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MINECK,D.L. Iowa Electric Light & Power Co.
RECIP.NAME RECIPIENT AFFILIATION
MURLEY,T.E. Office of Nuclear Reactor Regulation, Director (Post 870411

SUBJECT: Responds to Generic Ltr 89-04, "Guidance on Developing Acceptable Inservice Testing Programs."

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R I D S / A D D S

Iowa Electric Light and Power Company
October 15, 1990

NG-90-2454

Dr. Thomas E. Murley, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, DC 20555

Subject: Duane Arnold Energy Center
Docket No: 50-331
Op. License No: DPR-49
Response to NRC Generic Letter 89-04,
"Guidance on Developing Acceptable
Inservice Testing Programs"

Reference: 1) Meeting Summary - Inservice Testing Program Relief Requests, August 8, 1990 (TAC No. 76095) dated September 7, 1990 from J. R. Hall (NRC)
2) Letter from D. Mineck (Iowa Electric) to T. Murley (NRC) dated January 5, 1990 (NG-90-0030)

File: A-101b, A-286e

Dear Dr. Murley:

Revision 9 of the Duane Arnold Energy Center (DAEC) Inservice Testing (IST) Program was submitted on January 5, 1990, in response to NRC Generic Letter 89-04, "Guidance on Developing Acceptable Inservice Testing Programs." The relief requests included in Revision 9 were the subject of a meeting on August 8, 1990, between members of the NRC staff, it's Contractor and Iowa Electric personnel. The agreements reached during this meeting were confirmed during a conference call on August 16, 1990 and documented in the meeting summary (Reference 1). We have revised the relief requests accordingly.





A047
1/1

Attachment 1 contains the revised ASME IST Relief Requests PR-001, PR-005, PR-012, PR-015, VR-003, VR-006, VR-012, VR-013, VR-017, VR-021, VR-031 through VR-035, and VR-050. PR-015 is a new Relief Request added as a result of dividing PR-005 into two separate relief requests. Relief Requests PR-010, VR-004, VR-039, VR-043 through VR-048, and VR-052 are, hereby, withdrawn.

Attachment 1 also contains Relief Requests VR-005 and VR-053 which were not discussed at the meeting. VR-005 was submitted with Revision 9, but has been subsequently revised. VR-053 is a new relief request. The need for this relief request was identified during the revision and review process.

As agreed, Relief Requests PR-013, VR-051 and VR-007 will be revised and resubmitted to the NRC by December 31, 1990. Additional information on Relief Requests PR-013 and VR-051 is provided in Attachment 2.

Very truly yours,

Daniel L. Mineck
Manager, Nuclear Division

DLM/CJR/pjv+

Attachments: 1) Duane Arnold Energy Center IST Program Relief Requests
2) Additional Information on Relief Requests PR-013 and VR-051

cc: C. Rushworth
L. Liu
L. Root
R. McGaughy
J. R. Hall (NRC-NRR)
A. Bert Davis (Region III)
NRC Resident Office
Commitment Control No. 900297, 900299

Attachment 1
35 pages

**DUANE ARNOLD ENERGY CENTER**
**IST PROGRAM RELIEF REQUESTS**

RELIEF REQUEST NO. PR-001
TYPE 4

PUMP NUMBER:

Diesel Fuel Oil Transfer 1P-44A, 1P-44B

SECTION XI REQUIREMENT:

Measure pump vibration amplitude quarterly. (IWP-3100)

BASIS FOR RELIEF:

The diesel fuel oil pumps and motors are submerged inside the diesel fuel oil tank (1T-35) and thus are inaccessible for the purpose of taking such measurements. The installation of accelerometers on the pumps is deemed impractical due to the environmental conditions involved and the impracticality of removing the pumps periodically to calibrate and/or repair the accelerometer. Additionally, since the accelerometers would be inaccessible, any abnormal indications from the equipment might be related to a hardware problem that could not be verified without the removal of the pump.

ALTERNATE TESTING:

The Diesel Fuel Oil Transfer Pumps are included in the Duane Arnold Energy Center Preventive Maintenance Program and are removed, disassembled, inspected and rebuilt every other outage. The pumps are inspected for signs of mechanical wear or vibration induced damage. Detailed measurements with a micrometer are taken and the condition of the pump is compared with the manufacturer's tolerances. Any adverse conditions are noted and corrected before the pumps are reassembled and placed back into service. Proper pump operation is verified by conducting the quarterly pump surveillance prior to the pump being declared operable.

The results of the most recent inspection (November 1988) revealed that the pumps are in "like new" condition after more than fourteen years of service.

Bearing vibration measurements are taken to detect (indirectly) evidence of mechanical degradation. Duane Arnold's preventive maintenance activities are tailored to inspect (directly) for evidence of degradation. No additional testing is necessary because Duane Arnold's combination of historical data and preventive maintenance is superior to the indirect test required by the Code. The pumps will be disassembled and inspected in accordance with the DAEC Preventive Maintenance Program.

**DUANE ARNOLD ENERGY CENTER**
**IST PROGRAM RELIEF REQUESTS**

RELIEF REQUEST NO. PR-005
TYPE 4

PUMP NUMBER:

| System | Pump Number |
|---|---|
| River Water | 1P-117A, 1P-117B, 1P-117C, 1P-117D |
| Core Spray | 1P-221A, 1P-221B |
| RCIC | 1P-226 |
| RHR | 1P-229A, 1P-229B, 1P-229C, 1P-229D |

SECTION XI REQUIREMENT:

The resistance of the system shall be varied until either the measured differential pressure or the measured flow rate equals the corresponding reference value. (IWP-3100)

BASIS FOR RELIEF:

Operating experience has shown that flow rates (independent variables during inservice performance testing) for these pumps cannot be readily duplicated with the present flow control systems. Flow control for these systems can only be accomplished through the operation of relatively large gate and globe valves as throttling valves. Because these valves are not generally equipped with position indicators which reflect percent open, the operator must repeatedly "jog" the motor or air operator to try to make minor adjustments in flow rate. These efforts, to exactly duplicate the reference values, would require excessive valve manipulation which could ultimately result in damage to valves or operators.

ALTERNATE TESTING:

The alternative approach calls for the establishment of reference values for flow rate and differential pressure during a reference value test. The reference flow rate ($Q_r$) and differential pressure ($dP_r$) define a point on the pump performance curve as shown in Figure PR-005.1. The solid line in Figure PR-005.1 represents the pump curve which exists during the reference value test.

If the pump characteristics were to degrade during time, the pump would operate on a different curve as represented by the broken line in Figure PR-005.1. Given that $Q_r$ cannot be duplicated exactly in subsequent tests, inservice tests will be performed by taking two sets of measurements and establishing a dP which corresponds to $Q_r$ for the inservice test as described.

RELIEF REQUEST NO. PR-005 (Continued)

After the pump has run for at least five minutes, a flow rate will be obtained which is lower than the reference flow rate ($Q_r$) but greater than a specified lower limit as established in the Test Procedure. When the lower flow rate (Ql) is established, the suction pressure during testing ($P_{il}$) and the discharge pressure ($P_{dl}$) will be measured. The differential pressure ($dP_l$) corresponding to the lower flow rate is computed by:

$$dP_l = P_{dl} - P_{il}$$

After the test quantities corresponding to $Q_l$ have been recorded, the flow rate is adjusted to a value higher than $Q_r$ but less than a specified upper limit as established in the test procedure. When the higher flow rate ($Q_h$) is established, the suction pressure and discharge pressure will be measured and the differential pressure ($dP_h$) corresponding the $Q_h$ will be computed.

As shown in Figure PR-005.1, two points have been established that define a small portion of the pump curve. By linear interpolation between the two points, a differential pressure corresponding to $Q_r$ can be computed.

The general equation at the line between points ($Q_l$, $dP_l$) and ($Q_h$, $dP_h$) is:

$$dP = a - bQ$$

Writing the above equation in terms of $Q_l$, $dPp_l$, $Q_h$ and $dP_h$, and solving for $Q_r$ yields:

$$dP = dP_l + \left(\frac{dP_l - dP_h}{Q_h - Q_l}\right)(Q_h - Q_r) \qquad \text{(Eq.1)}$$

Assuming that the pump curve is nearly linear between $Q_l$ and $Q_h$, Equation 1 gives an accurate value for dP which corresponds to $Q_r$. This precise value of dP obtained analytically can then be compared to the Alert and Required Action limits which are computed using $dP_r$.

