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, NM 87505

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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
30-015-	98236	WC-015 G-08 S233135D; WOLFCAMP

[4] Property Code	[5] Property Name	[6] Well Number
326058	VANADIUM 32 STATE	171H

[7] OGRID No.	[8] Operator Name	[9] Elevation
16696	OXY USA INC.	3344'

[10] Surface Location

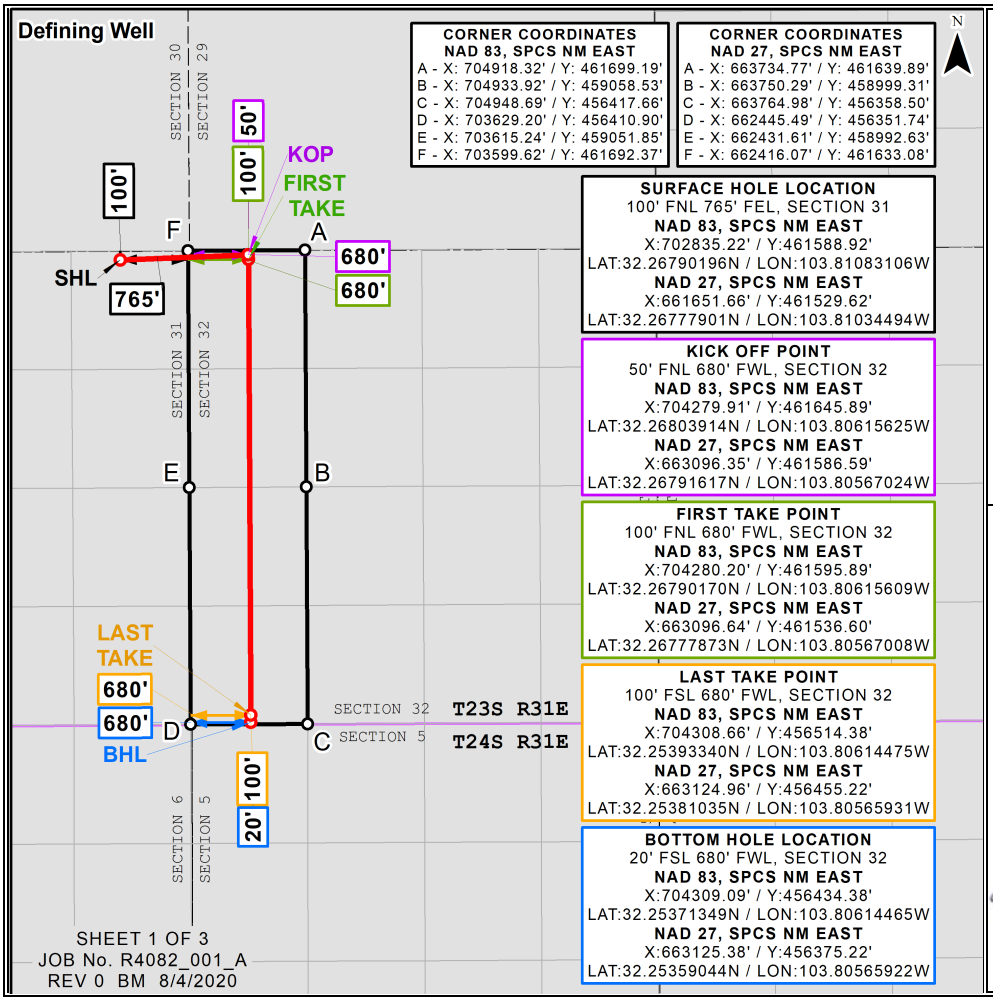
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	31	23S	31E		100	NORTH	765	EAST	EDDY

[11] 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	32	23S	31E		20	SOUTH	680	WEST	EDDY

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
160.0			

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.



CORNER COORDINATES NAD 83, SPCS NM EAST
A - X: 704918.32' / Y: 461699.19'
B - X: 704933.92' / Y: 459058.53'
C - X: 704948.69' / Y: 456417.66'
D - X: 703629.20' / Y: 456410.90'
E - X: 703615.24' / Y: 459051.85'
F - X: 703599.62' / Y: 461692.37'

CORNER COORDINATES NAD 27, SPCS NM EAST
A - X: 663734.77' / Y: 461639.89'
B - X: 663750.29' / Y: 458999.31'
C - X: 663764.98' / Y: 456358.50'
D - X: 662445.49' / Y: 456351.74'
E - X: 662431.61' / Y: 458992.63'
F - X: 662416.07' / Y: 461633.08'

SURFACE HOLE LOCATION
100' FNL 765' FEL, SECTION 31
NAD 83, SPCS NM EAST
X:702835.22' / Y:461588.92'
LAT:32.26790196N / LON:103.81083106W
NAD 27, SPCS NM EAST
X:661651.66' / Y:461529.62'
LAT:32.26777901N / LON:103.81034494W

KICK OFF POINT
50' FNL 680' FWL, SECTION 32
NAD 83, SPCS NM EAST
X:704279.91' / Y:461645.89'
LAT:32.26803914N / LON:103.80615625W
NAD 27, SPCS NM EAST
X:663096.35' / Y:461586.59'
LAT:32.26791617N / LON:103.80567024W

FIRST TAKE POINT
100' FNL 680' FWL, SECTION 32
NAD 83, SPCS NM EAST
X:704280.20' / Y:461595.89'
LAT:32.26790170N / LON:103.80615609W
NAD 27, SPCS NM EAST
X:663096.64' / Y:461536.60'
LAT:32.26777873N / LON:103.80567008W

LAST TAKE POINT
100' FSL 680' FWL, SECTION 32
NAD 83, SPCS NM EAST
X:704308.66' / Y:456514.38'
LAT:32.25393340N / LON:103.80614475W
NAD 27, SPCS NM EAST
X:663124.96' / Y:456455.22'
LAT:32.25381035N / LON:103.80565931W

BOTTOM HOLE LOCATION
20' FSL 680' FWL, SECTION 32
NAD 83, SPCS NM EAST
X:704309.09' / Y:456434.38'
LAT:32.25371349N / LON:103.80614465W
NAD 27, SPCS NM EAST
X:663125.38' / Y:456375.22'
LAT:32.25359044N / LON:103.80565922W

[17] 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.

Leslie T. Reeves 9/10/20
Signature Date

LESLIE REEVES
Printed Name

LESLIE_REEVES@OXY.COM
E-mail Address

[18] 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.

AUGUST 4, 2020
Date of Survey

Signature and Seal of Professional Surveyor:

DAVID W. MYERS NEW MEXICO 11403 PROFESSIONAL SURVEYOR

Certificate Number
DAVID W. MYERS 11403

Distances/areas relative to NAD 83 Combined Scale Factor: 0.99977695 Convergence Angle: 00°16'56.77"

Oxy USA Inc. - Vanadium 32 State 171H

Drill Plan

1. Geologic Formations

TVD of Target (ft):	11601	Pilot Hole Depth (ft):	
Total Measured Depth (ft):	17255	Deepest Expected Fresh Water (ft):	382

Delaware Basin

Formation	MD-RKB (ft)	TVD-RKB (ft)	Expected Fluids
Rustler	382	382	
Salado	718	718	Salt
Castile	2601	2601	Salt
Lamar/Delaware	4092	4092	Oil/Gas/Brine
Bell Canyon	4123	4122	Oil/Gas/Brine
Cherry Canyon	5031	5017	Oil/Gas/Brine
Brushy Canyon	6326	6284	Losses
Bone Spring	8040	7960	Oil/Gas
Bone Spring 1st	9095	8992	Oil/Gas
Bone Spring 2nd	9751	9634	Oil/Gas
Bone Spring 3rd	10953	10810	Oil/Gas
Wolfcamp	11450	11288	Oil/Gas
Penn			Oil/Gas
Strawn			Oil/Gas

*H2S, water flows, loss of circulation, abnormal pressures, etc.

2. Casing Program

		MD		TVD					
Section	Hole Size (in)	From (ft)	To (ft)	From (ft)	To (ft)	Csg. OD (in)	Csg Wt. (ppf)	Grade	Conn.
Surface	17.5	0	442	0	442	13.375	54.5	J-55	BTC
Salt	12.25	0	4192	0	4191	9.625	40	L-80 HC	BTC
Production	8.5	0	17255	0	11601	5.5	20	P-110	DQX

All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

*Oxy requests the option to run the 7.625” Intermediate II as a contingency string to be run only if severe hole conditions dictate an additional casing string necessary.
*Oxy requests the option to run production casing with DQX, TORQ DQW and/or TORQ SFW connections to accommodate hole conditions or drilling operations.

All Casing SF Values will meet or exceed those below			
SF Collapse	**SF Burst**	**Body SF Tension**	**Joint SF Tension**
1.125	1.2	1.4	1.4

Annular Clearance Variance Request

As per the agreement reached in the Oxy/BLM face-to-face meeting on Feb 22, 2018, Oxy requests permission to allow deviation from the 0.422" annular clearance requirement from Onshore Order #2 under the following conditions:

1. Annular clearance to meet or exceed 0.422" between intermediate casing ID and production casing coupling only on the first 500' overlap between both casings.
2. Annular clearance less than 0.422" is acceptable for the curve and lateral portions of the production open hole section.

	Y or N
Is casing new? If used, attach certification as required in Onshore Order #1	Y
Does casing meet API specifications? If no, attach casing specification sheet.	Y
Is premium or uncommon casing planned? If yes attach casing specification sheet.	Y
Does the above casing design meet or exceed BLM's minimum standards? If not provide justification (loading assumptions, casing design criteria).	Y
Will the intermediate pipe be kept at a minimum 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing?	Y
Is well located within Capitan Reef?	N
If yes, does production casing cement tie back a minimum of 50' above the Reef?	
Is well within the designated 4 string boundary.	
Is well located in SOPA but not in R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3rd string cement tied back 500' into previous casing?	
Is well located in R-111-P and SOPA?	Y
If yes, are the first three strings cemented to surface?	Y
Is 2nd string set 100' to 600' below the base of salt?	Y
Is well located in high Cave/Karst?	N
If yes, are there two strings cemented to surface?	
(For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	
Is well located in critical Cave/Karst?	N
If yes, are there three strings cemented to surface?	

3. Cementing Program

Section	Stage	Slurry:	Capacities	ft^3/ft	Excess:	From	To	Sacks	Volume (ft^3)	Placement
Surface	1	Surface - Tail	OH x Csg	0.6946	100%	442	-	462	614	Circulate
Int.	1	Intermediate - Tail	OH x Csg	0.3132	20%	4,192	3,692	141	188	Circulate
Int.	1	Intermediate - Lead	OH x Csg	0.3132	50%	3,692	442	883	1527	Circulate
Int.	1	Intermediate - Lead	Csg x Csg	0.3627	0%	442	-	93	160	Circulate
Prod.	1	Production - Tail	OH x Csg	0.2291	15%	17,255	11,140	1167	1611	Circulate
Prod.	1	Production - Lead	OH x Csg	0.2291	100%	11,140	4,192	1421	3183	Circulate
Prod.	1	Production - Lead	Csg x Csg	0.2608	0%	4,192	3,692	58	130	Circulate

Description	Density (lb/gal)	Yield (ft3/sk)	Water (gal/sk)	500psi Time (hh:mm)	Cmt. Class	Accelerator	Retarder	Dispersant	Salt
Surface - Tail	14.8	1.33	6.365	5:26	C	x			
Intermediate - Lead	12.9	1.73	8.784	15:26	Pozz		x		
Intermediate - Tail	14.8	1.33	6.368	7:11	C	x			
Production - Lead	11.9	2.24	12.327	14:46	H		x	x	x
Production - Tail	13.2	1.38	6.686	3:39	H		x	x	x

Offline Cementing

Oxy requests a variance to cement the 9.625” and/or 7.625” intermediate casing strings offline in accordance to the approved variance, EC Tran 461365.

The summarized operational sequence will be as follows:
Run casing as per normal operations. While running casing, conduct negative pressure test and confirm integrity of the float equipment (float collar and shoe).
Land casing.
Fill pipe with kill weight fluid, and confirm well is static.
If well Oxy requests a variance to cement the 9.625” and/or 7.625” intermediate casing strings offline in accordance to the approved variance, EC Tran 461365.

The summarized operational sequence will be as follows:

1. Run casing as per normal operations. While running casing, conduct negative pressure test and confirm integrity of the float equipment (float collar and shoe).
2. Land casing.
3. Fill pipe with kill weight fluid, and confirm well is static.
   a. If well is not static notify BLM and kill well.
   b. Once well is static notify BLM with intent to proceed with nipple down and offline cementing.
4. Set and pressure test annular packoff.
5. After confirmation of both annular barriers and internal barriers, nipple down BOP and install cap flange. If any barrier fails to test, the BOP stack will not be nippled down until after the cement job is completed.
6. Skid rig to next well on pad.
7. Confirm well is static before removing cap flange.
8. If well is not static notify BLM and kill well prior to cementing or nippling up for further remediation.
9. Install offline cement tool.
10. Rig up cement equipment.
    a. Notify BLM prior to cement job.
11. Perform cement job.
12. Confirm well is static and floats are holding after cement job.
13. Remove cement equipment, offline cement tools and install night cap with pressure gauge for monitoring.

4. Pressure Control Equipment

BOP installed and tested before drilling which hole?	Size?	Min. Required WP	Type	✓	Tested to:	TVD Depth (ft) per Section:
12.25" Hole	13-5/8"	3M	Annular	✓	70% of working pressure	4191
		3M	Blind Ram	✓	250 psi / 3000 psi	
			Pipe Ram			
			Double Ram	✓		
			Other*			
8.5" Hole	13-5/8"	5M	Annular	✓	70% of working pressure	11601
		5M	Blind Ram	✓	250 psi / 5000 psi	
			Pipe Ram			
			Double Ram	✓		
			Other*			

*Specify if additional ram is utilized

BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested.

Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke

	Formation integrity test will be performed per Onshore Order #2.	
	On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i.	
	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.	
	Y	Are anchors required by manufacturer?
	A multibowl or a unionized multibowl wellhead system will be employed. The wellhead and connection to the BOPE will meet all API 6A requirements. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested. We will test the flange connection of the wellhead with a test port that is directly in the flange. We are proposing that we will run the wellhead through the rotary prior to cementing surface casing as discussed with the BLM on October 8, 2015. See attached schematics.	

BOP Break Testing Request

Oxy requests permission to adjust the BOP break testing requirements as per the agreement reached in the OXY/BLM meeting on September 5, 2019. A separate sundry will be sent prior to spud that reflects the pad based break testing plan.

BOP break test under the following conditions:
- After a full BOP test is conducted
- When skidding to drill an intermediate section where ICP is set into the third Bone Spring or shallower.
- When skidding to drill a production section that does not penetrate into the third Bone Spring or deeper.

If the kill line is broken prior to skid, two tests will be performed.
1) Wellhead flange, co-flex hose, kill line connections and upper pipe rams
2) Wellhead flange, HCR valve, check valve, upper pipe rams

If the kill line is not broken prior to skid, only one test will be performed.

5. Mud Program

Section	Depth		Depth - TVD		Type	Weight (ppg)	Viscosity	Water Loss
	From (ft)	To (ft)	From (ft)	To (ft)				
Surface	0	442	0	442	Water-Based Mud	8.6 - 8.8	40-60	N/C
Intermediate	442	4192	442	4191	Saturated Brine-Based or Oil-Based Mud	8.0 - 10.0	35-45	N/C
Production	4192	17255	4191	11601	Water-Based or Oil-Based Mud	9.5 - 12	38-50	N/C

Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept on location at all times. The following is a general list of products: Barite, Bentonite, Gypsum, Lime, Soda Ash, Caustic Soda, Nut Plug, Cedar Fiber, Cotton Seed Hulls, Drilling Paper, Salt Water Clay, CACL2. Oxy will use a closed mud system.

What will be used to monitor the loss or gain of fluid?	PVT/MD Totco/Visual Monitoring

6. Logging and Testing Procedures

Logging, Coring and Testing.	
Yes	Will run GR from TD to surface (horizontal well – vertical portion of hole).
	Stated logs run will be in the Completion Report and submitted to the BLM.
No	Logs are planned based on well control or offset log information.
No	Drill stem test? If yes, explain
No	Coring? If yes, explain

Additional logs planned		Interval
No	Resistivity	
No	Density	
No	CBL	
Yes	Mud log	Bone Spring – TD
No	PEX	

7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	7240 psi
Abnormal Temperature	No
BH Temperature at deepest TVD	173°F

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. Appropriately weighted mud will be used to isolate potential gas, oil, and water zones until such time as casing can be cemented into place for

Hydrogen Sulfide (H2S) monitors will be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the operator will comply with the provisions of Onshore Oil and Gas Order #6. If Hydrogen Sulfide is encountered, measured values and formations will be provided to the BLM.	
N	H2S is present
Y	H2S Plan attached

8. Other facets of operation

	Yes/No
Will the well be drilled with a walking/skidding operation? If yes, describe. We plan to drill the 2 well pad in batch by section: all surface sections, intermediate sections and production sections. The wellhead will be secured with a night cap whenever the rig is not over the well.	Yes
Will more than one drilling rig be used for drilling operations? If yes, describe. Oxy requests the option to contract a Surface Rig to drill, set surface casing, and cement for this well. If the timing between rigs is such that Oxy would not be able to preset surface, the Primary Rig will MIRU and drill the well in its entirety per the APD. Please see the attached document for information on the spudder rig.	Yes

Total Estimated Cuttings Volume: 1596 bbls

Attachments
_x__ Directional Plan
_x__ H2S Contingency Plan
_x__ Flex III Attachments
_x__ Spudder Rig Attachment

9. Company Personnel

Name	Title	Office Phone	Mobile Phone
Linsay Earle	Drilling Engineer	713-350-4921	832-596-5507
William Turner	Drilling Engineer Supervisor	713-350-4951	661-817-4586
Simon Benavides	Drilling Superintendent	713-522-8652	281-684-6897
Diego Tellez	Drilling Manager	713-350-4602	713-303-4932

PROJECT DETAILS: NM DIRECTIONAL PLANS (NAD 1983)

Project: PRD NM DIRECTIONAL PLANS (NAD 1983)
Site: Vanadium 32
Well: Vanadium 32 State 171H
Wellbore: Wellbore #1
Design: Permitting Plan

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Eastern Zone

System Datum: Mean Sea Level

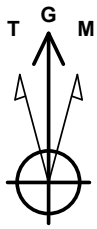
WELL DETAILS: Vanadium 32 State 171H

3344.34

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	461588.32	702835.80	32° 16' 4.441117 N	103° 48' 38.985072 W

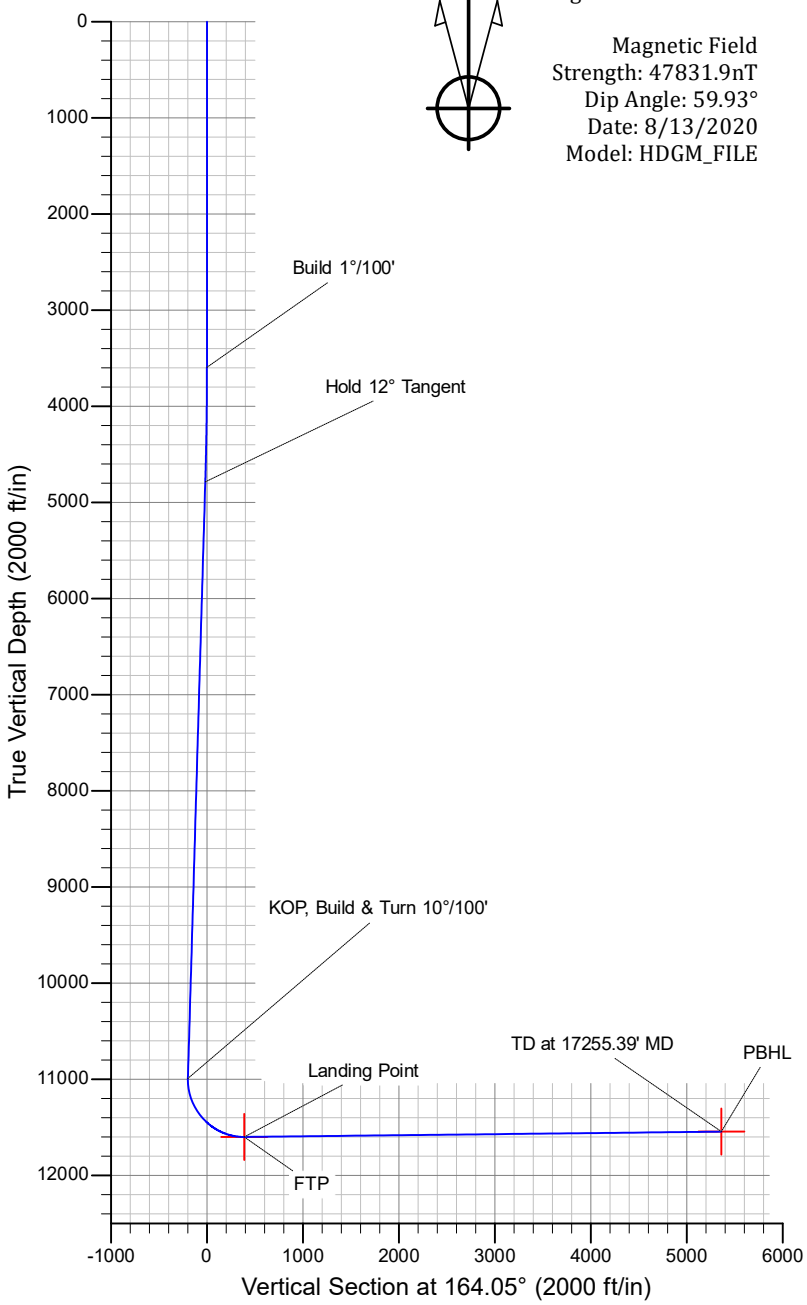
SECTION DETAILS

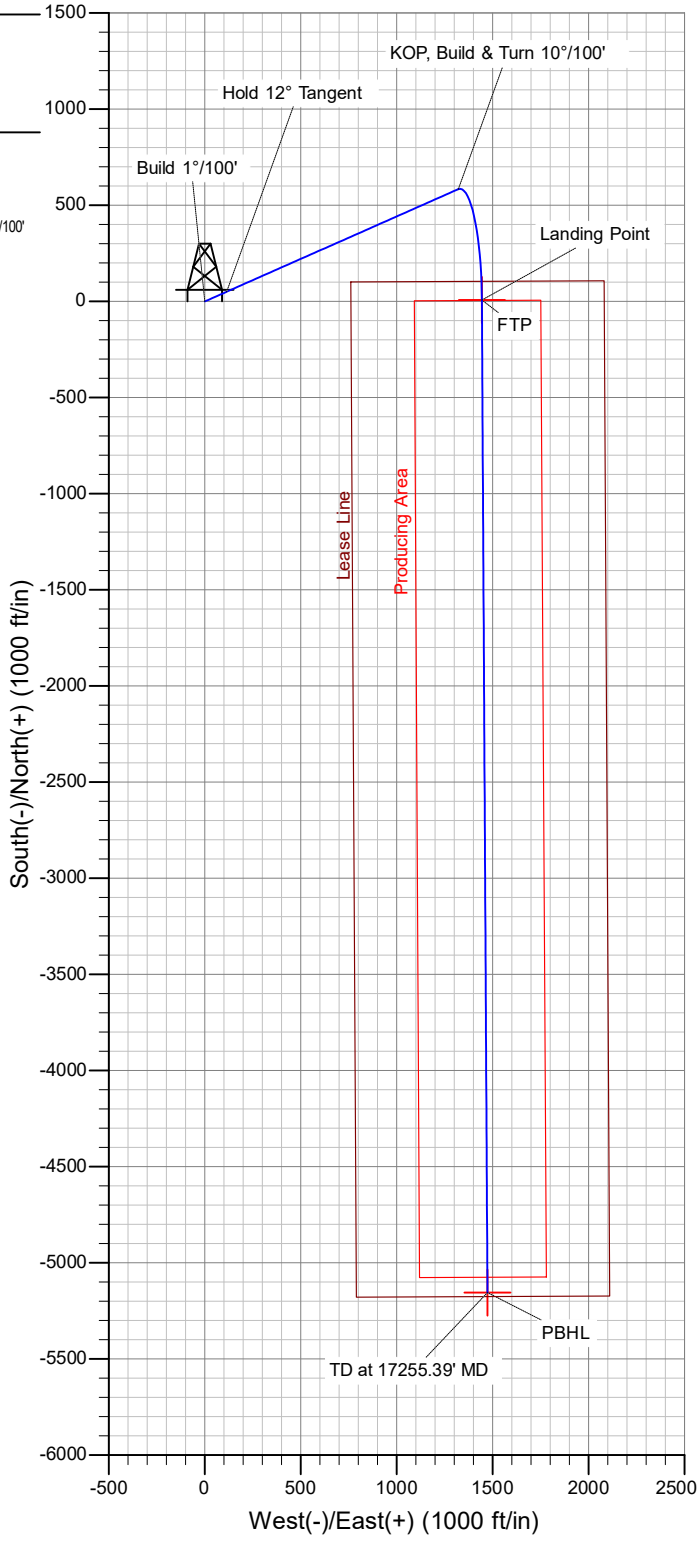
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
3595.00	0.00	0.00	3595.00	0.00	0.00	0.00	0.00	0.00	Build 1°/100'
4795.17	12.00	66.16	4786.41	50.62	114.55	1.00	66.16	-17.18	Hold 12° Tangent
11139.52	12.00	66.16	10992.08	583.82	1321.25	0.00	0.00	-198.18	KOP, Build & Turn 10°/100'
12093.10	90.61	179.68	11600.84	7.53	1444.46	10.00	112.94	389.78	Landing Point
17255.39	90.61	179.68	11545.84	-5154.38	1473.48	0.00	0.00	5360.86	TD at 17255.39' MD



Azimuths to Grid North
True North: -0.28°
Magnetic North: 6.40°

Magnetic Field
Strength: 47831.9nT
Dip Angle: 59.93°
Date: 8/13/2020
Model: HDGM_FILE





OXY

PRD NM DIRECTIONAL PLANS (NAD 1983)
Vanadium 32
Vanadium 32 State 171H

Wellbore #1

Plan: Permitting Plan

Standard Planning Report

13 August, 2020

Database:	HOPSPP	**Local Co-ordinate Reference:**	Well Vanadium 32 State 171H
Company:	ENGINEERING DESIGNS	**TVD Reference:**	RKB=26.5' @ 3370.84ft
Project:	PRD NM DIRECTIONAL PLANS (NAD 1983)	**MD Reference:**	RKB=26.5' @ 3370.84ft
Site:	Vanadium 32	**North Reference:**	Grid
Well:	Vanadium 32 State 171H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permitting Plan		

Project PRD NM DIRECTIONAL PLANS (NAD 1983)

Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		Using geodetic scale factor

