

DISTRICT I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170

DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate
District Office
 AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-015-41032	Pool Code 13354	Pool Name Wildcat 2nd Bone Springs
Property Code 39046	Property Name CEDAR CANYON 15 FEE	Well Number CORRAL DRAW, B2H
OGRID No. 16696	Operator Name OXY U.S.A., INC.	Elevation 2927'

Surface Location									
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	15	24-S	29-E		170	SOUTH	360	WEST	EDDY

Bottom Hole Location If Different From Surface									
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	15	24-S	29-E		330	SOUTH	350	EAST	EDDY

Dedicated Acres 160	Joint or Infill N	Consolidation Code	Order No.
------------------------	----------------------	--------------------	-----------

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

<p>GEODETIC COORDINATES NAD 27 NME</p> <p>SURFACE LOCATION Y=440526.1 N X=609522.8 E</p> <p>LAT.=32.210627° N LONG.=103.979217° W</p> <p>BOTTOM HOLE LOCATION Y=440684.0 N X=614107.3 E</p> <p>LAT.=32.211019° N LONG.=103.964393° W</p> <p>PENETRATION POINT Y=440686.1 N X=609521.7 E</p> <p>LAT.=32.211067° N LONG.=103.979219° W</p>	<p>CORNER COORDINATES TABLE</p> <p>A - Y=441684.7 N, X=609155.0 E B - Y=441680.9 N, X=614453.4 E C - Y=440356.3 N, X=609164.0 E D - Y=440353.9 N, X=614458.5 E</p>
<p>OPERATOR CERTIFICATION</p> <p>I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</p> <p><i>David Stewart</i> 1/29/13 Signature Date</p> <p>David Stewart Reg. Ado. Printed Name</p> <p>David_Stewart@oxy.com E-mail Address</p>	
<p>SURVEYOR CERTIFICATION</p> <p>I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.</p> <p>JANUARY 17, 2013</p> <p>Date of Survey</p> <p><i>James S. Eidson</i> Signature & Seal of Professional Surveyor</p> <p></p> <p>Certification Number: James S. Eidson 12641 Professional Surveyor: Ronald F. Eidson 3239</p> <p>DSS JWSC W.O.: 13.11.0085</p>	

Operator Name/Number: OXY USA Inc. 16696
 Lease Name/Number: Cedar Canyon 15 Fee #2H Fee
 Pool Name/Number: Wildcat 2nd Bone Spring
 Surface Location: 170 FSL 360 FWL M Sec 15 T24S R29E
 Bottom Hole Location: 330 FSL 350 FEL P Sec 15 T24S R29E

C-102 Plats: 1/17/13 1/23/13 1/28/13 Elevation: 2927' GL

Proposed TD: 8787' TVD 13029' TMD
 SL - Lat: 32.210627 Long: 103.979217 X=609522.8 Y=440526.1 NAD - 1927
 BH - Lat: 32.211019 Long: 103.964393 X=614107.3 Y=440684.0 NAD - 1927

Casing Program:

Hole Size	Interval	OD Csg	Weight	Collar	Grade	Condition	Collapse Design Factor	Burst Design Factor	Tension Design Factor
17-1/2"	320'	13-3/8"	48	ST&C	H-40	New	4.32	1.45	16.2
				Hole filled with 8.4# Mud			740#	1730#	
12-1/4"	3100'	9-5/8"	40	LT&C	J-55	New	3.18	1.36	3.43
				Hole filled with 10.0# Mud			2570#	3950#	
8-3/4"	13029'	5-1/2"	17	BT&C	L-80	New	1.4	1.3	1.7
				Hole filled with 9.2# Mud			8831#	9189#	

Collapse and burst loads calculated using Stress Check with anticipated loads

Cement Program:

- a. 13-3/8" Surface Circulate cement to surface w/ 480sx PP cmt w/ 2% CaCl₂, 14.8ppg 1.35 yield 1326# 24hr CS 165% Excess
- b. 9-5/8" Intermediate Circulate cement to surface w/ 780sx HES light PP cmt w/ 5% Salt + 5#/sx Kol-Seal + .35% Halad R-800 + .125#/sx Poly-E-Flake, 12.9ppg 1.88 yield 500# 24hr CS 105% Excess followed by 320sx PP cmt w/ .5% WellLife-734, 14.8ppg 1.33 yield 1586# 24hs CS 105% Excess
- c. 5-1/2" Production Cement w/ 1220sx HES light PP w/ 3#/sx salt, 12.4ppg 2.05 yield 500# 24hr CS 85% Excess followed by 1220sx Super H cmt w/ .125#/sx Poly-E-Flake + 0.5% Halad R-344 + 0.4% CFR-3 3#/sx Kol Seal + .2% HR-601, 13.2ppg 1.66 yield 1673# 24hr CS 50% Exc - Calc TOC-2500'

Description of Cement Additives: Calcium Chloride, Salt (Accelerator), WellLife-734 (Cement Enhancer), CFR-3 (Dispersant), Kol-Seal, Poly-E-Flake (Lost Circulation Additive), HR-344 (Low Fluid Loss Control), HR-601, HR-800 (Retarder).

Proposed Mud Circulation System:

Depth	Mud Wt. ppg	Visc sec	Fluid Loss	Type System
0 - 320'	8.5-9.0	28-38	NC	Fresh Water/Spud Mud
320 - 3100'	9.8-10.2	28-32	NC	NaCl Brine
3100 - TD	8.8-9.4	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	287'	Formation
b. Top Salt	387'	Formation
c. Bottom Salt	1377'	Formation
d. Base Anhydrite	2977'	Formation
e. Delaware	3020'	Oil/Gas
f. Delaware-Brushy Canyon	5102'	Oil/Gas
g. 1st Bone Spring Lime	6672'	Oil/Gas
h. 1st Bone Spring Sand	7652'	Oil/Gas
i. 2nd Bone Spring Lime	8012'	Oil/Gas
j. 2nd Bone Spring Sand	8472'	Oil/Gas
k. 3rd Bone Spring	8787'	Oil/Gas

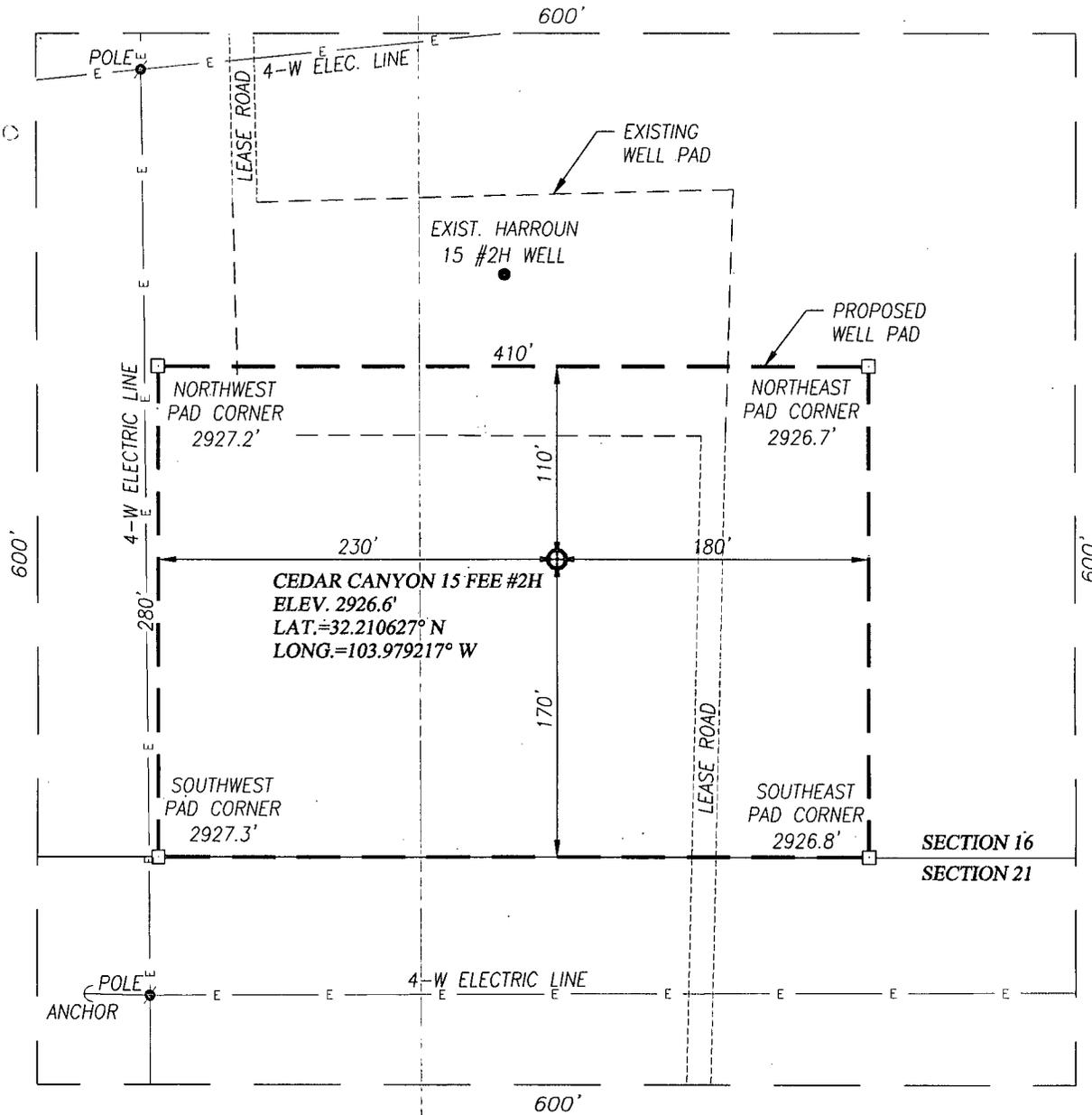
Fresh water may be present above the Rustler formation. Surface casing will be set below the top of the Rustler, which will cover potential fresh water sources.

Spacing Unit:

The following wells are in the Pierce Crossing Bone Spring E. (96473) and completed in the 1st Bone Spring.

