4 CRUDE MAJOR EWO NO. :	BE102-E2	REV: 0

PLANT: 4 CRUDE	SAP COST CENTER: DD173-EXP
W/O # 313079-001	PROJECT / OUTAGE #: SDD108A

EXTRA PROCESS VALVES ENGINEERING INSTRUCTIONS

MOC #:

Level 1 - Management of Change Review

Will This Change:

- [ ] Cause the use of different feeds, chemicals, or catalysts?
- [ ] Cause the use of different process conditions, instrumentation, process control, or affect upstream/downstream plants?
- [ ] Cause the use of new or modified equipment (which is other than in-kind)?
- [ ] Alter equipment siting, building, trailer locations, roads, or fire protection?
- [ ] Require modifying existing and/or developing new procedures?
- [ ] Affect employee emergency response due to an organizational change?
- [ ] Transfer the responsibility for any environmental, health, or safety-related task?
- [ ] Alter the permanent staffing level or organization of any safety-sensitive job?

SAFETY OPERATOR	IN VOC SERVICE?	IN PLANT WELDING?
[X] Yes [ ] No	[ ] Yes [ ] No	[ ] Yes [X] No

APPROVALS

OPERATIONS :	K. Sohnrey	DATE: 5/17/11	PHONE: 2-2042
ENGINEERING :	P. Murphy	DATE: 5/17/11	PHONE: 2-1864
IMPACT. T.L :	M. Greenfield	DATE: 5/17/11	PHONE: 2-1179
MAINTENANCE:	V. Massaro	DATE: 5/24/11	PHONE: 2-5995

R. RAMIREZ

MAY 24 2011

Engineering Work Order - EWO

5/11/2011 6:38:06 PM

EWO #:	5849	Revision:	0	Created On:	2/17/2011
Originator:	Hohmann, Mark D.	ABU:	D&R	Plant:	4 Crude
MOC#:		Section Two Reviewer:		Equipment #:	Various
Passport W/O:	313079	Project Number:	DD173-EXP	EWO Type:	Shutdown
Item:		SAP Cost Center:		Status:	Active
S/D EWO #:	BE-102-E2				

☑ FullVersion ☐ SupplementalVersion

Title: 4CU - Extra Valve List

Scope: 38 extra valves have been identified as needing replacement or repair. This EWO provides specific work direction for each of these valves.

- ☐ **Cause the use of different feeds, chemicals, or catalyst**
- ☐ **Cause the use of different process conditions, instrumentation, process control, or affect upstream/downstream plants?**
- ☐ **Cause the use of new or modified equipment (which is other than in-ki**
- ☐ **Alter equipment siting, building, trailer locations, roads, or fire protecti**
- ☐ **Require modifying existing and/or developing new procedur**

Technical Basis For Change

Safety Operator Required? Yes **In VOC Service?** Yes **In Plant Welding?** Yes

Approvers Section

	Person Responsible	Notified O	Completed B	Completed O
Lead Engineer:	Murphy, Patrick K.	4/25/2011	Murphy, Patrick K.	5/2/2011
Maintenance:	Massaro, Vincent R.	5/2/2011	Massaro, Vincent R.	5/3/2011
Building Permit:	Linares, Elena E.	5/2/2011		
Inspection:				
Operations:	Sohnrey, Kenneth C.	5/2/2011	Sohnrey, Kenneth C.	5/3/2011

CUSA-CSB-0019074
EPA

1.0 SCOPE

38 extra valves have been identified as needing replacement or repair. This EWO provides specific work direction for each of these valves.

2.0 GENERAL REQUIREMENTS

All work in this EWO shall be in strict compliance with the following ASME Codes and Richmond Refinery standards:

- ASME B31.3 (latest):_____Process Piping
- ASME Section IX (latest):_____Welding and Brazing Qualifications
- ASME Section V (latest):_____Nondestructive Examination
- All piping work in this EWO shall be in compliance with the "Richmond Refinery Weld Inspection Requirements for Piping Fabrication". The piping Contractor is responsible for complying with these quality assurance procedures.
- Any repair alternatives to the instructions in this EWO shall be reviewed and approved by a Chevron Designs Engineer.

3.0 MATERIALS

- Obtain valves from **Maximo#: 313079**
- All other materials to be supplied by Maintenance and/or the Contractor

4.0 WORK INSTRUCTIONS

4.1 Perform work on valves as directed on attached "General Valve Work Detail List". This list will provide the following information:

- Valve info (tag #, size, class, style).
- Location within plant (work with attached sketches).
- Work direction (repack, remove/repair, replace, etc.).
- Appropriate Welding Procedure Specifications.
- Hydrostatic Test Pressure Information
- Pipe Class Specifications

4.2 Unless noted otherwise, maintain existing valve handwheel orientations.

4.3 Verify that all pipe is adequately supported before starting to demo any pipe.

4.4 Replace Insulation In Kind

- Where required, insulation shall be removed sufficiently to complete valve work including testing. The insulation shall be replaced to match existing after all valve work and testing is complete.
- Test and Abate Asbestos Insulation as Necessary.

5.0 ATTACHMENTS

- Valve Work Detail List_____3 Sheets
- Individual Valve Sketches_____22 Sheets
- Hydrostatic Test Waiver Forms: XVLV-066, XVLV-077_____2 Sheets
- Piping Class Sheets: 1CS12, 1CS13, 3CS11, 3CS14, 1CS21, 3CL11, 1CS23_____21 Sheets
- Weld Procedures: WPS CVX 101, 104, 107_____See Maintenance Personnel
- Chevron Coating System: 3.1, 3.5, 12.1_____3 Sheets

D&R Di[illegible]ation

EWO LIST

General Valve Work Detail Li[illegible]

Passport # 313079-001	Plant: 4Crude	Impact Team Leader	Woolley, Scott J.
EWO # BE102-E2	Equipment: 4Q 11 4CU S/D - EXTRA VAL	Impact Supervisor:	Smith, Bruce D.
MOC #	Shutdown Info: 2011	Maint. Supervisor:	MARK PAULSON
		Ops. Coordinator:	KENNETH SOHNREY

Tag Number	Valve				Location	Service	Work	P&ID / ISO #	Pipe Class	Weld Proc	Hydro (psi)
	Size (in.)	Rating	End Conn.	Type							
XVLV-051	12"	150	RF	Gate Valve	P-1100A Suction Block Valve	Naphtha	Replace valve (see drawing SK-5849-01)	D-308314-22 / 0955-003-005	1CS12	N/A	N/A
XVLV-052	6"	150	RF	Gate Valve	P-1100A Discharge Block Valve	Naphtha	Replace valve (see drawing SK-5849-02)	D-308314-22 / 0955-003-006	1CS12	N/A	N/A
XVLV-054	0.75"	800	Welded	Gate Valve	V-1177 3/4' Warm-Up Line	150# Steam	Replace valve per EWO BE136-E1.	N/A	N/A	N/A	N/A
XVLV-055	1"	800	Welded	Gate Valve	V-1177 3/4' Warm-Up Line	150# Steam	Replace valve per EWO BE-136-E1	N/A	N/A	N/A	N/A
XVLV-056	0.75"	800	Welded	Gate Valve	V-1177 3/4' Warm-Up Line Bleeder Valve	150# Steam	Replace valve per EWO BE-136-E1	N/A	N/A	N/A	N/A
XVLV-057	2.0"	300	RF	Gate Valve	K-1179 Inlet Block Valve	7 S/C	Replace valve (see drawing SK-5849-03)	D-308352 / 0955-012-003	3CS11	N/A	N/A
XVLV-058	3"	300	RF	Gate Valve	11FV752 Upstream Block Valve	LPBFW	Replace valve (see drawing SK-5849-04).	D-336673-6 / 0955-027-004	3CS14	N/A	N/A
XVLV-059	0.75"	800	Welded	Gate Valve	150# Steam to SARCO Pot A Inlet	50# Steam	Replace valve (see drawings SK-5849-05 and SK-5849-05-1).	D-311337-21 / 0957-009-014	1CS21	CVX-101, 104, 107	450 psig
XVLV-060	0.75"	800	Welded	Gate Valve	150# Steam to SARCO Pot B Inlet	50# Steam	Replace valve (see drawings SK-5849-05 and SK-5849-05-1).	D-311337-21 / 0957-009-014	1CS21	CVX-101, 104, 107	450 psig
XVLV-061	0.75"	800	Welded	Gate Valve	850# Steam Trap to 150# Steam Header D/S Block Valve (UPLM)	150# Steam	Replace valve per EWO BE-137-E1.	N/A	N/A	N/A	N/A
XVLV-062	2.0"	300	RF	Gate Valve	K-1179 Outlet Block Valve	7 S/C	Replace valve (see drawing SK-5849-06)	D-308352 / 0955-036-B01	3CS11	N/A	N/A
XVLV-063	2.0"	300	RF	Gate Valve	K-1179A Outlet Block Valve	7 S/C	Replace valve (see drawing SK-5849-06).	D-308352 / 0955-036-B01	3CS11	N/A	N/A
XVLV-064	2.0"	300	RF	Gate Valve	K-1179A Inlet Block Valve	7 S/C	Replace valve (see drawing SK-5849-03)	D-308352 / 0955-012-003	3CS11	N/A	N/A
XVLV-065	2.0"	300	RF	Gate Valve	K-1179A Bypass Block Valve	7 S/C	Replace valve (see drawing SK-5849-03)	D-308352 / 0955-012-003	3CS11	N/A	N/A

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EPA

EWO LIST

General Valve Work Detail Lis

Passport # 313079-001	Plant: 4Crude	Impact Team Leader	Woolley, Scott J.
EWO # BE102-O1	Equipment: 4Q 11 4CU S/D - EXTRA VAL	Impact Supervisor:	Smith, Bruce D.
MOC #	Shutdown Info: 2011	Maint. Supervisor:	MARK PAULSON
		Ops. Coordinator:	KENNETH SOHNREY

Tag Number	Valve				Location	Service	Work	P&ID / ISO #	Pipe Class	Weld Proc	Hydro (psi)
	Size (in.)	Rating	End Conn.	Type							
XVLV-066	0.75"	800	Welded	Gate Valve	P-1167 Seal Flush Line 3/4" Vent Valve	7 S/C	Replace valve per instructions provided on drawing SK-5849-07.	D-308352-16 / 0955-036-B08	3CS11	CVX-101, 104, 107	N/A
XVLV-067	0.75"	800	Welded	Gate Valve	K-1100B 1st Stage Discharge Line Bleeder Valve	OVHD GAS	Replace valve per instructions provided on drawing SK-5849-08.	D-308316 / 0955-016-006	1CS12	CVX-101, 104, 107	N/A
XVLV-068	1.5"	800	Welded	Gate Valve	Steam trap B/V for 7&8 s/c lines to RLOP - Outside PLM	150# Steam	Replace valve per EWO BE-138-E1.	N/A	N/A	N/A	N/A
XVLV-072	2.0"	300	RF	Gate Valve	P-1159 Discharge	6 S/C	Replace valve (see drawing SK-5849-09)	D-308309 / 0955-011-008	3CL11	N/A	N/A
XVLV-073	4"	300	RF	Gate Valve	P-1159 Suction MOV	6 S/C	Replace valve (see drawing SK-5849-10).	D-308309 / 0955-008-001	3CL11	N/A	N/A
XVLV-074	4"	300	RF	Gate Valve	P-1159 Suction	6 S/C	Replace valve (see drawing SK-5849-10).	D-308309 / 0955-008-001	3CL11	N/A	N/A
XVLV-075	1"	800	Welded	Gate Valve	V-1100 11LSL011 Upper Lead BV	Naphtha	Replace valve per EWO BE-139-E1.	N/A	N/A	N/A	N/A
XVLV-076	0.75"	800	Welded	Gate Valve	V-1100 11LSL011 Upper Lead Vent Valve	Naphtha	Replace valve per EWO BE-139-E1.	N/A	N/A	N/A	N/A
XVLV-077	0.75"	800	Welded	Gate Valve	V-1100 Upper Boot Area	Naphtha	Replace valve (see drawings SK-5849-11 and SK-5849-11-1).	D-305314 / 0955-003-012	1CS23	CVX-101, 104, 107	75 psig
XVLV-078	1"	600	Welded	Gate Valve	V-1100 11LSL011 Lower Lead BV	Naphtha	Replace valve per EWO BE-139-E1.	N/A	N/A	N/A	N/A
XVLV-079	1"	800	Welded	Gate Valve	K-1100A 1st Dampner Drain to P-1171B	Naphtha	Replace valve per instructions provided on drawings SK-5849-12 and SK-5849-12-1.	D-308315 / 0955-016-014	1CS23	CVX 101, 104, 107	450 psig
XVLV-080	12"	150	RF	Gate Valve	P-1101C Suction MOV	Crude Oil	Replace valve (see drawing SK-5849-13).	D-308300 / 0955-001-001	1CS12	N/A	N/A
XVLV-082	8"	150	RF	Gate Valve	V-1101 BP Block Valve	150# Steam	Replace valve (see drawing SK-5849-14)	D-308326	1CS13	N/A	N/A
XVLV-083	14"	150	RF	Gate Valve	P-1128 Suction Valve	ATCR	Replace valve (see drawing SK-5849-15)	D-308309 / 0955-005-010	1CS12	N/A	N/A

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EPA

EWO LIST

General Valve Work Detail Lis

Passport #	313079-001	Plant:	4Crude	Impact Team Leader	Woolley, Scott J.
EWO #	BE102-O1	Equipment:	4Q 11 4CU S/D - EXTRA VAL	Impact Supervisor:	Smith, Bruce D.
MOC #		Shutdown Info:	2011	Maint. Supervisor:	MARK PAULSON
				Ops. Coordinator:	KENNETH SOHNREY

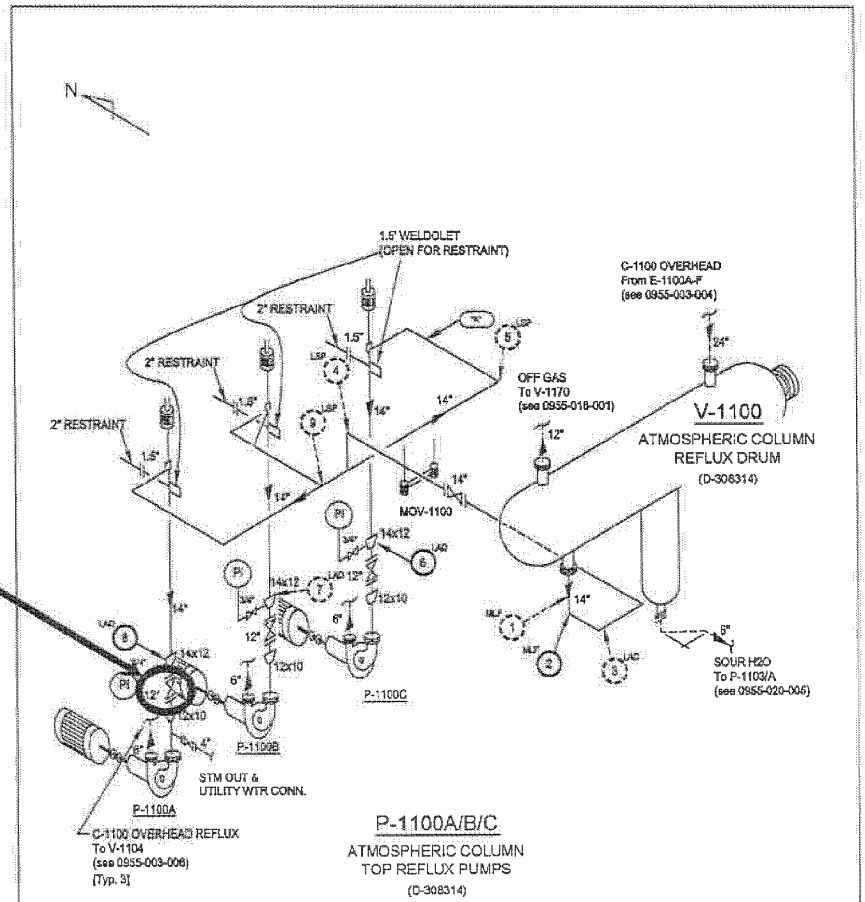
Tag Number	Valve				Location	Service	Work	P&ID / ISO #	Pipe Class	Weld Proc	Hydro (psi)
	Size (in.)	Rating	End Conn.	Type							
XVLV-084	14"	150	RF	Gate Valve	P-1128A Suction Valve	ATCR	Replace valve (see drawing SK-5849-15).	D-308309 / 0955-005-010	1CS12	N/A	N/A
XVLV-085	10"	300	RF	Gate Valve	P-1128 Discharge Valve	ATCR	Replace valve (see drawing SK-5849-16)	D-308309 / 0955-005-011	3CS11	N/A	N/A
XVLV-086	10"	300	RF	Gate Valve	P-1128A Discharge Valve	ATCR	Replace valve (see drawing SK-5849-16)	D-308309 / 0955-005-011	3CS11	N/A	N/A
XVLV-087	4"	150	RF	Gate Valve	P-1160 Suction Valve	Vacuum Oil	Replace valve (see drawing SK-5849-17)	D-308331 / 0955-010-008	1CS23	N/A	N/A
XVLV-088	4"	150	RF	Gate Valve	P-1160A Suction Valve	Vacuum Oil	Replace valve (see drawing SK-5849-17).	D-308331 / 0955-010-008	1CS23	N/A	N/A
XVLV-089	0.75"	800	Welded	Gate Valve	P-1167 Seal Flush Steam Tracing Block Valve	Stm/Condensate	Replace valve per drawing SK-5849-18.	N/A	1CS13	CVX-101, 104, 107	450 psig
XVLV-090	0.75"	800	Welded	Gate Valve	P-1105 Steam Tracing Manifold	150# Steam	Replace valve per EWO BE-140-E1.	N/A	N/A	N/A	N/A

CUSA-CSB-0019078
EPA

XVLV-051

Replace valve

12", 150#, RF Gate Valve
Maximo #313079
Pipe Class: 1CS12

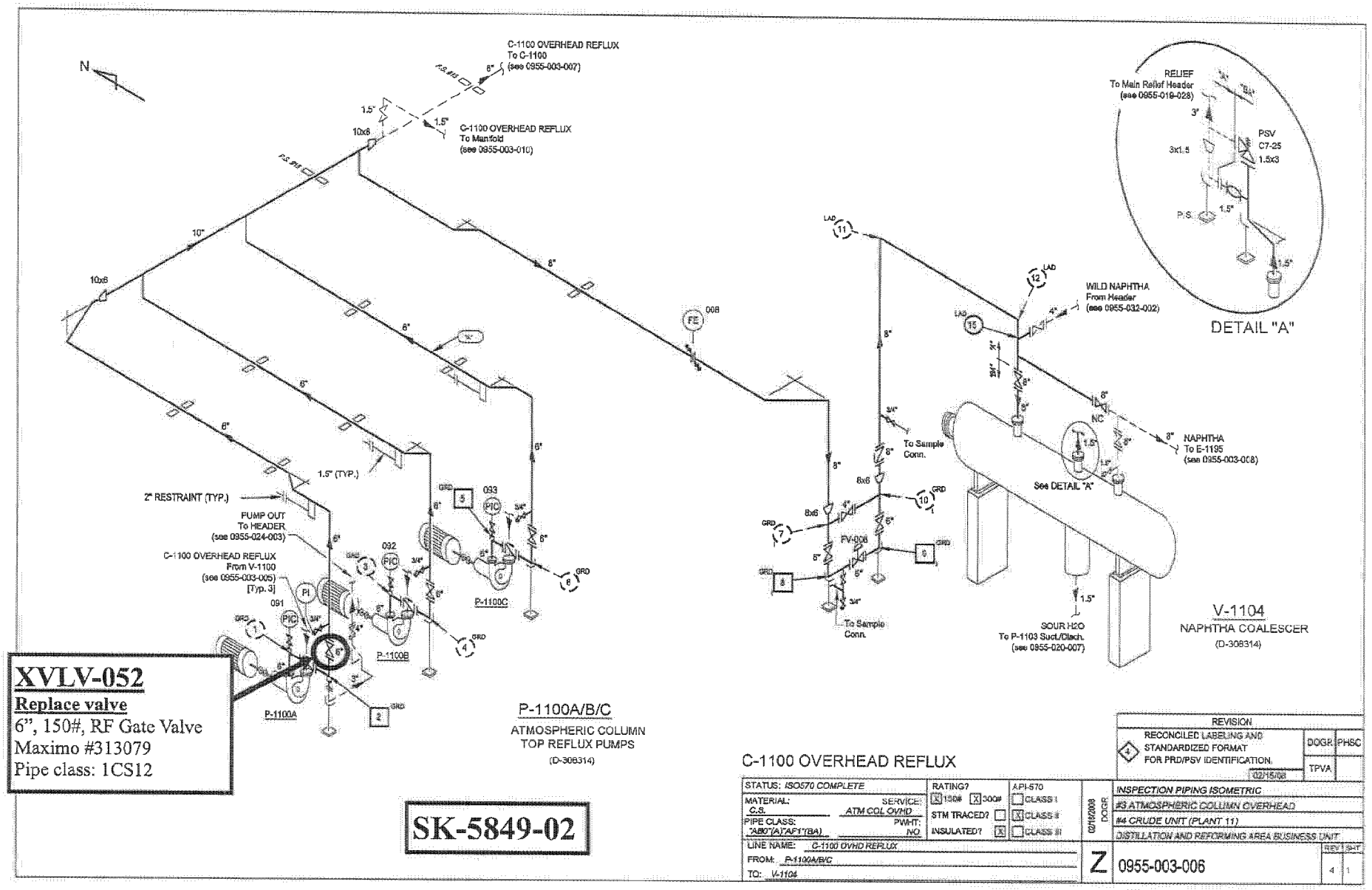


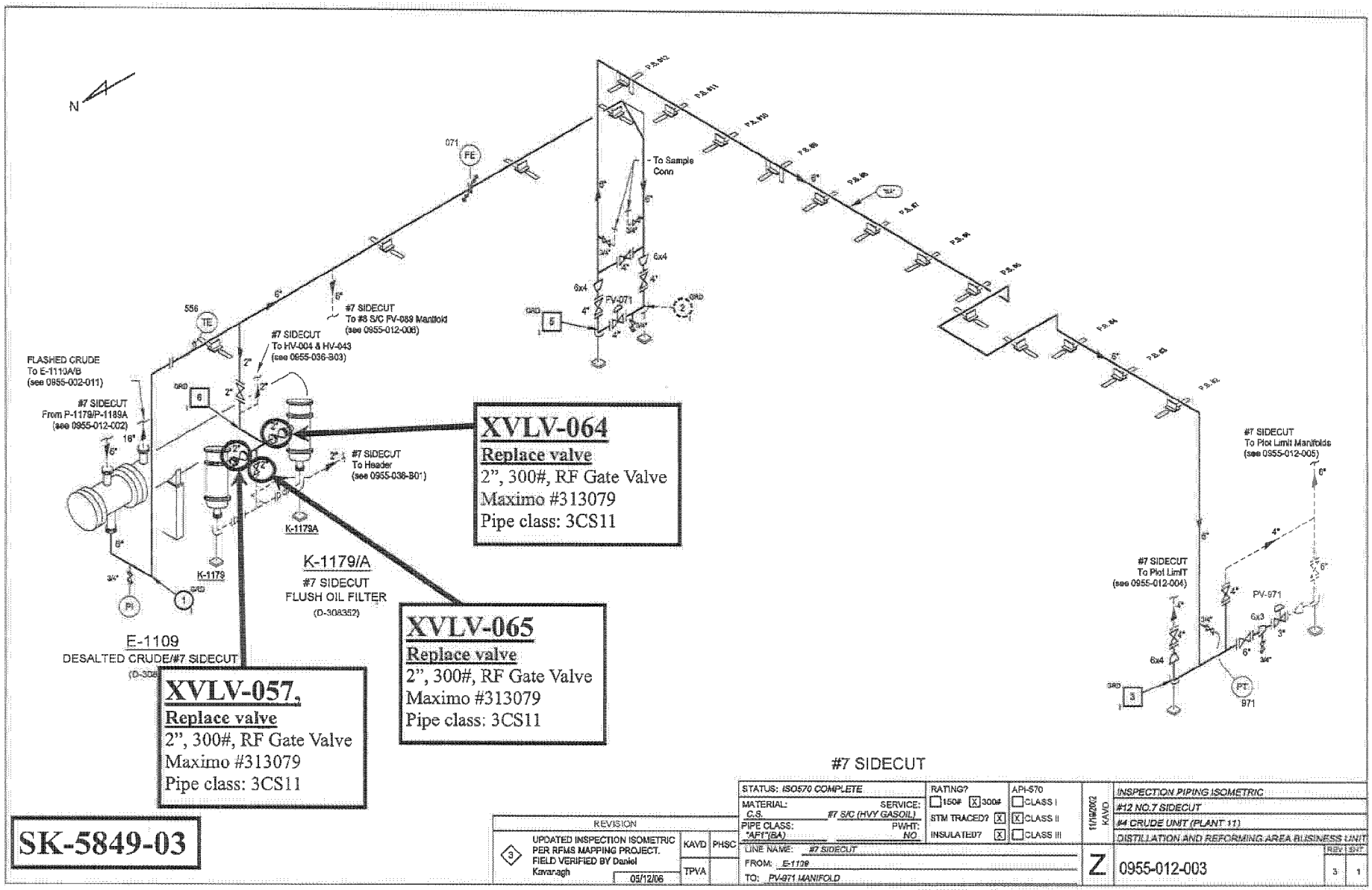
C-1100 OVERHEAD REFLUX

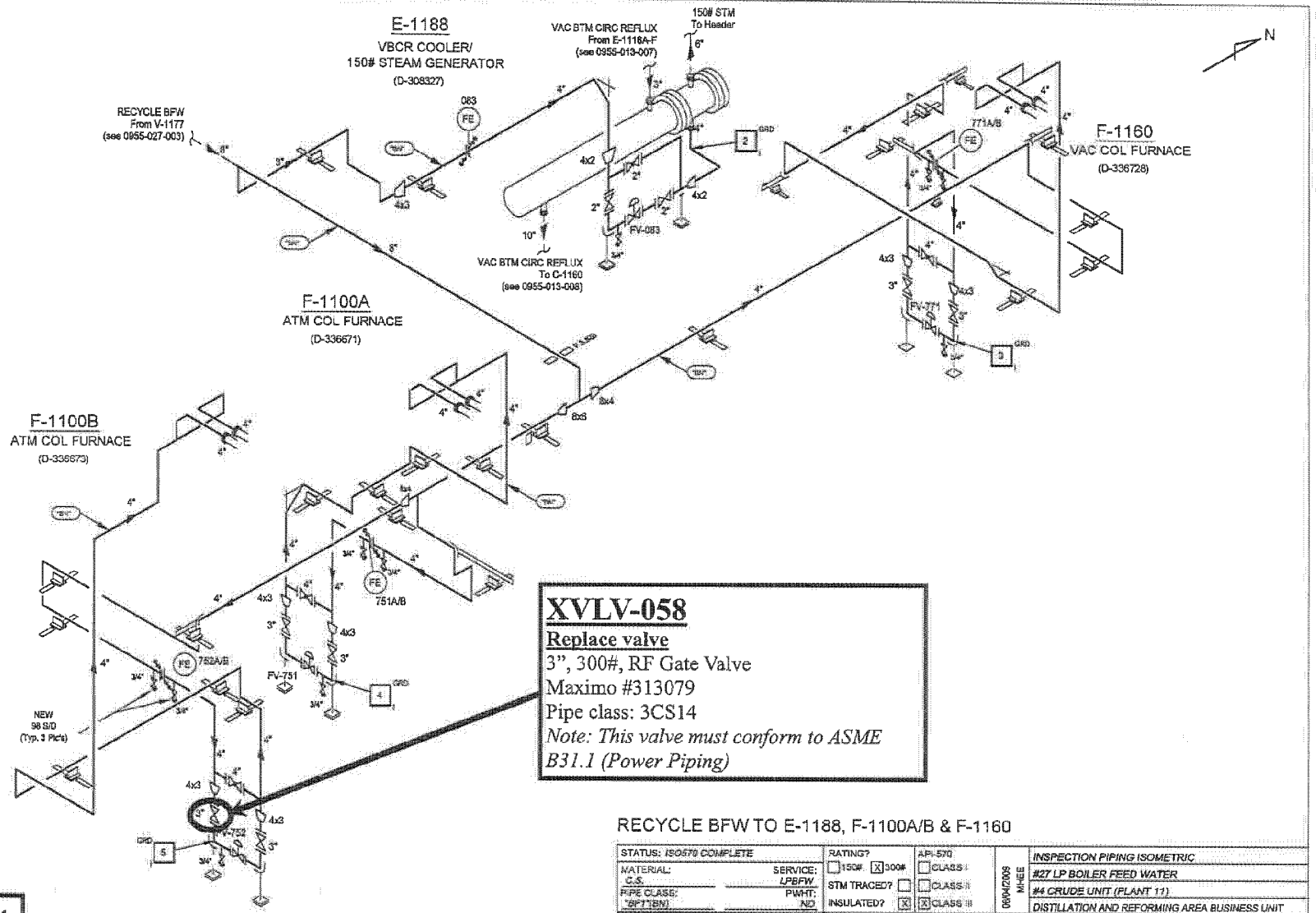
STATUS: ISO570 COMPLETE	RATING? [X] 150# [ ] 300#	API-570 [ ] CLASS I	07/27/01 tahn/pjpc	INSPECTION PIPING ISOMETRIC
MATERIAL: C.S. / SERVICE: ATM COL OVHD	STM TRACED? [ ]	[X] CLASS II		#3 ATMOSPHERIC COLUMN OVERHEAD
PIPE CLASS: *ABO7(A) / PWHT: NO	INSULATED? [ ]	[ ] CLASS III		#4 CRUDE UNIT (PLANT 11)
				DISTILLATION AND REFORMING AREA BUSINESS UNIT
LINE NAME: C-1100 OVHD REFLUX			Z	0955-003-005 — REV 2, SHT 1
FROM: V-1100				
TO: P-1100A/B/C				

