

SPECIFICATION
 FOR
 TEST REQUIREMENTS
 FOR
 HOT DEFLECTION TESTING
 OF
 ASME SECTION III NUCLEAR CLASS
 1,2,3 AND ANSI B31.1 BECHTEL PIPING
 FOR THE
 LIMERICK GENERATING STATION
 UNITS 1 & 2
 PHILADELPHIA ELECTRIC COMPANY
 POTTSTOWN, PENNSYLVANIA

Bechtel Power Corporation
 San Francisco, California

NO.	DATE	REVISIONS	APPROVALS
	5/29/54	Addition number 1 to Rev 1	<i>[Handwritten initials]</i>
1	5/7/84	Revised as noted on sheets i, ii. Issued for use.	<i>[Handwritten initials]</i>
2	12/6/83	Issued for Use	<i>[Handwritten initials]</i>

P-257/2

TEST POINT INFORMATION

SYSTEM NAME: Diesel Exhaust
 LOCATION NAME: Outside Containment
 ISOMETRIC NO: SK-M-6192 Rev. H
 CALCULATION NO: 1-49-51 Rev. 1



REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
	Yes	750° 600	12	X	9/16 -7/16	
	Yes	750° 600	60	Z	2-1/8 1 5/8	
	Yes	750° 600	88	Y	11/16 1/2	




TEST TEMPERATURES

Test Condition	System Description			Expected 1 Test Temperature	Remarks
	System Name	Stress Isometric	Line Number		
Normal Operation	R.H.R.	SK-M-1540A	DCA-105	522/150 °F	Note 4
		SK-M-1542	DLA-112	150 °F	Note 2
			DCA-318	550/150 °F	
		SK-M-1546	DCA-104	522/150 °F	Note 5
Normal Operation	Diesel Exhaust	SK-M-6192	XRE-IXH	750 °F 600 °F change	



SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.
i	1	1	0	A-1	0	B-1	1	B-26	1	C-1	1	C-26	1
ii	1	2	1			B-2	1	B-27	1	C-2	1	C-27	1
iii	0	3	1			B-3	1	B-28	1	C-3	1	C-28	1
iv	0	4	1			B-4	0	B-29	1	C-4	1	C-29	1
		5	1			B-5	0	B-30	1	C-5	1	C-30	1
		6	1			B-6	0	B-31	1	C-6	1	C-31	1
						B-7	0	B-32	1	C-7	1	C-32	1
						B-8	1	B-33	1	C-8	1		
						B-9	1	B-34	1	C-9	1		
						B-10	1	B-35	1	C-10	1		
						B-11	1	B-36	1	C-11	1		
						B-12	0	B-37	1	C-12	1		
						B-13	1	B-38	1	C-13	1		
						B-14	0	B-39	1	C-14	1		
						B-15	1	B-40	1	C-15	1		
						B-16	1			C-16	1		
						B-17	1			C-17	1		
						B-18	1			C-18	1		
						B-19	1			C-19	1		
						B-20	0			C-20	1		
						B-21	1			C-21	1		
						B-22	1			C-22	1		
						B-23	1			C-23	1		
						B-24	1			C-24	1		
						B-25	1			C-25	1		

NO.	DATE	REVISIONS	BY	CHK'D	APP'D	NO.	DATE	REVISIONS	BY	CHK'D	APP'D
1	5/7/68	Revised sheets i, ii, 2 to 6, B-1 to B-3, B-8 to B-11, B-13, B-15 to B-19, B-21 to B-40, C-1 to C-30	(w)	KCP	FPZ						
0	2/16/68	Issued for Use	KCP	FPZ	DF						

	FACING SHEET LIMERICK GENERATING STATION, UNITS 1 & 2 PHILADELPHIA ELECTRIC COMPANY		JOB No 8031 8031-P-362 sheet i	REV. 1

SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.
D-1	0	E-1	1	F-1	1								
D-2	0	E-2	1										
D-3	0	E-3	1										
D-4	0	E-4	1										
D-5	0	E-5	1										
D-6	0	E-6	1										
D-7	0	E-7	1										
D-8	0	E-8	0										
D-9	0												
D-10	0												
D-11	0												
D-12	0												
D-13	0												
D-14	0												

NO.	DATE	REVISIONS	BY	CHK'D	APP'D	NO.	DATE	REVISIONS	BY	CHK'D	APP'D
1	5/7/83	Revised sheets E-1 to E-7, F-1	KCB	KCB	[Signature]						
		Added sheets C-31 to C-32									
0	12/16/83	Issued for Use	KCB	KCB	[Signature]						


 BECHTEL POWER DIVISION	FACING SHEET LIMERICK GENERATING STATION, UNITS 1 & 2 PHILADELPHIA ELECTRIC COMPANY	JOB No 8031 8031-P-362 Sheet ii	REV. 1
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1.0 OBJECTIVES

1.1 The purpose of Hot Deflection Testing for the piping systems listed in Section 2.0 is to verify that:

- a) These piping systems respond to thermal expansion consistent with stress analysis results by comparison of measured deflections with calculated deflections.
- b) These piping systems meet the Acceptance Criteria specified in Section 3.0.

2.0 PIPING SYSTEMS SCOPE

2.1 Hot Deflection Testing of the BOP (Balance-Of-Plant) piping systems listed below will be conducted only for those piping sections identified in the Stress Isometric Drawings contained in Appendix C and in the Scoping P&ID's contained in Appendix D.

2.1.1 Main Steam (MS)

2.1.2 Feedwater (FW)

2.1.3 Reactor Water Clean-Up (RWCU)

2.1.4 Reactor Core Isolation Cooling (RCIC)

2.1.5 High Pressure Coolant Injection (HPCI)

2.1.6 Residual Heat Removal (RHR) (Including Head Spray)

2.1.7 Core Spray (CS)

2.1.8 Diesel Auxiliaries

2.2 The piping systems included within the scope of testing shall be tested during start-up. Testing will be done at the temperatures specified in Appendix E.

Testing during plant pre-operational modes may be substituted wherever practical provided that the test temperatures are equivalent to those specified in Appendix E.

3.0 ACCEPTANCE CRITERIA

3.1 Remote Monitoring

Piping systems in this test that are subject to remote monitoring will be deemed acceptable for thermal expansion if the following criteria is satisfied.

3.1.1 All measured deflections during the testing, when plotted against the calculated deflections listed in Appendix B, shall fall within the shaded acceptable range of the graph in Appendix F.

3.1.2 The change of location of the piping system, after the testing has been completed and the piping temperature has returned to its initial temperature (i.e., to the piping temperature at the start of the testing), will not be more than the greater of $\pm 25\%$ of the total measured deflection during testing or $\pm 1/16$ inch. Multiple cycles are not required.

3.2 Visual Inspection

Piping systems involved in this test that are subject to visual inspection will be deemed acceptable for thermal expansion if the following criteria are satisfied.


3.2.1 All observed deflections during the testing, when plotted against the calculated deflections listed in Appendix B, shall fall within the shaded acceptable range of the graph in Appendix F.

3.2.2 The piping system will not be restrained against thermal expansion during the test, except by design intent.

3.2.3 If the piping system is supported by spring hangers, these will not become extended or compressed beyond their working range, during the thermal expansion of the piping.

3.2.4 If the piping system is restrained by snubbers, these will not become extended or compressed

to the limits of their total travel, during the thermal expansion of the piping.

- 3.2.5 The change of location of the piping system, after the testing has been completed and the piping temperature has returned to its initial temperature (i.e., to the piping temperature at the start of the testing), will not be more than the greater of $\pm 25\%$ of the total measured deflection during testing or $\pm 1/16$ inch. Multiple cycles are not required. | 

3.3 Exceptions to Acceptance Criteria

All exceptions to the acceptance criteria of Section 3.0 shall be documented as test exceptions in the test results and reconciled by Project Engineering.

4.0 PRE REQUISITES

- 4.1 Construction of the piping system, including insulation, penetration sealing etc., must be complete and all pipe supports installed, inspected and adjusted per Reference 7.4.
- 4.2 The test equipment specified in Section 6.0 shall be calibrated within the specified ranges and accuracies for the systems where such equipment is required.

5.0 PRECAUTIONS AND NOTES

- 5.1 As pipe system temperature is raised during the conduct of the test, constant surveillance is required to ensure that intermediate hold temperatures are not exceeded before the required data is recorded and verified as acceptable.
- 5.2 All measured deflection data shall be recorded. Appendix "B" lists the calculated deflection, test temperature at the point of measurement, instrument number with location and direction of deflection.
- 5.3 All measured system test temperatures shall be recorded in the test results and shall be within $\pm 10\%$ of the values specified in Appendix E.

- 5.4 Prior to recording data at a given temperature, the system's temperature must be held constant for approximately 45 minutes, to allow thermal transients to decay, and thus ensure that the entire piping system is essentially at steady state temperature. | △
- 5.5 It is anticipated that some system thermal expansion measurements will not be within the acceptance criteria. Should this situation arise, it will be up to the discretion of the Test Director, after consultation with the Test Engineer, whether to continue or terminate the test.
- 5.6 All original strip charts and recorder charts shall be properly identified as data obtained during the conduct of this test, dated and signed by the Test Director, and stored in accordance with administrative procedures.
- 5.7 The Test Engineer
- a. Shall be qualified to make a visual determination of the thermal expansion response of the piping system based on the test results.
 - b. Must be familiar with the piping stress analysis and pipe supports from a static and dynamic point of view.
 - c. Must be familiar with the operation of the system being tested, or similar systems, and understand any unique operational characteristics of the system being tested.
 - d. Must be familiar with the instrumentation and acceptance criteria for the test being performed.
 - e. Must be familiar with the applicable technical procedures and specifications.

It is acceptable that a team of personnel with the above qualifications perform the testing.

Project Engineering shall designate those individuals qualified to perform visual inspection. | △

- 5.8 The isometrics provided in Appendix C are used to show instrument locations and piping routing only. Other sources must be consulted for pipe support location, types, piping operating conditions, layout dimensions etc.
- 5.9 Expected test temperatures for piping within the test scope are specified in Appendix E. Branch lines from the piping specified in Appendix D and E are assumed to be in normal operation with their valve line up as specified in the P&IDs.
- 5.10 Prior to testing, a system walkdown shall be conducted to verify that the instrument installation is in conformance with this specification. | △

6.0 INSTRUMENTATION

- 6.1 The portions of the piping system that will be inaccessible for visual examination will require remote instrumentation.
- 6.2 The location and direction of the deflection transducers are shown in Appendices B and C. All instruments must be located within one pipe diameter of the location specified in Appendix C.
- 6.3 The remote instrumentation data shall be provided in chart form. Chart scales shall be such that there is no loss of data within the ranges and accuracies specified in Section 6.4. A copy of each chart shall be provided to Project Engineering for information and action as required.
- 6.4 The instrumentation must be capable of measuring 1.5 times the thermal displacement specified in Appendix B, but no less than 6 inches, with a span error of 5% of reading and residual error of $\pm .05$ inch. | △
- 6.5 The instrumentation will not be removed or disconnected prior to final acceptance and/or reconciliation of the system being tested.
- 6.6 The instrument installation shall not affect the operation or integrity of the piping within the test scope or adjacent piping or equipment.

- 6.7 Piping and equipment temperatures are to be measured with existing plant instrumentation when available. When the piping is accessible during testing and there is no existing plant instrumentation, the piping temperature shall be measured using hand held instruments.



7.0 REFERENCES

- 7.1 ASME Boiler and Pressure Vessel Code, Division 1, Section III, 1971 issue with all addenda issued through winter 1972.
- 7.2 ANSI Power Piping, Code B31.1, 1973.
- 7.3 Piping Class Sheets, Summary Sheets and Standards 8031-P-300.
- 7.4 Technical Specification for Installation, Inspection and Documentation of Pipe Supports, Hangers and Restraints, 8031-P-319.
- 7.5 Final Safety Analysis Report Chapter 3, Section 3.0 and Chapter 14.
- 7.6 Stress Isometrics (Included in Appendix C).
- 7.7 Piping and Instrument Diagrams (Included in Appendix D).

APPENDIX A

Number of Instruments

NUMBER OF INSTRUMENTS
LOCATION AND DESCRIPTION

SYSTEM IDENTIFICATION	SYSTEM DESCRIPTION	LOCATION	NO. OF INSTRUMENTS
A	MAIN STEAM	STEAM TUNNEL	10
		OUTSIDE CIMNT	5
B	FEEDWATER	INSIDE CIMNT.	6
C	FEEDWATER	STEAM TUNNEL	1
D	HPCI STEAM SUPPLY	INSIDE CIMNT.	3
E	HPCI TO F.W.	STEAM TUNNEL	DELETED
F	RCIC STEAM SUPPLY	INSIDE CIMNT.	3
G	CORE SPRAY	INSIDE CIMNT.	3
H	RHR (LPCI) LOOP-D	INSIDE CIMNT.	3
I	RHR SHUTDOWN SUPPLY TO LOOP-A	INSIDE CIMNT.	3
J	RHR SHUTDOWN RETURN FROM LOOP-B	INSIDE CIMNT.	3
K	HEAD SPRAY	INSIDE CIMNT.	4
L	RWCU	INSIDE CIMNT.	2
M	RWCU FROM REGENERATIVE HEAT EXCHANGER	STEAM TUNNEL	3
N	RWCU FROM RPV	INSIDE CIMNT.	3

TOTAL INSTRUMENTS INSIDE CIMNT. - 33
TOTAL INSTRUMENTS OUTSIDE CIMNT. - 5
TOTAL INSTRUMENTS IN THE STEAM TUNNEL - 14
TOTAL - 52

APPENDIX B

Test Point Information

Instrumented Piping

TEST POINT INFORMATION

SYSTEM NAME: A - Main Steam
 LOCATION NAME: Steam Tunnel
 ISOMETRIC NO: SK-M-1500 Rev. M
 CALCULATION NO: 1-01-226 REV.3



REMOTE (1) INSTRUMENT NUMBER	VISUAL(2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.Y.A.01		275	C25B	Y	-.342	
DT.Z.A.02		275	C26	Z	-.408	@ Snubber (EBB-101-H12)
DT.Z.A.03		275	C57B	Z	1.562	
DT.X.A.04		275	C57E	X	-2.996	
DT.X.A.05		275	C65B	X	-1.515	
DT.Y.A.01		450	C25B	Y	-.672	
DT.Z.A.02		450	C26	Z	-.801	@ Snubber (EBB-101-H12)
DT.Z.A.03		450	C57B	Z	3.065	
DT.X.A.04		450	C57E	X	-5.880	
DT.X.A.05		450	C65B	X	-2.973	



TEST POINT INFORMATION

SYSTEM NAME: A - Main Steam
 LOCATION NAME: Steam Tunnel
 ISOMETRIC NO: SK-M-1500 Rev. M
 CALCULATION NO: 1-01-226 RFV. 3



REMOTE (1) INSTRUMENT NUMBER	VISUAL(2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.Y.A.01		550	C25B	Y	-0.874	
DT.Z.A.02		550	C26	Z	-1.042	@ Snubber (EBB-101-H12)
DT.Z.A.03		550	C57B	Z	3.987	
DT.X.A.04		550	C57E	X	-7.648	
DT.X.A.05		550	C65B	X	-3.867	

TEST POINT INFORMATION

SYSTEM NAME: A - Main Steam
 LOCATION NAME: Steam Tunnel
 ISOMETRIC NO: SK-M-1503 Rev. N
 CALCULATION NO: 1-01-226 REV. 3

REMOTE (1) INSTRUMENT NUMBER	VISUAL(2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.X.A.06		275	B19E	X	-1.404	
DT.X.A.07		275	B24B	X	-2.785	
DT.Z.A.08		275	B24E	Z	1.192	
DT.Z.A.09		275	B41	Z	- .766	@ Snubber (EBB-104-H12)
DT.Y.A.10		275	B45B	Y	- .263	
DT.X.A.06		450	B19E	X	-2.756	
DT.X.A.07		450	B24B	X	-5.466	
DT.Z.A.08		450	B24E	Z	2.430	
DT.Z.A.09		450	B41	Z	-1.504	@ Snubber (EBB-104-H12)
DT.Y.A.10		450	B45B	Y	- .516	



TEST POINT INFORMATION

SYSTEM NAME: A - Main Steam
 LOCATION NAME: Steam Tunnel
 ISOMETRIC NO: SK-M-1503 Rev. N
 CALCULATION NO: 1-01-226 REV. 3

REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.X.A.06		550	B19E	X	-3.585	
DT.X.A.07		550	B24B	X	-7.109	
DT.Z.A.08		550	B24E	Z	3.044	
DT.Z.A.09		550	B41	Z	-1.956	@ Snubber (EBB-104-H12)
DT.Y.A.10		550	B45B	Y	- .670	

TEST POINT INFORMATION

SYSTEM NAME: A - Main Steam
 LOCATION NAME: Outside Containment
 ISOMETRIC NO: SK-M-1504 Rev. H
 CALCULATION NO: 1-01-226 REV. 3

REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.Z.A.11		275	P3A	Z	.530	@ Snubber (EBB-107-H6)
DT.X.A.12		275	P34E	X	-1.292	
DT.X.A.13		275	P17E	X	-1.228	
DT.Z.A.14		275	P47	Z	-.523	
DT.X.A.15		275	V76	X	- .389	

TEST POINT INFORMATION

SYSTEM NAME: A - Main Steam
 LOCATION NAME: Outside Containment
 ISOMETRIC NO: SK-M-1504 Rev. H
 CALCULATION NO: 1-01-226 REV. 3

REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.Z.A.11		450	P3A	Z	1.041	@ Snubber (EBB-107-H6)
DT.X.A.12		450	P34E	X	-2.537	
DT.X.A.13		450	P17E	X	-2.411	
DT.Z.A.14		450	P47	Z	-1.026	
DT.X.A.15		450	V76	X	- .763	

TEST POINT INFORMATION

SYSTEM NAME: A - Main Steam
 LOCATION NAME: Outside Containment
 ISOMETRIC NO: SK-M-1504 Rev. H.
 CALCULATION NO: 1-01-226 REV. 3

REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.Z.A.11		550	P3A	Z	1.354	@ Snubber (EBB-107-H6)
DT.X.A.12		550	P34E	X	-3.299	
DT.X.A.13		550	P17E	X	-3.135	
DT.Z.A.14		550	P47	Z	-1.335	
DT.X.A.15		550	V76	X	- .992	

TEST POINT INFORMATION

SYSTEM NAME: B - Feedwater
 LOCATION NAME: Inside Containment
 ISOMETRIC NO: SK-M-1552 Rev. J
 CALCULATION NO: 1-12-01 Rev. 3

REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.X.B.01		275	50B	X	.238	
DT.Y.B.02		275	55	Y	.259	
DT.S.B.03		275	104E	E-UP	.618	Perpendicular to pipe in X-Y plane
DT.Y.B.04		275	152	Y	.538	
DT.S.B.05		275	162E	S-E	.800	Azimuth 150° in X-Z plane
DT.Y.B.06		275	172	Y	.825	

TEST POINT INFORMATION

SYSTEM NAME: B - Feedwater
 LOCATION NAME: Inside Containment
 ISOMETRIC NO: SK-M-1552 Rev. J.
 CALCULATION NO: 1-12-01 REV. 3



REMOTE (1) INSTRUMENT NUMBER	VISUAL(2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.X.B.01		420	50B	X	.426	
DT.Y.B.02		420	55	Y	.463	
DT.S.B.03		420	104E	E-UP	1.107	Perpendicular to pipe in X-Y plane
DT.Y.B.04		420	152	Y	.964	
DT.S.B.05		420	162E	S-E	1.434	Azimuth 150° in X-Z plane
DT.Y.B.06		420	172	Y	1.477	



TEST POINT INFORMATION

SYSTEM NAME: C - Feedwater
LOCATION NAME: Steam Tunnel
ISOMETRIC NO: SK-M-1554 Rev. M
CALCULATION NO: 1-15-51A REV. 0



REMOTE (1) INSTRUMENT NUMBER	VISUAL(2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.Z.C.01		275	41E	Z	- .430	

TEST POINT INFORMATION

SYSTEM NAME: C - Feedwater
 LOCATION NAME: Steam Tunnel
 ISOMETRIC NO: SK-M-1554 Rev. M
 CALCULATION NO: 1-15-51A REV. 0



REMOTE (1) INSTRUMENT NUMBER	VISUAL(2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.Z.C.01		420	41E	Z	- .771	

TEST POINT INFORMATION

SYSTEM NAME: C - Feedwater
 LOCATION NAME: Steam Tunnel
 ISOMETRIC NO: SK-M-1615
 CALCULATION NO: 1-15-51 REV. 4

REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.Y.C.02			29E	Y		Piping deleted from test scope

TEST POINT INFORMATION

SYSTEM NAME: D - H.P.C.I. Steam Supply
 LOCATION NAME: Inside Containment
 ISOMETRIC NO: SK-M-1592 Rev. L
 CALCULATION NO: 1-01-03 REV. 5



REMOTE (1) INSTRUMENT NUMBER	VISUAL(2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.Z.D.01		275	200E	Z	.646	
DT.X.D.02		275	210A	X	- .569	
DT.Y.D.03		275	314	Y	- .417	@ Snubber (DBA-106-H7)
DT.Z.D.01		450	200E	Z	1.268	
DT.X.D.02		450	210A	X	-1.116	
DT.Y.D.03		450	314	Y	- .819	@ Snubber (DBA-106-H7)
DT.Z.D.01		550	200E	Z	1.649	
DT.X.D.02		550	210A	X	-1.452	
DT.Y.D.03		550	314	Y	-1.065	@ Snubber (DBA-106-H7)

TEST POINT INFORMATION

SYSTEM NAME: E - H.P.C.I.
 LOCATION NAME: Steam Tunnel
 ISOMETRIC NO: SK-M-6799
 CALCULATION NO: 1-15-51 REV. 4

REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.Z.E.01			B63	Z		Piping deleted from test scope

TEST POINT INFORMATION

SYSTEM NAME: F - R.C.I.C. Steam Supply
 LOCATION NAME: Inside Containment
 ISOMETRIC NO: SK-M-1593 Rev. L
 CALCULATION NO: 1-01-02 REV. 6



REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.Y.F.01		275	310	Y	- .442	@ Snubber (DBA-107-H11)
DT.X.F.02		275	336	X	.532	@ Spring Hgr. (DBA-107- H3)
DT.Z.F.03		275	365B	Z	.697	
DT.Y.F.01		450	310	Y	- .867	@ Snubber (DBA-10007-H11)
DT.X.F.02		450	336	X	1.045	@ Spring Hgr. (DBA-107- H3)
DT.Z.F.03		450	365B	Z	1.369	
DT.Y.F.01		550	310	Y	-1.128	@ Snubber (DBA-107-H11)
DT.X.F.02		550	336	X	1.359	@ Spring Hgr. (DBA-107- H3)
DT.Z.F.03		550	365B	Z	1.780	



TEST POINT INFORMATION

SYSTEM NAME: G - Core Spray
 LOCATION NAME: Inside Containment
 ISOMETRIC NO: SK-M-1610 Rev. Q
 CALCULATION NO: 1-20-02 Rev. 4



REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.X.G.01		150	30B	X	- .548	
DT.Z.G.02		150	55B	Z	- .663	
DT.Y.G.03		550	65B	Y	1.378	



TEST POINT INFORMATION

SYSTEM NAME: H - R.H.R. LPCI
 LOCATION NAME: Inside Containment
 ISOMETRIC NO: SK-M-1542 Rev. L
 CALCULATION NO: 1-10-05 Rev. 4



REMOTE (1) INSTRUMENT NUMBER	VISUAL(2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.X.H.01		550	80	X	.856	@ Spring Hgr. (DCA-318- H5)
DT.Y.H.02		550	80	Y	.885	@ Spring Hgr. (DCA-318- H5)
DT.Z.H.03		550	95	Z	.526	

TEST POINT INFORMATION

SYSTEM NAME: I - R.H.R. Shutdown Supply
 LOCATION NAME: Inside Containment
 ISOMETRIC NO: SK-M-1546 Rev. J
 CALCULATION NO: 1-10-10 REV. 3



REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.S.I.01		150	27N	S-W	.806	Horizontal Perpendicular to pipe.
DT.Y.I.02		150	280	Y	- .874	@ Spring Hgr. (DCA-104- H10)
DT.X.I.03		150	300	X	-1.295	@ Snubber (DCA-104-H25)



TEST POINT INFORMATION

SYSTEM NAME: J - R.H.R. Shutdown Return

LOCATION NAME: Inside Containment

ISOMETRIC NO: SK-M-1548A Rev. H

CALCULATION NO: 1-10-11A REV. 2



REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.Z.J.01		522	110	Z	1.139	
DT.X.J.02		522	142E	X	-1.015	
DT.Y.J.03		150	173	Y	- .695	@ Snubber (DCA-101-H7)

TEST POINT INFORMATION

SYSTEM NAME: K - R.H.R.
 LOCATION NAME: Inside Containment
 ISOMETRIC NO: SK-M-1549
 CALCULATION NO: 1-10-22 REV. 2

REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.X.K.04			35B	X		Piping deleted from test scope
DT.Y.K.05			40	Y		
DT.Z.K.06			72	Z		
DT.Y.K.07			93	Y		

TEST POINT INFORMATION

SYSTEM NAME: K. R.H.R. Head Spray

LOCATION NAME: Inside Containment

ISOMETRIC NO: SK-M-1550 Rev. P

CALCULATION NO: 1-10-09 REV. 3



REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.Z.K.08		150	230B	Z	0.119	
DT.X.K.09		150	247	X	- .149	@ Spring Hgr. (DCA-103- H5)
DT.Y.K.10		550	257	Y	2.659	@ Spring Hgr. (DCA-103- H23)



TEST POINT INFORMATION

SYSTEM NAME: K - R.H.R. Head Spray
LOCATION NAME: Inside Containment
ISOMETRIC NO: SK-M-6794A Rev. D
CALCULATION NO: 1-10-09 Rev. 3



REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.Y.K.12		150	190	Y	.734	



TEST POINT INFORMATION

SYSTEM NAME: L - R.W.C.U.
 LOCATION NAME: Inside Containment
 ISOMETRIC NO: SK-M-1551B Rev. M
 CALCULATION NO: 1-10-11A REV. 2



REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.Z.L.01		522	65	Z	1.238	@ Spring Hgr. (DCA-101-H4)



TEST POINT INFORMATION

SYSTEM NAME: L - R.W.C.U.
 LOCATION NAME: Inside Containment
 ISOMETRIC NO: SK-M-6345B Rev. K
 CALCULATION NO: 1-12-01 Rev. 3



REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.Y.L.02		275	207	Y	.221	@ Spring Hgr. (DBA-112-H2), was DT.Y.B.07

TEST POINT INFORMATION

SYSTEM NAME: L - R.W.C.U.
 LOCATION NAME: Inside Containment
 ISOMETRIC NO: SK-M-6345B Rev. L
 CALCULATION NO: 1-12-01 Rev. 3



REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.Y.L.02		420	207	Y	.395	@ Spring Hgr. (DBA-112- H2) was DT.Y.B.07

TEST POINT INFORMATION

SYSTEM NAME: M - R.W.C.U. from Regenerative Heat Exchanger

LOCATION NAME: Steam Tunnel

ISOMETRIC NO: SK-M-1737 Rev. G

CALCULATION NO: P1-22-61 Rev. 3



REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.X.M.01		434°F	211B	X	.399	
DT.Y.M.02		434°F	215B	Y	.640	
DT.Z.M.03		434°F	200E	Z	-.699	



TEST POINT INFORMATION

SYSTEM NAME: N - R.W.C.U.
 LOCATION NAME: Inside Containment
 ISOMETRIC NO: SK-M-6433 Rev. G
 CALCULATION NO: 1-10-11A REV. 2

REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
DT.Z.N.01		522	570	Z	1.542	@ Snubber (DCA-101-H47)
DT.Y.N.02		522	600E	Y	-0.544	
DT.X.N.03		522	625	X	-1.449	@ Snubber (DCA-101-H55)

Visually Monitored Piping

TEST POINT INFORMATION

SYSTEM NAME: Feedwater
 LOCATION NAME: Outside Containment
 ISOMETRIC NO: SK-M-298 Rev. J
 CALCULATION NO: 1-15-51A REV. 0



REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
	Yes	275°F	86B	X	- 9/16	
	Yes	275°F	86B	Z	3/16	
	Yes	275°F	87E	X	1/2	
	Yes	275°F	87E	Z	3/4	
	Yes	275°F	88B	Z	1 1/8	
	Yes	275°F	89B	X	9/16	
	Yes	275°F	89B	Z	13/16	
	Yes	275°F	370	Y	1/4	@ Spring hgr. (DBD-102- H2)
	Yes	275°F	465	Y	1/4	@ Spring hgr. (DBD-102- H13)
	Yes	275°F	575	Y	3/8	@ Spring hgr. (DBD-102- H16)



TEST POINT INFORMATION

SYSTEM NAME: Feedwater
 LOCATION NAME: Outside Containment
 ISOMETRIC NO: SK-M-298 Rev. J
 CALCULATION NO: 1-15-51A REV. 0



REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
	Yes	420°F	86B	X	- 1.0	
	Yes	420°F	86B	Z	5/16	
	Yes	420°F	87E	X	7/8	
	Yes	420°F	87E	Z	1 5/16	
	Yes	420°F	88B	Z	2 1/16	
	Yes	420°F	89B	X	15/16	
	Yes	420°F	89B	Z	1 1/2	
	Yes	420°F	370	Y	7/16	@ Spring hgr. (DBD-102- H2)
	Yes	420°F	465	Y	1/2	@ Spring hgr. (DBD-102- H13)
	Yes	420°F	575	Y	5/8	@ Spring hgr. (DBD-102- H16)



TEST POINT INFORMATION

SYSTEM NAME: Feedwater
 LOCATION NAME: Outside Containment
 ISOMETRIC NO: SK-M-299A Rev. R
 CALCULATION NO: 1-15-51A REV. 0



REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
	Yes	275°F	57	Z	- 11/16	@ Welded Tee.
	Yes	275°F	58	Z	- 11/16	@ Welded Tee.
	Yes	275°F	70B	X	7/8	
	Yes	275°F	70B	Z	-1 1/4	
	Yes	275°F	126B	X	7/16	
	Yes	275°F	126B	Z	-1 7/16	
	Yes	275°F	139A	Z	-1 5/16	
	Yes	275°F	550	X	11/16	@ (DBD-102-H20)
	Yes	275°F	550	Z	-1 9/16	@ (DBD-102-H20)

TEST POINT INFORMATION

SYSTEM NAME: Feedwater
 LOCATION NAME: Outside Containment
 ISOMETRIC NO: SK-M-299A Rev. R
 CALCULATION NO: 1-15-51A REV. 0



REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
	Yes	420°F	57	Z	-1 3/16	@ Welded Tee.
	Yes	420°F	58	Z	-1 1/4	@ Welded Tee.
	Yes	420°F	70B	X	1 9/16	
	Yes	420°F	70B	Z	-2 3/16	
	Yes	420°F	126B	X	3/4	
	Yes	420°F	126B	Z	-2 5/8	
	Yes	420°F	139A	Z	-2 5/16	
	Yes	420°F	550	X	1 5/16	@ (DBD-102-H20)
	Yes	420°F	550	Z	-2 13/16	@ (DBD-102-H20)

TEST POINT INFORMATION

SYSTEM NAME: H.P.C.I. Steam Supply
 LOCATION NAME: Outside Containment
 ISOMETRIC NO: SK-M-1556A Rev. P
 CALCULATION NO: PI-10-72 REV. 2



REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
	Yes	350	35B	X	- 5/8	
	Yes	350	70	Z	- 7/16	@ Snubber (EBB-108-H26)
	Yes	350	60E	Y	- 3/16	
	Yes	450	35B	X	- 7/8	
	Yes	450	70	Z	- 5/8	@ Snubber (EBB-108-H26)
	Yes	450	60E	Y	- 1/4	
	Yes	550	35B	X	- 1 1/8	
	Yes	550	70	Z	- 13/16	@ Snubber (EBB-108-H26)
	Yes	550	60E	Y	- 3/8	



TEST POINT INFORMATION

SYSTEM NAME: H.P.C.I Steam Supply
 LOCATION NAME: Outside Containment
 ISOMETRIC NO: SK-M-1556B Rev. N
 CALCULATION NO: Pl-24-51 Rev. 3



REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
	Yes	350	R55	X	3/8	@ Snubber (EBB-108-H4)
	Yes	350	67	Y	3/16	@ Spring Hgr. (EBB-108- H33)
	Yes	350	S87	Z	- 3/4	@ Snubber (EBB-108-H16)
	Yes	450	R55	X	1/2	@ Snubber (EBB-108-H4)
	Yes	450	67	Y	5/16	@ Spring Hgr. (EBB-108- H33)
	Yes	450	S87	Z	- 1.0	@ Snubber (EBB-108-H16)
	Yes	550	R55	X	5/8	@ Snubber (EBB-108-H4)
	Yes	550	67	Y	3/8	@ Spring Hgr. (EBB-108- H33)
	Yes	550	S87	Z	-1 5/16	@ Snubber (EBB-108-H16)



TEST POINT INFORMATION

SYSTEM NAME: R.C.I.C. Steam Supply
 LOCATION NAME: Outside Containment
 ISOMETRIC NO: SK-M-1565 Rev. G
 CALCULATION NO: P1-22-51 Rev. 3

REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
	Yes	350	107	X	- 13/16	@ Snubber (EBB-109-H16)
	Yes	450	107	X	-1 3/16	" "
	Yes	550	107	X	-1 9/16	" "

TEST POINT INFORMATION

SYSTEM NAME: R.C.I.C. Steam Supply
 LOCATION NAME: Outside Containment
 ISOMETRIC NO: SK-M-1566 Rev. J
 CALCULATION NO: 1-22-51 Rev. 3



REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
	Yes	350	47A	Z	1/4	@ Snubber (EBB-109-H37)
	Yes	350	51A	Y	5/16	@ Snubber (EBB-109-H39)
	Yes	350	65B	Y	-5/16	
	Yes	350	66A	Z	-1 1/8	@ Snubber (EBB-109-H8)
	Yes	450	47A	Z	3/8	@ Snubber (EBB-109-H37)
	Yes	450	51A	Y	3/8	@ Snubber (EBB-109-H39)
	Yes	450	65B	Y	-1/2	
	Yes	450	66A	Z	-1 5/8	@ Snubber (EBB-109-H8)



TEST POINT INFORMATION

SYSTEM NAME: R.C.I.C. Steam Supply
 LOCATION NAME: Outside Containment
 ISOMETRIC NO: SK-M-1566 Rev. J
 CALCULATION NO: Pl-22-51 Rev. 3



REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA NUMBER	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
	Yes	550	47A	Z	1/2	@ Snubber (EBB-109-H37)
	Yes	550	51A	Y	1/2	@ Snubber (EBB-109-H39)
	Yes	550	65B	Y	-5/8	
	Yes	550	66A	Z	-2 1/8	@ Snubber (EBB-109-H8)



TEST POINT INFORMATION

SYSTEM NAME: R.W.C.U.
 LOCATION NAME: Outside Containment
 ISOMETRIC NO: SK-M-1764B Rev. K
 CALCULATION NO: P1-37-58 Rev. 1



REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
	Yes	434	165	Z	-1 5/16	@ Snubber (DCC-104-H5)
	Yes	434	195	X	-1 3/16	@ Snubber (DCC-104-H22)



TEST POINT INFORMATION

SYSTEM NAME: R.W.C.U.
 LOCATION NAME: Outside Containment
 ISOMETRIC NO: SK-M-1776 Rev. G
 CALCULATION NO: P1-37-58 Rev. 1



REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE °F	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
	Yes	434	25	Y	5/8	@ Spring Hgr. (ECC-105- H1)
	Yes	434	42	Z	-11/16	@ Snubber (ECC-105-H4)

TEST POINT INFORMATION

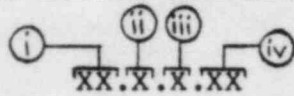
SYSTEM NAME: Diesel Exhaust
 LOCATION NAME: Outside Containment
 ISOMETRIC NO: SK-M-6192 Rev. H
 CALCULATION NO: 1-49-51 Rev. 1




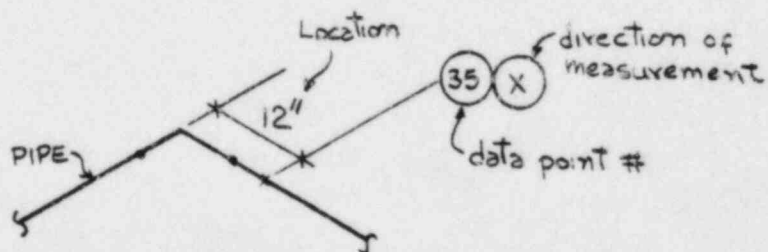
REMOTE (1) INSTRUMENT NUMBER	VISUAL (2) INSPECTION	EXPECTED TEST TEM- PERATURE	DATA POINT	DIRECTION OF (3) DEFLECTION	CALCULATED DEFLECTION (IN)	REMARKS
	Yes	750	12	X	9/16	
	Yes	750	60	Z	2 1/8	
	Yes	750	88	Y	11/16	



NOTES: 1. Instrument number has been designated as follows:



- (i) DT - Displacement transducer
 - (ii) Sensitive axis
 - (iii) System Identification
 - (iv) Instrument No.
2. Visual inspection of displacement will be conducted by the Test Engineer by means of a walkdown, observing spring hanger or snubber scales; scratch pads; plumb-bobs and graph paper. | 
3. Sensitive axis are nominated as:
- X = East
 - Y = UP
 - Z = South
 - S = Skewed
4. Visual inspection displacement measurement points nomenclature:



SK-M- detail sample

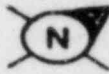
APPENDIX - C
STRESS ISOMETRICS

LIST OF STRESS ISOMETRICS:

<u>Drawing No.</u>	<u>Rev.</u>
SP-DCA-113-E1	7
SK-M-298	J
SK-M-299A	R
SK-M-299B	R
SK-M-1500	M
SK-M-1503	N
SK-M-1504	H
SK-M-1542	L
SK-M-1546	J
SK-M-1548A	H
SK-M-1550	P
SK-M-1551B	M
SK-M-1552	J
SK-M-1554	M
SK-M-1555	F
SK-M-1556A	P
SK-M-1556B	N
SK-M-1565	G
SK-M-1566	J
SK-M-1592	L
SK-M-1593	L
SK-M-1610	Q
SK-M-1642	G
SK-M-1737	G
SK-M-1764A	K
SK-M-1764B	K
SK-M-1776	G
SK-M-6192	H
SK-M-6345B	K
SK-M-6433	G
SK-M-6522	F
SK-M-6794A	D



REF. DWG. NO. SK-M-6434-B



NOTE: ALL WELDS TO BE MADE AT POINT OF INSTALLATION.

NOTES

1) DELETED

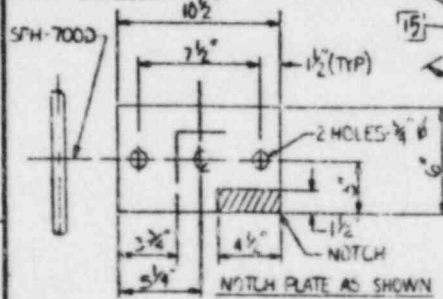
2) PROVIDE STIFF RS AT POINT OF ATTACHMENT & ITEM ① SPH-100B TO W/O X 33. SEE STIFF R DETAIL

3) DELETED

4) CHANGE 1/4" OF SPH-700E TO E.P. PART # 2410.35 SEE HG DETL.

5) QUALITY OF B1 = 16% B2 = 13%

INSTALL BOLTS IN LINE WITH SNUBBER



DETAIL H7-LOOKING SOUTH

LEGEND	
	SPRING HANGER
	RIGID HANGER
	ANCHOR
	GUIDE
	SNUBBER
	RESTRAINT

STIFF R DETAIL

HANGER - CRITICAL

CLEANLINESS CLASS B

TI APERTURE CARD

Note: No measurement required. For reference only

Also Available On Aperture Card

This drawing and the design it covers are the property of BECHTEL. They are loaned and on the borrower's express agreement that they will not be reproduced, copied, loaned, substituted, or used except in the limited way and for the limited purpose shown by the lender to the borrower.

05-20-11

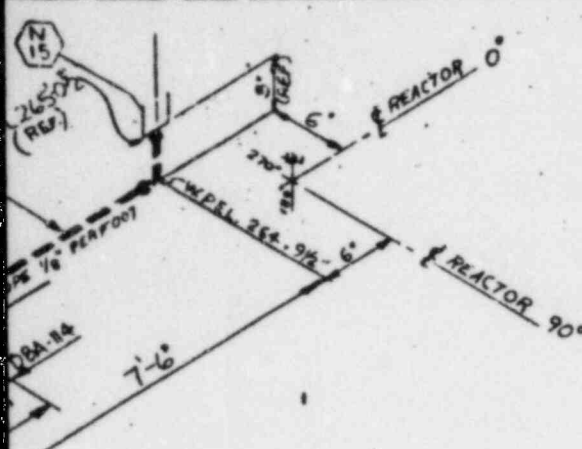
HGR MARK	H1	H2	H3	H4	H5
	STD ASSY DWG #	SPH-405F	SEE HGR	SPH-405F	SPH-405X	SPH-700D
STD STR DWG #	SPH-018	DETAIL	SPH-028	SPH-109B	---
LENGTH "E-E"	8"	SP-DCA-113	8"	15"	---
ELEVATION "B"	263'-4 1/2"	E1-H2	260'-1 1/2"	261'-2"	---
DESIGN LOAD LBS	F _A -625	F _A -565 F _B -450	F _A -585	HL-115	F _A 407
REMARK	#-REST	FAFB LOCAL COORD	---	---	---

ALLOW 1/16" ROOT GAP ON ALL SOCKET WELDS PIPING SYMBOLS SEE P. 360 IN DRAFTING MANUAL VENDOR SUPPLIES

Specification 8031-P-362
Appendix C

14 LF.

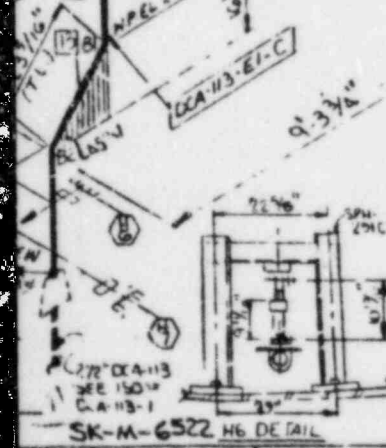
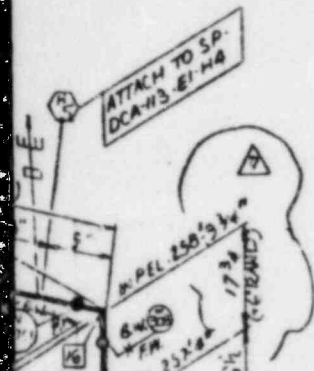
14 LF.
- 8" V.
10 B.W.



REV. NOTE A:
ALL S.W.'S CUT OUT & CHANGED TO BUTT WELDS. REMOVED PC #'S 2,3,6,7, 10 & 11. ADDED PC #'S 18 THRU 20. CUT OUT SPOOL & RETURN TO STOCK. APP. OF SURPLUS AS REQ'D ISSUED SPOOL E' FOR CONSTRUCTION

NOTE: REV. A2
ISO. OCA-113-E1 WAS SPLIT 15 NOW OCA-113-E1 & OCA-113-E2. LINE WAS REROUTED.

NOTE: REV. A3
PIPING FROM PIECE # 5 TO NOZZ. WAS CHANGED TO DBA-114.



NO.	DATE	BY	CHKD.	APP.
1	11/19/68	DET. HG	L. 9/16"	8 1/4"
2	12/23/68	DET. HG	L. 9/16"	8 1/4"
3	1/24/69	DET. HG	L. 9/16"	8 1/4"
4	2/10/69	DET. HG	L. 9/16"	8 1/4"

PROBLEM NO. SP.	
SPECIAL CALC.	YES () NO (X)
TEMP.	582.4 F (312.4 C)
EXP. COEFF.	0.0502 1/FT
MAXIMUM STRESS (PSI)	15,000
ALLOW. STRESS (PSI)	27,350
PIPE SIZE	2"
MAX. GRAVITY SPAN	10'-9"
MAX. GRAVITY LOAD	119
MAX. SEISMIC SPAN	8'-6"
MAX. SEISMIC LOAD	279

REFERENCES	
LINE CLASSIFICATION	BOP
SEISMIC CLASS	II
START OF NO.	62A
END OF NO.	62B
PLANT DESIGN NO.	M-43/18 (F-5) SM-225/47 SM-247/22
AREA	15C/16C DRYWELL

COLOR CODE AND STOCK CODE NO.		BILL OF MATERIAL			
PC	QTY	SIZE AND DESCRIPTION	WELD	SP	HEAT NO.
COLOR RED/WHITE		NUCLEAR CLASS I			
P4710600251	19 2/4	PIPE: SMLS S.S. SCH. 80S SA-312/2866			462713
	20 1/4				
	18 1/4				
	13 5/8				
	5 1/2	TRANSITION PIECE			464151
COLOR RED/WHITE		FITTINGS: SCH 80 B.W. SA-405 HP 304			
P473067167-1	14	2" 90° ELL.			E1805
	15				
	16				
P473067468-1	17	2" 45° ELL.			E1814

NO.	DATE	DESCRIPTION	CHKD.	APP.
1	11-11-68	REVISED DIM. AS SHOWN.	SM	CC JR
2	11-11-68	INCORP. PER M988161 & SP40 REV. 5A	SM	CC JR
3	11-11-68	REVISED TO SHOW FIELD REBURY	SM	CC JR
4	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
5	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
6	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
7	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
8	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
9	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
10	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
11	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
12	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
13	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
14	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
15	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
16	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
17	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
18	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
19	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
20	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
21	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
22	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
23	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
24	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
25	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
26	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
27	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
28	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
29	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR
30	11-11-68	REVISED TO INCLUDE ENG. COMMENT	SM	CC JR

BECHTEL SAN FRANCISCO		
LIMERICK GENERATING STATION UNITS 1 & 2		
PHILADELPHIA ELECTRIC COMPANY		
REACTOR VESSEL DRAIN THRU VALVE 1F030		
JOB NO.	DRAWING NO.	REV.
8031	SP/OCA-113-E1	27

FOR DOCUMENTATION PROCEDURE WD-1 FOR SMALL PIPE WELDING AND NONDESTRUCTIVE EXAMINATION, SEE BECHTEL QUALITY CONTROL MANUAL ADME III, VOL. A, SEC. B.

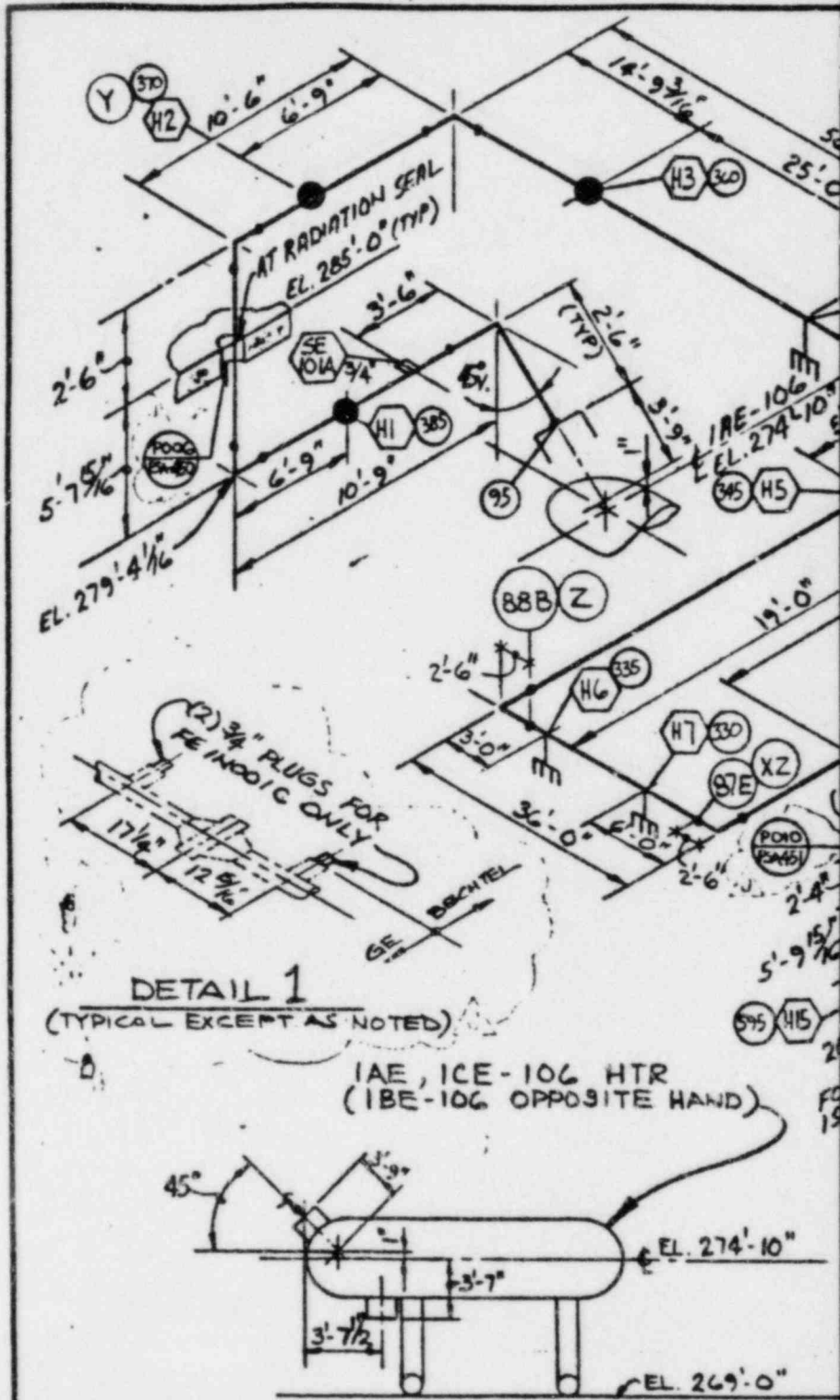
N = HORIZONTAL V = VERTICAL B = BEND F.T.P. = FIELD TO FIT F.W. = FIELD WELD

1 (40R) SP-35-42/10

I certify that the microfilm image contained on this microform was made in the normal and regular course of business. This is a true, full, correct and complete reproduction, and no document has been in lieu of original document.

