~Amended~

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 217818

NM OIL CONSERVATION
ARTESIA DISTRICT
MAR 18 2016
RECEIVED

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

1. Operator Name and Address	2. OGRID Number
OXY USA INC PO Box 4294 Houston, TX 77210	16696
	3. API Number: 30-015-43673
4. Property Code: 304790 / 5. Property Name: Cedar Canyon 27 State Com.	6. Well No.: 010H

7. Surface Location

UL - Lot	Section	Township	Range	Lot Idn	Feet From	N/S Line	Feet From	E/W Line	County
D	27	24S	29E		1154	N	121	W	EDDY

8. Proposed Bottom Hole Location

UL - Lot	Section	Township	Range	Lot Idn	Feet From	N/S Line	Feet From	E/W Line	County
A	27	24S	29E	A	355	N	250	E	Eddy

9. Pool Information

Pierce Crossing;
~~WILDCAT~~;WOLFCAMP OIL ~~96794~~ 50373 ✓

Additional Well Information

11. Work Type	12. Well Type	13. Cable/Rotary	14. Lease Type	15. Ground Level Elevation
New Well	OIL		Private	2919
16. Multiple	**17. Proposed Depth**	**18. Formation**	**19. Contractor**	**20. Spud Date**
N	14757	Wolfcamp		7/1/2016
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	14.75	10.75	40.5	500	330	0
Int1	9.875	7.625	29.7	9013	2030	0
Prod	6.75	5.5	20	10400	580	8013
Prod	6.75	4.5	13.5	14757	580	10250

Casing/Cement Program: Additional Comments

Proposed Casing/Cementing Program: Intermediate 2 – Contingency DVT/ECP @ +/- 2950'. If cement circulates to surface during primary cementing operation, DVT cancellation cone will be run and 2nd stage cancelled. Proposed Production Casing consisting of 5-1/2" 20# P110 USF @ 0-10250' followed by 4-1/2" 13.5# P110 DQX @ 10250-14757'. Proposed Mud Program: 0-500' Spud Mud - 500-3000' Brine - 3000-9013' EnerSeal (MMH) - 9013'-TD Oil Based Mud. BOP Program: 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
Double Ram	10000	10000	
Annular	5000	5000	

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:

OIL CONSERVATION DIVISION

Printed Name:	Electronically filed by KELLEY MONTGOMERY	Approved By:	
Title:	Manager Regulatory	Title:	
Email Address:	kelley_montgomery@oxy.com	Approved Date:	Expiration Date:
Date:	3/15/2016 Phone: 713-366-5716	Conditions of Approval Attached	

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ARTESIA DISTRICT

MAR 18 2016

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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-	~~96794~~ 50373	Pierce Crossing ~~Wildcat~~ Wolfcamp Oil

Property Code	Property Name	Well Number
304790	CEDAR CANYON "27" STATE COM	10H

OGRID No.	Operator Name	Elevation
16696	OXY USA INC.	2918.9'

Surface Location

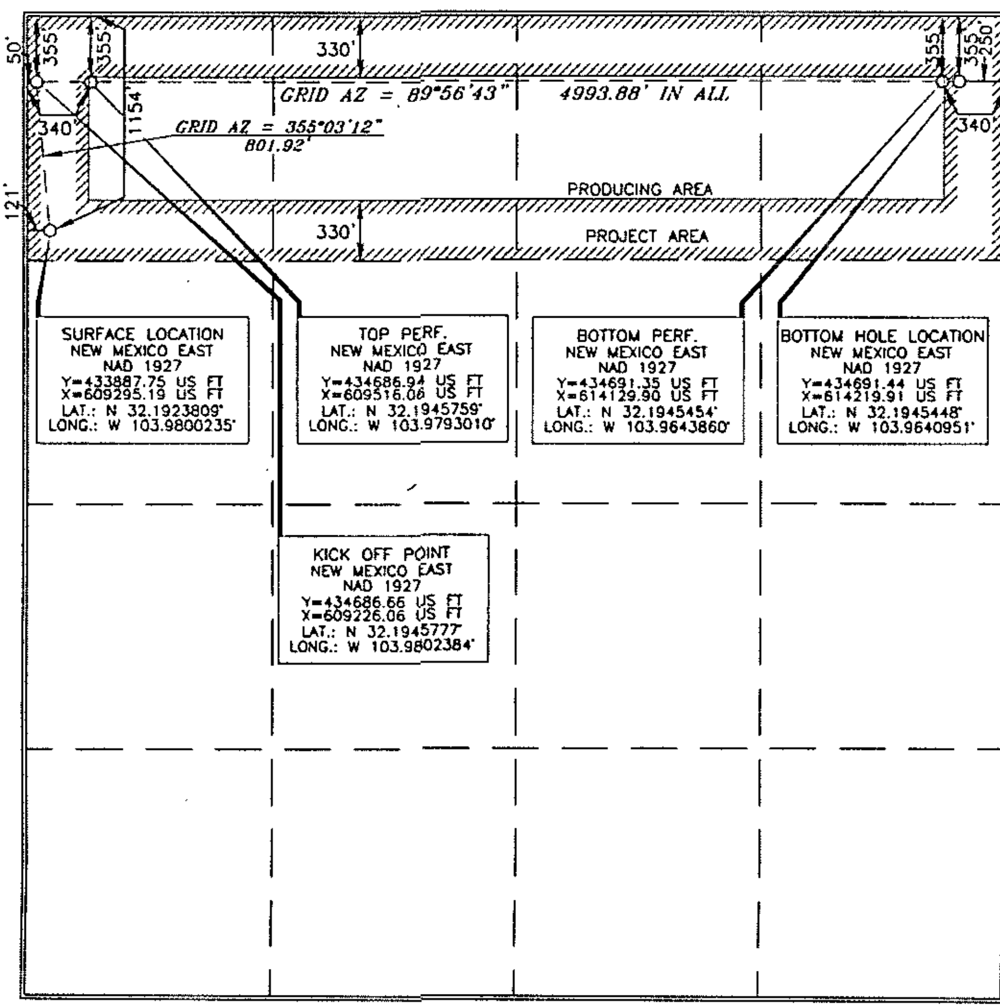
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	27	24 SOUTH	29 EAST, N.M.P.M.		1154'	NORTH	121'	WEST	EDDY

Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	27	24 SOUTH	29 EAST, N.M.P.M.		355'	NORTH	250'	EAST	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] 3/15/16
Signature / Date

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.

DECEMBER 10, 2015
Date of Survey

Signature and Seal of Professional Surveyor

TERRY J. ASEL NEW MEXICO 15079 REGISTERED PROFESSIONAL LAND SURVEYOR

[signature] 2/9/2016

Certificate Number 15079

WO# 151210WL-b (Rev. C) (KA)

OXY USA Inc. - Cedar Canyon 27 State Com #10H

OXY USA Inc. proposes to drill a pilot hole 150' into the Wolfcamp E formation; then sidetrack and drill a lateral wellbore into the Wolfcamp A formation.

- Drill 14-3/4" surface hole to 500' MD; run 10-3/4" casing and cement to surface.
- Drill 9-7/8" intermediate hole to ±9,013' MD (approximately 200' into Third Bone Spring formation); run 7-5/8" casing and cement to surface.
- Drill 6-3/4" pilot hole to 11,373' MD (150' into Wolfcamp E formation), log as per program and abandon with two cement plugs. See below for details.
- Sidetrack from top cement plug and drill 6-3/4" lateral to 14,757' MD targeting Wolfcamp A formation (~10,035' TVD).

During 2015 & 2016, Oxy has successfully drilled 8 Second Bone Spring lateral wells in Federal lands (Peaches & Cedar Canyon fields in Eddy County, NM) that set a deep intermediate casing string. These deep intermediate sections were drilled from Surface Casing Point, through the salts and Delaware formations, setting casing at either the First or Second Bone Spring formation. In all 8 cases, the intermediate casing was successfully cemented to surface (on 5 of these wells, cement returned to surface during the first stage, and 3 required a second stage to bring cement back to surface).

Oxy proposes setting the 7-5/8" casing for this well at 9,013' MD (200' into Third Bone Spring formation) in order to ensure a competent intermediate casing shoe that can withstand the potential high pressure in the Wolfcamp E formation (12.0 – 13.5 ppg). When setting this casing at 9,013', the resulting kick tolerance to drill the pilot hole to 11,373' is **24.2 bbl** (based on 15.0 ppg fracture gradient at 9,013' MD and 13.5 ppg max expected pore pressure at 11,373' MD).

No high pore pressures are expected when drilling through the Second and top of the Third Bone Springs formation. Maximum mud weight expected to drill the 9 7/8" intermediate is 10.0 ppg, which is within the fracture gradient limits of the Delaware formation in this field.

1. Geologic Formations

TVD of target	10,035'	Pilot hole depth	11,373' MD
MD at TD:	14,757'	Deepest expected fresh water:	386'

Delaware Basin

Formation	TVD - RKB	Expected Fluids
T. Rustler	386	--
T. Salt	766	--
T. Delaware / Lamar / B. Anhydrite	2962	--
T. Bell Canyon*	2976	Water/Oil/Gas
T. Cherry Canyon*	3677	Oil/Gas
T. Brushy Canyon*	5082	Oil/Gas
T. BSPG	6644	Oil/Gas
T. 1st BSPG	7624	Oil/Gas
T. 2nd BSPG	7885	Oil/Gas
T. 3rd BSPG	8827	Oil/Gas
T. Wolfcamp	9952	Oil/Gas
Target Wolfcamp	**10,250**	**Oil/Gas**
T. Strawn	12209	Oil/Gas

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

2. Casing Program

Hole Size	Casing Interval From	Casing Interval To	Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
14.75"	0'	500'	10.75"	40.5	J55	BTC	7.05	1.40	3.67
9.875"	0'	9,013'	7.625"	29.7	L80	BTC	3.41	1.27	1.84
6.75"	0'	10,250'	5.5"	20	P-110	Ultra SF	2.25	1.24	1.80
6.75"	10,250'	14,757'	4.5"	13.5	P-110	DQX	2.10	1.24	2.47
				BLM Minimum Safety Factor			1.125	1	1.6 Dry 1.8 Wet

	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?	N
If yes, are the first three strings cemented to surface?	
Is 2nd string set 100' to 600' below the base of salt?	
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?	

2. Cementing Program

Casing	# Sks	Wt. lb/ gal	Yld ft3/ sack	H_20 gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	330	14.8	1.35	6.53	6:50	Premium Plus Cement 2% Calcium Chloride – Flake (Accelerator)
Inter.	1090	10.3	3.05	15.63	15:07	TUNED LIGHT (TM) SYSTEM 0.80% HR-601(Retarder), 3 lbm/sk Kol-Seal (Lost Circulation Additive), 0.125 lbm/sk Poly-E-Flake (Lost Circulation Additive)
	250	13.2	1.65	8.45	12:57	Super H Cement, 0.1 % HR-800 (Retarder), 0.5 % Halad(R)-344 (Low Fluid Loss Control), 0.3 % CFR-3 (Dispersant), 2 lbm Kol-Seal, 3 lbm Salt (Accelerator)
	DV/ECP Tool @ Base of salts ~2,950' (We request the option to cancel the second stage if cement is circulated to surface during the first stage of cement operations) ,					
	520	12.9	1.85	9.86	12:44	Halliburton Light Premium Plus Cement with 5% Salt, 0.125 lbs/sk Poly-E-Flake, 5 lbs/sk Kol-Seal, 0.35% HR-800
	170	14.8	1.33	6.34	6:31	Premium Plus cement
Prod.	580	13.2	1.631	8.37	15:15	Super H Cement, 0.1 % HR-800, 0.5 % Halad(R)-344, 0.4 % CFR-3, 3 lbm Salt

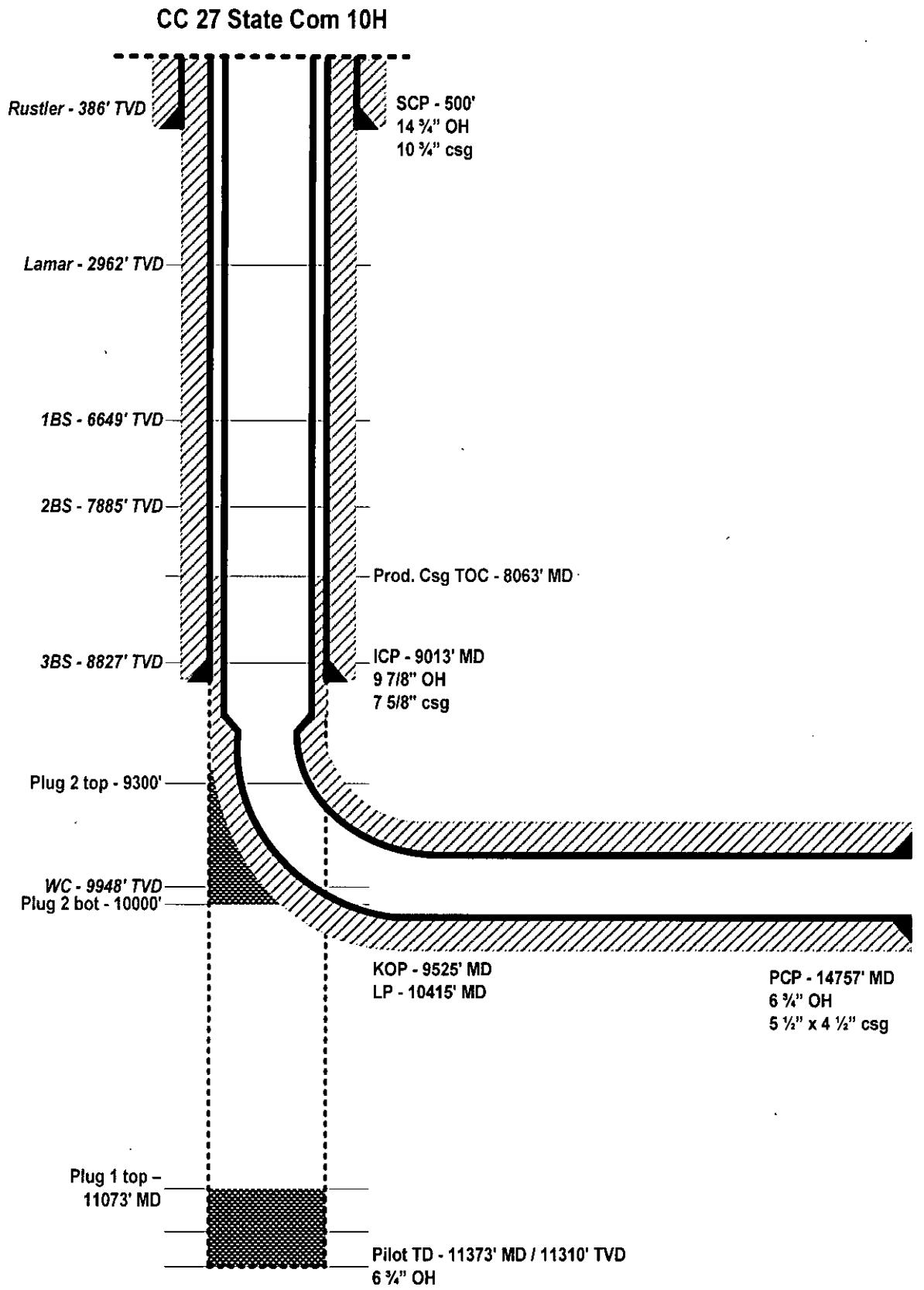
Casing String	TOC	% Excess (Lead/Tail)
Surface	0'	50%
Intermediate	0'	100% / 20%
Intermediate Contingency 2nd Stage	0'	100% / 100%
Production	8,013'	15%

Include Pilot Hole Cementing specs:
Pilot hole depth: 11,373' MD
KOP 9,525' MD

Plug top	Plug Bottom	% Excess	No. Sacks	Wt. lb/gal	Yld ft3/sack	Water gal/sk	Slurry Description and Cement Type
11,073' MD	11,373' MD	40	85	14.4	1.246	5.73	VersaCem H, 50% Cement H, 50% Poz mix, 2% Bentonite (Light Weight Additive), 0.3% CFR-3
9,300' MD	10,000' MD	40	260	17.5	0.952	3.51	PlugCem, Cement H, 0.5% CFR-3, 0.25% HR-601

Note: The first plug is designed to be 300' in length (150' above/below Wolfcamp E top) to isolate the upper Wolfcamps from potential high pressure zones in the Wolfcamp E.

