Filed On-Line 3/31/15

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 Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

Form C-101
August 1, 2011

Permit 202137

NM OIL CONSERVATION
ARTESIA DISTRICT
APR 03 2015
RECEIVED

APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE

1. Operator Name and Address	2. OGRID Number
OXY USA WTP LIMITED PARTNERSHIP PO Box 4294 Houston, TX 77210	192463
	3. API Number: 30-015-43020
4. Property Code: 302156	5. Property Name: OXY Bulldog State
	6. Well No.: 002H

7. Surface Location

UL - Lot	Section	Township	Range	Lot Idn	Feet From	N/S Line	Feet From	E/W Line	County
P	16	20S	28E		510	S	330	E	EDDY

8. Proposed Bottom Hole Location

UL - Lot	Section	Township	Range	Lot Idn	Feet From	N/S Line	Feet From	E/W Line	County
M	16	20S	28E	M	665	S	180	W	Eddy

9. Pool Information

OLD MILLMAN RANCH;BS (ASSOC)	48035

Additional Well Information

11. Work Type	12. Well Type	13. Cable/Rotary	14. Lease Type	15. Ground Level Elevation
New Well	OIL		State	3258
16. Multiple	**17. Proposed Depth**	**18. Formation**	**19. Contractor**	**20. Spud Date**
N	12313	2nd Bone Spring Sand		8/3/2015
Depth to Ground water		Distance from nearest fresh water well		Distance to nearest surface water

☒ **We will be using a closed-loop system in lieu of lined pits**

21. Proposed Casing and Cement Program

Type	Hole Size	Casing Size	Casing Weight/ft	Setting Depth	Sacks of Cement	Estimated TOC
Surf	18.5	16	75	295	310	0
Int1	14.75	11.75	47	1075	660	0
Int2	10.625	8.625	32	3175	1100	0
Prod	7.875	5.5	17	12313	1300	2175

Casing/Cement Program: Additional Comments

Proposed Mud Program: 0-295' Fresh Water/Spud Mud - 295-1075' Fresh Water/NaCl Brine - 1075-3175' Fresh Water - 3175-TD Cut Brine/Sweeps. Proposed Casing/Cementing Program: Intermediate 2 – Contingency DV Tool w/ external packer @ 1125'. If cement circulates to surface during primary cementing operation, DVT cancellation cone will be run and 2nd stage cancelled. BOP Program: 295-1075' - 16-3/4" 2M annular preventer – 1075-TD - 13-5/8" 10M three ram stack w/ 5M annular preventer, 5M choke manifold. Additional information will be sent along with the H2S plan.

22. Proposed Blowout Prevention Program

Type	Working Pressure	Test Pressure	Manufacturer
Annular	5000	5000	
Double Ram	10000	10000	
Blind	10000	10000	

23. I hereby certify that the information given above is true and complete to the best of my knowledge and belief.
I further certify I have complied with 19.15.14.9 (A) NMAC ☒ and/or 19.15.14.9 (B) NMAC ☒, if applicable.

Signature:

Printed Name:	Electronically filed by Teresa L Jackson	Approved By:	
Title:	Regulatory Team Lead	Title:	
Email Address:	Teresa_Jackson@oxy.com	Approved Date:	Expiration Date:
Date:	3/31/2015 Phone: 713-366-5069	Conditions of Approval Attached	

OIL CONSERVATION DIVISION

Accepted for record
NMOCD

District I
1625 N. French Dr., Hobbs, NM 88240
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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, NM 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	Pool Code	Pool Name
30-015-43020	48035	Old Millman Ranch Bone Spring (Assoc)

Property Code	Property Name	Well Number
302156	OXY BULLDOG STATE	2H

OGRID No.	Operator Name	Elevation
192463	OXY USA WTP LP	3258.0'

Surface Location

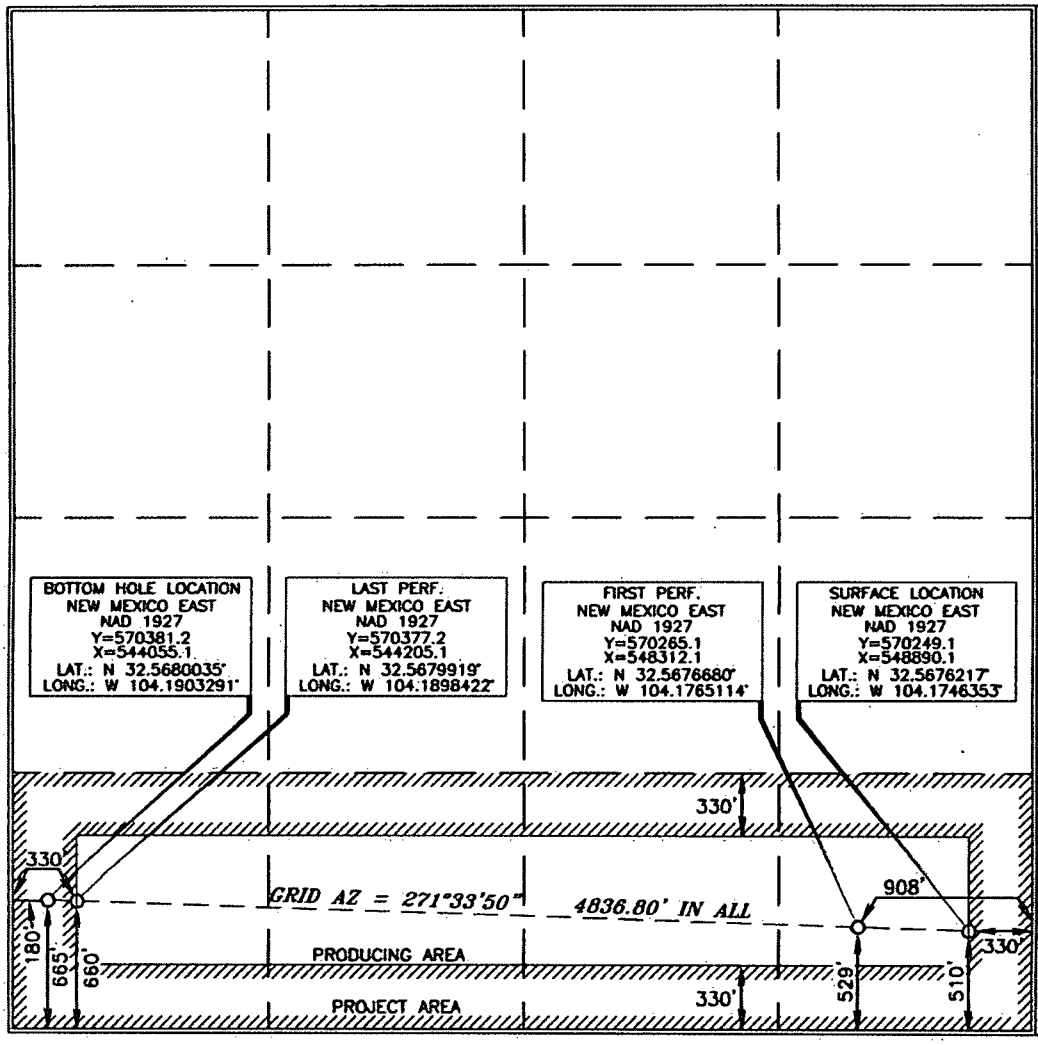
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	16	20 SOUTH	28 EAST, N.M.P.M.		510'	SOUTH	330'	EAST	EDDY

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
M	16	20 SOUTH	28 EAST, N.M.P.M.		665'	SOUTH	180'	WEST	EDDY

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

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.



OPERATOR CERTIFICATION

I hereby certify that the information contained 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 a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature — Date: 3/31/15

David Stewart Sr. Reg. Adv.
Printed Name

david_stewart@oxy.com
E-mail Address

SURVEYOR CERTIFICATION

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.

JANUARY 30, 2014
Date of Survey

Signature and Seal of Professional Surveyor

NEW MEXICO — 15079 — REGISTERED PROFESSIONAL LAND SURVEYOR

5/6/2014

Certificate Number 15079

WO# 140130WL-b (Rev. A) (KA)

Operator Name/Number:	**OXY USA WTP LP**	**192463**
Lease Name/Number:	**OXY Bulldog State #2H**	
Pool Name/Number:	**Old Millman Ranch Bone Spring (Assoc)**	**48035**
Surface Location:	**510 FSL 330 FEL P Sec 16 T20S R28E**	**LG-794**
Top Perf:	**529 FSL 908 FEL P Sec 16 T20S R28E**	
Bottom Perf:	**660 FSL 330 FWL M Sec 16 T20S R28E**	**K-6599**
Bottom Hole Location:	**665 FSL 180 FWL M Sec 16 T20S R28E**	

C-102 Plats: 1/30/14 5/6/14 3/25/15 **Elevation:** 3258' GL **Objective:** 2nd Bone Spring

Proposed TD: Horizontal Lateral 7395' TVD 12313' TMD

SL - Lat: 32.5676217	Long: 104.1746353	X=548890.1	Y=570249.1	NAD - 1927
TP - Lat: 32.5676680	Long: 104.1765114	X=548312.1	Y=570265.1	NAD - 1927
BP - Lat: 32.5679919	Long: 104.1898422	X=544205.1	Y=570377.2	NAD - 1927
BH - Lat: 32.5680035	Long: 104.1903291	X=544055.1	Y=570381.2	NAD - 1927

Casing Program:

Hole Size	Interval	OD Csg	Weight	Collar	Grade	Condition	Collapse Design Factor	Burst Design Factor	Tension Design Factor
18-1/2"	0-295'	16"	75	BT&C	J55	New	10.77	1.42	5.89
14-3/4"	0-1075'	11-3/4"	47	BT&C	J55	New	6.23	1.36	4.55
10-5/8"	0-3175'	8-5/8"	32	LT&C	J-55	New	2.91	1.42	2.68
7-7/8"	0-12313'	5-1/2"	17	BT&C	P-110	New	2.17	1.25	2.61

Collapse and burst loads calculated using Stress Check with anticipated loads

Cement Program:

a. 16" Surface Circulate cement to surface w/ 310sx PPC cmt w/ 1% CaCl2 + .125#/sx Poly-E-Flake, 14.8ppg 1.34 yield 1323# 24hr CS 160% Excess

a. 11-3/4" Intermediate 1 Circulate cement to surface w/ 200sx HES Light PPC cmt w/ 5% Salt + .40% HR-800, 12.9ppg 1.69 yield 813# 24hr CS 120% Excess followed by 460sx PPC cmt, 14.8ppg 1.33 yield 1789# 24hr CS 120% Excess

b. 8-5/8" Intermediate 2 Circulate cement to surface w/ 680sx HES Light PPC cmt w/ 5% salt + .4% HR-800, 12.9ppg 1.69 yield 813# 24hr CS 150% Excess followed by 210sx PPC cmt, 14.8ppg 1.33 yield 1789# 24hr 150% Excess

Contingency DVT w/ external csg pkr @ 1125'. If cement circulates to surface during primary cementing operation, DVT cancellation cone will be run and 2nd stage cancelled. See below for contingency cementing plan.
Circulate cement to surface w/ 90sx HES Light PPC cmt w/ 3% salt, 12.4ppg 2.05 yield 500# in 26 hrs CS 10% Excess followed by 120sx PPC cmt w/ 2% CaCl2, 14.8ppg 1.35 yield 1789# 24hr 200% Excess

c. 5-1/2" Production Cement w/ 450sx Tuned Light cmt w/ 1#/sx Kol-Seal + .125#/sx Poly-E-Flake + .35% HR-601, 10.2ppg 3.2 yield 555# 24hr CS 100% Excess followed by 850sx Super H cmt w/ 3#/sx salt + .4% CFR-3 + .5% Halad-344 + .125# Poly-E-Flake + .50% HR-800, 13.2ppg 1.63 yield 1162# 24hr CS 40% Excess, Calc TOC 2175'

Description of Cement Additives: Calcium Chloride, Salt (Accelerator); CFR-3 (Dispersant); Kol-Seal, Poly-E-Flake (Lost Circulation Additive); Halad-344 (Low Fluid Loss Control); HR-601, 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 - 295'	8.5	28-38	NC	Fresh Water/Spud Mud
295 - 1075'	10.2	28-32	NC	Fresh water/NaCl Brine
1075 - 3175'	8.5	28-32	NC	Fresh water
3175 - TD	9.2	28-34	NC	Cut Brine/Sweeps

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
Intermediate1	16-3/4" 2M annular preventor system
Intermediate2/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	30'	Formation
b. Top Salt (Salado)	320'	Formation
c. Base Salt (Tansill)	600'	Formation
d. Yates	1000'	Formation
e. Capitan Reef	1125'	Formation
f. Delaware/B.Anhydrite/T.Lamar	3125'	Formation
g. Delaware-Brushy Canyon	4025'	Oil/Gas
h. Bone Spring	4950'	Oil/Gas
i. 1st Bone Spring	6415'	Oil/Gas
j. 2nd Bone Spring	7090'	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.