8408140314-01

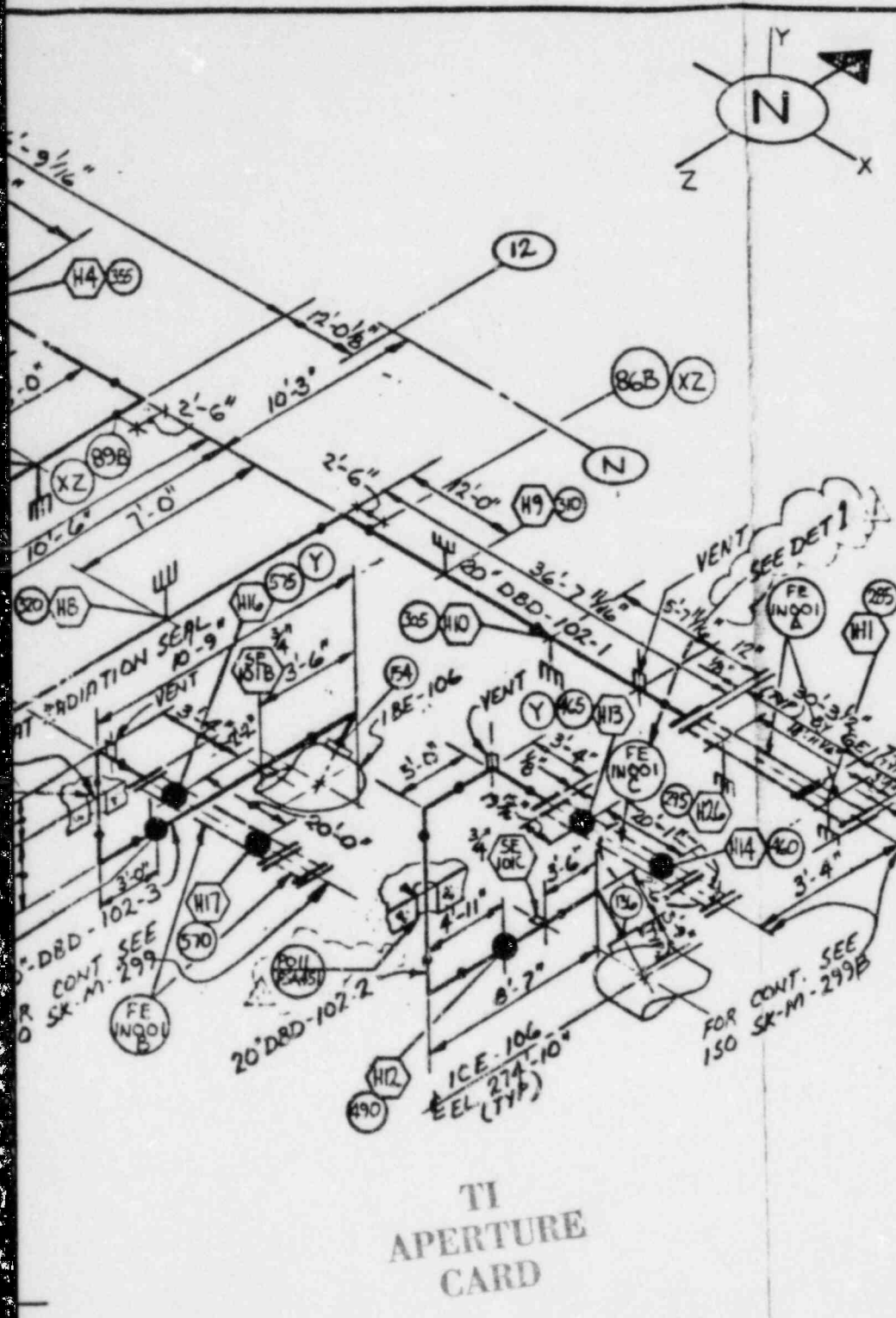
SPECIFICATION 8031-P-362
APPENDIX C



DETAIL 1
(TYPICAL EXCEPT AS NOTED)

		DATA	REV	DATE	BY	REV	DATE
PIPING ENGINEER	LINE No.	DBD-102					
	MATERIAL	A106 GR B					
	LINE THICKNESS (IN)	1.500"					
MECHANICAL ENGINEER	LINE O.D. (IN)	20.00"					
	MODE	I II III					
	PRESS. PSIG						
	TEMP. F						
STRESS ENGINEER	EXP. COEFF. IN/100FT						
	EXP. COEFF. MIL-IN/IN						
	MOD. OF ELAS. E PSI						

C-3 REV 1



TI
APERTURE
CARD

STRESS APPROVALS

REV	THERMAL	SEISMIC

REV. J NOTE:

REDRAWN (SEE NOTE 1)
 ADDED PLUGS TO FE INCOIC
 CONNECTIONS PER FAB ISO,
 ADDED PENETRATION IDENTIFICATION
 NOS, ADDED PIPE SUPPORTS &
 DATA POINTS.
 DELETED PRESS/TEMP DATA PER
 STRESS GROUP MARK-UP.
 CALC. 1-15-51A WAS CALC. NO. 1-15-51.
 SEISMIC I CHANGED TO SEISMIC II,
 CHANGED FROM NUMERICAL TO ALPHA NUMERICAL

NOTE:

1. THIS DWG. SUPERCEDED
 SK-M-298 REV 9 (11"x17")

REFERENCE

- M-06 P:1D
- M-189 PIPING PLAN AREA 7
- M-178 PIPING PLAN AREA 6
- DBD-102-1 FAB ISO
- DBD-102-2 "
- DBD-102-3 "

CALC NO 1-15-51A

MODE DESCRIPTION

- MODE I
- MODE II
- MODE III Also Available On Aperture Card

8408140314-02

DATE	BY	CHKD	APPV
SEE REV J NOTE			

BY	DATA	REV	DATE	BY	REV	DATE	BY	LEGEND
								● SPRING HANGER
								■ RIGID HANGER
								▲ ANCHOR
								■ GUIDE
								⊥ SNUBBER
								⊥ RESTRAINT
								○ HANGER NUMBER
								○ STRESS DATA POINT

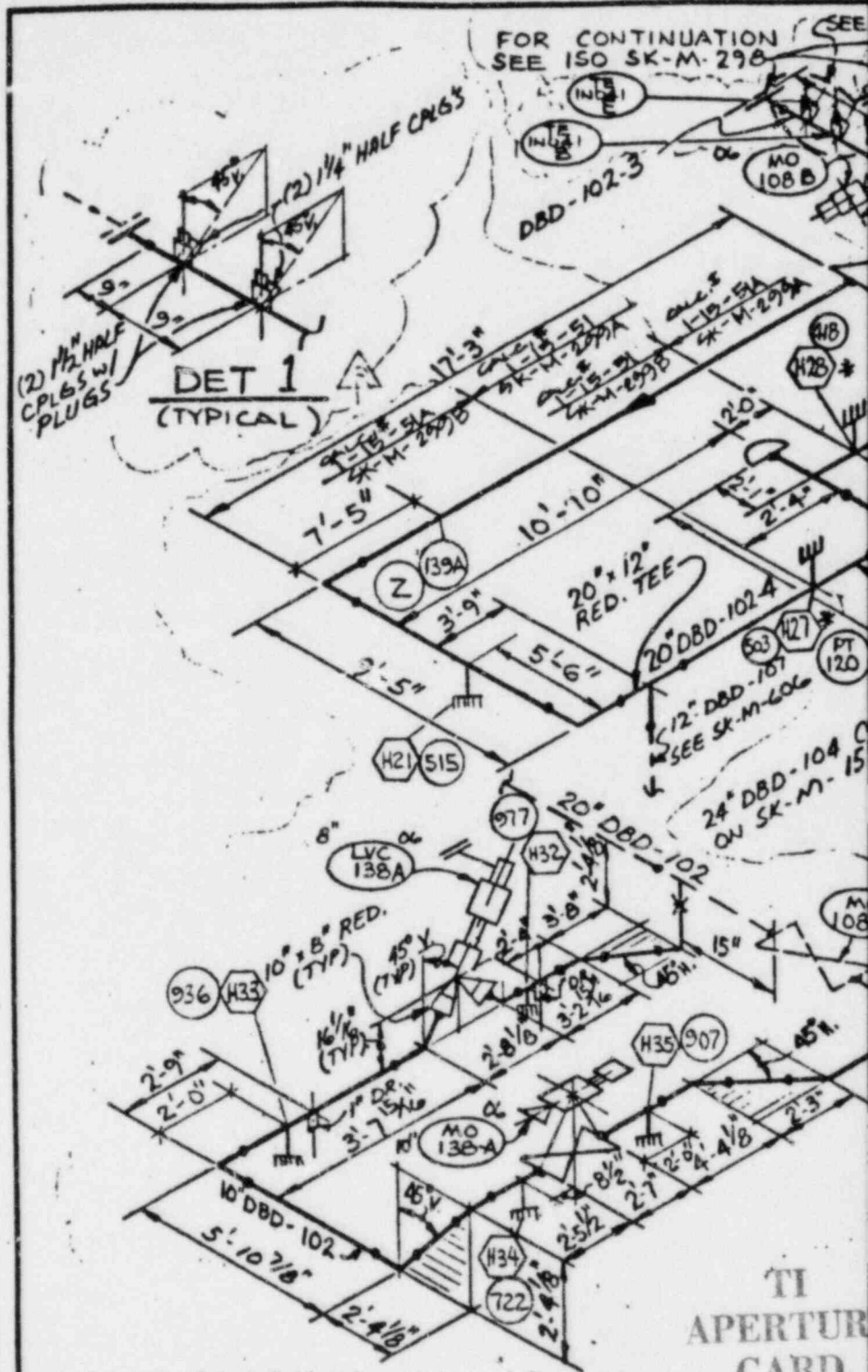
BECHTEL
 SAN FRANCISCO

LIMERICK GENERATING STATION
 UNITS 1 & 2
 PHILADELPHIA ELECTRIC COMPANY

FW. FROM HEATERS IAE-106,
 IBE-106 & ICE-106 TO
 REACTOR BLDG.

8031 SK-M-298 J

SPECIFICATION 8031-P-362
APPENDIX C



FOR CONTINUATION SEE ISO SK-M-298

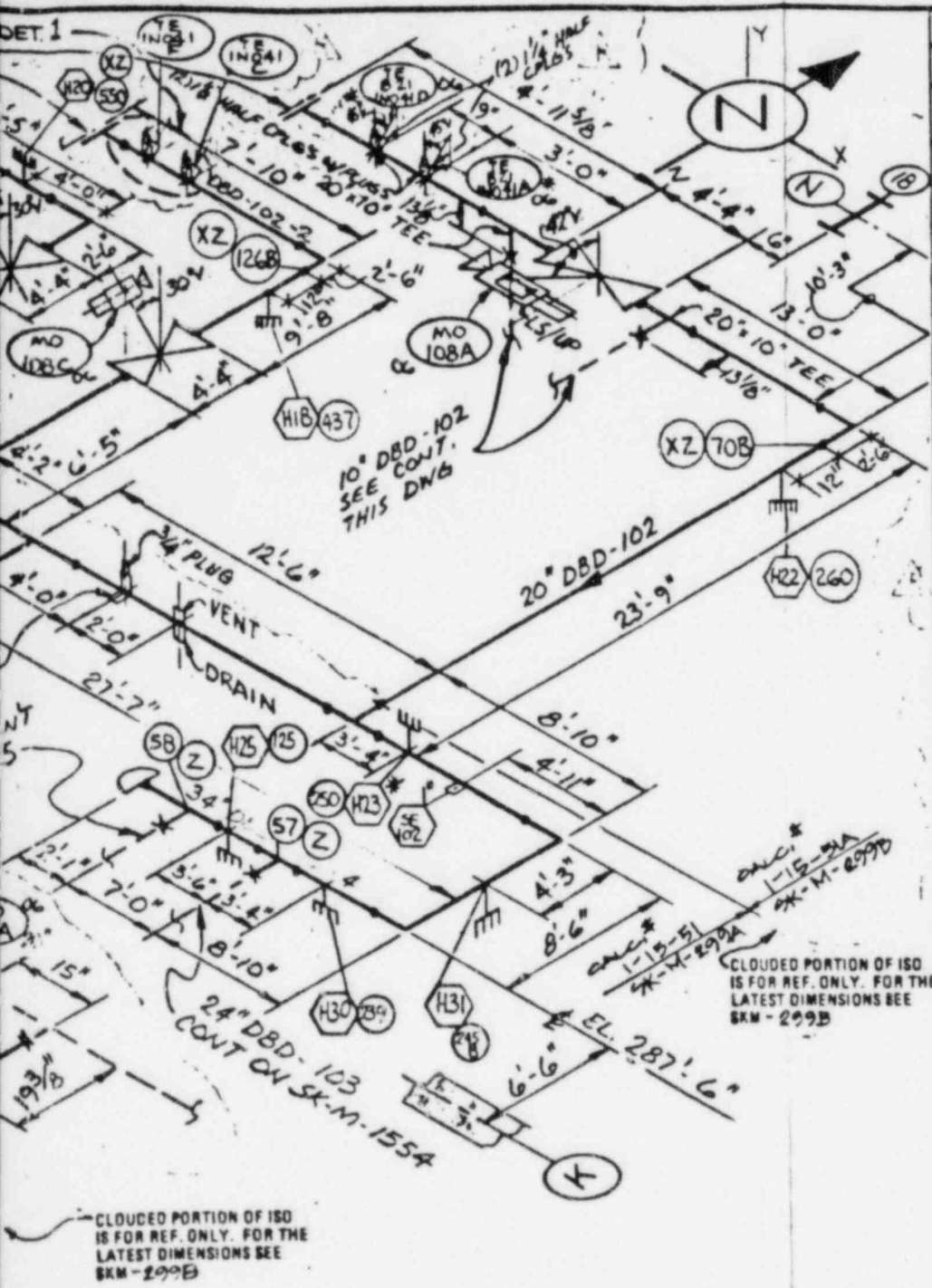
(2) 1/2\"/>

DET 1
(TYPICAL)

TI
APERTURE
CARD

C-4 REV 1

		DATA		REV	DATE	BY	REV	DATE
PIPING ENGINEER	LINE No.	DBD-102						
	MATERIAL	20\"/>						
	LINE THICKNESS (IN)	.844"	1.500"	1.740"				
MECHANICAL ENGINEER	LINE O.D. (IN)	10.750"	20.00"	34.00"				
	MODE	I	II	III				
	PRESS. PSIG							
STRESS ENGINEER	TEMP F							
	EXP. COEFF. IN/100FT							
	EXP. COEFF. MIL-IN/IN							
	MOD. OF BLAS. & PSI							



STRESS APPROVALS		
REV	THERMAL	SEISMIC

REV. R. NOTE:

REDRAWN (SEE NOTE 1)
 ADDED TE CONNECTIONS (PLUGS PER FAB ISO.
 ADDED PIPE SUPPORTS + DATA POINTS FOR RECONCILIATION
 DELETED VALVE PRESS/TEMP DATA PER STRESS GROUP MARK-UP.
 CHANGED REV. NO. FROM NUMERICAL TO ALPHA NUMERICAL. SK-M-299A WAS SK-M-299.

NOTE

1. THIS DWG SUPERCEDED SK-M-299 REV 17 (11"x17")

REFERENCE

- M-06 P.I.D.
- M-189 PIPING PLAN AREA 7
- DBD-102-1 FAB ISO.
- DBD-102-2 " "
- DBD-102-3 " "
- DBD-102-4 " "
- DBD-102-5 " "
- CALC. NR 1-15-51
- 1-15-51A

MODE DESCRIPTION

- MODE I
- MODE II
- MODE III

Also Available On Aperture Card

8408140314-03

* HGRS NOT REQ'D FOR DET. I AS-BUILT RECONCILIATION, FOR MODELING PURPOSES ONLY. SEE CALC. NO. 1-15-51A.

SEE REV R NOTE	CU	ES	WJ
----------------	----	----	----

DATA	REV	DATE	BY	REV	DATE	BY	LEGEND
							● SPRING HANGER
							⊙ RIGID HANGER
							★ ANCHOR
							⊞ GUIDE
							⊞ SNUBBER
							⊞ RESTRAINT
							○ HANGER NUMBER
							○ STRESS DATA POINT

SCALE: DRAWN BY: E. BESS

BECHTEL
 SAN FRANCISCO

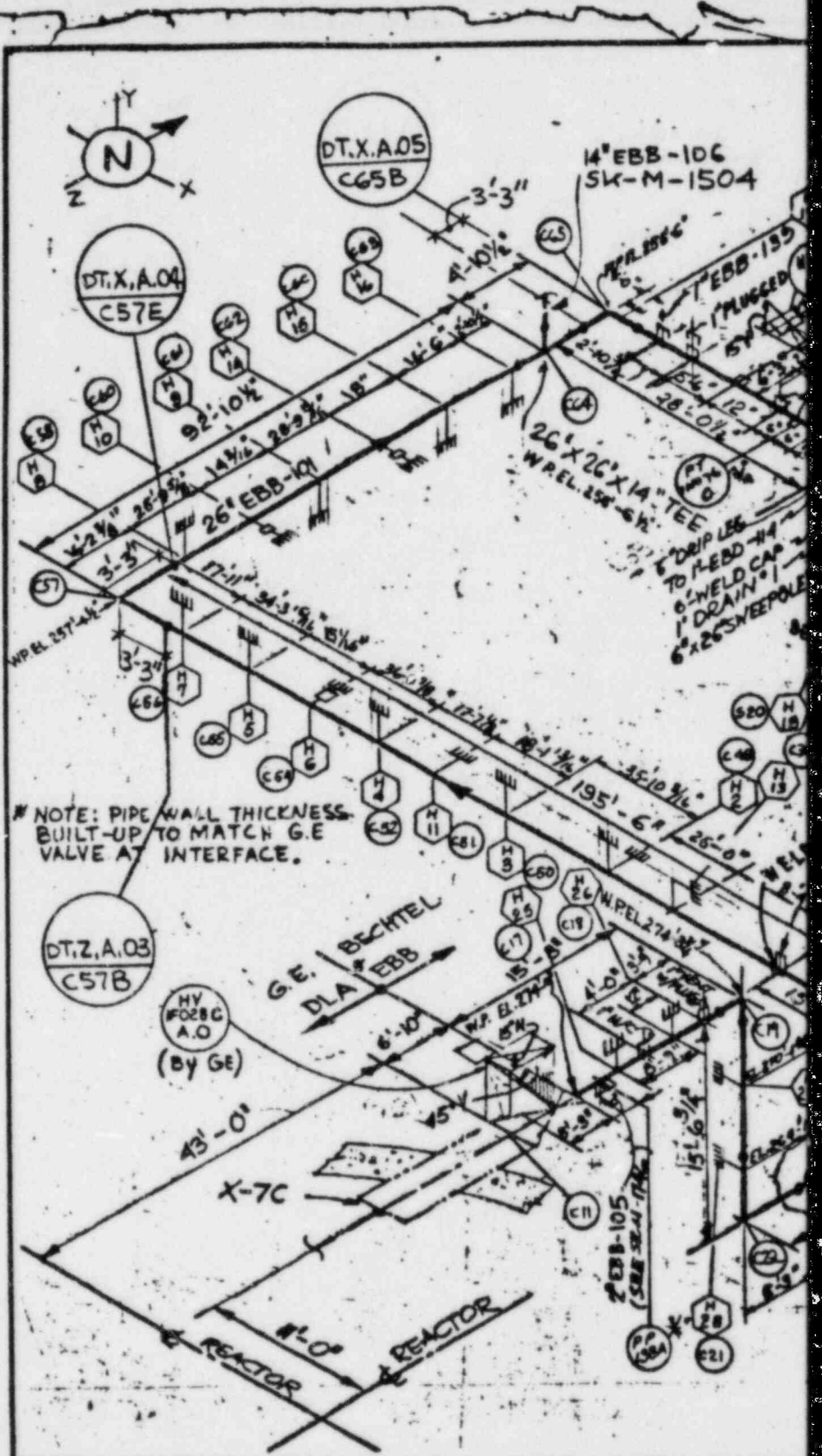
LIMERICK GENERATING STATION
 UNITS 1 & 2
 PHILADELPHIA ELECTRIC COMPANY

FEED WATER SYSTEM FROM
 #6 HEATERS TO REACTOR
 PEN

8031	SK-M-299A	R
AND	SK-M-299B	

SPECIFICATION 8031-P-362
APPENDIX C

Also Available On
Aperture Card

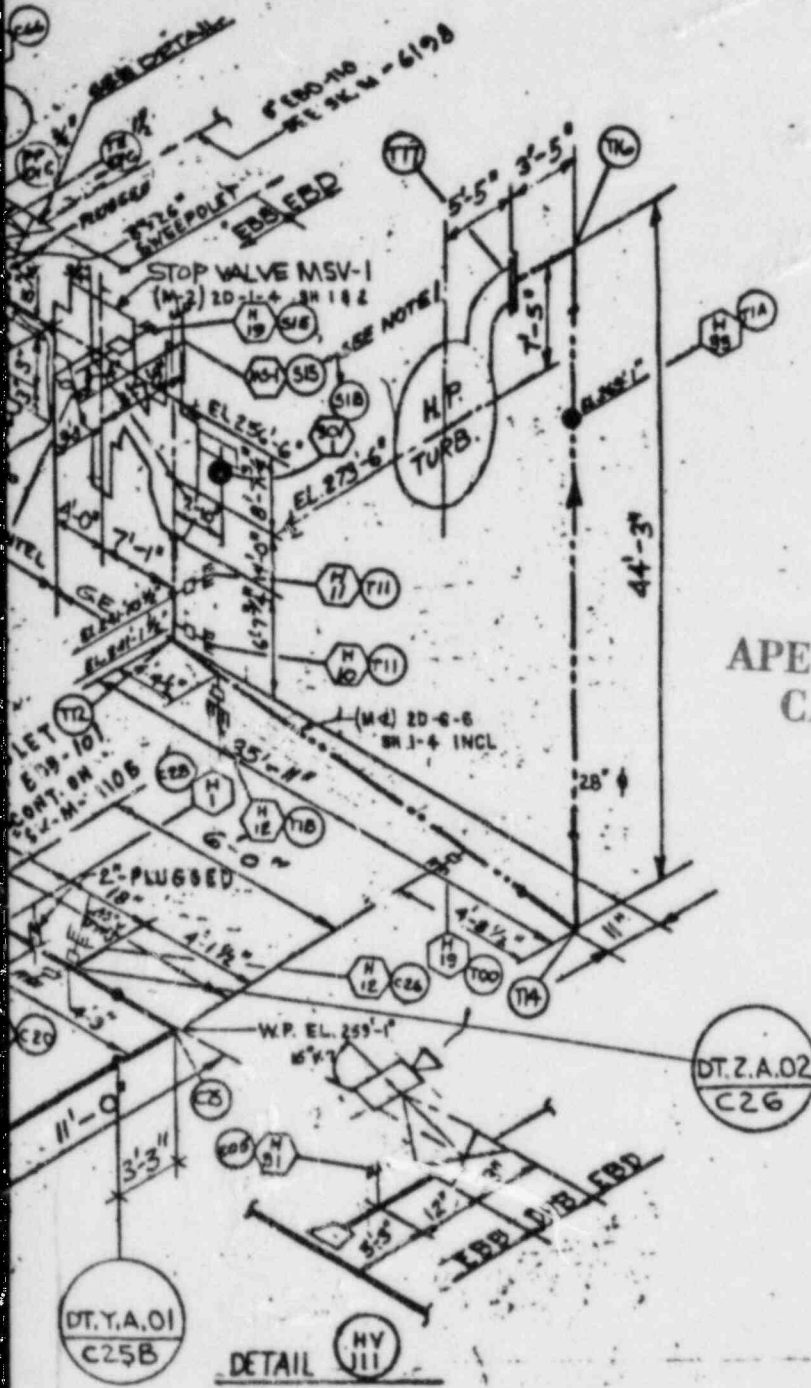


NOTE: PIPE WALL THICKNESS BUILT-UP TO MATCH G.E. VALVE AT INTERFACE.

		DATA	REV	DATE	BY	REV	DATE
PIPING ENGINEER	LINE No.	EBB-101	Δ	8/7/75	gbd		
	MATERIAL	26" SA-106 GR C 8" SA-106 GR B					
	LINE THICKNESS (IN)	1.315 1.315					
MECHANICAL ENGINEER	LINE O.D. (IN)	26 3/4 6.625	Δ	8/24/75	OR/LK		
	MODE	I II III					
	PRESS. PSIG	100 100 100					
STRESS ENGINEER	TEMP	250 250 250					
	EXP. COEFF. IN/100FT	6.5 6.5 6.5					
	EXP. COEFF. MIL-IN/IN	6.5 6.5 6.5					
	MOD. OF BLAS. PSI	100 100 100					

8408140314-04

C-5 REV 1



TI
APERTURE
CARD

STRESS APPROVALS

REV	THERMAL	SEISMIC
B	RRR 8-27-74	

UNIT 2 EBB-204 IS SUPERSEDED
BY SK-M-2757

THIS STRESS ISO APPLIES AS FOLLOWS:			
UNIT No. 1 AS SHOWN	UNIT No. 2 APP. MARK		
EBB-101	EBB-204		
DES. C.W. 1-2-74	CHKD. [Signature]	INGR. [Signature]	DATE 1-4-74

REV. M NOTE

ADDED 1" PLUG TO EXISTING 1" CONN. 1" HALF CPLG, PER FAB ISO.
ADDED PIPE SUPPORTS (DATA POINTS) FOR RECONCILIATION.
DELETED VALVE TEMP / PRESS DATA PER STRESS GROUP MARK-UP.

REFERENCE:

M-01 P.I.D. L
M-41 P.I.D. L
M-368 PIPING PLAN
EBB-101-1 FAB ISO, REV. 50
STRESS CALC. 123, E226

NOTE:

1. G.E. HANGERS, SEE DWG. NO. 8031-M-2D-1(1)-6 SHT. 1

MODE DESCRIPTION

MODE I - DESIGN

MODE II - MAXIMUM

M	DESCRIPTION	REV	BY	CHKD	DATE
L	ING. FOR M-6796F	RY			
G	ADDED PT. WORK DELETED PS. WORK				
F	DIM. C-TWMS 2-3/2	ALG			
K	SEE REV. M NOTE				
C	REV. INST. NUM PER PIPING PLAN				
A	RELOCATED PERD-150				
A	RELEASED FOR WHITE ANGLE				
A	ISSUED FOR STRESS ANALYSIS				

Q-LISTED

BY	DATA	REV	DATE	BY	REV	DATE	BY	LEGEND
	G.E. PIPING							● SPRING HANGER
								■ RIGID HANGER
								▲ ANCHOR
								■ GUIDE
								■ SHUSHER
								— RESTRAINT
								○ HANGER NUMBER
								○ STRESS DATA POINT

BECHTEL
SAN FRANCISCO

LIMERICK GENERATING STATION
UNITS 1 & 2
PHILADELPHIA ELECTRIC COMPANY

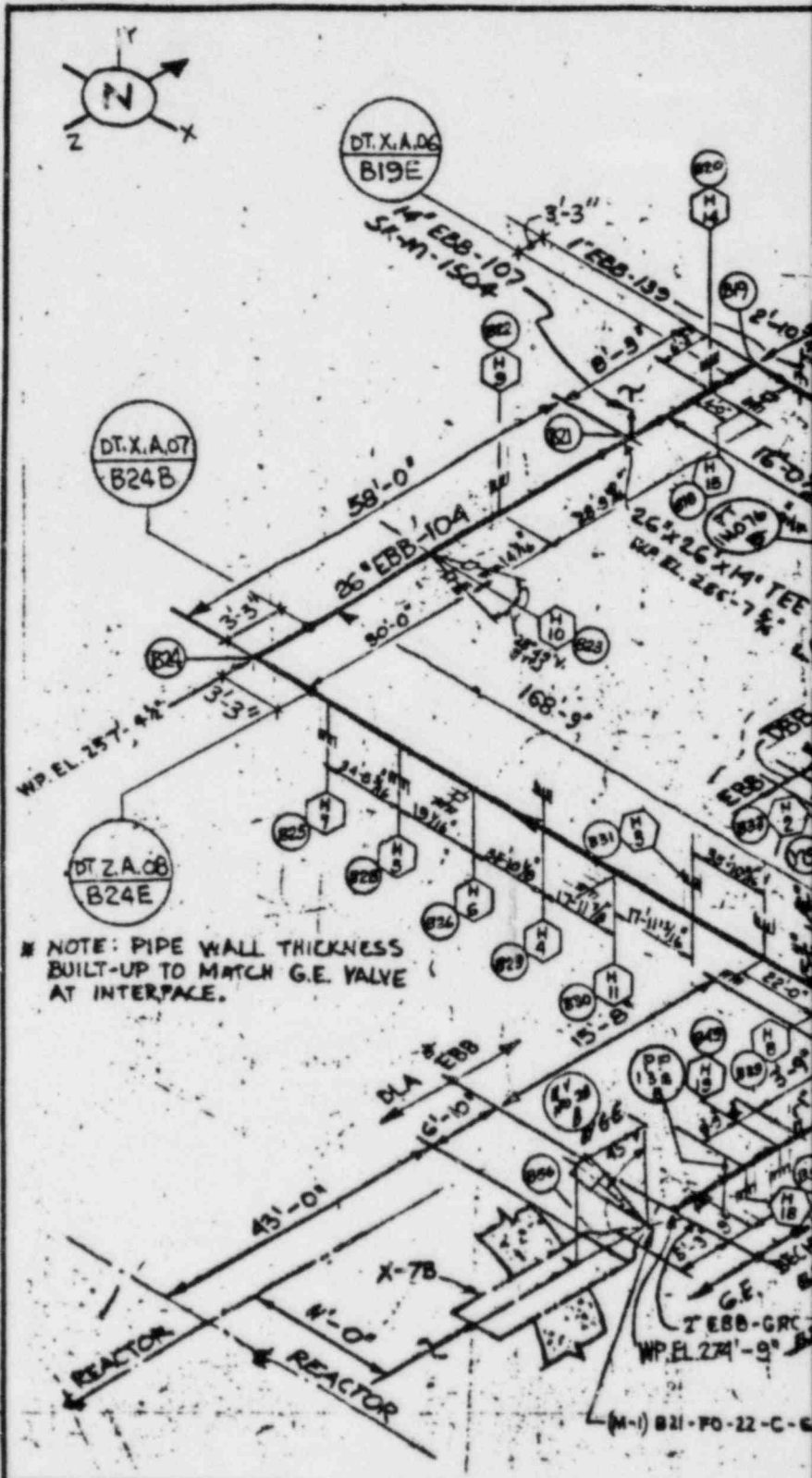
ISOMETRIC TURBINE BLDG. UNIT
MAIN STEAM PIPING
(LINE C)



8031 SK-M-1500 M

SPECIFICATION 8031-P-362^①
APPENDIX C

Also Available On
Aperture Card



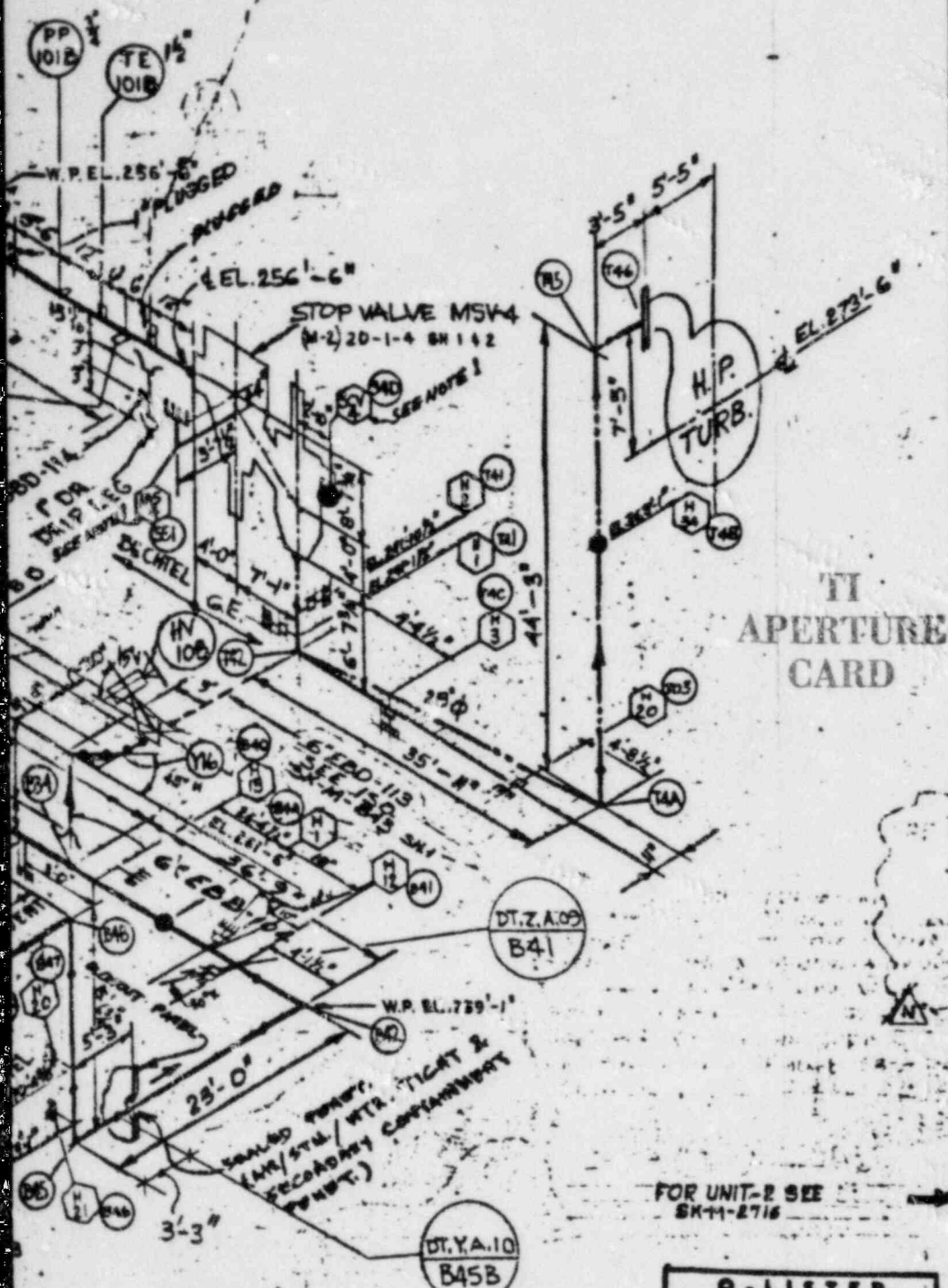
		DATA	REV	DATE	BY	REV	DATE
PIPING ENGINEER	LINE No.	EBB-104	△	4/7/73	gbd	△	7/4/76
	MATERIAL	34" SEA-106 GRG 34" SA-106 GRG					E
	LINE THICKNESS (IN.)	1.01 MIN 3/16 MIN					E
MECHANICAL ENGINEER	LINE O.D. (IN.)	26 6/25	△	7/24/73	gbd		E
	MODE	I II III					
	PRESS. PSIG	1035 1507 1887					
STRESS ENGINEER	TEMP	540 570 580				△	
	EXP. COEFF. IN/100°F						
	EXP. COEFF						
		MOD. OF SLAB 8 PM					

8408140314-05

C-6

REV I

Approved 5-11-73



STRESS APPROVALS		
REV	THERMAL	SEISMIC
2	RDR 8-27-74	

REV. N Note:
 ADDED PIPE SUPPORTS & DATA POINTS FOR RECONCILIATION
 DELETED VALVE, PRESS & TEMP DATA PER STRESS GROUP
 MARK-UP

THIS STRESS ISO APPLIES AS FOLLOWS:			
UNIT No. 1 AS SHOWN	UNIT No. 2 OFF. HAND		
EBB-104	EBB-104		
DES	CHKD	ENGR	DATE
GM	1-1-74		

REV. K Note:
 ADDED NOTE AT G.E./BECHTEL INTERFACE
 (REF: FCR-M-4419F) REV. 2

REFERENCE

- M-41 PIPING PLAN
- M-01 PIPING PLAN
- M-368 PIPING PLAN
- EBB-104-1 REV. 2, FAB. ISO
- EBB-104-2 REV. 2, FAB. ISO
- CALC. 1-01-226

MODE DESCRIPTION

- MODE I - DESIGN
- MODE - MAXIMUM

NOTE:
 1. GE HANGERS, SEE DWG. NO. 8031-M-2D-1 (1)-6 SHT. 1..

NO.	DATE	REVISION	BY	CHKD	ENGR	DATE
1		ISSUED FOR STRESS ANALYSIS	PP	PP		
2		REWORKED FOR REV. K	PP	PP		
3		REWORKED FOR REV. N	PP	PP		

BY	DATA	REV	DATE	BY	REV	DATE	BY	LEGEND
CRK	G. E. PIPING							● SPRING HANGER
								■ RIGID HANGER
								▲ ANCHOR
								□ GUIDE
								○ SNUBBER
								⊥ RESTRAINT
								○ HANGER NUMBER
								○ STRESS DATA POINT

BECHTEL
 SAN FRANCISCO

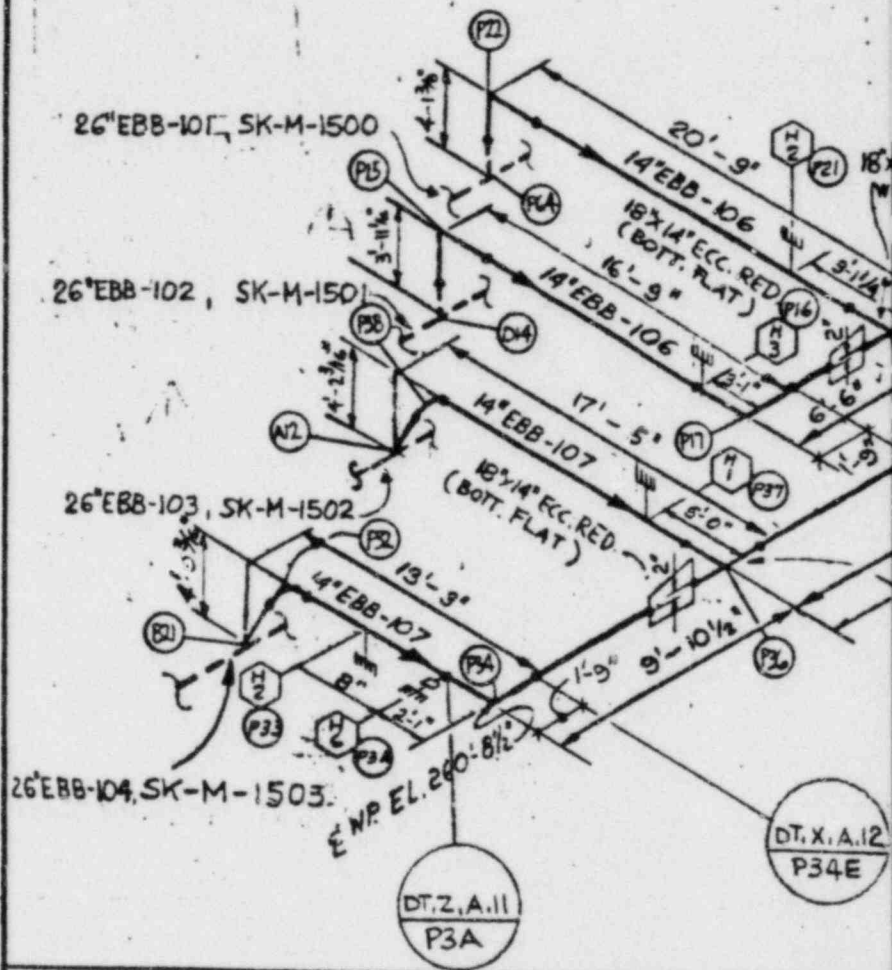
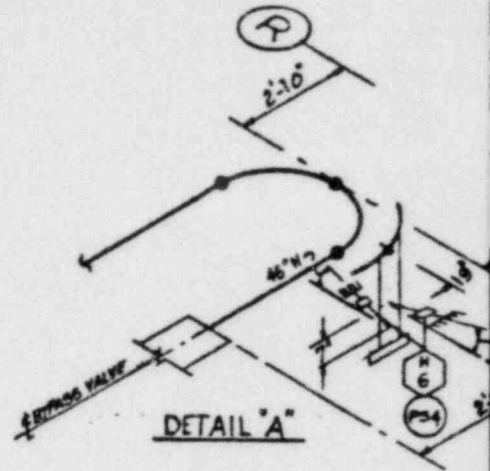
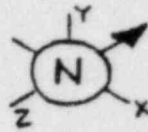
LIMERICK GENERATING STATION
 UNITS 1 & 2
 PHILADELPHIA ELECTRIC COMPANY

ISOMETRIC TURBINE BLDG. UNIT 2
 UNIT 2
 MAIN STEAM PIPING (LINE B)

8031 5K-M-1503 N

SPECIFICATION 8031-P-362
APPENDIX C

Also Available On
Aperture Card

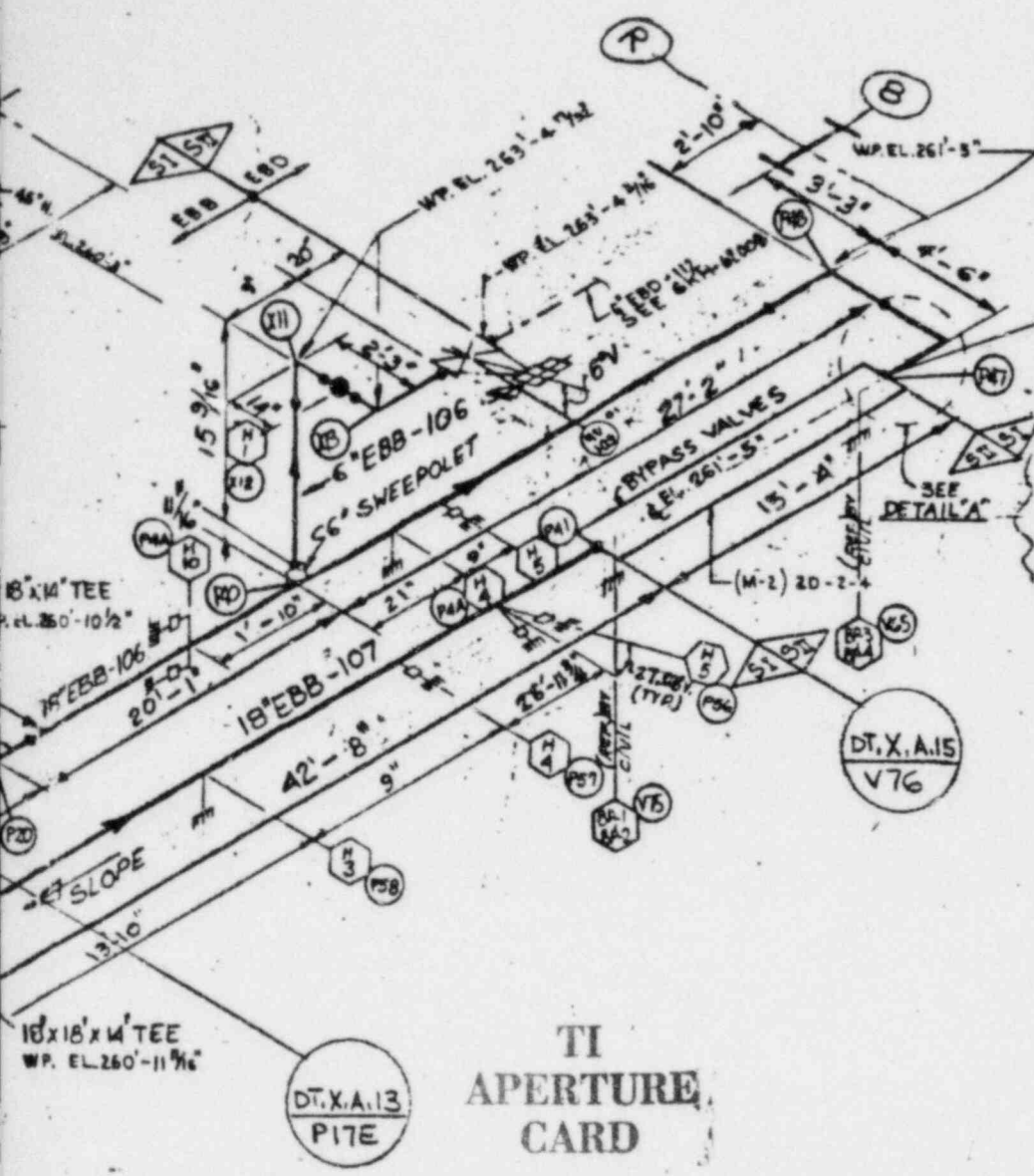


		DATA	REV	DATE	BY	REV	DATE
PIPING ENGINEER	LINE No.	EBB-106	A	8/1/73	gda		
	MATERIAL	SML A BME SA-1066A B					
	LINE THICKNESS (IN)	.750 .538 .432					
MECHANICAL ENGINEER	LINE O.D. (IN)	14 18 6.625	A	8/1/73	gda		
	MODE	I II III					
	PRESS. PSIG						
	TEMP F						
STRESS ENGINEER	EXP. COEFF. IN/100FT						
	EXP. COEFF. MIL-IN/IN						
	MOD. OF ELAS. E PSI						

C-7

REV 1

Appendix C-N-899



STRESS APPROVALS		
REV	THERMAL	SEISMIC
8	RRJ 8-23-74	

REV. H NOTE:
 ADDED PIPE SUPPORTS & DATA POINTS FOR RECONCILIATION
 DELETED VALVE, PRESS & TEMP DATA FOR STRESS @ 2048 HOURS

THIS STRESS ISO APPLIES AS FOLLOWS:	
UNIT No. 1 AS SHOWN	UNIT No. 2 OFF MAIN
EBB-106 EBB-107	EBB-207 EBB-208
DES C-R 1-74	CHKD. 1-11-74
ENGR.	DATE

DT.Z.A.14
P47

REFERENCE

- M-01 REV 3 P&ID
- M-152 PIPING PLAN
- M-368
- EBB-106-1 REV. B FAB 150
- EBB-106-2 REV. B FAB 150
- EBB-107-1 REV. 10 FAB 150
- STRESS CALC 1-01-226

MODE DESCRIPTION

- MODE I DESIGN
- MODE II MAXIMUM

8408140314-06

NO	DATE	REVISION	BY	CHKD.	ENGR.	DATE
1		REV. 6" EBB-106 PER FOR M-6710 REV. 1	FY	BR		
2		ROTATED WV-109 15° UPWARD PER NCD-735				
3		ADDED SEISMIC FLAG CONTIN. 15" REV.				
4		DELETED UNIT 2 STAMP				
5		REVISED AS SHOWN	BR			
6		REVISION NOTE	NSH			
7		REVISION FOR UNIT 2 AMEND				
8		ISSUED FOR STRESS ANALYSIS				

TI
 APERTURE
 CARD

DT.X.A.13
P17E

UNIT 2 EBB-206 IS SUPERSEDED
 BY SHM-2754 EBB-207 BY SHM-2748

Q-LISTED

BY	DATA	REV	DATE	BY	REV	DATE	BY	LEGEND
	EBB-107		8/1/74	gld				● SPRING HANGER
	SML ASME SA-1066-B							■ RIGID HANGER
	.750 .938							★ ANCHOR
	14 18		8/4/73	10/cse				≡ GUIDE
	I B III							⊥ SNUBBER
								⊥ RESTRAINT
								○ HANGER NUMBER
								○ STRESS DATA POINT

BECHTEL
 SAN FRANCISCO

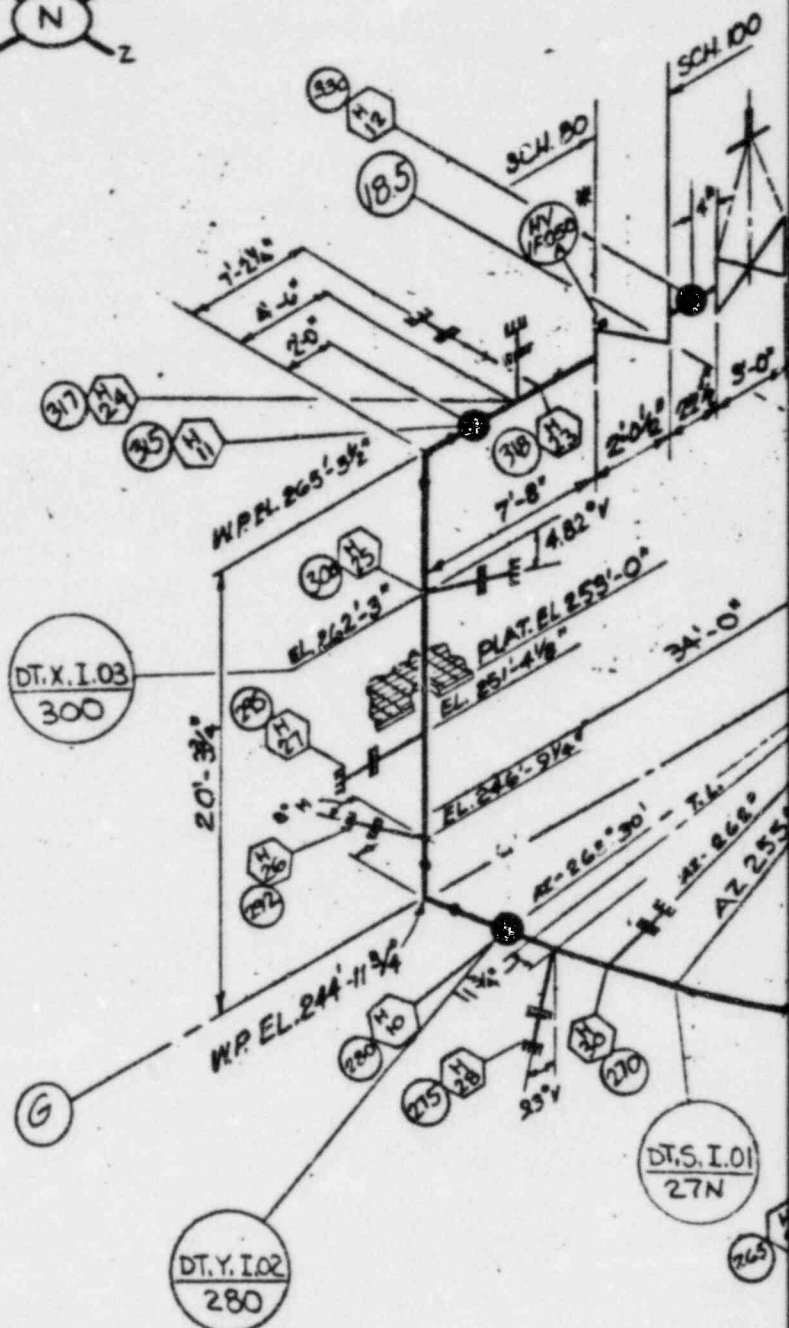
LIMERICK GENERATING STATION
 UNITS 1 & 2
 PHILADELPHIA ELECTRIC COMPANY

ISOMETRIC TURBINE BLDG UNIT "1
 MAIN STEAM BYPASS PIPING

8031 SK-M-1504 H

SPECIFICATION 8031-P-362
APPENDIX C

Also Available On
Aperture Card



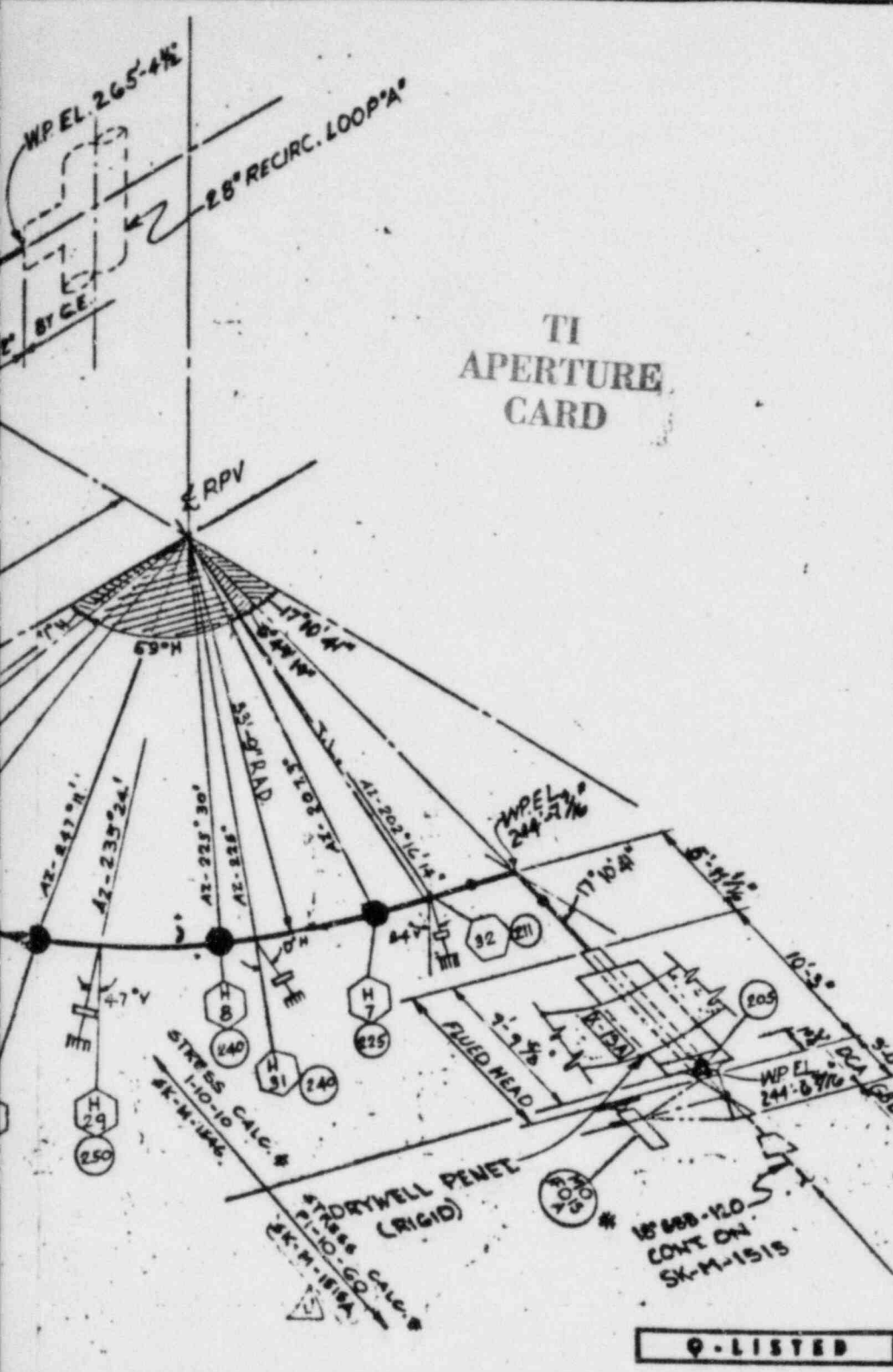
CCN REV 1
CALC. HO-10
NO

8408140314-08

C-9

REV 1

	DATA	REV	DATE	BY	REV	DATE
PIPING ENGINEER	LINE No. DCA-104					
MATERIAL	BMLS 3A-312 TP 304 50#	A	11-13-73	BRZ	C	7/1/74
ENGINEER	LINE THICKNESS (IN) .687					
		A	11-13-73	BRZ		
MECHANICAL ENGINEER	LINE O.D. (IN) 12.750					
		A	11-13-73	BRZ		
MODE	I II III					
MECHANICAL ENGINEER	PR. & S. PSIG					
TEMP F						
STRESS ENGINEER	EXP. COEFF. IN/100FT					
	EXP. COEFF. MIL-IN/IN					
	MOD. OF ELAS. & PSI					



STRESS APPROVALS		
REV	THERMAL	SEISMIC

REV. F NOTE:
 REV. TO AGREE WITH FAB. 180
 RELEASED 'HOLD'. REF. FME 5136.
 ADDED MATERIAL SPECS.

