

March 2, 2000

Mr. Randall K. Edington
Vice President - Operations
Entergy Operations, Inc.
River Bend Station
P. O. Box 220
St. Francisville, LA 70775

SUBJECT: RIVER BEND STATION, UNIT 1 - RE: REQUEST FOR APPROVAL OF
ALTERNATIVE TO THE SECOND INTERVAL INSERVICE TESTING
PROGRAM; EXTENSION OF TEST INTERVAL FOR MAIN STEAM LINE
SAFETY RELIEF VALVES (TAC NO. MA6464)

Dear Mr. Edington:

By application dated August 31, 1999, as supplemented by letter dated December 2, 1999, Entergy Operations, Inc. (EOI), the licensee for River Bend Station (RBS), Unit 1, requested approval of an alternative to its second ten-year interval Inservice Testing (IST) program. The proposed alternative would allow a one-time extension of the test interval for 20% of the full set (16) of main steam line safety relief valves (SRV).

The one-time delay for the SRV testing was requested as a result of changes in the current operating cycle at RBS. Operating Cycle 9 had been shortened from a normal 18 month period to nine months as a result of fuel cladding integrity issues encountered during Cycle 8.

The staff has reviewed your relief request VRR-003, and finds that the alternative described in the request for relief is authorized pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that the proposed alternative provides an acceptable level of quality and safety. The staff's evaluation and conclusions are contained in the enclosed Safety Evaluation.

Sincerely,

/RA/

Robert Gramm, Chief, Section 1
Project Directorate IV & Decommissioning
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-458

Enclosure: Safety Evaluation

cc w/encls: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO INSERVICE TESTING PROGRAM RELIEF REQUEST FOR

ENTERGY OPERATIONS, INC.

RIVER BEND STATION, UNIT 1

DOCKET NO. 50-458

1.0 INTRODUCTION

Title 10 of the Code of Federal Regulations (10 CFR) Section 50.55a, requires that inservice testing (IST) of certain American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 pumps and valves are to be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code (ASME Code) and applicable addenda, except where alternatives have been authorized or relief has been requested by the licensee and granted by the Commission pursuant to paragraphs (a)(3)(i), (a)(3)(ii), or (f)(6)(i) of 10 CFR 50.55a. In proposing alternatives or requesting relief, the licensee must demonstrate that: (1) the proposed alternatives provide an acceptable level of quality and safety; (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety; or (3) conformance is impractical for its facility. Section 50.55a authorizes the Commission to approve alternatives and to grant relief from ASME Code requirements upon making the necessary findings. Guidance related to the development and implementation of IST programs is given in Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," issued April 3, 1989, and its Supplement 1 issued April 4, 1995 (also see NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," and NUREG/CR-6396, "Examples, Clarifications, and Guidance on Preparing Requests for Relief from Pump and Valve Inservice Testing Requirements").

By letter dated August 31, 1999, as supplemented by letter dated December 2, 1999, Entergy Operations, Inc. (EOI), the licensee for River Bend Station (RBS), Unit 1, requested approval of an alternative to its second ten-year interval IST program. The proposed alternative would allow a one-time extension of the test interval for 20% of the full set (16) of main steam line safety relief valves (SRV). The one-time delay for the SRV safety mode set pressure testing is requested as a result of changes in the current operating cycle at RBS. Operating Cycle 9 has been shortened from a normal 18 month period to nine months as a result of fuel cladding integrity issues documented during Cycle 8. Consequently, the licensee is proposing to delay SRV set pressure testing from Cycle 9 to no later than Cycle 10 (currently scheduled for September 2001).

2.0 BACKGROUND

SRVs provide overpressure protection for the reactor coolant system (i.e., reactor vessel, main steam lines (MSL), and associated piping) and are further discussed in Section 5.2.2 of the RBS Updated Safety Analysis Report (USAR). The SRVs are Crosby, direct-acting spring-loaded safety valves with attached pneumatic cylinder for relief mode operation. Each SRV performs its intended function through two modes of operation:

- Safety mode by direct action of the steam pressure against a single spring-loaded disk that will open when the valve inlet pressure force exceeds the spring force. The safety function set pressure is determined by changing the value of the compressed spring force.
- Relief mode by using an auxiliary actuating device consisting of a pneumatic piston/cylinder and a mechanical linkage assembly which opens the valve by overcoming the spring force.

