Commonwealth Edison Company
1400 Opus Place
Downers Grove, IL 60515

ComEd

September 8, 1995

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

Subject: Revision 10a of the Inservice Testing Program for Pumps and
Revision 13a of the Inservice Testing Program for Valves
Byron Nuclear Power Station, Units 1 and 2
Facility Operating Licenses NPF-37 and NPF-66
NRC Docket Nos. 50-454 and 50-455

References:

1. Robert A. Capra (USNRC) letter to D. L. Farrar (ComEd), Safety Evaluation of the Inservice Testing Program Relief Requests for Pumps and Valves, Byron Station, Units 1 and 2 (TAC Nos. M85884, M85885, M89037 and M89038), dated October 24, 1994

2. Robert A. Capra (USNRC) letter to D. L. Farrar (ComEd), Inservice Testing Program Relief Requests for Valves, Byron Station, Units 1 and 2 (TAC Nos. M90719 and M90720), dated February 17, 1995

3. Harold D. Pontious, Jr. (ComEd) letter to USNRC Document Control Desk, Extension of the First Ten Year Inspection Interval for the Inservice Testing Program Byron Nuclear Power Station, Unit 1, dated July 5, 1995

Ladies and Gentlemen:

Commonwealth Edison Company's (ComEd's) Byron Nuclear Power Station, Units 1 and 2 (Byron), performs inservice testing (IST) in accordance with Section XI of the 1983 Edition of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code through the Summer 1983 Addenda (ASME Code), as required by

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1/1

Title 10, Code of Federal Regulations, Part 50, Section 55a, Paragraph f, Subparagraph 3 [10 CFR 50.55a(f)(3)], except where alternatives have been authorized or relief has been requested and granted by the United States Nuclear Regulatory Commission (USNRC).

Revision 10a of the Byron IST Pump Program is provided in Enclosure 1. Attachment A provides a summary of all of the changes associated with this revision. The two major changes are discussed below.

The first major change is the elimination of Relief Request PR-7 regarding vibration measurements for the Essential Service Water Makeup Pumps, 0SX02PA and 0SX02PB. PR-7 is being replaced with a new Technical Approach and Position PA-1. Due to the unique design of these pumps, the pump thrust bearings are physically located within the gearbox which houses the gear drive. ASME/ANSI OMa-1988 Addenda to the OM-1987 Edition, Part 6, Paragraph 4.6.4(a) requires, in part, vibration monitoring of the pump thrust bearings but not the gear drive. PA-1 defines the approach to be taken discriminate the vibration attributable to the pump thrust bearings from the total vibration measurement.

The second major change is the addition of a new Relief Request PR-8 regarding the reference value tolerance for the Diesel Oil Transfer Pumps, 1DO01PA-D and 2DO01PA-D, discharge pressure. These pumps are positive displacement pumps. The discharge pressure from these pumps are considered to be constant and there are no throttling techniques or other methods available to adjust discharge pressure. It is impractical to establish a total tolerance of ± 2 % of the reference value (as allowed by Draft NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," dated November 1993) due to the small magnitude of the reference value and the readability of the installed gauges. PR-8 presents the basis for establishing a total reference value tolerance of ± 1 psig.

Revision 13a of the Byron IST Valve Program is provided in Enclosure 2. Attachment B provides a summary of all of the changes associated with this revision. The major changes are discussed below.

Revisions 12 and 13 of the Byron IST Valve Program included several new valves as a result of the 1994 Byron/Braidwood IST scope review. The initial testing of these valves, along with subsequent testing, has been completed, as required. However, Byron has come across a few cases in which it is felt that alternative test methods and/or frequencies would give an acceptable level of quality and safety. Therefore, the following relief requests are being submitted:

1. VR-28: Incorporates the disassembly plan in accordance with Generic Letter (GL) 89-04 for the 1/2FW079A-D check valves.

2. VR-29: Proposes performing acoustic testing for closure on the 0SX028A,B check valves on an 18 month frequency.

3. VR-30: Proposes performing the full flow test for the 0SX127A,B check valves in accordance with the applicable portions of Byron Technical Specification 4.7.5.

As allowed by 10 CFR 50.55a(f)(4)(iv), Byron has utilized portions of ASME/ANSI OMa-1988 Addenda to the OM-1987 Edition, Part 10 which allows the use of justifications for deferral of testing up to refueling outage frequencies. The following refueling outage justifications are also being submitted:

1. ROJ-1: Allows radiography testing to be performed for the 0SX127A,B and 0SX143A,B check valves for closure on a refueling outage frequency.

2. ROJ-2: Allows full stroke testing of the SI8948A-D Check Valves (previously Cold Shutdown) and the SI8956A-D Check Valves (previously VR-5) on a refueling outage frequency. The acoustic sampling plan will also be used. Additionally, the SI8948 check valves will be partially stroked on a Cold Shutdown frequency. Justification for not performing a partial stroke test on the SI8956 Check Valves was documented in ROJ-2, as required by Reference 2.

As stated in Reference 3, the Second Ten Year Inspection Interval for the Byron Unit 1 IST Program will begin July 1, 1996 with its associated IST Program Plan being submitted to the USNRC for review and approval no later than December 31, 1995. Therefore, ComEd respectfully requests USNRC review and approval of Relief Requests PR-8, VR-29, and VR-30 no later than November 17, 1995, such that any comments can be incorporated into the Byron Unit 1 Second Ten Year Inspection Interval IST Program Plan prior to its submittal.

Please address any comments or questions regarding this matter to this office.

Very truly yours,

Harold D. Pontious, Jr.
Nuclear Licensing Administrator

Attachments (2)
Enclosures (2)

cc: H. J. Miller, Regional Administrator - RIII
G. F. Dick Jr., Byron Project Manager - NRR
H. Peterson, Senior Resident Inspector - Byron
Office of Nuclear Facility Safety - IDNS

ATTACHMENT A

Summary of Changes for Revision 10a of the Inservice Testing Program Plan for Pumps

Section 3.0 - Table of Contents

1. Under Section 3.5, relief requests, PR-7 has been deleted
2. Added in PR-8 for the Diesel Oil Transfer Pumps under Section 3.5
3. Created Section 3.6 for technical positions and added technical position PA-1 for the SX Makeup Pump Vibrations

Section 3.2 - Program References

1. Added SER, dated 10/24/94

Section 3.3 - Program Tables

1. 1/2DO01PA-1/2DO01PD: Added "PR-8" under the Remarks column
2. 0SX02PA/0SX02PB: Deleted "PR-7" and added in PA-1 under the Vibration column

Section 3.5 - Pump Relief Requests

1. Deleted Relief Request PR-7 (incorporated in Technical Position PA-1)
2. New Relief Request PR-8 was added for the Diesel Oil Transfer Pumps >2% tolerance for reference value

Section 3.6 - Pump Technical Positions

1. Added PA-1 concerning the SX Makeup Pump Vibrations

ATTACHMENT B

Summary of Changes for Revision 13a of the Inservice Testing Program Plan for Valves

Section 4.0 - Table of Contents

1. Added Refueling Outage Justifications into Section 4.4

2. Added Refueling Outage Justification ROJ-1 concerning SX Circ Water and Deep Well Pump Discharge Check Valves and ROJ-2 concerning the SI Accumulator Outlet Check Valves

3. Deleted VR-2A and VR-5

4. Deleted the term "DRAFT" associated with VR-15A, VR-15B, VR-15C, and VR-15D, VR-26, VR-27

5. Added in VR-28 (concerning the main Feedwater Header Check Valves), VR-29 (concerning the SX makeup Pump Discharge Check Valves), and VR-30 (concerning the Deep Well Pump Discharge Check Valves).

Section 4.2 - Program References

1. Added SERs, dated 10/24/94 and 02/17/95

Section 4.3 - Program Tables

1. 1/2FW079A-D: Changed Test Mode column from "CS" to "RR", added "VR-26" under the Relief Request column, and deleted note 46.

2. 1/2SI8948A-D: Added "RR" under Test Mode column to reflect frequency for the full Stroke test (Ct), and added "ROJ-2" reference under the Notes column.

3. 1/2SI8956A-D: Deleted VR-5 under the Relief Request column, and added "ROJ-2" reference under the Notes column.

4. 0SX028A/B: Added "VR-29" under Relief Request column and "Bt Relief Pending" under Remarks column

5. 0SX127A/B: Added "RR" under Test Mode column to reflect frequency of Bt test, "VR-30" under Relief Request Column, "ROJ-1" under Notes column, and "Ct Relief Pending" under Remarks Column.

6. 0SX143A/B: Changed "OP" to "RR" under Test Mode column and added "ROJ-1" under Notes column

Section 4.4 - Valve Notes / Cold Shutdown Justifications/Refueling Outage Justifications

1. Revised Note 42 to state that a partial flow test for the 1/2SI8948A-D valves would be performed at Cold Shutdown (not full flow test).

