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FACIL:50-331 Duane Arnold Energy Center, Iowa Electric Light & Pow 05000331
AUTH.NAME AUTHOR AFFILIATION
MCGAUGHY,R.W. Iowa Electric Light & Power Co.
RECIP.NAME RECIPIENT AFFILIATION
DENTON,H.R. Office of Nuclear Reactor Regulation, Director

SUBJECT: Requests permanent relief from individual valve leakage testing requirements of ASME Boiler & Pressure Vessel Code Section XI for torus-drywell vacuum breakers.Fee encl.

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Iowa Electric Light and Power Company
August 9, 1984
NG-84-3082

Mr. Harold Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Duane Arnold Energy Center
Docket No: 50-331
Op. License No: DPR-49
Inservice Testing Program - Torus/Drywell
Vacuum Breaker Leak Testing

References:
1. IE Letters dated March 1, 1978, revised May 14, 1980 (Revision 2), revised November 11, 1980 (Revision 3), and revised December 8, 1982 (Revision 4).
2. Enclosure 1 of NRC Letter dated September 26, 1983 from D. B. Vassallo (NRC) to L. Liu (IE).
3. Letter, R. McGaughy (IE) to H. Denton (NRC) dated March 29, 1984 (NG-84-1269)

Dear Mr. Denton:

By Reference 1, Iowa Electric Light and Power Company (IE) submitted a proposed inservice testing (IST) program description and request for relief from testing requirements, for the Duane Arnold Energy Center (DAEC). One request (VR-11) sought to obtain relief from individual valve leakage testing requirements of the ASME Boiler and Pressure Vessel Code Section XI for the seven torus-drywell vacuum breakers.

Reference 2 provided results of the NRC staff review of our relief requests. For VR-11, NRC granted relief but indicated that "Although the licensee provided justification for not meeting the Code, permanent relief is not granted at this time...pending supplemental information." NRC requested that we investigate methods (plant modifications, etc.) of determining individual torus-drywell vacuum breaker leakage.

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The attachment to this letter summarizes the results of our investigation to determine individual vacuum breaker leak testing methods (Reference 3). We have determined that, although not necessary for safety, methods of determining individual torus-drywell vacuum breaker leakage are technically feasible. However, each method results in increased radiation exposure to personnel, increased personnel safety concerns, and increased risk of damage to the vacuum breakers and torus internals. As discussed in the attachment, we believe the present DAEC method of determining torus-drywell vent system leakage provides both a conservative and positive means of verifying that the total bypass leakage does not exceed the maximum allowable limits, thus assuring acceptable individual vacuum breaker performance. In light of the foregoing, we are requesting that permanent relief, in accordance with VR-11 of Reference 1, be granted.

In accordance with the requirements of 10 CFR Part 170, we are enclosing the required application fee of $150.

If you have any questions, please feel free to call me.

Very truly yours,

R. W. McGaughy

Richard W. McGaughy
Manager, Nuclear Division

RWM/MSG/dmb*
Attachment: 1. Torus-Drywell Vacuum Breaker Leak Testing Options

cc: M. Grim
L. Liu
S. Tuthill
M. Thadani (NRC)
NRC Resident Office
Commitment Control No. 84-0082

DUANE ARNOLD ENERGY CENTER TORUS-DRYWELL VACUUM BREAKER LEAK TESTING OPTIONS

1.0 INTRODUCTION

By reference 1, Iowa Electric Light and Power Company (IE) submitted a proposed inservice testing (IST) program description and request for relief from testing requirements for the Duane Arnold Energy Center (DAEC). One request (VR-11) sought to obtain relief from the individual valve leakage testing requirements of the ASME Boiler and Pressure Vessel Code Section XI for the seven torus-drywell vacuum breakers.

