WorleyParsons resources & energy	Job Number 10741001	Document Number TD-SPC-001	Rev ~~E~~F	Date ~~06~~07/~~27~~19/07	Sheet 1 of ~~57~~

Project, Client, Location
WRDX Transition Engineering
BPXA
Greater Prudhoe Bay, Alaska

Document Title
Z-PAD GAS PARTIAL PROCESSING PLANT Performance Specifications For Inlet Separator and the 1st Stage Scrubber

☐ In-House Review ☐ Client Approval ☒ Design

☒ Entire Criteria Attached

☐ Revised Sheets Only Attached

Rev	Date	By	Chk	Approvals					Remarks
				Section	Proj Engr		Client		
A	10/12/06	WW	JA AL		AT				
B	11/14/06	WW	AL		AT				
C	03/05/07	AL	OK		SDL				
D	03/13/07	AL	OK		SDL				
E	06/27/07	DW	AL		SDL				~~REVISED AS NOTED~~
F	07/19/07	DW	OK		SDL				REVISED AS NOTED

This sheet is a record of each issue or revision to the subject criteria. Each time this criteria document is changed, only the new or revised sheets must be issued. The exact sheets changed and the nature of the change should be noted in the Remarks column; however, these remarks are not a part of the criteria. The revised sheets shall become part of the original criteria and shall be complied with in their entirety.

Table of Contents

1. Introduction

The crude oil productions from several oil pads in the Western Region Development areas are gathered at Z-Pad. The total production stream enters the ~~Inlet Separator~~Inlet Separator (VSP-Z6011) of the Gas Partial Processing (GPP) facility, where gas and liquid are disengaged.

2. Production Stream Data

The total crude oil production will vary over time. The projected production capacities for year 2011, 2015, and 2019 are chosen to define the design basis for the GPP. The production rates and stream data for these three years are shown in ~~Table 1~~Table 4.1.

The production stream carries certain amount of sand particles which also varies over time. The expected sand rate increases from ~~20~~ 10 cubic yards a day initially to approximately ~~40~~ 30 cubic yards a day beyond Year 2019.

The hydrogen sulfide (H_2S) content of the gas will be 20 ppm initially and could rise to ~~gas is expected to contain as much as~~ 200 ppm of ~~H_2S. hydrogen sulfide (H_2S)~~. 50 to 80 MMSCFD of gas out of the Inlet Separator (VSP-Z6011) is bypassed around the plant to the outlet liquid line. The remaining gas goes to the 1st Stage Scrubber (VS-Z6001). The liquid entrainment amount in the gas, leaving the Inlet Separator (VSP-Z6011), is not as critical as the liquid entrainment amount out of the 1st Stage Scrubber (VS-Z6001) which feeds a compressor.

The Process Flow Diagrams (PFDs) of the GPP are appended at the end of this document.

3. Vessel Design Criteria

3.1 The ~~Inlet Separator~~Inlet Separator (VSP-Z6011) is designed to achieve good separation of gas and liquid. Since the total liquid production leaving the vessel shall be returned to the production pipeline, separation of oil and water is not required. The ~~Inlet Separator~~Inlet Separator (VSP-Z6011) is to be design according to the Vessel Datasheet located in Appendix B. All operating and alarm levels as well as the weir height are indicative only. Internal vendor to optimize the levels to maximize the surge volume and to specify Low, Normal and High liquid levels that better suit~~e~~ their internal device selection.

3.2 The Feed stream of the ~~Inlet Separator~~Inlet Separator (VSP-Z6011) is shown in ~~Table 1~~Table 4.1 for typical operating years.

3.3 The ~~1st Stage Scrubber~~1st Stage Scrubber (VS-Z6001) is designed to achieve good separation of liquid carry over in order to protect downstream compressor against liquid impingement. The ~~1st Stage Scrubber~~1st Stage Scrubber (VS-Z6001) is to be design according to the Vessel Datasheet located in Appendix C.

3.4 The separated gas of the ~~Inlet Separator~~Inlet Separator (VSP-Z6011) is feeding the ~~1st Stage Scrubber~~1st Stage Scrubber (VS-Z6001). However the gas rate is dictated by the compressor capacity with the excess separated gas sent via the excess gas bypass line to the pipeline to GC-2.