Site Vanadium 32

Site Position:		**Northing:**	461,451.09 usft	**Latitude:**	32° 16' 3.060951 N
From:	Map	**Easting:**	703,295.81 usft	**Longitude:**	103° 48' 33.635206 W
Position Uncertainty:	2.00 ft	**Slot Radius:**	13.200 in	**Grid Convergence:**	0.28 °

Well Vanadium 32 State 171H

Well Position	**+N/-S**	137.24 ft	**Northing:**	461,588.32 usft	**Latitude:**	32° 16' 4.441117 N
	+E/-W	-460.04 ft	**Easting:**	702,835.80 usft	**Longitude:**	103° 48' 38.985072 W
Position Uncertainty		2.00 ft	**Wellhead Elevation:**		**Ground Level:**	3,344.34 ft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM_FILE	8/13/2020	6.68	59.93	47,831.90000000

Design Permitting Plan

Audit Notes:

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

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	164.05

Plan Survey Tool Program **Date** 8/13/2020

	Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	17,255.39	Permitting Plan (Wellbore #1)	B001Mb_MWD+HRGM	
				OWSG MWD + HRGM	

Plan Sections

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,595.00	0.00	0.00	3,595.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,795.17	12.00	66.16	4,786.41	50.62	114.55	1.00	1.00	0.00	66.16	
11,139.52	12.00	66.16	10,992.08	583.82	1,321.25	0.00	0.00	0.00	0.00	
12,093.10	90.61	179.68	11,600.84	7.53	1,444.46	10.00	8.24	11.90	112.94	FTP (Vanadium 32
17,255.39	90.61	179.68	11,545.84	-5,154.39	1,473.48	0.00	0.00	0.00	0.00	PBHL (Vanadium 32

Database:	HOPSPP	**Local Co-ordinate Reference:**	Well Vanadium 32 State 171H
Company:	ENGINEERING DESIGNS	**TVD Reference:**	RKB=26.5' @ 3370.84ft
Project:	PRD NM DIRECTIONAL PLANS (NAD 1983)	**MD Reference:**	RKB=26.5' @ 3370.84ft
Site:	Vanadium 32	**North Reference:**	Grid
Well:	Vanadium 32 State 171H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permitting Plan		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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
3,595.00	0.00	0.00	3,595.00	0.00	0.00	0.00	0.00	0.00	0.00
3,600.00	0.05	66.16	3,600.00	0.00	0.00	0.00	1.00	1.00	0.00
3,700.00	1.05	66.16	3,699.99	0.39	0.88	-0.13	1.00	1.00	0.00
3,800.00	2.05	66.16	3,799.96	1.48	3.35	-0.50	1.00	1.00	0.00
3,900.00	3.05	66.16	3,899.86	3.28	7.42	-1.11	1.00	1.00	0.00
4,000.00	4.05	66.16	3,999.66	5.78	13.09	-1.96	1.00	1.00	0.00
4,100.00	5.05	66.16	4,099.35	8.99	20.34	-3.05	1.00	1.00	0.00
4,200.00	6.05	66.16	4,198.88	12.90	29.19	-4.38	1.00	1.00	0.00
4,300.00	7.05	66.16	4,298.22	17.51	39.62	-5.94	1.00	1.00	0.00
4,400.00	8.05	66.16	4,397.35	22.82	51.64	-7.75	1.00	1.00	0.00
4,500.00	9.05	66.16	4,496.24	28.83	65.24	-9.79	1.00	1.00	0.00
4,600.00	10.05	66.16	4,594.85	35.53	80.41	-12.06	1.00	1.00	0.00
4,700.00	11.05	66.16	4,693.16	42.93	97.16	-14.57	1.00	1.00	0.00
4,795.17	12.00	66.16	4,786.41	50.62	114.55	-17.18	1.00	1.00	0.00
4,800.00	12.00	66.16	4,791.14	51.02	115.47	-17.32	0.00	0.00	0.00
4,900.00	12.00	66.16	4,888.95	59.43	134.49	-20.17	0.00	0.00	0.00
5,000.00	12.00	66.16	4,986.77	67.83	153.51	-23.03	0.00	0.00	0.00
5,100.00	12.00	66.16	5,084.58	76.24	172.53	-25.88	0.00	0.00	0.00

Database:	HOPSPP	**Local Co-ordinate Reference:**	Well Vanadium 32 State 171H
Company:	ENGINEERING DESIGNS	**TVD Reference:**	RKB=26.5' @ 3370.84ft
Project:	PRD NM DIRECTIONAL PLANS (NAD 1983)	**MD Reference:**	RKB=26.5' @ 3370.84ft
Site:	Vanadium 32	**North Reference:**	Grid
Well:	Vanadium 32 State 171H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permitting Plan		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
5,200.00	12.00	66.16	5,182.39	84.64	191.55	-28.73	0.00	0.00	0.00
5,300.00	12.00	66.16	5,280.21	93.05	210.57	-31.58	0.00	0.00	0.00
5,400.00	12.00	66.16	5,378.02	101.45	229.59	-34.44	0.00	0.00	0.00
5,500.00	12.00	66.16	5,475.84	109.85	248.61	-37.29	0.00	0.00	0.00
5,600.00	12.00	66.16	5,573.65	118.26	267.63	-40.14	0.00	0.00	0.00
5,700.00	12.00	66.16	5,671.46	126.66	286.65	-43.00	0.00	0.00	0.00
5,800.00	12.00	66.16	5,769.28	135.07	305.67	-45.85	0.00	0.00	0.00
5,900.00	12.00	66.16	5,867.09	143.47	324.69	-48.70	0.00	0.00	0.00
6,000.00	12.00	66.16	5,964.91	151.88	343.71	-51.55	0.00	0.00	0.00
6,100.00	12.00	66.16	6,062.72	160.28	362.73	-54.41	0.00	0.00	0.00
6,200.00	12.00	66.16	6,160.54	168.69	381.75	-57.26	0.00	0.00	0.00
6,300.00	12.00	66.16	6,258.35	177.09	400.77	-60.11	0.00	0.00	0.00
6,400.00	12.00	66.16	6,356.16	185.49	419.79	-62.97	0.00	0.00	0.00
6,500.00	12.00	66.16	6,453.98	193.90	438.81	-65.82	0.00	0.00	0.00
6,600.00	12.00	66.16	6,551.79	202.30	457.83	-68.67	0.00	0.00	0.00
6,700.00	12.00	66.16	6,649.61	210.71	476.85	-71.52	0.00	0.00	0.00
6,800.00	12.00	66.16	6,747.42	219.11	495.87	-74.38	0.00	0.00	0.00
6,900.00	12.00	66.16	6,845.23	227.52	514.89	-77.23	0.00	0.00	0.00
7,000.00	12.00	66.16	6,943.05	235.92	533.91	-80.08	0.00	0.00	0.00
7,100.00	12.00	66.16	7,040.86	244.32	552.93	-82.94	0.00	0.00	0.00
7,200.00	12.00	66.16	7,138.68	252.73	571.95	-85.79	0.00	0.00	0.00
7,300.00	12.00	66.16	7,236.49	261.13	590.97	-88.64	0.00	0.00	0.00
7,400.00	12.00	66.16	7,334.31	269.54	609.99	-91.49	0.00	0.00	0.00
7,500.00	12.00	66.16	7,432.12	277.94	629.01	-94.35	0.00	0.00	0.00
7,600.00	12.00	66.16	7,529.93	286.35	648.03	-97.20	0.00	0.00	0.00
7,700.00	12.00	66.16	7,627.75	294.75	667.05	-100.05	0.00	0.00	0.00
7,800.00	12.00	66.16	7,725.56	303.15	686.07	-102.91	0.00	0.00	0.00
7,900.00	12.00	66.16	7,823.38	311.56	705.09	-105.76	0.00	0.00	0.00
8,000.00	12.00	66.16	7,921.19	319.96	724.11	-108.61	0.00	0.00	0.00
8,100.00	12.00	66.16	8,019.00	328.37	743.13	-111.46	0.00	0.00	0.00
8,200.00	12.00	66.16	8,116.82	336.77	762.15	-114.32	0.00	0.00	0.00
8,300.00	12.00	66.16	8,214.63	345.18	781.17	-117.17	0.00	0.00	0.00
8,400.00	12.00	66.16	8,312.45	353.58	800.19	-120.02	0.00	0.00	0.00
8,500.00	12.00	66.16	8,410.26	361.99	819.21	-122.87	0.00	0.00	0.00
8,600.00	12.00	66.16	8,508.07	370.39	838.23	-125.73	0.00	0.00	0.00
8,700.00	12.00	66.16	8,605.89	378.79	857.25	-128.58	0.00	0.00	0.00
8,800.00	12.00	66.16	8,703.70	387.20	876.27	-131.43	0.00	0.00	0.00
8,900.00	12.00	66.16	8,801.52	395.60	895.29	-134.29	0.00	0.00	0.00
9,000.00	12.00	66.16	8,899.33	404.01	914.31	-137.14	0.00	0.00	0.00
9,100.00	12.00	66.16	8,997.15	412.41	933.33	-139.99	0.00	0.00	0.00
9,200.00	12.00	66.16	9,094.96	420.82	952.35	-142.84	0.00	0.00	0.00
9,300.00	12.00	66.16	9,192.77	429.22	971.37	-145.70	0.00	0.00	0.00
9,400.00	12.00	66.16	9,290.59	437.62	990.39	-148.55	0.00	0.00	0.00
9,500.00	12.00	66.16	9,388.40	446.03	1,009.41	-151.40	0.00	0.00	0.00
9,600.00	12.00	66.16	9,486.22	454.43	1,028.43	-154.26	0.00	0.00	0.00
9,700.00	12.00	66.16	9,584.03	462.84	1,047.45	-157.11	0.00	0.00	0.00
9,800.00	12.00	66.16	9,681.84	471.24	1,066.47	-159.96	0.00	0.00	0.00
9,900.00	12.00	66.16	9,779.66	479.65	1,085.49	-162.81	0.00	0.00	0.00
10,000.00	12.00	66.16	9,877.47	488.05	1,104.51	-165.67	0.00	0.00	0.00
10,100.00	12.00	66.16	9,975.29	496.45	1,123.53	-168.52	0.00	0.00	0.00
10,200.00	12.00	66.16	10,073.10	504.86	1,142.55	-171.37	0.00	0.00	0.00
10,300.00	12.00	66.16	10,170.92	513.26	1,161.57	-174.23	0.00	0.00	0.00
10,400.00	12.00	66.16	10,268.73	521.67	1,180.59	-177.08	0.00	0.00	0.00
10,500.00	12.00	66.16	10,366.54	530.07	1,199.61	-179.93	0.00	0.00	0.00