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State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

Form APD Comments

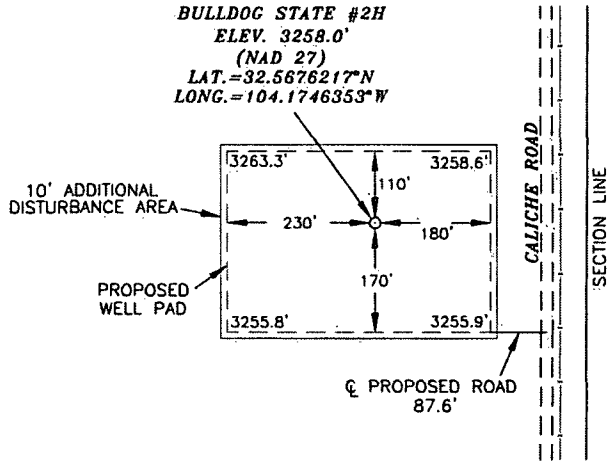
Permit 202137

PERMIT COMMENTS

Operator Name and Address:	API Number:
OXY USA WTP LIMITED PARTNERSHIP [192463] PO Box 4294 Houston, TX 77210	Well: OXY Bulldog State #002H

Created By	Comment	Comment Date
DAVIDSTEWART	Top Perforated Interval: 529 FSL 908 FEL P 16-20S-28E - Lat: 32.567668 Long: 104.1765114 Bottom Perforated Interval: 660 FSL 330 FWL M 16-20S-28E - Lat: 32.5679919 Long: 104.1898422 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.	3/31/2015

OXY USA INC.
BULLDOG STATE #2H
SITE PLAN



TERRY J ASEL
NEW MEXICO
15079
PROFESSIONAL LAND SURVEYOR

LEGEND

– – – – DENOTES PROPOSED WELL PAD
——– – DENOTES PROPOSED ROAD

300' 0 300' 600' FEET

SCALE: 1"=300'

SURVEYORS CERTIFICATE

I, TERRY J. ASEL, NEW MEXICO PROFESSIONAL SURVEYOR NO. 15079, DO HEREBY CERTIFY THAT I CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND MEETS THE "MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO" AS ADOPTED BY THE NEW MEXICO STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND SURVEYORS.

Terry J. Asel 2/11/2014

Terry J. Asel N.M. R.P.L.S. No. 15079

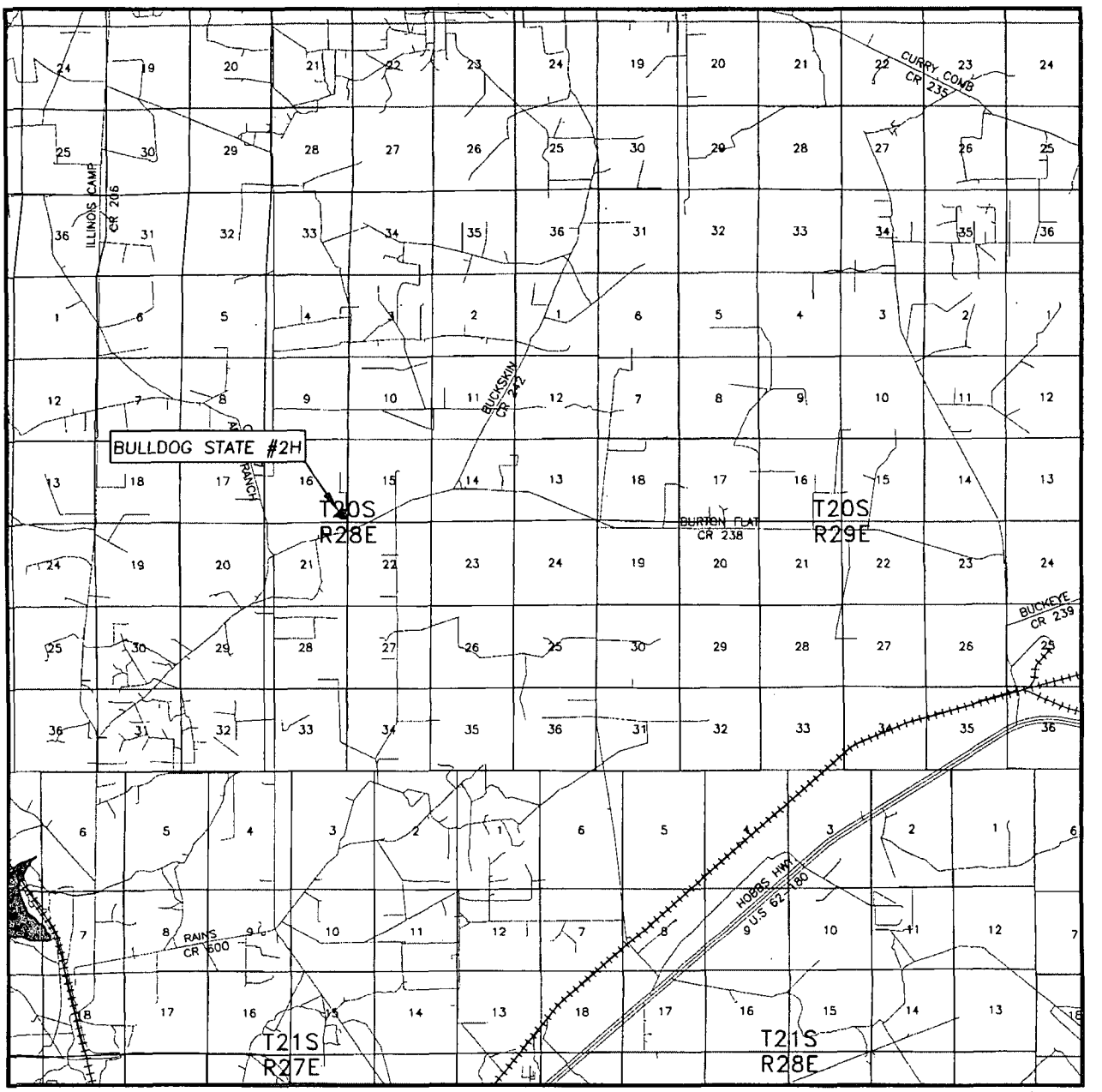
Asel Surveying
P.O. BOX 393 – 310 W. TAYLOR
HOBBS, NEW MEXICO – 575-393-9146

OXY USA INC.

BULLDOG STATE #2H WELL PAD LOCATED AT 510' FSL & 330' FEL IN SECTION 16, TOWNSHIP 20 SOUTH, RANGE 28 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO

Survey Date: 01/30/14	Sheet 1 of 1 Sheets	
W.O. Number: 140130WL-b	Drawn By: KA	Rev:
Date: 02/05/14	140130WL-b	Scale: 1"=300'

VICINITY MAP



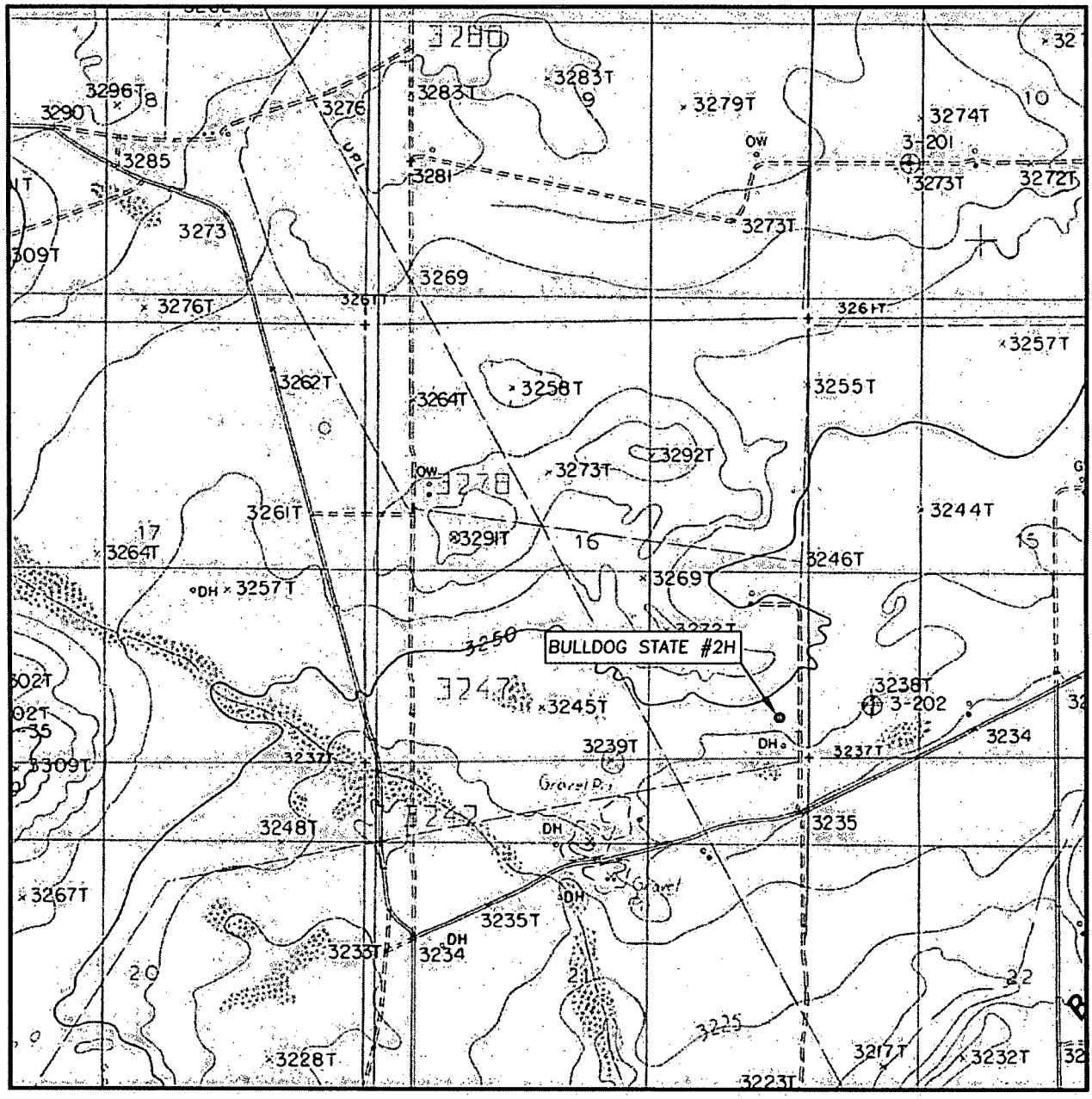
SEC. 16 TWP. 20-S RGE. 28-E
SURVEY N.M.P.M.
COUNTY EDDY
DESCRIPTION 510' FSL & 330' FEL
ELEVATION 3258.0'
OPERATOR OXY USA INC.
LEASE BULLDOG STATE #2H

SCALE: 1" = 2 MILES

Asel Surveying
P.O. BOX 393 - 310 W. TAYLOR
HOBBS, NEW MEXICO - 575-393-9146

DIRECTIONS BEGINNING AT THE INTERSECTION OF U.S. HWY. #62 AND EDDY COUNTY ROAD #238 (BURTON FLAT ROAD), GO NORTH ON EDDY COUNTY ROAD #238 FOR 2.1 MILES, GO WEST FOR 8.2 MILES, TURN RIGHT ON CALICHE ROAD AND GO NORTH FOR 0.2 MILES, TURN LEFT ON PROPOSED ROAD AND GO WEST FOR 87.6 FEET TO LOCATION.

LOCATION VERIFICATION MAP



SCALE: 1" = 2000'

CONTOUR INTERVAL: 10'

SEC. 16 TWP. 20-S RGE. 28-E

SURVEY N.M.P.M.