The compressor capacity is ~~depending~~ dependent on the operation suction pressure and it is anticipated to operate as follows:

Table 3.1 - Inlet Separator Operating Suction Pressure and Compressor Capacity

Year	Inlet Separator Pressure	Compressor Capacity
2011	350 psig	410 MMSCFD
2015	250 Psig	350 MMSCFD
2019	250 Psig	350 MMSCFD

4. Vessel Internals Criteria

4.1 The ~~Inlet Separator~~Inlet Separator (VSP-Z6011) vessel must be equipped with appropriate internals to mitigate foam formation and emulsion, as the crude oil is expected to be becoming colder and more viscous over time. The following internals are to be considered:

- Cyclone Inlet Devices
- Vane Pack Defoamer (if necessary)
- Perforated Baffles
- Demister Pad~~/~~ or Outlet Device of other design
- Sand Jet Removal System

Final selection of the internal is left to vendor.

4.2 ~~Inlet Separator~~Inlet Separator (VSP-Z6011): Slugs can arise in the production pipeline in irregular frequency and enter the vessel over a period of time. The vessel must be designed to handle a slug size of up to 580 barrels flowing at 100 ft/s. The slug is considered to ride on the normal production flow. The vessel and all internals must be strengthened to withstand the impact forces of an indefinite number of slug occurrences.

4.3 ~~Inlet Separator~~Inlet Separator (VSP-Z6011): The inlet stream is preferred to enter from the top at one end of the vessel and the vapor stream exits the vessel from the other end. Current piping layout provides 15' of ~~strait~~ straight 36" horizontal run in the axis of the Separator upstream of the inlet elbow down. The elbow upstream of the run is in the horizontal plane. Vendor to advise if different piping configuration is warranted.

4.4 ~~Inlet Separator~~Inlet Separator (VSP-Z6011): The vessel must include appropriate sand jetting system to remove sand accumulation. Currently there is no plan to dispose the sand locally at Z-pad. The slurry exiting the vessel shall be pumped and routed to the production pipeline along with the separated heated liquids and the excess gas.

Volume upstream of the suggested 18" weir should be sufficient to accommodate up to 20 cubic yard of sand. Motive water for the sand jetting system is derived from the water injection line that will be put in place during the Phase I of the GPP project. On higher sand loading, sand jetting will be scheduled more than once a day. Vendor to advise on sand weir height and location.

4.5 ~~1st Stage Scrubber~~1st Stage Scrubber (VS-Z6001):

4.5.1 For the outlet gas leaving the ~~1st Stage Scrubber~~1st Stage Scrubber (VS-Z6001), liquid entrainment should be limited to less than 10 micron droplets.

4.5.2 Maximum design liquid rate of 100 gallons per minute for start-up and upset condition.

4.6 Vendor to identify maximum liquid accumulation rate in the 1st Stage Scrubber (VS-Z6001) based on the proposed internals of the Inlet Separator (VSP-Z6011).

4.7 Size of the vessels identified in the vessel datasheets are the maximum anticipated requirement. Vendor can suggest reducing the size of the vessels provided that the internal design and performance allow and warrant it.

4.8 The maximum allowed total pressure drop of both Inlet Separator (VSP-Z6011) and 1st Stage Scrubber (VS-Z6001) ~~between the internal of the two vessels~~ is 5 psi which includes inlet and outlet nozzle-to-nozzle in addition to all internals.

4.9 Vendor to design inlet device to 1st Stage Scrubber (VS-Z6001).

~~Table 1~~Table 4.1- ~~Inlet Separator~~Inlet Separator (VSP-Z6011) Feed Stream Data