As explained in the USAR, credit is taken for the dual purpose SRVs in the valves' ASME Code-qualified modes of safety operation. When system pressure increases to the relief pressure set point of a group of SRVs having the same relief set point, half of these valves are assumed to operate in the relief mode. They are opened by pneumatic power actuation. If the system pressure increases to the spring set point of a group of valves, those valves not already open are assumed to begin opening and reach full-open at 103% of the set point.

The range of the maximum pressure limit for the power-actuated relief mode is 1125 to 1155 psig and the current spring-action safety mode is 1175 to 1215 psig.

The plant has a total of 16 SRVs installed on the four MSLs. The IST for the SRVs is performed in accordance with ASME/American National Standards Institute (ANSI) OM-1987, Part 1, or the ASME/ANSI OM-1 Code as approved by the RBS IST program. Set points for the SRVs are less than the reactor coolant design pressure of 1250 psig. The licensee typically removes all the valves from the MSLs for testing during a refueling outage in order to meet the OM Code requirements. They are tested on a test fixture for both the safety and relief modes of operation and seat leakage. The safety mode of operation is tested to determine the as-found lift set point of the valve with respect to the allowable set point tolerance stated in Technical Specifications (TS) Surveillance Requirement (SR) 3.4.4.1.

3.0 RELIEF REQUEST VRR-003

3.1 Test Requirements

ASME/ANSI OM-1987, Part 1, Paragraph 1.3.3(b) requires that all valves of each type and manufacture shall be tested within each subsequent five-year period, with a minimum of 20% of the valves tested within any 24-month period. OM-1 also states that the 20% sample be previously untested valves, where possible.

As stated in the licensee's submittal, OM-1, Paragraph 3.3.1.1, requires the following:

- (a) visual examination;

- (b) seat tightness determination;
- (c) set pressure determination;
- (d) determination of compliance with the owner's seat tightness criteria;
- (e) determination of electrical characteristics and pressure integrity of solenoid valve(s);
- (f) determination of pressure integrity and stroke capability of air actuator;
- (g) determination of operation and electrical characteristics of position indicators;
- (h) determination of operation and electrical characteristics of bellows alarm switch; and,
- (i) determination of actuating pressure of auxiliary actuating device sensing element, where applicable, and electrical continuity.

The licensee noted that item (h) was not applicable since the valves do not contain bellows alarm switches.

The aforementioned testing requirements and the scope of Relief Request VRR-003 apply to the following ASME Code Class 1, Category BC, MSL safety and relief valves:

B21-RVF041A	B21-RVF047A	B21-RVF051B
B21-RVF041B	B21-RVF047B	B21-RVF051C
B21-RVF041C	B21-RVF047C	B21-RVF051D
B21-RVF041D	B21-RVF047D	B21-RVF051G
B21-RVF041F	B21-RVF047F	
B21-RVF041G		
B21-RVF041L		

3.2 Proposed Alternate Testing

The licensee proposed the following alternative testing, as quoted:

A one-time alternative testing schedule would apply for operating Cycles 9 and 10. Due to a modified core design, Cycle 9 is scheduled to be a nine-month cycle. Cycle 10 is scheduled to be an eighteen-month cycle (RBS normally operates on an eighteen-month cycle). The plant operating time would be approximately 27 months, with the calendar time being approximately 30 months. This is an operating period of approximately three months, or 12.5%, longer than the 24 months period specified in OM Part 1. For each of the Main Steam Line Pressure Relief Valves [in Request for Relief VRR-003] listed above, the following tests listed in OM Part 1, Paragraph 3.3.1.1, would be performed during both Refueling Outage 9 and Refueling Outage 10:

- (a) visual examination;
- (e) determination of electrical characteristics and pressure integrity of solenoid valve(s);
- (f) (partial) stroke capability of air actuator;
- (g) determination of operation and electrical characteristics of position indicators; and,
- (i) determination of actuating pressure of auxiliary device sensing element, where applicable, and electrical continuity.

For the Main Steam Line Pressure Relief Valves listed above, no later than Refueling Outage 10 (currently scheduled for September 2001), a minimum of 20% of the valves will be tested for the following tests listed in OM Part 1, Paragraph 3.3.1.1:

- (b) seat tightness determination;
- (c) set pressure determination;
- (d) determination of compliance with the owner's seat tightness criteria; and
- (f) (partial) determination of pressure integrity.