REV. G NOTE:
 REV. TO REF. FCR-M14698F ONLY

REV. H NOTE:
 ADDED HANGERS AND DATA POINTS
 FOR RECONCILIATION. DELETED VALVE/
 PRESS/TEMP. DATA, PER STRESS
 GROUP MARK-UP.

REFERENCE

M-51	P4ID	REV. 2
M-213	PIPING PLAN	REV. 3
M-225	"	REV. 4
M-229	"	REV. 10
DCA-104-2	FAB. 180	REV. 13
REF. FCR-M14698F		
DCA-104-4	FAB. 180	REV. 2

STRESS CALC. # 1-10-10

MODE DESCRIPTION

MODE I - NORMAL (P-300)

MODE II - MAXIMUM (P-300)

MODE III - SHUTDOWN COOLING
 (KHR PROCESS DIAGRAM)

REV	DATE	DESCRIPTION	BY	CHKD	APPD	ISS
H		SEE REV. H NOTE	JBR	AUS		
G		SEE REV. G NOTE	AT	JS		
F		SEE REV. F NOTE	JBR	AUS		
E		11/20/79 DCA-104 RELEASED FOR HOLD PER ASME SEC. 8	BN	VB	MS	
J		REV. PER STRESS CALC. NO. AND STRESS 150	AD	SC		
C		REV. DR. VLV INFO. & PIP. SPEC.	B.R.			
B		ADDED WEIGHT OF VALVE	J.O.	PP		
A		ISSUED FOR STRESS ANAL.	J.O.			

Q-LISTED

BY	DATA	REV	DATE	BY	REV	DATE	BY	LEGEND
	DCA-104	F						● SPRING HANGER
PAK	58 AND 60 ASME SA-800 CL 1 TP 316L SCH 100	F	3/9/79	AKMS				■ RIGID HANGER
	.845	F	3/9/79	AKMS				★ ANCHOR
	12.750	F	3/9/79	AKMS				■ GUIDE
	I							■ SNUBBER
	II							■ RESTRAINT
	III							○ STRESS DATA POINT
								○ HANGER NUMBER

SCALE: _____

DESIGNED BY: J.O.

BECHTEL
 SAN FRANCISCO

LIMERICK GENERATING STATION
 UNITS 1 & 2
 PHILADELPHIA ELECTRIC COMPANY

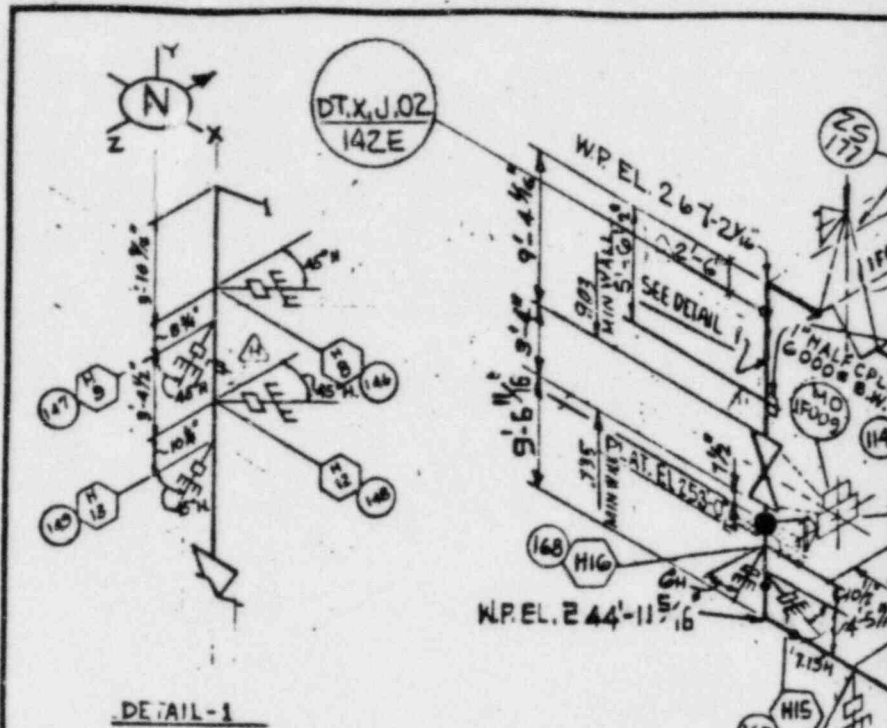
ISOMETRIC - REACTOR BUILDING (DRYWELL)
 RESIDUAL HEAT REMOVAL - UNIT #1

JOB NO.	ISSUANCE NO.	REV.
8031	SK-M-1546	J

RHR - SHUTDOWN SUPPLY

SPECIFICATION 8031-P-362
APPENDIX C

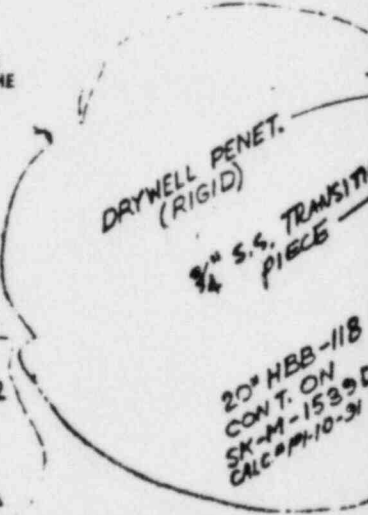
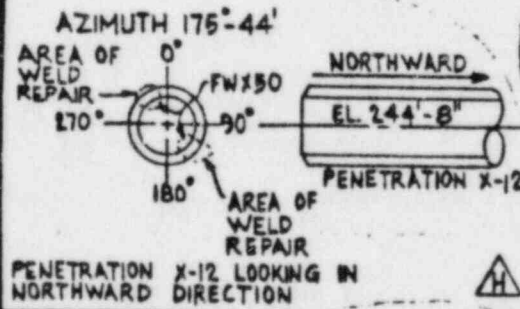
Also Available On
Aperture Card



NOTE 1:
FOR SUPPORT LOADS & PIPE STRESSES
ON THIS LINE, CALC. # 1-10-11A REV. 2

CCN REV 0
CALC NO 1-10-11A

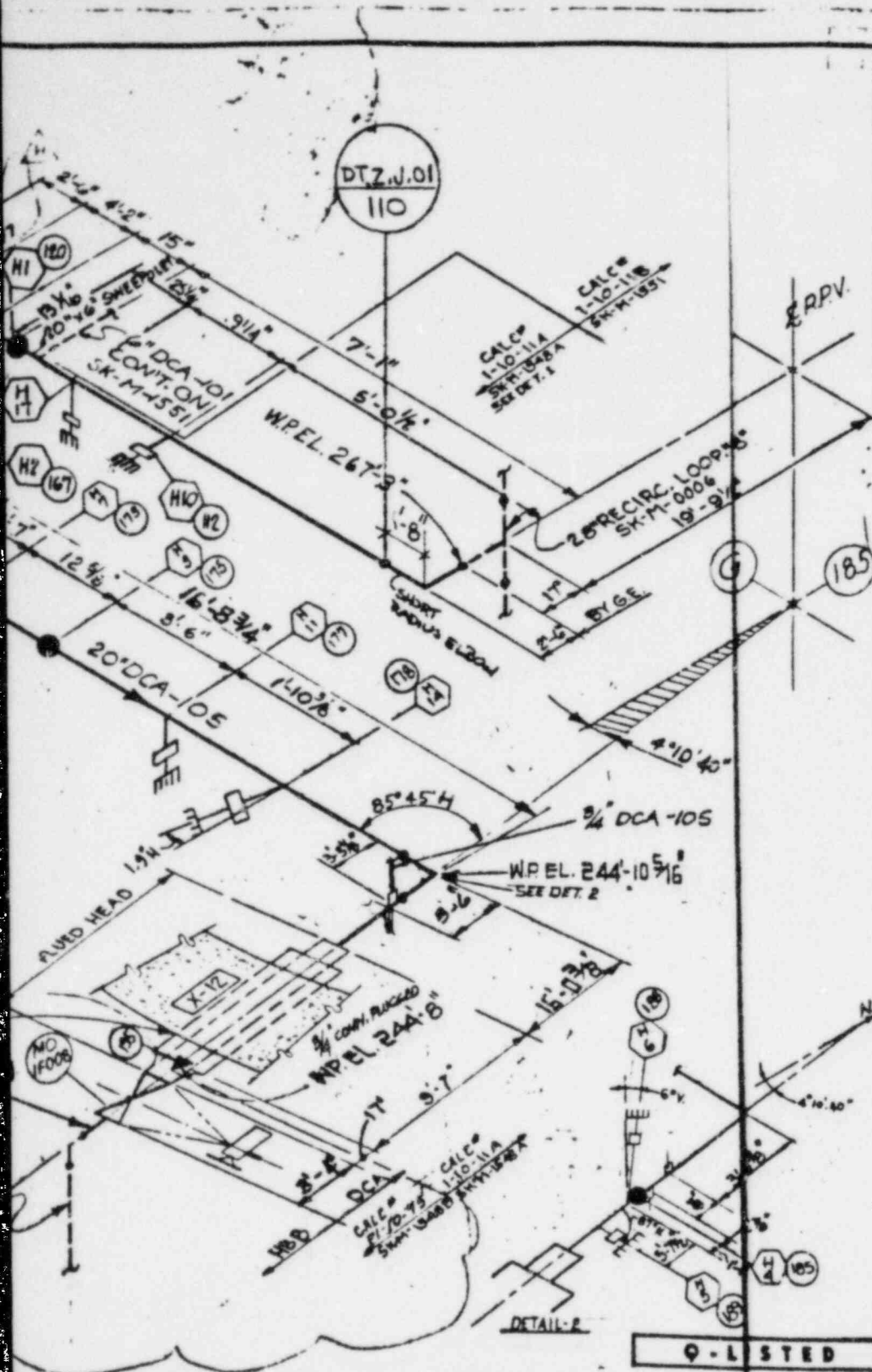
CLOUDED PORTION OF ISO
IS FOR REF. ONLY. FOR THE
LATEST DIMENSIONS SEE
SKM 1540B



		DATA		REV	DATE	BY	REV	DATE
PIPING ENGINEER	LINE No.	DCA-105						
	MATERIAL	SMLS SA-312 TP304		A	11-13-73	002	C	2/16
	LINE THICKNESS (IN)	3/32		A	11-13-73	002		
MECHANICAL ENGINEER	LINE O.D. (IN)	20.000		A	11-13-73	002		
	MODE	I II III						
	PRESS. PSIG							
STRESS ENGINEER	TEMP F							
	EXP. COEFF. IN/100FT							
	EXP. COEFF. MIL-IN/IN							
	MOD. OF ELAS. & PSI							

8408140314-09

C-10 REV 1



STRESS APPROVALS		
REV	THERMAL	SEISMIC
B	KDY	8-13-74

REV. H NOTE:
 ADDED PIPE SUPPORTS & DATA POINTS FOR RECONCILIATION. DELETED PRESS. TEMP / VALVE DATA PER STRESS GROUP MARK-UP. INCORP. FOR MIG, 235°F, INCORP. FSK SHT. 1 REV. 0.

REV. G NOTE:
 1 3/16" WAS 1 1/4" PER VENDOR REQUEST. ADDED FAB 150 REFERENCE. PLUGGED W/4" CONN. PER P&ID M-51 SHEET 2 REV. B.

REV. S NOTE:
 ADDED 1" CONN PER FOR MIG 94AF.



REFERENCE

M-43	P&ID	REV. 1
M-51	"	"
M-213	PIPING PLAN	REV. 1
M-225	"	REV. 2
M-259	"	REV. 3
DCA-105-B	REV 4 FAB 150	REV. 4
DCA-105-1	REV 15	"
STRESS CALC. # 1-10-11A		"

MODE DESCRIPTION

MODE I - NORMAL REACTOR OP. (P-300)

MODE II - MAXIMUM " " "

MODE III - SHUTDOWN COOLING

NO.	DATE	REVISIONS	BY	CHKD	APPV
H		SEE REV. H NOTE	SK	BLP	SK
G		SEE REV. G NOTE	SK	BJS	SK
F		SEE REV. F NOTE	JBR	SK	SK
E		ISSUED FOR WELD PER P&ID M-106-C ADDED W/ DCA-105 PER P&ID M-51 SHEET REV. B	SK	SK	SK
D		3-4" WAS 4-6" ADDED 3-C TRANSITION PIPE	NR	SK	SK
C		ADDED 2 REV. DMS, REV. 10. 1 REV. MATERIAL	B.R.	SK	SK
B		CHANGED VALVES TO BODY IF SOME FLUGS WERE RIPPED	T.S.	SK	SK
A		ISSUED FOR STRESS ANAL.	J.O.	SK	SK

Q - LISTED

BY	DATA	REV	DATE	BY	REV	DATE	BY	LEGEND
	DCA-105	E						● SPRING HANGER
	SEAMWELD ASME SA-358 CL. 1 TP-316L	E	3/19/74	SK				■ RIGID HANGER
	903 MIN WALL	E	3/19/74	SK				▲ ANCHOR
	20.000	E	3/19/74	SK				□ GUIDE
	I							HOE NUMBER
	II							HE RESTRAINT

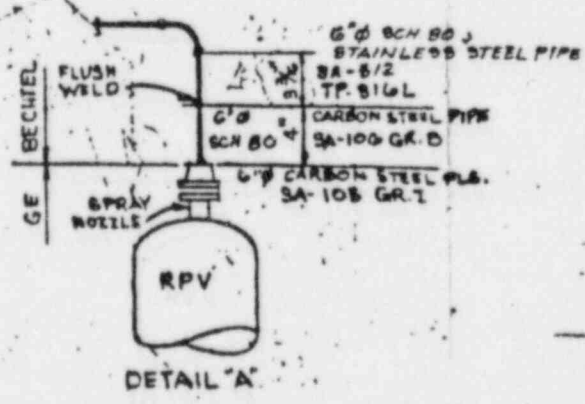
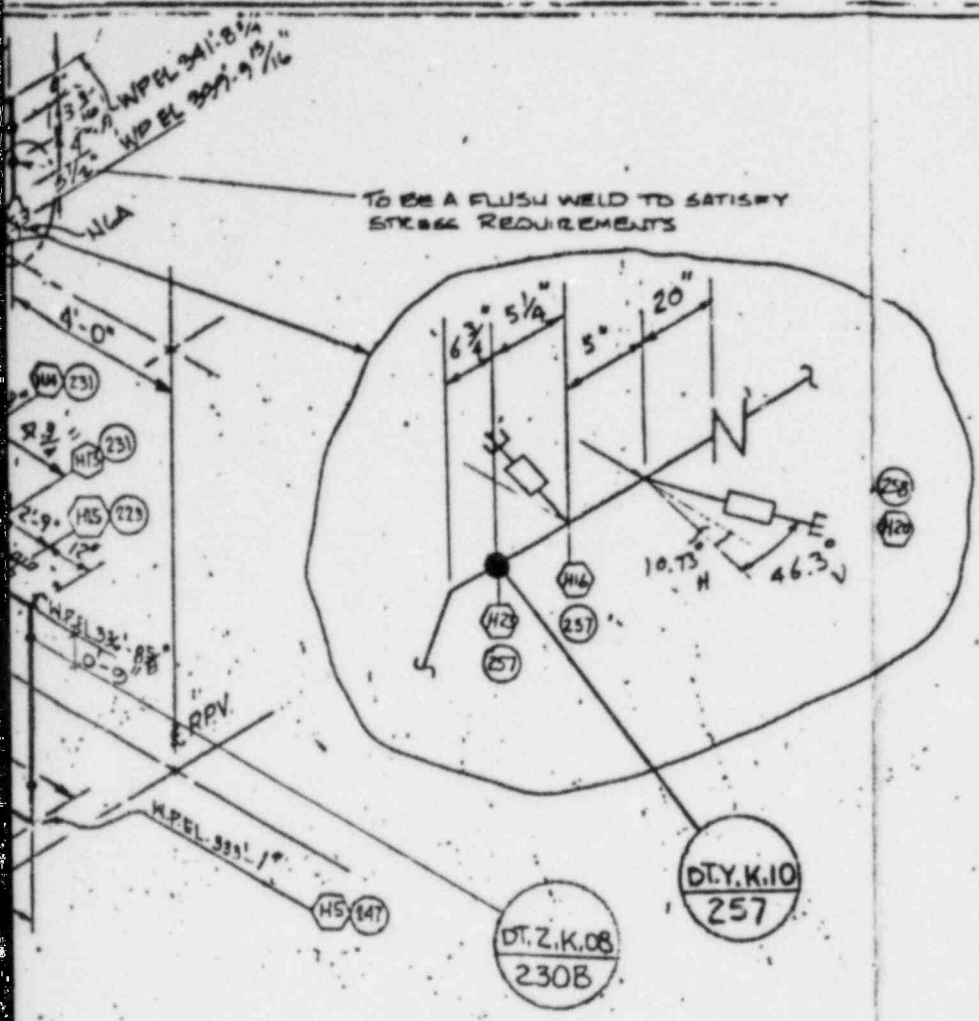
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 SAN FRANCISCO

LIMERICK GENERATING STATION
 UNITS 1 & 2
 PHILADELPHIA ELECTRIC COMPANY

ISOMETRIC - REACTOR BUILDING (DRYWELL)
 RESIDUAL HEAT REMOVAL - UNIT #1

APP. NO.	DESIGNED BY	CHKD
8031	SK-M-1548A H	

FOR SHUTDOWN RETURN



TI APERTURE CARD

Q-LISTED

BY	DATA	REV	DATE	BY	REV	DATE	BY	LEGEND
		E	3/9/75					● SPRING HANGER
								■ RIGID HANGER
								▲ ANCHOR
								≡ GUIDE
								⊥ SNUBBER
								⊥ RESTRAINT

STRESS APPROVALS		
REV	THERMAL	SEISMIC
A	R20	11-19-73

REV. J NOTE:
REVISED DIMENSIONS PER DET. 9 DWG. C-290...
RELOCATED 3/4" VENT CONN. PER STRESS GRP...
REQUEST RN 1A-DW-81.

REV. N NOTE:
ADDED FLUSH WELD TO SATISFY STRESS REQUIREMENTS - REVISED MATERIAL PER SPEC F-300, ADDED DETAIL "A"

REV. P NOTE:
ADDED HGERS - DATA POINTS & VALVE NO. FOR RECONCILIATION, INCORP. DCP #0239.

STRESS CALC # 1410-09

REFERENCE

M-51: 2 of 2 PID

M-236 PIPING PLAN

DCA-103-1 FPD 150. REV 15

C-290 CIVIL DETAIL - PENET. THRU CONST. SEAL PLATE

MODE DESCRIPTION

MODE I-NORMAL REACTOR OP. (P-300)

MODE II-MAXIMUM " "

MODE III-SHUT DOWN COOLING (RHR PROCESS DIAGRAM)

W	REV	FOR	REV	BY	DATE	BY	DATE	BY	DATE	BY	DATE
P	1200	SEE REV. NOTE		JMC							
N	80	GE REV. N NOTE		PJW							
A	24	ISSUED FOR STRESS ANAL		J.O.							

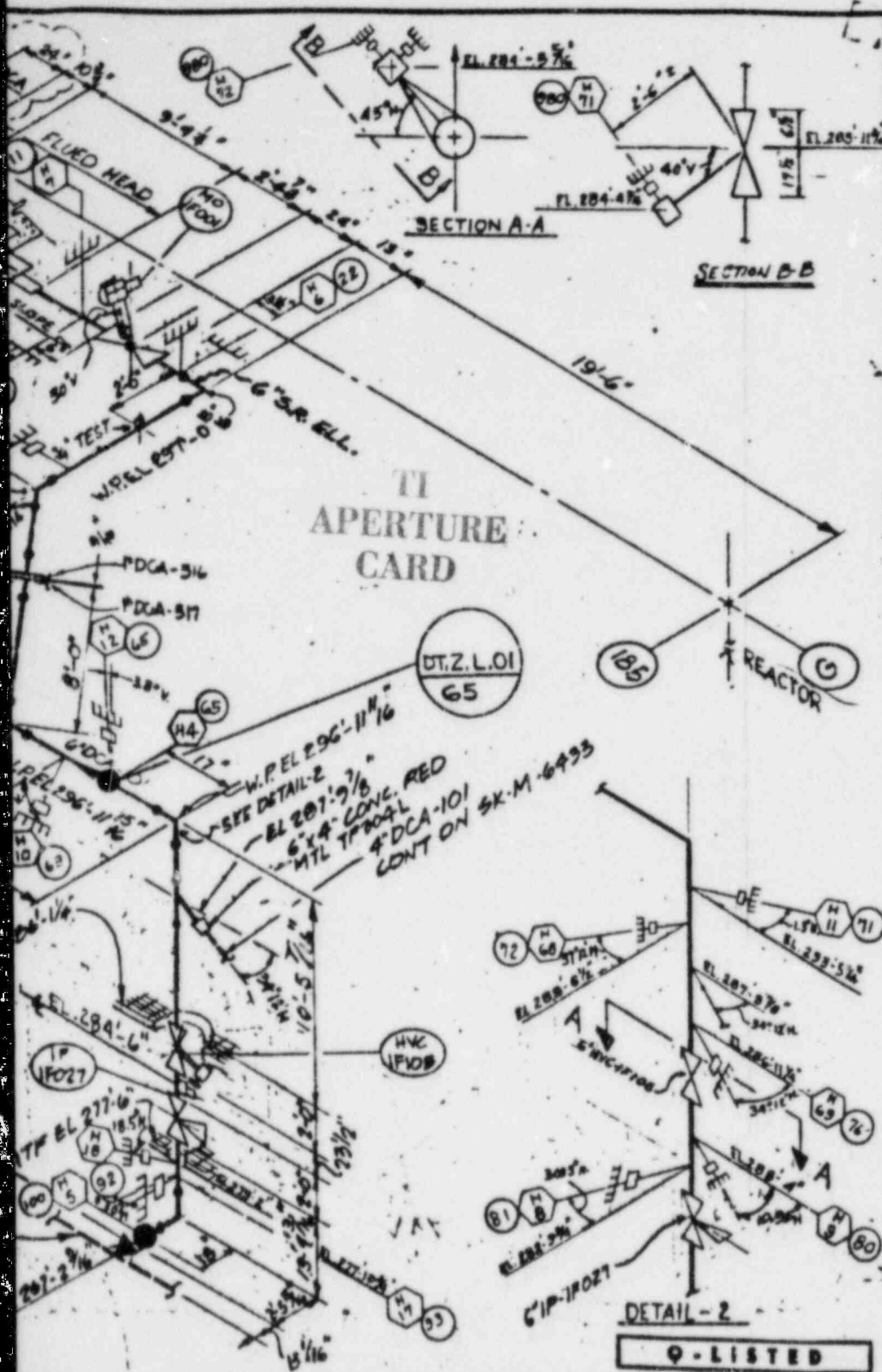
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LIMERICK GENERATING STATION
UNITS 1 & 2
PHILADELPHIA ELECTRIC COMPANY

ISOMETRIC - REACTOR BUILDING (DRYWELL)
RESIDUAL HEAT REMOVAL - UNIT #1

8031 SK-M-1550 P

RHR HEAD SPRAY



STRESS APPROVALS		
REV	THERMAL	SEISMIC
A	RDB	1-25-74

NOTE: THIS DRAWING SUPERCEDES SK-M-966 FOR DCA-101 AND SK-M-2437

REV. G NOTE:
 4\"/>

REV. M NOTE:
 ADDED PIPE SUPPORTS & DATAPOINTS FOR RECONCILIATION, DELETED PRESS, TEMP, VALVE DATA PER STRESS GROUP MARK-UP

REFERENCE		
M-43	PID	REV. 3
M-44	"	REV. 3
M-225	PIPING PLAN	REV. 11
M-226	"	REV. 11
M-231	"	REV. 11
M-234	"	REV. 11
M-285	"	REV. 11
DCA-101-1	REV. 17	FAB 150
STRESS CALC # 1-10-71B		

MODE DESCRIPTION
 MODE I-NORMAL CONDITIONS
 MODE II-MAXIMUM CONDITIONS
 MODE III

REV	DATE	DESCRIPTION	BY	CHKD	APPD
L	4/24	INC. FOR M14609F	CL	2/	50
G	4/11	SEE REV. G NOTE	GP	2/4	2/
F	4/11	SEE REV. F NOTE	FP	2/5	2/
K	4/11	SEE REV. K NOTE	KP	2/5	2/
J	4/11	SEE REV. J NOTE	JP	2/5	2/
M	4/11	SEE REV. M NOTE	MP	2/5	2/
B	4/11	REV. YENDOR VALVE ID = SAL	BP	2/5	2/
A	1/25	ISSUED FOR STRESS ANAL.	J.O.	AP	2/5

BY	DATA	REV	DATE	BY	REV	DATE	BY	LEGEND
								● SPRING HANGER
								■ RIGID HANGER
								★ ANCHOR
								□ GUIDE
								⊥ SNUBBER
								⊥ RESTRAINT
								○ HANGER NUMBER
								○ STRESS DATA POINT

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 UNITS 1 & 2
 PHILADELPHIA ELECTRIC COMPANY

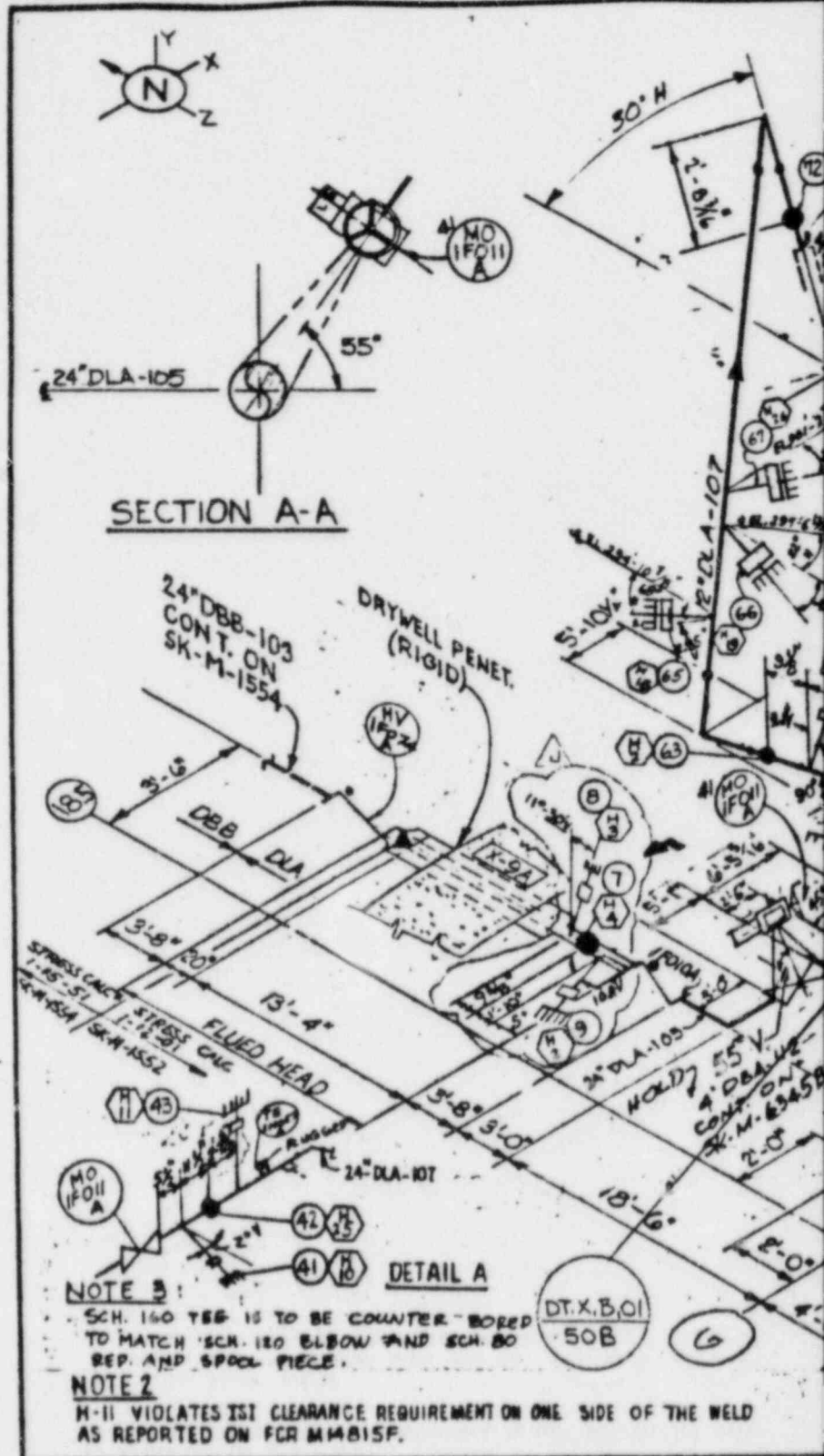
ISOMETRIC - REACTOR BUILDING (DRYWELL)
 REACTOR WATER CLEAN-UP & FILTER DEMIN. UNIT

8031	SK-M-1551B	M
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RWCU (1/c)

SPECIFICATION 8031-P-362
APPENDIX C

Also Available On
Aperture Card



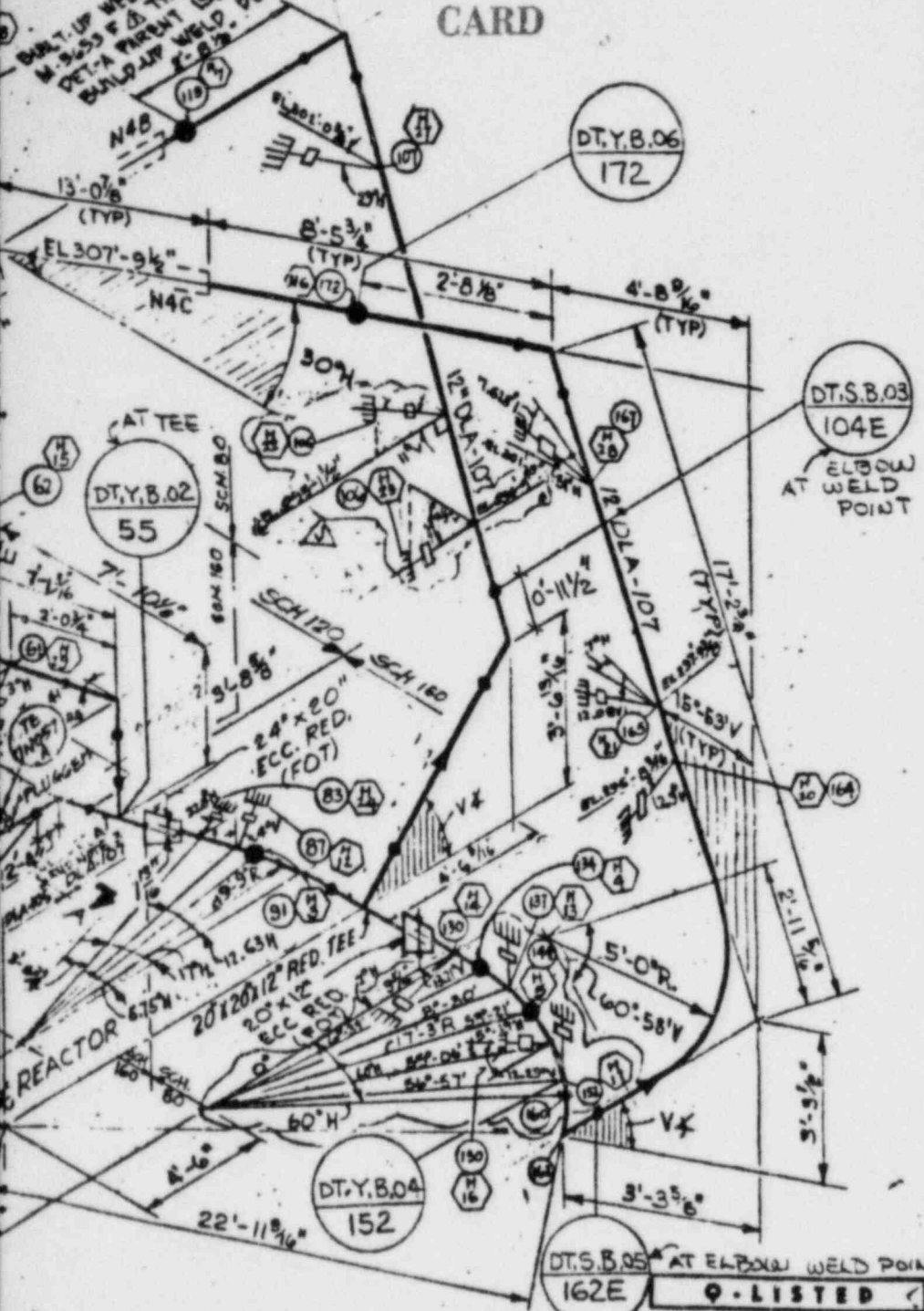
NOTE 1:
SCH. 160 T&B IS TO BE COUNTER-BORED TO MATCH SCH. 180 ELBOW AND SCH. 80 REP. AND SPOOL PIECE.

NOTE 2:
H-11 VIOLATES ISI CLEARANCE REQUIREMENT ON ONE SIDE OF THE WELD AS REPORTED ON FCR M4815F.

		DATA	REV	DATE	BY	REV	DATE
PIPING ENGINEER	LINE No.	DLA-105					
	MATERIAL	5ML ASME SA-333 Gr. 6	A	1/17/74	002		
	LINE THICKNESS (IN)	1.812					
MECHANICAL ENGINEER	LINE O.D. (IN)	24.000	A	1/17/74	002		
	MODE	I E III					
	PRESS. PSIG						
STRESS ENGINEER	TEMP F						
	EXP. COEFF. IN/100FT						
	EXP. COEFF. MIL-IN/IN						
	MOD. OF BLAS. & PBI						

8408140814-12
C-13
REV 1

TI APERTURE CARD



STRESS APPROVALS		
REV	THERMAL	SEISMIC
C	RRP	
	1-25-74	

REV. H NOTE:

PIPE SCH. REVISED AS SHOWN PER PIPE SPOOL SHEETS.
 REVISED CONFIGURATION TO MATCH FAB 150 & ADDED HANGER SYMBOLS PER HANGER GROUP MARK-UP. DELETED VALVE DATA/PRESS/TEMP. DATA.
 ADDED VALVE NO 1FO10A PER P&ID M-41 REV 22.
 ADDED REF FOR M14B15F & NOTE 2. INCORP. WCA NO. 6621 REV. 1 DELETED NOTE 1. ADDED NOTE 3.

REFERENCE STRESS CALC. NO 1-12-01
 M-41 P&ID
 M-234 PIPING PLAN
 M-235 " " " " " "
 DLA-107-i FAB.150 REV. 21
 DLA-105-i FAB.150 REV. 11
 FOR M14B15

MODE DESCRIPTION
 MODE I-NORMAL CONDITIONS
 MODE II-MAXIMUM CONDITIONS
 MODE III-

REV	DATE	DESCRIPTION	BY	CHKD	APPD
J		REVISED AS SHOWN	AS		
H	7/28/83	SEE REV. H NOTE	REN	5.30	TRF
G	7/27/83	REV PER FOR M-1517SP	PL	WJ	WJ
F	4/24/83	INCORP FOR M-3455FA	SD	BJS	WJ
E	2/17/83	SHOWN & DESIGN CORRECTION PER REV. A (3-18-77)	AG	CH	WJ
D	1/21/83	REORIENTED NO. 1FO10A AT 100% WCA 110% WCA	SAL	ADC	WJ
C	1/15/83	REVISED NO. 1FO10A FROM 110% WCA TO 100% WCA	ADC	WJ	WJ
B	1/14/83	REVISED WCA	J.O.	CB	WJ
A	1/14/83	ISSUED FOR STRESS ANALYSIS	J.O.	WJ	WJ

BY	DATA	REV	DATE	BY	REV	DATE	BY	LEGEND
	DLA-107							● SPRING HANGER
	SML ASME SA-333 Gr G	A	1/14/83	302				■ RIGID HANGER
	12000 1.031 .688	H						★ ANCHOR
	24000 20000 12.750	A	1/14/83	002				■ GUIDE
	I II III							⊖ SNUBBER
								⊥ RESTRAINT
								○ HANGER NUMBER
								○ STRESS DATA POINT

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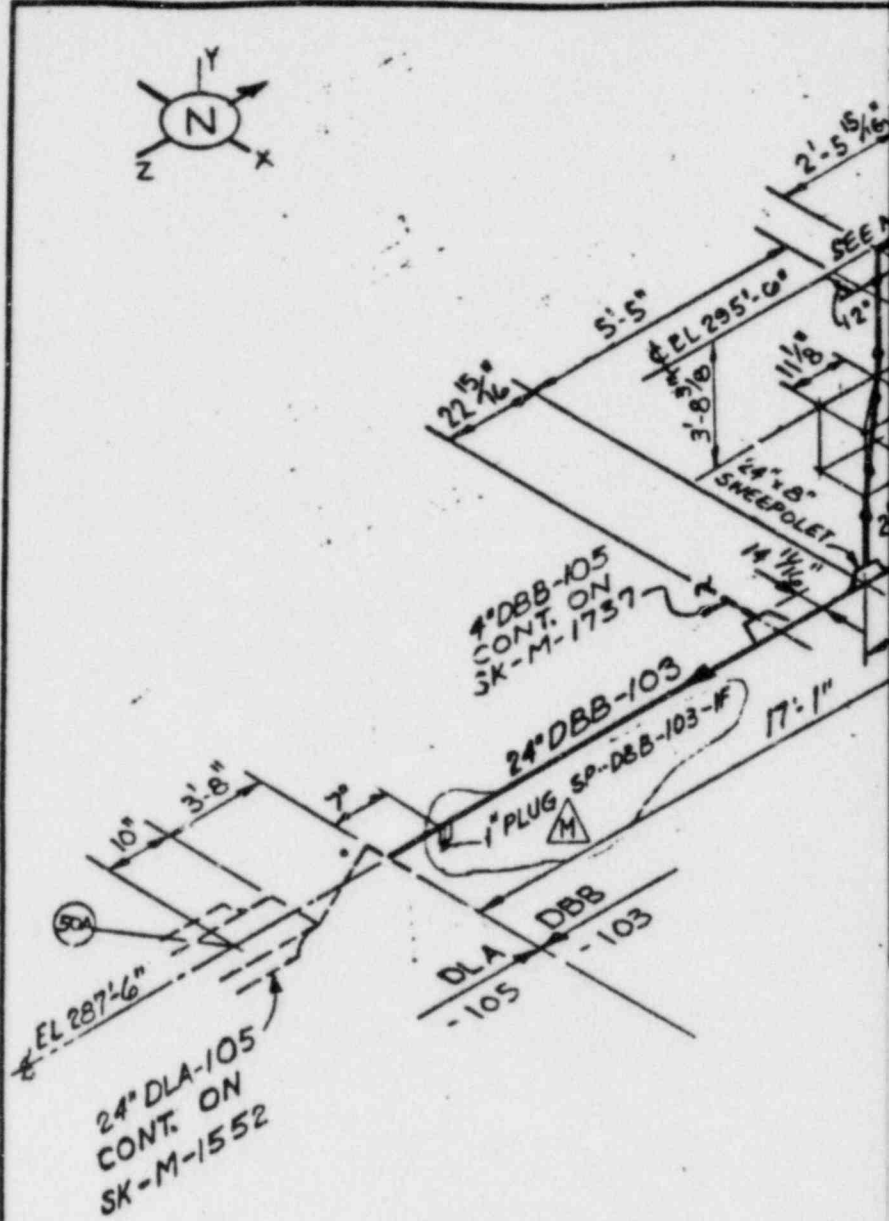
LIMERICK GENERATING STATION
 UNITS 1 & 2
 PHILADELPHIA ELECTRIC COMPANY

ISOMETRIC- REACTOR BUILDING (DRYWELL)
 FEEDWATER - UNIT # J

8031	SK-M-1552	J
	FW (1/c)	

SPECIFICATION 8031-P-362
APPENDIX C

Also Available On
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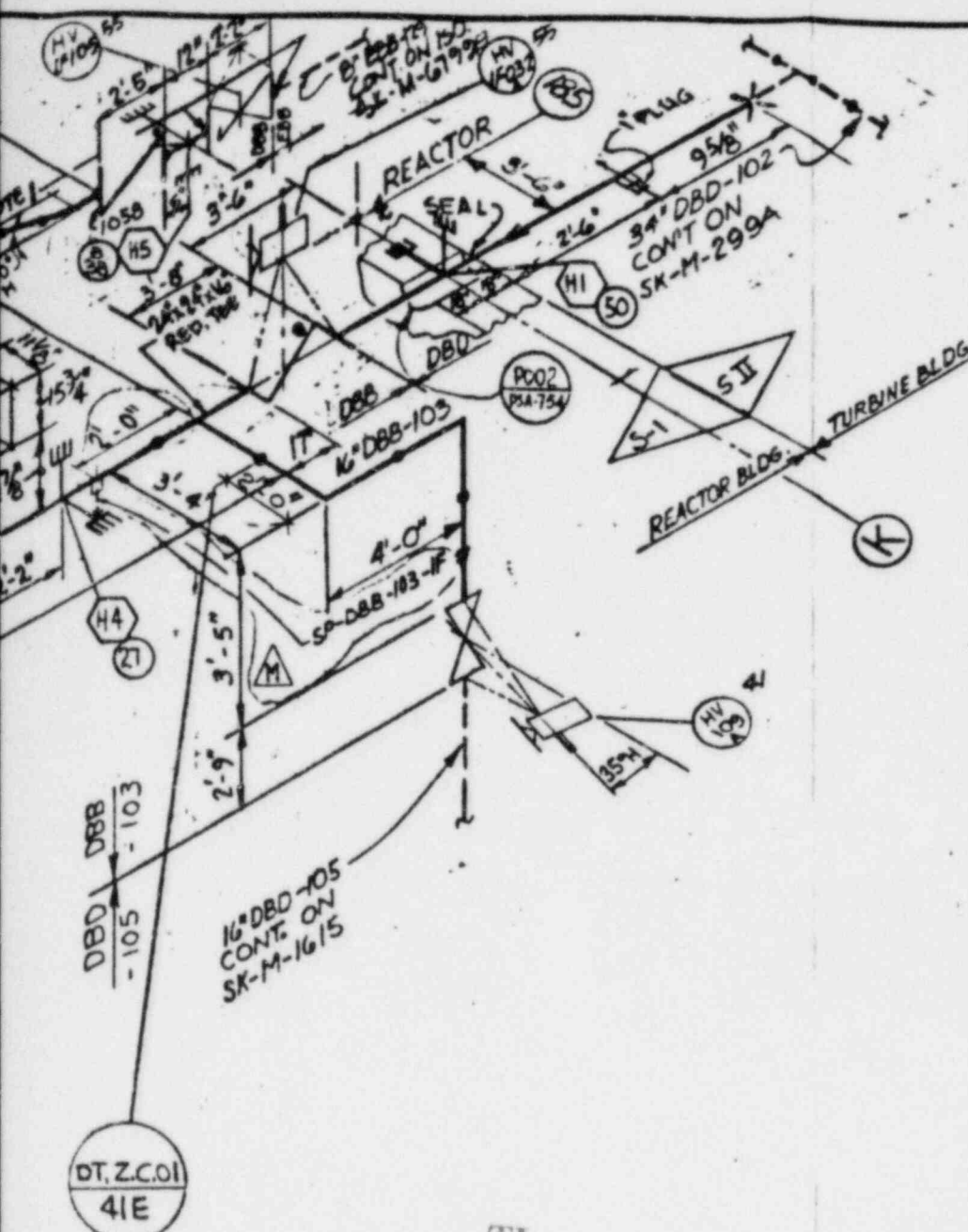
NOTE:

1. FIELD TO BUILD UP PIPE ON BOTH SIDES OF VALVE HV-1F105 TO MAINTAIN MIN. WALL THICKNESS OF 0.568 ON DBB SIDE OF 0.546 ON SBB SIDE.

		DATA			REV	DATE	BY	REV	DATE
PIPING ENGINEER	LINE No.	DBB-103							
	MATERIAL	SML ASME SA-106 Gr. B			A	1/17/79	002		
	LINE THICKNESS (IN)	1.812	1.219	—	A	1/19/79	002		
MECHANICAL ENGINEER	LINE O.D. (IN)	24.000	16.000	—	A	1/17/79	002		
	MODE	I	II	III					
	PRESS. PSIG								
	TEMP F								
STRESS ENGINEER	EXP. COEFF. IN/100FT								
	EXP. COEFF. MIL-IN/IN								
	MOD. OF ELAS. E PSI								

C-14

REV 1



TI
APERTURE
CARD

DT, Z.C. 01
41E

Q-LISTED

STRESS APPROVALS		
REV	THERMAL	SEISMIC

REV. L NOTE:
 ADDED PIPE SUPPORTS & DATA POINTS FOR RECONCILIATION. DELETED VALVE & PRESS/TEMP DATA PER STRESS GROUP MARK-UP. REVISED OFFSET PIPE CONFIGURATION PER FAB ISO. 5'-5" (WAS 4'-9 1/4"), 2'-11 1/8" (WAS 2'-3 1/8"), 3'-8 3/8" (WAS 4'-8 7/8").
 INCORP FOR M-15-304F 1

REV. M NOTE:
 REVISED DATA POINT B-88 (WAS 88) 9 5/8" DIM (WAS 7") PER FAB ISO. ADDED DATA POINT 50A (LINE NO). ADDED 2 SP-HALF CPLAS PER FAB ISO.

- REFERENCE**
- M-41 P&ID
 - M-226 PIPING PLAN
 - M-234 " " " "
 - M-189 " " " "
 - DBB-103-1 REV 9 FAB ISO
 - DBB-103-1 REV 14 FAB ISO
 - CALC NO PI-15-51

- MODE DESCRIPTION**
- MODE I - NORMAL CONDITIONS
 - MODE II - MAXIMUM CONDITIONS
 - MODE III -

8408140314-13

NO.	DATE	REVISIONS	BY	CHKD	APP'D
M		SEE REV. M NOTE	JDD	ES	
L		SEE REV. L NOTE	JDD	97	
K		INCORP FOR M150BBF	SS	95	
J		INCORP PLUS M150BSE	PLD	94	
A		ISSUED FOR STRESS ANAL	J.O.	93	

BY	DATA	REV	DATE	BY	REV	DATE	BY	LEGEND
	DBB-103							● SPRING HANGER
	5ML ASTM A-106 Gr B	B	4/15/76	ARZ				● RIGID HANGER
	1.812			B	4/15/76		ARZ	★ ANCHOR
	24.000			B	4/15/76		ARZ	■ GUIDE
	I	II	III					⊞ SNUBBER
								⊞ RESTRAINT
								○ HANGER NUMBER
								○ STRESS DATA POINT

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LIMERICK GENERATING STATION
 UNITS 1 & 2
 PHILADELPHIA ELECTRIC COMPANY

ISOMETRIC - REACTOR BUILDING
 FEEDWATER UNIT #1

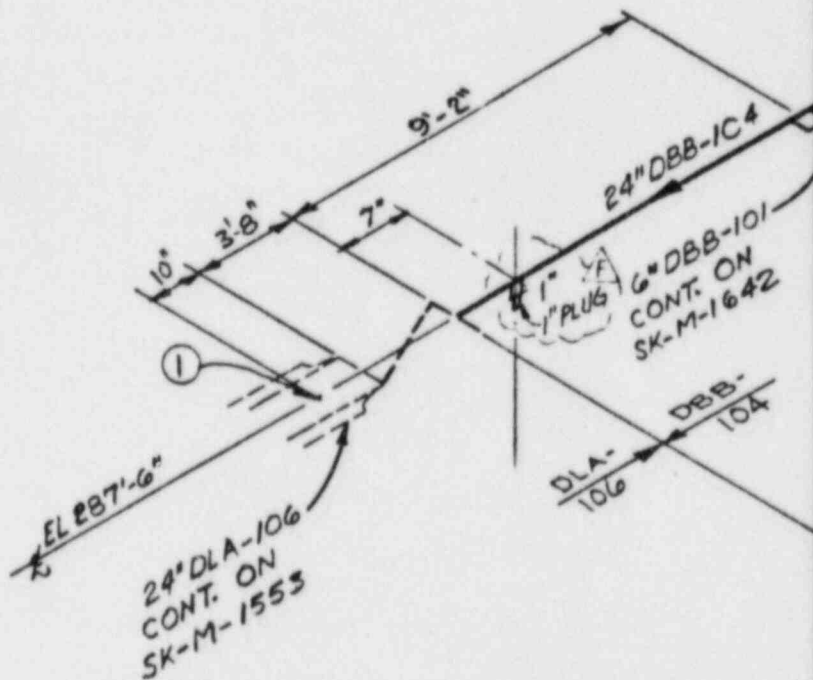
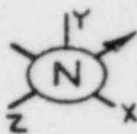
8031	SK-M-1554	M
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FW STM. TUNNEL

SPECIFICATION 8031-P-362
APPENDIX C

Also Available On
Aperture Card

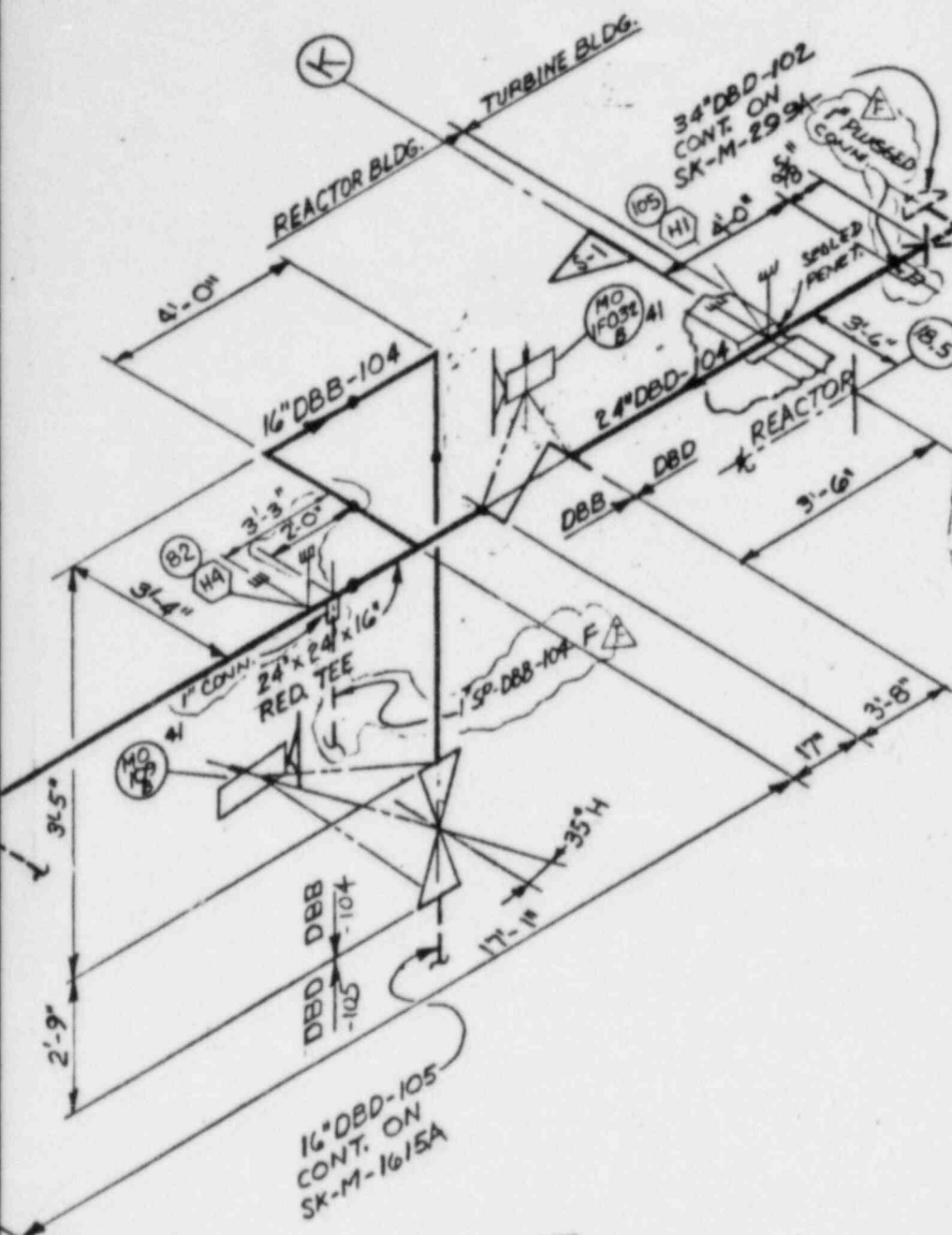
NOTE: No measurement
required.