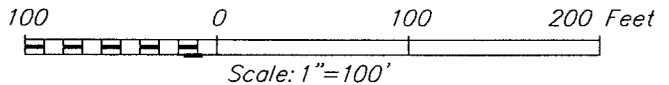
1. Harroun 15 #17 - 30-015-33822 - TVD 7663' - Unit M,N,O
2. Harroun 15 #13 - 30-015-31711 - TVD 7802' - Unit P

SECTION 15, TOWNSHIP 24 SOUTH, RANGE 29 EAST, N.M.P.M.
EDDY COUNTY **NEW MEXICO**



DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF CO. RD. #744 (NICHOLAS) AND CO. RD. #720 (DUARTE), GO EAST ON CO. RD. #720 APPROX. 1.0 MILE. TURN RIGHT ON CO. RD. #748 (McDONALD), AND GO SOUTH THEN EAST APPROX. 5.5 MILES. TURN LEFT AND GO NORTH ACROSS THE PECOS RIVER ON LEASE ROAD APPROX. 1.0 MILE. VEER RIGHT AND GO EAST APPROX. 1.0 MILE. VEER LEFT AND GO NORTHWEST APPROX. 1.0 MILE. TURN RIGHT AND GO NORTHEAST APPROX. 0.2 MILES. VEER LEFT AND GO NORTH APPROX. 0.1 MILE TO THIS LOCATION.



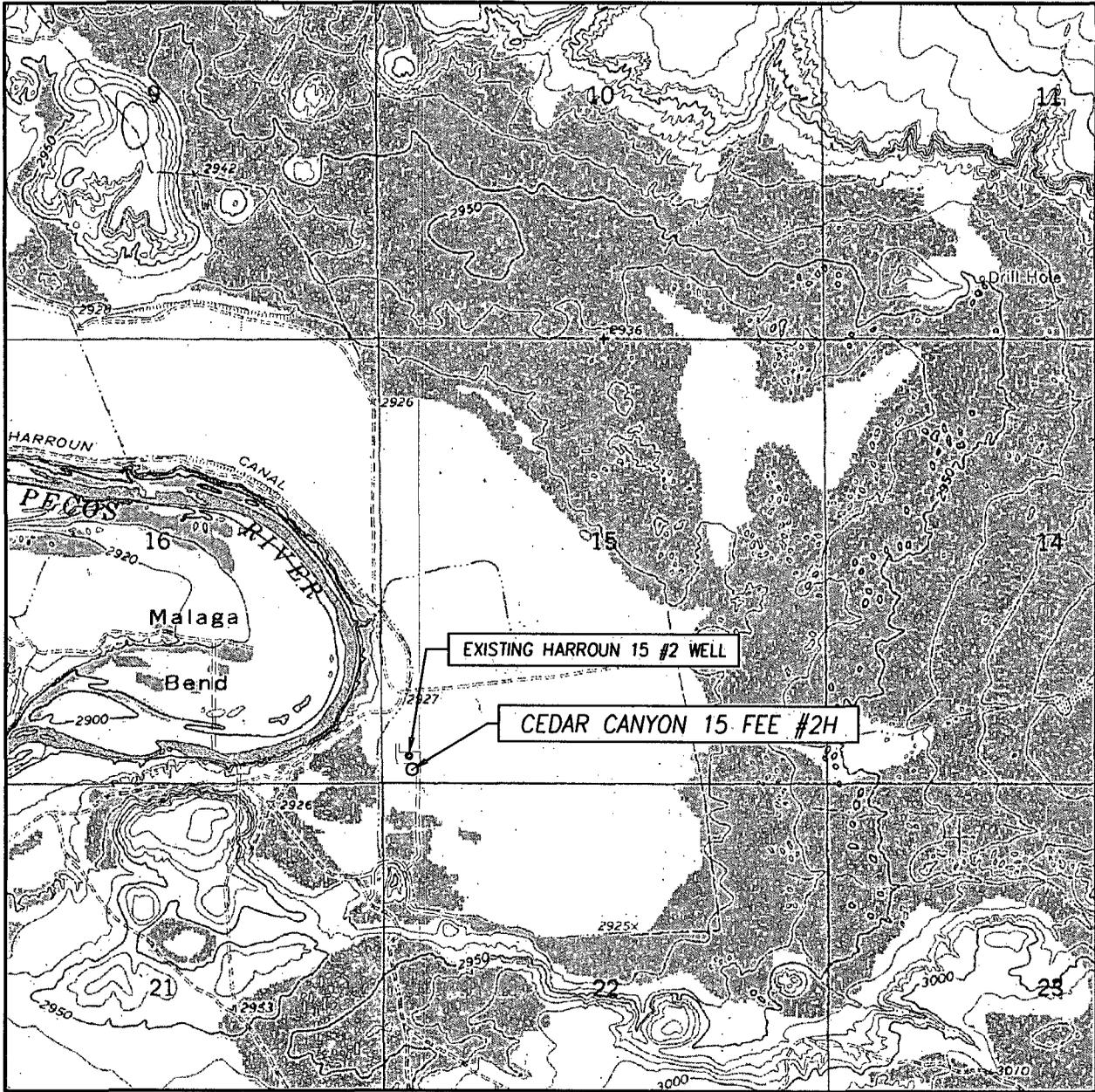
OXY U.S.A., INC.

**CEDAR CANYON 15 FEE #2H WELL
 LOCATED 170 FEET FROM THE SOUTH LINE
 AND 360 FEET FROM THE WEST LINE OF SECTION 15,
 TOWNSHIP 24 SOUTH, RANGE 29 EAST, N.M.P.M.,
 EDDY COUNTY, NEW MEXICO**

PROVIDING SURVEYING SERVICES
 SINCE 1946
JOHN WEST SURVEYING COMPANY
 412 N. DAL PASO
 HOBBS, N.M. 88240
 (575) 393-3117 www.jwsc.biz

Survey Date: 1/17/13	CAD Date: 1/22/13	Drawn By: DSS
W.O. No.: 13110085	Rev: .	Rel. W.O.:
		Sheet 1 of 1

LOCATION VERIFICATION MAP



SCALE: 1" = 2000'

CONTOUR INTERVAL:
PIERCE CANYON, N.M. - 10'

SEC. 15 TWP. 24-S RGE. 29-E

SURVEY _____ N.M.P.M.

COUNTY EDDY STATE NEW MEXICO

DESCRIPTION 170' FSL & 360' FWL

ELEVATION _____ 2927'

OPERATOR _____ OXY U.S.A., INC.

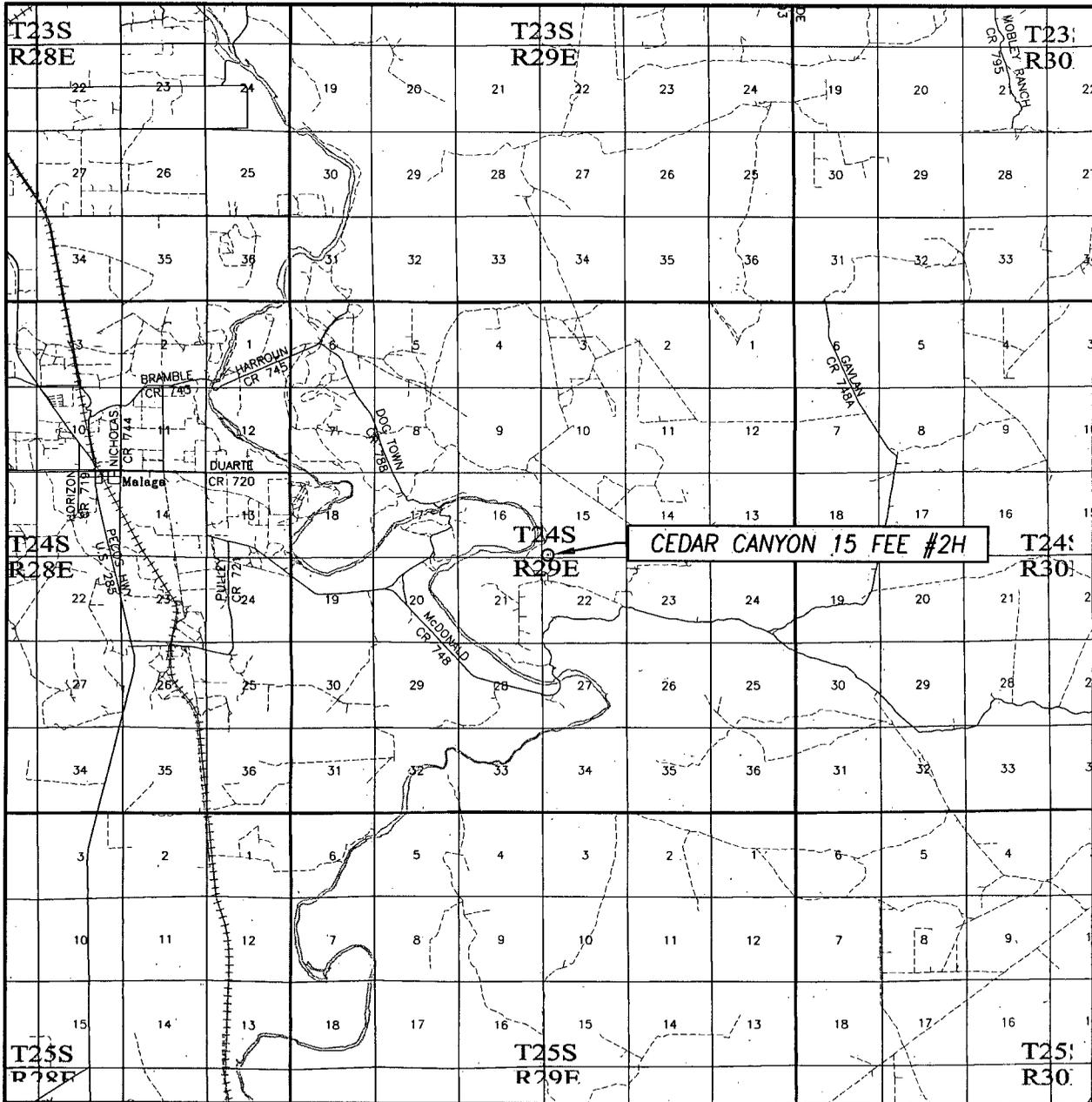
LEASE _____ CEDAR CANYON 15 FEE

U.S.G.S. TOPOGRAPHIC MAP
PIERCE CANYON, N.M.