3.3 Licensee's Basis for Requesting Relief

In the letter dated August 31, 1999, the licensee made the following points as the basis for its request:

- The Crosby model 8XRX10 main steam SRVs are the newer, power-operated safety valves that employ significantly fewer moving parts wetted by steam, and are considered more reliable than the multiple-stage pilot operated SRVs used in many boiling water reactors (BWRs) throughout the industry.
- RBS TS 3.4.4 requires that only five of the 16 SRVs be operable in the safety mode, and an additional four SRVs, other than the five valves used to satisfy the safety function, be operable in the Relief Mode. Analysis shows that the ASME Code design limit for the reactor coolant system of 1375 psig will not be exceeded when the TS condition is met.
- To meet the requirements of OM-1987, Part 1, Paragraph 3.3.1.1, Items (b), (c), (d), and (f) (partial - determination of pressure integrity) listed above, the designated valve must be removed from the plant and bench tested. Paragraph 3.3.1.1, Items (a), (e), (f) (partial - stroke capability of the actuator), (g), and (i) can be performed safely with the valve installed under the appropriate plant conditions.
- RBS installed a full complement of pre-tested valves during its most recent refueling outage which ended in July 1999. The current operating Cycle 9 is scheduled for approximately nine months and the following Cycle 10 is planned for a normal 18 month duration. The total 27 months of operation exceeds the ASME/ANSI OM-1987, Part 1, Paragraph 1.3.3(b), requirement to test 20% of the full complement of valves ($0.20 \times 16 = 3.2$ or four valves) within a 24-month period by approximately three months.
- Test results taken from valves installed during Cycles 5, 6, and 7 shows several set points were found below -2% (the previous set point tolerance); however, the safety significance is low since the purpose of the SRVs is to provide over-pressure protection. In addition, four of 48 valves tested lifted above (high) the acceptance criteria. The licensee added that the "data supports the premise that the longer period of time (approximately 3 months) would not tend to cause the set points to drift to a value significantly above the acceptance criteria. Additionally, analysis has been completed that supports an increase in the set point tolerance...to 3% above the set point would have no impact on public health and safety."

- Compliance with the OM-1987, Part 1 testing requirements would impose an unnecessary hardship and burden without a compensating increase in the level of quality and safety, as opposed to its proposed alternate testing plan.

Additional SRV test data for Cycles 5, 6, and 7 were provided in the licensee's letter dated December 2, 1999. The information included design, as-left, and as-found set point data for the 48 valves tested that could be used to predict an approximate safety mode set point following the proposed extended operating period.

3.4 Evaluation

- 3.4.1 TS Section 3.4.4 requires that five of 16 SRVs (31.2%) be operable in the safety mode and four additional valves, other than those credited for the safety function, be operable in the relief mode. SR 3.4.4.1 is performed to demonstrate that the required number of SRVs are available and will open at the pressures assumed in the safety analysis of USAR, Section 5.2.2.2.3. Consequently, the licensee's operating experience would be a key indicator of whether a sufficiently low drift rate could be anticipated over various operating periods that would result in an acceptable number of valves being within the allowed set point values.

License Amendment No. 109 to the RBS Facility Operating License changed the allowable (as-found) set points defined in TS 3.4.4 to the following values:

Allowable SRV Set Points (As-Found) with +0/-3 Percent Tolerance

Number of S/RVs	TS 3.4.4 Set Points (psig)
7	≥ 1130.1 and ≤ 1165
5	≥ 1144.6 and ≤ 1180
4	≥ 1154.3 and ≤ 1190

Although the revised set point tolerances shown in the table above were not applicable at the time the 48 SRVs were removed and tested following Cycles 5, 6, and 7, the information provided by the licensee could be used to predict SR test results following nine months of operation. Therefore, estimated pass/fail test results for half a normal operating cycle, as well as the number of valves that would need to be reset in accordance with the licensee's IST program, were computed. An average monthly drift rate was calculated from the plant-specific operating experience data by dividing the difference between the as-found lift point following operation and the "as-left" lift point, determined prior to operation, by 18 months. A corresponding estimated or predicted overall set point drift resulting from a hypothetical nine-month operating period was found by multiplying the average monthly drift rate by nine. This information is summarized in Table 1. More detailed information is provided in Attachment 1 to this Safety Evaluation.

