



Pipeline Launcher/Receiver Emission Reduction Systems

MPLX LP, a master limited partnership sponsored by Marathon Petroleum Corporation, through its subsidiaries MarkWest Liberty Midstream & Resources, L.L.C. and Ohio Gathering Company, L.L.C., (collectively "MPLX") has entered into a first-of-its-kind agreement with the U.S. Environmental Protection Agency, the Commonwealth of Pennsylvania and the U.S. Department of Justice to implement design and operating improvements at pipeline launcher and receiver stations. As a result of these enhancements, emissions from these operations are expected to be reduced by as much as 85 percent. As part of the agreement, we are sharing our proprietary designs for "pig ramps" to minimize liquid loss during pig retrieval and information on the installation of depressure systems to reduce the pressure in the launcher/receiver chamber prior to opening.

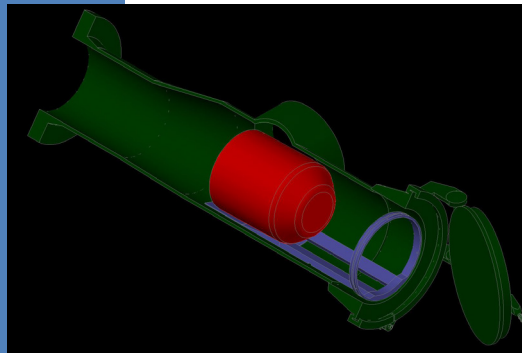


PIG RAMPS

MPLX designed and installed pig ramps within its pipeline receiver chambers to minimize liquids released while removing pigs. The ramps:

- Allow liquids trapped in front of the pig to be captured;
- Allow liquids on the pig itself to drain before the pig is pulled from the chamber

Any liquids that are captured by the pig ramps drain back into the pipeline. Design specification for the pig ramps are available in Patent Nos. 10,094,508; 10,001,240; and 10,012,340.



DEPRESSURE SYSTEMS

MPLX has also installed systems to depressure launcher/receiver chambers prior to opening, which substantially reduces the volume of gases vented to atmosphere. The simple design includes installation of valve and small-bore piping from the high-pressure chamber to a low-pressure system at the station.

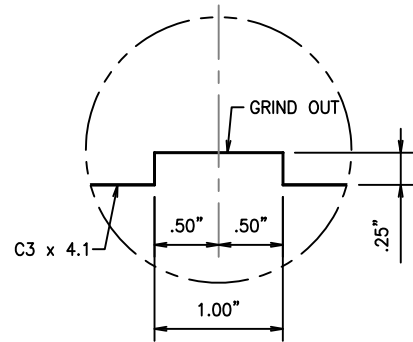
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K:\ENGINEERING\UTICA STANDARDS\PIG RAMPS

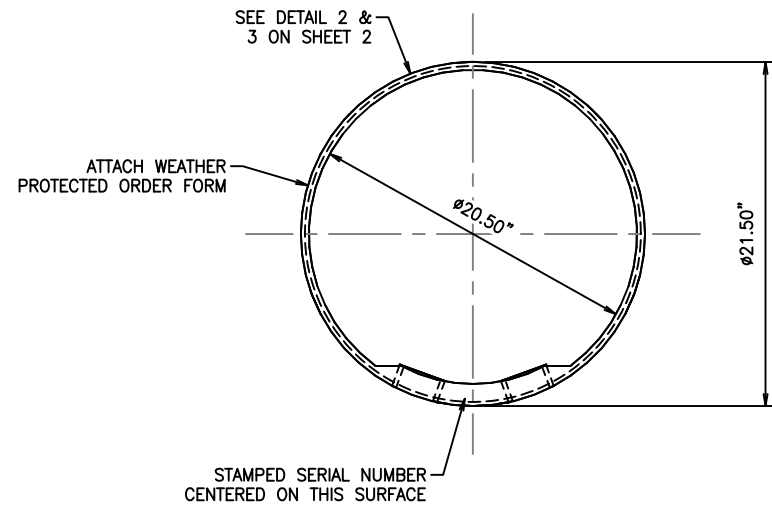
FOR USE IN PIG TRAP DRAWINGS:
 20IN.ANSI600.LH-PT-RO
 20IN.ANSI600.RH-PT-RO
 PT-600-20-A-LH-WS IFC REV 0B
 PT-600-20-A-LH-WS IFC REV 1
 PT-600-20-A-LH-WS IFC REV 2
 PT-600-20-A-RH-WS IFC REV 0
 PT-600-20-A-RH-WS IFC REV 1