Reference 2 provided results of the NRC staff review of Iowa Electric's relief requests. For VR-11, NRC granted relief but indicated that "Although the licensee provided justification for not meeting the Code, permanent relief is not granted at this time...pending supplemental information". NRC requested that IE investigate methods of determining individual torus-drywell vacuum breaker leakage.

We have completed our investigation, and have herein summarized the evaluation results for determining individual torus-drywell vacuum breaker leakage.

2.0 DESIGN AND SAFETY FUNCTION OF TORUS-DRYWELL VACUUM BREAKERS

The DAEC torus-drywell vacuum breaker group consists of seven vacuum breakers located inside the torus. Each vacuum breaker (Figure 1) is bolted to a short run of 18" piping which is welded to the torus-drywell vent header. Each vacuum breaker is provided with the counter-balanced pallet and a magnet providing positive closure after valve operation.

The primary safety function of the drywell-torus breaker group is to prevent drywell pressure from being significantly less than torus pressure. A second group, the reactor building-torus group prevents torus pressure from being significantly less than reactor building pressure.

In the event that drywell pressure becomes significantly less than torus pressure, the torus-drywell vacuum breakers open allowing noncondensible gases to flow from the torus air space to the drywell. Vacuum breaker leakage does not affect the ability to perform this safety function.

A second safety-related function associated with the torus-drywell vent system and vacuum breakers is containment pressure suppression. In the event of a process system piping failure within the drywell, reactor water and steam will be released into the drywell gas space.

The resulting increased drywell pressure forces a mixture of noncondensible gases, steam and water into the torus-drywell vent system. The torus-drywell vacuum breakers remain closed, forcing the mixture into the pressure suppression pool. The steam condenses rapidly in the suppression pool resulting in a pressure reduction in the containment.

Torus-drywell vent system leakage can allow the mixture of non-condensible gases, steam, and water to flow directly into the torus gas space bypassing the suppression pool (called bypass leakage). Because steam which bypasses the suppression pool may not be condensed, excessive bypass leakage may affect containment pressure suppression.

Chapter 6 of the DAEC Updated Final Safety Analysis Report discusses the maximum allowable bypass leakage for the DAEC containment in detail. It is shown there that the maximum allowable leakage area is approximately 0.2 ft^2, which corresponds to the area of a 6 inch pipe. This maximum allowable bypass leakage represents the sum of all drywell to torus gas space leakage paths, including torus-drywell vacuum breakers. Based on this, individual vacuum breaker leakage would not adversely affect pressure suppression as long as the total bypass leakage does not exceed the maximum allowable limit.

3.0 PRESENT TESTING METHOD

Iowa Electric presently conducts a leak test of the drywell vent system (vent pipes, headers, downcomers, and vacuum breakers) at the end of each regularly scheduled refueling outage, before the pressurization of the primary system. The present testing method is summarized in the following:

Step 1: Pressurize drywell so that its pressure is 1-1.25 psi higher than the torus pressure.

Step 2: If Step 1 pressurization cannot be achieved, excessive leakage exists. The leakage source is identified and repaired; and a new leak test is begun.

Step 3: After a positive pressure differential of Δ 1-1.25 psi between the drywell and torus is achieved, the pressure of the torus is monitored. The torus pressure response must be such that its corresponding "calculated by-pass area" is less than that of a 1" orifice.

Step 4: If the corresponding "calculated by-pass area" exceeds that of a 1" orifice, the source of leakage is identified and repaired.

The 1" orifice leakage area, used as the acceptance criteria for the present leak test of the drywell-torus vent system, represents only 3% of the maximum allowable bypass leakage area for the DAEC containment.

Additionally, this method provides conservative results because testing is performed at low drywell pressure, and the torus-drywell vacuum breakers increase in leak tightness with increased pressure on the drywell side. Consequently, the present method of testing the vent system and the test acceptance criteria ensure that individual vacuum breaker leak rates are acceptable. The DAEC method of testing the torus-drywell vacuum breakers is also consistent with the methods used at other BWRs.