Table 1, Cycles 5, 6, and 7 Predicted SRV Test Results Following 9 Months of Operation

Surveillance Test Result	Predicted 9-Month Surveillance Test Results (Using +0/-3 Percent Test and +0/-2 Percent Reset Tolerances)					
	Number of Valves	Percent	Average/Cycle	Number of Valves to Reset	Percent to Reset	Average No. Reset /Cycle
Passed	47	97.9%	15.7	4	8.3%	1.3
Failed Low	0	0%	0	0	0%	0
Failed High	1	2.1%	0.3	1	2.1%	0.3
Total	48	100%	16	5	10.4%	1.7

Based upon the above information, one valve from the 48 tested following Cycles 5, 6, and 7 would have failed its surveillance test following nine months of operation. Similarly, only five of the 48 valves would need to have been reset to within the “as-left” tolerance of +0/-2%. This number equates to approximately two valves that would need to be reset to their “as-left” tolerance following the completion of Cycle 9, if similar operating experience is assumed at RBS. The staff finds that, given the small number of valves that could reasonably be expected fail the surveillance test (less than or equal to 1) and be required to be reset to within tolerances (approximately 2), if the licensee was required to remove the SRVs during Cycle 9, it could be considered a hardship and burden without a compensating level of quality and safety.

However, the staff maintains that since the licensee is requesting to extend the time to perform the SRV IST from 18 months to approximately 27 months of operation, the proposed alternative must provide an acceptable level of quality and safety during the extended operating period. Therefore, the staff reviewed the licensee’s proposal to determine whether the proposed alternative fulfilled the requirements of 10 CFR 50.55a(a)(3)(i).

If the same surveillance test results supplied by the licensee in its August 31 and December 2, 1999, letters were applied to the current SR criteria revised by Amendment No. 109, the pass/fail test results would be as shown in Table 2 (see 18-Month Results columns). Table 2 also shows corresponding information for the case where the same 48 valves operated for 27 months instead of 18 months. These values were derived by computing a straight-line approximation from the plant-specific operating experience data provided by the licensee. As in the case for the nine-month operating period, an average monthly drift rate was calculated by dividing the difference between the as-found lift point following operation and the “as-left” lift point prior to operation by 18 months. A corresponding overall set point drift resulting from the proposed 27-month operating period was found by multiplying the average monthly drift rate by 27.

Table 2, Cycles 5, 6, and 7 SRV Test Data Using +0/-3 Percent Set Point Tolerance

Surveillance Test Result	18-Month Results (Using +0/-3 Percent Tolerance)			Predicted 27-Month Results (Using +0/-3 Percent Tolerance)		
	Number of Valves	Percent	Average/ Cycle	Number of Valves	Percent	Average/ Cycle
Passed	36	75.0%	12.0	26	54.2%	8.7
Failed Low	8	16.7%	2.7	16	33.3%	5.3
Failed High	4	8.3%	1.3	6	12.5%	2
Total	48	100%	16	48	100%	16

Based on the information in Table 2 above, RBS operating experience shows that 36 of the 48 (75%) Crosby model 8RX10 SRVs would have passed the safety function surveillance test when using the current set point tolerance of +0/-3%. If the same 48 valves had operated for 27 months instead of 18 months, it is also reasonable to assume that roughly 26 of the 48 SRVs (54.2%) would still have passed SR 3.4.4.1. Therefore, on average, eight or nine SRVs could be expected to be operable following 27 months of operation. This number is greater than the minimum number (five) of SRVs required to be operable in the safety mode in accordance with TS 3.4.4. The staff also notes that most of the predicted 27-month failures in Table 2 are projected to fail low, not high. This indicates that for the longer test interval proposed, there is not expected to be a significantly reduced capability of the SRVs to provide adequate system overpressure protection. Although the staff believes that the licensee could and should take additional steps to improve its SRV IST performance results, the staff finds that there is still reasonable assurance to conclude that the minimum number of SRVs, with margin, would be operable following RBS Cycle 10.

In its proposed alternative, the licensee stated that it would perform a visual examination and verify operation of the pneumatic piston/cylinder actuating device including associated mechanical linkage as currently required by OM-1. These inspections and tests would ensure that SRV relief mode operability will be maintained in accordance with TS 3.4.4.

3.5 Conclusion

Therefore, the staff finds that the alternative described in the licensee's request for relief VRR-003 is authorized pursuant to 10 CFR 50.55a(a)(3)(i), on the basis that the proposed alternative provides reasonable assurance that the minimum number of SRVs required by TS 3.4.4 will be maintained through the end Cycle 10, and that the proposed alternative provides an acceptable level of quality and safety.