	Year 2011 Total Production @ Z-Pad	Year 2015 Total Production @ Z-Pad	Year 2019 Total Production @ Z-Pad
TOTAL STREAM:			
Phase	MIXED	MIXED	MIXED
Vapour Fraction	0.329	0.292	0.252
Temperature, °F	105	105.1	105.1
Pressure, psia	364.7	264.7	264.7
Molar Flow, Lbmol/h	151,874	158,803	183,537
Mass Flow, Lb/h	4,142,699	4,080,666	4,348,076
Molecular Weight	27.28	25.70	23.69
Heat Flow, MMBTU/h	-15288.2	-16440.0	-19440.2
VAPOR PHASE:			
Mass Flow, Lb/h	1,094,685	1,113,778	1,155,896
Actual Gas Flow, ACFM	12,993	16,694	16,597
Standard Gas Flow, MMSCFD	455.49	421.83	421.46
Molecular Weight	21.888	24.047	24.978
Z Factor	0.938	0.939	0.934
Mass Enthalpy, BTU/Lb	-2184.99	-2108.85	-2091.43
Mass Density, Lb/ft3	1.404	1.112	1.161
Mass Heat Capacity (Cp), BTU/Lb-°F	0.484	0.461	0.456
Cp/Cv	1.334	1.298	1.293
Thermal Conductivity, BTU/h-ft-°F	0.019	0.018	0.018
Viscosity, cp	0.013	0.012	0.012
MIXED LIQUID PHASE:			
Mass Flow, Lb/h	3,048,014	2,966,888	3,192,181
Actual Liquid Flow, GPM	6,473.2	6,234.9	6,624.8
Standard Liquid Volume Flow, BPD	218,780	211,048	224,602
Mass Enthalpy, BTU/Lb	-4,231.02	-4,749.45	-5,332.58
Mass Density, Lb/ft3	58.71	59.33	60.08
Mass Heat Capacity, BTU/Lb-°F	0.768	0.817	0.872
Thermal Conductivity, BTU/h-ft-°F	0.179	0.210	0.247
Viscosity, cp	71.06	34.41	1.06
Surface Tension, dyne/cm	---	---	---
HYDROCARBON LIQUID PHASE:			
Mass Flow, Lb/h	1,326,611	1,026,662	785,913
Actual Liquid Flow, GPM	3,006.5	2,327.4	1,778.7
Standard Liquid Volume Flow, BPD	100,737	78,000	59,595
Molecular Weight	210.30	214.50	212.90
Mass Enthalpy, BTU/Lb	-936.61	-930.85	-931.44
Mass Density, Lb/ft3	55.013	54.997	55.087
Mass Heat Capacity, BTU/Lb-°F	0.456	0.455	0.455
Thermal Conductivity, BTU/h-ft-°F	0.071	0.072	0.071
Viscosity, cp	13.02	13.78	14.31
Surface Tension, dyne/cm	20.58	20.87	20.33
AQUEOUS LIQUID PHASE:			
Mass Flow, Lb/h	1,721,403	1,940,226	2,406,268
Actual Liquid Flow, GPM	3,466.7	3,907.5	4,846.0
Standard Liquid Volume Flow, BPD	118,043	133,049	165,007
Mass Enthalpy, BTU/Lb	-6769.88	-6770.05	-6770.05
Mass Density, Lb/ft3	61.91	61.91	61.91
Mass Heat Capacity, BTU/Lb-°F	1.008	1.009	1.009
Thermal Conductivity, BTU/h-ft-°F	0.365	0.365	0.365
Viscosity, cp	0.64	0.64	0.64
Surface Tension, dyne/cm	69.40	69.39	69.39

Appendix

A. Process Flow Diagram

FS-WPZ-00006-001.pdf

B. Vessel Datasheet of the Inlet Separator (VSP-Z6011)

DAS-TD-VSP-Z6011 Inlet Separator-Rev D.pdf

C. Vessel Datasheet of the 1st Stage Scrubber (VS-Z6001)

DAS-TD-VS-Z6001 1st Stage Suction Scrubber-Rev E.pdf

D. Inlet Separator Feed Preliminary Isometric

IS-WPZ-05441-001 WOA – ISOMETRIC 4/17/07

VSP-Z6011
INLET SEPARATOR
13'-6" ID x 50'-0" T-T

VS-Z6001
1st STAGE SUCTION SCRUBBER
11'-6" ID x 15'-0" T-T

GT-Z6001
GPP TURBINE
42,480 HP

FLTR-Z6001A/B
FUEL GAS FILTERS

EAC-Z6021
1st STAGE DISCHARGE COOLER
82 MMBTU/HR

FS-WPZ-00006-002
TO 2nd STAGE SURGE CONTROL

COMPRESSOR CONTROLLER

PT FT TT PT TT TC TC

104

VS-Z6001

LC

GT-Z6001

106

EAC-Z6021

M SC

MEOH INJECTION

107

PRODUCTION GAS
FS-WPZ-00006-002
TO 1st STAGE DISCHARGE SCRUBBER, VS-Z6002

SC

K-Z6001

203

TURBINE EXHAUST GAS
FS-WPZ-00007-001
TO WHRU H-Z6002

FLTR-Z6001A/B

202

FUEL GAS
FS-WPZ-00006-002
FROM FUEL GAS HEATER, H-Z6003

EXCESS GAS BYPASS
FS-WPZ-00005-001

102

FC (NOTE 3)

101

PC

TO FLARE

CORROSION INHIBITOR

105

ANTIFOAM INJECTION

CONDENSATE
FS-WPZ-00006-002
FROM 1st STAGE DISCHARGE SCRUBBER, VS-Z6002

WELL FLUIDS
FS-WPZ-00005-001
FROM I, L, V, W & Z PADS

100

VSP-Z6011

LC (NOTE 2)

LC (NOTE 1)

