



PHILADELPHIA ELECTRIC COMPANY

2301 MARKET STREET

P.O. BOX 8699

PHILADELPHIA, PA. 19101

(215) 841-4502

March 13, 1984

JOHN S. KEMPER
VICE-PRESIDENT
ENGINEERING AND RESEARCH

Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Docket Nos. 50-352
50-353

Subject: Limerick Generating Station, Units 1&2
Request for Additional Information
from NRC Equipment Qualification
Branch (EQB)

References: Telecon between J. Jackson (NRC/EQB)
and J. J. Whittle (PECO) on 2/2/84

File: GOVT 1-1 (NRC)

Dear Mr. Schwencer:

Enclosed per the reference telecon is:

1. Anchor/Darling Valve Company Drawing No. 93-14182, Rev. C (8031-P-104C-34-4)
2. Correspondence regarding HPCI, RCIC, and RWCU containment isolation valves closure capabilities after HELB between Bechtel and Anchor/Darling.
3. Static deflection test of HPCI containment isolation valve: Required loads, acceptance criteria, and test data.
4. Material Requisition No. 8031-P-104, Revision 23.
5. Design Specification No. 8031-P-104, Revision 9.

Sincerely,

John S. Kemper

JHA/gra/021684335

cc: See Attached Service List

8403190197 840313
PDR ADJCK 05000352
A PDR

A049
11

cc: Judge Lawrence Brenner (w/o enclosure)
Judge Peter A. Morris (w/o enclosure)
Judge Richard F. Cole (w/o enclosure)
Troy B. Conner, Jr., Esq. (w/o enclosure)
Ann P. Hodgdon, Esq. (w/o enclosure)
Mr. Frank R. Romano (w/o enclosure)
Mr. Robert L. Anthony (w/o enclosure)
Mr. Marvin I. Lewis (w/o enclosure)
Charles W. Elliot, Esq. (w/o enclosure)
Zori G. Ferkin, Esq. (w/o enclosure)
Mr. Thomas Gerusky (w/o enclosure)
Director, Penna. Emergency (w/o enclosure)
Management Agency
Mr. Steven P. Hershey (w/o enclosure)
Angus Love, Esq. (w/o enclosure)
Mr. Joseph H. White, III (w/o enclosure)
David Wersen, Esq. (w/o enclosure)
Robert J. Sugarman, Esq. (w/o enclosure)
Spence W. Perry, Esq. (w/o enclosure)
Jay M. Gutierrez, Esq. (w/o enclosure)
Atomic Safety & Licensing (w/o enclosure)
Appeal Board
Atomic Safety & Licensing (w/o enclosure)
Board Panel
Docket & Service Section (w/o enclosure)
Martha W. Bush, Esq. (w/o enclosure)
James Wiggins (w/o enclosure)

Enclosure 2

Correspondence regarding HPCI, RCIC, and RWCU containment isolation valves closure capabilities after HELB between Bechtel and Anchor/Darling.

Note: See sheet 7 for correspondence confirming HPCI valve closure capability.



TELETYPE MESSAGE FORM

SPECIAL INSTRUCTIONS:

☐ STANDARD
☒ URGENT

☐ BECHTEL RESTRICTED
☐ BECHTEL CONFIDENTIAL
☐ STRICTLY CONFIDENTIAL

MULTIPLE ADDRESSES ARE TO BE:

☐ SHOWN ☐ NOT SHOWN

TIMESTAMP

OCT 20 1981

DATE AND TIME PREPARED

PR

JOB NUMBER SUBNUMBER ORGANIZATION CODE
CHG 8031 7 P E 2 1 4 5 / 6 4 3 3 4 3

ORIGINATOR'S
EMPLOYEE NUMBER

LELB
LCON
LKOR
LMAD
LPAR
LPRS
LRIO
LSAO

MAUB(22463)
MAUH(23604)
MBUH(23668)
MED(400309)
MJUB
MKLW
MRIY
MRUW(23712)
MSAU

SANN
SBOG
SCMS
SGAI
SHOU
SMED
SMEL
SMIN
SNOR
SSFO
STKO
SMAL
STAL

NOTE: STANDARD PROCEDURE IS ALL ACTION & CC - DDRESSES WILL BE SHOWN EXCEPT IN CASE OF BIDDERS UNLESS INDICATED DIFFERENTLY IN SPECIAL INSTRUCTIONS

LIST ALL ADDRESSES BEFORE TEXT

ANCHOR/DARLING VALVE

701 FIRST ST.

WILLIAMSPORT, PA 17701

ATTN: MR. W. COLLINS

SUBJECT: JOB NO. 8031

LIMERICK

P.O. 8031-P-104C
-107A

In reply please reference:

Doc. Control No. **111775**

WRITTEN RESPONSE REQ.
THRU PDCC

NO

YES

DUE 10/30

RESPONSE TO CHRON.

NO. NA

_____ COMPLETE
_____ PARTIAL

THE MAXIMUM FLOW RATE EXPECTED HAS BEEN REVISED FOR THE FOLLOWING VALUES

AS NOTED:

(HPCI) P.O. P-104CC
ITEM 21.1-21.4 FLOW RATE 5.3×10^6 LBS/HR

(RCIC) ITEM 22.1-22.4 FLOW RATE 1.4×10^6 LBS/HR

P.O. P-107A:

P.O. P-107A:
(RWCW) ITEM 16.1-16.4 FLOW RATE 5.83 X EG LBS/HR

NOTE: ACTUAL OPERATING DELTA P WILL REMAIN THE SAME.

PLEASE CONFIRM THAT THE VALUES ARE
SUITABLE FOR THE CONDITIONS NOTED ABOVE.
YOUR RESPONSE IS REQUESTED BY 10-30-81

Dec: O.G. BROWN, E. PATEL, N. TYLER, M. TYER,
H. WINITSKI

ORIGINATOR R.H. ELIAS
PROJECT ENGINEER

SIGNATURE

LOCATION
221/2

PHONE
2092

PAGE	OF
1	1

ENCL(2), sk 2/7



IS14 0048 23:03GMT 10/23/81
SSFO 0272 23:05GMT 10/23/81
---RETRIEVED MESSAGE---

WU INFOMASTER 1-0273580296 10/23/81
TLX DARLING WIP
ZCZC 883 PD WILLIAMSPORT PENNSYLVANIA
TLX 34783 BECHTEL B SFO
ATTN R H ELIAS

BT

SUBJECT PD 8031-P-104C
PD 8031-P-107A
LIMERICK UNITS 1 & 2

TO RESPOND TO YOUR 10/20/81 TELEX A/DU NEEDS TO KNOW
FLUID DENSITY OR SPECIFIC VOLUME AT THE STATED FLOW
CONDITIONS

ANCHOR/DARLING VALVE COMPANY
BILL COLLINS
TELEX 841438 OCTOBER 23 1981 705 PM

COPY TO
R MAIETTA
R ESPLIN
R RINEHART

NNNN

1804 EST

TO J. SUTTON
FLASH COPY

/NO EOM/



ENCL(2), sk 3/7

TELETYPE MESSAGE FORM

SPECIAL INSTRUCTIONS:

☐ STANDARD
☐ URGENT☐ BECHTEL RESTRICTED
☐ BECHTEL CONFIDENTIAL
☐ STRICTLY CONFIDENTIAL

MULTIPLE ADDRESSES ARE TO BE:

☐ SHOWN ☐ NOT SHOWNRECEIVED
10:15 20 7 00 100

TIME STAMP

DATE AND TIME PREPARED

OCT 30 1981

PR

JOB NUMBER/SUBNUMBER ORGANIZATION CODE

ORIGINATOR'S
EMPLOYEE NUMBER

CHG 8031 7 PE 2145 643543

LELB
LLON
LKOR
LMAD
LPAR
LPRS
LRIO
LSAOMAUB(22463)
MAUH(23604)
MBUH(23668)
MUED(400309)
MJUB
MKUW
MRIV
MRUW(23712)
MSAUSANN
SBOG
SCMS
SGAI
SHOU
SMED
SMEL
SMIN
SNOR
SSFO
STKO
SMRL
STRL

NOTE: STANDARD PROCEDURE IS ALL ACTION & CC ADDRESSES WILL BE SHOWN (EXCEPT IN CASE OF BIDDERS) UNLESS INDICATED DIFFERENTLY IN "SPECIAL INSTRUCTIONS"

LIST ALL ADDRESSES BEFORE TEXT

ANCHOR DARLING VALVE
701 FIRST ST
WILLIAMSPORT PA 17701

ATTN: B. COLLINS

SUBJ: JOB NO. 8031
LIMERICK
P.O. 8031-P-104C
-P-107A

In reply please reference:

Doc. Control No.

WRITTEN RESPONSE REQ.
THRU PDCC☒ NO
☐ YES DUE _____
RESPONSE TO CHRON.
NO. NA
☐ COMPLETE
☐ PARTIAL

112427

REF: AIDY TELEX, DTD 10/23/81

SPECIFIC VOLUMES AT BEGINNING OF
TRANSIENT ARE AS FOLLOWS:HPCI RCK
55-1F002, 1F003; 49-1F007, 1F008 - 0.4343 FT³/LBRWCU
44-1F001, 1F004 - 0.02122 FT³/LB

PLEASE ADVISE IF FURTHER INFO IS REQ'D.

bcc: O.G. BROWN, M. IYER, E. PATEL
N. TYLER,

MWS (PP) JKL 10.28

ORIGINATOR R.H. ELIAS
PROJECT ENGINEERSIGNATURE M. Iyer/RHELOCATION
221/2PHONE
2092PAGE OF
1 1



ENCL(2), sh 4/7

IS14 0047 19:15GMT
SSFO 0236 19:18GMT 11/05/81
---RETRIEVED MESSAGE---

WU INFOMASTER 1-014924C309003 11/05/81
TLX DARLING WIP
ZCZC 1012 PD WILLIAMSPOT PENNSYLVANIA
TLX 34783 BECHTEL B SFO
ATTN R H ELIAS

TO J. Sutton
FLASH COPY

BT
SUBJECT PD 8031-P-104-CL
8031-P-107-A
REFERENCE DCN 111775

STATED FLOW CONDITIONS RESULT IN PIPE VELOCITY OF 1282 FT/SEC
FOR ITEMS 21.1 - 21.4 AND 4500 FT/SEC FOR ITEMS 22.1 - 22.4.
THE VALVES ARE NOT SUITABLE FOR THESE VELOCITIES.

FLOW CONDITIONS ARE ACCEPTABLE FOR ITEMS 16-1 - 16.4

ANCHOR/DARLING VALVE COMPANY
BILL COLLINS
TELEX 841438 NOVEMBER 5 1981 215 PM

COPY TO
R MAIETTA
R ESPLIN
R RINEHART

NNNN

1418 EST

/NO EDM/

○ ENCL (2), sh 5/7

TELETYPE MESSAGE FORM

SPECIAL INSTRUCTIONS:

<input type="checkbox"/>	STANDARD
<input type="checkbox"/>	URGENT

BECHTEL RESTRICTED
BECHTEL CONFIDENTIAL
STRICTLY CONFIDENTIAL

MULTIPLE ADDRESSES ARE TO BE:

☐ SHOWN ☐ NOT SHOWN

TIME STAMP

DATE AND TIME PREPARED

NOV 10 1981

PR

JOB NUMBER SUBNUMBER ORGANIZATION CODE

CHG 8031 7 P E 2145

EMPLOYEE NUMBER

643343

:

NOTE: STANDARD PROCEDURE IS ALL ACTION & CC ADDRESSES WILL BE SHOWN EXCEPT IN CASE OF BIDDERS UNLESS INDICATED DIFFERENTLY IN SPECIAL INSTRUCTIONS

LIST ALL ADDRESSES BEFORE TEXT

ANCHOR/DARLING VALVE
701 FIRST ST.
WILLIAMSPORT, PA 17701

ATTN: B. COLLINS

SUBJ: JOB NO. 8031, LIMERICK
P.O. P-104 CC
P-107 A

In reply please reference:

Doc. Control No.

WRITTEN RESPONSE REQ.
THRU PDCC

☐ NO
☒ YES

DUE 1/4

RESPONSE TO CHRON.

NO. _____
 _____ COMPLETE
 _____ PARTIAL

113051

REF: 1) BPC TWX DTD 10/20/81 (111775)
2) BPC TWX DTD 10/30/81 (112427)
3) TELECON, M. SCHLETZ/R. MAIETTA

THIS IS ISSUED TO CONFIRM THE REF(3) TELECON.
THE INFORMATION REQUESTED BY REF(1) AND (2)
SHOULD BE CLARIFIED AS FOLLOWS:

THE VALVES NOTED IN THE REFERENCES ARE USED IN THE HPCI, RCIC AND RWCU SYSTEMS; AND WILL BE USED FOR CONTAINMENT ISOLATION IN THE CASE OF A PIPE RUPTURE IMMEDIATELY DOWNSTREAM OF THE VALVES (HELB). THE EXPECTED FLOW IS IN EXCESS OF THAT PREVIOUSLY SPECIFIED AS NOTED BELOW:

ORIGINATOR R.H. ELIAS
PROJECT ENGINEER

SIGNATURE

Ms. J. / RHE

LOCATION
221/2

PHONE
2092

PAGE	OF
1	2

ENLL(2), sh 6/7

TELETYPE MESSAGE FORM
CONTINUATION SHEET

113051

RECNET

P-104CC (HPCI)

- 1) ITEM 21.1-21.4 (HV-1F002, 1F003) - AT T=0 SEC.
PIPE BREAKS WITH RESULTANT FLOW EQUAL
TO 1470 LBM/SEC. AT T=0.135 SEC FLOW
RATE REDUCES TO 328 LBM/SEC. AND REMAINS
CONSTANT UNTIL VALVE CLOSES. RCIC
- 2) ITEM 22.1-22.4 (HV-1F007, 1F008) - AT T=0 SEC.
PIPE BREAKS WITH RESULTANT FLOW EQUAL
TO 380 LBM/SEC. AT T=0.181 SEC FLOW
RATE IS 168 LBM/SEC. AT T=0.302 SEC
FLOW RATE IS 41.5 LBM/SEC. AND REMAINS
CONSTANT UNTIL VALVE CLOSES.

BOTH CASES HAVE STEAM WITH SPECIFIC
VOLUME EQUAL TO 0.4343 FT³/LB. AT
START OF TRANSIENT.

QUESTION: WILL THE VALVES CLOSE AGAINST
THE FLOW CONDITIONS NOTED ABOVE.

SHOULD FURTHER INFO BE REQUIRED
PLEASE ADVISE. MAY WE HAVE YOUR
RESPONSE BY 11-16-81.

MWS/EDP(JP)

JP
11/9

bcc: O.G. BROWN, M. IYER, E. PATEL, N. TYLER
K. WALTERS

ORIGINATOR

SIGNATURE

LOCATION

PHONE

PAGE OF

22



ENCL (2), sh 7/7

IS14 0035 19:00GMT
SSFO 0198 19:03GMT 11/25/81
---RETRIEVED MESSAGE---

WU INFOMASTER 1-015952A329 11/25/81
TLX DARLING WIP
ZCZC 1061 PD WILLIAMSPORT PENNSYLVANIA
TLX 34783 BECHTEL B SFO
ATTN R H ELIAS

To J. SUTTON
FLASH COPY

BT
SUBJECT LIMERICK PD 9031-P-104CC
A/DV E-6179-8,9
REFERENCE DCN 111775 AND 113051
VALVES 21.1 - 21.4 AND 22.1 - 22.4 ARE DESIGNED TO CLOSE AGAINST
PIPE RUPTURE FLOW CONDITIONS STATED ON DCN'S

ANCHOR/DARLING VALVE COMPART
G G FLEXER
TELEX 841438 NOVEMBER 25 1981 200 PM

COPY TO
R T MEEK R E RINEHART
R J ESPLIN J B MORIARTY
R H MAIETTA R L STANNERT
E-6179

NNNN

1404 EST

/RD EDM/

Enclosure 3

Static deflection test of HPCI containment isolation valve:
Required Loads, acceptance criteria, and test data.

S.O. R1573 Item No. 9Serial No. E 6179-8-4

ENCL (3), sh 1/3

10" 600 Y G1.6c

1. Static Load

Horizontal Load		Vertical Load		Distance h.	
Required	Actual	Required	Actual	Required	Actual
10970	12700	9721	10,000	42.5"	39.1"
Performed by <u>J. Russell</u>				Date <u>1-31-83</u>	

BECHTEL
615
1-31-83

2. End Load N/A

Axial Load		Bending		Torsion		Shear	
Req.	Actual	Req.	Actual	Req.	Actual	Req.	Actual
N/A		-		-		-	
Performed by _____				Date _____			

3. Internal Pressure

Required	Actual
1337	1350

BECHTEL
615Performed by J. Russell 1-31-83 Date 1-31-83

4. Performance Requirements 368 volts

Required Cycles 2Max. Closing Time 12 secMax. Open Time 12 secBECHTEL
615
1-31-83

Cycle No.	Close Time	Open Time	Cycle No.	Close Time	Open Time
<u>1</u>	<u>11 sec.</u>	<u>10 sec</u>			
<u>2</u>	<u>11 sec.</u>	<u>10 sec</u>			

Performed by J. Russell Date 1-31-83

5. Seat Test

Pressure		Duration		Leakage	
Required	Actual	Required	Actual	Allowable	Actual
1471	1471	4 min	4	20cc/hr	3.6
-		-		-	
Performed by <u>J. Russell</u>				Date: <u>1-31-83</u>	

2-1-83

Page 32 31A

12700#
Rhm
1-31-83
ANIR
RWIM1-31-83
ANIR
RWIM1-31-83
ANIR
RWIM

EPS-105-2

2-1-83
ANIR
RWIM095
Ruled
2/1/85

ANCHOR/DARLING VALVE COMPANY

BY RLM DATE 11-23-82 SUBJECT Static Seismic Testing SHEET NO. 1 OF 2

Δ Rev A 1/31/83 RLM

P.O.: 8031-P-104-CCValve Size: 10" 600 V GlobeItem: 21.4A/DV Item: EG179-8-410-EBA-GB-MD-SS-2F003Valve centerline to yoke c.g. = 37.95 in.Valve centerline to operator c.g. = 53.46 in.Yoke weight = 321 lbs. (incl. stem)Operator weight = 1765 lbs.

$$(h)_{\text{calc.}} = \frac{321(37.95) + 1765(53.46)}{2086} = \underline{51.1} \text{ in.}$$

$$(\text{horiz. load})_{\text{calc}} = \underline{2086} \text{ lbs.} \times \underline{4.666} = \underline{9721} \text{ lbs.}$$

$$\Delta h_{\text{actual}} = \underline{39.1} \text{ in.}^* = \text{distance from valve centerline to operator-yoke flange, where horizontal load will be applied.}$$

$$\Delta \therefore \text{horiz. load} = \underline{9721} \text{ lbs.} \left(\frac{51.1}{39.1} \right) = \underline{12700} \text{ lbs.}^*$$

$$\text{vertical load} = \underline{2086} \text{ lbs.} \times \underline{4.666} = \underline{9721} \text{ lbs.}^*$$

ENCL (3), sh 3/3

Data Sheet R1573-9

Test Data & Acceptance Criteria

Sheet 2 of 2

S.O. E 6179 Item No. 8

Date 11-23-82

Serial No. 4

Δ Rev A 1/31/83

Project Engineer R M Nath

1. Static Loads

Seismic Accelerations: 4.66 vertical
4.66 horizontal
- horizontal

Valve Weight: - lbs.

Static Load (min.): 9721 lbs vertical
12700 lbs horizontal

Distance h (min.): 39.1 in.

Yoke Leg Orientation ✓ As shown in Figure 1
- Rotated 90°

2. End Loads

Required End Loads (min.): - Axial Tension lbs.
- Bending in-lbs.
- Torsion in-lbs.
- Shear lbs.

3. Internal Pressure

Internal Pressure (min.): 1337 psig

Test Fluid: water

4. Performance Requirements

Voltage: 368 Ac

Number of Close Cycles Required: 2

Maximum Closure Time: 12 sec.

Maximum Open Time: 12 sec.

5. Seat Leakage Requirements

Maximum Allowable Leakage: 20 cu/hr Test Pressure: 1471 psi

Test Duration (min.): 4 minutes

Remarks: _____

EPS-105-1



ENCL (4)

MATERIAL REQUISITION

PKG. D - 112

Sec. 1-1

Page 1 of 24 pages

MATERIAL: Nuclear Service, Carbon Steel Gate, Globe and Check Valves, 600# Rating and Higher, 2 1/2" and Larger.

BECHTEL AUDIT REQUIRED ☒ YES ☐ NO

SHOP INSPECTION ☒ IS ☐ IS NOT REQUIRED

COST CODE: TO 5420

JOB SITE DELIVERY DATE: UNIT 1:

10 CFR 21 is applicable

UNIT 2:

M/R STATUS

REV NO	DATE	REVISIONS	ORIGINATOR (NAME)	APPROVALS	T/NO.
0	4-27-71	ISSUED FOR RIDS	Z. YOUSIF		
1	5-6-71	REVISED AS MARKED	Z. YOUSIF		
2	8-14-72	ISSUED FOR PURCHASE	Z. YOUSIF		
3	9-16-72	REVISED AS MARKED	Z. YOUSIF		
4	9-20-72	REVISED ITEMS 11.1 & 11.2	Z. YOUSIF		
5	10-2-72	REVISED ITEMS 3.9 & 3.10	Z. YOUSIF		
6	1-2-74	REVISED AS MARKED	Z. YOUSIF		
7	7-15-75	REVISED AS SHOWN ON SHEET 2	M. Schlotz		
8	12-3-75	REVISED AS SHOWN ON SHEET 2	M. Schlotz		
9	4-14-76	REVISED AS SHOWN ON SHEET 2	M. Schlotz		
10	1-24-77	REVISED AS SHOWN ON SHEET 2A	M. Schlotz		
11	3-24-77	REVISED AS SHOWN ON SHEET 2A	M. Schlotz		
12	1-5-78	REVISED AS SHOWN ON SHEET 2A	M. Schlotz		
13	6-29-78	REVISED AS SHOWN ON SHEET 2A	M. Schlotz		
14	4/16/79	REVISED AS SHOWN ON SHEET 2A	M. Schlotz		

* ALL NUCLEAR VALVES ARE TO BE CONSIDERED AS Q-LISTED ITEMS

Job

Requisition No.

8031-P-104 Rev. 23

M/R STATUS

Job 8031-P-104 Requisition No. 23



PURCHASE ORDER NO.

REQUISITION NO.

8031-P-104

REV

6

Page 1A of 24 Pages

ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
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Summary of Changes to Revision 1 Incorporated in Revision 2 of M/R 8031-P-104

1. Items deleted: 1.5-1.8; 2.1, 2.2, 3.1-3.4, 3.7, 3.8, 3.11, 3.12, 4.9-4.14, 5.1-5.6, 6.1, 6.2, 7.3, 7.4, 8.1, 8.2, 10.1, 10.2.
2. Items added: 3.13, 3.14, 4.15-4.22, 6.5-6.10, 9.3, 9.4, 11.1, 11.2, 12.1-12.6, 13.1-13.6.
3. Items with revised quantities: 4.1, 4.2.
4. Items with description revised: 3.5, 3.6, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 6.3, 6.4, 7.1, 7.2, 9.1, 9.2.
5. Design Specification 8031-P-104 introduced.
6. Items to be placed on hold: 6.5, 6.6, 13.1, 13.2.

Summary of Changes to Rev. 2 Incorporated in Rev. 3 of M/R 8031-P-104

1. Items with description revised: 4.19 thru 4.22.
2. Valve Data Sheets revised: Sheets 1 thru 5, 7 thru 9 & 12.

Summary of Changes to Rev. 5 Incorporated in Rev. 6 of M/R 8031-P-104

1. Items deleted: 3.5, 3.6, 4.3 thru 4.9, 4.16 thru 4.22, 6.3, 6.4, 6.9, 6.10, 9.3, 9.4, 12.1 thru 12.6, 13.1 thru 13.6
2. Items added: 1.9, 1.10, 3.15 thru 3.26, 5.7 thru 5.12, 8.3 thru 8.6, 14.1, 14.2, 15.1, 15.2, 16.1, 16.2, 17.1, 17.2, 18.1, 18.2, 19.1, 19.2, 20.1, 20.2, 6.11 thru 6.14
3. Items with revised descriptions: 1.1 thru 1.4, 3.9, 3.10, 6.5 thru 6.8.
4. Items with revised quantities: 3.9, 3.10, 4.1, 4.2.



PURCHASE ORDER NO.

REQUISITION NO.

	REV
8031-P-104	10

Page 1B of 24 Pages

ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
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5. Revised Valve Data Sheets No. 1 thru 5, 7 thru 17.
6. Deleted Valve Data Sheet No. 6.
7. Revised Design Specification 8031-P-104 as marked.

Summary of changes incorporated in Rev. 7 of M/R 8031-P-104

1. Revised Design Specification as marked.
2. Revised Valve Data Sheets 8, 10, 11, 16, 17, 3, 12, 4 and added Sheets 18 AND 19.
3. Items deleted: 1.9, 1.10 and 6.11-6.14.
4. Items added: 21.1-21.4, 22.1-22.4, and 4.23-4.26., 4.27, 4.28, 5.13 AND 5.14.
5. CORRECTED MARK NO. OF ITEM 18.2
6. ADDED SHEET 3B - "SPECIAL NOTES".

SUMMARY OF CHANGES INCORPORATED IN REV. 8 OF M/R 8031-P-104.

1. ADDED SPECIAL NOTE #6 TO PAGE 3B.

Summary of changes incorporated by Rev. 9 of M/R 8031-P-104,

1. Revised design specification as marked - and added new certification.
2. Added special notes 7, 8, 9, 10, 11 + 12; Deleted 6c(3)c.
3. Revised Valve Data Sheets 2 and 14.
4. Deleted items 5.13 and 5.14

Summary of changes incorporated by Rev. 10 of M/R 8031-P-104

1. Revised Design Specification as marked.
2. Revised Special Note 4.
3. Deleted items 15.1 & 15.2
4. Revised the following items: 3.13, 3.14, 4.0, 4.1, 4.2, 4.23, 4.24, 4.26, 4.27, 4.28, 11.1, 11.2, 18.1, 18.2, 19.1 & 19.2.



PURCHASE ORDER NO.

REQUISITION NO.

	REV.
8031-P-104	17

PAGE 1C OF 24 PAGES

ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
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Summary of changes incorporated by Rev. 11 of M/R 8031-P-104

1. Revised Special Note 4 on page 3B.
2. Added Special Notes 13 thru 18 on pages 3E thru 3I.
3. Revised the Design Specification 8031-P-104 as shown on sheet i thereof.
4. CORRECTED THE DESCRIPTION OF ITEMS 3.19, 3.20, 3.23, 3.24, 4.1, 4.2 + 6.8.