Principal Contributor: R. J. Fretz

Date: March 2, 2000

SURVEILLANCE TEST RESULTS WITH REVISED SET POINT TOLERANCE

Valve Number	Design Set Point	As Left/Set	As Left vs. Design	As Found	18-Mo. Design Delta	18-Mo. Design Delta (%)	SR Test Result with +0/-2 % Tolerance	SR Test Result with +0/-3% Tolerance
B21-RVF041L	1165	1161.5	-0.30%	1136	-29	-2.50%	FAILED LOW	PASSED
B21-RVF051B	1190	1179.3	-0.90%	1194	4	0.34%	FAILED HIGH	FAILED HIGH
B21-RVF051G	1190	1180.5	-0.80%	1168	-22	-1.86%	PASSED	PASSED
B21-RVF051C	1190	1178.5	-0.97%	1173	-17	-1.44%	PASSED	PASSED
B21-RVF041G	1165	1157.3	-0.67%	1146	-19	-1.64%	PASSED	PASSED
B21-RVF041C	1165	1155.0	-0.86%	1151	-14	-1.21%	PASSED	PASSED
B21-RVF041B	1165	1151.3	-1.18%	1176	11	0.96%	FAILED HIGH	FAILED HIGH
B21-RVF041D	1165	1153.8	-0.97%	1152	-13	-1.13%	PASSED	PASSED
B21-RVF047B	1180	1158.9	-1.79%	1158	-22	-1.90%	PASSED	PASSED
B21-RVF047C	1180	1169.1	-0.92%	1149	-31	-2.65%	FAILED LOW	PASSED
B21-RVF047A	1180	1167.3	-1.08%	1152	-28	-2.40%	FAILED LOW	PASSED
B21-RVF047F	1180	1162.5	-1.48%	1153	-27	-2.32%	FAILED LOW	PASSED
B21-RVF047D	1180	1165.0	-1.27%	1179	-1	-0.09%	PASSED	PASSED
B21-RVF051D	1190	1177.8	-1.03%	1182	-8	-0.68%	PASSED	PASSED
B21-RVF041A	1165	1149.5	-1.33%	1146	-19	-1.65%	PASSED	PASSED
B21-RVF041F	1165	1159.0	-0.52%	1165	0	0.00%	PASSED	PASSED
B21-RVF041A	1165	1145.8	-1.65%	1184	19	1.66%	FAILED HIGH	FAILED HIGH
B21-RVF041B	1165	1158.0	-0.60%	1154	-11	-0.95%	PASSED	PASSED
B21-RVF041C	1165	1156.5	-0.73%	1139	-26	-2.25%	FAILED LOW	PASSED
B21-RVF041D	1165	1158.8	-0.54%	1175	10	0.86%	FAILED HIGH	FAILED HIGH
B21-RVF041F	1165	1161.5	-0.30%	1160	-5	-0.43%	PASSED	PASSED
B21-RVF041G	1165	1159.3	-0.49%	1125	-40	-3.45%	FAILED LOW	FAILED LOW