The second plug will isolate the Wolfcamp from Third Bone Spring formation. It is designed to be 700' in length and will be used to sidetrack a Wolfcamp A lateral target. The production casing is planned to be cemented 1000' inside the previous intermediate casing. A CBL-VDL log will be run after the rig is released to evaluate the cement at the Third Bone Spring – Wolfcamp transition.


CC 27 State Com 10H
Rustler - 386' TVD
SCP - 500'
14 ¾" OH
10 ¾" csg
Lamar - 2962' TVD
1BS - 6649' TVD
2BS - 7885' TVD
Prod. Csg TOC - 8063' MD
3BS - 8827' TVD
ICP - 9013' MD
9 7/8" OH
7 5/8" csg
Plug 2 top - 9300'
WC - 9948' TVD
Plug 2 bot - 10000'
KOP - 9525' MD
LP - 10415' MD
PCP - 14757' MD
6 ¾" OH
5 ½" x 4 ½" csg
Plug 1 top –
11073' MD
Pilot TD - 11373' MD / 11310' TVD
6 ¾" OH

4. Pressure Control Equipment

BOP installed and tested before drilling which hole?	Size?	Min. Required WP	Type	✓	Tested to:
9-7/8" Intermediate	13-5/8"	5M	Annular	✓	70% of working pressure
		10M	Blind Ram	✓	250 / 10,000psi
			Upper Pipe Ram	✓	
			Double Ram		
			Lower Pipe Ram	✓	

*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. 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 manifold. See attached schematics.

	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 wellhead is being used. 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. See attached schematic. 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.

5. Mud Program

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	Surf. TD 500'	EnerSeal (MMH)	8.4-8.8	40-60	N/C
500'	3,000'	Brine	9.8-10.5	35-45	N/C
3,000'	Int. TD 9,013'	EnerSeal (MMH)	9.4-9.7	38-50	N/C
9,013'	Pilot TD 11,373'	Oil-Based Mud	10.0 – 13.0	35-50	N/C
9,013'	Prod. TD 14,757'	Oil-Based Mud	8.8-9.4	35-50	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.

Oxy proposes to drill out the 10-3/4" surface casing shoe with a saturated brine system from 500'-3,000', which is the base of the salt system. At this point we will swap fluid systems to a high viscosity mixed metal hydroxide system. We will drill with this system to the intermediate TD @ 9,013'.

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

Additional logs planned		Interval
Yes	CBL	0' – 10100' Note: Will run CBL in production casing until refusal, to evaluate cement around Bone Spring – Wolfcamp transition
Yes	Mud log	Surface Shoe - TD
Yes	PEX	9,013' – Pilot TD

7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	7645 psi (pilot) / 4778 psi (lateral)
Abnormal Temperature	No

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 zonal isolation.

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 two well pad in batch by section with the 27 Federal 5H well: all surface sections, intermediate sections and production sections.	Yes
Will more than one drilling rig be used for drilling operations? If yes, describe.	No

Attachments
_x__ Directional Plan
_x__ H2S Contingency Plan

Company Personnel:

Name	Title	Office Phone	Mobile Phone
Ludwing Franco	Drilling Engineer	(713)366-5174	(832) 523-6392
Miranda Hust	Drilling Engineer	(713)215-7576	(832) 390-0645
Diego Tellez	Drilling Engineering Team Lead	(713)350-4602	(713) 303-4932
Ryan Farrell	Drilling Engineer Supervisor	(713)366-5058	(832) 914-7443
Travis Samford	Drilling Superintendent	(713)522-8652	(281) 684-6897
Daniel Holderman	Drilling Manager	(713)497-2006	(832) 525-9029

Plan - ST01 Rev4 — OXY — RKB 26.5' — Schlumberger

Borehole:	Well:	Field:	Structure:
ST01	Cedar Canyon 27 State Com 10H	NM Eddy County (NAD 27)	H&P 636

Gravity & Magnetic Parameters
Model: HDGM 2015 Dip: 60.038° Date: 11-Mar-2016
MagDec: 7.253° FS: 48249.016nT Gravity FS: 998.468mgn (9.80665 Based)

Surface Location NAD27 New Mexico State Plane, Eastern Zone, US Feet
Lat: N 32 11 32.57 Northing: 433887.75ftUS Grid Conv: 0.1882°
Lon: W 103 58 48.08 Easting: 609295.19ftUS Scale Fact: 0.99992277

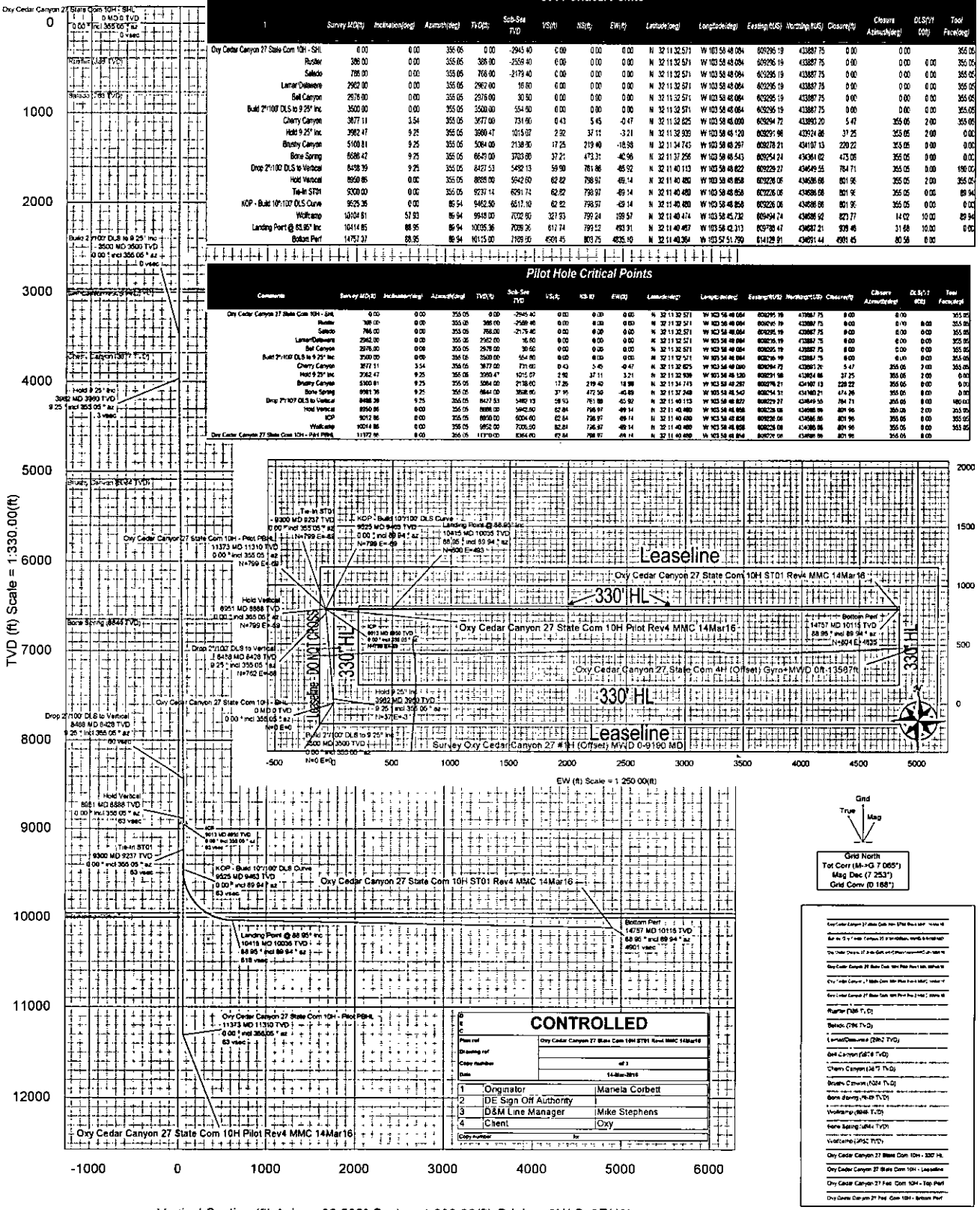
Miscellaneous
Slot: Canyon 27 TVD Ref: RKB(2945.4ft above MSL)
Plan: Oxy Cedar Canyon 27 State Com 10H ST01 Rev4 MMC 14Mar16

ST01 Critical Points

1	Survey MD(ft)	Inclination(deg)	Azimuth(deg)	TVD(ft)	Sub-Sea TVD	VS(ft)	NS(ft)	EW(ft)	Latitude(deg)	Longitude(deg)	Easting(NUS)	Northing(NUS)	Closure(ft)	Closure Azimuth(deg)	DLS(°/100)	Tool Face(deg)
Oxy Cedar Canyon 27 State Com 10H - SHL	0.00	0.00	355.05	0.00	-2945.40	0.00	0.00	0.00	N 32 11 32.573	W 103 58 48.084	609295.19	433887.75	0.00	0.00		355.05
Rustler	386.00	0.00	355.05	386.00	-2559.40	0.00	0.00	0.00	N 32 11 32.573	W 103 58 48.084	609295.19	433887.75	0.00	0.00	0.00	355.05
Salado	786.00	0.00	355.05	786.00	-2159.40	0.00	0.00	0.00	N 32 11 32.573	W 103 58 48.084	609295.19	433887.75	0.00	0.00	0.00	355.05
Lamar/Delaware	2962.00	0.00	355.05	2962.00	16.60	0.00	0.00	0.00	N 32 11 32.573	W 103 58 48.084	609295.19	433887.75	0.00	0.00	0.00	355.05
Bell Canyon	2976.00	0.00	355.05	2976.00	30.60	0.00	0.00	0.00	N 32 11 32.573	W 103 58 48.084	609295.19	433887.75	0.00	0.00	0.00	355.05
Build 2°/100 DLS to 9.25° Inc	3500.00	0.00	355.05	3500.00	554.60	0.00	0.00	0.00	N 32 11 32.573	W 103 58 48.084	609295.19	433887.75	0.00	0.00	0.00	355.05
Cherry Canyon	3677.11	3.54	355.05	3677.00	731.60	0.43	5.45	-0.47	N 32 11 32.625	W 103 58 48.090	609294.72	433893.20	5.47	355.05	2.00	355.05
Hold 9.25° Inc	3962.47	9.25	355.05	3960.47	1015.07	2.92	37.11	-3.21	N 32 11 32.939	W 103 58 48.120	609291.98	433924.86	37.25	355.05	2.00	0.00
Brushy Canyon	5100.81	9.25	355.05	5084.00	2138.60	17.25	219.40	-18.98	N 32 11 34.743	W 103 58 48.297	609278.21	434107.13	220.22	355.05	0.00	0.00
Bone Spring	6686.42	9.25	355.05	6649.00	3703.60	37.21	473.31	-40.96	N 32 11 37.256	W 103 58 48.543	609254.24	434361.02	475.05	355.05	0.00	0.00
Drop 2°/100 DLS to Vertical	8458.39	9.25	355.05	8427.53	5482.13	59.90	761.86	-65.92	N 32 11 40.113	W 103 58 48.822	609229.27	434649.55	764.71	355.05	0.00	180.00
Hold Vertical	8950.86	0.00	355.05	8918.00	5942.60	62.82	798.97	-69.14	N 32 11 40.480	W 103 58 48.858	609226.06	434686.86	801.96	355.05	2.00	355.05
Tie-In ST01	9300.00	0.00	355.05	9237.14	6291.74	62.82	798.97	-69.14	N 32 11 40.480	W 103 58 48.858	609226.06	434686.86	801.96	355.05	0.00	89.94
KOP - Build 10°/100 DLS Curve	9525.36	0.00	89.94	9462.50	6517.10	62.82	798.97	-69.14	N 32 11 40.480	W 103 58 48.858	609226.06	434686.86	801.96	355.05	0.00	0.00
Wolfcamp	10104.81	57.93	89.94	9948.00	7002.60	321.93	799.24	159.57	N 32 11 40.474	W 103 58 45.732	609494.74	434686.92	823.77	14.02	10.00	89.94
Landing Point @ 89.95° Inc	10414.85	88.95	89.94	10035.36	7089.96	617.74	799.52	493.31	N 32 11 40.487	W 103 58 42.313	609788.47	434687.21	928.48	31.68	10.00	0.00
Bottom Perf	14757.37	88.95	89.94	10115.00	7169.60	4501.45	803.75	4835.10	N 32 11 40.384	W 103 57 51.799	614128.91	434691.44	4901.45	80.58	0.00	

Pilot Hole Critical Points

Comments	Survey MD(ft)	Inclination(deg)	Azimuth(deg)	TVD(ft)	Sub-Sea TVD	VS(ft)	NS(ft)	EW(ft)	Latitude(deg)	Longitude(deg)	Easting(NUS)	Northing(NUS)	Closure(ft)	Closure Azimuth(deg)	DLS(°/100 ft)	Tool Face(deg)
Oxy Cedar Canyon 27 State Com 10H - SHL	0.00	0.00	355.05	0.00	-2945.40	0.00	0.00	0.00	N 32 11 32.573	W 103 58 48.084	609295.19	433887.75	0.00	0.00		355.05
Rustler	386.00	0.00	355.05	386.00	-2559.40	0.00	0.00	0.00	N 32 11 32.573	W 103 58 48.084	609295.19	433887.75	0.00	0.00	0.00	355.05
Salado	786.00	0.00	355.05	786.00	-2159.40	0.00	0.00	0.00	N 32 11 32.573	W 103 58 48.084	609295.19	433887.75	0.00	0.00	0.00	355.05
Lamar/Delaware	2962.00	0.00	355.05	2962.00	16.60	0.00	0.00	0.00	N 32 11 32.573	W 103 58 48.084	609295.19	433887.75	0.00	0.00	0.00	355.05
Bell Canyon	2976.00	0.00	355.05	2976.00	30.60	0.00	0.00	0.00	N 32 11 32.573	W 103 58 48.084	609295.19	433887.75	0.00	0.00	0.00	355.05
Build 2°/100 DLS to 9.25° Inc	3500.00	0.00	355.05	3500.00	554.60	0.00	0.00	0.00	N 32 11 32.573	W 103 58 48.084	609295.19	433887.75	0.00	0.00	0.00	355.05
Cherry Canyon	3677.11	3.54	355.05	3677.00	731.60	0.43	5.45	-0.47	N 32 11 32.625	W 103 58 48.090	609294.72	433893.20	5.47	355.05	2.00	355.05
Hold 9.25° Inc	3962.47	9.25	355.05	3960.47	1015.07	2.92	37.11	-3.21	N 32 11 32.939	W 103 58 48.120	609291.98	433924.86	37.25	355.05	2.00	0.00
Brushy Canyon	5100.81	9.25	355.05	5084.00	2138.60	17.25	219.40	-18.98	N 32 11 34.743	W 103 58 48.297	609278.21	434107.13	220.22	355.05	0.00	0.00
Bone Spring	6686.42	9.25	355.05	6649.00	3703.60	37.21	473.31	-40.96	N 32 11 37.256	W 103 58 48.543	609254.24	434361.02	475.05	355.05	0.00	0.00
Drop 2°/100 DLS to Vertical	8458.39	9.25	355.05	8427.53	5482.13	59.90	761.86	-65.92	N 32 11 40.113	W 103 58 48.822	609229.27	434649.55	764.71	355.05	0.00	180.00
Hold Vertical	8950.86	0.00	355.05	8918.00	5942.60	62.82	798.97	-69.14	N 32 11 40.480	W 103 58 48.858	609226.06	434686.86	801.96	355.05	2.00	355.05
KOP	9012.86	0.00	355.05	8980.00	6004.60	62.82	798.97	-69.14	N 32 11 40.480	W 103 58 48.858	609226.06	434686.86	801.96	355.05	0.00	355.05
Wolfcamp	10014.86	0.00	355.05	9952.00	7036.60	62.82	798.97	-69.14	N 32 11 40.480	W 103 58 48.858	609226.06	434686.86	801.96	355.05	0.00	353.05
Oxy Cedar Canyon 27 State Com 10H - Pilot PBHL	11372.98	0.00	355.05	11310.00	8364.60	62.84	798.97	-69.14	N 32 11 40.480	W 103 58 48.858	609226.06	434686.86	801.96	355.05	0.00	