2. Deleted Note 46 as Relief Request VR-28 now covers the testing requirements for the 1/2FW079 Check Valves

3. Added ROJ-1 Refueling Outage Justification for the radiography testing of the 0SX127A,B and 0SX143A,B check valves

4. Added ROJ-2 Refueling Outage Justification for the SI Accumulator Discharge Check Valves, 1/2SI8948A-D and 1/2SI8956A-D

Section 4.6 - Valve Relief Requests

1. Deleted Relief Request VR-2A (denied in SER, dated 10/24/94) and VR-5 (incorporated in ROJ-2)

2. New Relief Request VR-28 was added for the 1/2FW079 sample disassembly Program

3. New Relief Request VR-29 was added for the nonintrusive testing of the 0SX028A,B check valve closure test

4. New Relief Request VR-30 was added for the full flow testing of the 0SX127A,B check valves

ENCLOSURE 1

Revision 10a of the Inservice Testing Program
Plan for Pumps

SECTION 3.0

INSERVICE TESTING

PROGRAM PLAN FOR PUMPS

Table of Contents

SECTION 3.2

PROGRAM REFERENCES

REFERENCES

1. Title 10, Code of Federal Regulations, Part 50, Domestic Licensing of Production and Utilization Facilities, particularly Section 50.55a, Codes and Standards.

2. ASME Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, 1983 Edition, Summer 1983 Addenda.

3. ASME/ANSI OM-1987, Operation and Maintenance of Nuclear Power Plants, including 1989 Addenda, Part 6, Inservice Testing of Pumps in Light Water Reactor Power Plants.

4. U.S. Nuclear Regulatory Commission, Generic Letter 89-04, Guidance on Developing Acceptable Inservice Testing Programs.

5. Byron/Braidwood Station UFSAR, Section 3.9.6.1, Inservice Testing of Pumps.

6. Byron Station Technical Specification, 3/4.0.5, Generic ASME Program Requirement.

7. Byron Technical Staff Procedure, BVP 200-1, ISI Requirements for Pumps.

8. NRC Safety Evaluation Reports (SER's):
   a. 09/15/88 (Initial Program Plan Review)
   b. 09/14/90 (Supplemental Program Plan Review)
   c. 01/31/92 (Supplemental Program Plan Review)
   d. 10/24/94 (Review of Rev. 9b and 10)

9. Byron Station IST Pump Program Plan Review Responses (file: 3.11.0240):
   a. Byron Letter 88-1321 (Initial Program Plan Review Response)
   b. Byron Letter 90-0724 (Supplemental Program Plan Review Response)
   c. Byron Letter 93-0047 (Rev. 9b, Submitted in Response to SER 01/31/92)

SECTION 3.3

PROGRAM TABLES

		CLASS	TEST PARAMETERS									
PUMP NUMBER	PUMP NAME		P&ID	SPEED	INLET PRESS	DIFF PRESS	FLOW RATE	VIBRATION	BEARING TEMP	TEST INTERVAL	LUBRICATION LEVEL	REMARKS
2CS01PA	Containment Spray Pump	2	M-129	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	No	Note 2
2CS01PB	Containment Spray Pump	2	M-129	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	No	Note 2
1CV01PA	Centrifugal Charging Pump	2	M-64	No	Yes	Yes	PR-5	PR-1	PR-2	Quarterly	Yes	
1CV01PB	Centrifugal Charging Pump	2	M-64	No	Yes	Yes	PR-5	PR-1	PR-2	Quarterly	Yes	
2CV01PA	Centrifugal Charging Pump	2	M-138	No	Yes	Yes	PR-5	PR-1	PR-2	Quarterly	Yes	
2CV01PB	Centrifugal Charging Pump	2	M-138	No	Yes	Yes	PR-5	PR-1	PR-2	Quarterly	Yes	
1DO01PA	Diesel Oil Transfer Pump	3	M-50	No	Yes	PR-6	PR-5	PR-1	PR-2	Quarterly	No	Note 2 PR-8
1DO01PB	Diesel Oil Transfer Pump	3	M-50	No	Yes	PR-6	PR-5	PR-1	PR-2	Quarterly	No	Note 2 PR-8
1DO01PC	Diesel Oil Transfer Pump	3	M-50	No	Yes	PR-6	PR-5	PR-1	PR-2	Quarterly	No	Note 2 PR-8
1DO01PD	Diesel Oil Transfer Pump	3	M-50	No	Yes	PR-6	PR-5	PR-1	PR-2	Quarterly	No	Note 2 PR-8
2DO01PA	Diesel Oil Transfer Pump	3	M-130	No	Yes	PR-6	PR-5	PR-1	PR-2	Quarterly	No	Note 2 PR-8

		CLASS	TEST PARAMETERS									
PUMP NUMBER	PUMP NAME		P&ID	SPEED	INLET PRESS	DIFF PRESS	FLOW RATE	VIBRATION	BEARING TEMP	TEST INTERVAL	LUBRICATION LEVEL	REMARKS
2DO01PB	Diesel Oil Transfer Pump	3	M-130	No	Yes	PR-6	PR-5	PR-1	PR-2	Quarterly	No	Note 2 PR-8
2DO01PC	Diesel Oil Transfer Pump	3	M-130	No	Yes	PR-6	PR-5	PR-1	PR-2	Quarterly	No	Note 2 PR-8
2DO01PD	Diesel Oil Transfer Pump	3	M-130	No	Yes	PR-6	PR-5	PR-1	PR-2	Quarterly	No	Note 2 PR-8
1RH01PA	Residual Heat Removal Pump	2	M-62	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	No	Note 2
1RH01PB	Residual Heat Removal Pump	2	M-62	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	No	Note 2
2RH01PA	Residual Heat Removal Pump	2	M-137	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	No	Note 2
2RH01PB	Residual Heat Removal Pump	2	M-137	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	No	Note 2
1SI01PA	Safety Injection Pump	2	M-61	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	Yes	
1SI01PB	Safety Injection Pump	2	M-61	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	Yes	
2SI01PA	Safety Injection Pump	2	M-136	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	Yes	
2SI01PB	Safety Injection Pump	2	M-136	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	Yes	

		CLASS	TEST PARAMETERS									
PUMP NUMBER	PUMP NAME		P&ID	SPEED	INLET PRESS	DIFF PRESS	FLOW RATE	VIBRATION	BEARING TEMP	TEST INTERVAL	LUBRICATION LEVEL	REMARKS
0SX02PA	Essen. Service Water Makeup Pump (Diesel)	3	M-42	Yes	Yes	Yes	PR-5	PA-1	PR-2	Quarterly	Yes	Note 5
0SX02PB	Essen. Service Water Makeup Pump (Diesel)	3	M-42	Yes	Yes	Yes	PR-5	PA-1	PR-2	Quarterly	Yes	Note 5
1SX01PA	Essential Service Water Pump	3	M-42	No	Yes	Yes	PR-5	PR-1	PR-2	Quarterly	Yes	Note 3
1SX01PB	Essential Service Water Pump	3	M-42	No	Yes	Yes	PR-5	PR-1	PR-2	Quarterly	Yes	Note 3
2SX01PA	Essential Service Water Pump	3	M-42	No	Yes	Yes	PR-5	PR-1	PR-2	Quarterly	Yes	Note 3
2SX01PB	Essential Service Water Pump	3	M-42	No	Yes	Yes	PR-5	PR-1	PR-2	Quarterly	Yes	Note 3
1SX04P	1B AFW SX Booster Pump	3	M-42-3	Yes	Yes	Yes	Yes	PR-1	PR-2	Quarterly	Yes	
2SX04P	2B AFW SX Booster Pump	3	M-126-1	Yes	Yes	Yes	Yes	PR-1	PR-2	Quarterly	Yes	
0WO01PA	Control Room Chilled Water Pump	3	M-118	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	Yes	Note 3
0WO01PB	Control Room Chilled Water Pump	3	M-118	No	Yes	Yes	Yes	PR-1	PR-2	Quarterly	Yes	Note 3

SECTION 3.5

RELIEF REQUESTS

RELIEF REQUEST NO. PR-7

"Deleted"

RELIEF REQUEST NO. PR-8

1. PUMP NUMBER (S): 1DO01PA, 1DO01PB, 1DO01PC, 1DO01PD
2DO01PA, 2DO01PB, 2DO01PC, 2DO01PD

2. NUMBER OF ITEMS: 8 PUMPS

3. ASME CODE CLASS: 3

4. ASME CODE, SECTION XI REQUIREMENTS:

a. IWP-3100 requires: The resistance of the system shall be varied until either the measured differential pressure [discharge pressure per approved PR-6] or the measured flow rate equals the corresponding reference value. The test quantities shown in Table IWP-3100-1 shall then be measured or observed and recorded as directed in this subsection.

b. NUREG 1482, section 5.3 states: A total tolerance of +/-2 percent of the reference value is allowed without approval from the NRC.