B21-RVF041L	1165	1151.3	-1.18%	1144	-21	-1.82%	PASSED	PASSED
B21-RVF047A	1180	1171.0	-0.76%	1143	-37	-3.16%	FAILED LOW	FAILED LOW
B21-RVF047B	1180	1178.3	-0.15%	1142	-38	-3.23%	FAILED LOW	FAILED LOW
B21-RVF047C	1180	1175.5	-0.38%	1152	-28	-2.38%	FAILED LOW	PASSED
B21-RVF047D	1180	1174.3	-0.49%	1142	-38	-3.24%	FAILED LOW	FAILED LOW
B21-RVF047F	1180	1176.8	-0.28%	1132	-48	-4.08%	FAILED LOW	FAILED LOW
B21-RVF051B	1190	1175.8	-1.20%	1149	-41	-3.49%	FAILED LOW	FAILED LOW
B21-RVF051C	1190	1181.5	-0.71%	1179	-11	-0.93%	PASSED	PASSED
B21-RVF051D	1190	1177.0	-1.09%	1161	-29	-2.46%	FAILED LOW	PASSED
B21-RVF051G	1190	1184.3	-0.48%	1167	-23	-1.94%	PASSED	PASSED
B21-RVF041F	1165	1156.0	-0.77%	1153	-12	-1.04%	PASSED	PASSED
B21-RVF041A	1165	1153.3	-1.01%	1150	-15	-1.30%	PASSED	PASSED
B21-RVF051D	1190	1174.5	-1.30%	1177	-13	-1.11%	PASSED	PASSED
B21-RVF047D	1180	1173.0	-0.59%	1153	-27	-2.30%	FAILED LOW	PASSED
B21-RVF047F	1180	1165.3	-1.25%	1155	-25	-2.15%	FAILED LOW	PASSED
B21-RVF047A	1180	1164.5	-1.31%	1157	-23	-1.98%	PASSED	PASSED
B21-RVF047C	1180	1169.0	-0.93%	1164	-16	-1.37%	PASSED	PASSED
B21-RVF047B	1180	1173.0	-0.59%	1152	-28	-2.39%	FAILED LOW	PASSED
B21-RVF041D	1165	1152.0	-1.12%	1137	-28	-2.43%	FAILED LOW	PASSED
B21-RVF041B	1165	1160.0	-0.43%	1125	-40	-3.45%	FAILED LOW	FAILED LOW
B21-RVF041C	1165	1156.8	-0.71%	1154	-11	-0.95%	PASSED	PASSED
B21-RVF041G	1165	1152.3	-1.09%	1147	-18	-1.56%	PASSED	PASSED
B21-RVF041L	1165	1150.5	-1.24%	1140	-25	-2.17%	FAILED LOW	PASSED
B21-RVF051C	1190	1175.5	-1.22%	1141	-49	-4.17%	FAILED LOW	FAILED LOW
B21-RVF051G	1190	1184.5	-0.46%	1183	-7	-0.59%	PASSED	PASSED
B21-RVF051B	1190	1170.5	-1.64%	1160	-30	-2.56%	FAILED LOW	PASSED