PROVIDING SURVEYING SERVICES
SINCE 1946
JOHN WEST SURVEYING COMPANY
412 N. DAL PASO
HOBBS, N.M. 88240
(575) 393-3117 www.jwsc.biz

VICINITY MAP



SCALE: 1" = 2 MILES

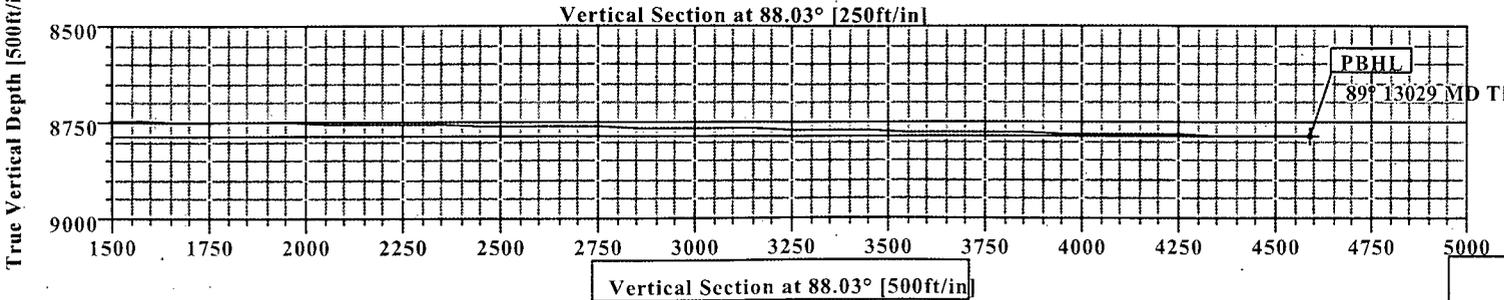
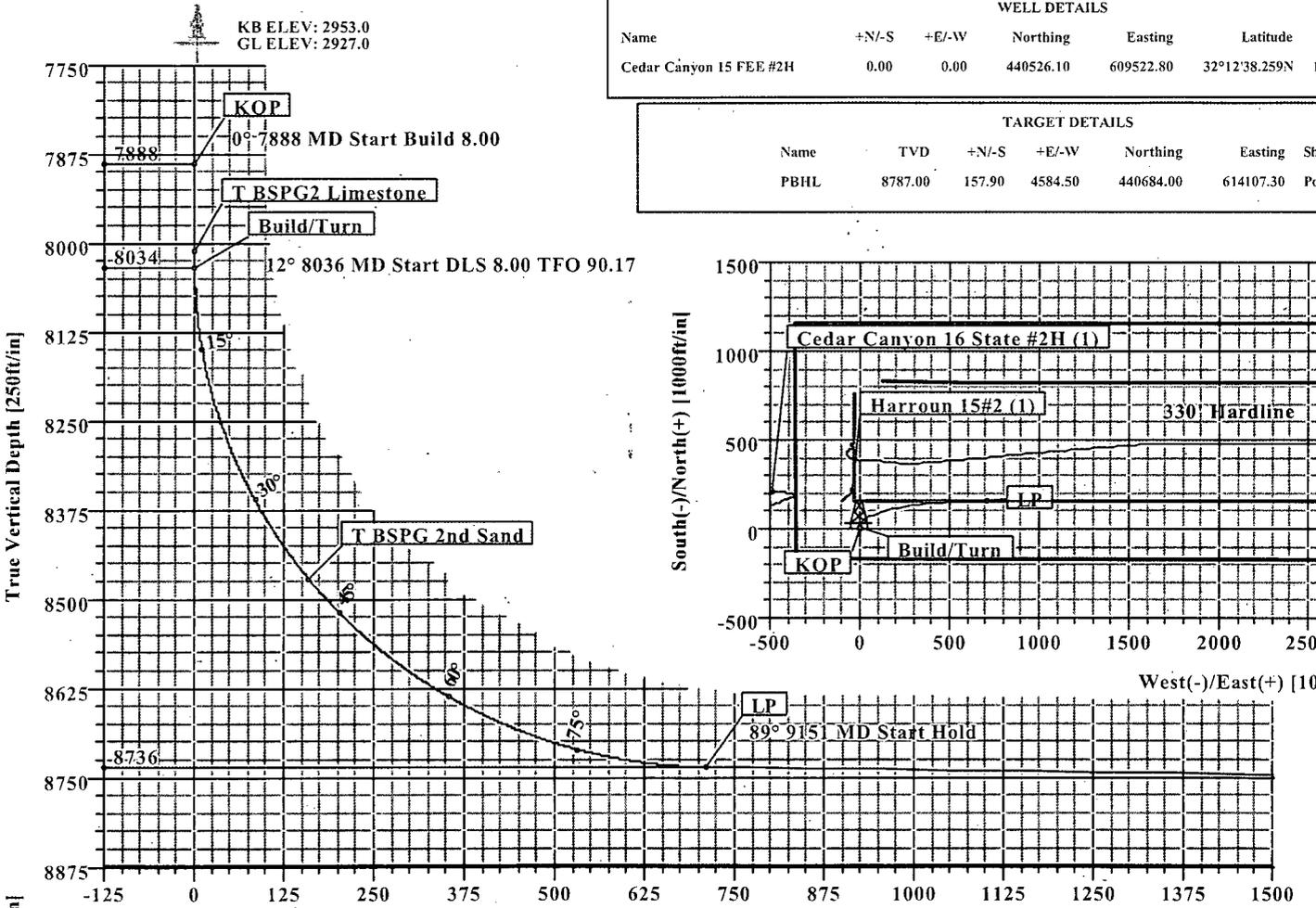
SEC. 15 TWP. 24-S RGE. 29-E
 SURVEY N.M.P.M.
 COUNTY EDDY STATE NEW MEXICO
 DESCRIPTION 170' FSL & 360' FWL
 ELEVATION 2927'
 OPERATOR OXY U.S.A., INC.
 LEASE CEDAR CANYON 15 FEE



PROVIDING SURVEYING SERVICES
 SINCE 1946
JOHN WEST SURVEYING COMPANY
 412 N. DAL PASO
 HOBBS, N.M. 88240
 (575) 393-3117 www.jwsc.biz



Cedar Canyon 15 FEE #2H
Eddy Co, NM



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	7888.26	0.00	0.00	7888.26	0.00	0.00	0.00	0.00	0.00	
3	8035.51	11.78	0.00	8034.47	15.08	0.00	8.00	0.00	0.52	
4	9151.33	89.25	90.02	8735.97	159.20	707.02	8.00	90.17	712.07	
5	13029.15	89.25	90.02	8787.00	157.90	4584.50	0.00	0.00	4587.22	PBHL

WELL DETAILS

Name	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
Cedar Canyon 15 FEE #2H	0.00	0.00	440526.10	609522.80	32°12'38.259N	103°58'45.181W	N/A

TARGET DETAILS

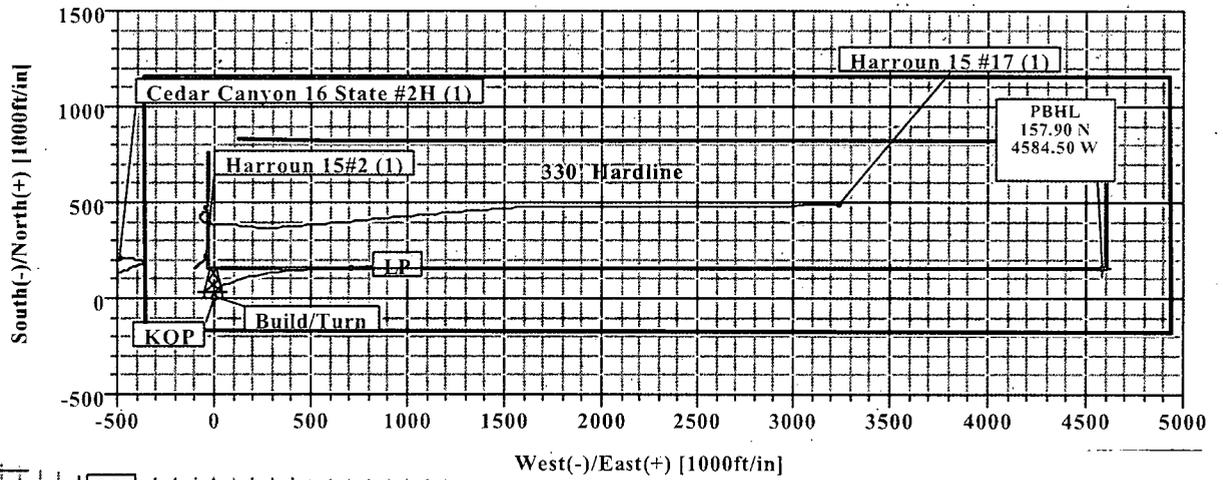
Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
PBHL	8787.00	157.90	4584.50	440684.00	614107.30	Point

SITE DETAILS

Cedar Canyon 15 FEE #2H
 Site Centre Northing: 440526.10
 Easting: 609522.80
 Ground Level: 2927.00
 Positional Uncertainty: 0.00
 Convergence: 0.19

LEGEND

- Cedar Canyon 16 State #2H (1)
- Harroun 15 #17 (1)
- Harroun 15#2 (1)
- Exist. HB State #6 (1)
- 1
- Plan #1





Weatherford International Ltd.

WFT Plan Report - X & Y's



Weatherford

Company: Occidental Permian Ltd. Field: Eddy Co, NM (Nad. 27) Site: Cedar Canyon 15 FEE #2H Well: Cedar Canyon 15 FEE #2H Wellpath: 1	Date: 1/25/2013 Co-ordinate(NE) Reference: Vertical (TVD) Reference: Section (VS) Reference: Survey Calculation Method:	Time: 11:06:22 Well: Cedar Canyon 15 FEE #2H, Grid North SITE: 2952.0 Well (0.00N,0.00E,88.03Azi) Minimum Curvature	Page: 1 Db: Sybase
--	--	--	-------------------------------------

Plan: Plan #1 Principal: Yes	Date Composed: 1/25/2013 Version: 1 Tied-to: From Surface
---	--

Site: Cedar Canyon 15 FEE #2H			
Site Position:	Northing:	440526.10 ft	Latitude: 32 12 38.259 N
From: Map	Easting:	609522.80 ft	Longitude: 103 58 45.181 W
Position Uncertainty: 0.00 ft			North Reference: Grid
Ground Level: 2927.00 ft			Grid Convergence: 0.19 deg

Well: Cedar Canyon 15 FEE #2H				Slot Name:			
Well Position:	+N/-S	0.00 ft	Northing:	440526.10 ft	Latitude:	32 12 38.259 N	
	+E/-W	0.00 ft	Easting :	609522.80 ft	Longitude:	103 58 45.181 W	
Position Uncertainty:		0.00 ft					

Wellpath: 1				Drilled From: Surface			
Current Datum: SITE				Tie-on Depth: 0.00 ft			
Magnetic Data: 3/1/2013				Above System Datum: Mean Sea Level			
Field Strength: 48418 nT				Declination: 7.56 deg			
Vertical Section: Depth From (TVD)				Mag Dip Angle: 60.06 deg			
		+N/-S	+E/-W	ft	ft	deg	deg
	0.00	0.00	0.00	0.00	0.00	88.03	