SK-5849-01

CUSA-CSB-0019079
EPA


N
C-1100 OVERHEAD REFLUX
To C-1100
(see 0955-003-007)
C-1100 OVERHEAD REFLUX
To Manifold
(see 0955-003-010)
10x8
10x6
10"
8"
6"
1.5"
1.5" (TYP.)
2" RESTRAINT (TYP.)
PUMP OUT
To HEADER
(see 0955-024-003)
C-1100 OVERHEAD REFLUX
From V-1100
(see 0955-003-005)
[Typ. 3]
091
092
033
PI
PIC
FE
008
P-1100A
P-1100B
P-1100C
P-1100A/B/C
ATMOSPHERIC COLUMN
TOP REFLUX PUMPS
(D-308314)
To Sample
Conn.
8x6
FV-008
SOUR H2O
To P-1103 Suct./Disch.
(see 0955-020-007)
WILD NAPHTHA
From Header
(see 0955-032-002)
NAPHTHA
To E-1195
(see 0955-003-008)
See DETAIL "A"
V-1104
NAPHTHA COALESCER
(D-308314)
RELIEF
To Main Relief Header
(see 0955-019-028)
PSV
C7-25
1.5x3
3x1.5
P.S.
DETAIL "A"
XVLV-052
Replace valve
6", 150#, RF Gate Valve
Maximo #313079
Pipe class: 1CS12
SK-5849-02
C-1100 OVERHEAD REFLUX
REVISION
RECONCILED LABELING AND STANDARDIZED FORMAT FOR PRD/PSV IDENTIFICATION.
02/15/08
DOGR
PHSC
TPVA
STATUS: ISO570 COMPLETE
RATING? 150# 300#
API-570 CLASS I CLASS II CLASS III
MATERIAL: C.S.
SERVICE: ATM COL OVHD
PIPE CLASS: "A80"(A)"AF1"(BA)
PWHT: NO
STM TRACED?
INSULATED?
02/15/08
DOGR
INSPECTION PIPING ISOMETRIC
#3 ATMOSPHERIC COLUMN OVERHEAD
#4 CRUDE UNIT (PLANT 11)
DISTILLATION AND REFORMING AREA BUSINESS UNIT
LINE NAME: C-1100 OVHD REFLUX
FROM: P-1100A/B/C
TO: V-1104
Z
0955-003-006
REV 4
SHT 1


N
071
FE
556
TE
FLASHED CRUDE
To E-1110A/B
(see 0955-002-011)
#7 SIDECUT
From P-1179/P-1189A
(see 0955-012-002)
#7 SIDECUT
To #8 S/C FV-089 Manifold
(see 0955-012-006)
#7 SIDECUT
To HV-004 & HV-043
(see 0955-036-B03)
#7 SIDECUT
To Header
(see 0955-036-B01)
K-1179A
K-1179
PI
E-1109
DESALTED CRUDE/#7 SIDECUT
K-1179/A
#7 SIDECUT
FLUSH OIL FILTER
(D-308352)
To Sample
Conn
FV-071
PV-971
#7 SIDECUT
To Plot Limit Manifolds
(see 0955-012-005)
#7 SIDECUT
To Plot LimIT
(see 0955-012-004)
PT
971
XVLV-064
Replace valve
2", 300#, RF Gate Valve
Maximo #313079
Pipe class: 3CS11
XVLV-065
Replace valve
2", 300#, RF Gate Valve
Maximo #313079
Pipe class: 3CS11
XVLV-057,
Replace valve
2", 300#, RF Gate Valve
Maximo #313079
Pipe class: 3CS11
SK-5849-03
#7 SIDECUT
REVISION
3
UPDATED INSPECTION ISOMETRIC PER RFMS MAPPING PROJECT. FIELD VERIFIED BY Daniel Kavanagh
05/12/06
KAVD
TPVA
PHSC
STATUS: ISO570 COMPLETE
MATERIAL: C.S.
SERVICE: #7 S/C (HVY GASOIL)
PIPE CLASS: "AF1"(BA)
PWHT: NO
LINE NAME: #7 SIDECUT
FROM: E-1109
TO: PV-971 MANIFOLD
RATING? 150# X 300#
STM TRACED? X
INSULATED? X
API-570 CLASS I CLASS II CLASS III
11/19/2002 KAVD
Z
INSPECTION PIPING ISOMETRIC
#12 NO.7 SIDECUT
#4 CRUDE UNIT (PLANT 11)
DISTILLATION AND REFORMING AREA BUSINESS UNIT
0955-012-003
REV 3
SHT 1



XVLV-058

Replace valve

3", 300#, RF Gate Valve

Maximo #313079

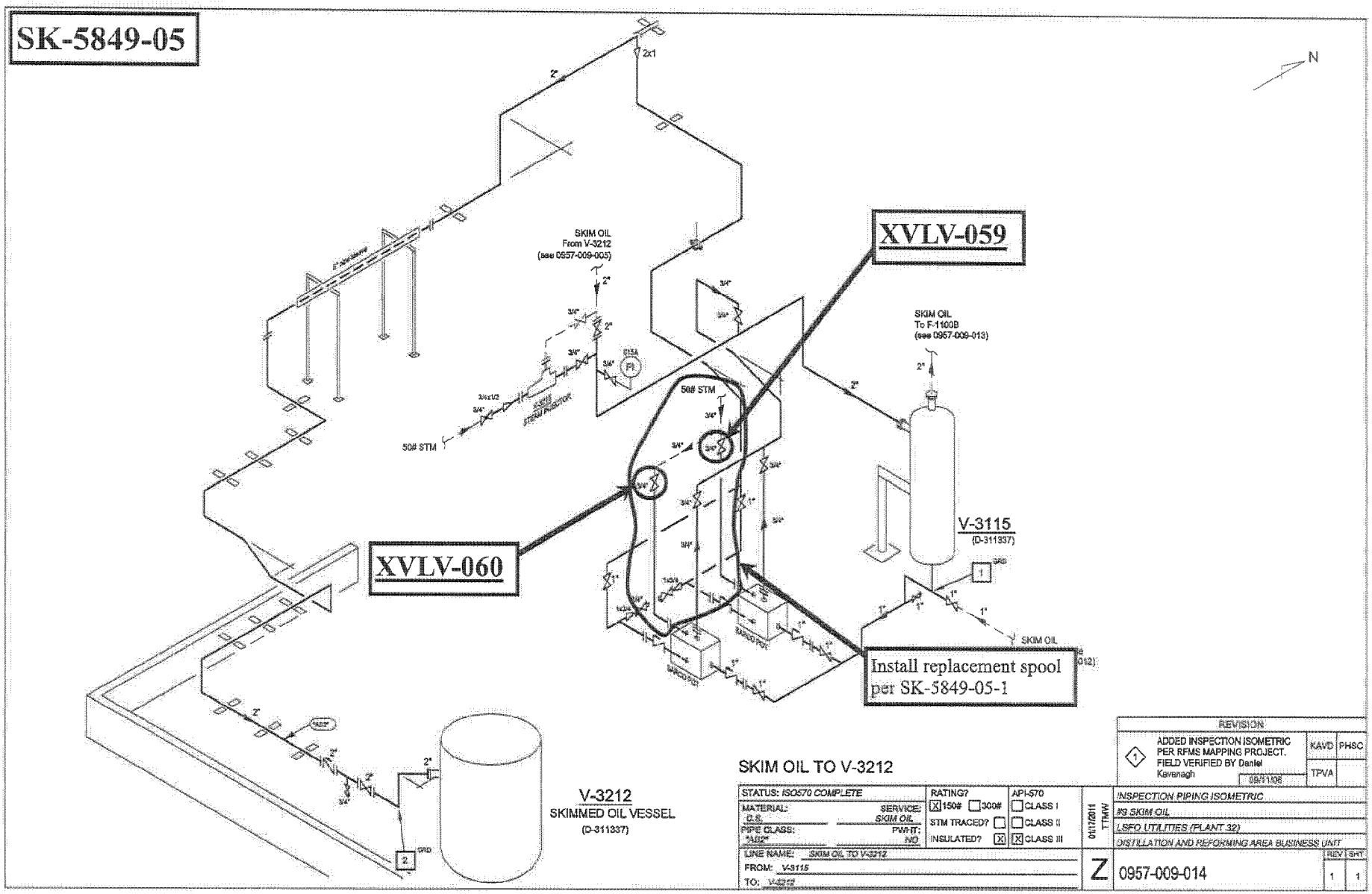
Pipe class: 3CS14

Note: This valve must conform to ASME B31.1 (Power Piping)

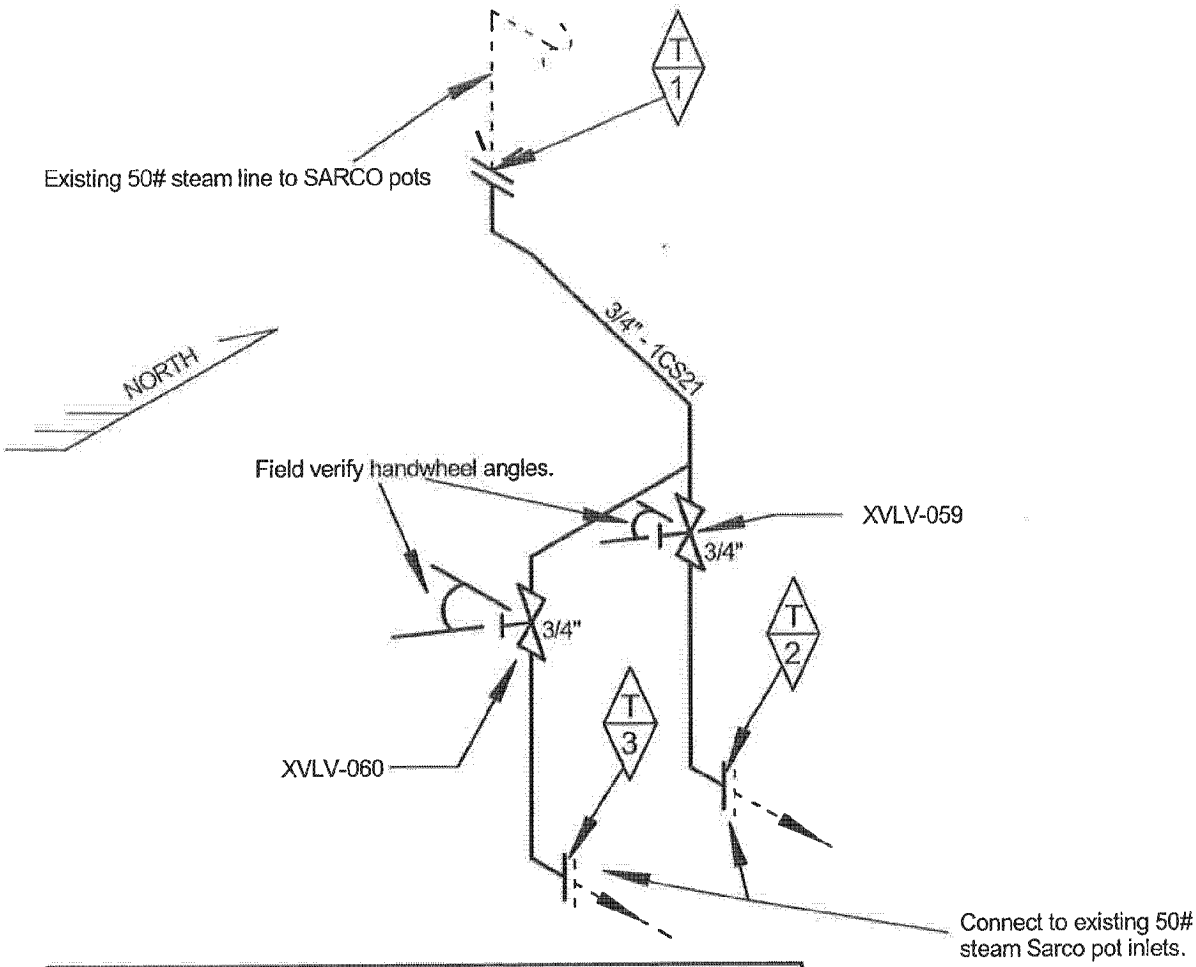
RECYCLE BFW TO E-1188, F-1100A/B & F-1160

STATUS: ISO570 COMPLETE	RATING? ☐150# ☒300#	API-570 ☐CLASS I	06/04/2009 M-HEE	INSPECTION PIPING ISOMETRIC
MATERIAL: C.S. / SERVICE: LPBFW	STM TRACED? ☐	☐CLASS II		#27 LP BOILER FEED WATER
PIPE CLASS: "8P1"BN) / PWHT: ND	INSULATED? ☒	☒CLASS III		#4 CRUDE UNIT (PLANT 11)
				DISTILLATION AND REFORMING AREA BUSINESS UNIT
LINE NAME: RECYCLE BFW TO E-1188, F-1100A/B & F-1160			Z	0955-027-004 (REV 4, SHT 1)
FROM: V-1177				
TO: E-1188, F-1100A/B & F-1160				

SK-5849-04


SK-5849-05
N
XVLV-059
XVLV-060
SKIM OIL
From V-3212
(see 0957-009-005)
SKIM OIL
To F-1100B
(see 0957-009-013)
50# STM
V-3115
(D-311337)
SKIM OIL
Install replacement spool
per SK-5849-05-1
V-3212
SKIMMED OIL VESSEL
(D-311337)
REVISION
ADDED INSPECTION ISOMETRIC PER RFMS MAPPING PROJECT. FIELD VERIFIED BY Daniel Kavanagh
KAVD
PHSC
TPVA
SKIM OIL TO V-3212
STATUS: ISO570 COMPLETE
MATERIAL: C.S.
SERVICE: SKIM OIL
PIPE CLASS: *A02*
PWHT: NO
RATING? 150# 300#
STM TRACED?
INSULATED?
API-570
CLASS I
CLASS II
CLASS III
INSPECTION PIPING ISOMETRIC
#9 SKIM OIL
LSFO UTILITIES (PLANT 32)
DISTILLATION AND REFORMING AREA BUSINESS UNIT
LINE NAME: SKIM OIL TO V-3212
FROM: V-3115
TO: V-3212
Z
0957-009-014
REV
SHT

REPLACEMENT SPOOL FOR 50# STEAM SUPPLY TO SARCO POTS



WORK INSTRUCTIONS FOR XVLV-059 AND XVLV-060
BE-102-E2 Rev 0 (eEWO 5849) - Maximo #313079

1. ??? QUESTIONS??? Contact Pat Murphy at 2-1864.
2. FIELD VERIFY ALL DIMENSIONS
3. MATERIAL
   * Valves ordered on Maximo #313079.
   * Maintenance and/or the Contractor to provide all other materials.
4. LOCATION
   SARCO POT A AND B STEAM INLETS (see SK-5849-05).

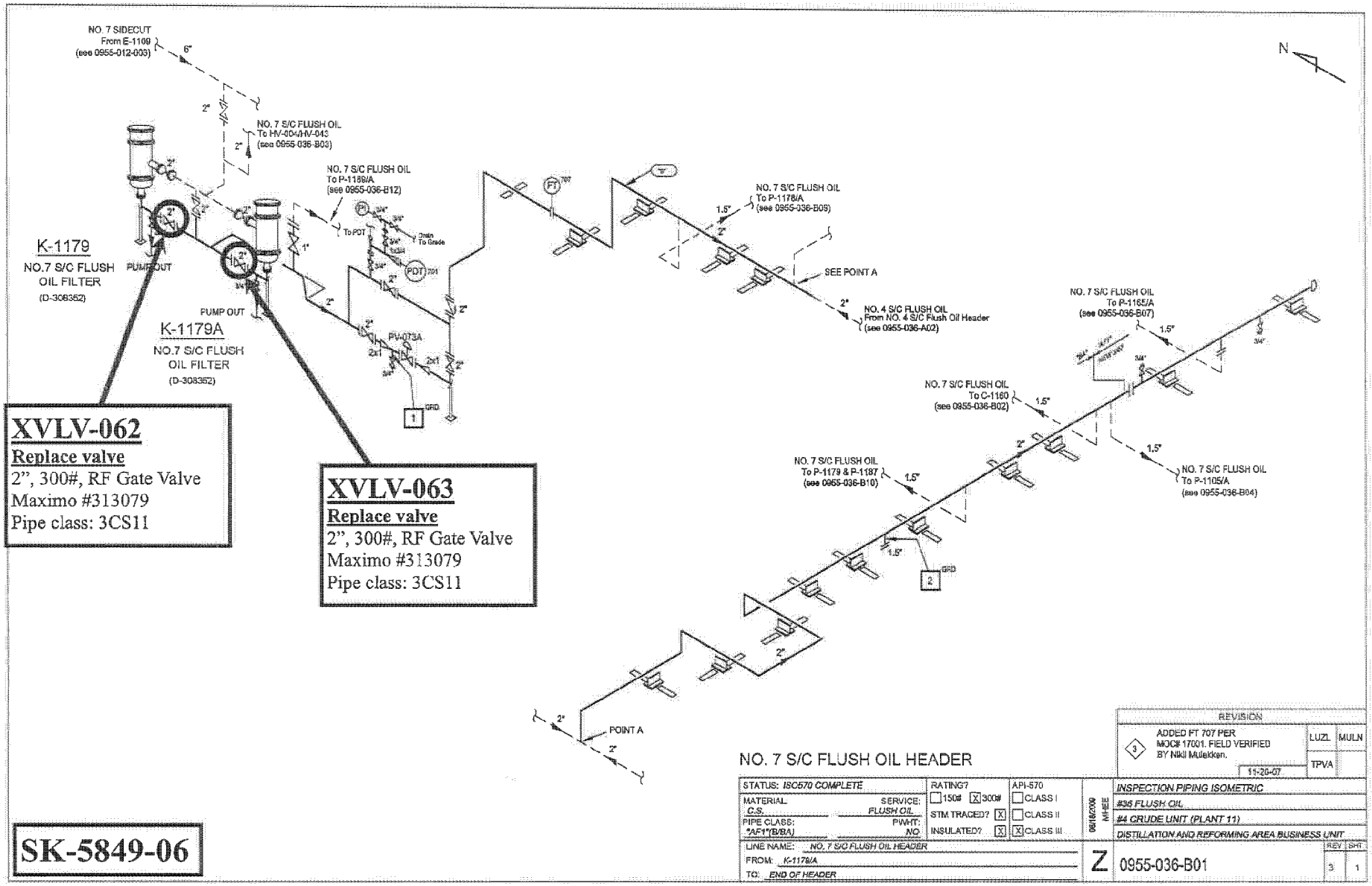
Pre-Shutdown Work:

5. Pre-fabricate new piping spool per above sketch.
   * Pipe Class: 1CS21.
   * Weld Procedures: CVX-101, CVX-104, CVX-107
   * Hydrostatic test pressure: 450 psig
   * Coat piping per spec 12.1 - Gray Primer Color.

Shutdown Work:

6. Cut pipe at T1.
7. Demo pipe between T1, T2, and T3.
8. Field weld new 3/4" 150# RF-SW flange at T1.
   * Pipe Class: 1CS21.
   * Weld Procedures: CVX-101, CVX-104, CVX-107
   * Hydrostatic test pressure: 450 psig (use a test plug)
9. Install prefabricated piping spool.
10. Coat new flange per spec 12.1 - Gray Primer Color.
11. Install calcium silicate insulation to match existing.

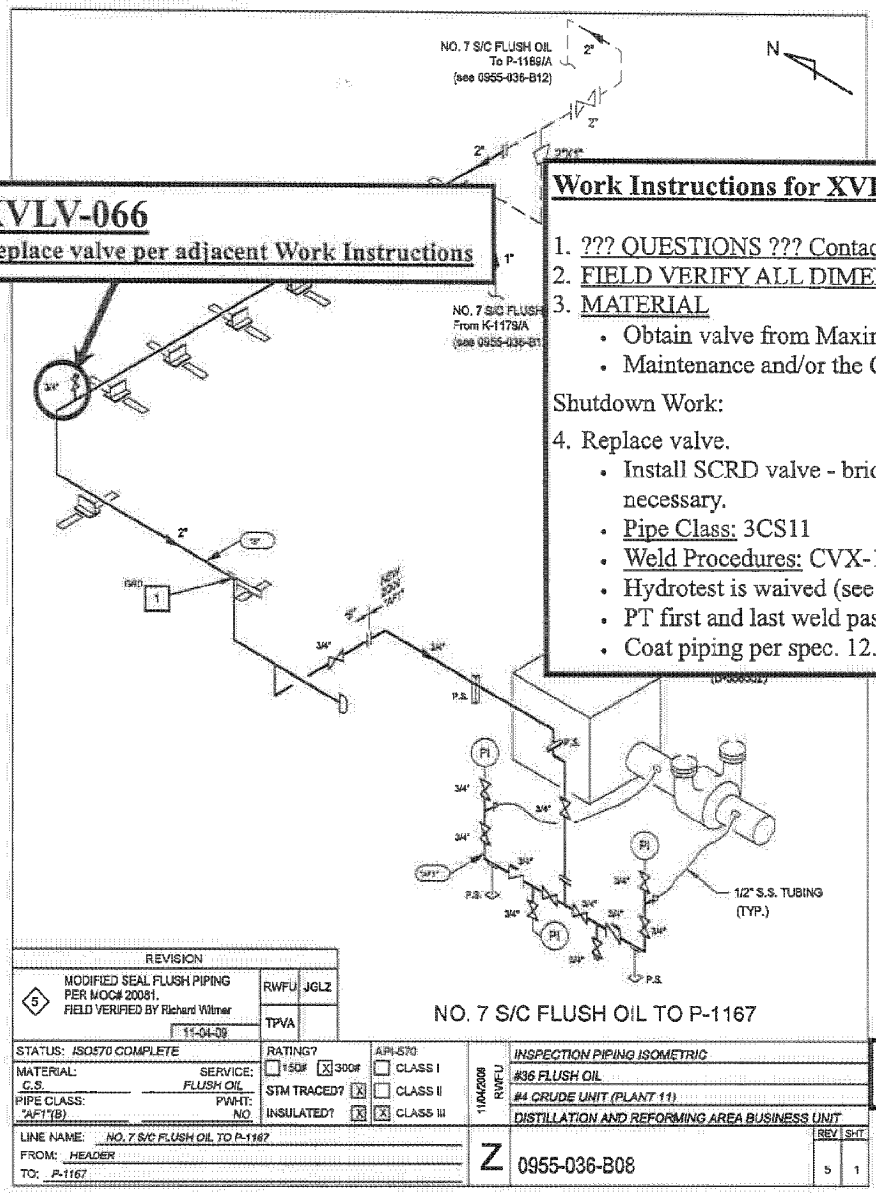
SK-5849-05-1



XVLV-062
Replace valve
2", 300#, RF Gate Valve
Maximo #313079
Pipe class: 3CS11

XVLV-063
Replace valve
2", 300#, RF Gate Valve
Maximo #313079
Pipe class: 3CS11

SK-5849-06



XVLV-066

Replace valve per adjacent Work Instructions

Work Instructions for XVLV-066

1. ??? QUESTIONS ??? Contact Pat Murphy 2-1864
2. FIELD VERIFY ALL DIMENSIONS
3. MATERIAL
   - Obtain valve from Maximo #313079
   - Maintenance and/or the Contractor to provide all other materials.

Shutdown Work:

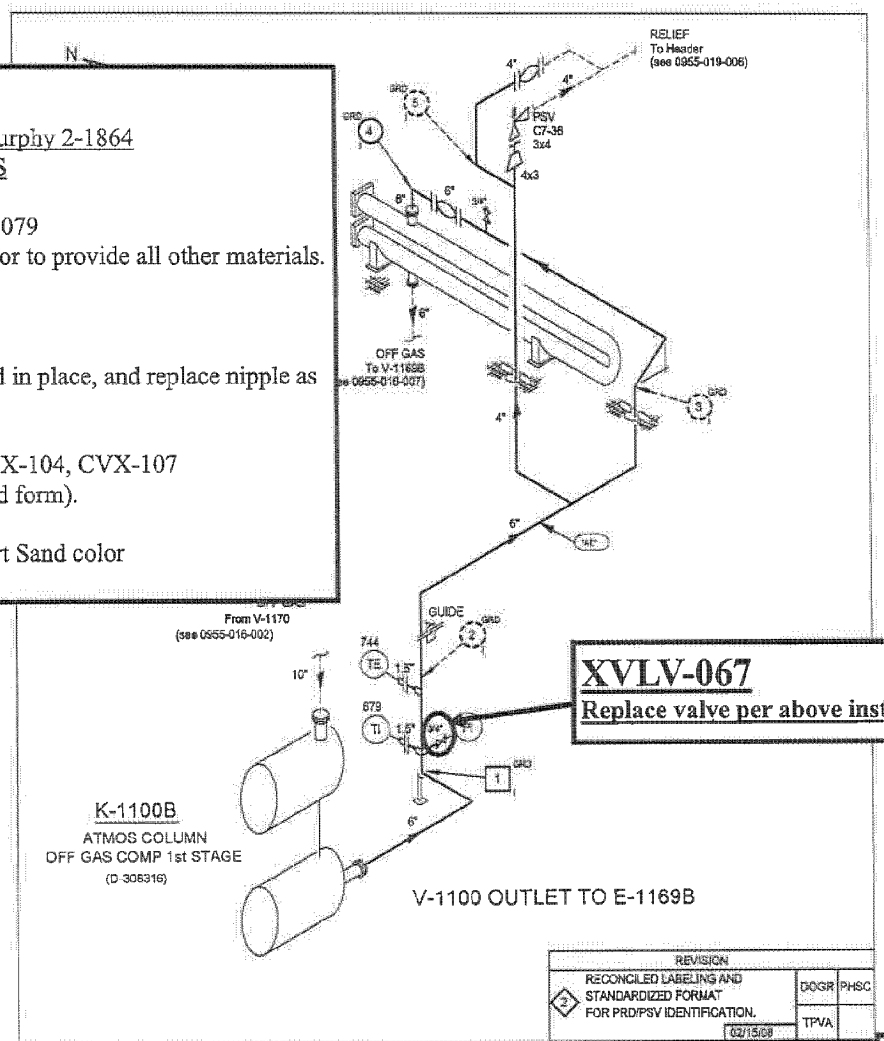
4. Replace valve.
   - Install SCRD valve - bridge weld in place, and replace nipple as necessary.
   - Pipe Class: 3CS11
   - Weld Procedures: CVX-101, CVX-104, CVX-107
   - Hydrotest is waived (see attached form)
   - PT first and last weld passes.
   - Coat piping per spec. 12.1 - Gray Primer Color

Work Instructions for XVLV-067

1. ??? QUESTIONS ??? Contact Pat Murphy 2-1864
2. FIELD VERIFY ALL DIMENSIONS
3. MATERIAL
   - Obtain valve from Maximo #313079
   - Maintenance and/or the Contractor to provide all other materials.

Shutdown Work:

4. Replace valve.
   - Install SCRD valve - bridge weld in place, and replace nipple as necessary.
   - Pipe Class: 1CS12
   - Weld Procedures: CVX-101, CVX-104, CVX-107
   - Hydrotest is waived (see attached form).
   - PT first and last weld passes.
   - Coat piping per spec. 3.5 - Desert Sand color



XVLV-067
Replace valve per above instructions.