Vertical Section (ft) Azim = 80.562° Scale = 1:330.00(ft) Origin = 0N/-S, 0E/-W

Schlumberger

Oxy Cedar Canyon 27 State Com 10H ST01 Rev4 MMC 14Mar16 Proposal
Geodetic Report
(Non-Def Plan)

Report Date:	March 14, 2016 - 02 00 PM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	OXY	**Vertical Section Azimuth:**	60 560 ° (Grid North)
Field:	NM Eddy County (NAD 27)	**Vertical Section Origin:**	0.000 ft, 0 000 ft
Structure / Slot:	Oxy Cedar Canyon 27 State Com 10H / Oxy Cedar Canyon 27 State Com 10H.	**TVD Reference Datum:**	RKB
Well:	Oxy Cedar Canyon 27 State Com 10H	**TVD Reference Elevation:**	2945 400 ft above MSL
Borehole:	ST01	**Seabed / Ground Elevation:**	2918 900 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	7.253 °
Survey Name:	Oxy Cedar Canyon 27 State Com 10H ST01 Rev4 MMC 14Mar16	**Total Gravity Field Strength:**	998 4683mgn (9 80665 Based)
Survey Date:	January 07, 2016	**Gravity Model:**	GARM
Tort / AHD / DDI / ERD Ratio:	107 448 ° / 5706 200 ft / 5.952 / 0 564	**Total Magnetic Field Strength:**	48249 018 nT
Coordinate Reference System:	NAD27 New Mexico State Plane, Eastern Zone, US Feet	**Magnetic Dip Angle:**	60 038 °
Location Lat / Long:	N 32° 11' 32.57143", W 103° 58' 48 08448"	**Declination Date:**	March 11, 2016
Location Grid N/E Y/X:	N 433887.750 ftUS, E 609295.190 ftUS	**Magnetic Declination Model:**	HDGM 2015
CRS Grid Convergence Angle:	0.1882 °	**North Reference:**	Grid North
Grid Scale Factor:	0 99992277	**Grid Convergence Used:**	0.1882 °
Version / Patch:	2 9 365.0	**Total Corr Mag North->Grid North:**	7.0646 °
		Local Coord Referenced To:	Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
Tie-In ST01	9300 00	0 00	355 05	9237.14	6291.74	62.84	798 97	-69.14	N/A	434686.66	609226.06	N 32 11 40 48	W 103 58 48.86
KOP - Build 10°/100' DLS Curve	9525.36	0 00	89 94	9462 50	6517.10	62 84	798.97	-69.14	0.00	434686.66	609226.06	N 32 11 40.48	W 103 58 48.86
Landing Point @ 86.95° Inc	10414 85	86.95	89.94	10035 36	7089 96	617.77	799 52	493 31	10.00	434687 21	609788 47	N 32 11 40 47	W 103 58 42.31
Bottom Perf	14757.37	86.95	89.94	10115 00	7169 60	4901 45	803.75	4835 10	0 00	434691 44	614129.91	N 32 11 40.36	W 103 57 51.79

Survey Type: Non-Def Plan

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma
Survey Program:

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Expected Max Inclination (deg)	Survey Tool Type	Borehole / Survey
	1	0 000	26.500	1/100.000	30 000	30 000		SLB_MWD-STD_HDGM-Depth Only	Pilot Hole / Oxy Cedar Canyon 27 State Com 10H Pilot Rev4 MMC 14Mar16
	1	26 500	9300 000	1/100.000	30 000	30 000		SLB_MWD-STD_HDGM	Pilot Hole / Oxy Cedar Canyon 27 State Com 10H Pilot Rev4 MMC
	1	9300.000	14757.371	1/100 000	30 000	30 000		SLB_MWD-STD_HDGM	ST01 / Oxy Cedar Canyon 27 State Com 10H ST01 Rev4 MMC

Schlumberger

Oxy Cedar Canyon 27 State Com 10H ST01 Rev4 MMC 14Mar16 Proposal
Geodetic Report
(Non-Def Plan)

Report Date:	March 14, 2016 - 01:58 PM	**Survey / DLS Computation:**	Minimum Curvature / Lubinski
Client:	OXY	**Vertical Section Azimuth:**	80 560 ° (Grid North)
Field:	NM Eddy County (NAD 27)	**Vertical Section Origin:**	0 000 ft, 0.000 ft
Structure / Slot:	Oxy Cedar Canyon 27 State Com 10H / Oxy Cedar Canyon 27 State Com 10H	**TVD Reference Datum:**	RKB
Well:	Oxy Cedar Canyon 27 State Com 10H	**TVD Reference Elevation:**	2945.400 ft above MSL
Borehole:	ST01	**Seabed / Ground Elevation:**	2918 900 ft above MSL
UWI / API#:	Unknown / Unknown	**Magnetic Declination:**	7.253 °
Survey Name:	Oxy Cedar Canyon 27 State Com 10H ST01 Rev4 MMC 14Mar16	**Total Gravity Field Strength:**	998 4683mgn (9 80665 Based)
Survey Date:	January 07, 2016	**Gravity Model:**	GARM
Tort / AHD / DDI / ERD Ratio:	107 448 ° / 5706 200 ft / 5 952 / 0 564	**Total Magnetic Field Strength:**	48249 018 nT
Coordinate Reference System:	NAD27 New Mexico State Plane, Eastern Zone, US Feet	**Magnetic Dip Angle:**	60 038 °
Location Lat / Long:	N 32° 11' 32.57143", W 103° 58' 48 08448"	**Declination Date:**	March 11, 2016
Location Grid N/E Y/X:	N 433887.750 ftUS, E 609295.190 ftUS	**Magnetic Declination Model:**	HDGM 2015
CRS Grid Convergence Angle:	0.1882 °	**North Reference:**	Grid North
Grid Scale Factor:	0 99992277	**Grid Convergence Used:**	0.1882 °
Version / Patch:	2.9 365 0	**Total Corr Mag North->Grid North:**	7.0646 °
		Local Coord Referenced To:	Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
Oxy Cedar Canyon 27 State Com 10H - SHL	0.00	0 00	355 05	0 00	-2945 40	0.00	0 00	0.00	N/A	433887.75	609295 19	N 32 11 32.57	W 103 58 48.08
	100.00	0 00	355.05	100 00	-2845 40	0 00	0.00	0 00	0 00	433887.75	609295.19	N 32 11 32.57	W 103 58 48 08
	200 00	0 00	355 05	200 00	-2745.40	0 00	0 00	0 00	0.00	433887.75	609295 19	N 32 11 32.57	W 103 58 48.08
	300 00	0 00	355.05	300 00	-2645 40	0 00	0.00	0.00	0 00	433887.75	609295.19	N 32 11 32.57	W 103 58 48.08
Rustler	*386.00*	*0.00*	*355.05*	*386.00*	*-2559 40*	*0.00*	*0.00*	*0.00*	*0.00*	*433887.75*	*609295 19*	*N 32 11 32.57*	*W 103 58 48.08*
	400 00	0 00	355.05	400 00	-2545 40	0.00	0.00	0 00	0 00	433887.75	609295.19	N 32 11 32 57	W 103 58 48 08
	500.00	0.00	355 05	500 00	-2445.40	0.00	0 00	0 00	0.00	433887.75	609295 19	N 32 11 32 57	W 103 58 48 08
	600 00	0 00	355.05	600 00	-2345 40	0.00	0 00	0 00	0 00	433887.75	609295.19	N 32 11 32.57	W 103 58 48 08
	700.00	0 00	355 05	700 00	-2245.40	0 00	0 00	0.00	0 00	433887.75	609295 19	N 32 11 32 57	W 103 58 48 08
Salado	*766.00*	*0 00*	*355.05*	*766.00*	*-2179.40*	*0.00*	*0.00*	*0.00*	*0.00*	*433887.75*	*609295.19*	*N 32 11 32.57*	*W 103 58 48.08*
	800 00	0 00	355 05	800.00	-2145 40	0 00	0 00	0.00	0 00	433887.75	609295.19	N 32 11 32.57	W 103 58 48.08
	900.00	0.00	355.05	900 00	-2045 40	0 00	0.00	0 00	0 00	433887.75	609295.19	N 32 11 32.57	W 103 58 48 08
	1000 00	0 00	355 05	1000.00	-1945 40	0 00	0.00	0.00	0.00	433887.75	609295.19	N 32 11 32.57	W 103 58 48 08
	1100 00	0 00	355.05	1100 00	-1845.40	0.00	0 00	0 00	0.00	433887.75	609295.19	N 32 11 32.57	W 103 58 48 08
	1200 00	0 00	355 05	1200.00	-1745.40	0.00	0.00	0 00	0.00	433887.75	609295.19	N 32 11 32.57	W 103 58 48.08
	1300 00	0 00	355 05	1300 00	-1645 40	0.00	0 00	0 00	0.00	433887.75	609295.19	N 32 11 32 57	W 103 58 48 08
	1400 00	0 00	355 05	1400.00	-1545 40	0.00	0.00	0.00	0.00	433887.75	609295.19	N 32 11 32.57	W 103 58 48.08
	1500 00	0 00	355 05	1500 00	-1445 40	0.00	0 00	0 00	0.00	433887.75	609295.19	N 32 11 32 57	W 103 58 48 08
	1600 00	0.00	355 05	1600 00	-1345.40	0.00	0 00	0 00	0.00	433887.75	609295.19	N 32 11 32.57	W 103 58 48.08
	1700.00	0 00	355.05	1700 00	-1245.40	0.00	0.00	0 00	0 00	433887.75	609295.19	N 32 11 32.57	W 103 58 48.08
	1800 00	0 00	355 05	1800 00	-1145.40	0 00	0 00	0.00	0 00	433887.75	609295.19	N 32 11 32.57	W 103 58 48.08
	1900 00	0 00	355.05	1900.00	-1045 40	0.00	0 00	0.00	0 00	433887.75	609295.19	N 32 11 32 57	W 103 58 48 08
	2000 00	0 00	355 05	2000.00	-945 40	0 00	0.00	0.00	0 00	433887.75	609295.19	N 32 11 32.57	W 103 58 48.08
	2100 00	0 00	355.05	2100.00	-845 40	0 00	0.00	0.00	0 00	433887.75	609295.19	N 32 11 32.57	W 103 58 48 08
	2200.00	0 00	355 05	2200.00	-745 40	0 00	0 00	0.00	0.00	433887.75	609295 19	N 32 11 32 57	W 103 58 48 08
	2300 00	0.00	355.05	2300.00	-645 40	0 00	0.00	0 00	0.00	433887.75	609295.19	N 32 11 32.57	W 103 58 48.08
	2400.00	0.00	355 05	2400.00	-545 40	0.00	0.00	0 00	0.00	433887.75	609295 19	N 32 11 32.57	W 103 58 48 08
	2500 00	0 00	355 05	2500.00	-445 40	0 00	0.00	0.00	0.00	433887.75	609295 19	N 32 11 32.57	W 103 58 48.08
	2600 00	0.00	355.05	2600 00	-345 40	0 00	0.00	0 00	0.00	433887.75	609295.19	N 32 11 32.57	W 103 58 48 08
	2700.00	0.00	355 05	2700.00	-245 40	0 00	0.00	0.00	0.00	433887.75	609295.19	N 32 11 32.57	W 103 58 48.08
	2800 00	0 00	355.05	2800 00	-145 40	0.00	0.00	0 00	0.00	433887.75	609295.19	N 32 11 32.57	W 103 58 48 08
	2900 00	0 00	355.05	2900.00	-45 40	0 00	0.00	0 00	0.00	433887.75	609295.19	N 32 11 32.57	W 103 58 48 08
Lamar/Delaware	*2962.00*	*0.00*	*355.05*	*2962.00*	*16.60*	*0.00*	*0.00*	*0.00*	*0.00*	*433887.75*	*609295.19*	*N 32 11 32.57*	*W 103 58 48.08*
Bell Canyon	*2976.00*	*0.00*	*355.05*	*2976.00*	*30.60*	*0.00*	*0.00*	*0.00*	*0.00*	*433887.75*	*609295.19*	*N 32 11 32.57*	*W 103 58 48.08*
	3000 00	0 00	355.05	3000.00	54 60	0.00	0.00	0.00	0.00	433887.75	609295.19	N 32 11 32.57	W 103 58 48 08
	3100.00	0.00	355.05	3100.00	154 60	0.00	0.00	0.00	0.00	433887.75	609295.19	N 32 11 32.57	W 103 58 48.08
	3200 00	0.00	355 05	3200.00	254.60	0.00	0 00	0 00	0.00	433887.75	609295 19	N 32 11 32.57	W 103 58 48.08
	3300 00	0.00	355 05	3300.00	354.60	0.00	0.00	0.00	0.00	433887.75	609295.19	N 32 11 32.57	W 103 58 48.08
	3400 00	0 00	355 05	3400 00	454.60	0 00	0 00	0 00	0 00	433887.75	609295.19	N 32 11 32.57	W 103 58 48.08
Build 2°/100' DLS to 9 25° Inc	3500 00	0.00	355 05	3500.00	554 60	0 00	0 00	0 00	0 00	433887.75	609295.19	N 32 11 32.57	W 103 58 48.08
	3600 00	2 00	355 05	3599 98	654.58	0 14	1 74	-0.15	2.00	433889 49	609295 04	N 32 11 32.59	W 103 58 48.09
Cherry Canyon	*3677.11*	*3.54*	*355.05*	*3677.00*	*731.60*	*0.43*	*5.45*	*-0.47*	*2.00*	*433893.20*	*609294.72*	*N 32 11 32.63*	*W 103 58 48.09*
	3700 00	4.00	355.05	3699 84	754 44	0.55	6.95	-0.60	2 00	433894.70	609294.59	N 32 11 32 64	W 103 58 48 09
	3800.00	6.00	355.05	3799 45	854 05	1.23	15.64	-1.35	2 00	433903 38	609293.84	N 32 11 32.73	W 103 58 48.10
	3900.00	8 00	355 05	3898 70	953.30	2.18	27 78	-2 40	2.00	433915 52	609292.79	N 32 11 32 85	W 103 58 48.11
Hold 9 25° Inc	3962 47	9 25	355 05	3960 47	1015.07	2.92	37 11	-3 21	2.00	433924 86	609291.98	N 32 11 32 94	W 103 58 48.12
	4000 00	9 25	355 05	3997.51	1052 11	3 39	43.12	-3.73	0 00	433930 87	609291.46	N 32 11 33.00	W 103 58 48.13
	4100.00	9 25	355.05	4096 21	1150.81	4 65	59 13	-5.12	0.00	433946 88	609290 07	N 32 11 33.16	W 103 58 48.14
	4200.00	9 25	355 05	4194 91	1249 51	5.91	75.15	-6 50	0 00	433962.89	609288 69	N 32 11 33 32	W 103 58 48 16
	4300.00	9 25	355 05	4293 61	1348.21	7.17	91.16	-7.89	0.00	433978 90	609287.30	N 32 11 33 47	W 103 58 48.17
	4400 00	9 25	355 05	4392.31	1446.91	8.43	107.17	-9 27	0 00	433994.91	609285 92	N 32 11 33 63	W 103 58 48.19
	4500.00	9 25	355 05	4491.00	1545 60	9.69	123.19	-10 66	0 00	434010.93	609284.53	N 32 11 33.79	W 103 58 48 20
	4600 00	9 25	355.05	4589.70	1644 30	10 95	139 20	-12.04	0 00	434026 94	609283.15	N 32 11 33.95	W 103 58 48 22
	4700 00	9 25	355 05	4688 40	1743 00	12 21	155.21	-13.43	0.00	434042 95	609281.76	N 32 11 34.11	W 103 58 48.23
	4800 00	9 25	355 05	4787.10	1841.70	13 47	171 23	-14 82	0.00	434058.96	609280 37	N 32 11 34 27	W 103 58 48 25
	4900 00	9 25	355 05	4885 80	1940 40	14.73	187.24	-16 20	0 00	434074.98	609278.99	N 32 11 34 42	W 103 58 48.27
	5000 00	9 25	355 05	4984 50	2039.10	15 99	203 25	-17.59	0.00	434090 99	609277.60	N 32 11 34.58	W 103 58 48 28
	5100 00	9 25	355 05	5083 20	2137.80	17 25	219 27	-18.97	0.00	434107.00	609276 22	N 32 11 34.74	W 103 58 48 30
Brushy Canyon	*5100.81*	*9.25*	*355.05*	*5084.00*	*2138.60*	*17.26*	*219 40*	*-18.98*	*0.00*	*434107.13*	*609276 21*	*N 32 11 34.74*	*W 103 58 48.30*
	5200 00	9 25	355.05	5181.90	2236 50	18 51	235.28	-20 36	0 00	434123 01	609274.83	N 32 11 34.90	W 103 58 48.31
	5300 00	9 25	355.05	5280.60	2335 20	19 77	251 29	-21.74	0 00	434139 02	609273 45	N 32 11 35 06	W 103 58 48 33
	5400 00	9 25	355 05	5379 30	2433.90	21.03	267 31	-23.13	0 00	434155 04	609272.06	N 32 11 35.22	W 103 58 48 34
	5500 00	9 25	355 05	5478.00	2532.60	22 28	283 32	-24.52	0.00	434171.05	609270 68	N 32 11 35 38	W 103 58 48.36
	5600 00	9 25	355.05	5576.70	2631 30	23 54	299.33	-25.90	0 00	434187.06	609269 29	N 32 11 35 53	W 103 58 48 37
	5700 00	9 25	355 05	5675.40	2730 00	24 80	315 35	-27.29	0 00	434203 07	609267.91	N 32 11 35 69	W 103 58 48 39
	5800 00	9.25	355 05	5774.10	2828 70	26.06	331.36	-28.67	0.00	434219 08	609266 52	N 32 11 35 85	W 103 58 48 41