The major assumption in the approach described above is that the pump curve is nearly linear between $Q_l$ and $Q_h$. Therefore, values for $Q_l$ and $Q_h$ should fall within a narrow range of $Q_r$, so that the curve in that range approaches linearity. The appropriate flow rate range between the lower and upper procedural limits have been determined on a pump by pump basis.

RELIEF REQUEST NO. PR-005 (Continued)

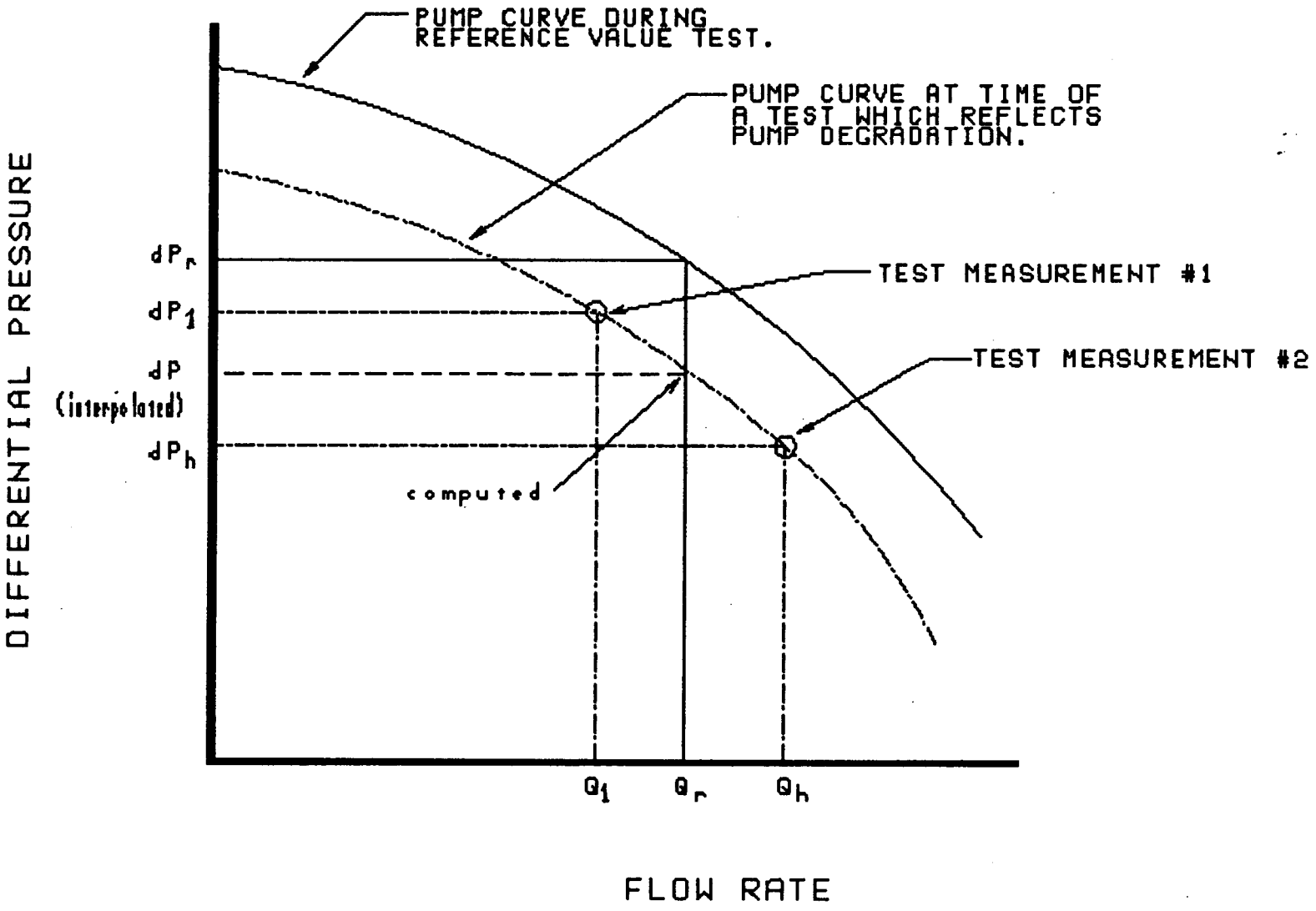


Figure PR-005.1 Alternate Testing Approach for Determination of Hydraulic Change

**DUANE ARNOLD ENERGY CENTER**
**IST PROGRAM RELIEF REQUESTS**

RELIEF REQUEST NO. PR-012
TYPE 3

PUMP NUMBER:

| System | Pump Number |
|---|---|
| Core Spray | 1P-211A, 1P-211B |
| Residual Heat Removal Service Water | 1P-22A, 1P-22B, 1P-22C, 1P-22D |
| High Pressure Coolant Injection | 1P-216 |
| Reactor Core Isolation Cooling | 1P-226 |

SECTION XI REQUIREMENT:

The full-scale range of each instrument shall be three times the reference value or less. (IWP-4120)

BASIS FOR RELIEF:

In several instances the accuracy of installed flow rate instrumentation does not meet the requirements of IWP-4110. In these instances, temporary instrumentation is used to replace less accurate panel meters. However, the available electronic instruments suitable for this service generally do not meet the range limitations imposed by IWP-4120, in that the instrument ranges exceed the respective reference values by greater than a factor of 3. Since the accuracies of the instruments used for the inservice test are based on the actual indicated reading and not on full-scale range of the instruments, this is considered to be acceptable. The specific systems affected are listed below:

| SYSTEM | REF. VALUE | INST. RANGE(1) |
|---|---|---|
| Core Spray | 30 ma | 0-200 ma |
| RHR Service Water | 30 mv | 0-200 mv |
| H.P. Coolant Inj. | 50 mv | 0-200 mv |
| RCIC | 50 mv | 0-200 mv |

(1) Based on FLUKE Model 8024B Digital Multimeter

ALTERNATE TESTING:

No alternate method of measurement is proposed.

**DUANE ARNOLD ENERGY CENTER**
**IST PROGRAM RELIEF REQUESTS**

RELIEF REQUEST NO. PR-015
TYPE 4

PUMP NUMBER:

| System | Pump Number |
|---|---|
| HPCI | 1P-226 |

SECTION XI REQUIREMENT:

The resistance of the system shall be varied until either the measured differential pressure or the measured flow rate equals the corresponding reference value. (IWP-3100)

BASIS FOR RELIEF:

Operating experience has shown that flow rates (independent variables during inservice performance testing) for the HPCI pump cannot be readily duplicated with the present flow control systems. Efforts to exactly duplicate the reference values would require excessive valve manipulation which could ultimately result in damage to valves or operators. In order to perform accurate trending and data analysis, the use of an accurate reference value is very important. The complexities of the flow control systems found within these systems make it extremely difficult to exactly duplicate the reference values.

ALTERNATE TESTING:

Pump differential (discharge) pressure and flow rate will be evaluated using a reference value test derived pump curve. The reference value test pump curve will cover a limited range of pump operation. The reference value test pump curve will be restricted to an operating regime that is representative of accident conditions, or conditions that are the most sensitive indicator of pump degradation.

Based on the reference value test pump curve, a series of "parallel" acceptance criteria curves will be established for Required Action Range and Alert Range limits. Both upper and lower limits will be established.

Detailed Technical Description

The reference value curve (Figure PR-015.1, the solid line) will be established by measuring five (5) to eight (8) sets of differential pressure/flow data when the equipment is known to be operating acceptably. The measurements will be distributed (as uniformly as possible) across the entire range of potential inservice test conditions.

