-C CT-D	2Y RR RR CS			43.401.303 43.401.511 VR-002 43.401.303 VR-002 24.107.01
B2100F010B (V12-2007)	1	A/C	20.000	CK	SAT	S	C	AT-1 AT-4 CT-C	2Y RR RR			43.401.304 43.401.511 VR-002 43.401.304
B2100F029A (V30-0195)	E3	A/C	1.000	CK	SA	S	O&C	CT-C CT-D	RR RR			VR-016 24.137.02 VR-016 24.137.02
B2100F029B (V30-0196)	E3	A/C	1.000	CK	SA	S	O&C	CT-C CT-D	RR RR			VR-016 24.137.02 VR-016 24.137.02
B2100F029C (V30-0197)	E3	A/C	1.000	CK	SA	S	O&C	CT-C CT-D	RR RR			VR-016 24.137.02 VR-016 24.137.02
B2100F029D (V30-0198)	E3	A/C	1.000	CK	SA	S	O&C	CT-C CT-D	RR RR			VR-016 24.137.02 VR-016 24.137.02
B2100F031A (V22-2125)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
B2100F031B (V22-2132)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
B2100F031C (V22-2139)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
B2100F031D (V22-2141)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
B2100F037A (V22-2111)	2	C	8.000	CK	SA	S	O&C	CT-F	CS			VR-017 24.201.01
B2100F037B (V22-2100)	2	C	8.000	CK	SA	S	O&C	CT-F	CS			VR-017 24.201.01
B2100F037C (V22-2101)	2	C	8.000	CK	SA	S	O&C	CT-F	CS			VR-017 24.201.01

PIS No: B21 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	REMARKS
B2100F037D (V22-2104)	2	C	8.000	CK	SA	S	O&C	CT-F	CS	VR-017	24.201.01
B2100F037E (V22-2105)	2	C	8.000	CK	SA	S	O&C	CT-F	CS	VR-017	24.201.01
B2100F037F (V22-2107)	2	C	8.000	CK	SA	S	O&C	CT-F	CS	VR-017	24.201.01
B2100F037G (V22-2099)	2	C	8.000	CK	SA	S	O&C	CT-F	CS	VR-017	24.201.01
B2100F037H (V22-2098)	2	C	8.000	CK	SA	S	O&C	CT-F	CS	VR-017	24.201.01
B2100F037J (V22-2102)	2	C	8.000	CK	SA	S	O&C	CT-F	CS	VR-017	24.201.01
B2100F037K (V22-2103)	2	C	8.000	CK	SA	S	O&C	CT-F	CS	VR-017	24.201.01
B2100F037L (V22-2106)	2	C	8.000	CK	SA	S	O&C	CT-F	CS	VR-017	24.201.01
B2100F037M (V22-2097)	2	C	8.000	CK	SA	S	O&C	CT-F	CS	VR-017	24.201.01
B2100F037N (V22-2108)	2	C	8.000	CK	SA	S	O&C	CT-F	CS	VR-017	24.201.01
B2100F037P (V22-2110)	2	C	8.000	CK	SA	S	O&C	CT-F	CS	VR-017	24.201.01
B2100F037R (V22-2109)	2	C	8.000	CK	SA	S	O&C	CT-F	CS	VR-017	24.201.01
B2100F076A (V12-2002)	1	A/C	20.000	CK	SAS	S	C	AT-1 CT-C PIT	2Y RR 2Y	VR-046 VR-002	43.401.303 43.401.303 24.107.01
B2100F076B (V12-2001)	1	A/C	20.000	CK	SAS	S	C	AT-1 CT-C PIT	2Y RR 2Y	VR-046 VR-002	43.401.304 43.401.304 24.107.01

PIS No: B21 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B2100F248A (V30-0271)	E4	A/C	0.400	CK	SA	O	C	AT-4 CT-C	RR RR			43.401.511 43.401.511
B2100F248B (V30-0272)	E4	A/C	0.400	CK	SA	O	C	AT-4 CT-C	RR RR			43.401.511 43.401.511
B2100F249A (V30-0273)	E4	A/C	0.400	CK	SA	O	C	AT-4 CT-C	RR RR			43.401.511 43.401.511
B2100F249B (V30-0274)	E4	A/C	0.400	CK	SA	O	C	AT-4 CT-C	RR RR			43.401.511 43.401.511
B2100F433 (V30-0003)	E3	B	1.000	GA	AO	C/FC	O&C	BTC BTO FST PIT	OP OP OP 2Y	7.00 7.00		24.137.16 24.137.16 24.137.16 24.137.20
B2100F434 (V30-0006)	1	A	1.000	GA	AO	C/FC	O&C	AT-1 BTC BTO FST PIT	2Y CS CS CS 2Y			43.401.388 24.137.03 24.137.03 24.137.03 24.137.20
B2100F437 (V30-0005)	2	B	1.000	GA	AO	C/FC	O&C	BTC BTO FST PIT	CS CS CS 2Y	12.00 6.00	VR-052 VR-052 VR-023	24.137.03 24.137.03 24.137.03 24.137.20
B2100F438 (V30-0004)	E3	B	1.000	GA	AO	C/FC	O&C	BTC BTO FST PIT	OP OP OP 2Y	9.00 6.00		24.137.16 24.137.16 24.137.16 24.137.20
B2103F016 (V17-2009)	1	A	3.000	GL	MO	C	O	AT-1 AT-4 BTC GLB910 PIT	2Y RR OP GP 2Y			43.401.302 43.401.511 24.137.18 47.306.01 / 47.306.02 24.137.18

PIS No: B21 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	REQ.	REMARKS
B2103F019 (V17-2010)	1	A	3.000	GL	MO	C	C	AT-1 AT-4 BTC GLB910 PIT	2Y RR OP GP 2Y	12.00		43.401.302 43.401.511 24.137.18 47.306.01 / 47.306.02 24.137.18
B2103F022A (VR-02003)	1	A	26.000	GL	AO	O	C	AT-9 BTC-1 BTP FST PIT	6Q CS OP CS 2Y		VR-046 VR-015 VR-023	43.401.500 24.137.03 24.137.01 24.137.03 24.137.03
B2103F022B (V17-2001)	1	A	26.000	GL	AO	O	C	AT-9 BTC-1 BTP FST PIT	6Q CS OP CS 2Y		VR-046 VR-015 VR-023	43.401.500 24.137.03 24.137.01 24.137.03 24.137.03
B2103F022C (V17-2002)	1	A	26.000	GL	AO	O	C	AT-9 BTC-1 BTP FST PIT	6Q CS OP CS 2Y		VR-046 VR-015 VR-023	43.401.500 24.137.03 24.137.01 24.137.03 24.137.03
B2103F022D (V17-2004)	1	A	26.000	GL	AO	O	C	AT-9 BTC-1 BTP FST PIT	6Q CS OP CS 2Y		VR-046 VR-015 VR-023	43.401.500 24.137.03 24.137.01 24.137.03 24.137.03
B2103F028A (V17-2007)	1	A	26.000	GL	AO	O	C	AT-9 BTC-1 BTP FST PIT	6Q CS OP CS 2Y		VR-046 VR-015 VR-023	43.401.500 24.137.03 24.137.01 24.137.03 24.137.03
B2103F028B (V17-2005)	1	A	26.000	GL	AO	O	C	AT-9 BTC-1 BTP FST PIT	6Q CS OP CS 2Y		VR-046 VR-015 VR-023	43.401.500 24.137.03 24.137.01 24.137.03 24.137.03

PIS No: B21 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B2103F028C (V17-2006)	1	A	26.000	GL	AO	O	C	AT-9 BTC-1 BTP FST PIT	6Q CS OP CS 2Y		VR-046 VR-015 VR-023	43.401.500 24.137.03 24.137.01 24.137.03 24.137.03
B2103F028D (V17-2008)	1	A	26.000	GL	AO	O	C	AT-9 BTC-1 BTP FST PIT	6Q CS OP CS 2Y		VR-046 VR-015 VR-023	43.401.500 24.137.03 24.137.01 24.137.03 24.137.03
B2103F600 (V10-2010)	2	B	3.000	GL	MO	O	C	BTC GLB910 PIT	OP GP 2Y	33.00		24.137.16 47.306.01 / 47.306.02 24.137.20
B2104F013A (V22-2071)	1	C	6.000	SRV	SAP	C	O	CT-SP	2R			43.137.01
B2104F013B (V22-2060)	1	C	6.000	SRV	SAP	C	O	CT-SP	2R			43.137.01
B2104F013C (V22-2592)	1	C	6.000	SRV	SAP	C	O	CT-SP	2R			43.137.01
B2104F013D (V22-2050)	1	C	6.000	SRV	SAP	C	O	CT-SP	2R			43.137.01
B2104F013E (V22-2064)	1	B/C	6.000	SRV	SAP	C	O	BTO CT-SP	SP 2R	2.00	VR-014	24.137.11 43.137.01
B2104F013F (V22-2595)	1	C	6.000	SRV	SAP	C	O	CT-SP	2R			43.137.01
B2104F013G (V22-2591)	1	C	6.000	SRV	SAP	C	O	CT-SP	2R			43.137.01
B2104F013H (V22-2058)	1	B/C	6.000	SRV	SAP	C	O	BTO CT-SP	SP 2R	2.00	VR-014	24.137.11 43.137.01
B2104F013J (V22-2052)	1	B/C	6.000	SRV	SAP	C	O	BTO CT-SP	SP 2R	2.00	VR-014	24.137.11 43.137.01

ISI CLASS 1, 2, 3, and EX VALVES

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PIS No: B21 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B2104F013K (V22-2062)	1	C	6.000	SRV	SAP	C	O	CT-SP	2R			43.137.01
B2104F013L (V22-2056)	1	C	6.000	SRV	SAP	C	O	CT-SP	2R			43.137.01
B2104F013M (V22-2046)	1	C	6.000	SRV	SAP	C	O	CT-SP	2R			43.137.01
B2104F013N (V22-2054)	1	C	6.000	SRV	SAP	C	O	CT-SP	2R			43.137.01
B2104F013P (V22-2070)	1	B/C	6.000	SRV	SAP	C	O	BTO CT-SP	SP 2R	2.00	VR-014	24.137.11 43.137.01
B2104F013R (V22-2597)	1	B/C	6.000	SRV	SAP	C	O	BTO CT-SP	SP 2R	2.00	VR-014	24.137.11 43.137.01
B21F431 (V5-2291)	E3	B	1.000	GL	SO	C/FC	O&C	BTC BTO FST PIT	OP OP OP 2Y	2.00 2.00	VR-006 VR-006 VR-023	24.137.16 24.137.16 24.137.16 24.137.20
B21F432 (V5-2292)	E3	B	1.000	GL	SO	O/FO	C	BTC FST PIT	OP OP 2Y	2.00	VR-006 VR-023	24.137.16 24.137.16 24.137.20
B21F435 (V5-2263)	E3	B	1.000	GL	SO	O/FO	C	BTC FST PIT	OP OP 2Y	2.00	VR-006 VR-023	24.137.16 24.137.16 24.137.20
B21F436 (V5-2264)	E3	B	1.000	GL	SO	C/FC	O&C	BTC BTO FST PIT	OP OP OP 2Y	2.00 2.00	VR-006 VR-006 VR-023	24.137.16 24.137.16 24.137.16 24.137.20
B21F501A (V13-2301)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.101 44.220.101
B21F501B (V13-2302)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.101 44.220.101

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FERMI-2 POWER PLANT - Unit 1

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PIS No: B21 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B21F501C (V13-2303)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.101 44.220.101
B21F501D (V13-2304)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.101 44.220.101
B21F502A (V13-2305)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.101 44.220.101
B21F502B (V13-2306)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.101 44.220.101
B21F502C (V13-2307)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.101 44.220.101
B21F502D (V13-2308)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.101 44.220.101
B21F503A (V13-2309)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.101 44.220.101
B21F503B (V13-2310)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.101 44.220.101
B21F503C (V13-2311)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.101 44.220.101
B21F503D (V13-2312)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.101 44.220.101
B21F504A (V13-2313)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.101 44.220.101
B21F504B (V13-2314)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.101 44.220.101
B21F504C (V13-2315)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.101 44.220.101
B21F504D (V13-2316)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.101 44.220.101

VALVE TABLES

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ISI CLASS 1, 2, 3, and EX VALVES

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PIS No: B21 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B21F506 (V13-2317)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.105 44.220.105
B21F507 (V13-2318)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.105 44.220.105
B21F508 (V13-2397)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.105 44.220.105
B21F509 (V13-2320)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.105 44.220.105
B21F510 (V13-2321)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.105 44.220.105
B21F511 (V13-2396)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.105 44.220.105
B21F512 (V13-2323)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.105 44.220.105
B21F513A (V13-2324)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.103 44.220.103
B21F513B (V13-2325)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.103 44.220.103
B21F513C (V13-2326)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.102 44.220.102
B21F513D (V13-2327)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.102 44.220.102
B21F514A (V13-2328)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.102 44.220.102
B21F514B (V13-2329)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.102 44.220.102
B21F514C (V13-2330)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.102 44.220.102

ISI CLASS 1, 2, 3, and EX VALVES
FERMI-2 POWER PLANT - Unit 1

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PIS No: B21 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B21F514D (V13-2331)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.102 44.220.102
B21F515A (V13-2332)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.102 44.220.102
B21F515B (V13-2333)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.102 44.220.102
B21F515C (V13-2334)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.102 44.220.102
B21F515D (V13-2335)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.102 44.220.102
B21F515E (V13-2336)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.102 44.220.102
B21F515F (V13-2337)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.102 44.220.102
B21F515G (V13-2338)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.102 44.220.102
B21F515H (V13-2339)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.102 44.220.102
B21F515L (V13-2340)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.102 44.220.102
B21F515M (V13-2341)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.102 44.220.102
B21F515N (V13-2342)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.102 44.220.102
B21F515P (V13-2343)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.102 44.220.102
B21F515R (V13-2344)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.102 44.220.102