Plan Section Information

MD	Incl	Azim	TVD	+N/-S	+E/-W	DLS	Build	Turn	TFO	Target
ft	deg	deg	ft	ft	ft	deg/100ft	deg/100ft	deg/100ft	deg	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
7888.26	0.00	0.00	7888.26	0.00	0.00	0.00	0.00	0.00	0.00	
8035.51	11.78	0.00	8034.47	15.08	0.00	8.00	8.00	0.00	0.00	
9151.33	89.25	90.02	8735.97	159.20	707.02	8.00	6.94	8.07	90.17	
13029.15	89.25	90.02	8787.00	157.90	4584.50	0.00	0.00	0.00	0.00	PBHL

Survey

MD	Incl	Azim	TVD	N/S	E/W	VS	DLS	MapN	MapE	Comment
ft	deg	deg	ft	ft	ft	ft	deg/100ft	ft	ft	
7800.00	0.00	0.00	7800.00	0.00	0.00	0.00	0.00	440526.10	609522.80	
7888.26	0.00	0.00	7888.26	0.00	0.00	0.00	0.00	440526.10	609522.80	KOP
7900.00	0.94	0.00	7900.00	0.10	0.00	0.00	8.00	440526.20	609522.80	
7950.00	4.94	0.00	7949.92	2.66	0.00	0.09	8.00	440528.76	609522.80	
8000.00	8.94	0.00	7999.55	8.70	0.00	0.30	8.00	440534.80	609522.80	
8012.62	9.95	0.00	8012.00	10.77	0.00	0.37	8.00	440536.87	609522.80	T BSPG2 Limestone
8035.51	11.78	0.00	8034.47	15.08	0.00	0.52	8.00	440541.18	609522.80	Build/Turn
8050.00	11.83	5.66	8048.66	18.04	0.15	0.77	8.00	440544.14	609522.95	
8100.00	12.83	23.89	8097.52	28.22	2.90	3.87	8.00	440554.32	609525.70	
8150.00	14.86	38.37	8146.08	38.33	9.13	10.44	8.00	440564.43	609531.93	
8200.00	17.57	48.97	8194.10	48.32	18.81	20.46	8.00	440574.42	609541.61	
8250.00	20.68	56.65	8241.34	58.13	31.88	33.86	8.00	440584.23	609554.68	
8300.00	24.05	62.32	8287.58	67.72	48.29	50.58	8.00	440593.82	609571.09	
8350.00	27.58	66.65	8332.58	77.04	67.95	70.55	8.00	440603.14	609590.75	
8400.00	31.22	70.05	8376.14	86.06	90.76	93.67	8.00	440612.16	609613.56	
8450.00	34.93	72.80	8418.03	94.71	116.63	119.82	8.00	440620.81	609639.43	
8500.00	38.69	75.08	8458.06	102.97	145.42	148.87	8.00	440629.07	609668.22	
8518.03	40.06	75.81	8472.00	105.85	156.49	160.04	8.00	440631.95	609679.29	T BSPG 2nd Sand
8550.00	42.49	77.02	8496.02	110.79	176.98	180.69	8.00	440636.89	609699.78	
8600.00	46.31	78.69	8531.74	118.14	211.18	215.11	8.00	440644.24	609733.98	
8650.00	50.16	80.16	8565.04	124.97	247.83	251.98	8.00	440651.07	609770.63	
8700.00	54.02	81.47	8595.76	131.25	286.77	291.11	8.00	440657.35	609809.57	



Weatherford International Ltd.

WFT Plan Report - X & Y's



Weatherford

Company: Occidental Permian Ltd	Date: 1/25/2013	Time: 11:06:22	Page: 12
Field: Eddy Co. NM (Nad 27)	Co-ordinate(NE) Reference: Well: Cedar Canyon 15 FEE #2H, Grid: Nort	Vertical (TVD) Reference: SITE 2952.0	
Site: Cedar Canyon 15 FEE #2H	Section (VS) Reference: Well: (0°00N, 0°00E, 88.03Azi)	Survey Calculation Method: Minimum Curvature	
Well: Cedar Canyon 15 FEE #2H	Db: Sybase		
Wellpath: 1			

Survey

MD ft	Incl deg	Azim deg	TVD ft	N/S ft	E/W ft	VS ft	DLS deg/100ft	MapN ft	MapE ft	Comment
8750.00	57.90	82.66	8623.74	136.96	327.80	332.31	8.00	440663.06	609850.60	
8800.00	61.79	83.75	8648.85	142.07	370.72	375.38	8.00	440668.17	609893.52	
8850.00	65.68	84.77	8670.98	146.54	415.32	420.11	8.00	440672.64	609938.12	
8900.00	69.58	85.72	8690.00	150.37	461.39	466.29	8.00	440676.47	609984.19	
8950.00	73.49	86.63	8705.83	153.53	508.70	513.68	8.00	440679.63	610031.50	
9000.00	77.40	87.50	8718.40	156.00	557.03	562.06	8.00	440682.10	610079.83	
9050.00	81.31	88.35	8727.63	157.77	606.12	611.19	8.00	440683.87	610128.92	
9100.00	85.23	89.18	8733.49	158.84	655.76	660.83	8.00	440684.94	610178.56	
9151.33	89.25	90.02	8735.97	159.20	707.02	712.07	8.00	440685.30	610229.82	LP
9200.00	89.25	90.02	8736.61	159.18	755.68	760.71	0.00	440685.28	610278.48	
9300.00	89.25	90.02	8737.92	159.15	855.67	860.64	0.00	440685.25	610378.47	
9400.00	89.25	90.02	8739.24	159.12	955.66	960.57	0.00	440685.22	610478.46	
9500.00	89.25	90.02	8740.55	159.08	1055.65	1060.50	0.00	440685.18	610578.45	
9600.00	89.25	90.02	8741.87	159.05	1155.65	1160.43	0.00	440685.15	610678.45	
9700.00	89.25	90.02	8743.19	159.02	1255.64	1260.36	0.00	440685.12	610778.44	
9800.00	89.25	90.02	8744.50	158.98	1355.63	1360.29	0.00	440685.08	610878.43	
9900.00	89.25	90.02	8745.82	158.95	1455.62	1460.22	0.00	440685.05	610978.42	
10000.00	89.25	90.02	8747.13	158.92	1555.61	1560.15	0.00	440685.02	611078.41	
10100.00	89.25	90.02	8748.45	158.88	1655.60	1660.09	0.00	440684.98	611178.40	
10200.00	89.25	90.02	8749.77	158.85	1755.59	1760.02	0.00	440684.95	611278.39	
10300.00	89.25	90.02	8751.08	158.81	1855.58	1859.95	0.00	440684.91	611378.38	
10400.00	89.25	90.02	8752.40	158.78	1955.58	1959.88	0.00	440684.88	611478.38	
10500.00	89.25	90.02	8753.71	158.75	2055.57	2059.81	0.00	440684.85	611578.37	
10600.00	89.25	90.02	8755.03	158.71	2155.56	2159.74	0.00	440684.81	611678.36	
10700.00	89.25	90.02	8756.35	158.68	2255.55	2259.67	0.00	440684.78	611778.35	
10800.00	89.25	90.02	8757.66	158.65	2355.54	2359.60	0.00	440684.75	611878.34	
10900.00	89.25	90.02	8758.98	158.61	2455.53	2459.53	0.00	440684.71	611978.33	
11000.00	89.25	90.02	8760.30	158.58	2555.52	2559.47	0.00	440684.68	612078.32	
11100.00	89.25	90.02	8761.61	158.55	2655.52	2659.40	0.00	440684.65	612178.32	
11200.00	89.25	90.02	8762.93	158.51	2755.51	2759.33	0.00	440684.61	612278.31	
11300.00	89.25	90.02	8764.24	158.48	2855.50	2859.26	0.00	440684.58	612378.30	
11400.00	89.25	90.02	8765.56	158.45	2955.49	2959.19	0.00	440684.55	612478.29	
11500.00	89.25	90.02	8766.88	158.41	3055.48	3059.12	0.00	440684.51	612578.28	
11600.00	89.25	90.02	8768.19	158.38	3155.47	3159.05	0.00	440684.48	612678.27	
11700.00	89.25	90.02	8769.51	158.35	3255.46	3258.98	0.00	440684.45	612778.26	
11800.00	89.25	90.02	8770.82	158.31	3355.45	3358.91	0.00	440684.41	612878.25	
11900.00	89.25	90.02	8772.14	158.28	3455.45	3458.84	0.00	440684.38	612978.25	
12000.00	89.25	90.02	8773.46	158.24	3555.44	3558.78	0.00	440684.34	613078.24	
12100.00	89.25	90.02	8774.77	158.21	3655.43	3658.71	0.00	440684.31	613178.23	
12200.00	89.25	90.02	8776.09	158.18	3755.42	3758.64	0.00	440684.28	613278.22	
12300.00	89.25	90.02	8777.40	158.14	3855.41	3858.57	0.00	440684.24	613378.21	
12400.00	89.25	90.02	8778.72	158.11	3955.40	3958.50	0.00	440684.21	613478.20	
12500.00	89.25	90.02	8780.04	158.08	4055.39	4058.43	0.00	440684.18	613578.19	
12600.00	89.25	90.02	8781.35	158.04	4155.39	4158.36	0.00	440684.14	613678.19	
12700.00	89.25	90.02	8782.67	158.01	4255.38	4258.29	0.00	440684.11	613778.18	
12800.00	89.25	90.02	8783.98	157.98	4355.37	4358.22	0.00	440684.08	613878.17	
12900.00	89.25	90.02	8785.30	157.94	4455.36	4458.16	0.00	440684.04	613978.16	
13000.00	89.25	90.02	8786.62	157.91	4555.35	4558.09	0.00	440684.01	614078.15	
13029.15	89.25	90.02	8787.00	157.90	4584.50	4587.22	0.00	440684.00	614107.30	PBHL



Weatherford International Ltd.