The reference value curve will be computed using a third order polynomial regression technique that employs a least-squares fit of the data by successive polynomials of order 1 through 3. The standard deviation about the regression line will be evaluated for each case. The resulting reference value curve is expressed as a third order polynomial in the general form:

$$y=a_3x^3+a_2x^2+a_1x+a_0$$

, where

y : dependent variable
x : independent variable

The Required Action and Alert Range Curves (Figure PR-015.1) will be scaler multiples of the reference value curve:

- o 1.075 - Upper Required Action Range Limit (the upper dotted line)
- o 1.05 - Upper Alert Range Limit (the upper dashed line)
- o 0.94 - Flow Lower Alert Range Limit, or
- o 0.93 - Differential Pressure Lower Alert Range Limit (the lower dashed line)
- o 0.90 - Lower Required Action Range Limit (the lower dotted line)

Since the typical curve (Figure PR-015.1) may be subject to interpretation, a tabular summary (Figure PR-015.2) of the acceptance criteria will actually be used to evaluate the inservice test results.

The measurements taken during an inservice test will be restricted. Only test measurements within the envelope of reference value test measurements will be acceptable. The inservice test differential pressure/flow will be plotted on the pump curve (Figure PR-015.1), noted on the acceptance criteria table (Figure PR-015.2), and included in the permanent test records.

Finally, the combined differential pressure/flow test measurement will be evaluated for changes from test-to-test. While the "points" on the curve cannot be trended in a meaningful way, the differential pressure/flow data can be

"normalized". The normalized value can be trended across time to determine whether pump hydraulic performance is degrading (Figure PR-015.3). The normalized value of differential pressure/flow is defined as a ratio:

$$y_n = \frac{y}{a_3x^3+a_2x^2+a_1x+a_0}$$

, where

| | | |
|---|---|---|
| $y_n$ | : | normalized dependent variable |
| $y$ | : | actual test measurement of the dependent variable |
| $x$ | : | actual test measurement of the independent variable |

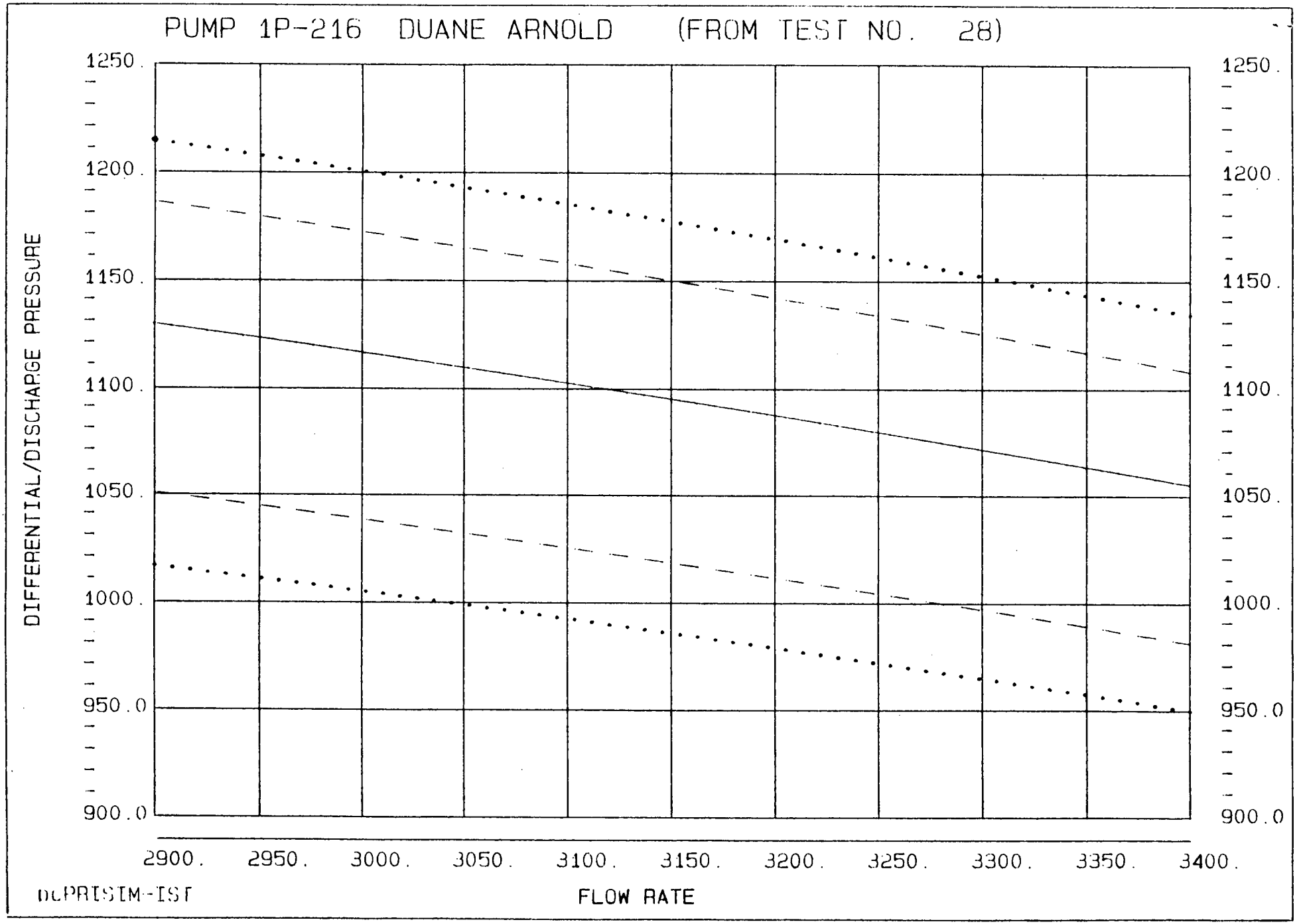


Figure 9 PR-015.1

LIBP REQUEST PR-015 (Continued)

********** IOWA ELECTRIC LIGHT AND POWER COMPANY *** pcPRISIM-IST **
DUANE ARNOLD ENERGY CENTER
**********
INSERVICE TEST ACCEPTANCE CRITERIA FOR * DATE: 09/20/90
PUMP NUMBER : 1P-216 REFERENCE TEST : 028 * PAGE: 1
**********