VALVE TABLES

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PIS No: B21 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B21F515B (V13-2345)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.102 44.220.102
B21F515T (V13-2346)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.102 44.220.102
B21F515U (V13-2347)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.102 44.220.102
B21F516A (V13-2348)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.102 44.220.102
B21F516B (V13-2349)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.102 44.220.102
B21F516C (V13-2388)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.103 44.220.103
B21F517A (V13-2350)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.103 44.220.103
B21F517B (V13-2389)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.105 44.220.105
B21F517C (V13-2390)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.104 44.220.104
B21F517D (V13-2391)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.104 44.220.104

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B3100F014A (VB-3710)	E2	A	0.750	GL	AO	O	C	AT-1 BTC PIT	2Y CS 2Y	5.00	VR-018	43.401.361 24.138.02 24.138.02
B3100F014B (VB-3590)	E2	A	0.750	GL	AO	O	C	AT-1 BTC PIT	2Y CS 2Y	5.00	VR-018	43.401.360 24.138.02 24.138.02
B3100F016A (VB-3767)	E2	A	0.750	GL	AO	O	C	AT-1 BTC PIT	2Y CS 2Y	5.00	VR-018	43.401.361 24.138.02 24.138.02
B3100F016B (VB-376B)	E2	A	0.750	GL	AO	O	C	AT-1 BTC PIT	2Y CS 2Y	5.00	VR-018	43.401.360 24.138.02 24.138.02
B3100F019 (V17-2077)	1	A	0.750	GL	AO	C/KL	C	AT-1 BTC PIT	2Y OP 2Y	6.00		43.401.330 24.138.04 / 24.138.02 24.138.02
B3100F020 (V17-207B)	1	A	0.750	GL	AO	C/KL	C	AT-1 BTC PIT	2Y OP 2Y	5.00		43.401.330 24.138.04 / 24.138.02 24.138.02
B3105F031A (VB-2003)	1	B	28.000	GA	MO	O	C	BTC GLB910 PIT PIT-RS	CS GP 2Y 2Y	32.00	VR-021	24.138.02 47.306.01 / 47.306.02 24.138.02 24.321.04
B3105F031B (VB-2004)	1	B	28.000	GA	MO	O	C	BTC GLB910 PIT	CS GP 2Y	32.00	VR-021	24.138.02 47.306.01 / 47.306.02 24.138.02
B31F501A (V13-2351)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.103 44.220.103
B31F501B (V13-2353)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.103 44.220.103
B31F501C (V13-2352)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.103 44.220.103

PIS No: B31 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B31F501D (V13-2354)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103
B31F502A (V13-2355)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103
B31F502B (V13-2356)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103
B31F502C (V13-2357)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103
B31F502D (V13-2358)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103
B31F503A (V13-2359)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103
B31F503B (V13-2360)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103
B31F504A (V13-2361)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103
B31F504B (V13-2362)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103
B31F505A (V13-2363)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103
B31F505B (V13-2364)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103
B31F506A (V13-2365)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103
B31F506B (V13-2366)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103
B31F510A (V13-2367)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103

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INSERVICE TESTING PROGRAM
VALVE TABLESISI-IST PROGRAM
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PIE No: B31 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B31F510B (V13-2368)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103
B31F511A (V13-2369)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103
B31F511B (V13-2370)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103
B31F512A (V13-2371)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103
B31F512B (V13-2372)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103
B31F515A (V13-2373)	E1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103
B31F515B (V13-2374)	E1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103
B31F516A (V13-2375)	E1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103
B31F516B (V13-2376)	E1	C	1.000	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.103 44.220.103

PIS No: C11

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	REQ.	REMARKS
C1100F010 (VB-2073)	2	A	1.000	GL	DO	O/FC	C	AT-1 BTC FST PIT	2Y OP OP 2Y	15.00	VR-023	43.401.355 24.106.04 24.106.04 24.106.04
C1100F011 (V30-0012)	2	A	2.000	GL	DO	O/FC	C	AT-1 BTC FST PIT	2Y OP OP 2Y	6.00	VR-023	43.401.355 24.106.04 24.106.04 24.106.04
C1100F180 (VB-3876)	2	A	1.000	GL	DO	O/FC	C	AT-1 BTC FST PIT	2Y OP OP 2Y	84.00	VR-023	43.401.355 24.106.04 24.106.04 24.106.04
C1100F181 (V30-0011)	2	A	2.000	GL	DO	O/FC	C	AT-1 BTC FST PIT	2Y OP OP 2Y	25.00	VR-023	43.401.355 24.106.04 24.106.04 24.106.04
C1103F114 (V-1**)	C	C	0.750	CK	SA	S	O	CT-O	SP		VR-012	54.000.03
C1103F115 (V-2**)	2	C	0.500	CK	SA	S	C	CT-C	SP		VR-043	44.010.201
C1103F126 (V-9**)	2	B	0.500	GL	DO	C/FO	O	BTO FST	SP SP	7.00	VR-012 VR-023	54.000.03 54.000.03
C1103F127 (V-10**)	2	B	0.750	GL	DO	C/FO	O	BTO FST	SP SP	7.00	VR-012 VR-023	54.000.03 54.000.03
C1103F138 (V-11**)	2	C	0.500	CK	SA	S	C	CT-C	SP		VR-044	24.106.01

PIS No: C41

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	REMARKS
C4100F006 (VR4-2036)	1	A/C	1.500	CK	SA	S	O&C	AT-1 CT-C CT-O PIT	2Y 2Y 6Q 6Q	VR-020 VR-020	43.401.347 43.401.347 24.139.03 24.139.03
C4100F007 (VR4-2037)	1	A/C	1.500	CK	SA	S	O&C	AT-1 CT-C CT-O	2Y 2Y 6Q	VR-020 VR-020	43.401.347 43.401.347 24.139.03
C4100F029A (V22-2625)	2	C	1.000	RV	SA	C	O	CT-SP	5Y		43.000.02
C4100F029B (V22-2030)	2	C	1.000	RV	SA	C	O	CT-SP	5Y		43.000.02
C4100F033A (VR4-2004)	2	C	2.000	CK	SA	S	O	CT-O	OP		24.139.02
C4100F033B (VR4-2005)	2	C	2.000	CK	SA	S	O	CT-O	OP		24.139.02
C4104F004A (VR4-2008)	2	D	1.500	GA	EXP	C/KL	O	DT	3Y		24.139.03
C4104F004B (VR4-2009)	2	D	1.500	GA	EXP	C/KL	O	DT	3Y		24.139.03

PIS No: C51

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
C5100F001A (SHEAR)	E2	D	0.380	SH	EXP	O	C	DT	5Y			43.606.01
C5100F001B (SHEAR)	E2	D	0.380	SH	EXP	O	C	DT	5Y			43.606.01
C5100F001C (SHEAR)	E2	D	0.380	SH	EXP	O	C	DT	5Y			43.606.01
C5100F001D (SHEAR)	E2	D	0.380	SH	EXP	O	C	DT	5Y			43.606.01
C5100F001E (SHEAR)	E2	D	0.380	SH	EXP	O	C	DT	5Y			43.606.01
C5100F002A (BALL)	E2	A	0.380	BAL	SO	C	C	AT-1 BTC PIT	2Y OP 2Y	2.00	VR-006	43.401.338 24.606.01 43.401.338
C5100F002B (BALL)	E2	A	0.380	BAL	SO	C	C	AT-1 BTC PIT	2Y OP 2Y	2.00	VR-006	43.401.337 24.606.01 43.401.337
C5100F002C (BALL)	E2	A	0.380	BAL	SO	C	C	AT-1 BTC PIT	2Y OP 2Y	2.00	VR-006	43.401.339 24.606.01 43.401.339
C5100F002D (BALL)	E2	A	0.380	BAL	SO	C	C	AT-1 BTC PIT	2Y OP 2Y	2.00	VR-006	43.401.341 24.606.01 43.401.341
C5100F002E (BALL)	E2	A	0.380	BAL	SO	C	C	AT-1 BTC PIT	2Y OP 2Y	2.00	VR-006	43.401.340 24.606.01 43.401.340

PIS No: E11

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E1100F001A (V22-2643)	2	C	0.500	RV	SA	C	O&C	CT-SP	5Y			43.000.02
E1100F001B (V22-2642)	2	C	0.500	RV	SA	C	O&C	CT-SP	5Y			43.000.02
E1100F020A (V15-2021)	3	C	24.000	CK	SA	S	O	CT-O	OP			24.205.05
E1100F020B (V15-2020)	3	C	24.000	CK	SA	S	O	CT-O	GP			24.205.06
E1100F025A (V22-2041)	2	C	1.500	RV	SA	C	O&C	CT-SP	5Y			43.000.02
E1100F025B (V22-2041)	2	C	1.500	RV	SA	C	O&C	CT-SP	5Y			43.000.02
E1100F029 (V22-2033)	2	C	1.000	RV	SA	C	O&C	CT-SP	5Y			43.000.02
E1100F030A (VB-2034)	2	C	1.000	RV	SA	C	O&C	CT-SP	5Y			43.000.02
E1100F030B (V22-2037)	2	C	1.000	RV	SA	C	O&C	CT-SP	5Y			43.000.02
E1100F030C (V22-2036)	2	C	1.000	RV	SA	C	O&C	CT-SP	5Y			43.000.02
E1100F030D (V22-2035)	2	C	1.000	RV	SA	C	O&C	CT-SP	5Y			43.000.02
E1100F031A (VB-2103)	2	C	20.000	CK	SA	S	O&C	CT-C CT-O	OP OP			24.204.01 24.204.01
E1100F031B (VB-2104)	2	C	20.000	CK	SA	S	O&C	CT-C CT-O	OP OP			24.204.06 24.204.06
E1100F031C (VB-2105)	2	C	20.000	CK	SA	S	O&C	CT-C CT-O	OP OP			24.204.01 24.204.01

ISI CLASS 1, 2, 3, and EX VALVES
FERMI-2 POWER PLANT - Unit 1

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PIS No: E11 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E1100F031D (VB-2106)	2	C	20.000	CK	SA	S	O&C	CT-C CT-D	OP OP			24.204.06 24.204.06
E1100F046A (VB-2125)	2	C	3.000	CK	SA	S	O&C	CT-C CT-D CT-O	OP RR OP			24.204.01 43.000.010 24.204.01
E1100F046B (VB-2126)	2	C	3.000	CK	SA	S	O&C	CT-C CT-D CT-O	OP RR OP			24.204.06 43.000.010 24.204.06
E1100F046C (VB-2127)	2	C	3.000	CK	SA	S	O&C	CT-C CT-D CT-O	OP RR OP			24.204.01 43.000.010 24.204.01
E1100F046D (VB-2128)	2	C	3.000	CK	SA	S	O&C	CT-C CT-D CT-O	OP RR OP			24.204.06 43.000.010 24.204.06
E1100F050A (VB-2163)	1	A/C	24.000	CK	SAT	S	O&C	AT-10 CT-C CT-O PIT	6Q CS CS 2Y		VR-008 VR-008	43.401.516 24.204.04 24.204.04 24.204.05
E1100F050B (VB-2164)	1	A/C	24.000	CK	SAT	S	O&C	AT-10 CT-C CT-O PIT	6Q CS CS 2Y		VR-008 VR-008	43.401.516 24.204.04 24.204.04 24.204.05
E1100F079A (VB-3206)	2	B	0.750	GL	AO	C	C	BTC PIT	OP 2Y	7.00		24.204.01 24.204.05
E1100F079B (VB-3193)	2	B	0.750	GL	AO	C	C	BTC PIT	OP 2Y	5.00		24.204.06 24.204.05
E1100F089 (VB-2179)	E2	C	4.000	CK	SA	S	C	CT-C	OP		VR-041	24.204.06
E1100F090 (VB-2180)	2	C	4.000	CK	SA	S	C	CT-C	OP		VR-041	24.204.06
E1100F148A (V15-2004)	3	C	16.000	CK	SA	S	O&C	CT-C CT-D	OP OP			24.205.05 24.205.05

ISI CLASS 1, 2, 3, and EX VALVES
FERMI-2 POWER PLANT - Unit 1

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PIS No: E11 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	N/RMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE REQ.	REMARKS
E1100F148B (V15-2001)	3	C	16.000	CK	SA	S	O&C	CT-C CT-O	OP OP		24.205.06 24.205.06
E1100F148C (V15-2003)	3	C	16.000	CK	SA	S	O&C	CT-C CT-O	OP OP		24.205.05 24.205.05
E1100F148D (V15-2002)	3	C	16.000	CK	SA	S	O&C	CT-C CT-O	OP OP		24.205.06 24.205.06
E1100F184 (VB-2491)	E2	C	2.000	CK	SA	S	C	CT-C	OP	VR-041	24.204.01
E1100F185 (VB-2492)	2	C	2.000	CK	SA	S	C	CT-C	OP	VR-041	24.204.01
E1100F408 (VB-3874)	1	A/C	0.750	CK	SA	S	PAS	AT-1 CT-O	2Y 2Y		43.401.307 VR-055 43.401.307
E1100F409 (VB-3875)	1	C	0.750	CK	SA	S	PAS	CT-O	2Y	VR-055	43.401.307
E1150F003A (VB-2141)	2	B	20.000	GA	MO	O/KL	O	BTO GL8910 PIT PIT-RS	OP GP 2Y 2Y	110.00	24.204.01 47.306.01 / 47.306.02 24.204.05 24.321.02
E1150F003B (VB-2142)	2	B	20.000	GA	MO	O/KL	O	BTO GL8910 PIT	OP GP 2Y	110.00	24.204.06 47.306.01 / 47.306.02 24.204.05
E1150F004A (VB-2099)	2	B	24.000	GA	MO	O/KL	O&C	BTC BTO GL8910 PIT PIT-RS	OP OP GP 2Y 2Y	68.00 68.00	24.204.01 24.204.01 47.306.01 / 47.306.02 24.204.05 24.321.03 / 24.630.01
E1150F004B (VB-2102)	2	B	24.000	GA	MO	O/KL	O&C	BTC BTO GL8910 PIT	OP OP GP 2Y	69.00 69.00	24.204.06 24.204.06 47.306.01 / 47.306.02 24.204.05

VALVE TABLES

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ISI CLASS 1, 2, 3, and EX VALVES