WFT Plan Report - X & Y's



Weatherford

Company: Occidental Permian Ltd Field: Eddy Co, NM (Nad27) Site: Cedar Canyon 15 FEE #2H Well: Cedar Canyon 15 FEE #2H Wellpath: 1	Date: 1/25/2013 Time: 11:06:22 Page: 3 Co-ordinate(NE) Reference: Well: Cedar Canyon 15 FEE #2H; Grid: Nort Vertical (TVD) Reference: SITE 2952.0 Section (VS) Reference: Well (0.00N;0.00E;88.03Azi) Survey Calculation Method: Minimum Curvature Db: Sybase
---	---

Targets

Name	Description Dip Dir	TVD ft	+N/-S ft	+E/-W ft	Map Northing ft	Map Easting ft	Latitude			Longitude				
							Deg	Min	Sec	Deg	Min	Sec		
PBHL		8787.00	157.90	4584.50	440684.00	614107.30	32	12	39.669	N	103	57	51.813	W

Casing Points

MD ft	TVD ft	Diameter in	Hole Size in	Name
350.00	350.00	0.000	0.000	Csg
3100.00	3100.00	0.000	0.000	Csg

Annotation

MD ft	TVD ft	Description
7888.26	7888.26	KOP
8035.51	8034.47	Build/Turn
9151.33	8735.97	LP
13029.15	8787.00	PBHL

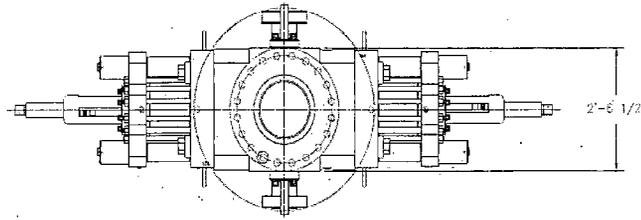
Formations

MD ft	TVD ft	Formations	Lithology	Dip Angle deg	Dip Direction deg
8012.62	8012.00	T BSPG2 Limestone		0.00	0.00
8518.03	8472.00	T BSPG 2nd Sand		0.00	0.00

Field: Eddy Co, NM (Nad 27)

Map System: US State Plane Coordinate System 1927
Geo Datum: NAD27 (Clarke 1866)
Sys Datum: Mean Sea Level

Map Zone: New Mexico, Eastern Zone
Coordinate System: Well Centre
Geomagnetic Model: IGRF2010



- 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 ANNULAR PREVENTER (API 16A MONOGRAMMED, 13 5/8" - 5M WP), 10M BOTTOM FLANGE + 5M STUDDED TOP (WEIGHT = 14,300 LBS WITH SHAFFER API 16A HCT OIL RESISTANT ACRYLONITRILE ELEMENT)

CAMERON CM DOUBLE RAM-TYPE PREVENTER (API 16A MONOGRAMMED, 13 5/8" - 10M WP), WITH 5" CAMERON PIPE RAMS (CAMRAM FRONT PACKERS & TOP SEALS) IN TOP CAVITY AND CAMERON BS SHEARING BUND RAMS IN BOTTOM CAVITY. BOTTOM FLANGE + STUDDED TOP (WEIGHT = 21,100 LBS WITH RAMS)

13 5/8" - 10M WP CAMERON DRILLING SPOOL (API 16A MONOGRAMMED), STUDDED TOP, 3" FLANGED BOTTOM, WITH 4 1/16" - 10M WP FLANGED OUTLETS (WEIGHT APPROXIMATELY 5,000 LBS)

CAMERON CM SINGLE RAM-TYPE PREVENTER (API 16A MONOGRAMMED, 13 5/8" - 10M WP), WITH 5" CAMERON PIPE RAMS (CAMRAM FRONT PACKERS & TOP SEALS) BOTTOM FLANGE + STUDDED TOP (WEIGHT = 10,900 LBS)

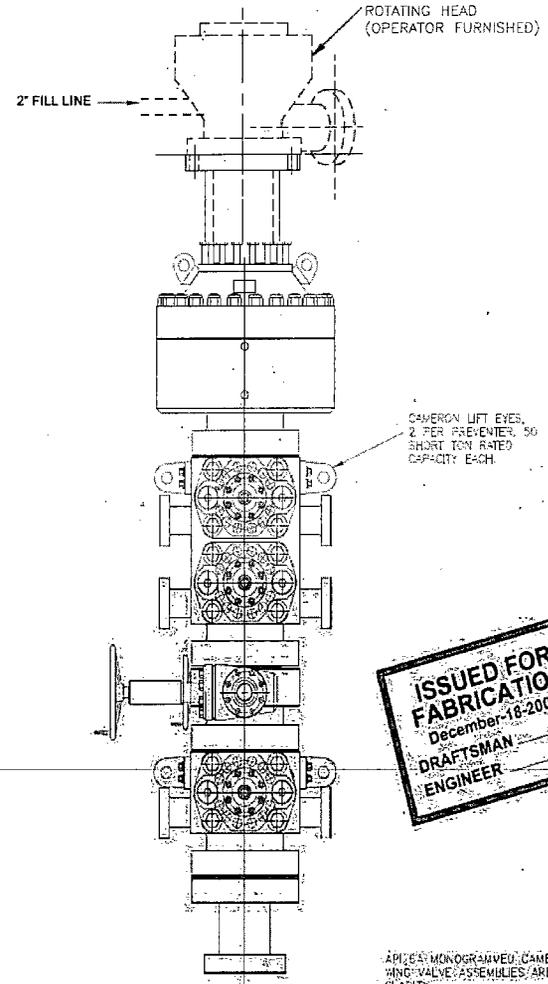
H&P FURNISHED
13 5/8" - 10M x 13 5/8" - 5M
ADAPTER SPOOL 2' - 0" LONG

11'-11 5/8" CLOSED

12'-5 3/8" OPERATING

18'-0" OPENED

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



ISSUED FOR FABRICATION
December-18-2007
DRAFTSMAN
ENGINEER

API 16A MONOGRAMMED CAMERON CHECK AND KILL VALVE ASSEMBLIES ARE NOT SHOWN FOR CLARITY
WEIGHTS DO NOT INCLUDE HOSES, ADAPTER SPOOLS OR QUICK CONNECT FITTINGS

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

ENGINEERING APPROVAL	DATE	DESCRIPTION
	12/18/07	CLOSED SHEET (S)
	4-19-07	PROVIDED DETAILS, CHECKED WEIGHTS, PERFORMED CHECKS TO CHECK WEIGHTS
	4-24-07	ADDED TO STACK - ADAPTER SPOOL
	02-07-07	ADDED ADAPTER SPOOL
	06-13-06	CORRECTED BOP STACK
REV	DATE	DESCRIPTION

**HELMERICH & PAYNE
INTERNATIONAL DRILLING CO.**

TITLE: 13 5/8" - 10M BOP 3 RAM STACK (FLEXRIC3)