Database:	HOPSPP	**Local Co-ordinate Reference:**	Well Vanadium 32 State 171H
Company:	ENGINEERING DESIGNS	**TVD Reference:**	RKB=26.5' @ 3370.84ft
Project:	PRD NM DIRECTIONAL PLANS (NAD 1983)	**MD Reference:**	RKB=26.5' @ 3370.84ft
Site:	Vanadium 32	**North Reference:**	Grid
Well:	Vanadium 32 State 171H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permitting Plan		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
10,600.00	12.00	66.16	10,464.36	538.48	1,218.63	-182.78	0.00	0.00	0.00
10,700.00	12.00	66.16	10,562.17	546.88	1,237.65	-185.64	0.00	0.00	0.00
10,800.00	12.00	66.16	10,659.99	555.29	1,256.67	-188.49	0.00	0.00	0.00
10,900.00	12.00	66.16	10,757.80	563.69	1,275.69	-191.34	0.00	0.00	0.00
11,000.00	12.00	66.16	10,855.61	572.09	1,294.71	-194.20	0.00	0.00	0.00
11,100.00	12.00	66.16	10,953.43	580.50	1,313.73	-197.05	0.00	0.00	0.00
11,139.52	12.00	66.16	10,992.08	583.82	1,321.25	-198.18	0.00	0.00	0.00
11,200.00	11.12	96.38	11,051.39	585.71	1,332.80	-196.82	10.00	-1.46	49.96
11,300.00	15.76	135.81	11,148.82	574.88	1,351.90	-181.16	10.00	4.64	39.43
11,400.00	23.88	153.41	11,242.90	546.97	1,370.47	-149.22	10.00	8.13	17.61
11,500.00	33.01	162.08	11,330.77	502.84	1,387.95	-101.98	10.00	9.13	8.67
11,600.00	42.50	167.27	11,409.76	443.82	1,403.82	-40.87	10.00	9.49	5.18
11,700.00	52.16	170.84	11,477.47	371.70	1,417.59	32.25	10.00	9.65	3.57
11,800.00	61.89	173.58	11,531.84	288.68	1,428.83	115.16	10.00	9.73	2.74
11,900.00	71.67	175.85	11,571.22	197.29	1,437.22	205.35	10.00	9.78	2.28
12,000.00	81.47	177.88	11,594.42	100.29	1,442.49	300.06	10.00	9.80	2.03
12,093.10	90.61	179.68	11,600.84	7.53	1,444.46	389.78	10.00	9.81	1.93
12,100.00	90.61	179.68	11,600.77	0.63	1,444.50	396.42	0.00	0.00	0.00
12,200.00	90.61	179.68	11,599.70	-99.36	1,445.06	492.72	0.00	0.00	0.00
12,300.00	90.61	179.68	11,598.64	-199.35	1,445.62	589.02	0.00	0.00	0.00
12,400.00	90.61	179.68	11,597.57	-299.34	1,446.19	685.31	0.00	0.00	0.00
12,500.00	90.61	179.68	11,596.51	-399.34	1,446.75	781.61	0.00	0.00	0.00
12,600.00	90.61	179.68	11,595.44	-499.33	1,447.31	877.90	0.00	0.00	0.00
12,700.00	90.61	179.68	11,594.37	-599.32	1,447.87	974.20	0.00	0.00	0.00
12,800.00	90.61	179.68	11,593.31	-699.32	1,448.44	1,070.50	0.00	0.00	0.00
12,900.00	90.61	179.68	11,592.24	-799.31	1,449.00	1,166.79	0.00	0.00	0.00
13,000.00	90.61	179.68	11,591.18	-899.30	1,449.56	1,263.09	0.00	0.00	0.00
13,100.00	90.61	179.68	11,590.11	-999.29	1,450.12	1,359.38	0.00	0.00	0.00
13,200.00	90.61	179.68	11,589.05	-1,099.29	1,450.68	1,455.68	0.00	0.00	0.00
13,300.00	90.61	179.68	11,587.98	-1,199.28	1,451.25	1,551.98	0.00	0.00	0.00
13,400.00	90.61	179.68	11,586.92	-1,299.27	1,451.81	1,648.27	0.00	0.00	0.00
13,500.00	90.61	179.68	11,585.85	-1,399.26	1,452.37	1,744.57	0.00	0.00	0.00
13,600.00	90.61	179.68	11,584.79	-1,499.26	1,452.93	1,840.86	0.00	0.00	0.00
13,700.00	90.61	179.68	11,583.72	-1,599.25	1,453.49	1,937.16	0.00	0.00	0.00
13,800.00	90.61	179.68	11,582.65	-1,699.24	1,454.06	2,033.46	0.00	0.00	0.00
13,900.00	90.61	179.68	11,581.59	-1,799.24	1,454.62	2,129.75	0.00	0.00	0.00
14,000.00	90.61	179.68	11,580.52	-1,899.23	1,455.18	2,226.05	0.00	0.00	0.00
14,100.00	90.61	179.68	11,579.46	-1,999.22	1,455.74	2,322.34	0.00	0.00	0.00
14,200.00	90.61	179.68	11,578.39	-2,099.21	1,456.31	2,418.64	0.00	0.00	0.00
14,300.00	90.61	179.68	11,577.33	-2,199.21	1,456.87	2,514.94	0.00	0.00	0.00
14,400.00	90.61	179.68	11,576.26	-2,299.20	1,457.43	2,611.23	0.00	0.00	0.00
14,500.00	90.61	179.68	11,575.20	-2,399.19	1,457.99	2,707.53	0.00	0.00	0.00
14,600.00	90.61	179.68	11,574.13	-2,499.18	1,458.55	2,803.82	0.00	0.00	0.00
14,700.00	90.61	179.68	11,573.07	-2,599.18	1,459.12	2,900.12	0.00	0.00	0.00
14,800.00	90.61	179.68	11,572.00	-2,699.17	1,459.68	2,996.42	0.00	0.00	0.00
14,900.00	90.61	179.68	11,570.94	-2,799.16	1,460.24	3,092.71	0.00	0.00	0.00
15,000.00	90.61	179.68	11,569.87	-2,899.16	1,460.80	3,189.01	0.00	0.00	0.00
15,100.00	90.61	179.68	11,568.80	-2,999.15	1,461.37	3,285.30	0.00	0.00	0.00
15,200.00	90.61	179.68	11,567.74	-3,099.14	1,461.93	3,381.60	0.00	0.00	0.00
15,300.00	90.61	179.68	11,566.67	-3,199.13	1,462.49	3,477.90	0.00	0.00	0.00
15,400.00	90.61	179.68	11,565.61	-3,299.13	1,463.05	3,574.19	0.00	0.00	0.00
15,500.00	90.61	179.68	11,564.54	-3,399.12	1,463.61	3,670.49	0.00	0.00	0.00
15,600.00	90.61	179.68	11,563.48	-3,499.11	1,464.18	3,766.78	0.00	0.00	0.00
15,700.00	90.61	179.68	11,562.41	-3,599.10	1,464.74	3,863.08	0.00	0.00	0.00

Database:	HOPSPP	**Local Co-ordinate Reference:**	Well Vanadium 32 State 171H
Company:	ENGINEERING DESIGNS	**TVD Reference:**	RKB=26.5' @ 3370.84ft
Project:	PRD NM DIRECTIONAL PLANS (NAD 1983)	**MD Reference:**	RKB=26.5' @ 3370.84ft
Site:	Vanadium 32	**North Reference:**	Grid
Well:	Vanadium 32 State 171H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permitting Plan		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
15,800.00	90.61	179.68	11,561.35	-3,699.10	1,465.30	3,959.38	0.00	0.00	0.00
15,900.00	90.61	179.68	11,560.28	-3,799.09	1,465.86	4,055.67	0.00	0.00	0.00
16,000.00	90.61	179.68	11,559.22	-3,899.08	1,466.43	4,151.97	0.00	0.00	0.00
16,100.00	90.61	179.68	11,558.15	-3,999.08	1,466.99	4,248.26	0.00	0.00	0.00
16,200.00	90.61	179.68	11,557.08	-4,099.07	1,467.55	4,344.56	0.00	0.00	0.00
16,300.00	90.61	179.68	11,556.02	-4,199.06	1,468.11	4,440.86	0.00	0.00	0.00
16,400.00	90.61	179.68	11,554.95	-4,299.05	1,468.67	4,537.15	0.00	0.00	0.00
16,500.00	90.61	179.68	11,553.89	-4,399.05	1,469.24	4,633.45	0.00	0.00	0.00
16,600.00	90.61	179.68	11,552.82	-4,499.04	1,469.80	4,729.74	0.00	0.00	0.00
16,700.00	90.61	179.68	11,551.76	-4,599.03	1,470.36	4,826.04	0.00	0.00	0.00
16,800.00	90.61	179.68	11,550.69	-4,699.02	1,470.92	4,922.34	0.00	0.00	0.00
16,900.00	90.61	179.68	11,549.63	-4,799.02	1,471.48	5,018.63	0.00	0.00	0.00
17,000.00	90.61	179.68	11,548.56	-4,899.01	1,472.05	5,114.93	0.00	0.00	0.00
17,100.00	90.61	179.68	11,547.50	-4,999.00	1,472.61	5,211.22	0.00	0.00	0.00
17,200.00	90.61	179.68	11,546.43	-5,099.00	1,473.17	5,307.52	0.00	0.00	0.00
17,255.39	90.61	179.68	11,545.84	-5,154.39	1,473.48	5,360.86	0.00	0.00	0.00

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL (Vanadium 32 - plan hits target center - Point	0.00	0.00	11,545.84	-5,154.39	1,473.48	456,434.26	704,309.19	32° 15' 13.367356 N	103° 48' 22.119546
FTP (Vanadium 32 - plan hits target center - Point	0.00	0.00	11,600.84	7.53	1,444.46	461,595.85	704,280.17	32° 16' 4.445730 N	103° 48' 22.162277

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
381.84	381.84	RUSTLER			
717.84	717.84	SALADO			
2,600.84	2,600.84	CASTILE			
4,092.46	4,091.84	DELAWARE			
4,122.59	4,121.84	BELL CANYON			
5,030.75	5,016.84	CHERRY CANYON			
6,326.06	6,283.84	BRUSHY CANYON			
8,039.51	7,959.84	BONE SPRING			
9,094.58	8,991.84	BONE SPRING 1ST			
9,750.92	9,633.84	BONE SPRING 2ND			
10,953.20	10,809.84	BONE SPRING 3RD			
11,450.06	11,287.84	WOLFCAMP			

Database:	HOPSPP	**Local Co-ordinate Reference:**	Well Vanadium 32 State 171H
Company:	ENGINEERING DESIGNS	**TVD Reference:**	RKB=26.5' @ 3370.84ft
Project:	PRD NM DIRECTIONAL PLANS (NAD 1983)	**MD Reference:**	RKB=26.5' @ 3370.84ft
Site:	Vanadium 32	**North Reference:**	Grid
Well:	Vanadium 32 State 171H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Permitting Plan		

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
3,595.00	3,595.00	0.00	0.00	Build 1°/100'
4,795.17	4,786.41	50.62	114.55	Hold 12° Tangent
11,139.52	10,992.08	583.82	1,321.25	KOP, Build & Turn 10°/100'
12,093.10	11,600.84	7.53	1,444.46	Landing Point
17,255.39	11,545.84	-5,154.39	1,473.48	TD at 17255.39' MD

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources Department

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Submit Original
to Appropriate
District Office

GAS CAPTURE PLAN

Date: 8-25-2020

☒ Original Operator & OGRID No.: OXY USA INC. - 16696
☐ Amended - Reason for Amendment: _____

This Gas Capture Plan outlines actions to be taken by the Operator to reduce well/production facility flaring/venting for new completion (new drill, recomplete to new zone, re-frac) activity.

Note: Form C-129 must be submitted and approved prior to exceeding 60 days allowed by Rule (Subsection A of 19.15.18.12 NMAC).

Well(s)/Production Facility – Name of facility

The well(s) that will be located at the production facility are shown in the table below.

Well Name	API	Well Location (ULSTR)	Footages	Expected MCF/D	Flared or Vented	Comments
Vanadium 32 State 171H	Pending			2300	0	

Gathering System and Pipeline Notification

Well(s) will be connected to a production facility after flowback operations are complete, where a gas transporter system is in place. The gas produced from production facility is dedicated to Enterprise Field Services, LLC ("Enterprise") and is connected to Enterprise low/high pressure gathering system located in Eddy County, New Mexico. OXY USA INC. ("OXY") provides (periodically) to Enterprise a drilling, completion and estimated first production date for wells that are scheduled to be drilled in the foreseeable future. In addition, OXY and Enterprise have periodic conference calls to discuss changes to drilling and completion schedules. Gas from these wells will be processed at Enterprise's Processing Plant located in Sec. 36, Twn. 24S, Rng. 30E, Eddy County, New Mexico. The actual flow of the gas will be based on compression operating parameters and gathering system pressures.

Flowback Strategy

After the fracture treatment/completion operations, well(s) will be produced to temporary production tanks and gas will be flared or vented. During flowback, the fluids and sand content will be monitored. When the produced fluids contain minimal sand, the wells will be turned to production facilities. Gas sales should start as soon as the wells start flowing through the production facilities, unless there are operational issues on Enterprise system at that time. Based on current information, it is OXY's belief the system can take this gas upon completion of the well(s).

Safety requirements during cleanout operations from the use of underbalanced air cleanout systems may necessitate that sand and non-pipeline quality gas be vented and/or flared rather than sold on a temporary basis.

Alternatives to Reduce Flaring

Below are alternatives considered from a conceptual standpoint to reduce the amount of gas flared.

- Power Generation – On lease
  - Only a portion of gas is consumed operating the generator, remainder of gas will be flared
- Compressed Natural Gas – On lease
  - Gas flared would be minimal, but might be uneconomical to operate when gas volume declines
- NGL Removal – On lease
  - Plants are expensive, residue gas is still flared, and uneconomical to operate when gas volume declines

SITE PLAN

SNDDNS-3116
SEC. 30 & 31 TWP. 23-S RGE. 31-E
SURVEY: N.M.P.M.
COUNTY: EDDY
OPERATOR: OXY USA, INC.
U.S.G.S. TOPOGRAPHIC MAP: LOS MEDANOS, N.M.
FAA PERMIT NEEDED: NO

TANK BATTERY
RECLAMATION
30' TOP SOIL
20' DISTURBANCE AREA

100' 0' 100' 200'
SCALE: 1" = 200'

WELL 1
PRECIOUS 30_18 FED COM 13H
OXY USA, INC.
100' FNL 1395' FEL, SECTION 31
NAD 83, SPCS NM EAST
X:702205.39' / Y:461586.22'
LAT:32.26790300N / LON:103.81286900W
NAD 27, SPCS NM EAST
X:661021.84' / Y:461526.93'
LAT:32.26778002N / LON:103.81238257W
ELEVATION = 3346'

WELL 2
PRECIOUS 30_18 FED COM 14H
OXY USA, INC.
100' FNL 1360' FEL, SECTION 31
NAD 83, SPCS NM EAST
X:702240.44' / Y:461586.40'
LAT:32.26790300N / LON:103.81275600W
NAD 27, SPCS NM EAST
X:661056.89' / Y:461527.11'
LAT:32.26778004N / LON:103.81226918W
ELEVATION = 3346'

WELL 3
PRECIOUS 30_18 FED COM 25H
OXY USA, INC.
100' FNL 1130' FEL, SECTION 31
NAD 83, SPCS NM EAST
X:702470.29' / Y:461587.50'
LAT:32.26790300N / LON:103.81201200W
NAD 27, SPCS NM EAST
X:661286.74' / Y:461528.21'
LAT:32.26778000N / LON:103.81152556W
ELEVATION = 3345'

WELL 4
PRECIOUS 30_18 FED COM 26H
OXY USA, INC.
100' FNL 1095' FEL, SECTION 31
NAD 83, SPCS NM EAST
X:702505.31' / Y:461587.53'
LAT:32.26790300N / LON:103.81189800W
NAD 27, SPCS NM EAST
X:661321.76' / Y:461528.24'
LAT:32.26777961N / LON:103.81141227W
ELEVATION = 3345'

WELL 5
ARKENSTONE 31 FED COM 5H
OXY USA, INC.
100' FNL 865' FEL, SECTION 31
NAD 83, SPCS NM EAST
X:702735.33' / Y:461588.60'
LAT:32.26790200N / LON:103.81115400W
NAD 27, SPCS NM EAST
X:661551.78' / Y:461529.31'
LAT:32.26777948N / LON:103.81066810W
ELEVATION = 3345'