START/STOP

P-Z6001A/B

(NOTE 5) FC

124

SEPARATED LIQUIDS
FS-WPZ-00005-001
TO BATH HEATER, H-Z-0611-01

MOTIVE FLUID
FS-WPZ-00005-001

SAND JETTING SYSTEM

SLURRY
FS-WPZ-00005-001
TO PIPELINE

(NOTE 4)

119

121

SEPARATED LIQUIDS
FS-WPZ-00007-001
TO PRODUCTION HEATERS, EST-Z6021A/B

TEG OFF GAS
FS-WPZ-00006-002
FROM SYS-Z-X102

NOTES:

1. SPLIT RANGE CONTROL:
   100-66% RAISES TURBINE SPEED AS LEVEL DROPS.
   66-33% OPEN FEED GAS BYPASS AS LEVEL DROPS.
   33-0% CLOSE LEVEL VALVE AS LEVEL DROPS.
2. OPEN COMPRESSOR RECYCLE VALVES AS LEVEL RISES.
3. THE FLOW CONTROLLER WILL OVERRIDE THE LEVEL CONTROL TO LIMIT GAS FLOW TO GC-2.
4. LEVEL VALVE IS NORMALLY FULLY OPEN.
5. BETWEEN 2011 AND 2016, FLOW TO BATH HEATER IS ZERO. SOME TIME AFTER YEAR 2016, THE BATH HEATER WILL NEED TO BE STARTED UP TO PROVIDE ADDITIONAL PRODUCTION HEATING. THE FLOW CONTROLLER SHALL BE UNDER DCS SUPERVISION TO OPTIMIZE BATH HEATER CAPACITY.
6. ALL EQUIPMENT DATA FROM YEAR 2011 HYSYS SIMULATION.

LEGEND:
XX – STREAM NUMBER

P-Z6001A/B
SCRUBBER PUMPS
RATED: 48 GPM EACH
2x100%

K-Z6001
1st STAGE COMPRESSOR
12,380 ACFM
20,390 HP

PHASE 2

REV	WP ENGR MGR	WP PROJ LEADER	BPXA TA	BPXA TA	BPXA ENGR MGR	BPXA PROJ LEADER
SIGN						
DATE						

APPROVAL TITLE BLOCK

REFERENCE DRAWINGS

NO.	DATE	REVISION	BY	CHK	APPD
A	07/06	ISSUED FOR CLIENT REVIEW PER EPT 36335424-02	WW	AL	WM
B	10/06	REISSUED FOR CLIENT REVIEW PER EPT 36335424-02	WW	AL	WM
C	11/06	ISSUED FOR PRELIMINARY PHA PER EPT 36335424-02	WW	AL	WM
D	02/07	ISSUED FOR PIPING DESIGN PER EPT 36335424-02	AL	RH	WM
E	04/07	ISSUED FOR DEFINE PHASE ESTIMATE	OK	DJS	AL

NO.	DATE	REVISION	BY	CHK	APPD

ENGINEERING RECORD	DATE
DRN: RQ	
DSGN:	
CHK:	
APP:	
APP:	
SCALE: NONE	

bp

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TITLE OF DRAWING:
WPZ PROCESS FLOW
PROCESS FLOW DIAGRAM
SEAPARATION/COMPRESSION/DEHYDRATION

WORK ORDER	DRAWING NUMBER	REV	SHEET
	FS-WPZ-00006	E	001
MODULE: GEN	JOB NO.: 107741002		OF 002

DATE: 04-30-07 TIME: 16:45:56 USER: T CAGER FILE INFO:: R:\BPXA\WOA\WPZGPP\pr\PFD\Phase_2\FS-WPZ-00006-001.dwg

REVISIONS	NO.	DATE	BY	CK	APP	DESCRIPTION
	B	10/24/06	WW	AL		ISSUED FOR DESIGN
	C	11/20/06	WW	AL	AL	ISSUED FOR DESIGN
	D	06/12/07	JC/DW			ISSUED FOR DESIGN

Accessories by Fabricator:	YES	NO
Vessel Davit Mark No.	X	
Ladder & Platform Clips	X	
Pipe Support & Pipe Guide Clips		X
Insulation Supports	X	
Fireproofing Supports	X	
Grounding Lugs	X	
Lifting Lugs	X	

NOZZLES & COUPLINGS SCHEDULE

Projections of Radial Nozzles & Manholes Are From Vessel Centerline to Extreme Face of Flange