4.0 INDIVIDUAL VACUUM BREAKER TESTING METHODS

As directed by the NRC in Reference 2, methods for performing individual testing of the seven torus-drywell breakers have been investigated. The following methods have been identified and evaluated:

- Bench Testing of Vacuum Breakers
- Use of Inflatable Plugs for In-Place Testing of Vacuum Breakers
- Use of Standard Pipe Plugs for In-Place testing of Vacuum Breakers
- Installation and use of Block Valves for In-Place Testing of Vacuum Breakers
- Use of Plexiglas/Aluminum Covers for In-Place Testing of Vacuum Breakers

Although any of the above methods is technically feasible, we found they all possess each of the following disadvantages:

- Increased radiation exposure of approximately 20 Man-rem per refueling outage to plant personnel due to working within the torus
- Increased personnel safety hazards due to working within the torus
- Increased risk of damage to the vacuum breakers and torus internals due to individual leak test equipment and procedures.

5.0 CONCLUSIONS

Leakage between the drywell and torus gas space (bypass leakage) must be minimized because it can affect containment pressure suppression capability. Torus-drywell vacuum breaker leakage contributes to total bypass leakage, and therefore, must be controlled. However, determination of individual torus-drywell vacuum breaker leakage is not necessary to verify containment pressure suppression capability. Verification that total bypass leakage does not exceed the maximum allowable is adequate.

Although not necessary for safety, methods of determining individual torus-drywell vacuum breaker leakage are technically feasible. However, each method results in increased radiation exposure to personnel, increased personnel safety concerns, and increased risk of damage to vacuum breakers and torus internals.

Based on the foregoing, we believe the NRC staff will agree that leak testing individual torus-drywell vacuum breakers is technically feasible but may not be desirable when plant and personnel safety is taken into consideration. We also believe the present DAEC method of determining torus-drywell vent system leakage provides a conservative and positive means of verifying that total bypass leakage does not exceed the maximum allowable limit and assures individual vacuum breaker leakage performance is acceptable.

6.0 REFERENCES

1. IE Letters dated March 1, 1978, revised May 14, 1980 (Revision 2), revised November 11, 1980 (Revision 3), and revised December 8, 1982 (Revision 4).

2. Enclosure 1 of NRC Letter dated September 26, 1983 from D. B. Vassallo (NRC) to L. Liu (IELP).

LD-240-208

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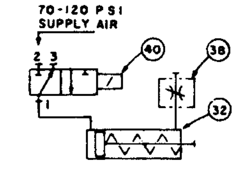
PARTS LIST