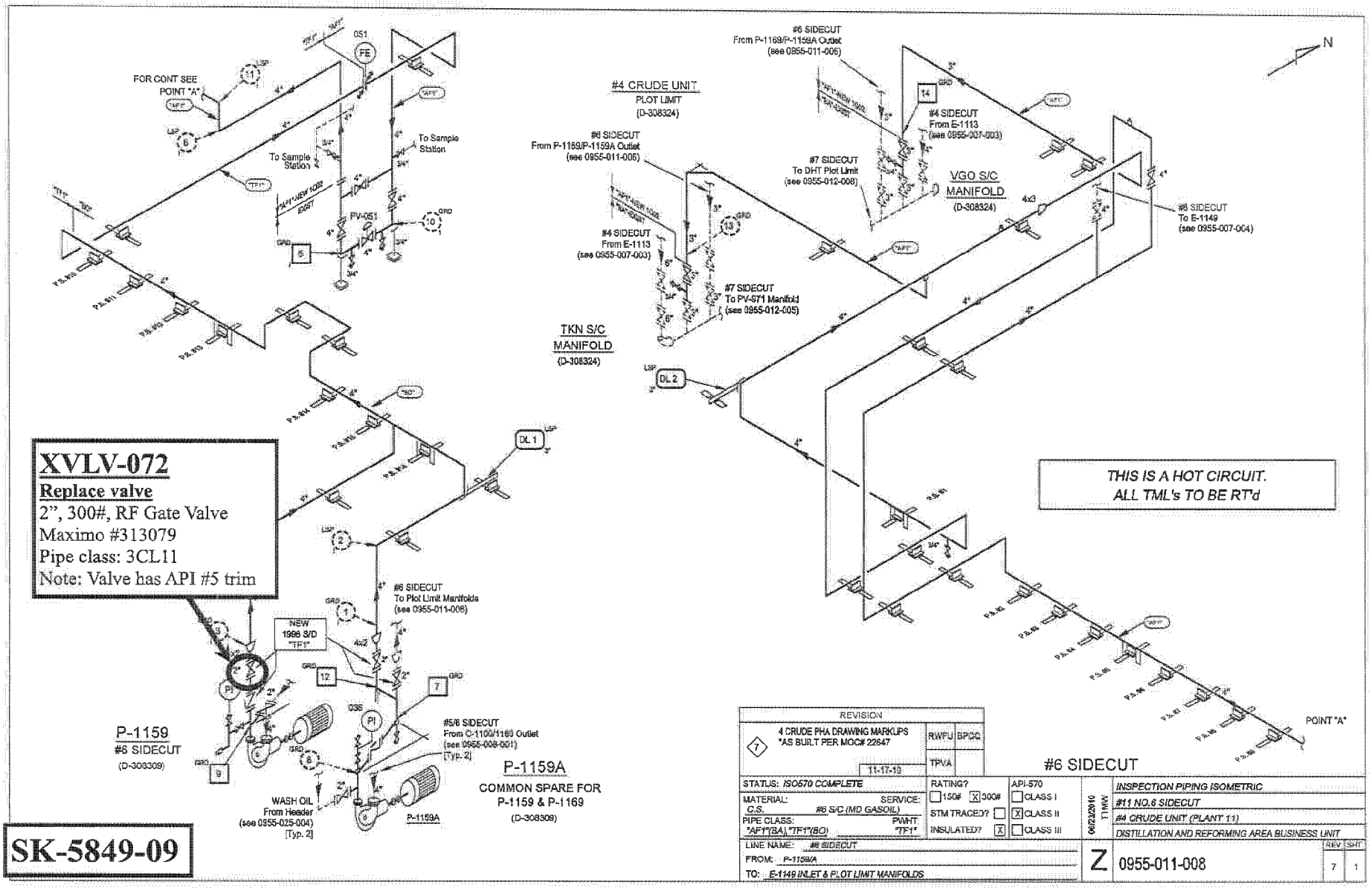
REVISION		
2 RECONCILED LABELING AND STANDARDIZED FORMAT FOR PRD/PSV IDENTIFICATION. 02/15/08	DOGR	PHSC
	TPVA	

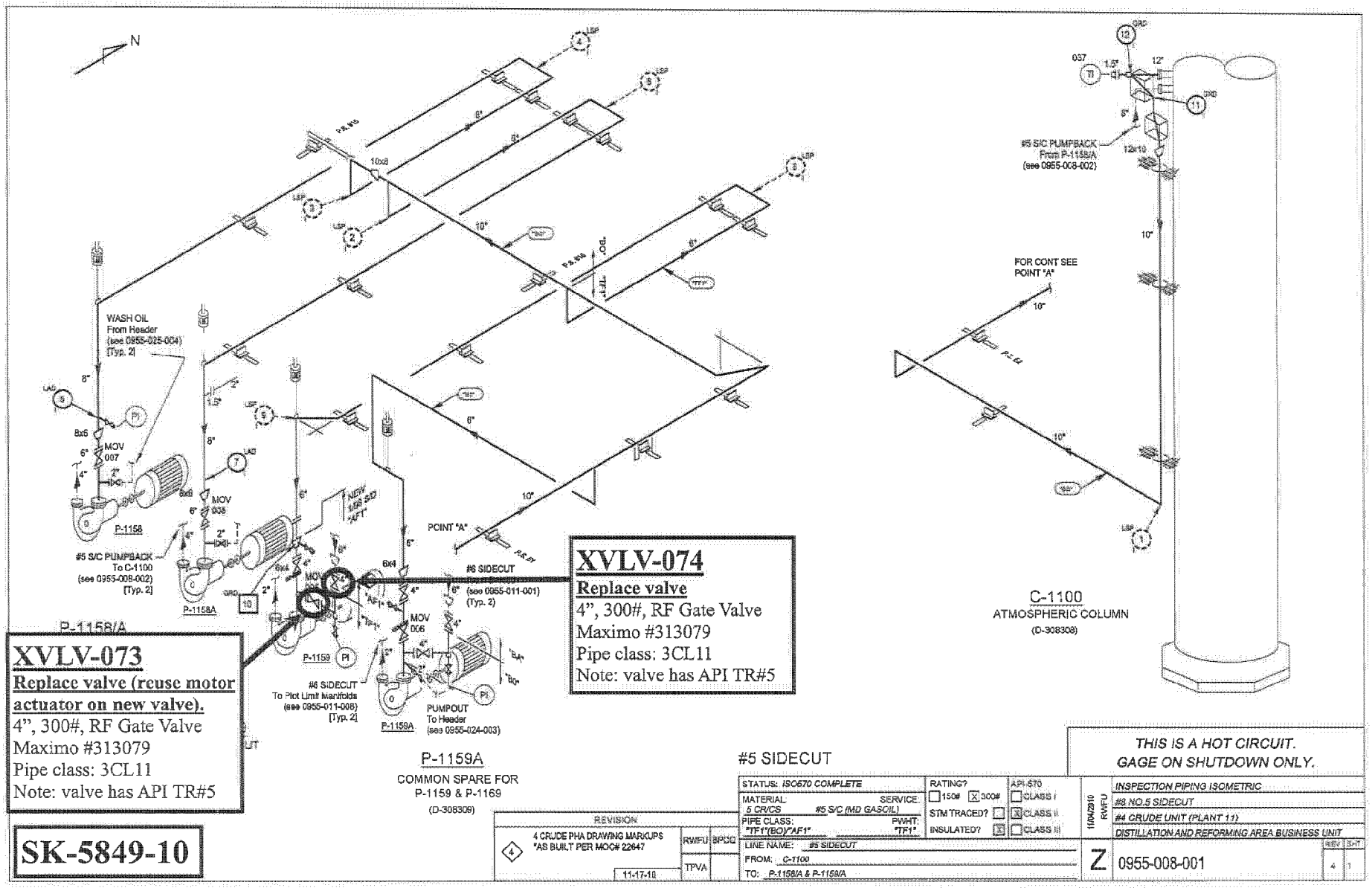
STATUS: ISO570 COMPLETE	RATING? [X] 150# [ ] 300#	API-570 [ ] CLASS I	INSPECTION PIPING ISOMETRIC
MATERIAL: C.S. / SERVICE: OFF-GAS	STM TRACED? [ ]	[X] CLASS II	#16 OFF-GAS
PIPE CLASS: "A51"(AE) / PWHT: NO	INSULATED? [X]	[ ] CLASS III	#4 CRUDE UNIT (PLANT 11)
			DISTILLATION AND REFORMING AREA BUSINESS UNIT
LINE NAME: V-1100 OUTLET TO E-1169B			
FROM: K-1100B			
TO: E-1169B			

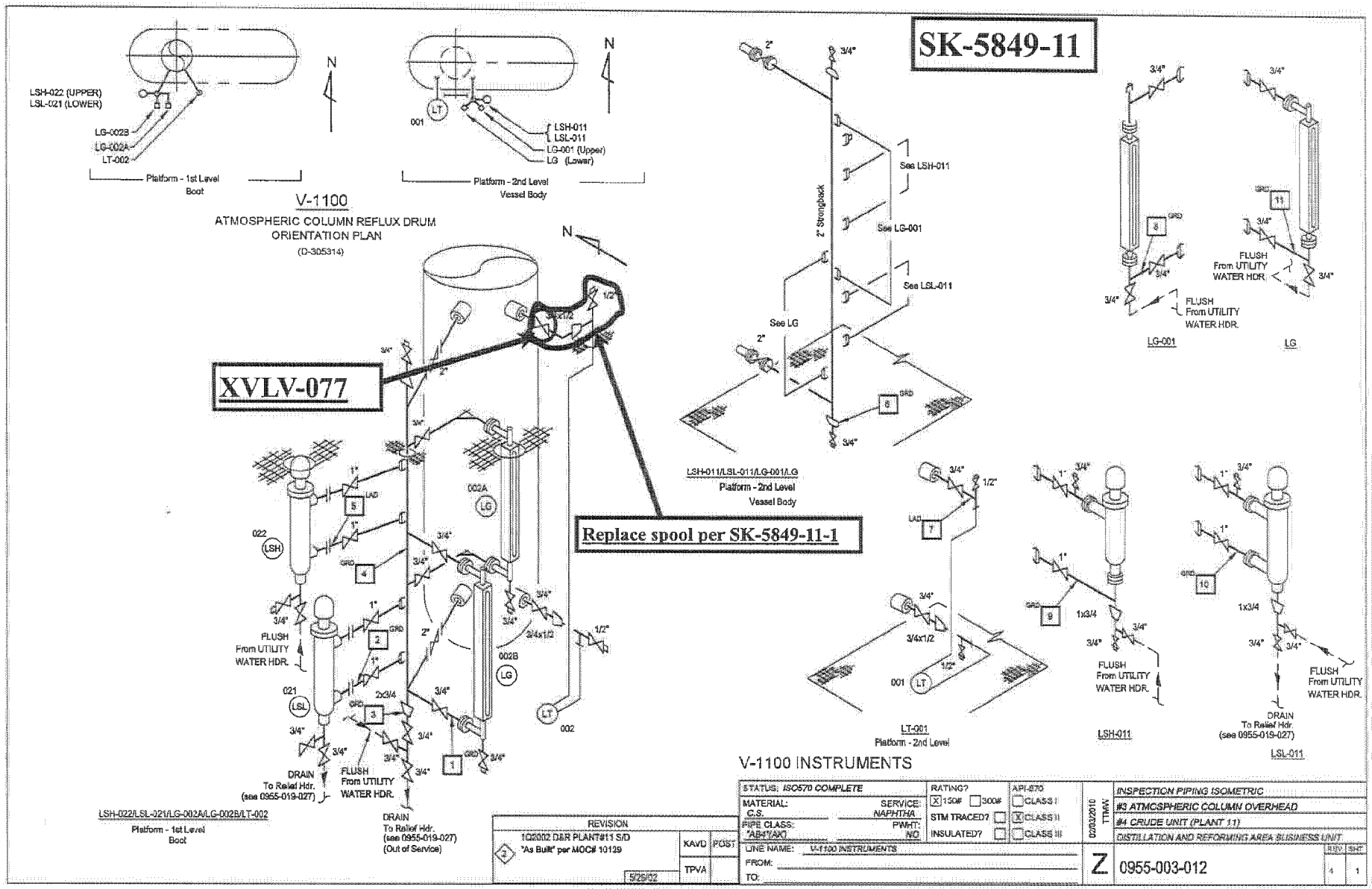
02/15/2008 DOGR

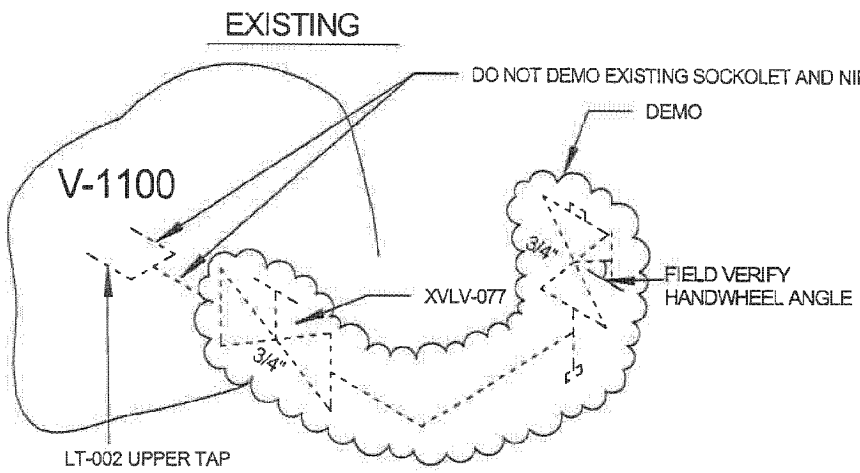
Z 0955-016-006 REV 2 SHT 1

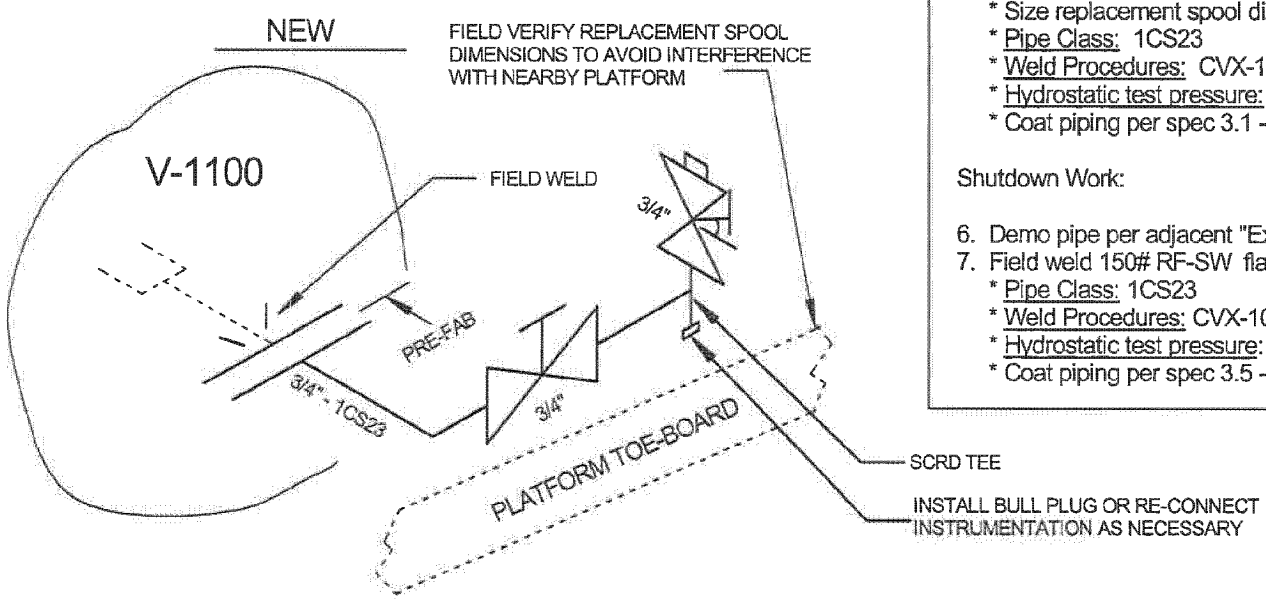
SK-5849-08


XVLV-072
Replace valve
2", 300#, RF Gate Valve
Maximo #313079
Pipe class: 3CL11
Note: Valve has API #5 trim
SK-5849-09
FOR CONT SEE POINT "A"
To Sample Station
To Sample Station
FV-051
#4 CRUDE UNIT
PLOT LIMIT
(D-308324)
#6 SIDECUT
From P-1169/P-1159A Outlet
(see 0955-011-006)
#4 SIDECUT
From E-1113
(see 0955-007-003)
#7 SIDECUT
To DHT Plot Limit
(see 0955-012-008)
VGO S/C
MANIFOLD
(D-308324)
#6 SIDECUT
To E-1149
(see 0955-007-004)
#7 SIDECUT
To PV-971 Manifold
(see 0955-012-005)
TKN S/C
MANIFOLD
(D-308324)
THIS IS A HOT CIRCUIT.
ALL TML's TO BE RT'd
#6 SIDECUT
To Plot Limit Manifolds
(see 0955-011-006)
NEW
1996 S/D
"TF1"
P-1159
#6 SIDECUT
(D-308309)
#5/6 SIDECUT
From C-1100/1169 Outlet
(see 0955-008-001)
[Typ. 2]
P-1159A
COMMON SPARE FOR
P-1159 & P-1169
(D-308309)
WASH OIL
From Header
(see 0955-025-004)
[Typ. 2]
POINT "A"
#6 SIDECUT
REVISION
4 CRUDE PHA DRAWING MARKUPS
*AS BUILT PER MOC# 22647
11-17-10
RWFU
BPCC
TPVA
STATUS: ISO570 COMPLETE
RATING? 150# 300#
API-570 CLASS I CLASS II CLASS III
MATERIAL: C.S.
SERVICE: #6 S/C (MD GASOIL)
PIPE CLASS: *AF1*(BA),*TF1*(BO)
PWHT *TF1*
STM TRACED?
INSULATED?
06/23/2010
TTMW
INSPECTION PIPING ISOMETRIC
#11 NO.6 SIDECUT
#4 CRUDE UNIT (PLANT 11)
DISTILLATION AND REFORMING AREA BUSINESS UNIT
LINE NAME: #6 SIDECUT
FROM: P-1159/A
TO: E-1149 INLET & PLOT LIMIT MANIFOLDS
Z
0955-011-008
REV 7
SHT 1


N
WASH OIL
From Header
(see 0955-025-004)
[Typ. 2]
MOV
007
MOV
008
P-1158
#5 S/C PUMPBACK
To C-1100
(see 0955-008-002)
[Typ. 2]
P-1158A
P-1158/A
XVLV-073
Replace valve (reuse motor actuator on new valve).
4", 300#, RF Gate Valve
Maximo #313079
Pipe class: 3CL11
Note: valve has API TR#5
NEW 1/68 S/O "AF1"
POINT "A"
#6 SIDECUT
(see 0955-011-001)
(Typ. 2)
MOV
006
XVLV-074
Replace valve
4", 300#, RF Gate Valve
Maximo #313079
Pipe class: 3CL11
Note: valve has API TR#5
P-1159
#6 SIDECUT
To Plot Limit Manifolds
(see 0955-011-008)
[Typ. 2]
P-1159A
PUMPOUT
To Header
(see 0955-024-003)
P-1159A
COMMON SPARE FOR
P-1159 & P-1169
(D-308309)
#5 SIDECUT
#5 S/C PUMPBACK
From P-1158/A
(see 0955-008-002)
FOR CONT SEE
POINT "A"
C-1100
ATMOSPHERIC COLUMN
(D-308308)
THIS IS A HOT CIRCUIT.
GAGE ON SHUTDOWN ONLY.
SK-5849-10
REVISION
4 CRUDE PHA DRAWING MARKUPS
*AS BUILT PER MOC# 22647
11-17-10
RWFU
TPVA
STATUS: ISO670 COMPLETE
MATERIAL: 5 CR/CS
SERVICE: #5 S/C (MD GASOIL)
PIPE CLASS: "TF1"(BO)"AF1"
PWHT: "TF1"
RATING? 150# X 300#
STM TRACED?
INSULATED? X
API-570 CLASS I X CLASS II CLASS III
LINE NAME: #5 SIDECUT
FROM: C-1100
TO: P-1158/A & P-1159/A
11/04/2010
RWFU
INSPECTION PIPING ISOMETRIC
#8 NO.5 SIDECUT
#4 CRUDE UNIT (PLANT 11)
DISTILLATION AND REFORMING AREA BUSINESS UNIT
Z
0955-008-001
REV 4
SHT 1


SK-5849-11
XVLV-077
Replace spool per SK-5849-11-1
LSH-022 (UPPER)
LSL-021 (LOWER)
LG-002B
LG-002A
LT-002
Platform - 1st Level
Boot
V-1100
ATMOSPHERIC COLUMN REFLUX DRUM
ORIENTATION PLAN
(D-305314)
LSH-011
LSL-011
LG-001 (Upper)
LG (Lower)
Platform - 2nd Level
Vessel Body
2" Strongback
See LSH-011
See LG-001
See LSL-011
See LG
LSH-011/LSL-011/LG-001/LG
Platform - 2nd Level
Vessel Body
FLUSH
From UTILITY
WATER HDR.
DRAIN
To Relief Hdr.
(see 0955-019-027)
(Out of Service)
LSH-022/LSL-021/LG-002A/LG-002B/LT-002
Platform - 1st Level
Boot
LT-001
Platform - 2nd Level
LG-001
LG
LSH-011
LSL-011
V-1100 INSTRUMENTS
REVISION
1Q2002 D&R PLANT#11 S/D
"As Built" per MOC# 10129
5/29/02
KAVD
POST
TPVA
STATUS: ISO570 COMPLETE
MATERIAL: C.S.
SERVICE: NAPHTHA
PIPE CLASS: "AB4"/AK
PWHT: NO
RATING? X 150# 300#
STM TRACED? INSULATED?
API-570 CLASS I CLASS II CLASS III
02/03/2010
TMW
INSPECTION PIPING ISOMETRIC
#3 ATMOSPHERIC COLUMN OVERHEAD
#4 CRUDE UNIT (PLANT 11)
DISTILLATION AND REFORMING AREA BUSINESS UNIT
LINE NAME: V-1100 INSTRUMENTS
FROM:
TO:
Z
0955-003-012
REV 4
SHT 1





WORK INSTRUCTIONS FOR XVLV-077
BE-102-E2 Rev 0 (eEWO 5849) - Maximo #313079

1. ??? QUESTIONS ??? Contact Pat Murphy 2-1864.
2. FIELD VERIFY ALL DIMENSIONS
3. MATERIAL
   * Obtain valves from Maximo #313079.
   * Maintenance and/or the Contractor to provide all other materials.
4. LOCATION
   V-1100 Boot - LT-002 Upper Tap (See SK-5849-11).

Pre-Shutdown Work:

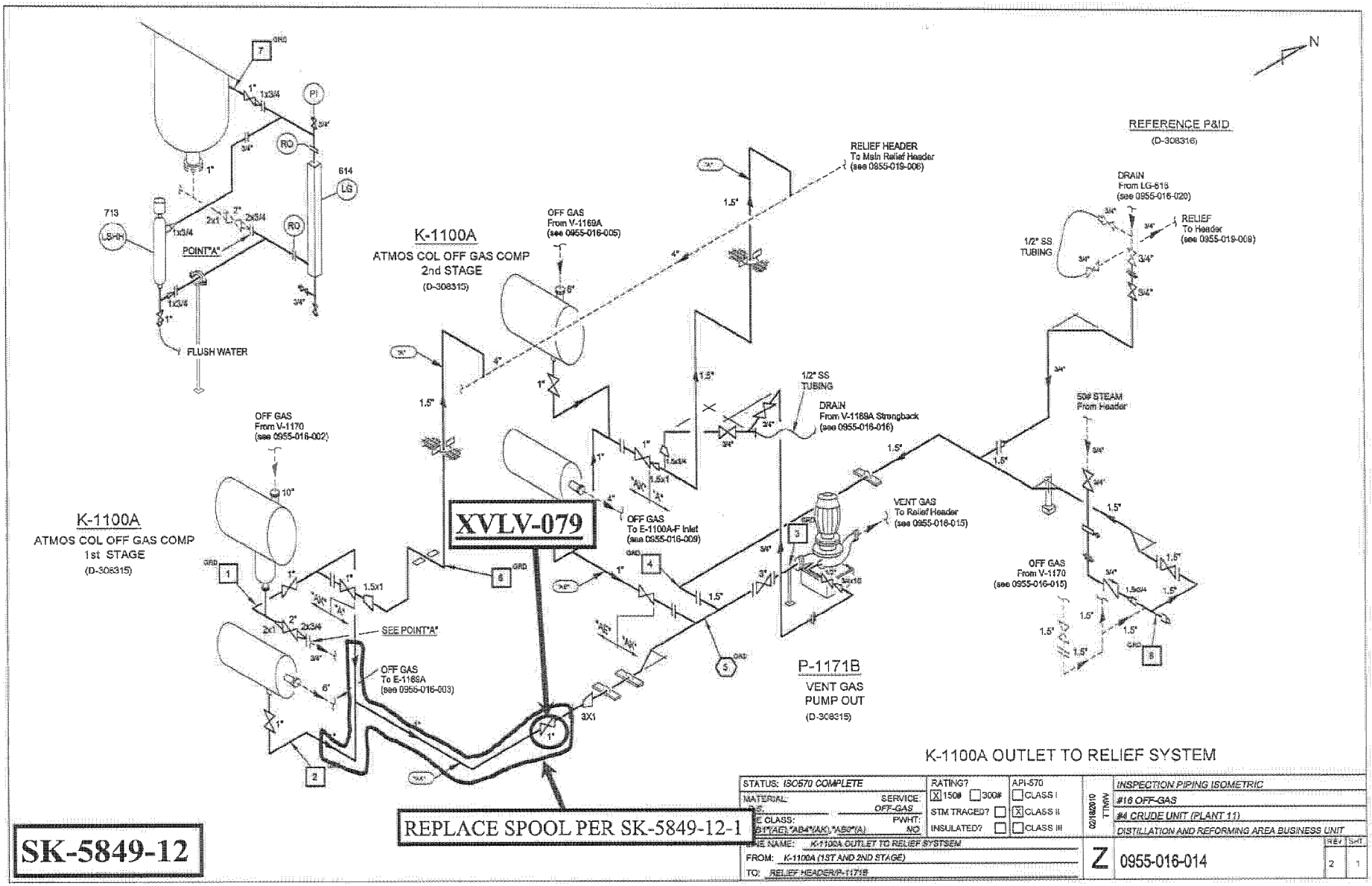
5. Pre-fabricate new spool per adjacent "New" sketch.
   * Size replacement spool dimensions to avoid interference with nearby platform.
   * Pipe Class: 1CS23
   * Weld Procedures: CVX-101, CVX-104, CVX-107
   * Hydrostatic test pressure: 450 psig
   * Coat piping per spec 3.1 - Desert Sand Color

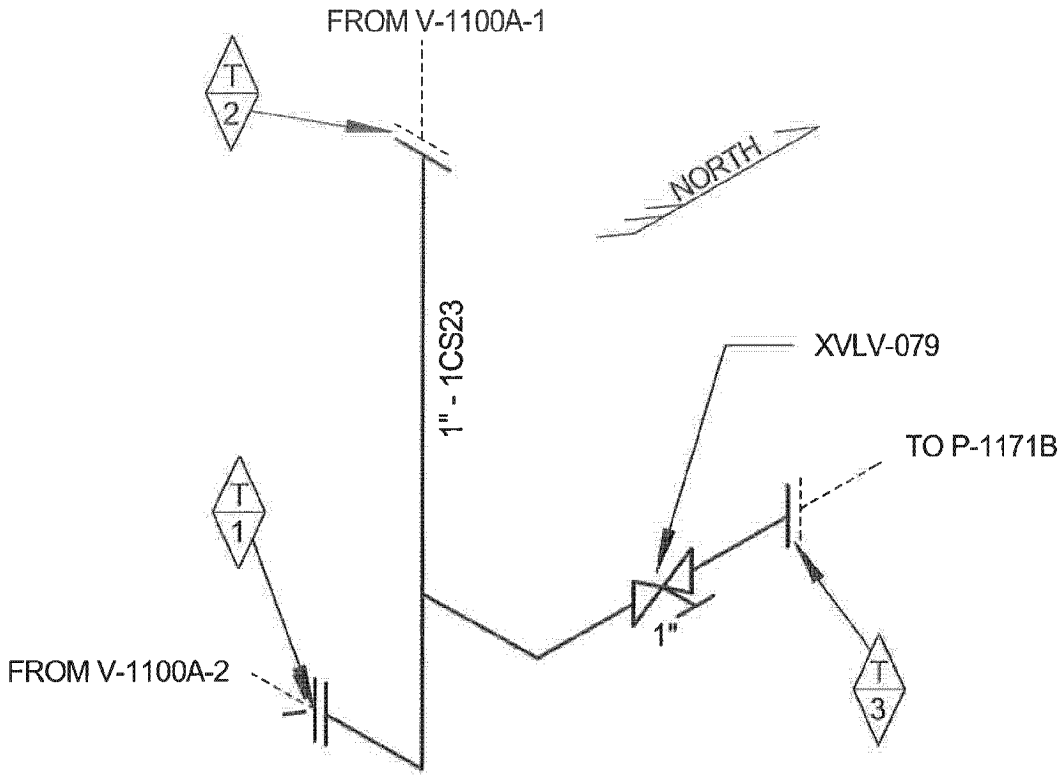
Shutdown Work:

6. Demo pipe per adjacent "Existing" sketch.
7. Field weld 150# RF-SW flange to existing 3/4" nipple per adjacent sketch "New".
   * Pipe Class: 1CS23
   * Weld Procedures: CVX-101, CVX-104, CVX-107
   * Hydrostatic test pressure: 75 psig (use test plug)
   * Coat piping per spec 3.5 - Desert Sand Color

SK-5849-11-1

CUSA-CSB-0019091
EPA


K-1100A
ATMOS COL OFF GAS COMP
1st STAGE
(D-308315)
K-1100A
ATMOS COL OFF GAS COMP
2nd STAGE
(D-308315)
P-1171B
VENT GAS
PUMP OUT
(D-308315)
REFERENCE P&ID
(D-308316)
XVLV-079
REPLACE SPOOL PER SK-5849-12-1
SK-5849-12
FLUSH WATER
POINT"A"
SEE POINT"A"
OFF GAS
From V-1170
(see 0955-016-002)
OFF GAS
To E-1169A
(see 0955-016-003)
OFF GAS
From V-1169A
(see 0955-016-005)
OFF GAS
To E-1100A-F Inlet
(see 0955-016-009)
RELIEF HEADER
To Main Relief Header
(see 0955-019-006)
DRAIN
From V-1169A Strongback
(see 0955-016-016)
1/2" SS
TUBING
VENT GAS
To Relief Header
(see 0955-016-015)
DRAIN
From LG-613
(see 0955-016-020)
RELIEF
To Header
(see 0955-019-009)
50# STEAM
From Header
OFF GAS
From V-1170
(see 0955-016-015)
K-1100A OUTLET TO RELIEF SYSTEM
STATUS: ISO570 COMPLETE
MATERIAL:
SERVICE: OFF-GAS
PWHT: NO
RATING? 150# 300#
STM TRACED?
INSULATED?
API-570 CLASS I CLASS II CLASS III
INSPECTION PIPING ISOMETRIC
#16 OFF-GAS
#4 CRUDE UNIT (PLANT 11)
DISTILLATION AND REFORMING AREA BUSINESS UNIT
FROM: K-1100A (1ST AND 2ND STAGE)
TO: RELIEF HEADER/P-1171B
Z
0955-016-014
REV 2
SHT 1