PREDICTED SURVEILLANCE TEST RESULTS FOLLOWING 27-MONTHS OPERATION

Valve Number	Design Set Point	18-Mo. "Drift" Rate	27-Mo. "Drift" Predicted	27-Mo. Predicted As-Found	Predicted Test Delta (%)	Test Result +0/-3% Tolerance	Test Result If +3/-3% Approved
B21-RVF041L	1165	-1.417	-38.3	1123.3	-3.58%	FAILED LOW	FAILED LOW
B21-RVF051B	1190	0.819	22.1	1201.4	0.96%	FAILED HIGH	PASSED
B21-RVF051G	1190	-0.694	-18.8	1161.8	-2.37%	PASSED	PASSED
B21-RVF051C	1190	-0.306	-8.3	1170.3	-1.66%	PASSED	PASSED
B21-RVF041G	1165	-0.625	-16.9	1140.4	-2.11%	PASSED	PASSED
B21-RVF041C	1165	-0.222	-6.0	1149.0	-1.37%	PASSED	PASSED
B21-RVF041B	1165	1.375	37.1	1188.4	2.01%	FAILED HIGH	PASSED
B21-RVF041D	1165	-0.097	-2.6	1151.1	-1.19%	PASSED	PASSED
B21-RVF047B	1180	-0.050	-1.4	1157.6	-1.90%	PASSED	PASSED
B21-RVF047C	1180	-1.118	-30.2	1138.9	-3.48%	FAILED LOW	FAILED LOW
B21-RVF047A	1180	-0.847	-22.9	1144.4	-3.02%	FAILED LOW	FAILED LOW
B21-RVF047F	1180	-0.528	-14.3	1148.3	-2.69%	PASSED	PASSED
B21-RVF047D	1180	0.778	21.0	1186.0	0.51%	FAILED HIGH	PASSED
B21-RVF051D	1190	0.236	6.4	1184.1	-0.49%	PASSED	PASSED
B21-RVF041A	1165	-0.194	-5.3	1144.3	-1.78%	PASSED	PASSED
B21-RVF041F	1165	0.333	9.0	1168.0	0.26%	FAILED HIGH	PASSED
B21-RVF041A	1165	2.125	57.4	1203.1	3.27%	FAILED HIGH	FAILED HIGH
B21-RVF041B	1165	-0.222	-6.0	1152.0	-1.12%	PASSED	PASSED
B21-RVF041C	1165	-0.972	-26.3	1130.3	-2.98%	PASSED	PASSED
B21-RVF041D	1165	0.903	24.4	1183.1	1.56%	FAILED HIGH	PASSED
B21-RVF041F	1165	-0.083	-2.3	1159.3	-0.49%	PASSED	PASSED
B21-RVF041G	1165	-1.903	-51.4	1107.9	-4.90%	FAILED LOW	FAILED LOW
B21-RVF041L	1165	-0.403	-10.9	1140.4	-2.11%	PASSED	PASSED
B21-RVF047A	1180	-1.556	-42.0	1129.0	-4.32%	FAILED LOW	FAILED LOW
B21-RVF047B	1180	-2.014	-54.4	1123.9	-4.76%	FAILED LOW	FAILED LOW
B21-RVF047C	1180	-1.306	-35.3	1140.3	-3.37%	FAILED LOW	FAILED LOW
B21-RVF047D	1180	-1.792	-48.4	1125.9	-4.59%	FAILED LOW	FAILED LOW
B21-RVF047F	1180	-2.486	-67.1	1109.6	-5.96%	FAILED LOW	FAILED LOW
B21-RVF051B	1190	-1.486	-40.1	1135.6	-4.57%	FAILED LOW	FAILED LOW
B21-RVF051C	1190	-0.139	-3.8	1177.8	-1.03%	PASSED	PASSED
B21-RVF051D	1190	-0.889	-24.0	1153.0	-3.11%	FAILED LOW	FAILED LOW
B21-RVF051G	1190	-0.958	-25.9	1158.4	-2.66%	PASSED	PASSED
B21-RVF041F	1165	-0.167	-4.5	1151.5	-1.16%	PASSED	PASSED
B21-RVF041A	1165	-0.181	-4.9	1148.4	-1.43%	PASSED	PASSED
B21-RVF051D	1190	0.139	3.8	1178.3	-0.99%	PASSED	PASSED
B21-RVF047D	1180	-1.111	-30.0	1143.0	-3.14%	FAILED LOW	FAILED LOW
B21-RVF047F	1180	-0.569	-15.4	1149.9	-2.55%	PASSED	PASSED
B21-RVF047A	1180	-0.417	-11.3	1153.3	-2.27%	PASSED	PASSED
B21-RVF047C	1180	-0.278	-7.5	1161.5	-1.57%	PASSED	PASSED
B21-RVF047B	1180	-1.167	-31.5	1141.5	-3.26%	FAILED LOW	FAILED LOW
B21-RVF041D	1165	-0.833	-22.5	1129.5	-3.05%	FAILED LOW	FAILED LOW
B21-RVF041B	1165	-1.944	-52.5	1107.5	-4.94%	FAILED LOW	FAILED LOW
B21-RVF041C	1165	-0.153	-4.1	1152.6	-1.06%	PASSED	PASSED
B21-RVF041G	1165	-0.292	-7.9	1144.4	-1.77%	PASSED	PASSED
B21-RVF041L	1165	-0.583	-15.8	1134.8	-2.60%	PASSED	PASSED
B21-RVF051C	1190	-1.917	-51.8	1123.8	-5.57%	FAILED LOW	FAILED LOW
B21-RVF051G	1190	-0.083	-2.3	1182.3	-0.65%	PASSED	PASSED
B21-RVF051B	1190	-0.583	-15.8	1154.8	-2.96%	PASSED	PASSED