| FLOW RATE | PRESSURE UPPER REQUIRED ACTION LIMIT | PRESSURE UPPER ALERT RANGE LIMIT | PRESSURE EXPECTED VALUE | PRESSURE LOWER ALERT RANGE LIMIT | PRESSURE LOWER REQUIRED ACTION LIMIT |
|---|---|---|---|---|---|
| 2,900.000 | 1,214.654 | 1,186.406 | 1,129.911 | 1,050.817 | 1,016.920 |
| 2,908.475 | 1,213.495 | 1,185.274 | 1,128.832 | 1,049.814 | 1,015.949 |
| 2,916.949 | 1,212.329 | 1,184.135 | 1,127.747 | 1,048.805 | 1,014.973 |
| 2,925.424 | 1,211.155 | 1,182.989 | 1,126.656 | 1,047.790 | 1,013.990 |
| 2,933.898 | 1,209.975 | 1,181.836 | 1,125.558 | 1,046.769 | 1,013.003 |
| 2,942.373 | 1,208.788 | 1,180.677 | 1,124.454 | 1,045.743 | 1,012.009 |
| 2,950.847 | 1,207.595 | 1,179.511 | 1,123.344 | 1,044.710 | 1,011.009 |
| 2,959.322 | 1,206.394 | 1,178.338 | 1,122.227 | 1,043.671 | 1,010.004 |
| 2,967.797 | 1,205.187 | 1,177.159 | 1,121.104 | 1,042.627 | 1,008.993 |
| 2,976.271 | 1,203.972 | 1,175.973 | 1,119.974 | 1,041.576 | 1,007.977 |
| 2,984.746 | 1,202.751 | 1,174.780 | 1,118.838 | 1,040.520 | 1,006.954 |
| 2,993.220 | 1,201.523 | 1,173.581 | 1,117.696 | 1,039.457 | 1,005.926 |
| 3,001.695 | 1,200.288 | 1,172.374 | 1,116.547 | 1,038.389 | 1,004.892 |
| 3,010.170 | 1,199.046 | 1,171.161 | 1,115.392 | 1,037.314 | 1,003.853 |
| 3,018.644 | 1,197.798 | 1,169.942 | 1,114.230 | 1,036.234 | 1,002.807 |
| 3,027.119 | 1,196.542 | 1,168.715 | 1,113.062 | 1,035.148 | 1,001.756 |
| 3,035.593 | 1,195.280 | 1,167.482 | 1,111.888 | 1,034.056 | 1,000.699 |
| 3,044.068 | 1,194.010 | 1,166.242 | 1,110.707 | 1,032.958 | 999.636 |
| 3,052.542 | 1,192.734 | 1,164.996 | 1,109.520 | 1,031.853 | 998.568 |
| 3,061.017 | 1,191.451 | 1,163.742 | 1,108.326 | 1,030.743 | 997.494 |
| 3,069.492 | 1,190.161 | 1,162.482 | 1,107.126 | 1,029.627 | 996.413 |
| 3,077.966 | 1,188.864 | 1,161.215 | 1,105.920 | 1,028.505 | 995.328 |
| 3,086.441 | 1,187.560 | 1,159.942 | 1,104.707 | 1,027.377 | 994.236 |
| 3,094.915 | 1,186.249 | 1,158.661 | 1,103.487 | 1,026.243 | 993.138 |
| 3,103.390 | 1,184.931 | 1,157.374 | 1,102.261 | 1,025.103 | 992.035 |
| 3,111.864 | 1,183.606 | 1,156.080 | 1,101.029 | 1,023.957 | 990.926 |
| 3,120.339 | 1,182.275 | 1,154.780 | 1,099.790 | 1,022.805 | 989.811 |
| 3,128.814 | 1,180.936 | 1,153.472 | 1,098.545 | 1,021.647 | 988.691 |
| 3,137.288 | 1,179.591 | 1,152.158 | 1,097.294 | 1,020.483 | 987.564 |
| 3,145.763 | 1,178.238 | 1,150.837 | 1,096.035 | 1,019.313 | 986.432 |
| 3,154.237 | 1,176.879 | 1,149.509 | 1,094.771 | 1,018.137 | 985.294 |
| 3,162.712 | 1,175.512 | 1,148.175 | 1,093.500 | 1,016.955 | 984.150 |
| 3,171.186 | 1,174.139 | 1,146.833 | 1,092.222 | 1,015.767 | 983.000 |
| 3,179.661 | 1,172.759 | 1,145.485 | 1,090.938 | 1,014.573 | 981.845 |
| 3,188.136 | 1,171.372 | 1,144.130 | 1,089.648 | 1,013.373 | 980.683 |
| 3,196.610 | 1,169.977 | 1,142.769 | 1,088.351 | 1,012.167 | 979.516 |
| 3,205.085 | 1,168.576 | 1,141.400 | 1,087.048 | 1,010.954 | 978.343 |
| 3,213.559 | 1,167.168 | 1,140.025 | 1,085.738 | 1,009.736 | 977.164 |
| 3,222.034 | 1,165.753 | 1,138.642 | 1,084.421 | 1,008.512 | 975.979 |
| 3,230.508 | 1,164.331 | 1,137.253 | 1,083.099 | 1,007.282 | 974.789 |
| 3,238.983 | 1,162.902 | 1,135.858 | 1,081.769 | 1,006.045 | 973.592 |
| 3,247.458 | 1,161.466 | 1,134.455 | 1,080.433 | 1,004.803 | 972.390 |
| 3,255.932 | 1,160.023 | 1,133.045 | 1,079.091 | 1,003.555 | 971.182 |

**Figure PR-015.2**

********** IOWA ELECTRIC LIGHT AND POWER COMPANY *** pcPRISIM-IST **
DUANE ARNOLD ENERGY CENTER
**********
INSERVICE TEST ACCEPTANCE CRITERIA FOR * DATE: 09/20/90
PUMP NUMBER : 1P-216 REFERENCE TEST : 028 * PAGE: 2
**********

| FLOW RATE | PRESSURE UPPER REQUIRED ACTION LIMIT | PRESSURE UPPER ALERT RANGE LIMIT | PRESSURE EXPECTED VALUE | PRESSURE LOWER ALERT RANGE LIMIT | PRESSURE LOWER REQUIRED ACTION LIMIT |
|---|---|---|---|---|---|
| 3,264.407 | 1,158.573 | 1,131.629 | 1,077.742 | 1,002.300 | 969.968 |
| 3,272.881 | 1,157.116 | 1,130.206 | 1,076.387 | 1,001.040 | 968.748 |
| 3,281.356 | 1,155.652 | 1,128.776 | 1,075.025 | 999.773 | 967.522 |
| 3,289.831 | 1,154.181 | 1,127.339 | 1,073.656 | 998.500 | 966.291 |
| 3,298.305 | 1,152.703 | 1,125.895 | 1,072.281 | 997.222 | 965.053 |
| 3,306.780 | 1,151.217 | 1,124.445 | 1,070.900 | 995.937 | 963.810 |
| 3,315.254 | 1,149.725 | 1,122.987 | 1,069.512 | 994.646 | 962.561 |
| 3,323.729 | 1,148.226 | 1,121.523 | 1,068.117 | 993.349 | 961.306 |
| 3,332.203 | 1,146.720 | 1,120.052 | 1,066.716 | 992.046 | 960.045 |
| 3,340.678 | 1,145.207 | 1,118.574 | 1,065.309 | 990.737 | 958.778 |
| 3,349.153 | 1,143.687 | 1,117.089 | 1,063.895 | 989.422 | 957.505 |
| 3,357.627 | 1,142.159 | 1,115.597 | 1,062.474 | 988.101 | 956.226 |
| 3,366.102 | 1,140.625 | 1,114.099 | 1,061.047 | 986.773 | 954.942 |
| 3,374.576 | 1,139.084 | 1,112.593 | 1,059.613 | 985.440 | 953.651 |
| 3,383.051 | 1,137.535 | 1,111.081 | 1,058.172 | 984.100 | 952.355 |
| 3,391.525 | 1,135.980 | 1,109.562 | 1,056.725 | 982.755 | 951.053 |
| 3,400.000 | 1,134.417 | 1,108.036 | 1,055.272 | 981.403 | 949.745 |