WORK INSTRUCTIONS FOR XVLV-079
BE-102-E2 Rev 0 (eEWO 5849) - Maximo #313079

1. ??? QUESTIONS ??? Contact Pat Murphy 2-1864.
2. FIELD VERIFY ALL DIMENSIONS.
3. MATERIAL
   * Obtain valve from Maximo #313079.
   * Maintenance and/or the Contractor to provide all other materials.
4. LOCATION
   K-1100A 1st Dampener Drain to P-1171-B (see SK-5849-12)

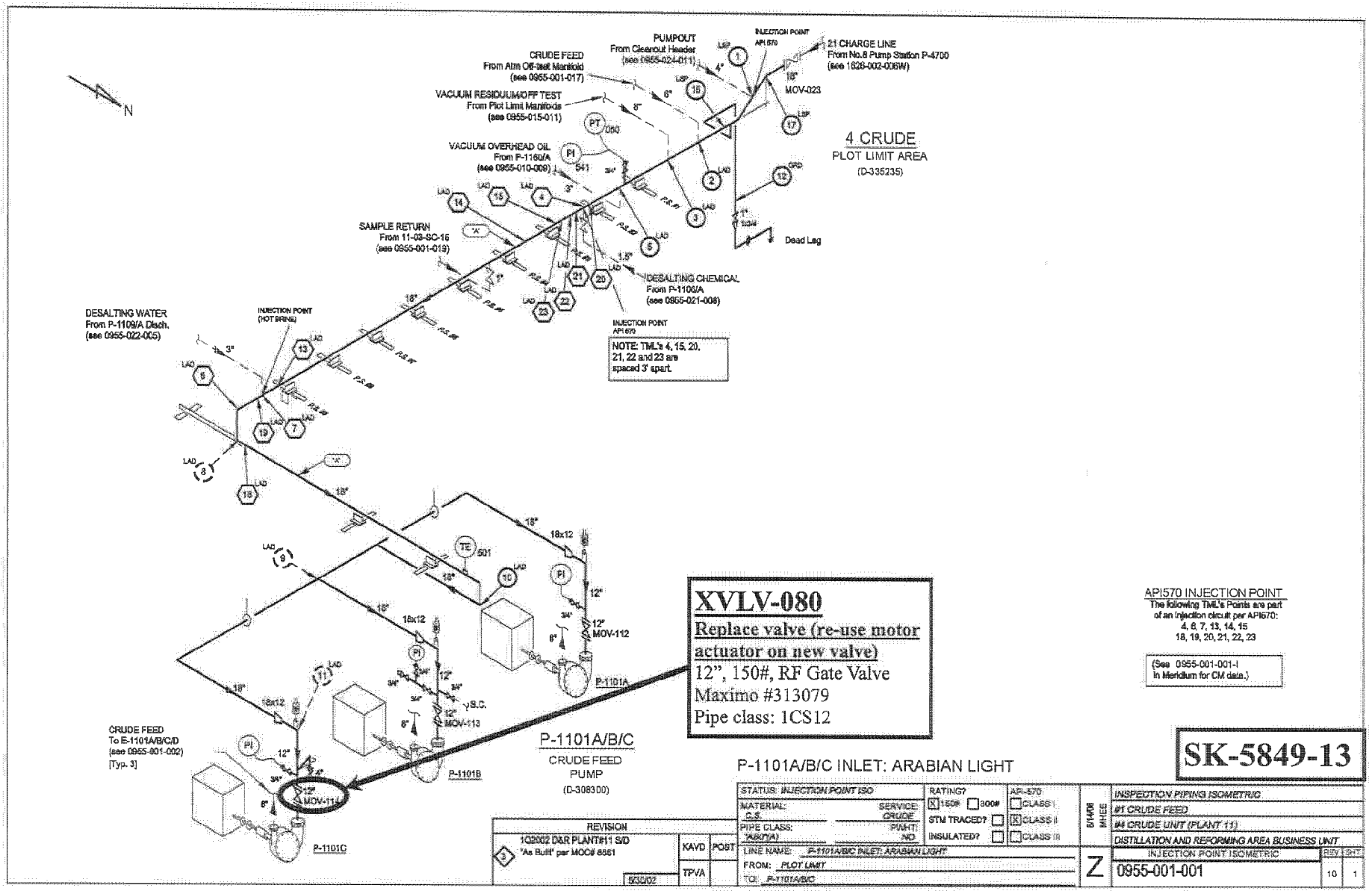
Pre-Shutdown Work:

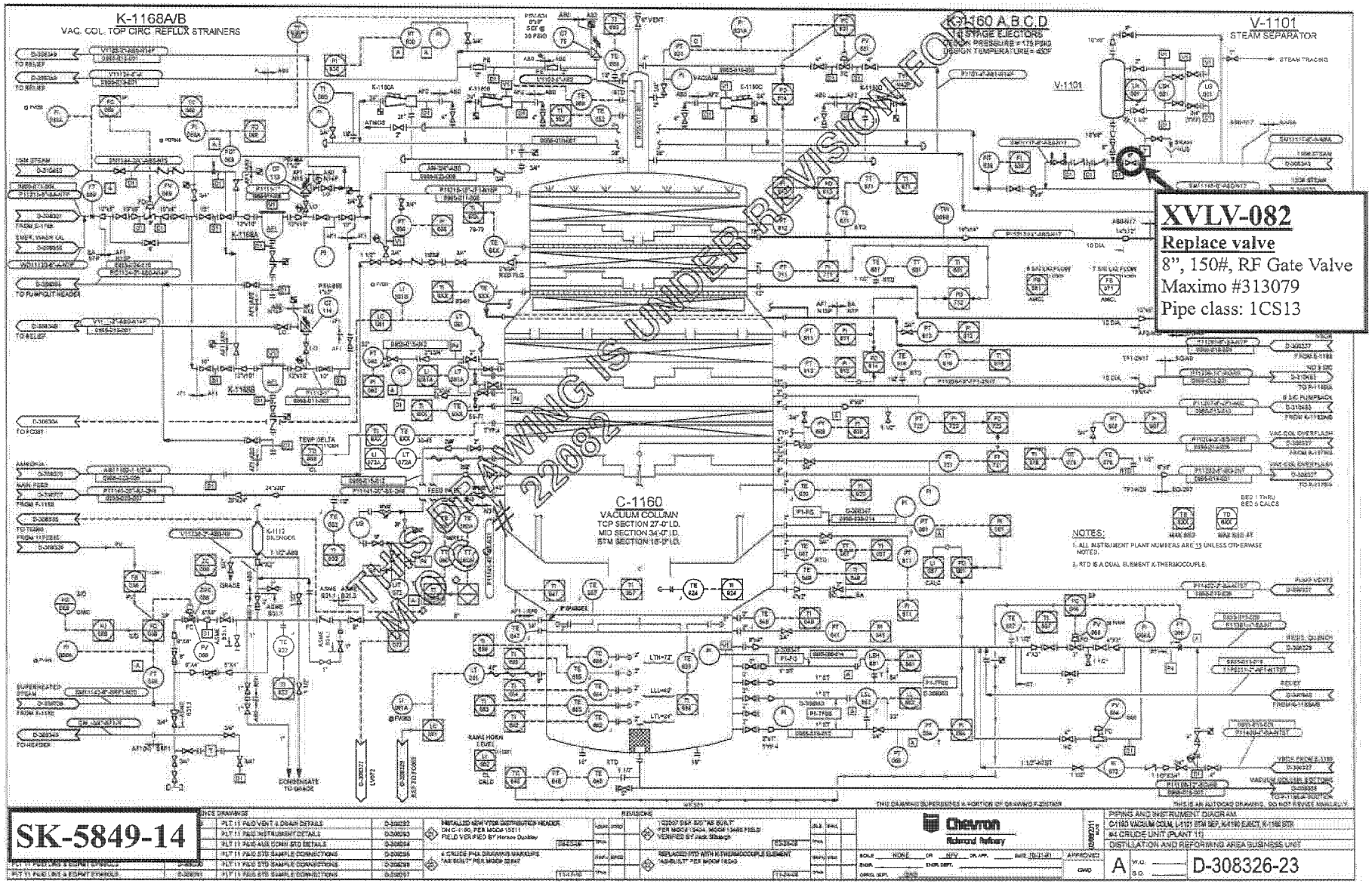
5. Pre-fabricate new spool per above sketch.
   * Pipe Class: 1CS23
   * Weld Procedures: CVX-101, CVX-104, CVX-107
   * Hydrostatic test pressure: 450 psig
   * Coat new spool per spec 3.1 - Desert Sand color.

Shutdown Work:

6. Cut piping at T1.
7. Remove piping between T1, T2, and T3.
8. Field weld 150# RF-SW flange at T1.
   * Pipe Class: 1CS23
   * Weld Procedures: CVX-101, CVX-104, CVX-107
   * Hydrostatic test pressure: 450 psig (use test plug)
   * Coat piping per spec 3.5 - Desert Sand color.
9. Install pre-fabricated piping.

SK-5849-12-1


N
PUMPOUT
From Cleanout Header
(see 0955-024-011)
INJECTION POINT
API 570
21 CHARGE LINE
From No.8 Pump Station P-4700
(see 1828-002-006W)
CRUDE FEED
From Atm Off-take Manifold
(see 0955-001-017)
VACUUM RESIDUUM/OFF TEST
From Plot Limit Manifolds
(see 0955-015-011)
VACUUM OVERHEAD OIL
From P-1160/A
(see 0955-010-009)
MOV-023
4 CRUDE
PLOT LIMIT AREA
(D-335235)
Dead Leg
SAMPLE RETURN
From 11-03-SC-16
(see 0955-001-019)
DESALTING CHEMICAL
From P-1106/A
(see 0955-021-008)
INJECTION POINT
API 570
NOTE: TML's 4, 15, 20, 21, 22 and 23 are spaced 3' apart.
DESALTING WATER
From P-1109/A Disch.
(see 0955-022-005)
INJECTION POINT
(HOT BRINE)
MOV-112
MOV-113
MOV-114
P-1101A
P-1101B
P-1101C
CRUDE FEED
To E-1101A/B/C/D
(see 0955-001-002)
[Typ. 3]
P-1101A/B/C
CRUDE FEED
PUMP
(D-308300)
XVLV-080
Replace valve (re-use motor actuator on new valve)
12", 150#, RF Gate Valve
Maximo #313079
Pipe class: 1CS12
API570 INJECTION POINT
The following TML's Points are part of an Injection circuit per API670:
4, 6, 7, 13, 14, 15
18, 19, 20, 21, 22, 23
(See 0955-001-001-I in Meridium for CM data.)
SK-5849-13
P-1101A/B/C INLET: ARABIAN LIGHT
REVISION
1Q2002 D&R PLANT#11 S/D
"As Built" per MOC# 8861
KAVD
POST
TPVA
5/30/02
STATUS: INJECTION POINT ISO
MATERIAL: C.S.
SERVICE: CRUDE
PIPE CLASS: 1A07(A)
PWHT: NO
RATING? 150# 300#
STM TRACED?
INSULATED?
API-570 CLASS I CLASS II CLASS III
01-06 MHEE
INSPECTION PIPING ISOMETRIC
#1 CRUDE FEED
#4 CRUDE UNIT (PLANT 11)
DISTILLATION AND REFORMING AREA BUSINESS UNIT
LINE NAME: P-1101A/B/C INLET: ARABIAN LIGHT
FROM: PLOT LIMIT
TO: P-1101A/B/C
Z
INJECTION POINT ISOMETRIC
0955-001-001
REV 10
SHT 1



XVLV-082

Replace valve

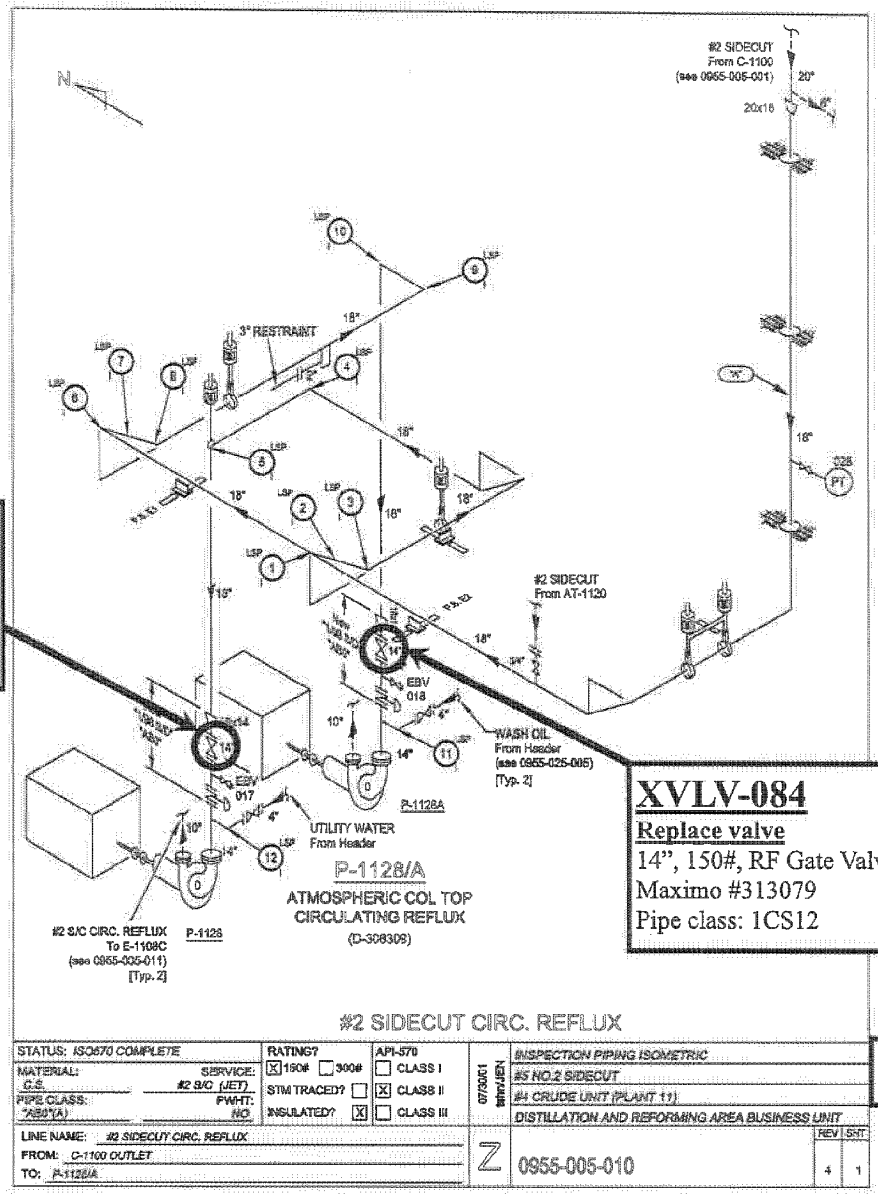
8", 150#, RF Gate Valve

Maximo #313079

Pipe class: 1CS13

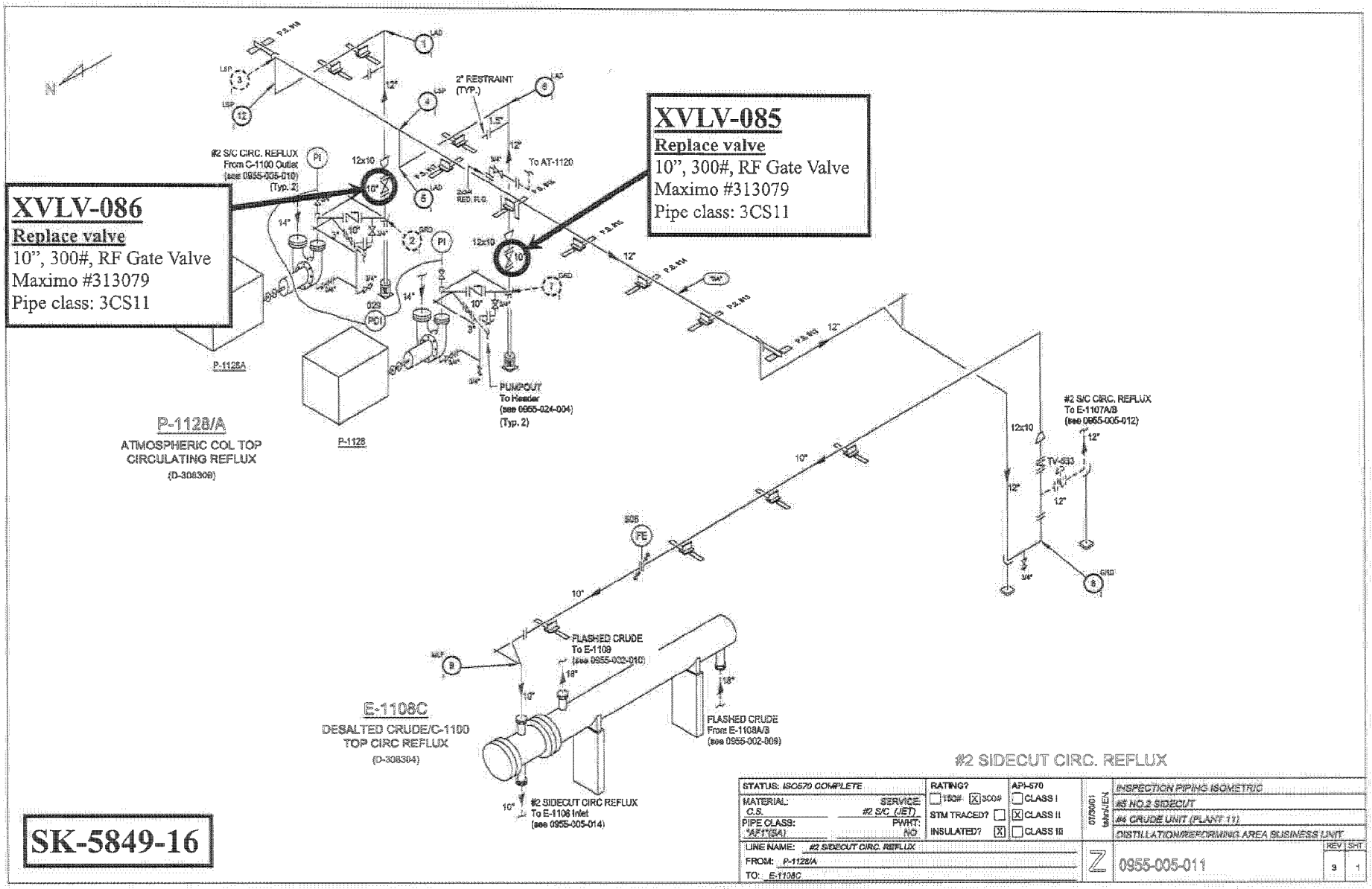
THIS DRAWING IS UNDER REVISION FOR WO # 220882

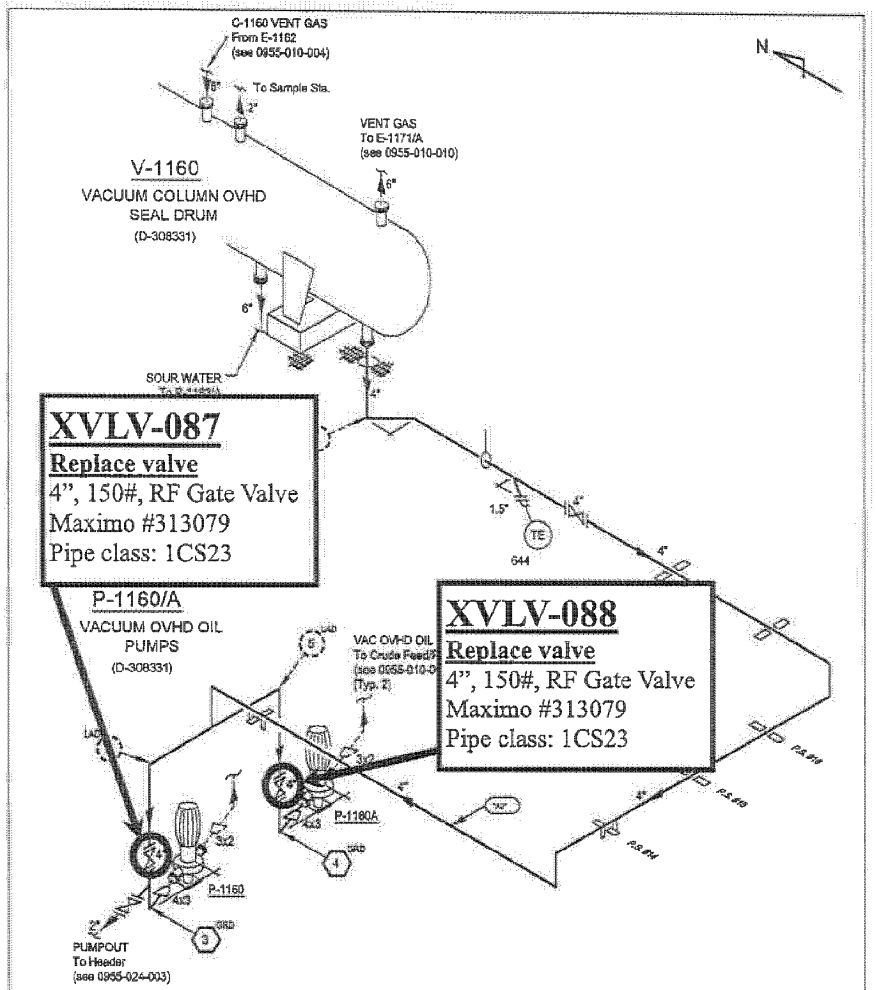
XVLV-083
Replace valve
14", 150#, RF Gate Valve
Maximo #313079
Pipe class: 1CS12



XVLV-084
Replace valve
14", 150#, RF Gate Valve
Maximo #313079
Pipe class: 1CS12

SK-5849-15


XVLV-086
Replace valve
10", 300#, RF Gate Valve
Maximo #313079
Pipe class: 3CS11
XVLV-085
Replace valve
10", 300#, RF Gate Valve
Maximo #313079
Pipe class: 3CS11
#2 S/C CIRC. REFLUX
From C-1100 Outlet
(see 0955-005-010)
(Typ. 2)
2" RESTRAINT
(TYP.)
To AT-1120
PUMPOUT
To Header
(see 0955-024-004)
(Typ. 2)
P-1128A
P-1128
P-1128/A
ATMOSPHERIC COL TOP
CIRCULATING REFLUX
(D-308308)
#2 S/C CIRC. REFLUX
To E-1107A/B
(see 0955-005-012)
TV-533
FLASHED CRUDE
To E-1109
(see 0955-002-010)
FLASHED CRUDE
From E-1108A/B
(see 0955-002-009)
E-1108C
DESALTED CRUDE/C-1100
TOP CIRC REFLUX
(D-308304)
#2 SIDECUT CIRC REFLUX
To E-1108 Inlet
(see 0955-005-014)
SK-5849-16
#2 SIDECUT CIRC. REFLUX
STATUS: ISO570 COMPLETE
MATERIAL: C.S.
SERVICE: #2 S/C (JET)
PIPE CLASS: *AF1*(SA)
PWHT: NO
RATING? 150# 300#
STM TRACED?
INSULATED?
API-570 CLASS I CLASS II CLASS III
07/30/01 tahn/JEN
INSPECTION PIPING ISOMETRIC
#5 NO.2 SIDECUT
#4 CRUDE UNIT (PLANT 11)
DISTILLATION/REFORMING AREA BUSINESS UNIT
LINE NAME: #2 SIDECUT CIRC. REFLUX
FROM: P-1128/A
TO: E-1108C
0955-005-011
REV 3
SHT 1



V-1160 VACUUM OVHD OIL

STATUS: ISO570 COMPLETE	RATING? [X] 150# [ ] 300#	API-570 [ ] CLASS I	02/18/2010 TTMNV	INSPECTION PIPING ISOMETRIC
MATERIAL: C.S. / SERVICE: VAC OVHD OIL	STM TRACED? [ ]	[X] CLASS II		#10 VACUUM COLUMN OVERHEAD
PIPE CLASS: *AB4*(A/J) / PWHT: NO	INSULATED? [ ]	[ ] CLASS III		#4 CRUDE UNIT (PLANT 11)
				DISTILLATION AND REFORMING AREA BUSINESS UNIT
LINE NAME: V-1160 VACUUM OVHD OIL			Z	0955-010-008
FROM: V-1160				REV 2 / SHT 1
TO: P-1160/A				

SK-5849-17

WORK INSTRUCTIONS FOR XVLV-089
BE-102-E2 (eEWO 5849) - Maximo #313079

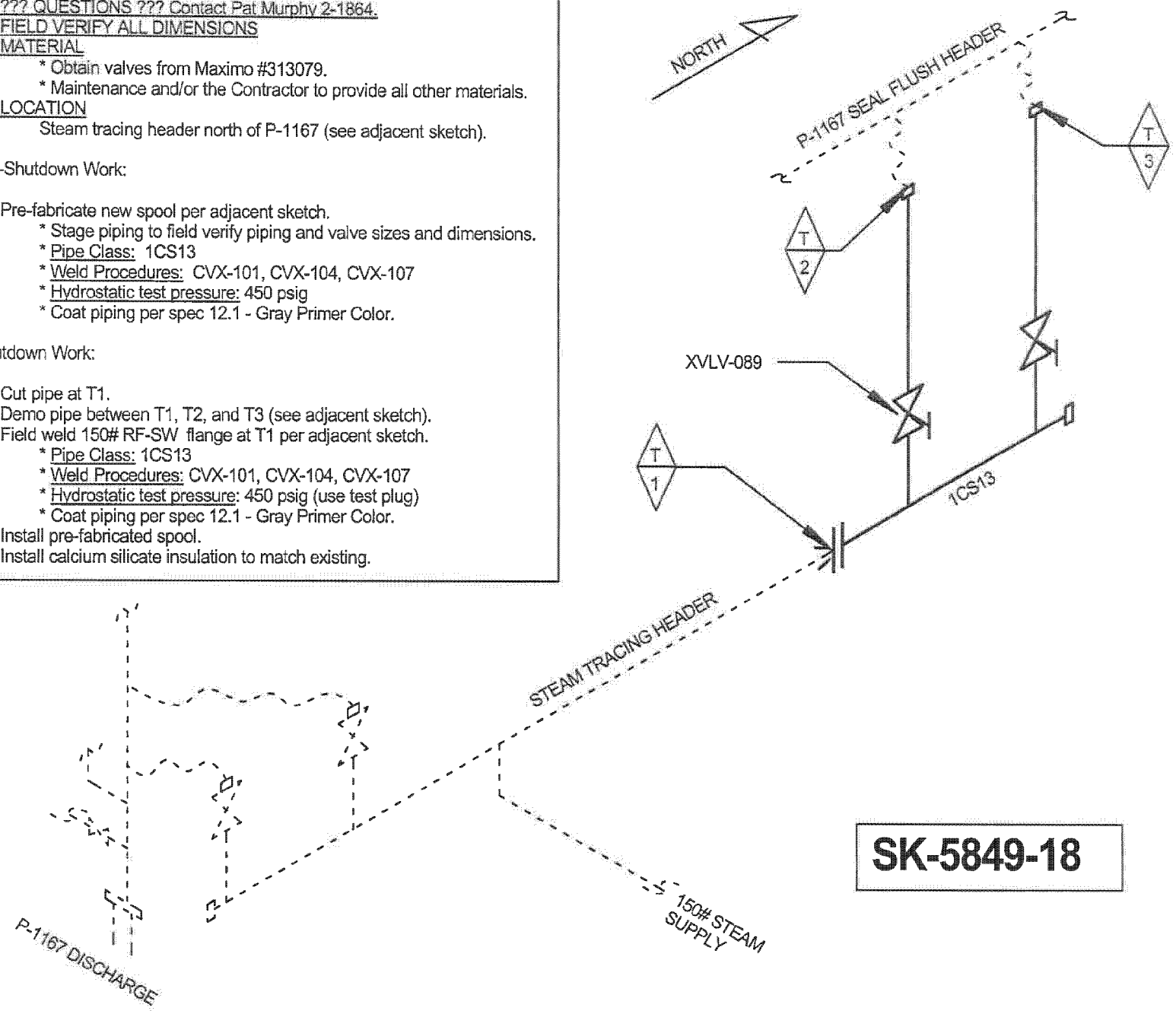
1. ??? QUESTIONS ??? Contact Pat Murphy 2-1864.
2. FIELD VERIFY ALL DIMENSIONS
3. MATERIAL
   * Obtain valves from Maximo #313079.
   * Maintenance and/or the Contractor to provide all other materials.
4. LOCATION
   Steam tracing header north of P-1167 (see adjacent sketch).