COUNTY EDDY

DESCRIPTION 510' FSL & 330' FEL

ELEVATION 3258.0'

OPERATOR OXY USA INC.

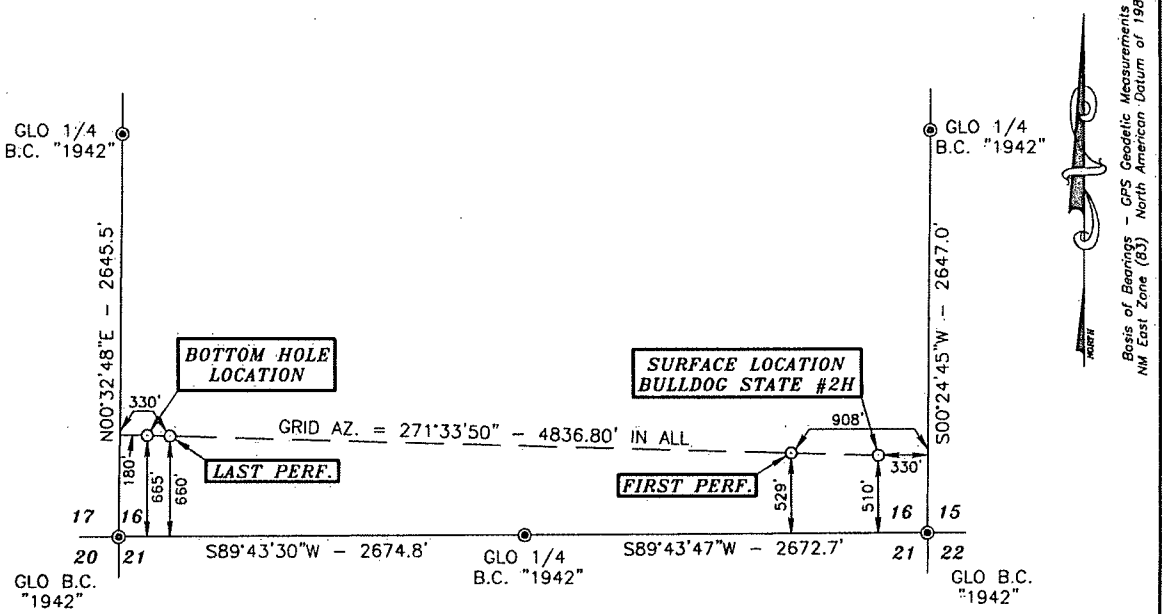
LEASE BULLDOG STATE #2H

U.S.G.S. TOPOGRAPHIC MAP
ANGEL DRAW, N.M.

Asel Surveying

P.O. BOX 393 - 310 W. TAYLOR
HOBBS, NEW MEXICO - 575-393-9146

SECTION 16, TOWNSHIP 20 SOUTH, RANGE 28 EAST, N.M.P.M.,
EDDY COUNTY NEW MEXICO



DRIVING DIRECTIONS:
BEGINNING AT THE INTERSECTION OF U.S. HWY. #62 AND EDDY COUNTY ROAD #238 (BURTON FLAT ROAD), GO NORTH ON EDDY COUNTY ROAD #238 FOR 2.1 MILES, GO WEST FOR 8.2 MILES, TURN RIGHT ON CALICHE ROAD AND GO NORTH FOR 0.2 MILES, TURN LEFT ON PROPOSED ROAD AND GO WEST FOR 87.6 FEET TO LOCATION.

TERRY J ASEL
NEW MEXICO
15079
REGISTERED PROFESSIONAL LAND SURVEYOR

LEGEND

◉ - DENOTES FOUND MONUMENT AS NOTED

1000' 0 1000' 2000' FEET
SCALE: 1"=1000'

SURVEYORS CERTIFICATE

I, TERRY J. ASEL, NEW MEXICO PROFESSIONAL SURVEYOR NO. 15079, DO HEREBY CERTIFY THAT I CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND MEETS THE "MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO" AS ADOPTED BY THE NEW MEXICO STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS AND SURVEYORS.

Terry J. Asel 5/6/2014
Terry J. Asel N.M. R.P.L.S. No. 15079

Asel Surveying

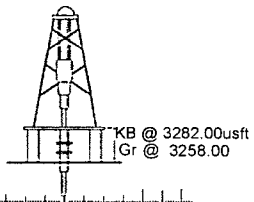
P.O. BOX 393 - 310 W. TAYLOR
HOBBS, NEW MEXICO - 575-393-9146

OXY USA INC.

BULLDOG STATE #2H LOCATED AT
510' FSL & 330' FEL IN SECTION 16,
TOWNSHIP 20 SOUTH, RANGE 28 EAST,
N.M.P.M., EDDY COUNTY, NEW MEXICO

Survey Date: 01/30/14	Sheet 1 of 1 Sheets		
W.O. Number: 140130WL-b (Rev. A)	Drawn By: KA	Rev: A	
Date: 05/02/14	140130WL-b	Scale: 1"=1000'	

Bulldog State 2H
Eddy County, NM (NAD 27 NME)
Northing: 570249.10
Easting: 548890.10
Plan #3



To convert Magnetic North to Grid, Add 7.46°
To convert True North to Grid, Subtract 0.09°

Azimuths to Grid North
True North: -0.09
Magnetic North: 7.46

Magnetic Field
Strength: 48478.9snT
Dip Angle: 60.33
Date: 3/31/201
Model: IGRF201

WELL DETAILS BS 2H

Ground Level: 3258.00

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	570249.10	548890.10	32° 34' 3.438 N	104° 10' 28.687 W

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSect
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3700.00	0.00	0.00	3700.00	0.00	0.00	0.00	0.00	0.00
4200.00	10.00	91.50	4197.47	-1.14	43.51	2.00	91.50	-43.52
5425.00	10.00	91.50	5403.85	-6.71	256.15	0.00	0.00	-256.24
5925.00	0.00	0.00	5901.32	-7.85	299.66	2.00	180.00	-299.76
6767.58	0.00	0.00	6743.90	-7.85	299.66	0.00	0.00	-299.76
7903.14	90.84	271.56	7460.02	11.95	-426.82	8.00	271.56	426.99
12313.43	90.84	271.56	7395.00	132.10	-4835.00	0.00	0.00	4836.80

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting
BS 2H BHL	7395.00	132.10	-4835.00	570381.20	544055.10
BS 2H LTP	7397.00	128.10	-4685.00	570377.20	544205.10
BS 2H FTP	7460.00	16.00	-578.00	570265.10	548312.10

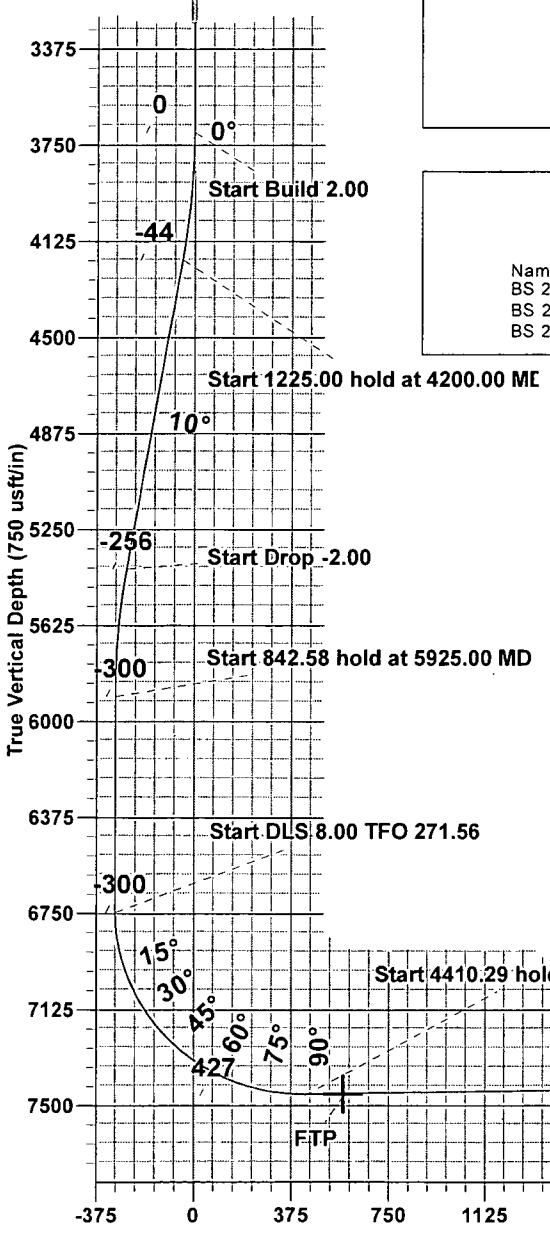
PROJECT DETAILS:

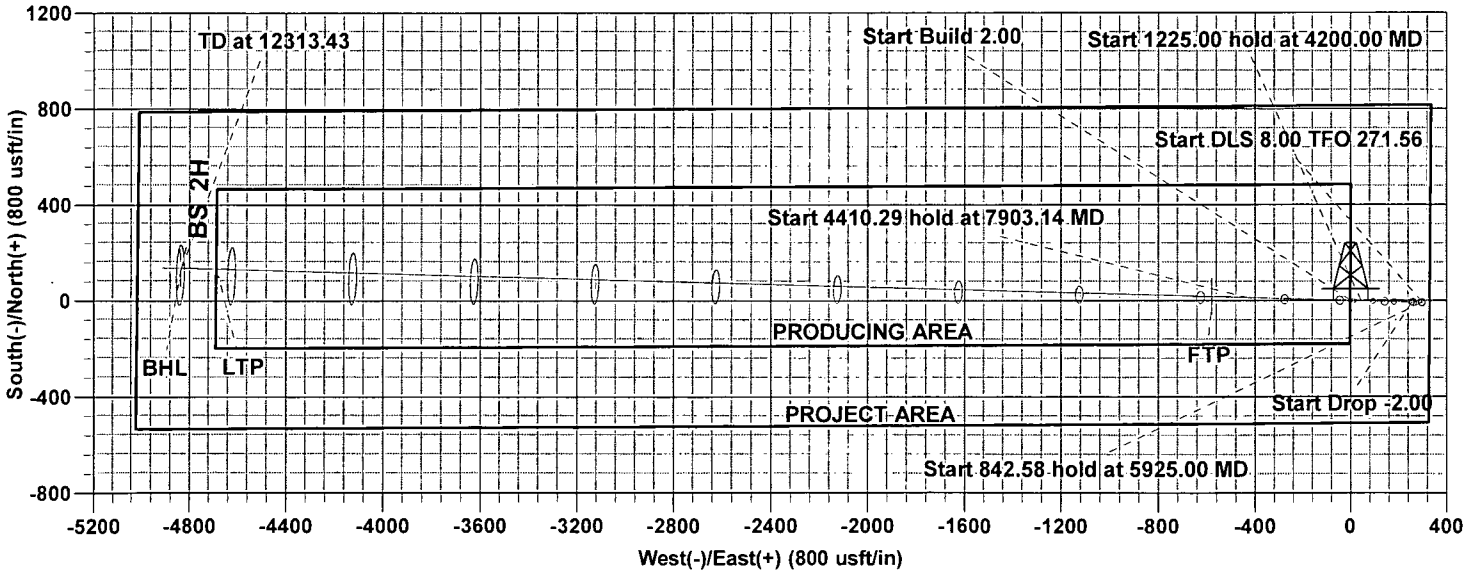
Eddy County, NM (NAD 27 NME)
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level