**********

**Figure PR-015.2**

DUANE ARNOLD ENERGY CENTER

PUMP · 1P-216 TEST TYPE · PTMPF , PRESSURE AND FLOW IN

MEASUREMENT

UPPER REQUIRED ACTION LIMIT

UPPER ALERT RANGE LIMIT

LOWER ALERT RANGE LIMIT

LOWER REQUIRED ACTION LIMIT

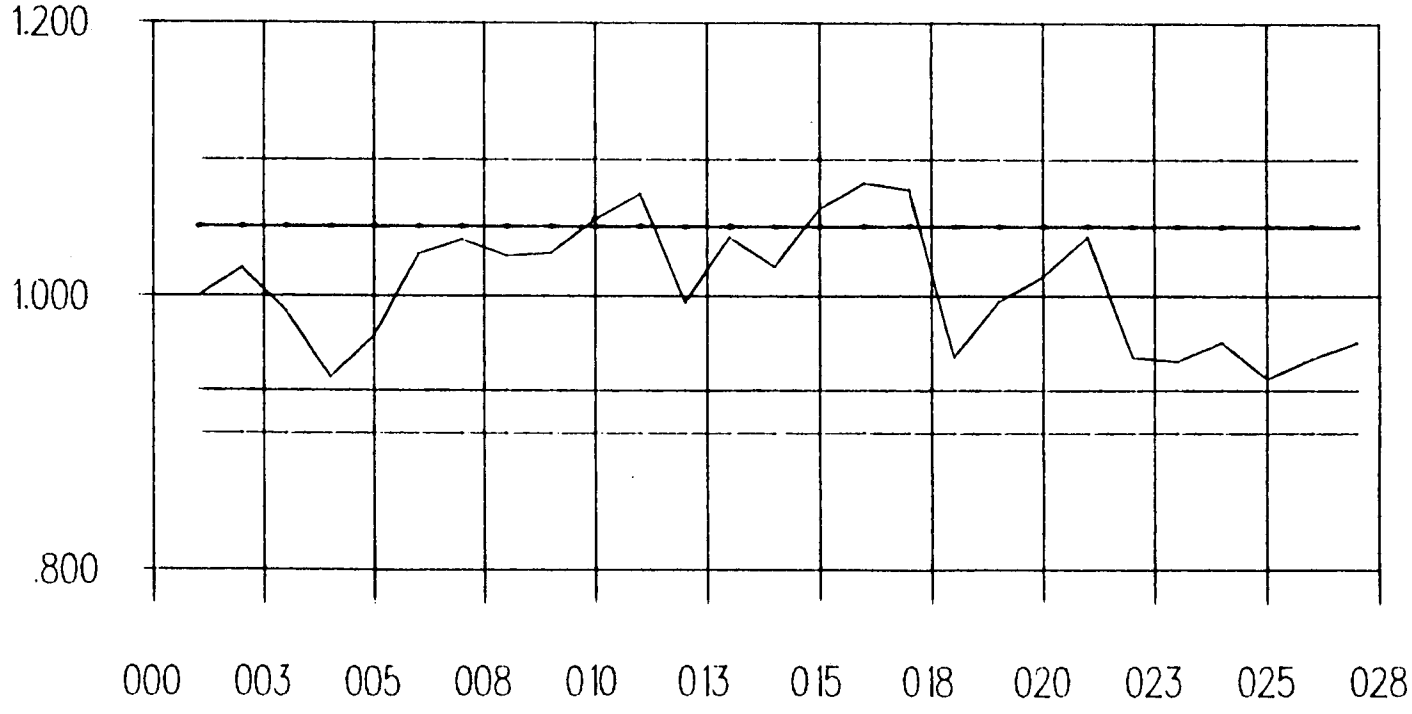


Figure PR-015.3

RELIEF REQUEST PR-015 (Continued)

**DUANE ARNOLD ENERGY CENTER**
**IST PROGRAM RELIEF REQUESTS**

RELIEF REQUEST NO. VR-003

SYSTEM:

Residual Heat Removal

COMPONENTS:

V-19-0149
V-20-0082

CATEGORY:

A/C

FUNCTION:

These valves open to provide a pathway for LPCI flow into the recirculation system and close to isolate the RHR system from the high pressure of the recirculation system.

TEST REQUIREMENT:

Check valves shall be exercised at least every 3 months. (IWV-3521)

BASIS FOR RELIEF:

These valves cannot be stroked during power operation because the RHR pumps cannot develop sufficient head to overcome recirculation system pressure. These valves cannot be manually stroked during operation because they are located in the drywell and are inaccessible.

One of these valves is partially stroked during Cold Shutdown for the operation of the shutdown cooling mode of RHR. This is only a partial stroke test as the normal flow rate in this mode is only 4000 gpm versus a maximum required accident flow rate of 14,400 gpm. While shifting system operation to the idle loop is possible, it is a time consuming operation. In order to change loops and inject cooling flow through the other loop, more than 8 hours of preparation and lineup work would be required of the control room personnel, assuming no other testing/duties ongoing at the time.

A full stroke test of these valves cannot be performed with flow at Cold Shutdown because it would be necessary to test two channels/loops of a safety system at the same time. Current guidance only allows the operation of one train of a safety system for surveillance purposes.

RELIEF REQUEST NO. VR-003 (Continued)

These valves cannot normally be manually exercised at Cold Shutdown because the containment is inerted with nitrogen. In order to gain personnel access to the drywell, the nitrogen must be vented (normally a 16 - 24 hour operation). The containment must be re-inerted before the plant is restarted (another 16 - 24 hour operation). Inerting and de-inerting the drywell solely for the purpose of valve testing is excessively burdensome.

ALTERNATE TESTING:

One of these valves will be partially stroked to the open position each cold shutdown.

V-19-0149 and V-20-0082 will be exercised to the full open position using a mechanical exerciser and the torque measurements recorded on a refueling outage basis.

**DUANE ARNOLD ENERGY CENTER**
**IST PROGRAM RELIEF REQUESTS**

RELIEF REQUEST NO. VR-005
TYPE 4

SYSTEM:

Various

COMPONENTS:

| | | | |
|---|---|---|---|
| PSV-1911 | PSV-2122 | PSV-2609 | PSV-4439B |
| PSV-1952 | PSV-2129 | PSV-3221A | PSV-4439C |
| PSV-1975 | PSV-2223 | PSV-3221B | PSV-4439D |
| PSV-1988 | PSV-2228 | PSV-3222A | PSV-4439E |
| PSV-2043 | PSV-2301 | PSV-3222B | PSV-4439F |
| PSV-2057 | PSV-2430 | PSV-3223A | PSV-4842 |
| PSV-2068 | PSV-2474 | PSV-3223B | |
| PSV-2102 | PSV-2501 | PSV-4336 | |
| PSV-2109 | PSV-2607 | PSV-4439A | |

CATEGORY:

C

FUNCTION:

These valves provide overpressure protection to the associated system components.

TEST REQUIREMENT:

Safety and relief valves shall be tested in accordance with Subsection IWV-3510.

BASIS FOR RELIEF:

ANSI/ASME OM-1-1981, "Requirements for Inservice Performance Testing of Nuclear Power Plant Pressure Relief Devices", was developed to supersede the requirements of Subsection IWV-3510. This standard is more definitive and better suited to operational testing than is ASME/PTC 25.3-1976 which is referenced in IWV-3512.

ALTERNATE TESTING:

Safety and relief valves will be tested in accordance with the requirements of ANSI/ASME OM-1-1981.

**DUANE ARNOLD ENERGY CENTER**
**IST PROGRAM RELIEF REQUESTS**

RELIEF REQUEST NO. VR-006

SYSTEM:

Nuclear Boiler

COMPONENTS:

| Reactor Relief Valves PIS No. | Solenoid Valves PIS No. |
|---|---|
| PSV-4400* | SV-4400 |
| PSV-4401 | SV-4401 |
| PSV-4402* | SV-4402 |
| PSV-4405* | SV-4405 |
| PSV-4406* | SV-4406 |
| PSV-4407 | SV-4407 |

*Automatic Depressurization System (ADS)

CATEGORY:

B/C for the relief valves
B for solenoid valves

FUNCTION:

The functions of the relief valves are to (1) open upon receipt of an ADS signal to blowdown the reactor vessel (for the ADS valves only), (2) act as primary system safety valves actuating on high system pressure or by manual actuation from the Control Room, and (3) to close to maintain the primary system pressure boundary and prevent uncontrolled depressurization of the reactor (stuck open relief valve). The function of the solenoid valves is to energize upon receipt of a manual or ADS actuation signal and, in so doing, vent the poppet valve assembly causing the associated main valves to open.

TEST REQUIREMENTS:

Exercise valves every three months (IWV-3412 (a)).

Evaluate stroke times with respect to the previously measured stroke time (IWV-3417 (a)).

BASIS FOR RELIEF:

These valves can only be tested at very low reactor power levels with primary system pressure greater than 50 psig. The test sequence requires an Operator to:

a. Open at least one turbine bypass valve and discharge main steam directly to the condenser,

b. Actuate the relief valve and observe the corresponding closure of the turbine bypass valve (pressure control on the turbine bypass valve is fairly quick to respond, ~1-1/2 seconds), and the response of pressure switches and thermocouples downstream of the relief valve.

c. Close the relief valve and observe the corresponding opening of the turbine bypass valve and the response of pressure switches and thermocouples downstream of the relief valves.

Each relief valve actuation produces hydrodynamic loads which are transmitted to the suppression Pool (Torus). The Duane Arnold Mark I Containment, Plant Unique Analysis Report (PUAR) fatigue evaluation is based on 740 relief valve actuations with normal operating conditions (i.e, 740 actuations for testing purposes). Quarterly testing of the subject valves would result in 4 (quarters) x 40 (years) x 6 (valves) = 960 test actuations, which would exceed the approved design basis.

Finally, the failure of any relief valve to close would cause an uncontrolled rapid depressurization of the primary system (stuck open relief valve transient). The resulting severe thermal gradients in the reactor vessel are not desirable, and should be minimized.

These valves should not be tested during cold shutdowns in order to reduce the number of challenges to safety/relief valves as recommended by NUREG-0737 and the BWR Owners Group Evaluation of NUREG-0737 Item II.K.3.16, Reduction of Challenges and Failures of Relief Valves.