Pre-Shutdown Work:

5. Pre-fabricate new spool per adjacent sketch.
   * Stage piping to field verify piping and valve sizes and dimensions.
   * Pipe Class: 1CS13
   * Weld Procedures: CVX-101, CVX-104, CVX-107
   * Hydrostatic test pressure: 450 psig
   * Coat piping per spec 12.1 - Gray Primer Color.

Shutdown Work:

6. Cut pipe at T1.
7. Demo pipe between T1, T2, and T3 (see adjacent sketch).
8. Field weld 150# RF-SW flange at T1 per adjacent sketch.
   * Pipe Class: 1CS13
   * Weld Procedures: CVX-101, CVX-104, CVX-107
   * Hydrostatic test pressure: 450 psig (use test plug)
   * Coat piping per spec 12.1 - Gray Primer Color.
9. Install pre-fabricated spool.
10. Install calcium silicate insulation to match existing.



SK-5849-18

HYDROSTATIC LEAK TEST WAIVER FORM

The following information shall be completed for each piping field weld that cannot be hydrostatically tested:

1.0 **EWO #:** BE-102-E2 (eEWO 5849)

2.0 **Job Description:** Valve to Sockolet Weld (Valve XVLV-066)

3.0 **Service (process, relief etc.):** No. 7 S/C

4.0 **Equip' downstream / upstream:** Up --- K-1179/A
Down --- P-1167

5.0 **Location within unit:**

¾" vent valve bridge weld on 2" seal flush header for P-1167 (see drawing SK-5849-07 in EWO BE-102-E2)

6.0 **P&ID Drawing #:** ISO# 0955-036-B08 / P&ID # D-308352

8.0 **Piping Classification:** 3CS11

9.0 **Explanation of why the weld in question cannot be hydrostatically tested:**

The piping test boundary is too extensive to hydrotest this weld.

10.0 **Perform the following nondestructive examinations for each piping field weld that cannot be hydrostatically tested:**

Dye Penetrate Test (PT 1st and Last Pass)
Initial Service Test

APPROVALS

LEAD WELD INSPECTOR: _____ **DATE:** _____

LEAD ENGINEER: _____ **DATE:** 5/2/11

UNIT AREA SUPERVISOR: _____ **DATE:** 5/2/11

HYDROSTATIC LEAK TEST WAIVER FORM

The following information shall be completed for each piping field weld that cannot be hydrostatically tested:

1.0 **EWO #:** BE-102-E2 (eEWO 5849)

2.0 **Job Description:** Valve to Sockolet Weld (Valve XVLV-067)

3.0 **Service (process, relief etc.):** Overhead Gas

4.0 **Equip' downstream / upstream:** Up --- K-1100B
Down --- Pressure Gauge

5.0 **Location within unit:**

¾" vent valve bridge weld downstream of K-1100B (see drawing SK-5849-08 in EWO BE-102-E2)

6.0 **P&ID Drawing #:** ISO# 0955-016-006 / P&ID # D-308316

8.0 **Piping Classification:** 1CS12

9.0 **Explanation of why the weld in question cannot be hydrostatically tested:**

The piping test boundary is too extensive to hydrotest this weld.

10.0 **Perform the following nondestructive examinations for each piping field weld that cannot be hydrostatically tested:**

Dye Penetrate Test (PT 1st and Last Pass)
Initial Service Test

APPROVALS

LEAD WELD INSPECTOR: _____ **DATE:** _____

LEAD ENGINEER: _____ **DATE:** 5/2/11

UNIT AREA SUPERVISOR: _____ **DATE:** 5/2/11

		LIMITED BY:	Flanges
SERVICE:	Process	MATERIAL:	Carbon Steel
RATING CLASS:	150 RF, ASME B16.5-2009	DESIGN CODE:	ASME B31.3-2008
TEMPERATURE LIMIT:	-20F to 450F	STRESS RELIEF:	NONE
NOMINAL CORROSION ALLOWANCE:	0.063 in. (0.050 in. MIN for ¾")	EXAMINATION:	5% RT, PT & Visual
VALVE TRIM:	API Trim #8 (13CR & HF)		

PRESSURE - TEMPERATURE RATINGS			NOTE: HYDROTEST @ AMBIENT = 450 psig		
TEMP F	-20 to 100	200	300	400	450
psig	285	260	230	200	185
TEMP C	-29 to 38	93	149	204	232
kPag	1965	1795	1585	1380	1275

For NPS 3/4 through NPS 30 (Full flange ratings per ASME B16.5 and ASME B16.47, Tables 2-1.1.)

ITEM	NOTES	NPS	SCH/RAT	ENDS	DESCRIPTION	ITEM CODE
PIPE						
		3/4 – 1-1/2	XS/80	PE	CS, SMLS, ASTM A106-B	L11NA1B
		2 – 2	XS/80	BE	CS, SMLS , ASTM A106-B	L11NA2A
		3 – 24	STD	BE	CS, SMLS , ASTM A106-B	L11MA2A
		28 – 42	STD	BE	CS, SMLS/DSAW, API-5L PSL2 (Ej=95)	L14MA2A
NIPPLES						
Branch		3/4 – 1-1/2	160	PE	CS, SMLS , ASTM A106-B	L34LAEJ
Branch		3/4 – 1-1/2	160	TOE-POE	CS, SMLS , ASTM A106-B	L34LAHJ
Swage (CONC)		3/4 – 1-1/2	160	BBE	CS, ASTM A234-WPB-S, MSS SP-95	L55NA1VA
Swage (CONC)		3/4 – 1-1/2	160	BLE-TSE	CS, ASTM A234-WPB-S, MSS SP-95	L35LBMQ
FITTINGS						
Sockolet		3/4 – 1-1/2	Class 3000	SW	CS, ASTM A105, MSS SP-97	L36SBDT
Thredolet	03	3/4 – 1-1/2	Class 3000	THRD	CS, ASTM A105, MSS SP-97	L36SBAT
SW Elbolet		1 – 1-1/2	Class 3000	SW	CS, ASTM A105	L36SBDU
Latrolet	92	1 – 1-1/2	XS/80	Weld	CS, ASTM A105	L56NA1K
Weldolet	05	1 – 1-1/2	XS/80	Weld	CS, ASTM A105, MSS SP-97	L56NA1H
90 ELL		3/4 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11	L30SBDB
45 ELL		3/4 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11	L30SBDA
Tee	03	3/4 – 1-1/2	Class 3000	THRD	CS, ASTM A105, ASME B16.11	L31SBA
Tee		3/4 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11	L31SBD
Tee (RED)		3/4 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11	L31SBDD
Plug	03	3/4 – 1-1/2		THRD	CS, ASTM A105, round head, ASME B16.11	L370ABW
Plug		3/4 – 1-1/2		PE	CS, ASTM A105, round head, ASME B16.11	L370AEW
Coupling		3/4 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11	L34SBDH
Cap		3/4 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11	L37SBDX
Reducer (CONC)		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55NA1DA
Reducer (ECC)		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55NA1DB
Weldolet	05	2 – 2	XS/80	Weld	CS, ASTM A105, MSS SP-97	L56NA1H
90 LR ELL		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50NA1BC
45 LR ELL		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50NA1AC
Tee		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51NA1
Tee (RED)		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51NA1D
Cap		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L57NA1R
Reducer (CONC)		3 – 24	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55MA1DA
Reducer (ECC)		3 – 24	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55MA1DB
Weldolet	05	3 – 8	STD	Weld	CS, ASTM A105, MSS SP-97	L56MA1H
90 LR ELL		3 – 24	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50MA1BC
45 LR ELL		3 – 24	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50MA1AC
Tee		3 – 24	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51MA1
Tee (RED)		3 – 24	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51MA1D
Cap		3 – 24	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L57MA1R

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ITEM	NOTES	NPS	SCH/RAT	ENDS	DESCRIPTION	ITEM CODE
FITTINGS						
Reducer (CONC)		28 – 42	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55MA1DA
Reducer (ECC)		28 - 42	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55MA1DB
90 LR ELL		28 - 42	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50MA1BC
45 LR ELL		28 - 42	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50MA1AC
Tee		28 - 42	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51MA1
Tee (RED)		28 - 42	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51MA1D
Cap		28 - 42	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L57MA1R
VALVES						
Gate	15	3/4 – 1-1/2	Class 150	RF	CS body, API #8 trim, RP, BB	L20BA3HD
Gate		1/2 – 1/2	Class 800	MSW/FSW	CS body, API #8 trim, RP, BB, EXTD BDY	L20KAXHDM
Gate	02	3/4 – 1-1/2	Class 800	MSW/FNPT	CS body, API #8 trim, RP, BB, EXTD BDY	L20KAYHDM
Gate		3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, RP, BB	L20KA1HD
Gate	325	3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, FP, BB	L20KA1DD
Gate	06	3/4 – 1-1/2	Class 800	T/SW	CS body, API #8 trim, BB	L20KA7HD
Gate	309	3/4 – 1-1/2	Class 800	T/SW	CS body, API #8 trim, RP, BELLOW SEAL, WB	L20KA7MDL
Gate	309	3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, RP, BELLOW SEAL, WB	L20KA1MDL
Gate		2 - 8	Class 150	RF	CS body, API #8 trim, FP, BB	L20BA3DD
Gate		10 – 24	Class 150	RF	CS body, API #8 trim, FP, BB, GO	L20BA3DDF
Knife Gate	329	14 – 24	Class 150	RF	CS body, 13CR trim, Aflas Seals, GO	L20BA3UDF
Knife Gate	329	26 – 42	Class 150	RF	CS body, 13CR trim, Aflas Seals, B16.47"B", GO	L20BA3UDFZ
Globe	307	3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, BB	L21KA1DE
Globe	309, 307	3/4 – 1-1/2	Class 800	THRD	CS body, API #8 trim, BELLOW SEAL, WB	L21KA0JEL
Globe	309, 307	3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, BELLOW SEAL, WB	L21KA1JEL
Globe	307	2 - 3	Class 150	RF	CS body, API #8 trim, BB	L21BA3DE
Globe	307	4 - 8	Class 150	RF	CS body, API #8 trim, BB, GO	L21BA3DEB
Check	61,328	3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, Piston, BC, HORIZ.	L22KA1TEF
Check	62,328	2 – 24	Class 150	RF	CS body, API #8 trim, BC, Swing	L22BA3PE
Check	62,328	6 – 24	Class 150	RF	CS body, API #8 trim, Dual Plate	L22BA3LEH
Ball	26, 101	2 – 12	Class 150	RF	CS, (A216-WCB) T3 MOD, RP, ORBIT	L25BB3FB
Ball	101, 327	2 – 6	Class 150	RF	CS body, 316 SS trim, RP, TFE seat, FS	L25BA3CE
Ball	101, 327	8 – 24	Class 150	RF	CS body, 316 SS trim, RP, TFE seat, FS, GO	L25BA3CEM
Butterfly	101	2 – 24	Class 150	RF	CS body, 316 SS trim, Flg, Triple Offset GO	L26BA3TJM
FLANGES	02					
Socket Weld		3/4 – 1-1/2	Class 150	RF	CS, ASTM A105, ASME B16.5, XS	L40BA3BN
Socket Weld	12	3/4 – 1-1/2	Class 300	RF	CS, ASTM A105, ASME B16.5, XS	L40FA3BN
Blind		3/4 – 24	Class 150	RF	CS, ASTM A105, ASME B16.5	L43BA3
Blind Spectacle		3/4 – 18	Class 150	RF	CS, ASTM A516-70, ASME B16.48	L45BA3E
Spacer Ring		20 – 24	Class 150	RF	CS, ASTM A516-70, ASME B16.48	L45BA3F
Blind Plate		20 – 24	Class 150	RF	CS, ASTM A516-70, ASME B16.48	L45BA3G
Weld Neck		2 – 2	Class 150	RF	CS, ASTM A105, ASME B16.5, XS/80 Bore	L40BA3DN
Weld Neck	12	2 – 2	Class 300	RF	CS, ASTM A105, ASME B16.5, XS/80 Bore	L40FA3DN
Weld Neck		3 – 24	Class 150	RF	CS, ASTM A105, ASME B16.5, STD Bore	L40BA3DM
Weld Neck	12	3 – 24	Class 300	RF	CS, ASTM A105, ASME B16.5, STD Bore	L40FA3DM
Weld Neck	203	28 - 42	Class 150	RF	CS, ASTM A105, ASME B16.47"B", STD Bore	L48BA3DM
Pair WN Orifice		1 – 2	Class 300	RF	CS, ASTM A105, ASME B16.36, NPS ½ SW taps, 80/XS Bore	L42FA3DNL
Pair WN Orifice	17	3 – 18	Class 300	RF	CS, ASTM A105, ASME B16.36, NPS ½ SW taps, Std Bore	L42FA3DML
GASKETS		3/4 – 24	Class 150		Spiral wound type 316L SS w/ flexible Inhibited Graphite filler, ASME B16.20, w/inner ring.	L61BF1CAC
	301	3/4 – 24	Class 150		KAM style, 316L SS w/APX-2 Graphite, EXH-SU-5151	L61BF1ZA
	12	3/4 – 24	Class 300		Spiral wound type 316L SS w/ flexible Inhibited Graphite filler, ASME B16.20, w/inner ring.	L61FF1CAC
	12, 301	3/4 – 24	Class 300		KAM style, 316L SS w/APX-2 Graphite, EXH-SU-5151	L61FF1ZA
	203	28 - 42	Class 150		Spiral wound type 316L SS w/ flexible Inhibited Graphite filler, ASME B16.20, w/inner ring.	L61BF1CAC
BOLTING Stud Bolts		3/4 – 42			ASTM A193, Gr B7 stud w/ 2 heavy hex nuts ASTM A194, Gr 2H	L620BM

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90° BRANCH CONNECTION, Legend and Chart

BRANCH \ HEADER SIZE	42	38	36	34	32	30	28	24	20	18	16	14	12	10	8	6	4	3	2	1-1/2	1	3/4
42	T																					
38	E	T																				
36	E	E	T																			
34	E	E	E	T																		
32	E	E	E	E	T																	
30	E	E	E	E	E	T																
28	E	E	E	E	E	E	T															
24	E	E	E	E	E	E	E	T														
20	E	E	E	E	E	E	E	E	T													
18	P	E	E	E	E	E	E	E	E	T												
16	P	P	E	E	E	E	E	E	E	E	T											
14	P	P	P	P	E	E	E	E	E	E	E	T										
12	P	P	P	P	P	P	E	E	E	E	E	E	T									
10	P	P	P	P	P	P	P	E	E	E	E	E	E	T								
8	W	W	W	W	W	W	W	W	E	E	E	E	E	E	T							
6	W	W	W	W	W	W	W	W	W	W	E	E	E	E	E	T						
4	W	W	W	W	W	W	W	W	W	W	W	W	W	E	E	E	T					
3	W	W	W	W	W	W	W	W	W	W	W	W	W	W	E	E	E	T				
2	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	E	E	T			
1-1/2	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	T		
1	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	E	T	
3/4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	E	E	T

E Reducing Tee
P Branch Weld w/ Reinforcing Pad (Pad thickness equals run pipe thickness. Pad width equals 1/2 branch OD.)
T Equal Tee
S Sockolet
W Weldolet (Note 05)

NOTES:

03 THREADED JOINTS ARE PERMITTED ONLY AT OUTLET OF VENT AND DRAIN VALVES,AT HYDROSTATIC CONNECTIONS, AT OUTLET OF INSTRUMENT TAKE-OFF VALVES, AND TO MATCH EQUIP.
05 INTEGRALLY REINFORCED BRANCH CONNECTIONS ARE PERMITTED OUTSIDE THE SIZES SHOWN IN THE BRANCH CONNECTION TABLE. DESIGNER SHALL CHECK WELD THICKNESS OF INTEGRALLY REINFORCED BRANCH CONNECTIONS TO DETERMINE IF PWHT IS REQUIRED.
06 THESE VALVES SHALL BE USED ONLY FOR VENT, DRAIN, AND INSTRUMENT CONNECTIONS.
12 TO BE USED ONLY TO MATCH CLASS 300 RATED FLANGE CONNECTIONS AT CONTROL VALVES AND SPECIAL EQUIPMENT.
15 TO BE USED WHEN MATING TO FLANGED NOZZLES.
26 TO BE USED ONLY WHEN INDICATED ON P&ID.
61 INSTALL IN HORIZONTAL POSITION WITH COVER UP.
62 INSTALL IN HORIZONTAL POSITION WITH COVER UP OR IN VERTICAL POSITION WITH UPWARD FLOW.
301 FOR USE IN VOC REGULATED SERVICES; IN FLANGES WITH SLIGHTLY DAMAGED GASKET SEATING FACES; OR IN FLANGES WITH A HISTORY OF LEAKING.
307 LIMITED TO THROTTLING SERVICES UP TO 150 PSI DIFFERENTIAL PRESSURE. FOR SERVICE APPLICATIONS WITH DIFFERENTIAL PRESSURES GREATER THAN 150 PSI, CONSULT WITH THE VALVE MANUFACTURER AND CHEVRON PIPING & VALVE SME FOR SUITABILITY.
325 USE FULL PORT VALVES IN LOCATIONS REQUIRING FULL OPENINGS SUCH AS UPSTREAM AND DOWNSTREAM OF RELIEF VALVES OR IN HORIZONTAL LINES CONTAINING HAZARDOUS LIQUIDS.
327 LIMITED TO PROCESS TEMPERATURES UP TO 250°F (121°C)
328 SIZING AND LOCATION OF CHECK VALVES IS CRITICAL FOR RELIABLE OPERATION. SEE SECTION 6.0 (25) IN THE GENERAL SPECIFICATION FOR MORE INFORMATION.
329 IN GENERAL, KNIFE GATE VALVES ARE TO BE RESTRICTED TO LARGE DIAMETER, LOW PRESSURE, LOW TEMPERATURE SERVICES SUCH AS RELIEF AND FLARE HEADERS.
17 USE WELD NECK FLANGE AND THROAT TAPS NPS 20" AND LARGER
92 USE RESTRICTED TO THERMOWELL ASSEMBLY ONLY
101 TO BE USED WHERE TIGHT SHUT-OFF IS REQUIRED.
309 USE BELLOW SEAL GATE VALVES FOR ALL IN-KIND PEPLACEMENT ONLY. INSTALL NEW BELLOW SEALVALVES WHEN REQUIRED BY PROJECT FOR PERMIT PURPOSES.
203 FLANGES AND GASKETS SHALL CONFORM TO ASME B16.47 SERIES B.

SERVICE:

- Hydrocarbon Gas, Vapor, Liquid with trace H2S
- Inert Gas, Nitrogen
- LPG and LPG/HC with trace H2S (USE TO MATCH TO EXISTING PIPING; CLASS 300 RECOMMENDED FOR NEW SYSTEMS)
- Primary Wash & Re-Pulp Filtrate, Primary Wax Mix, Solvent, Waxy Oil
- Sweet Gas, ,
- Flare
- Produced Water (non-sour)
- Aqueous Ammonia
- Caustic (<30% Conc. & below 140°F)

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		LIMITED BY:	Flanges
SERVICE:	Steam/Condensate (Non Boiler Code)	MATERIAL:	Carbon Steel
RATING CLASS:	150 RF, ASME B16.5-2009	DESIGN CODE:	ASME B31.3-2008
TEMPERATURE LIMIT:	-20F to 450F	STRESS RELIEF:	NONE
NOMINAL CORROSION ALLOWANCE:	0.063 in. (0.05 in. MIN for ¾")	EXAMINATION:	5% RT, PT & Visual
VALVE TRIM:	API Trim #5 (13CR & FHF)		

PRESSURE - TEMPERATURE RATINGS					
TEMP F	-20 to 100	200	300	400	450
psig	285	260	230	200	185
TEMP C	-29 to 38	93	149	204	232
kPag	1965	1795	1585	1380	1275

NOTE: HYDROTEST @ AMBIENT = 450 psig

For NPS 3/4 through NPS 24 (Full flange ratings per ASME B16.5, Table 2-1.1.)

ITEM	NOTES	NPS	SCH/RAT	ENDS	DESCRIPTION	ITEM CODE
PIPE						
	326	3/4– 1-1/2	XS/80	PE	CS, SMLS, ASTM A106-B	L11NA1B
	326	2 - 2	XS/80	BE	CS, ASTM A106-B	L11NA2A
		3 – 24	STD	BE	CS, ASTM A106-B	L11MA2A
NIPPLES						
Branch		3/4 – 1-1/2	160	PE	CS, SMLS, ASTM A106-B	L34LAEJ
Branch		3/4 – 1-1/2	160	TBE	CS, SMLS, ASTM A106-B	L34LABJ
Swage (CONC)		3/4 – 1-1/2	XS/80	BBE	CS, ASTM A234-WPB-S, MSS SP-95	L55NA1VA
Swage (CONC)		3/4 – 1-1/2	160	BLE-TSE	CS, ASTM A234-WPB-S, MSS SP-95	L35LBMQ
FITTINGS Sockolet		3/4 – 3/4	Class 6000	SW	CS, ASTM A105, MSS SP-97	L36VBDT
Sockolet		1 – 1-1/2	Class 3000	SW	CS, ASTM A105, MSS SP-97	L36SBDT
Thredolet	03	3/4 – 1-1/2	Class 3000	THRD	CS, ASTM A105, MSS SP-97	L36SBAT
SW Elbolet		3/4 – 3/4	Class 6000	SW	CS, ASTM A105	L36VBDU
SW Elbolet		3/4 – 1-1/2	Class 3000	SW	CS, ASTM A105	L36SBDU
Latrolet	92	1 – 1-1/2	XS/80	Weld	CS, ASTM A105	L56NA1K
Weldolet	05	1 – 1-1/2	XS/80	Weld	CS, ASTM A105, MSS SP-97	L56NA1H
Plug	03	3/4 – 1-1/2		THRD	CS, ASTM A105, round head, ASME B16.11	L370ABW
Plug		3/4 – 1-1/2		PE	CS, ASTM A105, round head, ASME B16.11	L370AEW
90 ELL		3/4 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11	L30SBDB
45 ELL		3/4 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11	L30SBDA
Tee		3/4 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11	L31SBD
Tee (RED)		3/4 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11	L31SBDD
Coupling		3/4 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11	L34SBDH
Cap		3/4 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11	L37SBDX
Reducer (CONC)		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-W, ASME B16.9	L55NA1DA
Reducer (ECC)		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-W, ASME B16.9	L55NA1DB
Weldolet	05	2 – 2	XS/80	Weld	CS, ASTM A105, MSS SP-97	L56NA1H
90 LR ELL		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-W, ASME B16.9	L50NA1BC
45 LR ELL		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-W, ASME B16.9	L50NA1AC
Tee		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-W, ASME B16.9	L51NA1
Tee (RED)	99	2 – 2	XS/80	Weld	CS, ASTM A234-WPB-W, ASME B16.9	L51NA1D
Cap		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L57NA1R
Reducer (CONC)		3 – 24	STD	Weld	CS, ASTM A234-WPB-W, ASME B16.9	L55MA1DA
Reducer (ECC)		3 – 24	STD	Weld	CS, ASTM A234-WPB-W, ASME B16.9	L55MA1DB
Weldolet	05	3 – 8	STD	Weld	CS, ASTM A105, MSS SP-97	L56MA1H
90 LR ELL		3 – 24	STD	Weld	CS, ASTM A234-WPB-W, ASME B16.9	L50MA1BC
45 LR ELL		3 – 24	STD	Weld	CS, ASTM A234-WPB-W, ASME B16.9	L50MA1AC
Tee		3 – 24	STD	Weld	CS, ASTM A234-WPB-W, ASME B16.9	L51MA1
Tee (RED)	99	3 – 24	STD	Weld	CS, ASTM A234-WPB-W, ASME B16.9	L51MA1D
Cap		3 – 24	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L57MA1R

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ITEM	NOTES	NPS	SCH/RAT	ENDS	DESCRIPTION	ITEM CODE
VALVES						
Gate	15	3/4 – 1-1/2	Class 150	RF	CS body w/API#5 trim, RP, WB	L20BA3MF
Gate		3/4 – 1-1/2	Class 800	SW	CS body w/API #5 trim, RP, WB	L20KA1MF
Gate	325	3/4 – 1-1/2	Class 800	SW	CS body w/API #5 trim, FP, WB	L20KA1FF
Gate	06	3/4 – 1-1/2	Class 800	T/SW	CS body w/API #5 trim, RP, WB	L20KA7MF
Gate		2 - 8	Class 150	RF	CS body w/API #5 trim, BB, FP	L20BA3DF
Gate		10 – 24	Class 150	RF	CS body w/API #5 trim, BB, FP, GO	L20BA3DFF
Globe	307	3/4 – 1-1/2	Class 800	SW	CS body w/API #5 trim, WB	L21KA1JG
Globe	307	2 - 3	Class 150	RF	CS body w/API #5 trim, BB	L21BA3DG
Globe	307	4 - 8	Class 150	RF	CS body w/API #5 trim, BB, GO	L21BA3DGB
Angle		3/4 – 1-1/2	Class 600	SW	CS body w/API #5 trim, WB	L23JA1JG
Check	61	3/4 – 1-1/2	Class 800	SW	CS body w/API #5 trim, BC, HORIZ., Piston	L22KA1TGF
Check	62	2 – 24	Class 150	RF	CS body w/API #5 trim, BC, Swing	L22BA3PG
FLANGES	02, 104,326					
Socket Weld		3/4 – 1-1/2	Class 150	RF	CS, ASTM A105, ASME B16.5, XS/80	L40BA3BN
Blind		3/4 – 24	Class 150	RF	CS, ASTM A105, ASME B16.5	L43BA3
Blind Spectacle		3/4 – 18	Class 150	RF	CS, ASTM A516-70, ASME B16.48	L45BA3E
Spacer Ring		20 – 24	Class 150	RF	CS, ASTM A516-70, ASME B16.48	L45BA3F
Blind Plate		20 – 24	Class 150	RF	CS, ASTM A516-70, ASME B16.48	L45BA3G
Weld Neck		2 – 2	Class 150	RF	CS, ASTM A105, ASME B16.5, XS/80 Bore	L40BA3DN
Weld Neck	12	2 – 2	Class 300	RF	CS, ASTM A105, ASME B16.5, XS/80 Bore	L40FA3DN
Weld Neck		3 – 24	Class 150	RF	CS, ASTM A105, ASME B16.5, STD Bore	L40BA3DM
Weld Neck	11	3 – 24	Class 150	FF	CS, ASTM A105, ASME B16.5, STD Bore	L40BA2DM
Weld Neck	12	3 – 24	Class 300	RF	CS, ASTM A105, ASME B16.5, STD Bore	L40FA3DM
Pair WN Orifice		1 – 2	Class 300	RF	CS, ASTM A105, ASME B16.36, ½ SW taps, XS/80 Bore	L42FA3DNL
Pair WN Orifice	17	3 – 24	Class 300	RF	CS, ASTM A105, ASME B16.36, ½ SW taps, STD Bore	L42FA3DML
GASKETS	14					
		3/4 – 24	Class 150		Spiral wound type 316L SS w/ flexible Inhibited Graphite filler, ASME B16.20, w/inner ring.	L61BF1CAC
	301	3/4 – 24	Class 150		KAM style, 316L SS w/APX-2 Graphite, EXH-SU-5151	L61BF1ZA
	12	3/4 – 24	Class 300		Spiral wound type 316L SS w/ flexible Inhibited Graphite filler, ASME B16.20, w/inner ring.	L61FF1CAC
	12, 301	3/4 – 24	Class 300		KAM style, 316L SS w/APX-2 Graphite, EXH-SU-5151	L61FF1ZA
BOLTING						
Stud Bolts		3/4 – 24			ASTM A193, B7 stud w/ 2 heavy hex nuts ASTM A194, GR 2H	L620BM

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90° BRANCH CONNECTION, Legend and Chart

BRANCH	24	20	18	16	14	12	10	8	6	4	3	2	1-1/2	1	3/4	1/2
24	T															
20	E	T														
18	E	E	T													
16	E	E	E	T												
14	E	E	E	E	T											
12	E	E	E	E	E	T										
10	E	E	E	E	E	E	T									
8	W	E	E	E	E	E	E	T								
6	W	W	W	E	E	E	E	E	T							
4	W	W	W	W	W	W	E	E	E	T						
3	W	W	W	W	W	W	W	E	E	E	T					
2	W	W	W	W	W	W	W	W	W	E	E	T				
1-1/2	S	S	S	S	S	S	S	S	S	S	S	S	T			
1	S	S	S	S	S	S	S	S	S	S	S	S	E	T		
3/4	S	S	S	S	S	S	S	S	S	S	S	S	E	E	T	
1/2	S	S	S	S	S	S	S	S	S	S	S	S	E	E	E	T

HEADER SIZE

E Reducing Tee
P Branch Weld w/ Reinforcing Pad (Pad thickness equals run pipe thickness. Pad width equals 1/2 branch OD.)
T Equal Tee
S Sockolet
W Weldolet (Note 05)

NOTES:

01 WHERE A PIPE SCHEDULE IS SHOWN UNDER "SCH/RAT," IT SHALL BE ADEQUATE FOR THE FULL FLANGE RATING. WHERE "CALC" IS SHOWN, THE PRESSURE LIMIT MAY BE LOWER THAN FULL FLANGE RATING.
02 ALL BUTT-WELDED COMPONENT THICKNESSES SHALL MATCH PIPE THICKNESS.
03 THREADED JOINTS ARE PERMITTED ONLY AT OUTLET OF VENT AND DRAIN VALVES, AT HYDROSTATIC CONNECTIONS, AT OUTLET OF INSTRUMENT TAKE-OFF VALVES, AND TO MATCH EQUIPMENT.
05 INTEGRALLY REINFORCED BRANCH CONNECTIONS ARE PERMITTED OUTSIDE THE SIZES SHOWN IN THE BRANCH CONNECTION TABLE. DESIGNER SHALL CHECK WELD THICKNESS OF INTEGRALLY REINFORCED BRANCH CONNECTIONS TO DETERMINE IF PWHT IS REQUIRED.
06 THESE VALVES SHALL BE USED ONLY FOR VENT, DRAIN, AND INSTRUMENT CONNECTIONS.
11 PROVIDE FLAT FACE FLANGES ADJACENT TO FLAT FACE EQUIPMENT NOZZLES.
12 TO BE USED ONLY TO MATCH CLASS 300 RATED FLANGE CONNECTIONS AT CONTROL VALVES AND SPECIAL EQUIPMENT.
14 FULL FACE GASKETS SHALL BE USED AT FLAT-FACED FLANGES.
15 TO BE USED WHEN MATING TO FLANGED NOZZLES.
19 SCH 160 PIPE AND PIPE NIPPLES SHALL BE USED FOR THREADED CONNECTIONS FOR NPS 3/4 - 1-1/2.
59 USE BRANCH WELD WITH REINFORCEMENT PAD WHEN THE MINIMUM HEADER WALL THICKNESS (SPECIFIED OR MEASURED) AT THE BRANCH LOCATION EXCEEDS XXS, WHERE XXS EQUALS THE WALL THICKNESS VALUE FOR THE LETTER SYMBOL SHOWN IN THE LEGEND. USE FULL ENCIRCLEMENT REINFORCEMENT (LENGTH EQUALS TWICE BRANCH PIPE OD) WHEN THE WALL IS LESS THAN OR EQUAL TO XXS.
61 INSTALL IN HORIZONTAL POSITION WITH COVER UP.
62 INSTALL IN HORIZONTAL POSITION WITH COVER UP OR IN VERTICAL POSITION WITH UPWARD FLOW.
301 FOR USE IN VOC REGULATED SERVICES; IN FLANGES WITH SLIGHTLY DAMAGED GASKET SEATING FACES; OR IN FLANGES WITH A HISTORY OF LEAKING.
307 LIMITED TO THROTTLING SERVICES UP TO 150 PSI DIFFERENTIAL PRESSURE. FOR SERVICE APPLICATIONS WITH DIFFERENTIAL PRESSURES GREATER THAN 150 PSI, CONSULT WITH THE VALVE MANUFACTURER AND CHEVRON PIPING & VALVE SME FOR SUITABILITY.
325 USE FULL PORT VALVES IN LOCATIONS REQUIRING FULL OPENINGS SUCH AS UPSTREAM AND DOWNSTREAM OF RELIEF VALVES OR IN HORIZONTAL LINES CONTAINING HAZARDOUS LIQUIDS.
326 USE OF MECHANICAL COMPRESSION (LOKRING) FITTINGS, UP TO 3" DIAMETER, IS ACCEPTABLE FOR ALL SERVICES IN THIS PIPE CLASS. SEE SECTION 6.0 (18) IN THE GENERAL SPECIFICATION FOR TEMPERATURE AND PRESSURE LIMITS.
17 USE WELD NECK FLANGES AND THROAT TAPS NPS 20 " AND LARGER
92 USE RESTRICTED TO THERMOWELL ASSEMBLY ONLY
104 USE CLASS 300 FLANGES WHEN MATING TO CONTROL VALVES AND EQUIPMENTS

SERVICE:

- Steam, Cond (Non-Boiler Code)
- Boiler feedwater (Non-Boiler Code)

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		LIMITED BY:	Flanges
SERVICE:	Process	MATERIAL:	Carbon Steel
RATING CLASS:	300 RF, ASME B16.5-2009	DESIGN CODE:	ASME B31.3-2008
TEMPERATURE LIMIT:	Min. to 750F	STRESS RELIEF:	None
NOMINAL CORROSION ALLOWANCE:	0.063 in. (0.035 in. MIN for ¾")	EXAMINATION:	5% RT, PT & Visual
VALVE TRIM:	API Trim #8 (13CR & HF)		

PRESSURE - TEMPERATURE RATINGS			NOTE: HYDROTEST @ AMBIENT = 1125 psig					
TEMP F	Min. to 100	200	300	400	500	600	700	750
psig	740	680	655	635	605	570	530	505
TEMP C	Min. to 38	93	149	204	260	316	371	399
kPag	5100	4690	4515	4380	4170	3930	3655	3480

For NPS 3/4 through NPS 24 (Full flange ratings per ASME B16.5, Table 2-1.1.)

MINIMUM TEMPERATURE (see Note 300)		
SIZE:	¾" - 20"	24"
°F:	-20	+9
°C:	-29	-12

ITEM	NOTES	NPS	SCH/RAT	ENDS	DESCRIPTION	ITEM CODE
PIPE						
		3/4 – 1-1/2	XS/80	PE	CS, SMLS, ASTM A106-B	L11NA1B
		2 – 2	XS/80	BE	CS, SMLS, ASTM A106-B	L11NA2A
		3 – 12	STD	BE	CS, SMLS, ASTM A106-B	L11MA2A
		14 – 20	XS	BE	CS, S MLS, ASTM A106-B	L11NA2A
		24 – 24	40	BE	CS, SMLS, ASTM A106-B	L11EA2A
NIPPLES Branch						
Branch		3/4 – 1-1/2	160	PE	CS, SMLS , ASTM A106-B	L34LAEJ
Branch		3/4 – 1-1/2	160	TOE-POE	CS, SMLS , ASTM A106-B	L34LAHJ
Swage (CONC)		3/4 – 1-1/2	160	BBE	CS, ASTM A234-WPB-S, MSS SP-95	L55NA1VA
Swage (CONC)		3/4 – 1-1/2	160	BLE-TSE	CS, ASTM A234-WPB-S, MSS SP-95	L35LBMQ
FITTINGS						
Sockolet		3/4 – 1-1/2	Class 3000	SW	CS, ASTM A105, MSS SP-97	L36SBDT
Thredolet	03	3/4 – 1-1/2	Class 3000	THRD	CS, ASTM A105, MSS SP-97	L36SBAT
SW Elbolet		3/4 – 1-1/2	Class 3000	SW	CS, ASTM A105	L36SBDU
Latrolet	92	3/4 – 1-1/2	XS/80	Weld	CS, ASTM A105	L56NA1K
Weldolet	05	3/4 – 1-1/2	XS/80	Weld	CS, ASTM A105, MSS SP-97	L56NA1H
90 ELL		3/4 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11	L30SBDB
45 ELL		3/4 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11	L30SBDA
Tee		3/4 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11	L31SBD
Tee	03	3/4 – 1-1/2	Class 3000	THRD	CS, ASTM A105, ASME B16.11	L31SBA
Tee (RED)		3/4 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11	L31SBDD
Plug	03	3/4 – 1-1/2		THRD	CS, ASTM A105, round head, ASME B16.11	L370ABW
Plug		3/4 – 1-1/2		PE	CS, ASTM A105, round head, ASME B16.11	L370AEW
Coupling		3/4 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11	L34SBDH
Cap		3/4 – 1-1/2	Class 3000	SW	CS, ASTM A105, ASME B16.11	L37SBDX
Reducer (CONC)		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55NA1DA
Reducer (ECC)		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55NA1DB
Weldolet	05	2 – 2	XS/80	Weld	CS, ASTM A105, MSS SP-97	L56NA1H
90 LR ELL		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50NA1BC
45 LR ELL		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50NA1AC
Tee		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51NA1
Tee (RED)	99	2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51NA1D
Cap		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L57NA1R
Reducer (CONC)		3 – 12	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55MA1DA
Reducer (ECC)		3 – 12	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55MA1DB
Weldolet	05	3 – 8	STD	Weld	CS, ASTM A105, MSS SP-97	L56MA1H
90 LR ELL		3 – 12	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50MA1BC
45 LR ELL		3 – 12	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50MA1AC
Tee		3 – 12	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51MA1
Tee (RED)	99	3 – 12	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51MA1D
Cap		3 – 12	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L57MA1R

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ITEM	NOTES	NPS	SCH/RAT	ENDS	DESCRIPTION	ITEM CODE
Reducer(CONC)		14 – 20	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55NA1DA
Reducer (ECC)		14 – 20	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55NA1DB
90 LR ELL		14 – 20	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50NA1BC
45 LR ELL		14 – 20	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50NA1AC
Tee		14 – 20	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51NA1
Tee (RED)		14 – 20	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51NA1D
Cap		14 – 20	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L57NA1R
Reducer (CONC)		24 – 24	40	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55EA1DA
Reducer (ECC)		24 – 24	40	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55EA1DB
90 LR ELL		24 – 24	40	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50EA1BC
45 LR ELL		24 – 24	40	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50EA1AC
Tee		24 – 24	40	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51EA1
Tee (RED)		24 – 24	40	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51EA1D
Cap		24 – 24	40	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L57EA1R
VALVES						
Gate	67	1/2 – 1/2	Class 800	MSW/FSW	CS body, API #8 trim, BB, RP, EXTD body	L20KAXHDM
Gate	15	3/4 – 1-1/2	Class 300	RF	CS body, API #8 trim, BB, RP	L20FA3HD
Gate		3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, RP, BB	L20KA1HD
Gate	325	3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, FP, BB	L20KA1DD
Gate		3/4 – 1-1/2	Class 800	T/SW	CS body, API #8 trim, RP, BB	L20KA7HD
Gate	94	3/4 – 1-1/2	Class 800	MSW/FNPT	CS body, API #8 trim, BB, RP, EXTD body	L20KAYHDM
Gate	06, 161	3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, RP, BELLOW SEAL, WB	L20KD1MDL
Gate	06, 161,325	3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, FP, BELLOW SEAL, WB	L20KD1FDL
Gate	06, 161	3/4 – 1-1/2	Class 800	T/SW	CS body, API #8 trim, RP, BELLOW SEAL, WB	L20KD7MDL
Gate		2 – 6	Class 300	RF	CS body, API #8 trim, BB, FP	L20FA3DD
Gate		8 – 24	Class 300	RF	CS body, API #8 trim, BB, FP, GO	L20FA3DDF
Globe	161, 307	3/4 – 1-1/2	Class 800	T/SW	CS body, API #8 trim, BELLOW SEAL, WB	L21KD7JEL
Globe	161, 307	3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, BELLOW SEAL, WB	L21KD1JEL
Globe	307	3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, BB	L21KA1DE
Globe	307	2 – 2	Class 300	RF	CS body, API #8 trim, BB	L21FA3DE
Globe	307	3 – 8	Class 300	RF	CS body, API #8 trim, BB, GO	L21FA3DEB
Check	61, 328	3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, BC, Piston, HORIZ	L22KA1TEF
Check	62, 328	2 – 24	Class 300	RF	CS body, API #8 trim, BC, Swing	L22FA3PE
Check	62,328	2 – 24	Class 300	RF	CS body, API #8 trim, Dual Plate	L22FA3LEH
Ball	26, 101	2 – 12	Class 300	RF	CS, (A216-WCB) T3 MOD, RP, ORBIT	L25FB3FB
Ball	101, 327	2 – 4	Class 300	RF	CS body, 316 SS trim, RP, TFE seat, FS	L25FA3CE
Ball	101, 327	6 – 24	Class 300	RF	CS body, 316 SS trim, RP, TFE seat, FS, GO	L25FA3CEM
Butterfly	101	2 – 24	Class 300	RF	CS body, 316 SS trim, Flg, Triple Offset GO	L26FA3TJM
FLANGES	02, 13					
Socket Weld		3/4 – 1-1/2	Class 300	RF	CS, ASTM A105, ASME B16.5, XS Bore	L40FA3BN
Blind		3/4 – 24	Class 300	RF	CS, ASTM A105, ASME B16.5	L43FA3
Blind Spectacle		3/4 – 14	Class 300	RF	CS, ASTM A516-70, ASME B16.48	L45FA3E
Spacer Ring		16 – 24	Class 300	RF	CS, ASTM A516-70, ASME B16.48	L45FA3F
Blind Plate		16 – 24	Class 300	RF	CS, ASTM A516-70, ASME B16.48	L45FA3G
Weld Neck		2 – 2	Class 300	RF	CS, ASTM A105, ASME B16.5, XS/80 Bore	L40FA3DN
Weld Neck		3 – 12	Class 300	RF	CS, ASTM A105, ASME B16.5, STD Bore	L40FA3DM
Weld Neck		14 – 20	Class 300	RF	CS, ASTM A105, ASME B16.5, XS Bore	L40FA3DN
Weld Neck		24 – 24	Class 300	RF	CS, ASTM A105, ASME B16.5, 40 Bore	L40FA3DE
Pair WN Orifice		1 – 2	Class 300	RF	CS, ASTM A105, ASME B16.36, ½ SW taps, XS/80 Bore	L42FA3DNL
Pair WN Orifice		3 – 12	Class 300	RF	CS, ASTM A105, ASME B16.36, 1/2 SW taps, STD bore	L42FA3DML
Pair WN Orifice	17	14 – 18	Class 300	RF	CS, ASTM A105, ASME B16.36, ½ SW taps, XS Bore	L42FA3DNL
GASKETS		3/4 – 24	Class 300	RF	Spiral wound type 316L SS w/ flexible Inhibited Graphite filler, ASME B16.20, w/inner ring.	L61FF1CAC
	301	3/4 – 24	Class 300		KAM style, 316LSS w/APX-2 Graphite, EXH-SU-5151	L61FF1ZA
BOLTING						
Stud Bolts	310	3/4 – 24			ASTM A193, Gr B7 stud w/ 2 heavy hex nuts ASTM A194,Gr 2H	L620BM
Stud Bolts	311	3/4 – 24			ASTM A193, Gr B16 stud w/ 2 heavy hex nuts ASTM A194,Gr 7	L620CM

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90° BRANCH CONNECTION, Legend and Chart

BRANCH \ HEADER SIZE	24	20	18	16	14	12	10	8	6	4	3	2	1-1/2	1	3/4	1/2
24	T															
20	E	T														
18	E	E	T													
16	E	E	E	T												
14	E	E	E	E	T											
12	E	E	E	E	E	T										
10	E	E	E	E	E	E	T									
8	W	E	E	E	E	E	E	T								
6	W	W	W	E	E	E	E	E	T							
4	W	W	W	W	W	W	E	E	E	T						
3	W	W	W	W	W	W	W	E	E	E	T					
2	W	W	W	W	W	W	W	W	W	E	E	T				
1-1/2	S	S	S	S	S	S	S	S	S	S	S	S	T			
1	S	S	S	S	S	S	S	S	S	S	S	S	E	T		
3/4	S	S	S	S	S	S	S	S	S	S	S	S	E	E	T	
1/2	S	S	S	S	S	S	S	S	S	S	S	S	E	E	E	T

E Reducing Tee
P Branch Weld w/ Reinforcing Pad (Pad thickness equals run pipe thickness. Pad width equals 1/2 branch OD.)
T Equal Tee
S Sockolet
W Weldolet (Note 05)

NOTES:

03 THREADED JOINTS ARE PERMITTED ONLY AT OUTLET OF VENT AND DRAIN VALVES, AT HYDROSTATIC CONNECTIONS, AT OUTLET OF INSTRUMENT TAKE-OFF VALVES, AND TO MATCH EQUIPMENT.
05 INTEGRALLY REINFORCED BRANCH CONNECTIONS ARE PERMITTED OUTSIDE THE SIZES SHOWN IN THE BRANCH CONNECTION TABLE. DESIGNER SHALL CHECK WELD THICKNESS OF INTEGRALLY REINFORCED CONNECTIONS TO DETERMINE IF PWHT IS REQUIRED.
06 THESE VALVES SHALL BE USED FOR VENT, DRAIN AND INSTRUMENT CONNECTIONS ONLY.
15 TO BE USED WHEN MATING TO FLANGED NOZZLES.
26 TO BE USED ONLY WHEN INDICATED ON THE P&ID.
61 INSTALL IN HORIZONTAL POSITION WITH COVER UP.
62 INSTALL IN HORIZONTAL POSITION WITH COVER UP OR IN VERTICAL POSITION WITH UPWARD FLOW.
300 FOR PIPING SYSTEM MAWP LOWER THAN PIPE CLASS MAX. PRESSURE, SEE FIG. 323.2.2B IN ASME B31.3 FOR REDUCTION IN MINIMUM DESIGN METAL TEMPERATURE.
301 FOR USE IN VOC REGULATED SERVICES; IN FLANGES WITH SLIGHTLY DAMAGED GASKET SEATING FACES; OR IN FLANGES WITH A HISTORY OF LEAKING.
307 LIMITED TO THROTTLING SERVICES UP TO 150 PSI DIFFERENTIAL PRESSURE. FOR SERVICE APPLICATIONS WITH DIFFERENTIAL PRESSURES GREATER THAN 150 PSI, CONSULT WITH THE VALVE MANUFACTURER AND CHEVRON PIPING & VALVE SME FOR SUITABILITY.
310 ASME A193/SA193 GR. B7 STUD BOLTING IS LIMITED TO PROCESS SERVICE TEMPERATURES NOT GREATER THAN 700°F TO AVOID THERMAL FATIGUE CRACKING.
311 ASME A193/SA193 GR. B16 STUD BOLTING SHOULD BE USED IN ALL PROCESS SERVICES WITH TEMPERATURES GREATER THAN 700°F. FLANGES SHOULD NOT BE INSULATED AT PROCESS SERVICE TEMPERATURES ABOVE 850°F TO AVOID THERMAL FATIGUE CRACKING. AT TEMPERATURES GREATER THAN 850°F, WEATHER SHIELDS OVER FLANGES ARE ACCEPTABLE.
325 USE FULL PORT VALVES IN LOCATIONS REQUIRING FULL OPENINGS SUCH AS UPSTREAM AND DOWNSTREAM OF RELIEF VALVES OR IN HORIZONTAL LINES CONTAINING HAZARDOUS LIQUIDS.
327 LIMITED TO PROCESS TEMPERATURES UP TO 250°F (121°C)
328 SIZING AND LOCATION OF CHECK VALVES IS CRITICAL FOR RELIABLE OPERATION. SEE SECTION 6.0 (25) IN THE GENERAL SPECIFICATION FOR MORE INFORMATION.
17 USE WELD NECK FLANGES AND THROAT TAPS NPS 20" AND LARGER.
67 USE RESTRICTED TO ORIFICE FLANGE TAP CONNECTIONS. THREADED NIPPLES TO BE SEAL WELDED. NIPPLE LENGTHS SHALL BE IN ACCORDANCE WITH STANDARD DRAWING D-601407.
92 USE RESTRICTEDTO THERMOWELL ASSEMBLY.
94 USE RESTRICTED TO DRAINS, OPERATIONAL VENTS, AND INSTRUMENT CONNECTIONS.
101 TO BE USED WHERE TIGHT SHUT-OFF IS REQUIRED.
104 ORBIT VALVES WITH TYPE "H" SEATS ARE LIMITED TO 500 F.
161 USE BELLOW SEAL GATE VALVES FOR ALL IN-KIND PEPLACEMENT ONLY. INSTALL NEW BELLOW SEAL VALVES WHEN REQUIRED BY PROJECT FOR PERMIT PURPOSES.

SERVICES:

- Hydrocarbon Liquid, Gas and Vapor
- Hydrocarbon Liquid, Gas and Vapor w/ Trace H2S
- LPG and LPG/HC
- LPG and LPG/HC w/ Trace H2S
- Fuel Gas, Fuel Oil, Natural Gas
- Hydrogen (to 450°F Maximum)
- Aqueous Ammonia
- Nitrogen, Process Air, and Process Water

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		LIMITED BY:	Flanges
SERVICE:	Steam/Condensate (Boiler Code)	MATERIAL:	Carbon Steel
RATING CLASS:	300 RF, ASME B16.5-2009	DESIGN CODE:	ASME B31.1-2007
TEMPERATURE LIMIT:	-20F to 700F	STRESS RELIEF:	None
NOMINAL CORROSION ALLOWANCE:	0.063 in. (0.035 in. MIN for ¾")	EXAMINATION:	5% RT, PT & Visual
VALVE TRIM:	API Trim #5 (13CR & FHF)		

NOTE: ALL PIPING SHALL CONFORM TO ASME B31.1 AS MODIFIED HEREIN. IF USED FOR ASME SECTION I BOILER EXTERNAL PIPING,
USE EQUIVALENT ASME (SA) MATERIAL AND USE VALVES CERTIFIED PER ASME SECTION I.

PRESSURE - TEMPERATURE RATINGS			**NOTE: HYDROTEST @ AMBIENT = 1125 psig**				
TEMP F	-20 to 100	200	300	400	500	600	700
psig	740	675	655	635	600	550	535
TEMP C	-29 to 38	93	149	204	260	316	371
kPag	5100	4655	4515	4380	4135	3790	3690

For NPS 3/4 through NPS 24 (Full flange ratings per ASME B16.5, Table 2-1.1.)

ITEM	NOTES	NPS	SCH/RAT	ENDS	DESCRIPTION	ITEM CODE
PIPE						
		3/4 – 1-1/2	XS/80	PE	CS, SMLS, ASME SA106-B	L11NA1B5
		2 - 2	XS/80	BE	CS, ASME SA106-B	L11NA1A5
		3 – 8	STD/40	BE	CS, ASME SA106-B	L11EA2A5
	163	3 – 8	80	BE	CS, ASTM SA106-B	L11GA2A5
		10 - 14	XS	BE	CS, ASME SA106-B	L11NA2A5
		16 - 24	60	BE	CS, ASME SA106-B	L11FC2J5
NIPPLES						
Branch		3/4– 1-1/2	160	PE	CS, SMLS , ASME SA106-B	L34LAEJ5
Branch		3/4 – 1-1/2	160	TOE-POE	CS, SMLS , ASME SA106-B	L34LAHJ5
Swage (CONC)		3/4 – 1-1/2	160	BBE	CS, ASME SA234-WPB-S, MSS SP-95	L55NA1VA5
Swage (CONC)		3/4 – 1-1/2	160	BLE-TSE	CS, ASME SA234-WPB-S, MSS SP-95	L35LBMQ5
FITTINGS						
Sockolet		3/4 – 1-1/2	Class 3000	SW	CS, ASME SA105, MSS SP-97	L36SBDT5
Thredolet	03	3/4 – 1-1/2	Class 3000	THRD	CS, ASME SA105, MSS SP-97	L36SBAT5
SW Elbolet		3/4 – 1-1/2	Class 3000	SW	CS, ASME SA105	L36SBDU5
Latrolet	92	3/4 – 1-1/2	XS/80	Weld	CS, ASME SA105	L56NA1K5
Weldolet	05	3/4 – 1-1/2	XS/80	Weld	CS, ASME SA105, MSS SP-97	L56NA1H5
90 ELL		3/4 – 1-1/2	Class 3000	SW	CS, ASME SA105, ASME B16.11	L30SBDB5
45 ELL		3/4 – 1-1/2	Class 3000	SW	CS, ASME SA105, ASME B16.11	L30SBDA5
Tee	03	3/4 – 1-1/2	Class 3000	THRD	CS, ASME SA105, ASME B16.11	L31SBA5
Tee		3/4 – 1-1/2	Class 3000	SW	CS, ASME SA105, ASME B16.11	L31SBD5
Tee (RED)		3/4 – 1-1/2	Class 3000	SW	CS, ASME SA105, ASME B16.11	L31SBDD5
Plug	03	3/4 – 1-1/2		THRD	CS, ASME SA105, round head, ASME B16.11	L370ABW5
Plug		3/4 – 1-1/2		PE	CS, ASME SA105, round head, ASME B16.11	L370AEW5
Coupling		3/4 – 1-1/2	Class 3000	SW	CS, ASME SA105, ASME B16.11	L34SBDH5
Cap		3/4 – 1-1/2	Class 3000	SW	CS, ASME SA105, ASME B16.11	L37SBDX5
Reducer (CONC)		2 – 8	XS/80	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L55NA1DA5
Reducer (ECC)		2 – 8	XS/80	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L55NA1DB5
Weldolet	05	2 – 8	XS/80	Weld	CS, ASME SA105, MSS SP-97	L56NA1H5
90 LR ELL		2 – 8	XS/80	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L50NA1BC5
45 LR ELL		2 – 8	XS/80	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L50NA1AC5
Tee		2 – 8	XS/80	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L51NA15
Tee (RED)	99	2 – 8	XS/80	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L51NA1D5
Cap		2 – 8	XS/80	Weld	CS, ASME SA234-WPB-S, ASME B16.9	L57NA1R5
Reducer (CONC)		3 – 8	STD/40	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L55MA1DA5
Reducer (ECC)		3 – 8	STD/40	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L55MA1DB5
Weldolet	05	3 – 8	STD/40	Weld	CS, ASME SA105, MSS SP-97	L56MA1H5
90 LR ELL		3 – 8	STD/40	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L50MA1BC5
45 LR ELL		3 – 8	STD/40	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L50MA1AC5
Tee		3 – 8	STD/40	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L51MA15
Tee (RED)	99	3 – 8	STD/40	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L51MA1D5
Cap		3 – 8	STD/40	Weld	CS, ASME SA234-WPB-S, ASME B16.9	L57MA1R5

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ITEM	NOTES	NPS	SCH/RAT	ENDS	DESCRIPTION	ITEM CODE
Reducer (CONC)		10 - 14	XS	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L55NA1DA5
Reducer (ECC)		10 - 14	XS	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L55NA1DB5
90 LR ELL		10 - 14	XS	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L50NA1BC5
45 LR ELL		10 - 14	XS	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L50NA1AC5
Tee		10 - 14	XS	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L51NA15
Tee (RED)	99	10 - 14	XS	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L51NA1D5
Cap		10 - 14	XS	Weld	CS, ASME SA234-WPB-S, ASME B16.9	L57NA1R5
Reducer (CONC)		16 - 24	60	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L55FA1DA5
Reducer (ECC)		16 - 24	60	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L55FA1DB5
90 LR ELL		16 - 24	60	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L50FA1BC5
45 LR ELL		16 - 24	60	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L50FA1AC5
Tee		16 - 24	60	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L51FA15
Tee (RED)	99	16 - 24	60	Weld	CS, ASME SA234-WPB-W, ASME B16.9	L51FA1D5
Cap		16 - 24	60	Weld	CS, ASME SA234-WPB-S, ASME B16.9	L57FA1R5
VALVES						
Gate	15	3/4 – 1-1/2	Class 300	RF	CS body w/ #5 trim, RP, BB	L20FA3HF5
Gate		3/4 – 1-1/2	Class 800	SW	CS body w/ #5 trim, RP, WB	L20KA1MF5
Gate	325	3/4 – 1-1/2	Class 800	SW	CS body w/ #5 trim, FP, WB	L20KA1FF5
Gate	06	3/4 – 1-1/2	Class 800	T/SW	CS body w/ #5 trim, RP, WB	L20KA7MF5
Gate		2 – 6	Class 300	RF	CS body w/ #5 trim, FP, BB	L20FA3DF5
Gate		8 – 24	Class 300	RF	CS body w/ #5 trim, FP, BB, GO	L20FA3DFF5
Globe	307	3/4 – 1-1/2	Class 800	SW	CS body w/ #5 trim, WB	L21KA1JG5
Globe	307	2 – 2	Class 300	RF	CS body w/ #5 trim, BB	L21BA3DG5
Globe	307	3 – 8	Class 300	RF	CS body w/ #5 trim, BB, GO	L21BA3DGB5
Angle		3/4 – 1-1/2	Class 600	SW	CS body w/API #5 trim, RP, WB	L23JA1DG5
Stop Check (Angle)	167,328	3 - 12	Class 300	RF	CS body w/API #5 trim, BB	L22FA3UGL5
Stop Check (Globe)	167,328	3 - 12	Class 300	RF	CS body w/API #5 trim, BB	L22FA3UGM5
Check	61, 328	3/4 – 1-1/2	Class 800	SW	CS body w/API #5 trim, HF, BC, Piston, Horiz.	L22KA1TGF5
Check	62, 328	2 – 24	Class 300	RF	CS body w/API #5 trim, HF, Swing	L22FA3PG5
FLANGES	02					
Socket Weld		3/4 – 1-1/2	Class 300	RF	CS, ASME SA105, ASME B16.5, XS Bore	L40FA3BN5
Blind		3/4 – 24	Class 300	RF	CS, ASME SA105, ASME B16.5	L43FA35
Blind Spectacle		3/4 – 14	Class 300	RF	CS, ASME SA516-70, ASME B16.5	L45FA3E5
Spacer Ring		16 – 24	Class 300	RF	CS, ASME SA516-70, ASME B16.5	L45FA3F5
Blind Plate		16 – 24	Class 300	RF	CS, ASME SA516-70, ASME B16.5	L45FA3G5
Weld Neck		2 – 8	Class 300	RF	CS, ASME SA105, ASME B16.5, XS/80 Bore	L40FA3DN5
Weld Neck		3 – 8	Class 300	RF	CS, ASME SA105, ASME B16.5, STD/40 Bore	L40FA3DE5
Weld Neck		10 - 14	Class 300	RF	CS, ASME SA105, ASME B16.5, XS Bore	L40FA3DN5
Weld Neck		16 – 24	Class 300	FF	CS, ASME SA105, ASME B16.5, 60 Bore	L40FA3DF5
Pair WN Orifice		2 – 8	Class 300	RF	CS, ASME SA105, ASME B16.36, ½ SW taps, XS/80 Bore	L42FA3DNL5
Pair WN Orifice		3 – 8	Class 300	RF	CS, ASME SA105, ASME B16.36, ½ SW taps, STD/40 Bore	L42FA3DML5
Pair WN Orifice		10 – 14	Class 300	RF	CS, ASME SA105, ASME B16.36, ½ SW taps, XS Bore	L42FA3DNL5
Pair WN Orifice	17	16 – 18	Class 300	RF	CS, ASME SA105, ASME B16.36,1/2 SW taps, 60 Bore	L42FA3DFL5
GASKETS						
		3/4 – 24	Class 300		Spiral wound type 316L SS w/ flexible Inhibited Graphite filler, ASME B16.20, w/inner ring.	L61FF1CAC
	301	3/4 – 24	Class 300		KAM style, 316LSS w/APX-2 Graphite, EXH-SU-5151	L61FF1ZA
BOLTING						
Stud Bolts		3/4 – 24			ASTM SA193, B7 stud w/ 2 heavy hex nuts ASTM SA194, GR 2H	L620BM5

