

Operator Name/Number: OXY USA Inc. 30-015-41595 16696  
 Lease Name/Number: Cedar Canyon 16 State #6H 39668  
 Pool Name/Number: Pierce Crossing Bone Spring, East 96473  
 Surface Location: 1430 FSL 710 FWL L Sec 15 T24S R29E  
 Penetration Point Location: 1650 FSL 330 FEL I Sec 16 T24S R29E  
 Bottom Hole Location: 1658 FSL 330 FWL L Sec 16 T24S R29E

C-102 Plats: 3/28/13 4/25/13 7/17/13 Elevation: 2927' GL

Proposed TD: 8721' TVD 13800' TMD Objective: 2nd Bone Spring  
 SL - Lat: 32.214087 Long: 103.978100 X=609864.2 Y=441785.8 NAD - 1927  
 PP - Lat: 32.214721 Long: 103.981464 X=608822.9 Y=442012.8 NAD - 1927  
 BH - Lat: 32.214692 Long: 103.996449 X=604188.6 Y=441987.5 NAD - 1927

#### Casing Program:

Hole Size	Interval	OD Csg	Weight	Collar	Grade	Condition	Collapse Design Factor	Burst Design Factor	Tension Design Factor
14-3/4"	0-370'	11-3/4"	42	ST&C	H-40	New	6	1.52	2.2
				Hole filled with 8.6# Mud			1070#	1980#	
10-5/8"	0-3100'	8-5/8"	32	LT&C	J-55	New	1.62	1.86	2.29
				Hole filled with 10.0# Mud			2530#	3930#	
7-7/8"	0-13800'	5-1/2"	17	BT&C	L-80	New	1.4	1.29	1.71
				Hole filled with 9.4# Mud			6390#	7740#	

Collapse and burst loads calculated using Stress Check with anticipated loads

#### Cement Program:

- 11-3/4" Surface Circulate cement to surface w/ 240sx PP cmt w/ 2% CaCl<sub>2</sub>, 14.8ppg 1.35 yield 1346# 24hr CS 150% Excess
- 8-5/8" Intermediate Circulate cement to surface w/ 620sx PP cmt w/ 5% salt, 12.9ppg 1.85 yield 853# 24hr CS 125% Excess followed by 230sx PPC, 14.8ppg 1.33 yield 1571# 24hr CS 125% Excess
- 5-1/2" Production Cement w/ 720sx PP cmt w/ 14.8#/sx Silicalite 50/50 Blend + 15#/sx Schotchlite HGS-6000 + 1#/sx Cal Seal 60 + .5#/sx CFR-3 + .15#/sx WG-17 + 1.5#/sx salt + 2% CaCl<sub>2</sub>, 10.6ppg 2.69 yield 646# 24hr CS 80% Excess followed by 860sx Super H cmt w/ 3#/sx salt + .4% CFR-3 + .5% Halad-344 + .2% HR-800, 13.2ppg 1.64 yield 1447# 24hr CS 40% Excess Calc TOC-2500'

**Description of Cement Additives:** Calcium Chloride, Cal-Seal 60, Salt (Accelerator); Silicalite (Additive Material); CFR-3 (Dispersant); WG-17 (Gelling Agent); Schotchlite HGS-6000 (Light Weight Additive); Halad-344 (Low Fluid Loss Control); HR-800 (Retarder)

The above cement volumes could be revised pending the caliper measurement.

#### Proposed Mud Circulation System:

Depth	Mud Wt. ppg	Visc sec	Fluid Loss	Type System
0 - 370'	8.5-9.0	28-38	NC	Fresh Water/Spud Mud
370 - 3100'	9.8-10.2	28-32	NC	NaCl Brine
3100 - TD	8.6-9.4	28-34	NC	Cut Brine/Salt Gel-Starch

Pump high viscosity sweeps as needed for hole cleaning. The mud system will be monitored visually/manually as well as with an electronic PVT. The necessary mud products for additional weight and fluid loss control will be on location at all times.

#### BOP Program:

Surface None  
 Intermediate/Production 13-5/8" 10M three ram stack w/ 5M annular preventer, 5M Choke Manifold

#### Estimated Tops of Geological Markers & Depths of Anticipated Fresh Water, Oil or Gas:

Geological Marker	Depth	Type
a. Rustler	341'	Formation
b. Top Salt	441'	Formation
c. Bottom Salt	1376'	Formation
d. Base Anhydrite	2956'	Formation
e. Delaware-Bell Canyon	3011'	Oil/Gas
f. Delaware-Brushy Canyon	5071'	Oil/Gas
g. 1st Bone Spring	6661'	Oil/Gas
h. 2nd Bone Spring	8016'	Oil/Gas

Fresh water may be present above the Rustler formation. Surface casing will be set below the top of the Rustler, which will cover potential fresh water sources.

A closed loop system will be utilized consisting of above ground steel tanks and haul-off bins.  
 Disposal of liquids, drilling fluids and cuttings will be disposed of at an approved facility.

#### Spacing Unit:

The following wells are completed in the 1<sup>st</sup> Bone Spring.

- H Buck State #5 - 30-015-35042 - TVD 7630' - Unit I,J,K - Pierce Crossing Bone Spring, E. (96473)
- Cedar Canyon 16 #1H - 30-015-39856 - TVD 7685' - Units D,E,L,M Corral Draw Bone Spring (96238)

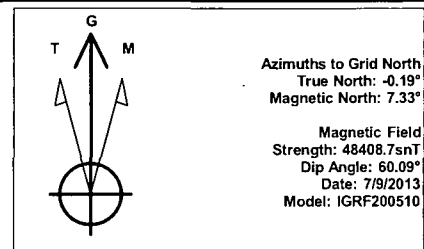


Project: Permian - Eddy County, NM  
 Site: Cedar Canyon 16 State #6H  
 Well: Cedar Canyon 16 State #6H  
 Wellbore: ORIG HOLE  
 Design: Cedar Canyon 16 State #6H

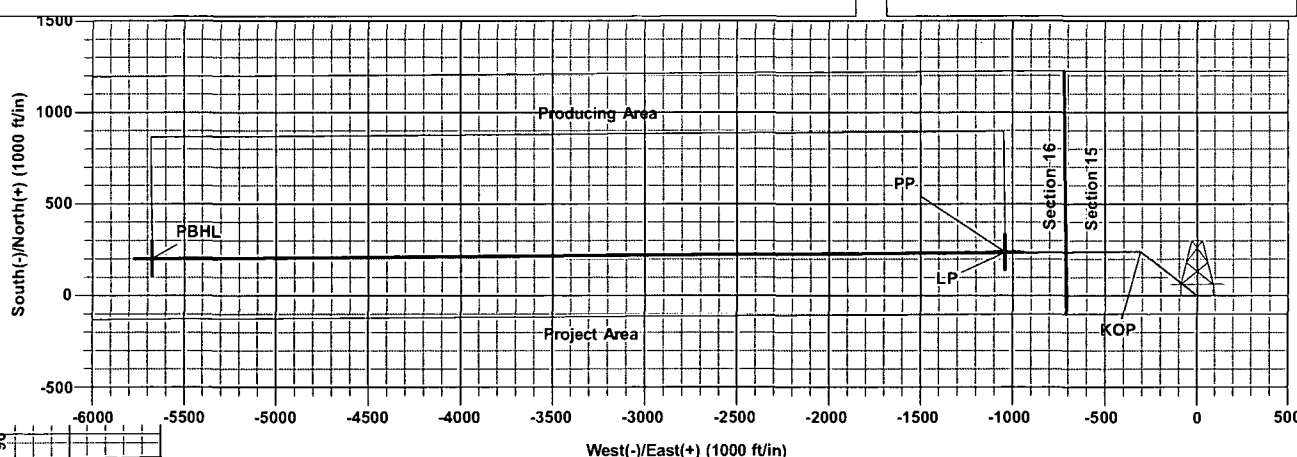
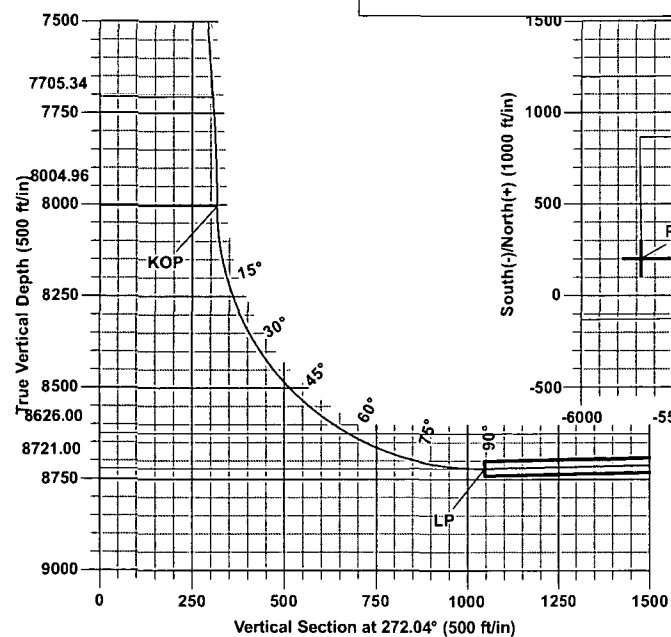
SECTION DETAILS										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	3260.00	0.00	0.00	3260.00	0.00	0.00	0.00	0.00	0.00	
3	3510.00	5.00	308.00	3509.68	6.71	-8.59	2.00	308.00	8.82	
4	7721.68	5.00	308.00	7705.34	232.70	-297.85	0.00	0.00	305.92	
5	8021.68	0.00	0.00	8004.96	240.76	-308.16	1.67	180.00	316.51	
6	9161.35	91.17	269.58	8721.00	235.44	-1039.00	8.00	269.58	1046.71	
7	13799.48	91.17	269.58	8626.00	201.72	-5676.04	0.00	0.00	5679.62	Cedar Canyon 16 State #6H PBHL