3

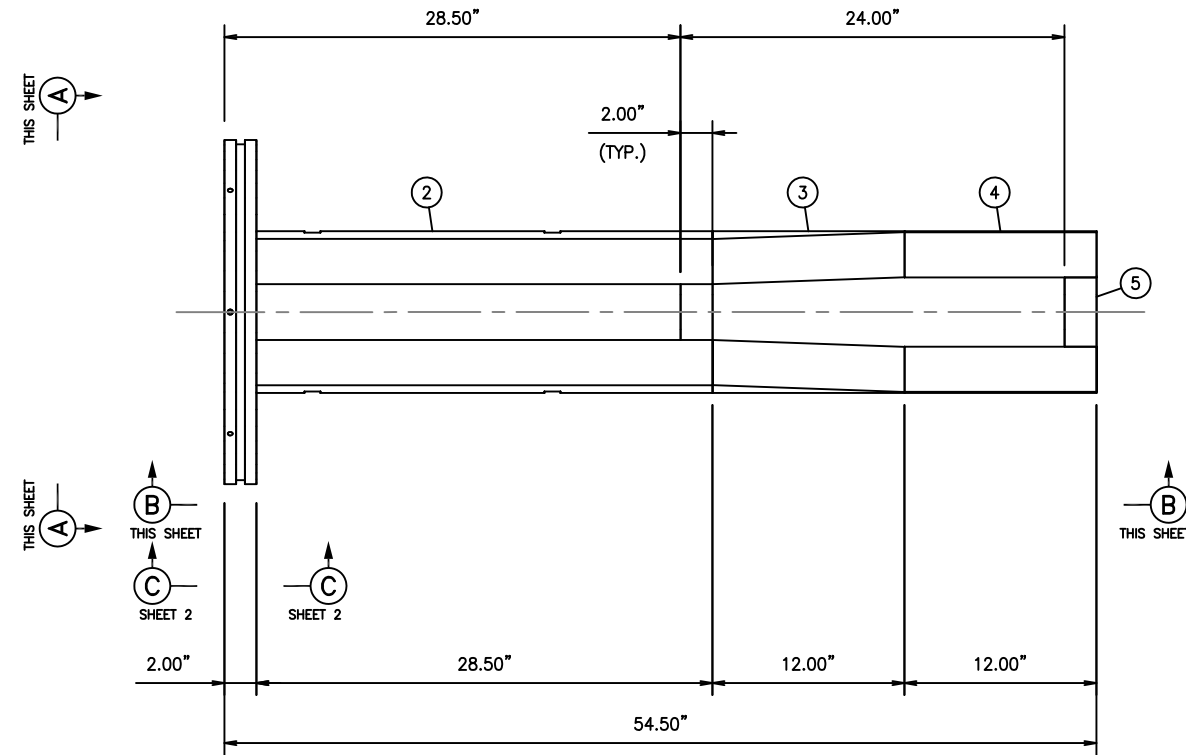
NOTE:
 1. SEE SHEET 2 FOR BILL OF MATERIAL.



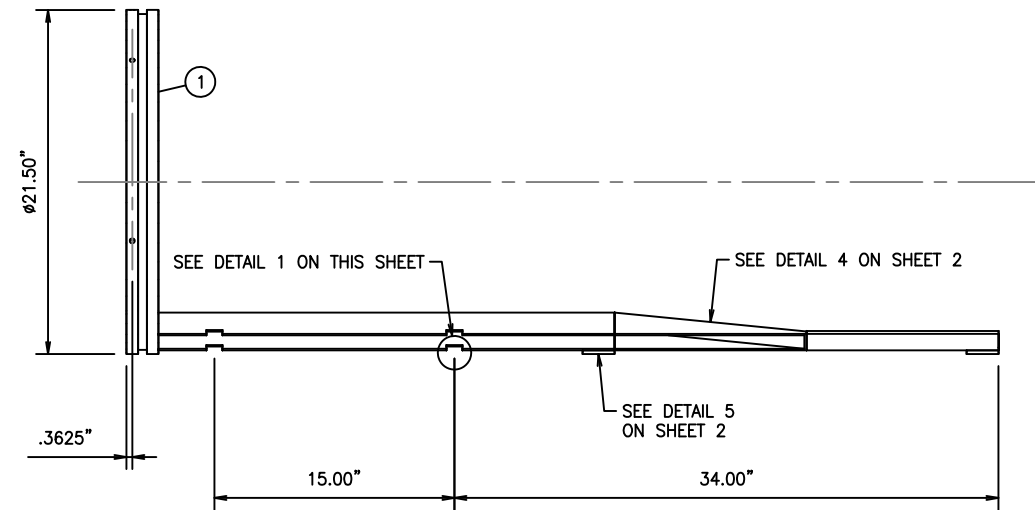
DETAIL 1
 GRIND OUT FOR WELD
 SCALE: NONE
 (TYPICAL OF 2)