The subject valves are fast acting valves (normally exercise in less than 2 seconds) and they do not have stem/disk position indicators.

PROPOSED ALTERNATE TESTING:

At least half of these valves will be removed, tested, disassembled, inspected and rebuilt every cycle in accordance with Technical Specification 4.6.D.1. Stroke timing of the solenoid actuators is performed by Wyle Labs. Comparison to previously measured stroke time will not be performed. The subject valves will be exercised once every refueling outage during plant startup.

**DUANE ARNOLD ENERGY CENTER**
**IST PROGRAM RELIEF REQUESTS**

RELIEF REQUEST NO. VR-012

SYSTEM:

Control Rod Hydraulic

COMPONENTS:

V-17-0083
V-17-0096

CATEGORY:

A/C

FUNCTION:

Valves V-17-0083 and V-17-0096 prevent backflow through the reactor recirculation pumps seal purge line. They also function as primary containment isolation valves.

TEST REQUIREMENTS:

Exercise every three (3) months (CT-CC) IWV-3521.

BASIS FOR RELIEF:

These simple check valves cannot be remotely operated. They are located inside primary containment and are not accessible for testing during reactor operation. These valves cannot be exercised by utilizing the outside drywell test lines because air would be introduced into the reactor recirculation pump seals which could cause the pump bearings to be damaged.

These valves cannot normally be manually exercised at Cold Shutdown because the containment is inerted with nitrogen. In order to conduct a test of these valves, downstream manual block valves inside containment would require closing in order to ensure that air is not introduced into the pump seals. In order to gain personnel access to the drywell, the nitrogen must be vented (normally a 16 - 24 hour operation). The containment must be re-inerted before the plant is restarted (normally a 16 - 24 hour operation). Inerting and de-inerting the drywell solely for the purpose of valve testing is excessively burdensome.

ALTERNATE TESTING:

These valves will be exercised during leak testing conducted at refueling in accordance with DAEC Technical Specification 4.7.A.2.C (Appendix J, Type C tests).

**DUANE ARNOLD ENERGY CENTER**
**IST PROGRAM RELIEF REQUESTS**

RELIEF REQUEST NO. VR-013

SYSTEM:

Control Rod Drive (CRD) Hydraulic

COMPONENTS:

| | |
|---|---|
| SV-1840 A & B | V-17-0062 |
| CV-1849 | V-18-0118 thru 0206 |
| CV-1850 | V-18-0919 thru 1007 |
| SV-1855 | V-18-1453 thru 1541 |
| SV-1856 | |
| SV-1868 A & B | |
| SV-1869 A & B | |

CATEGORY:

Category B -- CV-1849, CV-1850, SV-1840 A & B, SV-1855 and SV-1856

Category C -- V-17-0062, V-18-0118 thru 0206, V-18-0919 thru 1007 and V-18-1453 thru 1541

FUNCTION:

SV-1840 A & B - Backup scram valves; bleed off scram air header upon receiving a SCRAM signal from the reactor protection system.

CV-1849 - Opens with SCRAM signal to pressurize lower side of CRD piston from accumulator.

CV-1850 - Opens with SCRAM signal to vent top of CRD piston to scram discharge header.

SV-1855 & SV-1856 - Pilot valves for CV-1849 & CV-1850, respectively. Open on SCRAM signal to vent air operators.

V-17-0062 - Back-up SCRAM check valves; ensure the venting of the screen valve pilot air header if SV-1840B has a plugged vent port with the air supply isolated.

V-18-0118 thru 0206 - Prevent bypassing SCRAM water (from the accumulator) to charging water header (if depressurized); open to charge accumulators following SCRAM.

V-18-0919 thru 1007 - Prevent backflow into cooling water header during SCRAM; allow cooling water circulating during normal operation.

RELIEF REQUEST NO. VR-013 (Continued)

| | |
|---|---|
| V-18-1453 thru 1541 - | Open to allow flow from top of CRD pistons to the SCRAM discharge header. |
| SV-1868 A & B and SV-1869 A & B - | Safety related pilot valves for CV-1859A & B and CV-1867A & B. Open on SCRAM signal to vent air operators. |

TEST REQUIREMENTS:

Exercise and time air-operated and solenoid valves every three months (BTO, BTC). IWV-3411, IWV-3413, IWV-3417.

Exercise check valves every three months (CT-CO, CT-CC) IWV-3521. The corresponding fail-safe test is discussed in VR-017.

BASIS FOR RELIEF:

Individual testing of the backup scram valves SV-1840A and SV-1840B requires modifying the electrical configuration of the reactor protection system by jumpers, etc. and inserting a scram signal to each valve -- a complex test.

Testing of valves SV-1840A, SV-1840B, V-17-0062 would require or result in depressurization of the SCRAM air header and the initiation of a full SCRAM signal. Testing of valves SV-1868A, SV-1868B, SV-1869A, and SV-1869B would require the initiation of a full SCRAM signal. Valves CV-1849, CV-1850, SV-1855, SV-1856, and V-18-1453 thru 1541 can only be tested by scramming each individual control rod. Due to the extensive effort and operational constraints associated with scram testing, this is impractical to accomplish on a quarterly basis or even during cold shutdown periods.

Closure testing of valves V-18-0118 thru 0206 require that the control rod drive pumps be stopped to depressurize the charging water header. This test will not be performed during power operation because stopping the pumps results in loss of cooling water to all control rod drive mechanisms and seal damage could result. In addition, stopping the control rod drive pumps stops the flow of seal purge water to the reactor recirculation pumps seals which could result in seal damage due to the ingestion of dirt from an unclean piping system. This test cannot be performed during each cold shutdown because one of the recirculation pumps is usually kept running. USNRC Generic Letter 89-04, Attachment 1, Position 7, provides pre-approval for this testing frequency.

Proper operation of the check valve V-18-0919 is monitored during plant operation. Failure of any of these valves manifests itself in abnormal operation of the associated control rod drive which would be noted (and corrected) by the plant staff.

ALTERNATIVE TESTING:

Proper operation of these valves is demonstrated by testing performed during plant operation or each refueling outage. SV-1840 A & B are tested once per operating cycle as required by a commitment (NG-84-0825). During the test, valve operation is locally observed upon initiation of a manual scram. This testing of the backup SCRAM valves meets the requirements of NUREG-0979, "Safety Evaluation Report Related to the Fuel Design Approval of the GESSAR II, BWR/6 Nuclear Island Design."

Valves SV-1840A and SV-1840B will be tested at each refueling by inserting a SCRAM signal and monitoring that the valves energize to vent the air header. Check valve V-17-0062 is verified to open when SV-1840A and SV-1840B energize and vent. In order for air to exhaust from both SV-1840A and SV-1840B, check valve V-17-0062 must fully open. Valves SV-1868A and SV-1868B, SV-1869A, and SV-1869B will be tested at each refueling by initiating a SCRAM signal to the valves and verifying that the de-energized CRD supplies air to the main valves (CV-1867A, CV-1867B, CV-1859A and CV-1859B).

SV-1840A, SV-1840B, CV-1849; CV-1850; SV-1855, SV-1856, and V-18-1453 thru V-18-1541.

These valves are tested once each operating cycle per DAEC Technical Specifications, Section 4.3.C. Following each refueling outage, all operable control rods are SCRAM time tested from the fully withdrawn position with nuclear system pressure above 950 psig. The time-position performance of each control rod and all rods collectively are compared against the acceptance criteria established for various rod insertion positions per DAEC Technical Specifications, Section 3.3.C.

V-18-118 thru V-18-206 -

Once each operating cycle, the CRD charging header is depressurized and HCU accumulator levels monitored over a period of time. Proper operation of these valves is verified by each accumulator remaining in a charged condition during the test.

V-18-919 thru V-18-1007 -

RELIEF REQUEST NO. VR-013 (Continued)

During normal plant operation at power, each partially or fully withdrawn operable control rod is exercised one notch at least once each week (Technical Specification, Section 4.3.A.2.a). Excessive backleakage through these valves would prevent rod movement.