		DATA		REV	DATE	BY	REV	DATE
PIPING ENGINEER	LINE No.	DBB-104						
	MATERIAL	SML ASME SA-106 Gr. B		A	1/17/74	002		
	LINE THICKNESS (IN)	1.812	1.219	—	A	1/17/74	002	
MECHANICAL ENGINEER	LINE O.D. (IN)	24.000	16.000	—	A	1/17/74	002	
	MODE	I	II	III				
	PRESS. PSIG							
STRESS ENGINEER	TEMP F							
	EXP. COEFF. IN/100FT							
	EXP. COEFF. MIL-IN/IN							
	MOD. OF ELAS. E PSI							

C-15 |

REV 1



TI
APERTURE
CARD

Q-LISTED

BY	DATA	REV	DATE	BY	REV	DATE	BY	LEGEND
	DBD - 104							● SPRING HANGER
	SML ASTM A-106 Gr B	B	4/15/74	AOZ				■ RIGID HANGER
	1.812			B	4/15/74			★ ANCHOR
	24,000			B	4/15/74			≡ GUIDE
	I							⊥ SNUBBER
								⊥ RESTRAINT
								○ HANGER NUMBER
								○ STRESS DATA POINT

STRESS APPROVALS		
REV	THERMAL	SEISMIC

REV. F NOTE:
 ADDED PIPE SUPPORTS & DATA POINTS FOR RECONCILIATION. DELETED PRESS/TEMP & VALVE DATA PER STRESS GROUP MARK-UP. ADDED PLUGS & 1" CONN. PER FAB ISO. INCORP. FOR M16208F.

REFERENCE

- M-41 P&ID
- M-226 PIPING PLAN
- M-234 " " "
- M-189 " " "

CALC # PH-5-51
 DBD-104-1 FAB. ISO REV 9
 DBD-104-1 FAB. ISO REV 11
 MODE DESCRIPTION

- MODE I - NORMAL CONDITION
- MODE II - MAXIMUM CONDITIONS
- MODE III -

8408140314-14

REV	DATE	BY	DESCRIPTION	CHKD	APPD
F			SEE REV. F NOTE		
E			REV BY 1088 TO CLK VALUE ON ASSEMBLY PER GENERAL DING P-1048-R-22-3		
D			GEN REV AS NOTED		
C			REVISED AS SHOWN		
B			ADDED DBD-TIGHT RELEASE AND STRESS ANALYSIS		
A			ISSUED FOR STRESS ANAL		

SCALE: DRAWN BY J.O. DATE: 1974

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 PHILADELPHIA ELECTRIC COMPANY

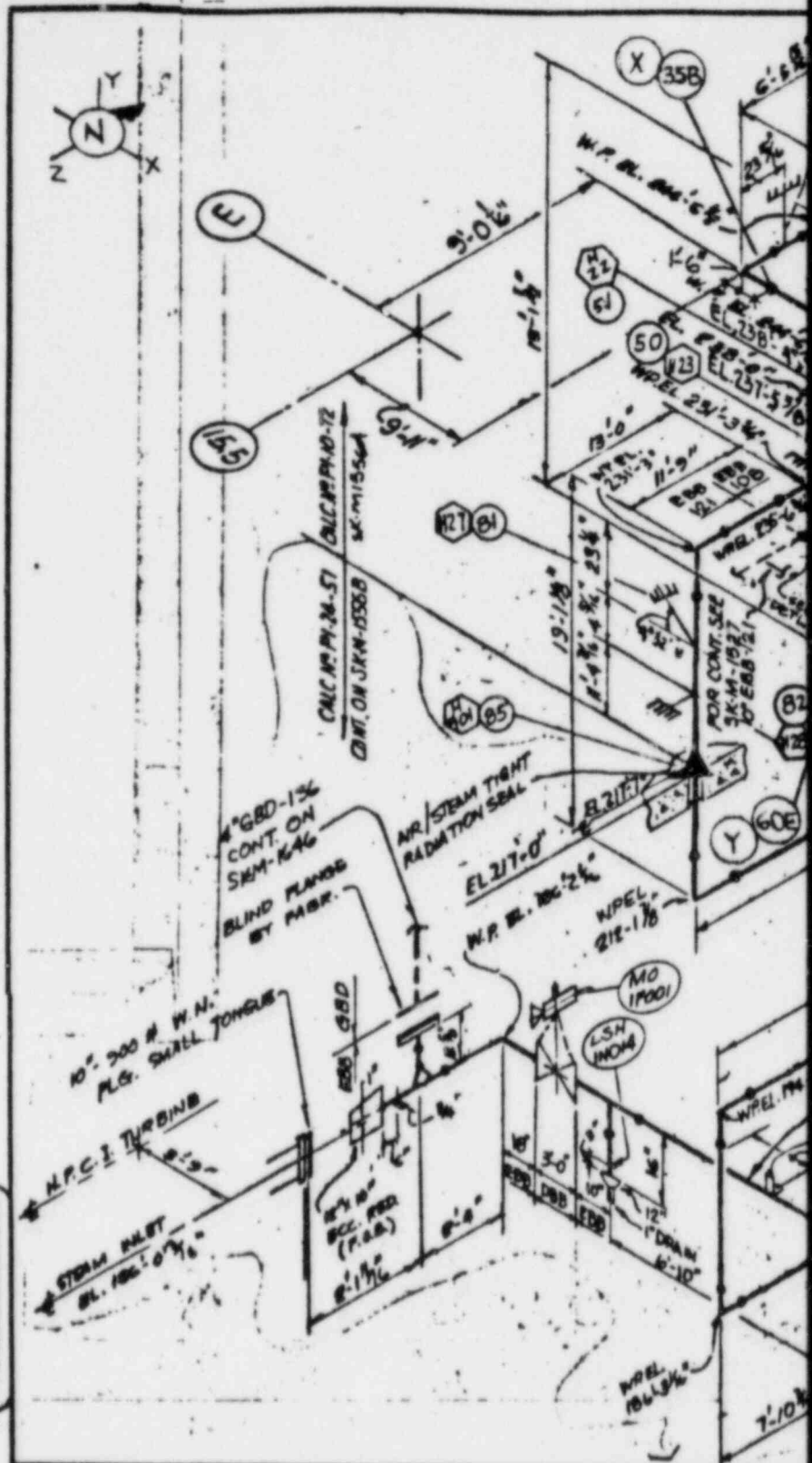
ISOMETRIC - REACTOR BUILDING
 FEEDWATER UNIT #1

JOB NO.	DRAWING NO.	REV.
8031	SK-M-1555	F.

SPECIFICATION 803(-P-362)
APPENDIX C

Also Available On
Aperture Card

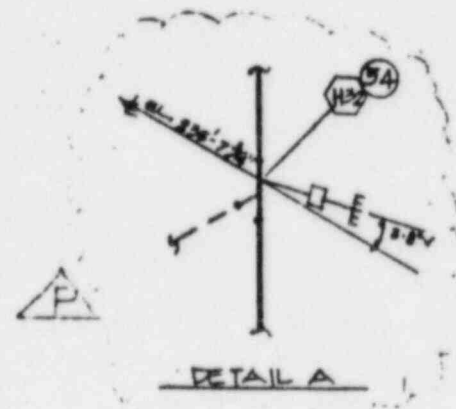
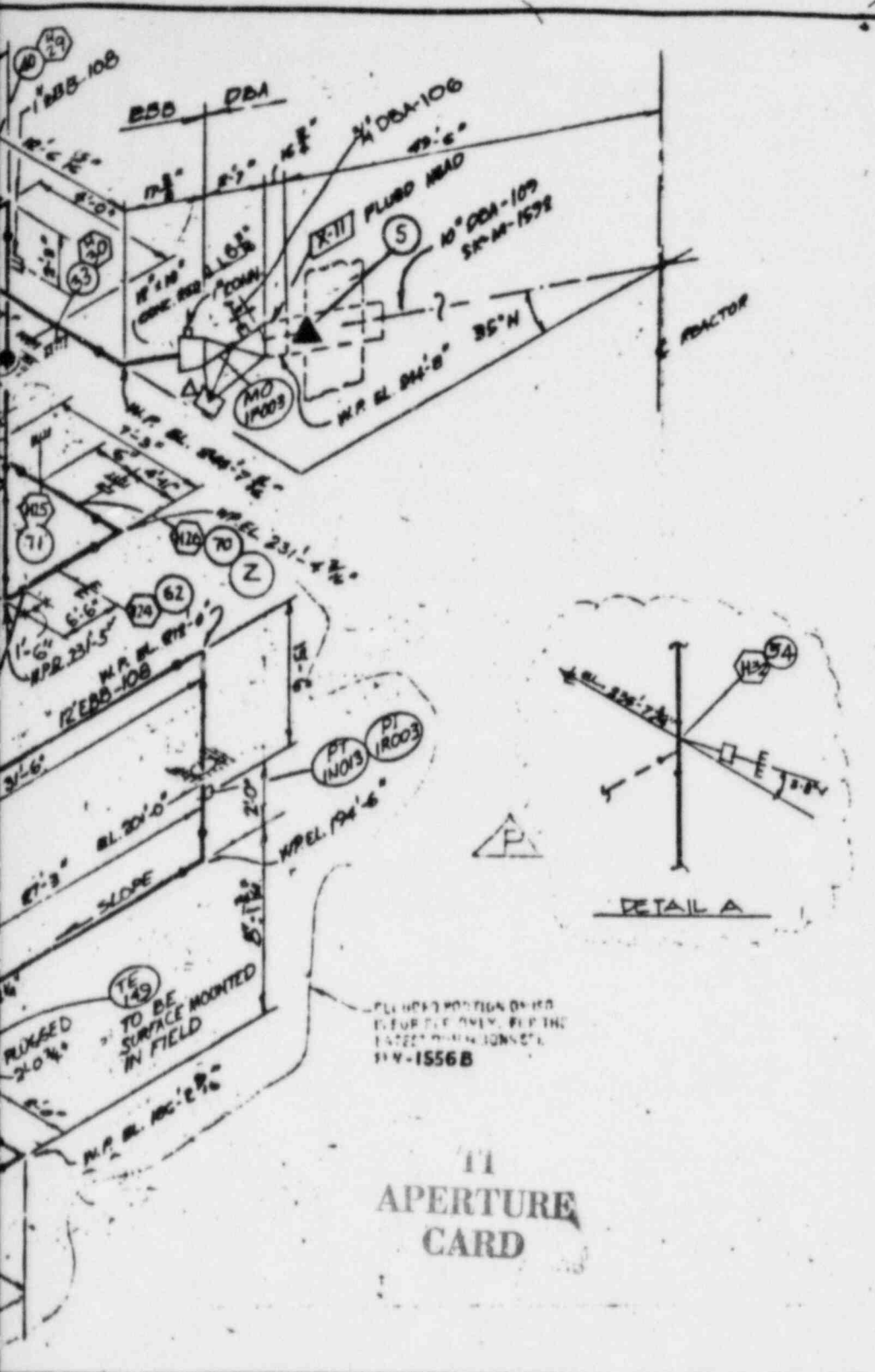
CCN REV 0
CALC. PI-10-72



	DATA			REV	DATE	BY	REV	DATE	
PIPING ENGINEER	LINE No.	E55-105			E	2-17-77	RRK	1	
	MATERIAL	SML. 10WG SA-106, GR B			E	2-17-77	RRK		
	LINE THICKNESS (IN)	.625	.524		E	2-17-77	RRK		
MECHANICAL ENGINEER	LINE O.D. (IN)	11.790	10.790		E	2-17-77	RRK		
	MODE	II	II	III					
	PRESS. PSIG								
STRESS ENGINEER	TEMP F								
	EXP. COEFF. IN/100FT								
	EXP. COEFF. MIL-IN/IN								
	MOD. OF ELAS. E PSI								

8408140314-15

C-16 | REV 1



ALL HANGERS TO BE MOUNTED ON FIELD SURFACE ONLY. SEE THE LATEST REVISIONS OF SK-M-1556B

11 APERTURE CARD

STRESS APPROVALS

REV	THERMAL	SEISMIC

NOTE: THIS DWG. SUPERSEDES SK-M-362

REV. F NOTE:
ADDED NORTH ARROW, COLUMN REF. & TE-149. ADDED CONT'D STRESS 150
REV. W.P. ELEVATIONS AS NOTED.
DIM. 8'-1 1/2" HAS 8' 1 3/4"

REV. N NOTE:
DELETED VALVE DATA / PRESS / TEMP. DATA.
SK-M-1556A WAS SK-M-1556. ADDED PIPE SUPPORTS & DATA POINTS FOR RECONCILIATION.

REFERENCE STRESS CALC. NO PI-10-72.

- M-55 P&ID
- M-227 PIPING PLAN
- M-228 " "
- M-229 " "

EBB-108-1 REV. 10/10/70
EBB-108-2 REV. 10/10/70

MODE DESCRIPTION

- MODE I - NORMAL SYSTEM NON-OPERATING CONDITIONS
- MODE II - MAXIMUM DESIGN CONDITIONS
- MODE III - ACCIDENT SYSTEM OPERATING CONDITIONS

REV	DATE	BY	CHKD	APP'D	REVISION
P	11/22/70	AS	SR	AW	REVISED PER H.32 REV. 1
N	11/22/70	OL	SR	AW	SEE REV. N NOTE.
M	11/22/70	SRT	SR	AW	REV PER P&ID M-55
A	11/22/70	SP	SR	AW	SEE REV. L NOTE
A	11/22/70	PV	SR	AW	ADDED 1" COLUMN ON 10" DIA. PIPE. REV.
A	11/22/70	JBR	SR	AW	INC. FOR M-4034F
M	11/22/70	BT	SR	AW	RELEASED HOLD PER EN 7-4797
E	11/22/70	BT	SR	AW	ADDED 1" COLUMN ON 10" DIA. PIPE. REV.
F	11/22/70	SAL	SR	AW	SEE REV. F NOTE
E	11/22/70	LTL	SR	AW	ADDED 1" COLUMN ON 10" DIA. PIPE. REV.

BY	DATA	REV	DATE	BY	REV	DATE	BY	LEGEND
								● SPRING HANGER
								● RIGID HANGER
								▲ ANCHOR
								⊕ GUIDE
								⊞ SHUBBER
								⊞ RESTRAINT
								○ HANGER NUMBER
								○ STRESS DATA POINT

DRG NO. 8031
DESIGNED BY DANIEL L. LABARO
DATE 11/22/70

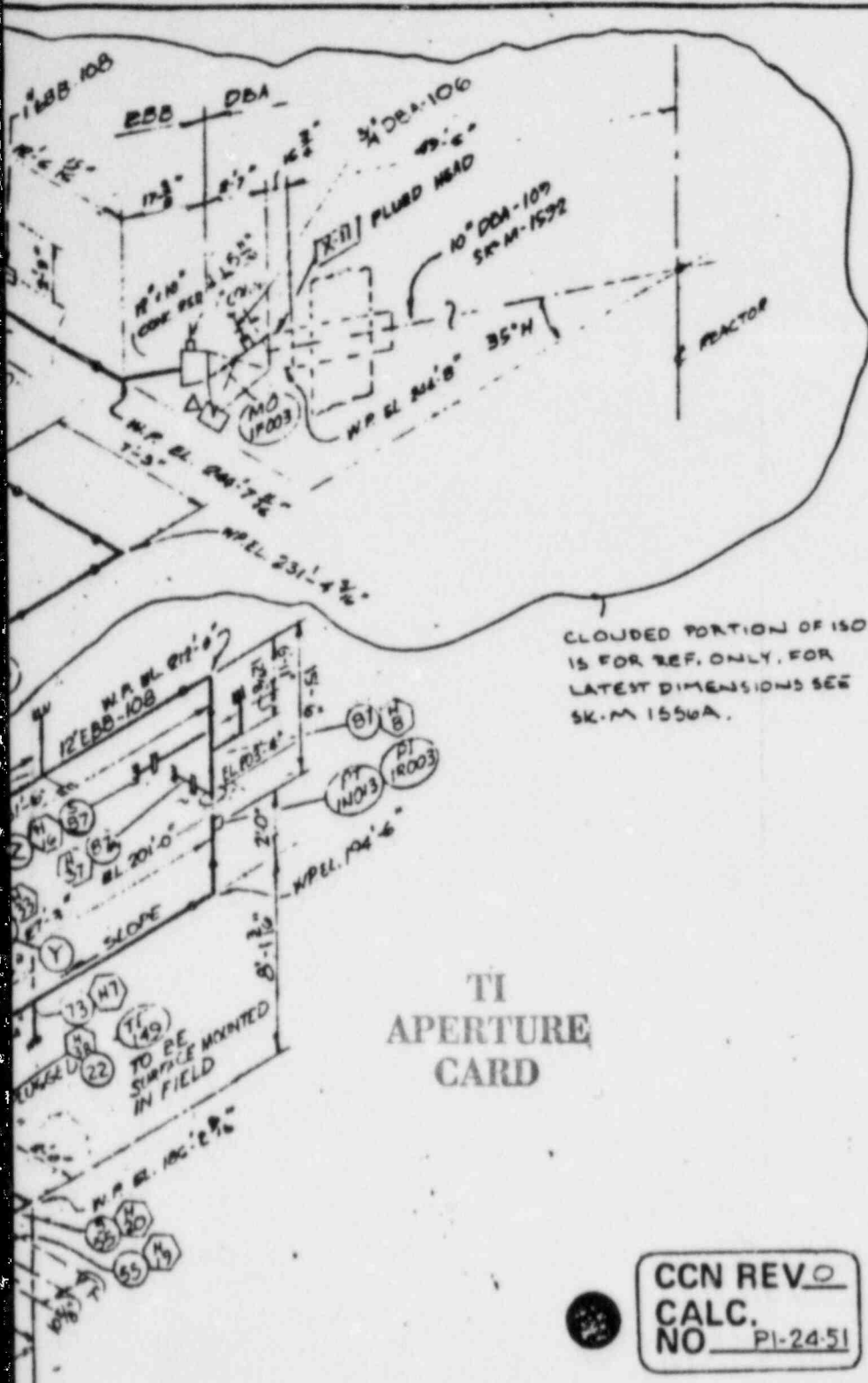
BECHTEL
SAN FRANCISCO

LIMERICK GENERATING STATION
UNITS 1 & 2
PHILADELPHIA ELECTRIC COMPANY

ISOMETRIC - REACTOR BUILDING
HIGH PRESSURE COOLANT INJECTION
UNIT 1

JOB NO. 8031
DRAWING NO. SK-M-1556

(OK) HOCI STA



CLOUDED PORTION OF ISO IS FOR REF. ONLY, FOR LATEST DIMENSIONS SEE SK-M-1556A.

TI APERTURE CARD

CCN REV 0
CALC.
NO PI-24-51

STRESS APPROVALS		
REV	THERMAL	SEISMIC

NOTE:
THIS DWS SUPERSEDES SK-M-362

REV F NOTE:
ADDED NORTH ARROW, COLUMN REF. & TE-149. ADDED CONT'D STRESS ISO REV. W.P. ELEVATIONS AS NOTED. DIM. 8'-1 1/2" WAS 8'-3 1/2"

REV N NOTE:
ADDED HANGER SYMBOLS & DATA POINTS PER HANGER MARK-UPS. SK-M-1556B WAS SK-M-1556

Also Available On Aperture Card

REFERENCE

- M-55 P&ID
- M-227 PIPING PLAN
- M-228 " " "
- M-229 " " "
- EBB-108-1 REV 16 FAB-150
- EBB-108-2 REV 20 " "

MODE DESCRIPTION

- MODE I - NORMAL SYSTEM NON-OPERATING CONDITIONS
- MODE II - MAXIMUM DESIGN CONDITIONS
- MODE III - ACCIDENT SYSTEM OPERATING CONDITIONS

STRESS CALC. # PI-24-51

8408140314-16

N	REV	DESCRIPTION	BY	CHKD	DATE	APP'D
M	0	REV PER PI-24-51	SPY	REB	6	RE
L	1	SEE REV L NOTE	SPY	REB	2/4	RE
A	1	ADDED 1" COIN ON T-1 W/ CONC. RED.	PV	VA	1/4	RE
A	1	W.C. PER M-4034	JBR	VA	1/4	RE
M	1	RELEASED HOLD PER ENP 4737	BT	VA	1/4	RE
B	1	SEE REV F NOTE	JBR	VA	1/4	RE
F	1	SEE REV F NOTE	SAL	J.B.	1/4	RE
E	1	REV - WAVE DATA	LTL	VA	1/4	RE

BY	DATA	REV	DATE	BY	REV	DATE	BY	LEGEND
								● SPRING HANGER
								● RIGID HANGER
								★ ANCHOR
								⊕ GUIDE
								⊖ SNUBBER
								⊥ RESTRAINT

BECHTEL
SAN FRANCISCO

LIMERICK GENERATING STATION
UNITS 1 & 2
PHILADELPHIA ELECTRIC COMPANY

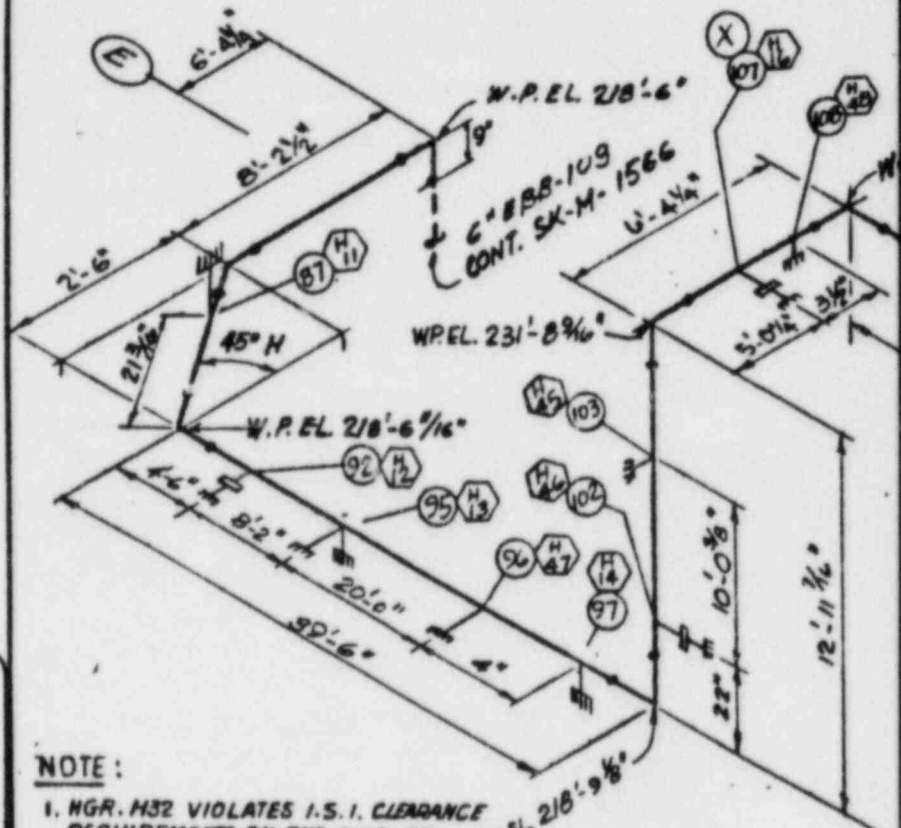
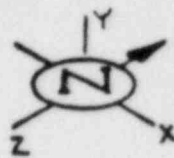
ISOMETRIC - REACTOR BUILDING
HIGH PRESSURE COOLANT INJECTION
UNIT 1

8031	SK-M-1556 B	N
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rolc) HPCI STM

SPECIFICATION 8031-P-362
APPENDIX C

Also Available On
Aperture Card

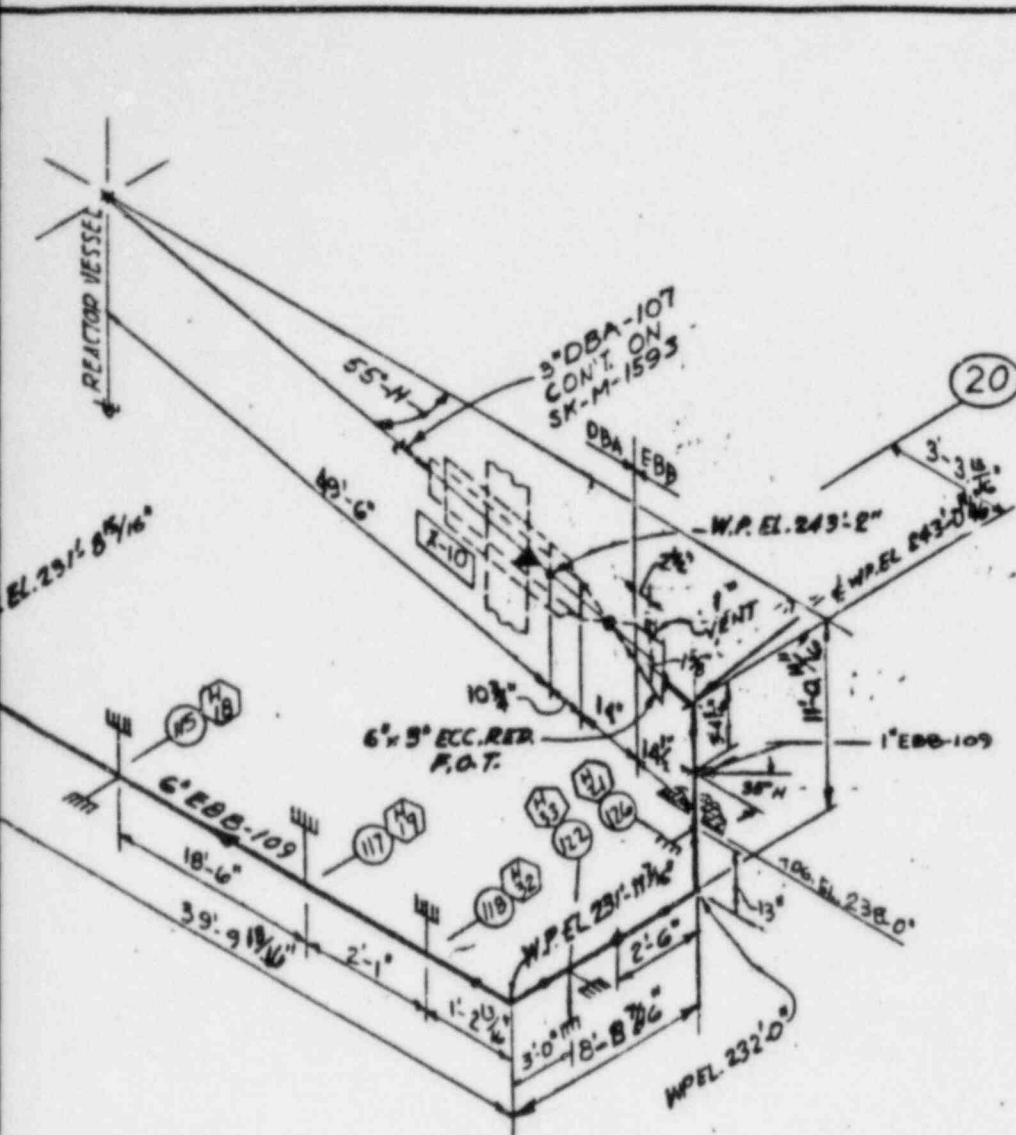


CCN REV 0
CALC.
NO PI-22-51

NOTE:

1. MGR. H32 VIOLATES I.S.I. CLEARANCE REQUIREMENTS ON ONE SIDE OF THE WELD. CLAMP MUST BE WOKED FOR WELD INSPECTION, TEMP. SUPPORT PROVIDED AS REPORT ON FCR M14304F.

		DATA	REV	DATE	BY	REV	DATE
PIPING ENGINEER	LINE No.	EBB-109					
	MATERIAL	SML ASME SA-106 Gr.B	A	11-4-73	102		
	LINE THICKNESS (IN)	.432	A	11-9-73	107		
MECHANICAL ENGINEER	LINE O.D. (IN)	6.625	A	11-9-73	107		
	MODE	I II III					
	PRESS. PSIG						
	TEMP F						
STRESS ENGINEER	EXP. COEFF. IN/100FT						
	EXP. COEFF. MIL-IN/IN						
	MOD. OF ELAS. & PW						



TI
APERTURE
CARD

Q-LISTED

BY	DATA	REV	DATE	BY	REV	DATE	BY	LEGEND
								● SPRING HANGER
								■ RIGID HANGER
								▲ ANCHOR
								■ GUIDE
								HOE ENUBBER
								H RESTRAINT
								○ HANGER NUMBER
								○ STRESS DATA POINT

STRESS APPROVALS		
REV	THERMAL	SEISMIC
A	RRM	4-7-79

REV. F NOTE:

ADDED HANGER SYMBOLS & DATA POINTS PER HANGER MARK-UPS.
ADDED HANGER NOTE 1 TO REF. FCR M4304F.

REV. G NOTE:

DELETED TEMP & PRESS. DATA PER STRESS REQUEST.

ADDED HANGER NB'S & DATA POINTS FOR RECONCILIATION.
INCCORP. FCR # M 17.128 F

REFERENCE
FCR # M 17.128 F
STRESS CALC NR P1-82-51
FCR M4304F
M-49 PEID
M-216 SECTION
M-229 PIPING PLAN
M-239
M-208
DBB-109-1 FAB. 150 12/1/72

MODE DESCRIPTION

- MODE I - NORMAL CONDITIONS (SYSTEM NOT OPERATING)
- MODE II - MAXIMUM DESIGN CONDITIONS (MAX. REACTOR PRESSURE)
- MODE III - OPERATING CONDITIONS (DURING ACCIDENT)

8408140314-17

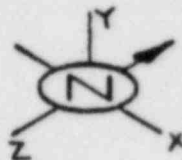
G	7/14	SEE REV. G NOTE	EG	BR	FR	10/10	10/10
F	3/12	SEE REV. F NOTE	ALG	BR	FR	10/10	10/10
E	7/14	INC. FCR M-4102 F	R	BR	FR	10/10	10/10
D	7/14	PLUGGED 17Y-CONN.	ALG	BR	FR	10/10	10/10
C	7/14	ADDED VENT	ALG	BR	FR	10/10	10/10
B	8-24	DELETED VENT	BR	FR	10/10	10/10	10/10
A	8-12	ISSUED FOR STRESS ANALYSIS	T.S.	FR	10/10	10/10	10/10

NO.	DATE	REVISIONS	BY	CHKD	DESIGN	DRWG	APP
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BECHTEL
SAN FRANCISCO
LIMERICK GENERATING STATION
UNITS 1 & 2
PHILADELPHIA ELECTRIC COMPANY
ISOMETRIC REACTOR BUILDING
REACTOR CORE ISOLATION COOLING UNIT # 1

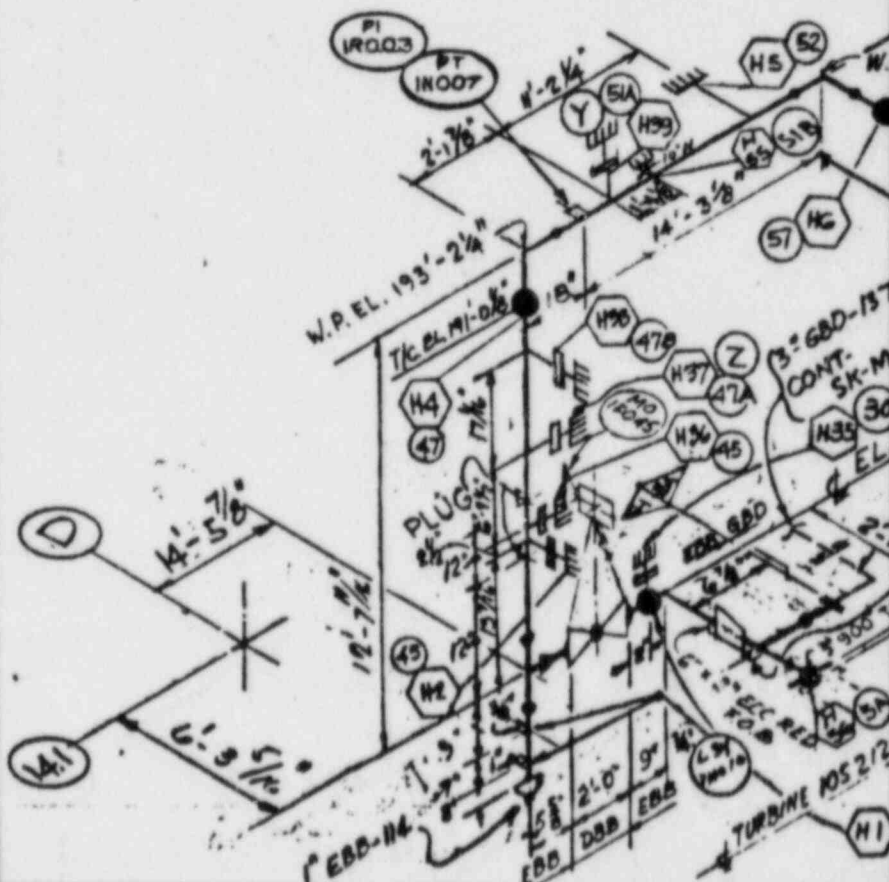
8031	SK-M-1555	G
1106	RCIC STM	

SPECIFICATION 8031-P-362
APPENDIX C



Also Available On
Aperture Card

CCN REV 2
CALC.
NO. F1-22-51



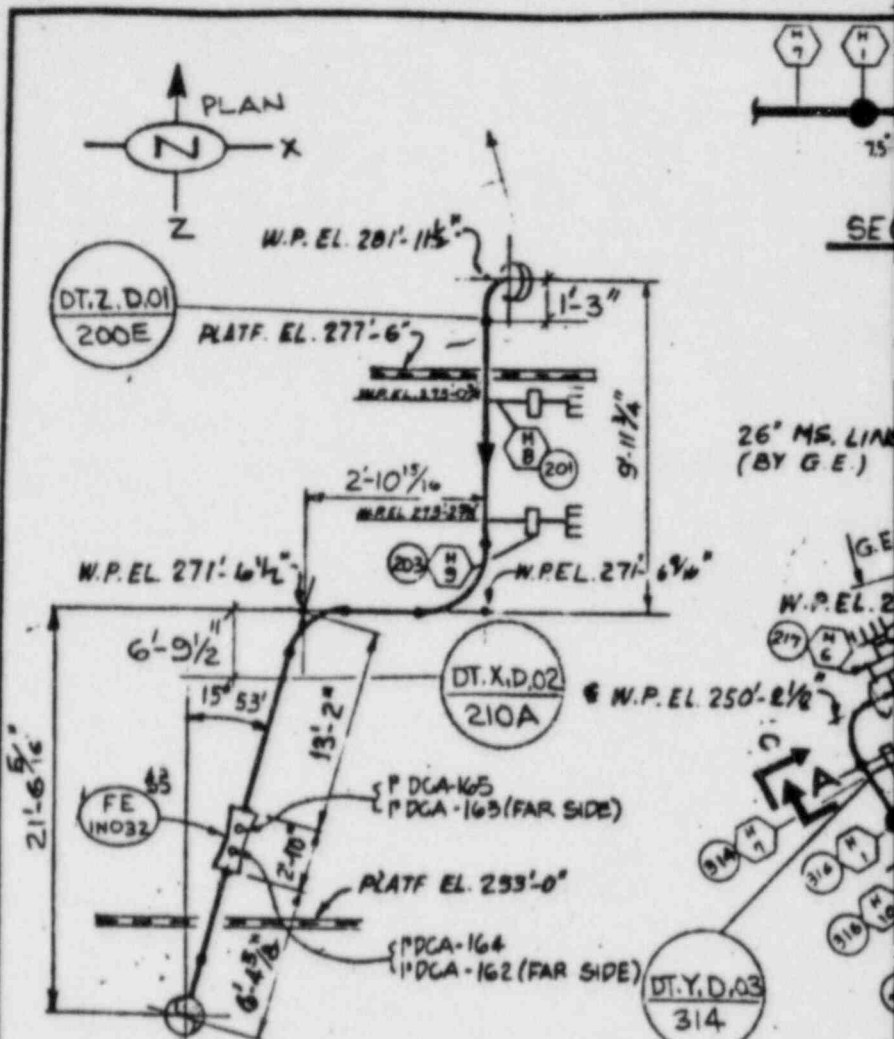
		DATA	REV	DATE	BY	REV	DATE
PIPING ENGINEER	LINE No.	EBB-109					
	MATERIAL	SML ASME SA-106 Gr. B		A	11-4-73	627	
	LINE THICKNESS (IN)	.432	.438	A	11-4-73	627	
MECHANICAL ENGINEER	LINE O.D. (IN)	6.625	3.500	A	11-4-73	627	
	MODE	I	II	III			
	PRESS. PSIG						
	TEMP F	500					
STRESS ENGINEER	EXP. COEFF. IN/100FT						
	EXP. COEFF. MIL-IN/IN						
	MOD. OF ELAS. S. PSI						

C-19

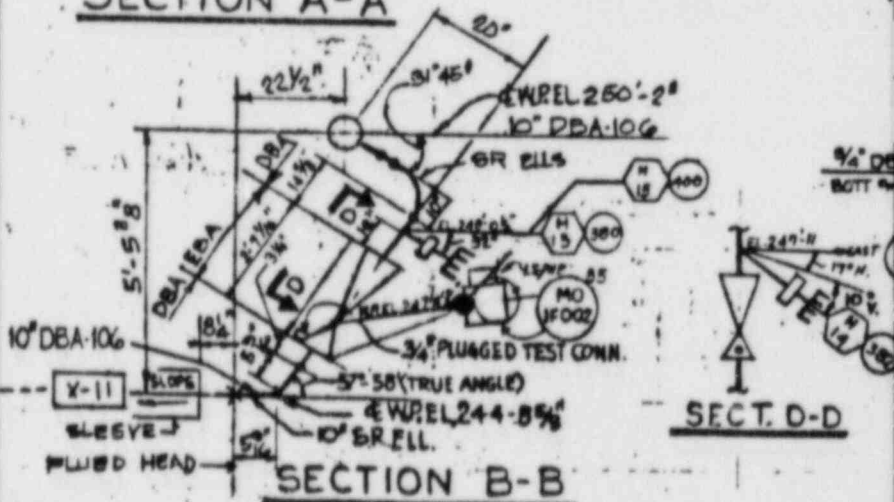
REV 1

SPECIFICATION 8031-P-362
APPENDIX C

Also Available On
Aperture Card



SECTION A-A



SECTION B-B

		DATA	REV	DATE	BY	REV	DATE
PIPING ENGINEER	LINE No.	DBA-106					
	MATERIAL	316L ASME SA-106 Gr. B		12/1/78	BAZ		
	LINE THICKNESS (IN)	.394		12/1/78	BAZ		
MECHANICAL ENGINEER	LINE O.D. (IN)	10.750		12/1/78	BAZ		
	MODE	I II III					
	PRESS. PSIG						
STRESS ENGINEER	TEMP						
	EXP. COEFF. IN/100FT						
	EXP. COEFF. MIL-IN/IN						
	MOD. OF ELAS. & PSI						

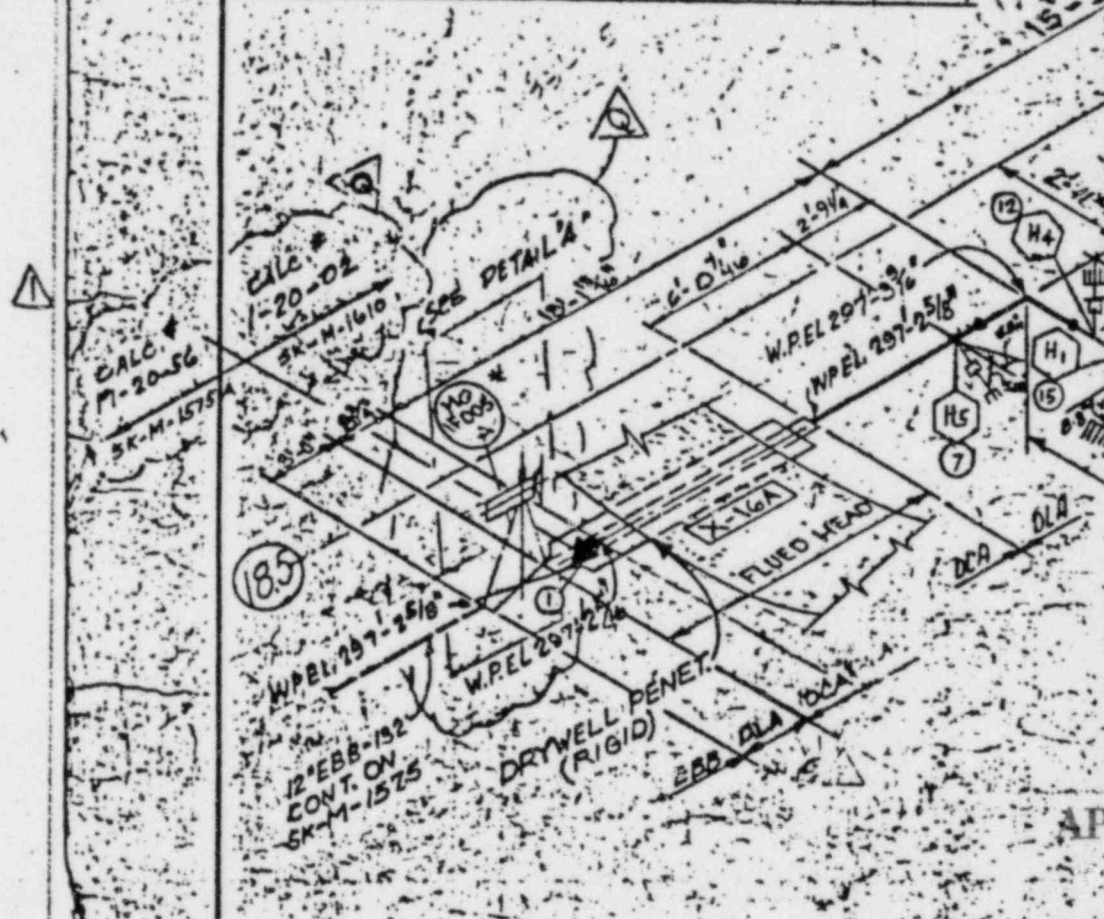
8408140314-19

C-20 | REV 1

SPECIFICATION 8031-P-362
APPENDIX C

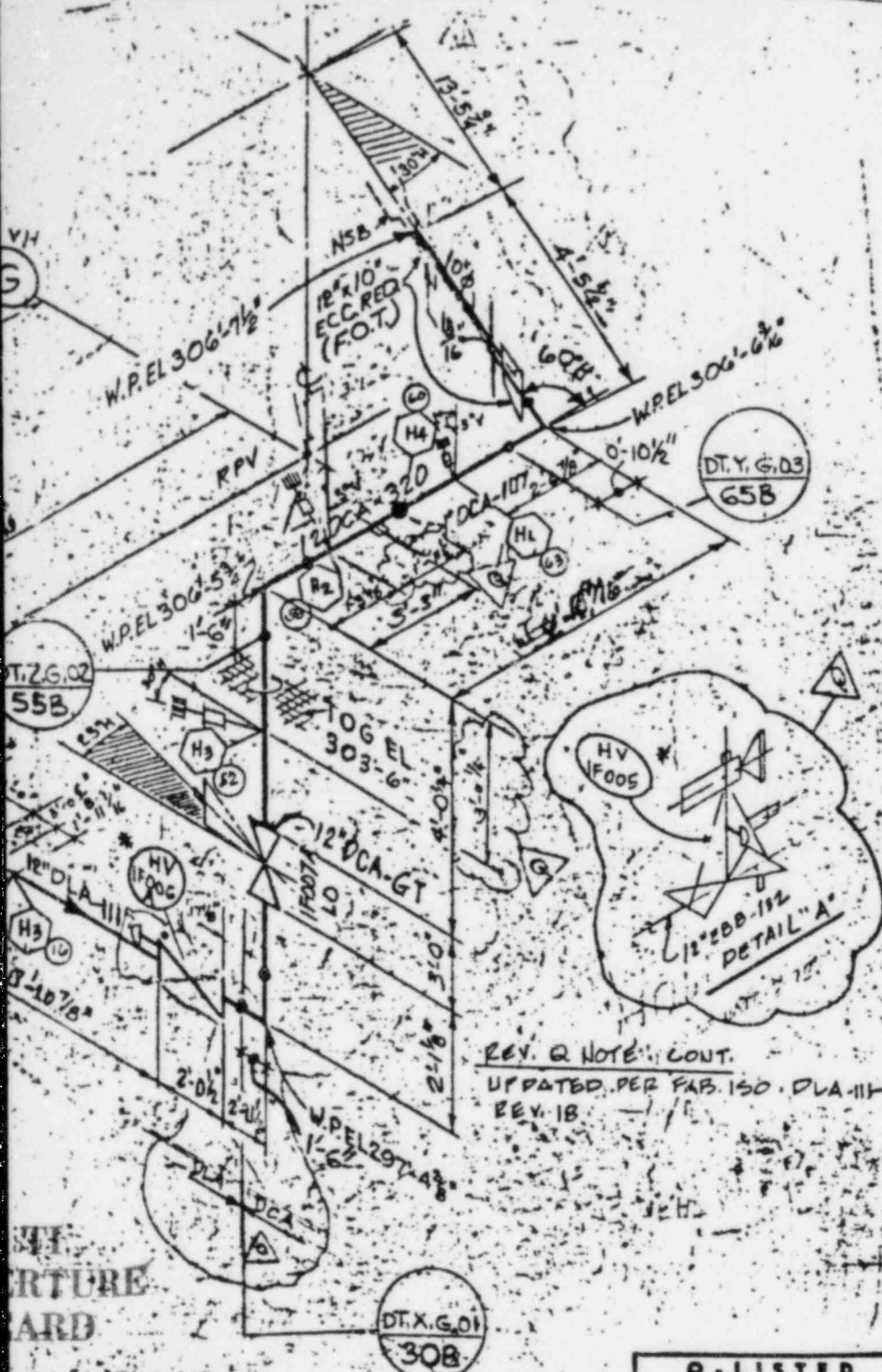
Also Available On
Aperture Card

		DATA		REV	DATE	BY
MECHANICAL PIPING ENGINEER	LINE	DCA-920		J	4/27/79	ANSAW
	MATERIAL	SMLS SA-312 TP. 316L DR. C MAX. SCH. 80		J	4/27/79	ANSAW
	LINE THICK. (IN)	.595		J	4/27/79	ANSAW
MECHANICAL ENGINEER	LINE O.D. (IN)	10.750		J	4/27/79	ANSAW
	MODE	I	II	III		
	PRESS. PSIG	100	100	100		
	TEMP F	500	500	500		



		DATA		REV	DATE	BY	REV	DATE
PIPING ENGINEER	LINE No.	DLA-III					E	4/17/76
	MATERIAL	SMLS	RSME SR 333 GR G	A	4/4/79	ANSAW	E	4/17/76
	LINE THICKNESS (IN)	.687		A	4/4/79	ANSAW	E	4/17/76
MECHANICAL ENGINEER	LINE O.D. (IN)	12.750		A	4/4/79	ANSAW	E	4/17/76
	MODE	I	II	III				
	PRESS. PSIG	100	100	100	A	4/4/79		
	TEMP F	500	500	500	A	4/4/79		
STRESS ENGINEER	EXP. COEFF. IN/100FT							
	EXP. COEFF. MIL-IN/IN	14						
	MOD. OF ELAS. E PSI							

8408140314-21
C-22 | REV 1



STRESS APPROVALS		
REV	THERMAL	SEISMIC

REV. K NOTE:
 REV. VALVE CLASS PER FIELD REQUEST.
 REV. VALVE SIZE 3'-0" WAS 3'-2" PER
 VENDOR PRINT M-1-B21-F005-C-2.5

REV P NOTE:
 REV PER FCR M-12491F. & CHANGED 5.75 TO
 5.82 IN TEMP MODE III PER MECH. ENGR.

REV. L NOTE:
 REVISED DIMENSIONS D-2078 WAS 2'-2 1/4"
 2'-11 5/8" WAS 2' 8 3/8" PER FCR 4474 F.
 ADDED AS BUILT W.P. ELEVATIONS PER FCR 4472 F.

REV. Q NOTE:
 ADDED PIPESUPPORTS & DATA POINTS FOR
 RECONCILIATION & DELETED PRESS. & TEMP.
 DATA & VALVE DATA PER STRESS MARK-UP.
 ADDED STRESS CALC. #'S. ADDED RETAIN-A
 3'-0" WAS 2'-5 1/2" AND ADDED DIM. 1'-11 1/2"

- REFERENCE STRESS CAL. 1-20102
- M-52 P110 FCR 3
 - M-210 PIPING PLAN REV 12
 - M-235 PIPING PLAN FCR 4
 - DCA-320-1 REV 12 FAB 130
 - DLA-111-1 REV 18
 - M-7976F (REF. FCR)

MODE DESCRIPTION

- MODE I - NORMAL SYSTEM NON-OPERATING CONDITIONS (NORMAL REACTOR PRESSURE)
- MODE II - MAXIMUM DESIGN CONDITIONS (MAX. REACTOR PRESSURE)
- MODE III - SYSTEM OPERATING CONDITIONS

REV. Q NOTE: CONT.
 UPDATED PER FAB. ISO. DLA-111-1
 REV. 18

REV	DATE	BY	DESCRIPTION	CHKD	APPD
Q			SEE REV. Q NOTE		
P			SEE REV. P NOTE		
N			ADDED REF. FOR M-7976F		
M			INCORPORATED 5166F		
L			SEE REV. L NOTE		
K			SEE REV. K NOTE		
B			REVISED & REISSUED		
A			ISSUED FOR STRESS ANAL.		

Q-LISTED

REV	DATE	BY	REV	DATE	BY	LEGEND
CK			H			● SPRING HANGER
CK			H	5/19/79		■ RIGID HANGER
K			H	5/2/79		★ ANCHOR
CK			H	5/19/79		□ GUIDE
						⊥ SNUBBER
A						⊥ RESTRAINT

BECHTEL
 SAN FRANCISCO

LIMERICK GENERATING STATION
 UNITS 1 & 2
 PHILADELPHIA ELECTRIC COMPANY

ISOMETRIC REACTOR BUILDING (DRYWELL)
 CORE SPRAY SYSTEM - UNIT 1

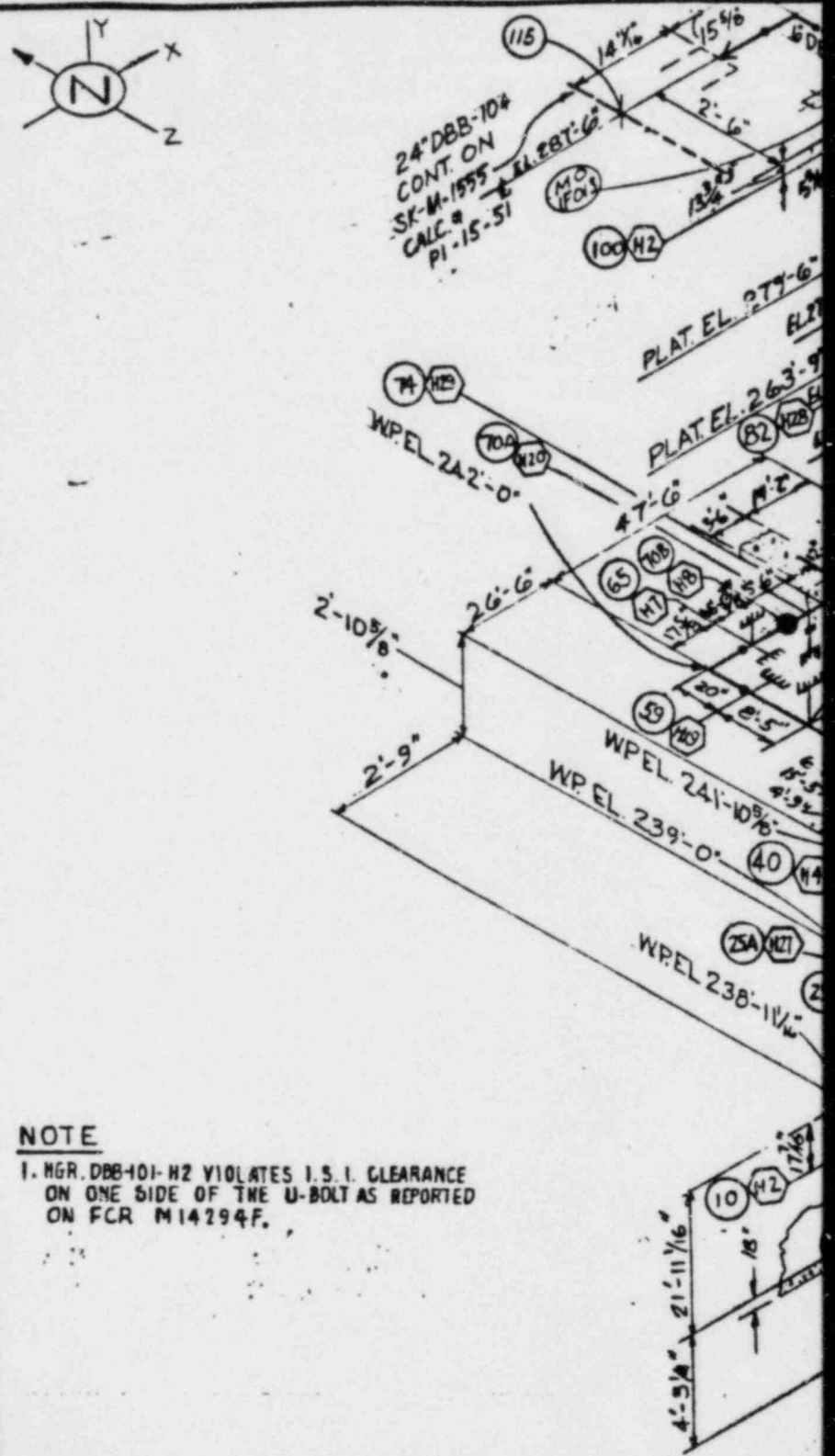
8031 SK-M-1610 Q

SPECIFICATION 8031-P-362
APPENDIX C

NOTE: No measurement
required.