WELL DETAILS: Cedar Canyon 16 State #6H						
+N/-S	+E/-W	Northing	Ground Level:	2927.00	Latitude	Longitude
0.00	0.00	441785.80	Easting	609864.20	32° 12' 50.705 N	103° 58' 41.173 W

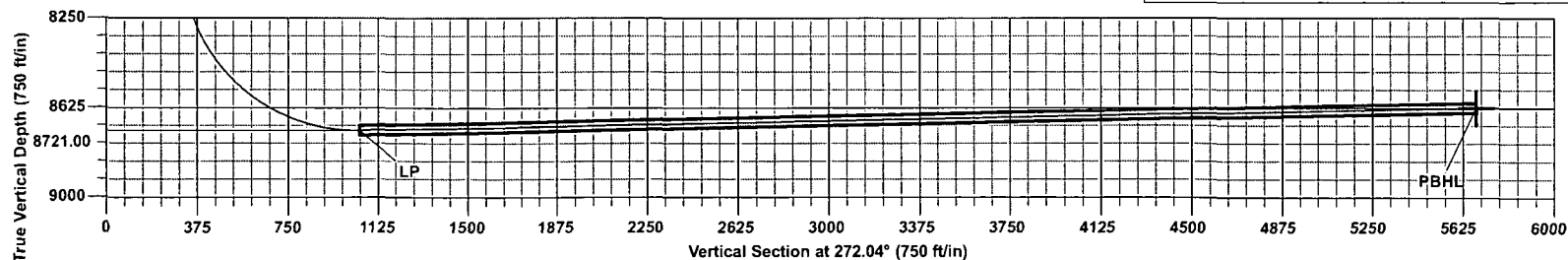
DESIGN TARGET DETAILS						
Name	TVD	+N/-S	+E/-W	Northing	Easting	
Cedar Canyon 16 State #6H PP	0.00	237.02	-1041.38	442022.80	608822.90	
Cedar Canyon 16 State #6H PBHL	8626.00	201.72	-5676.04	441987.50	604188.60	



SITE DETAILS: Cedar Canyon 16 State #6H	
Site Centre Northing:	441785.80
Easting:	609864.20
Positional Uncertainty:	0.00
Convergence:	0.19
Local North:	Grid



Plan: Cedar Canyon 16 State #6H (Cedar Canyon 16 State #6H/ORIG HOLE)  
 Created By: Puneet Bhatia Date: 11:12, July 10 2013



# OXY

## Planning Report

Database:	HOPSPP	Local Co-ordinate Reference:	Well Cedar Canyon 16 State #6H
Company:	ENGINEERING.CALCS	TVD Reference:	WELL @ 2951.00ft (H&P 477 KB -24')
Project:	Permian - Eddy County, NM	MD Reference:	WELL @ 2951.00ft (H&P 477 KB -24')
Site:	Cedar Canyon 16 State #6H	North Reference:	Grid
Well:	Cedar Canyon 16 State #6H	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIG HOLE		
Design:	Cedar Canyon 16 State #6H		

Project:	Permian - Eddy County, NM, New Mexico		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		Using geodetic scale factor

Site:	Cedar Canyon 16 State #6H		
Site Position:	Northings:	441,785.80 ft	Latitude: 32° 12' 50.705 N
From: Map	Easting:	609,864.20 ft	Longitude: 103° 58' 41.173 W
Position Uncertainty:	0.00 ft	Slot Radius: 0.000 in	Grid Convergence: 0.19 °

Well:	Cedar Canyon 16 State #6H		
Well Position	+N/-S	0.00 ft	Northings: 441,785.80 ft
	+E/-W	0.00 ft	Easting: 609,864.20 ft
Position Uncertainty	0.00 ft	Wellhead Elevation:	Ground Level: 2,927.00 ft

Wellbore:	ORIG HOLE		
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	7/9/2013	7.51	60.09	48,409

Design:	Cedar Canyon 16 State #6H		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(ft)	(ft)	(ft)
	0.00	0.00	0.00
			272.04

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,260.00	0.00	0.00	3,260.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,510.00	5.00	308.00	3,509.68	6.71	-8.59	2.00	2.00	0.00	308.00	
7,721.68	5.00	308.00	7,705.34	232.70	-297.85	0.00	0.00	0.00	0.00	
8,021.68	0.00	0.00	8,004.96	240.76	-308.16	1.67	-1.67	0.00	180.00	
9,161.35	91.17	269.58	8,721.00	235.44	-1,039.00	8.00	8.00	-7.93	269.58	
13,799.48	91.17	269.58	8,626.00	201.72	-5,676.04	0.00	0.00	0.00	0.00	Cedar Canyon 16 Sta

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Company:	ENGINEERING CALCS	TVD Reference:	WELL @ 2951.00ft (H&P 477 KB - 24')
Project:	Permian - Eddy County, NM	MD Reference:	WELL @ 2951.00ft (H&P 477 KB - 24')
Site:	Cedar Canyon 16 State #6H	North Reference:	Grid
Well:	Cedar Canyon 16 State #6H	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIG HOLE		
Design:	Cedar Canyon 16 State #6H		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cedar Canyon 16 State #6H PP									
3,260.00	0.00	0.00	3,260.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
3,300.00	0.80	308.00	3,300.00	0.17	-0.22	0.23	2.00	2.00	0.00
3,400.00	2.80	308.00	3,399.94	2.11	-2.70	2.77	2.00	2.00	0.00
3,500.00	4.80	308.00	3,499.72	6.19	-7.92	8.13	2.00	2.00	0.00
3,510.00	5.00	308.00	3,509.68	6.71	-8.59	8.82	2.00	2.00	0.00
Start 4211.68 hold at 3510.00 MD									
3,600.00	5.00	308.00	3,599.34	11.54	-14.77	15.17	0.00	0.00	0.00
3,700.00	5.00	308.00	3,698.96	16.91	-21.64	22.23	0.00	0.00	0.00
3,800.00	5.00	308.00	3,798.58	22.27	-28.51	29.28	0.00	0.00	0.00
3,900.00	5.00	308.00	3,898.20	27.64	-35.38	36.33	0.00	0.00	0.00
4,000.00	5.00	308.00	3,997.82	33.00	-42.24	43.39	0.00	0.00	0.00
4,100.00	5.00	308.00	4,097.44	38.37	-49.11	50.44	0.00	0.00	0.00
4,200.00	5.00	308.00	4,197.06	43.74	-55.98	57.50	0.00	0.00	0.00
4,300.00	5.00	308.00	4,296.68	49.10	-62.85	64.55	0.00	0.00	0.00
4,400.00	5.00	308.00	4,396.30	54.47	-69.72	71.61	0.00	0.00	0.00
4,500.00	5.00	308.00	4,495.92	59.83	-76.58	78.66	0.00	0.00	0.00
4,600.00	5.00	308.00	4,595.54	65.20	-83.45	85.71	0.00	0.00	0.00
4,700.00	5.00	308.00	4,695.15	70.57	-90.32	92.77	0.00	0.00	0.00
4,800.00	5.00	308.00	4,794.77	75.93	-97.19	99.82	0.00	0.00	0.00
4,900.00	5.00	308.00	4,894.39	81.30	-104.06	106.88	0.00	0.00	0.00
5,000.00	5.00	308.00	4,994.01	86.66	-110.92	113.93	0.00	0.00	0.00
5,100.00	5.00	308.00	5,093.63	92.03	-117.79	120.99	0.00	0.00	0.00
5,200.00	5.00	308.00	5,193.25	97.39	-124.66	128.04	0.00	0.00	0.00
5,300.00	5.00	308.00	5,292.87	102.76	-131.53	135.09	0.00	0.00	0.00
5,400.00	5.00	308.00	5,392.49	108.13	-138.39	142.15	0.00	0.00	0.00
5,500.00	5.00	308.00	5,492.11	113.49	-145.26	149.20	0.00	0.00	0.00
5,600.00	5.00	308.00	5,591.73	118.86	-152.13	156.26	0.00	0.00	0.00
5,700.00	5.00	308.00	5,691.35	124.22	-159.00	163.31	0.00	0.00	0.00
5,800.00	5.00	308.00	5,790.97	129.59	-165.87	170.36	0.00	0.00	0.00
5,900.00	5.00	308.00	5,890.59	134.96	-172.73	177.42	0.00	0.00	0.00
6,000.00	5.00	308.00	5,990.21	140.32	-179.60	184.47	0.00	0.00	0.00
6,100.00	5.00	308.00	6,089.83	145.69	-186.47	191.53	0.00	0.00	0.00
6,200.00	5.00	308.00	6,189.45	151.05	-193.34	198.58	0.00	0.00	0.00
6,300.00	5.00	308.00	6,289.07	156.42	-200.21	205.64	0.00	0.00	0.00
6,400.00	5.00	308.00	6,388.69	161.78	-207.07	212.69	0.00	0.00	0.00
6,500.00	5.00	308.00	6,488.31	167.15	-213.94	219.74	0.00	0.00	0.00
6,600.00	5.00	308.00	6,587.92	172.52	-220.81	226.80	0.00	0.00	0.00
6,700.00	5.00	308.00	6,687.54	177.88	-227.68	233.85	0.00	0.00	0.00
6,800.00	5.00	308.00	6,787.16	183.25	-234.55	240.91	0.00	0.00	0.00
6,900.00	5.00	308.00	6,886.78	188.61	-241.41	247.96	0.00	0.00	0.00
7,000.00	5.00	308.00	6,986.40	193.98	-248.28	255.02	0.00	0.00	0.00
7,100.00	5.00	308.00	7,086.02	199.35	-255.15	262.07	0.00	0.00	0.00
7,200.00	5.00	308.00	7,185.64	204.71	-262.02	269.12	0.00	0.00	0.00
7,300.00	5.00	308.00	7,285.26	210.08	-268.89	276.18	0.00	0.00	0.00
7,400.00	5.00	308.00	7,384.88	215.44	-275.75	283.23	0.00	0.00	0.00
7,500.00	5.00	308.00	7,484.50	220.81	-282.62	290.29	0.00	0.00	0.00
7,600.00	5.00	308.00	7,584.12	226.17	-289.49	297.34	0.00	0.00	0.00
7,700.00	5.00	308.00	7,683.74	231.54	-296.36	304.39	0.00	0.00	0.00
7,721.68	5.00	308.00	7,705.34	232.70	-297.85	305.92	0.00	0.00	0.00
Start Drop -1.67									
7,800.00	3.69	308.00	7,783.43	236.36	-302.53	310.73	1.67	-1.67	0.00