Item	No.	Size	Proj	Service
N1	1	36"	FLG	Feed
N2	1	24"	FLG	Liquid Outlet
N3	1	30"	FLG	Vapor Outlet
N5	1	4"	FLG	Vent
N6	1	18"	FLG	PSV (Note 1)
D N7A-E	8 D	3"	FLG	Sandjet Water Inlets
D N7F-H	8 D	3"	FLG	Sandjet Slurry Outlets
N8A-B	2 D	3"	FLG	Level Transmitter (guided wave) D
N9A-B	2 D	3"	FLG	Level Gauge/Transmitter (magnetic) D
D N10	1	2"	FLG	Pressure Differential Transmitter
N11	1	2"	FLG	Temperature Transmitter
D N12 A-C D	3	2"	FLG	Pressure Transmitter
N13A-B	2	4"	FLG	Drain
D N14 A-B	2	3"	FLG	Level Switch
D N15 A-B	2	6"	FLG	Level Transmitter
M1, M2	2	30"	FLG	Manway with Swing Davits

Rating D 300 # Facing RF Finish Smooth

See Plans For True Orientation

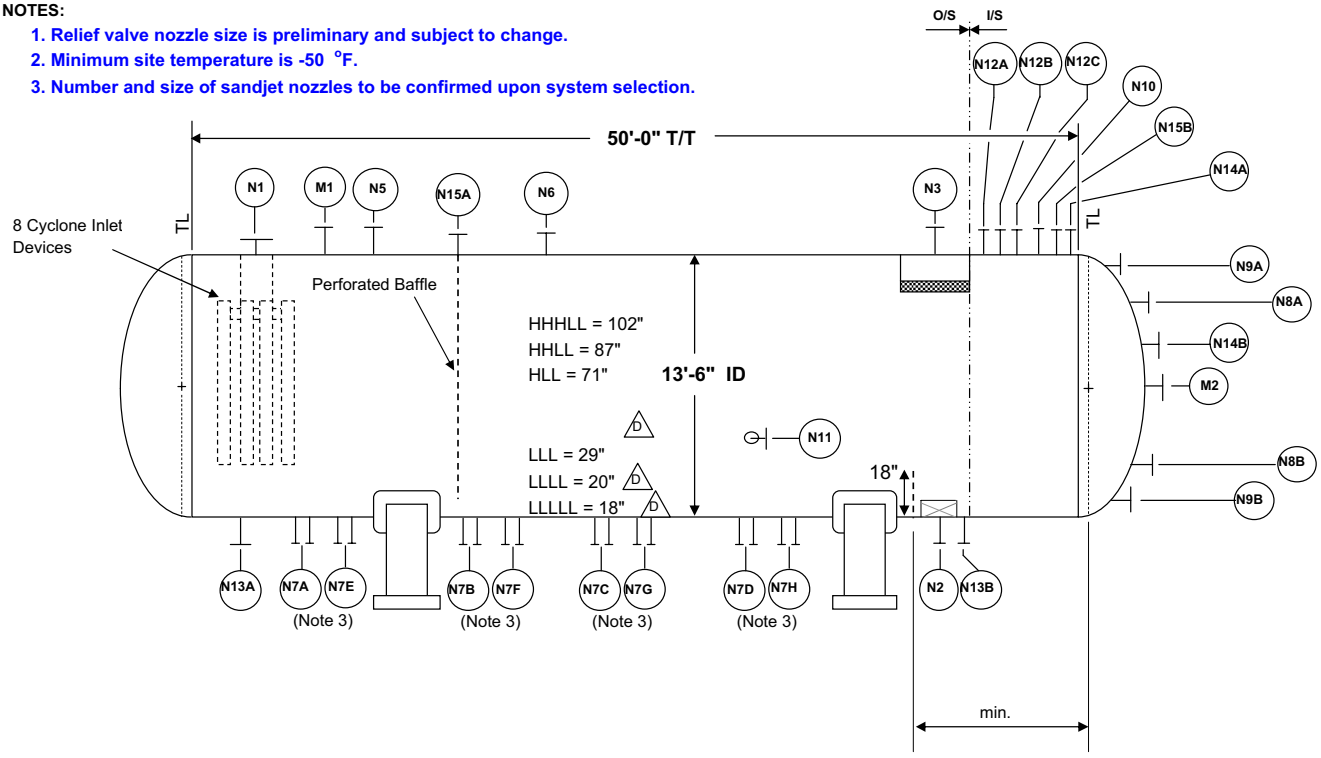
Code:	ASME SECTION VIII DIV.			
Code Certificate Req'd		Code Stamp		
National Board Registration				
Opr Pressure (Intl)	350 psig	at	105 °F	
Des Pressure (Intl)	450 psig	at	200 °F	
Des Pressure (Ext)	FV psia	at	200 °F	
Minimum Design Metal Temp	-50 °F	(Note 2) at	450 psig	
Corrosion Allowances:	Shell 1/8 "	Heads 1/8 "	Noz	
Liquid Level for Design		at Sp Gr		
MAWP	psig at	°F limited by		
MAP N&C	psig at	Amb Temp limited by		
Shop Hydro	psig	°F	Min Horiz Posn	
Field Hydro New	psig	°F	Min Opr Posn	
Field Hydro Crsn	psig	°F	Min Opr Posn	
PWHT per		Radiograph RT-		
Joint Eff: Shell		Heads		
Allow Stress	psig	at Design Temp		