PREDICTED SURVEILLANCE TEST RESULTS FOLLOWING 9-MONTHS OPERATION

Valve Number	DesignSet Point	18-Mo. "Drift" Rate	9-Mo. "Drift" Predicted	9-Mo. Predicted As-Found	Predicted Test Delta (%)	Test Result +0/-3% Tolerance	Reset Valve Outside +0/-2% Tolerance
B21-RVF041L	1165	2.123	-12.8	1148.8	-1.39%	PASSED	OKAY
B21-RVF051B	1190	-1.229	7.4	1186.6	-0.28%	PASSED	OKAY
B21-RVF051G	1190	1.040	-6.3	1174.3	-1.32%	PASSED	OKAY
B21-RVF051C	1190	0.457	-2.8	1175.8	-1.20%	PASSED	OKAY
B21-RVF041G	1165	0.936	-5.6	1151.6	-1.15%	PASSED	OKAY
B21-RVF041C	1165	0.333	-2.0	1153.0	-1.03%	PASSED	OKAY
B21-RVF041B	1165	-2.061	12.4	1163.6	-0.12%	PASSED	OKAY
B21-RVF041D	1165	0.145	-0.9	1152.9	-1.04%	PASSED	OKAY
B21-RVF047B	1180	0.074	-0.5	1158.5	-1.83%	PASSED	OKAY
B21-RVF047C	1180	1.676	-10.1	1159.1	-1.77%	PASSED	OKAY
B21-RVF047A	1180	1.269	-7.6	1159.6	-1.73%	PASSED	OKAY
B21-RVF047F	1180	0.790	-4.8	1157.8	-1.89%	PASSED	OKAY
B21-RVF047D	1180	-1.166	7.0	1172.0	-0.68%	PASSED	OKAY
B21-RVF051D	1190	-0.354	2.1	1179.9	-0.85%	PASSED	OKAY
B21-RVF041A	1165	0.291	-1.8	1147.8	-1.48%	PASSED	OKAY
B21-RVF041F	1165	-0.500	3.0	1162.0	-0.26%	PASSED	OKAY
B21-RVF041A	1165	-3.186	19.1	1164.9	-0.01%	PASSED	OKAY
B21-RVF041B	1165	0.333	-2.0	1156.0	-0.77%	PASSED	OKAY
B21-RVF041C	1165	1.457	-8.8	1147.8	-1.48%	PASSED	OKAY
B21-RVF041D	1165	-1.353	8.1	1166.9	0.16%	FAILED HIGH	RESET
B21-RVF041F	1165	0.125	-0.8	1160.8	-0.36%	PASSED	OKAY
B21-RVF041G	1165	2.851	-17.1	1142.1	-1.96%	PASSED	OKAY
B21-RVF041L	1165	0.603	-3.6	1147.6	-1.49%	PASSED	OKAY
B21-RVF047A	1180	2.331	-14.0	1157.0	-1.95%	PASSED	OKAY
B21-RVF047B	1180	3.018	-18.1	1160.1	-1.68%	PASSED	OKAY
B21-RVF047C	1180	1.956	-11.8	1163.8	-1.38%	PASSED	OKAY
B21-RVF047D	1180	2.685	-16.1	1158.1	-1.85%	PASSED	OKAY
B21-RVF047F	1180	3.726	-22.4	1154.4	-2.17%	PASSED	RESET
B21-RVF051B	1190	2.227	-13.4	1162.4	-2.32%	PASSED	RESET
B21-RVF051C	1190	0.208	-1.3	1180.3	-0.82%	PASSED	OKAY
B21-RVF051D	1190	1.332	-8.0	1169.0	-1.76%	PASSED	OKAY
B21-RVF051G	1190	1.436	-8.6	1175.6	-1.21%	PASSED	OKAY
B21-RVF041F	1165	0.249	-1.5	1154.5	-0.90%	PASSED	OKAY
B21-RVF041A	1165	0.270	-1.6	1151.6	-1.15%	PASSED	OKAY
B21-RVF051D	1190	-0.209	1.3	1175.8	-1.20%	PASSED	OKAY
B21-RVF047D	1180	1.665	-10.0	1163.0	-1.44%	PASSED	OKAY
B21-RVF047F	1180	0.853	-5.1	1160.1	-1.68%	PASSED	OKAY
B21-RVF047A	1180	0.624	-3.8	1160.8	-1.63%	PASSED	OKAY
B21-RVF047C	1180	0.416	-2.5	1166.5	-1.14%	PASSED	OKAY
B21-RVF047B	1180	1.748	-10.5	1162.5	-1.48%	PASSED	OKAY
B21-RVF041D	1165	1.248	-7.5	1144.5	-1.76%	PASSED	OKAY
B21-RVF041B	1165	2.914	-17.5	1142.5	-1.93%	PASSED	OKAY
B21-RVF041C	1165	0.229	-1.4	1155.4	-0.83%	PASSED	OKAY
B21-RVF041G	1165	0.437	-2.6	1149.6	-1.32%	PASSED	OKAY
B21-RVF041L	1165	0.874	-5.3	1145.3	-1.70%	PASSED	OKAY
B21-RVF051C	1190	2.872	-17.3	1158.3	-2.67%	PASSED	RESET
B21-RVF051G	1190	0.125	-0.8	1183.8	-0.53%	PASSED	OKAY
B21-RVF051B	1190	0.873	-5.3	1165.3	-2.08%	PASSED	RESET