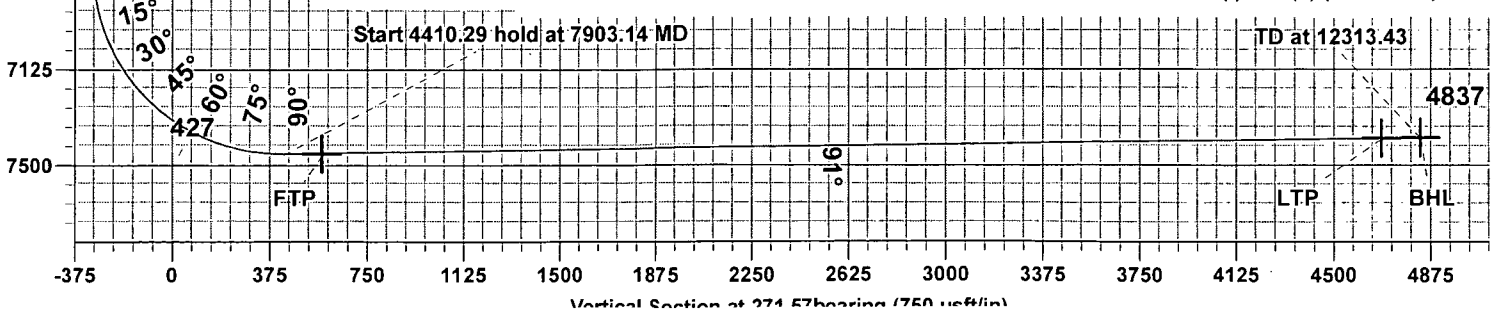
SITE DETAILS:

Bulldog State 2H
Site Centre Northing: 570249.10
Easting: 548890.10

Positional Uncertainty: 0.00
Convergence: 0.09
Local North: Grid







Database:	Midland District	**Local Co-ordinate Reference:**	Well BS 2H
Company:	OXY	**TVD Reference:**	KB @ 3282.00usft
Project:	Eddy County, NM (NAD 27 NME)	**MD Reference:**	KB @ 3282.00usft
Site:	Bulldog State 2H	**North Reference:**	Grid
Well:	BS 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #3		

Project Eddy County, NM (NAD 27 NME) 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		

Site Bulldog State 2H

Site Position:		**Northing:**	570,249.10 usft	**Latitude:**	32° 34' 3.438 N
From:	Map	**Easting:**	548,890.10 usft	**Longitude:**	104° 10' 28.687 W
Position Uncertainty:	0.00 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.09 °

Well BS 2H

Well Position	**+N/-S**	0.00 usft	**Northing:**	570,249.10 usft	**Latitude:**	32° 34' 3.438 N
	+E/-W	0.00 usft	**Easting:**	548,890.10 usft	**Longitude:**	104° 10' 28.687 W
Position Uncertainty		0.00 usft	**Wellhead Elevation:**	0.00 usft	**Ground Level:**	3,258.00 usft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/31/2014	7.55	60.33	48,479

Design Plan #3

Audit Notes:

Version:		**Phase:**	PROTOTYPE	**Tie On Depth:**	0.00

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (bearing)
	0.00	0.00	0.00	271.57

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (bearing)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,200.00	10.00	91.50	4,197.47	-1.14	43.51	2.00	2.00	0.00	91.50	
5,425.00	10.00	91.50	5,403.86	-6.71	256.15	0.00	0.00	0.00	0.00	
5,925.00	0.00	0.00	5,901.32	-7.85	299.66	2.00	-2.00	0.00	180.00	
6,767.58	0.00	0.00	6,743.90	-7.85	299.66	0.00	0.00	0.00	0.00	
7,903.14	90.84	271.56	7,460.02	11.95	-426.82	8.00	8.00	-7.79	271.56	
12,313.43	90.84	271.56	7,395.00	132.10	-4,835.00	0.00	0.00	0.00	0.00	BS 2H BHL

Database:	Midland District	Local Co-ordinate Reference:	Well BS 2H
Company:	OXY	TVD Reference:	KB @ 3282.00usft
Project:	Eddy County, NM (NAD 27 NME)	MD Reference:	KB @ 3282.00usft
Site:	Bulldog State 2H	North Reference:	Grid
Well:	BS 2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #3		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (bearing)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	0.00	0.00
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00
3,800.00	2.00	91.50	3,799.98	-0.05	1.74	-1.75	2.00	2.00	0.00
3,900.00	4.00	91.50	3,899.84	-0.18	6.98	-6.98	2.00	2.00	0.00
4,000.00	6.00	91.50	3,999.45	-0.41	15.69	-15.69	2.00	2.00	0.00
4,100.00	8.00	91.50	4,098.70	-0.73	27.87	-27.88	2.00	2.00	0.00
4,200.00	10.00	91.50	4,197.47	-1.14	43.51	-43.52	2.00	2.00	0.00
4,300.00	10.00	91.50	4,295.95	-1.59	60.87	-60.89	0.00	0.00	0.00
4,400.00	10.00	91.50	4,394.43	-2.05	78.23	-78.25	0.00	0.00	0.00
4,500.00	10.00	91.50	4,492.91	-2.50	95.58	-95.62	0.00	0.00	0.00
4,600.00	10.00	91.50	4,591.39	-2.96	112.94	-112.98	0.00	0.00	0.00
4,700.00	10.00	91.50	4,689.87	-3.41	130.30	-130.35	0.00	0.00	0.00
4,800.00	10.00	91.50	4,788.35	-3.87	147.66	-147.71	0.00	0.00	0.00
4,900.00	10.00	91.50	4,886.83	-4.32	165.02	-165.08	0.00	0.00	0.00
5,000.00	10.00	91.50	4,985.31	-4.78	182.38	-182.44	0.00	0.00	0.00
5,100.00	10.00	91.50	5,083.79	-5.23	199.74	-199.81	0.00	0.00	0.00
5,200.00	10.00	91.50	5,182.27	-5.68	217.10	-217.17	0.00	0.00	0.00
5,300.00	10.00	91.50	5,280.75	-6.14	234.46	-234.54	0.00	0.00	0.00

Database:	Midland District	**Local Co-ordinate Reference:**	Well BS 2H
Company:	OXY	**TVD Reference:**	KB @ 3282.00usft
Project:	Eddy County, NM (NAD 27 NME)	**MD Reference:**	KB @ 3282.00usft
Site:	Bulldog State 2H	**North Reference:**	Grid
Well:	BS 2H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #3		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (bearing)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,400.00	10.00	91.50	5,379.23	-6.59	251.81	-251.90	0.00	0.00	0.00
5,425.00	10.00	91.50	5,403.86	-6.71	256.15	-256.24	0.00	0.00	0.00
5,500.00	8.50	91.50	5,477.88	-7.02	268.21	-268.30	2.00	-2.00	0.00
5,600.00	6.50	91.50	5,577.02	-7.36	281.25	-281.35	2.00	-2.00	0.00
5,700.00	4.50	91.50	5,676.55	-7.62	290.83	-290.93	2.00	-2.00	0.00
5,800.00	2.50	91.50	5,776.36	-7.78	296.94	-297.04	2.00	-2.00	0.00
5,900.00	0.50	91.50	5,876.32	-7.84	299.55	-299.65	2.00	-2.00	0.00
5,925.00	0.00	0.00	5,901.32	-7.85	299.66	-299.76	2.00	-2.00	0.00
6,000.00	0.00	0.00	5,976.32	-7.85	299.66	-299.76	0.00	0.00	0.00
6,100.00	0.00	0.00	6,076.32	-7.85	299.66	-299.76	0.00	0.00	0.00
6,200.00	0.00	0.00	6,176.32	-7.85	299.66	-299.76	0.00	0.00	0.00
6,300.00	0.00	0.00	6,276.32	-7.85	299.66	-299.76	0.00	0.00	0.00
6,400.00	0.00	0.00	6,376.32	-7.85	299.66	-299.76	0.00	0.00	0.00
6,500.00	0.00	0.00	6,476.32	-7.85	299.66	-299.76	0.00	0.00	0.00
6,600.00	0.00	0.00	6,576.32	-7.85	299.66	-299.76	0.00	0.00	0.00
6,700.00	0.00	0.00	6,676.32	-7.85	299.66	-299.76	0.00	0.00	0.00
6,767.58	0.00	0.00	6,743.90	-7.85	299.66	-299.76	0.00	0.00	0.00
6,800.00	2.59	271.56	6,776.31	-7.83	298.93	-299.03	8.00	8.00	0.00
6,850.00	6.59	271.56	6,826.14	-7.72	294.93	-295.03	8.00	8.00	0.00
6,900.00	10.59	271.56	6,875.57	-7.51	287.46	-287.56	8.00	8.00	0.00
6,950.00	14.59	271.56	6,924.35	-7.22	276.56	-276.66	8.00	8.00	0.00
7,000.00	18.59	271.56	6,972.26	-6.83	262.29	-262.38	8.00	8.00	0.00
7,050.00	22.59	271.56	7,019.06	-6.35	244.72	-244.80	8.00	8.00	0.00
7,100.00	26.59	271.56	7,064.51	-5.78	223.92	-223.99	8.00	8.00	0.00
7,150.00	30.59	271.56	7,108.41	-5.13	200.00	-200.07	8.00	8.00	0.00
7,200.00	34.59	271.56	7,150.52	-4.40	173.08	-173.14	8.00	8.00	0.00
7,250.00	38.59	271.56	7,190.66	-3.59	143.29	-143.34	8.00	8.00	0.00
7,300.00	42.59	271.56	7,228.62	-2.70	110.78	-110.81	8.00	8.00	0.00
7,350.00	46.59	271.56	7,264.22	-1.74	75.70	-75.71	8.00	8.00	0.00
7,400.00	50.59	271.56	7,297.28	-0.72	38.22	-38.22	8.00	8.00	0.00
7,450.00	54.59	271.56	7,327.65	0.36	-1.48	1.49	8.00	8.00	0.00
7,500.00	58.59	271.56	7,355.17	1.50	-43.19	43.22	8.00	8.00	0.00
7,550.00	62.59	271.56	7,379.71	2.68	-86.73	86.77	8.00	8.00	0.00
7,600.00	66.59	271.56	7,401.16	3.91	-131.87	131.92	8.00	8.00	0.00
7,650.00	70.59	271.56	7,419.41	5.18	-178.39	178.47	8.00	8.00	0.00
7,700.00	74.59	271.56	7,434.36	6.48	-226.07	226.17	8.00	8.00	0.00
7,750.00	78.59	271.56	7,445.95	7.81	-274.68	274.79	8.00	8.00	0.00
7,800.00	82.59	271.56	7,454.12	9.15	-323.98	324.11	8.00	8.00	0.00
7,850.00	86.59	271.56	7,458.83	10.51	-373.73	373.88	8.00	8.00	0.00
7,903.14	90.84	271.56	7,460.02	11.95	-426.82	426.99	8.00	8.00	0.00
8,000.00	90.84	271.56	7,458.59	14.59	-523.64	523.84	0.00	0.00	0.00
8,100.00	90.84	271.56	7,457.12	17.32	-623.59	623.83	0.00	0.00	0.00
8,200.00	90.84	271.56	7,455.64	20.04	-723.54	723.82	0.00	0.00	0.00
8,300.00	90.84	271.56	7,454.17	22.77	-823.50	823.81	0.00	0.00	0.00
8,400.00	90.84	271.56	7,452.69	25.49	-923.45	923.80	0.00	0.00	0.00
8,500.00	90.84	271.56	7,451.22	28.21	-1,023.40	1,023.79	0.00	0.00	0.00
8,600.00	90.84	271.56	7,449.75	30.94	-1,123.35	1,123.78	0.00	0.00	0.00
8,700.00	90.84	271.56	7,448.27	33.66	-1,223.30	1,223.77	0.00	0.00	0.00
8,800.00	90.84	271.56	7,446.80	36.39	-1,323.26	1,323.76	0.00	0.00	0.00
8,900.00	90.84	271.56	7,445.32	39.11	-1,423.21	1,423.74	0.00	0.00	0.00
9,000.00	90.84	271.56	7,443.85	41.83	-1,523.16	1,523.73	0.00	0.00	0.00
9,100.00	90.84	271.56	7,442.37	44.56	-1,623.11	1,623.72	0.00	0.00	0.00
9,200.00	90.84	271.56	7,440.90	47.28	-1,723.06	1,723.71	0.00	0.00	0.00
9,300.00	90.84	271.56	7,439.43	50.01	-1,823.02	1,823.70	0.00	0.00	0.00

Database:	Midland District	Local Co-ordinate Reference:	Well BS 2H
Company:	OXY	TVD Reference:	KB @ 3282.00usft
Project:	Eddy County, NM (NAD 27 NME)	MD Reference:	KB @ 3282.00usft
Site:	Bulldog State 2H	North Reference:	Grid
Well:	BS 2H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #3		