Also Available On
Aperture Card

CCN REV 0
CALC. NO. P-22-61

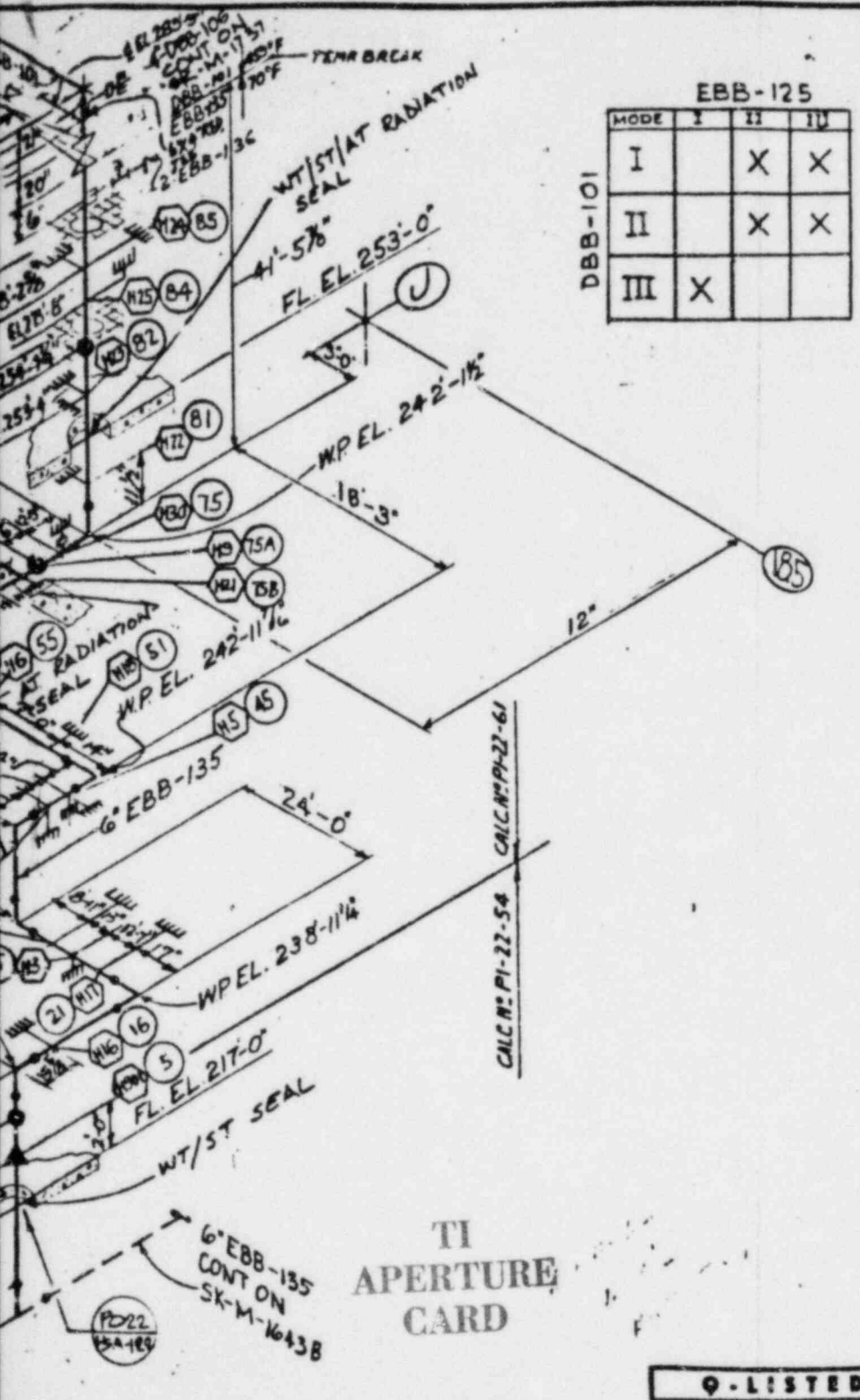


NOTE
1. MGR. DBB-101-HZ VIOLATES I. S. I. CLEARANCE
ON ONE SIDE OF THE U-BOLT AS REPORTED
ON FCR M14294F.

	DATA	REV	DATE	BY	REV	DATE
PIPING ENGINEER	LINE No.	EBB-135				
	MATERIAL	5ML ASME SA-106 Gr. B	A	12/18/73	BLZ	
	LINE THICKNESS (IN)	.562	A	12/18/73	BLZ	
MECHANICAL ENGINEER	LINE O.D. (IN)	6.625	A	12/18/73	BLZ	
	MODE	I II III				
	PRESS. PSIG					
STRESS ENGINEER	TEMP F					
	EXP. COEFF. IN/100FT					
	EXP. COEFF. MIL-IN/IN					
	MOD. OF SLAB & PSI					

8408140314-22

C-23 REV 1



EBB-125

MODE	I	II	III
I		X	X
II		X	X
III	X		

DBB-101

STRESS APPROVALS		
REV	THERMAL	SEISMIC
A	ERL	

REV. E NOTE:
 DELETED VALVE DATA/ PRESS./ TEMP. DATA, ADDED PIPE SUPPORTS & DATA POINTS FOR RECONCILIATION. INC. PER FCR-M15321F.
MODE DESCRIPTION DBB-101

MODE I NORMAL CONDITIONS FO13 CLOSED, FEED-WATER AT NORMAL OPERATING CONDITIONS
 MODE II MAXIMUM CONDITIONS FO13 CLOSED, FEED WATER AT MAXIMUM SHUTOFF CONDITIONS
 MODE III NORMAL SYSTEM OPERATING CONDITIONS FO13 OPEN, REACTOR AT HIGH PRESSURE

REFERENCE STRESS CALC. NO PI-22-61

M-49 P1D
 M-207 PIPING PLAN-EL.201-AREA II
 M-208 EL.217
 M-228 EL.201-AREA 15
 EBB-135-1
 DBB-101-1
 FCR M-14294F

MODE DESCRIPTION EBB-135

MODE I - NORMAL SYSTEM OPERATING CONDITIONS REACTOR AT HIGH PRESSURE
 MODE II - MAXIMUM SHUTOFF CONDITIONS CLOSE DISCHARGE VALVE
 MODE III - NORMAL SYSTEM CONDITIONS SYSTEM NOT OPERATING, FILL SYSTEM OPERATING

F	REVISED PER	AV	SR	SA	...
E	SEE REV. E NOTE	CL	...	...	...
D	REV. PERIT. LD	MG	F	...	...
C	SEE REV. C NOTE	GP	WP	...	...
B	ADDED SEALS	SH	...	...	...
A	ISSUED FOR STRESS	T.S.	...	...	...

TI APERTURE CARD

Q-LISTED

BY	DATA	REV	DATE	BY	REV	DATE	BY	LEGEND
	DBB-101							SPRING HANGER
	SAIL ASME SA-106 Gr B	A	12/12/73	RAZ				RIGID HANGER
	.562	A	12/12/73	RAZ				ANCHOR
	6.625	A	12/12/73	RAZ				GUIDE
	I							SHOCKER
	II							RESTRAINT
	III							HANGER NUMBER
								STRESS DATA POINT

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 SAN FRANCISCO

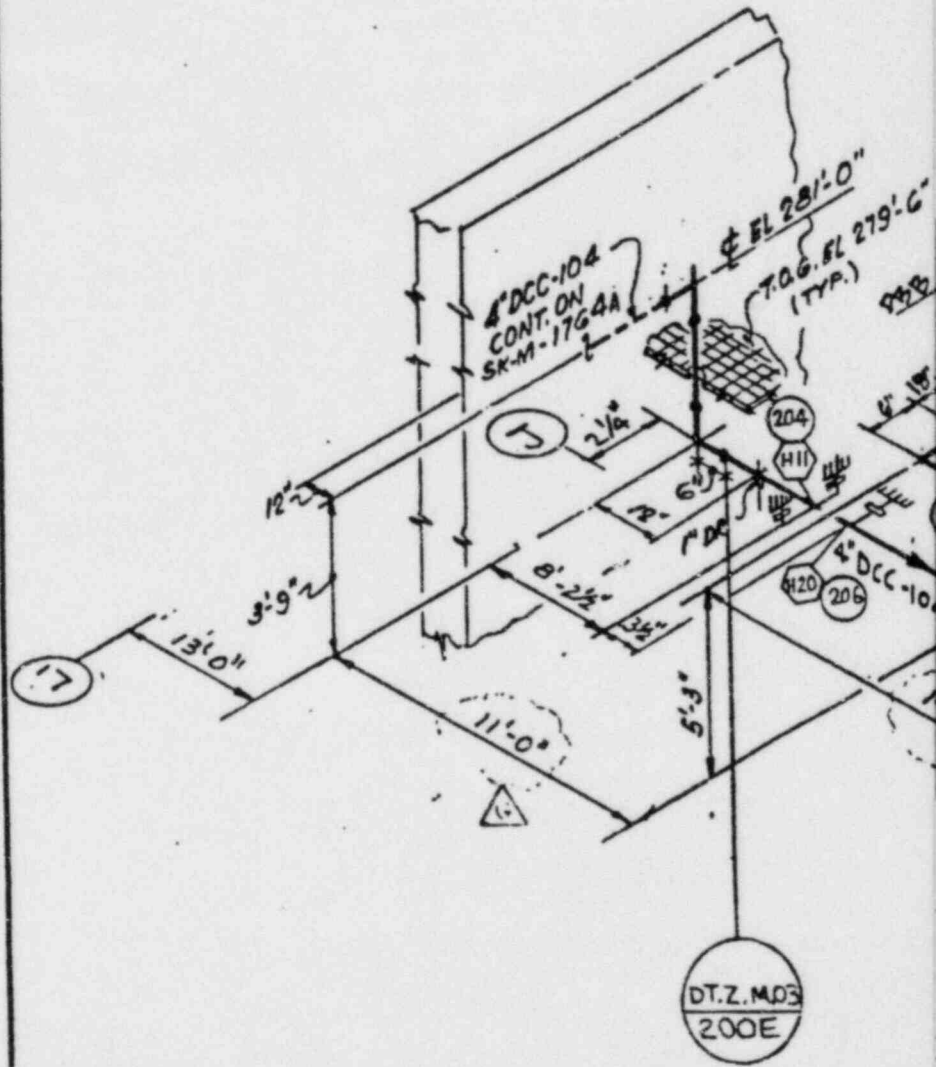
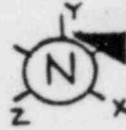
LIMERICK GENERATING STATION
 UNITS 1 & 2
 PHILADELPHIA ELECTRIC COMPANY

ISOMETRIC - REACTOR BLDG.

REACTOR CORE ISOLATION COOLING UNIT

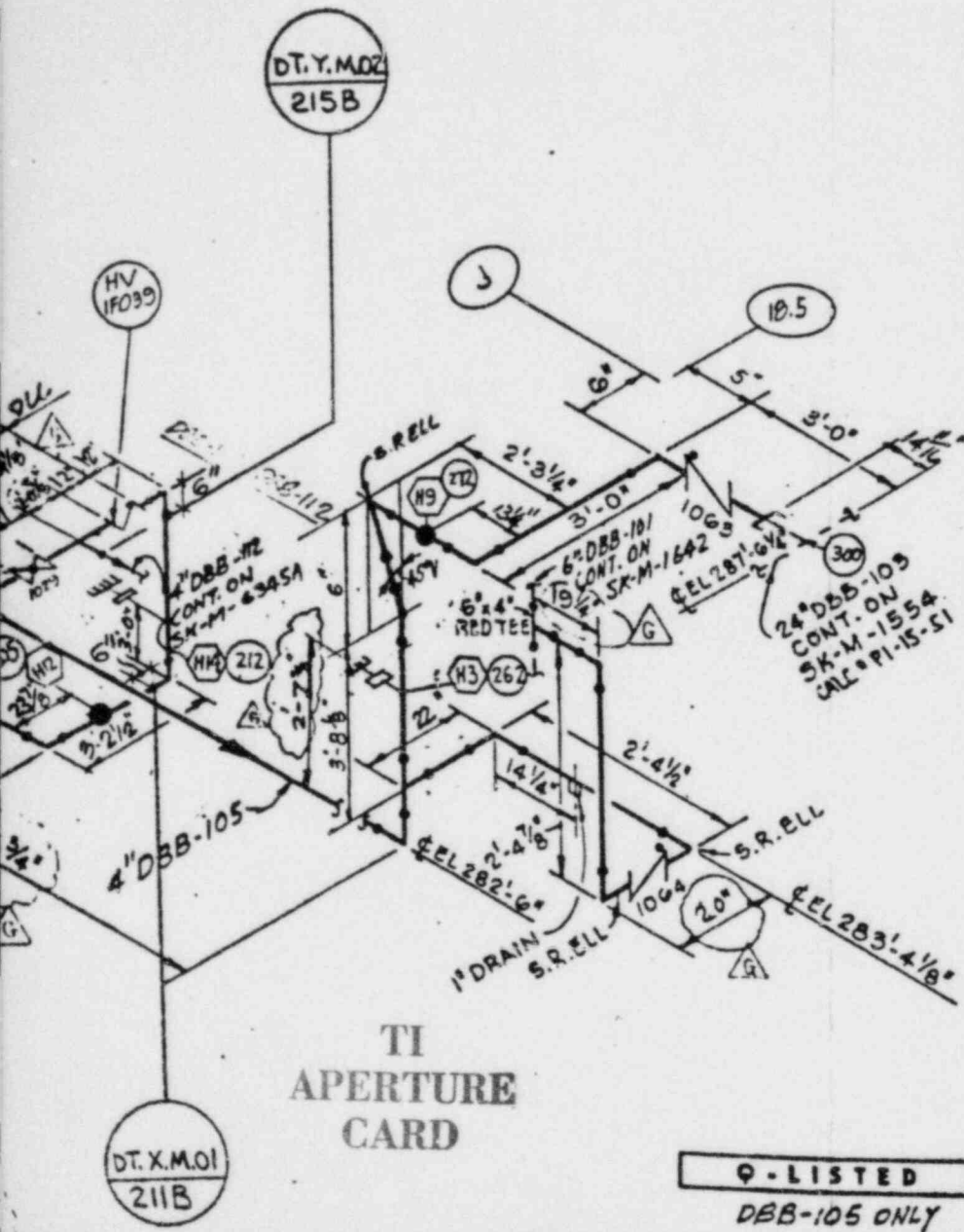
8031	SK-M-1642	G
RCIC DISCH.		

SPECIFICATION 8031-P-362
APPENDIX C



CCN REV 0
CALC. NO. P1-22-61

		DATA			REV	DATE	BY	REV	DATE
PIPING ENGINEER	LINE No.	DCC-104			A	4/2/76	ORIGINAL SIGNED	C	6/8/75
	MATERIAL	6MLB. ASME SA-376 OR SA-312 TP-304			A	4/2/76		C	6/8/75
	LINE THICKNESS (IN)	0.837			A	4/2/76		C	6/8/75
MECHANICAL ENGINEER	LINE O.D. (IN)	4.500			A	4/2/76		C	6/8/75
	MODE	I	II	III					
	PRESS. PSIG								
	TEMP F								
STRESS ENGINEER	EXP. COEFF. IN/100FT								
	EXP. COEFF. MIL-IN/IN								
	MOD. OF ELAS. E PSI								



TI
APERTURE
CARD

Q - LISTED
DBB-105 ONLY

STRESS APPROVALS		
REV	THERMAL	SEISMIC

REV. F NOTE:
 DELETED VALVE DATA / PRESS. / TEMP. DATA,
 ADDED PIPE SUPPORTS & DATA POINTS
 FOR RECONCILIATION.
 INCORP. FCR M15,321F CORRECTED DRAFTING
 ERROR OF HV-IF039 3V-1029 PER P&ID & PLAN
 DWG SHOWN.

REV. G NOTE:
 INCORP. PER FCN-6629M & DIM. 20" WAS 22",
 11'-0" WAS 9'-6", 14 3/4" WAS 2'-8 3/4" &
 19 1/4" WAS 19". INCORP. PER FCN-G319M,
 DIM. 2'-7 7/8" WAS 3'-0 1/8".

Also Available On
Aperture Card

REFERENCE STRESS CALC. NO PI-22-61
 M-41 P&ID
 M-44 P&ID
 M-22G PIPING PLAN
 M-234
 DCC-104-1/17, FAB 150
 DBB-105-1 REV. 5
MODE DESCRIPTION

- MODE I - NORMAL PLANT OPERATION
- MODE II - MAXIMUM CONDITIONS
- MODE III - NO FLOW IN DCC-104,
SYSTEM SHUTDOWN.

REV. D NOTE:
 ISSUED FOR STRESS ANALYSIS
 (PORTION) PER P&ID M-44 REV. 13

8408140314-23

NO.	DATE	REVISIONS	BY	ENGR	DESIGN SUPV	ENGR	PROJ ENGR	APPR
G	1/16/76	SEE REV. G NOTE	CL	YB	KA	KA	KA	KA
F	1/16/76	SEE REV. F NOTE	CL	YB	KA	KA	KA	KA
E	1/16/76	REV. PER FCN-6629M	CL	YB	KA	KA	KA	KA
D	1/16/76	SEE REV. D NOTE	CL	YB	KA	KA	KA	KA
C	1/16/76	PROGRAM / REV'D ALNOTED CEA	CL	YB	KA	KA	KA	KA

DATA	REV	DATE	BY	REV	DATE	BY	LEGEND
DBB-105	A	4/16/76	ORIGINAL (SIGNED)	C	4/16/76	KA	● SPRING HANGER
SMLS ASME SA-106 GR. B	A	4/16/76		C	4/16/76	KA	■ RIGID HANGER
0.438	A	4/16/76		C	4/16/76	KA	★ ANCHOR
4.500	A	4/16/76		C	4/16/76	KA	≡ GUIDE
I	II	III					HOE SNUBBER
							H RESTRAINT
							○ HANGER NUMBER
							○ STRESS DATA POINT

SCALE --- DESIGNED DRAWN **CMA** INCHES

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LIMERICK GENERATING STATION
UNITS 1 & 2
PHILADELPHIA ELECTRIC COMPANY

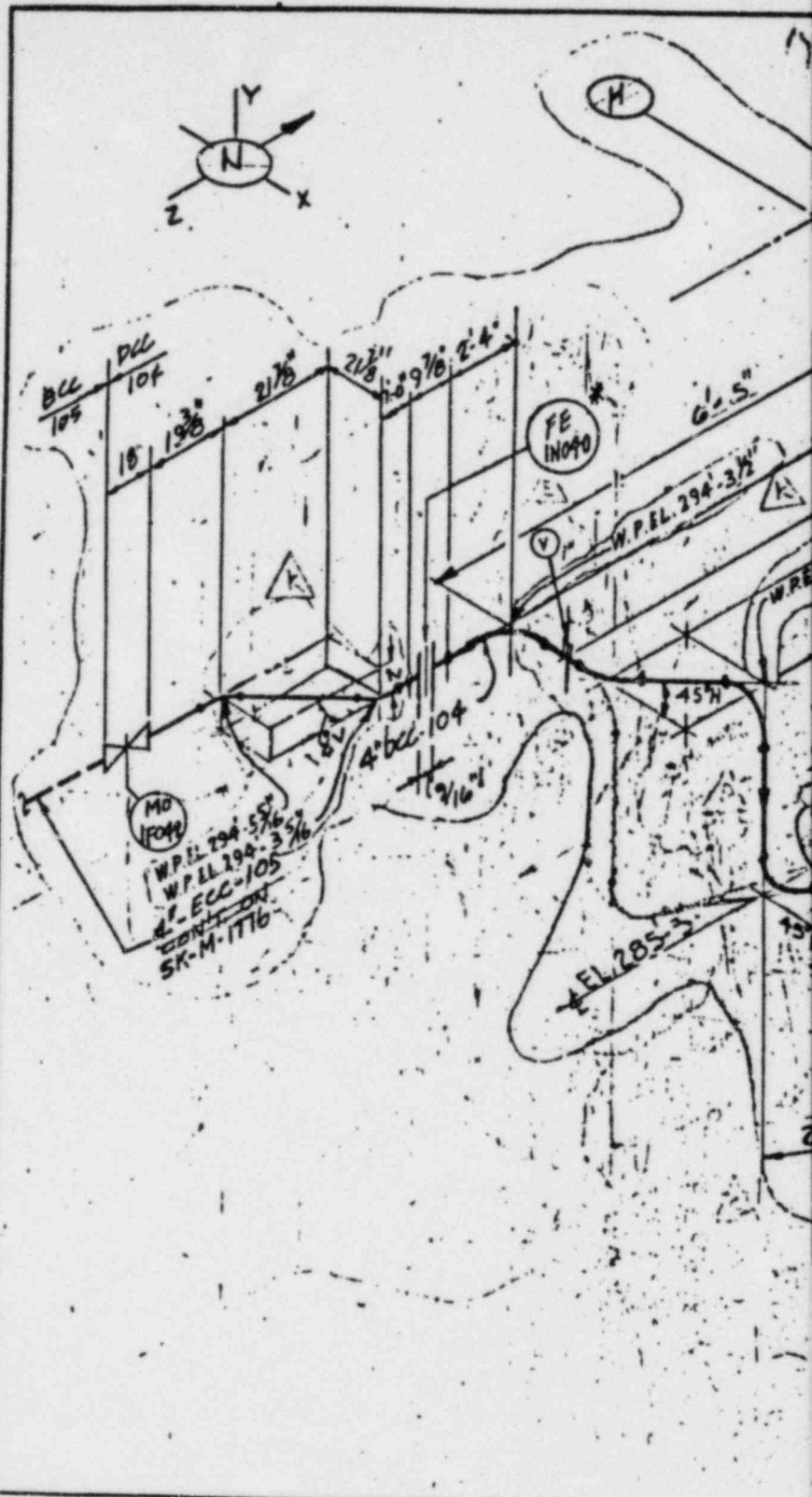
ISOMETRIC - REACTOR BLDG.
REACTOR WATER CLEANUP SYSTEM - UNIT 2

JOB NO.	DRAWING NO.	DTY
8031	SK-M-1737	G

RWCU (STN/TUN)

SPECIFICATION 8031-P-362
APPENDIX C

Also Available On
Aperture Card



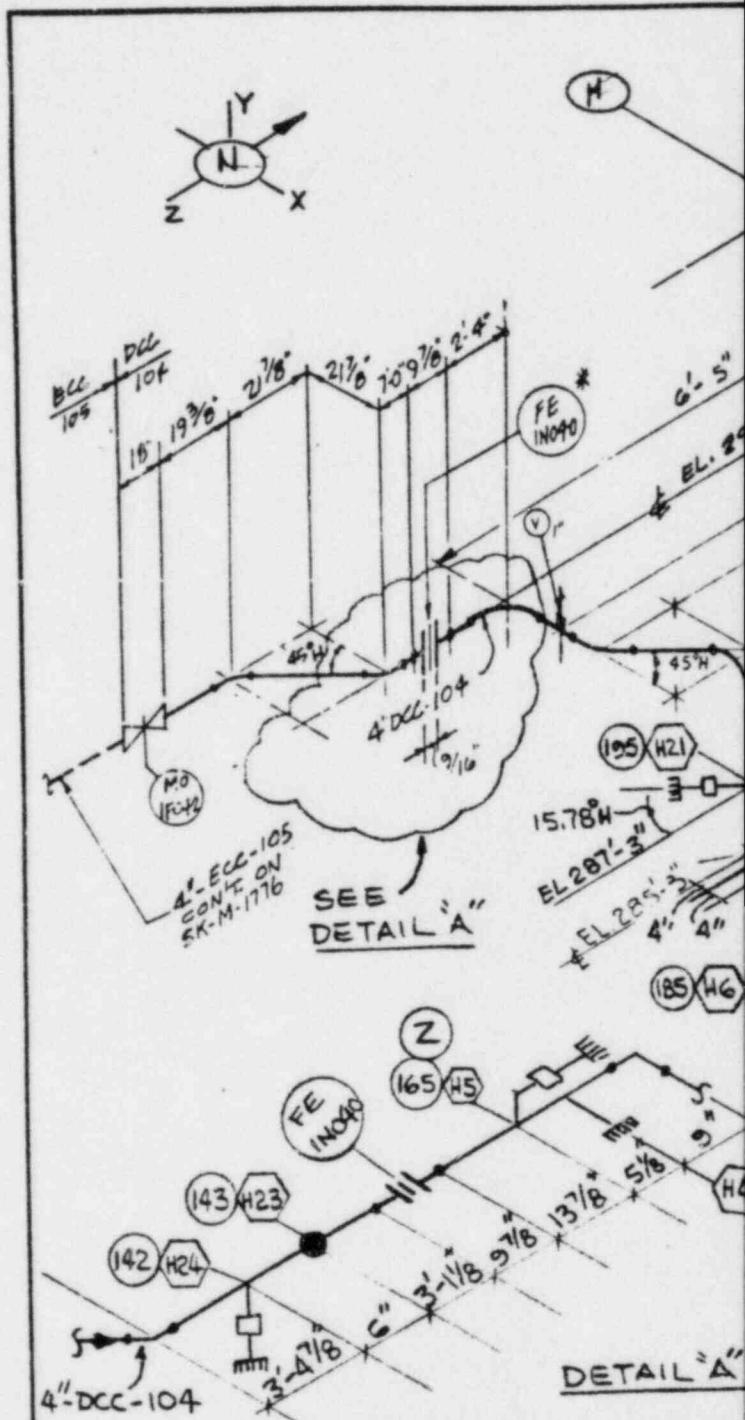
CCN REV 0
CALC. NO. P1-22-G1

		DATA	REV	DATE	BY	REV	DATE
PIPING ENGINEER	LINE No.	DCC-104					
	MATERIAL	6ML ASME SA-312 DR SA-312 TP 304	A	1/7/6	MDZ		
	LINE THICKNESS (IN)	0.337	A	1/8/16	MDZ		
MECHANICAL ENGINEER	LINE D. (IN)	4.500	A	1/8/16	MDZ		
	MODE	I II III					
	PRESS. PSIG						
	TEMP F						
STRESS ENGINEER	EXP. COEFF. IN/100FT						
	EXP. COEFF. MIL-IN/IN						
	MOD. OF ELAS. E PSI						

8408140314-27
C-25 | Δ REV 1

SPECIFICATION 8031-P-362
APPENDIX C

Also Available On
Aperture Card



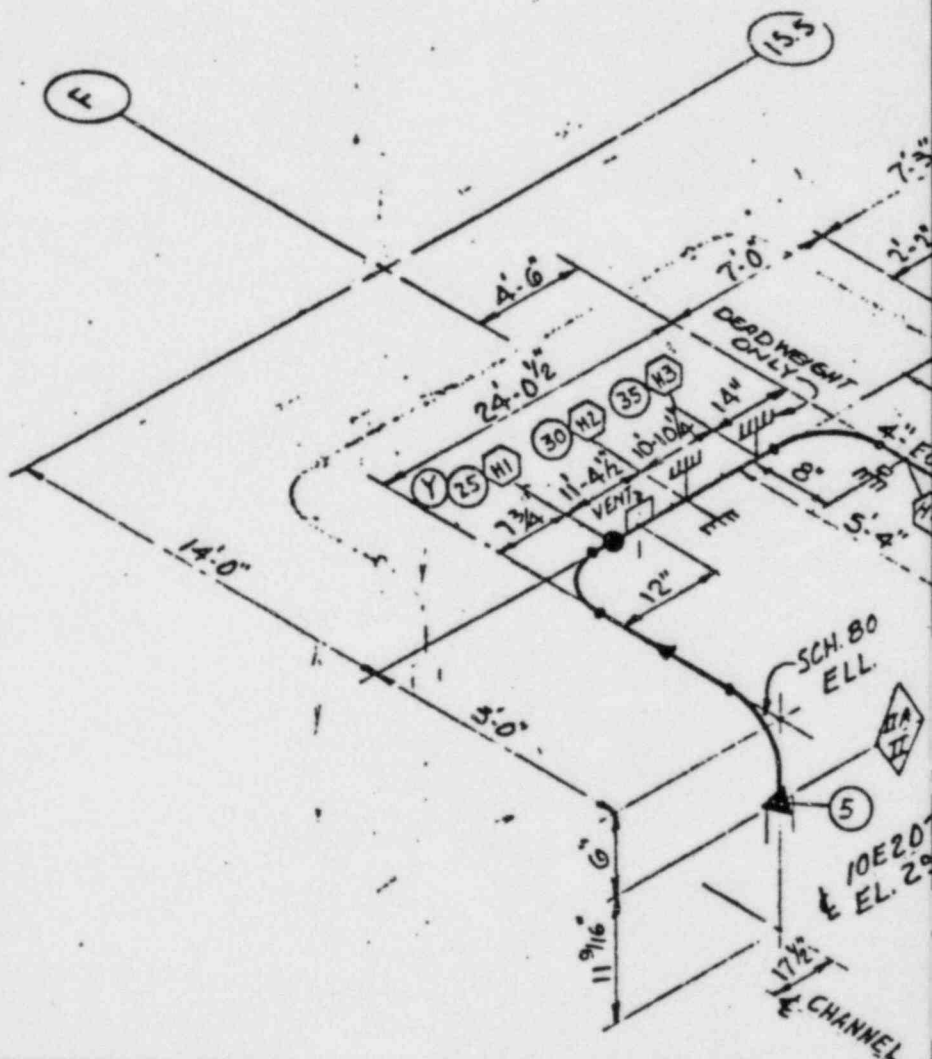
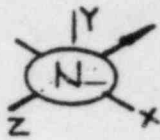
		DATA			REV	DATE	BY	REV
PIPING ENGINEER	LINE No.	DCC-104						
	MATERIAL	SML ASME SA-372 OR SA-312, TP 304			A	11/76	AKV	
	LINE THICKNESS (IN)	.337			A	11/76	AKV	
MECHANICAL ENGINEER	LINE O.D. (IN)	4.500			A	11/76	AKV	
	MODE	I	II	III				
	PRESS. PSIG	1128	1542		A	6/75	AKV	
	TEMP F	434	424		A	6/75	AKV	
STRESS ENGINEER	EXP. COEFF. IN/100FT							
	EXP. COEFF. MIL-IN/IN							
	MOD. OF ELAS. E PSI							

C-26



REV 1

SPECIFICATION B031-P-362
APPENDIX C

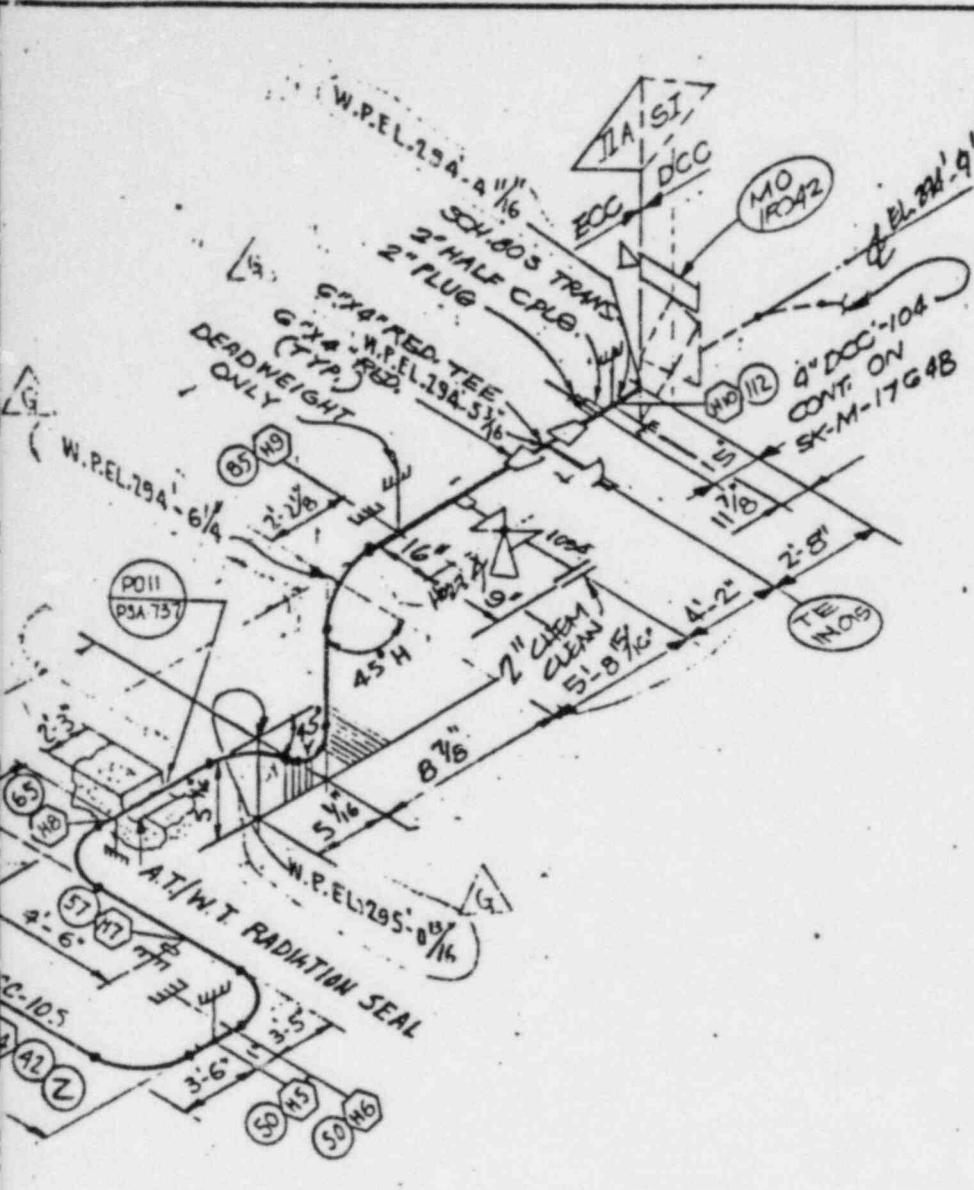


Also Available On
Aperture Card

		DATA			REV	DATE	BY	REV	DATE	BY
PIPING ENGINEER	LINE No.	ECC-105						B	1/4/77	RRR
	MATERIAL	SML ASME SA-876 OR SA-812 TP 304			A			B	1/26/77	RRR
	LINE THICKNESS (IN)	.297			A			B	1/26/77	RRR
MECHANICAL ENGINEER	LINE O.D. (IN)	4.500	F		A			B	11/6/77	RRR
	MODE	I	II	III						
	PRESS. PSIG									
	TEMP F									
STRESS ENGINEER	EXP. COEFF. IN/100FT									
	EXP. COEFF. MIL-IN/IN									
	MOD. OF ELAS. E PSI									

8408140314-26

C-27 | REV 1



TI
APERTURE
CARD

STRESS APPROVALS		
REV	THERMAL	SEISMIC

REV. G NOTE:
 DELETED PRESS./TEMP DATA, ADDED PIPE SUPPORTS
 & DATA POINTS FOR RECONCILIATION. REV.
 4"-ECC-105 PER NCR NO 7002.

REV. C NOTE:
 CHG'D 4" X 4" X 2" RED. TEE TO 2" HALF
 CPLG; RELOC. MO-1FOA2; DIM. 13'-0" WAS 5'-0"

REV. D NOTE:
 REROUTED & RELOCATED VALVES
 MO 1FOA2 & 1054 4" ELL 105, 4" DCC
 ADDED OFF-SETS 2 PLS

REV. E NOTE:
 INCORP. REV PER FCR-M-9868F Δ AND
 INCORP. FCR U-9246F NO CHANGE REQ'D

REFERENCE STRESS CALC NO PI-37-58
 M-44 P&I.D.
 M-231 PIPING PLAN
 ECC-105-1 REV. 11 FAB 150.

THIS IS A SPECIAL CIS SYSTEM

MODE DESCRIPTION

MODE I - NORMAL SYSTEM OPERATION
 MODE II - MAXIMUM

REV	DATE	DESCRIPTION	CL	ES	JSB	W	W	W
G	11/13/73	SEE REV. G NOTE	CL	ES	JSB	W	W	W
F	12-28-73	REV. TO INCORP. FCR M-19, 354 F. ADDED DEVEL. I.D. PO11/PSA 737	FY	FY	JSB	W	W	W
E	11/13/73	SEE REV. E NOTE	SC	WIP	JSB	W	W	W
D	10/21/73	SEE REV. D NOTE	TV	WIP	JSB	W	W	W
C	11/13/73	SEE REV. C NOTE	ALG	BW	JSB	W	W	W
B	11/13/73	SEE REV. B NOTE	SH	BW	JSB	W	W	W
A	11/13/73	ISSUED FOR STRESS ANALYSIS	SBA	JSB	JSB	W	W	W

DATA	REV	DATE	BY	REV	DATE	BY	LEGEND
ECC-105							● SPRING HANGER
SHU ACVMI SA-976 ON SA 312, TP 304							■ RIGID HANGER
337							▲ ANCHOR
45							≡ GUIDE
I	II	III					⊥ SNUGGER
							⊥ RESTRAINT
							○ HANGER NUMBER
							○ STRESS DATA POINT

SCALE NONE

BECHTEL
SAN FRANCISCO

LIMERICK GENERATING STATION
UNITS 1 & 2
PHILADELPHIA ELECTRIC COMPANY

ISOMETRIC - REACTOR BLDG.
REACTOR WATER CLEAN-UP &
FILTER DEMIN. UNIT # 1

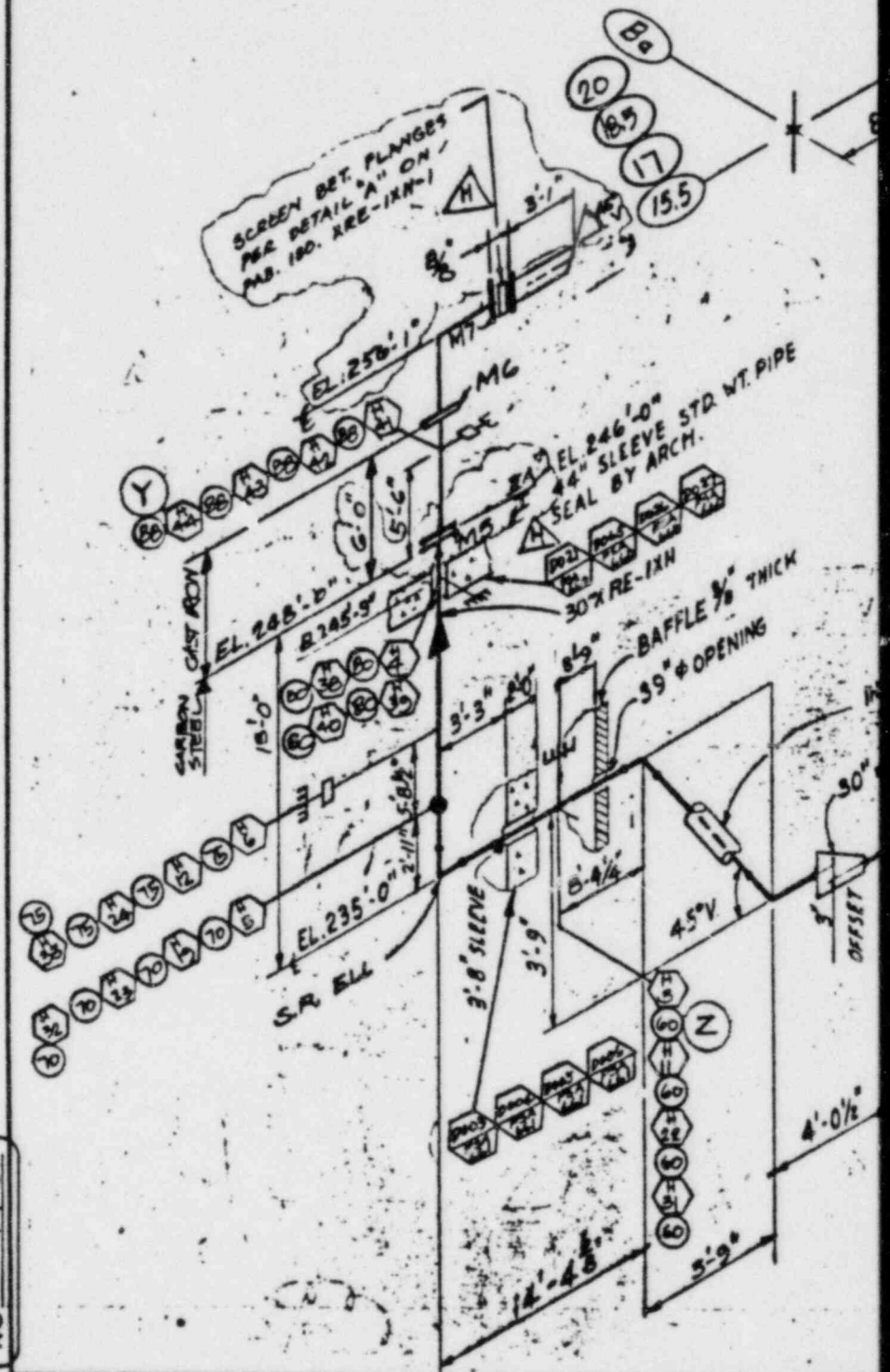
JOB NO.	DRAWING NO.	REV.
8031	EK-M-1776	G

IRWCU (c/c)

SPECIFICATION 8031-P-362
APPENDIX C

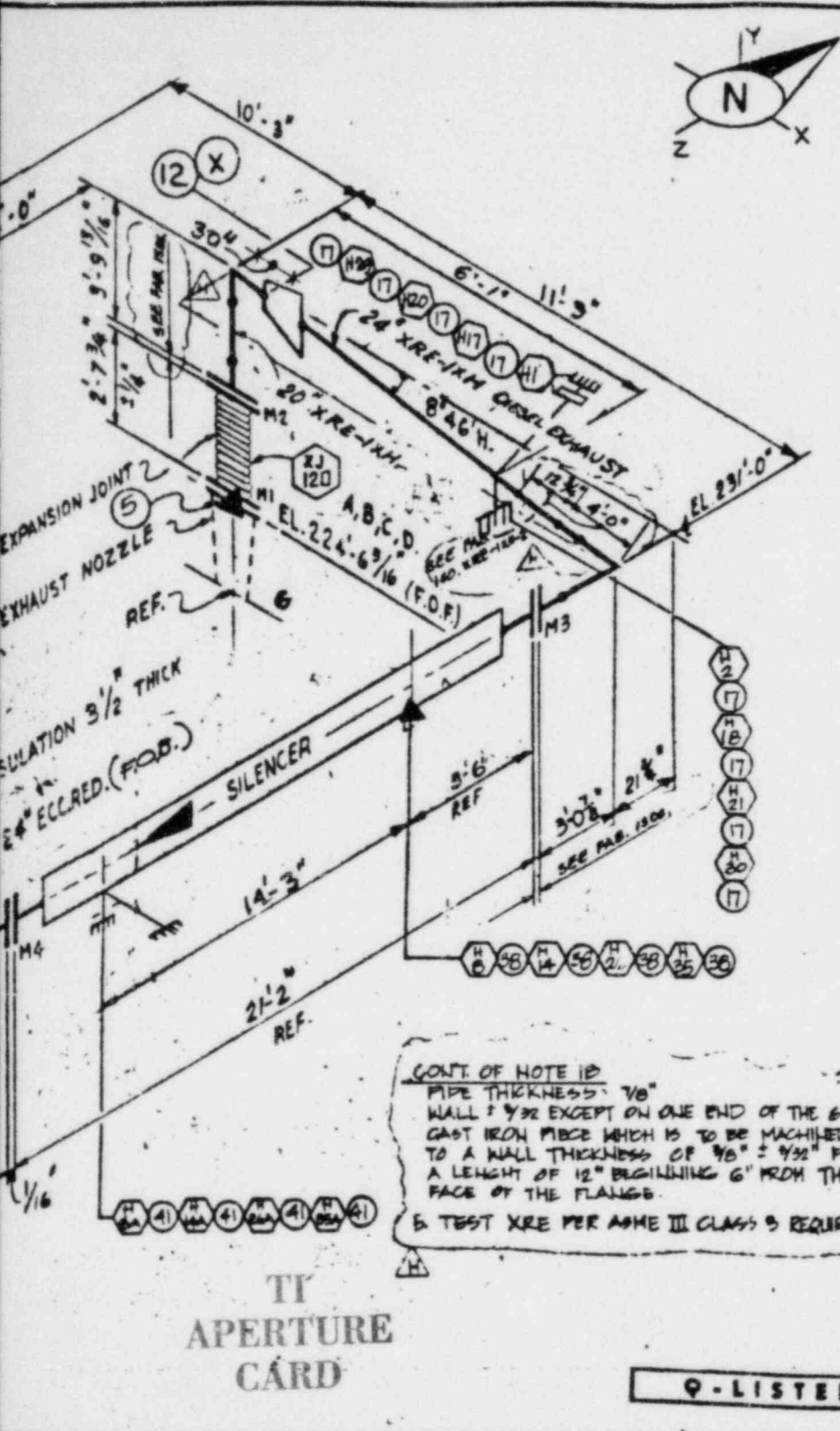
Also Available On
Aperture Card

CCN REV 0
CALC. NO 1-49-51



	DATA			REV	DATE	BY	REV	DATE	BY	
PIPING ENGINEER	LINE No.	XRE-1XH CARBON STEEL			A	11/4/77	ASPTD	B	11/4/77	RKA
	MATERIAL	SEE NOTE 1(A)			A	11/4/77	ASPTD			
	LINE THICKNESS (IN)	0.975	0.975	0.975	A	11/4/77	ASPTD			
MECHANICAL ENGINEER	LINE O.D. (IN)	20	24	30	A	11/4/77	ASPTD			
	MODE	I	II	III						
	PRESS. PBIG									
STRESS ENGINEER	TEMP									
	EXP. COEFF. IN/100FT									
	EXP. COEFF. MIL-IN/IN									
	MOD. OF BLAS. & PS:									

8408140314-27
C-28
REV. 1



TI
APERTURE
CARD

Q-LISTED

STRESS APPROVALS		
REV	THERMAL	SEISMIC

NOTE:

1. (A) DIESEL EXHAUST CARBON STEEL PIPING TO BE STD. WALL - GRAMWELDED ASTM-A-155 GR. C-85 (FIRE BOX QUALITY) CLASS 2, SEISMIC CLASS 3 BUILT PER SPEC 8081-P-218. FITTINGS - BUTT WELD, WALL TO MATCH PIPE, ASTM A-234 WPB OR WPB-W. FLANGES - 150" W.N.P.F. ASTM A-106. BOLTING - ASTM A-193 GR. B-1 BOLTS ASTM A-194 GR. 2H 30MM PH. NUTS GASKETS - 3TB 304 SS GASKETS WOUND PLEATHALIC "CG" OR LAMONS "WR"

(B) DIESEL EXHAUST CAST IRON SECTION MATERIAL: ASTM A278 CLASS 40 GRAY IRON FLANGES: 30" ANSI B16.1 CLASS 125 PIPE OD: 32 1/2" WALL THICKNESS: 3/8" (PIPE) 103" NOMINAL (ELBOW) 1430" (PIPE PER LIN. FT.) 235" (ELBOW) 235" (EACH FLANGE)

APPROX. WEIGHT: 103" NOMINAL (ELBOW) 1430" (PIPE PER LIN. FT.) 235" (ELBOW) 235" (EACH FLANGE)

2. THIS 100 IS TYPICAL FOR (4) CELLS.

3. SILENCER WEIGHT = 4500# DD #5-4 IAS-575, 1BS-575, 1CS-575 & 1DS-575

4. INSTALLED RULES FOR HBD IN SPECS. P-808, 511 & 522 ARE APPLICABLE TO XRE. DUE TO DIFF. FLANGE BOLT CIRCLE & MECHANICAL JOINT M-1-A 1/8" THK, FULL FACED COMPRESSED ASBESTOS GASKET WILL BE USED. PER FOR M-2027P.