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Site:	Cedar Canyon 16 State #6H	North Reference:	Grid
Well:	Cedar Canyon 16 State #6H	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIG HOLE		
Design:	Cedar Canyon 16 State #6H		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	N/S (ft)	E/W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
7,900.00	2.03	308.00	7,883.30	239.43	-306.46	314.77	1.67	-1.67	0.00	
8,000.00	0.36	308.00	7,983.28	240.72	-308.10	316.46	1.67	-1.67	0.00	
8,021.68	0.00	0.00	8,004.96	240.76	-308.16	316.51	1.67	-1.67	0.00	
<b>KOP</b>										
8,100.00	6.27	269.58	8,083.12	240.73	-312.43	320.79	8.00	8.00	0.00	
8,200.00	14.27	269.58	8,181.44	240.60	-330.24	338.58	8.00	8.00	0.00	
8,300.00	22.27	269.58	8,276.32	240.37	-361.56	369.86	8.00	8.00	0.00	
8,400.00	30.27	269.58	8,365.93	240.05	-405.77	414.04	8.00	8.00	0.00	
8,500.00	38.27	269.58	8,448.50	239.64	-462.03	470.25	8.00	8.00	0.00	
8,600.00	46.27	269.58	8,522.45	239.15	-529.23	537.39	8.00	8.00	0.00	
8,700.00	54.27	269.58	8,586.32	238.59	-606.07	614.16	8.00	8.00	0.00	
8,800.00	62.27	269.58	8,638.87	237.97	-691.04	699.06	8.00	8.00	0.00	
8,900.00	70.27	269.58	8,679.09	237.31	-782.51	790.44	8.00	8.00	0.00	
9,000.00	78.27	269.58	8,706.19	236.61	-878.68	886.53	8.00	8.00	0.00	
9,100.00	86.27	269.58	8,719.63	235.89	-977.69	985.45	8.00	8.00	0.00	
9,161.35	91.17	269.58	8,721.00	235.44	-1,039.00	1,046.71	8.00	8.00	0.00	
<b>LP</b>										
9,200.00	91.17	269.58	8,720.21	235.16	-1,077.64	1,085.32	0.00	0.00	0.00	
9,300.00	91.17	269.58	8,718.16	234.43	-1,177.62	1,185.20	0.00	0.00	0.00	
9,400.00	91.17	269.58	8,716.11	233.71	-1,277.60	1,285.09	0.00	0.00	0.00	
9,500.00	91.17	269.58	8,714.07	232.98	-1,377.57	1,384.98	0.00	0.00	0.00	
9,600.00	91.17	269.58	8,712.02	232.25	-1,477.55	1,484.87	0.00	0.00	0.00	
9,700.00	91.17	269.58	8,709.97	231.53	-1,577.53	1,584.75	0.00	0.00	0.00	
9,800.00	91.17	269.58	8,707.92	230.80	-1,677.50	1,684.64	0.00	0.00	0.00	
9,900.00	91.17	269.58	8,705.87	230.07	-1,777.48	1,784.53	0.00	0.00	0.00	
10,000.00	91.17	269.58	8,703.82	229.34	-1,877.45	1,884.42	0.00	0.00	0.00	
10,100.00	91.17	269.58	8,701.78	228.62	-1,977.43	1,984.30	0.00	0.00	0.00	
10,200.00	91.17	269.58	8,699.73	227.89	-2,077.41	2,084.19	0.00	0.00	0.00	
10,300.00	91.17	269.58	8,697.68	227.16	-2,177.38	2,184.08	0.00	0.00	0.00	
10,400.00	91.17	269.58	8,695.63	226.44	-2,277.36	2,283.97	0.00	0.00	0.00	
10,500.00	91.17	269.58	8,693.58	225.71	-2,377.34	2,383.85	0.00	0.00	0.00	
10,600.00	91.17	269.58	8,691.53	224.98	-2,477.31	2,483.74	0.00	0.00	0.00	
10,700.00	91.17	269.58	8,689.49	224.25	-2,577.29	2,583.63	0.00	0.00	0.00	
10,800.00	91.17	269.58	8,687.44	223.53	-2,677.27	2,683.52	0.00	0.00	0.00	
10,900.00	91.17	269.58	8,685.39	222.80	-2,777.24	2,783.40	0.00	0.00	0.00	
11,000.00	91.17	269.58	8,683.34	222.07	-2,877.22	2,883.29	0.00	0.00	0.00	
11,100.00	91.17	269.58	8,681.29	221.34	-2,977.19	2,983.18	0.00	0.00	0.00	
11,200.00	91.17	269.58	8,679.25	220.62	-3,077.17	3,083.07	0.00	0.00	0.00	
11,300.00	91.17	269.58	8,677.20	219.89	-3,177.15	3,182.95	0.00	0.00	0.00	
11,400.00	91.17	269.58	8,675.15	219.16	-3,277.12	3,282.84	0.00	0.00	0.00	
11,500.00	91.17	269.58	8,673.10	218.44	-3,377.10	3,382.73	0.00	0.00	0.00	
11,600.00	91.17	269.58	8,671.05	217.71	-3,477.08	3,482.61	0.00	0.00	0.00	
11,700.00	91.17	269.58	8,669.00	216.98	-3,577.05	3,582.50	0.00	0.00	0.00	
11,800.00	91.17	269.58	8,666.96	216.25	-3,677.03	3,682.39	0.00	0.00	0.00	
11,900.00	91.17	269.58	8,664.91	215.53	-3,777.01	3,782.28	0.00	0.00	0.00	
12,000.00	91.17	269.58	8,662.86	214.80	-3,876.98	3,882.16	0.00	0.00	0.00	
12,100.00	91.17	269.58	8,660.81	214.07	-3,976.96	3,982.05	0.00	0.00	0.00	
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12,500.00	91.17	269.58	8,652.62	211.16	-4,376.86	4,381.60	0.00	0.00	0.00	
12,600.00	91.17	269.58	8,650.57	210.44	-4,476.84	4,481.49	0.00	0.00	0.00	
12,700.00	91.17	269.58	8,648.52	209.71	-4,576.82	4,581.38	0.00	0.00	0.00	

# OXY

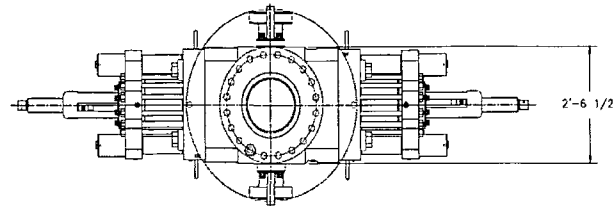
## Planning Report

Database:	HOPSPP	Local Co-ordinate Reference:	Well Cedar Canyon 16 State #6H
Company:	ENGINEERING CALCS	TVD Reference:	WELL @ 2951.00ft (H&P 477 KB -24')
Project:	Permian - Eddy County, NM	MD Reference:	WELL @ 2951.00ft (H&P 477 KB -24')
Site:	Cedar Canyon 16 State #6H	North Reference:	Grid
Well:	Cedar Canyon 16 State #6H	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIG HOLE		
Design:	Cedar Canyon 16 State #6H		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
12,800.00	91.17	269.58	8,646.47	208.98	-4,676.79	4,681.26	0.00	0.00	0.00
12,900.00	91.17	269.58	8,644.42	208.26	-4,776.77	4,781.15	0.00	0.00	0.00
13,000.00	91.17	269.58	8,642.38	207.53	-4,876.75	4,881.04	0.00	0.00	0.00
13,100.00	91.17	269.58	8,640.33	206.80	-4,976.72	4,980.93	0.00	0.00	0.00
13,200.00	91.17	269.58	8,638.28	206.07	-5,076.70	5,080.81	0.00	0.00	0.00
13,300.00	91.17	269.58	8,636.23	205.35	-5,176.67	5,180.70	0.00	0.00	0.00
13,400.00	91.17	269.58	8,634.18	204.62	-5,276.65	5,280.59	0.00	0.00	0.00
13,500.00	91.17	269.58	8,632.13	203.89	-5,376.63	5,380.48	0.00	0.00	0.00
13,600.00	91.17	269.58	8,630.09	203.17	-5,476.60	5,480.36	0.00	0.00	0.00
13,700.00	91.17	269.58	8,628.04	202.44	-5,576.58	5,580.25	0.00	0.00	0.00
13,799.48	91.17	269.58	8,626.00	201.72	-5,676.04	5,679.62	0.00	0.00	0.00
PBHL - Cedar Canyon 16 State #6H PBHL									

Design Targets									
Target Name	hit/miss target	Dip Angle (°)	Dip Dir (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	
Cedar Canyon 16 State	- plan misses target center by 1068.01ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)	0.00	0.00	0.00	237.02	-1,041.38	442,022.80	608,822.90	32° 12' 53.084 N 103° 58' 53.285 W
Cedar Canyon 16 State	- plan hits target center	-1.17	269.58	8,626.00	201.72	-5,676.04	441,987.50	604,188.60	32° 12' 52.882 N 103° 59' 47.230 W
	- Rectangle (sides W0.00 H4,638.13 D40.00)								

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Comment
3,260.00	3,260.00	0.00	0.00	Start Build 2.00
3,510.00	3,509.68	6.71	-8.59	Start 4211.68 hold at 3510.00 MD
7,721.68	7,705.34	232.70	-297.85	Start Drop -1.67
8,021.68	8,004.96	240.76	-308.16	KOP
9,161.35	8,721.00	235.44	-1,039.00	LP
13,799.48	8,626.00	201.72	-5,676.04	PBHL