Planned Survey

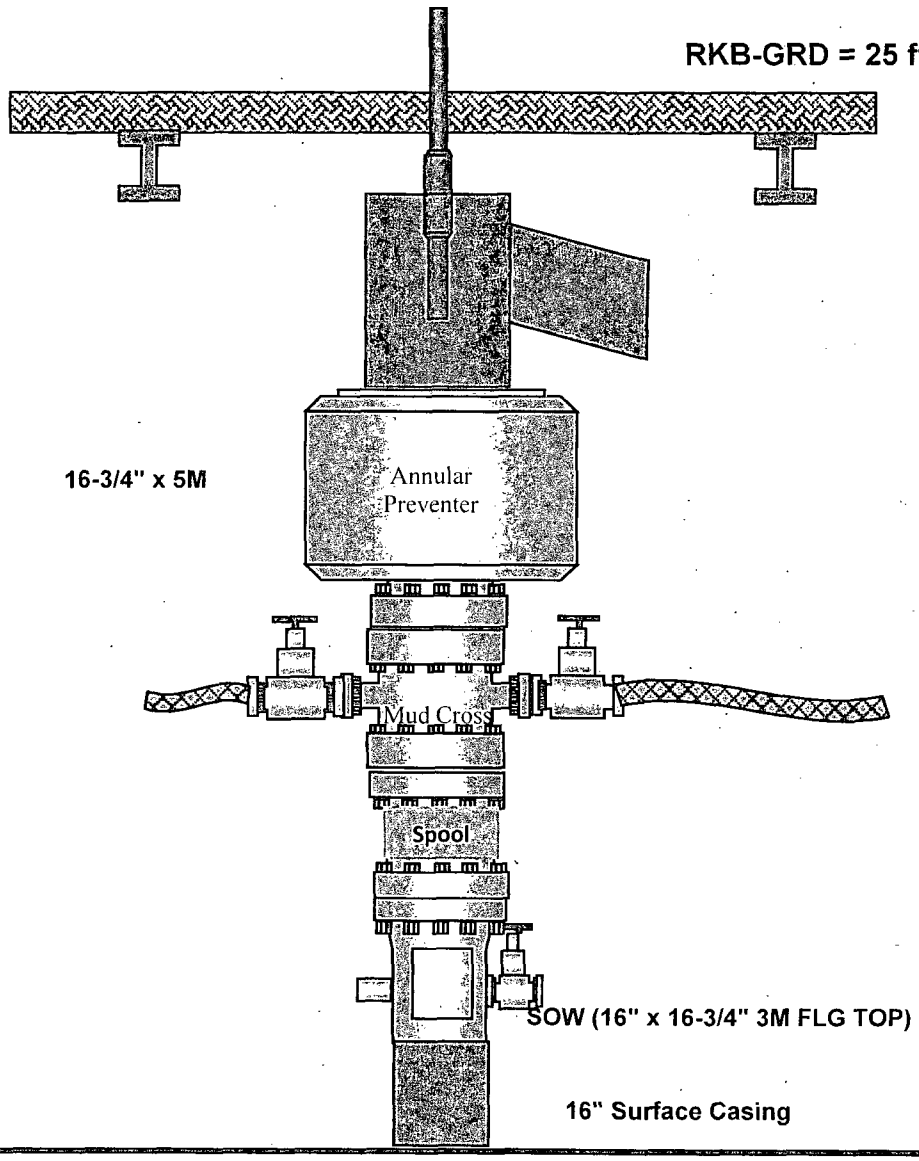
Measured Depth (usft)	Inclination (°)	Azimuth (bearing)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,400.00	90.84	271.56	7,437.95	52.73	-1,922.97	1,923.69	0.00	0.00	0.00
9,500.00	90.84	271.56	7,436.48	55.46	-2,022.92	2,023.68	0.00	0.00	0.00
9,600.00	90.84	271.56	7,435.00	58.18	-2,122.87	2,123.67	0.00	0.00	0.00
9,700.00	90.84	271.56	7,433.53	60.90	-2,222.82	2,223.66	0.00	0.00	0.00
9,800.00	90.84	271.56	7,432.05	63.63	-2,322.78	2,323.65	0.00	0.00	0.00
9,900.00	90.84	271.56	7,430.58	66.35	-2,422.73	2,423.64	0.00	0.00	0.00
10,000.00	90.84	271.56	7,429.11	69.08	-2,522.68	2,523.63	0.00	0.00	0.00
10,100.00	90.84	271.56	7,427.63	71.80	-2,622.63	2,623.61	0.00	0.00	0.00
10,200.00	90.84	271.56	7,426.16	74.53	-2,722.58	2,723.60	0.00	0.00	0.00
10,300.00	90.84	271.56	7,424.68	77.25	-2,822.54	2,823.59	0.00	0.00	0.00
10,400.00	90.84	271.56	7,423.21	79.97	-2,922.49	2,923.58	0.00	0.00	0.00
10,500.00	90.84	271.56	7,421.73	82.70	-3,022.44	3,023.57	0.00	0.00	0.00
10,600.00	90.84	271.56	7,420.26	85.42	-3,122.39	3,123.56	0.00	0.00	0.00
10,700.00	90.84	271.56	7,418.79	88.15	-3,222.34	3,223.55	0.00	0.00	0.00
10,800.00	90.84	271.56	7,417.31	90.87	-3,322.30	3,323.54	0.00	0.00	0.00
10,900.00	90.84	271.56	7,415.84	93.59	-3,422.25	3,423.53	0.00	0.00	0.00
11,000.00	90.84	271.56	7,414.36	96.32	-3,522.20	3,523.52	0.00	0.00	0.00
11,100.00	90.84	271.56	7,412.89	99.04	-3,622.15	3,623.51	0.00	0.00	0.00
11,200.00	90.84	271.56	7,411.42	101.77	-3,722.10	3,723.49	0.00	0.00	0.00
11,300.00	90.84	271.56	7,409.94	104.49	-3,822.06	3,823.48	0.00	0.00	0.00
11,400.00	90.84	271.56	7,408.47	107.22	-3,922.01	3,923.47	0.00	0.00	0.00
11,500.00	90.84	271.56	7,406.99	109.94	-4,021.96	4,023.46	0.00	0.00	0.00
11,600.00	90.84	271.56	7,405.52	112.66	-4,121.91	4,123.45	0.00	0.00	0.00
11,700.00	90.84	271.56	7,404.04	115.39	-4,221.86	4,223.44	0.00	0.00	0.00
11,800.00	90.84	271.56	7,402.57	118.11	-4,321.82	4,323.43	0.00	0.00	0.00
11,900.00	90.84	271.56	7,401.10	120.84	-4,421.77	4,423.42	0.00	0.00	0.00
12,000.00	90.84	271.56	7,399.62	123.56	-4,521.72	4,523.41	0.00	0.00	0.00
12,100.00	90.84	271.56	7,398.15	126.29	-4,621.67	4,623.40	0.00	0.00	0.00
12,200.00	90.84	271.56	7,396.67	129.01	-4,721.62	4,723.39	0.00	0.00	0.00
12,300.00	90.84	271.56	7,395.20	131.73	-4,821.58	4,823.38	0.00	0.00	0.00
12,313.43	90.84	271.56	7,395.00	132.10	-4,835.00	4,836.80	0.00	0.00	0.00

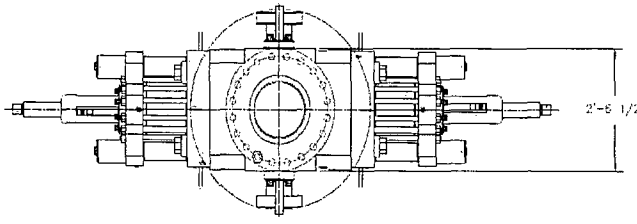
Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (bearing	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
BS 2H BHL - plan hits target center - Point	0.00	0.00	7,395.00	132.10	-4,835.00	570,381.20	544,055.10	32° 34' 4.813 N	104° 11' 25.185 W
BS 2H LTP - plan misses target center by 0.23usft at 12163.36usft MD (7397.21 TVD, 128.01 N, -4685.01 E) - Point	0.00	0.01	7,397.00	128.10	-4,685.00	570,377.20	544,205.10	32° 34' 4.771 N	104° 11' 23.432 W
BS 2H FTP - plan misses target center by 2.21usft at 8054.35usft MD (7457.79 TVD, 16.07 N, -577.97 E) - Point	0.00	0.00	7,460.00	16.00	-578.00	570,265.10	548,312.10	32° 34' 3.605 N	104° 10' 35.441 W

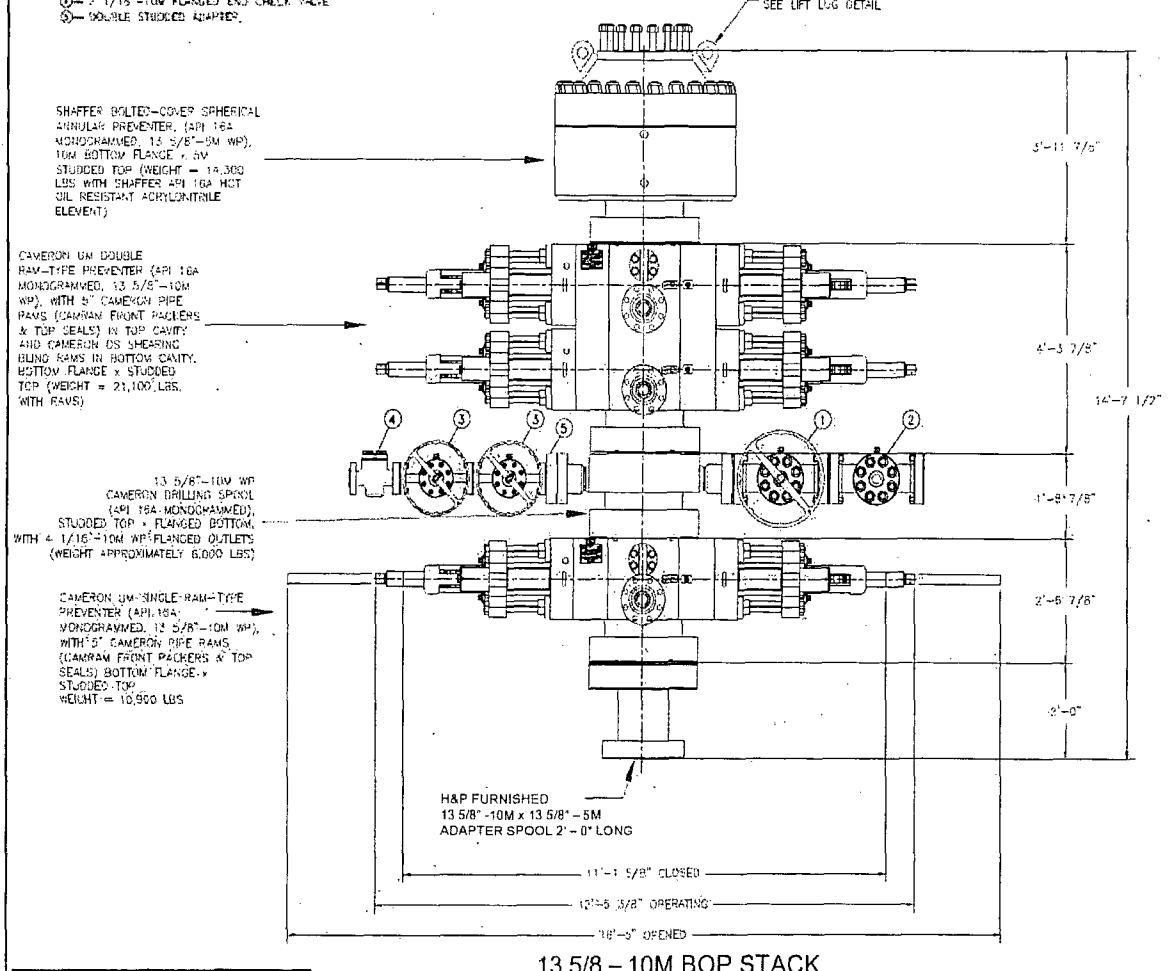
BOP STACK for 16" Surface Casing

16-3/4" 5M BOP Stack

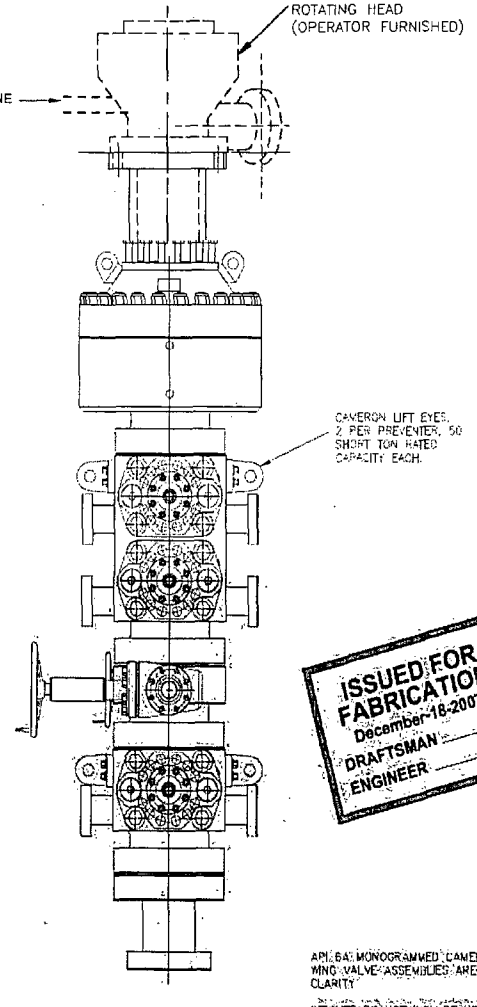




LEGEND
① — 4 1/16"-10M FLANGED END GATE VALVE
② — 4 1/16"-10M FLANGED END GATE VALVE WITH DOUBLE ACTING HYDRAULIC ACTUATOR
③ — 2 1/16"-10M FLANGED END GATE VALVE
④ — 2 1/16"-10M FLANGED END CHECK VALVE
⑤ — DOUBLE STUDDED ADAPTER