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	5900.00	9.25	355.05	5872.80	2927.40	27.32	347.37	-30.06	0.00	434235.10	609265.13	N 32 11 36.01	W 103 58 48.42
	6000.00	9.25	355.05	5971.50	3026.10	28.58	363.39	-31.44	0.00	434251.11	609263.75	N 32 11 36.17	W 103 58 48.44
	6100.00	9.25	355.05	6070.20	3124.80	29.84	379.40	-32.83	0.00	434267.12	609262.36	N 32 11 36.33	W 103 58 48.45
	6200.00	9.25	355.05	6168.90	3223.50	31.10	395.41	-34.22	0.00	434283.13	609260.98	N 32 11 36.49	W 103 58 48.47
	6300.00	9.25	355.05	6267.60	3322.20	32.36	411.43	-35.60	0.00	434299.15	609259.59	N 32 11 36.64	W 103 58 48.48
	6400.00	9.25	355.05	6366.30	3420.90	33.62	427.44	-36.99	0.00	434315.16	609258.21	N 32 11 36.80	W 103 58 48.50
	6500.00	9.25	355.05	6465.00	3519.60	34.88	443.45	-38.37	0.00	434331.17	609256.82	N 32 11 36.96	W 103 58 48.51
	6600.00	9.25	355.05	6563.70	3618.30	36.14	459.47	-39.76	0.00	434347.18	609255.44	N 32 11 37.12	W 103 58 48.53
Bone Spring	*6686.42*	*9.25*	*355.05*	*6649.00*	*3703.60*	*37.23*	*473.31*	*-40.96*	*0.00*	*434361.02*	*609254.24*	*N 32 11 37.26*	*W 103 58 48.54*
	6700.00	9.25	355.05	6662.40	3717.00	37.40	475.48	-41.14	0.00	434363.19	609254.05	N 32 11 37.28	W 103 58 48.55
	6800.00	9.25	355.05	6761.10	3815.70	38.66	491.50	-42.53	0.00	434379.21	609252.66	N 32 11 37.44	W 103 58 48.56
	6900.00	9.25	355.05	6859.80	3914.40	39.92	507.51	-43.91	0.00	434395.22	609251.28	N 32 11 37.59	W 103 58 48.58
	7000.00	9.25	355.05	6958.50	4013.10	41.18	523.52	-45.30	0.00	434411.23	609249.89	N 32 11 37.75	W 103 58 48.59
	7100.00	9.25	355.05	7057.20	4111.80	42.44	539.54	-46.69	0.00	434427.24	609248.51	N 32 11 37.91	W 103 58 48.61
	7200.00	9.25	355.05	7155.90	4210.50	43.70	555.55	-48.07	0.00	434443.25	609247.12	N 32 11 38.07	W 103 58 48.62
	7300.00	9.25	355.05	7254.60	4309.20	44.96	571.56	-49.46	0.00	434459.27	609245.74	N 32 11 38.23	W 103 58 48.64
	7400.00	9.25	355.05	7353.30	4407.90	46.22	587.58	-50.84	0.00	434475.28	609244.35	N 32 11 38.39	W 103 58 48.65
	7500.00	9.25	355.05	7452.00	4506.60	47.48	603.59	-52.23	0.00	434491.29	609242.97	N 32 11 38.55	W 103 58 48.67
	7600.00	9.25	355.05	7550.70	4605.30	48.74	619.60	-53.61	0.00	434507.30	609241.58	N 32 11 38.70	W 103 58 48.68
	7700.00	9.25	355.05	7649.40	4704.00	50.00	635.62	-55.00	0.00	434523.32	609240.19	N 32 11 38.86	W 103 58 48.70
	7800.00	9.25	355.05	7748.10	4802.70	51.25	651.63	-56.39	0.00	434539.33	609238.81	N 32 11 39.02	W 103 58 48.72
	7900.00	9.25	355.05	7846.80	4901.40	52.51	667.64	-57.77	0.00	434555.34	609237.42	N 32 11 39.18	W 103 58 48.73
	8000.00	9.25	355.05	7945.50	5000.10	53.77	683.66	-59.16	0.00	434571.35	609236.04	N 32 11 39.34	W 103 58 48.75
	8100.00	9.25	355.05	8044.20	5098.80	55.03	699.67	-60.54	0.00	434587.36	609234.65	N 32 11 39.50	W 103 58 48.76
	8200.00	9.25	355.05	8142.90	5197.50	56.29	715.68	-61.93	0.00	434603.38	609233.27	N 32 11 39.66	W 103 58 48.78
	8300.00	9.25	355.05	8241.60	5296.20	57.55	731.70	-63.31	0.00	434619.39	609231.88	N 32 11 39.81	W 103 58 48.79
	8400.00	9.25	355.05	8340.30	5394.90	58.81	747.71	-64.70	0.00	434635.40	609230.50	N 32 11 39.97	W 103 58 48.81
Drop 2°/100' DLS to Vertical	8488.39	9.25	355.05	8427.53	5482.13	59.93	761.86	-65.92	0.00	434649.55	609229.27	N 32 11 40.11	W 103 58 48.82
	8500.00	9.02	355.05	8439.00	5493.60	60.07	763.70	-66.08	2.00	434651.39	609229.11	N 32 11 40.13	W 103 58 48.82
	8600.00	7.02	355.05	8538.02	5592.62	61.16	777.59	-67.29	2.00	434665.28	609227.91	N 32 11 40.27	W 103 58 48.84
	8700.00	5.02	355.05	8637.46	5692.06	61.98	788.04	-68.19	2.00	434675.73	609227.01	N 32 11 40.37	W 103 58 48.85
	8800.00	3.02	355.05	8737.21	5791.81	62.53	795.02	-68.79	2.00	434682.70	609226.40	N 32 11 40.44	W 103 58 48.85
	8900.00	1.02	355.05	8837.14	5891.74	62.81	798.52	-69.10	2.00	434686.21	609226.10	N 32 11 40.48	W 103 58 48.86
Hold Vertical	8950.86	0.00	355.05	8888.00	5942.60	62.84	798.97	-69.14	2.00	434686.66	609226.06	N 32 11 40.48	W 103 58 48.86
	9000.00	0.00	355.05	8937.14	5991.74	62.84	798.97	-69.14	0.00	434686.66	609226.06	N 32 11 40.48	W 103 58 48.86
	9100.00	0.00	355.05	9037.14	6091.74	62.84	798.97	-69.14	0.00	434686.66	609226.06	N 32 11 40.48	W 103 58 48.86
	9200.00	0.00	355.05	9137.14	6191.74	62.84	798.97	-69.14	0.00	434686.66	609226.06	N 32 11 40.48	W 103 58 48.86
Tie-In ST01	9300.00	0.00	355.05	9237.14	6291.74	62.84	798.97	-69.14	0.00	434686.66	609226.06	N 32 11 40.48	W 103 58 48.86
	9400.00	0.00	89.94	9337.14	6391.74	62.84	798.97	-69.14	0.00	434686.66	609226.06	N 32 11 40.48	W 103 58 48.86
	9500.00	0.00	89.94	9437.14	6491.74	62.84	798.97	-69.14	0.00	434686.66	609226.06	N 32 11 40.48	W 103 58 48.86
KOP - Build 10°/100' DLS Curve	9525.36	0.00	89.94	9462.50	6517.10	62.84	798.97	-69.14	0.00	434686.66	609226.06	N 32 11 40.48	W 103 58 48.86
	9600.00	7.46	89.94	9536.93	6591.53	67.63	798.98	-64.28	10.00	434686.66	609230.91	N 32 11 40.48	W 103 58 48.80
	9700.00	17.46	89.94	9634.45	6689.05	88.90	799.00	-42.72	10.00	434686.69	609252.47	N 32 11 40.48	W 103 58 48.55
	9800.00	27.46	89.94	9726.74	6781.34	126.55	799.04	-4.56	10.00	434686.72	609290.63	N 32 11 40.48	W 103 58 48.11
	9900.00	37.46	89.94	9811.01	6865.61	179.44	799.09	49.05	10.00	434686.78	609344.23	N 32 11 40.48	W 103 58 47.48
	10000.00	47.46	89.94	9884.69	6939.29	245.97	799.15	116.47	10.00	434686.84	609411.65	N 32 11 40.48	W 103 58 46.70
	10100.00	57.46	89.94	9945.54	7000.14	324.11	799.23	195.67	10.00	434686.92	609490.84	N 32 11 40.47	W 103 58 45.78
Wolfcamp	*10104.81*	*57.93*	*89.94*	*9948.00*	*7002.60*	*327.95*	*799.24*	*199.57*	*10.00*	*434686.92*	*609494.74*	*N 32 11 40.47*	*W 103 58 45.73*
	10200.00	67.46	89.94	9991.71	7046.31	411.48	799.32	284.23	10.00	434687.00	609579.40	N 32 11 40.47	W 103 58 44.75
	10300.00	77.46	89.94	10021.80	7076.40	505.44	799.41	379.46	10.00	434687.10	609674.62	N 32 11 40.47	W 103 58 43.64
Landing Point @ 88.95° Inc	10414.85	88.95	89.94	10035.36	7089.96	617.77	799.52	493.31	10.00	434687.21	609788.47	N 32 11 40.47	W 103 58 42.31
	10500.00	88.95	89.94	10036.92	7091.52	701.76	799.60	578.45	0.00	434687.29	609873.59	N 32 11 40.47	W 103 58 41.32
	10600.00	88.95	89.94	10038.76	7093.36	800.41	799.70	678.43	0.00	434687.39	609973.57	N 32 11 40.46	W 103 58 40.16
	10700.00	88.95	89.94	10040.59	7095.19	899.05	799.80	778.42	0.00	434687.49	610073.54	N 32 11 40.46	W 103 58 39.00
	10800.00	88.95	89.94	10042.42	7097.02	997.70	799.90	878.40	0.00	434687.58	610173.52	N 32 11 40.46	W 103 58 37.83
	10900.00	88.95	89.94	10044.26	7098.86	1096.34	799.99	978.38	0.00	434687.68	610273.50	N 32 11 40.46	W 103 58 36.67
	11000.00	88.95	89.94	10046.09	7100.69	1194.99	800.09	1078.37	0.00	434687.78	610373.47	N 32 11 40.45	W 103 58 35.51
	11100.00	88.95	89.94	10047.93	7102.53	1293.63	800.19	1178.35	0.00	434687.88	610473.45	N 32 11 40.45	W 103 58 34.34
	11200.00	88.95	89.94	10049.76	7104.36	1392.28	800.29	1278.33	0.00	434687.97	610573.42	N 32 11 40.45	W 103 58 33.18
	11300.00	88.95	89.94	10051.59	7106.19	1490.92	800.38	1378.32	0.00	434688.07	610673.40	N 32 11 40.45	W 103 58 32.01
	11400.00	88.95	89.94	10053.43	7108.03	1589.57	800.48	1478.30	0.00	434688.17	610773.37	N 32 11 40.44	W 103 58 30.85
	11500.00	88.95	89.94	10055.26	7109.86	1688.21	800.58	1578.28	0.00	434688.27	610873.35	N 32 11 40.44	W 103 58 29.69
	11600.00	88.95	89.94	10057.10	7111.70	1786.86	800.68	1678.26	0.00	434688.36	610973.32	N 32 11 40.44	W 103 58 28.52
	11700.00	88.95	89.94	10058.93	7113.53	1885.51	800.77	1778.25	0.00	434688.46	611073.30	N 32 11 40.44	W 103 58 27.36
	11800.00	88.95	89.94	10060.76	7115.36	1984.15	800.87	1878.23	0.00	434688.56	611173.27	N 32 11 40.43	W 103 58 26.20
	11900.00	88.95	89.94	10062.60	7117.20	2082.80	800.97	1978.21	0.00	434688.66	611273.25	N 32 11 40.43	W 103 58 25.03
	12000.00	88.95	89.94	10064.43	7119.03	2181.44	801.07	2078.20	0.00	434688.75	611373.22	N 32 11 40.43	W 103 58 23.87
	12100.00	88.95	89.94	10066.27	7120.87	2280.09	801.16	2178.18	0.00	434688.85	611473.20	N 32 11 40.43	W 103 58 22.71
	12200.00	88.95	89.94	10068.10	7122.70	2378.73	801.26	2278.16	0.00	434688.95	611573.17	N 32 11 40.43	W 103 58 21.54
	12300.00	88.95	89.94	10069.93	7124.53	2477.38	801.36	2378.15	0.00	434689.05	611673.15	N 32 11 40.42	W 103 58 20.38
	12400.00	88.95	89.94	10071.77	7126.37	2576.02	801.46	2478.13	0.00	434689.14	611773.12	N 32 11 40.42	W 103 58 19.22
	12500.00	88.95	89.94	10073.60	7128.20	2674.67	801.55	2578.11	0.00	434689.24	611873.10	N 32 11 40.42	W 103 58 18.05
	12600.00	88.95	89.94	10075.44	7130.04	2773.31	801.65	2678.10	0.00	434689.34	611973.07	N 32 11 40.42	W 103 58 16.89
	12700.00	88.95	89.94	10077.27	7131.87	2871.96	801.75	2778.08	0.00	434689.44	612073.05	N 32 11 40.41	W 103 58 15.73
	12800.00	88.95	89.94	10079.10	7133.70	2970.60	801.85	2878.06	0.00	434689.53	612173.02	N 32 11 40.41	W 103 58 14.56
	12900.00	88.95	89.94	10080.94	7135.54	3069.25	801.94	2978.05	0.00	434689.63	612273.00	N 32 11 40.41	W 103 58 13.40
	13000.00	88.95	89.94	10082.77	7137.37	3167.89	802.04	3078.03	0.00	434689.73	612372.97	N 32 11 40.41	W 103 58 12.24
	13100.00	88.95	89.94	10084.61	7139.21	3266.54	802.14	3178.01	0.00	434689.82	612472.95	N 32 11 40.40	W 103 58 11.07
	13200.00	88.95	89.94	10086.44	7141.04	3365.18	802.24	3277.99	0.00	434689.92	612572.92	N 32 11 40.40	W 103 58 9.91
	13300.00	88.95	89.94	10088.27	7142.87	3463.83	802.33	3377.98	0.00	434690.02	612672.90	N 32 11 40.40	W 103 58 8.75
	13400.00	88.95	89.94	10090.11	7144.71	3562.47	802.43	3477.96	0.00	434690.12	612772.88	N 32 11 40.40	W 103 58 7.58
	13500.00	88.95	89.94	10091.94	7146.54	3661.12	802.53	3577.94	0.00	434690.21	612872.85	N 32 11 40.39	W 103 58 6.42
	13600.00	88.95	89.94	10093.77	7148.37	3759.76	802.63	3677.93	0.00	434690.31	612972.83	N 32 11 40.39	W 103 58 5.26
	13700.00	88.95	89.94	10095.61	7150.21	3858.41	802.72	3777.91	0.00	434690.41	613072.80	N 32 11 40.39	W 103 58 4.09
	13800.00	88.95	89.94	10097.44	7152.04	3957.05	802.82	3877.89	0.00	434690.51	613172.78	N 32 11 40.39	W 103 58 2.93
	13900.00	88.95	89.94	10099.28	7153.88	4055.70	802.92	3977.88	0.00	434690.60	613272.75	N 32 11 40.38	W 103 58 1.76
	14000.00	88.95	89.94	10101.11	7155.71	4154.34	803.02	4077.86	0.00	434690.70	613372.73	N 32 11 40.38	W 103 58 0.60
	14100.00	88.95	89.94	10102.94	7157.54	4252.99	803.11	4177.84	0.00	434690.80	613472.70	N 32 11 40.38	W 103 57 59.44
	14200.00	88.95	89.94	10104.78	7159.38	4351.63	803.21	4277.83	0.00	434690.90	613572.68	N 32 11 40.38	W 103 57 58.27
	14300.00	88.95	89.94	10106.61	7161.21	4450.28	803.31	4377.81	0.00	434690.99	613672.65	N 32 11 40.38	W 103 57 57.11
	14400.00	88.95	89.94	10108.45	7163.05	4548.92	803.41	4477.79	0.00	434691.09	613772.63	N 32 11 40.37	W 103 57 55.95
	14500.00	88.95	89.94	10110.28	7164.88	4647.57	803.50	4577.78	0.00	434691.19	613872.60	N 32 11 40.37	W 103 57 54.78
	14600.00	88.95	89.94	10112.11	7166.71	4746.21	803.60	4677.76	0.00	434691.29	613972.58	N 32 11 40.37	W 103 57 53.62
	14700.00	88.95	89.94	10113.95	7168.55	4844.86	803.70	4777.74	0.00	434691.38	614072.55	N 32 11 40.37	W 103 57 52.46
Bottom Perf	14757.37	88.95	89.94	10115.00	7169.60	4901.45	803.75	4835.10	0.00	434691.44	614129.91	N 32 11 40.36	W 103 57 51.79