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90° BRANCH CONNECTION, Legend and Chart

BRANCH \ HEADER SIZE	24	20	18	16	14	12	10	8	6	4	3	2	1-1/2	1	3/4	1/2
24	T															
20	E	T														
18	E	E	T													
16	E	E	E	T												
14	E	E	E	E	T											
12	E	E	E	E	E	T										
10	E	E	E	E	E	E	T									
8	W	E	E	E	E	E	E	T								
6	W	W	W	E	E	E	E	E	T							
4	W	W	W	W	W	W	E	E	E	T						
3	W	W	W	W	W	W	W	E	E	E	T					
2	W	W	W	W	W	W	W	W	W	E	E	T				
1-1/2	S	S	S	S	S	S	S	S	S	S	S	S	T			
1	S	S	S	S	S	S	S	S	S	S	S	S	E	T		
3/4	S	S	S	S	S	S	S	S	S	S	S	S	E	E	T	
1/2	S	S	S	S	S	S	S	S	S	S	S	S	E	E	E	T

E Reducing Tee
P Branch Weld w/ Reinforcing Pad (Pad thickness equals run pipe thickness. Pad width equals 1/2 branch OD.)
T Equal Tee
S Sockolet
W Weldolet (Note 05)

NOTES:

01 WHERE PIPE SCHEDULE IS SHOWN UNDER "SCH/RAT," IT IS ADEQUATE FOR THE FULL FLANGE RATING. WHERE "CALC" IS SHOWN, THE PRESSURE LIMIT MAY BE LOWER THAN FLANGE RATING.
02 ALL BUTT-WELDED COMPONENT THICKNESSES SHALL MATCH PIPE THICKNESS.
03 THREADED JOINTS ARE PERMITTED ONLY AT OUTLET OF VENT AND DRAIN VALVES, AT HYDROSTATIC CONNECTIONS, AT OUTLET OF INSTRUMENT TAKE-OFF VALVES, AND TO MATCH EQUIPMENT.
05 INTEGRALLY REINFORCED BRANCH CONNECTIONS ARE PERMITTED OUTSIDE THE SIZES SHOWN IN THE BRANCH CONNECTION TABLE. DESIGNER SHALL CHECK WELD THICKNESS OF INTEGRALLY REINFORCED BRANCH CONNECTIONS TO DETERMINE IF PWHT IS REQUIRED.
06 THESE VALVES SHALL BE USED ONLY FOR VENT, DRAIN, AND INSTRUMENT CONNECTIONS.
11 PROVIDE FLAT FACE FLANGES ADJACENT TO FLAT FACE EQUIPMENT NOZZLES.
14 USE FULL FACE GASKETS AT FLAT FACED FLANGES.
15 TO BE USED WHEN MATING TO FLANGED NOZZLES.
19 SCH 160 PIPE AND PIPE NIPPLES SHALL BE USED FOR THREADED CONNECTIONS FOR NPS ½ - 1-1/2.
61 INSTALL IN HORIZONTAL POSITION WITH COVER UP.
62 INSTALL IN HORIZONTAL POSITION WITH COVER UP OR IN VERTICAL POSITION WITH UPWARD FLOW.
301 FOR USE IN VOC REGULATED SERVICES; IN FLANGES WITH SLIGHTLY DAMAGED GASKET SEATING FACES; OR IN FLANGES WITH A HISTORY OF LEAKING.
307 LIMITED TO THROTTLING SERVICES UP TO 150 PSI DIFFERENTIAL PRESSURE. FOR SERVICE APPLICATIONS WITH DIFFERENTIAL PRESSURES GREATER THAN 150 PSI, CONSULT WITH THE VALVE MANUFACTURER AND CHEVRON PIPING & VALVE SME FOR SUITABILITY.
325 USE FULL PORT VALVES IN LOCATIONS REQUIRING FULL OPENINGS SUCH AS UPSTREAM AND DOWNSTREAM OF RELIEF VALVES OR IN HORIZONTAL LINES CONTAINING HAZARDOUS LIQUIDS.
328 SIZING AND LOCATION OF CHECK VALVES IS CRITICAL FOR RELIABLE OPERATION. SEE SECTION 6.0 (25) IN THE GENERAL SPECIFICATION FOR MORE INFORMATION.
17 USE WELD NECK FLANGES AND THROAT TAPS NPS 20" AND LARGER
92 USE RESTRICTEDTO THERMOWELL ASSEMBLY
163. BLOWDOWN PIPING SHALLBE SCHEDULE 80 MINIMUM WHEN DESIGN PRESSURE AS DEFINDED IN ASME B31.1, PARA. 122.1.4 EXCEEDS 100 PSIG.
167 TO BE USED AS A "NON- RETURN VALVE" (FIRST VALVE ON BOILER STEAM OUTLET)

SERVICES:

- Steam, Condensate (Boiler Code)
- BFW Blowdown Piping (Note 163) (Boiler Code)
- Boiler External Piping (Boiler Code)
- Boiler Feedwater & Blowoff Piping (ASME SECT.I Boiler Code)

		LIMITED BY:	Flanges
SERVICE:	Process	MATERIAL:	Carbon Steel
RATING CLASS:	150 RF, ASME B16.5-2009	DESIGN CODE:	ASME B31.3-2008
TEMPERATURE LIMIT:	-20F to 450F	STRESS RELIEF:	NONE
NOMINAL CORROSION ALLOWANCE:	0.125 in. (0.092 in. MIN)	EXAMINATION:	5% RT, PT & Visual
VALVE TRIM:	API Trim #8 (13CR & HF)		

PRESSURE - TEMPERATURE RATINGS			NOTE: HYDROTEST @ AMBIENT = 450 psig		
TEMP F	-20 to 100	200	300	400	450
psig	285	260	230	200	185
TEMP C	-29 to 38	93	149	204	232
kPag	1965	1795	1585	1380	1275

For NPS 3/4 through NPS 24 (Full flange ratings per ASME B16.5, Tables 2-1.1.)

ITEM	NOTES	NPS	SCH/RAT	ENDS	DESCRIPTION	ITEM CODE
PIPE	01					
		3/4 – 1-1/2	160	PE	CS, SMLS, ASTM A106-B	L11LA1B
		2 – 2	XS/80	BE	CS, SMLS , ASTM A106-B	L11NA2A
		3 - 24	STD	BE	CS, SMLS , ASTM A106-B	L11MA2A
NIPPLES	03, 20					
Branch		3/4 – 1-1/2	160	PE	CS, SMLS , ASTM A106-B	L34LAEJ
		3/4 – 1-1/2	XXS	TOE-POE	CS, SMLS , ASTM A106-B	L34PAHJ
Swage (CONC)		3/4 – 1-1/2	160	BBE	CS, ASTM A234-WPB-S, MSS SP-95	L55LA1VA
Swage (CONC)		3/4 – 1-1/2	XXS	BLE-TSE	CS, ASTM A234-WPB-S, MSS SP-95	L35PBMQ
FITTINGS	02					
Sockolet		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105, MSS SP-97	L36VBDT
Thredolet	03	3/4 – 1-1/2	Class 6000	THRD	CS, ASTM A105, MSS SP-97	L36VBAT
SW Elbolet		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105	L36VBDU
Latrolet	92	3/4 – 1-1/2	160	Weld	CS, ASTM A105	L56LA1K
Weldolet	05	3/4 – 1-1/2	160	Weld	CS, ASTM A105, MSS SP-97	L56LA1H
90 ELL		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105, ASME B16.11	L30VBDB
45 ELL		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105, ASME B16.11	L30VBDA
Tee	03	3/4 – 1-1/2	Class 6000	THRD	CS, ASTM A105, ASME B16.11	L31VBA
Tee		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105, ASME B16.11	L31VBD
Tee (RED)		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105, ASME B16.11	L31VBDD
Plug	03	3/4 – 1-1/2		THRD	CS, ASTM A105, round head, ASME B16.11	L370ABW
Plug		3/4 – 1-1/2		PE	CS, ASTM A105, round head, ASME B16.11	L370AEW
Coupling		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105, ASME B16.11	L34VBDH
Cap		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105, ASME B16.11	L37VBDX
Reducer (CONC)		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55NA1DA
Reducer (ECC)		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55NA1DB
Weldolet	05	2 – 2	XS/80	Weld	CS, ASTM A105, MSS SP-97	L56NA1H
90 LR ELL		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50NA1BC
45 LR ELL		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50NA1AC
Tee		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51NA1
Tee (RED)	99	2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51NA1D
Cap		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L57NA1R
Reducer (CONC)		3 – 24	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55MA1DA
Reducer (ECC)		3 – 24	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55MA1DB
Weldolet	05	3 – 8	STD	Weld	CS, ASTM A105, MSS SP-97	L56MA1H
90 LR ELL		3 – 24	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50MA1BC
45 LR ELL		3 – 24	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50MA1AC
Tee		3 – 24	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51MA1
Tee (RED)	99	3 – 24	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51MA1D
Cap		3 – 24	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L57MA1R
VALVES						
Gate	15	3/4 – 1-1/2	Class 150	RF	CS body, API #8 trim, RP, BB	L20BA3HD
Gate		1/2 – 1/2	Class 800	MSW/FSW	CS body, API #8 trim, RP, BB, EXTD BDY	L20KAXHDM
Gate	02	3/4 – 1-1/2	Class 800	MSW/FNPT	CS body, API #8 trim, RP, BB, EXTD BDY	L20KAYHDM
Gate		3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, RP, BB	L20KA1HD
Gate	325	3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, FP, BB	L20KA1DD

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ITEM	NOTES	NPS	SCH/RAT	ENDS	DESCRIPTION	ITEM CODE
VALVES						
Gate	06	3/4 – 1-1/2	Class 800	T/SW	CS body, API #8 trim, BB	L20KA7HD
Gate	309	3/4 – 1-1/2	Class 800	T/SW	CS body, API #8 trim, RP, BELLOW SEAL, WB	L20KA7MDL
Gate	309	3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, RP, BELLOW SEAL, WB	L20KA1MDL
Gate		2 - 8	Class 150	RF	CS body, API #8 trim, FP, BB	L20BA3DD
Gate		10 – 24	Class 150	RF	CS body, API #8 trim, FP, BB, GO	L20BA3DDF
Globe	307	3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, BB	L21KA1DE
Globe	309, 307	3/4 – 1-1/2	Class 800	THRD	CS body, API #8 trim, BELLOW SEAL, WB	L21KA0JEL
Globe	309, 307	3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, BELLOW SEAL, WB	L21KA1JEL
Globe	307	2 - 3	Class 150	RF	CS body, API #8 trim, BB	L21BA3DE
Globe	307	4 - 8	Class 150	RF	CS body, API #8 trim, BB, GO	L21BA3DEB
Check	61,328	3/4 – 1-1/2	Class 800	SW	CS body, API #8 trim, Piston, BC, HORIZ.	L22KA1TEF
Check	62,328	2 – 24	Class 150	RF	CS body, API #8 trim, BC, Swing	L22BA3PE
Check	62,328	6 – 24	Class 150	RF	CS body, API #8 trim, Dual Plate	L22BA3LEH
Ball	26, 101	2 – 12	Class 150	RF	CS, (A216-WCB) T3 MOD, RP, ORBIT	L25BB3FB
Ball	101, 327	2 – 6	Class 150	RF	CS body, 316 SS trim, RP, TFE seat, FS	L25BA3CE
Ball	101, 327	2– 24	Class 150	RF	CS body, 316 SS trim, RP, TFE seat, FS, GO	L25BA3CEM
Butterfly	101	2 – 24	Class 150	RF	CS body, 316 SS trim, Flg, Triple Offset GO	L26BA3TJM
FLANGES	02, 104					
Socket Weld		3/4 – 1-1/2	Class 150	SW	CS, ASTM A105, ASME B16.5, 160 Bore	L40BA3BL
Blind		3/4 – 24	Class 150	RF	CS, ASTM A105, ASME B16.5	L43BA3
Blind Spectacle		3/4 – 18	Class 150	RF	CS, ASTM A516-70, ASME B16.48	L45BA3E
Spacer Ring		20 – 24	Class 150	RF	CS, ASTM A516-70, ASME B16.48	L45BA3F
Blind Plate		20 – 24	Class 150	RF	CS, ASTM A516-70, ASME B16.48	L45BA3G
Weld Neck		2 – 2	Class 150	RF	CS, ASTM A105, ASME B16.5, XS/80 Bore	L40BA3DN
Weld Neck	12	2 – 2	Class 300	RF	CS, ASTM A105, ASME B16.5, XS/80 Bore	L40FA3DN
Weld Neck		3 – 24	Class 150	RF	CS, ASTM A105, ASME B16.5, STD Bore	L40BA3DM
Weld Neck	12	3 – 24	Class 300	RF	CS, ASTM A105, ASME B16.5, STD Bore	L40FA3DM
Pair WN Orifice		2 – 2	Class 300	RF	CS, ASTM A105, ASME B16.36, NPS ½ SW taps, XS/80 Bore	L42FA3DNL
Pair WN Orifice	17	3 – 18	Class 300	RF	CS, ASTM A105, ASME B16.36, NPS ½ SW taps, STD Bore	L42FA3DML
GASKETS						
		3/4 – 24	Class 150		Spiral wound type 316L SS w/ flexible Inhibited Graphite filler, ASME B16.20, w/inner ring.	L61BF1CAC
	301	3/4 – 24	Class 150		KAM style, 316LSS w/APX-2 Graphite, EXH-SU-5151	L61BF1ZA
	12	3/4 – 24	Class 300		Spiral wound type 316L SS w/ flexible Inhibited Graphite filler, ASME B16.20, w/inner ring.	L61FF1CAC
	12, 301	3/4 – 24	Class 300		KAM style, 316LSS w/APX-2 Graphite, EXH-SU-5151	L61FF1ZA
BOLTING						
Stud Bolts		3/4 – 24			ASTM A193, Gr B7 stud w/ 2 heavy hex nuts ASTM A194, Gr 2H	L620BM

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90° BRANCH CONNECTION, Legend and Chart

BRANCH	24	20	18	16	14	12	10	8	6	4	3	2	1-1/2	1	3/4	1/2
24	T															
20	E	T														
18	E	E	T													
16	E	E	E	T												
14	E	E	E	E	T											
12	E	E	E	E	E	T										
10	E	E	E	E	E	E	T									
8	W	E	E	E	E	E	E	T								
6	W	W	W	E	E	E	E	E	T							
4	W	W	W	W	W	W	E	E	E	T						
3	W	W	W	W	W	W	W	E	E	E	T					
2	W	W	W	W	W	W	W	W	W	E	E	T				
1-1/2	S	S	S	S	S	S	S	S	S	S	S	S	T			
1	S	S	S	S	S	S	S	S	S	S	S	S	E	T		
3/4	S	S	S	S	S	S	S	S	S	S	S	S	E	E	T	
1/2	S	S	S	S	S	S	S	S	S	S	S	S	E	E	E	T

HEADER SIZE

E Reducing Tee
P Branch Weld w/ Reinforcing Pad (Pad thickness equals run pipe thickness. Pad width equals 1/2 branch OD.)
T Equal Tee
S Sockolet
W Weldolet (Note 05)

NOTES:

01 WHERE PIPE SCHEDULE IS SHOWN UNDER "SCH/RAT," IT IS ADEQUATE FOR THE FULL FLANGE RATING. WHERE "CALC" IS SHOWN, THE PRESSURE LIMIT MAY BE LOWER THAN FLANGE RATING.
02 ALL BUTT-WELDED COMPONENT THICKNESSES SHALL MATCH PIPE THICKNESS.
03 THREADED JOINTS ARE PERMITTED ONLY AT OUTLET OF VENT AND DRAIN VALVES, AT HYDROSTATIC CONNECTIONS, AT OUTLET OF INSTRUMENT TAKE-OFF VALVES, AND TO MATCH EQUIPMENT.
05 INTEGRALLY REINFORCED BRANCH CONNECTIONS ARE PERMITTED OUTSIDE THE SIZES SHOWN IN THE BRANCH CONNECTION TABLE. DESIGNER SHALL CHECK WELD THICKNESS OF INTEGRALLY REINFORCED BRANCH CONNECTIONS TO DETERMINE IF PWHT IS REQUIRED.
06 THESE VALVES SHALL BE USED ONLY FOR VENT, DRAIN, AND INSTRUMENT CONNECTIONS.
12 TO BE USED ONLY TO MATCH CLASS 300 RATED FLANGE CONNECTIONS AT CONTROL VALVES AND SPECIAL EQUIPMENT.
15 TO BE USED WHEN MATING TO FLANGED NOZZLES.
26 TO BE USED ONLY WHEN INDICATED ON P&ID.
61 INSTALL IN HORIZONTAL POSITION WITH COVER UP.
62 INSTALL IN HORIZONTAL POSITION WITH COVER UP OR IN VERTICAL POSITION WITH UPWARD FLOW.
301 FOR USE IN VOC REGULATED SERVICES; IN FLANGES WITH SLIGHTLY DAMAGED GASKET SEATING FACES; OR IN FLANGES WITH A HISTORY OF LEAKING.
307 LIMITED TO THROTTLING SERVICES UP TO 150 PSI DIFFERENTIAL PRESSURE. FOR SERVICE APPLICATIONS WITH DIFFERENTIAL PRESSURES GREATER THAN 150 PSI, CONSULT WITH THE VALVE MANUFACTURER AND CHEVRON PIPING & VALVE SME FOR SUITABILITY.
325 USE FULL PORT VALVES IN LOCATIONS REQUIRING FULL OPENINGS SUCH AS UPSTREAM AND DOWNSTREAM OF RELIEF VALVES OR IN HORIZONTAL LINES CONTAINING HAZARDOUS LIQUIDS.
327 LIMITED TO PROCESS TEMPERATURES UP TO 250°F (121°C)
328 SIZING AND LOCATION OF CHECK VALVES IS CRITICAL FOR RELIABLE OPERATION. SEE SECTION 6.0 (25) IN THE GENERAL SPECIFICATION FOR MORE INFORMATION.
17 USE WELD NECK FLANGES AND THROAT TAPS NPS 20" AND LARGER
67 USE RESTRICTED TO ORIFICE FLANGE TAP CONNECTIONS. THREADED NIPPLES TO BE SEAL WELDED. NIPPLE LENGTHS SHALL BE IN ACCORDANCE WITH STANDARD DRAWING D-601407.
92 USE RESTRICTED TO THERMOWELL ASSEMBLY ONLY
94 USE RESTRICTED TO DRAINS, OPERATIONAL VENTS, AND INSTRUMENT CONNECTIONS.
101 TO BE USED WHERE TIGHT SHUT-OFF IS REQUIRED.
104 USE CLASS 300 FLANGES WHEN MATING TO CONTROL VALVES AND EQUIPMENTS
309 USE BELLOW SEAL GATE VALVES FOR ALL IN-KIND PEPLACEMENT ONLY. INSTALL NEW BELLOW SEALVALVES WHEN REQUIRED BY PROJECT FOR PERMIT PURPOSES.

SERVICE:

- General Services (Corrosive)
- Hydrocarbon Gas, Vapor & Liquid
- Hydrocarbons Gas, Vapor & Liquid with Trace H2S
- LPG and LPG with Trace H2S (USE TO MATCH TO EXISTING PIPING; CLASS 300 RECOMMENDED FOR NEW SYSTEMS)
- LPG/HC Mixture with Trace H2S (USE TO MATCH TO EXISTING PIPING; CLASS 300 RECOMMENDED FOR NEW SYSTEMS)

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SERVICE:	Process	MATERIAL:	5 CR - 1/2 MO
RATING CLASS:	300 RF, ASME B16.5-2009	DESIGN CODE:	ASME B31.3-2008
TEMPERATURE LIMIT:	-20F to 800F	STRESS RELIEF:	YES
NOMINAL CORROSION ALLOWANCE:	0.063 in. (0.05 in. MIN)	EXAMINATION:	25% RT, PT & Visual
VALVE TRIM:	API #8 (13CR & HF)		

PRESSURE - TEMPERATURE RATINGS				NOTE: HYDROTEST @ AMBIENT = 1125 psig				
TEMP F	-20 to 100	200	300	400	500	600	700	800
psig	750	750	730	705	665	605	570	510
TEMP C	-29 to 38	93	149	204	260	316	371	427
kPag	5175	5170	5035	4860	4585	4175	3930	3515

For NPS 3/4 through NPS 24 (Full flange ratings per ASME B16.5, Table 2-1.13.)

ITEM	NOTES	NPS	SCH/RAT	ENDS	DESCRIPTION	ITEM CODE
PIPE	01, 19					
		3/4 – 1-1/2	XS/80	PE	5 CR - 1/2 MO, SMLS, ASTM A335-P5	L11NT1
		2 – 2	XS/80	BE	5 CR - 1/2 MO, SMLS, ASTM A335-P5	L11NT2
		3 – 12	STD	BE	5 CR - 1/2 MO, SMLS, ASTM A335-P5	L11MT2
		14 – 24	40	BE	5 CR - 1/2 MO, SMLS, ASTM A335-P5	L11ET2
NIPPLES	03, 19					
Branch		3/4 – 1-1/2	XS/80	PE	5 CR - 1/2 MO, SMLS, ASTM A335-P5	L34NTEJ
Branch		3/4 – 1-1/2	160	TOE-POE	5 CR - 1/2 MO, SMLS, ASTM A335-P5	L34LTHJ
Swage (CONC)		3/4 – 1-1/2	XS/80	BBE	5 CR - 1/2 MO, ASTM A234-WP5-S, MSS SP-95	L55NT1VA
Swage CONC)		3/4 – 1-1/2	XXS	BLE-TSE	5 CR - 1/2 MO, ASTM A234-WP5-S, MSS SP-95	L35PTMQ
FITTINGS	02					
Sockolet		3/4 – 1-1/2	Class 3000	SW	5 CR - 1/2 MO, ASTM A182-F5, MSS SP-97	L36STDT
Thredolet	03	3/4 – 1-1/2	Class 3000	THRD	5 CR - 1/2 MO, ASTM A182-F5, MSS SP-97	L36STAT
SW Elbolet		3/4 – 1-1/2	Class 3000	SW	5 CR - 1/2 MO, ASTM A182-F5, ASME B16.11	L36STDU
Latrolet	92	3/4 – 1-1/2	XS/80	Weld	5 CR - 1/2 MO, ASTM A182-F5	L56NT1K
Weldolet	05	3/4 – 1-1/2	XS/80	Weld	5 CR - 1/2 MO, ASTM A182-F5, MSS SP-97	L56NT1H
90 ELL		3/4 – 1-1/2	Class 3000	SW	5 CR - 1/2 MO, ASTM A182-F5, ASME B16.11	L30STDB
45 ELL		3/4 – 1-1/2	Class 3000	SW	5 CR - 1/2 MO, ASTM A182-F5, ASME B16.11	L30STDA
Tee		3/4 – 1-1/2	Class 3000	SW	5 CR - 1/2 MO, ASTM A182-F5, ASME B16.11	L31STD
Tee (RED)		3/4 – 1-1/2	Class 3000	SW	5 CR - 1/2 MO, ASTM A182-F5, ASME B16.11	L31STDD
Plug	03	3/4 – 1-1/2		THRD	5 CR - 1/2 MO, ASTM A182-F5, rd. hd., ASME B16.11	L370TBW
Plug		3/4 – 1-1/2		PE	5 CR - 1/2 MO, ASTM A182-F5, rd. hd., ASME B16.11	L370TEW
Coupling		3/4 – 1-1/2	Class 3000	SW	5 CR - 1/2 MO, ASTM A182-F5, ASME B16.11	L34STDH
Cap		3/4 – 1-1/2	Class 3000	SW	5 CR - 1/2 MO, ASTM A182-F5, ASME B16.11	L37STDX
Reducer (CONC)		2 – 2	XS/80	Weld	5 CR - 1/2 MO, ASTM A234-WP5-S, ASME B16.9	L55NT1DA
Reducer (ECC)		2 – 2	XS/80	Weld	5 CR - 1/2 MO, ASTM A234-WP5-S, ASME B16.9	L55NT1DB
Weldolet	05	2 – 2	XS/80	Weld	5 CR - 1/2 MO, ASTM A182-F5, MSS SP-97	L56NT1H
90 LR ELL		2 – 2	XS/80	Weld	5 CR - 1/2 MO, ASTM A234-WP5-S, ASME B16.9	L50NT1BC
45 LR ELL		2 – 2	XS/80	Weld	5 CR - 1/2 MO, ASTM A234-WP5-S, ASME B16.9	L50NT1AC
Tee		2 – 2	XS/80	Weld	5 CR - 1/2 MO, ASTM A234-WP5-S, ASME B16.9	L51NT1
Tee (RED)		2 – 2	XS/80	Weld	5 CR - 1/2 MO, ASTM A234-WP5-S, ASME B16.9	L51NT1D
Cap		2 – 2	XS/80	Weld	5 CR - 1/2 MO, ASTM A234-WP5-S, ASME B16.9	L57NT1R
Reducer (CONC)		3 – 12	STD	Weld	5 CR - 1/2 MO, ASTM A234-WP5-S, ASME B16.9	L55MT1DA
Reducer (ECC)		3 – 12	STD	Weld	5 CR - 1/2 MO, ASTM A234-WP5-S, ASME B16.9	L55MT1DB
Weldolet	05	3 – 8	STD	Weld	5 CR - 1/2 MO, ASTM A182-F5, MSS SP-97	L56MT1H
90 LR ELL		3 – 12	STD	Weld	5 CR - 1/2 MO, ASTM A234-WP5-S, ASME B16.9	L50MT1BC
45 LR ELL		3 – 12	STD	Weld	5 CR - 1/2 MO, ASTM A234-WP5-S, ASME B16.9	L50MT1AC
Tee		3 – 12	STD	Weld	5 CR - 1/2 MO, ASTM A234-WP5-S, ASME B16.9	L51MT1
Tee (RED)		3 – 12	STD	Weld	5 CR - 1/2 MO, ASTM A234-WP5-S, ASME B16.9	L51MT1D
Cap		3 – 12	STD	Weld	5 CR - 1/2 MO, ASTM A234-WP5-S, ASME B16.9	L57MT1R
Reducer (CONC)		14 – 24	40	Weld	5 CR - 1/2 MO, ASTM A234-WP5-S, ASME B16.9	L55ET1DA
Reducer (ECC)		14 – 24	40	Weld	5 CR - 1/2 MO, ASTM A234-WP5-S, ASME B16.9	L55ET1DB
90 LR ELL		14 – 24	40	Weld	5 CR - 1/2 MO, ASTM A234-WP5-S, ASME B16.9	L50ET1BC
45 LR ELL		14 – 24	40	Weld	5 CR - 1/2 MO, ASTM A234-WP5-S, ASME B16.9	L50ET1AC
Tee		14 – 24	40	Weld	5 CR - 1/2 MO, ASTM A234-WP5-S, ASME B16.9	L51ET1
Tee (RED)		14 – 24	40	Weld	5 CR - 1/2 MO, ASTM A234-WP5-S, ASME B16.9	L51ET1D
Cap		14 – 24	40	Weld	5 CR - 1/2 MO, ASTM A234-WP5-S, ASME B16.9	L57ET1R