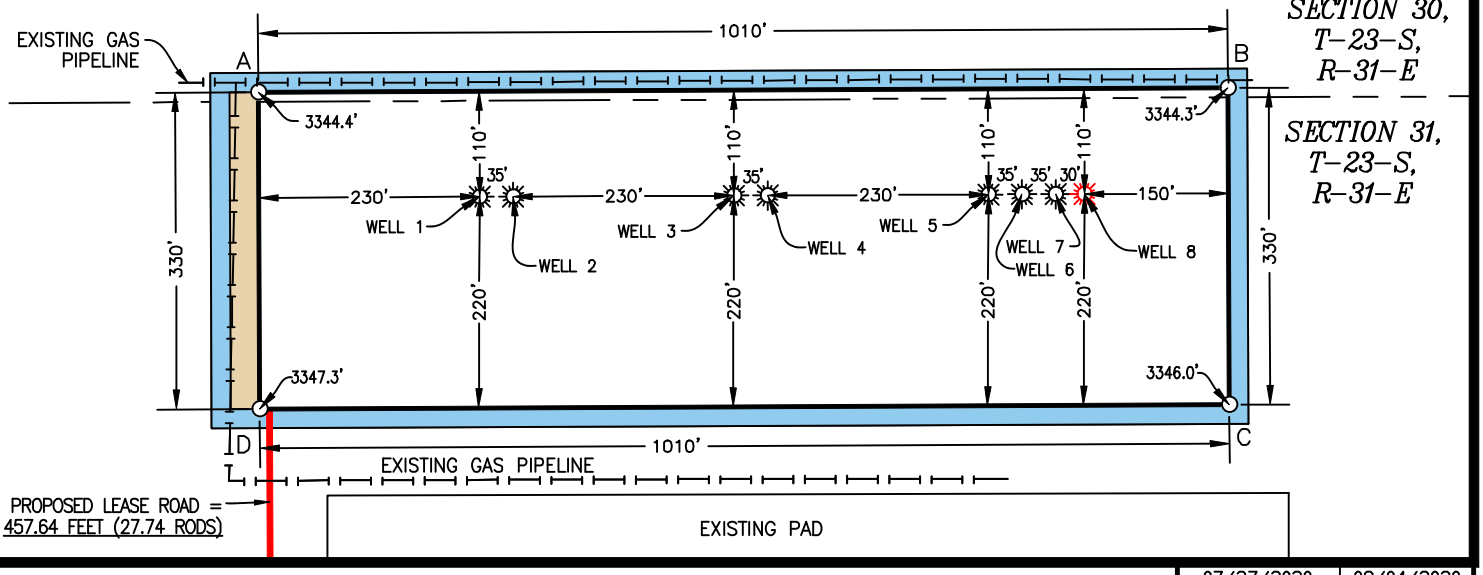
WELL 6
ARKENSTONE 31 FED COM 6H
OXY USA, INC.
100' FNL 830' FEL, SECTION 31
NAD 83, SPCS NM EAST
X:702770.26' / Y:461588.71'
LAT:32.26790200N / LON:103.81104100W
NAD 27, SPCS NM EAST
X:661586.71' / Y:461529.42'
LAT:32.26777931N / LON:103.81055509W
ELEVATION = 3345'

WELL 7
ARKENSTONE 31 FED COM 10H
OXY USA, INC.
100' FNL 795' FEL, SECTION 31
NAD 83, SPCS NM EAST
X:702805.17' / Y:461588.91'
LAT:32.26790200N / LON:103.81092800W
NAD 27, SPCS NM EAST
X:661621.62' / Y:461529.62'
LAT:32.26777939N / LON:103.81044215W
ELEVATION = 3345'

WELL 8
VANADIUM 32 STATE 171H
OXY USA, INC.
100' FNL 765' FEL, SECTION 31
NAD 83, SPCS NM EAST
X:702835.22' / Y:461588.92'
LAT:32.26790196N / LON:103.81083106W
NAD 27, SPCS NM EAST
X:661651.66' / Y:461529.62'
LAT:32.26777901N / LON:103.81034494W
ELEVATION = 3344'

NAD 83		
A	E:(X)701974.73 N:(Y)461695.03	LAT:32.26820512 LON:-103.81361329
B	E:(X)702984.72 N:(Y)461699.59	LAT:32.26820418 LON:-103.81034564
C	E:(X)702986.21 N:(Y)461369.60	LAT:32.26729708 LON:-103.81034602
D	E:(X)701976.22 N:(Y)461365.03	LAT:32.26729802 LON:-103.81361363

NAD 27		
A	E:(X)660791.18 N:(Y)461635.73	LAT:32.26808219 LON:-103.81312708
B	E:(X)661801.17 N:(Y)461640.29	LAT:32.26808122 LON:-103.80985952
C	E:(X)661802.65 N:(Y)461310.31	LAT:32.26717413 LON:-103.80985994
D	E:(X)660792.66 N:(Y)461305.74	LAT:32.26717507 LON:-103.81312747



07/27/2020	08/04/2020
DATE SURVEYED	DATE DRAWN

BASIS OF BEARING
ALL BEARINGS AND COORDINATES REFER TO NAD 83, NEW MEXICO STATE PLANE COORDINATE SYSTEM, EAST ZONE, U.S. SURVEY FEET. (ALL BEARINGS, DISTANCES, COORDINATES AND AREAS ARE GRID MEASUREMENTS UTILIZING A COMBINED SCALE FACTOR OF 0.99977695 CONVERGENCE ANGLE OF 00°16'56.77".)

LEGEND

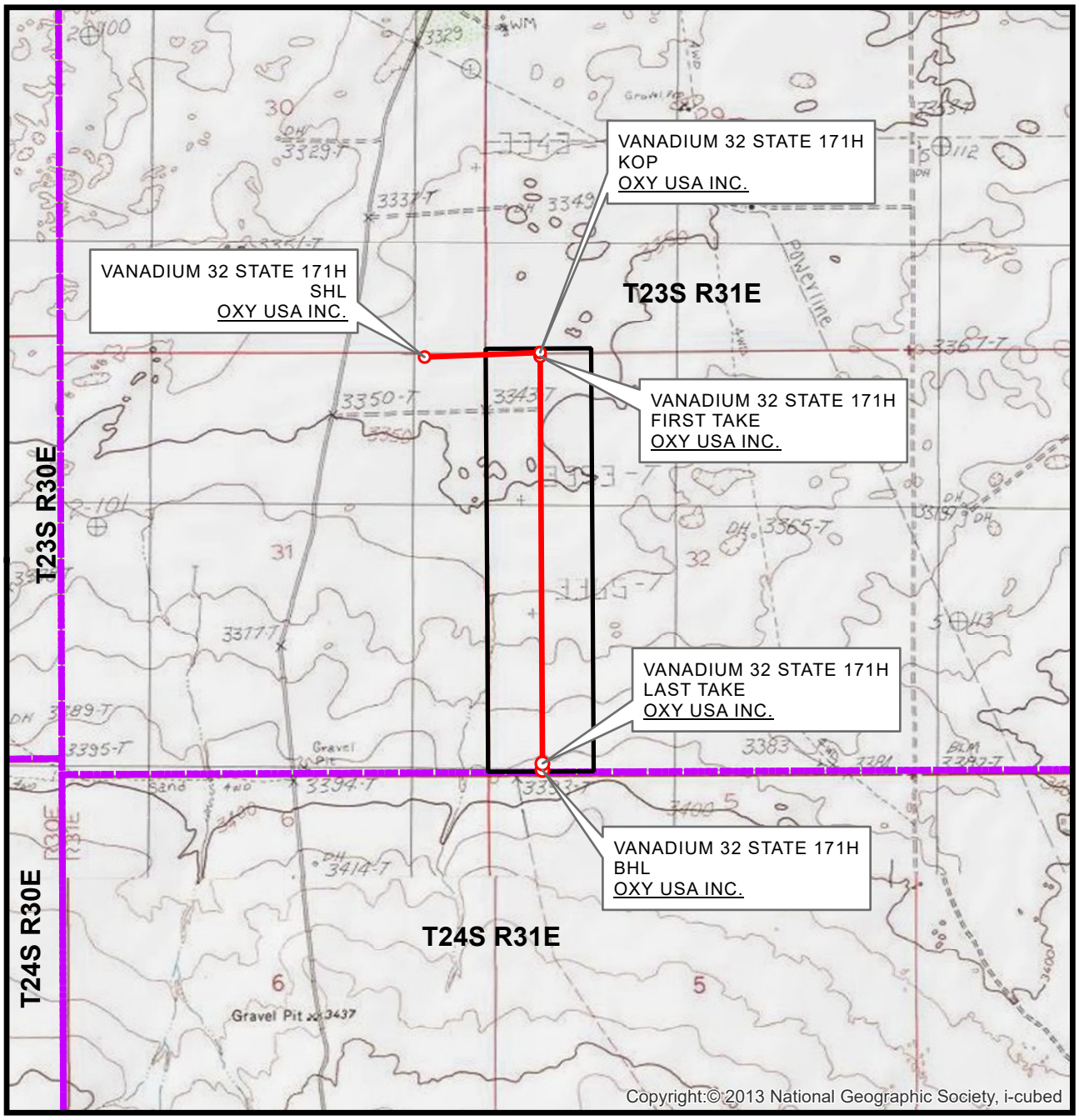
- EXISTING ROAD
- PROPOSED ROAD
- SURFACE SITE EDGE
- EXIST. PIPELINE
- MONUMENT
- QUARTER SPLIT
- OHP — OVERHEAD POWER
- x — x — FENCE
- SECTION LINE
- PL — PROPERTY LINE
- W — WATER LINE
- SWD — SALT WATER LINE
- SUBJECT WELL

THIS DOCUMENT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING, RECORDATION, CONVEYANCE, SALE OR THE BASIS FOR THE ISSUANCE OF A PERMIT.

PREPARED BY:
R-SQUARED GLOBAL, LLC
1309 LOUISVILLE AVENUE,
MONROE, LA 71201
318-323-6900 OFFICE
JOB No. R4082_001

LOCATION VERIFICATION MAP

VANADIUM 32 STATE



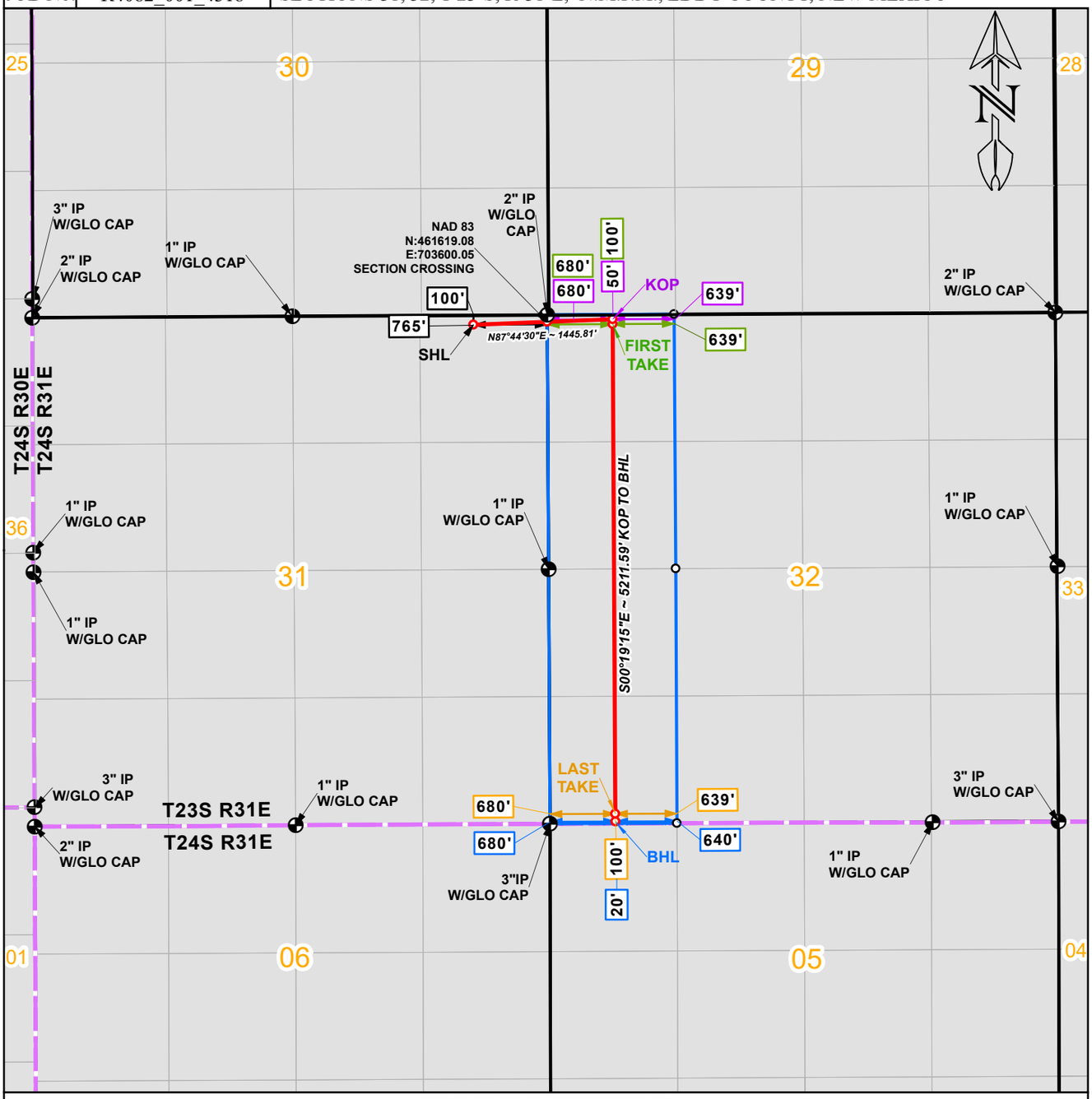
SEC. 31 TWP. 23-S RGE. 31-E
SURVEY: N.M.P.M.
COUNTY: EDDY
OPERATOR: OXY USA INC.
DESCRIPTION: 100' FNL & 765' FEL
ELEVATION: 3344'
LEASE: VANADIUM 32 STATE
U.S.G.S. TOPOGRAPHIC MAP: LOS MEDANOS, NM.