ELEVATION A-A
 SCALE: 1" = 1'-0"



PLAN
 SCALE: 1" = 1'-0"



ELEVATION B-B
 SCALE: 1" = 1'-0"

ISSUED FOR
 CONSTRUCTION

CONFIDENTIAL & PROPRIETARY

REVISIONS												
NO.	DESCRIPTION	AFE	DRAWN	DATE	CHECK	DATE	ENGINEER	DATE	OPERATIONS	DATE	SAFETY	DATE
2	ADDED APPLICABLE PIG TRAP DRAWINGS	N/A	DMH	06-27-17	EDC	06-27-17	EDC	06-27-17				
3	ADDED APPLICABLE PIG TRAP DRAWINGS	N/A	DMH	07-18-17	EDC	07-18-17	EDC	07-18-17				

DRAWN BY:	DMH	DATE	11-14-16
CHECKED BY:	EDC	DATE	11-14-16
PROJECT ENGINEER:	EDC	DATE	11-14-16
OPERATIONS:		DATE	
SAFETY:		DATE	

MarkWest Energy Partners, L.P.		LOCATION	N/A
		SHEET NAME	1 OF 2
		SCALE	AS NOTED
		AFE	N/A

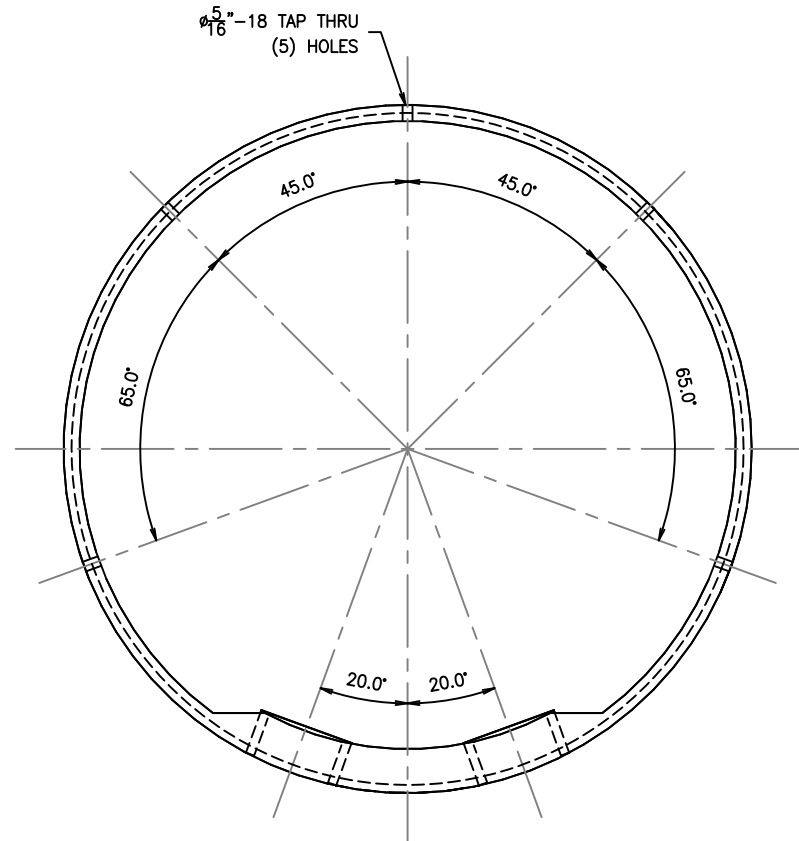
DESIGN STANDARD STANDARD 24" BARREL PIG RAMP PLAN & ELEVATIONS	
CAD FILE NAME	24 PIG RAMP
REVISION	3