Item No.	Part Number	Qty	Description	ASME OR AISI Material	CM	N	UT	MP	PT	R	V	Notes
1.	LC-240-797	1	Pallet Seat Assembly									8
1.1	LC-240-779	1	Seat (Mach)	(LC-240-778)					X			7,8,9
-	LC-240-778	1	Seat (Weld Assem)					X		X		3,8
1.1.1	LD-240-734	1	Seat Flange (Mach)	(LB-240-748)								9
-	LB-240-748	1	Flange	SA350-LF1	X	X	X					9,6
1.1.2	LC-240-762	1	Seat Ring (Mach/Weld)	(LC-240-749)								3,8
-	LC-240-749	1	Seat Ring (Form)	(LC-240-774-3)								4,9
-	LC-240-774-3	1	Seat Ring	SA518 GR. 70								8
1.1.3	LA-240-750	2	Hinge Ear	(LC-240-774-5)								8
-	LC-240-774-5	2	Hinge Ear	SA516 GR. 70	X	X	X					8
1.1.4	LA-240-733-1	A/R	Weld Rod	SFA5.1/E7018	X	X						9
1.1.5	LA-240-709	A/R	Weld Rod	SFA5.9/ER309	X							9
1.1.6												
1.2	LC-240-751	1	Pallet Assem.									7,8,9
1.2.1	LC-240-708	1	Pallet (Mach)	(LC-240-587)				X				3,8
-	LC-240-587	1	Pallet (Form)	(LC-240-774-2)								5,9
-	LC-240-774-2	1	Pallet	SA516 GR. 70	X	X	X					8
1.2.2	LB-240-720	1	Hinge Arm #1 (Mach)	(LB-240-719)								8
-	LB-240-719	1	Hinge Arm #1	SA 516 Gr. 70	X	X						9,6
1.2.3	LB-240-722	1	Hinge Arm #2 (Mach)	(LB-240-721)								8
-	LB-240-721	1	Hinge Arm #2	SA 516 Gr. 70	X	X						9,6
1.2.4	LA-240-616-2	4	Stud 3/8	(LA240-803)							X	8
-	LA-240-803	A/R	3/8 Dia. Rounds	303 S.S.							X	2,9
1.2.5	SP-1003-Z	4	Hex Nut 3/8	18-8 S.S.							X	2,9
1.2.6	LA-240-783-1	1	Stud 1/4	(LA-240-804)							X	8
1.2.7	LA-240-783-2	15	Stud 1/4	(LA-240-804)							X	8
-	LA-240-804	A/R	1/4" Dia. Rounds	303 S.S.							X	2,9
1.2.8												
1.3	SP-388-A	A/R	Silicone Sealant	Dow #781								1
1.4	LC-240-784	1	Seal	(SP-1020-B)								1,2,9
1.5	LC-240-753	1	Seal Retainer (Mach)	(LC-240-806)								8
-	LB-240-806	1	Seal Retainer (Rolled)	304 S.S.								2,9
1.6	LB-240-775	1	Magnet Plate	410 S.S.								8
1.7	SP-1003-V	17	Hex Nut 1/4-28	18-8 S.S.							X	2,9
1.8	SP-1000-AF	1	Hex Cap Screw 1/4-28	303 S.S.							X	2,9
1.9	SP-332-E	16	Washer	18-8 S.S.								
1.10	SP-322-F	2	Lock Washer	18-8 S.S.								
1.11	LA-240-809	2	Hinge Bushing	(LA-240-765)							X	1,8
-	LA-240-765	A/R	1" Dia. Rounds	Bronze							X	2,9
1.12	LA-240-10	1	Hinge Shaft	(LA-240-801)							X	8
-	LA-240-801	A/R	9/16 Dia.	303 S.S.							X	2,9
1.13	SP-331-HG	4	Set Screw	18-8 S.S.								
1.14	LA-240-32	2	Retainer Ring	Ph15-7 Mo S.S.								1,2,9
1.15	LA-240-620	2	Adjuster Stud	303 S.S.								8
1.16	LA-240-741	2	Adjuster Stud	303 S.S.								8
1.17	LA-240-780-1	1	O-Ring	Ethylene Propylene								1,2,9
1.18												
1.19												
1.20	LA-240-901	A/R	Retaining Compound	Loctite RC 40								
2.	LC-240-831	1	Housing (weld)	—				X		X		3,7,8
2.1	LD-240-763	1	Flange (Mach)	(LB-240-764)								9
-	LB-240-764	1	Flange	SA350 LF1	X	X	X					9,6
2.2	LB-240-766	1	Body (Weld/Mach)	(LC-240-774-1)								8,9,4
-	LC-240-774-1	1	Body	A516 GR.70	X	X	X					9
2.3	LC-240-769	1	Reducer 18 X 30	(LC-240-770)								8