- LEGEND**
- ① 4 1/16"-10M FLANGED END GATE VALVE
  - ② 4 1/16"-10M FLANGED END GATE VALVE WITH DOUBLE ACTING HYDRAULIC ACTUATOR
  - ③ 2 1/16"-10M FLANGED END GATE VALVE
  - ④ 2 1/16"-10M FLANGED END CHECK VALVE
  - ⑤ DOUBLE STUDDED ADAPTER

SHAFFER BOLTED-COVER SPHERICAL ANNUULAR PREVENTER (API 16A MONOGRAMMED, 13 5/8"-5M WP), 10M BOTTOM FLANGE x 5M STUDDED TOP (WEIGHT = 14,300 LBS WITH SHAFFER API 16A HOT OIL RESISTANT ACRYLONITRILE ELEMENT)

CAVERON DM DOUBLE RAM-TYPE PREVENTER (API 16A MONOGRAMMED, 13 5/8"-10M WP), WITH 5" CAVERON PIPE RAMS (CAMRAM FRONT PACKERS & TOP SEALS) IN TOP CAVITY AND CAMRON DS SHEARING BLIND RAMS IN BOTTOM CAVITY. BOTTOM FLANGE x STUDDED TOP (WEIGHT = 21,100 LBS WITH RAMS)

13 5/8"-10M WP CAMRON DRILLING SPOOL (API 16A MONOGRAMMED), STUDDED TOP x FLANGED BOTTOM WITH 4 1/16"-10M WP FLANGED OUTLETS (WEIGHT APPROXIMATELY 5,000 LBS)

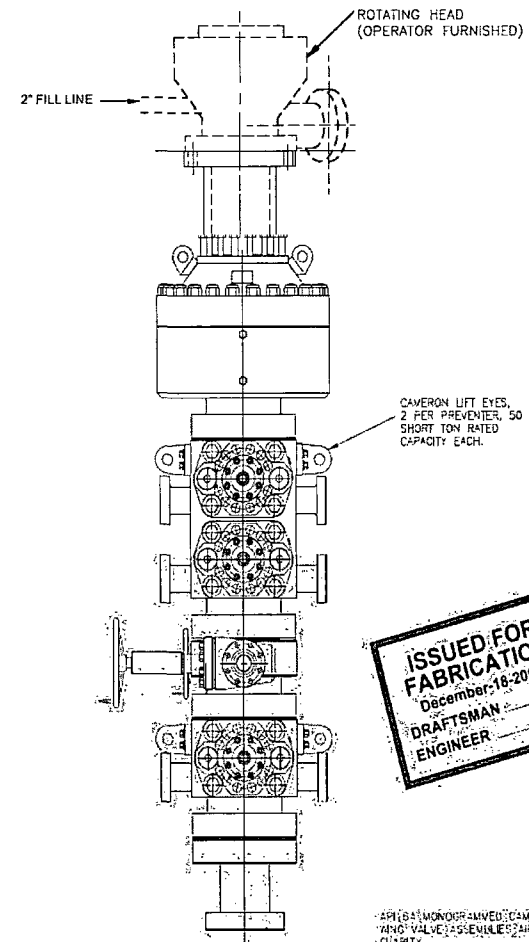
CAVERON DM SINGLE RAM-TYPE PREVENTER (API 16A MONOGRAMMED, 13 5/8"-10M WP) WITH 5" CAVERON PIPE RAMS (CAMRAM FRONT PACKERS & TOP SEALS) BOTTOM FLANGE x STUDDED TOP (WEIGHT = 10,000 LBS)

H&P FURNISHED  
13 5/8"-10M x 13 5/8"-5M  
ADAPTER SPOOL 2'-0" LONG

### 13 5/8 - 10M BOP STACK WITH 13 5/8 - 5M ANNULAR

#### PROPRIETARY

THE DRAWING AND THE IDEAS AND INFORMATION INCLUDED IN THE DRAWING ARE PROPRIETARY AND ARE NOT TO BE REPRODUCED, REPRINTED OR DISCLOSED IN ANY MANNER WITHOUT THE PRIOR WRITTEN CONSENT OF A DULY AUTHORIZED OFFICER OF HELMERICH & PAYNE INTERNATIONAL DRILLING CO.



**ISSUED FOR  
FABRICATION**  
December 16, 2007  
DRAFTSMAN  
ENGINEER

API 16A MONOGRAMMED CAMRON CHOKES AND KILLING VALVE ASSEMBLIES ARE NOT SHOWN FOR CLARITY.  
HEIGHTS DO NOT INCLUDE HOSES, ADAPTER SPOOLS OR CAUTION CONNECT FITTINGS.

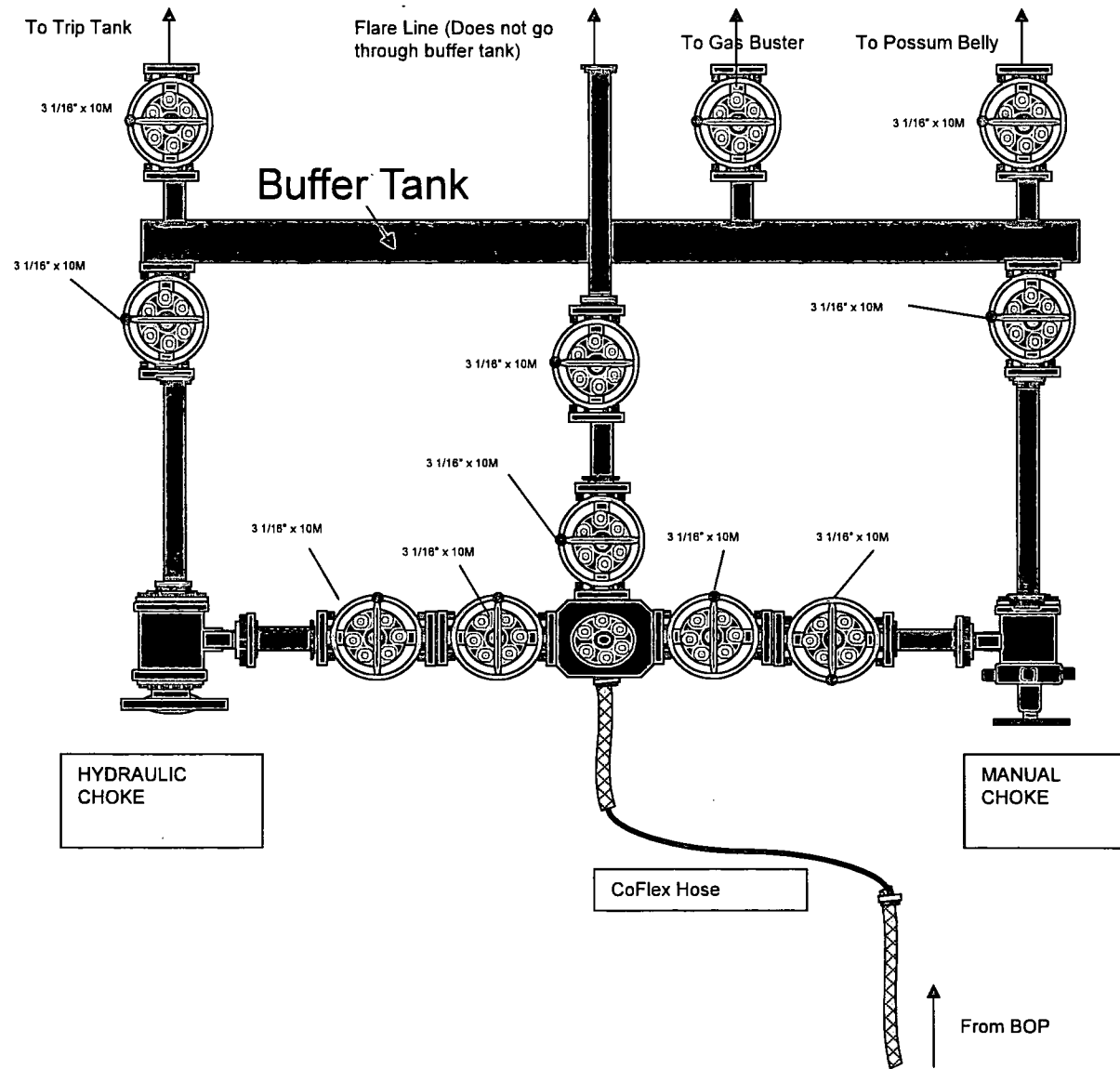
ENGINEERING APPROVAL		DATE	TITLE
12/18/07	ADDED SHEET 05	JAY	13 5/8"-10M BOP-3 RAM-STACK FLEXRIG3
4-10-07	CAVERON TIE-ROD GATE VALVES ADDED	JAY	CUSTOMER H&P
4-24-07	ADDED TO SPOOL ADAPTER SPOOL	JAY	PROJECT: FLEXRIG3
02-07-07	ADDED ADAPTER SPOOL	VAL	DATE 02-05-07
05-13-02	DISPERSED BOP STACK	VAL	SCALE 3/4"=1'-0"
REV	DATE	DESCRIPTION	BY
1	12/18/07	ADDED SHEET 05	JAY
2	4-10-07	CAVERON TIE-ROD GATE VALVES ADDED	JAY
3	4-24-07	ADDED TO SPOOL ADAPTER SPOOL	JAY
4	02-07-07	ADDED ADAPTER SPOOL	VAL
5	05-13-02	DISPERSED BOP STACK	VAL