13 5/8 – 10M BOP STACK WITH 13 5/8 – 5M ANNULAR



ISSUED FOR FABRICATION
December-18-2007
DRAFTSMAN
ENGINEER

API 6A MONOGRAMMED CAMERON CHOKE AND KILL WING VALVE ASSEMBLIES ARE NOT SHOWN FOR CLARITY

WEIGHTS DO NOT INCLUDE HOSES, ADAPTER SPOOLS OR QUICK-CONNECT FITTINGS.

REV	DATE	DESCRIPTION	BY	ENGINEERING APPROVAL	DATE
E	12/18/07	ADDED SHEET 0.0	JAV		
D	4-10-07	DIMENSION ADDED, DOUBLE STUDDED ADAPTER MOVED TO 2-4-3, AND NO CHECK VALVE ADDED	JBC		
C	4-04-07	5" ADDED TO SPACER ADAPTER SPOOL	JBC		
B	02-07-07	ADDED ADAPTER SPOOL	VAL		
A	06-13-02	CORRECTED BOP STACK	VAL		

HELMERICH & PAYNE INTERNATIONAL DRILLING CO.

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

CUSTOMER: H&P

PROJECT: FLEXRIG3

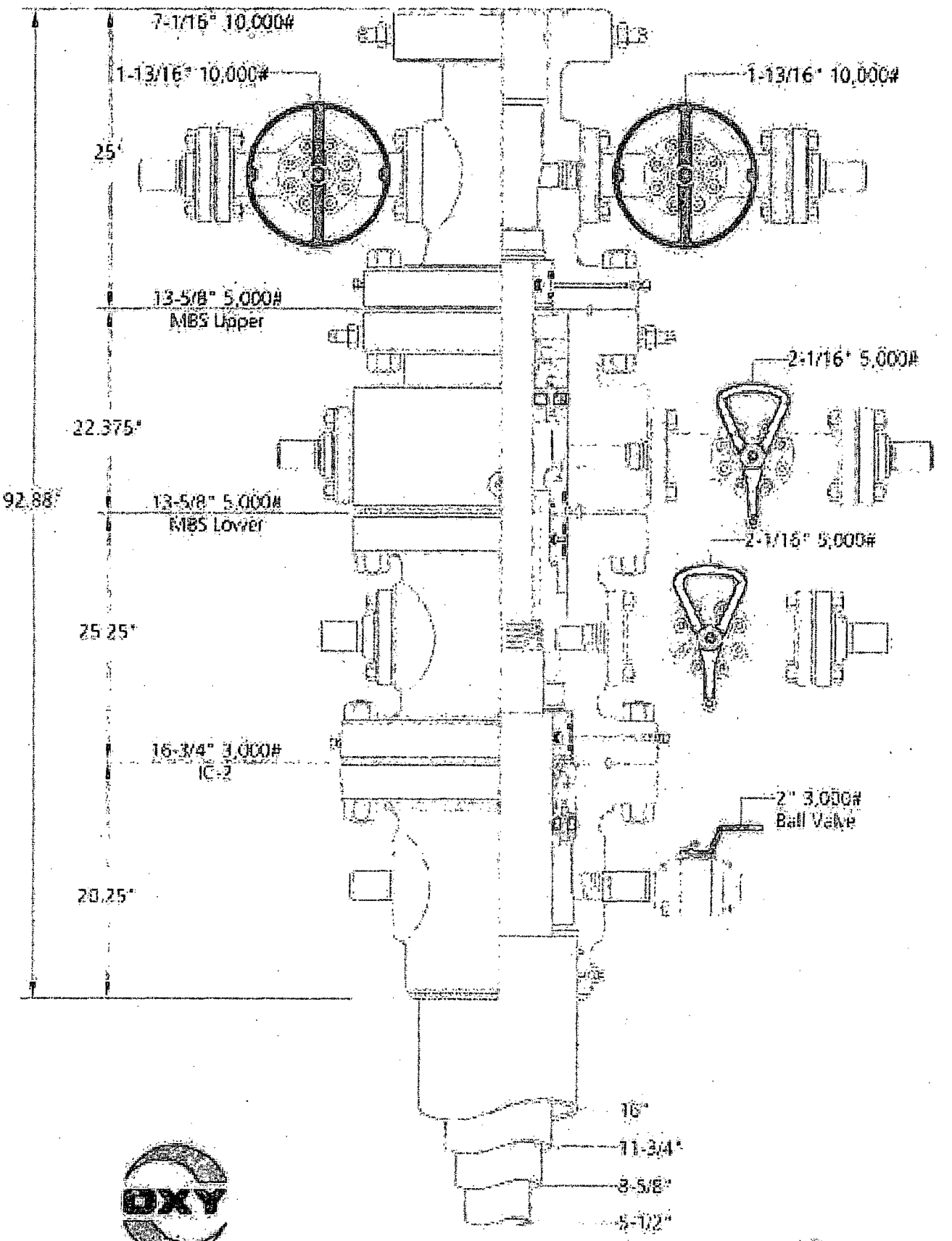
DRAWN: MTS | DATE: 6-5-02 | DWG. NO.: 210-P1-07 | REV: E

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

BOP-2

BOP-3

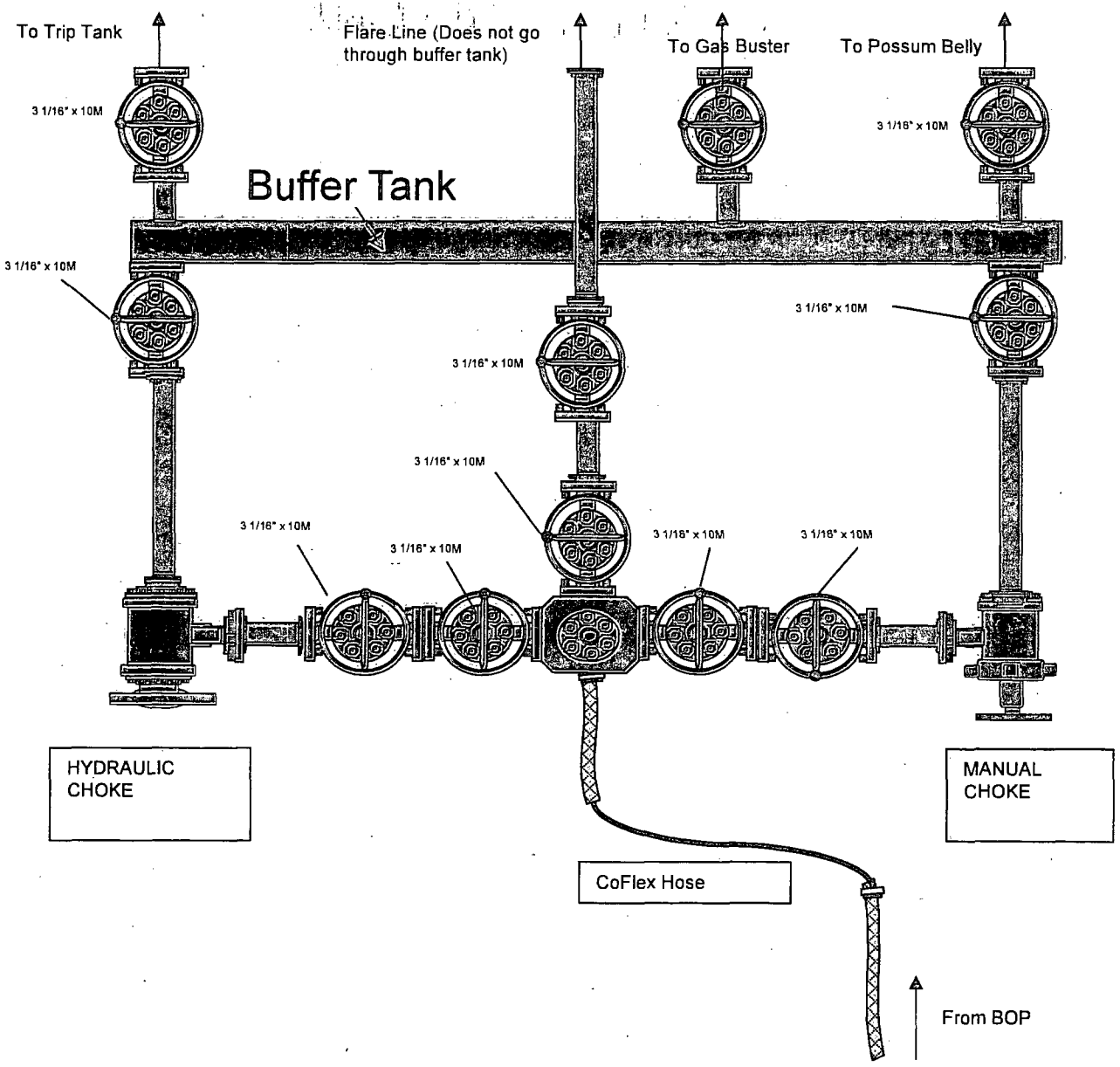
Note: Dimensional information reflected on this drawing are estimated measurements only.