FERMI-2 POWER PLANT - Unit 1

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PIS No: E11 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E1150F004C (VB-2101)	2	B	24.000	GA	MO	O/KL	O&C	BTC BTO GL8910 PIT PIT-RS	OP OP GP 2Y 2Y	69.00 69.00		24.204.01 24.204.01 47.306.01 / 47.306.02 24.204.05 24.321.02
E1150F004D (VB-2100)	2	B	24.000	GA	MO	O/KL	O&C	BTC BTO GL8910 PIT	OP OP GP 2Y	67.00 67.00		24.204.06 24.204.06 47.306.01 / 47.306.02 24.204.05
E1150F006A (VB-2095)	2	B	20.000	GA	MO	C	C	BTC PIT PIT-RS	OP 2Y 2Y	63.00		24.204.01 24.204.05 24.630.01
E1150F006B (VB-2098)	2	B	20.000	GA	MO	C	C	BTC PIT	OP 2Y	57.00		24.204.06 24.204.05
E1150F006C (VB-2097)	2	B	20.000	GA	MO	C	C	BTC PIT PIT-RS	OP 2Y 2Y	58.00		24.204.01 24.204.05 24.321.02
E1150F006D (VB-2096)	2	B	20.000	GA	MO	C	C	BTC PIT	OP 2Y	57.00		24.204.06 24.204.05
E1150F007A (VB-2154)	2	B	4.000	GA	MO	O	O&C	BTC BTO GL8910 PIT	OP OP GP 2Y	19.00 19.00		24.204.01 24.204.01 47.306.01 / 47.306.02 24.204.05
E1150F007B (VB-2134)	2	B	4.000	GA	MO	O	O&C	BTC BTO GL8910 PIT	OP OP GP 2Y	19.00 19.00		24.204.06 24.204.06 47.306.01 / 47.306.02 24.204.05
E1150F008 (VB-2092)	1	2	20.000	GA	MO	C	C	AT-1 AT-10 BTC GL8910 PIT PIT-RS	2Y 6Q CS GP 2Y 2Y		24.00 VR-007	43.401.307 43.401.512 24.204.04 47.306.01 / 47.306.02 24.204.08 24.630.01

ISI CLASS 1, 2, 3, and EX VALVES
FERMI-2 POWER PLANT - Unit 1

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PIS No: E11 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E1150F009 (VB-2091)	1	A	20.000	GA	MO	C	C	AT-1 AT-10 BTC GL8910 PIT PIT-RS	2Y 60 CS GP 2Y 2Y		VR-046 VR-049 VR-007	43.401.307 43.401.512 24.204.04 47.306.01 / 47.306.02 24.204.08 24.321.02 / 24.630.01
E1150F010 (VB-2187)	2	B	24.000	GA	MO	O/KL	O&C	PIT PIT-RS	2Y 2Y			24.204.08 24.321.04
E1150F015A (VB-2161)	1	A	24.000	GA	MO	C	O&C	AT-10 BTC BTO GL8910 PIT PIT-RS	60 CS CS GP 2Y 2Y	24.00 24.00	VR-007 VR-007	43.401.512 24.204.04 24.204.04 47.306.01 / 47.306.02 24.204.05 24.321.04 / 24.630.01
E1150F015B (VB-2162)	1	A	24.000	GA	MO	C	O&C	AT-10 BTC BTO GL8910 PIT	60 CS CS GP 2Y	24.00 24.00	VR-007 VR-007	43.401.512 24.204.04 24.204.04 47.306.01 / 47.306.02 24.204.05
E1150F016A (VB-2167)	2	A	12.000	GL	MO	C/KL	C	AT-1 BTC GL8910 PIT PIT-RS	2Y OP GP 2Y 2Y	111.00		43.401.344 24.204.01 47.306.01 / 47.306.02 24.204.05 24.321.02
E1150F016B (VB-2168)	2	A	12.000	GL	MO	C/KL	C	AT-1 BTC GL8910 PIT	2Y OP GP 2Y	121.00		43.401.345 24.204.06 47.306.01 / 47.306.02 24.204.05
E1150F017A (VB-2159)	2	B	24.000	GL	MO	O	O	BTO GL8910 PIT PIT-RS	OP GP 2Y 2Y	24.00		24.204.01 47.306.01 / 47.306.02 24.204.05 24.321.04 / 24.630.01
E1150F017B (VB-2160)	2	B	24.000	GL	MO	O	O	BTO GL8910 PIT	OP GP 2Y	24.00		24.204.06 47.306.01 / 47.306.02 24.204.05

PIS No: E11 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E1150F021A (VB-2165)	E2	A	12.000	GA	MO	C	C	AT-1 BTC GL8910 PIT	2Y OP GP 2Y	21.00		43.401.344 24.204.01 47.306.01 / 47.306.02 24.204.05
E1150F021B (VB-2170)	E2	A	12.000	GA	MO	C	C	AT-1 BTC GL8910 PIT	2Y OP GP 2Y	19.00		43.401.345 24.204.06 47.306.01 / 47.306.02 24.204.05
E1150F022 (VB-2172)	1	A	6.000	GA	MO	C	C	AT-1 BTC PIT	2Y OP 2Y	29.00		43.401.313 24.204.06 24.204.05
E1150F023 (VB-2171)	1	A	6.000	GL	MO	C	C	AT-1 BTC PIT	2Y OP 2Y	68.00		43.401.313 24.204.06 24.204.05
E1150F024A (VB-2135)	2	A	18.000	GL	MO	C	O&C	AT-1 BTC BTO GL8910 PIT PIT-RS	2Y OP OP GP 2Y 2Y	24.00 24.00	VR-046	43.401.381 24.204.01 24.204.01 47.306.01 / 47.306.02 24.204.05 24.321.03 / 24.630.01
E1150F024B (VB-2136)	2	A	18.000	GL	MO	C	O&C	AT-1 BTC BTO GL8910 PIT	2Y OP OP GP 2Y	25.00 25.00	VR-046	43.401.380 24.204.06 24.204.06 47.306.01 / 47.306.02 24.204.05
E1150F026B (VB-2152)	2	B	4.000	GA	MO	C	C	BTC PIT	OP 2Y	35.00		24.204.06 24.204.05
E1150F027A (VB-2157)	2	A	6.000	GL	MO	C	C	AT-1 BTC GL8910 PIT	2Y OP GP 2Y	45.00	VR-046	43.401.381 24.204.01 47.306.01 / 47.306.02 24.204.05
E1150F027B (VB-2158)	2	A	6.000	GL	MO	C	C	AT-1 BTC GL8910 PIT	2Y OP GP 2Y	45.00	VR-046	43.401.380 24.204.06 47.306.01 / 47.306.02 24.204.05

PIS No: E11 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	REMARKS
E1150F028A (VB-2155)	2	A	18.000	GA	MO	C/KL	O&C	AT-1 BTC BTO GL8910 PIT PIT-RS	2Y OP OP GP 2Y 2Y	VR-046 27.00 27.00	43.401.381 24.204.01 24.204.01 47.306.01 / 47.306.02 24.204.05 24.321.03 / 24.630.01
E1150F028B (VB-2156)	2	A	18.000	GA	MO	C/KL	O&C	AT-1 BTC BTO GL8910 PIT	2Y OP OP GP 2Y	VR-046 27.00 27.00	43.401.380 24.204.06 24.204.06 47.306.01 / 47.306.02 24.204.05
E1150F047A (VB-2137)	2	B	20.000	GA	MO	O/KL	O&C	BTC BTO GL8910 PIT PIT-RS	OP OP GP 2Y 2Y	109.00 109.00	24.204.01 24.204.01 47.306.01 / 47.306.02 24.204.05 24.321.02
E1150F047B (VB-2138)	2	B	20.000	GA	MO	O/KL	O&C	BTC BTO GL8910 PIT	OP OP GP 2Y	111.00 111.00	24.204.06 24.204.06 47.306.01 / 47.306.02 24.204.05
E1150F048A (VB-2139)	2	B	24.000	GL	MO	O	O&C	BTC BTO GL8910 PIT PIT-RS	OP OP GP 2Y 2Y	207.00 207.00	24.204.01 24.204.01 47.306.01 / 47.306.02 24.204.05 24.321.02 / 24.630.01
E1150F048B (VB-2140)	2	B	24.000	GL	MO	O	O&C	BTC BTO GL8910 PIT	OP OP GP 2Y	207.00 207.00	24.204.06 24.204.06 47.306.01 / 47.306.02 24.204.05
E1150F068A (V15-2018)	3	B	24.000	GL	MO	C	O&C	BTC BTO GL8910 PIT PIT-RS	OP OP GP 2Y 2Y	131.00 131.00	24.205.05 24.205.05 47.306.01 / 47.306.02 24.205.05 24.321.02 / 24.630.01

PIS No: E11 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E1150F0688 (V15-2019)	3	B	24.000	GL	MO	C	O&C	BTC BTO GL8910 PIT	OP OP GP 2Y	131.00 131.00		24.205.06 24.205.06 47.306.01 / 47.306.02 24.205.06
E1150F073 (V15-2015)	3	NA	12.000	GA	MO	C	O&C	GL8910	GP			47.306.01 / 47.306.02
E1150F075 (V15-2016)	3	NA	12.000	GA	MO	C	O&C	GL8910	GP			47.306.01 / 47.306.02
E1150F601A (V15-2127)	3	B	10.000	BAL	MO	O	O&C	BTC BTO GL8910 PIT	OP OP 2Y	24.00 24.00		24.205.05 24.205.05 24.205.05
E1150F601B (V15-2125)	3	B	10.000	BAL	MO	C	O&C	BTC BTO GL8910 PIT	OP OP 2Y	24.00 24.00		24.205.05 24.205.05 24.205.05
E1150F602A (V15-2128)	3	B	10.000	BAL	MO	C	O&C	BTC BTO GL8910 PIT	OP OP 2Y	24.00 24.00		24.205.05 24.205.05 24.205.05
E1150F602B (V15-2126)	3	B	10.000	BAL	MO	O	O&C	BTC BTO GL8910 PIT	OP OP 2Y	24.00 24.00		24.205.05 24.205.05 24.205.05
E1150F603A (V15-2108)	3	B	16.000	GA	MO	C	O&C	BTC BTO GL8910 PIT	OP OP GP 2Y	100.00 100.00		24.205.05 24.205.05 47.306.01 / 47.306.02 24.205.05
E1150F603B (V15-2083)	3	B	16.000	GA	MO	C	O&C	BTC BTO GL8910 PIT	OP OP GP 2Y	98.00 98.00		24.205.06 24.205.06 47.306.01 / 47.306.02 24.205.06

PIS No: E11 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E1150F604A (V15-2109)	3	B	18.000	GA	MO	O	O&C	BTC BTO GLB910 PIT	OP OP GP 2Y	113.00 113.00		24.205.05 24.205.05 47.306.01 / 47.306.02 24.205.05
E1150F604B (V15-2084)	3	B	18.000	GA	MO	O	O&C	BTC BTO GLB910 PIT	OP OP GP 2Y	113.00 113.00		24.205.06 24.205.06 47.306.01 / 47.306.02 24.205.06
E1150F605A (V15-2110)	3	B	18.000	GA	MO	O	O&C	BTC BTO GLB910 PIT	OP OP GP 2Y	113.00 113.00		24.205.05 24.205.05 47.306.01 / 47.306.02 24.205.05
E1150F605B (V15-2085)	3	B	18.000	GA	MO	O	O&C	BTC BTO GLB910 PIT	OP OP GP 2Y	113.00 113.00		24.205.06 24.205.06 47.306.01 / 47.306.02 24.205.06
E1150F608 (V8-3407)	1	A	20.000	GA	MO	C/KL	C	AT-1 AT-10 BTC GLB910 PIT	2Y 60 CS GP 2Y		VR-046 VR-049 VR-007	43.401.307 43.401.512 24.204.04 47.306.01 / 47.306.02 24.204.08
E11F400A (V15-2088)	C	B	3.000	GL	AO	C/FC	C	FST	OP			24.205.05
E11F400B (V15-2061)	C	B	3.000	GL	AO	C/FC	C	FST	OP			24.205.06
E11F400C (V15-2086)	C	B	3.000	GL	AO	C/FC	C	FST	OP			24.205.05
E11F400D (V15-2063)	C	B	3.000	GL	AO	C/FC	C	FST	OP			24.205.06
E11F412 (V5-2546)	E2	A	1.000	GL	SO	O	C	AT-1 BTC PIT	2Y CS 2Y		2.00 VR-035	43.401.331 24.204.04 43.401.331

PIS No: E11 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E11F413 (V5-2547)	E2	A	1.000	GL	SO	O	C	AT-1 BTC PIT	2Y CS 2Y	2.00	VR-035	43.401.332 24.204.04 43.401.332
E11F414 (V5-2548)	E2	A	1.000	GL	SO	O	C	AT-1 BTC PIT	2Y CS 2Y	2.00	VR-035	43.401.350 24.204.04 43.401.350
E11F415 (V5-2549)	E2	A	1.000	GL	SO	O	C	AT-1 BTC PIT	2Y CS 2Y	2.00	VR-035	43.401.351 24.204.04 43.401.351
E11F610A (V13-7687)	1	A	1.000	GL	SO	C	PAS	BTC PIT	CS 2Y	2.00	VR-006	24.204.04 43.401.516
E11F610D (V13-7688)	1	A	1.000	GL	SO	C	PAS	BTC PIT	CS 2Y	2.00	VR-006	24.204.04 43.401.516