**HELMERICH & PAYNE**  
INTERNATIONAL DRILLING CO.

13 5/8"-10M BOP-3 RAM-STACK  
FLEXRIG3

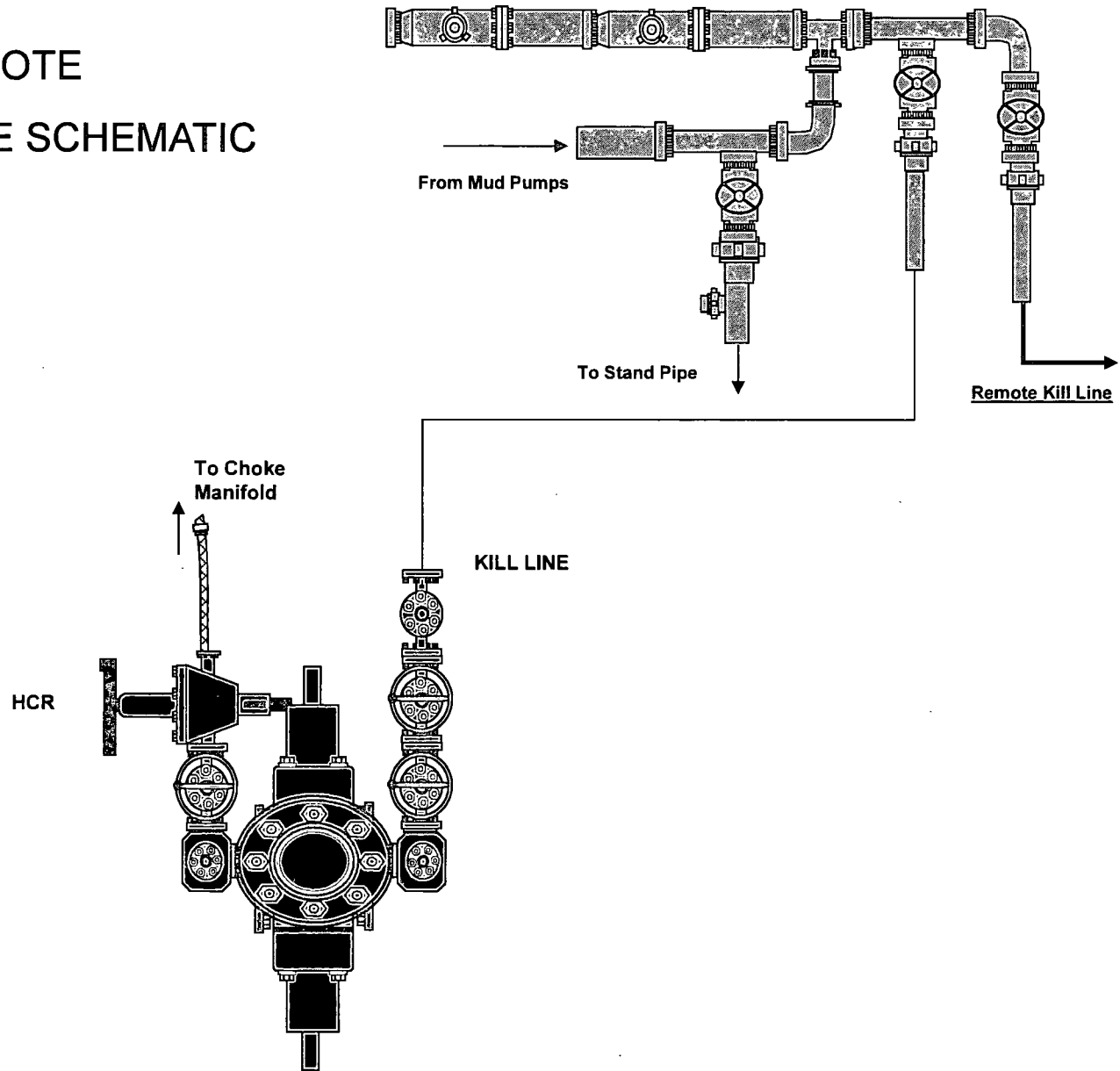
CUSTOMER H&P  
PROJECT: FLEXRIG3  
DATE 02-05-07  
SCALE 3/4"=1'-0"  
SHEET 05 OF 05  
210-P1-07