Summary of changes incorporated by Rev. 12

1. REVISED SPECIAL NOTE 7 AND 10
2. REVISED VALVE DATA SHEETS 17 & 18

Summary of changes incorporated by Rev. 13

1. Added new items 23.1, 24.1, 25.1, 26.1, 26.2.
2. Added Valve Data Sheet No. 20.
3. REVISED Valve Data Sheet No. 17

Summary of changes incorporated by Rev. 14

1. REVISED DESCRIPTION OF ITEMS 23.1, 24.1
2. REVISED VALVE DATA SHEET 20
3. REVISED PARA. 15.3b

Summary of changes incorporated by Rev. 15

1. Added Items 23.2, 3.27 and 3.28
2. Revised Valve Data Sheets 16, 17, 19, 20 & 3
3. Added note to items 3.19, 3.20

Summary of changes incorporated by Rev. 16

1. Added items 27.1 and 27.2
2. Added page 24 and Valve Data Sheet 21
3. Added Special Notes 19.1, 19.2 and 19.3

Summary of changes incorporated by Rev. 17

1. Added item 28.1

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The following changes were made by Rev. 18

1. Increased quantity on Item 8.3
2. Added Items 29.1, 12.7, 8.7
3. Added Valve Data Sheet #22

The following changes were made by Rev. 19

1. Added Attachments 3 & 4
2. Added Special Note 20
3. Added Special Notes 14.3C & 15.3C
4. Added Attachment 5

The following changes were made by Rev. 20

Retagged items 4.26 and 29.1

The following changes were made by Rev. 21

1. Deleted item 29.1
2. Revised Attachments 3 & 4

The following changes were made by Rev. 22

1. Added Special Note 21
2. Added Item 30.1

The change made by Revision 23

1. Revised Attachment 1

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P-231/11

SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.
1	9	3C	9			VALVE DATA							
2	9	3D	9			SHEETS							
3A	9	3E	9			1	6						
4	7					2	9						
5	1					3	7						
6	6					4	7						
7	7					5	6						
8	7					6	DELETED						
9	6					7	6						
10	6					8	7						
11	6					9	6						
12	6					10	7	SEE SHEET 2A					
13	7					11	7						
14	9					12	7						
15	7					13	6						
16	6					14	9						
17	6					15	6						
18	6					16	7						
19	6					17	7						
20	7					18	7						
21	7					19	7						
22	7												
1A	6												
1B	9												
3B	8												

4	9-20-72	REVISED SHT 18, DATA SHT 11 & DESIGN SPEC	331	28	9	4-14-76	REVISED SHTS 1, 1B, 2, 3, 3D, 3C, 1V, 1W SHTS 2, 1A, 1B, 2	MUS	18	AT	
3	9-16-72	REVISED SHTS 13, 1A & DATA SHTS 1 THRU 5, 7 THRU 9 & 12	331	28	8	12-3-75	REVISED SHTS 1, 1B, 2, 3B, ADDED SHTS 3C, 3D	CH	18	AT	
2	8-4-72	REVISED SHEETS 1-19 & DATA SHT 1-9	331	28	7	9-15-75	REVISED SHEETS 1, 2, 3, 4, 7, 8, 13, 14, 15, 20, 21, 22, 3B, 1B, VALVE DATA SHEETS 3, 4, 8, 10, 11, 12, 16, 17, 18, 19	MUS	21	AT	
1	5-6-71	ADDED SHTS 1A & 20 AND DATA SHTS 10-13 & DESIGN SPEC.	331	28	6	1-7-74	REVISED SHTS 1, 2, 3, 7 thru 21. REVISED VALVE DATA SHTS 1 thru 5, 7 thru 11	MUS	21	AT	
0	1-22-71	REVISED SHEETS MARKED ABOVE. ADDED DATA SHEETS	331	28			Deleted VALVE D. SHT 6				
A	10-30-70	Issued for Bids	331	28	5	10-2-72	Revised Design Spec	331	28	CH	
		Issued for Approval	331	28			Revised page 9	331	28	CH	
NO.	DATE	REVISIONS	BY	CHK'D	APP'D	NO.	DATE	REVISIONS	BY	CHK'D	APP'D



POWER AND
INDUSTRIAL
DIVISION

FACING SHEET
LIMERICK GENERATING STATION, UNITS 1 & 2
PHILADELPHIA ELECTRIC COMPANY

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JOB No 8031

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1	23	19	10			VALVE DATA				ATTNMENT 3			
1A	6	20	10			SHEETS				SHT.			
1B	10	21	17			1	6			1	0		
2	9	22	7			2	9			2	21		
2A	23	23	15			3	15						
3A	23	3F	19			4	7						
3B	11	3G	11			5	6			ATTNMENT 4			
3C	9	3H	19			6	DELETED			SHT.			
3D	12	3I	22			7	6			1	0		
3E	11	1C	17			8	7			2	23		
4	7	1.1	23			9	6						
5	1	1D	23			10	7						
6	6	16A	18			11	7			ATTNMENT 5			
7	7	24	22			12	7			SHT			
8	7					13	6			1	22		
9	10					14	9			2	22		
10	15					15	6			3	22		
11	15					16	15			4	22		
12	6					17	20			5	22		
13	20					18	12			6	22		
14	9					19	16						
15	17					20	15						
16	18					21	16						
17	18					22	21						
18	18												

10	1-29-77	REVISED SHTS 1, 1B, 2A, 3A, 3B, 9, 11, 13, 18, 20, 21 & DESIGN	JFA	17	4/10/81	REV. SHTS 1, 1.1, 1C, 2A, 15, 21 AND 24	RN	10/28/81	RN/A		
11	3-31-77	REV D PGS 1, 2A, 3A, 3B, 3C, 10, 11, 15 & DESIGN SPEC. ADDED PGS 1C, 3F, 3G, 3H & 3I	JFA	18	5/5/82	REV SHTS 1, 1.1, 16, 24, 3A added 1D, 16A, 17, 20, 21, 22	MNC	10/28/81	SP		
12	1-5-78	REVISED SHTS 2A, 3D, 1C, 3A REV SHTS 17 & 18 INCORP. FOR P-372	MNC	19	8/19/82	added dets 3+4+5 Rev SHT 2F, 3H Rev. 1, 10, 2A, 3A, 3I, 10, 22	JFA	10/28/81	DA		
13	6-7-78	REVISED SHTS 1, 2A, 3A, 23 AND VALVE DATA SHTS 17	MNC	20	9/17/82	Rev. valve data SHTS 17 & 22 P1, 1.1, 1D, 2A, 13, 24	JFA	10/28/81	RP/10/82		
14	4/16/79	REVISED SHTS 1, 1C, 2A, 3A, 23. VALVE SHT 20	MNC	21	11-4-82	Rev SHTS 1, 1.1, 1D, 2A, 3A, 24 Rev. OTE SHT 22 & ATT. 2+4	JFA	10/28/81	RP/10/82		
15	1-21-79	REVISED SHTS 1, 1.1, 2A, 3A, 17, 23 VALVE DATA SHEET	MNC	22	12/17/82	Rev SHTS 1, 1.1, 1D, 2A, 3A, 24 added SHTS ATTACHED	JFA	10/28/81	RP/10/82		
16	2-11-80	REV. SHTS 1, 1C, 2A, 3A, 3F, 3H, 3I, 24 AND DATA SHTS 19, 21	RN	23	7/3/83	REVISED SHEETS 1, 2A, 3A, 1.1, AND 1D AS NOTED	RBA	10/28/81	RP/10/82		
NO.	DATE	REVISIONS	BY	CHK'D	APP'D	NO.	DATE	REVISIONS	BY	CHK'D	APP'D



POWER
DIVISION

FACING SHEET
LIMERICK GENERATING STATION, UNITS 1 & 2
PHILADELPHIA ELECTRIC COMPANY

REQUISITION NO. 8031-P-104

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ATTACHMENTS

1. Design Specification 8031-P-104, Rev. 9,
including all contents shown on page (ii)
thereof.
2. Valve Data Sheets

No. 1, Rev. 6
No. 2, Rev. 9
No. 3, Rev. 15
No. 4, Rev. 7
No. 5, Rev. 6
No. 6 Deleted
No. 7, Rev. 6
No. 8, Rev. 7
No. 9, Rev. 6
No. 10, Rev. 7
No. 11, Rev. 7
No. 12, Rev. 7
No. 13, Rev. 6
No. 14, Rev. 9
No. 15, Rev. 6
No. 16, Rev. 15
No. 17, Rev. 20
No. 18, Rev. 12
No. 19, Rev. 16
No. 20, Rev. 15
No. 21, Rev. 16
No. 22, Rev. 21
3. Valve Operability Test Requirements
Sht 1, Rev. 0; Sheet 2, Rev. 21
4. Max "G" force table Sht. 1, Rev. 0;
Sht. 2, Rev. 23
5. Witness and Hold Points Shts. 1-6,
Rev. 22

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SPECIAL NOTES:

1. The technical requirements listed in this Purchase Order revision are retroactive and apply to all valves to be manufactured under this Purchase Order unless otherwise noted below.
2. All valves on Velan's P. O. 8031-P-104BC are manufactured to ASME Section III 1971 edition, Summer '73 Addenda.
3. All valves on Atwood & Morrill's P. O. 8031-P-104A are manufactured to ASME Section III, 1971 edition, Winter '72 addenda.
4. This note supplements paragraph 3.2 of Specification 8031-P-350. Precipitation hardened materials conforming to ASTM A-564 Grade 630 or A564-XM25 are acceptable alternates. A564 Grade 630 is to be age hardened at 1075°F, + 15°F, minimum and A564-XM25 is to be age hardened at 1000°F, + 15°F, minimum. This note is retroactive to all valves manufactured to previous revision of the P.O.
5. All valve documentation shall be sent to the field for review and approval unless otherwise shown on Form 8031-QA. This note shall become effective 30 days after issuance of Rev. 7 to the M/R.
6. The motor operated valves supplied by Atwood & Morrill for Items 9.1 & 9.2 of P.O. 8031-P-104A are to meet the requirements of Specification 8031-G-11, Rev. 12 with the following exceptions:
 - a. Limitorque will provide the certification that the motor operators supplied for Items 9.1 & 9.2 are of similar design and construction to those tested and qualified in Franklin Institute Research Lab Report F-C3441. This will satisfy the requirements of Spec. 8031-G-11, Rev. 12, Para. G11.3.4 & G11.8.2.
 - b. Limitorque shall provide a typical motor curve and routine test report for each 30 minute duty rated motor. Typical curves to be actual test not engineering calculated curve, from a lot being furnished to Bechtel. *THIS WILL SATISFY THE REQ'TS OF SPEC. 8031-G-11, REV. 12, PARA. G11.3.4 & G11.8.2.*
 - c. Testing of the motor operator will be done in two sections. Limitorque will test the motor.



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operator simulating the torque required to close the valve at zero differential pressure. Atwood & Morrill will test operational aspects of the motor operator integrated on a check valve. Certified test reports shall be submitted covering the following:

- (1) Limitorque will demonstrate the operators provide six inches of travel at twelve inches per minute at 70% rated voltage at the motor operator terminals for six cycles (open, close, open). Limitorque will simulate a valve load of 85 ft-lbs. during these six cycles at the 70% rated voltage.
- (2) Atwood & Morrill will conduct (3) operational test cycles of motor operator and check valve to insure valve is closed at zero differential pressure.
- (3) Limitorque will conduct the following tests with a simulated load of 85 ft-lbs. and provide test results for the certified test reports.
 - a. Test voltage and frequency,
 - b. Motor running current drawn during test operation of simulated load of 85 ft.-lbs. in closing direction for motor operators.
 - c. Deleted
 - d. Record settings and performance verification of torque switches and position switches. The position switches shall be set in accordance with Figures 1 or 2 of Spec. 8031-G-11, Rev. 12.
 - e. Included with the test data required by (b) and (c) above is a listing of the test instruments used, identified by manufacturers catalog number, and the instrument range setting for each test.



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				\$	\$
		(4) The above will satisfy the requirements of Spec. 8031-G-11, Rev. 12 Para. G11.8.4a, c & d. The requirements of Para. G11.8.4b are not applicable since these are not torque seated valves.			
		d. Atwood & Morrill shall provide in lieu of the design interface procedure (reference Para. G11.10 of Specification 8031-G-11) the following:			
		(1) Certification that Limitorque has provided the required documents for each valve as required in Sheets A5-3 & A5-4 of Design Spec. 8031-P-104, Rev. 3 (Ref. 8031-DR Forms attached to Spec. 8031-G-11, Rev. 12).			
		(2) Certification that Limitorque test data and typical curves meet data of Form 182 and motor operator Valve Data Sheet 9 of M/R 8031-P-104.			
		(3) Certification that Limitorque has met the requirements of Spec. 8031-G-11, Rev. 12 and these clarifications.			
		(4) Customer witnessing and inspection, per A&M's approved production test procedures of valve and motor operator during final testing at A&M.			
		7. All valves on Anchor/Darling's P.O. 8031-P-104CC shall conform to ASME B&PV Code, Section III, 1974 Edition, thru and including Winter 1974 Addenda and Code Cases 1516-2, 1567, 1622 and 1682.			
		8. Atwood & Morrill (P-104A) and Anchor/Darling (P-104C) shall work in accordance with Revision 2 to Specification 8031-G-13. Velan (P-104B) shall work in accordance with Revision 3 to Specification 8031-G-13.			
		9. Code Case 1519 is hereby approved for use on the Atwood & Morrill P.O. P-104A.			
		10. The following supplements Spec. 8031-P-350, para. 4.7.3. Haynes Stellite #21 & Poly Cast No. 21 are acceptable hardsurfacing materials for items on Atwood & Morrill's P.O. P-104A.			



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11. This paragraph is to clarify the requirements of the following Purchase Orders:
- Atwood & Morrill (P.O. P-104A) shall work in accordance with Specification 8031-P-350, Revision 4, with Addenda 1 & 2 to Rev.4.
 - Velan (P.O. P-104B) shall work in accordance with Specification 8031-P-350, Revision 6, with Addition 1 to Rev.6.
 - Anchor/Darling (P.O. P-104CC) shall work in accordance with Specification 8031-P-350, Revision 6.
12. The following supplements Spec. 8031-P-350, Revision 6, para. 8.1. The second paragraph shall only apply to Nuclear Class 2, "Cast" valves, 2½" thru 4" nominal pipe size.
13. QA Program, for Functionally Related Non-Pressure Retaining Valve Parts for Atwood & Morrill's P.O. 8031-P-104A
- The valves of items 9.1, 9.2, 11.1, 11.2, 14.1 & 14.2 were essentially completed or completed and shipped prior to January 5, 1977 and must meet the P.O. requirements in effect at time of completion. There are no additional Quality Assurance requirements for the functionally related non-pressure retaining valve parts.
14. QA Program for functionally Related Non-Pressure Retaining Valve Parts for Velan's P.O. 8031-P-104B
- 14.1 The following are the requirements for the non-pressure retaining parts of the valves on order and yet to be fabricated as of January 5, 1977.
- 14.1a- Velan procedure VEL-QCI-477, Check List Assembly and Final Inspection (as approved by Bechtel) shall be used for these valves.



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14.1.b - Velan procedure VEL-QC-155, Quality Control of Non-Pressure Boundary Parts (as approved by Bechtel) shall be used for these parts.

14.2 The following are the requirements for the non-pressure retaining parts of the valves added to the P.O. after January 5, 1977:

14.2.a - The stems for gate and globe valves shall meet the requirements for the pressure retaining parts of the valve. This shall include implementation of the appropriate Quality Assurance Program, performance of NDE at a level comparable to that performed on the pressure retaining parts, and submission of the required material test reports.

14.2.b - All of the requirements listed above in paragraph 14.1.

14.3 Applicability:

14.3.a - The requirements of paragraph 14.1. are applicable to the following items: 1.1, 1.2, 1.3, 1.4, 3.9, 3.10, 3.13, 3.14, 3.15, 3.16, 3.17, 3.18, 3.19, 3.20, 3.21, 3.22, 3.23, 3.24, 3.25, 3.26, 4.1, 4.2, 4.23, 4.24, 4.26, 4.27, 4.25, 4.28, 7.1, 7.2, 8.3, 8.4, 8.5, 8.6, 17.1, 17.2, 18.1, 18.2, 19.1, 19.2, 20.1 & 20.2.

14.3.b - The requirements of paragraph 14.2 are applicable to the following items: 3.27, 3.28

14.3.c - Paragraphs 14.1, 14.1a, 14.1.b, 14.2, 14.2a are applicable to all valves purchased on P104 B after January 5, 1977



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15.0 QA Program for Functionally Related Non-Pressure Retaining Valve Parts for Anchor/Darling's P.O. 8031-P-104CC

15.1 The following are the requirements for the functionally related non-pressure ~~retaining~~ parts of the valves on order and yet to be fabricated as of January 5, 1977:

15.1.a - Certified material test reports shall be made available for the gate and globe valve stems, yokes and for the check valve hangers (includes disc hanger, hinge, hanger block + hinge support) to permit verification of material conformance to the drawing requirements.

15.1.b - The following parts shall be marked to provide evidence of conformance of the materials to the drawing requirements.

Gate & Globe Valves

- (1) Bolting at yoke to operator
- (2) Bolting at yoke to bonnet or bolting or clamping device at yoke to body.

Check Valves

- (1) Hanger Pin
- (2) Disc Nut
- (3) Internal Bolting

15.1.c - The functionally related non-pressure retaining parts shall be purchased from A/DV Co.'s approved Vendor for non-pressure retaining parts.



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15.2		The following are the requirements for the functionally related non-pressure retaining parts of the valves added to the P.O. after January 5, 1977:			
15.2a		The stems for the gate and globe valves shall meet the requirements for the pressure retaining parts of the valve. This shall include implementation of the appropriate Quality Assurance Program, performance of NDE at a level comparable to that performed on the pressure retaining parts and submission of the required material test reports.			
15.2b		All of the requirements listed above in paragraph 15.1.			
15.3		Applicability:			
15.3a		The requirements of paragraph 15.1 are applicable to the following items: 5.7, 5.8, 5.9, 5.10, 5.11, 5.12, 6.7, 6.8, 16.1, 16.2, 21.1, 21.2, 21.3, 21.4, 22.1, 22.2, 22.3 & 22.4.			
15.3b		The requirements of paragraph 15.2 are applicable to the following items: 23.1, 24.1, 25.1, 26.1, 26.2, 23.2			
15.3c		Paragraphs 15.1a, 15.1b, 15.1c, 15.2, 15.2a, are applicable to all valves purchased on this P.O. after January 5, 1977			
16.0		The following supplements and clarifies paragraph 9.0 of Specification 8031-P-350: Seat leakage test for actuated globe valves may be performed at 110 percent of the differential pressure as listed on the Valve Data Sheet (pressure applied under the disc).			
17.0		The following supplements Specification 8031-P-350, paragraph 4.7.3. Stellite #156 is an acceptable hard surfacing material.			



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18.0 The following supplements Specification 8031-P-350, paragraph 5.3.3(a). The use of A-106 Gr. B pipe for the interconnecting piping between the solenoid valve and the air operator is acceptable. This note is applicable to items 11.1, 11.2, 14.1 & 14.2 on Atwood & Morrill's P.O. 8031-P-104A.

19.0 Special Wiring Requirements for air operated actuators and solenoids.

19.1 No wire splices, whether crimp type or wire nuts, are acceptable. All electrical devices shall have leads of sufficient length to extend to terminal blocks.

19.2 Terminal blocks shall be Buchanan 2B100 series, with white marking strips.

19.3 Other details shall conform to the requirements of Specification 8031-P-354, para. 6.3 as applicable.

19.4 Requirements of Special Note 19 apply only to valves purchased after January 1, 1980.

20. Value operability tests will be performed (per attachments 3+4) on the following valves:
P.104BC Items 1.4, 3.10, 3.26, 4.2, 4.28
P.104CC Items 5.8, 5.10, 6.8, 21.4, 22.4

21. Items 22.1 - 22.4 are supplied with strengthened yokes and ring clamps (item 30.1)



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ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
		<u>MATERIAL: NUCLEAR VALVES</u>		\$	\$
A	1 Lot	Drawings and data as required by form(s) G-321-C. The documentation requirements set forth herein shall be satisfied and provided with each shipment as specified. Failure to do so will render the shipment incomplete and payment will be adjusted accordingly.			Included in Itemized Prices Below
B	1 Lot	Seller shall furnish to the Expediter, shown on Page 1 of the Purchase Order, not later than , a complete schedule, forecasting engineering; material and/or sub-assembly acquisition; fabrication and/or labor; final assembly; testing, if any, and shipping date(s). In addition, Seller shall furnish a progress report to the Expediter every two weeks, in sufficient detail to allow a realistic evaluation of all phases toward Purchase Order completion.			
C	1 Lot	Parts lists required shall contain the name and order number of every part for the equipment and its auxiliaries including drawings in sufficient detail to locate and identify each part. In addition, where parts are manufactured by other than the Seller, the name of the original manufacturer and his part number shall be matched with the Sellers number on the part lists.			
D		<u>VALVE IDENTIFICATION</u> Valves are identified by a number consisting of: (1) nominal size, (2) materials class, (3) type, (5) operator type and number (if any), and (4) exception letters signifying unique features or requirements. For example: $\frac{6''}{(1)} - \frac{HBD}{(2)} - \frac{GT}{(3)} - \frac{A}{(4)} - \frac{MO-18-123}{(5)}$ The letters in components 2, 3, and 4 have the following meanings: A. <u>Material Class</u> (2) First letter (Primary Pressure Rating - unless otherwise noted all ratings are in accordance with ANSI B16.5)			



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A - specific pressure @	G - 300#
specific temperature	H - 150#
B - 2500#	J - 125# ANSI B16.1
C - 1500#	K - 175# WOG, UL, Inc.
D - 900#	L - 250# ANSI B16.1
E - 600#	X - Gravity rating

Other pressure ratings:

M - 200# (Mfr's rating)	R - 75# (Mfr's rating)
N - 150# WOG	S - 50# WOG
P - 100# (Mfr's rating)	T - 25# AWWA (or Mfr's rating)

Second letter (Materials)

A - Alloy steel	H - Cast Iron
B - Carbon steel	L - Carbon steel - impact tested
C - Austenitic steel	M - Cast iron - high silicon
D - Copper, brass, or bronze	
F - Carbon steel, - copper bearing	
G - Carbon steel - lined	

Third letter (Applicable Codes)

A - Nuclear Class 1	F - Nat'l Fire Pro- tection Code
B - Nuclear Class 2	G - Nat'l Plumbing Code
C - Nuclear Class 3	H - ASME Boiler & Pressure Vessel Code, Sec. I, Power Boilers
D - Power Piping Code, ANSI B31.1.0	J - AWWA

B. Valve Type (3)

Ball	BL	Globe	GB
Butterfly	BF	Globe Stop Check	GCK
Check	CK	Plug	PL
Diaphragm	DIA	Stop Check	SCK
Gate	GT	Testable Check	TCK
		Wafer Check	WCK
		Wafer Butterfly	WBF



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ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
C. <u>Exceptions (4)</u>					
A		Angle Valves			
B		Valve furnished with extension stem per Bechtel Dwg. SK-M-147 suitable for field mounting			
C		Check valve with manual test lever			
D		3-way plug valve			
E		Spring loaded, piston actuated			
F		Valve located inside drywell			
G		Valve equipped with hand actuator mounted at side			
H		Special stem packing for chlorine service			
J		Butterfly valve - expansion joint unit			
K		Valve for slurry service			
L		Corrosion resistant trim			
O		Special stem packing for oil service			
R		With brass or bronze trim			
S		With stainless steel trim			
T		Valves with chains			
U		Valves with extended stem			
ZS		Position indicator			
X		Use of MSS-SP-66 is permitted for design of Class 2 and 3 Nuclear Service valves when necessary to meet overpressure conditions expected to occur (see item description).			
N		Manual Valve located in Seismic Class I system.			

FURNISH THE FOLLOWING VALVES AND ACCESSORIES,
F.O.B. JOBSITE:

GATE VALVES - MOTOR OPERATED

1.0 CLASS DBA-GT, 900# ASME Sec III rating -
Nuclear Class 1

1.1 For Unit No. 1 -

1 Mark: 3" - DBA-GT-F-MO-41-1F016

Ends: Sch. 160 BW

Exception 'F': Valve located inside drywell.
For thermal transient data, refer to Table I,
Appendix 'B' of Spec. 8031-P-350
Valve Data Sheet No. 3.