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	REMARKS
E2100F003A (VB-2015)	2	C	12.000	CK	SA	S	O&C	CT-C CT-D CT-OP	OP RR OP	VR-60	24.203.02 43.000.010 24.203.02
E2100F003B (VB-2018)	2	C	12.000	CK	SA	S	O&C	CT-C CT-D CT-OP	OP RR OP	VR-60	24.203.03 43.000.010 24.203.03
E2100F003C (VB-2017)	2	C	12.000	CK	SA	S	O&C	CT-C CT-D CT-OP	OP RR OP	VR-60	24.203.02 43.000.010 24.203.02
E2100F003D (VB-2016)	2	C	12.000	CK	SA	S	O&C	CT-C CT-D CT-OP	OP RR OP	VR-60	24.203.03 43.000.010 24.203.03
E2100F006A (VB-2023)	1	A/C	12.000	CK	SAT	S	O&C	AT-1 AT-10 CT-C CT-D CT-OP PIT	2Y 6Q CS RR CS 2Y	VR-008 VR-008 VR-008	43.401.312 43.401.513 24.203.04 43.000.010 24.203.04 24.203.04
E2100F006B (VB-2024)	1	A/C	12.000	CK	SAT	S	O&C	AT-1 AT-10 CT-C CT-D CT-OP PIT	2Y 6Q CS RR CS 2Y	VR-008 VR-008 VR-008	43.401.311 43.401.513 24.203.04 43.000.010 24.203.04 24.203.04
E2100F011A (V22-2120)	2	C	2.000	RV	SA	C	O&C	CT-SP	5Y		43.000.02
E2100F011B (V22-2119)	2	C	2.000	RV	SA	C	O&C	CT-SP	5Y		43.000.02
E2100F012A (V22-2016)	2	C	2.000	RV	SA	C	O&C	CT-SP	5Y		43.000.02
E2100F012B (V22-2017)	2	C	2.000	RV	SA	C	O&C	CT-SP	5Y		43.000.02
E2100F029A (VB-2053)	E2	C	3.000	CK	SA	S	C	CT-C	OP	VR-040	24.203.02

PIS No: E21 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	REMARKS
E2100F029B (VB-2057)	E2	C	3.000	CK	SA	S	C	CT-C	OP	VR-040	24.203.03
E2100F030A (VB-2051)	2	C	3.000	CK	SA	S	C	CT-C	OP	VR-040	24.203.02
E2100F030B (VB-2055)	2	C	3.000	CK	SA	S	C	CT-C	OP	VR-040	24.203.03
E2100F032A (VB-2019)	2	C	1.000	RV	SA	C	O&C	CT-SP	5Y		43.000.02
E2100F032B (VB-2004)	2	C	1.000	RV	SA	C	O&C	CT-SP	5Y		43.000.02
E2100F038A (VB-2044)	2	C	3.000	CK	SA	S	O&C	CT-D	RR	VR-045	43.000.010
E2100F038B (VB-2041)	2	C	3.000	CK	SA	S	O&C	CT-D	RR	VR-045	43.000.010
E2100F038C (VB-2045)	2	C	3.000	CK	SA	S	O&C	CT-D	RR	VR-045	43.000.010
E2100F038D (VB-2040)	2	C	3.000	CK	SA	S	O&C	CT-D	RR	VR-045	43.000.010
E2150F004A (VB-2019)	2	B	12.000	GA	MO	O	O	BTO GLB910 PIT	OP GP 2Y	13.00	24.203.02 47.306.01 / 47.306.02 24.203.04
E2150F004B (VB-2020)	2	B	12.000	GA	MO	O	O	BTO GLB910 PIT	OP GP 2Y	13.00	24.203.03 47.306.01 / 47.306.02 24.203.04
E2150F005A (VB-2021)	1	A	12.000	GA	MO	C	O&C	AT-1 AT-10 BTC BTO GLB910 PIT	2Y 6Q CS CS GP 2Y		43.401.312 43.401.513 24.203.04 24.203.04 / 24.203.02 47.306.01 / 47.306.02 24.203.04

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E2150F005B (VB-2022)	1	A	12.000	GA	MO	C	O&C	AT-1 AT-10 BTC BTO GL8910 PIT	2Y 6Q CS CS GP 2Y			43.401.311 43.401.513 24.203.04 24.203.04 / 24.203.03 47.306.01 / 47.306.02 24.203.04
E2150F015A (VB-2033)	2	B	10.000	GL	MO	C	C	BTC GL8910 PIT	OP GP 2Y	17.00		24.203.02 47.306.01 / 47.306.02 24.203.04
E2150F015B (VB-2034)	2	B	10.000	GL	MO	C	C	BTC GL8910 PIT	OP GP 2Y	25.00		24.203.03 47.306.01 / 47.306.02 24.203.04
E2150F031A (VB-4683)	2	B	3.000	GA	MO	O	O&C	BTC BTO GL8910 PIT	OP OP GP 2Y	18.00 18.00		24.203.02 24.203.02 47.306.01 / 47.306.02 24.203.04
E2150F031B (VB-2032)	2	B	3.000	GA	MO	O	O&C	BTC BTO GL8910 PIT	OP OP GP 2Y	18.00 18.00		24.203.03 24.203.03 47.306.01 / 47.306.02 24.203.04
E2150F036A (VB-2007)	2	B	20.000	GA	MO	O/KL	C	BTC GL8910 PIT	OP GP 6Q	56.00		24.203.02 47.306.01 / 47.306.02 24.203.04
E2150F036B (VB-2008)	2	B	20.000	GA	MO	O/KL	C	BTC GL8910 PIT	OP GP 2Y	58.00		24.203.03 47.306.01 / 47.306.02 24.203.04
E21F500A (V13-2377)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.104 44.220.104
E21F500B (V13-2378)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.104 44.220.104

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E4100F005 (VB-4656)	2	C	14.000	CK	SA	S	O	CT-O	OP			24.202.01
E4100F019 (VB-2192)	2	C	16.000	CK	SA	S	O	CT-O	OP			24.202.01
E4100F020 (V22-2044)	2	C	1.500	RV	SA	C	O	CT-SP	5Y			43.000.02
E4100F026 (VB-2214)	2	B	1.000	GL	DO	C/FC	C	BTC FST PIT	OP OP 2Y	6.00	VR-023	24.202.01 24.202.01 24.202.05
E4100F040 (V11-2007)	2	C	2.000	CK	SA	S	O	CT-O	OP			24.202.01
E4100F045 (VB-2203)	2	C	16.000	CK	SA	S	O	CT-D	RR		VR-010	43.000.010
E4100F048 (VB-2208)	2	C	2.000	CK	SA	S	O	CT-O	OP			24.202.01
E4100F049 (V11-2538)	2	C	20.000	CK	SA	S	O	CT-O	OP			24.202.01
E4100F050 (V22-2586)	2	C	3.000	RV	SA	C	O	CT-SP	5Y			43.000.02
E4100F052 (VB-2238)	2	C	2.000	CK	SA	S	C	CT-C	OP			24.202.01
E4100F053 (VB-2212)	2	B	1.000	GL	AO	C/FC	C	BTC FST PIT	OP OP 2Y	12.00	VR-023	24.202.01 24.202.01 24.202.05
E4100F054 (V17-2033)	2	B	1.000	GL	DO	C/FC	C	BTC FST PIT	OP OP 2Y	8.00	VR-023	24.202.01 24.202.01 24.202.05
E4100F057 (VB-2236)	2	C	2.000	CK	SA	S	O	CT-O	OP			24.202.01

PIS No: E41 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	REMARKS
E4100F067 (V17-2023)	2	B	10.000	GA	MO	C	O	BTO PIT	OP 2Y	21.00	24.202.01 24.202.05
E4100F076 (V11-2015)	2	C	4.000	CK	SA	S	O&C	CT-C CT-O	OP OP		24.202.07 24.202.07
E4100F077 (V11-2016)	2	C	4.000	CK	SA	S	O&C	CT-C CT-O	OP OP		24.202.07 24.202.07
E4150D003 (N/A)	2	D	16.000	RD	SA	C		DT	5Y		E316
E4150D004 (N/A)	E2	D	16.000	RD	SA	C		DT	5Y		E316
E4150F001 (V17-2022)	2	B	10.000	GA	MO	C	O	BTO GLB910 PIT	OP GP 2Y	17.00	24.202.01 47.306.01 / 47.306.02 24.202.05
E4150F002 (V17-2020)	1	A	10.000	GA	MO	O/KL	O&C	AT-1 AT-4 BTC BTO GLB910 PIT	2Y RR CS CS GP 2Y	14.00 14.00	VR-036 VR-036 24.202.05 24.202.05 47.306.01 / 47.306.02 24.202.05
E4150F003 (V17-2021)	1	A	10.000	GA	MO	C	O&C	AT-1 AT-4 BTC BTO GLB910 PIT	2Y RR OP OP GP 2Y	12.00 12.00	VR-046 43.401.306 43.401.511 24.202.01 / 24.202.05 24.202.01 47.306.01 / 47.306.02 24.202.05
E4150F004 (V8-2191)	2	B	16.000	GA	MO	O	C	BTC GLB910 PIT	OP GP 2Y	19.00	24.202.01 47.306.01 / 47.306.02 24.202.05

PIS No: E41 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E4150F006 (VB-2194)	1	A	14.000	GA	MO	C	O&C	AT-1 AT-10 AT-4 BTC BTO GLB910 PIT	2Y 6Q RR CS CS GP 2Y		VR-046	43.401.303 43.401.514 43.401.511 24.202.05 24.202.05 47.306.01 / 47.306.02 24.202.05
E4150F007 (VB-2193)	2	A	14.000	GA	MO	O	O&C	AT-10 BTC BTO PIT	6Q OP OP 2Y	20.00 20.00		43.401.514 24.202.01 24.202.01 24.202.05
E4150F008 (VB-2198)	2	B	10.000	GL	MO	C	C	BTC GLB910 PIT	OP GP 2Y	123.00		24.202.01 47.306.01 / 47.306.02 24.202.05
E4150F012 (VB-2196)	2	B	4.000	GL	MO	C	O&C	BTC BTO GLB910 PIT	OP OP GP 2Y	10.00 10.00		24.202.01 24.202.01 47.306.01 / 47.306.02 24.202.05
E4150F021 (V11-2006)	2	B/C	16.000	SCK	SAM	C/LO	O&C	BTC CT-O GLB910 PIT	OP OP GP 2Y	104.00		24.202.01 24.202.01 47.306.01 / 47.306.02 24.202.05
E4150F022 (V11-2008)	2	B/C	2.000	SCK	SAM	C/LO	O&C	BTC CT-O GLB910 PIT	OP OP GP 2Y	27.00		24.202.01 24.202.01 47.306.01 / 47.306.02 24.202.05
E4150F041 (VB-2204)	2	B	16.000	GA	MO	C	O	BTO GLB910 PIT	OP GP 2Y	18.00		24.202.01 47.306.01 / 47.306.02 24.202.05
E4150F042 (VB-2202)	2	B	16.000	GA	MO	C	O&C	BTC BTO GLB910 PIT	OP OP GP 2Y	18.00 18.00		24.202.01 / 24.202.05 24.202.01 47.306.01 / 47.306.02 24.202.05

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FERMI-2 POWER PLANT - Unit 1

PIS No: E41 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E4150F059 (VB-2218)	2	B	2.000	GL	MO	C	O	BTO GLB910 PIT	OP GP 2Y	29.00		24.202.01 47.306.01 / 47.306.02 24.202.05
E4150F075 (V11-2013)	2	A	4.000	GA	MO	O	C	AT-1 BTC GLB910 PIT	2Y OP GP 2Y	26.00		43.401.382 24.202.01 / 24.202.05 47.306.01 / 47.306.02 24.202.05
E4150F079 (V11-2019)	2	A	4.000	GA	MO	O	C	AT-1 BTC GLB910 PIT	2Y OP GP 2Y	25.00		43.401.382 24.202.01 / 24.202.05 47.306.01 / 47.306.02 24.202.05
E4150F600 (V17-2088)	1	A	1.000	GL	MO	O/KL	C	AT-1 AT-4 BTC GLB910 PIT	2Y RR OP GP 2Y		VR-046	43.401.306 43.401.511 24.202.01 / 24.202.05 47.306.01 / 47.306.02 24.202.05
E41F011 (V30-0253)	E2	B	8.000	GL	AO	C	C	BTC PIT	OP 2Y	30.00		24.202.01 24.202.05
E41F400 (V5-2550)	E2	A	1.000	GL	SO	O	C	AT-1 BTC PIT PIT-RS	2Y OP 2Y 2Y	2.00	VR-006	43.401.379 24.408.03 43.401.379 24.321.02
E41F401 (V5-2551)	E2	A	1.000	GL	SO	O	C	AT-2 BTC PIT	60 OP 60	2.00	VR-006	43.401.401 24.408.03 43.401.401
E41F402 (V5-2552)	E2	A	1.000	GL	SO	O	C	AT-1 BTC PIT	2Y OP 2Y	2.00	VR-006	43.401.378 24.408.04 43.401.378
E41F403 (V5-2553)	E2	A	1.000	GL	SO	O	C	AT-2 BTC PIT	60 OP 60	2.00	VR-006	43.401.400 24.408.04 43.401.400
E41F500 (V13-2379)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	60 2Y		VR-009	44.220.104 44.220.104

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E41F501 (V13-2380)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.104 44.220.104
E41F502 (V13-2381)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.104 44.220.104
E41F503 (V13-2382)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.104 44.220.104

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INSERVICE TESTING PROGRAM
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ISI CLASS 1, 2, 3, and EX VALVES

FERMI-2 POWER PLANT - Unit 1

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	REMARKS
E5100F017 (V22-2002)	E2	C	1.000	RV	SA	C	O	CT-SP	5Y		43.000.02
E5150F001 (V11-2002)	E2	B/C	10.000	SCK	SAH	C/LO	C	BTC GLB910 PIT	OP GP 2Y	87.00	24.206.01 47.306.01 / 47.306.02 24.206.02
E5150F002 (V8-2235)	E2	B/C	2.000	SCK	SAH	C/LO	C	BTC GLB910 PIT	OP GP 2Y	28.00	24.206.01 47.306.01 / 47.306.02 24.206.02
E5150F007 (V17-2030)	1	A	4.000	GA	MO	O/KL	C	AT-1 AT-4 BTC GLB910 PIT	2Y RR CS GP 2Y	14.00	VR-036 43.401.305 43.401.511 24.206.02 47.306.01 / 47.306.02 24.206.02
E5150F008 (V17-2031)	1	A	4.000	GA	MO	O/KL	C	AT-1 AT-4 BTC GLB910 PIT	2Y RR OP GP 2Y	13.00	43.401.305 43.401.511 24.206.01 / 24.206.02 47.306.01 / 47.306.02 24.206.02
E5150F010 (V8-2221)	2	NA	6.000	GA	MO	O	O	GLB910	GP		47.306.01 / 47.306.02
E5150F012 (V8-2227)	E2	A	6.000	GA	MO	O	C	AT-10 BTC PIT	6Q OP 2Y	15.00	43.401.515 24.206.01 24.206.02
E5150F013 (V8-2228)	1	A	6.000	GA	MO	C	C	AT-1 AT-10 AT-4 BTC GLB910 PIT	2Y 6Q RR CS GP 2Y	18.00	VR-046 43.401.304 43.401.515 43.401.511 24.206.02 47.306.01 / 47.306.02 24.206.02
E5150F019 (V8-2230)	2	B	2.000	GL	MO	C	C	BTC GLB910 PIT	OP GP 2Y	25.00	24.206.01 47.306.01 / 47.306.02 24.206.02