# FLEX3 STD CHOKE MANIFOLD (COMPREHENSIVE)

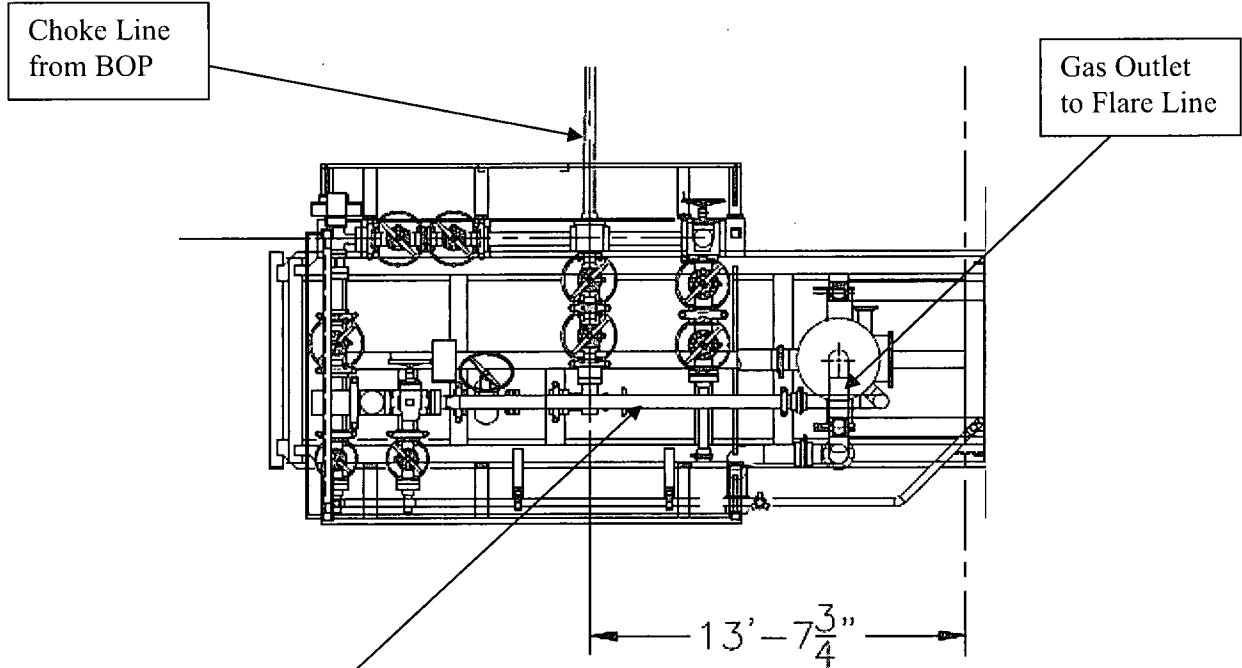




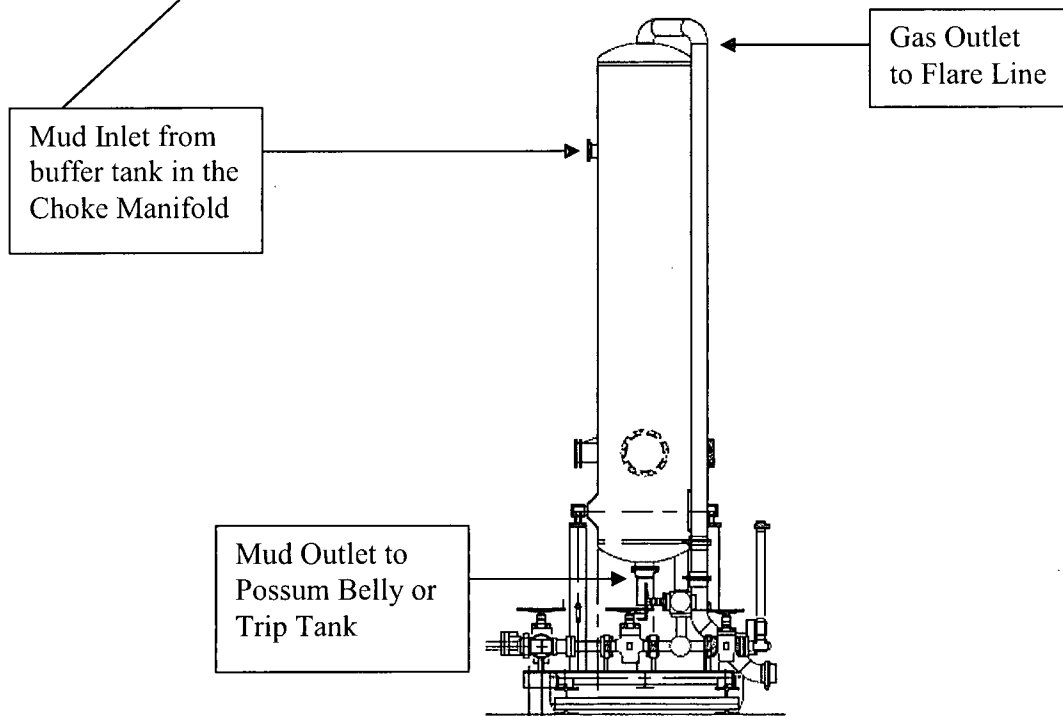
# 10M REMOTE KILL LINE SCHEMATIC



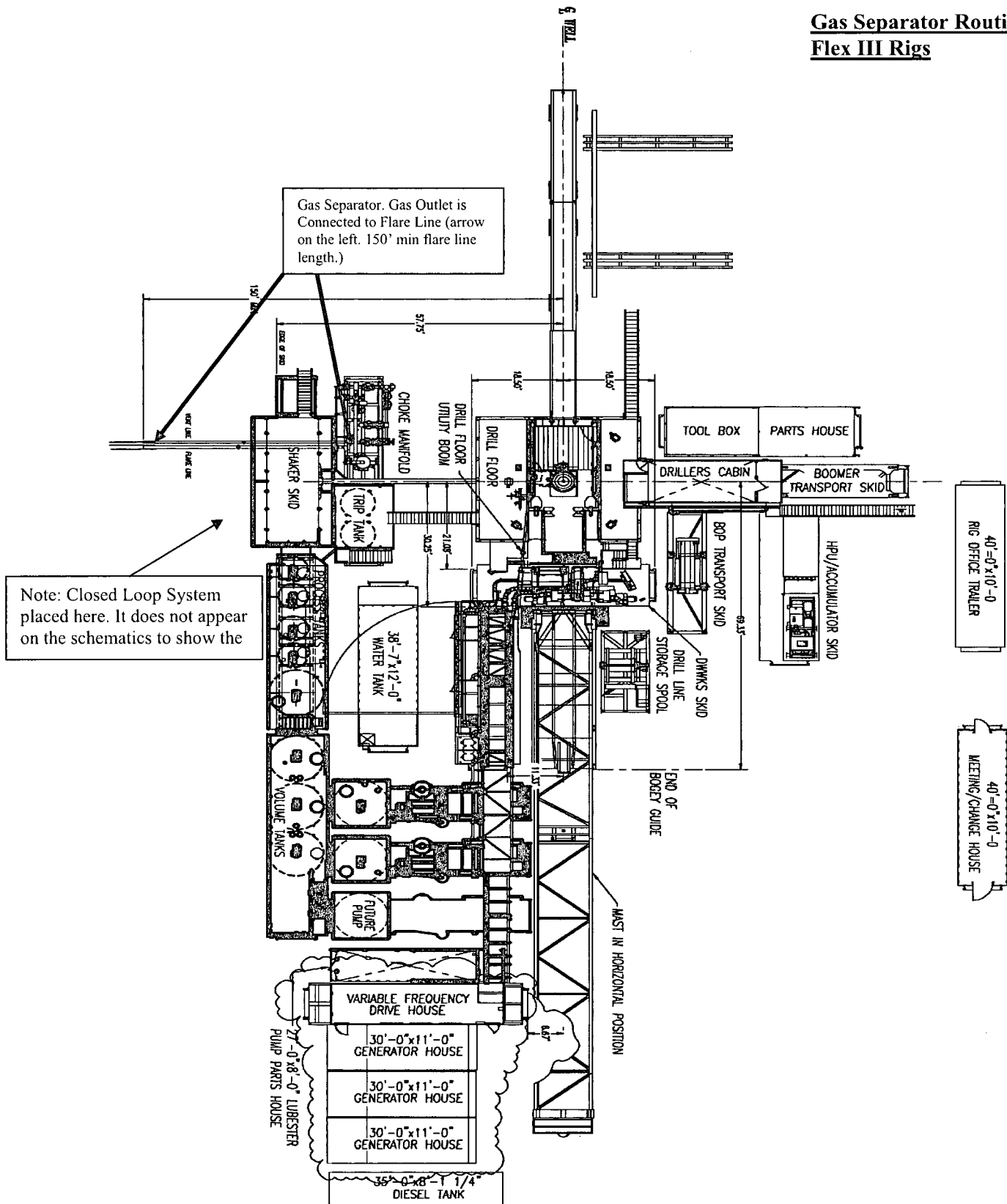
**Choke Manifold – Gas Separator (Top View)**



**Choke Manifold – Gas Separator (Side View)**

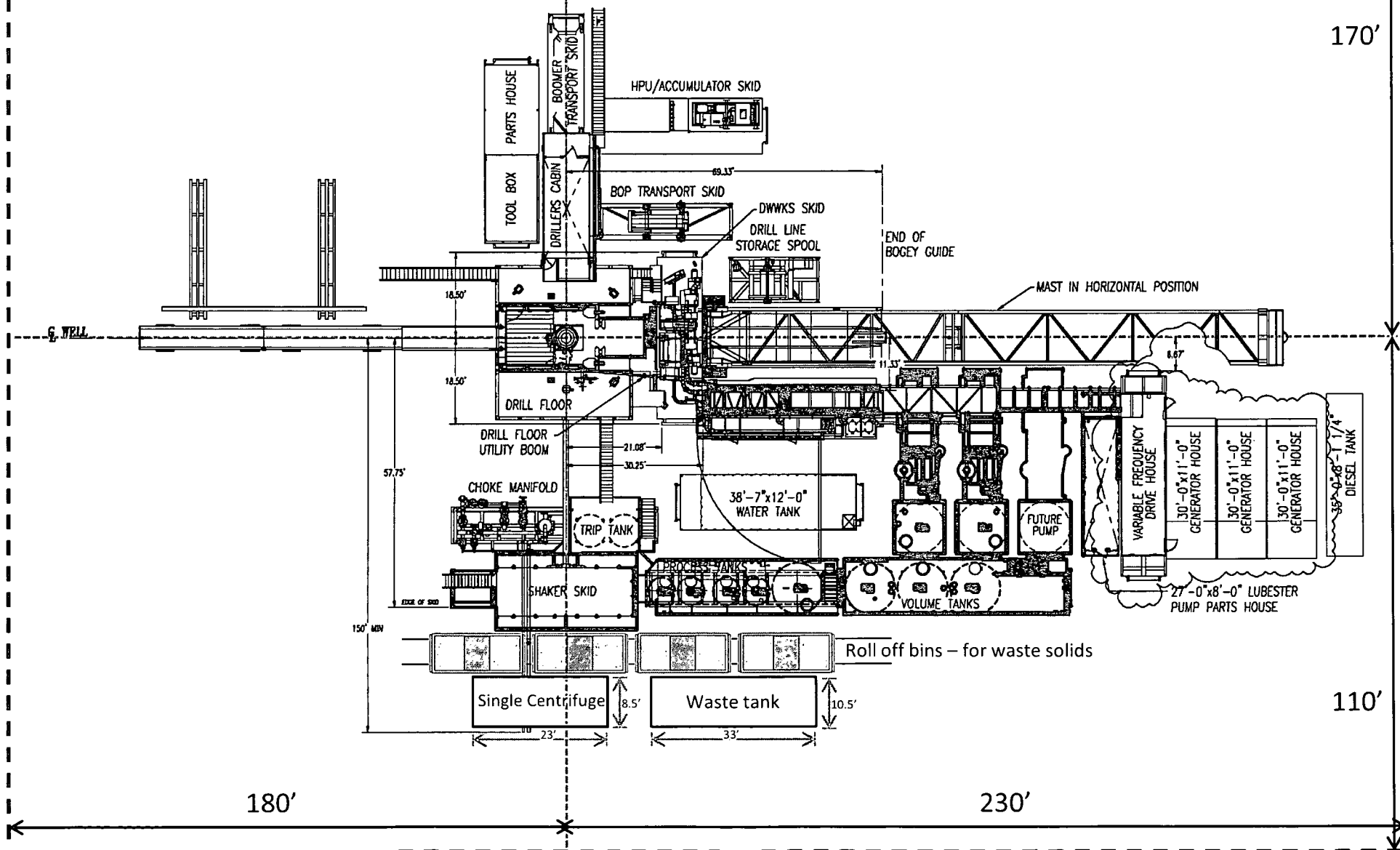


## Gas Separator Routing Flex III Rigs

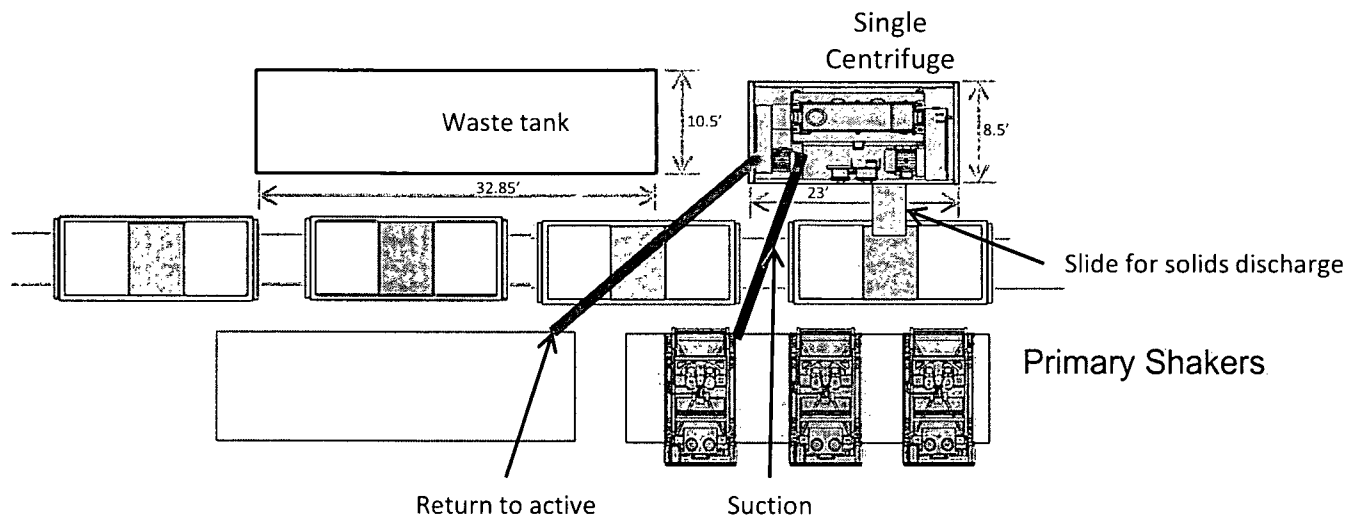


# Oxy Single Centrifuge Closed Loop System – New Mexico Flex III

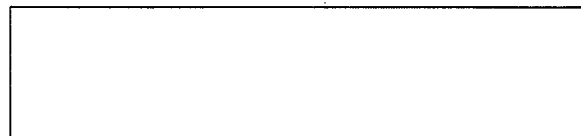
May 28, 2013



# Oxy



Well Head



Oxy Single Centrifuge  
Closed Loop System – New  
Mexico Flex III  
May 28, 2013



## **Permian Drilling Hydrogen Sulfide Drilling Operations Plan New Mexico**

### **Scope**

This contingency plan establishes guidelines for the public, all company employees, and contract employees who's work activities may involve exposure to hydrogen sulfide (H<sub>2</sub>S) gas.

While drilling this well, it is possible to encounter H<sub>2</sub>S bearing formations. At all times, the first barrier to control H<sub>2</sub>S emissions will be the drilling fluid, which will have a density high enough to control influx.

### **Objective**

1. Provide an immediate and predetermined response plan to any condition when H<sub>2</sub>S is detected. All H<sub>2</sub>S detections in excess of 10 parts per million (ppm) concentration are considered an Emergency.
2. Prevent any and all accidents, and prevent the uncontrolled release of hydrogen sulfide into the atmosphere.
3. Provide proper evacuation procedures to cope with emergencies.
4. Provide immediate and adequate medical attention should an injury occur.