5. BASIS FOR RELIEF:

The Diesel Oil Transfer pumps are positive displacement pumps which transfer diesel oil to the diesel generator day tanks. The discharge pressure (constant for positive displacement pumps) is considered the set value for the pumps and have indicated consistent values in the past. The lowest discharge pressure reference value for a specific Diesel Oil Transfer Pump is currently 23 psig and the highest reference value is 25.5 psig. Numbers this low allow only a small tolerance for the discharge pressure when applying the +/-2% tolerance (as noted in NUREG 1482, section 5.3). For instance, in considering a reference value of 23 psig, the +/-2% criteria allows only a +/- 0.46 psig tolerance. The pressure indicators are 0-60 psig analog gauges with increments of 0.5 psig, allowing readability to the nearest 0.25 psig (readings are acceptable to a degree of precision no greater than one-half the smallest increment). To be within the +/-2% criteria, only a readability range of +/- 0.25 psig would be possible (next higher reading of +/-0.5 psig would represent a tolerance > 2%). For the reference values of 25 psig or above, only a readability range of +/- 0.5 psig would be possible to remain within the +/-2% tolerance. History indicates that there would be a few "acceptable" data points that would fall outside of these tight ranges. Byron proposes a more practical acceptable range of +/- 1 psig.

6. ALTERNATE TESTING:

Byron will use a discharge pressure tolerance of +/- 1 psig from the reference value when testing the Diesel Oil Transfer Pumps. The Flow will be compared to Table IWP-3100-2 to ensure the measured value is within the necessary acceptable limits.

7. JUSTIFICATION:

Discharge pressure for these positive displacement pumps are considered to be constant. There are no throttling techniques or other methods available to adjust the discharge pressure. It would be impractical to set up strict ranges of +/-2% due to the small magnitude of the numbers involved. In addition, the readability of the gauges are limited. History has shown acceptable pump operation for values within the +/- 1 psig tolerance. The level of safety concerning the operation of these pumps will not be compromised by allowing a tolerance of +/-1 psig versus a strict +/-2% tolerance. Any deviations greater than 1 psig from the reference value would result in an investigation of the pump performance. To encompass all the pumps on a consistent basis, a +/-1 psig tolerance on the discharge pressure reference value is requested, which would represent a tolerance of +/-3.9% to +/-4.3% of the existing reference values.

8. APPLICABLE TIME PERIOD:

This relief request is requested once per quarter during the remainder of the first inspection interval.

9. APPROVAL STATUS:

Pending Approval

SECTION 3.6

TECHNICAL POSITIONS

PA-01
TECHNICAL APPROACH AND POSITION

PUMP NUMBER: 0SX02PA, 0SX02PB pumps

ASME CODE CLASS: 2 & 3

ASME CODE SECTION XI REQUIREMENTS:

ANSI/ASME OMa-1988 Part 6: Table 3a Ranges For Test Parameters, Paragraph 4.6.4(a) Vibration Measurements, Paragraph 4.6.1.6 Frequency Response Range

POSITION:

The Essential Service Water Makeup Pumps 0SX02PA & B are of a very unique design (see Fig. 1 and Fig. 2). The pump is attached to a horizontal diesel driver via a right angle gear drive, and the gear drive is located approximately 39 feet above the pump. This configuration assures pump operability during the design basis flooding of the Rock River.

The Essential Service Water Makeup Pumps OSX02PA & B are classified as centrifugal pumps. ANSI/ASME OMa-1988 Part 6 Paragraph 4.6.4 (a) requires that for centrifugal pumps, vibration measurements are to be taken in two directions on each accessible pump bearing housing and in the axial direction on each accessible pump thrust bearing housing. The OM Code does not require vibration monitoring of the gear drive. For the Essential Service Water Makeup Pumps, however, the pump thrust bearings are physically located within the gearbox which houses the gear drive. This pump configuration is not addressed by OM Part 6. With this unique configuration, the only means of collecting vibration readings for the pump thrust bearing is to physically take the vibration measurements on the gear box itself. The limitations of taking the vibration readings at this location is that the resultant vibration readings are not solely attributable to the pump thrust bearing. The vibration readings obtained are the result of other factors such as the vibration induced by the gear drive itself.

When recording vibration results based on a frequency response range to 2000 Hz., which has been the customary practice at Byron for these pumps, the gear drive significantly contributes to the vibration which is measured at the gearbox location. The vibration induced by the gear drive is largely due to the gears meshing. Taking into account the pump running speed and the number of gear teeth, Byron has calculated the gear mesh frequency and hence a vibration frequency attributable to the gear drive. This frequency was calculated to be 1080 Hz. By performing spectral analysis of the vibration data obtained at the gearbox locations, engineering personnel were able to identify the vibration which was attributable to the gear drive, as there was an easily identifiable peak within this 1080 Hz frequency range. This particular peak, associated with the gear mesh frequency, exceeded the acceptance criteria of Table 3a of OM Part 6. The OM Part 6 Table 3a

acceptance criteria applies to pump bearings and pump thrust bearings, and not to gear drives which induce vibration due to the gears meshing. Additionally, Paragraph 4.6.1.6 of OM Part 6 states that the frequency response range of the vibration measuring transducers and their readout system shall be to at least 1000 Hz. The 1080 Hz gear mesh frequency goes beyond what is required for the frequency response range of the vibration measuring transducers and their readout system. As a result, for the gearbox locations on these pumps, Byron will apply the OM Part 6 Table 3a acceptance limits in the frequency range of one third minimum pump shaft rotational speed up to and including 1000 Hz, and will not apply the OM Part 6 acceptance limits to the gear drive frequencies above 1000 Hz. By applying a cutoff at 1000 Hz, the resulting peak reading is more applicable to the vibration from the pump thrust bearing. The 1000 Hz cutoff meets the requirements of OM Part 6 for frequency response range of the vibration measuring transducers and their readout system. Additionally, vibration measurements will continue to be taken at the lowest accessible bushing on the pump shaft. These vibration readings will be subject to the OM Part 6 Table 3a acceptance criteria.

Both the A and B pumps have experienced vibration at the gearbox location in the vicinity of 0.4 - 0.45 in/sec since installation, at which time they were verified by the vendor to be operating properly. They have continued to display such vibration levels throughout their service life. In August of 1992, the gearbox for pump 0SX02PA was replaced. The replacement was performed due to repair work which was performed on the pump and was not attributable to a gearbox problem. It was felt that this was an opportunity to discover if a rebuilt gearbox would reduce the vibration levels. Replacement with a rebuilt gearbox did not significantly reduce vibration levels at the gearbox location. Additionally, an inspection of the original gearbox revealed that it was in an acceptable condition. Also, in 1995 the 0SX02PA gearbox was opened and visually inspected. It should be noted that the 0SX02PA pump has experienced slightly higher vibration levels at the gearbox location than the 0SX02PB pump. The gearbox of the 0SX02PA pump was found to be in excellent condition. ComEd's conclusions are that the vibration levels recorded at the gearbox locations do not have a detrimental affect on the gearbox or the pump, and that this vibration level is normal for such a pump configuration. Although the OM Code vibration limits will not be applied to the vibration levels attributed to the gear mesh frequencies, Byron will continue to monitor these vibration levels, and take action as appropriate.