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ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
1.2		For Unit No. 2 -			
	1	Mark: 3" - DBA-GT-F-MO-41-2F016			
		Ends: Sch. 160 BW			
		Exception 'F': See item 1.1			
		For thermal transient data, See item 1.1			
		Valve Data Sheet No. 3.			
1.3		For Unit No. 1 -			
	1	Mark: 3" - DBA-GT-MO-41-1F019			
		Ends: Sch. 160 BW			
		For thermal transient data, see item 1.1			
		Valve Data Sheet No. 4.			
1.4		For Unit No. 2 -			
	1	Mark: 3" - DBA-GT-MO-41-2F019			
		Ends: Sch. 160 BW			
		For thermal transient data, see item 1.1			
		Valve Data Sheet No. 4.			
1.5		Deleted			
1.6		Deleted			
1.7		Deleted			
1.8		Deleted			
1.9		Deleted			



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ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
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1.10 Deleted

GATE VALVES - MOTOR OPERATED

2.0 CLASS EBA-GT, 600# ANSI - Nuclear Class 1

2.1 Deleted

2.2 Deleted

GATE VALVES - MOTOR OPERATED

3.0 CLASS DBB-GT, 900# - NUCLEAR CLASS 2

3.1 Deleted

3.2 Deleted

3.3 Deleted

3.4 Deleted



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ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
3.5		Deleted		\$	\$
3.6		Deleted			
3.7		Deleted			
3.8		Deleted			
3.9		For Unit No. 1 -			
	2	Mark: 6" - DBB-GT-X-MO-49-1F013, 1F012 Ends: SCH 120 BW Exception "X": Refer to Appendix 3, Para. 7.2 of Design Specification 8031-P-104, Maximum Pressure and Temperature are listed on the Valve Data Sheets. Valve Data Sheets No. 5, 8			
3.10	2	For Unit No. 2 -			
		Mark: 6" - DBB-GT-X-MO-49-2F013, 2F012 Ends: Sch. 120 BW Exception 'X': Same as for Item 3.9 Valve Data Sheet No. 5, 8			
3.11		Deleted			
3.12		Deleted			
3.13		For Unit No. 1 -			
	1	Mark: 3" - DBB-GT-MO-46-1F082 Ends: Sch. 160 BW Valve Data Sheet No. 12 1 Spare Valve			
3.14		For Unit No. 2 -			
	1	Mark: 3" - DBB-GT-MO-46-2F082 Ends: Sch. 160 BW Valve Data Sheet No. 12 1 Spare Valve			



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ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
3.15		For Unit No. 1 -		\$	\$
2		Mark: 16"-DBB-GT-X-MO-41-109A, B Ends: SCH 120 BW Exception 'X': Refer to Appendix 3, para. 7.2 of Design Specification 8031-P-104 Maximum pressure and temperature are 2132 psig and 459°F Valve Data Sheet No.: 9			
3.16		For Unit No. 2 -			
2		Mark: 16"-DBB-GT-X-MO-41-209A, B Ends: SCH 120 BW Exception 'X': Same as item 3.15 Valve Data Sheet No.: 9			
3.17		For Unit No. 1 -			
1		Mark: 4"-DBB-GT-MO-55-1F071 Ends: SCH 120 BW Valve Data Sheet: 3			
3.18		For Unit No. 2 -			
1		Mark: 4"-DBB-GT-MO-55-2F071 Ends: SCH 120 BW Valve Data Sheet: 3			
3.19		For Unit No. 1 -			
1		Mark: 10"-DBB-GT-MO-55-1F011 Ends: SCH 120 BW Valve Data Sheet: 3 Note: This valve shipped to Peach Bottom for Mod. 381			
3.20		For Unit No. 2 -			
1		Mark: 10"-DBB-GT-MO-55-2F011 Ends: SCH 120 BW Valve Data Sheet: 3 Note: This valve shipped to Peach Bottom for Mod 381			
3.21		For Unit No. 1 -			
1		Mark: 12"-DBB-GT-MO-55-1F006 Ends: SCH 100 BW Valve Data Sheet No.: 2			



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ITEM NO.	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
3.22	For Unit No. 2 -		\$	\$
1	Mark: 12"-DBB-GT-MO-55-2F006 Ends: SCH 100 BW Valve Data Sheet No. 2			
3.23	For Unit No. 1 -			
1	Mark: 14"-DBB-GT-MO-55-1F007 Ends: SCH 100 BW Valve Data Sheet No. 2			
3.24	For Unit No. 2 -			
1	Mark: 14"-DBB-GT-MO-55-2F007 Ends: SCH 100 BW Valve Data Sheet No. 2			
3.25	For Unit No. 1 -			
1	Mark: 12"-DBB-GT-MO-55-1F001 Ends: SCH 80 BW Valve Data Sheet No. 1			
3.26	For Unit No. 2 -			
1	Mark: 12"-DBB-GT-MO-55-2F001 Ends: SCH 80 BW Valve Data Sheet No. 1			
3.27	For Unit No. 1			
1	Mark: 10"-DBB-GT-MO-55-1F011 Ends: Sch. 120B.W. Valve Data Sheet No. 19			
3.28	For Unit No. 2			
1	Mark: 10"-DBB-GT-MO-55-2F011 Ends: Sch 120B.W. Valve Data Sheet No. 19			
4.0	GATE VALVES - MOTOR OPERATED CLASS DBB-GT & EBB-GT, 900# - Nuclear Class 2			
4.1	For Unit No. 1 -			
2	Mark: 12" - DBB-GT-MO-52-1F004A, B Ends: Sch. 80 BW Valve Data Sheet No. 8			
4.2	For Unit No. 2 -			
2	Mark: 12" - DBB-GT-MO-52-2F004A, B Ends: Sch. 80 BW Valve Data Sheet No. 8			
4.3	Deleted			



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ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
				\$	\$
4.4		Deleted			
4.5		Deleted			
4.6		Deleted			
4.7		Deleted			
4.8		Deleted			
4.9		Deleted			
4.10		Deleted			
1		Deleted			
4.12		Deleted			
4.13		Deleted			
4.14		Deleted			
4.15		Deleted			
4.16		Deleted			
4.17		Deleted			
4.18		Deleted			
4.19		Deleted			
4.20		Deleted			



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ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
4.21		Deleted			
4.22		Deleted			
4.23		For Unit No. 1			
	2	Mark: 6"-DBB-GT - MO-01-108,109 Ends: Sch. 80 BW Valve Data Sheet No. 16			
4.24		For Unit No. 2			
	2	Mark: 6"-DBB-GT - MO-01-208,209 Ends: Sch. 80 BW Valve Data Sheet No. 16			
4.25		For Unit No. 1			
	1	Mark: 8"-DBB-GT - MO-01-111 Ends: Sch. 80 BW Valve Data Sheet No. 17			
4.26		For Unit No. 1			
	1	Mark: 8"-DBB-GT - MO-55-1F105 Ends: Sch. 120 BW Valve Data Sheet No. 22			
4.27		For Unit No. 1			
	1	Mark: 4" - EBB-GT-X-MO-01-150 Ends: Sch. 80 BW Exception "X": Refer to Appendix 3, para. 7.2 of Design Spec. 8031-P-104 Maximum pressure and temperature are 1337 ^{psi} and 582°F. Valve Data Sheet No. 18			
4.28		For Unit No. 2			
	1	Mark: 4" - EBB-GT-X-MO-01-250 Ends: Sch. 80 BW Valve Data Sheet No. 18 EXCEPT. "X": SAME AS ITEM 4.27			
GLOBE VALVES - MOTOR OPERATED -					
CLASS DBB-GB, 900# ANSI - Nuclear Class 2					
5.0					
5.1		Deleted			
5.2		Deleted			
5.3		Deleted			
5.4		Deleted			
5.5		Deleted			
5.6		Deleted			



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ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
5.7		For Unit No. 1 -			
	1	Mark: 6"-DBB-GB-MO-50-1F045 Ends: SCH 80 BW Valve Data Sheet No. 5			
5.8	1	For Unit No. 2 - Mark: 6"-DBB-GB-MO-50-2F045 Ends: SCH 80 BW Valve Data Sheet No. 5			
5.9		For Unit No. 1 -			
	1	Mark: 10"-DBB-GB-MO-55-1F008 Ends: SCH 120 BW Valve Data Sheet No. 2			
5.10		For Unit No. 2 -			
	1	Mark: 10"-DBB-GB-MO-55-2F008 Ends: SCH 120 BW Valve Data Sheet No. 2			
5.11		For Unit No. 1 -			
	1	Mark: 4"-DBB-GB-MO-49-1F022 Ends: Sch. 120 BW Valve Data Sheet No. 1			
5.12		For Unit No. 2 -			
	1	Mark: 4"-DBB-GB-MO-49-2F022 Ends: Sch 120 BW Valve Data Sheet No. 1			
5.13		Deleted			
5.14		Deleted			



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ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
6.0		CLASS EBB-GB, 600# ANSI - MOTOR OPERATED - <u>Nuclear Class 2</u>			
6.1		Deleted			
6.2		Deleted			
6.3		Deleted			
6.4		Deleted			
6.5		Deleted			
6.6		Deleted			
6.7		For Unit No. 1			
	2	Mark: 10"-EBB-GB-X-MO-51-1F052A, B Ends: Sch. 80 BW Exception 'X': See page G. Valve Data Sheet No. 12			
6.8		For Unit No. 2 -			
	2	Mark: 10"-EBB-GB-X-MO-51-2F052A, B Ends: Sch. 80 BW Exception 'X': See page G. VALVE DATA SHEET NO. 12			
6.9		Deleted			
6.10		Deleted			
6.11		Deleted			
6.12		Deleted			
6.13		Deleted			
6.14		Deleted			
		<u>CHECK VALVES</u>			
7.0		<u>CLASS DBA-CK, 900# - Nuclear Class I</u>			
7.1		For Unit No. 1 -			
	1	Mark: 3"-DBA-CK-F Ends: Sch. 80 BW Exception 'F': See Item 1.1			



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ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
		For thermal transient data, refer to Table VIII, Appendix 'B' of Spec. 8031-P-350 Valve Data Sheet No. 10			
7.2		For Unit No. 2 -			
	1	Mark: 3"-DBA-CK-F			
		Ends: Sch. 80 BW			
		Exception 'F': See Item 1.1			
		For thermal transient data, see Item 7.1			
		Valve Data Sheet No. 10			
7.3		Deleted			
7.4		Deleted			
8.0		<u>CLASS DBB-CK, 900# ANSI - Nuclear Class 2</u>			
8.1		Deleted			
8.2		Deleted			
8.3		For Unit No. 1 -			
	4	Mark: 4"-DBB-CK-49-1F023; 4"-DBB-CK-55-1F046			
		Ends: CK-49-1F023 - SCH. 120 BW			
		CK-55-1F046 - SCH. 80 BW			
8.4		For Unit No. 2 -			
	2	Mark: 4"-DBB-CK-49-2F023; 4"-DBB-CK-55-2F046			
		Ends: CK-49-2F023 - SCH. 120 BW			
		CK-55-2F046 - SCH. 80 BW			
8.5		For Unit No. 1 -			
	1	Mark: 10"-DBB-CK			
		Ends: SCH 120 BW			



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ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
8.6	1	For Unit No. 2 - Mark: 10"-DBB-CK Ends: Sch. 120 BW		\$	\$
8.7	1	Mark: 8"-DBB-CK Ends: Sch. 120 BW			

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ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
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STOPCHECK VALVES - MOTOR OPERATED9.0 CLASS DBB-S.CK, 900# - Nuclear Class 2

9.1 For Unit No. 1 -

2 Mark: 24"-DBB-S.CK-X-MO-41-1F032 A&B

Ends: Sch. 120 BW

Exception 'X': Refer to 7.2, Appendix 3 of
Design Specification No. 8031-P-104.Maximum pressure and temperature are
2132 psig and 459°F.

Valve Data Sheet No. 9

For Unit No. 2 -

2 Mark: 24"-DBB-S.CK-X-MO-41-2F032 A&B

Ends: Sch. 120 BW

Exception 'X': Same as Item 9.1

Valve Data Sheet No. 9

9.3 Deleted

9.4 Deleted

GATE VALVES - MANUALLY OPERATED10.0 CLASS DBA-GT, 900# - Nuclear Class 1

10.1 Deleted

10.2 Deleted

POWER ASSIST CHECK VALVES - AIR OPERATED0 CLASS DBA-CK, 900# rating - Nuclear Class 1

M.1 For Unit No. 1 -

1 Mark: 3"-DBA-CK-AO-46-1F121



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ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
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Ends: Sch. 80 BW

For thermal transient data, refer to Table VIII, Appendix 'B' of Spec. 8031-P-350

Valve Data Sheet No. 11

1 Spare Valve

11.2

For Unit No. 2 -

1 Mark: 3"-DBA-CK-AO-46-2F121

Ends: Sch. 80 BW

For thermal transient data, refer to Item 11.1

Valve Data Sheet No. 11

1 Spare Valve

CHECK VALVES12.0 CLASS EBB-CK, 600# rating - Nuclear Class 2

12.1 Deleted

12.2 Deleted

12.3 Deleted

12.4 Deleted

12.5 Deleted

12.6 Deleted

12.7 1 Mark: 12"-EBB-CK

Ends: Sch 80 BW

GATE VALVES - AIR OPERATED13.0 CLASS EBB-GT, 600# rating - Nuclear Class 2

13.1 Deleted

13.2 Deleted

13.3 Deleted

13.4 Deleted

13.5 Deleted

13.6 Deleted



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ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
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STOP CHECK VALVES14.0 CLASS DBB-SCK, 900# AIR OPERATED - Nuclear Class 2

14.1 For Unit No. 1 -

- 1 Mark: 4"-DBB-SCK-X-AO-44-1F039
Ends: SCH 120 BW
Exception 'X': Refer to Appendix 3, Para. 7.2 of
Design Specification 8031-P-104.
Maximum pressure and temperature
are 2132 psig and 459°F.
Valve Data Sheet No. 13

14.2 For Unit No. 2 -

- 1 Mark: 4"-DBB-SCK-X-AO-44-2F039
Ends: SCH 120 BW
Exception 'X': Same as item 14.1
Valve Data Sheet No. 13

GLOBE VALVES15.0 CLASS DBC-GB, 900# ANSI - AIR OPERATED - Nuclear Class 315.1 **DELETED**15.2 **DELETED**16.0 CLASS DBC-GB, 900# ANSI - MOTOR OPERATED - Nuclear Class 3

16.1 For Unit No. 1 -

- 1 Mark: 4"-DBC-GB-MO-44-1F031
Ends: SCH 80 BW
Valve Data Sheet No. 14



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ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
16.2		For Unit No. 2 -			
	1	Mark: 4"-DBC-GB-MO-44-2F031 Ends: SCH 80 BW Valve Data Sheet No. 14			
<u>GATE VALVES</u>					
17.0		<u>CLASS DBC-GT, 900# ANSI - MOTOR OPERATED - Nuclear Class 3</u>			
17.1		For Unit No. 1 -			
	2	Mark: 4"-DBC-GT-MO-44-1F034 & 1F035 Ends: SCH 80 BW Valve Data Sheet No. 14			
17.2		For Unit No. 2 -			
	2	Mark: 4"-DBC-GT-MO-44-2F034 & 2F035 Ends: SCH 80 BW Valve Data Sheet No. 14			
18.0		<u>CLASS EBC-GT, 600# ANSI - AIR OPERATED - Nuclear Class 3</u>			
18.1		For Unit No. 1 -			
	1	Mark: 4"-EBC-GT-AO-69-145 Ends: SCH 80 BW Valve Data Sheet No. 15 1 Spare Valve			
18.2		For Unit No. 2 -			
	1	Mark: 4"-EBC-GT-AO-69-245 Ends: SCH 80 BW Valve Data Sheet No. 15 1 Spare Valve			
19.0		<u>CLASS EBC-GT, 600# ANSI - MOTOR OPERATED - Nuclear Class 3</u>			
19.1		For Unit No. 1 -			
	1	Mark: 6"-EBC-GT-MO-69-146 Ends: SCH 80 BW Valve Data Sheet No. 16 1 Spare Valve			



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ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
19.2		For Unit No. 2 -		\$	\$
	1	Mark: 6"-EBC-GT-MO-69-246 Ends: SCH 80 BW Valve Data Sheet No. 16 1 Spare Valve			
20.0		<u>CLASS EBC-GT, 600# ANSI - MANUAL VALVE -</u> <u>Nuclear Class 3</u>			
20.1		For Unit No. 1			
	1	Mark: 6"-EBC-GT Ends: SCH 80 BW			
20.2		For Unit No. 2 -			
	1	Mark: 6"-EBC-GT Ends: SCH 80 BW			
		<u>ISOLATION VALVES - MOTOR OPERATED</u>			
21.0		<u>Class EBA-GB, 600# ASME Rating Carbon Steel</u> <u>Nuclear Class 1</u>			
21.1		For Unit No. 1			
	1	Mark: 10"-EBA-GB-F-MO-55-1F002 Ends: Sch. 80 BW Exception "F" - Valve located inside drywell see para. 3.6 of Appendix 3 of Design Spec. for environmental conditions. For thermal transient data, refer to Table I, Appendix 'B' of Spec. 8031-P-350. Drain required - see para. 16.0 of Appendix 3 of the Design Specification 8031-P-104 Valve Data Sheet No. 17			
21.2		For Unit No. 2			
	1	Mark: 10"-EBA-GB-F-MO-55-2F002 Ends: Sch. 80 BW Exception "F" - See Item 21.1. For thermal transient data - see Item 21.1 Drain required - See Item 21.1 Valve Data Sheet No. 17			
					NOTE: SEE ITEM 20.1 FOR REPLACEMENT OPERATOR FOR THIS VALVE
1.3		For Unit No. 1			
	1	Mark: 10"-EBA-GB-MO-55-1F003 Ends: Sch. 80 BW			



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ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
		For thermal transient data - see Item 21.1			
		Drain required - See Item 21.1			
		Valve Data Sheet No. 17			
21.4		For Unit No. 2			
	1	Mark: 10"-EBA-GB-MO-55-2F003			
		Ends: Sch. 80 BW			
		For thermal transient data - see Item 21.1			
		Drain required - see Item 21.1			
		Valve Data Sheet No. 17			
22.0		<u>ISOLATION VALVES - MOTOR OPERATED</u>			
		<u>CLASS DBA-GB, 900# ASME RATING, CARBON STEEL</u>			
		<u>NUCLEAR CLASS 1</u>			
22.1		For Unit No. 1			
	1	Mark: 3"-DBA-GB-F-MO-49-1F007			
		Ends: Sch. 160 BW			
		Exception 'F' - See Item 21.1			
		For thermal transient data, see Item 21.1			
		Valve Data Sheet No. 18 (Drain required - see item 21.1)			
22.2		For Unit No. 2			
	1	Mark: 3"-DBA-GB-F-MO-49-2F007			
		Ends: Sch. 160 BW			
		Exception 'F' - See Item 21.1-For thermal			
		transient data see Item 21.1			
		Drain required - see Item 21.1			
		Valve Data Sheet No. 18			
22.3		For Unit No. 1			
	1	Mark: 3"-DBA-GB-MO-49-1F008			
		Ends: Sch. 160 BW			
		For thermal transient data - See Item 21.1			
		Drain required - See Item 21.1			
		Valve Data Sheet No. 18			
22.4		For Unit No. 2			
	1	Mark: 3"-DBA-GB-MO-49-2F008			
		Ends: Sch. 160 BW			
		For Thermal transient data - See Item 21.1			
		Drain required - see Item 21.1			
		Valve Data Sheet No. 18			

BECHTEL

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ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
		<u>GLOBE VALVES</u>			
23.0		<u>CLASS DBA-GB, 900# RATING - MANUAL</u> <u>NUCLEAR CLASS 1</u>			
23.1		For Unit No. 1 & 2			
4		Mark: 4" DBA-GB-F-N-41-1017 & 2017 Ends: Sch. 80 B.W. 4" DBA-GB-N-41-1016 & 2016 Ends: Sch. 120 B.W. Valve Data Sheet No. 20 Exception "F": Valve located inside drywell, for thermal transient data refer to Table III, Appendix "B" of Spec. 8031-P-350. Exception "N": Valve located in Seismic I system, see para 2.3.3 of Spec. 8031-P-350			
23.2		For Unit No. 1 and 2			
2		Mark: 3" DBA-GB-F-N-41-1026 2026 Ends: Sch 160B.W. Valve Data Sheet No. 20 Exception "F" - Valve located in drywell, thermal transient data Exception "N" - see Item 23.1 per table I, App B of P-330			
24.0		<u>CLASS DBB-GB, 900# RATING - MANUAL</u> <u>NUCLEAR CLASS 2</u>			
24.1		For Unit No. 1 & 2			
2		Mark: 4" DBB-GB Ends: Sch. 120 B.W.			
25.0		<u>CLASS DBC-GB, 900# RATING - MANUAL</u> <u>NUCLEAR CLASS 3</u>			
25.1		For Unit No. 1 & 2			
2		Mark: 3" DBC-GB Ends: Sch. 160 B.W.			
26.0		<u>CLASS EBC-GB, 600# RATING - MANUAL</u> <u>NUCLEAR CLASS 3</u>			
26.1		For Unit No. 1 & 2			
2		Mark: 5" EBC-GB Ends: Sch. 80 B.W.			
26.2		For Unit No. 1 & 2			
2		Mark: 4" EBC-GB Ends: Sch. 80 B.W.			



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ITEM NO.	QUANTITY	DESCRIPTION	CODE OR EQUIP. NO.	UNIT PRICE	EXTENSION
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GATE VALVES

27.0 CLASS DBC-GT, 900# RATING, MOTOR
OPERATED, NUCLEAR CLASS 3

27.1 For Unit No. 1

2 Mark: 3"-DBC-GT-MO-41-142 and -143
Ends: Sch. 160 B.W.
Valve Data Sheet No. 21
For Unit No. 2

27.2 2 Mark: 3"-DBC-GT-MO-41-242 and -243
Ends: Sch. 160 B.W.
Valve Data Sheet No. 21

28.0 REPLACEMENT MOTOR OPERATOR

28.1 1 Limitorque SMB-4-150 Motor Operator for
Anchor/Darling valve EG179-8-2 furnished
on Item 21.2 of this requisition.

Note: All cost for this replacement is to be
charged to backcharge No. 66/214

29.0 Gate Valves - Motor Operated
Class DBB-GT 900# ASME
Nuclear Class 2

29.1 Deleted " "

30.0 Replacement Yokes

30.1 4 Replacement yokes and ring
clamps for items 22.1-22.4

DATE	APPROVALS	MATL	SUPV	CHK	DR	ENG	DESCRIPTION
1-7-74							2 REVISED AS MARKED 1 REVISED AS MARKED 6 REVISED AS MARKED
VALVE NO.	MO-55-1F002	MO-55-1F001	MO-49-1F022				
SERVICE	MO-55-2F002	MO-55-2F001	MO-49-2F022				
TYPE	HPCI TURB. STEAM	HPCI TURB. STEAM	RCIC TEST LINE				
LINE OR EQUIPMENT REF.	SUPPLY (INSIDE DRYWELL)	SUPPLY					
MOTOR RATED POWER	GATE	GATE	GLOBE				
SIZE	DBAI-106,206	EBB-108,208	EBB-133,233				
COMMODITY	460 V. 3Φ 60 HZ	240 V D.C.	240 V D.C.				
DESIGN/MAX. PRESS. PSI	10"X8"X10"	12"	A"				
DESIGN/MAX. TEMP. °F	MAIN STEAM	MAIN STEAM	DEMIN. WATER				
FLOW	1250 / 1337	1115 / 1337	1300 / 1500				
VALVE RATING	575 / 582	582 / 582	170 / 170				
TYPE ENDS/RATING	184,500 lb/hr	235,000 lb/hr	600 GPM				
BODY MATERIAL	600# ANSI	900# ANSI	900# ANSI				
TRIM MATERIAL	B.W. Sch. 80	B.W. Sch. 80	B.W. Sch. 120				
SEAT FACINGS	ASME SA-216 GR.	W.C.B. OR SA-	105 GR. II				
PACKING	STELLITE	STELLITE					
TYPE BONNET	CRANE 187-I	CRANE 187-I					
TYPE OF SEATS	PRESSURE SEAL	PRESSURE SEAL					
TYPE OF DISC	INTEGRAL OR	RENEWABLE					
BYPASS SIZE & TYPE	FLEXIBLE WEDGE						
HANDWHEEL PULL-BREAKAWAY							
ACT. OP. DIFF. PRESS. (MAX)	1250 PSI	1337 PSI	1000 PSI				
PORT DIAMETER							
PRESS. DROP (PSI)							
VELOCITY (FPS)							
(2) OPERATOR CLASS	CLASS I (IEEE STD. 323)						
MOTOR OPER (TYPE/SIZE/SPD)							
OPER. SPEED FT/MIN/HP			STANDARD				
TIME TO OPEN MAX	20 SEC	20 SEC					
TIME TO CLOSE MAX	20 SEC	20 SEC					
FULL LOAD CURRENT							
STALLED ROTOR CURRENT							
OPERATOR INSULATION CLASS		H	H				
COST - EACH VALVE							
BYPASS							
FURN & INSTALL LIMIT SWS.							
TESTS - MAGNAFLUX							
TESTS - X-RAY							
NO. REQUIRED UNIT 1 / UNIT 2	1 / 1	1 / 1	1 / 1				
TOTAL COST							
MANUFACTURER							
MODEL OR FIG. NO.							
VENDOR							
P/O (8 ITEM) NO.	P-104 / 2.1, 2.2	P-104 / 3.25, 3.26	P-104 / 5.11, 5.12				
FOREIGN PRINT NO.							
WELD END DWG. REFERENCE	8031-P-300 Sheets 75 & 72						
P & I DIAGRAM REF.	M-55	M-55	M-49				
LOCATION DWG. REF.							
(1) SEISMIC ITEM: (YES) (NO)	YES	YES	YES				
REMARKS	(1) REFER TO 2.3.3 OF SPEC. 8031-P-350 FOR SEISMIC REQTS (2) REFER TO SPEC 8031-G-11						

VALVE DATA SHEET
MOTOR OPERATED



POWER DIVISION
ENGINEERING

PHILADELPHIA ELECTRIC COMPANY
LIMERICK GENERATING STATION UNITS 1 & 2

JOB No

Attachment to
M/R No.

8031-P-104
SHEET 1 OF 22


REV.

6

DATE	APPROVALS	MATL	SUPV	CHK	OR	ENG	DESCRIPTION
3-15-72							
4-14-76							
1-7-79							
VALVE NO.	MO-55-1F007	MO-55-1F008	MO-55-1F006				
	MO-55-2F007	MO-55-2F008	MO-55-2F006				
SERVICE	HPCI PUMP DISCH.	HPCI PUMP TEST	HPCI PUMP DISCH				
TYPE	GATE	GLOBE	GATE				
LINE OR EQUIPMENT REF.	EBB-129,229	EBB-134,234	EBB-129,229				
MOTOR RATED POWER	240 V D.C.	240 V D.C.	240 V D.C.				
SIZE	14" x 12" x 14"	10"	12"				
COMMODITY	CONDENSATE	CONDENSATE	CONDENSATE				
DESIGN/MAX. PRESS.	1396/1625	1396/1625	1396/1625				
DESIGN/MAX. TEMP.	170/170	170/170	170/170				
FLOW	5600 GPM	5600 GPM	5600 GPM				
VALVE RATING	900# ANSI	900# ANSI	900# ANSI				
TYPE ENDS/RATING	B.W. Sch. 100	B.W. Sch. 120	B.W. Sch. 100				
BODY MATERIAL	ASME SA-216 GR.	W.C.B. OR SA-105	GR. II				
TRIM MATERIAL							
SEAT FACINGS	STELLITE	STELLITE	STELLITE				
PACKING	CRANE 187-I	CRANE 187-I	CRANE 187-I				
TYPE BONNET	PRESSURE SEAL	PRESSURE SEAL	PRESSURE SEAL				
TYPE OF SEATS	INTEGRAL OR	RENEWABLE					
TYPE OF DISC	FLEXIBLE	PLUG	FLEXIBLE				
BYPASS SIZE & TYPE							
HANDWHEEL PULL-BREAKAWAY							
ACT. OP. DIFF. PRESS. (Max)	1625 PSI	1000 PSI	1625 PSI				
PORT DIAMETER							
PRESS. DROP (PSI)							
VELOCITY (FPS)							
(2) OPERATOR CLASS	I (IEEE STD. 3-3)						
MOTOR OPER (TYPE/SIZE/SPD)							
OPER. SPEED FT/MIN/HP							
TIME TO OPEN, Max	20 SEC	20 SEC.	20 SEC				
TIME TO CLOSE, Max	20 SEC	20 SEC.	20 SEC				
FULL LOAD CURRENT							
STALLED ROTOR CURRENT							
OPERATOR INSULAT ON CLASS	H	H	H				
COST - EACH VALVE							
BYPASS							
FURN & INSTALL LIMIT SWS.							
TESTS - MAGNAFLUX							
TESTS - X-RAY							
NO. REQUIRED UNIT 1 / UNIT 2	1 / 1	1 / 1	1 / 1				
TOTAL COST							
MANUFACTURER							
MODEL OR FIG. NO.							
VENDOR							
P/O (8 ITEM) NO.	P-104 / 3.23, 324	P-104 / 59, 510	P-104 / 3.21, 322				
FOREIGN PRINT NO.							
WELD END DWG. REFERENCE	SPEC 8031-P-300	Sheets 75 & 72					
P & I DIAGRAM REF.	M-55	M-55	M-55				
LOCATION DWG. REF.							
(1) SEISMIC ITEM: (YES) (NO)	YES	YES	YES				
REMARKS	(1) REFER TO 2.3.3 OF SPEC. 8031-P-350 FOR SEISMIC REQ'TS. (2) REFER TO SPEC 8031-G-11						

2 REVISED AS MARKED
 9 REVISED AS MARKED
 6 REVISED AS MARKED

DATE	APPROVALS	DATE	VALVE NO.	MO-55-1FO11	MO-55-1FO71	MO-41-1FO16
DATE	APPROVALS	DATE	VALVE NO.	MO-55-2FO11	MO-55-2FO71	MO-41-2FO16
			SERVICE	HPCI PUMP TEST	HPCI PUMP TEST	MAIN STEAM LINE
			TYPE	TO COND. TANK	LINE TO SUPP. POOL	DRAIN (INSIDE DRYWELL)
			LINE OR EQUIPMENT REF.	GATE	GATE	GATE
			MOTOR RATING (POWER)	EBB-134,234	EBB-134,234	DBAL-105,205
			SIZE	460V, 3Ø, 60Hz	240 VDC	460V, 3Ø, 60Hz
			COMMODITY	10X8X10"	4"	3"
			DESIGN/MAX. PRESS. PSIG	CONDENSATE	CONDENSATE	MAIN STN/CONDENSATE
			DESIGN/MAX. TEMP. °F	1396/1625	1396/1625	1250/1337
			FLOW	170 / 170	170 / 170	575 / 582
			VALVE RATING	5600 GPM	5600 GPM	50 GPM
			TYPE ENDS/RATING	900 # ANSI	900 # ANSI	900 # ASME
			BODY MATERIAL	B.W. Sch 120	B.W. Sch 120	B.W. Sch 80
			TRIM MATERIAL	ASME SA-216 Gr. WCB	OR SA-105 Gr. II	
			SEAT FACINGS	STELLITE		
			PACKING	CRANE 187-I		
			TYPE BONNET	PRESSURE SEAL		
			TYPE OF SEATS	INTEGRAL OR RENEWABLE		
			TYPE OF DISC	FLEXIBLE WEDGE		SOLID WEDGE
			BYPASS SIZE & TYPE			
			HANDWHEEL PULL-BREAKAWAY			
			ACT. OP. ... L DIFF. PRESS. (Max)	1000 PSI	50 PSI	1250 PSI
			PORT DIAMETER			
			PRESS. DROP (PSI)			
			VELOCITY (FPS)			
			(2) OPERATOR CLASS	I (IEEE STD. 323)		
			MOTOR OPER (TYPE/SIZE/SPD)			
			OPER. SPEED FT/MIN/HP	STANDARD	STANDARD	STANDARD
			TIME TO OPEN			
			TIME TO CLOSE			
			FULL LOAD CURRENT			
			STALLED ROTOR CURRENT			
			OPERATOR INSULATION CLASS	H	H	H
			COST - EACH VALVE			
			BYPASS			
			FURN & INSTALL LIMIT SWS.			
			TESTS - MAG-AFLUX			
			TESTS - X-RAY			
			NO. REQUIRED Unit 1 / Unit 2	1 / 1	1 / 1	1 / 1
			TOTAL COST			
			MANUFACTURER			
			MODEL OR FIG. NO.			
			VENDOR			
			P/O (8 ITEM) NO.	P-104/B.P. 320	P-104/3.M. 3.B	P-104/1.1. 1.2
			FOREIGN PRINT NO.			
			WELD END DWG. REFERENCE	8031-P-300 Sheets 75 & 72		
			P & I DIAGRAM REF.	M-55	M-55	M-41
			LOCATION DWG. REF.			
			(1) SEISMIC ITEM (YES) (NO)	YES	YES	YES
			REMARKS	(1) REFER TO 2.3 OF SPEC. 8031-P-350 FOR SEISMIC REQ'TS		
				(2) REFER TO SPEC. 8031-G-11		
				DESIGN SPEC.		