SV-1868 A & B and SV-1869 A & B -

These valves are tested with the associated main valves (CV-1859A & B and CV-1967A & B). The main valves are exercised closed and the stroke times are verified to be within specified limits, during the Mode Switch Placed in Shutdown test, performed every refueling.

**DUANE ARNOLD ENERGY CENTER**
**IST PROGRAM RELIEF REQUESTS**

RELIEF REQUEST NO. VR-017

SYSTEM:

All Systems

COMPONENTS:

All solenoid and air operated valves equipped to fail open or closed.

Note: There are no other valve operator types with fail safe requirements.

CATEGORY:

A and B

FUNCTION:

Upon loss of actuator power (electrical or pneumatic), the valve must stroke to its fail-safe position.

TEST REQUIREMENTS:

When practical, valves with fail-safe actuators shall be tested by observing the operation of the valves upon loss of actuator power. (IWV-3415)

BASIS FOR RELIEF:

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 electric power or air supply. (FST)

De-energizing the solenoid valve has the same effect as loss of electrical power or loss of control air. Therefore, stroking the valve from the Control Room (BTO, BTC) to its fail-safe position constitutes a fail-safe test for most valves.

ALTERNATE TESTING:

For most configurations, normal stroking (BTO, BTC), to the fail-safe position of valves equipped to fail open or closed constitutes an FST. No additional testing of these valves is necessary.

RELIEF REQUEST NO. VR-017 (Continued)

Where complicated Fail Safe configurations exist, or where test solenoids are provided, a separate fail safe test, utilizing the proper solenoids and/or methods are used to verify true fail-safe operation. The following valves are tested to their fail safe position by means <u>other</u> than normal stroking:

| | | |
|---|---|---|
| MSIVs | - | CV-4412, CV-4413, CV-4415, CV-4416, CV-4418, CV-4419, CV-4420, CV-4421 |
| CRD | - | CV-1849, CV-1850 |
| *Service Water | - | CV-4909, CV-4914, CV-4915 |

*Note: A modification is planned to install necessary controls for the individual fail-safe testing of these valves. This modification will be complete by July 5, 1991.

**DUANE ARNOLD ENERGY CENTER**
**IST PROGRAM RELIEF REQUESTS**

RELIEF REQUEST NO. VR-021

SYSTEM:

High Pressure Coolant Injection (HPCI)
Reactor Core Isolation Cooling (RCIC)

COMPONENTS:

V-23-0001
V-25-0001

CATEGORY:

C

FUNCTION:

These check valves are 14 inch, swing check valves with the valve hinge pins mounted in the valve body. These valves prevent backflow into the suppression pool in the event of a pump suction shift from the condensate storage tank (CST) to the suppression pool. They open to provide flow from the suppression pool to the HPCI or RCIC pumps.

TEST REQUIREMENTS:

Exercise every three months (IWV-3521).

BASIS FOR RELIEF:

As noted in USNRC Generic Letter 89-04, Attachment 1, Position 2, there is no convenient method for verifying the ability of these valves to swing to the full-open or full-closed positions. The system test piping circuits utilize the CST for pump suction rather than the suppression pool. Taking suction from the suppression pool during testing is undesirable because, in so doing, torus water would be transferred to the condensate storage tank. Torus water is not demineralized, thus the entire condensate storage tank inventory would require processing following each test which would result in additional radioactive waste.

For the reasons noted above, these valves cannot be opened. Therefore, they cannot be stroked from the open to the fully closed position (i.e., a close test during quarterly testing could only demonstrate that the valve stayed closed). As a result, full-closed testing also cannot be done quarterly.

Since these valves do not normally see system conditions which cause them to change position, no wear-induced degradation is expected.

RELIEF REQUEST NO. VR-021 (Continued)

ALTERNATIVE TESTING:

In lieu of the code-required full stroke test, valve operability will be demonstrated by disassembling the valve in accordance with USNRC Generic Letter 89-04, Attachment 1, Position 2. Each refueling outage, the valve will be disassembled and the disc will be verified to swing freely to the open and closed positions. A reverse flow closure test of these valves will be conducted following reassembly.

**DUANE ARNOLD ENERGY CENTER**
**IST PROGRAM RELIEF REQUESTS**

RELIEF REQUEST NO. VR-031

SYSTEM:

Neutron Monitoring

COMPONENTS:

1S266/CK

CATEGORY:

A/C

FUNCTION:

This valve provides containment isolation for the nitrogen purge portion of the TIP system.

TEST REQUIREMENTS:

Check valves shall be exercised at least once every three months, except as provided by IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

This valve is a simple check valve and the only practical method to verify closure is by performing a leak test. conducting such test every three months or at cold shutdown is excessively time consuming and difficult.

In order to perform a leak test, the TIP purge line must be separated at a flange by maintenance technicians which results in a breach of primary containment integrity. Therefore, this test cannot be performed quarterly during plant operation. The LLRT rig must be set up and connected to the system. The leak rate test itself would require approximately 20 manhours to complete. General area dose rates near these valves at cold shutdown are approximately 200 Mr/hour. The man-Rem exposure per test (4 man-Rem) plus the significant wear and tear on the system caused by breaking the flanges make this test impractical to perform at cold shutdown or on a quarterly basis.

ALTERNATE TESTING:

This valve will be exercised to the closed position during leak testing conducted once each cycle in accordance with DAEC Technical Specification 4.7.A.2.c. (Appendix J, Type C leak test).

**DUANE ARNOLD ENERGY CENTER**
**IST PROGRAM RELIEF REQUESTS**

RELIEF REQUEST NO. VR-032

SYSTEM:

Containment Atmosphere Monitoring System

COMPONENTS:

| | |
|---|---|
| SV-8101A | SV-8106A |
| SV-8101B | SV-8106B |
| SV-8102A | SV-8107A |
| SV-8102B | SV-8107B |
| SV-8103A | SV-8108B |
| SV-8103B | SV-8108B |
| SV-8104A | SV-8109A |
| SV-8104B | SV-8109B |
| SV-8105A | SV-8110A |
| SV-8105B | SV-8110B |

CATEGORY:

A

FUNCTION:

These valves provide containment isolation for the containment atmosphere monitoring system.

TEST REQUIREMENTS:

The stroke time of all power-operated valves shall be measured. (IWV-3413 (b), IWV-3417 (a))

BASIS FOR RELIEF:

These valves are not provided with individual position indicators and meaningful stroke time measurements cannot be taken.

ALTERNATIVE TESTING:

These valves will be exercised and their positions verified every three months. Stroke times will not be measured.

**DUANE ARNOLD ENERGY CENTER**
**IST PROGRAM RELIEF REQUESTS**

RELIEF REQUEST NO. VR-033

SYSTEM:

Core Spray

COMPONENTS:

V-21-0072
V-21-0073

CATEGORY:

C

FUNCTION:

These check valves provide a flow path for core spray to the reactor vessel and prevent backflow from the reactor vessel to the core spray system.

TEST REQUIREMENTS:

Check valves shall be exercised at least once every three months, except as provided in IWV-3522. (IWV-3521)

BASIS FOR RELIEF:

These check valves are normally closed. To open the valves, the core spray pumps must be operated at rated flow discharging directly into the reactor vessel. This cannot be done during normal operation because the core spray pumps are not capable of overcoming reactor pressure.

Core spray injection during cold shutdown with the reactor head in place is impractical due to the difficulty of controlling reactor vessel water level. Core spray injection at rated flow would result in a vessel level increase of approximately 30" per minute. With the injection going into the vessel shroud region and a high rate of change in water level and a possible difference in level between the shroud region and the main vessel, it would very easily be possible to flood the main steam lines or overpressurize the reactor vessel (with regard to the pressure/temperature fracture prevention criteria) if this test were performed at Cold Shutdown with the head in place.

ALTERNATIVE TESTING:

These valves will be exercised at each refueling outage by verifying that each division of core spray can deliver rated flow to the reactor vessel.