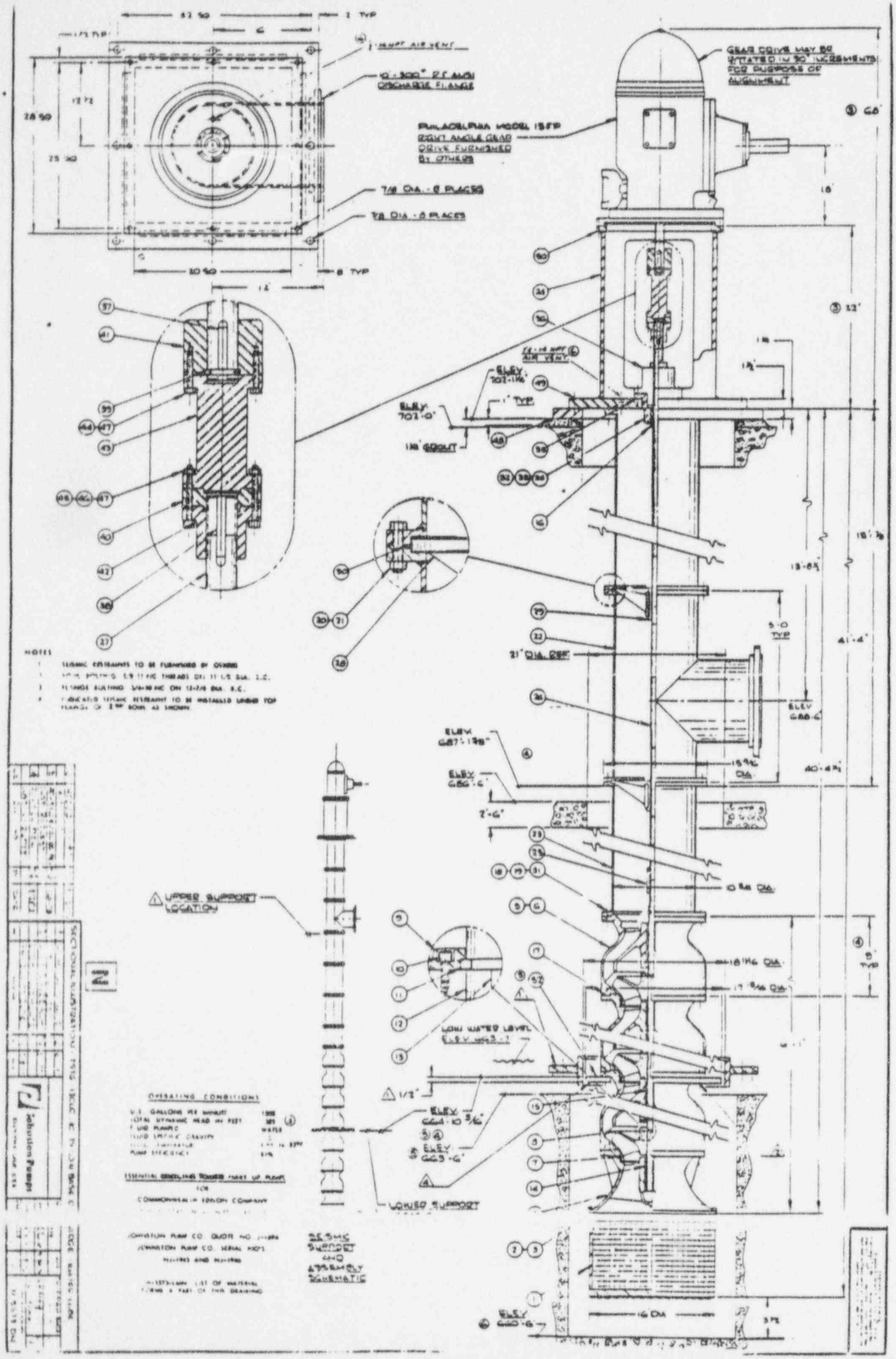
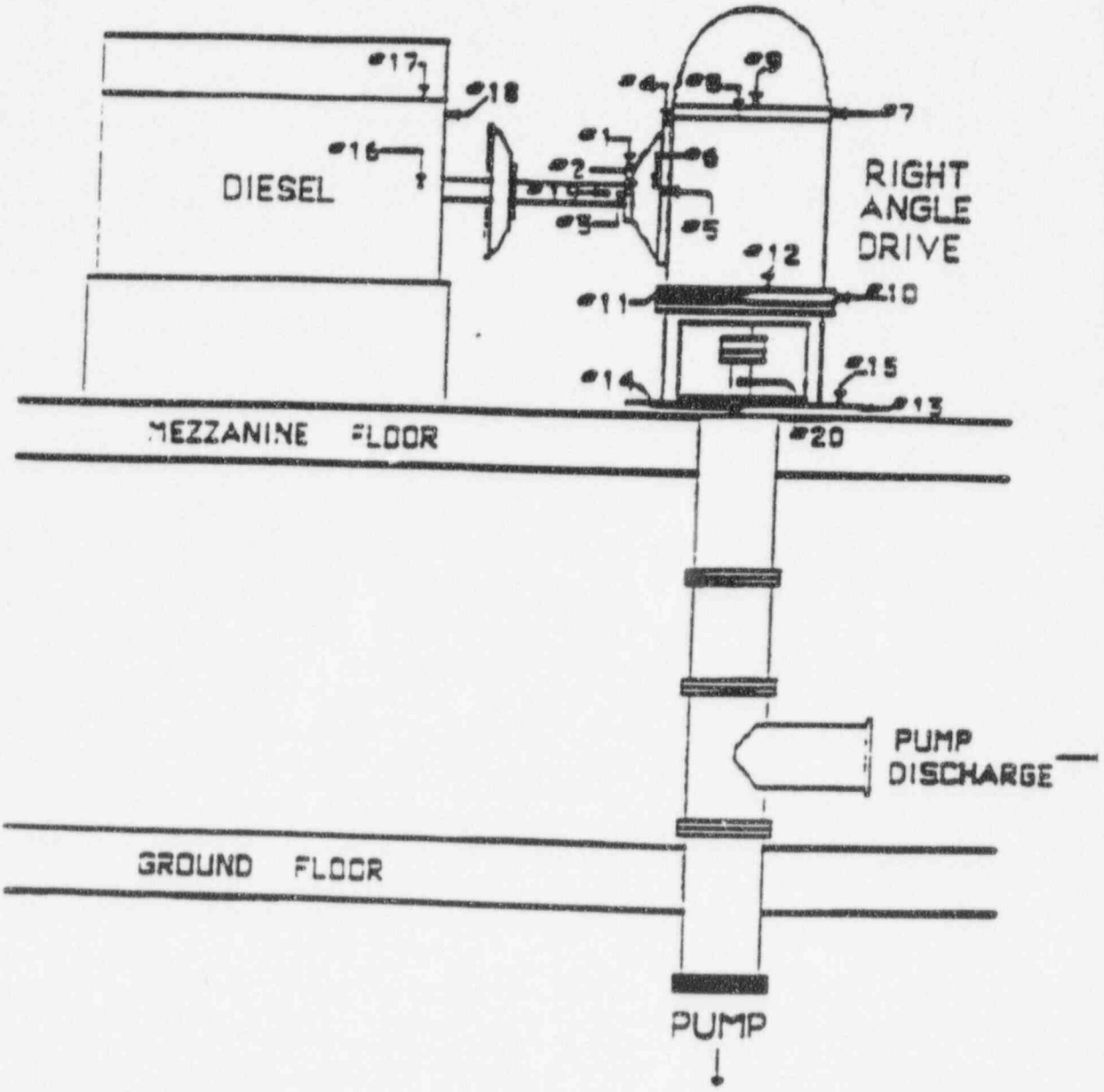

GEAR DRIVE MAY BE ROTATED IN 90° INCREMENTS FOR PURPOSE OF ALIGNMENT
PHILADELPHIA MODEL 15FP RIGHT ANGLE GEAR DRIVE FURNISHED BY OTHERS
7/8 DIA - 8 PLACES
1" TYP
1 1/2" GROUT
ELEV 702'-0"
ELEV 702'-11⅝"
21" DIA REF
ELEV 680'-6"
ELEV 687'-11⅜"
2'-6"
5'-0" TYP
41'-4"
40'-4½"
13'-0½"
10 3/8 DIA
18 1/16 DIA
17 3/16 DIA
UPPER SUPPORT LOCATION
LOWER SUPPORT
LOW WATER LEVEL ELEV 693'-1"
ELEV 664'-10 3/16"
ELEV 663'-6"
ELEV 660'-6"
16 DIA
OPERATING CONDITIONS
SEISMIC SUPPORT ARRANGEMENT DIAGRAMATIC
NOTES

Figure 1

FIGURE 2


DIESEL
RIGHT ANGLE DRIVE
MEZZANINE FLOOR
GROUND FLOOR
PUMP DISCHARGE
PUMP

ENCLOSURE 2

Revision 13a of the Inservice Testing Program
Plan for Valves

SECTION 4.0

INSERVICE TESTING

PROGRAM PLAN FOR VALVES

TABLE OF CONTENTS

4.4 (Cont.)

Note 36	RY PORV's and Block Valves
Note 37	Process Radiation Check Valves (1/2 PR032)
Note 38	Process Sampling Check Valves (1/2 PS231A,B)
Note 39	Nitrogen Supply to SI Accumulator Check Valves (1/2 SI8968)
Note 40	Safety Injection Check Valves (1/2 SI8815, 1/2 SI8900A-D, 1/2 SI8818A-D, 1/2 SI8819A-D, 1/2 SI8841A,B, 1/2 SI8905A-D, 1/2 SI8949A-D)
Note 41	RH Hot Leg Suction Pressure Relief Check Valves (1/2 RH8705A,B)
Note 42	Safety Injection Cold Leg Pressure Isolation Valves (1/2 SI8948A-D)
Note 43	RH Crosstie Valves (1/2RH8716A,B)
Note 44	Component Cooling Non-Essential Load Isolation Valves (1/2CC9415)
Note 45	Feedwater Tempering Flow Check Valves (1/2FW036A-D)
Note 46	Main Feedwater Header Flow Check Valves (1/2FW079A-D)
VC-1	Safety Injection Accumulator Discharge MOVs (1/2SI8808A-D)
VC-2	RCP Seal Injection Inlet MOVs & Check Valves
VC-3	Blowdown Flow Control/High Energy Line Break (HELB) Isolation Valves
VC-4	Charging and Volume Control System Letdown Isolation and Letdown Orifice Isolation Valves
ROJ-1	SX Circ Water and Deep Well Pump Discharge Check Valves
ROJ-2	SI Accumulator Outlet Check Valves

4.5 Technical Approaches and Positions

VA-01	Method of Stroke Timing Valves
VA-02	Method of Fail Safe Testing Valves
VA-03	Method of Exercising Check Valves
VA-04	Determining Limiting Values of Full-Stroke Times for Power-Operated Valves. (reference stroke time $\leq$10 seconds)
VA-05	Justification for Exercising the U-0 CC Heat Exchanger and Pump Isolation Valves on a U-2 Cold Shutdown Frequency
VA-06	Stroke Time Corrective Actions

4.6 Relief Requests

VR-1	Appendix J Valves
VR-2	Containment Spray NaOH Additive Check Valves
VR-2A	"Deleted"
VR-3	Safety Injection ECCS Check Valves

4.6 (Cont.)