1 " = 2,000 '
CONTOUR INTERVAL = 10'

PREPARED BY:
R-SQUARED GLOBAL, LLC
1309 LOUISVILLE AVENUE, MONROE, LA 71201
318-323-6900 OFFICE

JOB No. R4082_001_A

JOB No. R4082_001_4318 SECTIONS 31, 32, T-23-S, R-31-E, N.M.P.M., EDDY COUNTY, NEW MEXICO



DRIVING DIRECTIONS

FROM THE INTERSECTION OF US HWY 128 AND TWIN WELLS ROAD EAST OF LOVING, NM, HEAD SOUTH ON TWIN WELLS ROAD FOR 2.3 MILES THEN TURN EAST ON AN EXISTING PRIVATE ACCESS ROAD, CONTINUING .30 MILES THEN TURNING DUE NORTH ONTO THE PROPOSED LEASE ROAD. CONTINUE 458 FEET TO THE SOUTHWEST CORNER OF THE PROPOSED SNDDNS 3116 PAD.

EXHIBIT STATUS

AUGUST 4, 2020

DAVID W. MYERS 11403

DAVID W. MYERS NEW MEXICO 11403 PROFESSIONAL SURVEYOR

1,000 0 1,000 2,000

1 inch = 1,500 feet

LEGEND

- SUBJECT WELL / DRILL LINE
- SURVEY/SECTION LINE
- LEASE LINE
- OTHER WELLS / DRILL LINES
- TOWNSHIP / RANGE LINE
- FOUND MONUMENT

CERTIFICATION

I, DAVID W. MYERS, NEW MEXICO PROFESSIONAL SURVEYOR NO. 11403, DO HEREBY CERTIFY THAT THIS EASEMENT SURVEY PLAT AND THE ACTUAL SURVEY ON THE GROUND UPON WHICH IT IS BASED WERE PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION; THAT I AM RESPONSIBLE FOR THIS SURVEY; THAT THIS SURVEY MEETS THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO; AND THAT IT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. I FURTHER CERTIFY THAT THIS SURVEY IS NOT A LAND DIVISION OR SUBDIVISION AS DEFINED IN THE NEW MEXICO SUBDIVISION ACT AND THAT THIS INSTRUMENT IS AN EASEMENT SURVEY PLAT CROSSING AN EXISTING TRACT OR TRACTS.

OXY

WELL NAME

VANADIUM 32 STATE 171H

DATE SURVEYED: 03/05/20

NOTES

BASIS OF BEARING

ALL BEARINGS AND COORDINATES REFER TO NAD 83, NEW MEXICO STATE PLANE COORDINATE SYSTEM, EAST ZONE, U.S. SURVEY FEET. (ALL BEARINGS, DISTANCES, COORDINATES AND AREAS ARE GRID MEASUREMENTS UTILIZING A COMBINED SCALE FACTOR OF 0.99977695 CONVERGENCE ANGLE OF 00°16'56.77".)

REV.	DATE	DESCRIPTION	BY	CHKD
0				

SHEET 1 OF 1

DRAWN BY: WHM
DATE DRAWN: 8/4/2020
CHECKED BY: MWS

R-SQUARED GLOBAL LLC

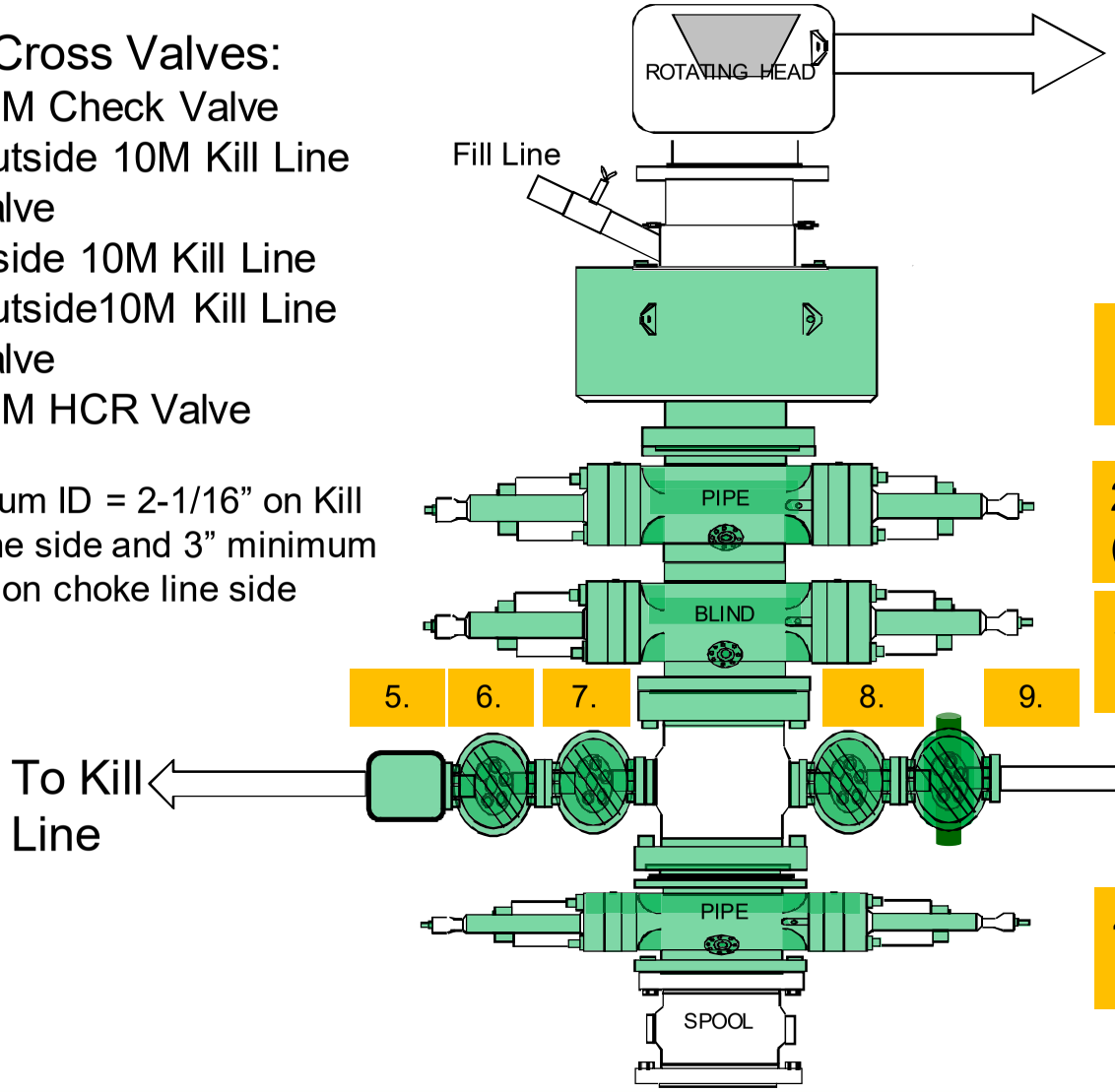
1309 LOUISVILLE AVE.
MONROE, LA 71201
(318) 323-6900

5/10M BOP Stack

Mud Cross Valves:

5. 10M Check Valve
6. Outside 10M Kill Line Valve
7. Inside 10M Kill Line
8. Outside10M Kill Line Valve
9. 10M HCR Valve

*Minimum ID = 2-1/16” on Kill Line side and 3” minimum ID on choke line side

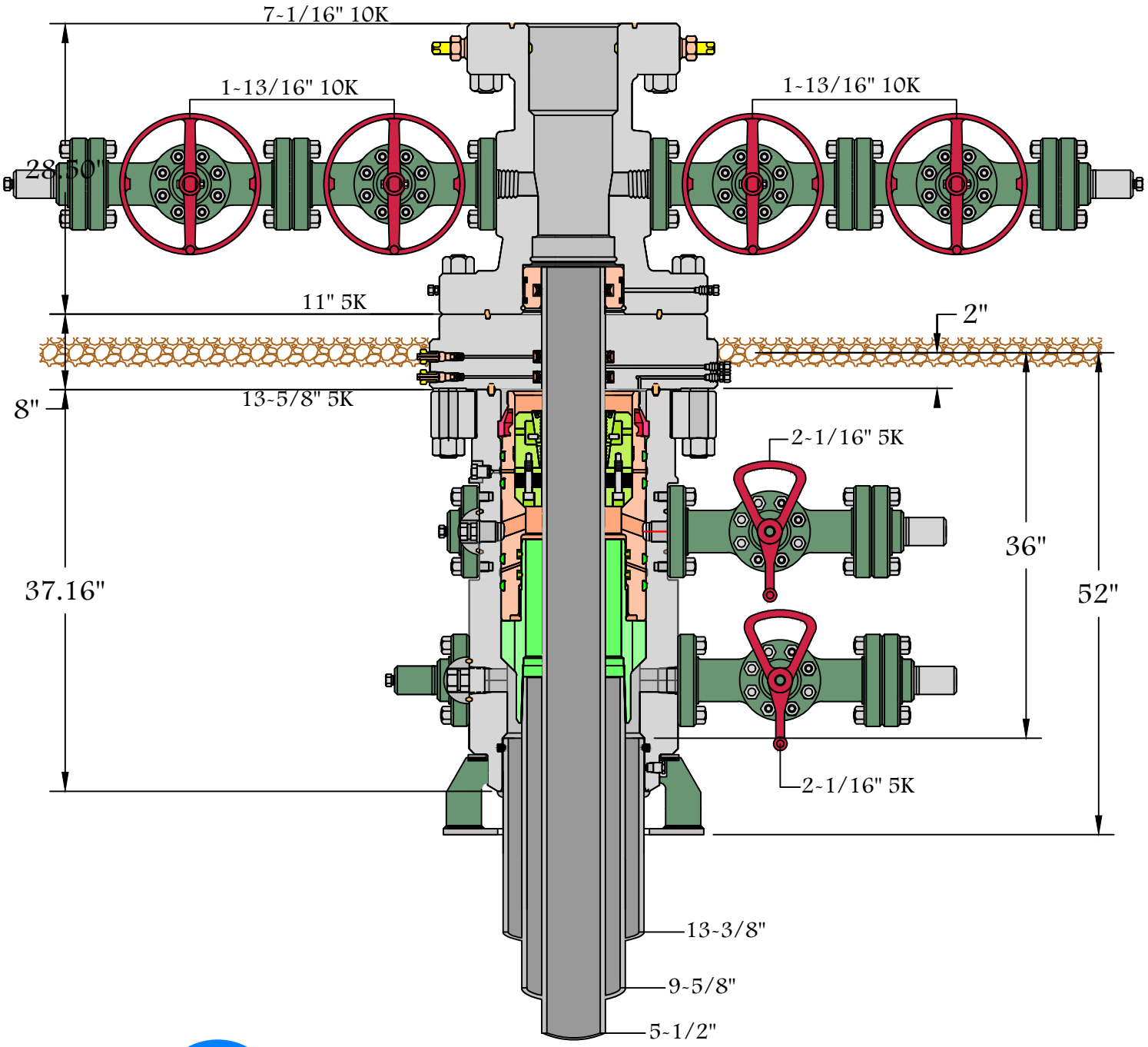


1. 5,000 psi Annular (13-5/8” ID)

2. 10,000 psi Upper Pipe Ram (13-5/8” ID)

3. 10,000 psi Blind Ram (13-5/8” ID)

4. 10,000 psi Lower Pipe Ram (13-5/8” ID)