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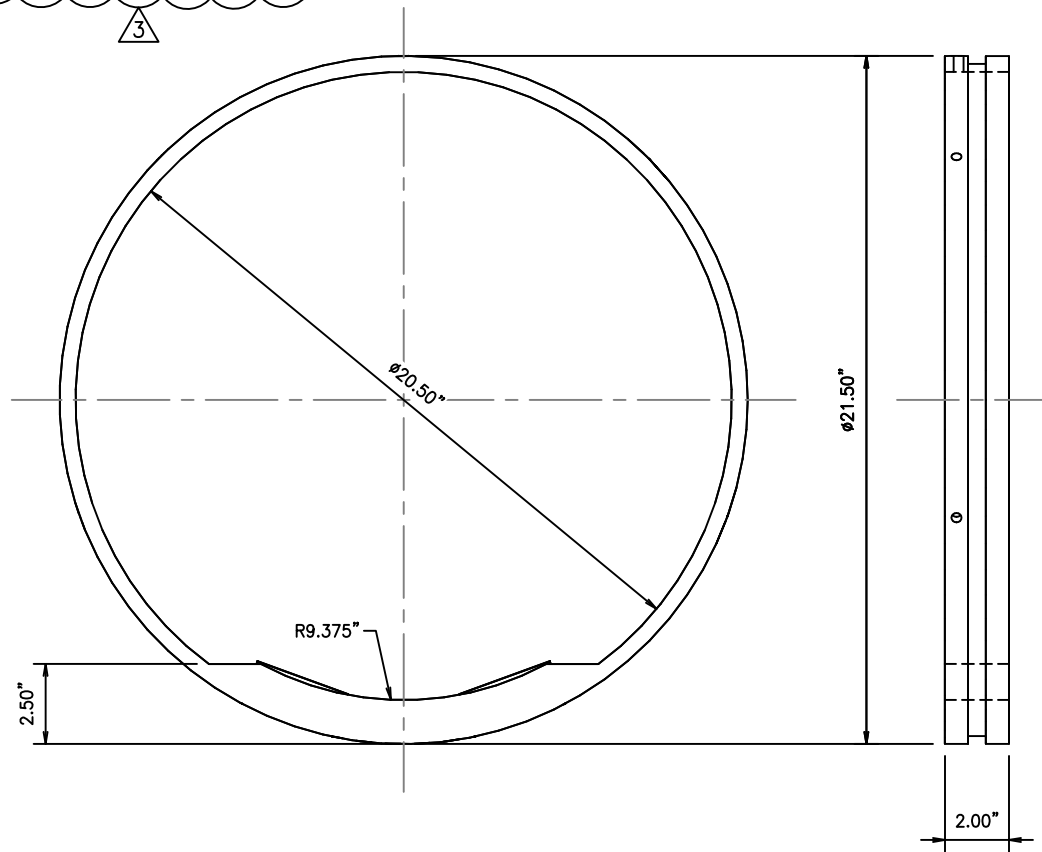
FOR USE IN PIG TRAP DRAWINGS:
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 20IN.ANSI600.RH-PT-RO
 PT-600-20-A-LH-WS IFC REV 0B
 PT-600-20-A-LH-WS IFC REV 1
 PT-600-20-A-LH-WS IFC REV 2
 PT-600-20-A-RH-WS IFC REV 0
 PT-600-20-A-RH-WS IFC REV 1

NOTE:
 1. SEE THIS SHEET FOR BILL OF MATERIAL.