VR-4	Containment Spray Discharge and Ring Header Check Valves
VR-5	"Deleted" (Incorporated into ROJ-2)
VR-6	SI Pump Suction Check Valve
VR-7	"Deleted" (Incorporated into VR-12 and VR-17)
VR-8	Component Cooling RC Pump Thermal Barrier Valves
VR-9	RC Pump Seal Injection CV Check Valves
VR-10	Instrument Air Containment Isolation Valves
VR-11	"Deleted" (per EG & G recommendation)
VR-12	Trending of Fast Actuating Valves
VR-13	Diesel Generator Air Start Valves
VR-14	"Deleted" (using ASME method instead of requesting exemption from position indication testing of solenoid operated valves)
VR-15	Safety Injection ECCS Check Valve Testing during Refueling Outage
VR-15A	CV Injection Related Check Valves
VR-15B	RH Suction Isolation Thermal/Pressure Relief Check Valves
VR-15C	SI Injection Related Check Valves
VR-15D	RH/SI Hot Leg Injection Related Check Valves
VR-16	Containment Sump Outlet Isolation Valve Testing During Refueling
VR-17	Motor Driven Auxiliary Feedwater Pump L.O. Cooler Solenoid Valve Stroke Testing
VR-18	"Deleted" re-organized into several relief requests
VR-19	Auxiliary Feedwater Check Valves
VR-20	Trending of Power-Operated Valve Stroke Times (reference stroke times >10 seconds)
VR-21	Draft "Withdrawn" per SER 9/14/90
VR-22	"Withdrawn"
VR-23	Primary Water Supply to PRT Check Valves and Nitrogen Supply to PRT Check Valves
VR-24	Chilled Water to RCFC Coils Check Valves
VR-25	Containment Spray Eductor Discharge Check Valves
VR-26	Fire Protection Inside Containment Isolation Valves
VR-27	Charging & Volume Control Loop Fill Check Valves
VR-28	Main Feedwater Header Check Valves
VR-29	SX Makeup Pump Discharge Check Valves
VR-30	Dry Well Pump Discharge Check Valves

SECTION 4.2

PROGRAM REFERENCES

PROGRAM REFERENCES

1. Title 10, Code of Federal Regulations, Part 50, Domestic Licensing of Production and Utilization Facilities, particularly Section 50.55a, Codes and Standards.

2. ASME Boiler and Pressure Vessel Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, 1983 Edition, Summer 1983 Addenda.

3. ASME/ANSI OM-1987, Operation and Maintenance of Nuclear Power Plants, including 1988 Addenda, Part 10, Inservice Testing of Valves in Light Water Reactor Power Plants.

4. U. S. Nuclear Regulatory Commission, Generic Letter 89-04, Guidance on Developing Acceptable Inservice Testing Programs.

5. Byron Station UFSAR, Section 3.9.6.2, Inservice Testing of Valves.

6. Byron Station Technical Specification 3/4.0.5, Generic ASME Program Requirement.

7. Byron Station Technical Staff Procedure, BVP 200-2, ISI Requirements for Valves.

8. NRC Safety Evaluation Reports (SER's):

   a. 09/15/88 (Initial Program Plan Review)
   b. 09/14/90 (Supplemental Program Plan Review)
   c. 09/14/90 (Relief Requests VR-21 and VR-22 Review)
   d. 08/16/91 (Relief Request VR-4 Review)
   e. 01/31/92 (Relief Requests VR-2, VR-18, VR-19, VR-20 Reveiw)
   f. 01/25/93 (Relief Requests VR-4 Review)
   g. 10/24/94 (Review of Rev. 11 and 12)
   h. 02/17/95 (Rev. 13 Review)

9. Byron Station IST Valve Program Plan Responses (file: 3.11.0240)

   a. Byron Letter 88-1321 (Initial Program Plan Review Response)

10. Minutes of the Public Meeting on Generic Letter 89-04, dated October 25, 1989, Question 40

SECTION 4.3

PROGRAM TABLES

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS. (VA)	REMARKS
1/2FW039A	M-36-1C M-121-1B	2	B	6.0	GA	A.O.	O	C	St It Ft	CS RR CS		10 10	1 2	
1/2FW039B	M-36-1A M-121-1B	2	B	6.0	GA	A.O.	O	C	St It Ft	CS RR CS		10 10	1 2	
1/2FW039C	M-36-1D M-121-1A	2	B	6.0	GA	A.O.	O	C	St It Ft	CS RR CS		10 10	1 2	
1/2FW039D	M-36-1B M-121-1C	2	B	6.0	GA	A.O.	O	C	St It Ft	CS RR CS		10 10	1 2	
1/2FW043A	M-36-1C M-121-1B	2	B	3.0	GL	A.O.	C	C	St It Ft	OP RR OP			1 2	
1/2FW043B	M-36-1A M-121-1D	2	B	3.0	GL	A.O.	C	C	St It Ft	OP RR OP			1 2	
1/2FW043C	M-36-1D M-121-1A	2	B	3.0	GL	A.O.	C	C	St It Ft	OP RR OP			1 2	
1/2FW043D	M-36-1B M-121-1C	2	B	3.0	GL	A.O.	C	C	St It Ft	OP RR OP			1 2	
1/2FW079A	M-36-1C M-121-1B	2	C	16.0	CK	S.A.	O	C	Bt	RR	VR-28		3	
1/2FW079B	M-36-1A M-121-1D	2	C	16.0	CK	S.A.	O	C	Bt	RR	VR-28		3	
1/2FW079C	M-36-1D M-121-1A	2	C	16.0	CK	S.A.	O	C	Bt	RR	VR-28		3	
1/2FW079D	M-36-1B M-121-1C	2	C	16.0	CK	S.A.	O	C	Bt	RR	VR-28		3	
1/2FW510	M-36-1C M-121-1	NONE	B	16.0	AN	A.O.	O	C	Ft	RR		16	2	
1/2FW510A	M-36-1C M-121-1	NONE	B	4.0	GA	A.O.	C	C	Ft	RR		17	2	
1/2FW520	M-36-1A M-121-1	NONE	B	16.0	AN	A.O.	O	C	Ft	RR		16	2	
1/2FW520A	M-36-1A M-121-1	NONE	B	4.0	GA	A.O.	C	C	Ft	RR		17	2	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS. (VA)	REMARKS
1/2SI8926	M-61-1A M-136-1	2	C	8.0	CK	S.A.	C	O	Ct/Xt	RR/OP	VR-6	25	3	
1/2SI8948A	M-61-5	1	AC	10.0	CK	S.A.	C	C	Lt	RR				
									Bt	CS		6, 23, 42	3	
	M-136-5							O	Xt/Ct	CS/RR		42, ROJ-2	3	
1/2SI8948B	M-61-5	1	AC	10.0	CK	S.A.	C	C	Lt	RR				
									Bt	CS		6, 23, 42	3	
	M-136-5							O	Xt/Ct	CS/RR		42, ROJ-2	3	
1/2SI8948C	M-61-6	1	AC	10.0	CK	S.A.	C	C	Lt	RR				
									Bt	CS		6, 23, 42	3	
	M-136-6							O	Xt/Ct	CS/RR		42, ROJ-2	3	
1/2SI8948D	M-61-6	1	AC	10.0	CK	S.A.	C	C	Lt	RR				
									Bt	CS		6, 23, 42	3	
	M-136-6							O	Xt/Ct	CS/RR		42, ROJ-2	3	
1/2SI8949A	M-61-3	1	AC	6.0	CK	S.A.	C	C	Lt/Bt	RR/CS		6, 40	3	
	M-136-3							O	Ct	RR	VR-15		3	
1/2SI8949B	M-61-3	1	AC	6.0	CK	S.A.	C	C	Lt/Bt	RR/CS		6, 40	3	
	M-136-3							O	Ct	RR	VR-15		3	
1/2SI8949C	M-61-3	1	AC	6.0	CK	S.A.	C	C	Lt/Bt	RR/CS		6, 40	3	
	M-136-3							O	Ct	RR	VR-15		3	
1/2SI8949D	M-61-3	1	AC	6.0	CK	S.A.	C	C	Lt/Bt	RR/CS		6, 40	3	
	M-136-3							O	Ct	RR	VR-15		3	
1/2SI8956A	M-61-5	1	AC	10.0	CK	S.A.	C	C	Lt/Bt	CS		6	3	
	M-136-5							O	Ct	RR		ROJ-2	3	
1/2SI8956B	M-61-5	1	AC	10.0	CK	S.A.	C	C	Lt/Bt	CS		6	3	
	M-136-5							O	Ct	RR		ROJ-2	3	
1/2SI8956C	M-61-6	1	AC	10.0	CK	S.A.	C	C	Lt/Bt	CS		6	3	
	M-136-6							O	Ct	RR		ROJ-2	3	
1/2SI8956D	M-61-6	1	AC	10.0	CK	S.A.	C	C	Lt/Bt	CS		6	3	
	M-136-6							O	Ct	RR		ROJ-2	3	