**DUANE ARNOLD ENERGY CENTER**
**IST PROGRAM RELIEF REQUESTS**

RELIEF REQUEST NO. VR-034

SYSTEM:

Neutron Monitoring
Post-Accident Sampling System (PASS)
RHR Sample Lines

COMPONENTS:

| | | |
|---|---|---|
| 1S260A/BALL | SV-4594A | SV-1972 |
| 1S260B/BALL | SV-4594B | SV-1973 |
| 1S260C/BALL | SV-4595A | SV-2051 |
| | SV-4595B | SV-2052 |
| | SV-8772A | |
| | SV-8772B | |

CATEGORY:

A

FUNCTION:

The TIP System valves function as containment isolation for the TIP tube penetrations.

The PASS system valves provide a flow path for post-accident sampling of the reactor recirculation system and return of the sample flowstream to the torus.

The RHR Sample valves provide a flow path for post-accident sampling of the RHR system.

TEST REQUIREMENTS:

Evaluate stroke times in accordance with IWV-3417 (a).

BASIS FOR RELIEF:

It is impractical to apply the requirements of IWV-3417 (a) to valves with stroke times less than 2 seconds without installing sophisticated timing devices. Operator reaction times could easily vary by .5 seconds or more, thereby invalidating the 50% criteria for increasing the surveillance frequency. As noted in USNRC Generic Letter 89-04, Attachment 1, Position 6, power operated valves with normal stroke times of 2 seconds or less are "rapid-acting valves". Relief may be granted from the requirements of Section XI, Paragraph IWV-3417 (a) for these valves provided the licensee assigns a maximum limiting value of full-stroke time of 2 seconds to these valves and, upon exceeding this limit, declares the valve inoperable and takes corrective action in accordance with IWV-3417 (b).

RELIEF REQUEST NO. VR-034 (Continued)

ALTERNATIVE TESTING:

Stroke times for these valves will be measured. Valves exceeding the maximum allowable stroke time of 2 seconds will be declared inoperable. The results of this test will be evaluated with respect to the maximum allowable stroke time but will not be compared to previous tests per the criteria set forth above or in IWV-3417 (a).

**DUANE ARNOLD ENERGY CENTER**
**IST PROGRAM RELIEF REQUESTS**

RELIEF REQUEST NO. VR-035

SYSTEM:

Emergency Service Water (ESW)

COMPONENTS:

| | |
|---|---|
| CV-1956A | CV-2080 |
| CV-1956B | CV-2081 |

CATEGORY:

B

FUNCTION:

CV-1956 A & B open to provide a return path for ESW cooling water from the control building chillers. CV-2080 and CV-2081 are ESW supply valves to the emergency diesel generators.

TEST REQUIREMENTS:

Evaluate stroke times in accordance with IWV-3417 (a).

BASIS FOR RELIEF:

CV-1956A & B are actuated by the starting logic of the associated emergency service water pump, with no individual control handswitch. Also, there are no position indicators for these valves. The test sequence requires an operator to be stationed at the valves, which are physically separated from the pumps, to measure the stroke time of the valve. The operator starts timing upon announcement of the ESW pump start and stops timing based upon the cessation of valve stem movement. For these reasons, precise stroke time measurements are impractical. CV-2080 and CV-2081 do not have position indication. To measure the stroke times of these valves the operator starts timing upon operation of the handswitch for the valve and stops timing based upon cessation of valve stem movement. Thus precise stroke time measurements are impractical

ALTERNATIVE TESTING:

These valves will be exercised every three months. During this testing, valve operation will be observed, and a stroke time estimated based on valve stem movement. Because the stroke time is estimated, the results of this test will be evaluated with respect to the maximum allowable stroke time but will not be compared to the previous tests per the criteria set forth above or in IWV-3417 (a).

**DUANE ARNOLD ENERGY CENTER**
**IST PROGRAM RELIEF REQUESTS**

RELIEF REQUEST NO. VR-050

SYSTEM:

Containment Atmosphere Control

COMPONENTS:

| | |
|---|---|
| CV-4327A | CV-4327F |
| CV-4327B | CV-4327G |
| CV-4327C | CV-4327H |
| CV-4327D | |

CATEGORY:

A/C

FUNCTION:

These are the pressure suppression chamber to drywell vacuum breaker valves which open to equalize the pressure between the two volumes should the drywell pressure decrease below that of the suppression chamber. These valves in conjunction with the torus to reactor building vacuum breakers protect the drywell if the drywell pressure becomes less than the reactor building.

TEST REQUIREMENTS:

Check valves shall be exercised at least once every three months, except as provided by IWV-3522. (IWV-3521)

Valves that are normally closed during plant operation and whose function is to open on reversal of pressure differential shall be tested by proving that the disk moves promptly away from the seat when the closing pressure differential is removed and flow through the valves is initiated, or when a mechanical opening force is applied to the disk. If the test is made without flow through the valve, a mechanical exerciser shall be used to move the disk. The force or torque delivered must be limited to less than 10% of the equivalent force..., except that for vacuum breaker valves, the exerciser force or torque delivered to the disk may be equivalent to the desired functional pressure differential force. This implies that force or torque measurements are required.

BASIS FOR RELIEF:

These valves are located inside the torus and, as such, are not accessible for obtaining the required measurements during reactor operation or during cold shutdown. In order to gain access to the torus, the containment would require de-

inerting, a 36" hatch would need to be removed, and temporary lighting and walkways would need to be installed. Upon completion of testing, this process would be reversed and a local leak rate test of the torus hatch would be required.

ALTERNATE TESTING:

These valves will be partially stroked quarterly during plant operation using installed air operators without any quantitative set point measurements. Additionally, each will be tested to the open and closed positions using a mechanical exerciser and obtaining setpoint measurements at least once each refueling cycle.

**DUANE ARNOLD ENERGY CENTER**
**IST PROGRAM RELIEF REQUESTS**

RELIEF REQUEST NO. VR-053

SYSTEM:

A side Control Building HVAC Instrument Air Supply

COMPONENTS:

V-73-006, V-73-007

CATEGORY:

C

FUNCTION:

To isolate the normal instrument air supply line from the back-up emergency air supply line, on a loss of normal instrument air.

TEST REQUIREMENTS:

Check valves shall be exercised at least once every three months (IWV-3520).

BASIS FOR RELIEF:

The system is only required to have one isolation valve. Total backflow leakage through the line these valves are on must be limited to a specific maximum amount. The valves are installed with no test connections between the valves so that a pressure decay or leak rate test on the individual valves is not possible. Therefore, testing of the individual valves is not possible without disassembly of the valve. Repeated disassembly of the valve will destroy the brass body and not permit reassembly. These valves have no known failures due to leakage.

ALTERNATIVE TESTING:

These valves will be back flow tested as one unit every three months. A pressure decay test will be performed on the system to verify that total back leakage through these two valves does not exceed a specific maximum amount.

Attachment 2

# ADDITIONAL INFORMATION ON RELIEF REQUESTS PR-013 AND VR-051

## PR-013

Pumps which may require expanded limits for flow or differential pressure:

| | |
|---|---|
| Reactor Core Isolation Cooling | 1P-226 |
| High Pressure Coolant Injection | 1P-216 |
| A and B River Water Screen Wash | 1P-112A & B |
| A, B, C and D River Water Supply | 1P-117A, B, C & D |
| A and B Standby Liquid Control | 1P-230A & B |

## VR-051

Additional valve testing which can be performed after valve reassembly:

| Valve Number | Test Type | STP No. |
|---|---|---|
| V-22-63 | CT-CC, CT-PO | BS-01 |
| V-22-64 | CT-CC, CT-PO | BS-01 |
| V-24-46 | CT-CC, CT-PO | BS-01 |
| V-24-47 | CT-CC, CT-PO | BS-01 |

| Valve Number | Test Type | STP No. |
|---|---|---|
| V-22-28 | CT-PO | 45D001 |
| V-22-29 | CT-PO | 45D001 |
| V-22-21 | CT-CC, CT-PO | BS-01, 45D001 |
| V-22-22 | CT-CC, CT-PO | BS-01, 45D001 |
| V-24-12 | CT-PO | 45E001 |
| V-24-09 | CT-PO | 45E001 |
| V-24-10 | CT-PO | 45E001 |

Additional testing for valves V-25-06, V-23-14, V-20-06, V-20-08, V-19-14 and V-19-16 is currently being studied.