Survey Type: Non-Def Plan

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma

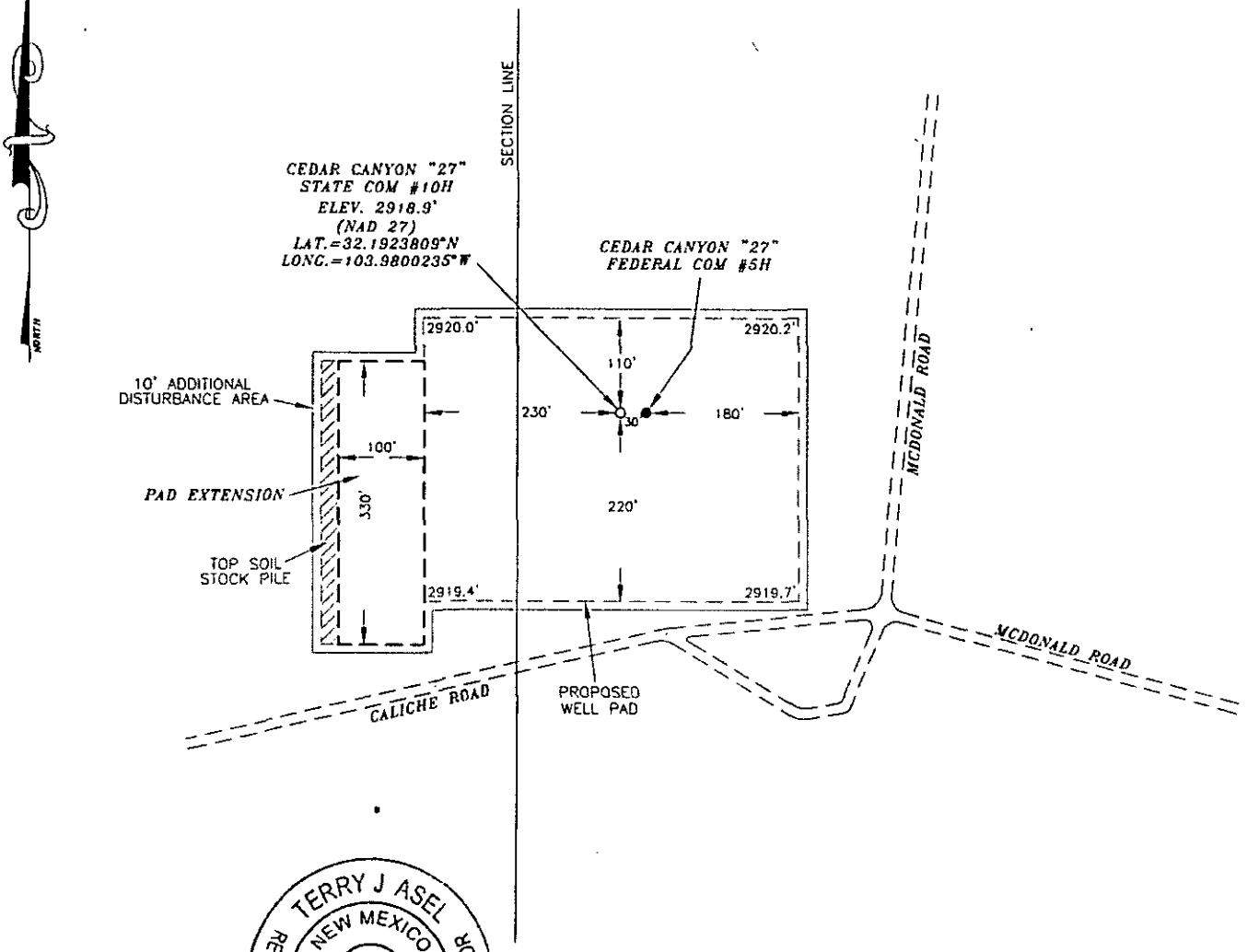
Survey Program:

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Expected Max Inclination (deg)	Survey Tool Type	Borehole / Survey
	1	0.000	26.500	1/100.000	30.000	30.000		SLB_MWD-STD_HDGM-Depth Only	Pilot Hole / Oxy Cedar Canyon 27 State Com 10H Pilot Rev4 MMC 14Mar16

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	TVDSS (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
		1	26.500	9300.000	1/100.000	30.000	30.000		SLB_MWD-STD_HDGM		Pilot Hole / Oxy Cedar Canyon 27 State Com 10H Pilot Rev4 MMC		
		1	9300.000	14757.371	1/100.000	30.000	30.000		SLB_MWD-STD_HDGM		ST01 / Oxy Cedar Canyon 27 State Com 10H ST01 Rev4 MMC		

OXY USA INC.
CEDAR CANYON "27" STATE COM #10H
SITE PLAN

FAA PERMIT: NO



TERRY J ASEL
NEW MEXICO
15079
REGISTERED PROFESSIONAL LAND SURVEYOR

LEGEND

- – – – – DENOTES PROPOSED WELL PAD
- ——— DENOTES PROPOSED ROAD
- ▨ DENOTES STOCK PILE AREA

200' 0 200' 400' FEET

SCALE: 1"=200'

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 2/19/2016

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

Asel Surveying

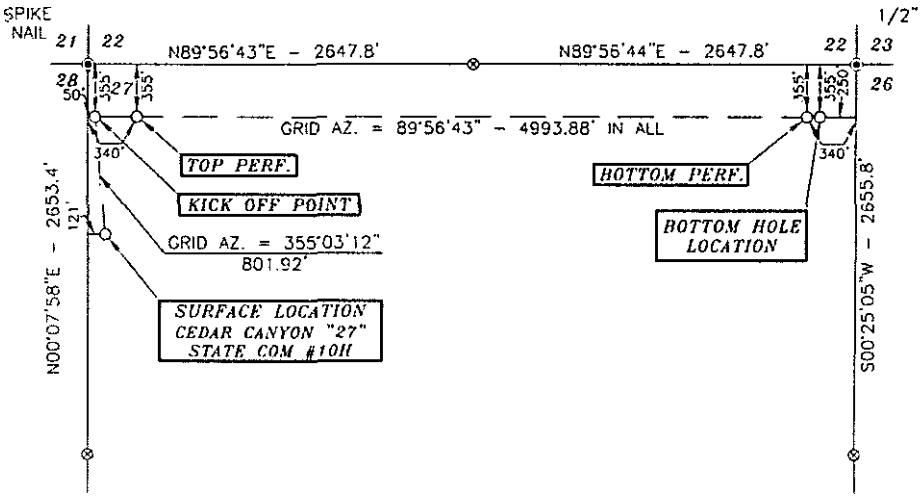
P.O. BOX 393 – 310 W. TAYLOR
HOBBS, NEW MEXICO – 575-393-9146

OXY USA INC.

CEDAR CANYON "27" STATE COM #10H
LOCATED AT 1154' FNL & 121' FWL IN
SECTION 27, TOWNSHIP 24 SOUTH, RANGE 29
EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO

Survey Date: 12/10/15	Sheet 1 of 1 Sheets	
W.O. Number: 151210WL-b (Rev. D)	Drawn By: KA	Rev: D
Date: 02/18/16	151210WL-b	Scale: 1"=200'

SECTION 27, TOWNSHIP 24 SOUTH, RANGE 29 EAST, N.M.P.M.,
EDDY COUNTY NEW MEXICO



DRIVING DIRECTIONS:
FROM THE INTERSECTION OF U.S. HWY. #285 AND BLACK RIVER VILLAGE ROAD IN MALAGA, GO EAST ON COUNTY ROAD #720 FOR 1.3 MILES, TURN RIGHT ON COUNTY ROAD #746 (MCDONALD ROAD) AND GO SOUTH FOR 0.8 MILES, CONTINUE SOUTHEAST/EAST FOR 4.8 MILES, CURVE TO THE LEFT FOR 0.4 MILES, TURN LEFT AND GO WEST FOR 0.1 MILES TO LOCATION.

TERRY J ASEL
NEW MEXICO
15079
REGISTERED PROFESSIONAL LAND SURVEYOR

LEGEND
- ⊕ - DENOTES FOUND MONUMENT AS NOTED
- ⊗ - DENOTES CALCULATED CORNER

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 2/9/2016
Terry J. Asel, N.M. R.P.L.S. No. 15079

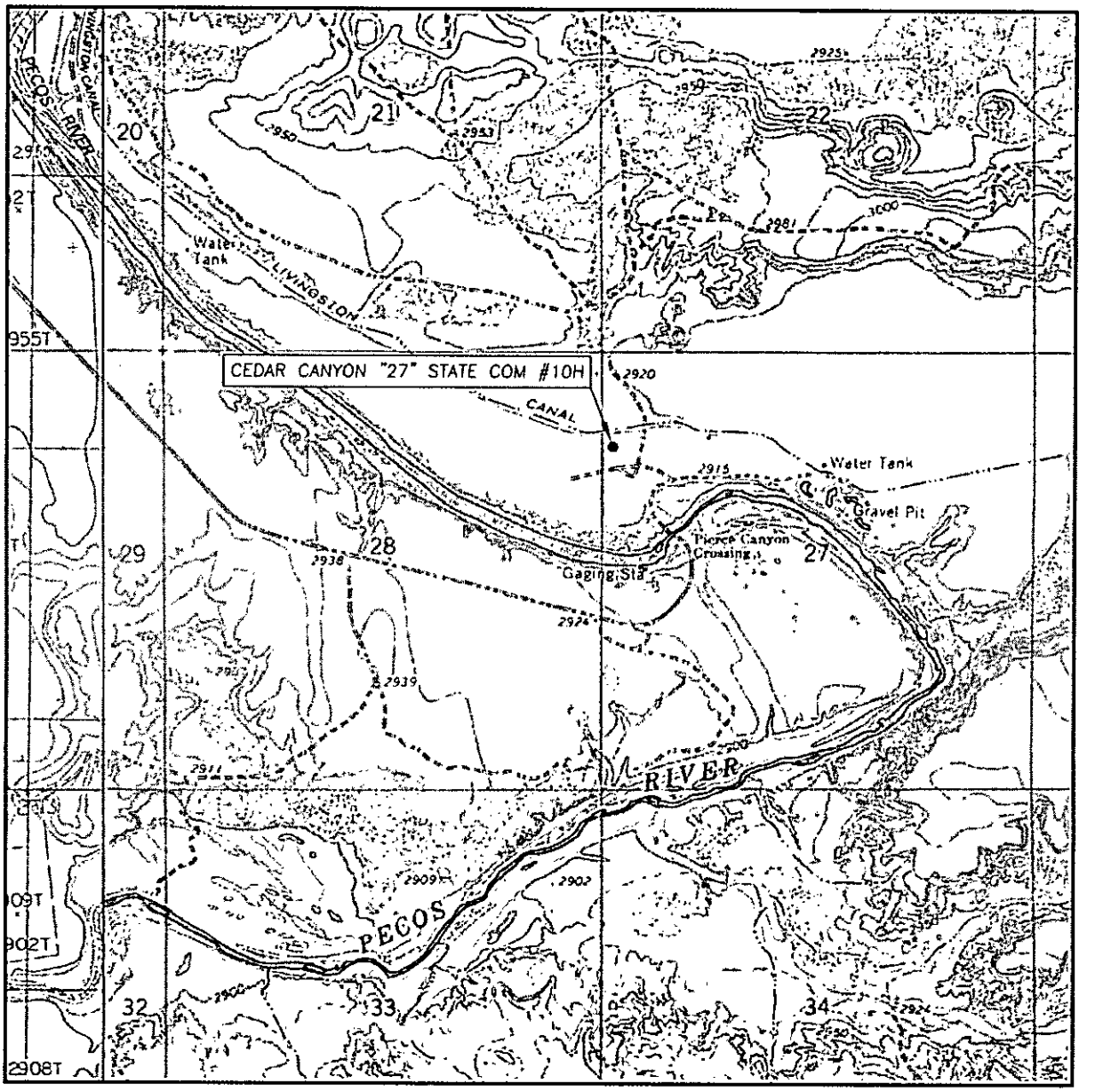
Asel Surveying
P.O. BOX 393 - 310 W. TAYLOR
HOBBS, NEW MEXICO - 575-393-9146

OXY USA INC.

CEDAR CANYON "27" STATE COM #10H
LOCATED AT 1154' FNL & 121' FWL IN
SECTION 27, TOWNSHIP 24 SOUTH, RANGE 29
EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO

Survey Date: 12/10/15	Sheet 1 of 1 Sheets	
W.O. Number: 151210WL-b (Rev. C)	Drawn By: KA	Rev: C
Date: 02/08/16	151210WL-b	Scale:1"=1000'

LOCATION VERIFICATION MAP



SCALE: 1" = 2000'

CONTOUR INTERVAL: 10'

SEC. 27 TWP. 24-S RGE. 29-E

SURVEY N.M.P.M.

COUNTY EDDY

DESCRIPTION 1154' FNL & 121' FWL

ELEVATION 2918.9'

OPERATOR OXY USA INC.