## **Discussion**

Implementation:	This plan with all details is to be fully implemented before drilling to <u>commence</u> .
Emergency response Procedure:	This section outlines the conditions and denotes steps to be taken in the event of an emergency.
Emergency equipment Procedure:	This section outlines the safety and emergency equipment that will be required for the drilling of this well.
Training provisions:	This section outlines the training provisions that must be adhered to prior to drilling.
Drilling emergency call lists:	Included are the telephone numbers of all persons to be contacted should an emergency exist.
Briefing:	This section deals with the briefing of all people involved in the drilling operation.
Public safety:	Public safety personnel will be made aware of any potential evacuation and any additional support needed.
Check lists:	Status check lists and procedural check lists have been included to insure adherence to the plan.
General information:	A general information section has been included to supply support information.

### **Hydrogen Sulfide Training**

All personnel, whether regularly assigned, contracted, or employed on an unscheduled basis, will receive training from a qualified instructor in the following areas prior to commencing drilling operations on the well:

1. The hazards and characteristics of H<sub>2</sub>S.
2. Proper use and maintenance of personal protective equipment and life support systems.
3. H<sub>2</sub>S detection.
4. Proper use of H<sub>2</sub>S detectors, alarms, warning systems, briefing areas, evacuation procedures and prevailing winds.
5. Proper techniques for first aid and rescue procedures.
6. Physical effects of hydrogen sulfide on the human body.
7. Toxicity of hydrogen sulfide and sulfur dioxide.
8. Use of SCBA and supplied air equipment.
9. First aid and artificial respiration.
10. Emergency rescue.

In addition, supervisory personnel will be trained in the following areas:

1. The effects of H<sub>2</sub>S on metal components. If high tensile strength tubular is to be used, personnel will be trained in their special maintenance requirements.
2. Corrective action and shut-in procedures when drilling a well, blowout prevention and well control procedures.
3. The contents and requirements of the H<sub>2</sub>S Drilling Operations Plan.

H<sub>2</sub>S training refresher must have been taken within one year prior to drilling the well. Specifics on the well to be drilled will be discussed during the pre-spud meeting. H<sub>2</sub>S and well control (choke) drills will be performed while drilling the well, at least on a weekly basis. This plan shall be available in the well site. All personnel will be required to carry the documentation proving that the H<sub>2</sub>S training has been taken.

#### **Service company and visiting personnel**

- A. Each service company that will be on this well will be notified if the zone contains H<sub>2</sub>S.
- B. Each service company must provide for the training and equipment of their employees before they arrive at the well site.
- C. Each service company will be expected to attend a well site briefing



## Emergency Equipment Requirements

### 1. Well control equipment

The well shall have hydraulic BOP equipment for the anticipated pressures. Equipment is to be tested on installation and follow Oxy Well Control standard, as well as BLM Onshore Order #2.

*Special control equipment:*

- A. Hydraulic BOP equipment with remote control on ground. Remotely operated choke.
- B. Rotating head
- C. Gas buster equipment shall be installed before drilling out of surface pipe.

### 2. Protective equipment for personnel

- A. Four (4) 30-minute positive pressure air packs (2 at each briefing area) on location.
- B. Adequate fire extinguishers shall be located at strategic locations.
- C. Radio / cell telephone communication will be available at the rig.
  - Rig floor and trailers.
  - Vehicle.

### 3. Hydrogen sulfide sensors and alarms

- A. H<sub>2</sub>S sensor with alarms will be located on the rig floor, at the bell nipple, and at the flow line. These monitors will be set to alarm at 10 ppm with strobe light, and audible alarm.
- B. Hand operated detectors with tubes.
- C. H<sub>2</sub>S monitor tester (to be provided by contract Safety Company.)
- D. There shall be one combustible gas detector on location at all times.

### 4. Visual Warning Systems

- A. One sign located at each location entrance with the following language:

**Caution – potential poison gas**  
**Hydrogen sulfide**  
**No admittance without authorization**

*Wind sock – wind streamers:*

- A. One 36" (in length) wind sock located at protection center, at height visible from rig floor.
- B. One 36" (in length) wind sock located at height visible from pit areas.

*Condition flags*

- A. One each condition flag to be displayed to denote conditions.

**green – normal conditions**  
**yellow – potential danger**  
**red – danger, H2S present**

- B. Condition flag shall be posted at each location sign entrance.

5. Mud Program

The mud program is designed to minimize the risk of having H2S and other formation fluids at surface. Proper mud weight and safe drilling practices will be applied. H2S scavengers will be used to minimize the hazards while drilling. Below is a summary of the drilling program.

*Mud inspection devices:*

Garrett gas train or hatch tester for inspection of sulfide concentration in mud system.

6. Metallurgy

- A. Drill string, casing, tubing, wellhead, blowout preventers, drilling spools or adapters, kill lines, choke manifold, lines and valves shall be suitable for the H2S service.
- B. All the elastomers, packing, seals and ring gaskets shall be suitable for H2S service.

7. Well Testing

No drill stem test will be performed on this well.

8. Evacuation plan

Evacuation routes should be established prior to well spud for each well and discussed with all rig personnel.

9. Designated area

- A. Parking and visitor area: all vehicles are to be parked at a predetermined safe distance from the wellhead.
- B. There will be a designated smoking area.
- C. Two briefing areas on either side of the location at the maximum allowable distance from the well bore so they offset prevailing winds perpendicularly, or at a 45-degree angle if wind direction tends to shift in the area.

**Emergency procedures**

- A. In the event of any evidence of H<sub>2</sub>S level above 10 ppm, take the following steps:
  - 1. The Driller will pick up off bottom, shut down the pumps, slow down the pipe rotation.
  - 2. Secure and don escape breathing equipment, report to the upwind designated safe briefing / muster area.
  - 3. All personnel on location will be accounted for and emergency search should begin for any missing, the Buddy System will be implemented.
  - 4. Order non-essential personnel to leave the well site, order all essential personnel out of the danger zone and upwind to the nearest designated safe briefing / muster area.
  - 5. Entrance to the location will be secured to a higher level than our usual "Meet and Greet" requirement, and the proper condition flag will be displayed at the entrance to the location.
  - 6. Take steps to determine if the H<sub>2</sub>S level can be corrected or suppressed and, if so, proceed as required.
- B. If uncontrollable conditions occur:
  - 1. Take steps to protect and/or remove any public in the down-wind area from the rig – partial evacuation and isolation. Notify necessary public safety personnel and appropriate regulatory entities (i.e. BLM) of the situation.

2. Remove all personnel to the nearest upwind designated safe briefing / muster area or off location.
3. Notify public safety personnel of safe briefing / muster area.
4. An assigned crew member will blockade the entrance to the location. No unauthorized personnel will be allowed entry to the location.
5. Proceed with best plan (at the time) to regain control of the well. Maintain tight security and safety procedures.

C. Responsibility:

1. Designated personnel.
  - a. Shall be responsible for the total implementation of this plan.
  - b. Shall be in complete command during any emergency.
  - c. Shall designate a back-up.

All personnel:	<ol style="list-style-type: none"> <li>1. On alarm, don escape unit and report to the nearest upwind designated safe briefing / muster area upw</li> <li>2. Check status of personnel (buddy system).</li> <li>3. Secure breathing equipment.</li> <li>4. Await orders from supervisor.</li> </ol>
Drill site manager:	<ol style="list-style-type: none"> <li>1. Don escape unit if necessary and report to nearest upwind designated safe briefing / muster area.</li> <li>2. Coordinate preparations of individuals to return to point of release with tool pusher and driller (using the buddy system).</li> <li>3. Determine H2S concentrations.</li> <li>4. Assess situation and take control measures.</li> </ol>
Tool pusher:	<ol style="list-style-type: none"> <li>1. Don escape unit Report to up nearest upwind designated safe briefing / muster area.</li> <li>2. Coordinate preparation of individuals to return to point of release with tool pusher drill site manager (using the buddy system).</li> <li>3. Determine H2S concentration.</li> <li>4. Assess situation and take control measures.</li> </ol>
Driller:	<ol style="list-style-type: none"> <li>1. Don escape unit, shut down pumps, continue rotating DP.</li> </ol>

- |   |  |
|---|--|
|   | <ol style="list-style-type: none"> <li>2. Check monitor for point of release.</li> <li>3. Report to nearest upwind designated safe briefing / muster area.</li> <li>4. Check status of personnel (in an attempt to rescue, use the buddy system).</li> <li>5. Assigns least essential person to notify Drill Site Manager and tool pusher by quickest means in case of their absence.</li> <li>6. Assumes the responsibilities of the Drill Site Manager and tool pusher until they arrive should they be absent.</li> </ol> |
| Derrick man<br>Floor man #1<br>Floor man #2 | <ol style="list-style-type: none"> <li>1. Will remain in briefing / muster area until instructed by supervisor.</li> </ol>   |
| Mud engineer:                               | <ol style="list-style-type: none"> <li>1. Report to nearest upwind designated safe briefing / muster area.</li> <li>2. When instructed, begin check of mud for pH and H<sub>2</sub>S level. (Garett gas train.)</li> </ol>   |
| Safety personnel:                           | <ol style="list-style-type: none"> <li>1. Mask up and check status of all personnel and secure operations as instructed by drill site manager.</li> </ol>  |

### **Taking a kick**

When taking a kick during an H<sub>2</sub>S emergency, all personnel will follow standard Well control procedures after reporting to briefing area and masking up.

### **Open-hole logging**

All unnecessary personnel off floor. Drill Site Manager and safety personnel should monitor condition, advise status and determine need for use of air equipment.

### **Running casing or plugging**

Following the same “tripping” procedure as above. Drill Site Manager and safety personnel should determine if all personnel have access to protective equipment.

### **Ignition procedures**

The decision to ignite the well is the responsibility of the operator (Oxy Drilling Management). The decision should be made only as a last resort and in a situation where it is clear that:

1. Human life and property are endangered.
2. There is no hope controlling the blowout under the prevailing conditions at the well.