REFERENCE	STRESS CALC. NO.
M-20 REV.	1-49-51/
M-400 REV.	P & ID (PER M16592P)
M-508 REV.	SECTION FOR M16501P
XRE-1XH-1	PLAN
XRE-1XH-2	FAB. 130, REV. 3
XRE-1XH-3	REV. 5
XRE-1XH-4	REV. 9

MODE DESCRIPTION:

MODE I - NORMAL
MODE II - MAXIMUM

NO.	DATE	DESCRIPTION	BY	CHKD	DESIGN	ENGR	APPV
G	10/20	ADDED NOTE B. PREV. PER P & ID M-20 REV. 10	RRR	Shy	JSB		
H	10/23	ADDED REVISIONS & DATA POINTS FOR RECONCILIATION & DELETED PRESS/TEMP. DATA @ EL. 224'-0" PER M16592P. REV. M16592P INCORP. PER M16592P. REV. M16592P. REV. M16592P.	RRR	Shy	JSB		
D	10/28	REV'D. DIM. M-1-4 WAS M-1-5 PER M16592P.	RRR	Shy	JSB		
C	11/27	REV. PIPING AS NOTED	RRR	Shy	JSB		
B	11/27	REV. NOTES & DIM. NUMBER	RRR	Shy	JSB		
A	11/27	ISS. FOR STRESS ANAL.	J.N	Shy	JSB		

DATA	REV	DATE	BY	REV	DATE	BY	LEGEND
XRE-1XH (CAST IRON)							● SPRING HANGER
SEE NOTE 1 (B)							■ RIGID HANGER
							★ ANCHOR
							□ GUIDE
I	II	III					⊥ SNUBBER
							⊥ RESTRAINT
							○ HANGER NUMBER
							○ STRESS DATA POINT

DESIGNED BY: J. NGUYEN

BECHTEL
SAN FRANCISCO

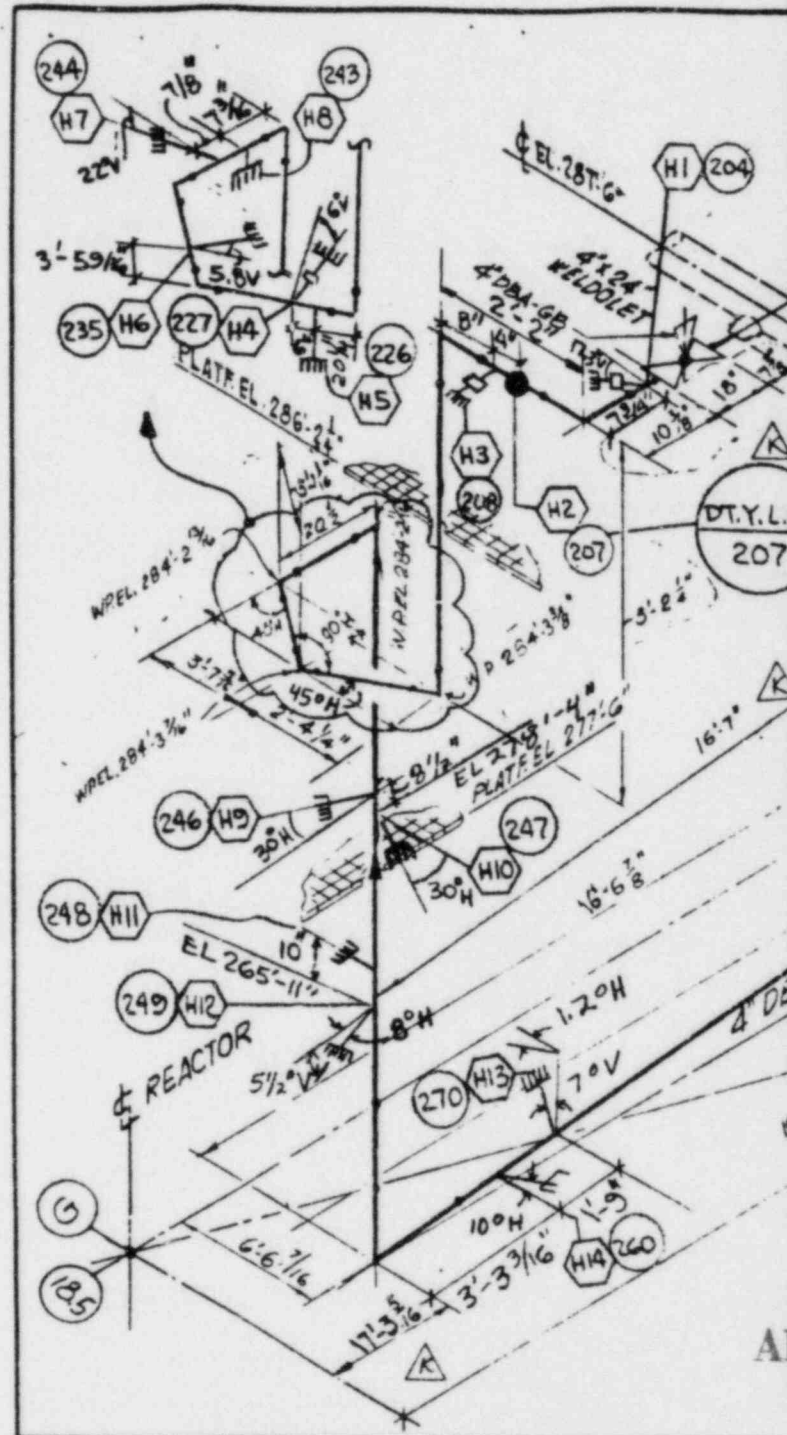
LIMERICK GENERATING STATION
UNITS 1 & 2
PHILADELPHIA ELECTRIC COMPANY

ISOMETRIC DIESEL EXHAUST PIPING
UNIT 1

8031 5K-M-6192 H

SPECIFICATION
8031-P-362
APPENDIX C

Also Available On
Aperture Card



		DATA	REV	DATE	BY	REV	DATE
PIPING ENGINEER	LINE No.	DBA-112	A	2/25/77	RRK		
	MATERIAL	SMLS ASME SA-106GR B	A	2/21/77	RRK		
	LINE THICKNESS (IN)	0.337	A	2/21/77	RRK		
MECHANICAL ENGINEER	LINE O.D. (IN)	4.500	A	4/18/77	RRK		
	MODE	I II III					
	PRESS. PSIG	1155 1540	A	6/10/78	CB		
	TEMP F	425 582	A	6/10/78	CB		
STRESS ENGINEER	EXP. COEFF. IN/100FT						
	EXP. COEFF. MIL-IN/IN						
	MOD. OF ELAS. E PSI						

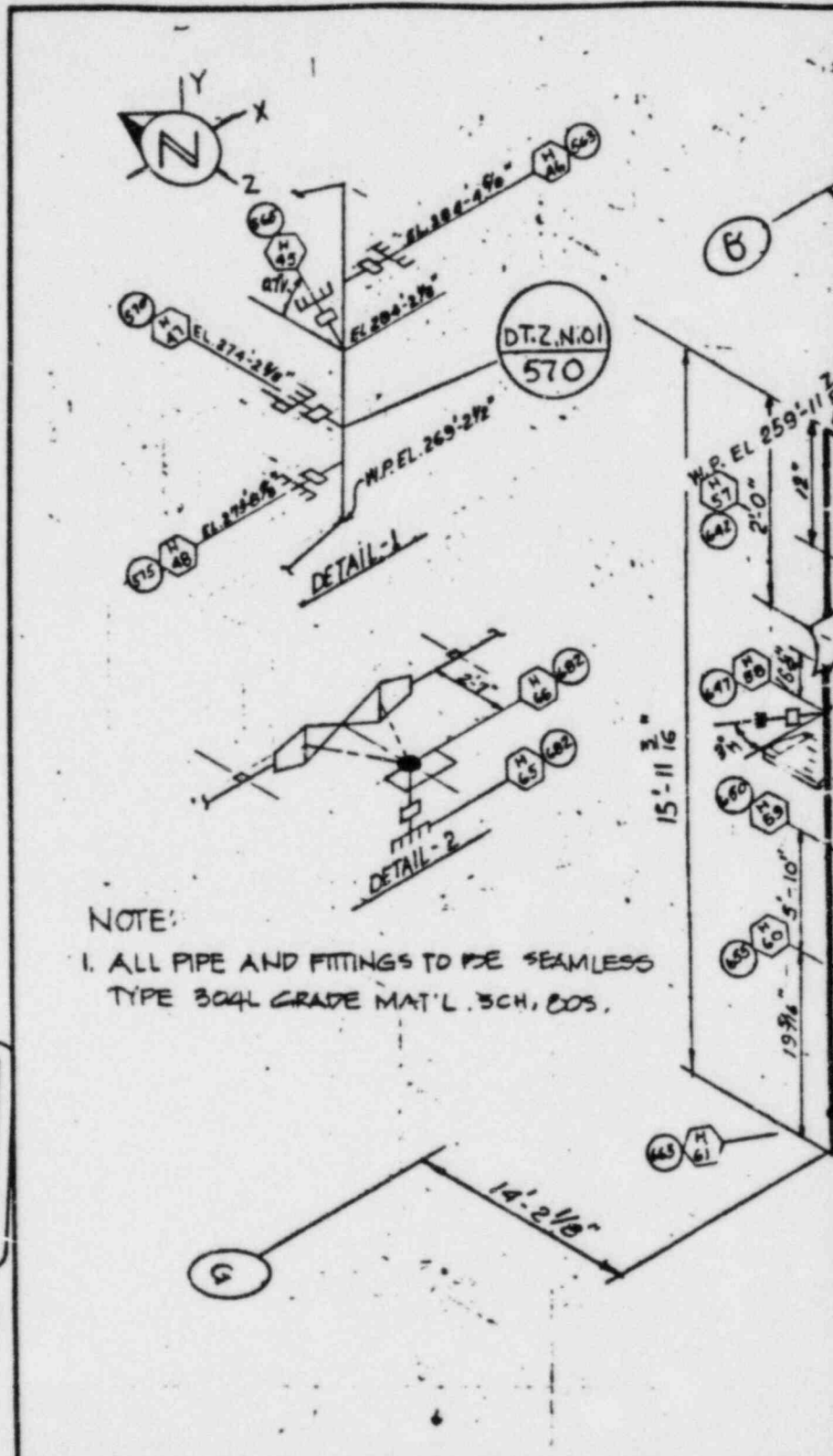
8408140314-28

C-29 REV 1

SPECIFICATION 8031-P-362
APPENDIX C

Also Available On
Aperture Card

CCN REV 0
CALC. NO. 1-10-11B

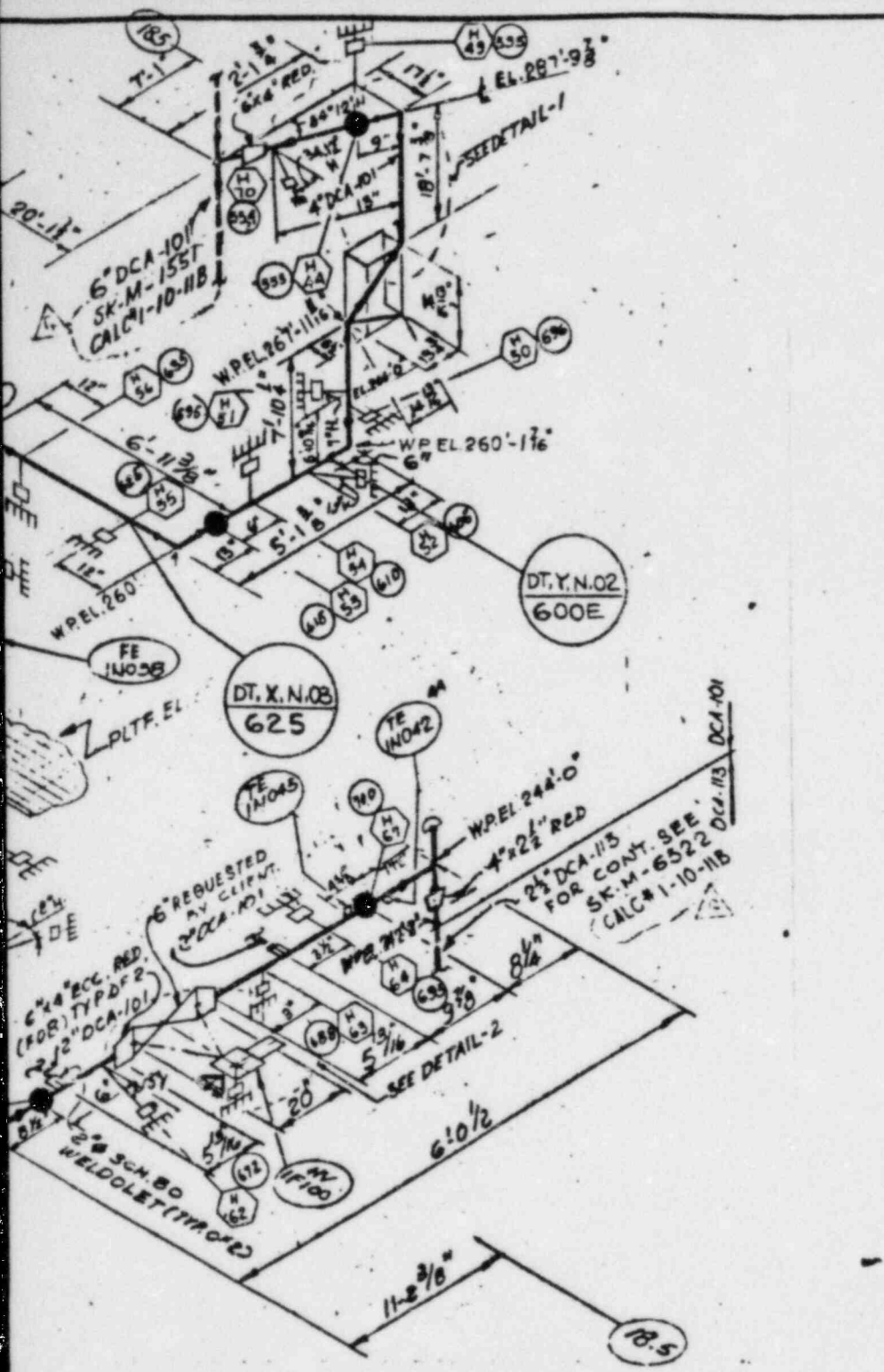


NOTE:
1. ALL PIPE AND FITTINGS TO BE SEAMLESS
TYPE 304L GRADE MAT'L. 3CH. 805.

	DATA	REV	DATE	BY	REV	DATE
PIPING ENGINEER	LINE No.	DCA-101		3/4/77 H2006		
	MATERIAL	SEAMLESS ANNE & STP TP-316L SCH. 805		A	3/4/77 H2006	
	LINE THICKNESS (IN)	0.218		A	3/4/77 H2006	
MECHANICAL ENGINEER	LINE O.D. (IN)	2.775		A	3/4/77 H2006	
	MODE	I II III				
	PRESS. PSIG					
STRESS ENGINEER	TEMP F					
	EXP. COEFF. IN/100FT					
	EXP. COEFF. MIL-IN/IN					
	MOD. OF ELAS. & PSI					

8408140314-29

C-30 | REV 1



STRESS APPROVALS		
REV	THERMAL	SEISMIC

REV. D NOTE:
 REV. G REROUTED THE LINE PER FCR'S M-11643FD & M-11650FD.

REV. G. NOTE:
 ADDED PIPE SUPPORTS & DATA POINTS FOR RECONCILIATION & DELETED PRESS, TEMP. & VALVE DATA PER STRESS GROUP MARK-UP. ADDED 6\"/>

REV. F NOTE:
 RELOCATED 4\"/>



REFERENCE

- M-43 P&ID
- M-44 P&ID
- M-213 PIPING PLAN
- M-225 "
- M-226 "
- M-217 SECT. AREA DWG.
- DCA-101-4 FAB. ISO.
- DCA-101-5 FAB. ISO.
- STRESS CALC. NO. 1-10-11B

TI APERTURE CARD

MODE DESCRIPTION

- MODE I - NORMAL
- MODE II - MAXIMUM
- MODE III -

NO.	DATE	REVISIONS	BY	CHKD	APPD	REASON
G	1/14/79	SEE REV. G NOTE	WGH	WJP	JCB	REV. G
F	1/17/79	SEE REV. F NOTE	WJP	WJP	JCB	REV. F
B	1/22/79	REV. B PER FCR M-12305F	WJP	WJP	JCB	REV. B
D	1/24/79	SEE REV. D NOTE	F.Y.	WJP	JCB	REV. D
C	1/17/79	SEE REV. C NOTE	WJP	WJP	JCB	REV. C
B	1/17/79	REV. B PER FCR M-12305F	WJP	WJP	JCB	REV. B
A	1/17/79	ISSUED FOR STRESS ANALYSIS	REG	EMC	JCB	REV. A

SY	DATA	REV	DATE	BY	REV	DATE	BY	LEGEND
	DCA-101							● SPRING HANGER
	SEAMLESS ANNE SA-312 OR SA-316 TR. WALL SCHED	C	1/14/79	WJP				■ RIGID HANGER
	0.557	C	1/14/79	WJP				▲ ANCHOR
	4.5	C	1/14/79	WJP				□ GUIDE
	I	II	III					⊕ SNUBBER
								⊥ RESTRAINT
								○ HANGER NUMBER
								○ STRESS DATA POINT

SCALE ~

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 SAN FRANCISCO

LIMERICK GENERATING STATION
 UNITS 1 & 2
 PHILADELPHIA ELECTRIC COMPANY

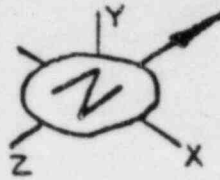
**ISOMETRIC - REACTOR BLDG.
 REACTOR WATER CLEANUP
 PIPING
 UNIT 1**

NO.	DATE	REVISIONS	BY	CHKD	APPD	REASON

8031 SK-M-6433 G

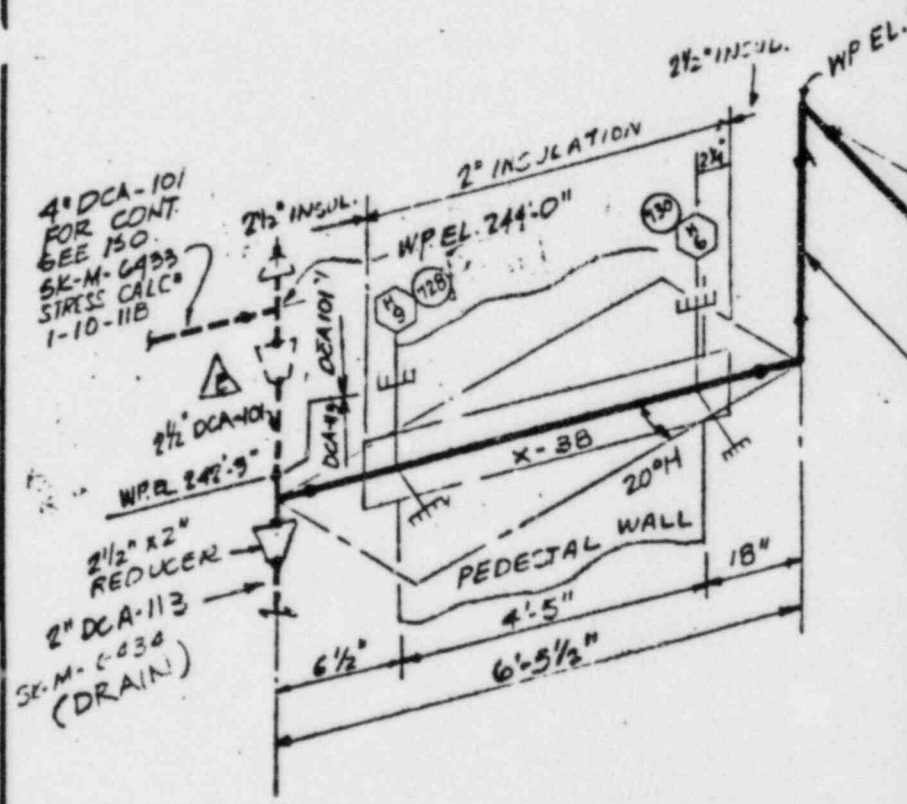
RWCU(1/C)

SPECIFICATION 8031-P-362
APPENDIX C

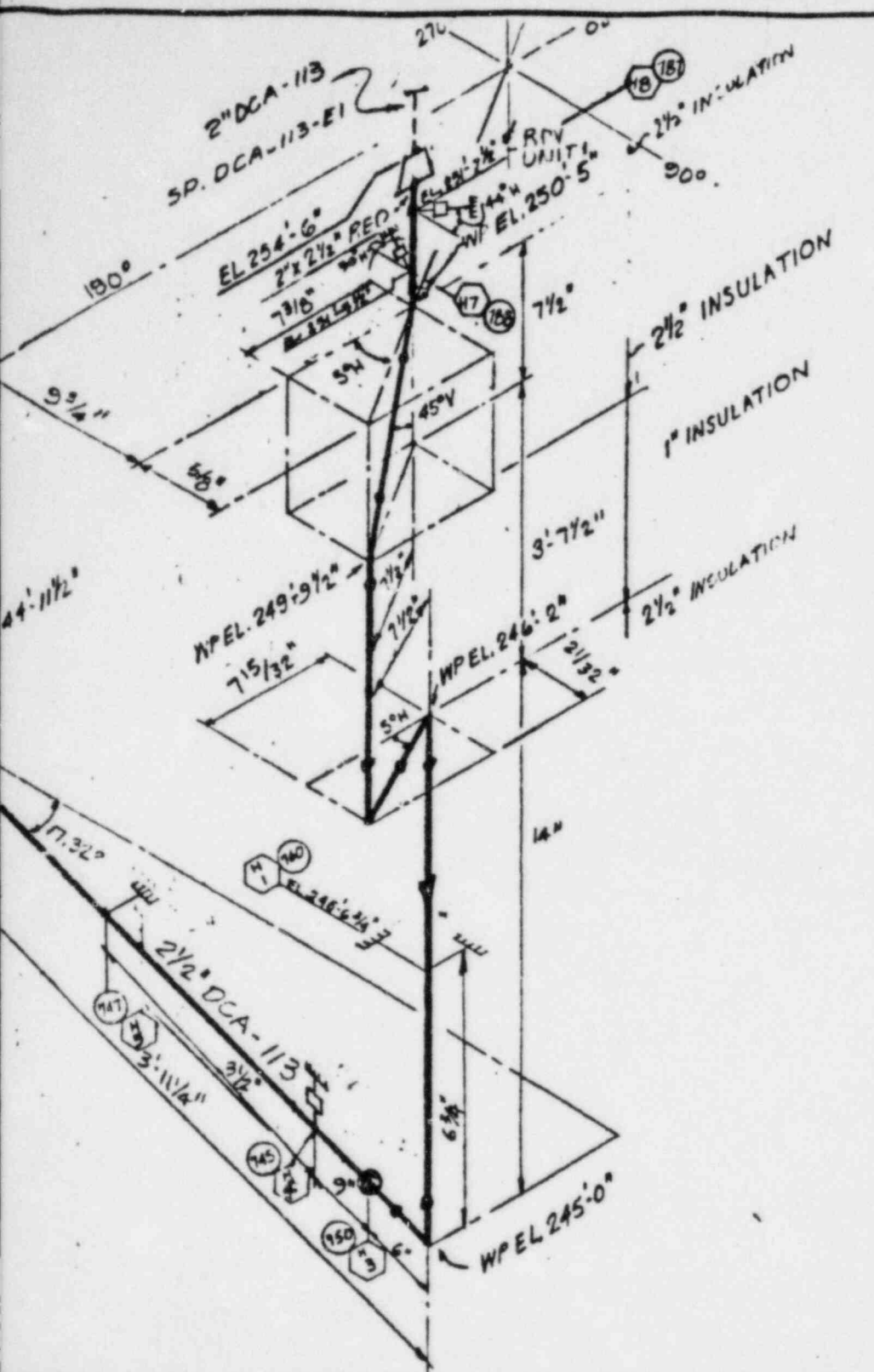


NOTE: No measurement required.

CCN REV 0
CALC. NO. 1-10-11B



		DATA	REV	DATE	BY	REV	DATE
PIPING ENGINEER	LINE No.	DCA-113					
	MATERIAL	SEAMLESS STEEL 304 3/4"	A	5/6/68	K.Y.C.		
	LINE THICKNESS (IN)	0.203	A	5/6/68	K.Y.C.		
MECHANICAL ENGINEER	LINE O.D. (IN)	2.875	A	5/6/68	K.Y.C.		
	MODE	I II III					
	PRESS. PSIG						
STRESS ENGINEER	TEMP F						
	EXP. COEFF. IN/100FT						
	EXP. COEFF. MIL-IN/IN						
	MOD. OF ELAS. E PSI						



STRESS APPROVALS		
REV	THERMAL	SEISMIC

REV. F. NOTE:
 ADDED PIPE SUPPORTS & DATA POINTS FOR RECONCILIATION & DELETED PRESS & TEMP. DATA PER STRESS GROUP MARK-UP

TI APERTURE CARD

Also Available On
 Aperture Card

- REFERENCE
- M-48 PD ID
 - M-225 PIPING PLAN
 - M-213 PIPING PLAN
 - M-247 PIPING SECTION
 - DCA-113-1 - FAB 150 REV 5
 - STRESS CALC. NO. 1-10-11B

- MODE DESCRIPTION
1. MODE I - NORMAL
 2. MODE II - MAXIMUM
 3. MODE III -

8408140314-30

NO	DATE	REVISIONS	BY	CHKD	APPV
F					
E					
D					
C					
B					
A					

BY	DATA	REV	DATE	BY	REV	DATE	BY	LEGEND
								● SPRING HANGER
								■ RIGID HANGER
								★ ANCHOR
								⊞ GUIDE
								⊞ SNUBBER
								⊞ RESTRAINT
								○ STRESS DATA POINT
								○ HANGER NUMBER

BECHTEL
 SAN FRANCISCO

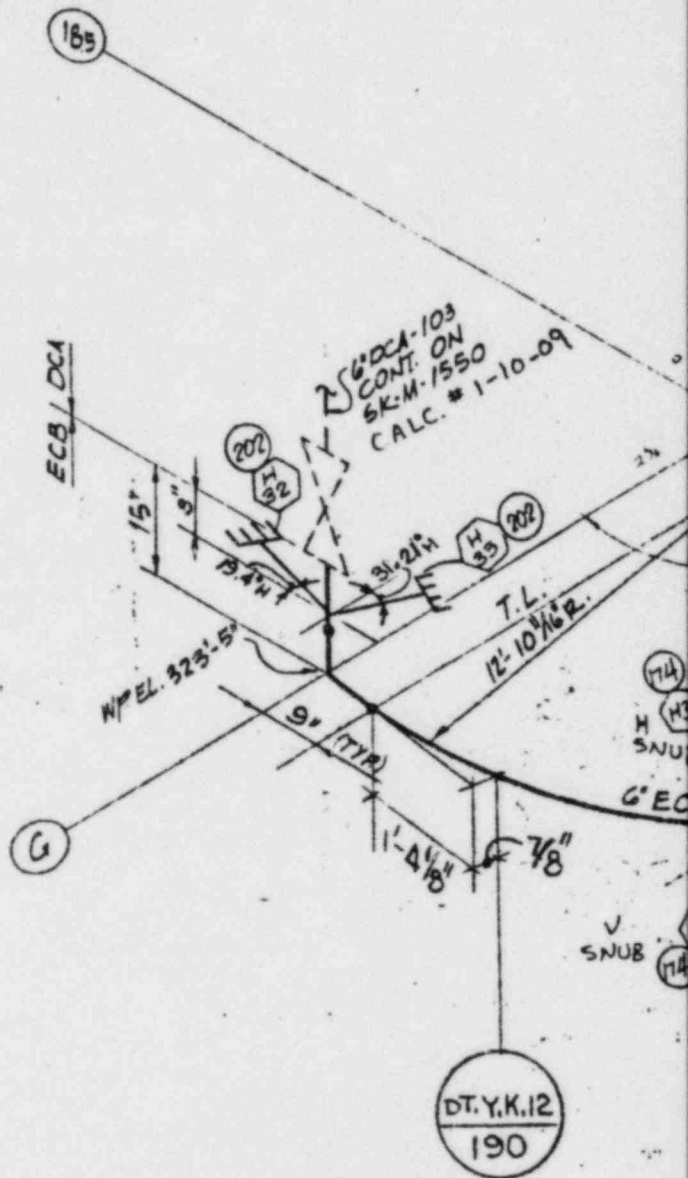
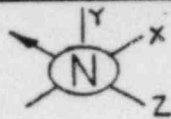
LIMERICK GENERATING STATION
 UNITS 1 & 2
 PHILADELPHIA ELECTRIC COMPANY

ISOMETRIC - REACTOR ENCLOSURE
 RPV DRAIN LINE

	JOB NO. 8031	DRAWING NO. SK-M-6522 F	REV. 1
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RWCU (1/2)

SPECIFICATION 8031-P-362
APPENDIX C



Also Available On Aperture Card



		DATA	REV	DATE	BY	REV	DATE	BY
PIPING ENGINEER	LINE No.	ECB-111	A					
	MATERIAL	SMLS. ASME SA-312 OR SA-376 TP 304	A	1/23/52	ASG			
	LINE THICKNESS (IN)	0.280	A	1/23/52	ASG			
MECHANICAL ENGINEER	LINE O.D. (IN)	6.625	A	1/23/52	ASG			
	MODE	I II III						
	PRESS. PSIG							
	TEMP F							
STRESS ENGINEER	EXP. COEFF. IN/100FT							
	EXP. COEFF. MIL-IN/IN							
	MOD. OF ELAS. E PSI							

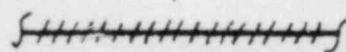
DT.Y.K.12
190

APPENDIX D
Scoping P&ID's

LIST OF SCOPING P&ID's:

<u>P&ID's No.</u>	<u>Title</u>
M-01	Main Steam
M-06	Feedwater
M-20	Fuel & Diesel Oil Storage & Transfer
M-41	Nuclear Boiler
M-43	Reactor Recirculation Pump
M-44	Reactor Water Clean-Up
M-49	Reactor Core Isolation Cooling
M-50	RCIC Pump Turbine
M-51 (Sheets 1 & 2)	Residual Heat Removal
M-52	Core Spray
M-55	High Pressure Coolant Injection
M-56	HPCI Pump Turbine

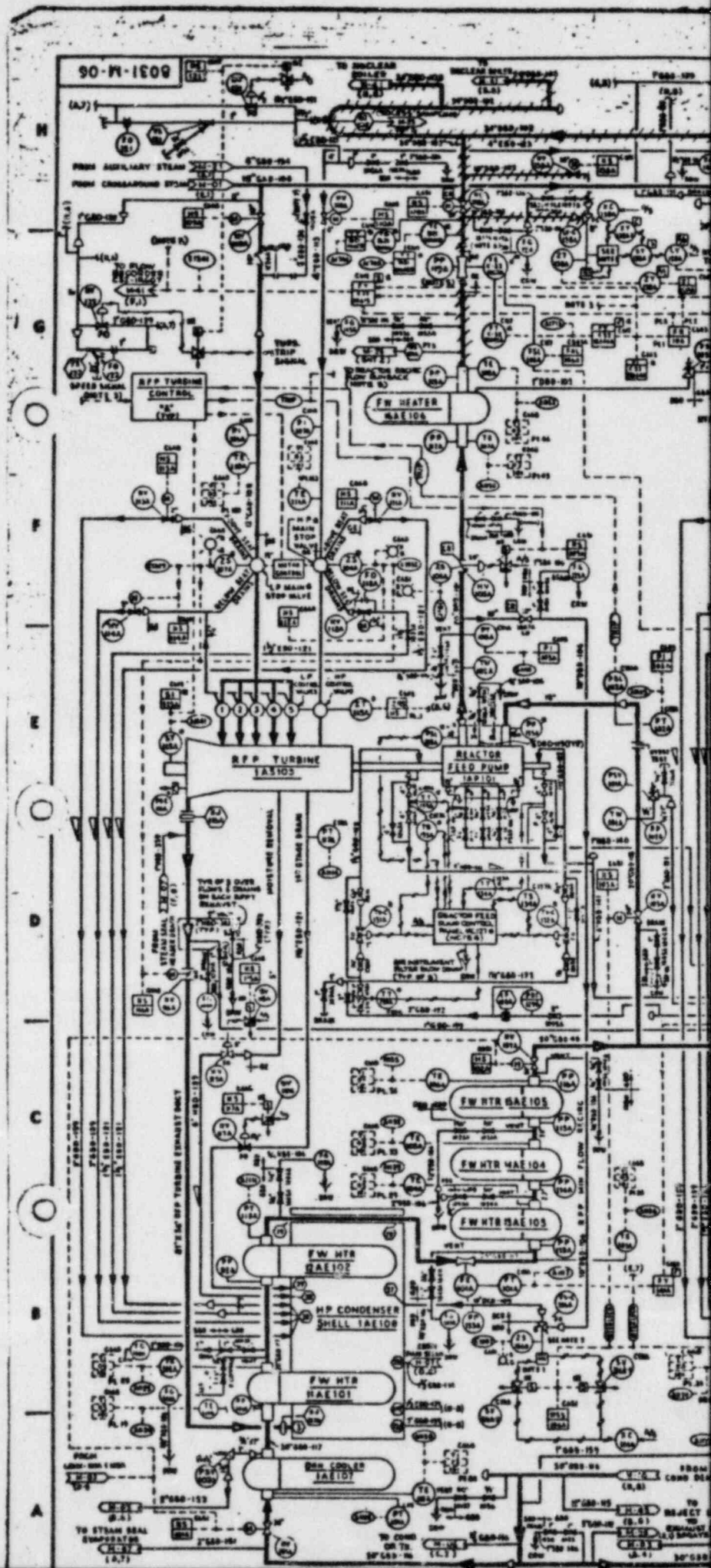
NOTE: Piping subjected to HOT DEFLECTION testing is denoted as follows:



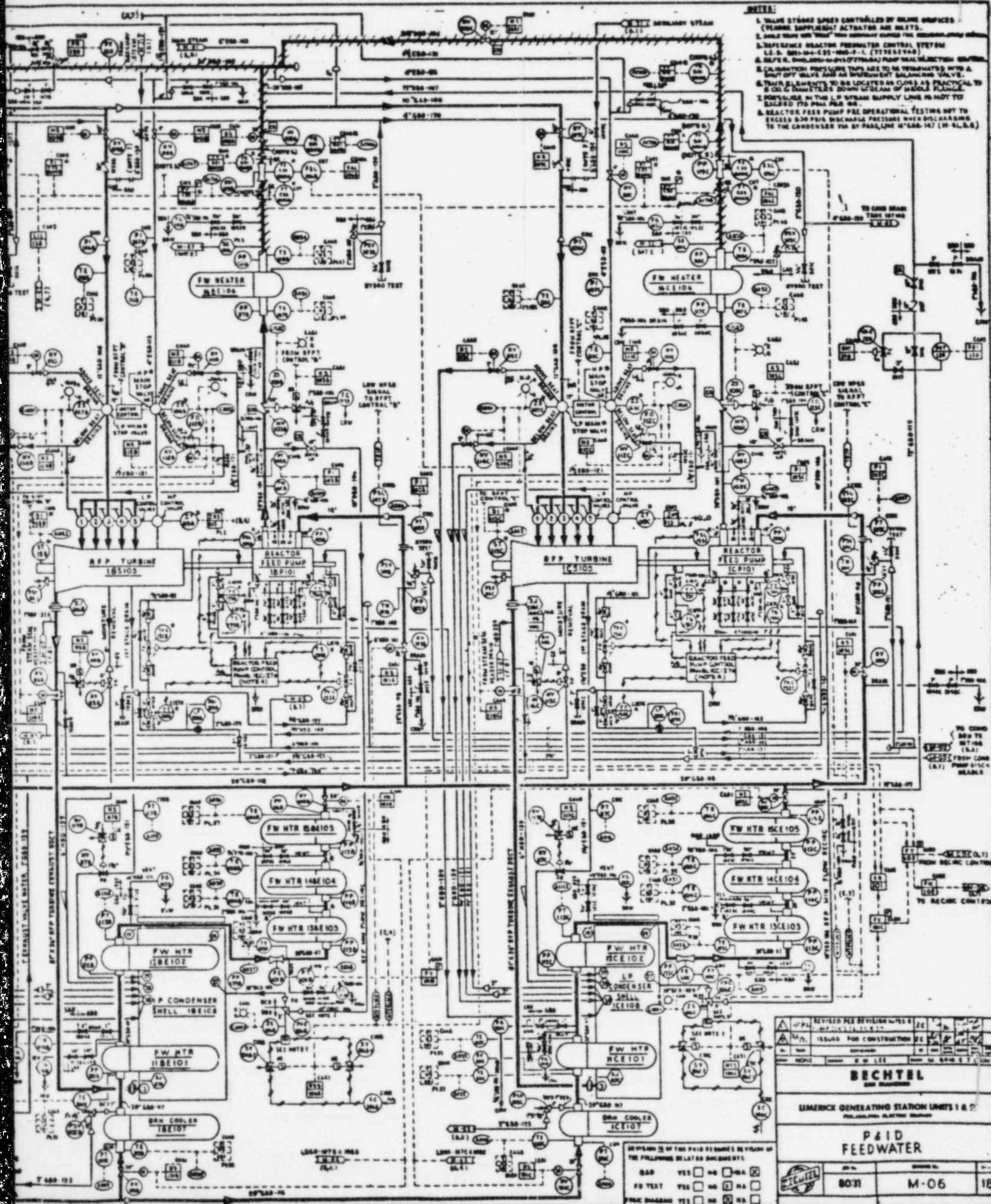
TI
APERTURE
CARD

Also Available On
Aperture Card

8408140314-33
D-3
BND



Specification 8031-P-362
Appendix D.

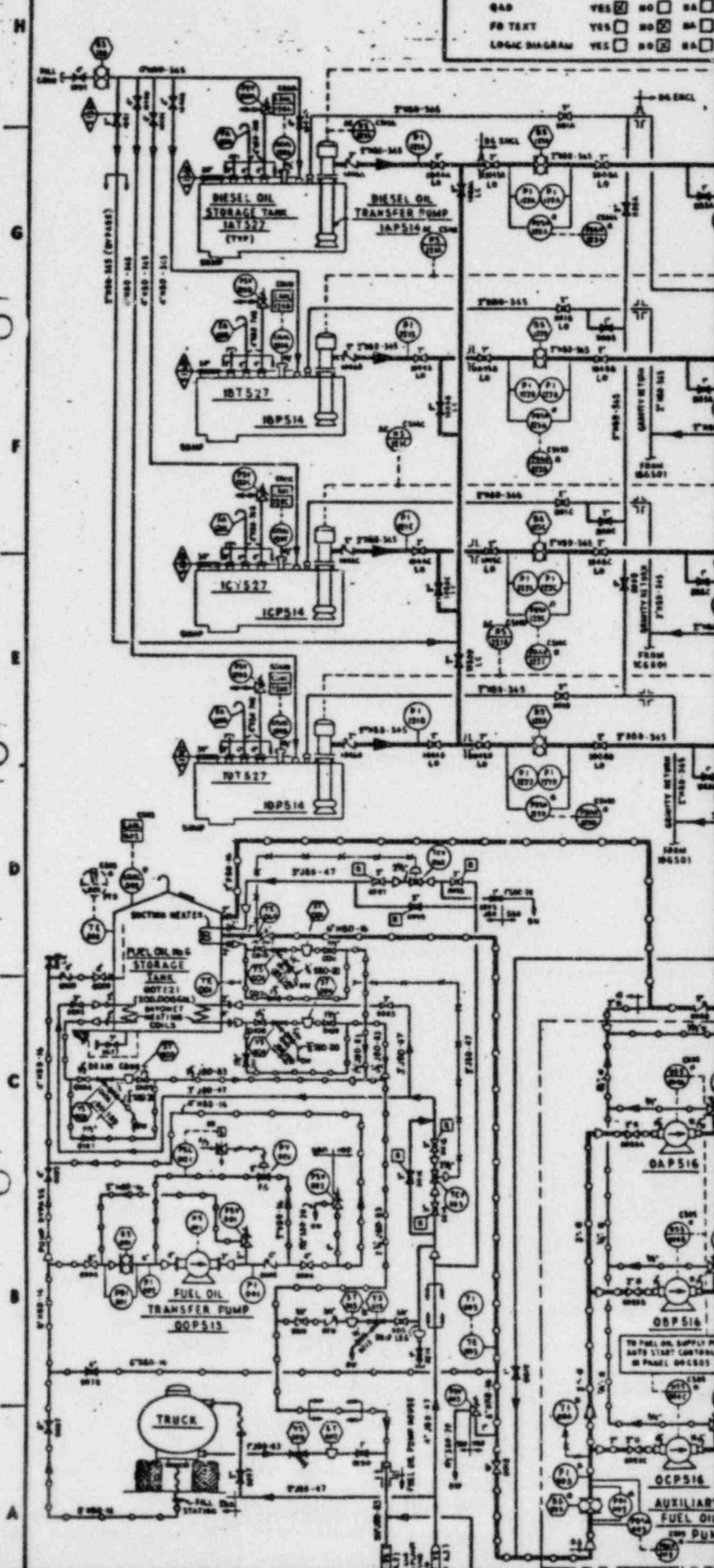


- NOTES:**
1. VALVE STROKE SPEED CONTROLLED BY VALVE DRIVERS (PLUMBER SUPPLIED) ACTUATOR AND RELAYS.
 2. LOW WATER HIGH TRIP AND SHUTDOWN DURING THE CONSTRUCTION PERIOD.
 3. REFERENCE REACTOR FEEDWATER CONTROL SYSTEM (E.S. 8031-04-C30-1000-P-1 (7710151748)).
 4. RAFFINER 8031-05-01-01 (7710151748) PUMP REALIGNMENT SYSTEM.
 5. CALIBRATION POINT LINE TAPS ARE TO BE TERMINATED INTO A SHUT OFF VALVE AND AN ISOLATING BALANCING VALVE.
 6. TAP ELEMENTS TO BE LOCATED AS CLOSE AS PRACTICAL TO 8 O.C.G. DIAMETERS DOWN STREAM OF ISOLATING VALVE.
 7. INSTRUMENTS IN THE L.P. STREAM SUPPLY LINE IS NOT TO EXCEED 750 PSIA MAX. OP.
 8. REACTOR FEED PUMP PRE OPERATIONAL TESTING NOT TO EXCEED 500 PSIA DISCHARGE PRESSURE WHEN DISCHARGING TO THE CONDENSER VIA BY-PASS LINE 185101-107 (18 51, 5.8).

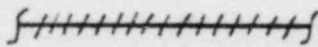
REVISED PER DIVISION 4054		20
ISSUED FOR CONSTRUCTION PER		20
<p align="center">BECHTEL AND ASSOCIATES</p>		
<p align="center">UMERICK GENERATING STATION UNITS 1 & 2 PHILADELPHIA ELECTRIC SYSTEM</p>		
<p align="center">P&ID FEEDWATER</p>		
<p>DESIGNER: [] OF THE P&ID REQUIRED IN VIEW OF THE FOLLOWING RELATED DOCUMENTS:</p> <p> <input type="checkbox"/> G&P <input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> NA <input type="checkbox"/> X <input type="checkbox"/> P&ID TEST <input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> NA <input type="checkbox"/> X <input type="checkbox"/> P&ID DISCHARGE <input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> NA <input type="checkbox"/> X </p>	<p>8031</p>	<p>M-06</p>
		18

8031-M-20

REVISION 17 OF THIS P&ID REQUIRES REVISION OF THE FOLLOWING RELATED DOCUMENTS:			
QAD	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	NA <input type="checkbox"/>
PD TEXT	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	NA <input type="checkbox"/>
LOGIC DIAGRAM	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	NA <input type="checkbox"/>



NOTE: Piping subjected to HOT DEFLECTION testing is denoted as follows:



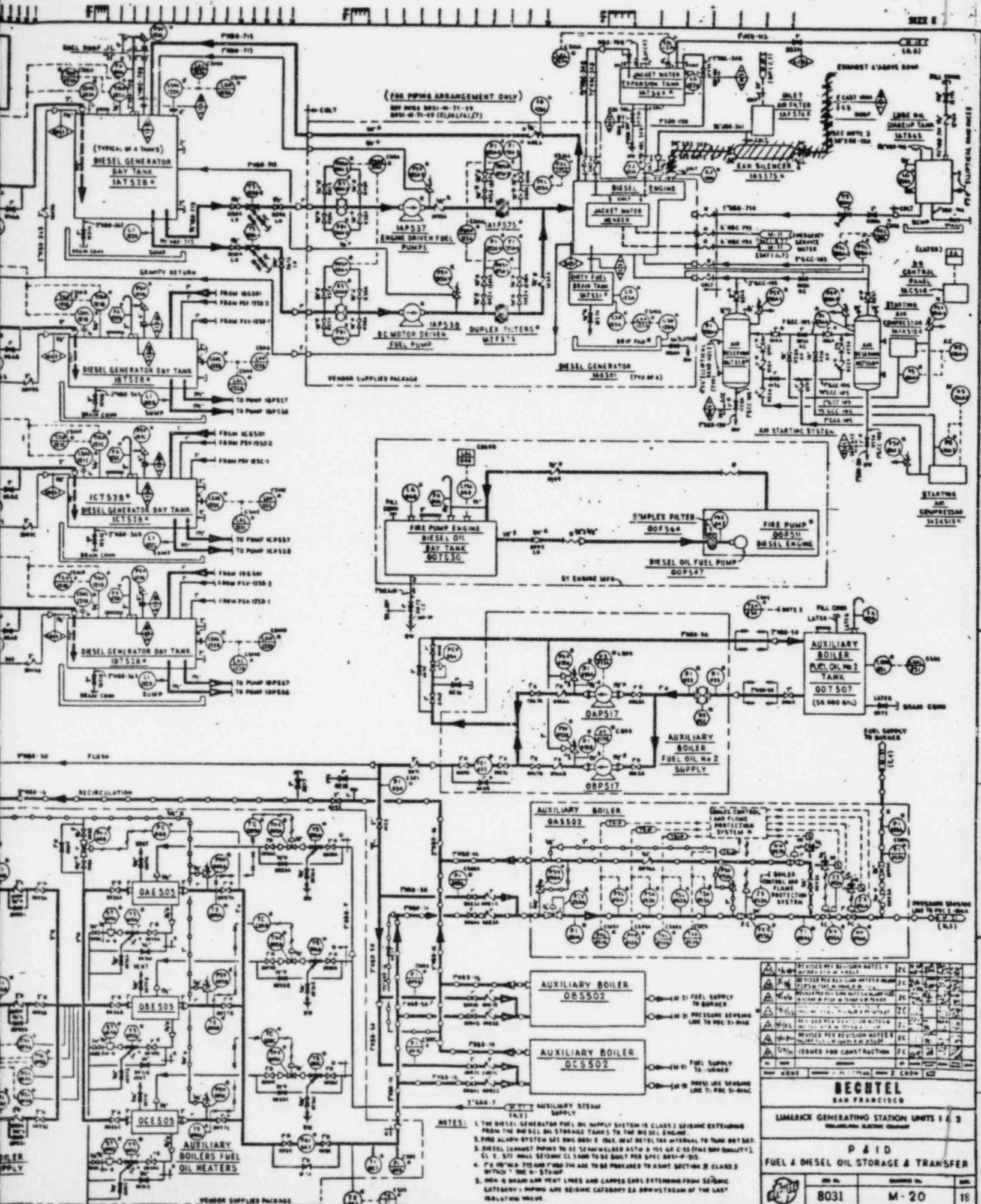
TI APERTURE CARD

Also Available On Aperture Card

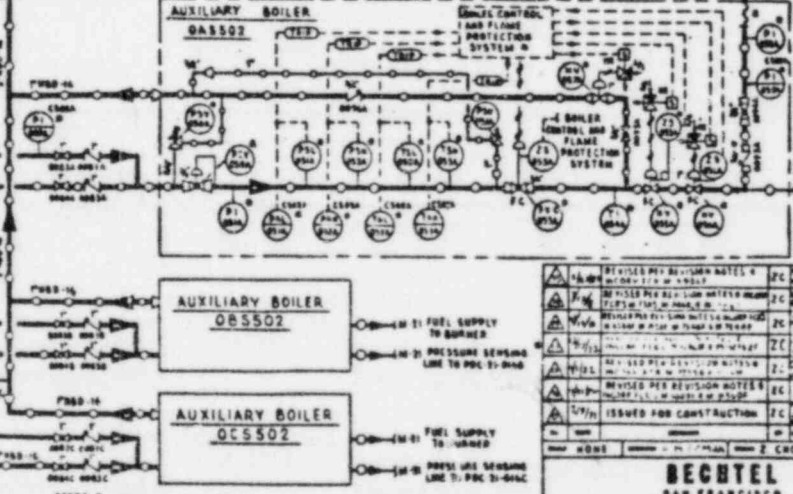
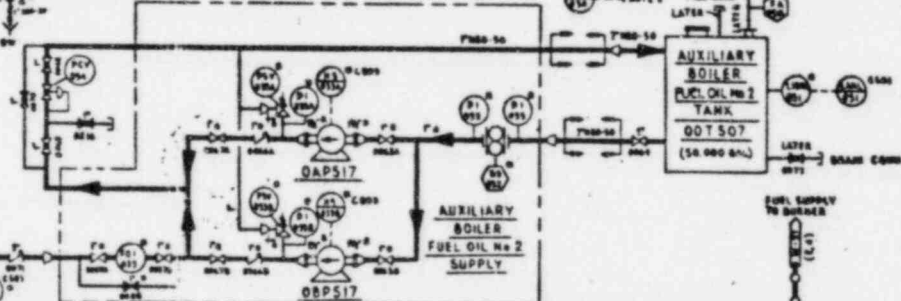
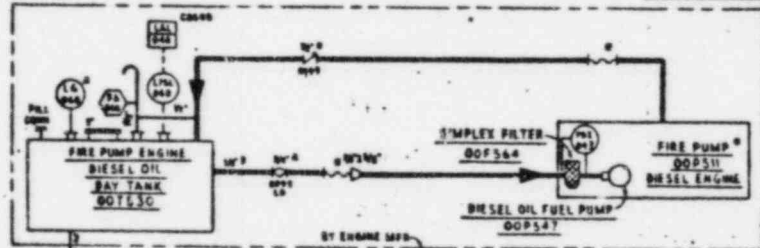
8408140314-34

D-4

Rev. 0



(FOR PIPING ARRANGEMENT ONLY)
SEE SPEC 8031-P-71-20
SPEC 71-49 (2,3,4,5,7,9)



- NOTES:
1. THE DIESEL GENERATOR FUEL OIL SUPPLY SYSTEM IS CLASS 2 SEISMIC EXTENDING FROM THE DIESEL OIL STORAGE TANKS TO THE DIESEL ENGINE.
 2. FIRE ALARM SYSTEM SEE SPEC 8031-P-71-20.
 3. DIESEL ENGINE PUMPS TO BE SEAMWELDED WITH A 15% GR. C-55 (FINE BODY QUALITY) CL. 2, SIZ. SMALL SEISMIC CL. TANK TO BE BUILT PER SPEC 8031-P-313.
 4. P. 0A5502-715 AND P. 0A5502-716 ARE TO BE PROCURED TO ASME SECTION II CLASS 2 DIVISION 1, TUBE 10-5700-1.
 5. 100% OF DRUM AND HEAD LINES AND CAPS ARE TO BE EXTENDING FROM SEISMIC CATEGORY 1 PIPING AND SEISMIC CATEGORY 2A DOWNSTREAM OF THE LAST ISOLATION VALVE.

REVISION	DATE	BY	CHKD
1	10/1/54	J. W. H.	J. W. H.
2	10/1/54	J. W. H.	J. W. H.
3	10/1/54	J. W. H.	J. W. H.
4	10/1/54	J. W. H.	J. W. H.
5	10/1/54	J. W. H.	J. W. H.
6	10/1/54	J. W. H.	J. W. H.
7	10/1/54	J. W. H.	J. W. H.
8	10/1/54	J. W. H.	J. W. H.
9	10/1/54	J. W. H.	J. W. H.
10	10/1/54	J. W. H.	J. W. H.
11	10/1/54	J. W. H.	J. W. H.
12	10/1/54	J. W. H.	J. W. H.
13	10/1/54	J. W. H.	J. W. H.
14	10/1/54	J. W. H.	J. W. H.
15	10/1/54	J. W. H.	J. W. H.
16	10/1/54	J. W. H.	J. W. H.
17	10/1/54	J. W. H.	J. W. H.
18	10/1/54	J. W. H.	J. W. H.
19	10/1/54	J. W. H.	J. W. H.
20	10/1/54	J. W. H.	J. W. H.

REVISIONS PER REVISION NOTES:
1. ISSUED FOR CONSTRUCTION

BECHTEL
SAN FRANCISCO

LIMERICK GENERATING STATION UNITS 1 & 2
INDUSTRIAL BASTIC COMPANY

P & ID
FUEL & DIESEL OIL STORAGE & TRANSFER

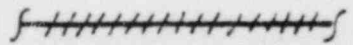
8031 M-20 18

8031-M-41

TABLE III

VALVE NUMBER	COMP. NO.	VALVE	COMP. NO.
W012A	E 1051	W022A	E 1074
W012B	E 1052	W022B	E 1075
W012C	E 1053	W022C	E 1076
W012D	E 1054	W022D	E 1077
W012E	E 1055	W022E	E 1078
W012F	E 1056	W022F	E 1079
W012G	E 1057	W022G	E 1080
W012H	E 1058	W022H	E 1081
W012I	E 1059	W022I	E 1082
W012J	E 1060	W022J	E 1083
W012K	E 1061	W022K	E 1084
W012L	E 1062	W022L	E 1085
W012M	E 1063	W022M	E 1086
W012N	E 1064	W022N	E 1087
W012O	E 1065	W022O	E 1088
W012P	E 1066	W022P	E 1089
W012Q	E 1067	W022Q	E 1090
W012R	E 1068	W022R	E 1091
W012S	E 1069	W022S	E 1092
W012T	E 1070	W022T	E 1093
W012U	E 1071	W022U	E 1094
W012V	E 1072	W022V	E 1095
W012W	E 1073	W022W	E 1096
W012X	E 1074	W022X	E 1097
W012Y	E 1075	W022Y	E 1098
W012Z	E 1076	W022Z	E 1099

NOTE: Piping subjected to HOT DEFLECTION testing is denoted as follows:



Also Available On Aperture Card

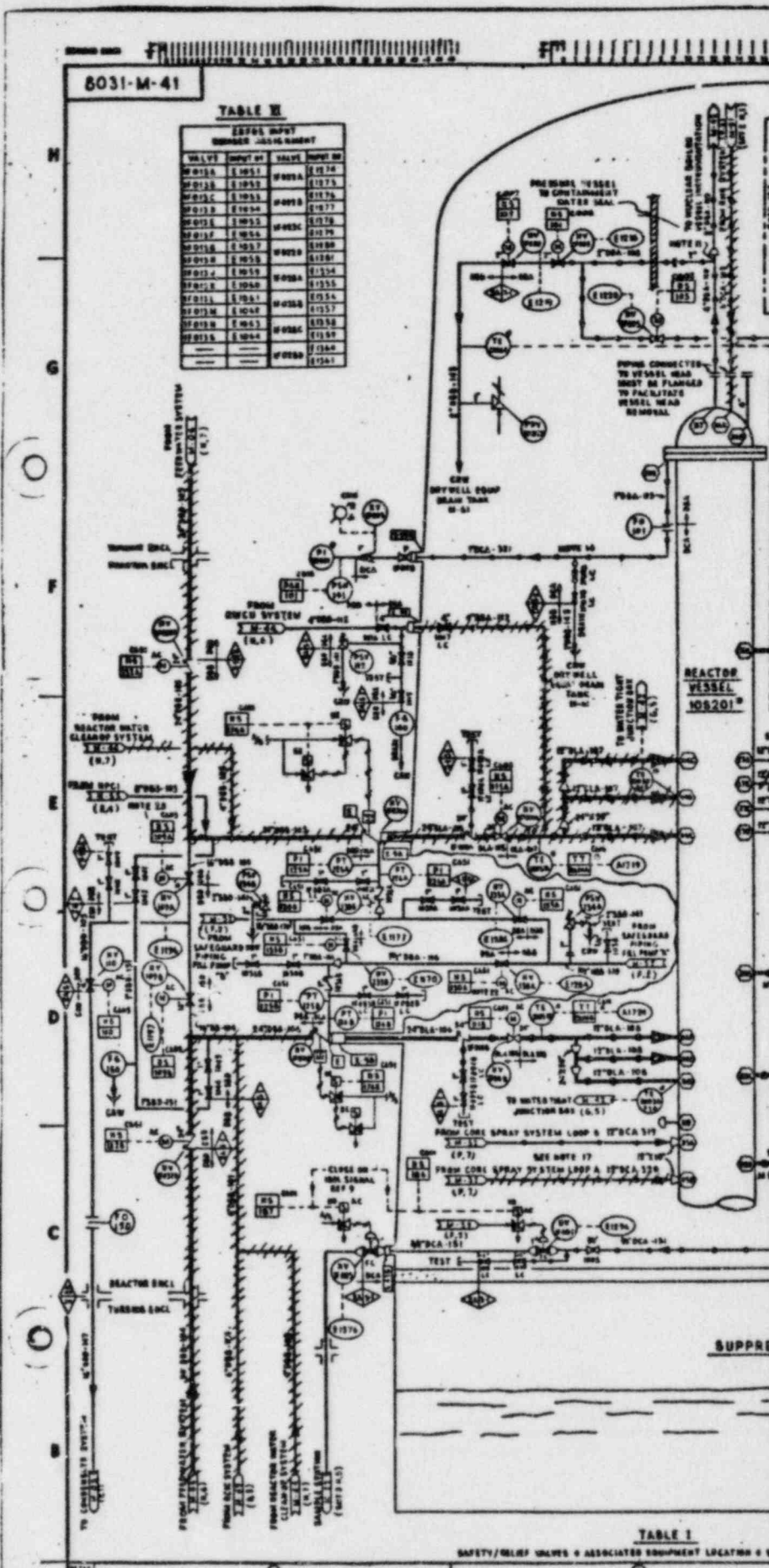


TABLE I SAFETY/RELIEF VALVES & ASSOCIATED EQUIPMENT LOCATION & SIZE

VALVE NO.	SIZE	LOCATION	ASSOCIATED EQUIPMENT
W012A	1/2"	...	...
W012B	1/2"	...	...
W012C	1/2"	...	...
W012D	1/2"	...	...
W012E	1/2"	...	...
W012F	1/2"	...	...
W012G	1/2"	...	...
W012H	1/2"	...	...
W012I	1/2"	...	...
W012J	1/2"	...	...
W012K	1/2"	...	...
W012L	1/2"	...	...
W012M	1/2"	...	...
W012N	1/2"	...	...
W012O	1/2"	...	...
W012P	1/2"	...	...
W012Q	1/2"	...	...
W012R	1/2"	...	...
W012S	1/2"	...	...
W012T	1/2"	...	...
W012U	1/2"	...	...
W012V	1/2"	...	...
W012W	1/2"	...	...
W012X	1/2"	...	...
W012Y	1/2"	...	...
W012Z	1/2"	...	...