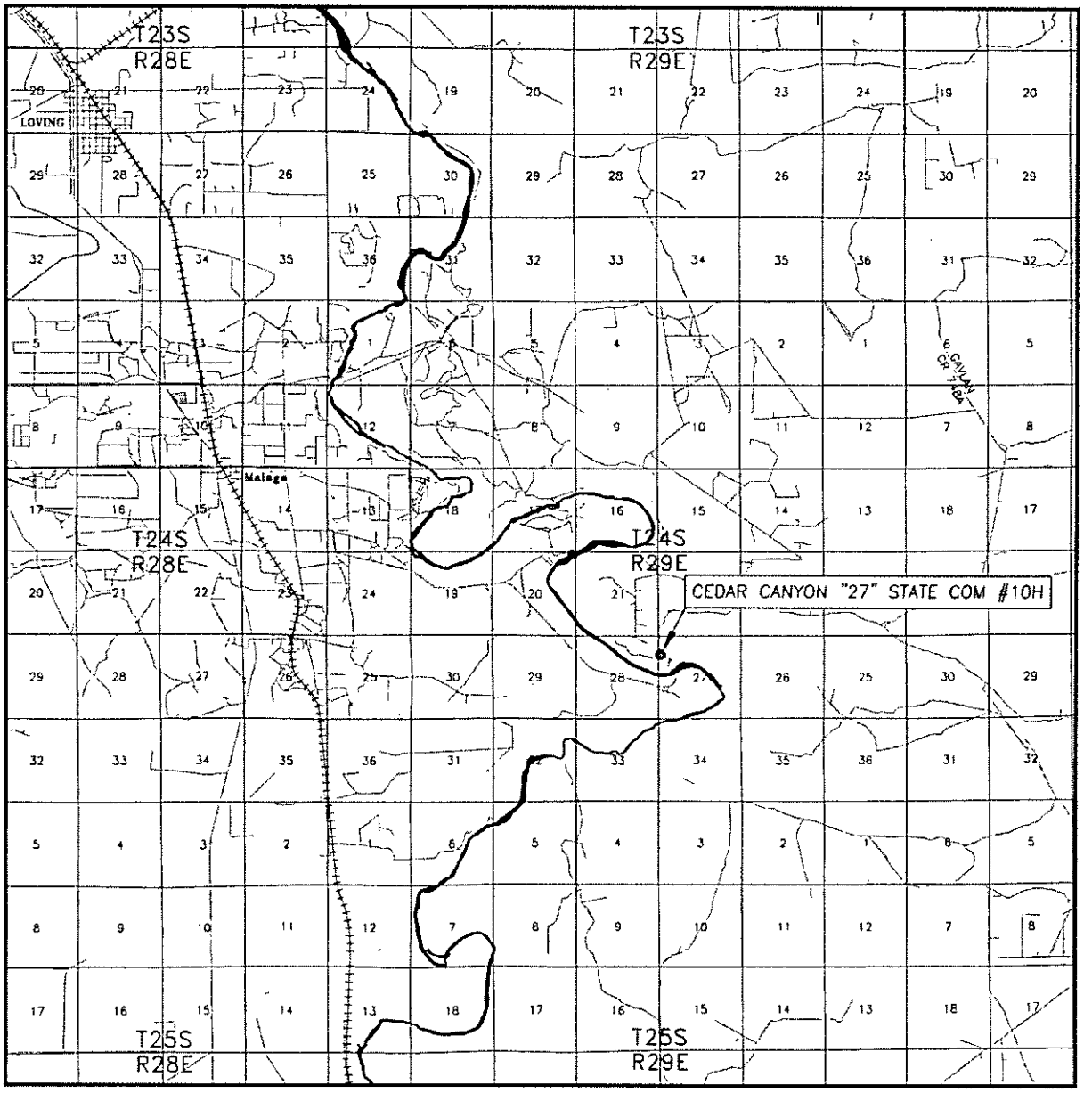
LEASE CEDAR CANYON "27" STATE COM #10H

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

Asel Surveying

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

VICINITY MAP

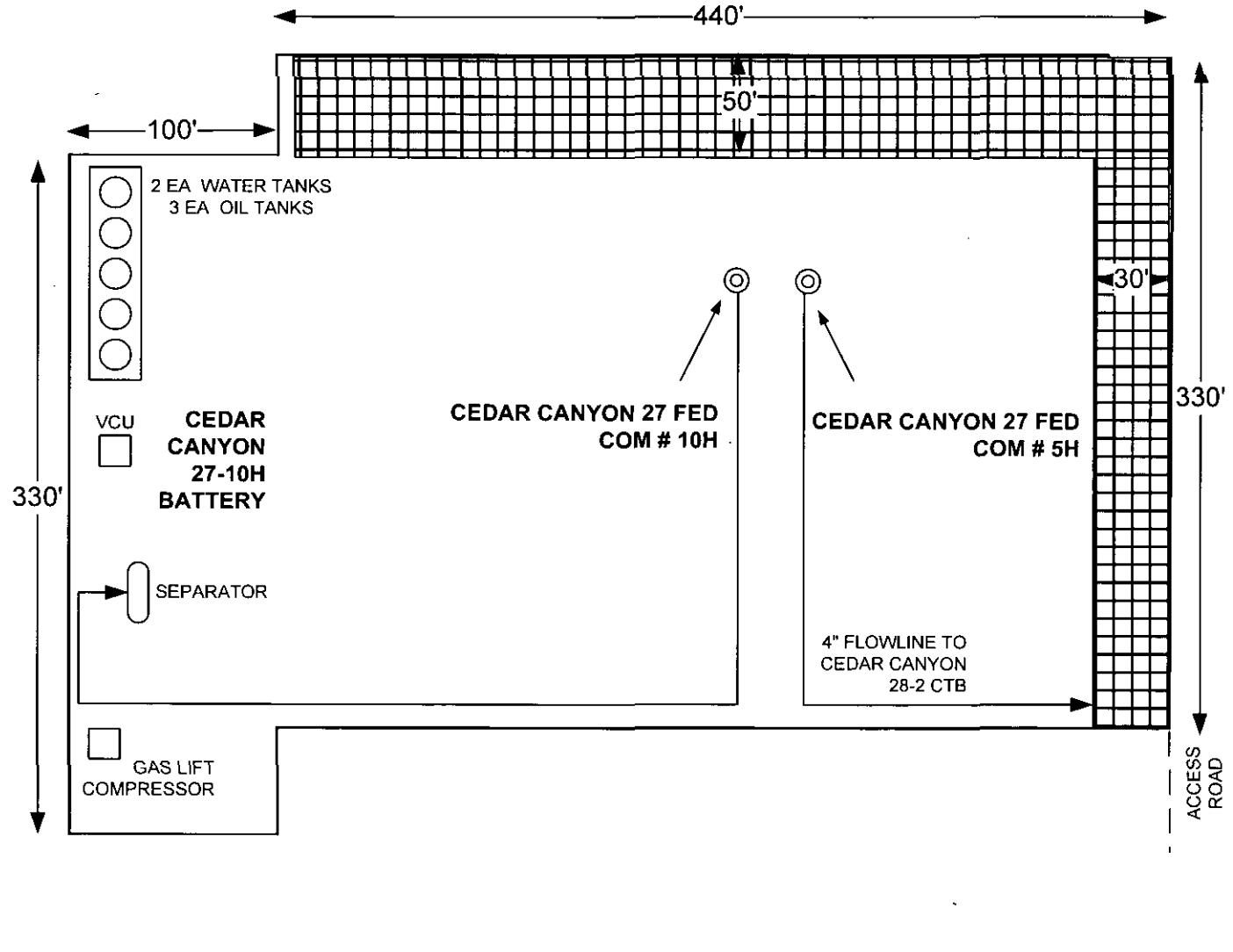


SCALE: 1" = 2 MILES

SEC. 27 TWP. 24-S RGE. 29-E
SURVEY N.M.P.M.
COUNTY EDDY
DESCRIPTION 1154' FNL & 121' FWL
ELEVATION 2918.9'
OPERATOR OXY USA INC.
LEASE CEDAR CANYON "27" STATE COM #10H

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

DIRECTIONS FROM THE INTERSECTION OF U.S. HWY. #285 AND BLACK RIVER VILLAGE ROAD IN MALAGA, GO EAST ON COUNTY ROAD #720 FOR 1.3 MILES, TURN RIGHT ON COUNTY ROAD #746 (MCDONALD ROAD) AND GO SOUTH FOR 0.8 MILES, CONTINUE SOUTHEAST/EAST FOR 4.8 MILES, CURVE TO THE LEFT FOR 0.4 MILES, TURN LEFT AND GO WEST FOR 0.1 MILES TO LOCATION.



V-Door East

REVISION BLOCK						ENGINEERING RECORD	
NO.	DATE	DESCRIPTION	BY	CHK	APP	BY	DATE
						KAO	2/9/16

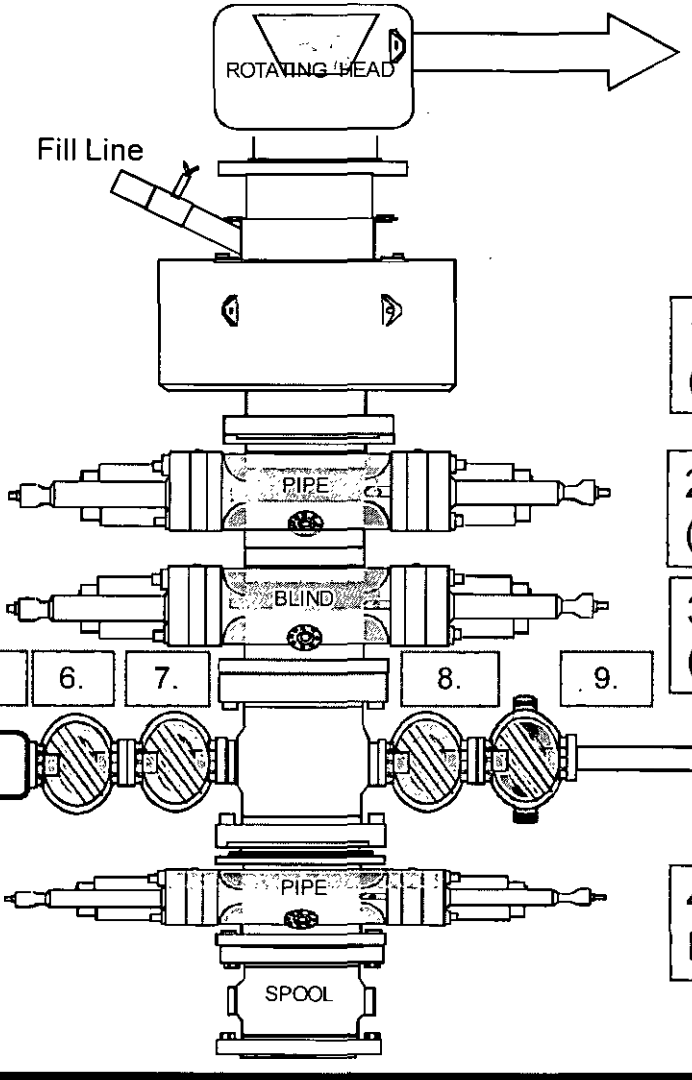
FACILITY LAYOUT DIAGRAM
CEDAR CANYON 27 FED COM # 5H & 10H
EDDY COUNTY, NEW MEXICO

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



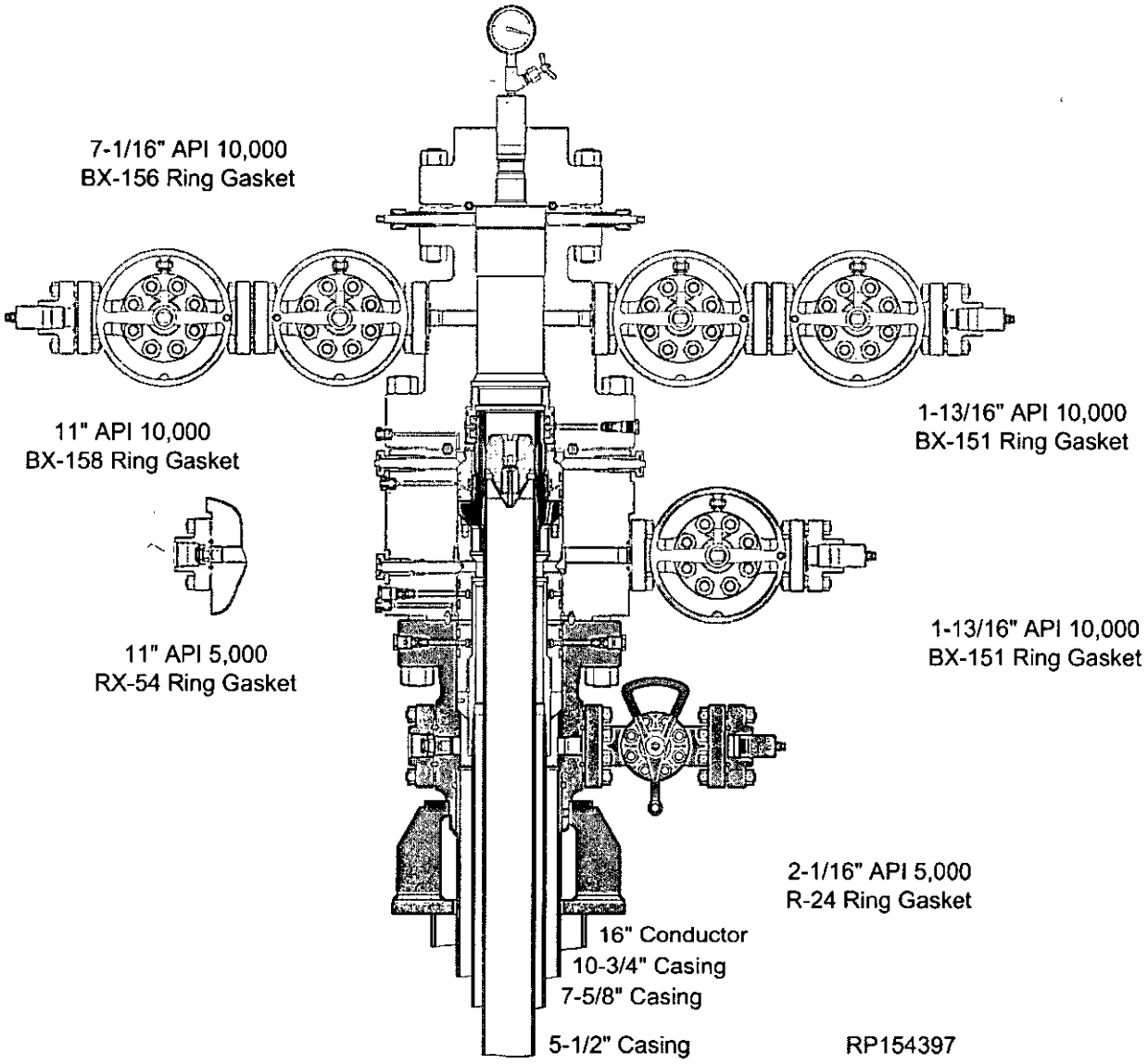
To Kill Line

To Co-Flex and Choke Manifold

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)

RUNNING PROCEDURE

Oxy



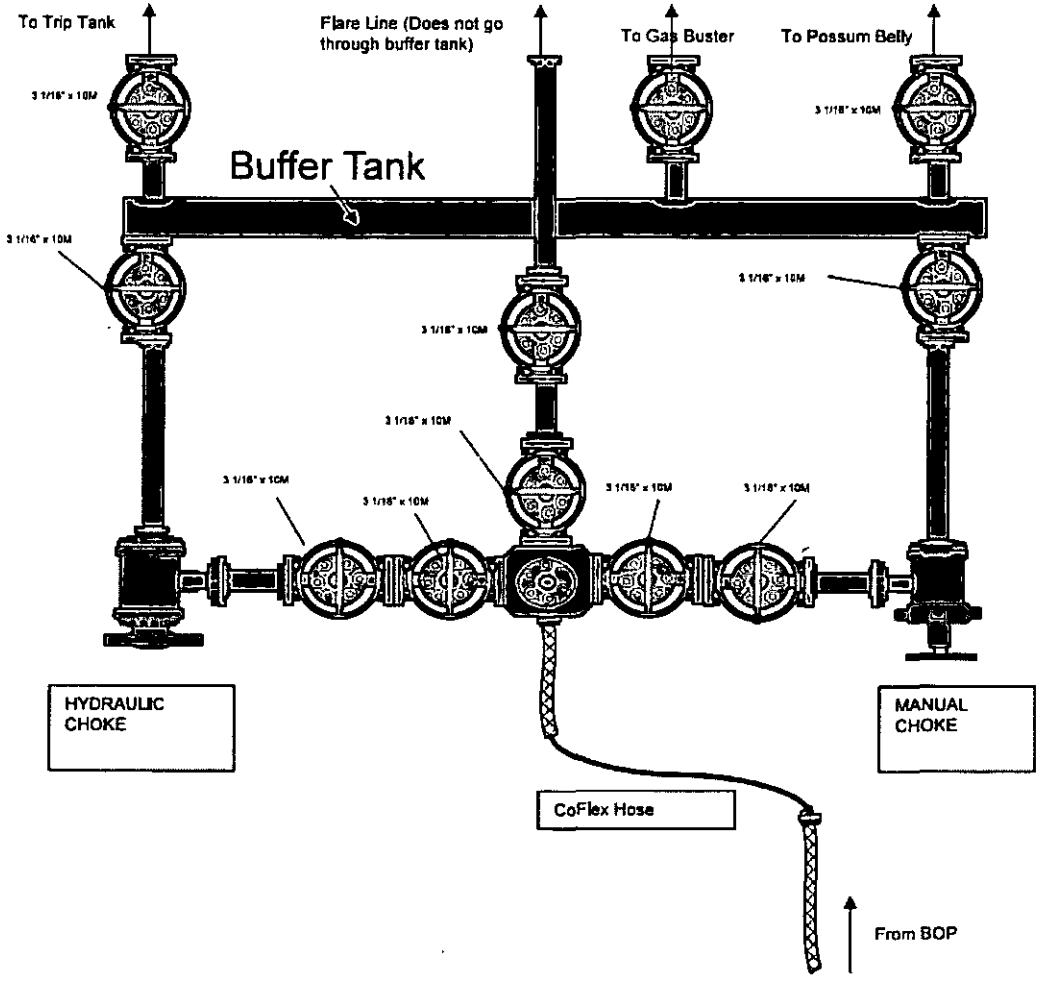
⚠ CAUTION Must verify Running Procedure Revision level in SAP prior to usage.