-	LC-240-770	1	Reducer Ellipsoidal	(LC-240-774-6)								5,9
-	LC-240-774-6	1	Reducer	SA516 GR. 70	X	X	X					8
2.4	LB-240-782	1	18" Weld Neck Flange	SA350 GR. LF1	X	X	X					2,9,6
2.5	LA-240-731	1	3/4 N.P.T. Drain Conn	(LA-240-805)								8
2.6	LA-240-543	3	Lift Ears (Form)	LC-240-774-4)								9
-	LC-240-774-4	3	Lift Ears	SA518 GR. 70	X	X	X					8
2.7	LA-240-578	1	1" Sch. 80 Soc. Weld	(LA-240-805)								8
2.8	LA-240-829	1	Switch Housing	(LA-240-805)								8
-	LA-240-805	A/R	2-1/4 Dia X 12-1/2 Lg.	SA350 GR. LF1	X	X	X					9,6
2.9												
-												
-												
-												
2.10	LA-240-791	2	Mounting Foot	(LC-240-774-7)								8
-	LC-240-774-7	2	Mounting Foot	SA516 GR. 70	X	X	X					8
2.11	LA-240-733-1	A/R	Weld Rod	SFA 5.1 GR.E7018	X	X						9
3.	LC-240-932	1	Hinge Post (Mach.)	(LC-240-931)								8,7,9
3.1	LC-240-931	1	Hinge Post (WELD)	(LC-240-930)								8
3.1.1	LC-240-930	1	Hinge Post (BLANK)	SA285 GR.C	X	X						9,
4.	LC-240-915	1	Actuator Arm Assem.	—								7,8,9
4.1	LC-240-917	1	Actuator Arm (Mech.)	(LC-240-916)								8
4.1.1	LC-240-916	1	Actuator Arm (Blank)	SA285 GR.C	X							9
4.2	LA-240-789	1	Pivot Hub	304 S.S.								8
4.3	LA-240-790	1	Roller Hub	304 S.S.								8
5.	LA-240-650	2	Bearing	Bronze								1,9
6.	LA-240-19	1	Shaft 1/2	303 S.S.								8
7.	LA-240-645	2	Roller	303 S.S.								8
8.	LA-240-541-1	2	Retainer Ring 1/2	Ph15-7 Mo S.S.								1,9
9.	LA-240-651	2	Bearing	Bronze								9
10.	LA-240-20	1	Shaft	303 S.S.								8
-												
11.	LA-240-541-2	2	Retainer Ring 5/8	Ph15-7 Mo S.S.								1,9
12.	241-117	1	Lockwasher	18-8 S.S.								8
13.	LA-240-787	1	Magnet	Alnico Gr. V								9
14.	LA-240-518	1	Magnet Spacer	2011-T3 Alum								3,8
15.	LA-240-732	1	Magnet Spacer	(SP-1020-B)								2,9
16.	LA-240-565	3	Shim 1/32	304 S.S.								9
17.	LA-240-623	3	Shim 1/64	304 S.S.								9
18.	LA-240-537-1	1	Socket Hd. Screw 7/16	18-8 S.S.							X	2,9
19.	SP-330-A	4	Hol. Hd. Screw	18-8 S.S.								
20.	SP-332-D	4	Plain Washer	18-8 S.S.								
21.	LA-240-813	A/R	Lubricant	Humble, UniRex N-2								1,9
22.	SP-203-CX	1	Pipe 1" X 3" Lg.	Sch 80 Pipe								
23.	SP-341-F	1	Pipe Cap	M.I.								
24.												
25.	LA-240-851	1	Pipe Plug	304 S.S.								
26.	LA-240-745	A/R	Rust Inhibitor	Manganese Phos. 7								9
27.	LA-240-752	15	Plain Washer	302 S.S.								9
28.	LA-240-772-2	3	Hex Bolt 3/4	A-193 Gr. B7							X	2,9
29.	LA-240-772-1	17	Hex Bolt 3/4	A-193 Gr. B7							X	2,9
30.	LA-240-786	1	Nameplate	18-8 S.S.								9
31.	SP-22-E	4	Drive Screw	18-8 S.S.								
32.	LB-240-808	1	Cylinder	Parker-Hannifin								9
33.	LA-240-817	1	Piston Rod Head	303 S.S.								8
34.	SP-331-GD	1	Set Screw #10	18-8 S.S.								
35.	SP-325-X	4	Soc. Hd. Screw 3/8	18-8 S.S.								
36.	SP-323-G	4	Lock Washer 3/8	18-8 S.S.								
37.												
38.	LA-240-602	1	Air Control Valve	Hannifin SP-20								9