8408140314-35

TI APERTURE CARD

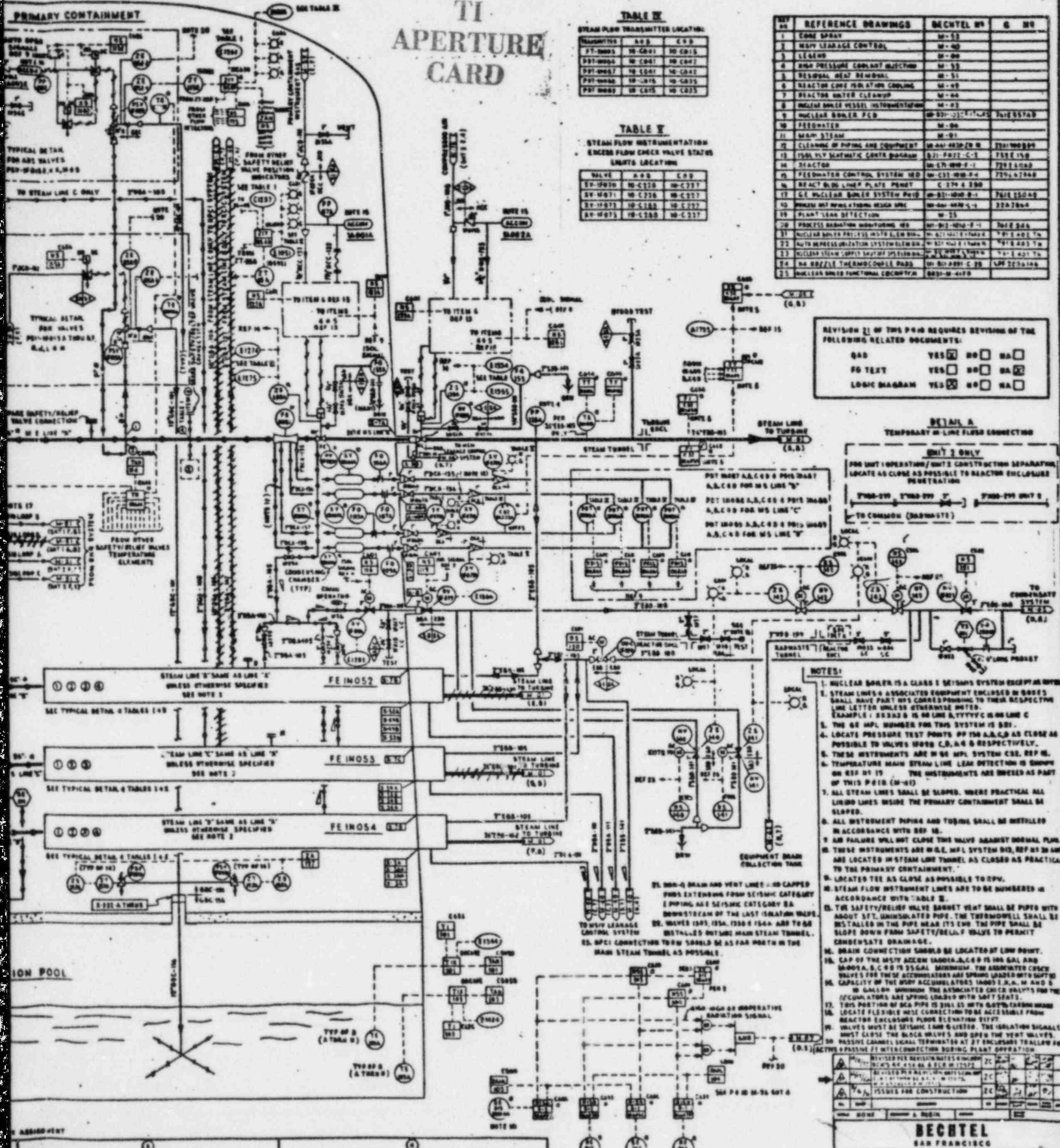


TABLE IV
STEAM FLOW TRANSDUCER LOCATIONS

TRANSDUCER	A-B	C-D
ST-0001	10-C001	10-C015
ST-0002	10-C001	10-C007
ST-0003	10-C001	10-C002
ST-0004	10-C015	10-C025

TABLE V
STEAM FLOW INSTRUMENTATION EXCEED FLOW CHECK VALVE STATUS

VALVE	A-B	C-D
SV-0010	10-C120	10-C217
SV-0071	10-C120	10-C217
SV-0072	10-C120	10-C217
SV-0073	10-C120	10-C217

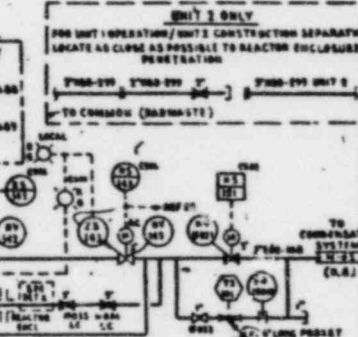
REF. REFERENCE DRAWINGS

REF.	REFERENCE DRAWINGS	BECHTEL NO.	Q. NO.
1	COOL SPRAY	M-53	
2	NOISE LEAKAGE CONTROL	M-40	
3	LEAKAGE	M-50	
4	NOISE PRESSURE CONTACT ALARM	M-53	
5	RESIDUAL HEAT DEMONSTRATION	M-51	
6	REACTOR COOLANT SYSTEM CABLES	M-49	
7	REACTOR WATER CLEANUP	M-44	
8	NUCLEAR SALES VESSEL INSTRUMENTATION	M-43	
9	NUCLEAR BOILER P&ID	8031-P-362	1
10	FEEDWATER	M-50	
11	MAIN STEAM	M-51	
12	CLEANING OF PIPING AND EQUIPMENT	8031-P-362	2
13	ISOLATION SYSTEM CONTROL DIAGRAM	8031-P-362	3
14	REACTOR	8031-P-362	4
15	FEEDWATER CONTROL SYSTEM	8031-P-362	5
16	REACTOR COOLANT SYSTEM P&ID	8031-P-362	6
17	NUCLEAR BOILER SYSTEM P&ID	8031-P-362	7
18	NUCLEAR BOILER INSTRUMENTATION	8031-P-362	8
19	PLANT LEAK DETECTION	M-55	
20	PROTECTIVE INSTRUMENTATION	8031-P-362	9
21	NUCLEAR SALES VESSEL INSTRUMENTATION	8031-P-362	10
22	NUCLEAR PRESSURIZATION SYSTEM	8031-P-362	11
23	NUCLEAR SALES VESSEL INSTRUMENTATION	8031-P-362	12
24	NUCLEAR SALES VESSEL INSTRUMENTATION	8031-P-362	13
25	NUCLEAR SALES VESSEL INSTRUMENTATION	8031-P-362	14

REVISION 11 OF THIS P&ID REQUIRES REVISION OF THE FOLLOWING RELATED DOCUMENTS:

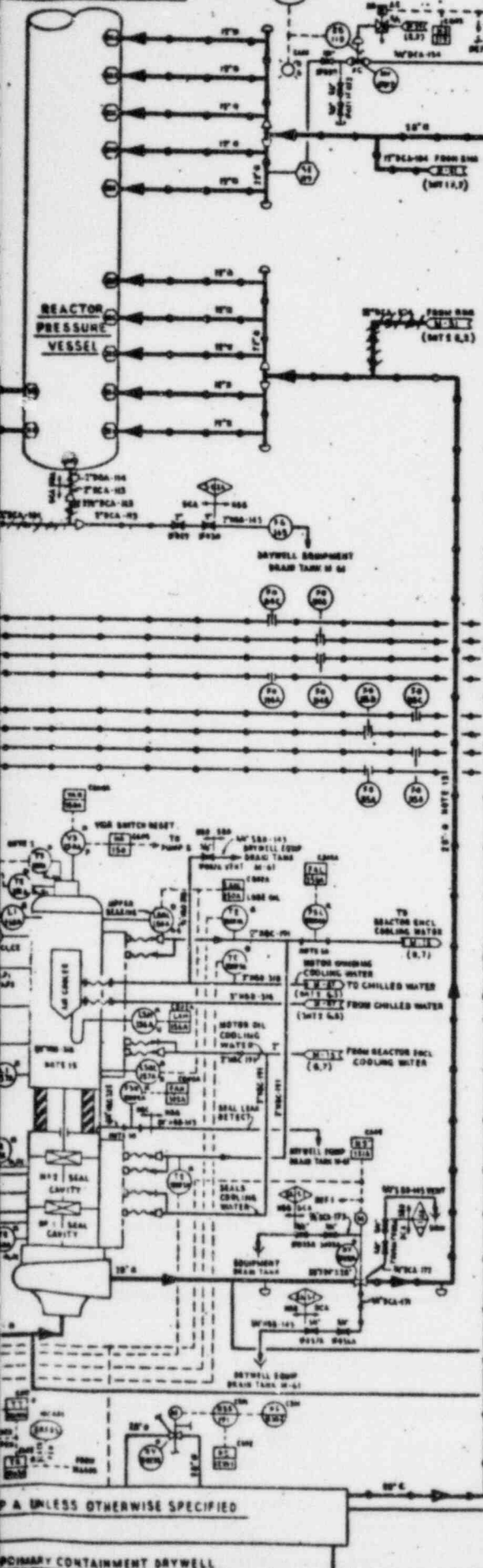
QAD	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
PD TEXT	YES <input type="checkbox"/>	NO <input type="checkbox"/>
LOGIC DIAGRAM	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>

DETAIL A
TEMPERATURE IN LINE FLOW CONNECTION

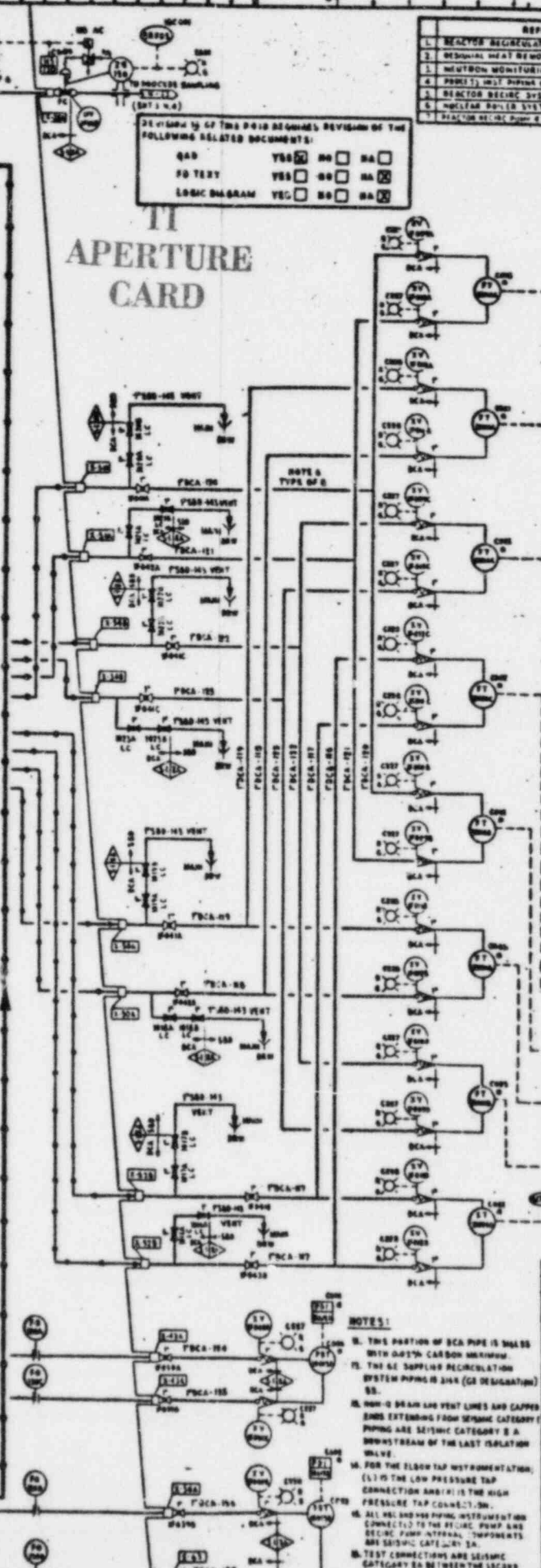


- NOTES:**
- NUCLEAR BOILER IS A CLASS 1 SYSTEM EXCEPT WHERE SHOWN OTHERWISE.
 - STEAM LINES & ASSOCIATED EQUIPMENT ENCLOSED IN BOXES SHALL HAVE PART OF ITS COVER PENETRATING TO THE RESPECTIVE LINE LETTER UNLESS OTHERWISE NOTED. EXAMPLE: 8031-B IS ON LINE A, TYPICAL ON LINE C.
 - THE 60 MFL NUMBER FOR THIS SYSTEM IS 601.
 - LOCATE TEMPERATURE TEST POINTS AT THE A.B.C.D. AS CLOSE AS POSSIBLE TO VALVES 1000, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1029, 1030, 1031, 1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1079, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1160, 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PRIMARY CONTAINMENT



II
APERTURE
CARD



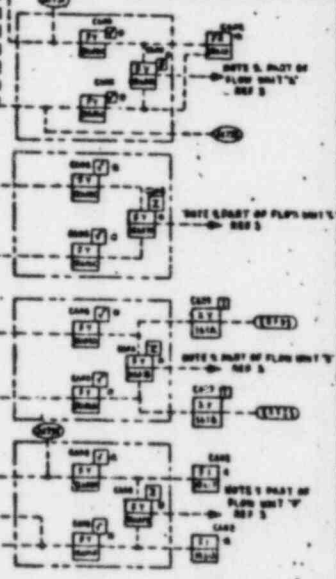
REFERENCE DRAWINGS	DESCRIPT	SI	RI
1	REACTOR RECIRCULATION PCB		
2	REACTOR HEAT REMOVAL PCB		
3	NEUTRON MONITORING SYSTEM		
4	REACTOR HEAT REMOVAL SYSTEM SPEC		
5	REACTOR HEAT REMOVAL SYSTEM P&ID		
6	REACTOR HEAT REMOVAL SYSTEM P&ID		
7	REACTOR HEAT REMOVAL SYSTEM P&ID		

REVISION 15 OF THIS P&ID REQUIRED REVISION OF THE FOLLOWING RELATED DOCUMENTS:

QAD YES NO NA
 PD TEST YES NO NA
 LOGIC DIAGRAM YES NO NA

NOTES:

- THIS IS A SEISMIC CATEGORY I SYSTEM EXCEPT AS NOTED.
- WHERE TWO INSTRUMENTS ARE SHOWN, THE FIRST IS A SEISMIC ELEMENT AND THE SECOND IS A SEISMIC ELEMENT.
- WHERE SEISMIC CATEGORY I INSTRUMENTS ARE SHOWN, THE FIRST IS A SEISMIC ELEMENT AND THE SECOND IS A SEISMIC ELEMENT.
- LIST OF PUMP & MOTOR INSTRUMENTS FOR PUMP MOTOR UNIT.
- TS/A, A₁ - THRUST BEARING, UPPER RACE
 TS/B, B₁ - THRUST BEARING, LOWER RACE
 TS/C, C₁ - UPPER GUIDE BEARING
 TS/D, D₁ - MOTOR WINDING "A"
 TS/E, E₁ - MOTOR WINDING "B"
 TS/F, F₁ - MOTOR WINDING "C"
 TS/G, G₁ - MOTOR WINDING "D"
 TS/H, H₁ - MOTOR WINDING "E"
 TS/I, I₁ - LOWER GUIDE BEARING
 TS/J, J₁ - NO. 1 SEAL CAVITY
 TS/K, K₁ - NO. 2 SEAL CAVITY
 TS/L, L₁ - MOTOR WINDING CHILLED COOLING WATER EXCHANGE
 TS/M, M₁ - MOTOR WINDING CHILLED COOLING WATER EXCHANGE
 TS/N, N₁ - MOTOR WINDING CHILLED COOLING WATER EXCHANGE
- ALL THERMOCOUPLES & RTDs MUST BE PROVIDED WITH A MINIMUM OF 18 INCHES OF PROTECTIVE JACKETING INSIDE THE PRIMARY CONTAINMENT SHALL BE SLOPER.
- ALL INSTRUMENT PIPING AND TUBING SHALL BE INSTALLED IN ACCORDANCE WITH REF. 1.
- THIS BLOCK IS PART OF THE INSTRUMENTATION SYSTEM AND SHALL BE INSTALLED IN ACCORDANCE WITH REF. 1.
- FLANGE CONNECTIONS SHALL BE PROVIDED WITH A MINIMUM OF 18 INCHES OF PROTECTIVE JACKETING INSIDE THE PRIMARY CONTAINMENT SHALL BE SLOPER.



NOTES:

- THIS PORTION OF SEA PIPE IS SHALLO WITH GASTON CARBON MONOXIDE.
- THE SEA SUPPLY RECIRCULATION SYSTEM PIPING IS SHALLO (SEE DESIGNATION) SS.
- NON-SEISMIC DRAIN AND VENT LINES AND CAPPED ENDS EXTENDING FROM SEISMIC CATEGORY I PIPING ARE SEISMIC CATEGORY I A DOWNSTREAM OF THE LAST ISOLATION VALVE.
- FOR THE ELBOW TAP INSTRUMENTATION, (S) IS THE LOW PRESSURE TAP CONNECTION AND (H) IS THE HIGH PRESSURE TAP CONNECTION.
- ALL RECORDING INSTRUMENTS AND CONNECTED TO THE REACTOR, PUMP AND BEARING PUMP INSTRUMENTS ARE SEISMIC CATEGORY I A.
- TEST CONNECTIONS ARE SEISMIC CATEGORY I A UNLESS THE LOCAL ISOLATION VALVE AND THE PIPE CAP.

REVISION	DATE	BY	CHKD
1	10/1/68	J. COOK	
2	10/1/68	J. COOK	
3	10/1/68	J. COOK	
4	10/1/68	J. COOK	
5	10/1/68	J. COOK	
6	10/1/68	J. COOK	
7	10/1/68	J. COOK	
8	10/1/68	J. COOK	
9	10/1/68	J. COOK	
10	10/1/68	J. COOK	
11	10/1/68	J. COOK	
12	10/1/68	J. COOK	
13	10/1/68	J. COOK	
14	10/1/68	J. COOK	
15	10/1/68	J. COOK	
16	10/1/68	J. COOK	
17	10/1/68	J. COOK	
18	10/1/68	J. COOK	
19	10/1/68	J. COOK	
20	10/1/68	J. COOK	

BECHTEL
SAN FRANCISCO

GENERAL ELECTRIC COMPANY

P & ID
REACTOR RECIRCULATION PUMP

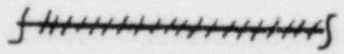
8031 M-43 16

803 M-43

TABLE I
LINE DESIGNATION FOR
VENTS AND DRAINS

LOOP 'A'	LOOP 'B'
W'DCA-171	-179
W'DCA-172	-180
W'DCA-173	-181
W'DCA-174	-182
W'DCA-175	-183
W'DCA-176	-184
W'DCA-177	-186

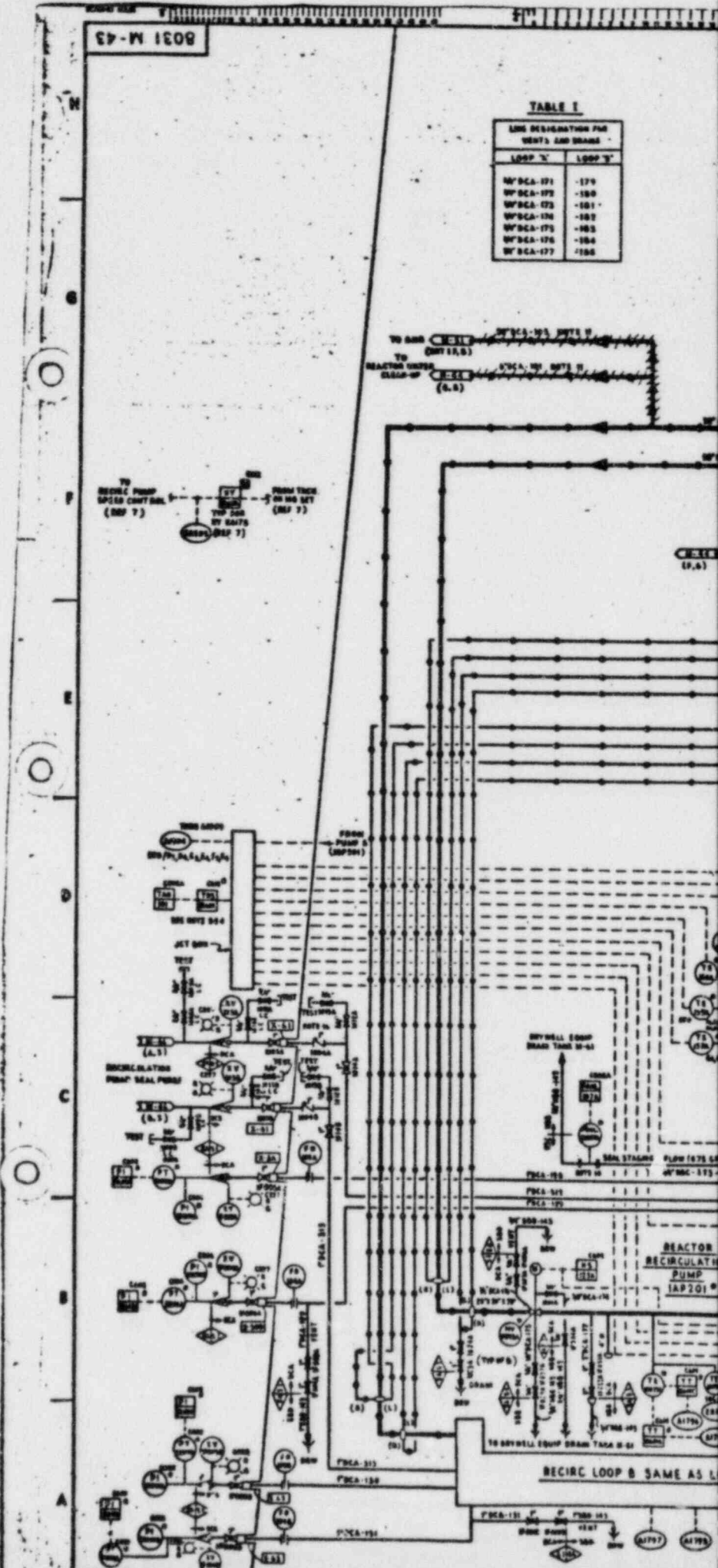
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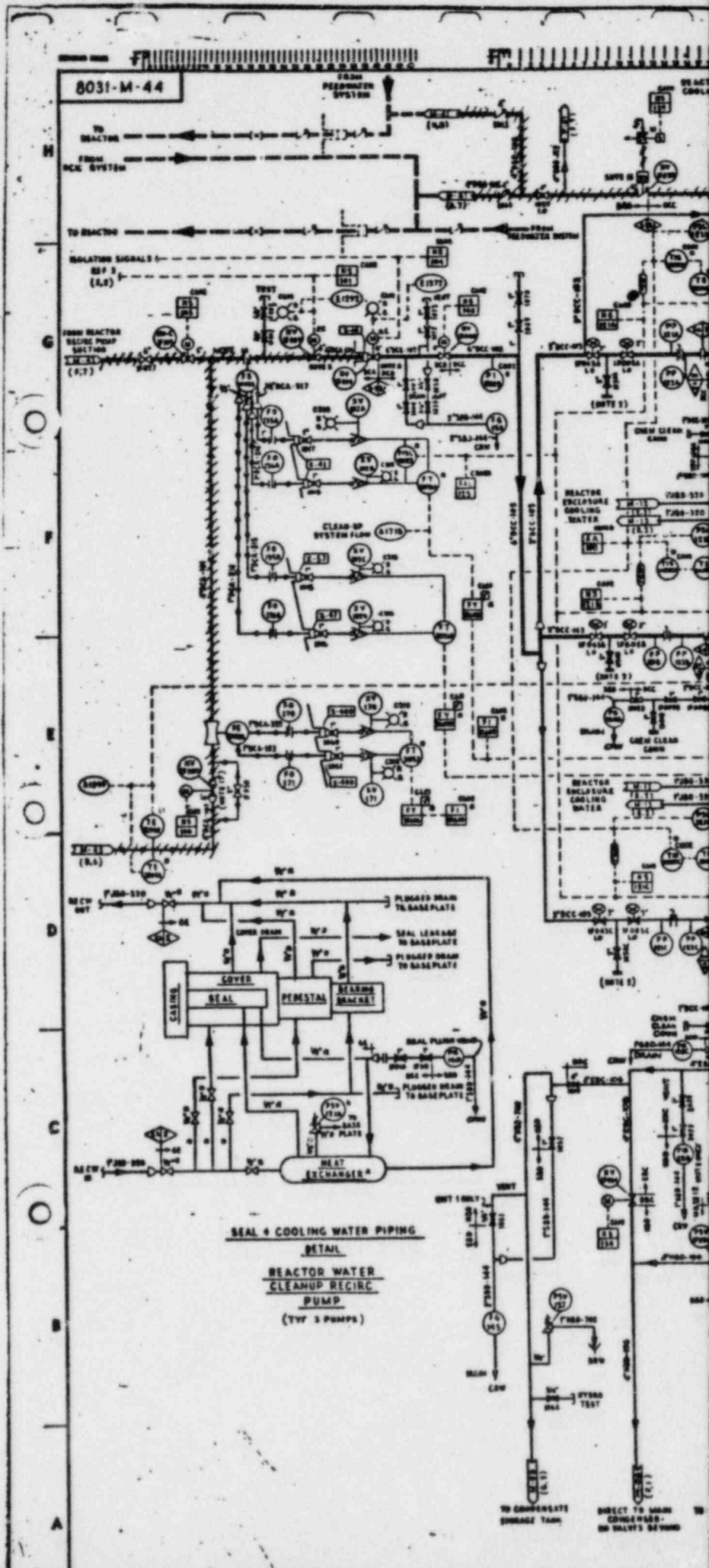


Also Available On Aperture Card

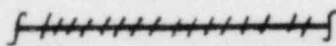
8408140314-36

D-6 Rev. 0





NOTE: Piping subjected to HOT DEFLECTION testing is denoted as follows:



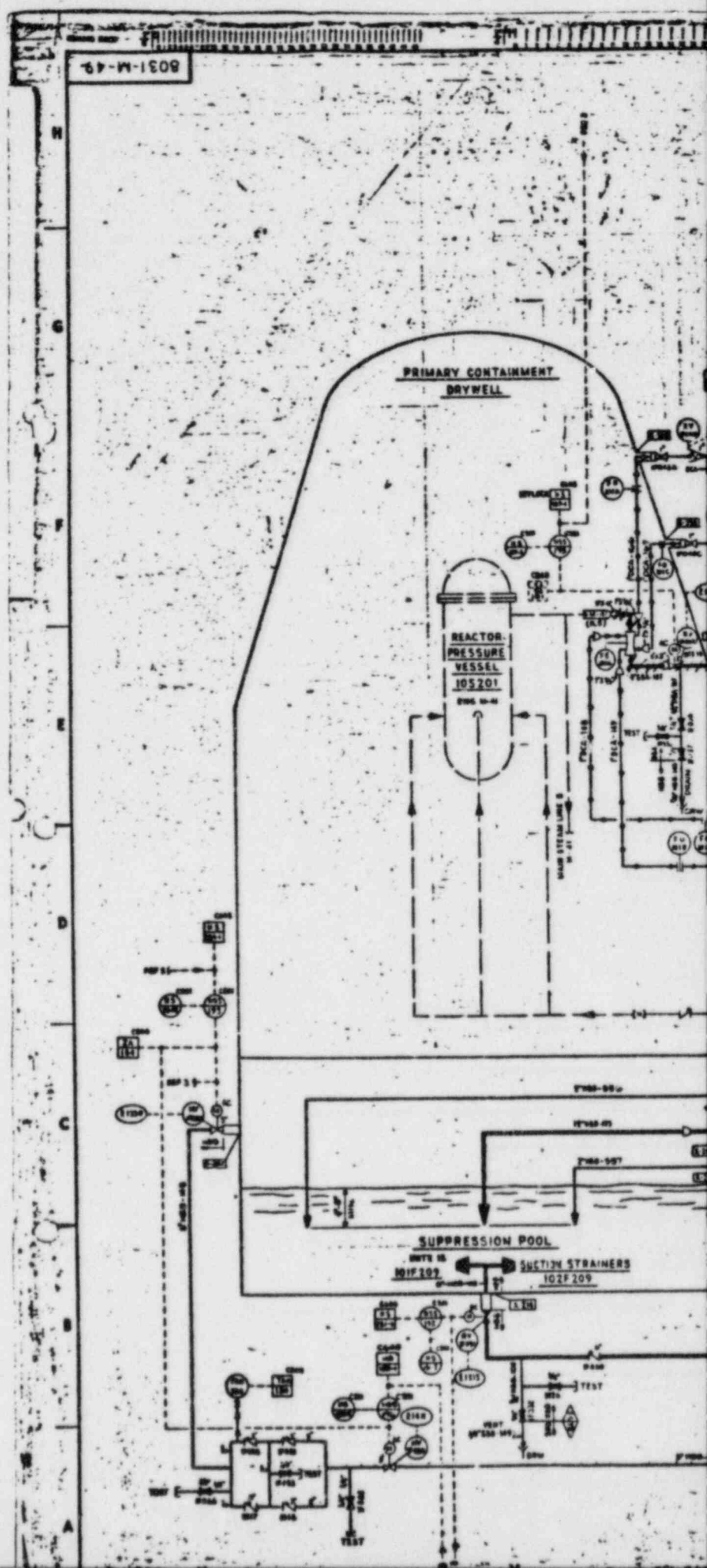
Also Available On Aperture Card

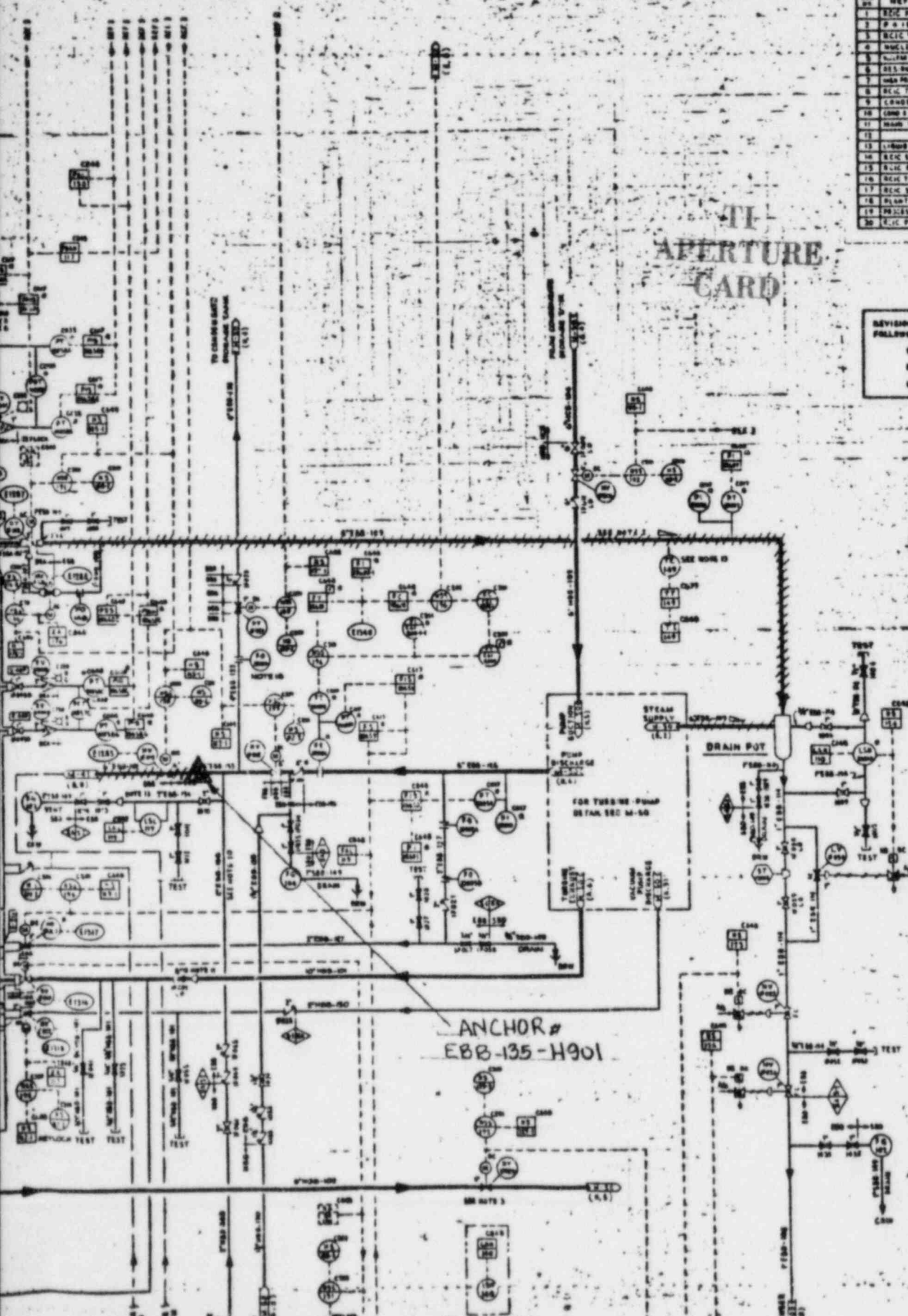
8408140314-37
D-7 Rev. 0

NOTE: Piping subjected to HOT DEFLECTION testing is denoted as follows:
 ////////////////

Also Available On Aperture Card

D-8 Rev. 0





REV NO	REFERENCE DRAWINGS	BECHTEL DT	GS NO
1	RCIC PUMP LAYOUT	M-50	
2	P & ID LAYOUT	M-50	
3	RCIC PUMP CONTROL DIAGRAM	M-50	20042140
4	NUCLEAR SYMBOLS	M-51	
5	RCIC PUMP CONTROL SYSTEM DIAGRAM	M-50-5107	20042140
6	RCIC PUMP CONTROL SYSTEM	M-51	
7	RCIC PUMP CONTROL SYSTEM	M-51	
8	RCIC PUMP CONTROL SYSTEM	M-51	
9	CONDENSATE SYSTEM	M-50	
10	CONDENSATE SYSTEM	M-50	
11	CONDENSATE SYSTEM	M-51	
12	CONDENSATE SYSTEM	M-51	
13	CONDENSATE SYSTEM	M-51	
14	RCIC SYS DESIGN SPECIFICATION	M-51-5101-1	20042140
15	RCIC OVERSPEED TRIP	M-51-5101-2	20042140
16	RCIC TURBINE CONTROL DIAGRAM	M-51-5101-3	20042140
17	RCIC SYSTEM P&ID (S&I)	M-51-5101-4	20042140
18	PLANT LAYOUT	M-51	
19	PROCESS AND INSTRUMENTATION DIAGRAM	M-51-5101-5	20042140
20	RCIC PUMP CONTROL SYSTEM	M-51	

REVISION 10 OF THIS P&ID REQUIRES REVISION OF THE FOLLOWING RELATED DOCUMENTS:

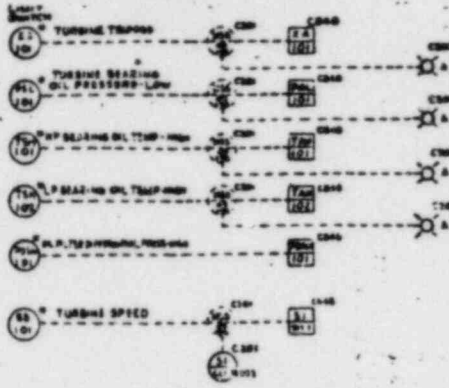
S&I	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	NA <input type="checkbox"/>
PD TEXT	YES <input type="checkbox"/>	NO <input type="checkbox"/>	NA <input type="checkbox"/>
LOGIC DIAGRAM	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	NA <input type="checkbox"/>

- NOTES:**
- RCIC IS A CLASS 1 DESIGN SYSTEM AS DEFINED IN THE DESIGN BASIS DOCUMENT.
 - SHOULD BE LOCATED AT THE LOW POINT OF THE MAIN STEAM LINE TO DRAIN PUMP JUST AHEAD OF TURBINE PUMP SECTION LINE FROM CONDENSATE SYSTEM. THIS SECTION LINE FROM CONDENSATE SYSTEM SHALL BE DERIVED FROM A DC SOURCE SEPARATE FROM THAT WHICH SUPPLIES THE RCIC SYSTEM, OR THE INTERMEDIATE AC OR COMPATIBLE DC TO AC CONVERSION SYSTEM.
 - THE LOW POINT DRAIN FOR THIS SYSTEM IS 6-01.
 - TEMPERATURE LEAK DETECTION FOR THIS SYSTEM IS SHOWN ON REF 10. THE TEMPERATURE INSTRUMENTS ARE LOCATED AS PART OF THIS P&ID (M-48).
 - ALL INSTRUMENT PIPING & TUBING SHALL BE INSTALLED IN ACCORDANCE WITH APPROPRIATE P&ID.
 - ALL STEAM LINES SHALL BE SLOPED.
 - ALL LIQUID LINES WITHIN THE PRIMARY CONTAINMENT SHALL BE SLOPED WHERE PRACTICAL.
 - ALL LINES SHOULD BE LOCATED AT HIGH POINT. (S&I)
 - VALVE P&ID SHOULD BE LOCATED AT HIGH POINT. (S&I)
 - ~~DELETED~~
 - TEMPERATURE SENSITIVE TO BE INSTALLED ON OUTSIDE SURFACE.
 - INSTALL VALVE IN STEAM DIRECTION SUCH THAT FLOW IS OVER THE SEAT TO COMPLY WITH HELICOPTER APPROACH.
 - THE MAXIMUM GAP ACROSS THE SECTION STRAINERS SHALL NOT EXCEED THE AVAILABLE HEAD ABOVE THE SECTION WHEN THE STRAINERS ARE 50% PLUGGED.
 - FOR HIGH PRESSURE TUBING (UNDER 1) REPLACEMENT ORPHICES (PD-40-1000A AND PD-41-1000A) ARE REQUIRED.
 - NON-C DRAIN AND VENT LINES AND CAPPED ENDS EXTENDING FROM DESIGN CATEGORY 1 DRINK 200 DESIGN CATEGORY 2A DOWNSTREAM OF THE LAST TIE-POINT ON THE LINE.
 - THIS PORTION OF THE P&ID SHALL BE A VERTICAL SECTION THROUGH THE PROCESS LINE, MINIMUM 3FT LONG. ALL TAPS SHALL BE PLACED 3FT APART. THE LINE FROM THE BOTTOM OF THE VERTICAL SECTION SHALL SLOPE DOWN TOWARDS THE PROCESS LINE.

REVISION 10 OF THIS P&ID REQUIRES REVISION OF THE FOLLOWING RELATED DOCUMENTS:	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	NA <input type="checkbox"/>
PD TEXT	YES <input type="checkbox"/>	NO <input type="checkbox"/>	NA <input type="checkbox"/>
LOGIC DIAGRAM	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	NA <input type="checkbox"/>
ISSUED FOR CONSTRUCTION	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	NA <input type="checkbox"/>
DATE	BY	CHECKED BY	APPROVED BY
BECHTEL SAN FRANCISCO			
LIMBICK GENERATING STATION UNITS 1 & 2 REACTOR CORE ISOLATION COOLING			
P & ID			
REACTOR CORE ISOLATION COOLING			
8031	M-49	18	

05-PT-1E00

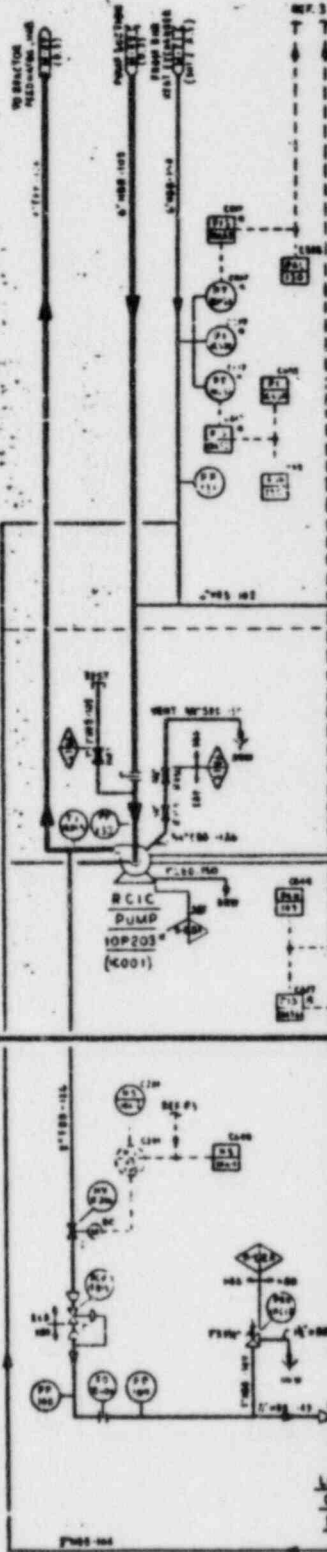
TURBINE SUPERVISORY INSTRUMENTATION ALARMS



TURBINE CONTROL LOGIC
DEF 2 0%

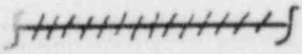
MAX FLOW

TO SUPPRESSION POOL (L.1)

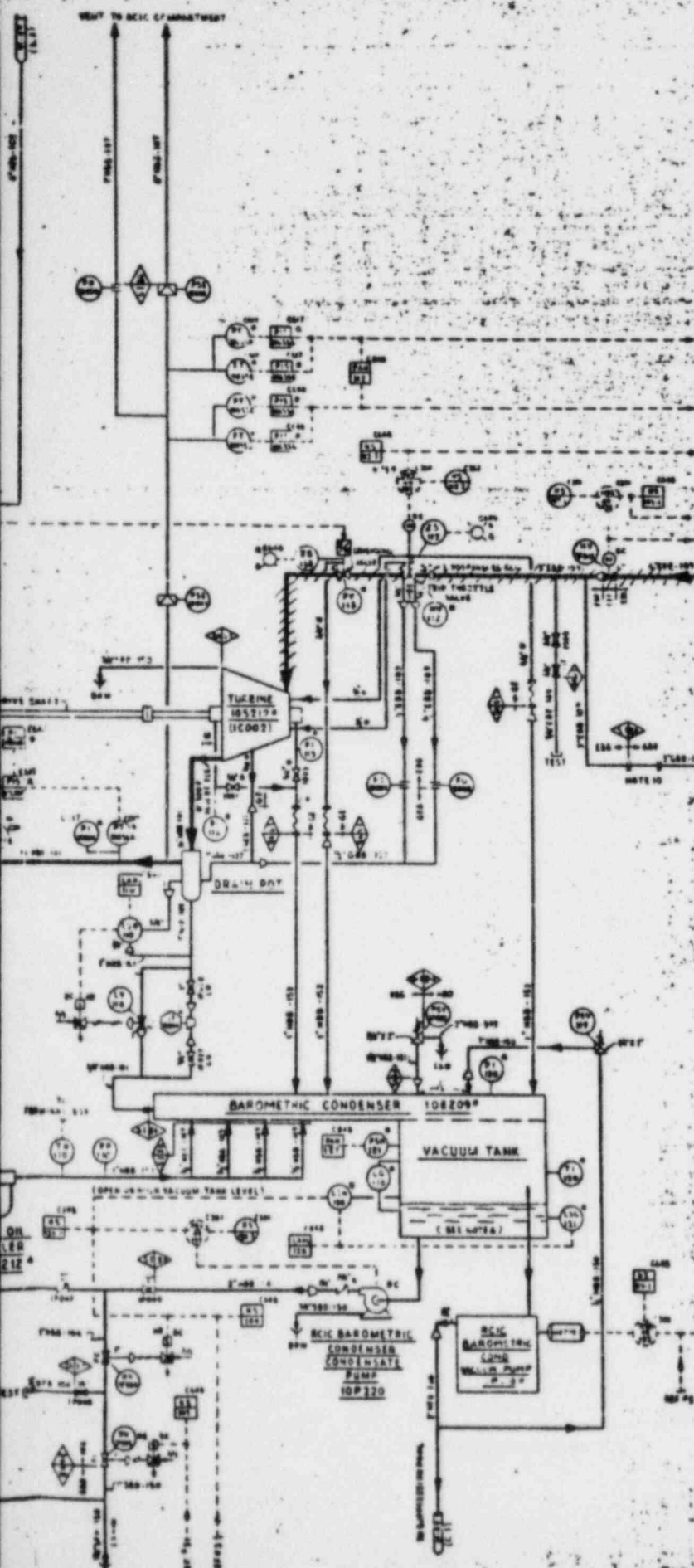


NOTE: Piping sub-
jected to HOT DE-
FECTION testing
denoted as

flows:



TI
APERTURE
CARD



NO.	REFERENCE DRAWINGS	BECHTEL No.	SE No.
1	RCIC	M-49	
2	P & ID LOGS	M-50	
3	RCIC SYSTEM CONTROL DIAGRAM	M-50-100-1	REVISION 00
4	NUCLEAR SYMBOLS	M-51	
5	REVISIONS TO P & ID LOGS	M-50-100-1	REVISION 00
6	REVISIONS TO P & ID LOGS	M-51	
7	REVISIONS TO P & ID LOGS	M-51	
8	RCIC SYSTEM CONTROL DIAGRAM	M-50-100-1	REVISION 01
9	CONDENSATE	M-50	
10	CONDENSATE SYSTEM CONTROL DIAGRAM	M-50	
11	STEAM SUPPLY	M-51	
12	CONDENSATE	M-51	
13	CONDENSATE SYSTEM CONTROL DIAGRAM	M-51	
14	RCIC SYSTEM CONTROL DIAGRAM	M-50-100-1	REVISION 00
15	RCIC OVERSPEED TRIP	M-51-100-1	REVISION 00
16	RCIC SYSTEM CONTROL DIAGRAM	M-50-100-1	REVISION 00
17	RCIC SYSTEM CONTROL DIAGRAM	M-50-100-1	REVISION 00
18	REVISIONS TO P & ID LOGS	M-50-100-1	REVISION 00

- NOTES:**
1. RCIC IS A CLASS I SEISMIC SYSTEM EXCEPT AS NOTED.
 2. SLOPE STEAM LINE DOWN AS THE MAIN STEAM MAIN STEAM LINE TO MAINTAIN 1/2" SLOPE UPWARD OF TURBINE.
 3. ALL INSTRUMENT PIPING & TUBING SHALL BE SEISMIC AS IN ACCORDANCE WITH SEISMIC CODES.
 4. AC POWER FOR ALL INSTRUMENTS SHALL BE DERIVED FROM A DC SOURCE SEPARATE FROM THAT WHICH IS USED IN THE RCIC SYSTEM AS THE UNIT IS NOT TO BE OPERATED ON COMPATIBLE AC TO AC CONVERSION SYSTEM.
 5. PIPING FROM POINT VALVES & GATE POINTS SHALL BE AS SHOWN.
 6. THE SHUT-OFF VALVE, ISOLATED AND MAINTENANCE SHALL BE LOCATED SUCH THAT ITS WATER LEVEL IS BELOW THE BOTTOM OF THE TURBINE EXHAUST FLANGE. THE BAROMETRIC CONDENSER IS DESIGNED AS A CLASS I SEISMIC SYSTEM FOR THIS SYSTEM IS 2.0G.
 7. ALL STEAM LINES SHALL BE SLOPED. ALL LIQUID LINES UNDER THE PRIMARY CONTAINMENT SHALL BE SLOPED WHERE PRACTICAL.
 8. REMOTE RESET CAPABLE AFTER ALL TRIP SIGNALS EXCEPT MECHANICAL OVERSPEED TRIP.
 9. REMOTE START/STOP AND REPLACE WITH A SHUT-OFF VALVE AT THE TURBINE.
 10. VENT AND DRAIN LINES ARE CAPPED AND ISOLATED FROM SEISMIC CATEGORY I PIPING AND SEISMIC CATEGORY 2A DOWNSTREAM OF THE LAST ISOLATION VALVE.