MATERIALS		
Shell	LTCS + epoxy coating inside + PWHT (NACE)	
Heads	LTCS + epoxy coating inside + PWHT (NACE)	
Supports	LTCS	
Internals	316SS	Trays
Bolts (Intl)		Nuts
Bolts (Ext)		Nuts
Flanges		Cplg
Nozzle Necks		
Gaskets		

Capacity			ft³
Fab Wt	lbs	Empty Wt	lbs
Tray Wt	lbs	Packing Wt	lbs
Opr Wt	lbs	Test Wt	lbs
Paint			
Insulation	4" (for winterization) D		
Fireproofing	Yes		

NOTES:

1. Relief valve nozzle size is preliminary and subject to change.
2. Minimum site temperature is -50 °F.
3. Number and size of sandjet nozzles to be confirmed upon system selection.



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HORIZONTAL VESSEL DATA SHEET

BPXA ZPAD GAS PARTIAL PROCESSING (GPP)

VSP-Z6011

Inlet Separator

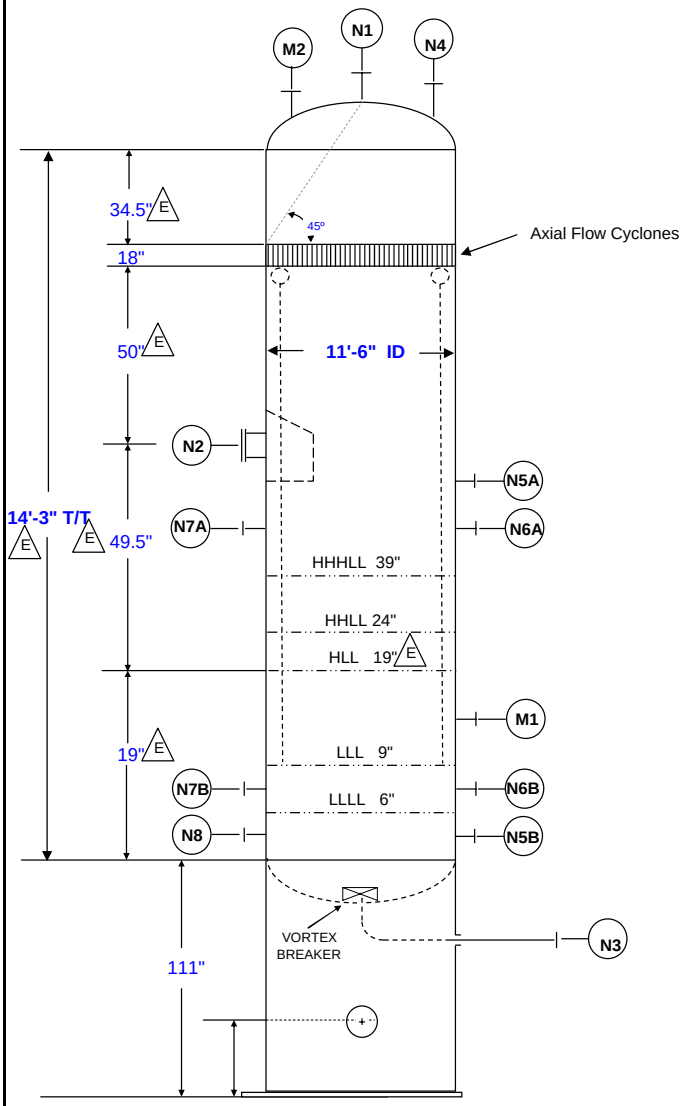
SHEET	OF	JOB NUMBER
1	1	10741003

DRAWING NUMBER	REV
DAS-TD-VSP-Z6011	D

REVISIONS	NO.	DATE	BY	CK	APP	DESCRIPTION
	C	2/12/2007	JC	AL	AL	
	D	2/22/2007	OK			
	E	7/19/2007	OK			ISSUED FOR DESIGN

VS-Z6001

1ST STAGE SUCTION SCRUBBER



Code:	ASME SECTION VIII				
Code Certificate Req'd		Code Stamp			
National Board Registration					
Opr Pressure (Intl)	E 347	psig	at	E 105	°F
Des Pressure (Intl)	E 650	psig	at	E 300	°F
Des Pressure (Ext)	FV	psi	at	300	°F E
Minimum Design Metal Temp	-20	°F	at	E 650	psig
Corrosion Allow:	Shell 1/8"	Heads 1/8"		Noz	
Liquid Level for Design			at Sp Gr	0.98	
MAWP	psig at	°F limited by			
MAP N&C	psig at	Amb Temp limited by			
Shop Hydro	psig	°F	Min Horiz Posn		
Field Hydro New	psig	°F	Min Opr Posn		
Field Hydro Crsn	psig	°F	Min Opr Posn		