Surface Systems Publication

CAMERON	**11" 10M MBS System** **16" x 10-3/4" x 7-5/8" x 5-1/2" Casing Program** **With Spacer Spool Contingency**	**RP-003263** **Rev 05**

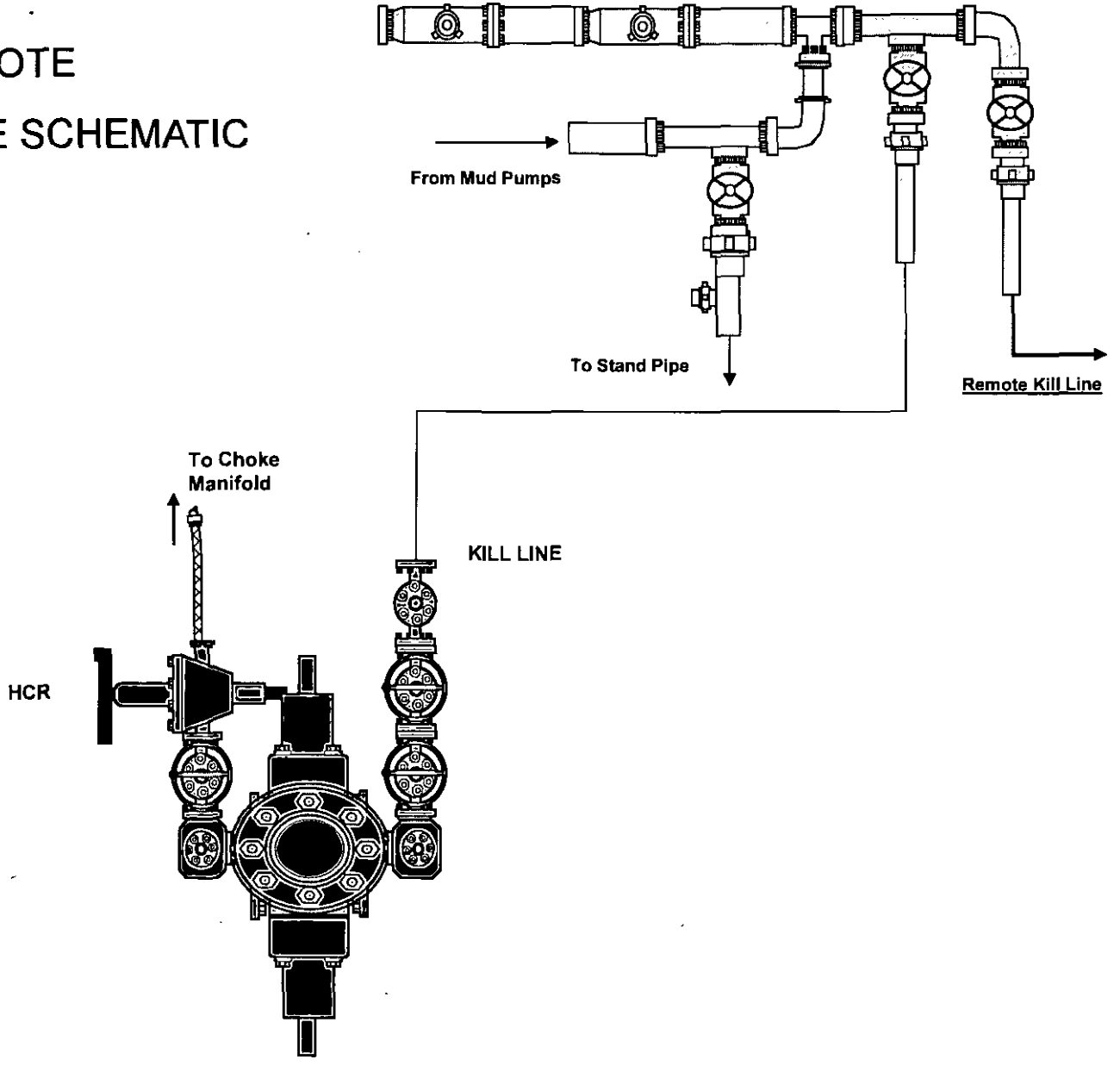
10M Choke Panel

FLEX3 STD CHOKE MANIFOLD (COMPREHENSIVE)