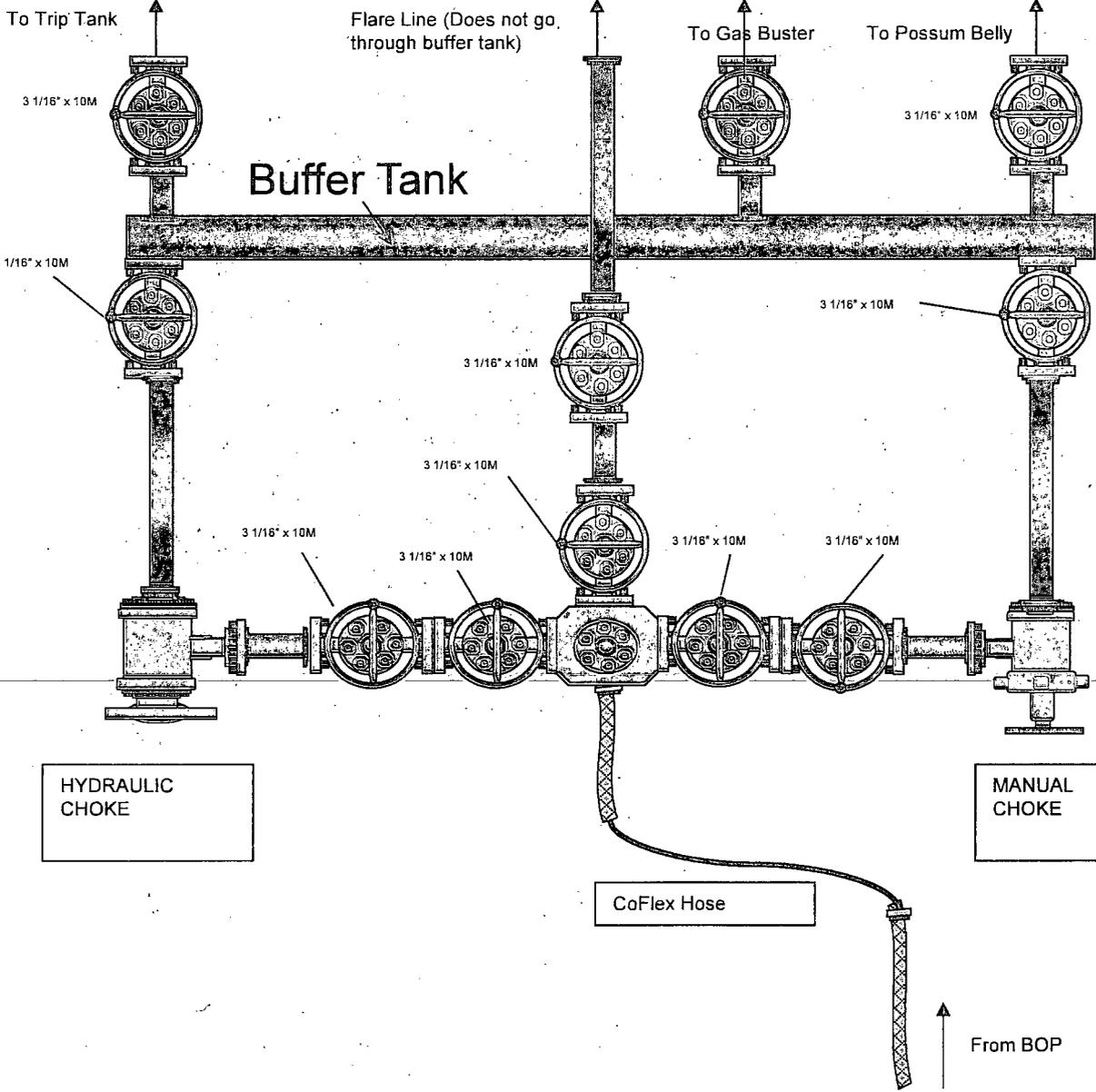
CUSTOMER: H&P

PROJECT: FLEXRIC3

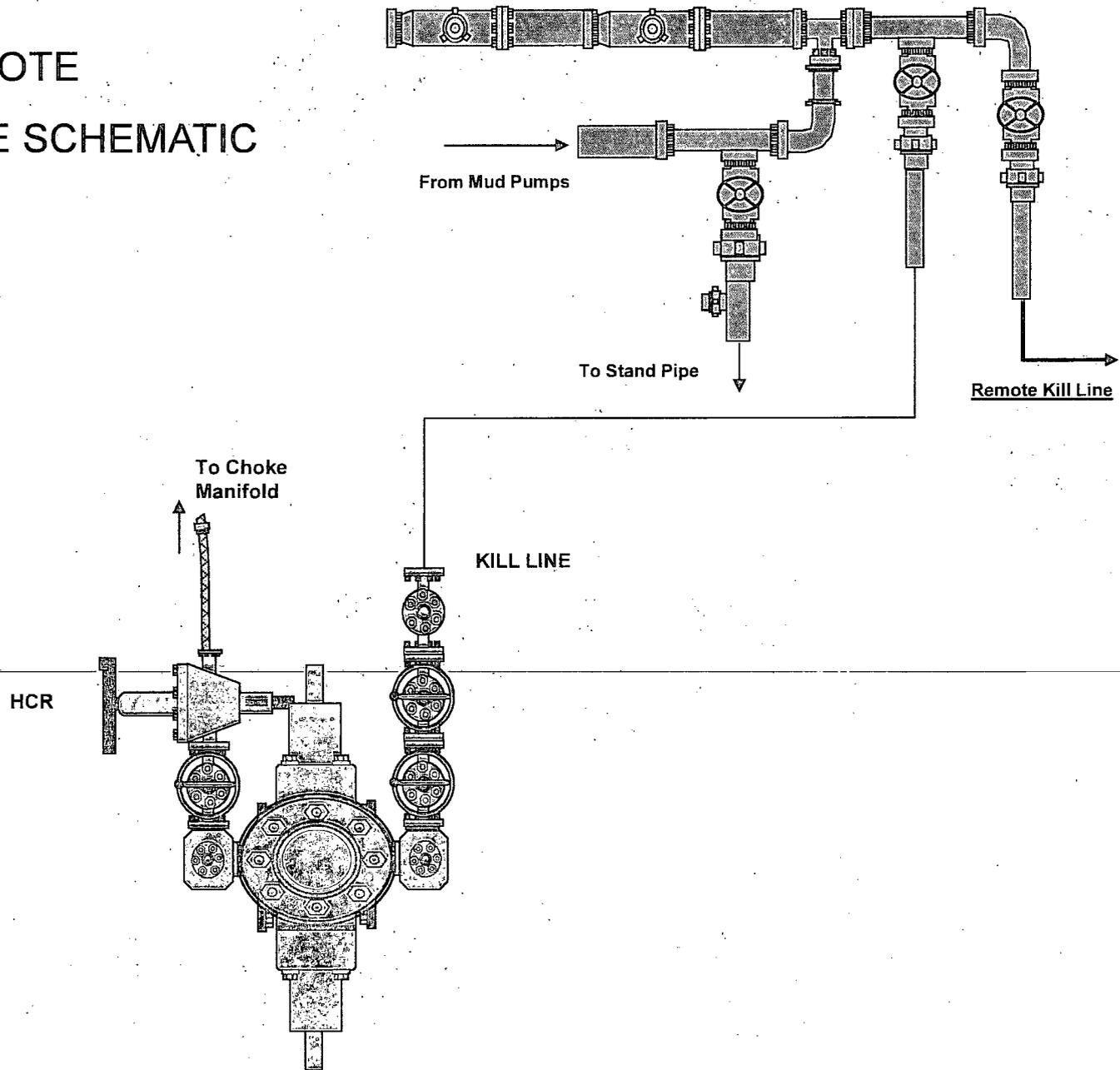
DRAWN: MTS DATE: 12-18-07 UNDOING: 210-P1-07

SCALE: 3/4"=1' SHEET: 1 OF 7

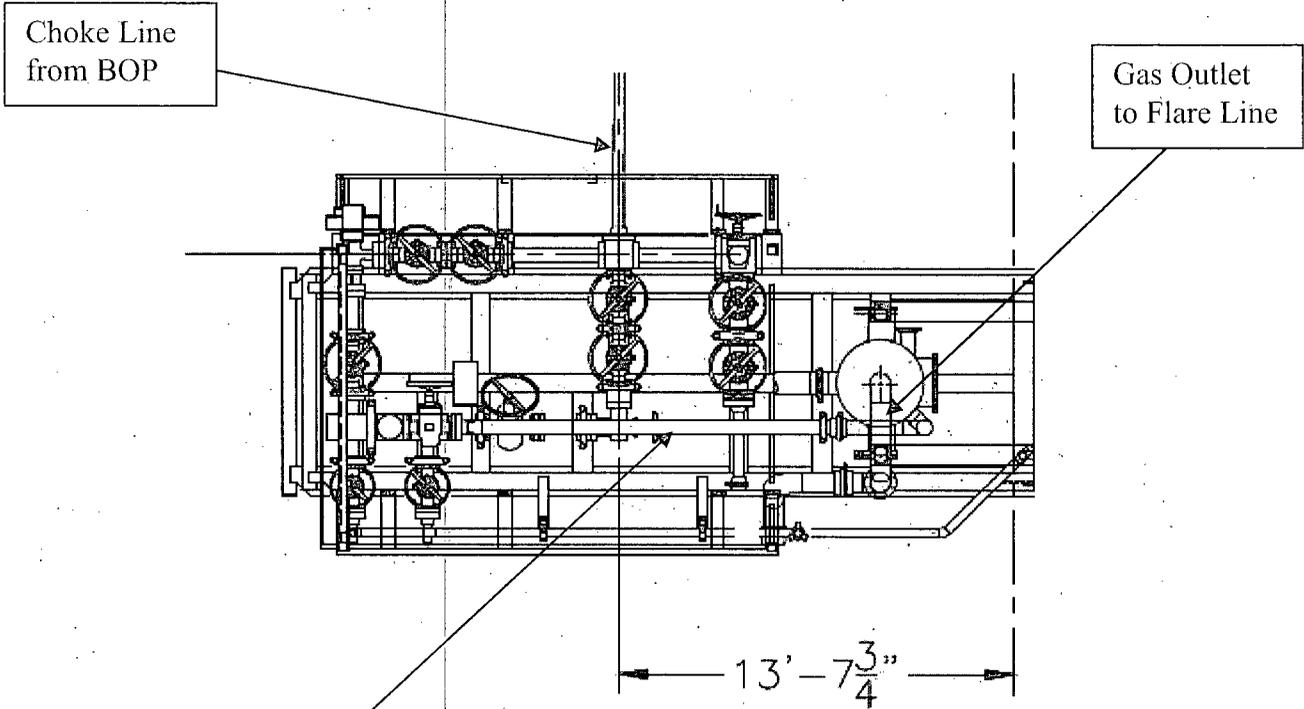
FLEX3 STD CHOKE MANIFOLD (COMPREHENSIVE)