PWHT	per	Radiograph RT-			
Joint Eff:	Shell	Heads			
Allow Stress		psi	at Design Temp		

MATERIALS			
Shell	CS (NACE) + PWHT+ internal epoxy coat E		
Heads	CS (NACE) + PWHT+ internal epoxy coat E		
Supports	CS		
Internals	316 SS	Trays	
Bolts (Intl)		Nuts	
Bolts (Ext)		Nuts	
Flanges		Cplg	
Nozzle Necks			
Gaskets			

Capacity			ft^3
Empty Wt	lbs	Fab Wt	lbs
Packing Wt	lbs	Tray Wt	lbs
Opr Wt	lbs	Test Wt	lbs
Paint			
Insulation			
Fireproofing			

Accessories by Fabricator:	YES	NO
Vessel Davit Mark No.		X
Ladder & Platform Clips		X
Pipe Support & Pipe Guide Clips		X
Insulation Supports		X
Fireproofing Supports		X
Grounding Lugs	X	
Lifting Lugs	X	

NOZZLES & COUPLINGS SCHEDULE

Projections of Radial Nozzles & Manholes Are From Vessel Centerline to Extreme Face of Flange

Item	No.	Size	Proj	Service
N1	1	30"		Vapor Exit
N2	1	30"		Feed
N3	1	3" E		Liquid Exit
N4	1	2"		Vent
N5 A/B	2	3" E		Level Gauge/Transmitter
N6 A/B	2	3" E		Level Transmitter
N7 A/B	2	3" E		Level Transmitter
N8	1	2"		Purge
M1	1	24"		Manway
M2	1	24"		Manway

Rating 300# Facing RF Finish

See Plans For True Orientation

NOTES:

1) LLL and skirt height are set to satisfy NPSH requirement for Scrubber Pump.

2) HLL is set to start Scrubber Pump and HHLL is set to start spare pump.

3) Feed nozzle location and HHHLL will be verified and determined by contractor.

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VERTICAL VESSEL DATA SHEET

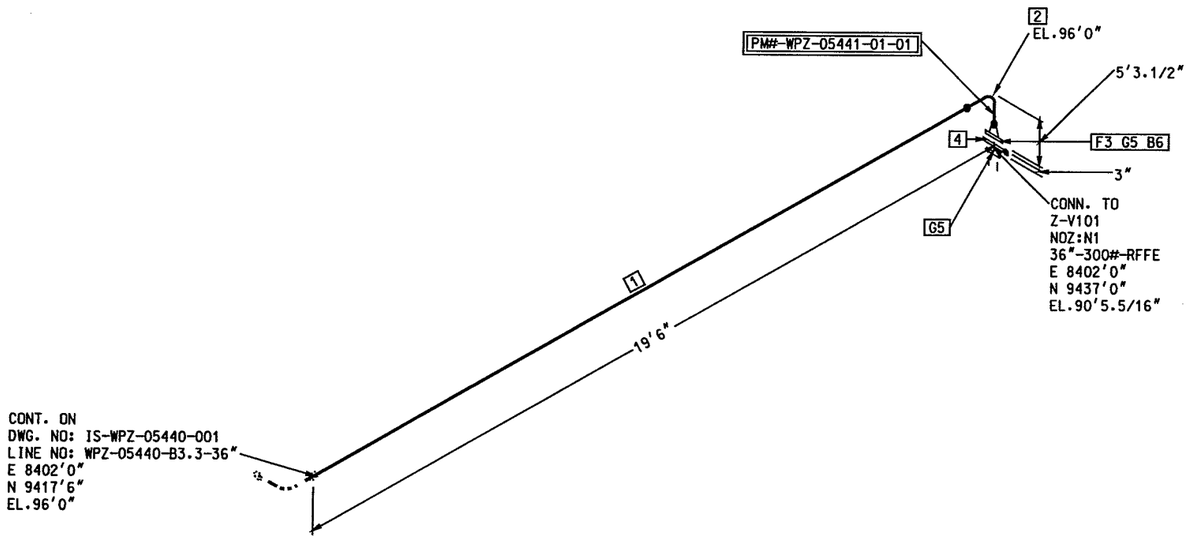
BPXA ZPAD GAS PARTIAL PROCESSING (GPP)