POWER DIVISION
ENGINEERING

VALVE DATA SHEET
MOTOR OPERATED

Limerick Generating Station
Units 1 & 2
Philadelphia Electric Company

JOB No 8031


Attachment to Re-
quisition No. 8031
P-104

SHEET 3 OF 22

REV.

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DATE	APPROVALS	MATL	SUPP	CHK	DR	ENG	DESCRIPTION
7-19-73 1-7-74							REVISED AS MARKED REVISED AS MARKED REVISED AS MARKED
VALVE NO.							
SERVICE TYPE	MAINSTEAM LINE DRAIN	RCIC TURB STEAM SUPPLY (INSIDE DRAIN)	RCIC TURB STEAM SUPPLY				
LINE OR EQUIPMENT REF.	DBA - 105,205	DBA1-107,207	DBA1-107,207				
MOTOR RATING (POWER)	460V, 3Φ, 60HZ	460V, 3Φ, 60Hz	240V, DC				
SIZE	3"	3"	3"				
COMMODITY	MAINSTM/CONDENSATE	MAIN STEAM	MAIN STEAM				
DESIGN/MAX. PRESS. PSIG	1250 / 1337	1250 / 1337	1250 / 1337				
DESIGN/MAX. TEMP. °F	575 / 582	575 / 582	575 / 582				
FLOW	50 GPM	33,000 lbs/hr	33,000 lbs/hr				
VALVE RATING	900# ASME III	900# ANSI	900# ANSI				
TYPE ENDS/RATING	B.W. SCH 80	B.W. SCH 80	B.W. SCH 80				
BODY MATERIAL	ASME SA-216 GR. WCB	GR SA-105 GR II					
TRIM MATERIAL							
SEAT FACINGS	STELLITE						
PACKING	CRANE 187-I						
TYPE BONNET	PRESSURE SEAL						
TYPE OF SEATS	INTEGRAL OR RENEWABLE						
TYPE OF DISC	SOLID WEDGE						
BYPASS SIZE & TYPE							
HANDWHEEL PULL-BREAKAWAY ACT. QP · DIFF. PRESS. (max)	1250 PSI	1250 PSI	1250 PSI				
PORT DIAMETER							
PRESS. DROP (PSI)							
VELOCITY (FPS)							
(2) OPERATOR CLASS	I (IEEE STD 323)						
MOTOR OPER (TYPE/SIZE/SPD)							
OPER. SPEED FT/MIN/W	STANDARD	STANDARD	STANDARD				
TIME TO OPEN							
TIME TO CLOSE							
FULL LOAD CURRENT							
STALLED ROTOR CURRENT							
OPERATOR INSULATION CLASS	H						
COST - EACH VALVE							
BYPASS							
FURN & INSTALL LIMIT SWS.							
TESTS - MAGNAFLUX							
TESTS - X-RAY							
NO. REQUIRED Unit 1 / Unit 2	1 / 1	1 / 1	1 / 1				
TOTAL COST							
MANUFACTURER							
MODEL OR FIG. NO.							
VENDOR							
P/O (8 ITEM) NO.	P-104/13.3.4	P-104/13.1.6	P-104/17.1.8				
FOREIGN PRINT NO.							
WELD END DWG. REFERENCE	8031-P-300 sheets 75 & 72						
P & I DIAGRAM REF.	M-41	M-49	M-49				
LOCATION DWG. REF.							
(1) SEISMIC ITEM: (YES) (NO)	YES	YES	YES				
REMARKS	(1) REFER TO 2.3.3 OF SPEC. 8031-P-350 FOR SEISMIC REQTS. (2) REFER TO SPEC 8031-G-11						



BECHTEL
POWER DIVISION
ENGINEERING

VALVE DATA SHEET
MOTOR OPERATED

Limerick Generating Station
Units 1 & 2

Philadelphia Electric Company

JOB No 8031

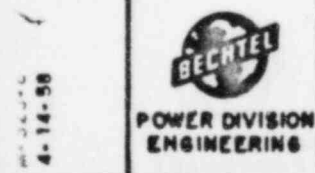
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P-104

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REV.
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DATE	APPROVALS	MATL	SUPV	CHK	DR	ENG	REV. DESCRIPTION
8-14-72							
1-7-79							
VALVE NO.	MO-50-1F045 MO-50-2F045	MO-49-1F012 MO-49-2F012	MO-49-1F013 MO-49-2F013				
SERVICE TYPE	RCIC TURB STEAM SUPPLY GLOBE	RCIC PUMP DISCHARGE GATE	RCIC PUMP DISCHARGE GATE				
LINE OR EQUIPMENT REF.	EBB-109,209	DBB-101,201	DBB-101,201				
MOTOR RATING (POWER)	240V DC	240V DC	240V DC				
SIZE	6"	6"	6"				
COMMODITY	MAIN STEAM	CONDENSATE	CONDENSATE				
DESIGN/MAX. PRESS.	1115/1337	1750/2100	1177/12132				
DESIGN/MAX. TEMP.	558/582	459/459	459/459				
FLOW	33,000 lbs/hr	616 GPM	600 GPM				
VALVE RATING	900# ANSI	900# ANSI	SEE ITEM DESCRIPTION				
TYPE ENDS/RATING	B.W. SCH 160	B.W. SCH 120	B.W. SCH 120				
BODY MATERIAL	ASME SA-216 GR. WCB	SA-105 GR. II					
TRIM MATERIAL							
SEAT FACINGS	STELLITE						
PACKING	CRANE 187-I						
TYPE BONNET	PRESSURE SEAL	PRESSURE SEAL					
TYPE OF SEATS	INTEGRAL OR	RENEWABLE					
TYPE OF DISC	PLUG	FLEXIBLE WEDGE					
BYPASS SIZE & TYPE							
HANDWHEEL PULL-BREAKAWAY							
ACT. OP. DIFF. PRESS (max)	1337 PSI	1500 PSI	1500 PSI				
PORT DIAMETER							
PRESS. DROP (PSI)							
VELOCITY (FPS)							
(2) OPERATOR CLASS	T (IEEE STD 323)		I (IEEE STD 323)				
MOTOR OPER (TYPE/SIZE/SPD)							
OPER. SPEED FT/MIN/HP							
TIME TO OPEN MAX	15 SEC	15 SEC	15 SEC				
TIME TO CLOSE MAX	15 SEC	15 SEC	15 SEC				
FULL LOAD CURRENT							
STALLED ROTOR CURRENT							
OPERATOR INSULATION CLASS	H		H				
COST - EACH VALVE							
BYPASS							
FURN & INSTALL LIMIT SWS.							
TESTS - MAGNAFLUX							
TESTS - X-RAY							
NO. REQUIRED Unit 1 / Unit 2	1 / 1	1 / 1	1 / 1				
TOTAL COST							
MANUFACTURER							
MODEL OR FIG. NO.							
VENDOR							
P/O (8 ITEM) NO.	P-104/5.3,5.8	P-104/3.7,3.8	P-104/3.9,3.10				
FOREIGN PRINT NO.							
WELD END DWG. REFERENCE	8031-P-300 SHEETS 75 & 72						
P & I DIAGRAM REF.	M-50	M-49	M-49				
LOCATION DWG. REF.							
(1) SEISMIC ITEM: (YES) (NO)	YES	YES	YES				
REMARKS	(1) REFER TO 2.3.3 OF SPEC. 8031-P-350 FOR SEISMIC REQTS. (2) REFER TO SPEC 8031-G-11						

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VALVE DATA SHEET
MOTOR OPERATED
Limerick Generating Station
Units 1 & 2
Philadelphia Electric Company

JOB No 8031
Attachment to Re-
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REV. 6




VALVE DATA SHEET
MOTOR OPERATED
LIMERICK GENERATING STATION
UNITS 1 & 2
PHILADELPHIA ELECTRIC COMPANY

JOB No 8031
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quisition No. 8031
P-104
SHEET 7 OF 22

REV.

DATE	APPROVALS	MATL	SUPV	CHK	DR	ENG	DESCRIPTION
7-15-75							
1-7-74							
9-15-72							
VALVE NO.	MO-44-1F035 MO-44-2F035	MO-52-1F004 AB MO-52-2F004 AB	MO-49-1F012 MO-49-2F012				
SERVICE TYPE	CLEANUP FILTER TO SORGE & COLL'N TKS.	CORE SPRAY PUMP DISCHARGE TO REACTOR	RCIC PUMP DISCHARGE				
LINE OR EQUIPMENT REF.	GATE	GATE	GATE				
MOTOR RATING (POWER)	EBB - 460V, 3Φ, 60Hz	EBB-132, 232 460V, 3Φ, 60Hz	EBB-135, 235 240V 60S.				
SIZE	4"	12"	12"				
COMMODITY	REACTOR WATER	DEMIN. WATER	DEMIN WATER				
DESIGN/MAX. PRESS.	1320/1577	1135/1340	1300/1500				
DESIGN/MAX. TEMP.	150/140	575/582	176/170				
FLOW	270 GPM	1900/ GPM	600 GPM				
VALVE RATING	600# ANSI	SEE ITEM DESCRIPTION					
TYPE ENDS/RATING	B.W. SCH 80	B.W. SCH 80	B.W. SCH 120				
BODY MATERIAL	ASME SA-216 GR WC	ASME SA-105 GR. II					
TRIM MATERIAL							
SEAT FACINGS	STELLITE						
PACKING	CRANE 187-T OR EQUAL						
TYPE BONNET	PRESSURE SEAL						
TYPE OF SEATS	INTEGRAL OR RENEWABLE						
TYPE OF DISC	FLEXIBLE WEDGE						
BYPASS SIZE & TYPE							
HANDWHEEL PULL-BREAKAWAY							
ACT. OP DIFF. PRESS. (max)	1320 PSI	730 PSI	1500 PSI				
PORT DIAMETER							
PRESS. DROP (PSI)							
VELOCITY (FPS)							
(2) OPERATOR CLASS		I (IEEE STD. 323)					
MOTOR OPER (TYPE/SIZE/SPD)							
OPER. SPEED FT/MIN/HP	STANDARD						
TIME TO OPEN MAX.		12 SEC.	15 SEC				
TIME TO CLOSE MAX.		12 SEC.	15 SEC				
FULL LOAD CURRENT							
STALLED ROTOR CURRENT							
OPERATOR INSULATION CLASS		H	H				
COST - EACH VALVE							
BYPASS							
FURN & INSTALL LIMIT SWS.							
TESTS - MAGNAFLUX							
TESTS - X-RAY							
NO. REQUIRED Unit 1 / Unit 2	1 / 1	2 / 2	1 / 1				
TOTAL COST							
MANUFACTURER							
MODEL OR FIG. NO.							
VENDOR							
P/O (8 ITEM) NO.	P-104 / 4.13, 4.14	P-104 / 4.1, 4.2	P-104 / 3.9, 3.10				
FOREIGN PRINT NO.							
WELD END DWG. REFERENCE	8031-P-300	SHEETS 75 & 72					
P & I DIAGRAM REF.	M-44	11-52	M-49				
LOCATION DWG. REF.							
(1) SEISMIC ITEM: (YES) (NO)	NO	YES	YES				
REMARKS	(1) REFER TO 2.3.3 OF SPEC 8031-P-350 (2) REFER TO SPEC 8031-G-11						



**POWER DIVISION
ENGINEERING**

VALVE DATA SHEET
MOTOR OPERATED

Limerick Generating Station
Units 1 & 2
Philadelphia Electric Company

JOB No 8031
Attachment to Re-
quisition No. 8031-P-104
P-104

SHEET 8 OF 22

DATE	APPROVALS	MATL	SUPV	CHK	OR	ENG	DESCRIPTION
8-24-72							2 REVISED AS MARKED
7-7-74							6 REVISED AS MARKED
8-16-74							3 REVISED AS MARKED
VALVE NO.	MO-51-1F023 MO-51-2F023	MO-41-1F032A,B MO-41-2F032A,B	MO-41-109A,B MO-41-209A,B				
SERVICE TYPE	REACTOR HEAD SPRAY	FEED WATER INTO BOILER	STARTUP RECIRC.				
LINE OR EQUIPMENT REF.	ECB1-111,211	DBB-103,203,104,204	DBB-103,203,104,204				
MOTOR RATING (POWER)	240V DC	460V, 3Φ, 60HZ	460V, 3Φ, 60HZ				
SIZE	6"	24"	16"				
COMMODITY	WATER OR STEAM	FEEDWATER	FEEDWATER				
DESIGN/MAX. PRESS.	115 / 133	1777 / 2132	1777 / 2132				
DESIGN/MAX. TEMP.	582 / 582	459 / 459	459 / 459				
FLOW	NORMAL	17,250 GPM	17,566 GPM				
VALVE RATING	600 # ANSI	SEE ITEM DESCRIPTION					
TYPE ENDS/RATING	B.W. SCH. 80	B.W. SCH. 120	B.W. SCH. 120				
BODY MATERIAL	ASME SA-216 GR WCB	BR SA-105 GR T					
TRIM MATERIAL							
SEAT FACINGS	STELLITE						
PACKING	CRANE 187-T						
TYPE BONNET	OR CAP	BOLTED	PRESSURE SEAL				
TYPE OF SEATS	INTEGRAL OR RENEWABLE						
TYPE OF DISC	PLUG	SWING OR TILTING	FLEXIBLE WEDGE				
BYPASS SIZE & TYPE							
HANDWHEEL PULL-BREAKAWAY							
ACT. OP. DIFF. PRESS. (max)	1115 PSI	0	700 PSI				
PORT DIAMETER							
PRESS. DROP (PSI)							
VELOCITY (FPS)							
(2) OPERATOR CLASS		I (IEEE STD. 323)					
MOTOR OPER (TYPE/SIZE/SPD)							
OPER. SPEED FT/MIN/MP	STANDARD	STANDARD	STANDARD				
TIME TO OPEN							
TIME TO CLOSE							
FULL LOAD CURRENT							
STALLED ROTOR CURRENT							
OPERATOR INSULATION CLASS		H	H				
COST - EACH VALVE							
BYPASS							
FURN & INSTALL LIMIT SWS.							
TESTS - MAGNAFLUX							
TESTS - X-RAY							
NO. REQUIRED Unit 1 / Unit 2	1 / 1	2 / 2	2 / 2				
TOTAL COST							
MANUFACTURER							
MODEL OR FIG. NO.							
VENDOR							
P/O (B ITEM) NO.	P-104 / 6.1, 6.2	P-104 / 9.1, 9.2	P-104 / 3.15, 3.16				
FOREIGN PRINT NO.							
WELD END DWG. REFERENCE	8031-P-300	SHEETS 75 & 72					
P & I DIAGRAM REF.	M-51	M-41	M-41				
LOCATION DWG. REF.							
(1) SEISMIC ITEM: (YES) (NO)	YES	YES	YES				
REMARKS	(1) REFER TO 2.3.3 OF SPEC. 8031-P-350 - (2) REFER TO SPEC 8031-G-11						

VALVE DATA SHEET
MOTOR OPERATED



Limerick Generating Station
Units 1 & 2
Philadelphia Electric Company

JOB No 8031

Attachment to Requisition No. 8031
P-104

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REV.

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4-323-E
4-14-58

1-7-74		DATE	APPROVALS		MATERIAL		SUPPLY		CHECK		DR		ENG	
VALVE NO.		A0-46-1F121		A0-01-109		A0-01-108								
SERVICE		CRD WATER TO REACTOR		MAIN STEAM TO HETWELL SPARGERS		MAIN STEAM TO RFPTURBINE								
TYPE		POWER ASSIST CHECK		GATE		GATE								
LINE OR EQUIPMENT REF.		DBA-109 (209)		EBB-106 (206)		EBB-104 (204)								
POWER RATING (SOLENOID)		115V, 1Φ, 60HZ		115V, 1Φ, 60HZ		115V, 1Φ, 60HZ								
SIZE		3"		6"		6"								
COMMODITY		CONDENSATE WATER		MAIN STEAM		MAIN STEAM								
DESIGN/MAX. PRESS. PSIG		1750 / 1750		1115 / 1337		1115 / 1337								
DESIGN/MAX. TEMP. °F		150 / 150		582 / 582		582 / 582								
FLOW		15 GPM				280000 LBS/HR								
VALVE RATING		900# (ASME)		SEE ITEM DESCRIPTION		SEE ITEM DESCRIPTION								
TYPE ENDS/RATING		B.W. / SCH. 80		B.W. / SCH. 80		B.W. / SCH. 80								
BODY MATERIAL		ASME SA-216 GR.		WCB OR SA-105		GR. 21								
TRIM MATERIAL														
SEAT FACINGS		STELLITED												
PACKING		CRANE 187-I OR EQUAL												
TYPE BONNET		PRESSURE SEAL												
TYPE OF SEATS		INTEGRAL OR RENEWABLE												
TYPE OF DISC		SWING		FLEXIBLE WEDGE										
BYPASS SIZE & TYPE														
HANDWHEEL PULL-BREAKAWAY														
ACT. OP. DIFF. PRESS. MAX		0		1352 PSI		1352 PSI								
PORT DIAMETER														
PRESS. DROP (PSI)														
VELOCITY (FPS)														
VALVE WEIGHT LBS														
AIR SUPPLY PRESS. PSIG		80 MIN. / 100 MAX												
OPER. SPEED FT/MIN/HP		STANDARD		STANDARD		STANDARD								
TIME TO OPEN														
TIME TO CLOSE														
FAILURE MODE		FAIL CLOSE		FAIL OPEN		FAIL OPEN								
(2) SOLENOID OPERATING FORM		I		I		I								
OPERATOR WEIGHT														
COST - EACH VALVE														
BYPASS														
FURN & INSTALL LIMIT SWS.														
TESTS - MAGNAFLUX														
TESTS - X-RAY														
NO. REQUIRED UNIT 1 / UNIT 2		1 / 1		1 / 1		1 / 1								
TOTAL COST														
MANUFACTURER														
MODEL OR FIG. NO.														
VENDOR														
P/O (8 ITEM) NO.		P-104 / 11.1, 11.2		P-104 / 13.3 & 13.4										
FOREIGN PRINT NO.														
WELD END DWG. REFERENCE														
P & I DIAGRAM REF.		M-46		M-01		M-01								
LOCATION DWG. REF.														
(1) SEISMIC ITEM: (YES) (NO)		YES		YES		YES								
REMARKS		(1) REFER TO 2.3.3 OF SPEC 8031-P-350		(2) REFER TO 5.3.3(b) OF SPEC 8031-P-350										



VALVE DATA SHEET
Air OPERATED

LIMERICK GENERATING STATION UNITS 1 & 2
PHILADELPHIA ELECTRIC COMPANY

JOB No

Attachment to
M/R No.
8031-P-104

SHEET 11 OF 22

REV.
7

10 REVISED AS MARKED
7 REVISED AS MARKED
0 ISSUED FOR T.A.C.T.

DATE	AD-69-145 AD-69-245	
	VALVE NO.	
APPROVALS	SERVICE TYPE	LOCK VALVE BETWEEN 1ST & 2ND HOLDUP PIPES GATE
	LINE OR EQUIPMENT REF.	ERG 107(207)
MATERIAL	SOLENOID POWER RATING	115V 10 AMP 2
	SIZE	4"
SUPPLY	COMMODITY	OFF-GAS
	DESIGN/MAX. PRESS.	1110/1330
CME	DESIGN/MAX. TEMP.	110/110
	FLOW	75 SCFM
OR	VALVE RATING	600# ANSI
	TYPE ENDS/RATING	SLH 80/8W
Eng'	BODY MATERIAL	ASME SA 216 WCB OR SA-105 GR11
	TRIM MATERIAL	
6	SEAT FACINGS	STELLITE
	PACKING	CRANE 187-I OR EQUAL
6	TYPE BONNET	BOLTED
	TYPE OF SEATS	INTEGRAL OR RENEWABLE
6	TYPE OF DISC	FLEXIBLE WEDGE
	BYPASS SIZE & TYPE	
6	HANDWHEEL PULL-BREAKAWAY	
	ACT. OPER. DIFF. PRESS.	21 PSI
6	PORT DIAMETER	
	PRESS. DROP (PSI)	MIN. POSSIBLE
6	VELOCITY (FPS)	
	VALVE WEIGHT LBS	
6	AIR SUPPLY PRESS. PSIG	80 MIN/100 MAX
	OPER. SPEED FT/MIN/HP	
6	TIME TO OPEN	
	TIME TO CLOSE	
6	FULL LOAD CURRENT (440V, 3Ø, 60C)	
	SOLENOID OPERATING FORM	I
6	FAILURE MODE	FAIL CLOSE
	COST - EACH VALVE	
6	BYPASS	
	FURN & INSTALL LIMIT SWS.	
6	TESTS - MAGNAFLUX	
	TESTS - X-RAY	
6	NO. REQUIRED UNIT 1 / UNIT 2	1 / 1
	TOTAL COST	
6	MANUFACTURER	
	MODEL OR FIG. NO.	
6	VENDOR	
	P/O (8 ITEM) NO.	P-104/18.1, 18.2
6	FOREIGN PRINT NO.	
	WELD END DWG. REFERENCE	SPEC 8031-P-300 SHEETS 72 & 75
6	P & I DIAGRAM REF.	M-69
	LOCATION DWG. REF.	
6	*SEISMIC ITEM (YES)(NO)	NO
	REMARKS	*REFER TO 2.3.3 OF SPEC 8031-P-350

BECHTEL CORPORATION



POWER DIVISION
ENGINEERING


VALVE DATA SHEET
AIR OPERATED

LIMERICK GENERATING STATION UNITS 1 & 2
PHILADELPHIA ELECTRIC COMPANY



JOB No 8031
ATTACHMENT TO
M/R No.
8031-P-104
SHEET 15 OF 22
REV 6

1-3-78 DATE	1-15-78 DATE	1-15-78 DATE	1-15-78 DATE
	MO-49-1F007	MO-49-1F008	MO-01-150
	MO-49-2F007	MO-49-2F008	MO-01-250
VALVE NO.			
SERVICE	RCIC TURBINE	RCIC TURBINE	STEAM TO
TYPE	STEAM SUPPLY	STEAM SUPPLY	AIR EJECTORS
LINE OR EQUIPMENT REF.	Y-PATTERN GLOBE VALVE		GATE
MOTOR RATING	DBA-107, 207	DBA 107, 207	EBB-101
SIZE	460V, 3 ϕ , 60HZ	460V, 3 ϕ , 60HZ	460V, 3 ϕ , 60HZ
COMMODITY	3"	3"	4"
DESIGN/MAX. PRESS. PSIG.	STEAM	STEAM	STEAM
DESIGN/MAX. TEMP. °F	1250 / 1337	1250 / 1337	1115 / 1337
FLOW LBS/HR MAX	575 / 582	575 / 582	582 / 582
VALVE RATING	33,000	33,000	23,000
TYPE ENDS/RATING	900# ASME	900# ASME	SEE ITEM DESCRIPTION
BODY MATERIAL	BW / SCH 160	BW / SCH 160	BW / SCH 80
TRIM MATERIAL	SA 216 GR WCB	SA 105	
SEAT FACINGS	STELLITE		
PACKING	CRANE 187-I		
TYPE BONNET	PRESSURE SEAL		
TYPE OF SEATS	INTEGRAL / RENEWABLE		
TYPE OF DISC			FLEX, WEDGE
BYPASS SIZE & TYPE			
HANDWHEEL PULL-BREAKAWAY			
ACT. OP. DIFF. PRESS. MAX	1337 PSI	1337 PSI	1337 PSI
PORT DIAMETER			
PRESS. DROP (PSI) MAX	1	1	
VELOCITY (FPS)			
VALVE WEIGHT LBS			
MOTOR OPER (TYPE/SIZE/SPD)	(2) CLASS I (IEEE STD 323)		
OPER. SPEED FT/MIN/HP			STANDARD
OPER CLASS INSULATION	H	H	H
TIME TO CLOSE MAXIMUM	7.2 SEC.	7.2 SEC.	
FULL LOAD CURRENT (460V, 3 ϕ , 60C)			
STALLED ROTOR CURRENT			
MOTOR OPERATOR WEIGHT			
COST - EACH VALVE			
BYPASS			
FURN & INSTALL LIMIT SYS.			
TESTS - MAGNAFLUX			
TESTS - X-RAY			
NO. REQUIRED UNIT 1 / UNIT 2	1 / 1	1 / 1	1 / 1
TOTAL COST			
MANUFACTURER			
MODEL OR FIG. NO.			
VENDOR			
P/O (8 ITEM) NO.	P-104 / 22.1, 22.2	P-104 / 22.3, 22.4	P-104 / 4.27, 4.28
FOREIGN PRINT NO.			
WELD END DWG. REFERENCE	8031-P-300,	SHEETS 72 & 75	
P & I DIAGRAM REF.	M-49	M-49	M-01
LOCATION DWG. REF.			
(1) SEISMIC ITEM: (YES) (NO)	YES	YES	YES.
REMARKS	(1) REFER TO 2.3.3 OF SPEC 8031-P-350		
	(2) REFER TO 8031-G-11		

12 REVISED AS MARKED
7 ADDED THIS SHEET
24. DESCRIPTION

 DUPONT CORPORATION PHILADELPHIA ELECTRIC COMPANY	VALVE DATA SHEET MOTOR OPERATED		8031 ATTACHMENT TO M/R NO 8031-P-104 SHEET 18 OF 22	REV. 12
	LIMERICK GENERATING STATION UNITS 1 & 2 PHILADELPHIA ELECTRIC COMPANY			