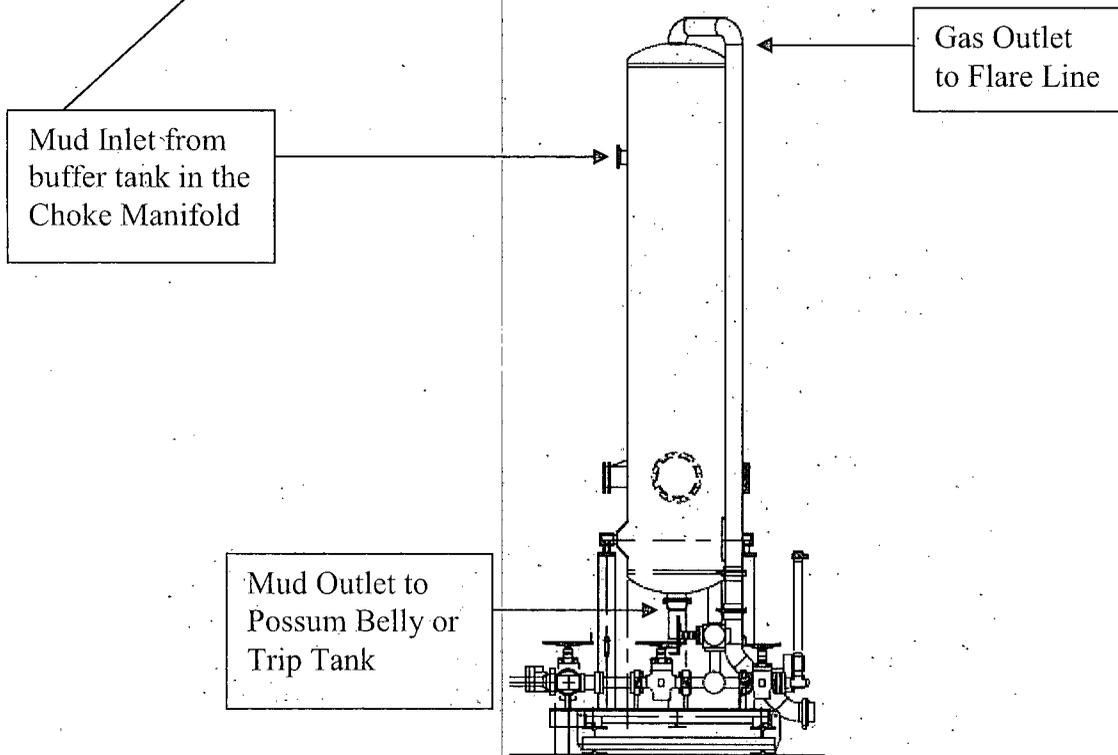
10M REMOTE KILL LINE SCHEMATIC



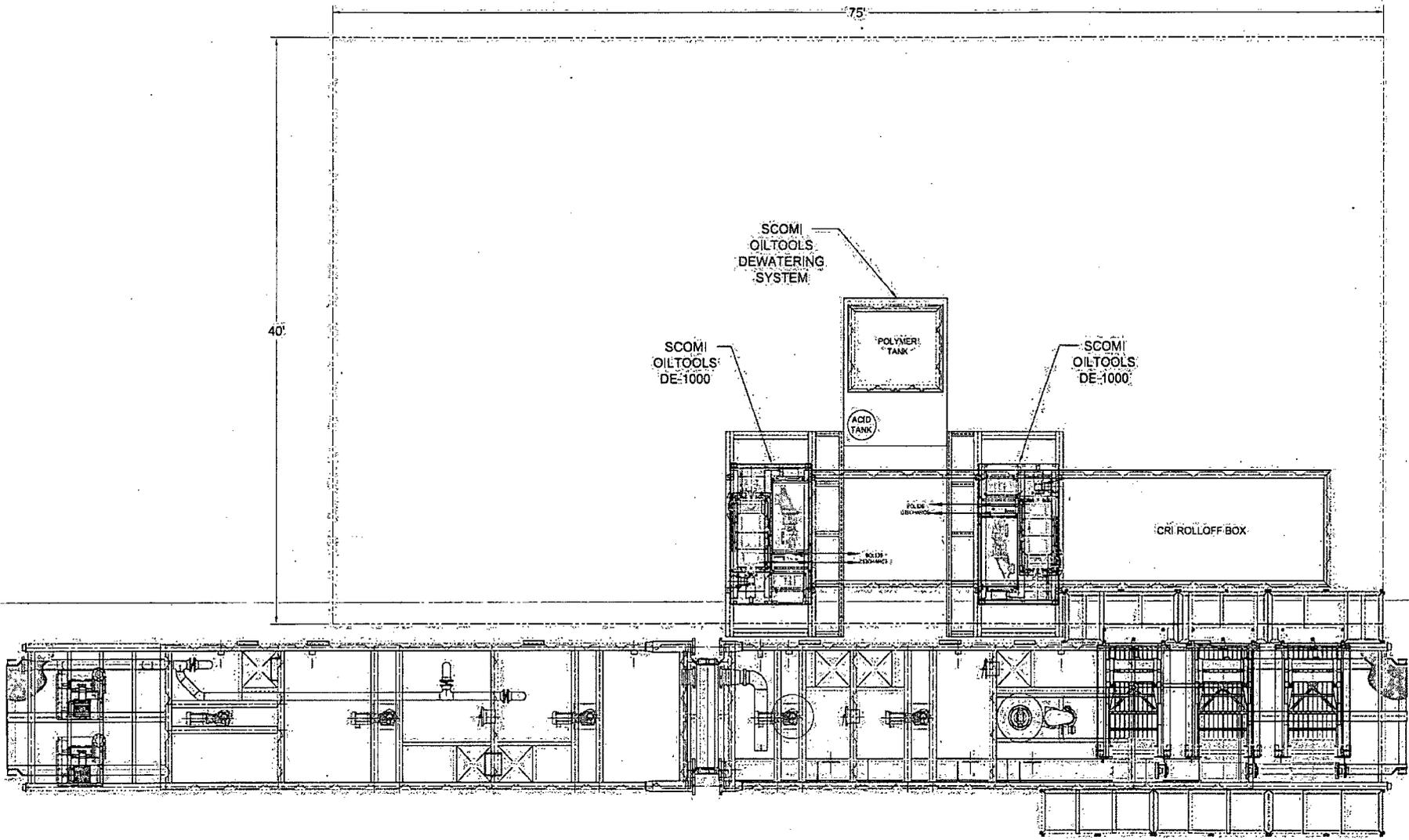
Choke Manifold – Gas Separator (Top View)



Choke Manifold – Gas Separator (Side View)



BILL OF MATERIAL				
ITEM	QTY.	DESCRIPTION	LENGTH	WEIGHT



NO.	REVISIONS	DATE	BY	CHKD	APPD
1	ADDED PAGE 2 TO SHOW FLD	3/12/00	POL	DF	

1. ALL STRUCTURAL MATERIAL SHALL BE ASTM - A36
 2. ALL PIPE SCH. 40 MATERIAL SA-105 GR. B
 3. ALL FLANGES SHALL BE 5015 / 5018 MATERIAL SA-105
 4. ALL FITTINGS SCH. 40 MATERIAL SHALL BE SA-234 GR. WPB
 5. TANK FABRICATION SHALL BE IN ACCORDANCE WITH API-650
- The design, information and disclosure on this drawing or copies are the exclusive confidential property of Scomi International Limited and are not to be reproduced or disclosed to others by any means, in any format, or transmitted or translated into a machine language or used for manufacture or other purpose without the written permission of Scomi International Limited. In receipt of such permission, copies shall directly for the purposes consented. This drawing and any copies shall be returned to Scomi International Limited upon request.

FILE #

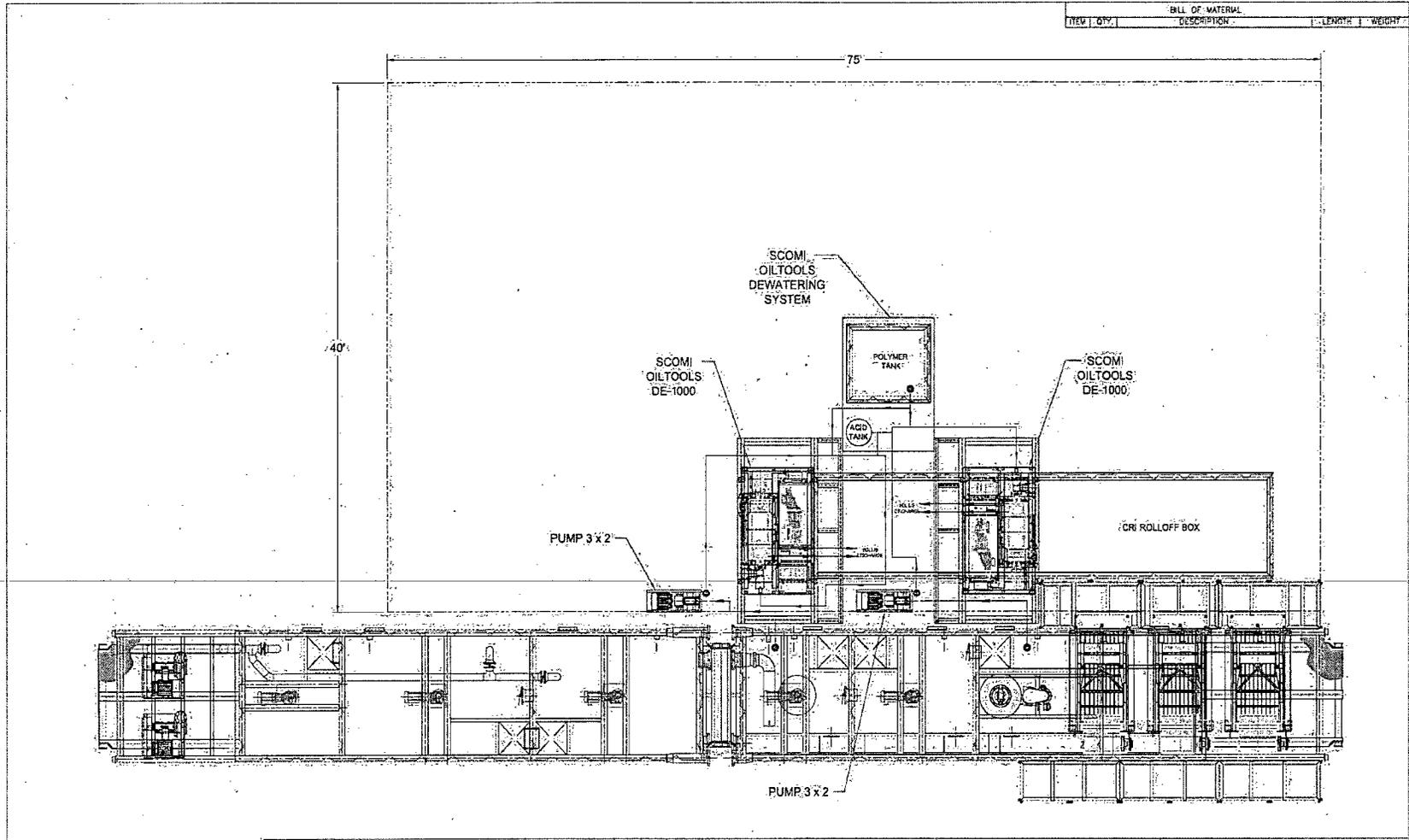
**CLOSED LOOP SYSTEM
BASIC LAYOUT AND TIE IN
OXY - H&P FLEX RIGS / PG. 1 OF 2.**

CREATED BY	DATE	CHECKED BY	DATE
POL	10/30/00		
APPROVED	DATE	SCALE	ACID CONC.
		NTS	D

Scomi

521 N. Salt Dioxation Parkway East, Suite 505,
Houston, Texas 77060
PHONE: (813) 240-5115 FAX: (281) 250-6969

JOB NO.	DWG. NO.	REV.
	521S-014	A



BILL OF MATERIAL		
ITEM NO.	DESCRIPTION	QTY

NO.	DESCRIPTION	QTY	UNIT	DATE	BY	CHKD
1	ADD PAGE 2 TO SHEET					

1. ALL STRUCTURAL MATERIAL SHALL BE ASTM - A36.
 2. ALL PIPE SHALL BE MATERIAL SA-106 B.
 3. ALL FLANGES SHALL BE SOFT-150F & MATERIAL SA-105.
 4. ALL FITTINGS SHALL BE MATERIAL SA-234 Gr. WPB.
 5. TANK FABRICATION SHALL BE IN ACCORDANCE WITH API-650.

The designer, information and dimensions on this drawing or report are the exclusive property of Scomi International Limited and shall not be reproduced or disclosed to others by any means, in any form, or transmitted, or translated into a machine language, or used for manufacture or other purposes without the written permission of Scomi International Limited. In receipt of such permission, liability and responsibility for the purposes mentioned, this drawing and any copies, shall be returned to Scomi International Limited upon request.