VS-Z6001

1ST STAGE SUCTION SCRUBBER

SHEET	OF	JOB NUMBER
1	1	10741230

DRAWING NUMBER	REV
DAS-TD-VS-Z6001	E



SHOP MATERIALS

PT NO	COMPONENT DESCRIPTION	SIZE (INS)	STOCK NO.	QTY
	PIPE			
1	PIPE, EFW, 100% XRAY, STL, ASTM A671 GR CC65 CL 12, IMPACT TESTED, BE, 0.750" WALL	36	059420100620000	15.0'
	FITTINGS			
2	90 DEG LR ELBOW, STL, ASTM A420 GR WPL6, WELDED, BW, 0.750" WALL	36	222010100620000	1
	FLANGES			
3	FLANGE, WN, PER ASME B16.47 SERIES A, STL, ASTM A350 GR LF2 CL 1, RF, CL300, 0.750" WALL	36	121100103620000	1

FIELD MATERIALS

PT NO	COMPONENT DESCRIPTION	SIZE (INS)	STOCK NO.	QTY
	FITTINGS			
4	SLIP BLANK AND SPACER, ASME B16.47 SERIES A, STL, ASTM A516 GR 70, IMPACT TESTED OR A350 LF2 CL1, RF, CL300, PER STD-PD-00-00067	36	55807060300SBP1	1
	GASKETS			
5	GASKET, SPIRAL WOUND, ASME B16.47 SERIES A, 304 SS WITH 304SS INNER/STL OUTER RINGS & FLEX GRAPH FILLER, 1/8" THK, CL300, FLEXITALLIC STYLE CGI	36	7SC3302030000F3	2
	BOLTS			
6	STUD BOLT W/2 HVY HEX NUTS, ASTM A320 GR L7 / ASTM A194 GR 7, 16.5" BOLT LENGTH	2	870010000000000	32

PIECE MARK NO.

PM#-WPZ-05441-01-01

ISOMETRIC CHECK PRINT		
ISO STATUS	INITIAL	DATE
DESIGNER REVIEW		
AREA LEAD		
STRESS CHECK		
FROM CHECK		
PDS UPDATE		
2D UPDATE		
BACK CHECK		
SIGN OFF		

NOTES: 1. FIELD VERIFY ALL ELEVATIONS AND DIMENSIONS PRIOR TO FABRICATION.
2. FFU = FIELD FIT-UP. WHEN INDICATED, ADD 1'-0" EXTRA TO PIPE LENGTH SHOWN. FIELD TO DETERMINE CUT LENGTH AT FIELD WELD.

LEGEND:
- DENOTES ITEM NUMBERS
- DENOTES SPOOL NUMBERS
- DENOTES TIE-IN POINT

DESIGN DATA

CODE:	ANSI-B31.3	CLEAN:	PER SPEC	WELD PROC:	PER SPEC
CLASS:	B5.3	PAINT:	PER SPEC	STRESS RELIEVE:	
DES PRESS:		INSULATION:		NUMBER OF WELDS:	
DES TEMP:		HYDRO TEST:			
OPER PRESS:		X-RAY QTY:	PER SPEC	PLAN NO.:	
OPER TEMP:		INTERP:	ANSI-B31.3	P&ID NO.:	
LINE NO.:					

REVISION

NO	DATE	DESCRIPTION	BY	CHK	APP
		ISSUED FOR CONTRUCTION PER EPT			

SERVICE: PROCESS LIQUID

SHOP FAB	FIELD FAB

ENGINEERING RECORD	DATE
DSGN:	
CHK:	
APP:	
APP:	
WORK ORDER:	

WorleyParsons
resources & energy

bp

TITLE OF DRAWING: WOA - ISOMETRIC

MODULE	UNIT CODE	DRAWING NUMBER	SHEET	REV.NO.
	WPZ	IS-WPZ-05441	001	

ISO FILE No: ISWPZ0544101 PDS MODEL: WPZGPPPM06 EXTRACTION DATE: 04/17/07