16-3/4" 3K with Large Bore MBS

Anar Khalilov	Jeanette	6-5-13	# 21115416

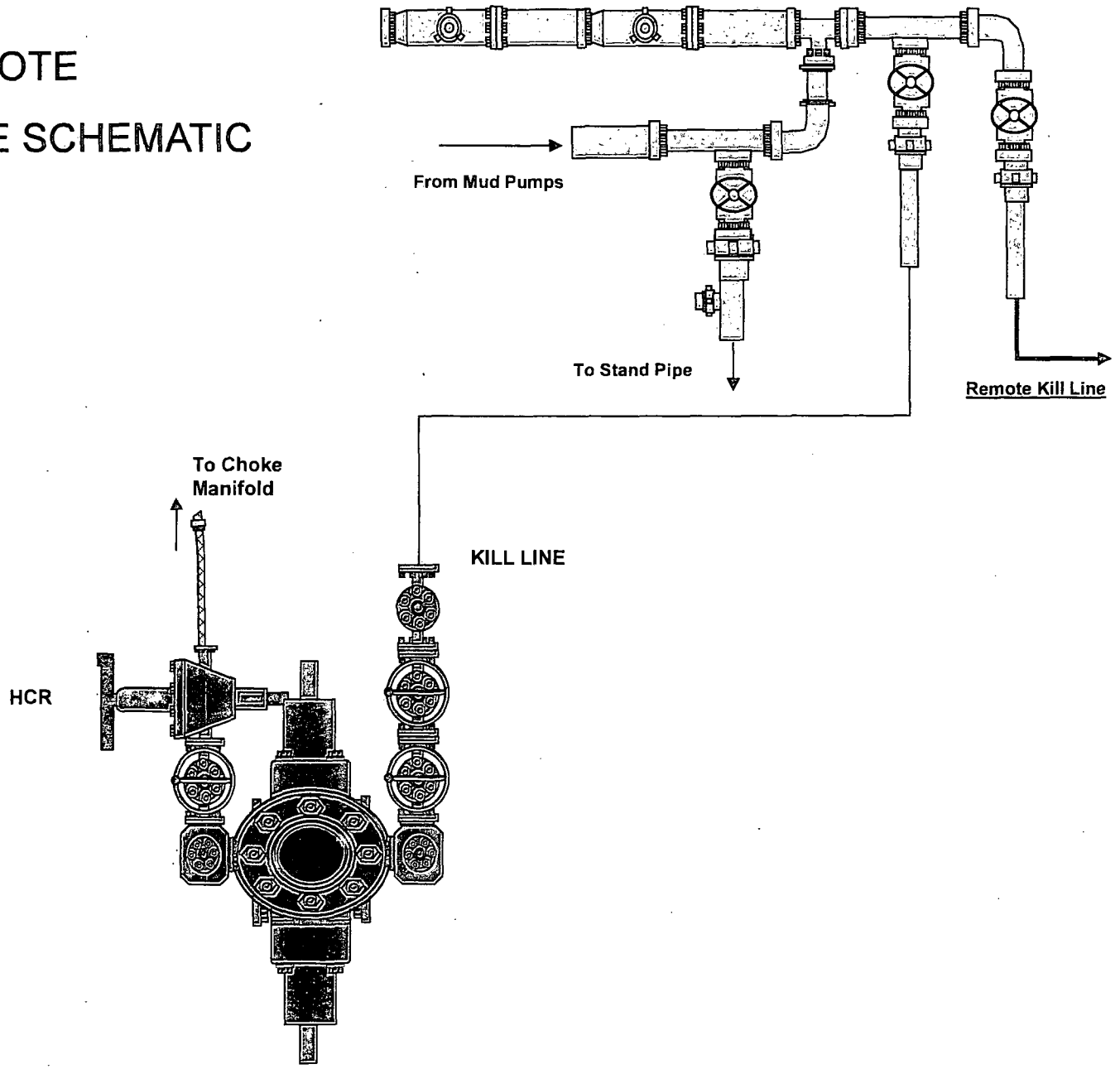
FLEX3 STD CHOKE MANIFOLD (COMPREHENSIVE)



CM-1

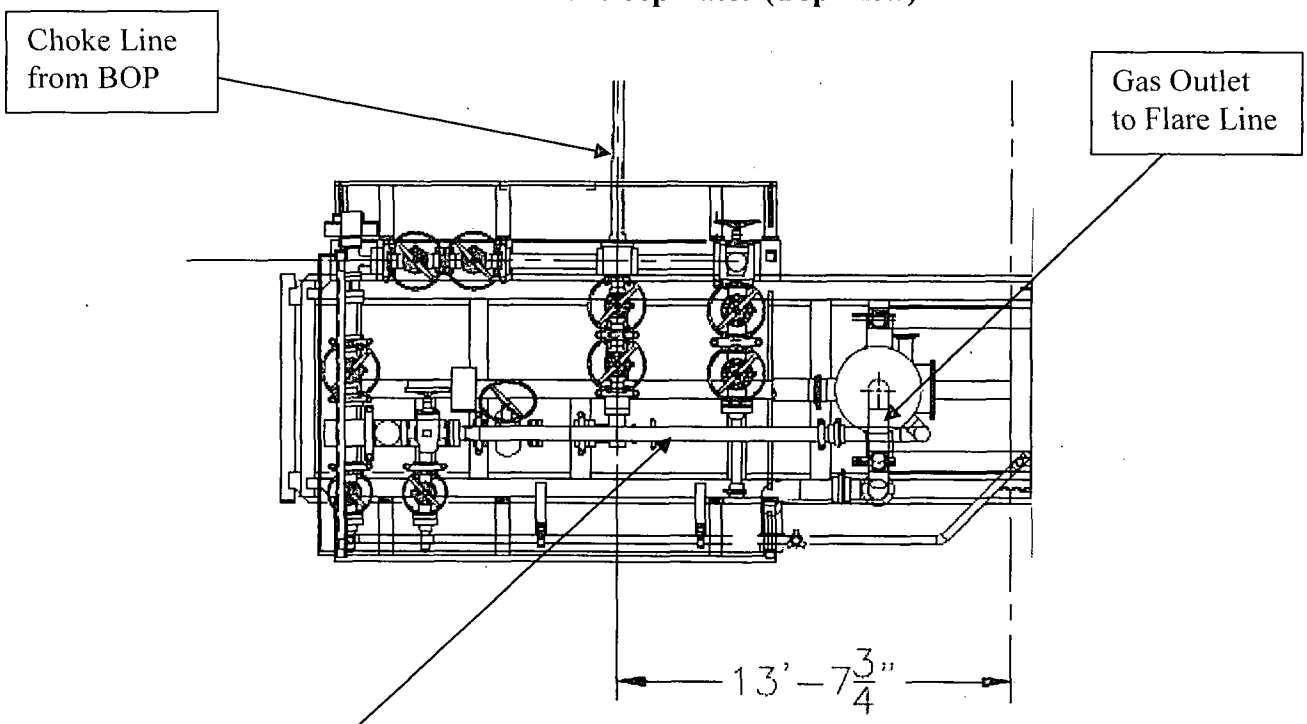
10M REMOTE

KILL LINE SCHEMATIC

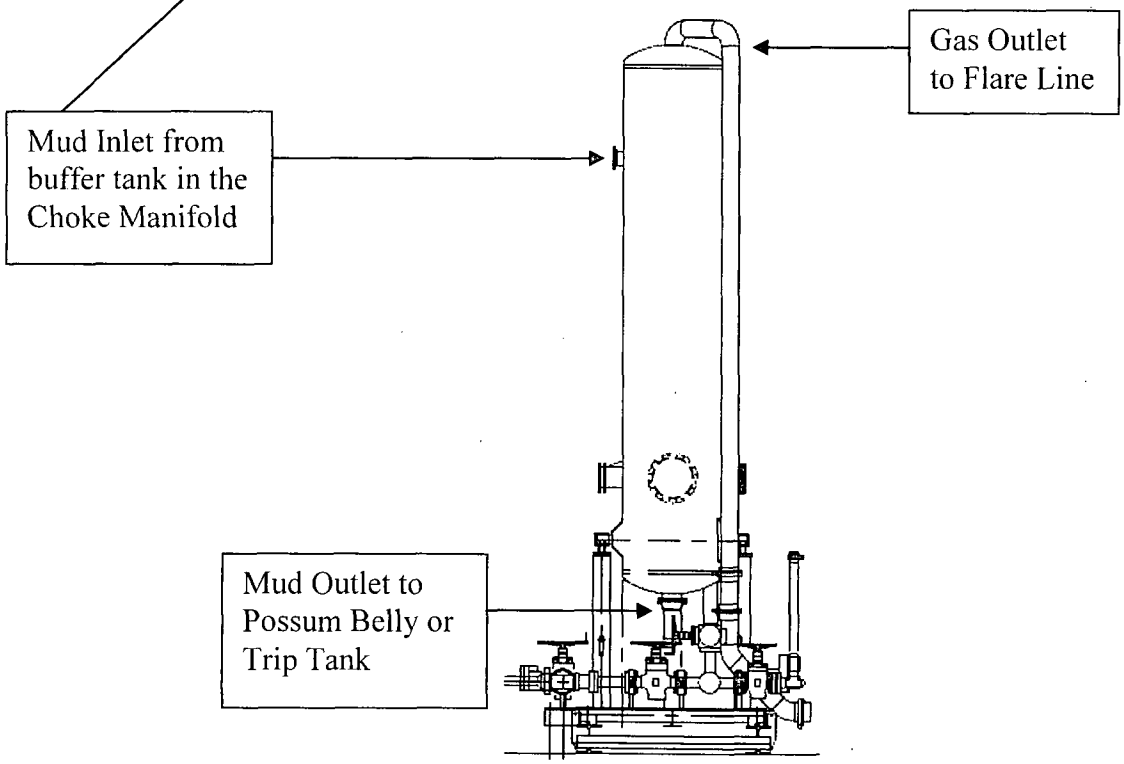


CM-2

Choke Manifold – Gas Separator (Top View)

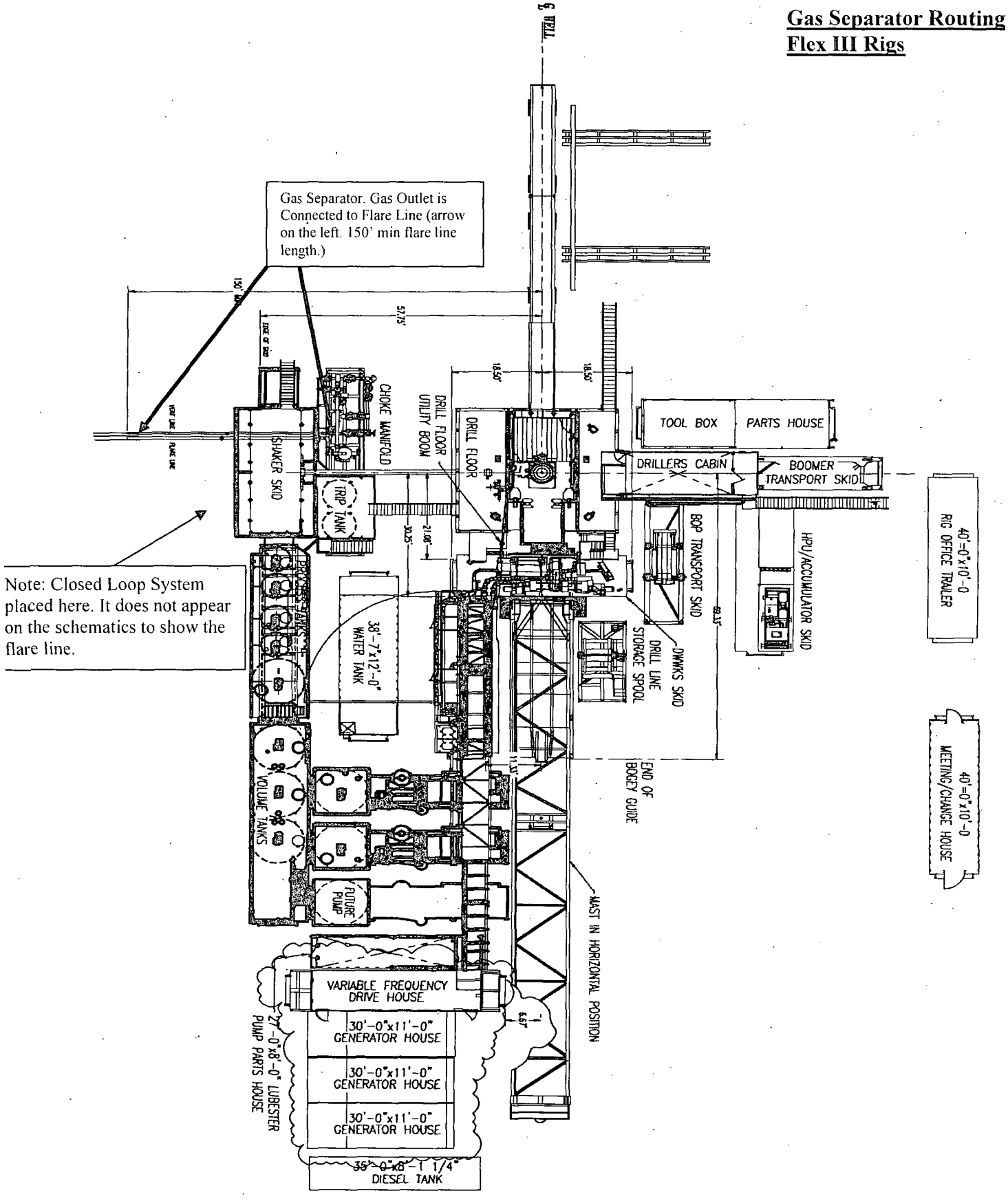


Choke Manifold – Gas Separator (Side View)