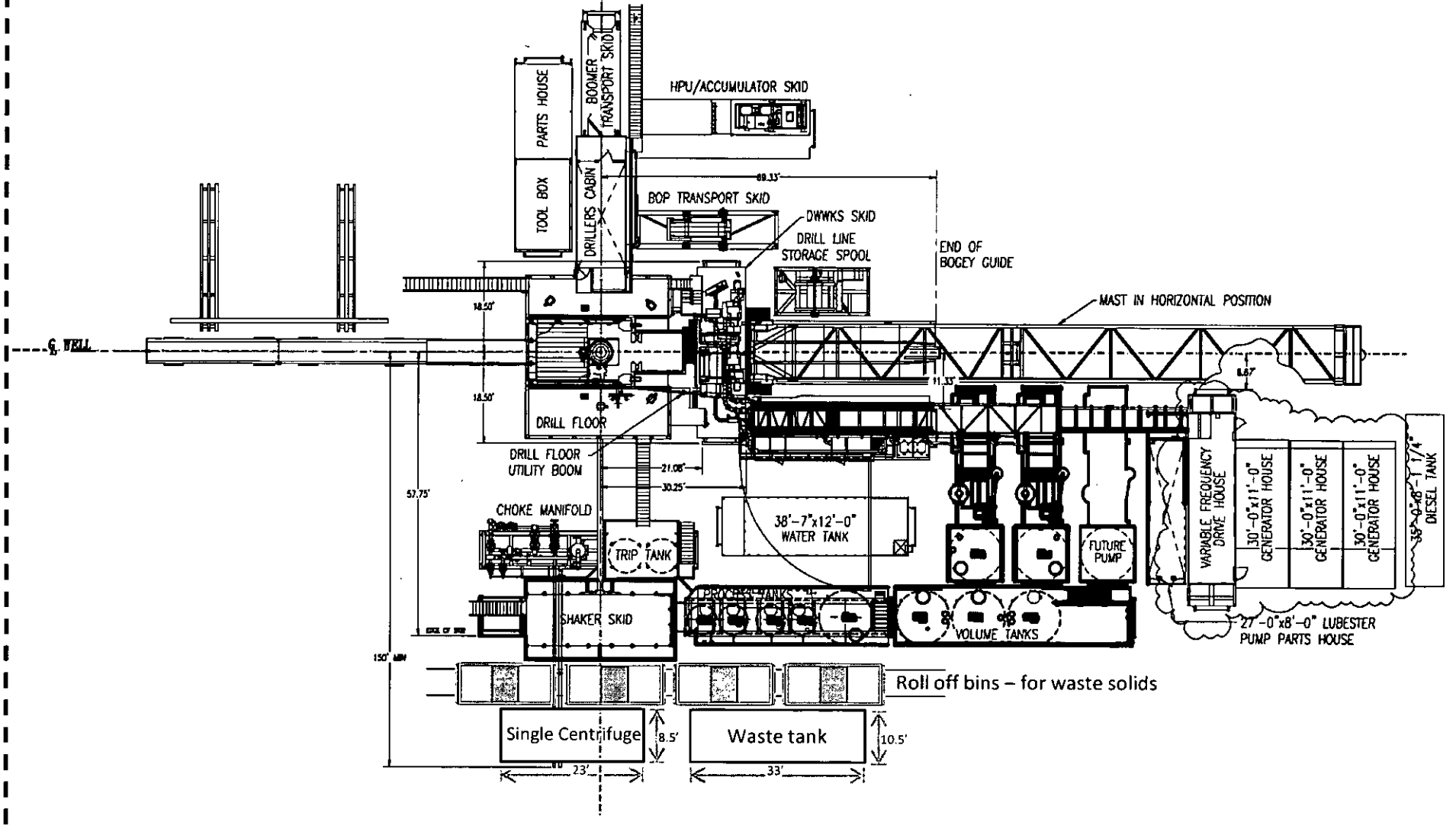
10M REMOTE

KILL LINE SCHEMATIC

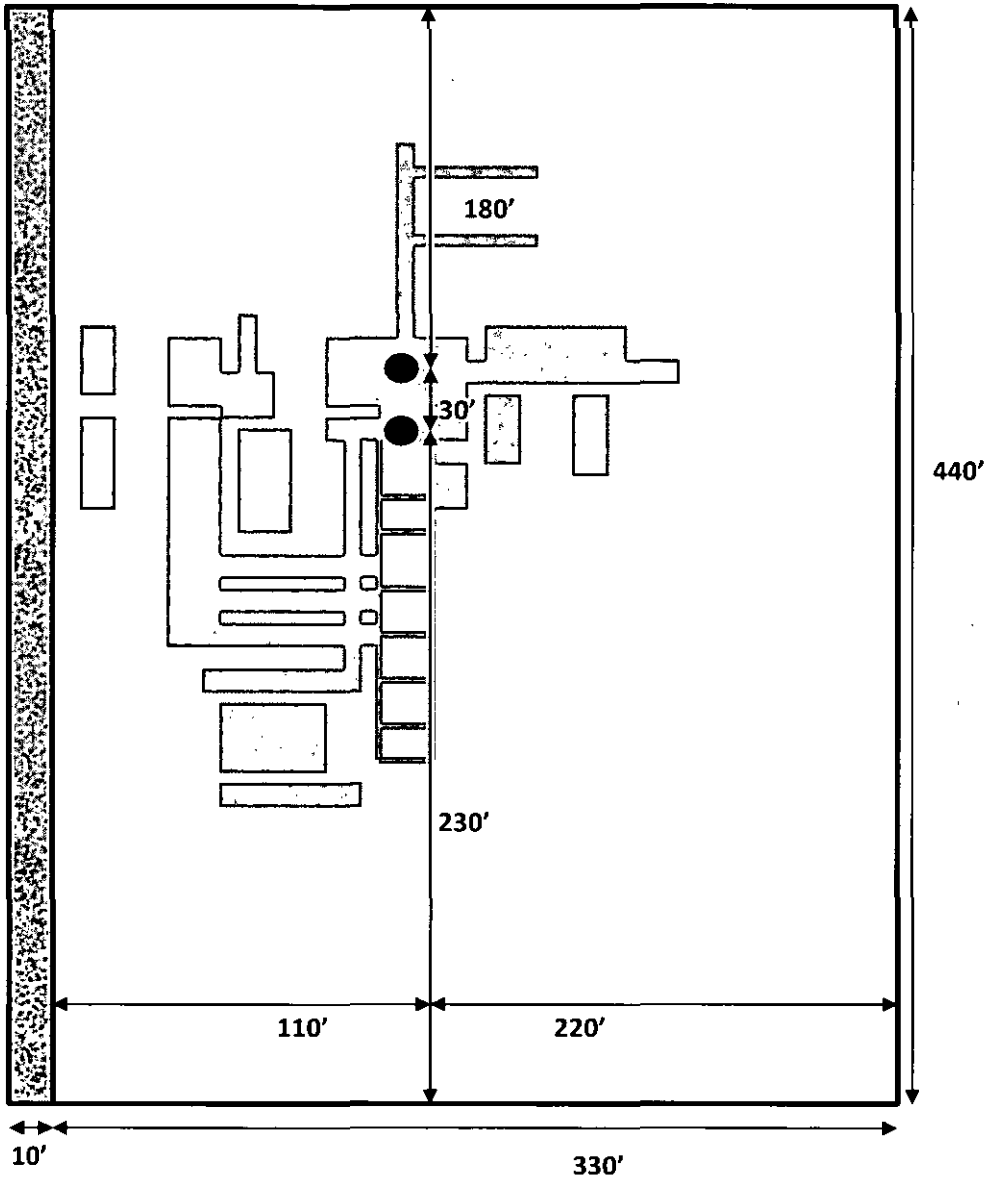


Oxy Single Centrifuge Closed Loop System – New Mexico Flex III

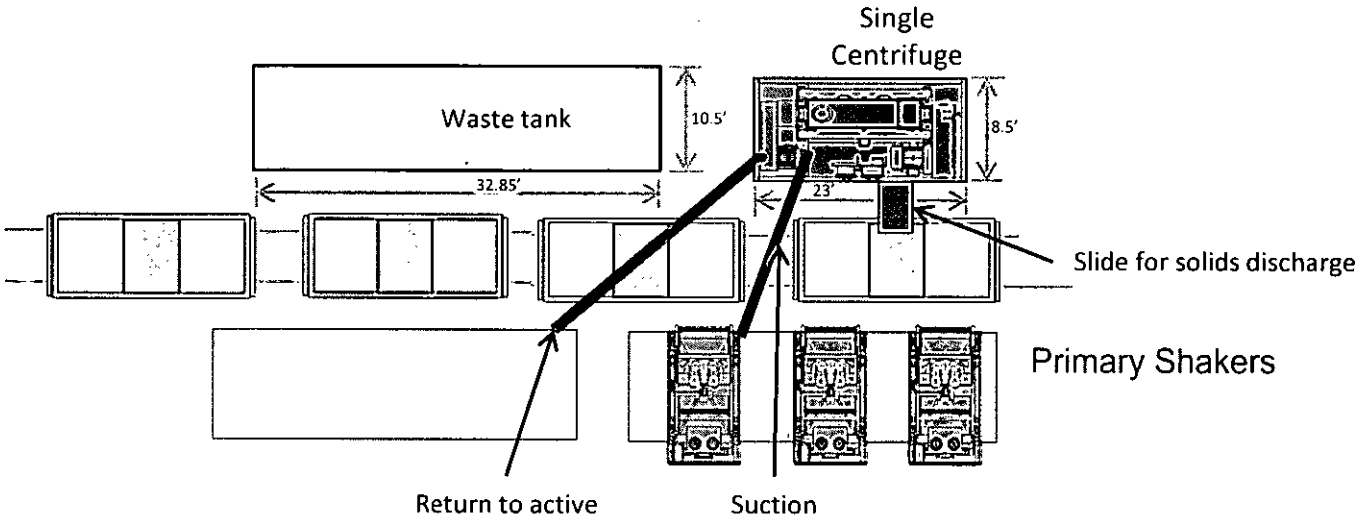
May 28, 2013

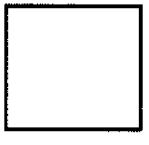


Pad Site Overall Rig Layout



Oxy

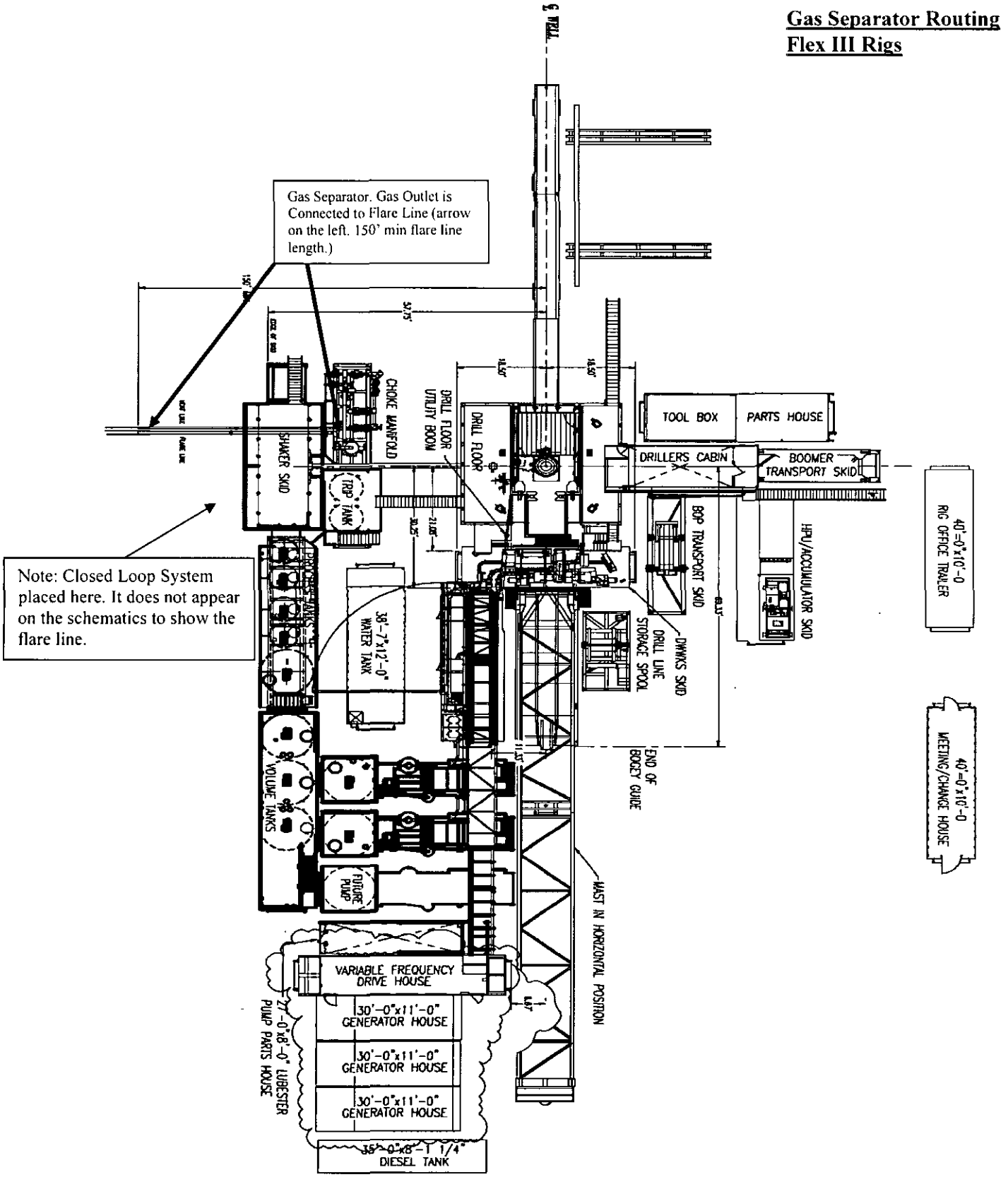




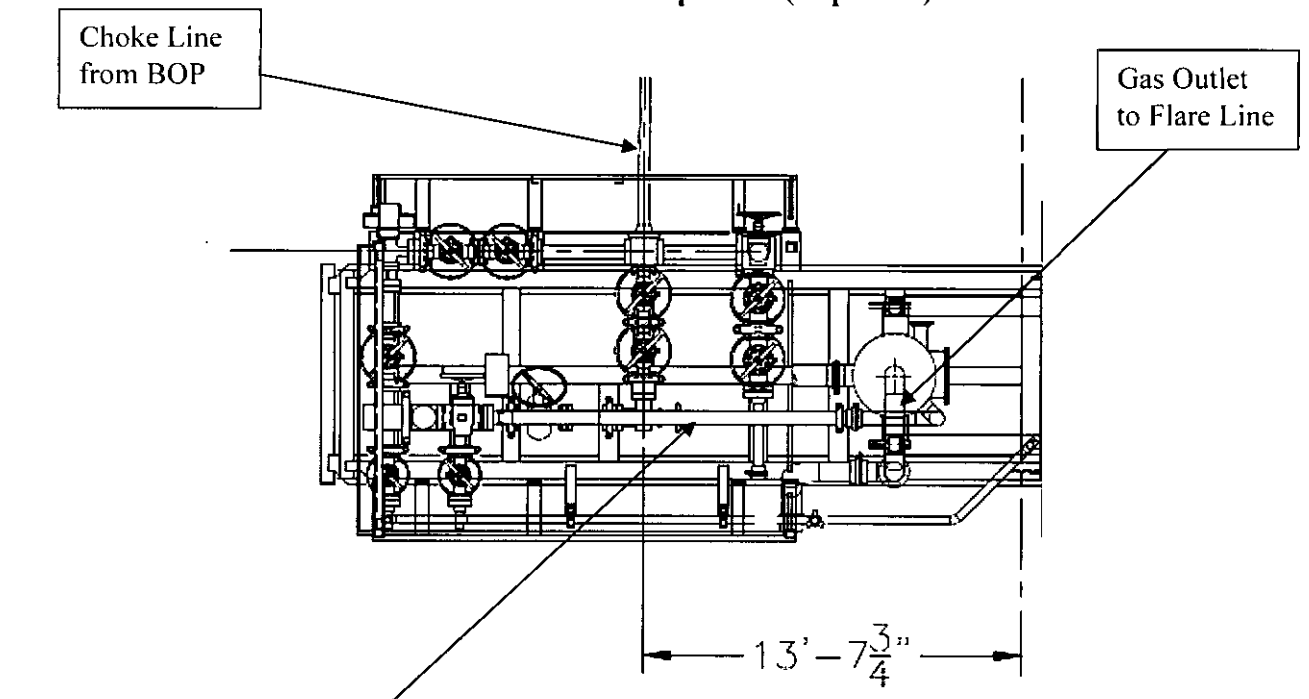
Oxy Single Centrifuge Closed Loop System – New Mexico Flex III

May 28, 2013

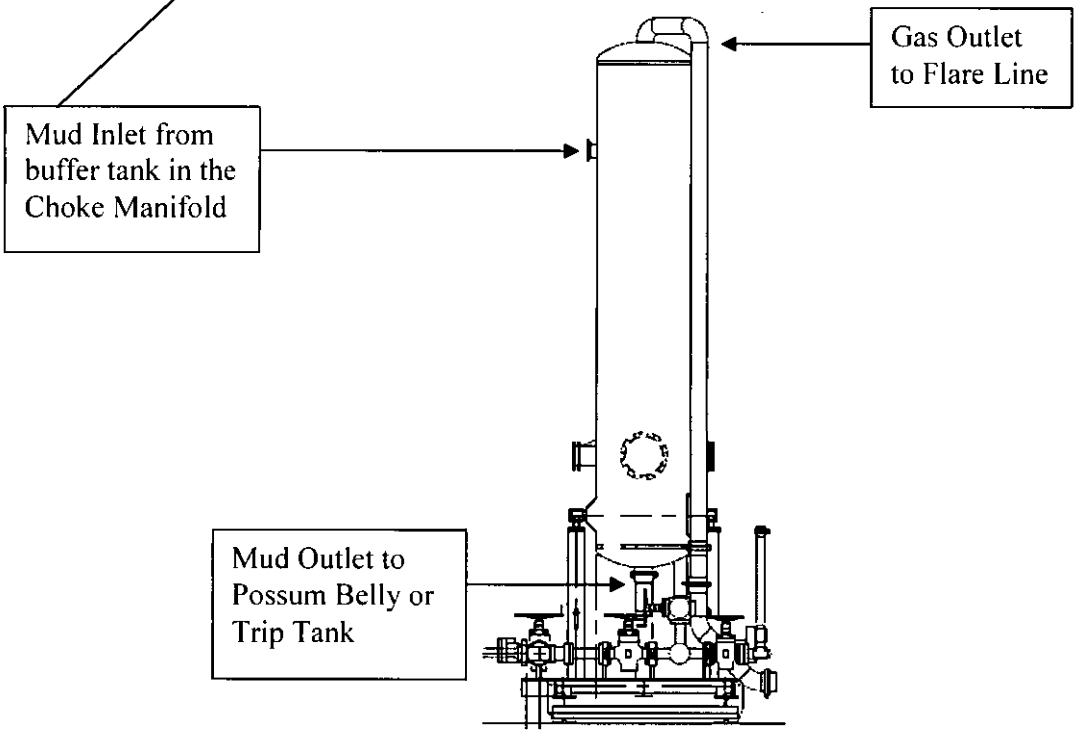
Gas Separator Routing
Flex III Rigs



Choke Manifold – Gas Separator (Top View)



Choke Manifold – Gas Separator (Side View)



Permian Drilling
Hydrogen Sulfide Drilling Operations Plan
Cedar Canyon 27 State Com 10H

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.

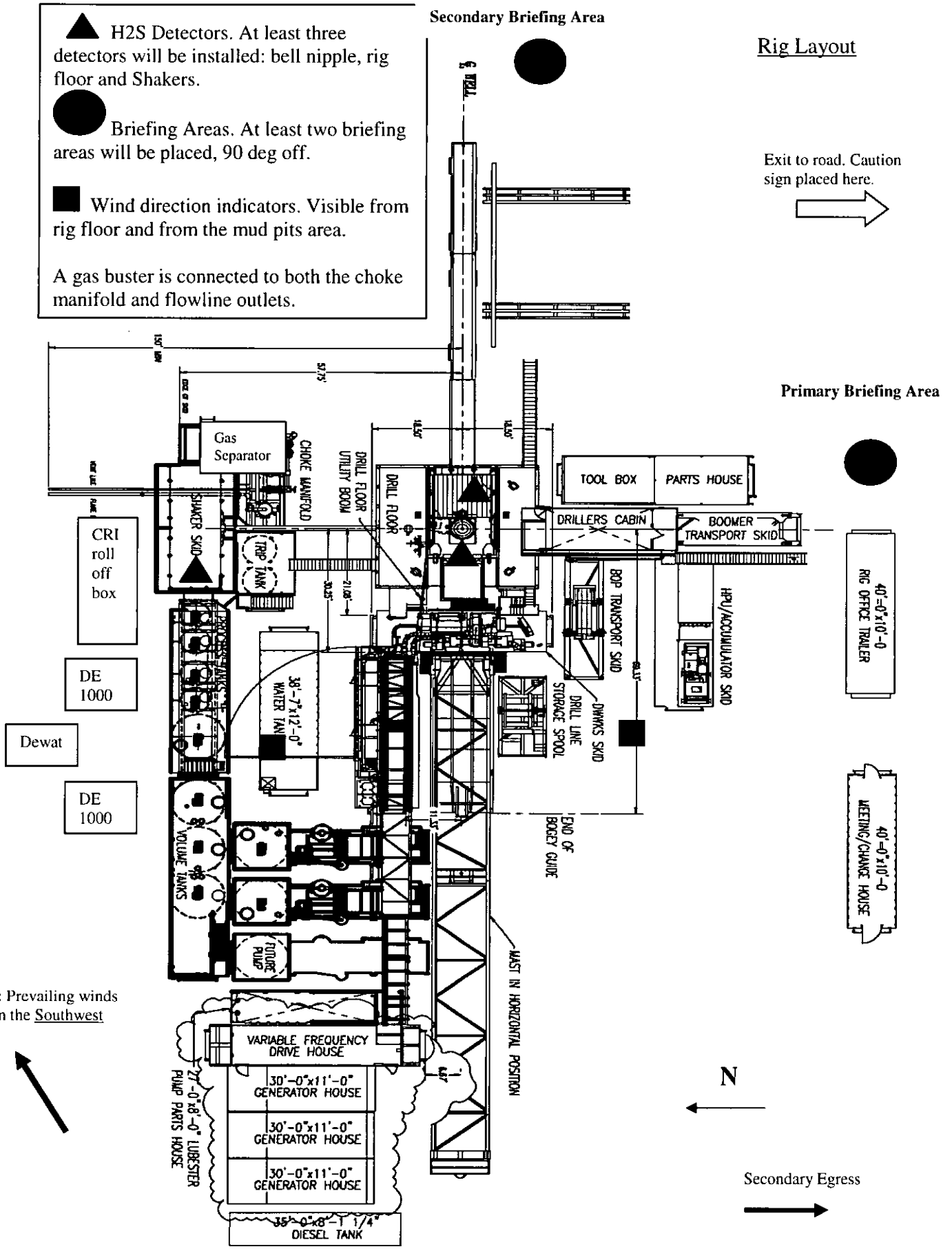
▲ H2S Detectors. At least three detectors will be installed: bell nipple, rig floor and Shakers.

● 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.

Rig Layout



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. 2.	Report to nearest upwind designated safe briefing / muster area. 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

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

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

*at 15.00 psia and 60'f.

Use of self-contained breathing equipment (SCBA)

1. Written procedures shall be prepared covering safe use of SCBA's in dangerous atmosphere, which might be encountered in normal operations or in emergencies. Personnel shall be familiar with these procedures and the available SCBA.

2 SCBA's shall be inspected frequently at random to insure that they are properly used, cleaned, and maintained.

3. Anyone who may use the SCBA's shall be trained in how to insure proper face-piece to face seal. They shall wear SCBA's in normal air and then wear them in a test atmosphere. (note: such items as facial hair {beard or sideburns} and eyeglasses will not allow proper seal.) Anyone that may be reasonably expected to wear SCBA's should have these items removed before entering a toxic atmosphere. A special mask must be obtained for anyone who must wear eyeglasses or contact lenses.

4. Maintenance and care of SCBA's:

   a. A program for maintenance and care of SCBA's shall include the following:
      1. Inspection for defects, including leak checks.
      2. Cleaning and disinfecting.
      3. Repair.
      4. Storage.

   b. Inspection, self-contained breathing apparatus for emergency use shall be inspected monthly.
      1. Fully charged cylinders.
      2. Regulator and warning device operation.
      3. Condition of face piece and connections.
      4. Rubber parts shall be maintained to keep them pliable and prevent deterioration.

   c. Routinely used SCBA's shall be collected, cleaned and disinfected as frequently as necessary to insure proper protection is provided.

5. Persons assigned tasks that requires use of self-contained breathing equipment shall be certified physically fit (medically cleared) for breathing equipment usage at least annually.

6. SCBA's should be worn when:

   A. Any employee works near the top or on top of any tank unless test reveals less than 10 ppm of H2S.

B. When breaking out any line where H2S can reasonably be expected.

C. When sampling air in areas to determine if toxic concentrations of H2S exists.

D. When working in areas where over 10 ppm H2S has been detected.

E. At any time there is a doubt as to the H2S level in the area to be entered.

Rescue
First aid for H2S poisoning

Do not panic!

Remain calm – think!

1. Don SCBA breathing equipment.

2. Remove victim(s) utilizing buddy system to fresh air as quickly as possible. (go up-wind from source or at right angle to the wind. Not down wind.)

3. Briefly apply chest pressure – arm lift method of artificial respiration to clean the victim's lungs and to avoid inhaling any toxic gas directly from the victim's lungs.

4. Provide for prompt transportation to the hospital, and continue giving artificial respiration if needed.

5. Hospital(s) or medical facilities need to be informed, before-hand, of the possibility of H2S gas poisoning – no matter how remote the possibility is.

6. Notify emergency room personnel that the victim(s) has been exposed to H2S gas.

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

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