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS. (VA)	REMARKS
1/2SX002A	M-42-1B	3	C	36.0	CK	S.A.	C	O	Ct	OP			3	
								C	Bt	OP			3	
1/2SX002B	M-42-1A	3	C	36.0	CK	S.A.	C	O	Ct	OP			3	
								C	Bt	OP			3	
1/2SX005	M-42-1A	3	B	30.0	BF	M.O.	C	O	St	OP			1	
									It	RR			1	
0SX007	M-42-2A	3	B	24.0	BTF	M.O.	C	O	St	OP			1	
									It	RR				
1/2SX016A	M-42-5B	2	B	16.0	BTF	M.O.	C	O/C	St	OP			1	
	M-126-3								It	RR				
1/2SX016B	M-42-5A	2	B	16.0	BTF	M.O.	O	O/C	St	OP			1	
	M-126-3								It	RR				
1/2SX027A	M-42-5B	2	B	16.0	BTF	M.O.	O	O/C	St	OP			1	
	M-126-3								It	RR				
1/2SX027B	M-42-5A	2	B	16.0	BTF	M.O.	O	O/C	St	OP			1	
	M-126-3								It	RR				
0SX028A	M-42-6	3	C	8.0	CK	S.A.	C	O	Ct	OP			3	Bt Relief
								C	Bt	OP	VR-29		3	Pending
0SX028B	M-42-6	3	C	8.0	CK	S.A.	C	O	Ct	OP			3	Bt Relief
								C	Bt	OP	VR-29		3	Pending
1/2SX101A	M-42-3	3	B	1.5	GL	S.O.	C	O	St	OP	VR-17			
	M-126-1								Ft	OP			2	
1/2SX112A	M-42-3	3	B	12.0	BTF	A.O.	O	C	St	OP			1	
	M-126-1								It	RR				
									Ft	OP			2	
1/2SX112B	M-42-3	3	B	12.0	BTF	A.O.	O	C	St	OP			1	
	M-126-1								It	RR				
									Ft	OP			2	
1/2SX114A	M-42-3	3	B	12.0	BTF	A.O.	O	C	St	OP			1	
	M-126-1								It	RR				
									Ft	OP			2	
1/2SX114B	M-42-3	3	B	12.0	BTF	A.O.	O	C	St	OP			1	
	M-126-1								It	RR				
									Ft	OP			2	
1/2SX116A	M-42-2B	3	C	3.0	CK	S.A.	O	O	Ct	OP			3	
	M-42-2B													
1/2SX116B	M-42-2A	3	C	3.0	CK	S.A.	O	O	Ct	OP			3	
	M-42-2A													

VALVE NUMBER	P&ID	CLASS	VALVE CATEGORY	VALVE SIZE (IN.)	VALVE TYPE	ACT. TYPE	NORMAL POSITION	STROKE DIRECT.	TEST METHOD	TEST MODE	RELIEF REQUEST	NOTES	TECH. POS. (VA)	REMARKS
0SX127A	M-42-6	3	BC	8.0	CK	S.A.	C	O/C	Ct/Bt	OP/RR	VR-30	ROJ-1	3	Ct Relief Pending
0SX127B	M-42-6	3	BC	8.0	CK	S.A.	C	O/C	Ct/Bt	OP/RR	VR-30	ROJ-1	3	Ct Relief Pending
0SX143A	M-42-6	3	BC	8.0	CK	S.A.	O	C	Bt	RR		ROJ-1	3	
0SX143B	M-42-6	3	BC	8.0	CK	S.A.	O	C	Bt	RR		ROJ-1	3	
0SX146	M-42-2A	3	B	30.0	BTF	M.O.	C	O	St lt	OP RR			1	
0SX147	M-42-2A	3	B	30.0	BTF	M.O.	C	O	St lt	OP RR			1	
1/2SX147A	M-42-3 M-126-1	3	B	16.0	BTF	S.O.	N/A	O	Ft	OP				
1/2SX147B	M-42-3 M-126-1	3	B	16.0	BTF	S.O.	N/A	O	Ft	OP				
0SX162A	M-42-7	3	B	24.0	BF	M.O.	C	O/C	St lt	OP RR				
0SX162B	M-42-7	3	B	24.0	BF	M.O.	C	O/C	St lt	OP RR				
0SX162C	M-42-7	3	B	24.0	BF	M.O.	C	O/C	St lt	OP RR				
0SX162D	M-42-7	3	B	24.0	BF	M.O.	C	O/C	St lt	OP RR				
0SX163A	M-42-7	3	B	24.0	BF	M.O.	O	O/C	St lt	OP RR				
0SX163B	M-42-7	3	B	24.0	BF	M.O.	O	O/C	St lt	OP RR				
0SX163C	M-42-7	3	B	24.0	BF	M.O.	O	O/C	St lt	OP RR				
0SX163D	M-42-7	3	B	24.0	BF	M.O.	O	O/C	St lt	OP RR				
0SX163E	M-42-7	3	B	24.0	BF	M.O.	O	O/C	St lt	OP RR				
0SX163F	M-42-7	3	B	24.0	BF	M.O.	O	O/C	St lt	OP RR				
0SX163G	M-42-7	3	B	24.0	BF	M.O.	O	O/C	St lt	OP RR				
0SX163H	M-42-7	3	B	24.0	BF	M.O.	O	O/C	St lt	OP RR				

SECTION 4.4

NOTES/

COLD SHUTDOWN JUSTIFICATIONS/

REFUELING OUTAGE JUSTIFICATIONS

NOTE 40

The following valves are backflow tested by way of a seat leakage test. These valves are inside containment and cannot be tested without entering containment. Since it is not radiologically prudent to make containment entries for routine testing, these valves will be backflow tested during cold shutdown.

1/2SI8815	1/2SI8900A-D
1/2SI8818A-D	1/2SI8905A-D
1/2SI8819A-D	1/2SI8949A-D
1/2SI8841A,B	

NOTE 41

The RH Hot Leg Suction Pressure Relief Check Valves (1/2RH8705A,B) are full stroke and backflow tested using a method which requires containment entry. Since it is not radiologically prudent to make containment entries for routine testing, these valves will be full stroke and backflow tested during cold shutdown.

NOTE 42

The 1/2SI8948A-D Safety Injection Cold Leg Pressure Isolation Valves cannot be tested during plant operation due to the high pressure of the RCS system relative to the pressures attainable through the RH and SI pumps. They will be partial flow and backflow tested at cold shutdown.

NOTE 43

The 1/2RH8716A/B "RHR Cross Tie" valves are out-of-service open per Technical Specifications and can only be exercised during cold shutdown or refuel.

NOTE 44

The 1/2CC9415 valves are motor-operated 16" Gate valves and are in the supply line to the RCPs and other non-essential Component Cooling Water loads. They close to isolate non-essential loads from essential loads during accident conditions. These valves may only be closed with all 4 RCPs off. Therefore, these valves will be tested at Cold Shutdown with all 4 RCPs off. Refer to VR-8 for additional information.

NOTE 45

The feedwater tempering flow check valves (1/2FW036A-D) are open during full/high power operation to ensure the S/G upper nozzle subcooled margin is maintained above the 75°F minimum. They also open to allow tempering flow during shutdown and startup. They close to provide an immediate isolation function during a feedwater line break accident to mitigate a loss of secondary make-up and/or inventory.

These are 3 inch swing type check valves with no position indication. Flow through this line at full/high power cannot be stopped for longer than one minute while in Mode 1. Also, flow/pressure is always toward the Steam Generators (S/Gs) during operation, making it impractical to perform a back leakage or back pressure test to prove valve closure. Theses check valves will be tested during cold shutdowns using non-intrusive techniques to prove valve closure.

NOTE 46

"Deleted"

REFUELING OUTAGE JUSTIFICATION ROJ-1

Valve(s):

0SX127A,B (Deep Well Pump Discharge Check Valves to SX Cooling Towers)
0SX143A,B (Circ Water Makeup Discharge Check Valves to SX Clg Towers)

ASME Code Class: 3 ASME Code Category (IWV-2200): BC

Valve Function(s):

a. 0SX127A,B: These check valves open (not covered in this justification) to provide a flow path for Deep Well Water to the Ultimate Heat Sink as a backup to the Emergency Makeup Pumps. In addition, these check valves are required to close to prevent loss of required Emergency Makeup water flow into the Deep Wells and not to the Ultimate Heat Sink when required.

b. 0SX143A,B: These check valves are required to close to prevent backflow into the Circ Water Makeup (non-safety) supply line to the SX towers. These valves are located at the safety related/non-safety related boundary.