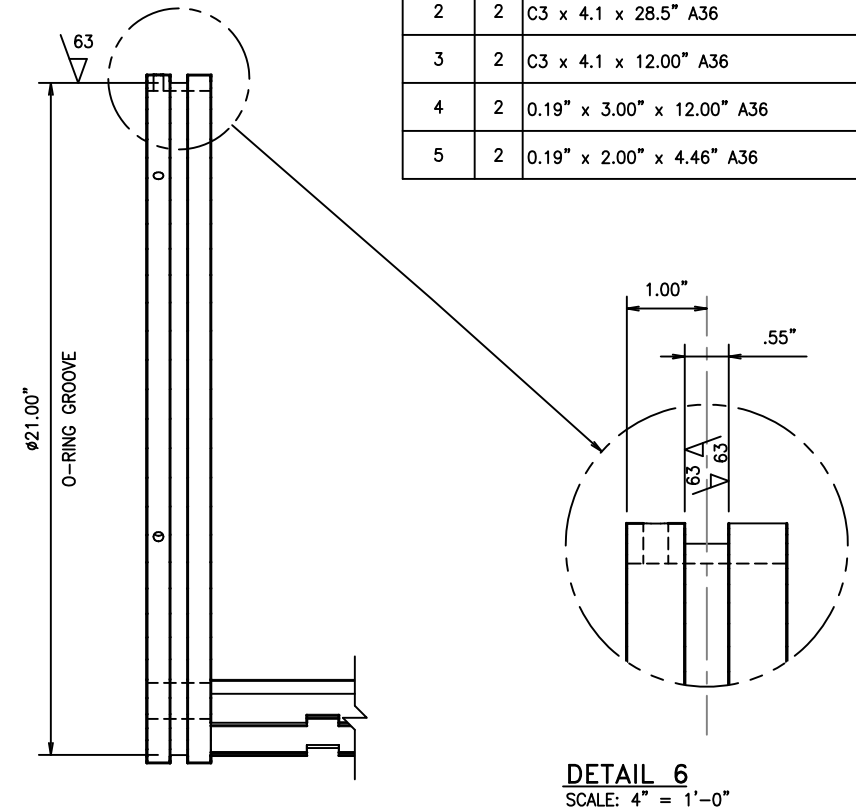
BILL OF MATERIAL		
MARK	QTY	DESCRIPTION
1	1	RING-2.00" x 21.5" x 21.5" A36
2	2	C3 x 4.1 x 28.5" A36
3	2	C3 x 4.1 x 12.00" A36
4	2	0.19" x 3.00" x 12.00" A36
5	2	0.19" x 2.00" x 4.46" A36



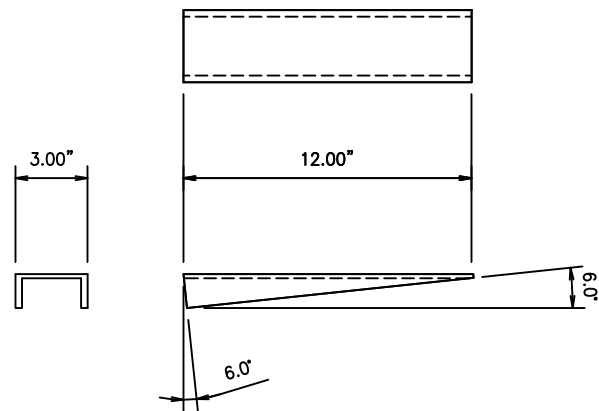
DETAIL 2
 SCALE: 2" = 1'-0"



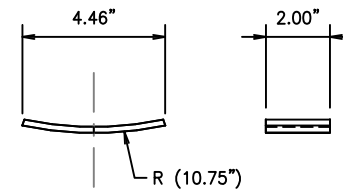
DETAIL 3
 SCALE: 2" = 1'-0"



ELEVATION C-C
 SCALE: 2" = 1'-0"



DETAIL 4
 SCALE: 1 1/2" = 1'-0"
 (TYPICAL OF 2)



DETAIL 5
 SCALE: 2" = 1'-0"
 (TYPICAL OF 2)

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3	ADDED APPLICABLE PIG TRAP DRAWINGS	N/A	DMH	07-18-17	EDC	07-18-17	EDC	07-18-17				

DRAWN BY:	DMH	DATE:	11-14-16
CHECKED BY:	EDC	DATE:	11-14-16
PROJECT ENGINEER:	EDC	DATE:	11-14-16
OPERATIONS:		DATE:	
SAFETY:		DATE:	

MARKWEST MarkWest Energy Partners, L.P.	
LOCATION	N/A
SCALE	AS NOTED
AFE	N/A
SHEET NAME	2 OF 2

DESIGN STANDARD	
STANDARD 24"	
BARREL PIG RAMP	
DETAILS & BILL OF MATERIAL	
CAD FILE NAME	24 PIG RAMP
REVISION	3