Also Available On
Aperture Card

REVISION 10 OF THIS P & ID REQUIRES REVIEW OF THE FOLLOWING RELATED DOCUMENTS:

SAD	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	NA <input type="checkbox"/>
PD T&T	YES <input type="checkbox"/>	NO <input type="checkbox"/>	NA <input checked="" type="checkbox"/>
LOGIC DIAGRAM	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	NA <input type="checkbox"/>

8408140314-39

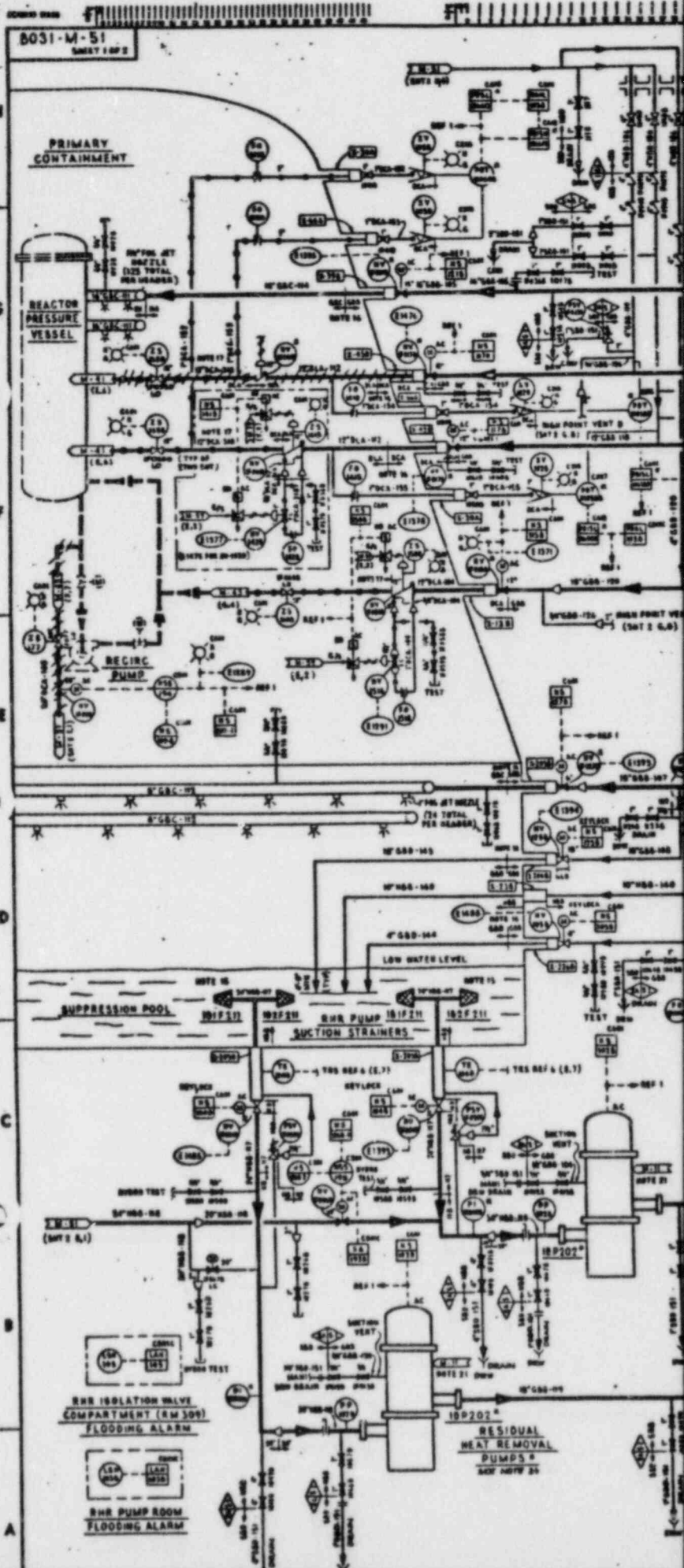
UNITED PER DAY	24		
REVISED PER REVISION NOTES	24		
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REVISED PER REVISION NOTES	24		
REVISED PER REVISION NOTES	24		
ISSUED FOR CONSTRUCTION	24		

BECHTEL
SAN FRANCISCO

LANCHBACH GENERATING STATION UNITS 1 & 2
MILWAUKEE ELECTRIC COMPANY

P & ID
RCIC PUMP TURBINE

NO.	REVISED BY	DATE
8031	M-50	14



NOTE: Piping subjected to HOT DEFLECTION testing is denoted as follows:

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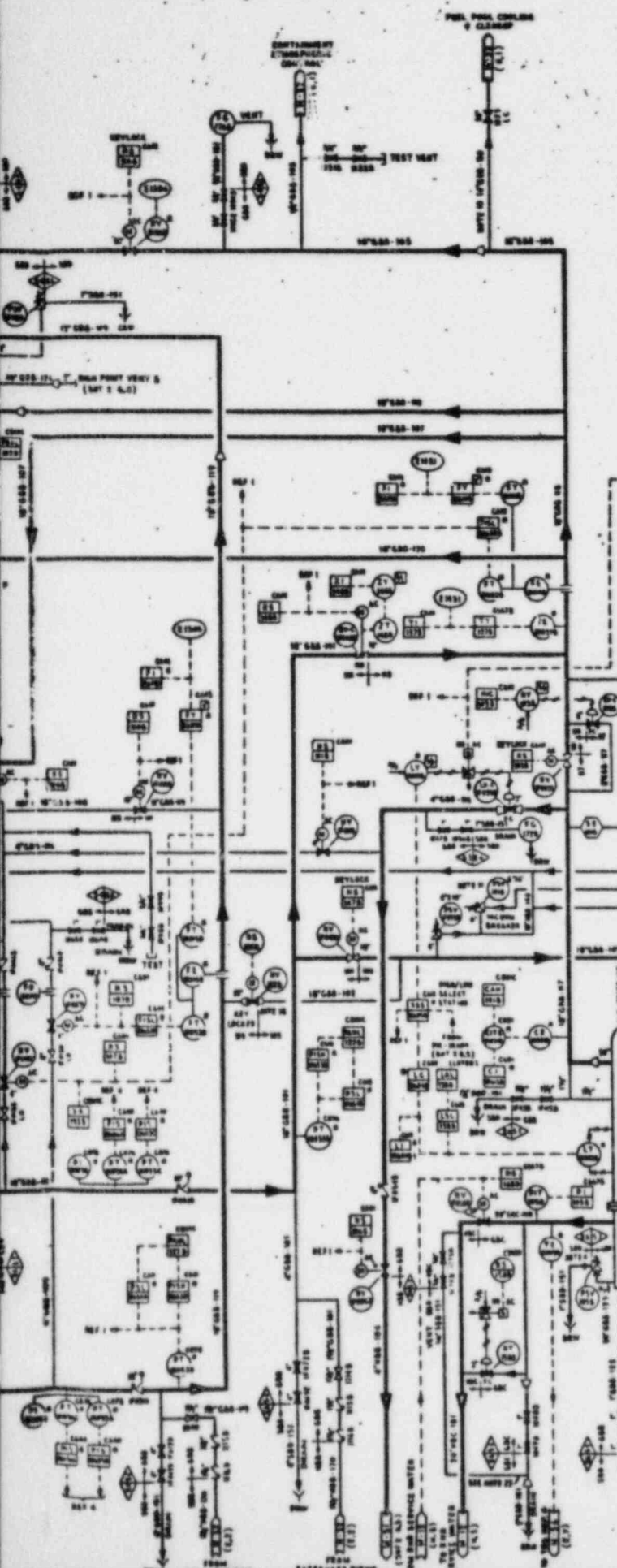
Also Available On Aperture Card

TI
APERTURE
CARD

8408140314-40

D-10

Rev. 0

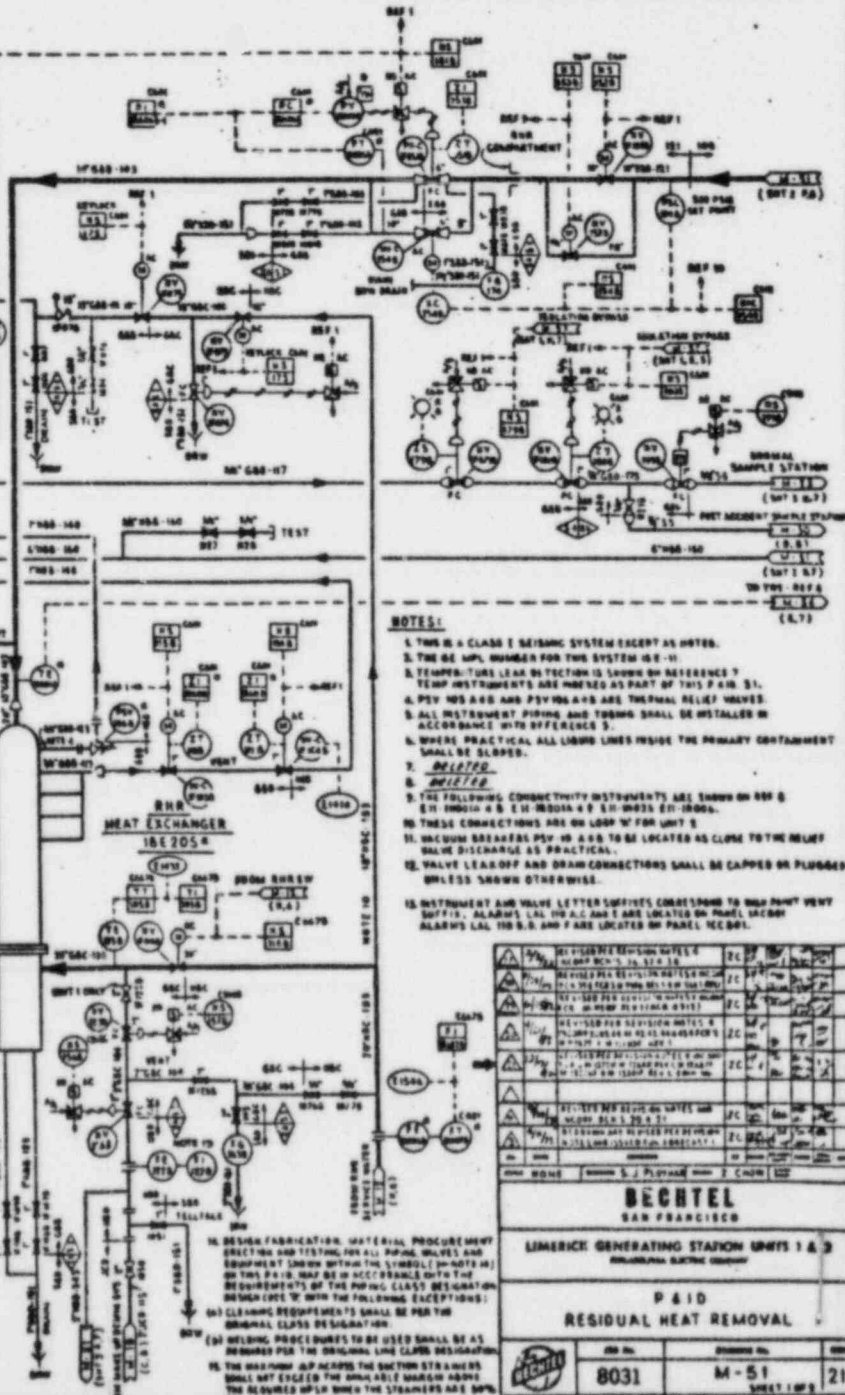


16. PIPE CLASS BREAK IS AT FLUID HEAD, DESIGN PRESSURE, TEMPERATURE AND SERVICE CONDITIONS FOR THE FLUID HEAD ARE THE SAME AS FOR ADJACENT STEEL PIPE WORK.
17. THIS PORTION OF S&C PIPE IS 2141 SS WITH GORE COMMON MARKING.
18. THE RHR LOOP INTERTIE LINE PIPING AND VALVES SHOULD BE DESIGN CATEGORY 1 & 2 (WHICH IS MORE ESSENTIAL).
19. PS-18A AND V-18A SHOULD BE LOCATED ADJACENT TO EACH OTHER, AND PS-18B AND V-18B SHOULD BE LOCATED ADJACENT TO EACH OTHER, SO THE OPERATOR MAY OBSERVE THE FLOW INDICATION WHILE OPERATING THE HEAT EXCHANGER LOOP UP VALVES.
20. RHR-1 BEAR AND VENT LINES AND CAPPED ENDS EXTENDING FROM SEISMIC CATEGORY 1 PIPING ARE SEISMIC CATEGORY 2A DOWNSTREAM OF THE LAST ISOLATION VALVE.
21. RHR-1 BEAR AND BEARING COOLING WATER LINES ARE SHOWN ON REFERENCE W.
22. RHR-1 THESE BEARS ARE NOT MANIFOLD AND RHR-1 IS LOCATED DOWNSTREAM OF VALVE 2049B.
23. THIS PORTION OF S&C-18A SHALL BE VERTICAL ABOVE THE PROCESS LINE AND AT LEAST 5 FEET LONG. L&L TAPS SHALL BE ABOUT 2 FEET APART. THE LINE FROM THE BOTTOM OF THE VERTICAL SECTION SHALL SLOPE DOWN TOWARDS THE PROCESS LINE.
24. THIS EQUIPMENT IS BEING MONITORED BY THE VIBRATION MONITORING SYSTEM (VMS). THE TYPE OF SENSOR BEING USED SEE THE VMS I/O SUMMARY, V.F. 8031-W-141-K00.

REVISION 02 OF THIS P&ID REQUIRES REVISION OF THE FOLLOWING RELATED DOCUMENTS:

S&C	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	NA <input type="checkbox"/>
P&ID TEXT	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	NA <input type="checkbox"/>
LOGIC DIAGRAM	YES <input type="checkbox"/>	NO <input type="checkbox"/>	NA <input type="checkbox"/>

REF. NO.	REFERENCE DRAWINGS	REVISION NO.	DATE
1	RESIDUAL HEAT REMOVAL P&ID	8031-W-100001	17/06/2000
2	HEATER PROTECTION SYSTEM P&ID	8031-W-100002	17/06/2000
3	NUCLEAR EARLY WARNING DETECTION SYS DESIGN SPEC	8031-W-100003	21/03/99
4	NUCLEAR BOILER SYSTEM P&ID	8031-W-100004	14/06/2000
5	PROCESS HEAT PIPING AND TUBING DESIGN SPEC	8031-W-100005	21/03/2000
6	VACUUM PUMP DESIGN P&ID	8031-W-100006	17/06/2000
7	PLANT LEAK DETECTION P&ID	8031-W-100007	17/06/2000
8	PROCESS SAMPLES	8031-W-100008	17/06/2000
9	RHR SYSTEM FUNCTION DESCRIPTION	8031-W-100009	14/06/2000
10	RHR SYSTEM LOOP DIAGRAMS	8031-W-100010	14/06/2000
11	EMERGENCY SERVICE WATER P&ID	8031-W-100011	



- NOTES:**
1. THIS IS A CLASS 1 SEISMIC SYSTEM EXCEPT AS NOTED.
 2. THE DC WPL NUMBER FOR THIS SYSTEM IS 0-11.
 3. TEMPERATURE LEAK DETECTION IS SHOWN ON REFERENCE 7. TEMP INSTRUMENTS ARE INDEXED AS PART OF THIS P&ID 31.
 4. PSV 185 AND PSV 186 ARE THERMAL RELIEF VALVES.
 5. ALL INSTRUMENT PIPING AND TUBING SHALL BE INSTALLED IN ACCORDANCE WITH REFERENCE 5.
 6. WHERE PRACTICAL ALL LIQUID LINES INSIDE THE PRIMARY CONTAINMENT SHALL BE SLOPED.
 7. WELDS
 8. WELDS
 9. THE FOLLOWING CONDUCTIVITY INSTRUMENTS ARE SHOWN ON REF 8: 8H-1000A & 8H-1000A-2 & 8H-1000A-3 & 8H-1000A-4.
 10. THESE CONNECTIONS ARE ON LOOP W FOR UNIT 5.
 11. VACUUM BREAKERS PSV 185 & 186 TO BE LOCATED AS CLOSE TO THE RELIEF VALVE DISCHARGE AS PRACTICAL.
 12. VALVE LEAK-OFF AND DRAIN CONNECTIONS SHALL BE CAPPED OR PLUGGED UNLESS SHOWN OTHERWISE.
 13. INSTRUMENT AND VALVE LETTER SURFIXES CORRESPOND TO NEAR POINT VENT SUFFIX. ALARMS LAL 100 A, C, E & F ARE LOCATED ON PANEL 10000. ALARMS LAL 100 B, D, G & H ARE LOCATED ON PANEL 10001.

NO. 1	REVISION 02 OF THIS P&ID REQUIRES REVISION OF THE FOLLOWING RELATED DOCUMENTS:	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	NA <input type="checkbox"/>
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NO. 4	REVISION 02 OF THIS P&ID REQUIRES REVISION OF THE FOLLOWING RELATED DOCUMENTS:	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	NA <input type="checkbox"/>
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NO. 26	REVISION 02 OF THIS P&ID REQUIRES REVISION OF THE FOLLOWING RELATED DOCUMENTS:	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	NA <input type="checkbox"/>
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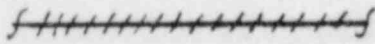
BECHTEL
SAN FRANCISCO

LIMESICK GENERATING STATION UNITS 1 & 2
RESIDUAL HEAT REMOVAL

P&ID
RESIDUAL HEAT REMOVAL

NO. 8031	NO. M-51	NO. 21
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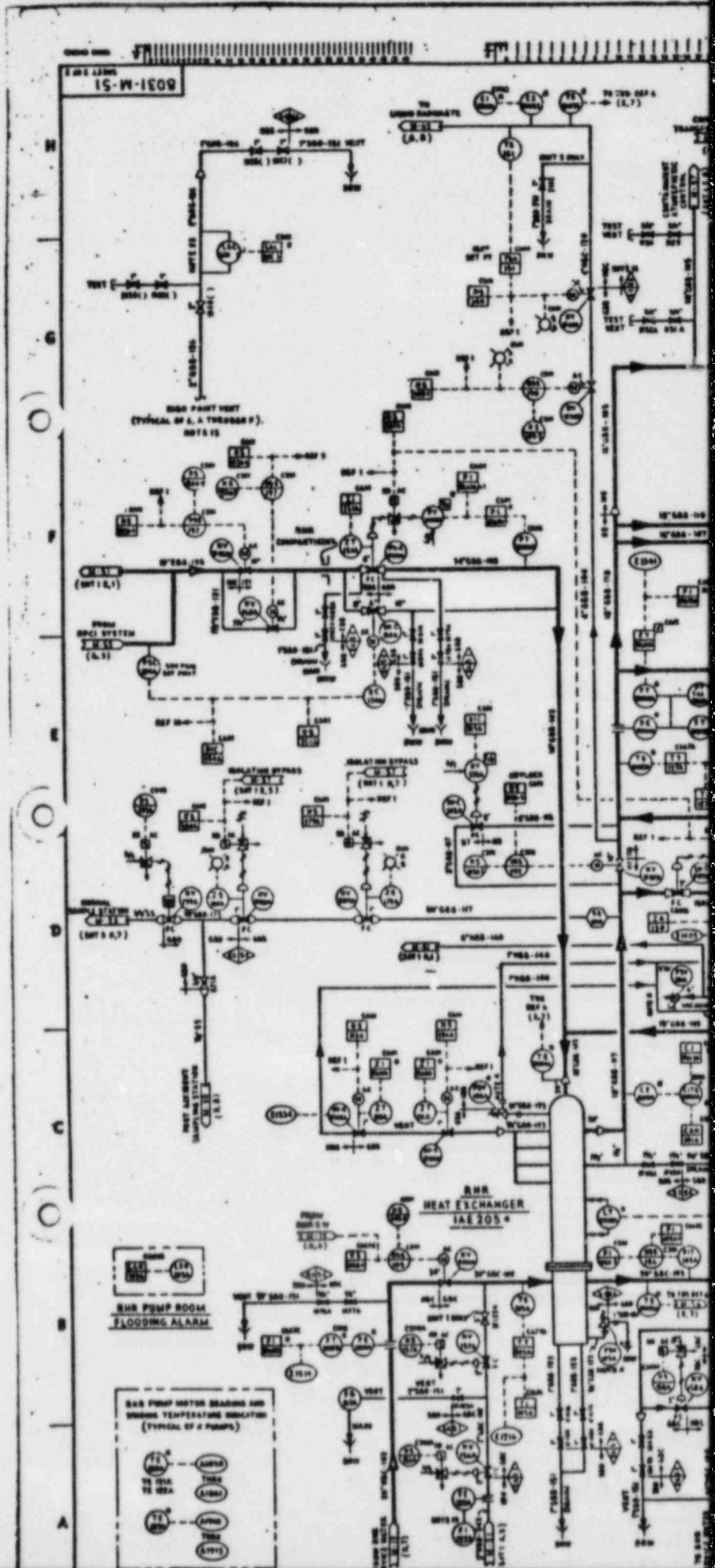
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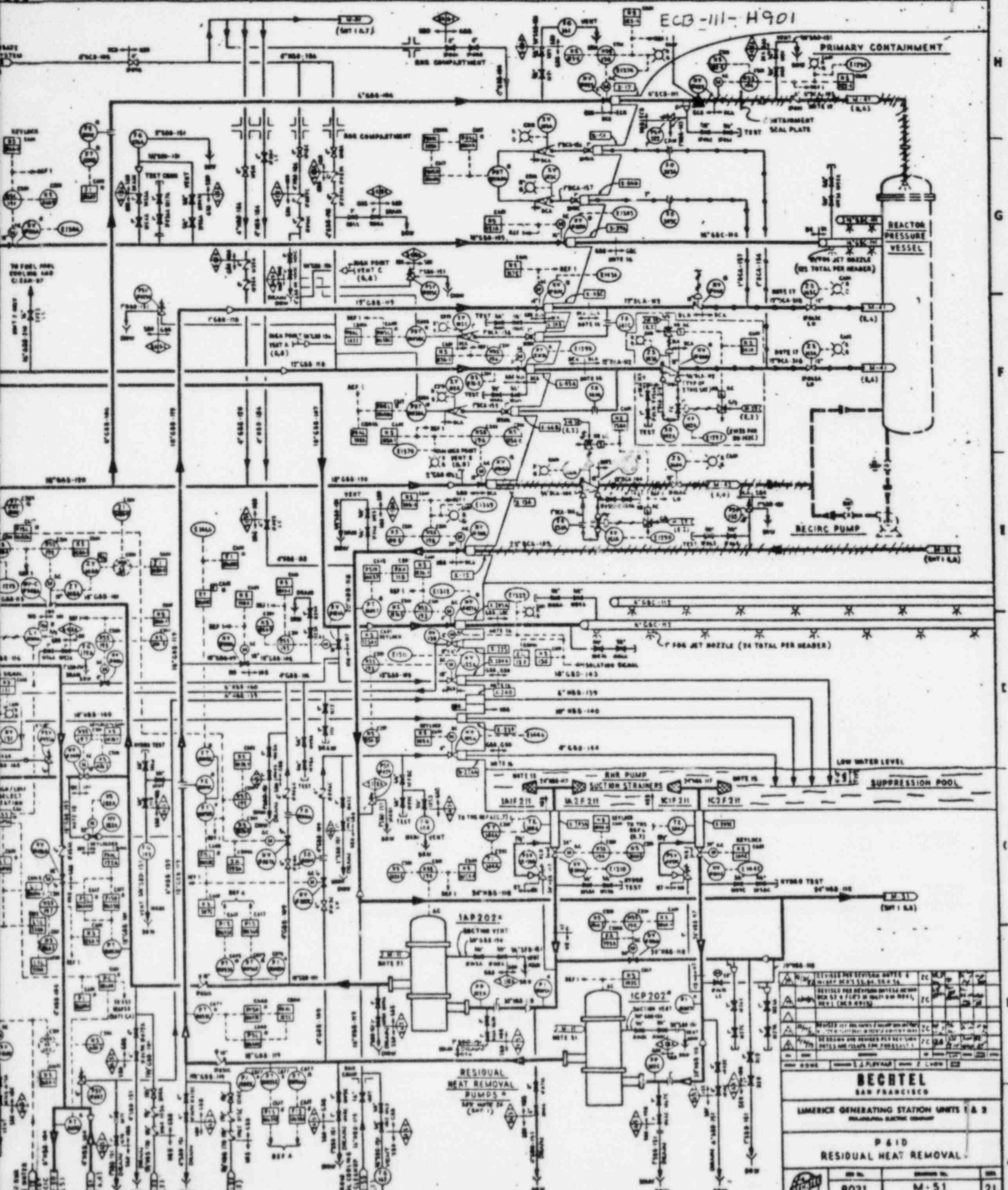
Also Available On Aperture Card

TI
APERTURE
CARD

8408140314-41



ECB-III-H901



REV	NO	DESCRIPTION	DATE
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2	1	REVISED FOR DESIGN	12/10/68
3	1	REVISED FOR REVIEW	1/10/69
4	1	REVISED FOR REVIEW	1/20/69
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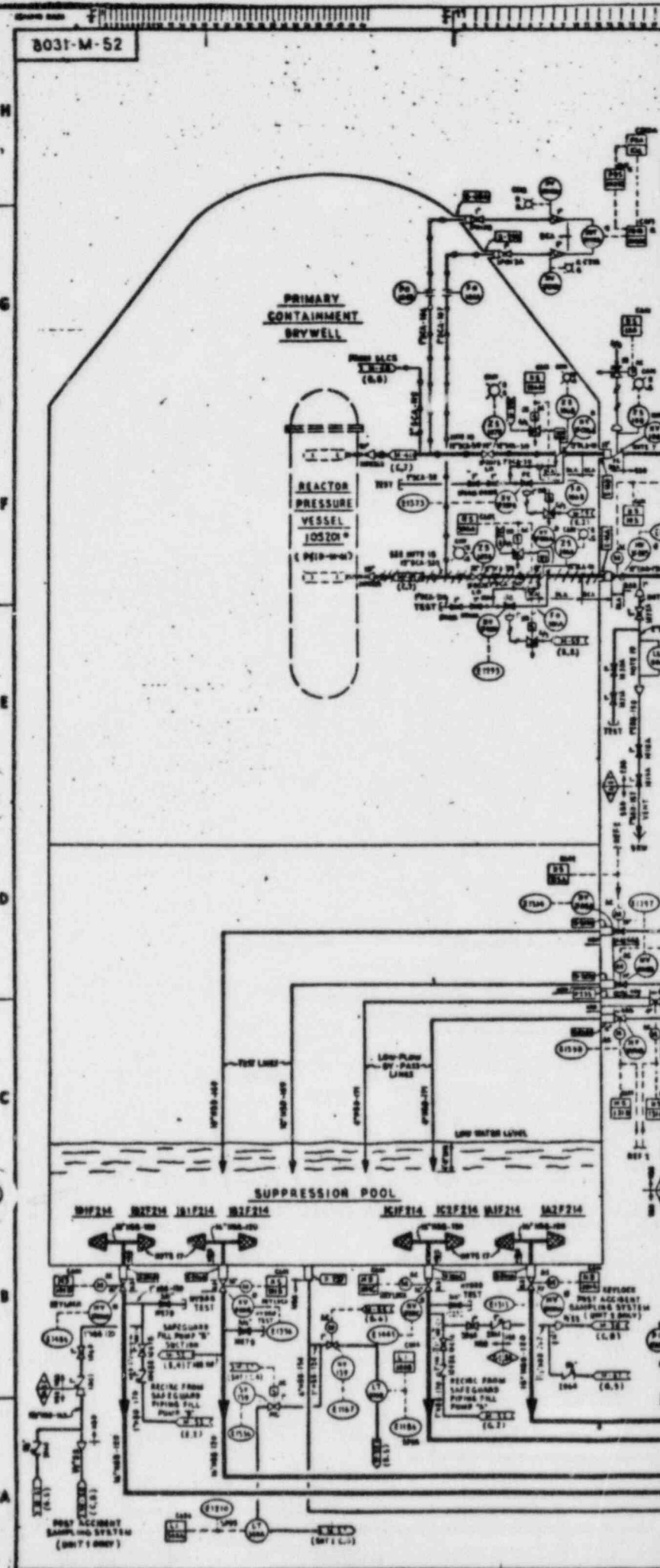
BECHTEL
SAN FRANCISCO

LIMERICK GENERATING STATION UNITS 1 & 2
RESIDUAL HEAT REMOVAL

P & ID
RESIDUAL HEAT REMOVAL

8031 M-51 21

8031-M-52



NOTE: Piping subjected to HOT DEFLECTION testing is denoted as follows:

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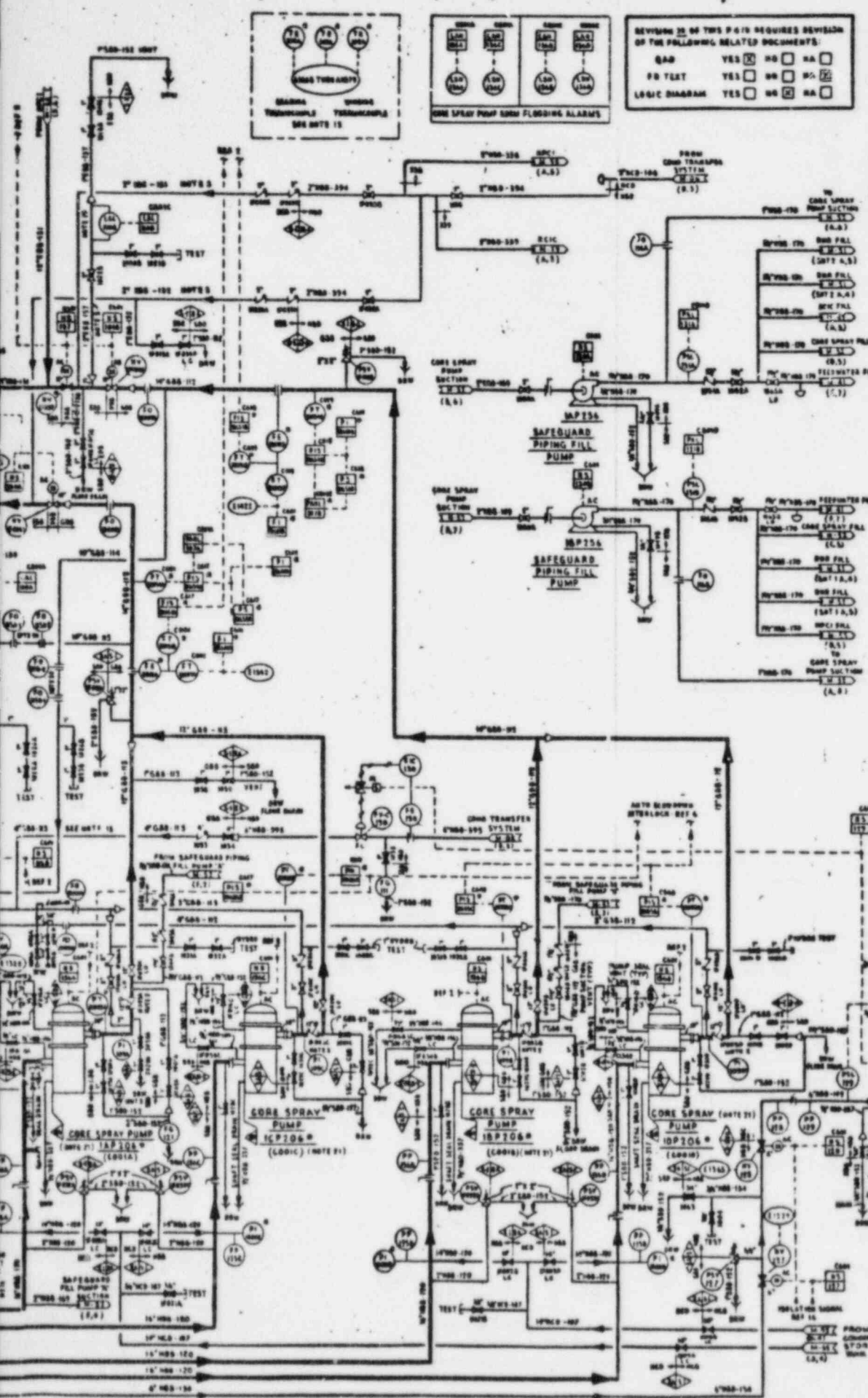
Also Available On Aperture Card

TI
APERTURE
CARD

8408140814-42

D-12

Rev. 0

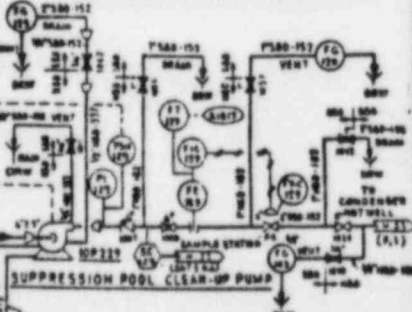


REVISION 32 OF THIS P&ID REQUIRES REVISION OF THE FOLLOWING RELATED DOCUMENTS:

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PD TLIST	YES <input type="checkbox"/>	NO <input type="checkbox"/>	NA <input checked="" type="checkbox"/>
LOGIC DIAGRAM	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>	NA <input type="checkbox"/>

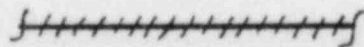
REF	REFERENCE DRAWING	BECHTEL NO.	REV.
1	P&ID LAYOUT	M-52	
2	CONCRETE FOR PUMP FOUNDATION	M-52-100-P	1
3	CONCRETE FOR SAFEGUARD PIPING FILL PUMP	M-52	
4	CONCRETE FOR CORE TRANSFER SYSTEM	M-52	
5	CONCRETE FOR SUPPRESSION POOL	M-52	
6	CONCRETE FOR SUPPRESSION POOL CLEAR-UP PUMP	M-52	
7	CONCRETE FOR SUPPRESSION POOL CLEAR-UP PUMP	M-52	
8	CONCRETE FOR SUPPRESSION POOL CLEAR-UP PUMP	M-52	
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13	CONCRETE FOR SUPPRESSION POOL CLEAR-UP PUMP	M-52	
14	CONCRETE FOR SUPPRESSION POOL CLEAR-UP PUMP	M-52	
15	CONCRETE FOR SUPPRESSION POOL CLEAR-UP PUMP	M-52	

- NOTES:
- CORE SPRAY SYSTEM IS A CLASS 2 SERVICE SYSTEM EXCEPT AS NOTED.
 - CHECK VALVES (P&ID TAG NO. 1) SHALL BE LOCATED NEAR THE SUPPRESSION POOL, 10' MIN. FROM THE POOL.
 - FILL LINE FROM CONCRETE SYSTEM SHOULD BE CONNECTED TO SUPPRESSION POOL AT LEVEL OF CLASS 2 SERVICE SYSTEM AS SHOWN.
 - PIPES NEAR POOL SHALL BE OF LOW POINT DESIGN TO BE ADDED AS NECESSARY.
 - VENT CONNECTION SHOULD BE LOCATED AT HIGH POINT.
 - THE A-E MPL NUMBER FOR THIS SYSTEM IS 0-21.
 - ALL PIPES SHALL BE OF THE HIGHEST AVAILABLE FLANGE.
 - ALL LEAK LINES NEAR THE PRIMARY CONTAINMENT SHALL BE SLOPED DOWNWARD.
 - ALL INSTRUMENT PIPING AND TUBING SHALL BE INSTALLED IN ACCORDANCE WITH REF 14.
 - ~~DELETED~~
 - ~~DELETED~~
 - CORE SPRAY PUMP MOTOR BEARING AND WINDING TEMPERATURES - SUPPLY TO BE PROVIDED, TYP. 0-5.
 - FOR UNIT 2 THIS LINE SHALL BE 1" DIA. PIPE TO CONNECT TO LINE OF 1" DIA. PIPE.
 - ~~DELETED~~
 - SEE MPL INDICATES THIS VALVE AS 2" DIA. 150#.
 - MIN. 6" DIA. AND VERT. LINES AND CAPPERIES EXTENDING FROM SEISMIC CATEGORY 1 PIPING ARE SEISMIC CATEGORY 2A DOWNSTREAM OF THE LAST ISOLATION VALVE.
 - THE MAXIMUM SPACING OF THE SIGHT GLASSES SHALL NOT EXCEED THE AVAILABLE MARGIN ABOVE THE REQUIRED MPSS WHEN THE STRAINERS ARE 50% PLUGGED.
 - THIS PORTION OF BCS PIPE IS SHALL BE WITH 6.00% CARBON MAXIMUM.
 - THIS PORTION OF BCS-121 (200) SHALL BE A VERTICAL SECTION, 10' FROM THE PROCESS LINE, MINIMUM 8" DIA. 150# TAPS SHALL BE PLACED 2" APART. THE LINE FROM THE BOTTOM OF THE VERTICAL SECTION SHALL SLOPE DOWN TOWARD THE PROCESS LINE.
 - A MINIMUM STRAIGHT LENGTH OF EIGHT TO TEN PIPE DIAMETERS SHALL BE PROVIDED BETWEEN P0-150-10 P0-150-10 AND P0-150-10 P0-150-10.
 - THIS EQUIPMENT IS BEING MODIFIED BY THE VIBRATION MONITORING SYSTEM (VMS) FOR THE TYPE OF SEISMIC DESIGN. SEE THE VMS IN LAYOUT, VP 200 001-1 047 100.



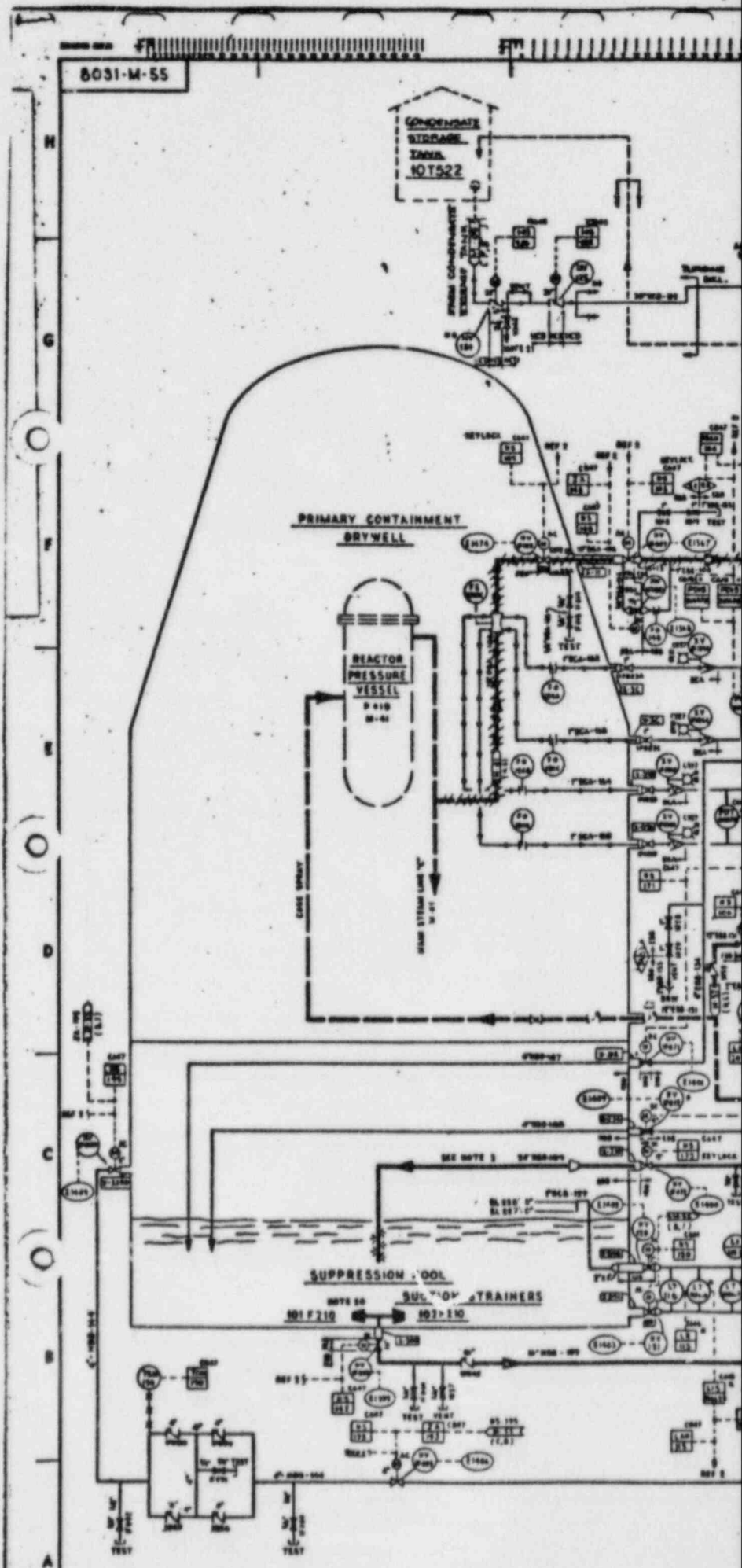
<p>BECHTEL SAN FRANCISCO</p> <p>LANSEX GENERATING STATION UNITS 1 & 2 SUPPRESSION POOL CLEAR-UP PUMP</p>		
<p>P&ID CORE SPRAY</p>		
<p>REV. NO.</p> <p>8031</p>	<p>REVISION NO.</p> <p>M-52</p>	<p>DATE</p> <p>20</p>

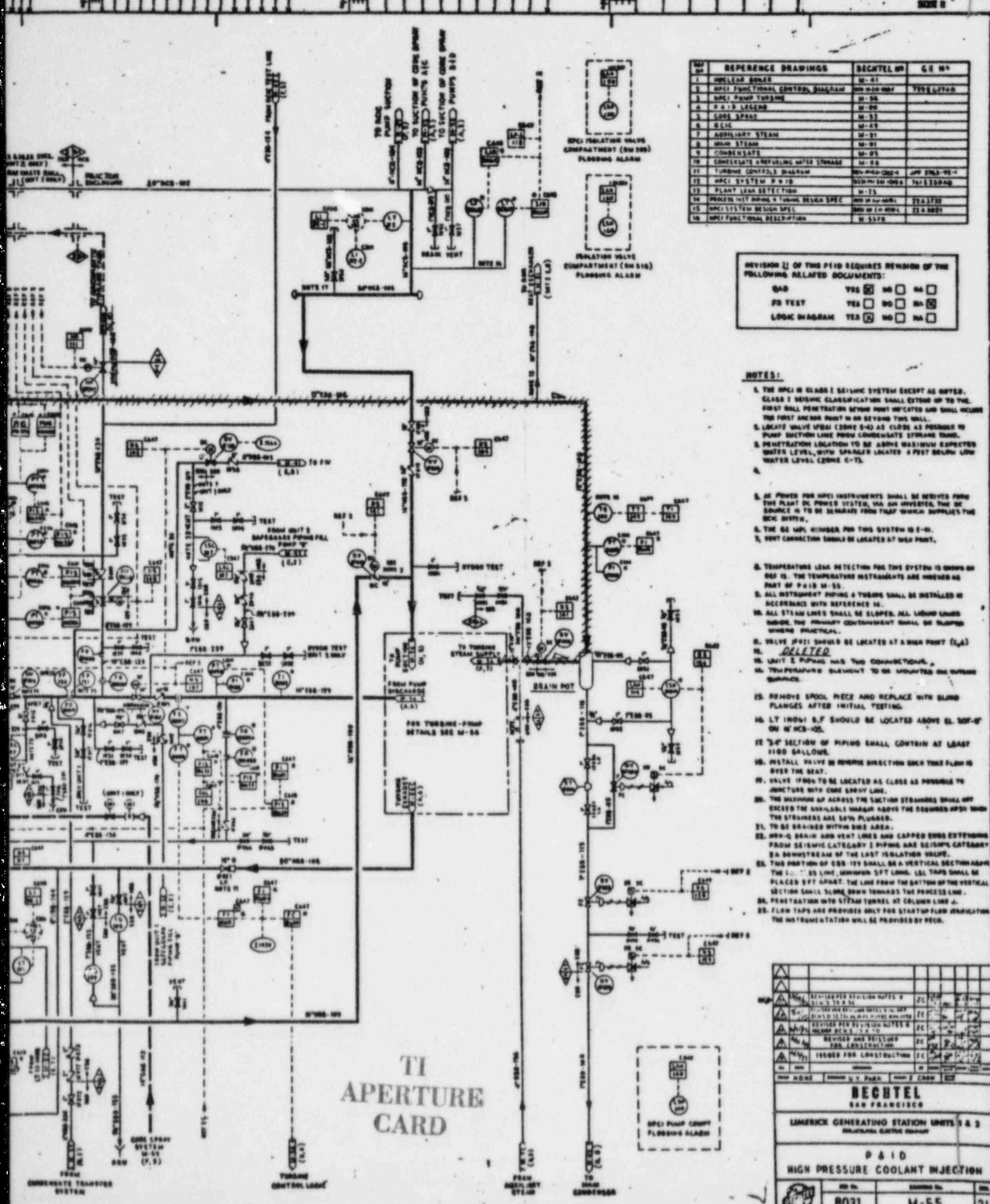
NOTE: Piping subjected to HOT DEFLECTION testing is denoted as follows:



Also Available On Aperture Card

8408140314-43
D-13 REV 0





REF NO	REFERENCE DRAWINGS	BECHTEL NO	CS NO
1	NUCLEAR SYMBOL	NU-01	
2	HPCI FUNCTIONAL CONTROL DIAGRAM	NU-100-1007	750217700
3	HPCI PUMP TUBING	M-56	
4	P & I LEGEND	M-80	
5	COOL SPRAY	M-83	
6	SCHEMATIC	M-85	
7	STEAM	M-86	
8	CONDENSATE	M-87	
9	CONDENSATE REFUELING WATER STORAGE	M-88	
10	TURBINE CONTROL DIAGRAM	NU-100-1008	750217700
11	HPCI SYSTEM P & I	NU-100-1009	750217700
12	PLANT LEAK DETECTION	M-75	
13	PROCESS UNIT DESIGN & TUBING DESIGN SPEC	NU-100-1010	750217700
14	HPCI SYSTEM DESIGN SPEC	NU-100-1011	750217700
15	HPCI FUNCTIONAL DESCRIPTION	M-5370	

REVISION 1 OF THIS P&ID REQUIRES REVISION OF THE FOLLOWING RELATED DOCUMENTS:

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FD TEST	YES	<input type="checkbox"/>	NO	<input type="checkbox"/>	NA	<input type="checkbox"/>
LOOK DIAGRAM	YES	<input checked="" type="checkbox"/>	NO	<input type="checkbox"/>	NA	<input type="checkbox"/>

- NOTES:**
- THE HPCI IS CLASS I SEISMIC SYSTEM EXCEPT AS NOTED. CLASS I SEISMIC CLASSIFICATION SHALL EXTEND UP TO THE FIRST BALL BEARING FROM THE POINT INSTALLED AND SHALL INCLUDE THE FIRST ANCHOR BOLT IN AN STEERING THIS WALL.
 - LOCATE VALVE UPON COOL SPRAY AS CLOSE AS POSSIBLE TO PUMP SECTION LINE FROM CONDENSATE STORAGE TANK.
 - PENETRATION LOCATION TO BE ABOVE MAXIMUM EXPECTED WATER LEVEL, WITH SPANGLER LOCATED 4 FEET BELOW LOW WATER LEVEL COOL SPRAY.
 - BE POWER FOR HPCI INSTRUMENTS SHALL BE DERIVED FROM THE PLANT DC POWER SYSTEM, VIA AN INVERTER, THE DC SOURCE IS TO BE DERIVED FROM TUPA WHICH SUPPLIES THE DC SYSTEM.
 - THE 60 MFL KINDER FOR THIS SYSTEM IS 2-10.
 - VENT CONNECTION SHOULD BE LOCATED AT THIS POINT.
 - TEMPERATURE LEAK DETECTION FOR THIS SYSTEM IS SHOWN ON REF 12. THE TEMPERATURE INSTRUMENTS ARE INDICATED AS PART OF P&ID M-55.
 - ALL INSTRUMENT TUBING & TUBINGS SHALL BE INSTALLED IN ACCORDANCE WITH REFERENCE 10.
 - ALL STEAM LINES SHALL BE SLOPED 3/8" PER FOOT UNLESS OTHERWISE SPECIFIED. THE PRIMARY CONTAINMENT SHALL BE SLOPED WHERE PRACTICAL.
 - VALVE 2021 SHOULD BE LOCATED AT A HIGH POINT (L.A.)
 - ~~UNIT 2 PIPING HAS TWO CONNECTIONS.~~
 - TEMPERATURE ELEMENT TO BE LOCATED ON OUTSIDE SURFACE.
 - REMOVE SPOOL PIECE AND REPLACE WITH SLIDING FLANGES AFTER INITIAL TESTING.
 - LT INDS 1 S.F. SHOULD BE LOCATED ABOVE EL. 507'-0" ON M-105-105.
 - 3/4" SECTION OF PIPING SHALL CONTRAIN AT LEAST 1100 GALLOWS.
 - INSTALL VALVE IN REVERSE DIRECTION SINCE THIS FLOW IS OVER THE SEAT.
 - VALVE 1020 TO BE LOCATED AS CLOSE AS POSSIBLE TO JOINTS WITH COOL SPRAY LINE.
 - THE SECTION OF ACROSS THE SECTION STRAINERS SHALL NOT EXCEED THE AVAILABLE HEADS ABOVE THE REQUIRED SPID WHEN THE STRAINERS ARE 50% PLUGGED.
 - TO BE DRAINED WITHIN ONE AREA.
 - 400-G DRAIN AND VENT LINES AND CAPPED ENDS EXTENDING FROM SEISMIC CATEGORY I PIPING AND SEISMIC CATEGORY 2A DOWNSTREAM OF THE LAST ISOLATION VALVE.
 - THE PORTION OF END-125 SHALL BE A VERTICAL SECTION ABOVE THE 10'-00" LINE, MINIMUM 5 FT LONG. 1/2" TAPS SHALL BE PLACED 5 FT APART. THE LINE FROM THE BOTTOM OF THE VERTICAL SECTION SHALL SLOPE DOWN TOWARDS THE PROCESS LINE & PENETRATION INTO STEAM TUNNEL AT COLUMN LINE J.
 - FLOW TAPS ARE PROVIDED ONLY FOR STARTUP FLOW INDICATION THE INSTRUMENTATION SHALL BE PROVIDED BY P&ID.

NO.	REVISED BY	DATE	REVISION
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BECHTEL
SAN FRANCISCO

LIMERICK GENERATING STATION UNITS 1 & 2
REVISIONS TO THE DESIGN

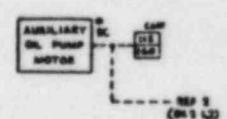
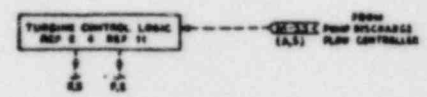
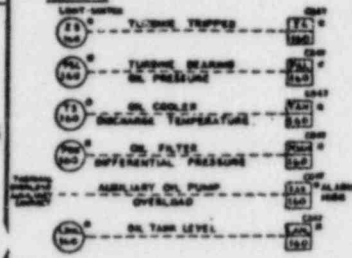
P & I D
HIGH PRESSURE COOLANT INJECTION

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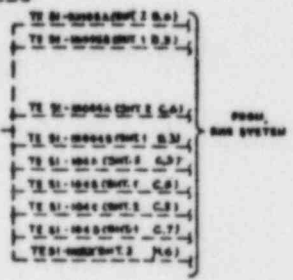
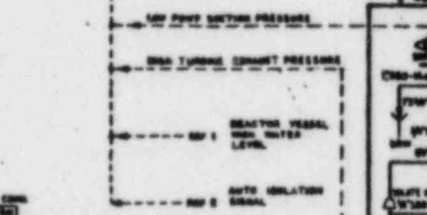
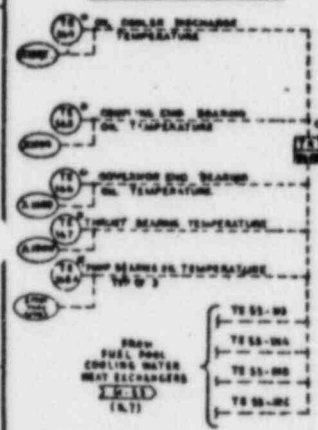
TURBINE SUPERVISORY INSTRUMENTATION

TURBINE HYDRAULIC CONTROL SYSTEM

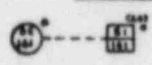
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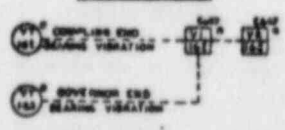
TEMPERATURE RECORDING



TURBINE SPEED



SHAFT VIBRATION



NOTE: Piping subjected to HOT DEFLECTION testing is denoted as follows:

//////

Also Available On Aperture Card

APPENDIX E
Test Temperatures

TEST TEMPERATURES

Test Condition	System Description			Expected Test Temperature	Remarks
	System Name	Stress Isometric	Line Number		
First Reactor Plateau	Main Steam	SK-M-1500	EBB-101	275 °F	Bypass valves closed Turbine leads
		SK-M-1503	EBB-104	275 °F	
		SK-M-1504	EBB-106	275 °F	
			EBB-107	275 °F	
		-		275 °F	
First Reactor Plateau	HPCI	SK-M-1592	DBA-106	275 °F	| △
		SK-M-1554A	EBB-108	350 °F	
		1554B	"	"	
First Reactor Plateau	RCIC	SK-M-1593	DBA-107	275 °F	| △
		SK-M-1565	EBB-109	350 °F	
		SK-M-1566	EBB-109	350 °F	

TEST TEMPERATURES

Test Condition	System Description			Expected Test Temperature	Remarks
	System Name	Stress Isometric	Line Number		
Second Reactor Plateau	Main Steam	SK-M-1500	EBB-101	450 °F	Bypass Valves closed Turbine leads
		SK-M-1503	EBB-104	450 °F	
		SK-M-1504	EBB-106	450 °F	
			EBB-107	450 °F	
		-		450 °F	
Second Reactor Plateau	HPCI	SK-M-1592	DBA-106	450 °F	⚠
		SK-M-1556A	EBB-108	450 °F	
		1556 B	"	"	
Second Reactor Plateau	RCIC	SK-M-1593	DBA-107	450 °F	
		SK-M-1565	EBB-109	450 °F	
		SK-M-1566	EBB-109	450 °F	

TEST TEMPERATURES

Test Condition	System Description			Expected Test Temperature	Remarks
	System Name	Stress Isometric	Line Number		
Reactor at Rated Temperature	Main Steam	SK-M-1500	EBB-101	550 °F	Bypass Valves closed Turbine leads
		SK-M-1503	EBB-104	550 °F	
		SK-M-1504	EBB-106	550 °F	
			EBB-107	550 °F	
		-		550 °F	
Reactor at Rated Temperature	HPCI	SK-M-1592	DBA-106	550 °F	
		SK-M-1556A	EBB-108	550 °F	
		1556B	" "	" "	
Reactor at Rated Temperature	RCIC	SK-M-1593	DBA-107	550 °F	
		SK-M-1565	EBB-109	550 °F	
		SK-M-1566	EBB-109	550 °F	



TEST TEMPERATURES

Test Condition	System Description			Expected Test Temperature	Remarks
	System Name	Stress Isometric	Line Number		
Normal Operation	Feedwater	SK-M-1552	DLA-105	275 °F	
			DLA-107	275 °F	
		SK-M-1554	DBB-103	275 °F	
			DBD-103	275 °F	
		SK-M-298	DBD-102	275 °F	
		SK-M-299A 299B	DBD-102 "	275 °F "	



TEST TEMPERATURES

Test Condition	System Description			Expected Test Temperature	Remarks
	System Name	Stress Isometric	Line Number		
Normal Operation	Feedwater	SK-M-1552	DLA-105	420 °F	
			DLA-107	420 °F	
		SK-M-1554	DBB-103	420 °F	
			DBD-103	420 °F	
		SK-M-298	DBD-102	420 °F	
		SK-M-299A 299B	DBD-102 "	420 °F "	



TEST TEMPERATURES

Test Condition	System Description			Expected 1 Test Temperature	Remarks	
	System Name	Stress Isometric	Line Number			
Reactor at Rated Tem- perature	Core Spray	SK-M-1610	DLA-111	150 °F	Note 2	
			DCA-320	550/150 °F		
Reactor at Rated Tem- perature	Head Spray	SK-M-1550	DCA-103	550/150 °F	Note 2	
			SK-M-6794	ECB-111		150 °F
Normal Operation	RWCU	SK-M-6345	DBA-112	275/420/ 150 °F	Note 3	
			SK-M-6433	DCA-101		522 °F
			SK-M-1776	ECC-105		434 °F
			SK-M-174A 1764B	DCC-104		434 °F
			SK-M-1737	DCC-104		434 °F
				DBB-105		434 °F
			SK-M-1551B	DCA-101		522 °F



TEST TEMPERATURES

Test Condition	System Description			Expected Test Temperature	Remarks
	System Name	Stress Isometric	Line Number		
Normal Operation	R.H.R.	SK-M-1540A	DCA-105	522/150 °F	Note 4
		SK-M-1542	DLA-112 DCA-318	150 °F 550/150 °F	Note 2
		SK-M-1546	DCA-104	522/150 °F	Note 5
Normal Operation	Diesel Exhaust	SK-M-6192	XRE-IXH	750 °F	



Notes

1. Refer to Section 5.9
2. RPV at 550°F. No flow required. Piping assumed to be 550°F for 10 nominal pipe diameters from the RPV nozzle and 150°F thereafter.
3. No flow required. Piping assumed to be 275°F and 420°F for 10 nominal pipe diameters from the feedwater line and 150°F thereafter during feedwater testing. Feedwater line assumed to be 275°F and 420°F during testing.
4. No flow required from MO-1F009 to X-12. This portion of the piping is assumed to be 150°F. Recirc. line at 522°F. Piping from the recirc. line to MO-1F009 is assumed to be 522°F.
5. No flow required. Recirc. line at 522°F. Piping is assumed to be 522°F for 10 nominal pipe diameters from the recirc. line and 150°F thereafter.

APPENDIX F
ACCEPTANCE CRITERIA

Acceptance Criteria Graph for
BOP Piping Hot Deflection Testing