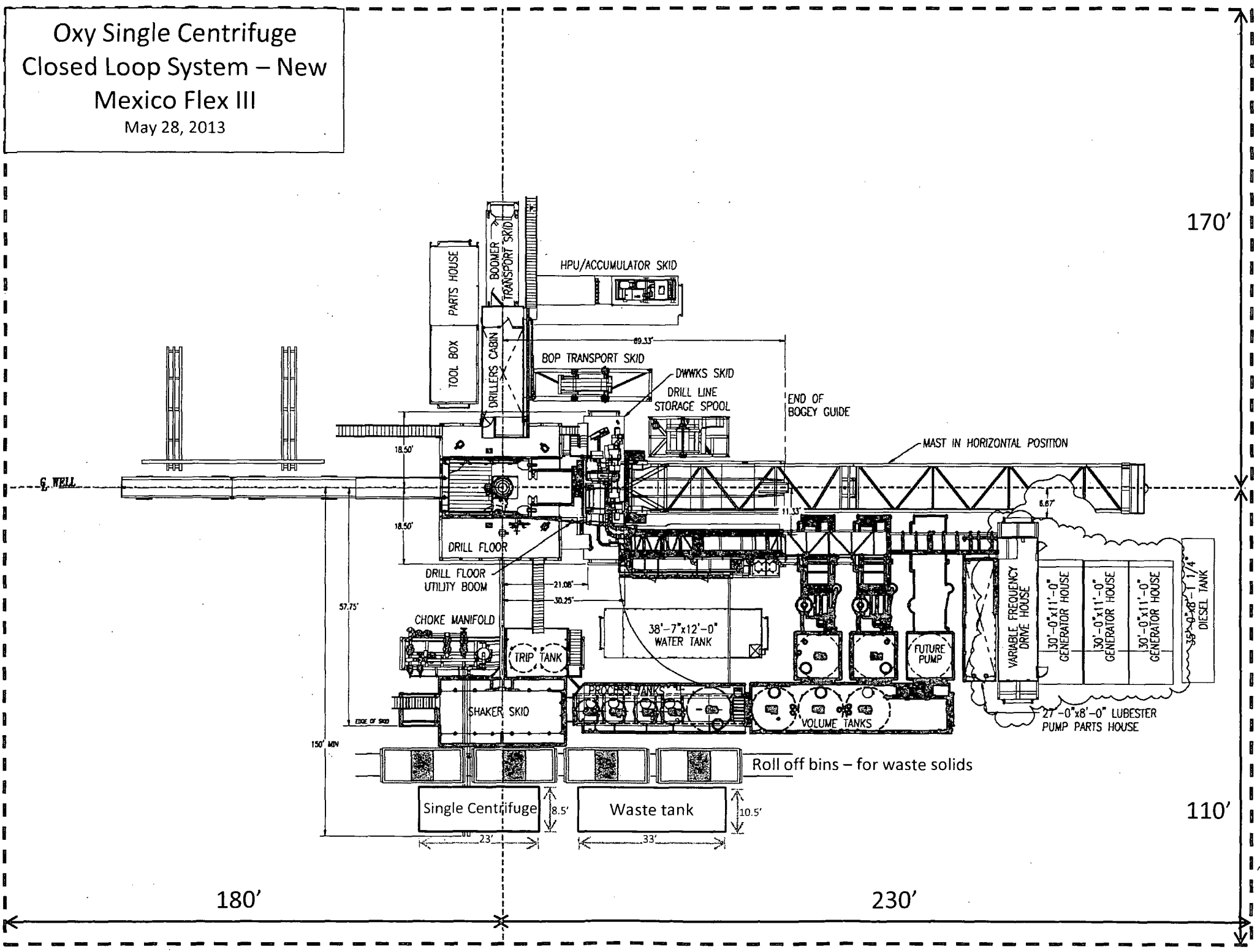
CM-4

Gas Separator Routing
Flex III Rigs

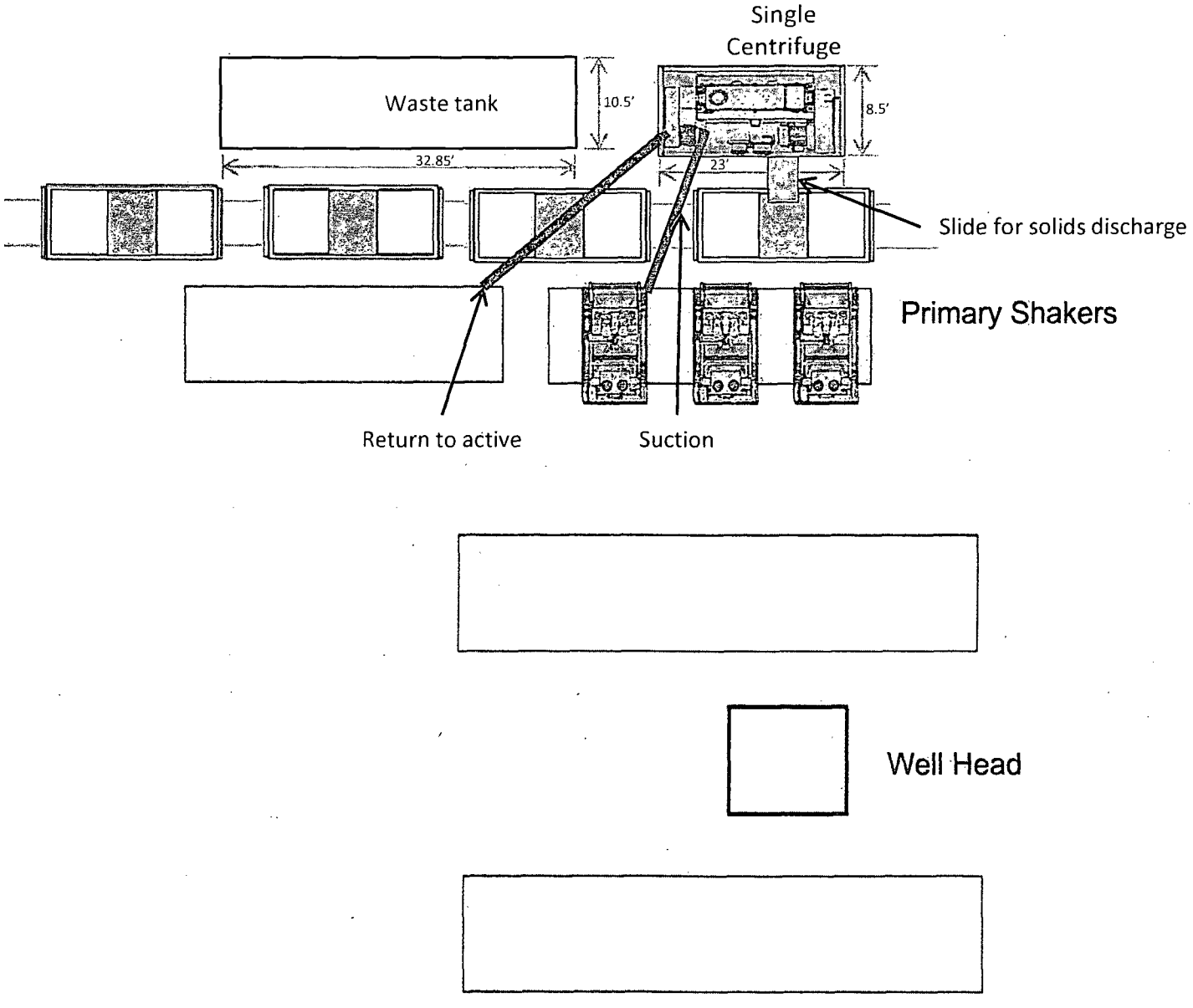


Oxy Single Centrifuge Closed Loop System – New Mexico Flex III

May 28, 2013



Oxy



Oxy Single Centrifuge Closed Loop System – New Mexico Flex III

May 28, 2013

CL-2

Permian Drilling
Hydrogen Sulfide Drilling Operations Plan
OXY Bulldog State 2H

Open drill site. No homes or buildings are near the proposed location.

1. Escape

   Personnel shall escape upwind of wellbore in the event of an emergency gas release. Escape can take place through the lease road on the SOUTHEAST side of the location. Personnel need to move to a safe distance and block the entrance to location. If the primary route is not an option due to the wind direction, then a secondary egress route should be taken.

Exit to road. Caution sign placed here.

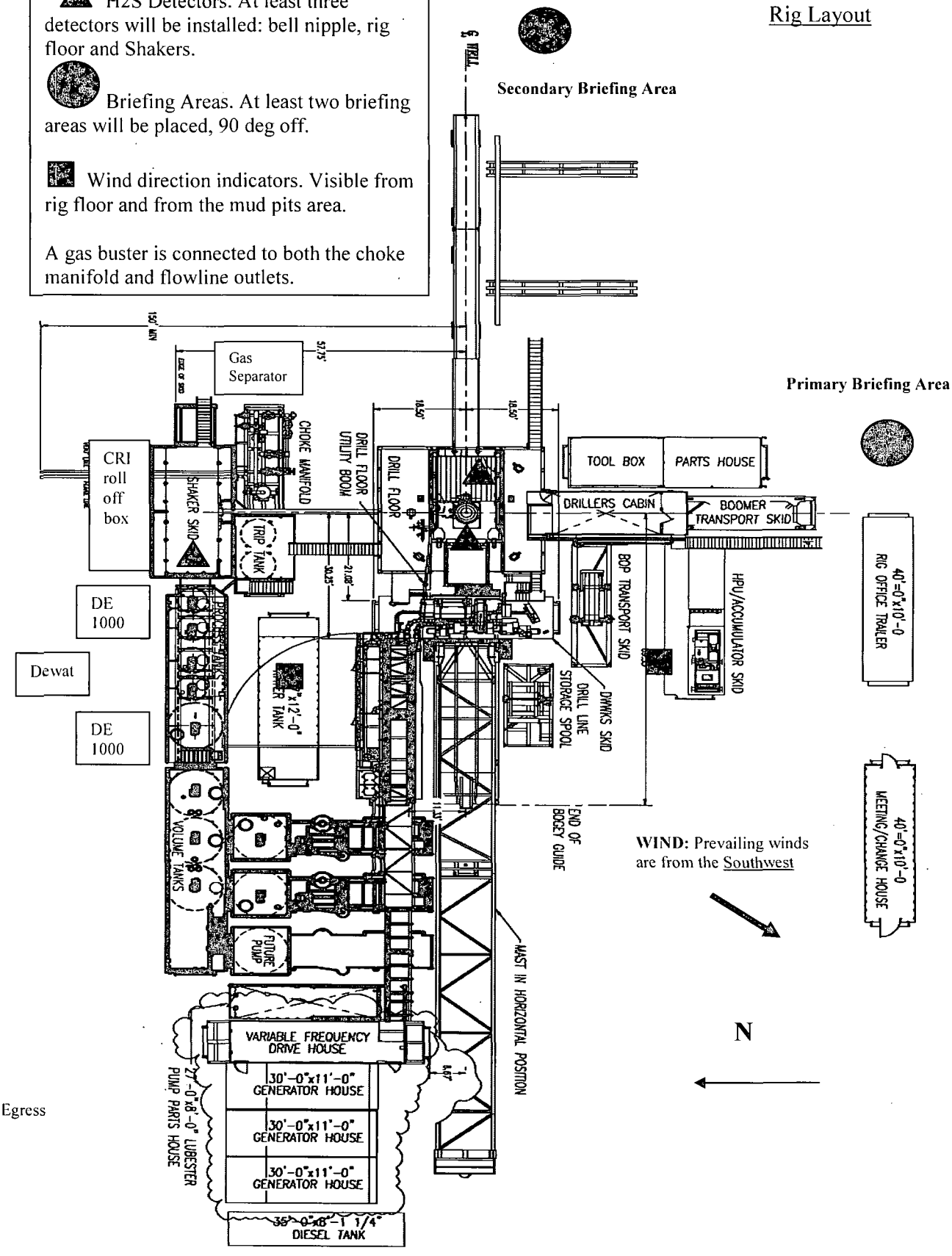
H2S Detectors. At least three detectors will be installed: bell nipple, rig floor and Shakers.

Briefing Areas. At least two briefing areas will be placed, 90 deg off.

Wind direction indicators. Visible from rig floor and from the mud pits area.

A gas buster is connected to both the choke manifold and flowline outlets.

Rig Layout



Secondary Egress

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 commence.
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. 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. 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. (Garett 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 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 Grains 100 std. Ft3*	Physical effects
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.

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