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	RELIEF REQ.	REMARKS
E5150F022 (VB-2232)	2	B	4.000	GL	MO	C	C	BTC GL8910 PIT	OP GP 2Y	54.00		24.206.01 47.306.01 / 47.306.02 24.206.02
E5150F029 (VB-2223)	2	NA	6.000	GA	MO	C	O	GL8910	GP			47.306.01 / 47.306.02
E5150F031 (VB-2225)	E2	B	6.000	GA	MO	C	C	BTC GL8910 PIT	OP GP 2Y	23.00		24.206.01 47.306.01 / 47.306.02 24.206.02
E5150F045 (V17-2032)	2	NA	4.000	GL	MO	C	O	GL8910	GP			47.306.01 / 47.306.02
E5150F046 (VB-2239)	2	NA	2.000	GL	MO	C	O	GL8910	GP			47.306.01 / 47.306.02
E5150F062 (V11-2020)	E2	A	3.000	GA	MO	O	C	AT-1 BTC GL8910 PIT	2Y OP GP 2Y	21.00		43.401.382 24.206.01 / 24.206.02 47.306.01 / 47.306.02 24.206.02
E5150F084 (V11-2026)	2	A	3.000	GA	MO	O	C	AT-1 BTC GL8910 PIT	2Y OP GP 2Y	19.00		43.401.382 24.206.01 / 24.206.02 47.306.01 / 47.306.02 24.206.02
E5150F095 (VB-2144)	2	NA	1.000	GL	MO	O	C	GL8910	GP			47.306.01 / 47.306.02
E51F503 (V13-2383)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.104 44.220.104
E51F504 (V13-2384)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.104 44.220.104
E51F505 (V13-2385)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.104 44.220.104
E51F506 (V13-2386)	1	C	0.750	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.104 44.220.104

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
G1100F003 (V9-2005)	E2	A	3.000	GA	AO	C	C	AT-1	2Y			43.401.314
								AT-4	RR			43.401.511
								BTC	OP	36.00		24.702.01
								FST	OP		VR-023	24.702.01
								PIT	2Y			24.702.01
G1100F019 (V9-2023)	E2	A	3.000	GA	AO	C	C	AT-1	2Y			43.401.315
								AT-4	RR			43.401.511
								BTC	OP	38.00		24.702.01
								FST	OP		VR-023	24.702.01
								PIT	2Y			24.702.01
G1154F018 (V9-2022)	E2	A	3.000	GA	MO	O	C	AT-1	2Y			43.401.315
								AT-4	RR			43.401.511
								BTC	CS	27.00	VR-036	24.702.01
								GLB910	GP			47.306.01 / 47.306.02
								PIT	2Y			24.702.01
G1154F600 (V9-2044)	E2	A	3.000	GA	MO	O	C	AT-1	2Y			43.401.314
								AT-4	RR			43.401.511
								BTC	CS	16.00	VR-036	24.702.01
								GLB910	GP			47.306.01 / 47.306.02
								PIT	2Y			24.702.01

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ISI CLASS 1, 2, 3, and EX VALVES

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PIS No: G33

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	REMARKS
G3352F001 (VB-2252)	1	A	6.000	GA	MO	O	C	AT-1 2Y BTC CS GL8910 GP PIT 2Y	10.00	VR-036	43.401.348 24.702.01 47.306.01 / 47.306.02 24.702.01
G3352F004 (VB-2253)	1	A	6.000	GA	MO	O	C	AT-1 2Y BTC OP GL8910 GP PIT 2Y	10.00		43.401.348 24.707.01 47.306.01 / 47.306.02 24.707.01
G3352F220 (V30-0322)	1	A	4.000	GA	MO	O	C	AT-1 2Y BTC OP GL8910 GP PIT 2Y	18.00		43.401.304 24.707.01 47.306.01 / 47.306.02 24.707.01
G33F583 (V13-2387)	1	C	1.000	XFC	SA	O	C	CT-EF 6Q PIT 2Y		VR-009	44.220.103 44.220.103

ISI CLASS 1, 2, 3, and EX VALVES

FERMI-2 POWER PLANT - Unit 1

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PIS No: G51

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
G5100F600 (VB-3832)	E2	A	6.000	GA	MO	O	C	AT-2 BTC GL8910 PIT	6Q OP GP 2Y	37.00		43.401.407 24.144.01 47.306.01 / 47.306.02 24.144.01
G5100F601 (VB-3834)	E2	A	6.000	GA	MC	O	C	AT-2 BTC GL8910 PIT	6Q OP GP 2Y	37.00		43.401.407 24.144.01 47.306.01 / 47.306.02 24.144.01
G5100F602 (VB-3831)	E2	A	6.000	GA	MO	O	C	AT-2 BTC GL8910 PIT	6Q OP GP 2Y	38.00		43.401.408 24.144.01 47.306.01 / 47.306.02 24.144.01
G5100F603 (VB-3833)	E2	A	6.000	GA	MO	O	C	AT-2 BTC GL8910 PIT	6Q OP GP 2Y	38.00		43.401.408 24.144.01 47.306.01 / 47.306.02 24.144.01
G5100F604 (VB-3849)	2	A	4.000	GA	MO	O	C	AT-2 BTC GL8910 PIT	6Q OP GP 2Y	28.00		43.401.405 24.144.01 47.306.01 / 47.306.02 24.144.01
G5100F605 (VB-4680)	E2	A	4.000	GA	MO	O	C	AT-2 BTC GL8910 PIT	6Q OP GP 2Y	27.00		43.401.405 24.144.01 47.306.01 / 47.306.02 24.144.01
G5100F606 (VB-3850)	2	A	4.000	GA	MO	O	C	AT-2 BTC GL8910 PIT	6Q OP GP 2Y	27.00		43.401.420 24.144.01 47.306.01 / 47.306.02 24.144.01
G5100F607 (VB-4682)	E2	A	4.000	GA	MO	O	C	AT-2 BTC GL8910 PIT	6Q OP GP 2Y	28.00		43.401.420 24.144.01 47.306.01 / 47.306.02 24.144.01

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VALVE NUMBER	CLASS	CATEGORY	VALVE SIZE	VALVE TYPE	VALVE ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
N1100F607 (V17-2099)	2	B	24.000	GA	MO	O	C	BTC GL8910 PIT	CS GP 2Y	109.00	VR-001	24.137.03 47.306.01 / 47.306.02 24.137.03
N1100F608 (V17-2100)	2	B	24.000	GA	MO	O	C	BTC GL8910 PIT	CS GP 2Y	110.00	VR-001	24.137.03 47.306.01 / 47.306.01 24.137.03
N1100F609 (V17-2101)	2	B	24.000	GA	MO	O	C	BTC GL8910 PIT	CS GP 2Y	107.00	VR-001	24.137.03 47.306.01 / 47.306.02 24.137.03
N1100F610 (V17-2102)	2	B	24.000	GA	MO	O	C	BTC GL8910 PIT	CS GP 2Y	110.00	VR-001	24.137.03 47.306.01 / 47.306.02 24.137.03

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
N21F539A (V13-2392)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.104 44.220.104
N21F539B (V13-2393)	1	C	1.000	XFC	SA	O	C	CT-EF PIT	6Q 2Y		VR-009	44.220.104 44.220.104

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PIS No: P11

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	REMARKS
P1100F126 (VB-3120)	E2	A	6.000	GA	M	C/KL	PAS	AT-1	2Y		43.401.316

ISI CLASS 1, 2, 3, and EX VALVES

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PIS No: P34

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	RELIEF REQ.	REMARKS
P34F401A (V13-7360)	1	A	0.750	GL	SO	C	C	AT-1 BTC PIT	2Y OP 2Y	3.00		43.401.329 24.714.01 43.401.329
P34F401B (V13-7361)	1	A	0.750	GL	SO	C	C	AT-1 BTC PIT	2Y OP 2Y	2.00	VR-006	43.401.346 24.714.01 43.401.346
P34F402A (V13-7363)	2	B	0.750	GL	SO	C	C	BTC PIT	OP 2Y	2.00	VR-006	24.714.01 78.000.17
P34F402B (V13-7362)	2	B	0.750	GL	SO	C	C	BTC PIT	OP 2Y	2.00	VR-006	24.714.01 78.000.14
P34F403A (V13-7364)	E2	A	0.750	GL	SO	C	C	AT-1 BTC PIT	2Y OP 2Y		VR-046 VR-006	43.401.324 24.714.01 43.401.324
P34F403B (V13-7365)	E2	A	0.750	GL	SO	C	C	AT-1 BTC PIT	2Y OP 2Y	2.00	VR-006	43.401.359 24.714.01 43.401.359
P34F404A (V13-7374)	E2	A	0.750	GL	SO	C	C	AT-1 BTC PIT	2Y OP 2Y		VR-046 VR-006	43.401.324 24.714.01 43.401.324
P34F404B (V13-7375)	E2	A	0.750	GL	SO	C	C	AT-1 BTC PIT	2Y OP 2Y	2.00	VR-006	43.401.359 24.714.01 43.401.359
P34F405A (V13-7366)	E2	A	0.750	GL	SO	C	C	AT-1 BTC PIT	2Y OP 2Y	2.00	VR-006	43.401.387 24.714.01 43.401.387
P34F405B (V13-7367)	E2	A	0.750	GL	SO	C	C	AT-1 BTC PIT	2Y OP 2Y	2.00	VR-006	43.401.386 24.714.01 43.401.386
P34F406A (V13-7376)	E2	A	0.750	GL	SO	C	C	AT-1 BTC PIT	2Y OP 2Y	2.00	VR-006	43.401.387 24.714.01 43.401.387

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
P34F4068 (V13-7377)	E2	A	0.750	GL	SO	C	C	AT-1 BTC PIT	2Y OP 2Y			43.401.386 24.714.01 43.401.386
P34F407 (V13-7368)	2	A	0.750	GL	SO	C	C	AT-2 BTC PIT	6Q OP 6Q	2.00	VR-006	43.401.405 24.714.01 43.401.405
P34F408 (V13-7369)	2	A	0.750	GL	SO	C	C	AT-1 BTC PIT	2Y OP 2Y	2.00	VR-006	43.401.383 24.714.01 43.401.383
P34F409 (V13-7378)	2	A	0.750	GL	S/O	C	C	AT-2 BTC PIT	6Q OP 6Q	2.00	VR-006	43.401.405 24.714.01 43.401.405
P34F410 (V13-7379)	2	A	0.750	GL	SO	C	C	AT-1 BTC PIT	2Y OP 2Y	2.00	VR-006	43.401.383 24.714.01 43.401.383

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PIS No: P44

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
P4400F003A (VB-2335)	3	C	8.000	CK	SA	S	O	CT-O	OP			24.207.08
P4400F003B (VB-2333)	3	C	8.000	CK	SA	S	O	CT-O	OP			24.207.08
P4400F038 (VB-3055)	3	C	1.500	CK	SA	S	C	CT-C	OP			24.207.08
P4400F051 (VB-2431)	3	C	6.000	CK	SA	S	O	CT-D CT-OP	SP OP		VR-048	43.000.010 24.207.08
P4400F077A (VB-2336)	3	C	8.000	CK	SA	S	O	CT-O	OP			24.207.08
P4400F077B (VB-2334)	3	C	8.000	CK	SA	S	O	CT-O	OP			24.207.08
P4400F111A (VB-2433)	3	C	2.000	CK	SA	S	C	CT-C	OP			24.207.08
P4400F111B (VB-2430)	3	C	1.500	CK	SA	S	C	CT-C	OP			24.207.08
P4400F116A (VB-2432)	3	C	6.000	CK	SA	S	O	CT-D CT-OP	SP OP		VR-048	43.000.010 24.207.08
P4400F116B (VB-2332)	3	C	8.000	CK	SA	S	O	CT-D CT-OP	RR OP		VR-062	43.000.010 24.207.08
P4400F126A (V22-2075)	3	A/C	1.000	RV	SA	C	O	AT-12 CT-SP	2Y 5Y			43.401.600 43.000.02
P4400F126B (V22-2076)	3	A/C	1.000	RV	SA	C	O	AT-12 CT-SP	2Y 5Y			43.401.601 43.000.02
P4400F165 (VB-2428)	3	C	6.000	CK	SA	S	O	CT-D CT-OP	SP OP		VR-048	43.000.010 24.207.08
P4400F182 (VB-2429)	3	C	2.000	CK	SA	S	C	CT-C	CS		VR-004	24.207.04
P4400F246 (VB-3056)	3	C	2.000	CK	SA	S	C	CT-C	RR		VR-032	24.207.04