9-14-79
 7-15-75
 15 REVISED AS MARKED
 7 ADDER THIS SHEET
 22V. DESCRIPTION

VALVE NO.	MD-55-1FO12 MD-55-2FO12	MD-55-1FO11 MD-55-2FO11
SERVICE	HPCI MIN FLOW	HPCI PUMP TEST
TYPE	RECIRCULATION	TO COND TANK
LINE OR EQUIPMENT REF.	GL2BE	GATE
MOTOR RATED POWER	EBB-130 (230)	EBB-134 (234)
SIZE	240V D.C.	240V D.C.
COMMODITY	4"	10"
DESIGN/MAX. PRESS.	WATER	CONDENSATE
DESIGN/MAX. TEMP.	1396 / 1625	1396 / 1625
FLOW	170 / 170	170 / 170
VALVE RATING	750 G.P.M.	5600 G.P.M.
TYPE ENDS/RATING	900# ASME	900# ASME
BODY MATERIAL	BW SCH 80	B.W. SCH 120
TRIM MATERIAL		SA 216 WCB / SA-105
SEAT FACINGS	STEELITE	STELLITE
PACKING	CRANE 187-I	CRANE 187-I
TYPE BONNET	PRESSURE SEAL	PRESS. SEAL
TYPE OF SEATS	INTEGRAL	INTEGRAL / RENEWABLE
TYPE OF DISC		
BYPASS SIZE & TYPE		
HANDWHEEL PULL-BREAKAWAY		
ACT. OP. DIFF. PRESS.	1625 PSI	1000 PSI
PORT DIAMETER		
PRESS. DROP (PSI)		
VELOCITY (FPS)		
VALVE WEIGHT LBS		
MOTOR OPER (TYPE/SIZE/SPD)		CLASS 1 (IEEE 323)
OPER. SPEED FT/MIN/HP	STANDARD	STANDARD
OPER CLASS INSULATION	H	H 
TIME TO CLOSE		
FULL LOAD CURRENT (440V, 3P, 60C)		
STALLED ROTOR CURRENT		
MOTOR OPERATOR WEIGHT		
COST - EACH VALVE		
BYPASS		
FURN & INSTALL LIMIT SWS.		
TESTS - MAGNAFLUX		
TESTS - X-RAY		
NO. REQUIRED UNIT1/UNIT2	1 / 1	1 / 1
TOTAL COST		
MANUFACTURER		
MODEL OR FIG. NO.		
VENDOR		
P/O (8 ITEM) NO.	P-104 / 5.13, 5.14	P-104 / 3.27, 3.28 
FOREIGN PRINT NO.		
WELD END DNG. REFERENCE	8031-P-300, SHEETS 72 & 75	
P & I DIAGRAM REF.	M-55	M-55
LOCATION DNG. REF.		
(1) SEISMIC ITEM	YES	YES
REMARKS	(1) REFER TO 2.3.3 OF SPEC. 8031-P-350	

DATE	APPROVALS	MATL	SUPV	CHK	DR	ENG	DESCRIPTION
9-14-74							13 REVISED AS MARKED
4-13-79							14 REVISED AS MARKED
4-12-79							15 ISSUED FOR CONSTRUCTION
VALVE NO.	DBA-GB-F-N-41-1017 & 2017	DBA-GB-N-41-1016 & 2016	DBA-GB-F-N-41-1026 & 2026				
SERVICE	REACTOR WATER CLEAN-UP SYSTEM	REACTOR WATER CLEAN-UP SYSTEM	MAIN STEAM DRAIN HDR				
VALVE TYPE	GLOBE	GLOBE	GLOBE				
LINE OR EQUIPMENT REF.	DBA-112, 212	DBB-112, 212	DBA-105, 205				
VALVE CLASS	DBA	DBA	DBA				
SIZE	4"	4"	3"				
COMMODITY	WATER	WATER	STEAM/CONDENSATE				
DESIGN/MAX. PRESS.	1400 / 1540	1777 / 2132	1250 / 1337				
DESIGN/MAX. TEMP.	582 / 582	459 / 459	582 / 582				
FLOW	480 GPM	480 GPM	506 GPM				
VALVE RATING	900 #	996 #	900 #				
TYPE ENDS/RATING	SCH 80 B.W.	SCH 120 B.W.	SCH 160 B.W.				
BODY MATERIAL	SA 216 GR WCB OR SA-105						
TRIM MATERIAL							
SEAT FACINGS	STELLITE						
PACKING	J.C. 187-I						
TYPE BONNET	PRESSURE SEAL						
TYPE OF SEATS	INTEGRAL OR RENEWABLE						
TYPE OF DISC	PLUG OR CONE						
OPER. DIFF. PRESS (MAX)	1540 PSI	1540 PSI	1250 PSI				
MAX. SEC. TO OPEN/CLOSE	NA	NA	NA				
LOCATION @ AMB. TEMP	SEE DESIGN SPEC	8031-P-104					
IN CONTAINMENT - YES/NO	YES	NO	YES				
SAFETY RELATED - YES/NO	YES	YES	YES				
SEISMIC CAT. 1 - YES/NO	YES	YES	YES				
THROTTLING SERVICE - YES/NO	NO	NO	NO				
TORQUE BACK SEATING - YES/NO	NA	NA	NA				
TORQUE OUTPUT MAX (MAX)	NA	NA	NA				
REMOTE POSITION INDICATOR	NONE	NONE	NONE				
FAIL SAFE MODE: Open/Clsd/Lkd	NA	NA	NA				
OPERATOR							
MANUFACTURER	*						
MODEL	*						
WEIGHT (LBS)	*						
VALVE							
WEIGHT (LBS)	*						
Cv VALUE	*						
MANUFACTURER	*						
MODEL OR FIG. NO.	*						
VENDOR	*						
P/O (& ITEM) NO.	P-104 / 23.1	P-104 / 23.1	P-104 / 23.2				
FOREIGN PRINT NO.	*						
WELD END DWG. REFERENCE	8031-P-300 SHEETS 72 & 75						
P & I DIAGRAM REF.	M-41	M-41	M-41				
LOCATION DWG. REF.							
NO. REQ. UNIT 1 / UNIT 2	1 / 1	1 / 1	1 / 1				
REMARKS	* TO BE COMPLETED BY THE VENDOR						



TPO

VALVE DATA SHEET
LIMERICK GENERATING STATION
UNITS 1 & 2


JOB 8031

ATTACHMENT TO
M/R 8031-P-104

REV.

15

DATE	APPROVALS	MATL	SUPV	CHK	DR	ENG	DESCRIPTION
							16 ADDED THIS PAGE
							VALVE NO.
							MO-41-142, 143 MO-41-242, 243
							SERVICE
							MAIN STEAM DRAIN
							VALVE TYPE
							GATE
							LINE OR EQUIPMENT REF.
							ERD-108/208
							VALVE CLASS
							DBC
							SIZE
							3"
							COMMODITY
							STEAM / CONDENSATE
							DESIGN/MAX. PRESS.
							1115 / 1337
							DESIGN/MAX. TEMP.
							582 / 582
							FLOW
							500 GPM
							VALVE RATING
							900# ASME
							TYPE ENDS/RATING
							DW / SCH 160
							BODY MATERIAL
							ASME SA-105
							TRIM MATERIAL
							STELLITE
							PACKING
							CRANE 187-I or EQ.
							TYPE BONNET
							PER PARA. 3.5 *
							TYPE OF SEATS
							INTEGRAL / RENEWABLE
							TYPE OF DISC
							FLEXIBLE WEDGE
							ACTUATOR
							OPER. DIFF. PRESS (MAX)
							1337
							MAX. SEC. TO OPEN/CLOSE
							STANDARD
							LOCATION @ AMB. TEMP
							IN CONTAINMENT - YES/NO
							NO
							SAFETY RELATED - YES/NO
							YES
							SEISMIC CAT 1 - YES/NO
							YES
							THROTTLING SERVICE - YES/NO
							NO
							TORQUE BACK SEATING - YES/NO
							NO
							TORQUE OUTPUT MAX (MAX)
							YES
							REMOTE POSITION INDICATOR
							FAIL SAFE MODE: Open/Clsd/Lkd
							ELECTRIC MOTOR: Hz OR DC
							460V, 34, 60 Hz
							NORMAL VOLTAGE
							MINIMUM VOLTAGE
							MAXIMUM VOLTAGE
							AIR MOTOR
							NORMAL SUPPLY PRESS.
							MINIMUM SUPPLY PRESS.
							CLASS I (IEEE)
							YES
							MANUFACTURER
							MODEL OR FIG. NO.
							VENDOR
							P/O (& ITEM) NO.
							P-104/27.1, 27.2
							FOREIGN PRINT NO.
							WELD END DWG. REFERENCE
							P & I DIAGRAM REF.
							M-41
							E-3
							LOCATION DWG. REF.
							1 / 1
							No Req'd: Unit 1/Unit 2
							ACTIVE YES/NO
							NO
							REMARKS
							* SPEC P-354

M-323-E 3-19-74	 TPO	VALVE DATA SHEET MOTOR OPERATED		JOB NO. 8031	REV. 16
		LIMERICK GENERATING STATION UNITS 1 & 2 PHILADELPHIA ELECTRIC COMPANY		Attachment to M/R No. 8031-P-104	
				SHEET 21 OF 22	

[illegible]

Reg. Guide 1.48

Valve Operability Test Requirements

- 20.1 Certain of the "active" valves, specified herein, shall be tested for operability during a postulated seismic disturbance, the test being conducted in conformance with the following general conditions.
- 20.1 The valve shall be placed in a suitable test stand with pipe lengths attached to each end of the valve by the same method as in actual installation, i. e. welded for weld end valves, flanged for flanged end valves. The pipe lengths attached shall be at least 12" long or a length equal to the pipe nominal diameter, whichever is longer. The attached pipe lengths shall be rigidly attached to the test stand, preferably by welding. The valve actuator and all other appurtenances shall be mounted on the valve as in a normal plant installation. The valve shall be oriented in the test stand such that the external loads applied impose the most adverse conditions for valve actuation.
- 20.2 The valve shall be internally pressurized to the maximum operating pressure as specified in the Valve Data Sheets, (Attachment to the procurement documents), and concurrently a static resultant load (the specified "g" force times the weight of the topworks) shall be applied to the center of mass of the topworks, in the direction of the weakest axis of the yoke, simulating the maximum acceleration load. The "g" value to be used to establish the maximum acceleration load is listed in the table and is the "maximum" "g" "force" sustainable by the valve as derived by the analysis made specifically to determine this force. For the opening cycle on a gate valve, the pressure shall be applied in a manner which establishes the maximum specified differential pressure across the disc. For globe valves and all other valve cycling the valve body shall be internally pressurized to the specified value.
- 20.3 The valve shall then be actuated, using minimum actuator supply as defined in the Valve Data Sheet. The valve shall be operated through two full cycles, a cycle being defined as closed-to-open-to-closed, or vice versa. The valve shall move to the safety related position within the time specified in the Valve Data Sheets. In addition, if any evidence of irregular stem movement or abnormal operation is observed, Bechtel engineering shall be contacted for guidance.

- 20.4 In the event that the valve fails to meet the operability test at "Maximum 'g'", the test for that valve shall be increased in scope to establish a value of "Max 'g'" which the valve can withstand.
- 20.5 Subsequent to the completion of the valve functional test, the seat leak test, as outlined in the valve Technical Specification hydrostatic test section, shall be repeated.
- 20.6 The format for documenting this Operability Test is left optional with the Seller, but the information recorded shall include at least the following:
1. Test result: satisfactory or unsatisfactory.
 2. Valve identification: P.O. No., Item No. Tag. No.
 3. Internal test pressure-psig
 4. Lateral applied load: Pounds (max "g" value times the weight of the valve topworks)
 5. Air supply pressure (air operators) - 80 psig
 6. Applied Motor voltage (Minimum Voltage to be 80% of rated voltage 460V = 368V)
 7. Cycle time under load
 8. Post-test seat leak rate
 9. List of test equipment used including serial numbers and calibration date.
- 21.0 Test data shall be submitted to and approved by the Buyer prior to acceptance of valve for shipment.
- 22.0 Subsequent to satisfactory completion of the test and Buyer's approval of the test data, the Seller shall remove the stub-end pipes, re-machine the valve weld ends and otherwise restore the valve to original condition and shall validate his original warranty.
- 23.0 The supplier shall submit to the Buyer for approval, procedures to be used for the functional testing noted above. The procedures shall include all pertinent requirements and sample copies of documentation to be supplied.

Note: These requirements are to be considered general. Test procedures with exceptions will be approved on a case by case basis.

Max-"G" Force Table Attachment 4 to
MIR 8031-P-104
Page 1

O.	Item #	Max G	Velan Report #
D104BC	1.4	8.8	SR6594
	3.10	11.8	SR6589
	3.26	6.5	SR6590
	4.2	6.5	SR6590
	4.28	7.2	SR6579

Max "G" Force table

P.D.	Item #	Max "G"	Report #	Comments
9104CC	5.10	13.31	81.204	
	5.8	11.36	81.203	
	6.8	7.72	81.206	
	21.4	4.66	81.207	
	22.4	4.56	81.208	△23

ATTACHMENT 5 TO MATERIAL REQUISITION
QUALITY SURVEILLANCE REQUIREMENTS

1.0 SCOPE

This Attachment details the responsibilities with regard to the quality surveillance of material/equipment covered by this MR and outlines the responsibilities and activities of Bechtel Supplier Quality Representative (SQR).

2.0 RESPONSIBILITY

The Supplier has the prime responsibility for implementation of the quality program, as well as for proper manufacture, inspection and testing of all material and work prior to its presentation to the Bechtel SQR. The performance (or waiver) of quality surveillance activities by the Owner, Bechtel, or their representatives, does not relieve the Supplier of any obligations to perform in accordance with all requirements of the procuring documents.

3.0 BECHTEL SQR ACTIVITIES

The Bechtel SQR is to be allowed free access to all areas where work involving this order is in progress. This includes access necessary to verify the implementation of all aspects of the quality program as well as access to sub-suppliers' facilities.

Quality surveillance by the Bechtel SQR of material/equipment produced under this MR shall include, but not be limited to the Witness and Hold Points listed in attached Tables 1 and 2. Additional Witness and Hold Points may be established by the Bechtel SQR if manufacturing or related activities warrant.

4.0 WITNESS POINTS

Witness Points are critical steps in manufacturing and testing where the Supplier is obligated to notify the Bechtel SQR at least five (5) days in advance of the start of operation/test so that it may be witnessed. The Supplier may proceed with the work past a witness point if the Bechtel SQR is not available at the appointed time.

5.0 HOLD POINTS

Hold Points are critical steps in manufacturing and testing where the Supplier is obligated to notify the Bechtel representative at least five (5) days in advance of the start of operation/test so that it may be witnessed. Final release prior to shipment is also a hold point. The Supplier may not proceed with the work past a hold point except by written waiver/agreement by the Bechtel SQR.

6.0 INITIAL QUALITY SURVEILLANCE VISIT

6.1 The Supplier shall furnish to the Bechtel SQR the names and addresses of sub-suppliers with description of the work to be subcontracted, when it falls under either of the following categories:

- 1) Custom fabricated equipment involving fabrication, operation, examination or testing, that will ship directly to the jobsite, from the sub-supplier's plant. (This does not include standard off-the-shelf equipment.)
- 2) Custom fabricated equipment that will ship to the prime supplier for further assembly and inspection, but where the fabrication, operation, examination or testing specified to be witnessed are performed at the sub-supplier's facilities and will not be repeated in the prime supplier's shop. (This does not include standard off-the-shelf equipment.)

7.0 PROGRESSIVE QUALITY SURVEILLANCE VISITS

7.1 The Supplier shall provide evidence to the Bechtel SQR that all engineering documents requiring Bechtel review, as shown on G-321-E Form, are Status Code 1 prior to release for shipping. Any exceptions require Bechtel approval.

7.2 The Supplier's quality verification documentation package with the G-321-V Form as a cover sheet, shall be presented to the Bechtel SQR for review, signature and dating, prior to granting a release for shipping. Missing, incomplete, or incorrect documentation shall be treated as a non-conformance and may be cause for denying the Supplier permission to release the items for shipment.

- 7.3 The Supplier's quality verification documents that do not require submittal to Bechtel and/or the Owner shall be available to the Bechtel SQR for review and verification. These documents shall be retained by the Supplier as required by the applicable standard or code, but in no case shall this time be less than the end of the warranty period.

TABLE 1

The following Bechtel Supplier Quality Surveillance Witness and hold points are required:

Witness Points

<u>Valve Part or Assembly</u>	<u>Operation, Test, or Examination</u>
Pressure boundary parts, welds and hardfacing	In-process non-destructive examinations on a first operation basis for each examination required by the procurement documents and referenced ASME Code, Section III.
Welds	Fit up and welding on a first operation basis for each Bechtel approved procedure
Forgings, castings and welds	Heat treatments on a first operation basis for each Bechtel approved procedure
Pressure boundary parts and welds	Major weld repairs*

- * A major weld repair is defined to be repair of defects which exceed the lesser of 3/8 inch or 10% of the section thickness.

Hold Points

<u>Valve part or Assembly</u>	<u>Operation, Test, or Examination</u>
Casting and welds	Review and signoff of all completed radiographs
Assembled valve	Hydrostatic test **
Assembled valve	Seat leak test ** All functional and operational tests
Completed valve	Final inspection for materials of construction, dimensions, general workman- ship, cleanliness, marking, tagging, and preparation for shipment
Supplier's quality verification documents	Review and signoff for completeness and accuracy

** Hold point first operation basis only; balance to
be witness points.

TABLE 2A

Valve Operability Test Hold Points

Assembled Valve

Valve Operability Test
Verify test pressure,
applied test load, and
cycling of valve, seat
leak test

Supplier's quality
verification documents

Review and signoff for
completeness and accuracy

ENCL (5)

DESIGN SPECIFICATION

FOR
Nuclear Service C.S. Gate, Globe + Check Valves
500# ANSI Rating and Higher, 2 1/2" and Larger

FOR THE

LIMERICK GENERATING STATION

UNITS 1 & 2

PHILADELPHIA ELECTRIC COMPANY

Bechtel Power Corporation

San Francisco, California

CERTIFICATION:

I, the undersigned, certify that this Design Specification covers the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Subsubparagraph N A 3250.

<u>Signature</u>	<u>Date</u>	<u>Revision</u>
<i>Mark Schletz</i>	<i>1 5-20-82</i>	<i>7</i>
<i>Mark Schletz</i>	<i>1 2-2-82</i>	<i>8</i>
<i>Mark Schletz</i>	<i>1 4-28-83</i>	<i>9</i>

Reviewed to ASME Section III-1971 Edition with Winter 72 and Summer 73 Addenda and ASME Section III-1974 Edition including the Winter 74 Addenda and Code Cases 1516-2, 1567, 1622, & 1682.



NO.	DATE	REVISIONS	APPROVALS
	5/3/83	REVISED SHTS. 11, A3-6, & A15-1 AS NOTED.	RBA <i>[initials]</i> RPK <i>[initials]</i>
	8/19/82	Revised as shown on sheet i	<i>[initials]</i>
	5/25/82	Revised as shown on sheet i	<i>[initials]</i>

DESIGN SPECIFICATION
FOR
NUCLEAR SERVICE C.S. GATE, GLOBE & CHECK VALVES
600# ANSI RATING & HIGHER, 2½" & LARGER
FOR THE
LIMERICK GENERATING STATION
UNITS 1 & 2
PHILADELPHIA ELECTRIC COMPANY

Bechtel Power Corporation
San Francisco, California

CERTIFICATION:

I, Clyde H. Nichols, certify that the information listed in Appendix 1 herein, which is specifically required to be furnished in accordance with ASME Boiler and Pressure Vessel Code, Section III, Division 1, Paragraph NA-3250, is correct and complete.



<u>Clyde H. Nichols</u>	<u>APRIL 16, 1976</u>
Signature	Date
<u>Clyde H. Nichols</u>	<u>1/18/77</u>
<u>Clyde H. Nichols</u>	<u>3/24/77</u>

6	3-8-77	REVISED AS SHOWN ON SHEET 1	
5	1-21-77	REVISED AS SHOWN ON SHEET 1	
4	4-14-76	REVISED AS SHOWN ON SHEET 1	
NO.	DATE	REVISIONS	APPROVALS


* CONTINUATION SHEET TO FOLLOWING PAGE.


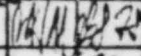

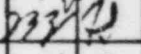

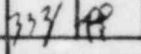
DESIGN SPECIFICATION
FOR
NUCLEAR SERVICE C.S. GATE, GLOBE & CHECK VALVES
600# ANSI RATING & HIGHER, 2½" & LARGER
FOR THE
LIMERICK GENERATING STATION
UNITS 1 & 2
PHILADELPHIA ELECTRIC COMPANY

Bechtel Corporation
San Francisco, California

CERTIFICATION:

I, B.H. Leonard, Jr., certify that this design specification covers the design requirements with respect to (1) function, (2) mechanical and operational loadings including vibration and shock, (3) environmental conditions, including radiation, and (4) the classification of the component as determined by its function and operating conditions, all as prescribed by Section III, Nuclear Power Plant Components, of the ASME Code.

B.H. Leonard, Jr. 7/31/72
Signature Date


	1-7-74	REVISED AS MARKED		
	9-20-72	ADDED PARA. 12.0 TO APPENDIX 3		CND
	8-14-72	ISSUED FOR CONSTRUCTION		CND
NO.	DATE	REVISIONS	APPROVALS	

* REVISIONS CONTINUED ON PRECEDING PAGE

5	4-29-77	REVISED SHEET A3-1 A3-2				6	7-11-77	REV'D SHEETS L.L., L.L. A3-4. ADDED A3-6			
	-	FRT SEAS-B	-	-	-	7	8-5-77	REVIS'D SHEETS A3-1, A3-2 added A3-1A, A3-2 added A3-6, A15-1, A15-8			
4	4-14-76	REVISED SHEET A3-2 ADDED NEW CERTIFICATION				8	8-19-82	Revised A3-1A, A3-2, A3-6			
3	7-15-75	REVISED SHEETS L.L. A3-4, A3-6, AA, A5 thru B				9	5-3-83	REVISED SHTS. L.L. A3-6, A15-1 AS NOTED			
2	1-27-74	REVISED SHTS L.L. A3-1, A3-3, A3-4, A5-1 THRU A5-5									
1	9-20-72	ADDED A3-4									
0	8-14-72	ISSUED FOR CONSTRUCTION									
NO.	DATE	REVISIONS	BY	CHK'D	APP'D	NO.	DATE	REVISIONS	BY	CHK'D	APP'D



POWER AND
INDUSTRIAL
DIVISION

FACING SHEET

LIMERICK GENERATING STATION, UNITS 1 & 2
PHILADELPHIA ELECTRIC COMPANY

Design Specification 8031-P-104

JOB No 8031

Sheet 1

REV.

9

CONTENTS

- I. Preface, Rev. 0
- II. Specification for Nuclear Service Valves, 8031-P-350, Rev. 8 △
9
- III. Appendices:
 - 1. ASME Criteria Locator, Sheets A1-1, Rev. 0 & A1-2, Rev. 0
 - 2. ASME Procedural Requirements, Sheet A2-1, Rev. 0
 - 3. Supplementary Criteria and Information for Valves,
Sheets A3-1, Rev. 7, A3-2, Rev. 7, A3-3, Rev. 5
A3-4, Rev. 6, A3-5, Rev. 4, A3-1A, Rev. 8, A3-1B, Rev. 7
A3-6, Rev. 9 △
9
 - 4. Form G-321-C Rev. 3, Drawings and Data Requirements
 - 5. Form 8031-QA, Sheets A5-1, A5-2, A5-3, A5-4, A5-5,
Rev. 5, Sheet A5-6, Rev. 8 Quality Assurance Documentation
Distribution Requirements △
9
 - 6. Specification 8031-G-1, Rev. 11, General Project Require-
ments for Purchase Orders △
9
 - 7. Specification 8031-G-13, Rev. 8, General Project
Requirements for Quality Assurance △
9
 - 8. Weld End Transition for Valves, Sheet 75, Rev. 16 of
Specification 8031-P-300. △
9
 - 9. Weld End Preparation, Sheet(s) 72-1, Rev. 14; 72.2, Rev. 3;
72.3, Rev. 14; 72.4, Rev. 2; 72.5 Rev. 7; 72.6 & 72.7,
Rev. 14 of Specification 8031-P-300. △
9
 - 10. Bechtel Standard Form 79, Rev. 4/68
 - 11. Bechtel Standard Form 3295 (11-71) - Statement of
Conformance
 - 12. Specification 8031-G-11, Rev. 17, General Project
Requirements for Valve Motor Operators △
9
 - 13. Specification 8031-G-4, Rev. 8, General Project
Requirements for Shop Painting for Mechanical and
Electrical Equipment △
9
 - 14. Bechtel Form ED-27 (SDDR)
 - 15. Dynamic Qualification and Functional Testing
Requirements ASME III Valves △
9

I. PREFACE

This Design Specification consists of design information as prescribed by Section III of the ASME Codes and of design information that is not specifically related to the Code. Of necessity, the two categories are interspersed.

For those primarily concerned with ASME criteria, such as enforcement authorities, reference should be made to Appendix No. 1, "ASME Criteria Locator", which identifies that information prescribed by the Code.

The particular valves to be furnished in accordance with this Design Specification and that design information which is subject to change are included in the associated Purchase Order, and, by reference, are part of this Design Specification.

APPENDIX 1ASME CRITERIA LOCATOR

I. GENERAL

Document/Para. No.

- | | |
|--|-------------------------|
| (a) Functions of the components or appurtenances including any dimensions upon which the functional performance depends. | App. 3 |
| (b) Seismic tests or calculations | Spec. P-350, Para 2.3.3 |
| (c) Environmental Conditions, including radiation | App. 3, Para 3.0 |
| (d) Code classification | See M/R, Identification |
| (e) Definition of the component and piping boundaries | Appendix 3 |
| (f) Procedure for review and certification of the Stress Reports | Appendix 2 |
| (g) Procedure for handling various Data Reports particularly with respect to transmittal to enforcement authorities | Appendix 2 |
| (h) Certification of the Design Specifications | Title Page |

II. MATERIALS

- | | |
|--|------------------------|
| (a) Hydrostatic testing | Spec.P-350, Para. 9.0 |
| (b) Requirements with respect to cleanliness | Spec.P-350, Para. 11.0 |
| (c) Requirements for heat treatment | Spec.P-350, Para. 7.0 |

APPENDIX 1

III. DESIGN AND OPERATING CONDITIONS	Document/Para. No.
(a) Design pressure and temperature	Valve Data Sheet and App. 3
(b) Thermal transients	Appendix B to Spec. P-350
IV. Marking, identification, crating and shipping requirements	Spec. P-350, Paras. 11.0 & 13.0

APPENDIX 2

ASME SECTION III

PROCEDURAL REQUIREMENTS

I. Stress Report

Review and Certification of Stress Report.

Two copies of the certified Stress Report required for Class 1 components by Paragraph NA-3352 of Section III shall be submitted to the Buyer, and one copy shall be made available to the authorized inspector.

II. Data Report

The Manufacturer shall send one copy of the Data Report directly to his authorized inspector and two copies to the Buyer's Project Superintendent. One of the latter copies will be sent to the enforcement authority at the job site.