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ITEM	NOTES	NPS	SCH/RAT	ENDS	DESCRIPTION	ITEM CODE
VALVES						
Gate	15	3/4 – 1-1/2	Class 300	RF	5 CR - 1/2 MO body API #8 trim, RP, BB	L20FT3HD
Gate		3/4 – 1-1/2	Class 800	SW	5 CR - 1/2 MO body API #8 trim, RP, BB	L20KT1HD
Gate	325	3/4 – 1-1/2	Class 800	SW	5 CR - 1/2 MO body API #8 trim, FP, BB	L20KT1DD
Gate	06	3/4 – 1-1/2	Class 800	T/SW	5 CR - 1/2 MO body API #8 trim, RP, BB	L20KT7HD
Gate		2 – 6	Class 300	RF	5 CR - 1/2 MO body API #8 trim, BB	L20FT3DD
Gate		8 – 24	Class 300	RF	5 CR - 1/2 MO body API #8 trim, BB, GO	L20FT3DDF
Globe	307	3/4 – 1-1/2	Class 800	SW	5 CR - 1/2 MO body API #8 trim, BB	L21KT1DE
Globe	307	2 – 2	Class 300	RF	5 CR - 1/2 MO body API #8 trim, BB	L21FT3DE
Globe	307	3 – 8	Class 300	RF	5 CR - 1/2 MO body API #8 trim, BB, GO	L21FT3DEB
Check	61,328	3/4 – 1-1/2	Class 800	SW	5 CR - 1/2 MO body API #8 trim, piston	L22KT1TEF
Check	62,328	2 – 24	Class 300	RF	5 CR - 1/2 MO body API #8 trim, Swing	L22FT3PE
FLANGES	02					
Socket Weld		3/4 – 1-1/2	Class 300	RF	5 CR - 1/2 MO, ASTM A182-F5, ASME B16.5, Sch 80	L40FT3BN
Blind		3/4 – 24	Class 300	RF	5 CR - 1/2 MO, ASTM A182-F5, ASME B16.5	L43FT3
Blind Spectacle		3/4 – 14	Class 300	RF	5 CR - 1/2 MO, ASTM A387-5 CL2, B16.48	L45FT3E
Spacer Ring		16 – 24	Class 300	RF	5 CR - 1/2 MO, ASTM A387-5 CL2, B16.48	L45FT3FZ
Blind Plate		16 – 24	Class 300	RF	5 CR - 1/2 MO, ASTM A387-5 CL2, B16.48	L45FT3GZ
Weld Neck		2 – 2	Class 300	RF	5 CR - 1/2 MO, ASTM A182-F5, ASME B16.5, XS/80 BORE	L40FT3DN
Weld Neck		3 – 12	Class 300	RF	5 CR - 1/2 MO, ASTM A182-F5, ASME B16.5, STD BORE	L40FT3DM
Weld Neck		14 – 24	Class 300	RF	5 CR - 1/2 MO, ASTM A182-F5, ASME B16.5, 40 BORE	L40FT3DE
Pair WN Orifice		1 – 2	Class 300	RF	5 CR - 1/2 MO, ASTM A182-F5, ASME B16.36, SW 1/2 taps, XS/80 Bore	L42FT3DNL
Pair WN Orifice		3 – 12	Class 300	RF	5 CR - 1/2 MO, ASTM A182-F5, ASME B16.36, SW 1/2 taps, STD Bore	L42FT3DML
Pair WN Orifice	17	14 – 18	Class 300	RF	5 CR - 1/2 MO, ASTM A182-F5, ASME B16.36, SW 1/2 taps, 40 Bore	L42FT3DEL
GASKETS						
		3/4 – 24	Class 300		Spiral wound type 316L SS w/flexible Inhibited Graphite filler, ASME B16.20, W/inner and outer ring	L61FF1CAC
	301	3/4 – 24	Class 300		KAM style, 316LSS w/APX-2 Graphite, EXH-SU-5151	L61FF1ZA
BOLTING						
Stud Bolts	310	3/4 – 24			ASTM A193, B7 stud w/ 2 heavy hex nuts ASTM A194, GR 2H	L620BM
Stud Bolts	311	3/4 – 24			ASTM A193, B16 stud w/ 2 heavy hex nuts ASTM A194, GR 7	L620CM

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90° BRANCH CONNECTION, Legend and Chart

BRANCH	24	20	18	16	14	12	10	8	6	4	3	2	1-1/2	1	3/4	1/2
24	T															
20	E	T														
18	E	E	T													
16	E	E	E	T												
14	E	E	E	E	T											
12	E	E	E	E	E	T										
10	E	E	E	E	E	E	T									
8	W	E	E	E	E	E	E	T								
6	W	W	W	E	E	E	E	E	T							
4	W	W	W	W	W	W	E	E	E	T						
3	W	W	W	W	W	W	W	E	E	E	T					
2	W	W	W	W	W	W	W	W	W	E	E	T				
1-1/2	S	S	S	S	S	S	S	S	S	S	S	S	T			
1	S	S	S	S	S	S	S	S	S	S	S	S	E	T		
3/4	S	S	S	S	S	S	S	S	S	S	S	S	E	E	T	
1/2	S	S	S	S	S	S	S	S	S	S	S	S	E	E	E	T

HEADER SIZE

E Reducing Tee
P Branch Weld w/ Reinforcing Pad (Pad thickness equals run pipe thickness. Pad width equals 1/2 branch OD.)
T Equal Tee
S Sockolet
W Weldolet (Note 05)

NOTES:

01 Where pipe schedule is shown under "SCH/RAT", it is adequate for full flange rating. Where "Calc." is shown, the pressure limit may be lower than flange ratings.
02 All buttwelded component thicknesses shall match pipe thicknesses.
03 Threaded joints are permitted only at outlet of vent and drain valves, at hydrostatic connections, at outlet of instrument take-off valves, and to match the equipment.
05 Integrally reinforced branch connections are permitted outside the sizes shown in the branch connection tables. Weld thickness of integrally reinforced branch connections shall be checked to determine if PWHT is required.
06 These valves shall be used only for vent, drain and instrument connections.
15 To be used when mating flanged valves to flanged nozzles.
19 Sch 160 pipe and pipe nipples shall be used for threaded connections for sizes NPS 1/2 – 1-1/2.
61 Install in horizontal position with cover up.
62 Install in horizontal position with cover up or in vertical position with upward flow.
301 For use in VOC regulated services; in flanges with slightly damaged gasket seating faces; or in flanges with a history of leaking.
307 Limited to throttling services up to 150 psi differential pressure. For service applications with differential pressures greater than 150 psi, consult with the valve manufacturer and Chevron Piping and Valve SME for suitability.
310 ASME A193/SA193 Gr. B7 stud bolting is limited to process service temperatures not greater than 700°F to avoid thermal fatigue cracking.
311 ASME A193/SA193 Gr. B16 stud bolting should be used in all process services with temperatures greater than 700°F. Flanges should not be insulated at process service temperatures above 850°F to avoid thermal fatigue cracking. At temperatures greater than 850°F, weather shields over flanges are acceptable.
325 USE FULL PORT VALVES IN LOCATIONS REQUIRING FULL OPENINGS SUCH AS UPSTREAM AND DOWNSTREAM OF RELIEF VALVES OR IN HORIZONTAL LINES CONTAINING HAZARDOUS LIQUIDS.
328 SIZING AND LOCATION OF CHECK VALVES IS CRITICAL FOR RELIABLE OPERATION. SEE SECTION 6.0 (25) IN THE GENERAL SPECIFICATION FOR MORE INFORMATION.
17 Use Weld Neck Flanges and Throat Taps 20 Inches and Larger.
92 Use Restricted to Thermowell Assemblies Only.

SERVICE:

- Sulfides, HC
- Hydrocarbons
- Sulfide (Corrosive)

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		LIMITED BY:	Flanges
SERVICE:	Process (NACE)	MATERIAL:	Carbon Steel
RATING CLASS:	150 RF, ASME B16.5-2009	DESIGN CODE:	ASME B31.3-2008
TEMPERATURE LIMIT:	-20F to 450F	STRESS RELIEF:	NONE
NOMINAL CORROSION ALLOWANCE:	0.125 in. (0.092 in. MIN)	EXAMINATION:	5% RT, PT & Visual
VALVE TRIM:	API Trim #12 (316SS & HF)		

PRESSURE - TEMPERATURE RATINGS			NOTE: HYDROTEST @ AMBIENT = 450 psig		
TEMP F	-20 to 100	200	300	400	450
psig	285	260	230	200	185
TEMP C	-29 to 38	93	149	204	232
kPag	1965	1795	1585	1380	1275

For NPS 3/4 through NPS 30 (Full flange ratings per ASME B16.5 and ASME B16.47, Tables 2-1.1.)

ITEM		NOTES	NPS	SCH/RAT	ENDS	DESCRIPTION	ITEM CODE
PIPE			3/4 – 1-1/2	160	PE	CS, SMLS, ASTM A106-B	L11LA1B
			2 – 2	XS/80	BE	CS, SMLS , ASTM A106-B	L11NA2A
			3 – 24	STD	BE	CS, SMLS , ASTM A106-B	L11MA2A
			26 – 28	STD	BE	CS, SMLS/DSAW, API-5L PSL2 (Ej=.95)	L14MA2A
			30 – 42	XS	BE	CS, SMLS/DSAW, API-5L PSL2 (Ej=.95)	L14NA2A
NIPPLES	Branch		3/4 – 1-1/2	160	PE	CS, SMLS , ASTM A106-B	L34LAEJ
	Branch		3/4 – 1-1/2	XXS	TOE-POE	CS, SMLS , ASTM A106-B	L34PAHJ
	Swage (CONC)		3/4 – 1-1/2	160	BBE	CS, ASTM A234-WPB-S, MSS SP-95	L55LA1VA
	Swage (CONC)		3/4 – 1-1/2	XXS	BLE-TSE	CS, ASTM A234-WPB-S, MSS SP-95	L35PBMQ
FITTINGS	Sockolet		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105, MSS SP-97	L36VBDT
	Thredolet	03	3/4 – 1-1/2	Class 6000	THRD	CS, ASTM A105, MSS SP-97	L36VBAT
	SW Elbolet		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105	L36VBDU
	Latrolet	92	3/4 – 1-1/2	160	Weld	CS, ASTM A105	L56LA1K
	Weldolet	05	3/4 – 1-1/2	160	Weld	CS, ASTM A105, MSS SP-97	L56LA1H
	90 ELL		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105, ASME B16.11	L30VBDB
	45 ELL		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105, ASME B16.11	L30VBDA
	Tee	03	3/4 – 1-1/2	Class 6000	THRD	CS, ASTM A105, ASME B16.11	L31VBA
	Tee		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105, ASME B16.11	L31VBD
	Tee (RED)		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105, ASME B16.11	L31VBDD
	Plug	03	3/4 – 1-1/2		THRD	CS, ASTM A105, round head, ASME B16.11	L370ABW
	Plug		3/4 – 1-1/2		PE	CS, ASTM A105, round head, ASME B16.11	L370AEW
	Coupling		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105, ASME B16.11	L34VBDH
	Cap		3/4 – 1-1/2	Class 6000	SW	CS, ASTM A105, ASME B16.11	L37VBDX
	Reducer (CONC)		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55NA1DA
	Reducer (ECC)		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55NA1DB
	Weldolet	05	2 – 2	XS/80	Weld	CS, ASTM A105, MSS SP-97	L56NA1H
	90 LR ELL		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50NA1BC
	45 LR ELL		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50NA1AC
	Tee		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51NA1
	Tee (RED)	99	2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51NA1D
	Cap		2 – 2	XS/80	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L57NA1R
	Reducer (CONC)		3 – 28	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55MA1DA
	Reducer (ECC)		3 – 28	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55MA1DB
	Weldolet	05	3 – 8	STD	Weld	CS, ASTM A105, MSS SP-97	L56MA1H
	90 LR ELL		3 – 28	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50MA1BC
	45 LR ELL		3 – 28	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50MA1AC
	Tee		3 – 28	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51MA1
	Tee (RED)	99	3 – 28	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51MA1D
	Cap		3 – 28	STD	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L57MA1R
	Reducer (CONC)		30 – 42	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55NA1DA
	Reducer (ECC)		30 – 42	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L55NA1DB
	90 LR ELL		30 – 42	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50NA1BC
	45 LR ELL		30 – 42	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L50NA1AC
	Tee		30 – 42	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51NA1
	Tee (RED)	99	30 – 42	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L51NA1D
	Cap		30 – 42	XS	Weld	CS, ASTM A234-WPB-S, ASME B16.9	L57NA1R

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ITEM	NOTES	NPS	SCH/RAT	ENDS	DESCRIPTION	ITEM CODE
VALVES						
Gate	15	3/4 – 1-1/2	Class 150	RF	CS body, API #12 trim, RP, BB, NACE	L20BA3HT9
Gate		1/2 – 1/2	Class 800	MSW/FSW	CS body, API #12 trim, RP, BB, EXTD BDY, NACE	L20KAXHTM9
Gate	02	3/4 – 1-1/2	Class 800	MSW/FNPT	CS body, API #12 trim, RP, BB, EXTD BDY, NACE	L20KAYHTM9
Gate		3/4 – 1-1/2	Class 800	SW	CS body, API #12 trim, RP, BB, NACE	L20KA1HT9
Gate	325	3/4 – 1-1/2	Class 800	SW	CS body, API #12 trim, FP, BB, NACE	L20KA1DT9
Gate	06	3/4 – 1-1/2	Class 800	T/SW	CS body, API #12 trim, RP, BB, NACE	L20KA7HT9
Gate	309	3/4 – 1-1/2	Class 800	T/SW	CS body, API #12 trim,RP,BELLOW SL,WB, NACE	L20KA7MTL9
Gate	309	3/4 – 1-1/2	Class 800	SW	CS body, API #12 trim,RP,BELLOW SL,WB, NACE	L20KA1MTL9
Gate		2 - 8	Class 150	RF	CS body, API #12 trim, BB, FP, NACE	L20BA3CT9
Gate		10 – 24	Class 150	RF	CS body, API #12 trim, BB, FP, GO, NACE	L20BA3CTF9
Knife Gate	329	14 – 24	Class 150	RF	CS body, 316SS trim, Aflas Seals, GO, NACE	L20BA3UTF9
Knife Gate	329	26 – 42	Class 150	RF	CS body, 316SS trim, Aflas,B16.47"B",GO, NACE	L20BA3UTFZ9
Globe	307	3/4 – 1-1/2	Class 800	SW	CS body, API #12 trim, BB, NACE	L21KA1DT9
Globe	309, 307	3/4 – 1-1/2	Class 800	THRD	CS body, API #12 trim, BELLOW SEAL,WB, NACE	L21KAOJTL9
Globe	309, 307	3/4 – 1-1/2	Class 800	SW	CS body, API #12 trim, BELLOW SEAL,WB, NACE	L21KA1JTL9
Globe	307	2 - 3	Class 150	RF	CS body, API #12 trim, BB, NACE	L21BA3DT9
Globe	307	4 - 8	Class 150	RF	CS body, API #12 trim, BB, GO, NACE	L21BA3DTB9
Check	61, 328	3/4 – 1-1/2	Class 800	SW	CS body, API #12 trim, Piston, BC, HORIZ.	L22KA1TTF9
Check	62, 328	2 – 24	Class 150	RF	CS body, API #12 trim, BC, Swing, NACE	L22BA3PT9
Ball	26, 101	2 – 12	Class 150	RF	CS, (A216-WCB) T7 MOD, RP, ORBIT, NACE	L25BB3FF9
Butterfly	101	2 – 24	Class 150	RF	CS body, 316 SS trim, Flg, Triple Offset GO, NACE	L26BA3TJM9
FLANGES	02, 104					
Socket Weld		3/4 – 1-1/2	Class 150	RF	CS, ASTM A105, ASME B16.5, 160	L40BA3BL
Socket Weld	12	3/4 – 1-1/2	Class 300	RF	CS, ASTM A105, ASME B16.5, 160	L40FA3BL
Blind		3/4 – 24	Class 150	RF	CS, ASTM A105, ASME B16.5	L43BA3
Blind Spectacle		3/4 – 18	Class 150	RF	CS, ASTM A516-70, ASME B16.48	L45BA3E
Spacer Ring		20 – 24	Class 150	RF	CS, ASTM A516-70, ASME B16.48	L45BA3F
Blind Plate		20 – 24	Class 150	RF	CS, ASTM A516-70, ASME B16.48	L45BA3G
Weld Neck		2 – 2	Class 150	RF	CS, ASTM A105, ASME B16.5, XS/80 Bore	L40BA3DN
Weld Neck	12	2 – 2	Class 300	RF	CS, ASTM A105, ASME B16.5, XS/80 Bore	L40FA3DN
Weld Neck		3 – 24	Class 150	RF	CS, ASTM A105, ASME B16.5, STD Bore	L40BA3DM
Weld Neck	12	3 – 24	Class 300	RF	CS, ASTM A105, ASME B16.5, STD Bore	L40FA3DM
Weld Neck	203	26 - 28	Class 150	RF	CS, ASTM A105, ASME B16.47"B", STD Bore	L48BA3DM
Weld Neck	203	30 - 42	Class 150	RF	CS, ASTM A105, ASME B16.47"B", XS Bore	L48BA3DN
Pair WN Orifice		1 – 1-1/2	Class 300	RF	CS, ASTM A105, ASME B16.36, NPS ½ SW taps, 160 Bore	L42FA3DLL
Pair WN Orifice		2 – 2	Class 300	RF	CS, ASTM A105, ASME B16.36, NPS ½ SW taps, 80/XS Bore	L42FA3DNL
Pair WN Orifice	17	3 – 18	Class 300	RF	CS, ASTM A105, ASME B16.36, NPS ½ SW taps, Std Bore	L42FA3DML
GASKETS						
		3/4 – 24	Class 150		Spiral wound type 316L SS w/ flexible Inhibited Graphite filler, ASME B16.20, w/inner ring.	L61BF1CAC
	301	3/4 – 24	Class 150		KAM style, 316L SS w/APX-2 Graphite, EXH-SU-5151	L61BF1ZA
	12	3/4 – 24	Class 300		Spiral wound type 316L SS w/ flexible Inhibited Graphite filler, ASME B16.20, w/inner ring.	L61FF1CAC
	12, 301	3/4 – 24	Class 300		KAM style, 316L SS w/APX-2 Graphite, EXH-SU-5151	L61FF1ZA
	203	28 - 42	Class 150		Spiral wound type 316L SS w/ flexible Inhibited Graphite filler, ASME B16.20, w/inner ring.	L61BF1CAC
BOLTING						
Stud Bolts		3/4 – 42			ASTM A193, Gr B7 stud w/ 2 heavy hex nuts ASTM A194, Gr 2H	L620BM

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90° BRANCH CONNECTION, Legend and Chart

BRANCH \ HEADER SIZE	42	38	36	34	32	30	28	24	20	18	16	14	12	10	8	6	4	3	2	1-1/2	1	3/4
42	T																					
38	E	T																				
36	E	E	T																			
34	E	E	E	T																		
32	E	E	E	E	T																	
30	E	E	E	E	E	T																
28	E	E	E	E	E	E	T															
24	E	E	E	E	E	E	E	T														
20	E	E	E	E	E	E	E	E	T													
18	P	E	E	E	E	E	E	E	E	T												
16	P	P	E	E	E	E	E	E	E	E	T											
14	P	P	P	P	E	E	E	E	E	E	E	T										
12	P	P	P	P	P	P	E	E	E	E	E	E	T									
10	P	P	P	P	P	P	P	E	E	E	E	E	E	T								
8	W	W	W	W	W	W	W	W	E	E	E	E	E	E	T							
6	W	W	W	W	W	W	W	W	W	W	E	E	E	E	E	T						
4	W	W	W	W	W	W	W	W	W	W	W	W	W	E	E	E	T					
3	W	W	W	W	W	W	W	W	W	W	W	W	W	W	E	E	E	T				
2	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	E	E	T			
1-1/2	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	T		
1	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	E	T	
3/4	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	E	E	T

E Reducing Tee
P Branch Weld w/ Reinforcing Pad (Pad thickness equals run pipe thickness. Pad width equals 1/2 branch OD.)
T Equal Tee
S Sockolet
W Weldolet (Note 05)

NOTES:

03 THREADED JOINTS ARE PERMITTED ONLY AT OUTLET OF VENT AND DRAIN VALVES,AT HYDROSTATIC CONNECTIONS, AT OUTLET OF INSTRUMENT TAKE-OFF VALVES, AND TO MATCH EQUIP.
05 INTEGRALLY REINFORCED BRANCH CONNECTIONS ARE PERMITTED OUTSIDE THE SIZES SHOWN IN THE BRANCH CONNECTION TABLE. DESIGNER SHALL CHECK WELD THICKNESS OF INTEGRALLY REINFORCED BRANCH CONNECTIONS TO DETERMINE IF PWHT IS REQUIRED.
06 THESE VALVES SHALL BE USED ONLY FOR VENT, DRAIN, AND INSTRUMENT CONNECTIONS.
12 TO BE USED ONLY TO MATCH CLASS 300 RATED FLANGE CONNECTIONS AT CONTROL VALVES AND SPECIAL EQUIPMENT.
15 TO BE USED WHEN MATING TO FLANGED NOZZLES.
19 SCH 160 PIPE AND PIPE NIPPLES SHALL BE USED FOR THREADED CONNECTIONS FOR NPS 1/2 - 1-1/2.
26 TO BE USED ONLY WHEN INDICATED ON P&ID.
61 INSTALL IN HORIZONTAL POSITION WITH COVER UP.
62 INSTALL IN HORIZONTAL POSITION WITH COVER UP OR IN VERTICAL POSITION WITH UPWARD FLOW.
301 FOR USE IN VOC REGULATED SERVICES; IN FLANGES WITH SLIGHTLY DAMAGED GASKET SEATING FACES; OR IN FLANGES WITH A HISTORY OF LEAKING.
307 LIMITED TO THROTTLING SERVICES UP TO 150 PSI DIFFERENTIAL PRESSURE. FOR SERVICE APPLICATIONS WITH DIFFERENTIAL PRESSURES GREATER THAN 150 PSI, CONSULT WITH THE VALVE MANUFACTURER AND CHEVRON PIPING & VALVE SME FOR SUITABILITY.
325 USE FULL PORT VALVES IN LOCATIONS REQUIRING FULL OPENINGS SUCH AS UPSTREAM AND DOWNSTREAM OF RELIEF VALVES OR IN HORIZONTAL LINES CONTAINING HAZARDOUS LIQUIDS.
328 SIZING AND LOCATION OF CHECK VALVES IS CRITICAL FOR RELIABLE OPERATION. SEE SECTION 6.0 (25) IN THE GENERAL SPECIFICATION FOR MORE INFORMATION.
329 IN GENERAL, KNIFE GATE VALVES ARE TO BE RESTRICTED TO LARGE DIAMETER, LOW PRESSURE, LOW TEMPERATURE SERVICES SUCH AS RELIEF AND FLARE HEADERS.
17 USE WELD NECK FLANGE AND THROAT TAPS NPS 20" AND LARGER
91 USE RESTRICTED TO DRAINS, OPERATIONAL VENTS, AND INSTRUMENT ASSEMBLIES ONLY. THREADED NIPPLES TO BE SEAL WELDED. NIPPLE LENGTHS SHALL BE IN ACCORDANCE WITH STANDARD DRAWING GD-L-1057
92 USE RESTRICTED TO THERMOWELL ASSEMBLY ONLY
101 TO BE USED WHERE TIGHT SHUT-OFF IS REQUIRED.
104 USE CLASS 300 FLANGES WHEN MATING TO CONTROL VALVES AND EQUIPMENTS
309 USE BELLOW SEAL GATE VALVES FOR ALL IN-KIND PEPLACEMENT ONLY. INSTALL NEW BELLOW SEALVALVES WHEN REQUIRED BY PROJECT FOR PERMIT PURPOSES.
203 FLANGES AND GASKETS SHALL CONFORM TO ASME B16.47 SERIES B.

SERVICE:

- Hydrocarbon Gas, Vapor, Liquid w/ Moderate H2S (USE TO MATCH TO EXISTING PIPING; CLASS 300 RECOMMENDED FOR NEW SYSTEMS)
- Sour Process Gas (USE TO MATCH TO EXISTING PIPING; CLASS 300 RECOMMENDED FOR NEW SYSTEMS)
- Flare Gas w/ H2S
- Rich & Lean DEA (<100 °F)
- Sour Service (NACE) (USE TO MATCH TO EXISTING PIPING; CLASS 300 RECOMMENDED FOR NEW SYSTEMS)

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Self-Cured Inorganic Zinc | Polyamide Epoxy (High Build) | Aliphatic Polyurethane — 3.1

Surface Prep: SSPC-SP6 (NACE No. 3) Commercial blast finish.

Anchor Pattern: 1.5 - 2.5 mils

Total DFT: 9.0 mils (min)

Touch Up: Coating System (CS) 3.5. After applying the tie-coat: (Repair any damage exposing bare metal with CS 3.5. Repair any damage to the inorganic zinc primer, as necessary, with CS 3.5 to maintain specified film thickness.).

Coat, Generic Classification, DFT	Manufacturer	Product Designation	VOC (G/L)	By Max Svc Temp
PRIMER	Ameron	Dimetcote 9	491	
Self-Cured Inorganic Zinc - Solvent Reducible	Ameron	Dimetcote 9HS	323	
	Carboline	Carbozinc 11	515	
	Carboline	Carbozinc 11 HS	264	
	Devoe	Catha-Coat 304V	336	
2.0 - 3.0 mils DFT	Hempel Coatings (USA), Inc.	Galvosil 1568	320	
	Hempel Coatings (USA), Inc.	Galvosil 1578	520	
	International	Interzinc 22	490	
	International	Interzinc 22HS	340	
	Jotun Paints	Resist 78	465	
	PPG Industries	Metalhide 1001 Primer 97-673/97-674	397	
	Sherwin Williams	Zinc Clad II B69V3/B69D11	462	
	Sherwin Williams	Zinc Clad II HS B69VZ1/B69VZ3/B69D11	312	
	Sigma Coatings	SigmaZinc 158	507	
	Keep inorganic zinc silicate mixed, using agitated pot while applying.			
TIECOAT	Ameron	Amercoat 385	276	
Epoxy - Polyamide	Carboline	Carboguard 893	195	
High Build	Devoe	Devran 224HS	212	
5.0 - 7.0 mils DFT	Hempel Coatings (USA), Inc.	Hempadur 4520	400	
	Hempel Coatings (USA), Inc.	Hempadur 45880	215	
	International	Intergard 475 HS	175	
	Jotun Paints	Penguard Tiecoat 100	480	
	PPG Industries	97-148	0	
	Sherwin Williams	Macropoxy 646 B58-600 Series/B68V600	235	
	Sigma Coatings	SigmaCover 435	344	
TOPCOAT	Ameron	Amercoat 450 Series	335	
Polyurethane - Aliphatic	Carboline	Carbothane 134 HG	288	
	Devoe	Devthane 379	311	
	Hempel Coatings (USA), Inc.	5595U	312	
2.0 - 3.0 mils DFT	Hempel Coatings (USA), Inc.	Hempathane 5595	332	
	International	Interthane 990	395	
	International	Interthane 990HS	332	
	Jotun Paints	Hardtop HB	256	
	PPG Industries	95-8512	0	
	Sherwin Williams	Hi-Solids Polyurethane B65-300 SeriesB65/	289	
	Sigma Coatings	Sigmadur 500 US	320	
	Respirators are strongly recommended when applying polyurethane.			

Volatile Organic Compound (VOC) limit may vary by location. Check local standards for current VOC limits. Consult manufacturer's product data sheets for specific details about applying any coating.

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Three-Coating Systems

Epoxy Mastic | Polyamide Epoxy (High Build) | Aliphatic Polyurethane — 3.5

Surface Prep: SSPC-SP3 Power-brush finish. **Touch Up:** Use this system.

Anchor Pattern: 1.5 - 3.0 mils

Total DFT: 12.0 mils (min)

Coat, Generic Classification, DFT	Manufacturer	Product Designation	VOC (G/L)	By Max Svc Temp
PRIMER	Ameron	Amerlock 400	120	
Epoxy Mastic - Surface Tolerant	Carboline	Carboguard 890	214	
	Devoe	Devran 224HS	212	
	Hempel Coatings (USA), Inc.	Hempadur 45880	215	
5.0 - 7.0 mils DFT	International	Interseal 670 HS	240	
	Jotun Paints	Jotamastic 87	196	
	PPG Industries	97-145	128	
	Sherwin Williams	Dura-Plate 235 B67-235 Series B67/V235	272	
	Sigma Coatings	SigmaCover 630	232	
	Available in colors. May use System 3.5.1 Aluminum-Filled Epoxy Mastic (Surface-Tolerant Primer) for better performance if aluminum color is acceptable.			
TIECOAT	Ameron	Amercoat 385	276	
Epoxy - Polyamide	Carboline	Carboguard 890	214	
High Build	Devoe	Devran 224HS	212	
	Hempel Coatings (USA), Inc.	Hempadur 4520	400	
5.0 - 7.0 mils DFT	Hempel Coatings (USA), Inc.	Hempadur 45880	215	
	International	Interseal 670 HS	240	
	Jotun Paints	Penguard HB	380	
	PPG Industries	Aquapon 97-130	373	
	Sherwin Williams	Macropoxy 646 B58-600 Series/B68V600	235	
	Sigma Coatings	SigmaCover 456	347	
TOPCOAT	Ameron	Amercoat 450 Series	335	
Polyurethane - Aliphatic	Carboline	Carbothane 134 HG	288	
	Devoe	Devthane 379	311	
	Hempel Coatings (USA), Inc.	5595U	312	
2.0 - 3.0 mils DFT	Hempel Coatings (USA), Inc.	Hempathane 5595	332	
	International	Interthane 990	395	
	International	Interthane 990HS	332	
	Jotun Paints	Hardtop HB	256	
	PPG Industries	95-812	241	
	Sherwin Williams	Hi-Solids Polyurethane B65-300 SeriesB65/	289	
	Sigma Coatings	Sigmadur 500 US	320	
	Respirators are strongly recommended when applying polyurethane.			

Vendors of mechanical equipment normally have their own standard coatings and find it economically impractical to change to purchaser-specified systems such as this one. Chevron's specified system must be applied unless the vendor obtains written approval from Chevron to substitute another. The alternative is to accept the vendor's standard primer and then apply Coating System 3.7 (Manufacturer's Standard/Universal Primer/Polyamide Epoxy (High Build)/Aliphatic Polyurethane).

Volatile Organic Compound (VOC) limit may vary by location. Check local standards for current VOC limits. Consult manufacturer's product data sheets for specific details about applying any coating.

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