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	REQ.	REMARKS
P4400F274 (VB-2488)	3	C	2.500	CK	SA	S	C	CT-C	RR		VR-032	24.207.04
P4400F282A (VB-4617)	3	A/C	6.000	CK	SA	S	C	AT-1 CT-C	2Y 2Y		VR-005	43.401.319 43.401.319
P4400F282B (VB-4616)	3	A/C	6.000	CK	SA	S	C	AT-1 CT-C	2Y 2Y		VR-005	43.401.335 43.401.335
P4400F387A (V22-2668)	3	A/C	1.000	RV	SA	C	O	AT-12 CT-SP	2Y 5Y			43.401.600 43.000.02
P4400F387B (V22-2667)	3	A/C	1.000	RV	SA	C	O	AT-12 CT-SP	2Y 5Y			43.401.601 43.000.02
P4400F601A (VB-2323)	3	B	8.000	GA	MO	O	C	BTC GL8910 PIT	OP GP 2Y	56.00		24.207.05 47.306.01 / 47.306.02 24.207.05
P4400F601B (VB-2314)	3	B	10.000	GA	MO	O	C	BTC GL8910 PIT	OP GP 2Y	51.00		24.207.05 47.306.01 / 47.306.02 24.207.05
P4400F602A (VB-2407)	3	B	4.000	GA	MO	C	O	BTO GL8910 PIT PIT-RS	OP GP 2Y 2Y	23.00		24.207.05 47.306.01 / 47.306.02 24.207.05 24.321.02
P4400F602B (VB-2374)	3	B	4.000	GA	MO	C	O	BTO GL8910 PIT	OP GP 2Y	23.00		24.207.05 47.306.01 / 47.306.02 24.207.05
P4400F603A (VB-2324)	3	B	8.000	GA	MO	O	C	BTC GL8910 PIT	OP GP 2Y	40.00		24.207.05 47.306.01 / 47.306.02 24.207.05
P4400F603B (VB-2315)	3	B	10.000	GA	MO	O	C	BTC GL8910 PIT	OP GP 2Y	50.00		24.207.05 47.306.01 / 47.306.02 24.207.05
P4400F604 (VB-2425)	3	B	2.000	GL	MO	O	C	BTC GL8910 PIT	CS GP 2Y	36.00	VR-004	24.207.04 47.306.01 / 47.306.02 24.207.04

PIS No: P46 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORM'L POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
P4400F605A (VB-2427)	3	B	2.000	GL	MO	O	C	BTC GL8910 PIT	OP GP 2Y	34.00		24.207.05 47.306.01 / 47.306.02 24.207.05
P4400F605B (VB-2426)	3	B	1.500	GL	MO	O	C	BTC GL8910 PIT	OP GP 2Y	35.00		24.207.05 47.306.01 / 47.306.02 24.207.05
P4400F606A (VB-4677)	3	A	6.000	GA	MO	O	C	AT-1 BTC GL8910 PIT PIT-RS	2Y CS GP 2Y 2Y	29.00	VR-005	43.401.319 24.207.04 47.306.01 / 47.306.02 24.207.04 24.321.02
P4400F606B (VB-4678)	3	A	6.000	GA	MO	O	C	AT-1 BTC GL8910 PIT	2Y CS GP 2Y	29.00	VR-005	43.401.335 24.207.04 47.306.01 / 47.306.02 24.207.04
P4400F607A (VB-2486)	3	A	6.000	GA	MO	O	C	AT-1 BTC GL8910 PIT PIT-RS	2Y CS GP 2Y 2Y	30.00	VR-005	43.401.320 24.207.04 47.306.01 / 47.306.02 24.207.04 24.321.02
P4400F607B (VB-4676)	3	A	6.000	GA	MO	O	C	AT-1 BTC GL8910 PIT	2Y CS GP 2Y	29.00	VR-005	43.401.336 24.207.04 47.306.01 / 47.306.02 24.207.04
P4400F608 (VB-2487)	3	B	2.500	GA	MO	O	C	BTC GL8910 PIT	CS GP 2Y	7.00	VR-036	24.207.04 47.306.01 / 47.306.02 24.207.04
P4400F613 (VB-3057)	3	B	1.500	GL	MO	O	C	BTC GL8910 PIT	OP GP 2Y	36.00		24.207.05 47.306.01 / 47.306.02 24.207.05
P4400F614 (VB-3058)	3	B	2.000	GL	MO	O	C	BTC GL8910 PIT	CS GP 2Y	37.00	VR-036	24.207.04 47.306.01 / 47.306.02 24.207.04

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PIS No: P44 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
P4400F615 (VB-3889)	3	A	6.000	GA	MO	O/KL	C	AT-1 BTC GL8910 PIT	2Y CS GP 2Y	37.00	VR-005	43.401.336 24.207.04 47.306.01 / 47.306.02 24.207.04
P4400F616 (VB-3882)	3	A	6.000	GA	MC	O/KL	C	AT-1 BTC GL8910 PIT PIT-RS	2Y CS GP 2Y 2Y	35.00	VR-005	43.401.320 24.207.04 47.306.01 / 47.306.02 24.207.04 24.321.04
P4400F972A (None Assigned)	3	A/C	4.000	CK	SA	S	C	AT-12 CT-C	2Y OP			43.401.600 24.207.08
P4400F972B (None Assigned)	3	A/C	4.000	CK	SA	S	C	AT-12 CT-C	2Y OP			43.401.601 24.207.08
P4400F974A (None Assigned)	3	A/C	1.000	CK	SA	S	C	AT-12 CT-C	2Y OP			43.401.600 24.207.08
P4400F974B (None Assigned)	3	A/C	1.000	CK	SA	S	C	AT-12 CT-C	2Y OP			43.401.601 24.207.08
P4400F975A (None Assigned)	3	B	0.750	GA	M	C	O	BT-OM	GP			43.401.602
P4400F975B (None Assigned)	3	B	0.750	GA	M	C	O	BT-OM	OP			43.401.603
P4400F976A (None Assigned)	3	C	0.750	CK	SA	C	O	CT-C CT-O	OP OP			43.401.602 43.401.602
P4400F976B (None Assigned)	3	C	0.750	CK	SA	C	O	CT-C CT-O	OP OP			43.401.603 43.401.603
P4400F978A (None Assigned)	3	A/C	0.750	CK	SA	C	O&C	AT-12 CT-C CT-O	2Y OP OP			43.401.600 24.207.08 24.207.08
P4400F978B (None Assigned)	3	A/C	0.750	CK	SA	C	O&C	AT-12 CT-C CT-O	2Y OP OP			43.401.601 24.207.08 24.207.08

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PIS No: P44 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	REMARKS
P4400F979A (None Assigned)	3	C	0.750	CK	SA	C	O	CT-O	OP		24.207.08
P4400F979B (None Assigned)	3	C	0.750	CK	SA	C	O	CT-O	OP		24.207.08
P44F400A (V15-2036)	C	B	8.000	GL	AO	O/FO	O	FST	OP		24.208.02
P44F400B (V15-2040)	C	B	8.000	GL	AO	O/FO	O	FST	OP		24.208.03

PIS No: P45

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	RELIEF REQ.	REMARKS
P4500F002A (V15-2092)	3	C	10.000	CK	SA	S	O	CT-O	OP			24.208.02
P4500F002B (V15-2067)	3	C	10.000	CK	SA	S	O	CT-O	OP			24.208.03
P4500F178A (None Assigned)	3	B	0.750	GA	M	C	O	BT-OM	OP			43.401.602
P4500F178B (None Assigned)	3	B	0.750	GA	M	C	O	BT-OM	OP			43.401.603
P4500F180A (None Assigned)	3	C	0.750	CK	SA	C	O	CT-O	OP			43.401.602
P4500F180B (None Assigned)	3	C	0.750	CK	SA	C	O	CT-O	OP			43.401.603
P45F400 (V15-2065)	C	B	2.000	GL	AO	C/FC	C	FST	OP			24.208.03
P45F401 (V15-2090)	C	B	2.000	GL	AO	C/FC	C	FST	OP			24.208.02

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PIS No: P50

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
P5000F207A (V22-2561)	E4	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
P5000F207B (V22-2610)	E4	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
P5000F208A (V5-2537)	E3	C	3.000	CK	SA	S	O	CT-O	OP			24.129.01
P5000F208R (V5-2536)	E3	C	3.000	CK	SA	S	O	CT-O	OP			24.129.01
P5000F219A (V5-2528)	E3	C	3.000	CK	SA	S	O	CT-C CT-O	OP OP			24.129.01 24.129.01
P5000F219B (V5-2527)	E3	C	3.000	CK	SA	S	O	CT-C CT-O	OP OP			24.129.01 24.129.01
P5000F223A (V22-2517)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
P5000F223B (V22-2516)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
P5000F402 (V5-2523)	E3	B	3.000	GL	AO	O/FO	O&C	BTC FST PIT	OP OP 2Y	18.00	VR-023	24.129.01 24.129.01 24.129.01
P5000F403 (V5-2055)	E3	B	2.000	GL	AO	C/FC	C	BTC FST PIT	OP OP 2Y	19.00	VR-023	24.129.01 24.129.01 24.129.01
P5000F440 (V5-2540)	E3	A	3.000	GA	AO	O/FC	C	AT-3 BTC FST PIT	6Q OP OP 2Y	37.00	VR-023	24.129.04 24.129.01 24.129.01 24.129.01
P5000F441 (V5-2541)	E3	A	3.000	GA	AO	O/FC	C	AT-3 BTC FST PIT	6Q OP OP 2Y	43.00	VR-023	24.129.04 24.129.01 24.129.01 24.129.01
P5000F603 (V5-2006)	E2	A	1.000	GA	MO	C/KC	PAS	AT-1	2Y			43.401.317

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	REMARKS
P5000F604 (V5-2007)	E2	A	1.000	GA	MO	C/KC	PAS	AT-1	2Y		43.401.317

PIS No: R30

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
R3000F031A (V5-2086)	E3	C	0.750	CK	SA	S	C	CT-C	OP			24.307.34
R3000F031B (V5-2062)	E3	C	0.750	CK	SA	S	C	CT-C	OP			24.307.36
R3000F031C (V5-2098)	E3	C	0.750	CK	SA	S	C	CT-C	OP			24.307.35
R3000F031D (V5-2074)	E3	C	0.750	CK	SA	S	C	CT-C	OP			24.307.37
R3000F032A (V5-2090)	E3	C	0.750	CK	SA	S	C	CT-C	OP			24.307.34
R3000F032B (V5-2066)	E3	C	0.750	CK	SA	S	C	CT-C	OP			24.307.36
R3000F032C (V5-2102)	E3	C	0.750	CK	SA	S	C	CT-C	OP			24.307.35
R3000F032D (V5-2078)	E3	C	0.750	CK	SA	S	C	CT-C	OP			24.307.37
R3000F035A (N/A)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
R3000F035B (N/A)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
R3000F035C (N/A)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
R3000F035D (N/A)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
R3000F036A (N/A)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
R3000F036B (N/A)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
R3000F036C (N/A)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02

PIS No: R30 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	MAX. FREQ	RELIEF STROKE REQ.	REMARKS
R3000F036D (N/A)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y		43.000.02
R3000F083A (V14-2026)	E3	C	1.500	CK	SA	S	O&C	CT-C CT-O	OP OP		24.307.34 24.307.34
R3000F083B (V14-2004)	E3	C	1.500	CK	SA	S	O&C	CT-C CT-O	OP OP		24.307.36 24.307.36
R3000F083C (V14-2037)	E3	C	1.500	CK	SA	S	O&C	CT-C CT-O	OP OP		24.307.35 24.307.35
R3000F083D (V14-2015)	E3	C	1.500	CK	SA	S	O&C	CT-C CT-O	OP OP		24.307.37 24.307.37
R3000F084A (V14-2029)	E3	C	1.500	CK	SA	S	O&C	CT-C CT-O	OP OP		24.307.34 24.307.34
R3000F084B (V14-2007)	E3	C	1.500	CK	SA	S	O&C	CT-C CT-O	OP OP		24.307.36 24.307.36
R3000F084C (V14-2040)	E3	C	1.500	CK	SA	S	O&C	CT-C CT-O	OP OP		24.307.35 24.307.35
R3000F084D (V14-2018)	E3	C	1.500	CK	SA	S	O&C	CT-C CT-O	OP OP		24.307.37 24.307.37
R3000F142A (V15-2096)	3	C	8.000	CK	SA	S	O	CT-C CT-O	OP OP		24.307.34 24.307.34
R3000F142B (V15-2071)	3	C	8.000	CK	SA	S	O	CT-C CT-O	OP OP		24.307.36 24.307.36
R3000F142C (V15-2102)	3	C	8.000	CK	SA	S	O	CT-C CT-O	OP OP		24.307.34 24.307.35
R3000F142D (V15-2078)	3	C	8.000	CK	SA	S	O	CT-C CT-O	OP OP		24.307.36 24.307.37
R30F400 (V15-2069)	C	B	2.000	GL	AO	C/FC	C	FST	OP		24.307.36
R30F401 (V15-2076)	C	B	2.000	GL	AO	C/FC	C	FST	OP		24.307.37

PIS No: R30 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	REQ.	REMARKS
R30F402 (V15-2094)	C	B	2.000	GL	AO	C/FC	C	FST	OP			24.307.34
R30F403 (V15-2100)	C	B	2.000	GL	AO	C/FC	C	FST	OP			24.307.35
R30FA04A (AS1)	E3	B	1.500	3WY	SO	C	O	BTO	SP	10.00	VR-051	24.307.14
R30FA04B (AS1)	E3	B	1.500	3WY	SO	C	O	BTO	SP	10.00	VR-051	24.307.16
R30FA04C (AS1)	E3	B	1.500	3WY	SO	C	O	BTO	SP	10.00	VR-051	24.307.15
R30FA04D (AS1)	E3	B	1.500	3WY	SO	C	O	BTO	SP	10.00	VR-051	24.307.17
R30FA05A (AS2)	E3	B	1.500	3WY	SO	C	O	BTO	SP	10.00	VR-051	24.307.14
R30FA05B (AS2)	E3	B	1.500	3WY	SO	C	O	BTO	SP	10.00	VR-051	24.307.16
R30FA05C (AS2)	E3	B	1.500	3WY	SO	C	O	BTO	SP	10.00	VR-051	24.307.15
R30FA05D (AS2)	E3	B	1.500	3WY	SO	C	O	BTO	SP	10.00	VR-051	24.307.17