TITLE: CLOSED LOOP SYSTEM BASIC LAYOUT AND TIE-IN OXY - H&P - FLEX RIGS / PG 2 OF 2			
Drawn BY: FDK	Scale: AS SHOWN	Checked BY: [Signature]	Date: [Date]
Approved BY: [Signature]	Rev: 1	Head PWD: D	Job No.:

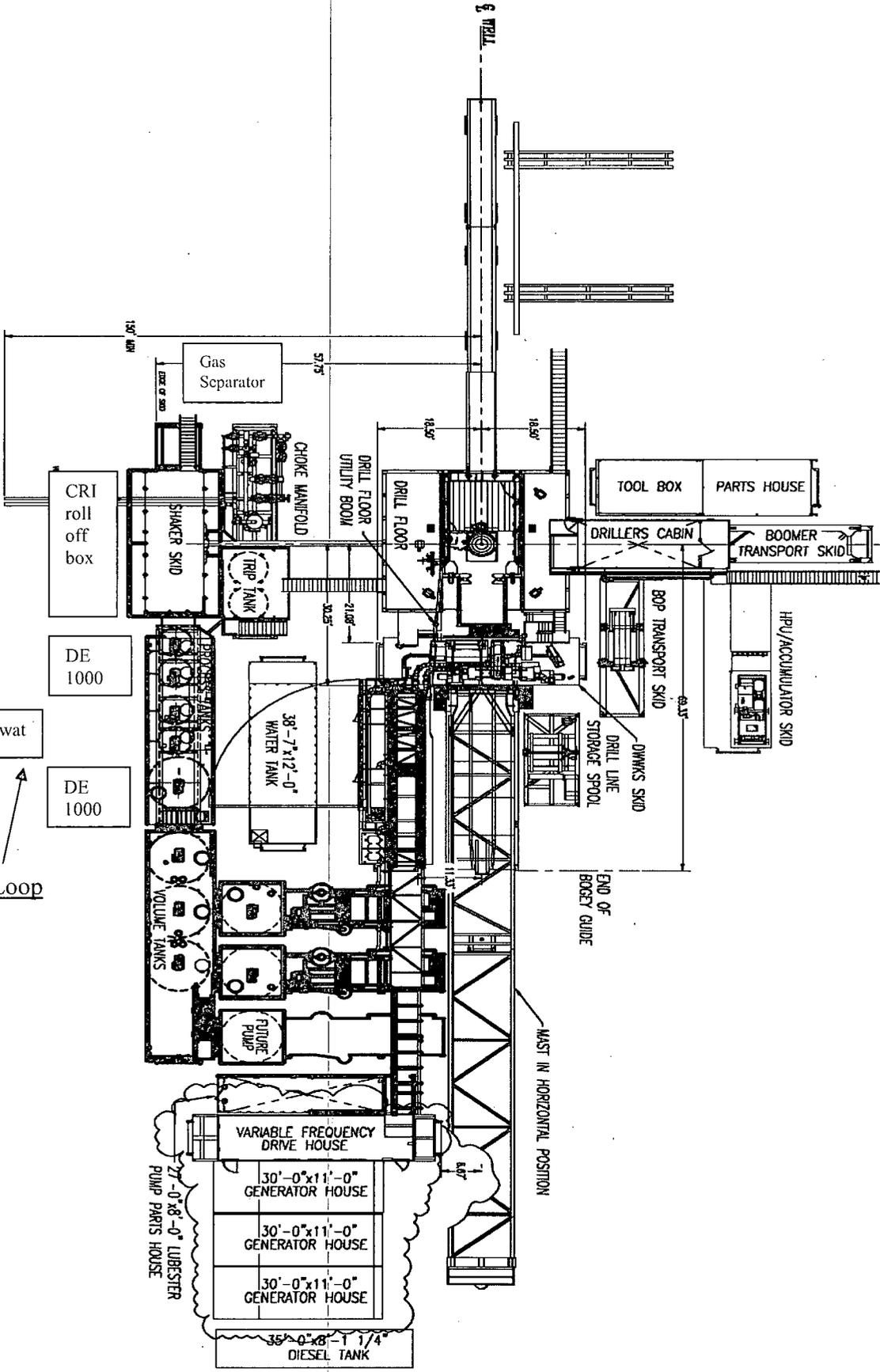


521S-014

521 W. Sam Houston Parkway East, Suite 300,
Houston, Texas 77060
PHONE: (713) 559-8111 FAX: (713) 559-0848

Closed Loop System

Dewat

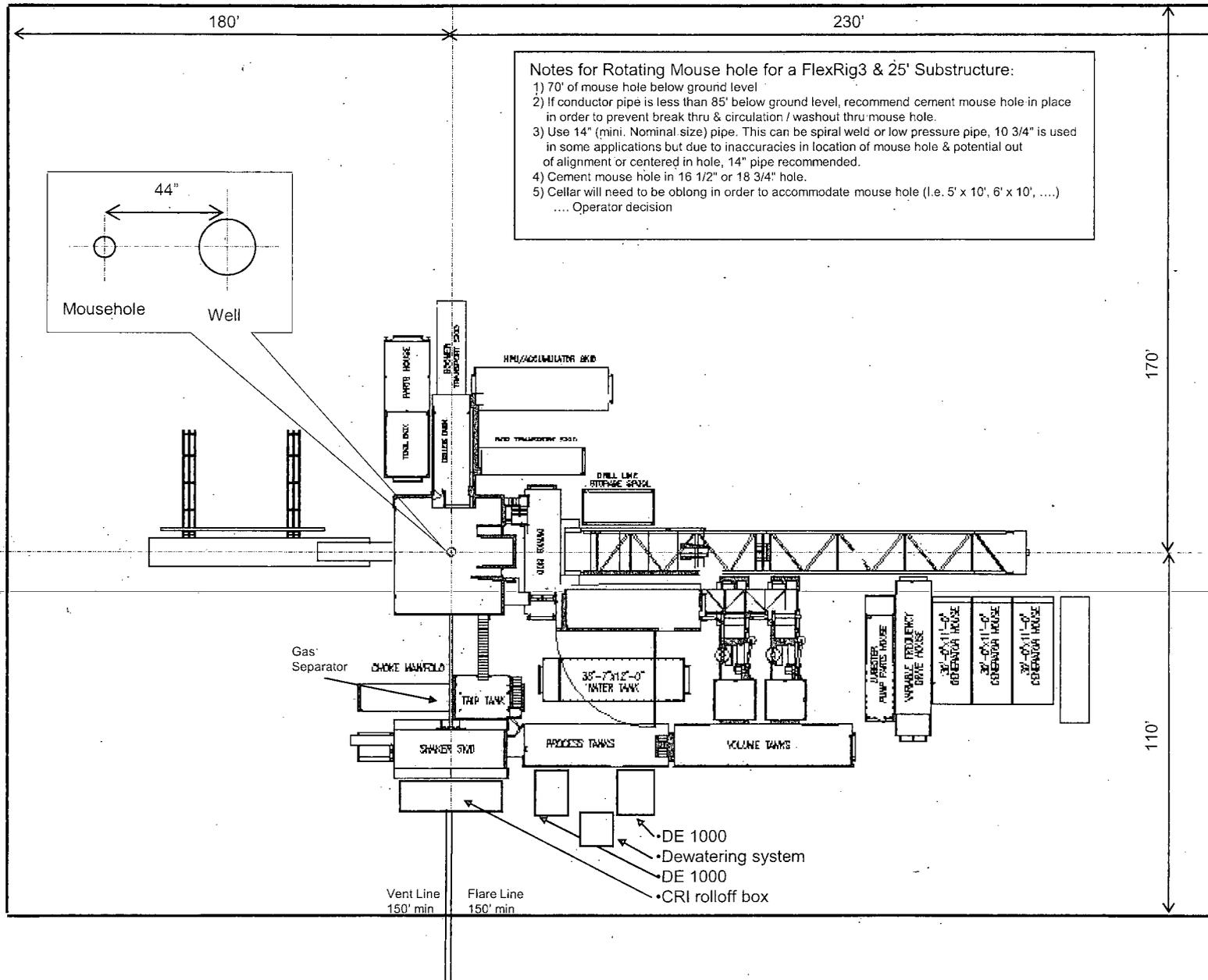


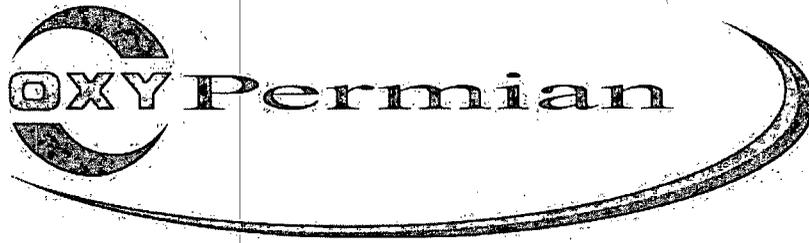
40'-0" x 10'-0"
RIG OFFICE TRAILER

40'-0" x 10'-0"
MEETING/CHANGE HOUSE

OXY FLEX III PAD (SCOMI Closed Loop System)

Level Area-No Caliche-For Offices and Living Quarters





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 (H₂S) gas.

While drilling this well, it is possible to encounter H₂S bearing formations. At all times, the first barrier to control H₂S 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 H₂S is detected. All H₂S 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 H₂S.
2. Proper use and maintenance of personal protective equipment and life support systems.
3. H₂S detection.
4. Proper use of H₂S 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 H₂S 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 H₂S Drilling Operations Plan.

H₂S 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. H₂S 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 H₂S 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 H₂S.
- 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.
- 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. H₂S 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. H₂S 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 H₂S 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 H₂S 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:
1. On alarm, don escape unit and report to the nearest upwind designated safe briefing / muster area upw
 2. Check status of personnel (buddy system).
 3. Secure breathing equipment.
 4. Await orders from supervisor.

- Drill site manager:
1. Don escape unit if necessary and report to nearest upwind designated safe briefing / muster area.
 2. Coordinate preparations of individuals to return to point of release with tool pusher and driller (using the buddy system).
 3. Determine H₂S concentrations.
 4. Assess situation and take control measures.

- Tool pusher:
1. Don escape unit Report to up nearest upwind designated safe briefing / muster area.
 2. Coordinate preparation of individuals to return to point of release with tool pusher drill site manager (using the buddy system).
 3. Determine H₂S concentration.
 4. Assess situation and take control measures.

- Driller:
1. Don escape unit, shut down pumps, continue rotating DP.

2. Check monitor for point of release.
3. Report to nearest upwind designated safe briefing / muster area.
4. Check status of personnel (in an attempt to rescue, use the buddy system).
5. Assigns least essential person to notify Drill Site Manager and tool pusher by quickest means in case of their absence.
6. Assumes the responsibilities of the Drill Site Manager and tool pusher until they arrive should they be absent.

Derrick man
Floor man #1
Floor man #2

1. Will remain in briefing / muster area until instructed by supervisor.

Mud engineer:

1. Report to nearest upwind designated safe briefing / muster area.
2. When instructed, begin check of mud for ph and H2S level. (Garrett gas train.)

Safety personnel:

1. Mask up and check status of all personnel and secure operations as instructed by drill site manager.

Taking a kick

When taking a kick during an H2S 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 H₂S 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 H₂S detection equipment and self-contained breathing equipment will monitor H₂S 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

Percent (%)	Ppm	Concentration	Physical effects
		Grains 100 std. Ft3*	
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 H₂S.

- B. When breaking out any line where H₂S can reasonably be expected.
- C. When sampling air in areas to determine if toxic concentrations of H₂S exists.
- D. When working in areas where over 10 ppm H₂S has been detected.
- E. At any time there is a doubt as to the H₂S level in the area to be entered.

Rescue
First aid for H₂S 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 H₂S gas poisoning – no matter how remote the possibility is.
6. Notify emergency room personnel that the victim(s) has been exposed to H₂S gas.

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

Revised CM 6/27/2012