APPENDIX 3

SUPPLEMENTARY CRITERIA AND
INFORMATION FOR VALVES

GENERAL REQUIREMENTS

1.0 Motor Operated Valves

- 1.1 All motor operated globe valves shall be considered "throttling service valves" and their operators shall be designed to maintain the valves at any intermediate position without drifting.
- 1.2 All motor operators must be sized to open and close the valve at the speeds indicated on the valve data sheets against the Actuator Operation Pressure Differential (ACT. OP. DIFF. PRESS. (MAX)), as listed on the valve data sheets) across the valve.

2.0 Position Switches

All air operated valves and valves marked with the exception letters "ZS" shall be equipped with 2-DPDT position switches with inductive load interrupting rating of at least 10 amp at 125-V AC or 1/2 amp at 125-V DC to indicate "FULL OPEN" and "FULL CLOSED" positions. The switch enclosure shall be NEMA 4, watertight.

Deleted

3.0 Environmental Condition

The valves shall be designed for the environmental conditions listed below.

3.1 Unless otherwise stated, valves shall be assumed located indoors and outside the drywell.

3.2 Normal Environmental Conditions (40 Years):

3.2.1 Outside Primary Containment

Temperature: 65°F min. to 120°F Max.
Pressure: 1/4" w.g. to atmospheric
Relative humidity: 50% ave. to 90% max.
Radiation: 1.35×10^6 rads (total integrated dose for 40 years).

3.2.2 Inside Primary Containment

Temperature: 65°F min. to 120°F Max.
Pressure: Atmospheric to .75 psig.
Relative humidity: 20% min. to 100% max.
Radiation: 1.37×10^7 rads (total integrated dose for 40 years).

3.3 Accident Conditions (180 days)

3.3.1 Outside Primary Containment

Temperature: 120°F
Pressure: Atmospheric
Relative humidity: 100%
Radiation: 4.8×10^6 rads gamma
and 1.38×10^6 rads beta

3.3.2 Inside Primary Containment:

Temperature: 340°F
Pressure: 44.0 psig
Relative humidity: 100%
Radiation dose: 5.91×10^7 rads gamma,
 1.18×10^7 rads beta

3.4 HELB

Valves outside primary containment exposed to HELB conditions shall be exposed to the following additional conditions.

Temperature: 511°F
Pressure: 9.9 psig.

3.5 Individual valves may be exposed to different environmental conditions as noted.

APPENDIX 3

Deleted

4.0 General Descriptions

Nuclear carbon steel valves, 2½" and larger, 600# rating or higher.

Butt weld ends; pressure seal bonnet or cap; O.S.&Y. for gate and globe valves; flexible wedge disc on sizes 4" and larger; swing or tilting disc on all check valves.

5.0 Materials

Bodies, Bonnets and Discs - Cast Carbon Steel, ASME SA-216 Gr. WCB, Forged Carbon Steel, ASME SA-105 Gr. II, ~~ASME SA-105.~~

NOTE: Materials are not required to be impact tested.

Stellited seating surfaces, other trim suitable for steam and water conditions within the limits of the pressure rating.

6.0 Weld End Transition and Preparation

Weld end transitions for valves shall be in accordance with "Type I" as shown in Specification 8031-P-300, Sheet 75. Ends shall be machined to match the Sch. pipe noted and configurations shown in Specification 8031-P-300, Sheet 72.

7.0 Design Pressure and Temperature7.1 All Items Except Those Marked with Exception Letter 'X'

Design pressure and temperature for motor and air operated valves are listed on the valve data sheets. For manually operated valves, design pressure and temperature for Class 1 valves, are listed on the valve data sheets and for Nuclear Classes 2 and 3 they shall not exceed the pressure-temperature ratings as listed in ASME Code, Section III, 1971 edition.

APPENDIX 37.2 Items Marked with Exception Letter 'X'

Use of MSS-SP-66 for design of these valves is permitted in accordance with NC-3512 or ND-3512. Under item description of these items, maximum operating pressure and temperature are listed. These conditions may exist in the piping where the valve is installed during 1% of the operating time or less and NC-3612.3 applies to the design of this piping.

8.0 Statement of Conformance for Q-Listed Items

The attached Form 3295 (11-71), listed as Appendix 11 on Sheet ii, shall be completed by the Buyer's inspector and signed by the Seller at time each shipment, or partial shipment of nuclear valves and their accessories, is ready to go forward from the Seller's facility. All nuclear valves are considered Q-Listed items.

9.0 Stop Check Valves

These valves shall be designed to normally function as check valves, but in addition are provided with means for positive shut off, using manual or mechanical actuators.

10.0 Corrosion Allowance

10.1 For Nuclear Class 1 valves, the valve body thickness shall include the following corrosion allowance as per Para NB-3541 of ASME Sec. III, 1971 edition.

Class 1 valves - 0.080" for all items in water service
0.120" for all items in steam service

10.2 For Nuclear Class 2 & 3 valves, the valve body thickness shall include the following corrosion allowance:

Class 2 & 3 valves - 0.080" for all manual valves.
0.080" for all motor and air operated valves in water service
0.120" for motor and air operated valves in steam service

11.0 DELETED

APPENDIX 312.0 POWER ASSIST CHECK VALVES, ITEMS 11.1 & 11.2

During normal operation, a spring loaded piston operator will be held open by air pressure. To insure that there is no accidental loss of air pressure, these operators will be connected to a critical air supply.

Upon a loss of water incident, the valve shall tightly shut as a normal check valve, and, in addition, the control room operator will assist in starting valve closure by sending a remote signal to open a fail-open solenoid valve releasing air pressure from the operator cylinder. All signal wiring will be furnished by others.

13.0 Storage Preparation13.1 Stem Packing

The wet stem packing shall be removed to prevent stem pitting. The new packing shall be identified and attached to the valve in a protective package.

13.2 Painting

The exterior surfaces of carbon steel valves, except for weld end preparations shall be primed with the vendor's standard shop primer.

13.3 Operators

The motor operators shall be painted per 8031-G-4, Para. G-4.3.2 OR G-4.3.3.

13.4 Storage

The valves shall be prepared and crated per paragraphs 11.2 and 13.2 of Specification 8031-P-350 to protect the valves during shipping and storage.

14.0 Deviation Requests

Deviation requests are to be submitted to Bechtel Project Engineering on Bechtel Form ED-27* for review and approval. A copy of the deviation request and the Bechtel Project Engineering reply are to be included in the documentation package for the affected item (or valve).

* AN ALTERNATE FORM PRESENTING EQUIVALENT INFORMATION MAY BE USED.

15.0 Drains

Underseat drains are no longer required for valves 12" and larger in size unless specifically required by Bechtel Project Engineering. Valves that already have drains installed are acceptable provided the approved outline drawing shows the drain.

16.0 Valves Requiring Drains - Items 21.1 - 21.4, 22.1 - 22.4

These valves are to be supplied with a 1" NPS drain on the upstream side of the valve. Drains are to be per para. 4.6 of Specification 8031-P-350.

17.0 Stop Check Valves, Items 14.1 & 14.2

These valves shall be designed to normally function as check valves. During normal operation, a spring loaded piston operator will be held open by air pressure. Upon accidental loss of operator air pressure, the valve shall stay open.

Upon a loss of water incident, the valve shall tightly shut, and in addition, a positive means of shut-off can be obtained by venting operator air pressure.

18.0 D.C. Valve Operators, Items 3.9, 3.10, 3.19-3.26, 5.7-5.10 21.3, 21.4, 22.3, 22.4

Terminal blocks on these operators shall be suitable for connection to wire sizes up to #2 AWG for motor power leads.

19.0 Special Seismic IIA Valves, Items 16.1, 16.2, 17.1 & 17.2

Valves having operators or similar features of extended proportions shall be able to withstand an inertial load of 3.0g in any direction in addition to the normal operating loads; the extended parts of the valves shall have a frequency of vibration greater than 33 cps. Fulfillment of this requirement shall be demonstrated either by tests or calculations. In either event, copies of the test data or calculations shall be submitted for approval by the Buyer prior to shipment of the valves.

20.0 Maximum Inertial Load Analyses

This paragraph supersedes para. 2.3.3 of Spec. 8031-P-350 and supplements the requirements of Appendix 15. Valves identified in the valve descriptions shall be capable of operation during and after loading due to combined hydrodynamic and seismic forces. Vendor shall provide the maximum inertial load capabilities of the valve and its extended portions determined by either test or analysis, which in all cases must be greater than 4.5 g's in both horizontal and vertical axes in addition to the normal operating loads. The extended portions of the valves shall be designed to have a frequency of vibration greater than 100 cps whenever possible. However, in no case shall the first natural frequency be less than 33 cps. In either case, the first natural frequency shall be reported to the Buyer.

9

This schedule of drawing and data requirements is to be fulfilled before rendering final invoices. See below for drawings required and dates due. Failure of Seller to comply with drawing and data requirements may result in order cancellation in the case of initial drawings, or final payment being withheld in the case of final drawings. Drawings are to be forwarded to:

BECHTEL CORPORATION • Power & Industrial Division • P. O. Box 3965 • San Francisco, California 94119

Attention: W.C. McDaniels

IN ADDITION, FORWARD WITH SHIPMENT, ONE SET OF ANY DRAWINGS NECESSARY FOR FIELD INSTALLATION. FORWARD COPY OF LETTER OF TRANSMITTAL TO: BECHTEL CORPORATION, PROCUREMENT DEPARTMENT, P. O. BOX 3965, SAN FRANCISCO, CALIFORNIA 94119, ATTENTION: EXPEDITOR NAMED ON PAGE 1 OF PURCHASE ORDER.

	TYPE OF DRAWINGS AND OTHER REQUIREMENTS	APPROVAL BEFORE FAB (YES/NO)	KIND OF COPIES	NUMBER REQUIRED	
				INITIAL	FINAL
A	OUTLINE DIMENSIONS AND FOUNDATION REQUIREMENTS	Yes	TRANSPARENCY PRINTS	1 1	1 1
B	CROSS SECTION WITH PARTS LISTS WITH PRICES	Yes	TRANSPARENCY PRINTS	1 1	1 1
C	SHOP DETAIL DRAWINGS		TRANSPARENCY PRINTS		
D	CERTIFIED PERFORMANCE DATA AND TEST REPORTS	*	TRANSPARENCY PRINTS		
E	WIRING DIAGRAMS	Yes	TRANSPARENCY PRINTS	1 1	1 1
F	CONTROL LOGIC DIAGRAMS		TRANSPARENCY PRINTS		
G	WELDING PROCEDURES	*	TRANSPARENCY PRINTS		
H	CODE CERTIFICATES, INSPECTION AND TEST REPORTS	*	ORIGINAL COPIES		
J	INSTRUCTIONS FOR ERECTION OR INSTALLATION, OPERATION AND MAINTENANCE	NO	MANUALS OF EACH TYPE		30
K	LIST OF RECOMMENDED SPARE PARTS FOR ONE YEAR'S OPERATION, WITH PRICES	NO	LISTS		6
L	COMPLETED BECHTEL CORPORATION DATA SHEETS	Yes	TRANSPARENCY		1
M	MATERIAL CERTIFICATIONS	*			
N	MANUFACTURERS QUALITY CONTROL, INSPECTION AND TEST PROCEDURES AND REPORTS	*			
O	Weld End Preparation Details	Yes	Transparency Prints	1 1	1 1
P	List of Valve & Operator Weight		Transparency Prints	1 1	1 1

*See Appendix A to Spec. 8031-P-350 for Q-A Documentation Required

*See Attached Q-A Documentation Distribution Requirements

Seller's drawings will be reviewed and approved only as to arrangement and conformance to the specifications and related drawings, and approval shall not be construed to relieve or mitigate the Seller's responsibility for accuracy or adequacy and suitability of materials and/or equipment represented thereon.

Final drawings must be certified and must show, adjacent to title block, Buyer's equipment title and number, mfr's serial no. and purchase order number. Final drawings shall be submitted in accordance with paragraph G1.8 of Specification 8031-G-1 or paragraph G2.6 of Specification 8031-G-2.

Initial drawings required within 15 days of receipt of firm order. Final drawings required within 15 days of receipt of initial drawings, or within 30 days of receipt of firm order if no initial drawings are requested.

7-16-75
1-7-74
8-14-72

APPROVALS

MATL.
SUPV.
CHR.
DR.
ENG.

DESCRIPTION

REV.

3 Revised as Marked
2 REVISED AS MARKED
0 ISSUED FOR CONSTRUCTION

DRAWINGS AND DATA REQUIREMENTS

DESIGN SPECIFICATION 8031-P-104

PHILADELPHIA ELECTRIC COMPANY
LIMERICK GENERATING STATION UNITS 1 & 2

JOB NO. 8031

Appendix 4

Sht. A4

REV.

3

FOR QUALITY ASSURANCE USE

(A) Mr. W.C. A. Dangle
Project Engineer
Bechtel Power Corporation
P.O. Box 3965
San Francisco, Calif. 94119

(B) Bechtel Power Corporation
Limerick Generating Station
P.O. Box A, Sanatoga Branch
Pottstown, PA. 19464
Attention: T.H. Gwin
Construction Manager

The required certified copies shall be furnished
prior to shipment of material.

1-10-74
1-7-74
1-18-74
DATE
APPROVALS
MATERIAL
SUPPLY
DR
REV. DESCRIPTION
2 REVISED AS MARKED
5 REVISED AS MARKED

DATA REQUIREMENTS	REFER TO SPECIFICATIONS PARAGRAPH	KIND OF COPIES	COPIES FOR APPROVAL TO (A) BEFORE FABRICATION	CERTIFIED COPIES	
				TO (A)	TO (B)
1 Qualified Welding and Hard Surfacing Procedures	See Appendix "A" to Specification 8031-P-350	REPRODUCIBLE	1		
		PRINTS	1		
2 List of Qualified Welders		REPRODUCIBLE	1		
		PRINTS	1		
3 QC Non-Destructive Examination and Test Procedures		REPRODUCIBLE	1		
		PRINTS	1		
4 Cleaning Procedures		REPRODUCIBLE	1		
		PRINTS	1		
5 Bending and Heat Treatment Procedures		REPRODUCIBLE	1		
		PRINTS	1		
6 Shipping Preparation Procedures		REPRODUCIBLE	1		
		PRINTS	1		
7 Welding Filler Metal Handling Procedure		REPRODUCIBLE	1		
		PRINTS	1		
8 Proposed QC/QA Program		REPRODUCIBLE	1		
		PRINTS	1		
9 Operational & Hydro Test Reports		REPRODUCIBLE			1
		PRINTS			1
10 Impact Test Results		REPRODUCIBLE			1
		PRINTS			1
11 Critical Dimension Checks		REPRODUCIBLE			1
		PRINTS			1
12 Radiographic Film		REPRODUCIBLE			1
		PRINTS			1
13 Magnetic Particle Test Results		REPRODUCIBLE			1
		PRINTS			1
14 Liquid Penetrant Test Results		REPRODUCIBLE			1
		PRINTS			1
15 Ultra Sonic Test Results		Prints			1
16 Mill Test Reports		Prints			1
17 Cleanliness Inspection Reports		Prints			1
18 Repair Procedures		Reproducible	1		
		Prints	1		
19 Deviation Requests		Prints	1		1
20 Code Data Report Form		Prints			1

PHILADELPHIA ELECTRIC COMPANY
LIMERICK GENERATING STATION UNITS 1 & 2

QUALITY ASSURANCE
DOCUMENTATION DISTRIBUTION
REQUIREMENTS

Job No. 8031

Design
Specification
8031-P-104
Appendix 5
Sheet A5-12

REV. 5

POWER AND
INDUSTRIAL
DIVISION

FORM 8031-QA

FOR QUALITY ASSURANCE USE

(A) Mr. W.C. McDavie
Project Engineer
Bechtel Power Corporation
P.O. Box 3965
San Francisco, Calif. 94119

(B) Bechtel Power Corporation
Limerick Generating Station
P.O. Box A, Sanatoga Branch
Pottstown, PA. 19464
Attention: T. L. Quinn Project
Construction Manager

The required certified copies shall be furnished
prior to shipment of material.

DATE	APPROVALS	MATERIAL	SUPPLY	DR.	REV.	DESCRIPTION	REFER TO SPECIFICATIONS PARAGRAPH	KIND OF COPIES	COPIES FOR APPROVAL TO (A) BEFORE FABRICATION	CERTIFIED COPIES	
										TO (A)	TO (B)
						1 Certified Design Reports	Appendix "A" to Specification 8031-P-350	REPRODUCIBLE			
						2 Test Data or/and Calculations Demonstrating Suitability for Seismic Loading		PRINTS		1	
						3		REPRODUCIBLE			
						4 Repair Reports	See Appendix "A" to Specification 8031-P-350	PRINTS			
						5 ALL POST WELD Heat Treatment Charts		REPRODUCIBLE			1
						6		PRINTS			
						7 Wall thickness Measurement Procedure		REPRODUCIBLE	1		
						8 Certification of Actual Test for Weld Filler Metal		PRINTS	2		
						9 Radiograph Report		REPRODUCIBLE			
						10 Certificate of Compliance	8.0 in App. 3	PRINTS			1
						11 Bechtel Std. Form 3295 (11-71)		REPRODUCIBLE			
						12 Visual Examination Report		PRINTS			1
						13		REPRODUCIBLE			
						14		PRINTS			
						15		REPRODUCIBLE			
						16		PRINTS			
						17		REPRODUCIBLE			
						18		PRINTS			
						19		REPRODUCIBLE			
						20		PRINTS			

** Form 3295 (11-71) must accompany shipment.

* For distribution, see footnote on Form 3295 (11-71)

Job No. 8031

PHILADELPHIA ELECTRIC COMPANY,
LIMERICK GENERATING STATION UNITS 1 & 2

QUALITY ASSURANCE
DOCUMENTATION DISTRIBUTION
REQUIREMENTS

Design
Specification
8031-P-104
Appendix 5
Sheet A5-2

REV.

5

REVISED AS MARKED
2 REVISED AS MARKED
5 REVISED AS MARKED

FOR QUALITY ASSURANCE USE

(A) Mr. W.C. McDaniel
Project Engineer
Bechtel Power Corporation
P.O. Box 3965
San Francisco, Calif. 94119

(B) Bechtel Power Corporation
Limerick Generating Station
P.O. Box A, Sanatoga Branch
Pottstown, PA. 19464
Attention: **T. McGWIN**
Construction Manager

The required certified copies shall be furnished
prior to shipment of material.

DATA REQUIREMENTS		REFER TO SPECIFI- CATIONS PARAGRAPH	KIND OF COPIES	COPIES FOR APPROVAL TO (A) BE- FORE FAB- RICATION	CERTIFIED COPIES	
CLASS I (IEEE) MOTOR OPERATORS					TO (A)	TO (B)
1	Certified Test Reports for	G-11.8.3	REPRODUCIBLE PRINTS			
2	Compliance to NEMA STD MG-1 as		REPRODUCIBLE PRINTS			
3	follows:		REPRODUCIBLE PRINTS			
4	a) MG1-12.42 Temperature Rise-a.c.		REPRODUCIBLE PRINTS	1		
5	b) MG1-12.63 Temperature Rise-d.c.		REPRODUCIBLE PRINTS	1		
6	c) MG1-12.02, 12.03 High Potential		REPRODUCIBLE PRINTS	1		
7	Tests		REPRODUCIBLE PRINTS			
8			REPRODUCIBLE PRINTS			1
9	Certified Test reports as follows:	G-11.8.4	REPRODUCIBLE PRINTS			
10	Valve operating performance at		REPRODUCIBLE PRINTS			
11	a) 80% rated voltage		REPRODUCIBLE PRINTS			1
12	Seat leakage test for Torque		REPRODUCIBLE PRINTS			1
13	b) Seated Valves only.		REPRODUCIBLE PRINTS			1
14	Operational Test for opening		REPRODUCIBLE PRINTS			1
15	c) against maximum differential pressure.		REPRODUCIBLE PRINTS			1
16	Motor Data Sheets, Form 182	G-11.11	REPRODUCIBLE PRINTS	1		
17	Motor Temperature Rise vs.		REPRODUCIBLE PRINTS			
18	Time Curve	G-11.8.3d	REPRODUCIBLE PRINTS	1		
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						



S.F.
POWER
DIVISION

PHILADELPHIA ELECTRIC COMPANY
LIMERICK GENERATING STATION UNITS 1 & 2

QUALITY ASSURANCE
DOCUMENTATION DISTRIBUTION
REQUIREMENTS

Job No. 8031

DESIGN
SPECIFICATION
8031-P-104
APPENDIX 5
SHEET A5-3

REV.

5

FORM 8031 OA

3 REVISED AS MARKED
3 REVISED AS MARKED
2 REVISED FOR CONSTRUCTION

REV. DESCRIPTION

ENG.

DR.

FILE

SHIPV.

APPROVALS

DATE

FOR QUALITY ASSURANCE USE

(A) Mr. W.C. McDaniel
Project Engineer
Bechtel Power Corporation
P.O. Box 3965
San Francisco, Calif. 94119

(B) Bechtel Power Corporation
Limerick Generating Station
P.O. Box A, Sanatoga Branch
Pottstown, PA. 19464
Attention: T.M. Gwin Project
Construction Manager

The required certified copies shall be furnished
prior to shipment of material.

DATA REQUIREMENTS		REFER TO SPECIFICATIONS PARAGRAPH	KIND OF COPIES	COPIES FOR APPROVAL TO (A) BEFORE FABRICATION	CERTIFIED COPIES	
CLASS I (IEEE) MOTOR OPERATORS					TO (A)	TO (B)
1	Electrical Data during operation	G-11.8.4	REPRODUCIBLE			
d)	test (c) above and during a closing cycle as follows:		PRINTS			
2	1) Test instrument identification		REPRODUCIBLE			
			PRINTS			1
3	2) Test voltage & Frequency		REPRODUCIBLE			
			PRINTS			1
4	Motor current drawn during		REPRODUCIBLE			
3)	valve operation		PRINTS			1
5	Motor current drawn at opening		REPRODUCIBLE			
4)	of torque switches		PRINTS			1
6	Settings of torque & position		REPRODUCIBLE			
5)	switches		PRINTS			1
7	6) Motor insulation test	G-11.8.3	REPRODUCIBLE			
			PRINTS			1
8	Qualification test procedure, including Seismic	G-11.8.2 & G-11.4	REPRODUCIBLE	1		
			PRINTS	1		
9	Qualification test results	G-11.8.2	REPRODUCIBLE		1	1
			PRINTS			
10	Design Interface Procedure	G-11.10	REPRODUCIBLE	1		
			PRINTS	1		
11	Valve Motor Operator Compatibility Form	G-11.8.3a	REPRODUCIBLE			
			PRINTS	1		1
12	Tabulation of motor no-load, full-load, and locked rotor currents	G-11.8.3c	REPRODUCIBLE			
			PRINTS	1		
13			REPRODUCIBLE			
			PRINTS			
14			REPRODUCIBLE			
			PRINTS			
15						
16						
17						
18						
19						
20						

5 REVISED AS MARKED

3 Revised as Marked

2 ISSUED FOR CO'S REVIEW

REV DESCRIPTION

FORM 8031-0A



S.F.
POWER
DIVISION

PHILADELPHIA ELECTRIC COMPANY
LIMERICK GENERATING STATION UNITS 1 & 2

QUALITY ASSURANCE
DOCUMENTATION DISTRIBUTION
REQUIREMENTS

Job No. 8031

DESIGN
SPECIFICATION
8031-P-104
APPENDIX 5
SHEET A5-4

REV.

5

FOR QUALITY ASSURANCE USE

(A) *W.C. McDaniel*
Project Engineer
Bechtel Power Corporation
P.O. Box 3965
San Francisco, Calif. 94119

(B) Bechtel Power Corporation
Limerick Generating Station
P.O. Box A, Sanatoga Branch
Pottstown, PA. 19464
Attention: *T.M. Gwalt* Project
Construction Manager

The required certified copies shall be furnished
prior to shipment of material.

DATE	APPROVALS	MATERIAL	SUPERVISOR	CHECKER	DRAWING	ENGINEER	DATA REQUIREMENTS		REFER TO SPECIFICATIONS PARAGRAPH	KIND OF COPIES	COPIES FOR APPROVAL TO (A) BEFORE FABRICATION	CERTIFIED COPIES	
							NON-CLASS I (IEEE) MOTOR OPERATORS					TO (A)	TO (B)
							1 Electrical Data during valve operational test as follows:		G-11.8.5	REPRODUCIBLE PRINTS			
							2 1) Test voltage and frequency			REPRODUCIBLE PRINTS			1
							3 Motor current drawn during valve operation			REPRODUCIBLE PRINTS			1
							4 Motor current drawn at opening of torque switches			REPRODUCIBLE PRINTS			1
							5 Settings of torque and position switches			REPRODUCIBLE PRINTS			1
							6 Design Interface Procedure		G-11.10	REPRODUCIBLE PRINTS	1 1		
							7 Motor Insulation Test		G-11.8.5b	REPRODUCIBLE PRINTS			1
							8 Valve Motor Operator Compatibility Form		G-11.8.3a	REPRODUCIBLE PRINTS	1		1
							9 Certified Test Reports for Compliance to NEMA STD MG-1		G-11.8.5b	REPRODUCIBLE PRINTS			
							10 a) MGI-12.42 Temperature Rise-a.c. Motors			REPRODUCIBLE PRINTS	1		
							11 b) MGI-12.61 Temperature Rise-d.c. Motors			REPRODUCIBLE PRINTS	1		
							12 c) MGI-12.02 Hi Potential Test			REPRODUCIBLE PRINTS	1		
							13 Tabulation of Motor no load, full load, and locked rotor currents		G-11.8.5c	REPRODUCIBLE PRINTS	1		
							14 Motor Data Sheets, Form 182		G-11.11	REPRODUCIBLE PRINTS	1		
							15 Motor Temperature Rise vs. Time Curve		G-11.8.5d	PRINTS	1		
							16						
							17						
							18						
							19						
							20						

5 REVISED AS MARKED
3 Revised as Marked
2 ISSUED FOR CONSTRUCTION
1 REV. DESCRIPTION



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POWER
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PHILADELPHIA ELECTRIC COMPANY
LIMERICK GENERATING STATION UNITS 1 & 2

QUALITY ASSURANCE
DOCUMENTATION DISTRIBUTION
REQUIREMENTS

Job No. 8031

DESIGN
SPECIFICATION
8031-P-104
APPENDIX 5
SHEET A5-1

REV.

5

FOR QUALITY ASSURANCE USE

(A) Mr. W. C. McDaniel
Project Engineer
Bechtel Power Corporation
P.O. Box 3965
San Francisco, Calif. 94119

(B) Bechtel Power Corporation
Limerick Generating Station
P.O. Box A, Sanatoga Branch
Pottstown, PA. 19464
Attention: T. M. GWIN
Construction Manager

The required certified copies shall be furnished
prior to shipment of material.

REV.	DESCRIPTION	DATE	APPROVALS	MATERIAL	SUPERVISOR	DATA REQUIREMENTS	REFER TO SPECIFICATIONS PARAGRAPH	KIND OF COPIES	COPIES FOR APPROVAL TO (A) BEFORE FABRICATION		CERTIFIED COPIES	
									TO (A)	TO (B)		
1						DATA REQ. MTS FOR THE FUNCTIONALLY RELATE NON-PRESSURE RETAINING VALVE PARTS FOR THE QUALITY ASSURED ITEMS ON ADV'S P.O. 8031-P-KACC	*	REPRODUCIBLE PRINTS				
2								REPRODUCIBLE PRINTS				
3								REPRODUCIBLE PRINTS				
4						CERTIFIED MILL TEST REPORTS FOR THE GATE & GLOBE VALVE STEMS, YOKES AND FOR THE CHECK VALVE HANGERS.	15.1.2	REPRODUCIBLE PRINTS				1
5								REPRODUCIBLE PRINTS				
6								REPRODUCIBLE PRINTS				
7						Valve Operability Test Procedure	see M/R special note 20	REPRODUCIBLE PRINTS	1	1		
8						Valve Operability Test Data		REPRODUCIBLE PRINTS	1	1		
9								REPRODUCIBLE PRINTS				
10								REPRODUCIBLE PRINTS				
11								REPRODUCIBLE PRINTS				
12								REPRODUCIBLE PRINTS				
13								REPRODUCIBLE PRINTS				
14								REPRODUCIBLE PRINTS				
15												
16												
17												
18												
19												
20												

*SPECIN NOTE 15 ON PG 34 OF M/R 8031-P-104

FORM 8031-QA.