PIS No: T23

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T2300F400A (V21-2001)	E2	A/C	18.000	CK	SAT	S	O&C	AT-11 CT-C CT-F CT-O PIT	6Q CS RR CS 2Y		VR-053 VR-057 VR-057	24.402.06 24.402.01 44.220.203 24.402.01 44.220.203
T2300F400B (V21-2002)	E3	A/C	18.000	CK	SAT	S	O&C	AT-11 CT-C CT-F CT-O PIT	6Q CS RR CS 2Y		VR-053 VR-057 VR-057	24.402.06 24.402.01 44.220.203 24.402.01 44.220.203
T2300F400C (V21-2003)	E2	A/C	18.000	CK	SAT	S	O&C	AT-11 CT-C CT-F CT-O PIT	6Q CS RR CS 2Y		VR-053 VR-057 VR-057	24.402.06 24.402.01 44.220.203 24.402.01 44.220.203
T2300F400D (V21-2004)	E2	A/C	18.000	CK	SAT	S	O&C	AT-11 CT-C CT-F CT-O PIT	6Q CS RR CS 2Y		VR-053 VR-057 VR-057	24.402.06 24.402.01 44.220.203 24.402.01 44.220.203
T2300F400E (V21-2005)	E2	A/C	18.000	CK	SAT	S	O&C	AT-11 CT-C CT-F CT-O PIT	6Q CS RR CS 2Y		VR-053 VR-057 VR-057	24.402.06 24.402.01 44.220.203 24.402.01 44.220.203
T2300F400F (V21-2006)	E2	A/C	18.000	CK	SAT	S	O&C	AT-11 CT-C CT-F CT-O PIT	6Q CS RR CS 2Y		VR-053 VR-057 VR-057	24.402.06 24.402.01 44.220.203 24.402.01 44.220.203
T2300F400G (V21-2007)	E2	A/C	18.000	CK	SAT	S	O&C	AT-11 CT-C CT-F CT-O PIT	6Q CS RR CS 2Y		VR-053 VR-057 VR-057	24.402.06 24.402.01 44.220.203 24.402.01 44.220.203

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T2300F400H (V21-2008)	E2	A/C	18.000	CK	SAT	S	O&C	AT-11	6Q		VR-053	24.402.06
								CT-C	CS		VR-057	24.402.01
								CT-F	RR			44.220.203
								CT-O	CS		VR-057	24.402.01
								PIT	2Y			44.220.203
T2300F400J (V21-2009)	E2	A/C	18.000	CK	SAT	S	O&C	AT-11	6Q		VR-053	24.402.06
								CT-C	CS		VR-057	24.402.01
								CT-F	RR			44.220.203
								CT-O	CS		VR-057	24.402.01
								PIT	2Y			44.220.203
T2300F400K (V21-2010)	E2	A/C	18.000	CK	SAT	S	O&C	AT-11	6Q		VR-053	24.402.06
								CT-C	CS		VR-057	24.402.01
								CT-F	RR			44.220.203
								CT-O	CS		VR-057	24.402.01
								PIT	2Y			44.220.203
T2300F400L (V21-2011)	E2	A/C	18.000	CK	SAT	S	O&C	AT-11	6Q		VR-053	24.402.06
								CT-C	CS		VR-057	24.402.01
								CT-F	RR			44.220.203
								CT-O	CS		VR-057	24.402.01
								PIT	2Y			44.220.203
T2300F400M (V21-2012)	E2	A/C	18.000	CK	SAT	S	O&C	AT-11	6Q		VR-053	24.402.06
								CT-C	CS		VR-057	24.402.01
								CT-F	RR			44.220.203
								CT-O	CS		VR-057	24.402.01
								PIT	2Y			44.220.203
T2300F409 (V21-2015)	E2	A	20.000	BTF	AO	C/FO	O&C	AT-1	2Y		VR-046	43.401.375
								BTC	OP	15.00		24.402.01
								BTC	OP	36.00		24.402.01
								FST	OP		VR-023	24.406.01
								PIT	2Y			24.406.02
T2300F410 (V21-2016)	E2	A	20.000	BTF	AO	C/FO	O&C	AT-1	2Y		VR-046	43.401.374
								BTC	OP	17.00		24.402.01
								BTO	OP	39.00		24.402.01
								FST	OP		VR-023	24.406.01
								PIT	2Y			24.406.02

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T2300F450A (V21-2013)	E2	A/C	20.000	CK	SAT	S	Q&C	AT-1	2Y		VR-046	43.401.375
								CT-C	OP			24.402.01
								CT-F	RR			44.220.204
								CT-D	OP			24.402.01
								PIT	2Y			44.220.204
T2300F450B (V21-2014)	E2	A/C	20.000	CK	SAT	S	Q&C	AT-1	2Y		VR-046	43.401.374
								CT-C	OP			24.402.01
								CT-F	RR			44.220.204
								CT-D	OP			24.402.01
								PIT	2Y			44.220.204

PIS No: T41

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T4100F008 (VR3-3027)	E4	B	72.000	BTF	AO	O/FC	C	BTC FST PIT	OP OP ZY	5.00	VR-023	24.404.04 24.404.04 24.404.04
T4100F009 (VR3-3028)	E4	B	72.000	BTF	AO	O/FC	C	BTC FST PIT	OP OP ZY	5.00	VR-023	24.404.02 24.404.02 24.404.02
T4100F010 (VR3-3029)	E4	B	72.000	BTF	AO	O/FC	C	BTC FST PIT	OP OP ZY	5.00	VR-023	24.404.04 24.404.04 24.404.04
T4100F011 (VR3-3030)	E4	B	72.000	BTF	AO	O/FC	C	BTC FST PIT	OP OP ZY	5.00	VR-023	24.404.02 24.404.02 24.404.02
T4100F352A (VB9-2594)	E4	C	4.000	CK	SA	S	O	CT-O	OP			24.413.01
T4100F352B (VB9-2597)	E4	C	4.000	CK	SA	S	O	CT-O	OP			24.413.01
T4100F600 (VB9-2625)	NA	NA	12.000	GA	MO	O	O&C	GLB910	GP			47.306.01 / 47.306.02
T4100F601 (VB9-2626)	NA	NA	12.000	GA	MO	O	O&C	GLB910	GP			47.306.01 / 47.306.02

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T4600F400 (VR3-3015)	E2	A	20.000	BTf	AO	C/FC	C	AT-1 AT-8 BTC FST PIT	2Y OP OP OP 2Y	3.00	VR-046 VR-023	43.401.377 43.401.510 24.404.03 24.404.03 24.404.03
T4600F401 (VR3-3016)	E2	A	20.000	BTf	AO	C/FC	C	AT-1 AT-8 BTC FST PIT	2Y OP OP OP 2Y	3.00	VR-046 VR-023	43.401.377 43.401.510 24.404.03 24.404.03 24.404.03
T4600F402 (VR3-3023)	E2	A	24.000	BTf	AO	C/FC	C	AT-1 AT-8 BTC FST PIT	2Y OP OP OP 2Y	3.00	VR-046 VR-023	43.401.321 43.401.510 24.404.03 24.404.03 24.404.03
T4600F407 (VR3-3022)	E4	B	24.000	BTf	AO	C/FO	O	BTO FST PIT	OP OP 2Y	100.00	VR-023	24.404.03 24.404.03 24.404.03
T4600F408 (VR3-3002)	E4	B	24.000	BTf	AO	C/FC	O&C	BTC BTO FST PIT	OP OP OP 2Y	30.00 14.00	VR-023	24.404.03 24.404.03 24.404.03 24.404.03
T4600F409 (VR3-3001)	E4	B	24.000	BTf	AO	C/FC	O&C	BTC BTO FST PIT	OP OP OP 2Y	29.00 15.00	VR-023	24.404.03 24.404.03 24.404.03 24.404.03
T4600F410 (VR3-3003)	E4	B	24.000	BTf	AO	O/FO	O	BTO FST PIT	OP OP 2Y	97.00	VR-023	24.404.03 24.404.03 24.404.03
T4600F411 (VR3-3026)	E2	A	6.000	BTf	AO	C/FC	C	AT-1 AT-8 BTC FST PIT	2Y OP OP OP 2Y	3.00	VR-046 VR-023	43.401.321 43.401.510 24.404.03 24.404.03 24.404.03

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	REMARKS
T4600F412	E2	A	6.000	BTf	AO	C/FC	C	AT-1	2Y	VR-046	43.401.377
(VR3-3019)								AT-8	OP		43.401.510
								BTC	OP	3.00	24.404.03
								FST	OP	VR-023	24.404.03
								PIT	2Y		24.404.03

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	REQ.	REMARKS
T4800F404 (VR3-3013)	E2	A	20.000	BTf	AO	C/FC	C	AT-1 AT-8 BTC FST PIT	2Y OP OP OP 2Y	3.00	VR-046 VR-023	43.401.376 43.401.510 24.406.01 24.406.01 24.406.02
T4800F405 (VR3-3014)	E2	A	20.000	BTf	AO	C/KC	C	AT-1 AT-8 BTC FST PIT	2Y SP OP OP 2Y	3.00	VR-046 VR-023	43.401.376 43.401.510 24.406.01 24.406.01 24.406.02
T4800F407 (VR3-3012)	E2	A	24.000	BTf	AO	C/KC	C	AT-1 AT-8 BTC FST PIT	2Y OP OP OP 2Y	4.00	VR-046 VR-023	43.401.322 43.401.510 24.406.01 24.406.01 24.406.02
T4800F408 (V4-2060)	E2	A	10.000	BTf	AO	C/FC	C	AT-1 AT-8 BTC FST PIT	2Y OP OP OP 2Y	3.00	VR-046 VR-023	43.401.322 43.401.510 24.406.01 24.406.01 24.406.02
T4800F409 (V4-2061)	E2	A	6.000	BTf	AO	C/FC	C	AT-1 AT-8 BTC FST PIT	2Y OP OP OP 2Y	3.00	VR-046 VR-023	43.401.376 43.401.510 24.406.01 24.406.01 24.406.02
T4800F410 (V4-2063)	E2	A	6.000	BTf	AO	C/FC	C	AT-1 AT-8 BTC FST PIT	2Y OP OP OP 2Y	3.00	VR-046 VR-023	43.401.377 43.401.510 24.406.01 24.406.01 24.406.02
T4800F416 (V4-2036)	E2	A	1.000	GL	AO	LC	C	AT-1 BTC PIT	2Y OP 2Y	16.00		43.401.362 24.406.01 24.406.02
T4800F417 (V4-2065)	E2	A	1.000	GL	AO	LC	C	AT-1 BTC PIT	2Y OP 2Y	16.00		43.401.363 24.406.01 24.406.02

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PIS No: T48 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	REMARKS
T4800F418 (V4-2075)	E2	A	1.000	GL	AO	LC	C	AT-1 2Y BTC OP PIT 2Y	14.00		43.401.364 24.406.01 24.406.02
T4800F419 (V4-2077)	E2	A	1.000	GL	AO	LC	C	AT-1 2Y BTC OP PIT 2Y	14.00		43.401.365 24.406.01 24.406.02
T4800F420 (V4-2082)	E2	A	1.000	GL	AO	LC	C	AT-1 2Y BTC OP PIT 2Y	9.00		43.401.366 24.406.01 24.406.02
T4800F421 (V4-2084)	E2	A	1.000	GL	AO	LC	C	AT-1 2Y BTC OP PIT 2Y	9.00		43.401.367 24.406.01 24.406.02
T4800F422 (V4-2086)	E2	A	1.000	GL	AO	LC	C	AT-1 2Y BTC OP PIT 2Y	15.00		43.401.368 24.406.01 24.406.02
T4800F423 (V4-2088)	E2	A	1.000	GL	AO	LC	C	AT-1 2Y BTC OP PIT 2Y	22.00		43.401.369 24.406.01 24.406.02
T4800F424 (V4-2090)	E2	A	1.000	GL	AO	LC	C	AT-1 2Y BTC OP PIT 2Y	13.00		43.401.370 24.406.01 24.406.02
T4800F425 (V4-2092)	E2	A	1.000	GL	AO	LC	C	AT-1 2Y BTC OP PIT 2Y	14.00		43.401.371 24.406.01 24.406.02
T4800F426 (V4-2094)	E2	A	1.000	GL	AO	LC	C	AT-1 2Y BTC OP PIT 2Y	9.00		43.401.372 24.406.01 24.406.02
T4800F427 (V4-2096)	E2	A	1.000	GL	AO	LC	C	AT-1 2Y BTC OP PIT 2Y	9.00		43.401.373 24.406.01 24.406.02

PIS No: T48 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T4800F451 (V4-2185)	E2	A	1.000	GL	AO	O/FC	C	AT-1 BTC FST PIT	2Y OP OP 2Y	5.00	VR-023	43.401.352 24.406.01 24.406.01 24.406.02
T4800F453 (VR3-2823)	E2	A	1.000	GL	AO	O	C	AT-1 BTC PIT	2Y OP 2Y	3.00	VR-046	43.401.334 24.406.01 24.406.02
T4800F454 (VR3-2824)	E2	A	1.000	GL	AO	O	C	AT-1 BTC PIT	2Y OP 2Y	3.00	VR-046	43.401.334 24.406.01 24.406.02
T4800F455 (VR3-2825)	E2	A	1.000	GL	AO	O	C	AT-1 BTC PIT	2Y OP 2Y	6.00	VR-046	43.401.334 24.406.01 24.406.02
T4800F456 (VR3-2826)	E2	A	1.000	GL	AO	O	C	AT-1 BTC PIT	2Y OP 2Y	3.00	VR-046	43.401.377 24.406.01 24.406.02
T4800F457 (VR3-2827)	E2	A	1.000	GL	AO	O	C	AT-1 BTC PIT	2Y OP 2Y	4.00	VR-046	43.401.377 24.406.01 24.406.02
T4800F458 (VR3-2828)	E2	A	1.000	GL	AO	O	C	AT-1 BTC PIT	2Y OP 2Y	3.00	VR-046	43.401.377 24.406.01 24.406.02
T4803F601 (VR3-3011)	E2	A	24.000	BTF	MO	C	C	AT-1 AT-8 BTC GLB910 PIT	2Y OP OP 2Y	5.00	VR-046	43.401.322 43.401.510 24.406.01 24.406.02
T4803F602 (VR3-3024)	E2	A	24.000	BTF	MO	C	C	AT-1 AT-8 BTC GLB910 PIT	2Y OP OP 2Y	5.00	VR-046	43.401.321 43.401.510 24.404.03 24.404.03