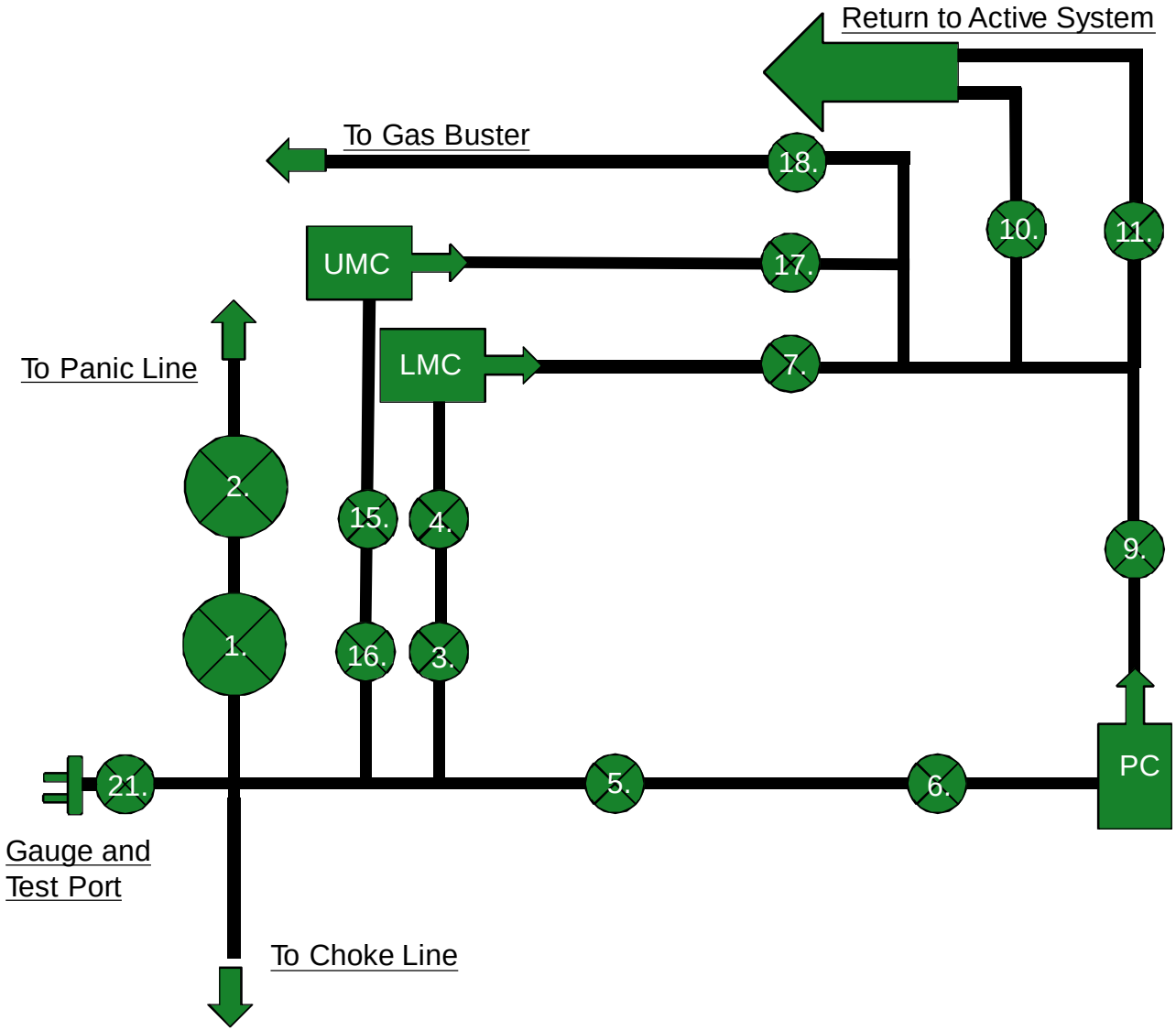


13-5/8" 5K MN-DS

CAMERON
A Schlumberger Company

Name:	Brandon	Date:	5-10-17	Working Pressure:	#	1505172

10M Choke Panel



1. Choke Manifold Valve
2. Choke Manifold Valve
3. Choke Manifold Valve
4. Choke Manifold Valve
5. Choke Manifold Valve
6. Choke Manifold Valve
7. Choke Manifold Valve
8. PC – Power Choke
9. Choke Manifold Valve
10. Choke Manifold Valve
11. Choke Manifold Valve
12. LMC – Lower Manual Choke
13. UMC – Upper manual choke

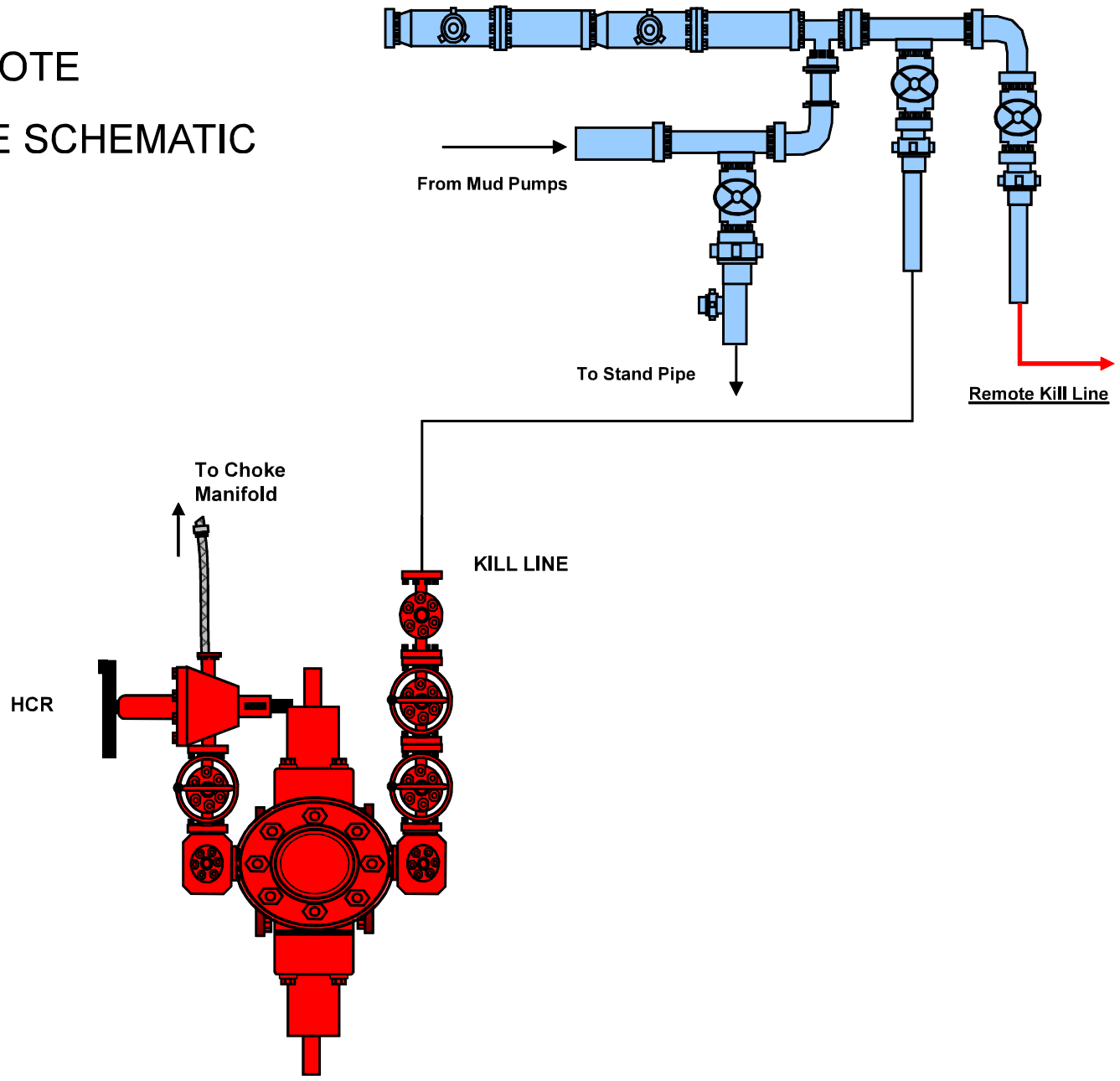
15. Choke Manifold Valve
16. Choke Manifold Valve
17. Choke Manifold Valve
18. Choke Manifold Valve