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DIVISION

PHILADELPHIA ELECTRIC COMPANY
LIMERICK GENERATING STATION UNITS 1 & 2

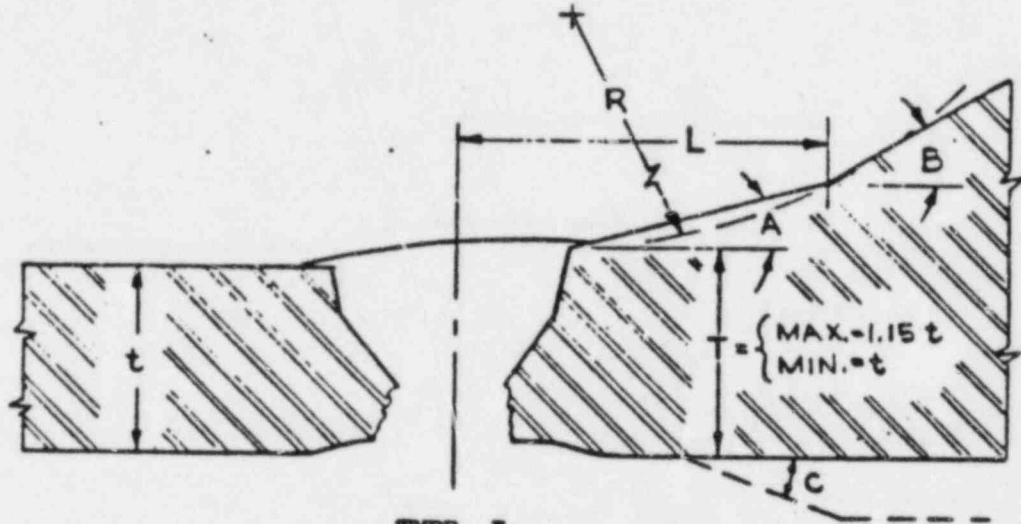
QUALITY ASSURANCE
DOCUMENTATION DISTRIBUTION
REQUIREMENTS

Job No. 8031

DESIGN
SPECIFICATION
8031-P-104
APPENDIX 5
SHEET A5-6

REV.

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TYPE I

Type	t=Nom. Pipe Wall	L	R	Maximum Angle (Deg.)		
				A	B	C
I	Less than 3/4"	2 1/2 t	2 1/2"	15°	30°	10°
I	3/4" to 1" Incl.	2t	3"	15°	30°	10°
I	More than 1"	1 1/2 t	3"	15°	30°	10°
II	Machine to ANSI B16.5 - Fig. 9 & Table 11 (See Note #4)					

1. For Nuclear Class 1 piping material, valves and equipment of 600#, 900# and 1500# primary valve and flange rating use type I
2. Type II Transitions for all other classes and primary valve/flange
3. The internal transition angle "C" shall not exceed 10° for Type I, or 30° for Type II.
4. Manufacturer's transition of radius "R" is an acceptable alternate.
5. Inside contours of all type I transition shall be in accordance with Fig. 9 or Fig. 11, as applicable, of ANSI B16.5, 1968.
6. Weld end transitions per ASME Section III-1977 Fig. NX 4250-1 are acceptable for all flange ratings and classes except those for Nuclear Class 1 shall be Type I above.

2 REVISED AS INDICATED
1 ISSUED FOR CONSTRUCTION
1/2 REVISED AS INDICATED
REV. DESCRIPTION

14-05-P
9-11-63



WELD END TRANSITIONS FOR
VALVES, FITTINGS AND EQUIPMENT

LIMERICK GENERATING STATION
UNITS 1 AND 2
PHILADELPHIA ELECTRIC COMPANY

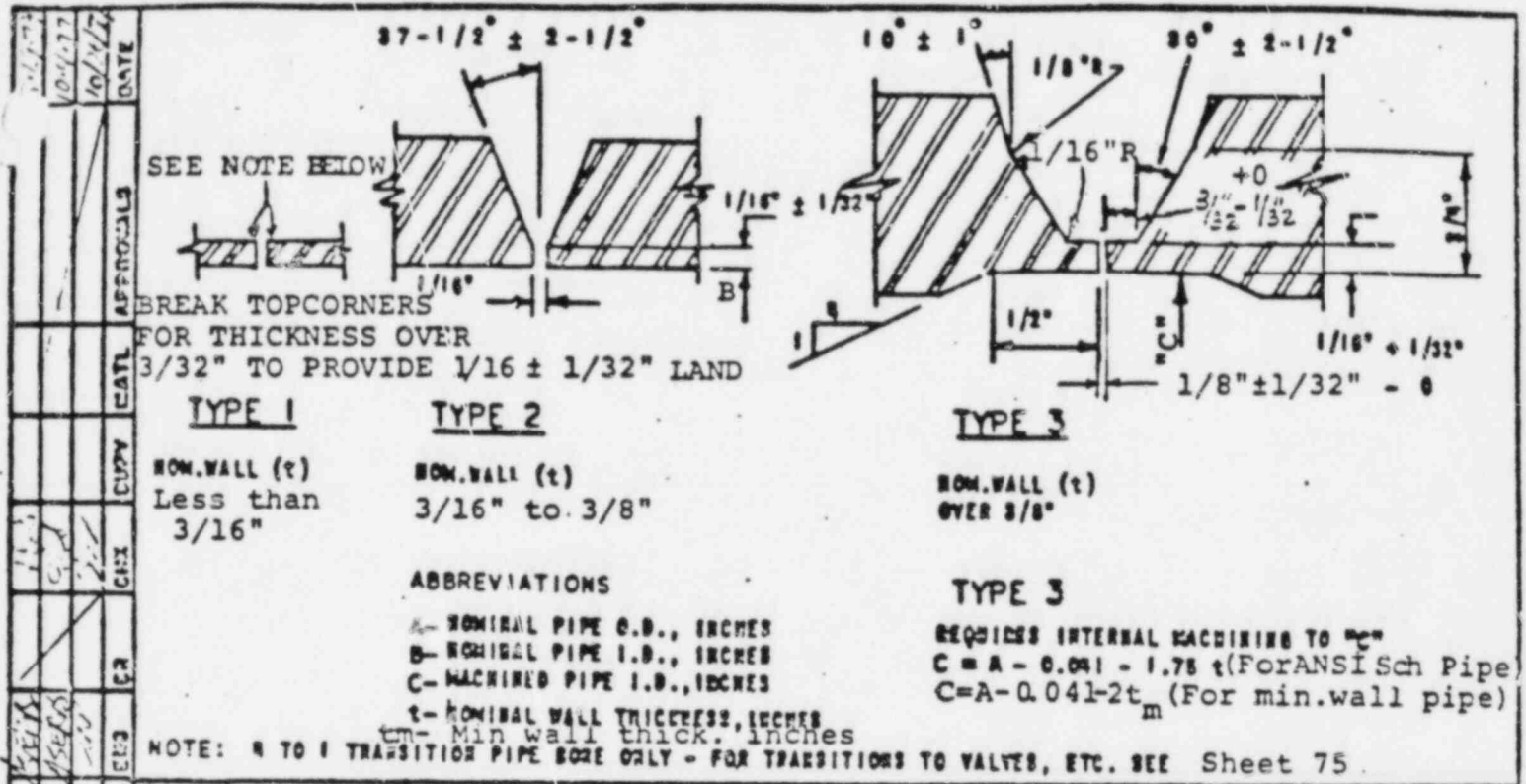
JOB No 8031

8031-P-300
APPENDIX B
SHEET 15 OF 22

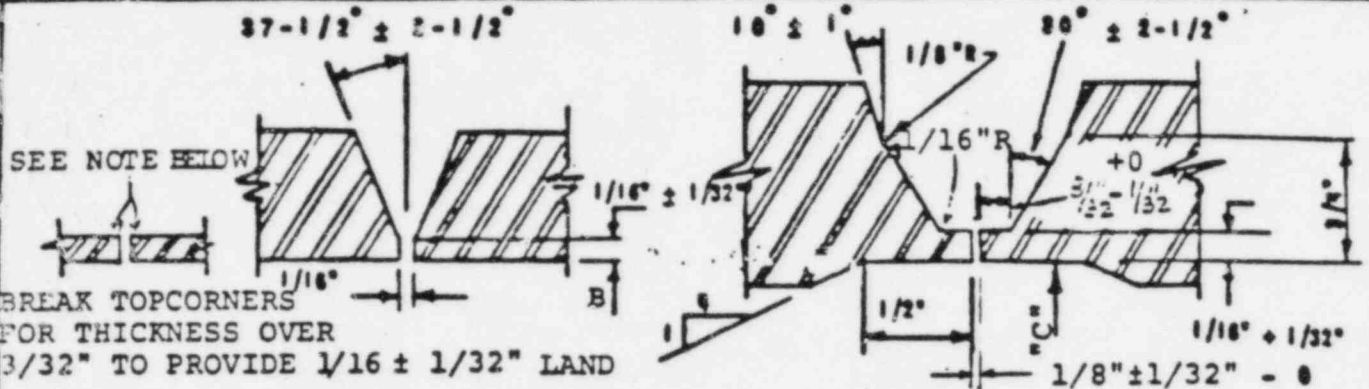
REV.

16

DESIGN SPECIFICATION 8031-P-104



PIPE CLASS	"A" NOMINAL O.D.	SCHEDULE	"t" NOMINAL WALL THICKNESS	"B" NOMINAL I. D. TYPE 1 & 2	"C" MACHINED I. D. TYPE 3 ± .018	REMARKS
	24.000	80	1.219	--	21.828	
	20.00		1.031	--	18.155	
	18.00		.938	--	16.318	
	16.00		.844	--	14.482	
	14.000		.750	--	12.647	
	12.750		.687	--	11.505	
	10.750		.594	--	9.670	
	8.625	80S	.500	--	7.709	
	6.625		.432	--	5.828	
	4.500		.337	3.826	--	
	3.500	160	.438	--	2.693	
	2.875		.375	2.125	--	
	4.500		.531	--	3.530	
	10.750	80S	.500	--	9.834	
	30.000	20	.500	--	29.084	



SEE NOTE BELOW

BREAK TOP CORNERS
FOR THICKNESS OVER
3/32" TO PROVIDE 1/16 ± 1/32" LAND

TYPE 1

NOM. WALL (t)
Less than
3/16"

TYPE 2

NOM. WALL (t)
3/16" to 3/8"

TYPE 3

NOM. WALL (t)
OVER 3/8"

ABBREVIATIONS

A- NOMINAL PIPE O.D., INCHES
B- NOMINAL PIPE I.D., INCHES
C- MACHINED PIPE I.D., INCHES

t- NOMINAL WALL THICKNESS, INCHES
tm- Min wall thick. inches

TYPE 3

REQUIRES INTERNAL MACHINING TO "m"
C = A - 0.041 - 1.75 t (For ANSI Sch Pipe)
C = A - 0.041 - 2t (For min. wall pipe)

NOTE: 4 TO 1 TRANSITION PIPE SOLE ONLY - FOR TRANSITIONS TO VALVES, ETC. SEE Sheet 75

PIPE CLASS	"A" NOMINAL O.D.	SCHEDULE	"t" NOMINAL WALL THICKNESS	"B" NOMINAL I. D. TYPE 1 & 2	"C" MACHINED I. D. TYPE 3 ± .010	REMARKS
	36"	Std	.375	35.250	--	
	30"		.375	29.250	--	
	28"		.375	27.250	--	
	26"		.375	25.250	--	
	24.000		.375	23.250	--	
	20.000		.375	19.250	--	
	18.000		.375	17.250	--	
	16.000		.375	15.250	--	
	14.000		.375	13.250	--	
	12.750		.375	12.000	--	
	10.750	40 & 40S	.365	10.020	--	
	8.625		.322	7.981	--	
	6.625		.280	6.065	--	
	4.500		.237	4.026	--	
	3.500	80 & 80S	.300	2.900	--	
	2.875		.276	2.323	--	
	3.500	40 & 40S	.216	3.068	--	
	2.875		.203	2.469	--	
	8.625		.375	7.875	--	



POWER AND
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DIVISION

WELD END PREPARATION

TUNGSTEN-INERT-GAS SHIELDED-ARC
WITHOUT CONSUMABLE INSERT RINGS

LIMERICK GENERATING STATION
UNITS 1 & 2

BECHTEL DELPHI ELECTRIC COMPANY

8031

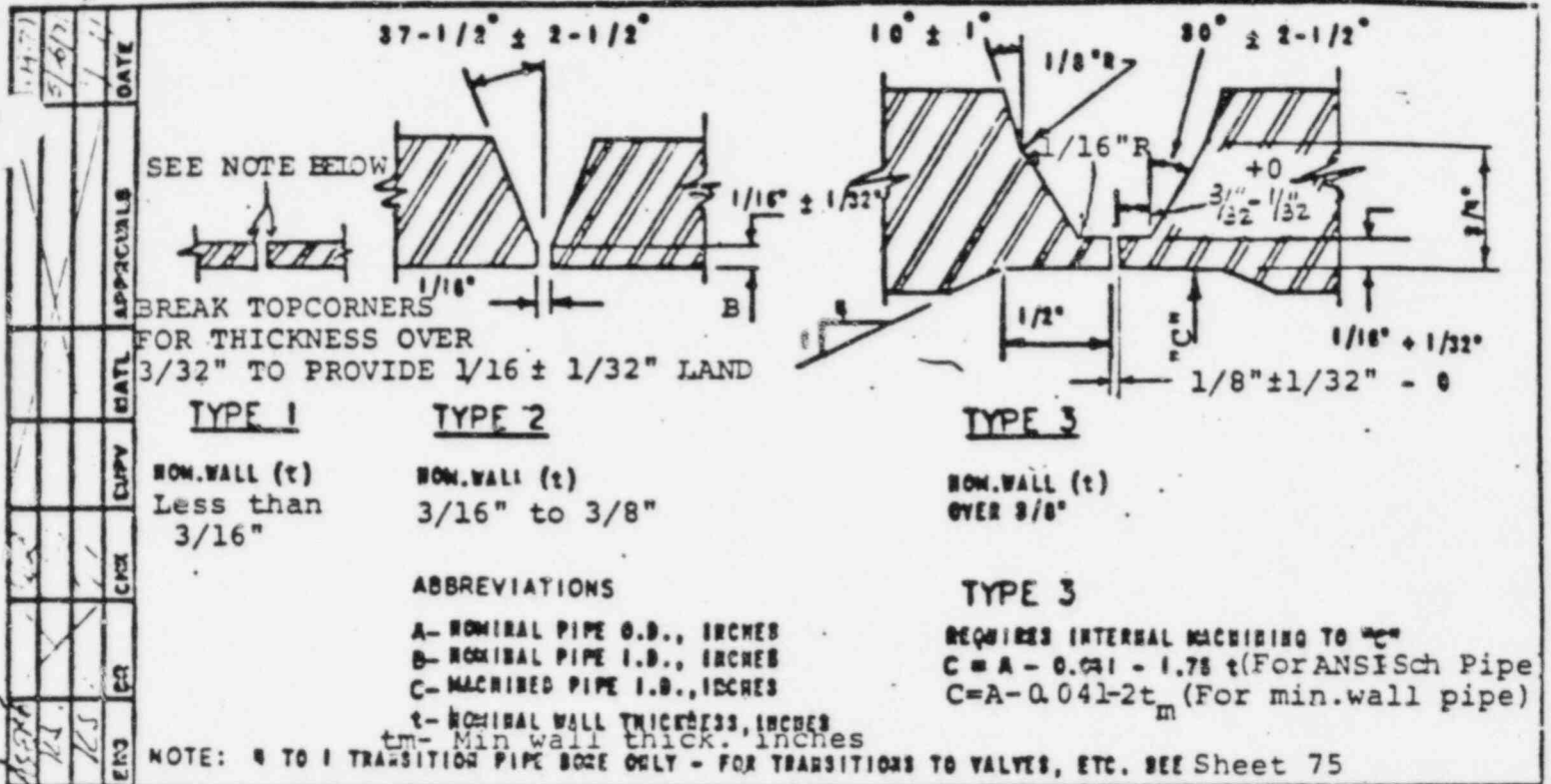
8031-P-300
APPENDIX 9
SHEET 72.2 OF 75

REV.

(M)

ISSUED FOR CONSTRUCTION
REVISED AS AMENDMENTS

REV. DESCRIPTION



PIPE CLASS	" A " NOMINAL O.D.	SCHEDULE	" t " NOMINAL WALL THICKNESS	" B " NOMINAL I. D. TYPE 1 & 2	" C " MACHINED I. D. TYPE 3 ± .010	REMARKS
	24.000 20.000 18.000 16.000 14.000 12.750	10	.688 .594 .562 .500 .438 .406	-- -- -- -- -- --	22.757 18.922 16.976 15.084 13.192 11.999	
	14.000 16.000	10	.250 .250	13.500 15.500	- -	

W-113 A

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14 REVISED INDICATED

ISSUED FOR CONSTRUCTION

ISSUED FOR BIDS

REV. DESCRIPTION

WELD END PREPARATION

TUNGSTEN-INERT-GAS SHIELDED-ARC

WITHOUT CONSUMABLE INSERT RINGS

LIMERICK GENERATING STATION

UNITS 1 & 2

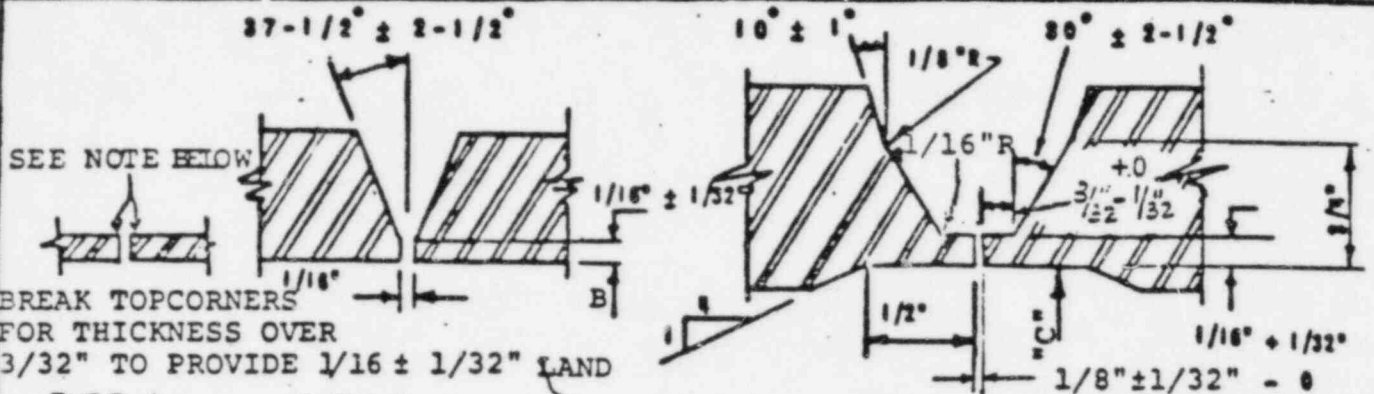
PHILADELPHIA ELECTRIC COMPANY

8031-P-300

APPENDIX 9

SHEET 72.3 OF 93

1+



TYPE 1

NOM. WALL (t)
Less than
3/16"

TYPE 2

NOM. WALL (t)
3/16" to 3/8"

TYPE 3

NOM. WALL (t)
OVER 3/8"

ABBREVIATIONS

A- NOMINAL PIPE O.D., INCHES
B- NOMINAL PIPE I.D., INCHES
C- MACHINED PIPE I.D., INCHES

t- NOMINAL WALL THICKNESS, INCHES
tm- Min wall thick., inches

TYPE 3

REQUIRES INTERNAL MACHINING TO "C"
C = A - 0.041 - 1.75 t (For ANSI Sch Pipe)
C = A - 0.041 - 2t_m (For min. wall pipe)

NOTE: 4 TO 1 TRANSITION PIPE EDGE ONLY - FOR TRANSITIONS TO VALVES, ETC. SEE Sheet 75

PIPE CLASS	"A" NOMINAL O.D.	SCHEDULE	"t" NOMINAL WALL THICKNESS	"B" NOMINAL I.D. TYPE 1 & 2	"C" MACHINED I.D. TYPE 3 ± .015	REMARKS
	24.000	120	1.812	--	20.788	
	20.000		1.500	--	17.334	
	18.000		1.375	--	15.553	
	16.000		1.219	--	13.825	
	14.000		1.094	--	12.046	
	12.750		1.000	--	10.959	
	10.750		.844	--	9.234	
	8.625		.719	--	7.327	
	6.625		.562	--	5.600	
	4.500		.438	--	3.693	

WELD END PREPARATION

TUNGSTEN-INERT-GAS SHIELDED-ARC
WITHOUT CONSUMABLE INSERT RIDGE
LIMERICK GENERATING STATION
UNITS 1 & 2
PHILADELPHIA ELECTRIC COMPANY

8031

8031-P-300
APPENDIX 9
SHEET 72. + OF 93

REV.

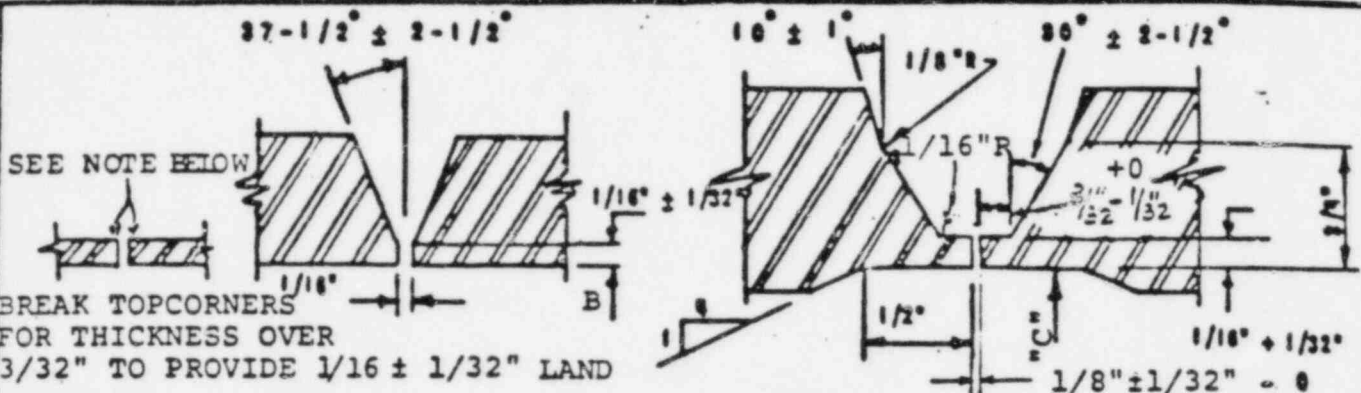
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POWER AND
INDUSTRIAL
DIVISION

3 REVISED AS INDICATED
4 REVISED AS INDICATED
12 REVISED AS INDICATED
REV. DESCRIPTION

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TYPE 1

NOM. WALL (t)
Less than
3/16"

TYPE 2

NOM. WALL (t)
3/16" to 3/8"

TYPE 3

NOM. WALL (t)
OVER 3/8"

ABBREVIATIONS

- A- NOMINAL PIPE O.D., INCHES
- B- NOMINAL PIPE I.D., INCHES
- C- MACHINED PIPE I.D., INCHES
- t- NOMINAL WALL THICKNESS, INCHES
- tm- Min wall thick. inches

TYPE 3

REQUIRES INTERNAL MACHINING TO "C"
C = A - 0.041 - 1.75 t (For ANSI Sch Pipe)
C = A - 0.041 - 2t (For min. wall pipe)

NOTE: 4 TO 1 TRANSITION PIPE BORE ONLY - FOR TRANSITIONS TO VALVES, ETC. SEE Sheet 75

PIPE CLASS	"A" NOMINAL O.D.	SCHEDULE	"t" NOMINAL WALL THICKNESS	"B" NOMINAL I. D. TYPE 1 & 2	"C" MACHINED I. D. TYPE 3 ± .010	REMARKS
	24.000	XS ↓ 10S ↓ XS	.500	--	23.084	
	20.000		.500	--	19.084	
	18.000		.500	--	17.084	
	24.000		.250	23.500		
	20.000		.219	19.564		
	18.000		.188	17.624		
	16.000		.188	15.624		
	14.000		.188	13.624		
	12.750		.180	12.390		
	10.750		.165	10.420		
	8.625		.148	8.329		
	6.625		.134	6.357		
	4.500		.120	4.260		
	3.500		.120	3.260		
	2.875		.120	2.635		
	16.000	XS	.500	--	15.084	
	14.000		.500	--	13.084	

WELD END PREPARATION

TUNGSTEN-INERT-GAS SHIELDED-ARC
WITHOUT CONSUMABLE INSERT RINGS
LIMERICK GENERATING STATION
UNITS 1 & 2
PHILADELPHIA ELECTRIC COMPANY

8031-P-300

8031-P-300
APPENDIX 9
SHEET 72.5 OF 85

REV.