PIS No: T48 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE REQ.	REMARKS
T4804F001A (VB-2002)	2	B	0.750	GA	MO	C	O&C	BTC BTO GLB910 PIT	OP OP GP 2Y	33.00 33.00	24.409.02 24.409.02 47.306.01 / 47.306.02 24.409.02
T4804F001B (VB-2001)	2	B	0.750	GA	MO	C	O&C	BTC BTO GLB910 PIT	OP OP GP 2Y	35.00 35.00	24.409.03 24.409.03 47.306.01 / 47.306.02 24.409.03
T4804F002A (FV4-2024)	2	NA	3.000	GL	MO	O	C	GLB910	GP		47.306.01 / 47.306.02
T4804F002B (FV4-2025)	2	NA	3.000	GL	MO	O	C	GLB910	GP		47.306.01 / 47.306.02
T4804F003A (FV4-2026)	2	NA	3.000	GL	MO	O	C	GLB910	GP		47.306.01 / 47.306.02
T4804F003B (FV4-2027)	2	NA	3.000	GL	MO	O	C	GLB910	GP		47.306.01 / 47.306.02
T4804F016A (V22-2122)	2	A/C	2.000	RV	SA	C	O&C	AT-1 CT-SP	2Y 5Y		43.401.384 43.000.02
T4804F016B (V22-2121)	2	A/C	2.000	RV	SA	C	O&C	AT-1 CT-SP	2Y 5Y		43.401.384 43.000.02
T4804F601A (V4-2140)	2	A	8.000	BTf	MO	C	O&C	AT-1 BTC BTO GLB910 PIT	2Y OP OP GP 2Y	VR-046 36.00 36.00	43.401.384 24.409.02 24.409.02 24.409.02
T4804F601B (V4-2139)	2	A	8.000	BTf	MO	C	O&C	AT-1 BTC BTO GLB910 PIT	2Y OP OP GP 2Y	VR-046 35.00 35.00	43.401.384 24.409.03 24.409.03 24.409.03

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T4804F602A (V4-2142)	2	A	4.000	BTF	MO	C	O&C	AT-1	2Y		VR-046	43.401.383
								BTC	OP	35.00		24.409.02
								BTO	OP	35.00		24.409.02
								GLB910				
								PIT	2Y			24.409.02
T4804F602B (V4-2141)	2	A	4.000	BTF	MO	C	O&C	AT-1	2Y		VR-046	43.401.385
								BTC	OP	38.00		24.409.03
								BTO	OP	38.00		24.409.03
								GLB910				
								PIT	2Y			24.409.03
T4804F603A (V4-2144)	2	A	4.000	BTF	MO	C	O&C	AT-1	2Y		VR-046	43.401.310
								BTC	OP	34.00		24.409.02
								BTO	OP	34.00		24.409.02
								GLB910				
								PIT	2Y			24.409.02
T4804F603B (V4-2143)	2	A	4.000	BTF	MO	C	O&C	AT-1	2Y		VR-046	43.401.349
								BTC	OP	34.00		24.409.03
								BTO	OP	34.00		24.409.03
								GLB910				
								PIT	2Y			24.409.03
T4804F604A (V4-2148)	2	A	8.000	BTF	MO	C	O&C	AT-1	2Y		VR-046	43.401.384
								BTC	OP	35.00		24.409.02
								BTO	OP	35.00		24.409.02
								GLB910				
								PIT	2Y			24.409.02
T4804F604B (V4-2149)	2	A	8.000	BTF	MO	C	O&C	AT-1	2Y		VR-046	43.401.384
								BTC	OP	34.00		24.409.03
								BTO	OP	34.00		24.409.03
								GLB910				
								PIT	2Y			24.409.03
T4804F605A (V4-2154)	2	A	4.000	BTF	MO	C	O&C	AT-1	2Y		VR-046	43.401.310
								BTC	OP	37.00		24.409.02
								BTO	OP	37.00		24.409.02
								GLB910				
								PIT	2Y			24.409.02

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	REMARKS
T4804F605B (V4-2153)	2	A	4.000	BTf	MO	C	O&C	AT-1 2Y BTC OP BTO OP GL8910 PIT 2Y		VR-046 43.401.349 24.409.03 24.409.03 24.409.03	
T4804F606A (V4-2156)	2	A	4.000	BTf	MO	C	O&C	AT-1 2Y BTC OP BTO OP GL8910 PIT 2Y		VR-046 43.401.383 24.409.02 24.409.02 24.409.02	
T4804F606B (V4-2155)	2	A	4.000	BTf	MO	C	O&C	AT-1 2Y BTC OP BTO OP GL8910 PIT 2Y		VR-046 43.401.385 24.409.03 24.409.03 24.409.03	

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PIS No: T49

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE	REMARKS
T4901F006 (V4-222B)	E3	C	1.000	CK	SA	S	C	CT-C	OP		24.406.01
T4901F007 (V4-2172)	E2	A	1.500	GL	M	C/LC	PAS	AT-1	2Y	VR-046	43.401.318
T4901F016 (VB-4140)	E2	A	1.500	GL	M	C/LC	PAS	AT-1	2Y	VR-046	43.401.343
T4901F019 (V30-0199)	E3	A/C	1.000	CK	SA	S	O&C	AT-3 CT-C CT-O	2Y RR RR	VR-016 VR-016	43.137.02 43.137.02 24.137.11
T4901F021 (V22-2123)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y		43.000.02
T4901F022 (V30-0200)	E3	A/C	1.000	CK	SA	S	O&C	AT-3 CT-C CT-O	2Y RR RR	VR-016 VR-016	43.137.02 43.137.02 24.137.11
T4901F024 (V22-2129)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y		43.000.02
T4901F025 (V30-0201)	E3	A/C	1.000	CK	SA	S	O&C	AT-3 CT-C CT-O	2Y RR RR	VR-016 VR-016	43.137.02 43.137.02 24.137.11
T4901F027 (V22-2128)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y		43.000.02
T4901F028 (V30-0202)	E3	A/C	1.000	CK	SA	S	O&C	AT-3 CT-C CT-O	2Y RR RR	VR-016 VR-016	43.137.02 43.137.02 24.137.11
T4901F030 (V22-2126)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y		43.000.02
T4901F031 (V30-0203)	E3	A/C	1.000	CK	SA	S	O&C	AT-3 CT-C CT-O	2Y RR RR	VR-016 VR-016	43.137.02 43.137.02 24.137.11
T4901F033 (V22-2127)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y		43.000.02

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T4901F034A (V30-0204)	E3	A/C	1.000	CK	SA	S	O&C	CT-C CT-O	RR RR		VR-016 VR-016	24.137.02 24.137.02
T4901F034B (V30-0205)	E3	A/C	1.000	CK	SA	S	O&C	CT-C CT-O	RR RR		VR-016 VR-016	24.137.02 24.137.02
T4901F034C (V30-0206)	E3	A/C	1.000	CK	SA	S	O&C	CT-C CT-O	RR RR		VR-016 VR-016	24.137.02 24.137.02
T4901F034D (V30-0207)	E3	A/C	1.000	CK	SA	S	O&C	CT-C CT-O	RR RR		VR-016 VR-016	24.137.02 24.137.02
T4901F036A (V22-2138)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
T4901F036B (V22-2140)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
T4901F036C (V22-2124)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
T4901F036D (V22-2131)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
T4901F039 (V30-0208)	E3	A/C	1.000	CK	SA	S	O&C	AT-3 CT-C CT-O	2Y RR RR		VR-016 VR-016	43.137.02 43.137.02 24.137.11
T4901F040 (V30-0209)	E3	A/C	1.000	CK	SA	S	O&C	AT-3 CT-C CT-O	2Y RR RR		VR-016 VR-016	43.137.02 43.137.02 24.137.11
T4901F465 (V4-2079)	E2	A	1.500	GL	AO	O/FC	C	AT-1 BTC FST PIT	2Y OP OP 2Y	13.00	VR-046 VR-023	43.401.31B 24.406.01 24.406.01 24.406.02
T4901F466 (V9-2081)	E3	B	1.500	GL	AO	O/FC	C	BTC FST PIT	OP OP 2Y	11.00	VR-023	24.406.01 24.406.01 24.406.02

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T4901F467 (V5-2610)	E3	B	1.500	GL	AO	C/FC	O&C	BTC BTO FST PIT	OP OP OP 2Y	10.00 6.00	VR-023	24.406.01 24.406.01 24.406.01 24.406.02
T4901F468 (V4-2187)	E2	A	1.500	GL	AO	O/FC	C	AT-1 BTC FST PIT	2Y OP OP 2Y	15.00	VR-046 VR-023	43.401.343 24.406.01 24.406.01 24.406.02
T4901F601 (V4-2080)	E2	A	1.500	GL	MO	O	C	AT-1 BTC GL8910 PIT	2Y OP GP 2Y	35.00	VR-046	43.401.318 24.406.01 47.306.01 / 47.306.02 24.406.02
T4901F602 (V4-2188)	E2	A	1.500	GL	MO	O	C	AT-1 BTC GL8910 PIT	2Y OP GP 2Y	21.00	VR-046	43.401.343 24.406.01 47.306.01 / 47.306.02 24.406.02

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T5000F401A (V5-2151)	E2	A	1.000	BAL	AO	O/FC	C	AT-1 BTC FST PIT	2Y OP OP 2Y	3.00	VR-046 VR-023	43.401.354 24.408.03 24.408.03 24.408.03
T5000F401B (V5-2159)	E2	A	1.000	BAL	AO	C/FC	C	AT-1 BTC FST PIT	2Y OP OP 2Y	3.00	VR-046 VR-023	43.401.323 24.408.04 24.408.04 24.408.04
T5000F402A (V5-2152)	E2	A	1.000	BAL	AO	O/FC	C	AT-1 BTC FST PIT	2Y OP OP 2Y	3.00	VR-046 VR-023	43.401.354 24.408.03 24.408.03 24.408.03
T5000F402B (V5-2160)	E2	A	1.000	BAL	AO	C/FC	C	AT-1 BTC FST PIT	2Y OP OP 2Y	3.00	VR-046 VR-023	43.401.324 24.408.04 24.408.04 24.408.04
T5000F403A (V5-2153)	E2	A	1.000	BAL	AO	O/FC	C	AT-1 BTC FST PIT	2Y OP OP 2Y	3.00	VR-046 VR-023	43.401.354 24.408.03 24.408.03 24.408.03
T5000F403B (V5-2161)	E2	A	1.000	BAL	AO	C/FC	C	AT-1 BTC FST PIT	2Y OP OP 2Y	3.00	VR-046 VR-023	43.401.323 24.408.04 24.408.04 24.408.04
T5000F404A (V5-2154)	E2	A	1.000	BAL	AO	O/FC	C	AT-1 BTC FST PIT	2Y OP OP 2Y	3.00	VR-046 VR-023	43.401.354 24.408.03 24.408.03 24.408.03
T5000F404B (V5-2162)	E2	A	1.000	BAL	AO	C/FC	C	AT-1 BTC FST PIT	2Y OP OP 2Y	3.00	VR-046 VR-023	43.401.323 24.408.04 24.408.04 24.408.04

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST TEST	MAX. FREQ	RELIEF STROKE REQ.	REMARKS
T5000F405A (V5-2155)	E2	A	1.000	BAL	AO	O/FC	C	AT-1 BTC FST PIT	2Y OP OP 2Y	3.00 VR-046 VR-023	43.401.354 24.408.03 24.408.03 24.408.03
T5000F4058 (V5-2163)	E2	A	1.000	BAL	AO	C/FC	C	AT-1 BTC FST PIT	2Y OP OP 2Y	3.00 VR-046 VR-023	43.401.323 24.408.04 24.408.04 24.408.04
T5000F407A (V5-2157)	E2	A	1.000	BAL	AO	C/FC	C	AT-1 BTC FST PIT	2Y OP OP 2Y	3.00 VR-023	43.401.386 24.408.03 24.408.03 24.408.03
T5000F407B (V5-2165)	E2	A	1.000	BAL	AO	O/FC	C	AT-1 BTC FST PIT	2Y OP OP 2Y	3.00 VR-023	43.401.387 24.408.04 24.408.04 24.408.04
T5000F408A (V5-2158)	E2	A	1.000	BAL	AO	O/FC	C	AT-1 BTC FST PIT	2Y OP OP 2Y	3.00 VR-023	43.401.383 24.408.03 24.408.03 24.408.03
T5000F4088 (V5-2166)	E2	A	1.000	BAL	AO	O/FC	C	AT-1 BTC FST PIT	2Y OP OP 2Y	3.00 VR-023	43.401.385 24.408.04 24.408.04 24.408.04
T5000F420A (V5-2230)	E2	A	1.000	BAL	AO	O	C	AT-1 BTC FST PIT	2Y OP OP 2Y	3.00 VR-023	43.401.353 24.408.03 24.408.03 24.408.03
T5000F420B (V5-2231)	E2	A	1.000	BAL	AO	O	C	AT-1 BTC FST PIT	2Y OP OP 2Y	3.00 VR-023	43.401.333 24.408.04 24.408.04 24.408.04

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VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T5000F455 (V5-2239)	E2	A	1.000	BAL	AO	O	C	AT-1 BTC FST PIT	2Y OP OP 2Y	3.00	VR-023	43.401.383 24.408.03 24.408.03 24.408.03
T5000F456 (V5-2239)	E2	A	1.000	BAL	AO	O	C	AT-1 BTC FST PIT	2Y OP OP 2Y	3.00	VR-023	43.401.354 24.408.03 24.408.03 24.408.03
T50F412A (V5-2555)	E2	A	1.000	GL	SO	O	C	AT-2 BTC PIT PIT-RS	6Q OP 2Y 2Y	2.00	VR-006	43.401.402 24.408.03 43.401.402 24.321.02
T50F412B (V5-2556)	E2	A	1.000	GL	SO	O	C	AT-2 BTC PIT	6Q OP 2Y	2.00	VR-006	43.401.403 24.408.04 43.401.403
T50F450 (V5-3083)	E2	A	0.750	GL	SO	O	C	AT-1 BTC FST PIT	2Y OP OP 2Y	2.00	VR-006 VR-023	43.401.354 24.408.03 24.408.03 43.401.354
T50F451 (V5-3084)	E2	A	0.750	GL	SO	O	C	AT-1 BTC FST PIT	2Y OP OP 2Y	2.00	VR-006 VR-023	43.401.383 24.408.03 24.408.03 43.401.383
T50F458 (N/A)	E2	A	1.000	GL	SO	O	C	AT-1 BTC PIT	2Y OP 2Y	2.00	VR-006	43.401.389 24.408.04 43.401.389