Basis for Deferral of Backflow Testing to Refueling Outages:

The 0SX127A/B and 0SX143A/B check valves were thoroughly investigated for possible closure testing, and it was determined that the only way to determine closure would be through nonintrusive techniques. Traditional methods of measuring leakage, etc. were not possible. The initial testing on these valves occurred in March of 1995 (prior to the end date of B2R05). Initially, acoustic testing was investigated using various system lineups with limited results. Alternate testing methods, which would establish future repeatable tests, were investigated. Both radiography and UT testing were attempted. UT testing produced a weak backwall signal and is inadequate at this time. Radiography produced the most conclusive test results concerning valve closure. Subsequent test results with radiography have confirmed that it is the most conclusive and repeatable.

Performing the radiography on these valves requires the use of outside contractor personnel. This is costly and impractical to perform on a quarterly basis. It is much more practical and less costly to perform the radiography on these valves during refueling outages, when radiography crews are available and on site performing other radiography associated with the refueling outage. This justification is consistent with NUREG 1482, section 3.1.1., in which deferral of testing to refueling is allowed without relief, provided the appropriate portions of OM-10 are followed.

Test Frequency:

The 0SX127A/B and 0SX143A/B backflow radiography tests will be completed during each refueling outage (U-1 and U-2).

(9679AA/WPF/080795)

REFUELING OUTAGE JUSTIFICATION ROJ-2

Valve(S):
1/2SI8948A-D (SI Accumulator 2nd Outlet Check Valves)
1/2SI8956A-D (SI Accumulator 1st Outlet Check Valves)

ASME Code Class: 1 ASME Code Category: AC

Valve Function(s):

The 1/2SI8948A-D and 1/2SI8956A-D check valves are located inside the containment building missile barrier on the lines from the accumulator tanks to the Reactor Coolant System (RCS) cold legs. These 16 check valves have safety functions in both the open and closed directions. This Refueling Outage Justification will address the check valve open test only. The open direction function of these check valves is to permit the injection of borated water into the reactor vessel cold legs during the passive injection phase of a safety injection.

Basis for Deferral of Full Flow Testing to Refueling Outages:

Check valves 1/2SI8956A-D cannot be full or partial tested during unit operation due to the pressure differential between the accumulators (650 psig) and the reactor coolant system (2235 psig). Full or partial stroke exercising of these valves could occur only with a rapid depressurization of the reactor coolant system.

Check valves 1/2SI8948A-D cannot be full or partial stroke tested during unit operation without depressurizing the RCS to 1600 psig (to stroke using Safety Injection pumps) or to 200 psig (to use the Residual Heat Removal pumps).

Full stroking these valves during cold shutdowns, routine or forced, would impose hardship with no compensating increase in plant safety. To perform this test, the reactor coolant system (RCS) must be at approximately 40 psi with all 4 reactor pumps (RCPs) off and accumulator pressure at approximately 100 psi over RCS pressure. The full stroke test is accomplished by opening the flowpath to the RCS by stroking the respective SI8808 valve open, and then closed. During this "burping" of the accumulators, strip chart recorders are used to obtain data that will be used to calculate the pressurizer level increase with time and verify that the flow that passed through the respective SI8956 and SI8948 check valves is greater than a calculated full flow value for the check valves. In addition, nonintrusive testing, which has proven the full stroke for each valve in the past, is performed on one valve from each group, consistent with NUREG 1482, section 4.1.2 (this also eliminates high radiation exposures associated with the nonintrusive testing of all valves).

REFUELING OUTAGE JUSTIFICATION ROJ-2 (continued)

A concern with testing is that at or near end-of-core life, the boron concentration of the RCS is low compared to the approximate 2000 ppm concentration of the accumulators. This injection test requires that approximately 8 thousand gallons of this boron concentrated water be injected into the RCS. This would result in a considerable increase in the boron concentration of the RCS. The feed and bleed process required to restore desired RCS boron concentration would result in considerable increases in restoration time and in amounts of radioactive water rejected from the site.

The partial stroke exercising of the 1/2SI8948 valves will be completed during cold shutdowns using the RH or SI pumps since there are alternate flowpaths available and it can be done with little or no effect on the RCS system. Partial stroking of the 1/2SI8956 valves will not be completed during cold shutdowns because the same test methodology used for the full stroke test would be required to perform the partial test.

This justification is consistent with NUREG 1482, Section 3.1.1, in which deferral of testing to refueling is allowed without relief, provided the appropriate portions of OM-10 are followed.

Test Frequency:

Byron Station will full stroke exercise (CT) the 1/2SI8948A-D and 1/2SI8956A-D check valves during each respective U-1 or U-2 refueling outage and partially stroke the 1/2SI8948 valves during cold shutdowns.

The 1SI8948A-D, 1SI8956A-D, 2SI8948A-D, and 2SI8956A-D valves each represent their own sampling group since each set of valves are of the same size, model number and system function. Under the sampling Program, one valve will be nonintrusively tested per group (one SI8948 valve and one SI8956 valve per outage), on a rotating schedule, while the balance of the plant groups will be flow tested with less than accident flow. If a problem is found with the nonintrusively tested valve, then the remaining three valves in that particular group will be checked using nonintrusives during the same outage

SECTION 4.6

RELIEF REQUESTS

DRAFT
RELIEF REQUEST VR-2a

"Deleted"

RELIEF REQUEST VR-5

"Deleted"

RELIEF REQUEST VR-28

1. Valve Number (Main Feedwater Header Check Valves)

   1FW079A-D 2FW079A-D

2. Number of Items: 8

3. ASME Code Category (IWV-2200): C

4. ASME Code Section XI Requirements:

   Check Valves shall be exercised to the position required to fulfill their function unless such operation is not practical during plant operation. Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be partial stroke exercised during power operations or full-stroke exercised during cold shutdowns. Normally open valves... shall be tested in a manner that proves the disk travels to the seat promptly on cessation or reversal of flow (IWV-3522).

5. Basis for Relief:

   The main feedwater header flow check valves are 16-inch tilting disk check valves built with a vertical piston and rod assembly that serves as an anti-slam mechanism; the valves do not have external position indicators. The valves are designed to have a delayed closure time of 2 to 3 seconds to isolate flow during a feedwater line break accident without inducing significant water hammer transients. Their closed safety functions are to 1) mitigate a loss of secondary inventory and/or make-up, and 2) provide pressure integrity between the safety and non-safety related portions of piping.

   These valves cannot be exercised to their closed position during power operations because feed flow to a steam generator would be isolated, causing loss of Steam Generator water inventory and a subsequent low S/G level Reactor Trip.

   Non-intrusive testing during cold shutdowns has been attempted at Braidwood and Byron Stations with still unproven results. Specifically, ultrasonic examination of the piston rod position has not conclusively demonstrated valve closure: The anti-slam mechanism prevents the disk from travelling completely to its seat after cessation of forward flow. In fact, during normal feedwater system shutdown evolutions, the valves routinely come to rest at a partial open position -- substantial reverse flow or reverse differential pressure would be required to bring the disk into contact with the seat.

RELIEF REQUEST VR-28 (continued)

Traditional backflow testing methods were considered, but it has been determined that reverse flow and/or differential pressure sufficient to close the valve cannot be obtained without major modification to the existing plant configuration. Clearly, acoustic testing techniques which require contact noise between disk and seat cannot be used for this application, either.

Full-stroke exercising these valves by performing complete disassembly and inspection of each valve during cold shutdown conditions is undesirable and impractical because:

1) The main feedwater system would have to be drained. This would both delay reactor start-up and eliminate a method of reactor decay heat removal. The latter, in particular, could adversely affect shutdown safety.

2) Complete disassembly often requires machining activities that remove metal from the valve walls which may jeopardize minimum wall thickness. If minimum wall thickness is approached, then costly and difficult weld overlay techniques and associated machining would be required.

3) Scaffolding must be built and removed to allow examination of these valves.

Full-stroke exercising these valves by performing partial disassembly (i.e. removing only the actuator bonnets) of all four valves on a refueling or cold shutdown frequency is burdensome because of the system draining necessary and the potential wall material loss associated with disassembly and inspection work.

6. Alternate Testing:

The four valves on each unit are of the same design (manufacturer, size, model number, and materials of construction) and have the same service conditions, including orientation; therefore, they form a sample disassembly group.

One valve from each group, on a per unit basis, will be fully disassembled and examined each refueling outage. If the initial disassembled valve is not capable of being full stroke exercised or if there is binding or failure of internals, subsequent disassembly and inspection of the remaining three group members will be commensurate with the initial valve's failure mode.