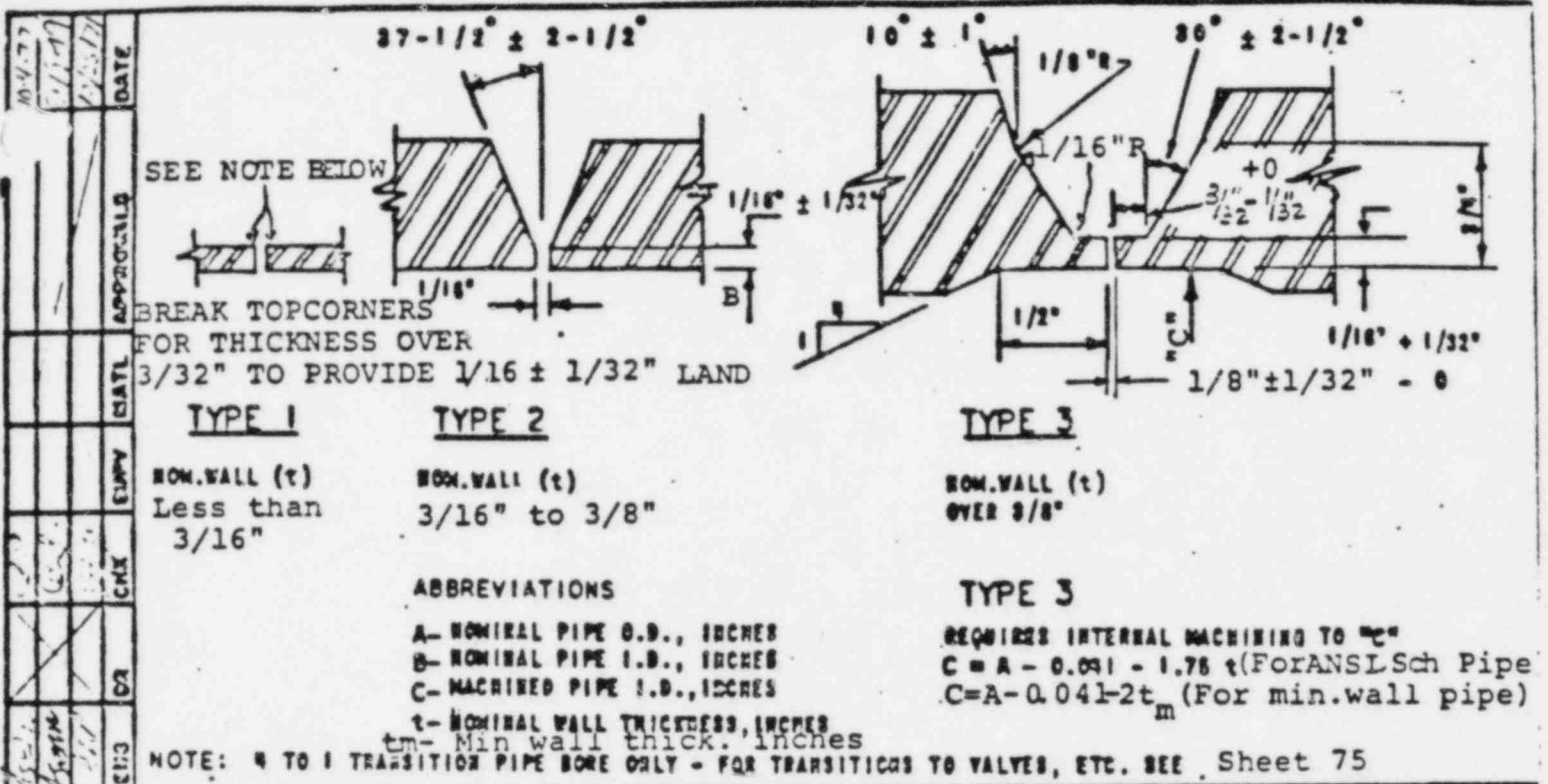
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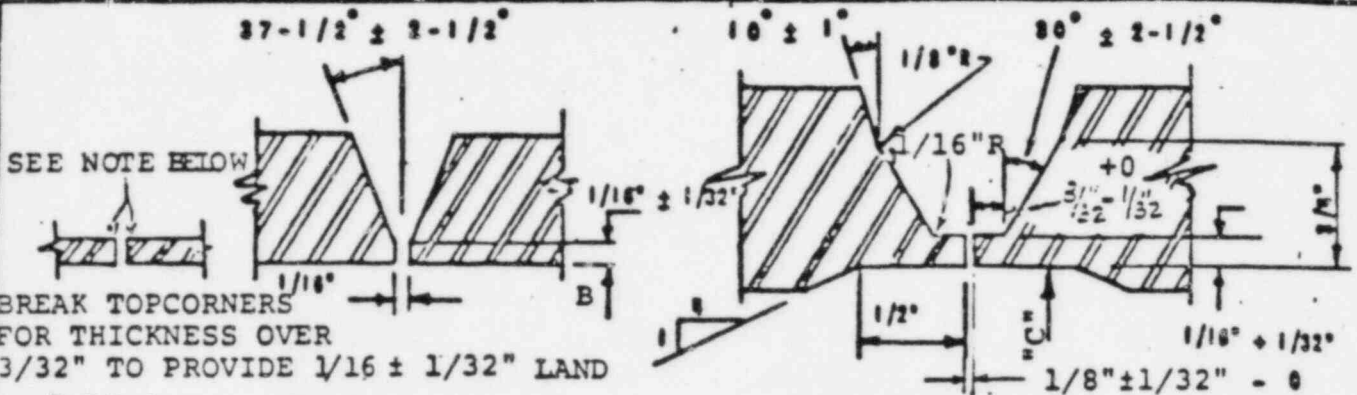
PETER AND
INDUSTRIAL
DIVISION

3 REVISED AS INDICATED
7 REVISED AS INDICATED
11 REVISED AS INDICATED

M-978 A - C
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PIPE CLASS	"A" NOMINAL O.D.	SCHEDULE	"t" NOMINAL WALL THICKNESS	"B" NOMINAL I. D. TYPE 1 & 2	"C" MACHINED I. D. TYPE 3 ± .015	REMARKS
	24.000	100 120	1.531	--	21.280	
	20.000		1.281	--	17.718	
	18.000		1.156	--	15.936	
	16.000		1.031	--	14.155	
	14.000		.938	--	12.318	
	12.750		.844	--	11.234	
	10.750		.719	--	9.453	
	8.625		.594	--	7.547	
	6.625		.562	--	5.601	



TYPE 1
 NOM. WALL (t)
 Less than
 3/16"

TYPE 2
 NOM. WALL (t)
 3/16" to 3/8"

TYPE 3
 NOM. WALL (t)
 OVER 3/8"

ABBREVIATIONS

- A- NOMINAL PIPE O.D., INCHES
- B- NOMINAL PIPE I.D., INCHES
- C- MACHINED PIPE I.D., INCHES
- t- NOMINAL WALL THICKNESS, INCHES
- t_m- Min. wall thick., inches

TYPE 3

- REQUIRES INTERNAL MACHINING TO "C"
- C = A - 0.041 - 1.73 t (For ANSI Sch Pipe)
- C = A - 0.041 - 2 t_m (For min. wall pipe)

NOTE: 4 TO 1 TRANSITION PIPE SIZE ONLY - FOR TRANSITIONS TO VALVES, ETC. SEE Sheet 75

PIPE CLASS	" A " NOMINAL O.D.	SCHEDULE	" t " WALL THICKNESS	" B " NOMINAL I. D. TYPE 1 & 2	" C " MACHINED I.D. TYPE 3 ± .010	REMARKS
DCA	20.000		.903	-	18.153	
DCA	24.000		1.100	-	21.759	
DCA	20.000		.735	-	18.489	
	DELETED			-		
	DELETED			-		
EBB	26.000		.928	-	24.103	
	DELETED			-		
GBD	30.000		.630	-	28.699	
GCC	16.000		.194	15.571	-	
	DELETED				-	
	18.000		.171"	17.617	-	
EBC	26.000		.578"		24.803	
DBD	34.000		1.740		30.479	



WELD END PREPARATION
 TUNGSTEN-INERT GAS SHIELDED-ARC
 WITHOUT CONSUMABLE INSERT RINGS
 LIMERICK GENERATING STATION
 UNITS 1 & 2
 DELPHIA ELECTRIC COMPANY

8031

8031-P-300
 APPENDIX 9
 SHEET 72.7 OF 53

25
 1/2

11 REVISED AS INDICATED
 10 REVISED AS INDICATED
 14 REVISED AS INDICATED
 12Y DESCRIPTION

W-978 A -
 0-0-0



Rev. 4/68

FORM 79

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FABRICATORS WELDING PROCEDURE
SPECIFICATION AND QUALIFICATION RECORD

NAME OF FABRICATOR: _____

LOCATION: _____

On work performed under the ASME or USA Standard Codes, the welding procedure to be used on fabrication and the qualification of this procedure in conformance with the applicable Code is required to be recorded. The information to be furnished is required by Section IX of the ASME Boiler and Pressure Vessel Code, Chapter V of the USA Standard Code for Pressure Piping; B31.1.0 and B31.3; and Section 7 of API 650. The Welding-Procedure Specification and the Qualification Records shall be recorded in the recommended forms outlined below as Part I and Part II, or in an equivalent form which covers all of the information required below.

Referenced to Paragraphs and Tables refer to those in Section IX of the ASME Boiler and Pressure Vessel Code. Similar requirements for procedure qualifications under the USAS Code are contained in Paragraph 127.5 of USAS B31.1.0 and Paragraph 327.5 of USAS B31.3.

PART I

WELDING-PROCEDURE SPECIFICATION

Applying to Ferrous and Nonferrous Materials and All Welding Processes.

PROCEDURE SPECIFICATION FOR _____ WELDING.

(Shielded metal-arc, automatic submerged-arc, gas tungsten-arc, gas metal-arc, combination, etc.)

FABRICATORS PROCEDURE DESIGNATION: _____ DATE _____ REVISION _____

A change in any of the essential variables which are described in the succeeding paragraphs will require a new Procedure Specification (see Paragraphs Q-11 and QN-11)

(continued on Page Two)

For Bechtel Use Only - Do Not Fill In

		COMMENTS
(1)	APPROVED	
(1A)	APPROVED FOR FABRICATION AS MARKED	
	REVISED DRAWING NOT REQUIRED	
(2)	APPROVED AS MARKED	
	REVISED DRAWING REQUIRED	
(3)	NOT APPROVED, REVISED DRAWING REQUIRED.	

This approval of general compliance with our requirements does not relieve Supplier of responsibility to furnish material or equipment meeting all service and dimensional conditions stipulated or implied by the purchase order.

BECHTEL CORPORATION

Date _____ By _____

V.P. _____

EQUIP. NO. _____

APPENDIX 10 TO
DESIGN SPECIFICATION 8031-P-104

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FABRICATORS PROCEDURE DESIGNATION: _____

1. BASE METAL. The base metal shall conform to the specifications for _____

(Insert here references to ASME, ASTM or other Code or Standard designations or attach complete information on chemical analysis and mechanical properties) Which is found in materials Group P-Number _____ (See Tables Q-11.1 and QN-11.1)

2. FILLER METAL. The filler metal shall conform to ASME Filler Metal Specification Number _____ for _____ filler metal
(A233, A316, A559, etc.) (ferrous, non-ferrous - state which)
in Group Number F- _____ AWS-ASTM Classification
(See Tables Q-11.2 and QN-11.2)

Number _____
(E6010, E8016-B2, EMI2K, E60S-2, etc.)

FOR FERROUS FILLER METAL INCLUDE THE FOLLOWING DATA:

The chemical composition of the weld deposit shall fall within the limits of weld metal analysis No. A- _____ (See Table Q-11.3), or shall be within the following composition limits: _____

For oxyacetylene welding, the filler metal shall be _____
_____ killed steel. (silicon, aluminum -
state which)

3. FLUX FOR SUBMERGED ARC WELDING. The flux shall conform to ASTM A558.
Type _____ - _____ or to the following nominal composition _____

(Insert here chemical composition range or trade designation)

4. GAS FOR INERT-GAS ARC WELDING. The shielding gas shall conform to the following nominal composition _____
(Insert here the single gas, the proportional

parts of flow rates of mixed gases, or the trade designation of the gas used)

5. POSITION: The welding shall be done in the _____ Position.
(Give position or positions in which the welding will be done. See paragraphs Q-3, QN-3, Q-4 and QN-4)
6. PREHEAT. _____

(This paragraph should describe any preheating and control of temperature during welding that will be done.)

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7. HEAT TREATMENT. _____

(This paragraph should describe any heat treatment or stress-relieving that is given the welded parts before or after welding. State rate of heating, holding time at temperature, and rate of cooling.)

8. BACKING STRIP. The welded joints _____ utilize a backing strip. (shall, shall not - state which)

9. WELDING PROCEDURE. Machine welded joints shall be made by _____ (Multiple passes, a single pass per side - state which)

Machine welded joints shall be made by _____ method.
(single arc, multiple arc, state which)

10. WELDING PROCESS. The welding process shall be done by _____ (name of process)

using a _____. Inert gas metal arc welding shall be done
(Machine or manual equipment - state which)

using a _____ electrode of _____
(consumable, nonconsumable - state which)

_____. (State ASTM Classification or material of
which electrode is made.)

11. BASE METAL THICKNESS. This procedure is proposed to allow welding of material thickness between _____ inch and _____ inches. (See Tables Q-13 and QN-13)

NON-ESSENTIAL VARIABLES

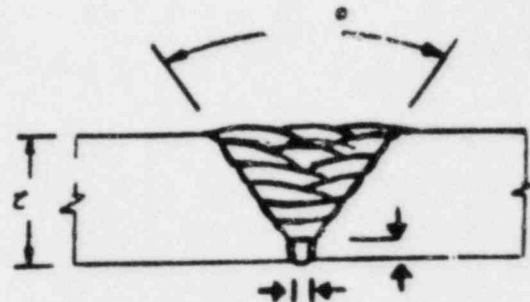
The following paragraphs describe details which are not essential variables.
Changes in these details may be made without setting up a new Procedure Specification provided they are recorded as revisions.

12. PREPARATION OF BASE MATERIAL. The edges of surfaces of the parts to be joined by welding shall be prepared by _____ (State whether sheared, machined, ground, gas-cut, etc.)

13. ELECTRICAL CHARACTERISTICS. The current used shall be _____ (State whether direct or alternating; if alternating, give frequency) The base material shall be on the _____ side of the (Negative "reverse polarity" or positive "straight polarity" when direct current is used.)

14. JOINT WELDING PROCEDURE. The welding technique, such as electrode sizes, and mean voltages and currents for each electrode, size of the welding tip and filler rods, shall be substantially as shown on sketches below or attached. (The sketches should show, for a minimum thickness and for several intermediate thick- nesses of base material, the welding technique to be used whether weaving or beading, the number of layers or passes and diameter of electrode with the mean voltage and current for each layer or pass, and in case of vertical welds, the progression of each pass, whether upward or downward.)

Show typical weld bevel details and sequence of weld layers above - see example at right.



Pass	Position	Electrode Classification	Diameter	Amps	Volts	Travel Speed

15. APPEARANCE OF WELDING LAYERS. The welding current and manner and of depositing the weld metal shall be such that there shall be practically no undercutting on the side wall of the welding groove or the adjoining base material.

16. CLEANING. All slag or flux remaining on any bead of welding shall be removed before laying down the next successive bead.

17. DEFECTS. Any cracks or blow holes that appear on the surface of any bead of welding shall be removed by chipping, grinding or gouging before depositing the next successive bead welding.

18. PEENING. _____

(If peening is to be used it shall be incorporated as part of the specification, and a description of the degree of peening to be done shall be stated in this paragraph)

19. TREATMENT OF UNDER SIDE OF WELDING GROOVE. _____

(The method of preparing the under or second side of a groove for welding on that side should be stated in this paragraph. If inert-gas purging is used, state gas composition and flow rate.)

Company Name _____

By _____

APPENDIX 10 TO DESIGN
SPEC. 8031-P-104

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PART II

WELDING-PROCEDURE QUALIFICATION RECORD

NAME OF FABRICATOR: _____
FABRICATOR'S PROCEDURE DESIGNATION _____ DATE _____ REV. _____
WELDING PROCESS _____
(Shielded metal-arc, automatic submerged-arc, gas tungsten-arc, Combination, etc.)
BASE MATERIAL: Spec _____ P-Number _____
(ASME, ASTM, or USAS Spec. & Grade) (From Table Q-11.1 or QN-11.1)
Shape _____ Thickness _____
(Plate or Pipe, If Pipe, show dia.)
Thickness Range this test qualifies _____
ELECTRODE or FILLER MATERIAL:
AWS Class _____ ASTM Spec. _____
(E6010, E8016-B2, ER308, E60S-2, EM12, etc.) (A316, A558, A559, etc.)
F- Number _____ A-Number _____
(From Table Q-11.2 or QN-11.2) (From Table Q-11.3)
Describe filler metal if not included in Table Q-11.2 or QN-11.2
Filler Wire Manufacturer and Trade Name _____
Submerged-Arc Flux _____
(State ASTM Classification and Trade Name or Composition)
Shielding-Gas Composition _____ Flow Rate _____ Cu. Ft/Hr.
(Helium, Argon, or Combination)
Purge-Gas Composition _____ Cu. Ft/Hr.
(Helium, Argon, or Combination)
JOINT DESIGN: Bevel Angle _____ Single or Double _____
WELDING TECHNIQUE: Amps _____ Volts _____ Inches per Min. _____
Backing Strips Used _____ Position of Groove _____
(Yes or No) (Flat, horizontal, vertical, overhead)
HEAT TREATMENT: Preheat _____ Postheat _____ Interpass Temp. Range _____
(None or °F) (None or °F) (°F to °F)
Stress Relief _____ Holding _____ Time _____
(None or °F) (In hours)

FABRICATORS PROCEDURE DESIGNATION: _____

REDUCED-SECTION TENSILE TESTS

Position	Specimen Number	Dimensions Width Thickness	Area	Ultimate Total Loads Lbs	Ultimate Unit-Stress PSI	Location of Failure

GUIDED-BEND TESTS

Position	Type	Specimen Number	Result	Position	Type	Specimen Number	Result

IMPACT TESTS
(Record When Required)

Specimen Type (Charpy - V, etc)	Size (Full, 1/2)	Position (1G, 2G, 5G)	Test Temperature	Weld Metal HAZ	Result (Foot Pounds)

WELDERS NAME _____ CLOCK NUMBER _____ STAMP NUMBER _____

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Date _____

Company Name _____

By _____

STATEMENT OF CONFORMANCE

We certify that the listed equipment and required documentation for same meet the requirements of the purchase order and applicable specifications:

P.O. NO.: _____ REV. _____

SPECIFICATION: _____ REV. _____

PRIME VENDOR: _____

SUPPLIER: _____

ADDRESS: _____

DESCRIPTION OF EQUIPMENT: _____

IDENTIFICATION: _____

a. ITEM NOS. _____

b. EQUIPMENT NOS. _____

c. TAG NOS. _____

APPROVED EXCEPTIONS: _____

Signature (Supplier Representative)

Title

Date

Distribution:

Original: Supplier to transmit to Jobsite

CC: Purchasers Inspector (2)

Supplier

[illegible]

APPENDIX 15

DYNAMIC QUALIFICATION AND FUNCTIONAL TESTING REQUIREMENTS

ASME III VALVES

1. DYNAMIC QUALIFICATION REQUIREMENTS

- A. All valves shall be demonstrated capable of withstanding the simultaneous application of the following loads:
- 1) All normal operating loads, including pressure and the weight of the valve topworks, i.e. everything above the body to bonnet joint.
 - 2) A horizontally applied inertial load equivalent to a seismic acceleration of [4.5g].
 - 3) A vertically applied inertial load equivalent to a seismic acceleration of [4.5g].
- B. The valve shall be assumed to be mounted in that orientation in which the loads in Paragraph 1A give rise to the highest stresses in the valve pressure boundary. The inertial loads shall be assumed to be applied at the center of mass of the valve topworks.
- C. Electric switches and all other mechanisms shall withstand the inertial loads noted in Paragraph 1.A without activating and changing the position of the valve.
- D. The topworks of the valve assembly shall be designed to have a fundamental frequency of vibration greater than 100 Hz whenever possible. However, in no case shall the first natural frequency be less than 33 cps. In either case, the first natural frequency shall be reported to the buyer. If this requirement cannot be obtained the Buyer shall be notified in the bid documents. △
- E. Manual valves supplied without mechanical gearing may demonstrate compliance with the above requirements by the provision of calculations showing that the subject valve meets the requirements of Paragraph 1.D. All other valves shall demonstrate compliance with the above requirements by tests and/or analysis. For all valves 4 inches and larger and all valves supplied with mechanical gearing or power actuators, an analysis shall also be made to verify that the stresser in the valve pressure boundary are within the allowable stress limits specified in Article 3 of this appendix. Copies of the test data and/or the analyses shall be submitted and accepted by Bechtel prior to acceptance of the valves for shipment.

2. FUNCTIONAL TESTING REQUIREMENTS FOR POWER ACTUATED VALVES

A. All power actuated valves shall be tested at the manufacturer's plant to demonstrate that the operators provide the specified valve performance.

- 1) Motor operated valves shall be tested in accordance with Specification 8031-G-11 para. G-11.8.
- 2) Air operated valves shall have certified test reports submitted covering the following:
 - a) Demonstrating the valve performs its intended function with minimum air supply within the maximum time specified. Time for open/close and failure mode shall be recorded.
 - b) Seat leakage tests shall be performed with the valve seated and maintained by the operator alone.
 - c) Valve performance test noted in (a) above shall also simulate maximum operating differential pressure in accordance with the valve data sheets.

B. Active valves will be designated on the valve data sheets in the procurement documents.

Operability of active valves, during a postulated dynamic occurrence, shall be verified by testing. Test data acquired for a qualified valve may be used to qualify valves of the same type that fall within the range of sizes permitted by Table C-1, provided geometric similarity is maintained and supporting stress calculations are provided. If the qualified valve is larger than 36 inch nominal diameter, extrapolation may be made to valves whose nominal size does not vary more than 25 percent from that of the qualified valves. All testing required by this section is considered to be supplemental to any test/analysis used to qualify valves per para. 1 of this Appendix.

Table C-1
Valve Qualification Limits

---Size of Qualified Valve

Qualification extends to:

	1/2	1	1-1/2	2	3	4	6	8	10	12	14	16	18	20	22	24	26	28	30	36
1/2	X	X																		
1	X	X	X																	
1-1/2		X	X	X																
2			X	X	X															
3				X	X	X														
4					X	X	X													
6						X	X	X												
8							X	X	X	X										
10								X	X	X	X									
12								X	X	X	X	X								
14									X	X	X	X	X							
16										X	X	X	X	X						
18											X	X	X	X	X					
20											X	X	X	X	X	X	X			
22												X	X	X	X	X	X	X		
24													X	X	X	X	X	X		
26														X	X	X	X	X	X	
28															X	X	X	X	X	X
30																X	X	X	X	X
36																	X	X	X	X

C. Valves without topworks do not require functional testing.

D. Except when an alternative testing procedure has been approved in accordance with Paragraph 2.E, valves with topworks shall be tested as follows:

- 1) The valve shall be placed in a suitable test stand. It shall be supported in a manner typical of actual installation, with the actuator and all other appurtenances mounted as in normal plant operation.
- 2) The valve shall be internally pressured to the maximum operating pressure, as specified in the data sheets, Attachment [D] to the procurement documents. Concurrently a static load shall be applied in accordance with Paragraph 1.A of this appendix.
- 3) The valve shall be actuated using the proposed valve actuator plant minimum actuation supply as defined in the data sheets.
 - a) The valve must cycle open and closed within its specified operating time limits as defined on the data sheets.
 - b) The valve stroke shall commence from the identical position (i.e. open or closed) as in the actual installation, and at least two full cycles shall be performed.

E. If the Seller wishes to demonstrate the operability of valves with topworks by procedures different from those described in Subparagraph 2.D.3, he shall submit a detailed description of his proposed procedure for Bechtel's approval.

F. After completion of the valve functional test, the seat leak test, as outlined in the hydrostatic test section of the specification, shall be repeated.

G. The Seller shall submit his proposed testing procedure and method of analysis for Bechtel's approval at the time of quotation.

H. The valve stresses associated with the functional test shall be shown by calculations to be within the allowable stress limits specified in Article 3 of this appendix.

I. Test data and the associated stress calculations shall be submitted to and accepted by Bechtel prior to acceptance of the valve for shipment.

3. ALLOWABLE STRESS LIMITS

A. Class 1 valves shall meet the stress limits given in Table C-2. It shall be assumed that the stress in the piping at its points of connection to the valve body inlet

and outlet nozzles is at the maximum value permitted by the code for the pipe for the design conditions specified in the data sheets, and that the pipe loading combination on the valve nozzles is being applied in the direction that will cause the maximum stress in the valve body.

Table C-2

Class 1 Valves

Plant Condition	Design Loading Combinations ⁽²⁾	Stress Limits ⁽¹⁾
Design	PD	The valve shall conform to the requirements of Section III, 1974 Paragraph NB3500
Normal	PO	
Upset ⁽⁴⁾	PO + OBE	NB3525
Emergency	PO	NB3526 ⁽³⁾
Faulted	PO + SSE	NB3527 ⁽³⁾

(1) As specified by ASME III, Division 1

(2) LEGEND: PD - Design pressure
 PO - Operating pressure
 OBE - Earthquake (inertia portion) (50 percent of SSE)
 SSE - Earthquake (inertia portion)

(3) If the valve function must be ensured during emergency/faulted conditions, the valve will be identified as active in the valve listing in the procurement documents.

(4) As required by subsection NB or NF of ASME III, other loads, such as thermal transient and thermal gradients, may require consideration in addition to those primary stress-producing loads listed.

B. Class 2 and Class 3 valves shall be provided with calculations verifying compliance with the following conditions:

- 1) The section modulus and metal area at a plane normal to the flow passage through the region at the valve body crotch (for definition of crotch, see Section A-A of Figure NB-3545.2-1) are at least 10 percent greater than the section modulus and metal area of the piping connected (or joined) to the valve body inlet and outlet nozzles.

- 2) The allowable stress S for the valve body material is equal to or greater than the allowable stress S of connected piping material. If the valve body material allowable is less than that of the connected piping, the selection modules and metal area at the valve body crotch as calculated in Subparagraph 3.B.1 shall be multiplied by the ratio $S(\text{pipe})/S(\text{valve})$ in satisfying the conditions in this subparagraph.
- 3) In lieu of the above requirements, the design-by-analysis procedures of NB-3545.2 may be followed.
- 4) In addition, valves shall be provided with calculations demonstrating compliance with the stress limits shown in Table C-3.

Table C-3

Class 2 and 3 valves (10)

Plant Conditions	Design Loading Combination (9)(10)	Stress Limits (1-7)	P_{max} (8)
Design	PD	The valve shall conform to the requirements of Section III Paragraph NC-3500 or ND3500, as applicable	1.0
Normal	PO		
Upset	PO + OBE	$S_m \leq 1.1S$ (S_m or S_L) + S_b $\leq 1.65S$	1.1
Emergency	PO	$S_m \leq 1.5S$ (S_m or S_L) + S_b ≤ 1.85	1.2
Faulted	PO + SSE	$S_m \leq 2.0S$ (S_m or S_L) + S_b $\leq 2.4S$	1.5

(1) Definition of symbols:

- S_m = General membrane stress. This stress is equal to the average stress across the solid section under consideration. Excludes discontinuities and concentrations. Produced only by mechanical loads.
- S_L = Local membrane stress. This stress is the same as S_m except it includes discontinuities.
- S_b = Bending stress. This stress is equal to the linear varying portion of the stress across the solid section under consideration. Excludes discontinuities and concentrations. Produced only by mechanical loads.
- S = Allowable stress value given in ASME Section III, Appendix I, Table I-7.0 corresponding to the highest metal temperature at the section during the condition under consideration.

(2) "Stress" means the maximum normal (or direct) primary stress. Classical bending and direct stress formulae where free body diagrams determine a simple stress distribution

that is in equilibrium with the applied loads, or any design formulae that have been demonstrated to be satisfactory may be used.

- (3) A casting factor of 1.0 shall be used in satisfying these limits.
 - (4) These requirements for the acceptability of the valve design are not intended to assure the functional adequacy of the valve.
 - (5) Design requirements listed in this table are not applicable to valve discs, stems, seat rings, or other parts of the valve that are contained within the confines of the body and bonnet.
 - (6) These rules do not apply to Class 2 and 3 safety or relief valves.
 - (7) Where valves are provided with topworks and where these topworks are essential to maintaining pressure integrity, the stress limits listed in this table shall be met by performing an analysis based on static forces resulting from equivalent earthquake accelerations acting at the centers of gravity of the extended masses for all conditions for which dynamic loadings are specified in the design specification.
 - (8) The maximum pressure during the condition under consideration shall not exceed a value equal to the design pressure multiplied by the corresponding factor listed under P_{max} for that condition.
 - (10) If valve function must be assured during emergency/faulted conditions, the valve will be identified as active in the valve listing in the procurement documents, and the specified emergency/faulted condition for the plant shall be considered as the normal condition for the valve.
 - (11) As required by subsections NC, ND, or NF of ASME III other loads, such as thermal transient and thermal gradients, may require consideration in addition to those primary stress-producing loads listed.
-