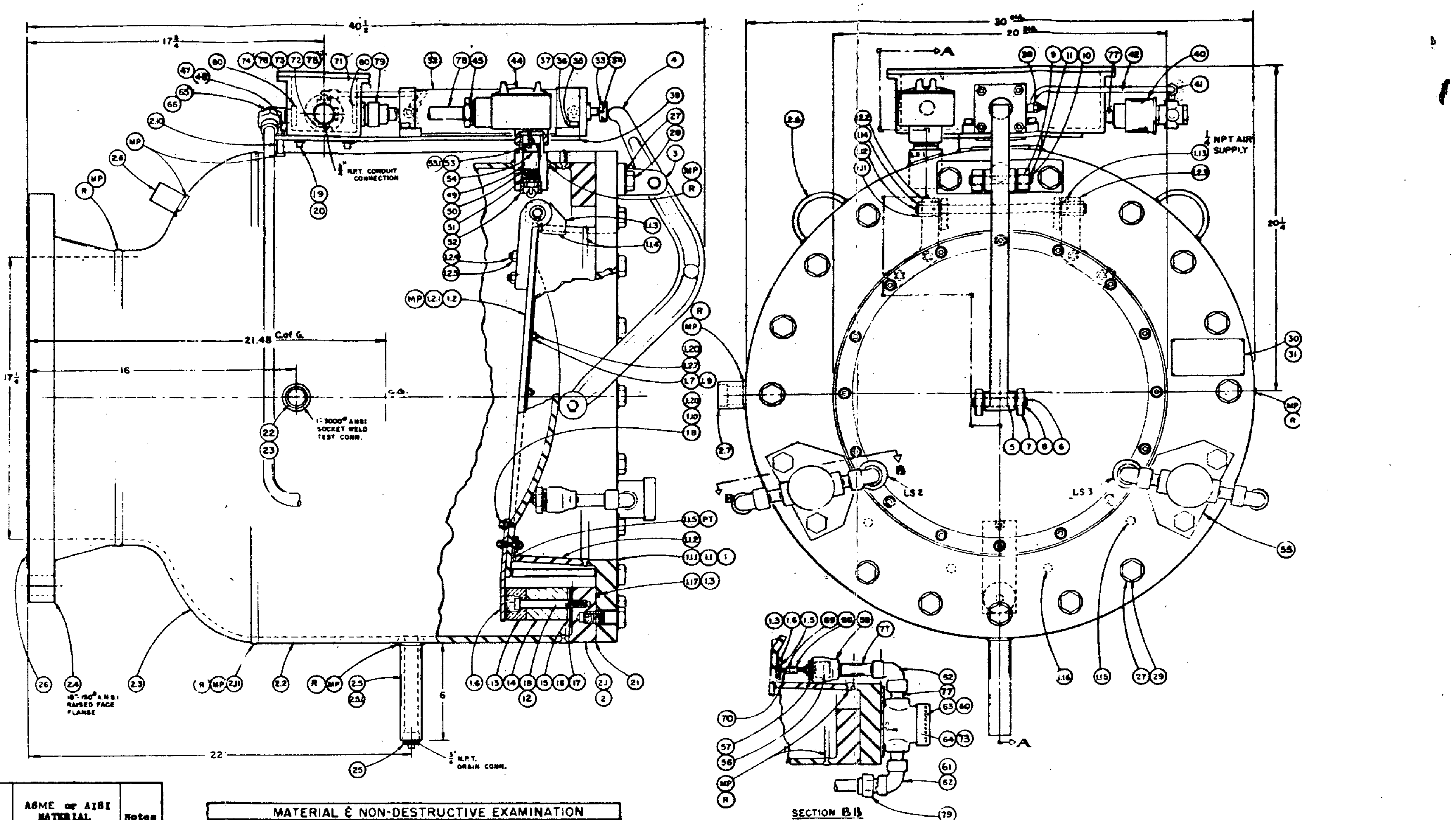
Item No.	Part Number	Qty	Description	ASME or AISI MATERIAL	Notes
39.	LB-240-807	1	Mounting Plate	SA285 Gr. C	9
40.	LA-240-742	1	Solenoid	Asco [illegible]	9
41.	SP-82-K	2	Male Conn. 1/4Tx1/4M	Parker 4CBTX-B	
42.	LA-240-601	1	Tubing 1/4 (035 Wall)	304 S.S.	9
43.					
44.	LA-240-824	1	Switch Box	Alum.	9
45.	LA-240-825	1	Reducer Bushing	Alum.	9
46.					
47.	SP-98-BJ	4	Screw Hex. Hd. 1/4-20	18-8 S.S.	
48.	SP-332-E	4	Plain Washer	18-8 S.S.	
49.	LB-240-616	1	Switch	Licon 63-700085	1,8
50.	LA-240-814	1	O-Ring	Ethylene Propylene	1,2,9
51.	LA-240-34	1	O-Ring Retainer	303 S.S.	8
52.	LA-240-38	1	Retainer Screw	303 S.S.	8
53.	LA-240-822	1	Adjuster Screw	—	8
-	LA-240-823	1	Screw	303 S.S.	8
53.1	LA-240-91	1	Plug	Nylon	9
54.	241 153	1	Washer	302 S.S.	1,9
55.	LA-240-858	1	Plate R.H.	1100 Alum.(SB 209)	9
56.	LB-240-754	2	Switch	Licon 65-430095	1,9
57.	LA-240-755	2	Switch Retainer	303 S.S.	8