RELIEF REQUEST VR-28 (continued)

This means that the remaining three valves may be "partially" disassembled, which refers to the removal of the actuator [upper] bonnet for inspection of the piston, piston seal ring, mating surfaces, and also for manual full stroke closing. A "fully" disassembled valve (minimum of one per outage) would additionally include removal of the valve body [lower] bonnet, giving access to the disk and seating surfaces. The subsequent disassembly requirements would be satisfied through either "partial" or "full" disassemblies depending on what is found with the initial disassembled valve. This will both satisfy the testing requirements to demonstrate all four valves' ability to perform their safety function and minimize the potential concerns regarding minimum wall thickness discussed earlier. This approach is consistent with Generic Letter 89-04, position 2.

A partial stroke test following complete installation will not be required for these check valves since an "as left" stroke is performed prior to the installation of the actuator bonnet; installation of the actuator bonnet does not affect the stroke of the valve. In addition, the plant operates with these valves in the open position and open stroke problems would be readily identified during plant startup.

7. Justification:

Because major plant modifications would be required to establish enough reverse flow/pressure to fully close the valves, in-service testing in accordance with NRC Generic Letter 89-04 is justified. The Generic Letter allows valves of similar design, service conditions, etcetera to be classified in sample disassembly and inspection groups of up to four

members with testing of one valve in the group during each refueling outage.

In-service testing of the valves that close on a feedwater isolation signal, including the safety-related feedwater containment isolation valves (FW009A-D), the non-safety-related feedwater regulating valves (FW510, 520, 530, 540), and the feedwater regulating bypass valves (FW510A, 520A,...) helps ensure that the power operated valves and the system are capable of safely responding to an initiating feedwater line break accident regardless of FW079 check valve position.

The alternate test method is sufficient to ensure operability of these valves and is consistent with Generic Letter 89-04 sample disassembly and inspection program. The alternate test method in conjunction with other existing in-service testing of feedwater valves is more than sufficient to ensure the system's ability to safely respond to a feedwater line break accident.

RELIEF REQUEST VR-28 (continued)

8. Applicable Time Period:

This relief is requested once per quarter during the first inspection interval and will be implemented prior to NRR review.

9. Approval Status:

Relief granted per Generic Letter 89-04.

RELIEF REQUEST VR-29

1. Valve Number (Essential Service Water Makeup Pump Discharge Check Valves)

   0SX028A 0SX028B

2. Number of Items: 2

3. ASME Code Category (IWV-2200): C

4. ASME Code Section XI Requirements:

   a. IWV-3522 States: Check Valves shall be exercised to the position required to fulfill their function unless such operation is not practical during plant operation. Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be partial stroke exercised during power operations or full-stroke exercised during cold shutdowns.

5. Basis for Relief:

   The backflow test for the 0SX028A/B check valves was added to the IST Valve Program in Rev 12 due to their closure function to prevent piping drain down from the basins to the river screen house. Since their incorporation into the program, the 0SX028A and 0SX028B check valves have been successfully tested for closure using acoustics during the respective A or B makeup pump runs a minimum of once each quarter. Each valve has successfully been tested 7 consecutive times without any signs of degradation or failure.

6. Alternate Testing:

   Byron proposes to complete both of the 0SX028A/B backflow acoustic tests at a minimum of once per 18 months.

7. Justification:

   Nonintrusive techniques are considered to be "other positive means" in accordance with ASME Section XI IWV-3522. As described in NUREG 1482, nonintrusive techniques may be used to verify the capability [of check valves] to open, close, and fully stroke.

   The acoustic testing of both of these valves on an eighteen month frequency (at approximately the same time period) is justified for the following reasons:

   a. Performing the acoustic test on both valves on an eighteen month frequency will ensure the operational readiness of the valves. These valves have been in operation for approximately 10 years without falure and have successfully passed their acoustic testing for seven tests in a row since being added to the IST program.

RELIEF REQUEST VR-29 (continued)

b. The A and B SX makeup pump surveillances will continue to be executed for IST on a quarterly basis. During this testing, the check valve will be experiencing the same evolution as it does when the backflow acoustic test is completed. The check valve will be opened and then closed on cessation of flow. The full flow test will be completed quarterly, verifying operability in the forward flow direction.

c. In addition, this will reduce the amount of manhours required in performing the acoustics at the river screen house a few miles from the Byron plant on the Rock River. For each test, approximately one full day is expended by the qualified acoustic monitoring individual to transfer the equipment to the river screen house, set up the equipment, record the data, transfer the equipment back to the station, evaluate the data, and complete surveillances.

8. Applicable Time Period:

This relief request is requested once per quarter during the remainder of the first inspection period.

9. Approval Status:

Approval Pending.

RELIEF REQUEST VR-30

1. Valve Number:

   0SX127A,B (Deep Well Pump Discharge Check Valves to SX Cooling Towers)

2. Number of Items: 2

3. ASME Code Category (IWV-2200): BC

4. ASME Code Section XI Requirements:

   a. IWV-3522 States: Check Valves shall be exercised to the position required to fulfill their function unless such operation is not practical during plant operation. Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be partial stroke exercised during power operations or full-stroke exercised during cold shutdowns.

5. Basis for Relief:

   The 0SX127A and 0SX127B check valves open to provide a flow path for Deep Well Water to the Ultimate Heat Sink as a backup to the Emergency Makeup Pumps. The nonsafety related, seismically qualified, Deep Well Pumps (0WW01PA/0WW01PB) are physically inaccessible and were not designed or installed in accordance with ASME code and are not required as long as the Emergency SX Makeup Pumps are available. Although the pumps do not fit the requirements of the IST Program, they do have significant importance and are tested outside of the IST Program as required per Tech Spec 3/4.7.5. The safety related check valves referenced in this relief request were conservatively added to the IST Program in the open direction to acknowledge the importance of ensuring the deep well flow path is capable of transferring water to the ultimate heat sink.

   In reference to the deep well pumps, per Tech Spec 4.7.5, the Ultimate Heat Sink shall be determined operable: at least once per 31 days by starting each deep well pump, operating it for at least 15 minutes and verifying that each valve (manual, power-operated, or automatic) in the flow path is in its correct position and; at least once per 18 months by verifying each deep well pump will provide at least 550 gpm flow rate.

RELIEF REQUEST VR-30 (continued)

6. Alternate Testing:

Byron proposes to complete a full stroke test for check valves 0SX127A and 0SX127B at a minimum of once every eighteen months, as required by Technical Specifications. Testing on a more frequent basis would be completed in accordance with station committments. This test will be accomplished by executing the Byron Station deep well surveillance in which, first, the "A" pump is lined up to the "A" basin and an ultrasonic flowmeter is attached to the makeup line (following the removal of a security barrier). The demand (throttling) valve is opened up until a minimum flow reading of at least 550 gpm is obtained through the line (and check valve 0SX127A). In addition, the amperage of the pump is recorded. Then, the "A" pump is shut down and the valves are re-aligned to the "B" Basin, in which there is no accessible piping of adequate length to attach an ultrasonic flowmeter. However, the same "A" pump is restarted and set to an amperage greater than or equal to the amps just recorded for the A basin flowpath. Byron Station trends flow versus amps for the Deep Well Pumps to help track degradation with the pumps, as required through a station commitment to the NRC. This should assure a full stroke test for the 0SX127B check valve (using other "positive means"). In addition, the A and B basins overflow into each other at 64% level, minimizing the importance of knowing the exact flow through the "B" makeup line (although it should be the same as just recorded through the "A" makeup line). Finally, the "B" pump is verified to generate an output greater than 550 gpm through the "A" train makeup line to satisfy the Tech Spec requirement.

In addition to the above testing, Byron will ensure operability of the Deep Well Pumps by executing an operating surveillance monthly in which the "A" pump is lined up to the "A" basis and the "B" pump is lined up to the "B" basin. In each case the demand for each pump will be at or near 100%, which should assure a full stroke of each check valve every month. However, since flow is not measured, it will be considered a partial stroke each month.

7. Justification:

The alternative testing requirements will not compromise the level of quality and safety when compared to quarterly code testing for the following reasons:

a. Byron Tech Specs are being satsfied through the eighteen month Deep Well Pump procedure and the monthly operating procedure. This testing will satisfy the operability requirements for the Deep Well Pumps and the flowpaths to the SX basin. In addition, the same or more flow is transferred through the check valves each month than during the procedure executed every eighteen months. The flowrates would be verified during the eighteen month procedure.

RELIEF REQUEST VR-30 (continued)

b. An ultrasonic flowmeter cannot be used on the "B" basin makeup line due to the lack of accessible piping available. In addition, at this time, inconclusive acoustic results were obtained for the full stroke testing on these valves. Finally, flow versus amps is trended to help aid in determining any degradation in the Deep Well Pumps.

8. Applicable Time Period:

This relief request is requested once per quarter during the remainder of the first inspection period.

9. Approval Status:

Approval Pending