#### **Instructions for igniting the well**

1. Two people are required for the actual igniting operation. They must wear self-contained breathing units and have a safety rope attached. One man (tool pusher or safety engineer) will check the atmosphere for explosive gases with the gas monitor. The other man is responsible for igniting the well.
2. Primary method to ignite: 25 mm flare gun with range of approximately 500 feet.
3. Ignite upwind and do not approach any closer than is warranted.
4. Select the ignition site best for protection, and which offers an easy escape route.
5. Before firing, check for presence of combustible gas.
6. After lighting, continue emergency action and procedure as before.
7. All unassigned personnel will remain in briefing area until instructed by supervisor or directed by the Drill Site Manager.

**Remember:** After well is ignited, burning hydrogen sulfide will convert to sulfur dioxide, which is also highly toxic. **Do not assume the area is safe after the well is ignited.**

### Status check list

Note: All items on this list must be completed before drilling to production casing point.

1. H2S sign at location entrance.
2. Two (2) wind socks located as required.
3. Four (4) 30-minute positive pressure air packs (2 at each Briefing area) on location for all rig personnel and mud loggers.
4. Air packs inspected and ready for use.
5. Cascade system and hose line hook-up as needed.
6. Cascade system for refilling air bottles as needed.
7. Condition flag on location and ready for use.
8. H2S detection system hooked up and tested.
9. H2S alarm system hooked up and tested.
10. Hand operated H2S detector with tubes on location.
11. 1 – 100' length of nylon rope on location.
12. All rig crew and supervisors trained as required.
13. All outside service contractors advised of potential H2S hazard on well.
14. No smoking sign posted and a designated smoking area identified.
15. Calibration of all H2S equipment shall be noted on the IADC report.

Checked by: \_\_\_\_\_ Date: \_\_\_\_\_

### **Procedural check list during H2S events**

#### **Perform each tour:**

1. Check fire extinguishers to see that they have the proper charge.
2. Check breathing equipment to ensure that it is in proper working order.
3. Make sure all the H2S detection system is operative.

#### **Perform each week:**

1. Check each piece of breathing equipment to make sure that demand or forced air regulator is working. This requires that the bottle be opened and the mask assembly be put on tight enough so that when you inhale, you receive air or feel air flow.
2. BOP skills (well control drills).
3. Check supply pressure on BOP accumulator stand by source.
4. Check breathing equipment mask assembly to see that straps are loosened and turned back, ready to put on.
5. Check pressure on breathing equipment air bottles to make sure they are charged to full volume. ( Air quality checked for proper air grade "D" before bringing to location)
6. Confirm pressure on all supply air bottles.
7. Perform breathing equipment drills with on-site personnel.
8. Check the following supplies for availability.
  - A. Emergency telephone list.
  - B. Hand operated H2S detectors and tubes.



### **General evacuation plan**

1. When the company approved supervisor (Drill Site Manager, consultant, rig pusher, or driller) determines the H<sub>2</sub>S gas cannot be limited to the well location and the public will be involved, he will activate the evacuation plan.
2. Drill Site Manager or designee will notify local government agency that a hazardous condition exists and evacuation needs to be implemented.
3. Company or contractor safety personnel that have been trained in the use of H<sub>2</sub>S detection equipment and self-contained breathing equipment will monitor H<sub>2</sub>S concentrations, wind directions, and area of exposure. They will delineate the outer perimeter of the hazardous gas area. Extension to the evacuation area will be determined from information gathered.
4. Law enforcement personnel (state police, police dept., fire dept., and sheriff's dept.) Will be called to aid in setting up and maintaining road blocks. Also, they will aid in evacuation of the public if necessary.
5. After the discharge of gas has been controlled, company safety personnel will determine when the area is safe for re-entry.

**Important: Law enforcement personnel will not be asked to come into a contaminated area. Their assistance will be limited to uncontaminated areas. Constant radio contact will be maintained with them.**

### **Emergency actions**

#### **Well blowout – if emergency**

1. Evacuate all personnel to “Safe Briefing / Muster Areas” or off location if needed.
2. If sour gas – evacuate rig personnel.
3. If sour gas – evacuate public within 3000 ft radius of exposure.
4. Don SCBA and shut well in if possible using the buddy system.
5. Notify Drilling Superintendent and call 911 for emergency help (fire dept and ambulance) if needed.
6. Implement the Blowout Contingency Plan, and Drilling Emergency Action Plan.
6. Give first aid as needed.

#### **Person down location/facility**

1. If immediately possible, contact 911. Give location and wait for confirmation.
2. Don SCBA and perform rescue operation using buddy system.

### Toxic effects of hydrogen sulfide

Hydrogen sulfide is extremely toxic. The acceptable ceiling concentration for eight-hour exposure is 10 ppm, which is .001% by volume. Hydrogen sulfide is heavier than air (specific gravity – 1.192) and colorless. It forms an explosive mixture with air between 4.3 and 46.0 percent by volume. Hydrogen sulfide is almost as toxic as hydrogen cyanide and is between five and six times more toxic than carbon monoxide. Toxicity data for hydrogen sulfide and various other gases are compared in table i. Physical effects at various hydrogen sulfide exposure levels are shown in table ii.

Table i  
Toxicity of various gases

Common name	Chemical formula	Specific gravity (sc=1)	Threshold limit (1)	Hazardous limit (2)	Lethal concentration (3)
Hydrogen Cyanide	Hcn	0.94	10 ppm	150 ppm/hr	300 ppm
Hydrogen Sulfide	H2S	1.18	10 ppm	250 ppm/hr	600 ppm
Sulfur Dioxide	So2	2.21	5 ppm	-	1000 ppm
Chlorine	Cl2	2.45	1 ppm	4 ppm/hr	1000 ppm
Carbon Monoxide	Co	0.97	50 ppm	400 ppm/hr	1000 ppm
Carbon Dioxide	Co2	1.52	5000 ppm	5%	10%
Methane	Ch4	0.55	90,000 ppm	Combustible above 5% in air	

- 1) threshold limit – concentration at which it is believed that all workers may be repeatedly exposed day after day without adverse effects.
- 2) hazardous limit – concentration that will cause death with short-term exposure.
- 3) lethal concentration – concentration that will cause death with short-term exposure.

### Toxic effects of hydrogen sulfide

Table ii  
Physical effects of hydrogen sulfide

<u>Percent (%)</u>	<u>Ppm</u>	<u>Concentration</u> Grains 100 std. Ft3*	<u>Physical effects</u>
0.001	<10	00.65	Obvious and unpleasant odor.

0.002	10	01.30	Safe for 8 hours of exposure.
0.010	100	06.48	Kill smell in 3 – 15 minutes. May sting eyes and throat.
0.020	200	12.96	Kills smell shortly; stings eyes and throat.
0.050	500	32.96	Dizziness; breathing ceases in a few minutes; needs prompt artificial respiration.
0.070	700	45.36	Unconscious quickly; death will result if not rescued promptly.
0.100	1000	64.30	Unconscious at once; followed by death within minutes.

\*at 15.00 psia and 60'f.

### **Use of self-contained breathing equipment (SCBA)**

1. Written procedures shall be prepared covering safe use of SCBA's in dangerous atmosphere, which might be encountered in normal operations or in emergencies. Personnel shall be familiar with these procedures and the available SCBA.
2. SCBA's shall be inspected frequently at random to insure that they are properly used, cleaned, and maintained.
3. Anyone who may use the SCBA's shall be trained in how to insure proper face-piece to face seal. They shall wear SCBA's in normal air and then wear them in a test atmosphere. (note: such items as facial hair {beard or sideburns} and eyeglasses will not allow proper seal.) Anyone that may be reasonably expected to wear SCBA's should have these items removed before entering a toxic atmosphere. A special mask must be obtained for anyone who must wear eyeglasses or contact lenses.
4. Maintenance and care of SCBA's:
  - a. A program for maintenance and care of SCBA's shall include the following:
    1. Inspection for defects, including leak checks.
    2. Cleaning and disinfecting.
    3. Repair.
    4. Storage.
  - b. Inspection, self-contained breathing apparatus for emergency use shall be inspected monthly.
    1. Fully charged cylinders.
    2. Regulator and warning device operation.
    3. Condition of face piece and connections.
    4. Rubber parts shall be maintained to keep them pliable and prevent deterioration.
  - c. Routinely used SCBA's shall be collected, cleaned and disinfected as frequently as necessary to insure proper protection is provided.
5. Persons assigned tasks that requires use of self-contained breathing equipment shall be certified physically fit (medically cleared) for breathing equipment usage at least annually.
6. SCBA's should be worn when:
  - A. Any employee works near the top or on top of any tank unless test reveals less than 10 ppm of H<sub>2</sub>S.

- B. When breaking out any line where H<sub>2</sub>S can reasonably be expected.
- C. When sampling air in areas to determine if toxic concentrations of H<sub>2</sub>S exists.
- D. When working in areas where over 10 ppm H<sub>2</sub>S has been detected.
- E. At any time there is a doubt as to the H<sub>2</sub>S level in the area to be entered.

**Rescue**  
**First aid for H<sub>2</sub>S poisoning**

**Do not panic!**

Remain calm – think!

1. Don SCBA breathing equipment.
2. Remove victim(s) utilizing buddy system to fresh air as quickly as possible. (go up-wind from source or at right angle to the wind. Not down wind.)
3. Briefly apply chest pressure – arm lift method of artificial respiration to clean the victim's lungs and to avoid inhaling any toxic gas directly from the victim's lungs.
4. Provide for prompt transportation to the hospital, and continue giving artificial respiration if needed.
5. Hospital(s) or medical facilities need to be informed, before-hand, of the possibility of H<sub>2</sub>S gas poisoning – no matter how remote the possibility is.
6. Notify emergency room personnel that the victim(s) has been exposed to H<sub>2</sub>S gas.

Besides basic first aid, everyone on location should have a good working knowledge of artificial respiration.

Revised CM 6/27/2012