58.	LA-240-859	1	Plate L.H.	1100 Alum.	9
59.	LA-240-757	2	Reducer	Alum	9
60.	LA-240-852	2	Conduit Box Seal	(SP-1020-B)	8
61.	LA-240-796	2	Conduit Nipple 2"	(LA-240-792)	6
62.	LA-240-795	4	Conduit Fe. El 90°	Alum	9
63.	LA-240-857	2	Conduit Box	Cast Alum	9
64.	SP-403-TJ	4	Screw 1/4-28 X 5/8	18-8 S.S.	
65.	LA-240-761	2	Union El 90°	Alum	9
66.	LA-240-792	2	Conduit	Alum	9
67.					
68.	LA-240-759	2	Sw. Adjuster	303 S.S.	9
69.	SP-330-V	6	Jam Nut	18-8 S.S.	
70.	LA-240-763-2	2	Stud	(LA-240-804)	8
71.	LC-240-830	1	Terminal Box Nema 4	Cast Alum	9
72.	LA-240-864	1	Terminal Board	Kulka 22014-10A	9
73.		1			
74.	LA-240-855	13	Spade Terminal	T.&B. A18-8F	9
75.	LA-240-913	1	Back Strip	Alum.	
76.	SP-375-KJ	2	Screw R.H.M.S. #8	18-8 S.S.	
77.	LA-240-856	5	Conduit Nipple 1 1/2	Alum.	9
78.	LA-240-919	2	Conduit Nipple 6"	(LA-240-792)	8
79.	LA-240-598	4	Male Union	Alum	9
80.	LA-240-793	4	Bushing	Phenolic	9
-	SP-1020-B	A/R	1/8 Ethylene Propylene EPDM	Nordel	9