21. Vertical Choke Manifold Valve

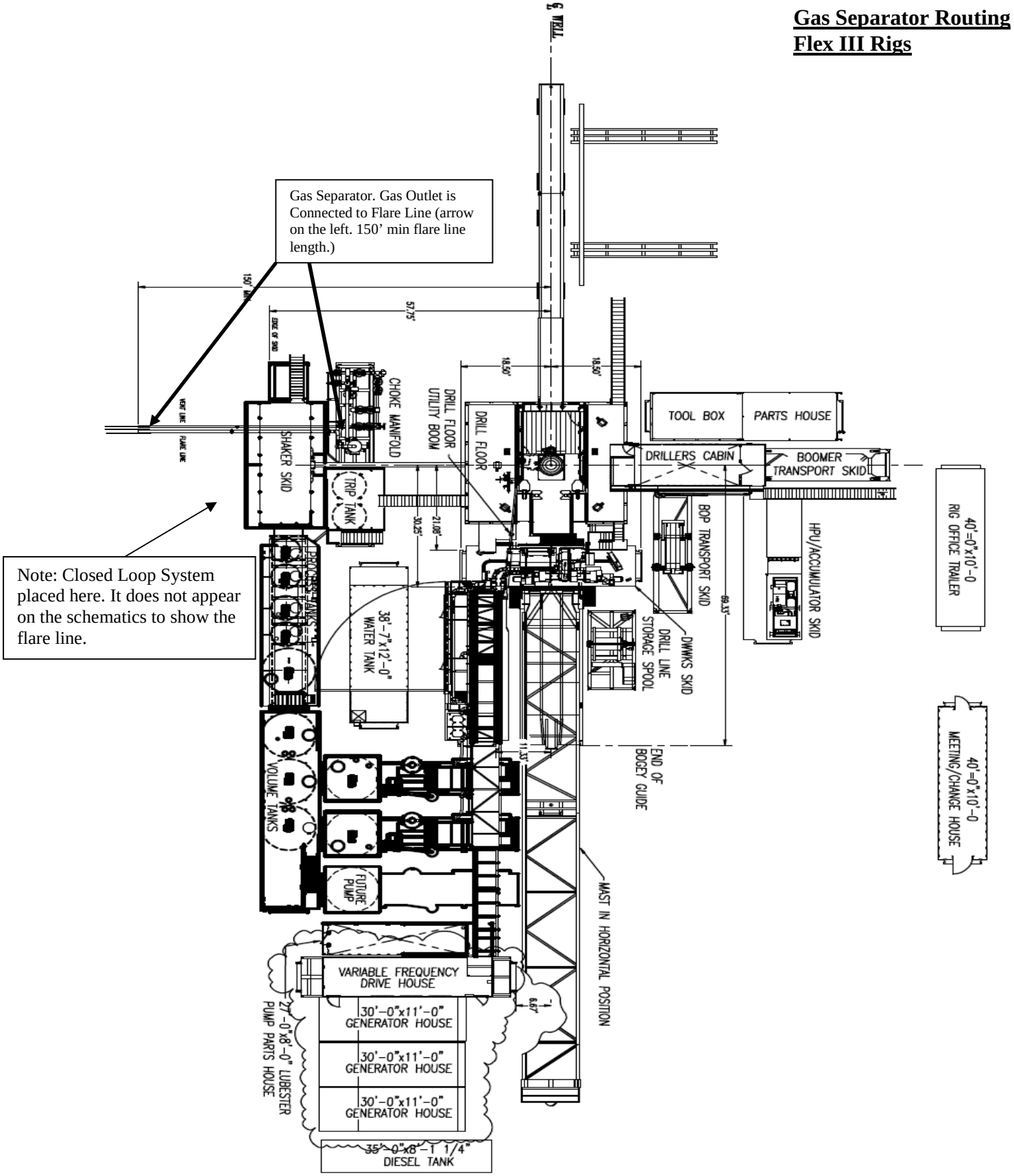
***All Valves 3" minimum**

10M REMOTE

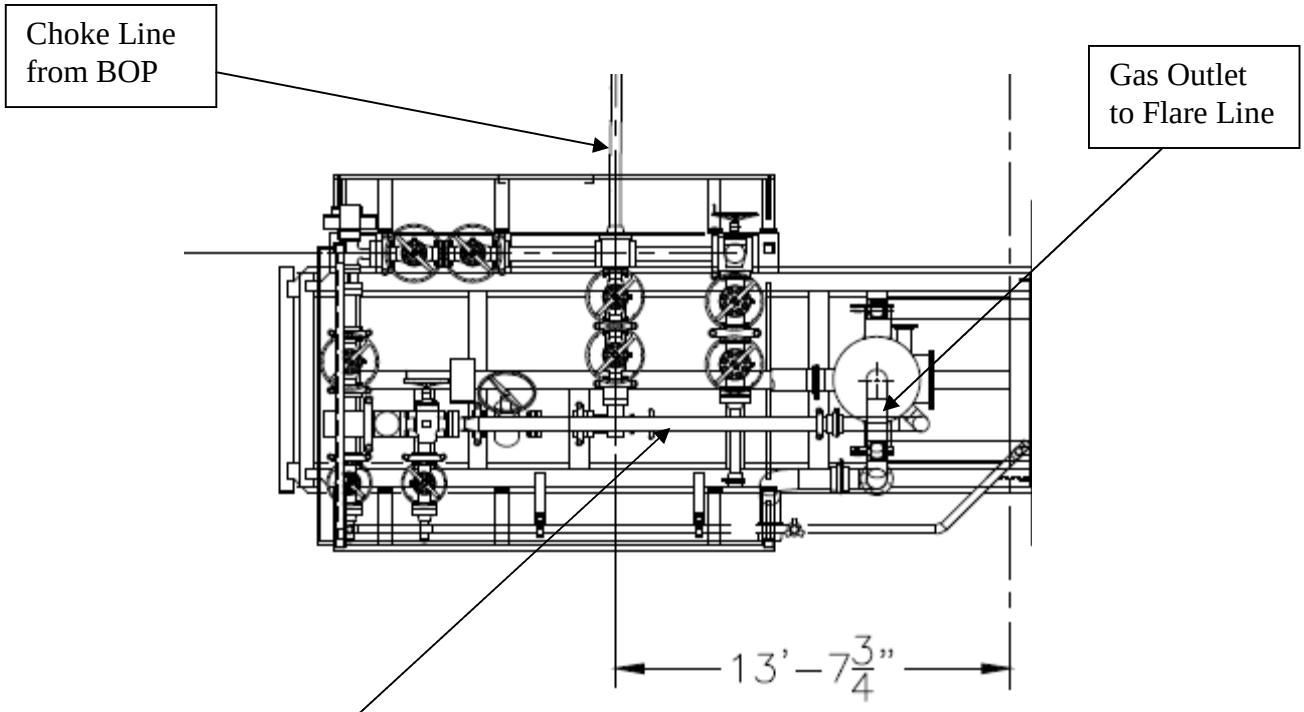
KILL LINE SCHEMATIC



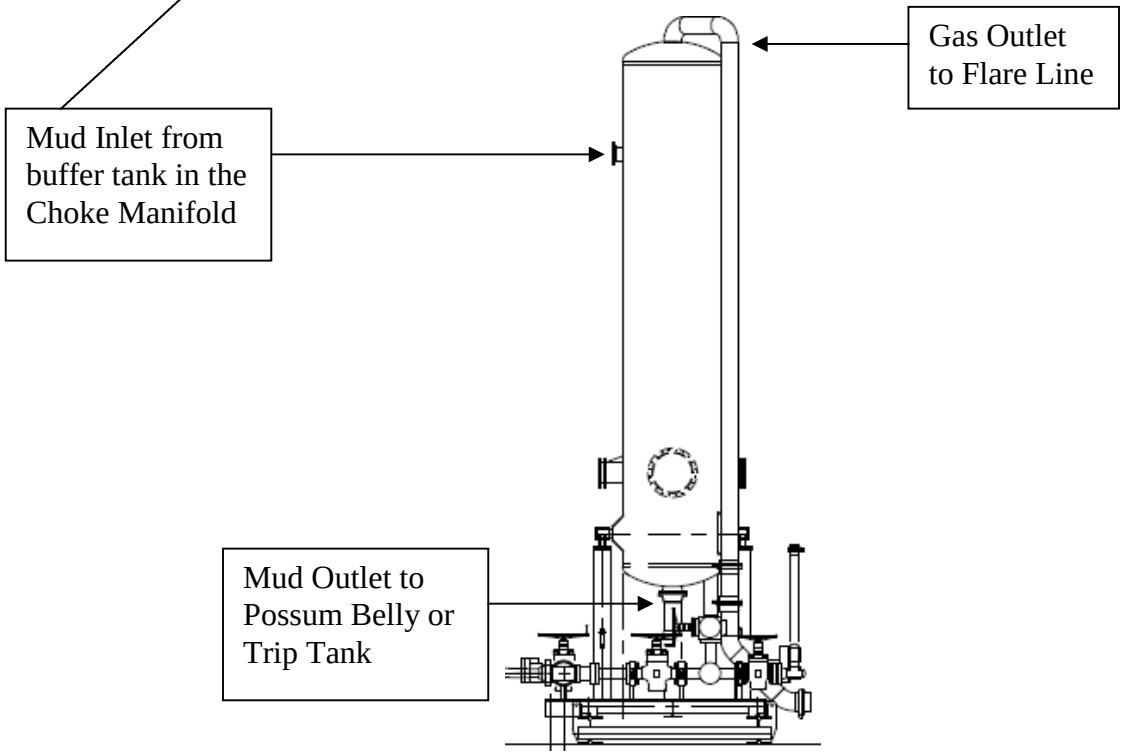
Gas Separator Routing
Flex III Rigs



Choke Manifold – Gas Separator (Top View)

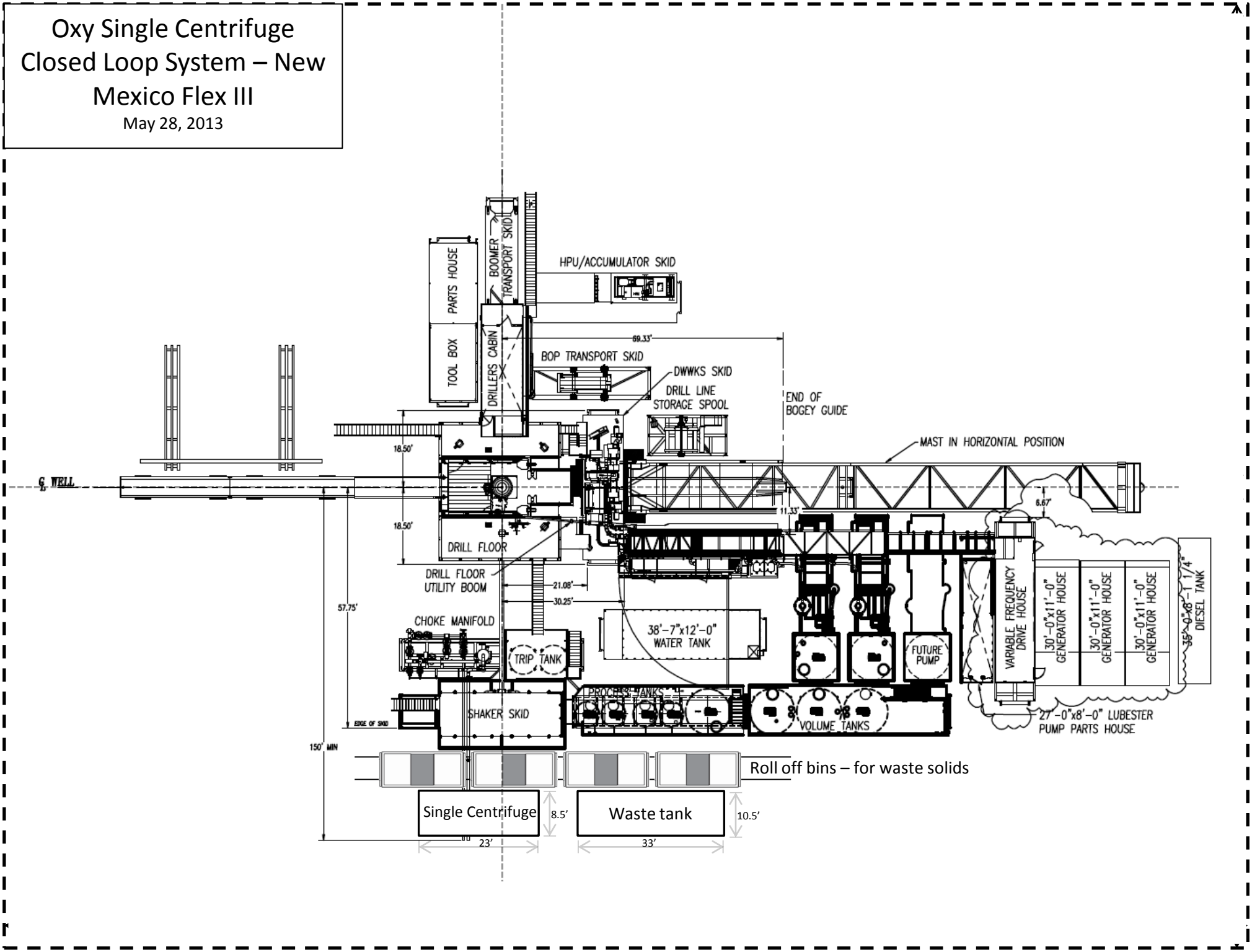


Choke Manifold – Gas Separator (Side View)

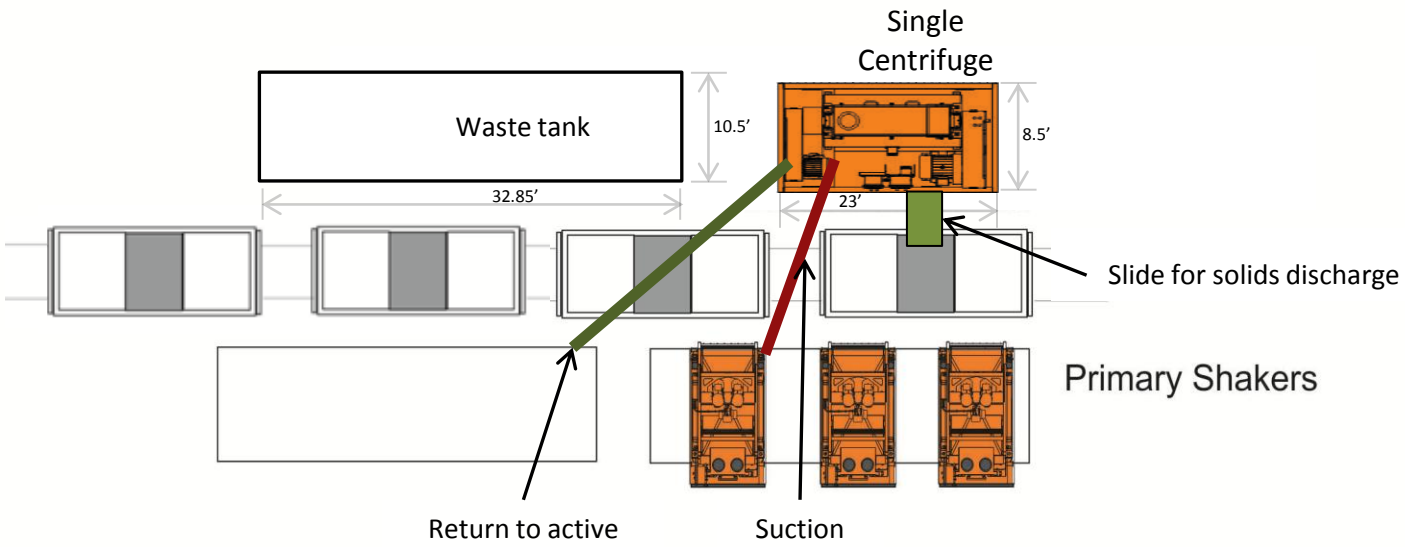


Oxy Single Centrifuge Closed Loop System – New Mexico Flex III

May 28, 2013



Oxy



Oxy Single Centrifuge Closed Loop System – New Mexico Flex III

May 28, 2013

Permian Drilling
Hydrogen Sulfide Drilling Operations Plan
Vanadium 32 State 171H

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

1. Escape

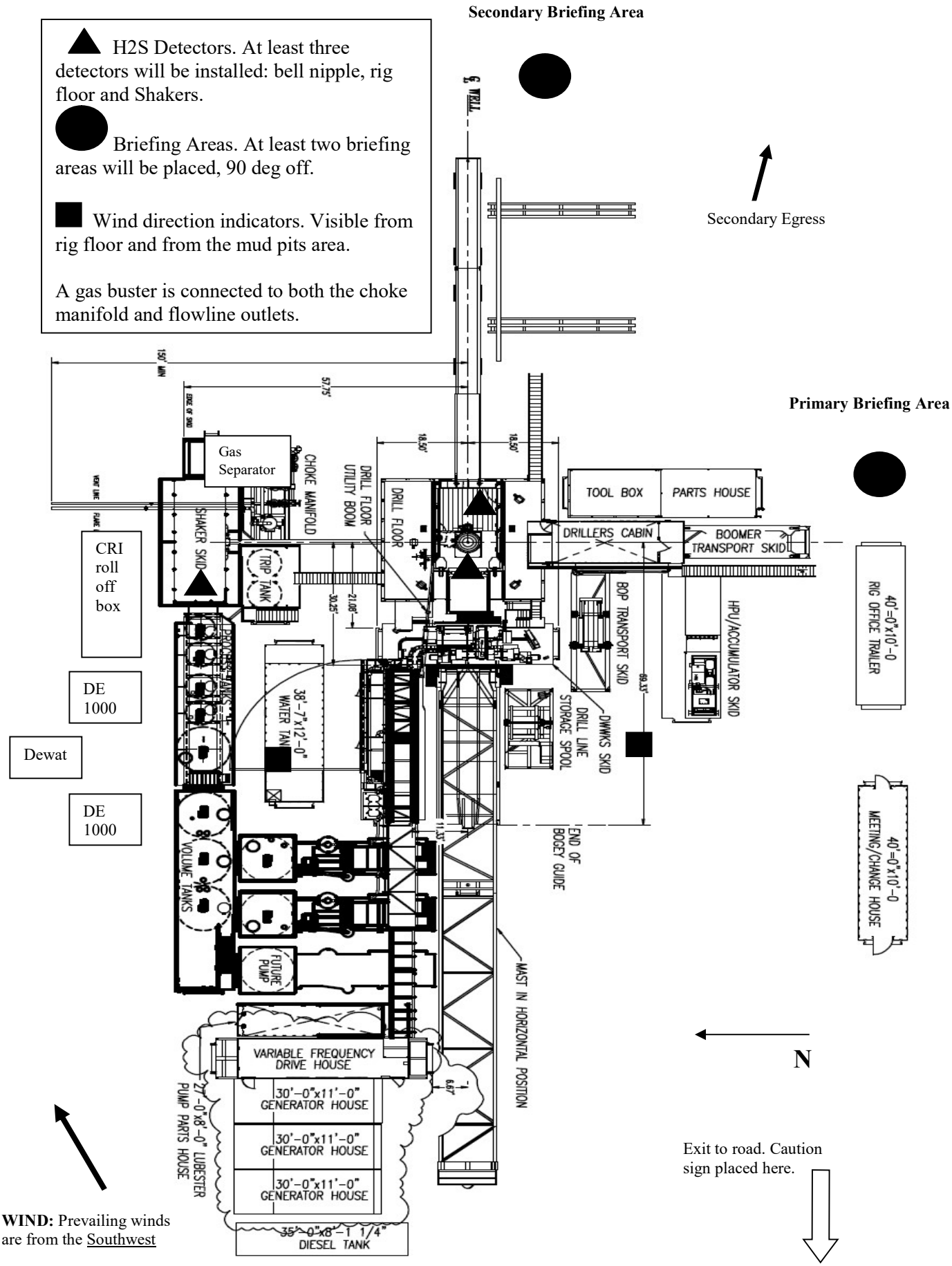
   Personnel shall escape upwind of wellbore in the event of an emergency gas release. Escape can take place through the lease road on the Southeast side of the location. Personnel need to move to a safe distance and block the entrance to location. If the primary route is not an option due to the wind direction,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

▲ 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.



WIND: Prevailing winds are from the Southwest

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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