PNEUMATIC DIAGRAM

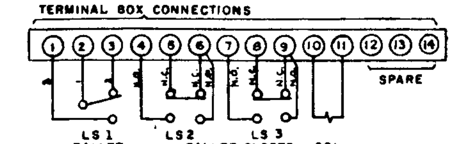
PARTS LIST NOTES:

1. Recommended Spare Parts.
2. Certificates of Compliance to Material Specification.
3. Weld Specification & Procedure: LA-240-167, LA-240-217, LA-240-274, LA-240-278
4. Cold Forming Procedure: LA-240-248
5. Hot Forming Procedure: LA-240-196, LA-240-197
6. Heat Treatment Procedure: LA-240-200
7. Paint Specification: LA-240-245
8. Quality Control (Q.C.) Check List and Process Sheets (in-plant operation)
9. Receiving Quality Control (R.Q.C.) Check List (Buy Out)



MATERIAL & NON-DESTRUCTIVE EXAMINATION			
TEST	MATERIAL	ASME SPECIFICATION	ASME ACCEPTANCE
CM CHEMICAL & MECHANICAL PROPERTY	AS INDICATED	SEC. II MATERIAL SPEC.	SEC. III NC 2120 MATERIAL SPEC.
	BOLTING		SEC. III NC 2581
N CHARPY V-NOTCH	SA 350 GR. LF1	A 370	SEC. III NC 2320
	SA 518 GR. 70	A 593	
UT ULTRASONIC	SA 350 GR. LF1	SEC III NB 2542	
	SA 516 GR. 70	SEC. III NB 2532.1	
MP MAGNETIC PARTICLE	MACH SURFACES	SEC. III IX 3500	SEC. III NB 25453
	WELDS	SEC. III NB 5112 IX 3500	SEC. III NB 5341, NB 5342
PT LIQUID PENETRANT	WELD OVERLAY	SEC. III NB 5112 IX 3600	SEC. III NB 5351, NB 5352
R RADIOGRAPHY	PRESS. CONTAINING WELDS	SEC. III NB 5112 IX 3300	SEC. III NB 5321, NB 5322
	PRESS. CONTAINING CASTINGS	SEC. III NB 2573.2	SEC. III NC 2573 (ASTM E-71-64)
V VISUAL	BOLTS, STUDS, NUTS	SEC. III NB 2581, NB 2582	SEC. III NB 2582

TERMINAL BOX CONNECTIONS



ELECTRICAL SCHEMATIC

(SWITCHES SHOWN IN SHELF POSITION)

GENERAL NOTES.

1. Instruction Manual LA-240-265
2. Tagging & Shipping Inst..........LA-240-236
3. Seismic Analysis..................LA-240-204
4. Hydrostatic/Leak/Setting Test............LA-240-253
5. Function/Operation Test..........LA-240-238
6. Seat Area........................... 314 Sq. In.
7. Maximum Pressure.......... 62 p.s.i.g. test
8. Ambient Temperature........ +30°F to 350°F
9. Setting....... .1 to .35 p.s.i. differential
10. Valve Net Weight.......... 890, Gross 1100
11. Limit Switches............Contacts S.P.D.T.
    Rating: 10 Amp (LS2(3); 5 Amp. (LS 1)
    Temperature: 0°F to 350°F
    Voltage: 115 V.A.C.
    Immersion Req: MIL-E5272
12. Solenoid: 120 VAC; 60 Hz, 6 watt
    Coil: NEMA Class H, Enclosure: NEMA 4
    COIL No. 27-502-10
    KIT No. 208-504

Also Available On Aperture Card

8408140247-01

DUANE ARNOLD ENERGY CENTER
IOWA ELECTRIC LIGHT & POWER COMPANY
UPDATED FINAL SAFETY ANALYSIS REPORT

Torus-Drywell Vacuum Breaker Details

Figure 6.2-58

M-129-2-5 Rev E

TI APERTURE CARD

Revision 1 - 6/83

FIGURE 1