

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 323538

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

1. Operator Name and Address COLGATE OPERATING, LLC 300 North Marienfeld Street Midland, TX 79701		2. OGRID Number 371449
		3. API Number 30-015-49923
4. Property Code 327171	5. Property Name Big Burro 27 State Corn	6. Well No. 123H

7. Surface Location

UL - Lot I	Section 27	Township 19S	Range 28E	Lot Idn	Feet From 1390	N/S Line S	Feet From 160	E/W Line E	County Eddy
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8. Proposed Bottom Hole Location

UL - Lot L	Section 28	Township 19S	Range 28E	Lot Idn L	Feet From 1650	N/S Line S	Feet From 10	E/W Line W	County Eddy
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9. Pool Information

WINCHESTER; BONE SPRING, WEST	97569
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Additional Well Information

11. Work Type New Well	12. Well Type OIL	13. Cable/Rotary	14. Lease Type State	15. Ground Level Elevation 3337
16. Multiple N	17. Proposed Depth 17658	18. Formation 2nd Bone Spring Sand	19. Contractor	20. Spud Date 10/1/2022
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	17.5	13.375	54.5	200	131	0
Int1	12.25	9.625	36	3050	854	0
Prod	8.75	5.5	20	17658	3781	2050

Casing/Cement Program: Additional Comments

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22. Proposed Blowout Prevention Program

Type	Working Pressure	Test Pressure	Manufacturer
Annular	1000	5000	Shaffer

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

Signature:

Printed Name: Electronically filed by Mikah Thomas

Title: Operations Tech

Email Address: mthomas@colgateenergy.com

Date: 8/29/2022

Phone: 432-695-4272

OIL CONSERVATION DIVISION

Approved By: Katherine Pickford

Title: Geoscientist

Approved Date: 8/31/2022

Expiration Date: 8/31/2024

Conditions of Approval Attached

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

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

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

☒ AMENDED REPORT
new SHL below

WELL LOCATION AND ACREAGE DEDICATION PLAT

1 API Number 30-015-46806 49923	2 Pool Code 97569	3 Pool Name WINCHESTER; BONE SPRING, WEST
4 Property Code 327171	5 Property Name BIG BURRO 27 STATE COM	
6 Well Number 123H	7 OGRID No. 371449	
8 Operator Name COLGATE OPERATING, LLC		9 Elevation 3336.9'

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
I	27	19-S	28-E		1390'	SOUTH	160'	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
L	28	19-S	28-E		1650'	SOUTH	10'	WEST	EDDY

12 Dedicated Acres 320.00	13 Joint or Infill	14 Consolidation Code C	15 Order No.
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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.

16		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. <i>Brian Wood</i> 7-25-21 Signature _____ Date _____ BRIAN WOOD Printed Name _____ brian@permitswest.com E-mail Address _____ 505 466-8120
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. DATE OF SURVEY _____ Signature and Seal of Professional Surveyor: <i>Mark J. Murray</i> 12177 6/1/2021 Certificate Number _____		CORNER DATA NEW MEXICO EAST - NAD 83 A - FOUND IRON PIPE W/ BRASS CAP N:596170.19' E:585579.70' B - FOUND IRON PIPE W/ BRASS CAP N:596193.40' E:588185.13' C - FOUND IRON PIPE W/ BRASS CAP N:596216.35' E:590789.98' D - FOUND IRON PIPE W/ BRASS CAP N:596236.89' E:593385.18' E - FOUND IRON PIPE W/ BRASS CAP N:596258.72' E:595984.31' F - FOUND IRON PIPE W/ BRASS CAP N:593620.12' E:595984.04' G - FOUND IRON PIPE W/ BRASS CAP N:590981.15' E:595983.74' H - FOUND IRON PIPE W/ BRASS CAP N:590962.75' E:593372.54' I - FOUND IRON PIPE W/ BRASS CAP N:590945.00' E:590760.88' J - FOUND 5/8" IRON ROD W/ ALUMINUM CAP N:590925.86' E:588152.01' K - FOUND IRON PIPE W/ BRASS CAP N:590907.03' E:585541.35' L - FOUND IRON PIPE W/ BRASS CAP N:593538.25' E:585560.00' M - FOUND IRON PIPE W/ BRASS CAP N:593580.23' E:590775.84'

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

Form APD Conditions

Permit 323538

PERMIT CONDITIONS OF APPROVAL

Operator Name and Address: COLGATE OPERATING, LLC [371449] 300 North Marienfeld Street Midland, TX 79701	API Number: 30-015-49923
	Well: Big Burro 27 State Com #123H

OCD Reviewer	Condition
kpickford	Notify OCD 24 hours prior to casing & cement
kpickford	Will require a File As Drilled C-102 and a Directional Survey with the C-104
kpickford	The Operator is to notify NMOC by sundry (Form C-103) within ten (10) days of the well being spud
kpickford	Once the well is spud, to prevent ground water contamination through whole or partial conduits from the surface, the operator shall drill without interruption through the fresh water zone or zones and shall immediately set in cement the water protection string
kpickford	Cement is required to circulate on both surface and intermediate1 strings of casing
kpickford	Oil base muds are not to be used until fresh water zones are cased and cemented providing isolation from the oil or diesel. This includes synthetic oils. Oil based mud, drilling fluids and solids must be contained in a steel closed loop system



Colgate Energy

**Eddy County, NM (N83-NME)
Big Burro 27 State Com
Big Burro 27 State Com 123H**

OH

Plan: Plan #1

Standard Planning Report

13 February, 2020



Planning Report

Database:	EDM 5000.14 Single User Db	Local Co-ordinate Reference:	Well Big Burro 27 State Com 123H
Company:	Colgate Energy	TVD Reference:	KB @ 3361.00usft (Permit)
Project:	Eddy County, NM (N83-NME)	MD Reference:	KB @ 3361.00usft (Permit)
Site:	Big Burro 27 State Com	North Reference:	Grid
Well:	Big Burro 27 State Com 123H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Project	Eddy County, NM (N83-NME)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Big Burro 27 State Com			
Site Position:		Northing:	592,946.93 usft	Latitude: 32.62993761
From:	Map	Easting:	595,464.19 usft	Longitude: -104.15751180
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence: 0.09 °

Well	Big Burro 27 State Com 123H			
Well Position	+N/-S	0.00 usft	Northing:	592,946.93 usft
	+E/-W	0.00 usft	Easting:	595,464.19 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:		Ground Level: 3,336.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2020	2/12/2020	7.00	60.22	47,812.56692472

Design	Plan #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	269.59

Plan Survey Tool Program	Date	2/13/2020		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	17,657.84 Plan #1 (OH)	OWSG MWD Rev 4	
			OWSG MWD - Standard	



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Project:	Eddy County, NM (N83-NME)	MD Reference:	KB @ 3361.00usft (Permit)
Site:	Big Burro 27 State Com	North Reference:	Grid
Well:	Big Burro 27 State Com 123H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,776.69	8.65	123.92	1,774.50	-24.25	36.06	1.50	1.50	0.00	123.92	
4,963.94	8.65	123.92	4,925.50	-291.75	433.85	0.00	0.00	0.00	0.00	
5,540.63	0.00	0.00	5,500.00	-316.00	469.91	1.50	-1.50	0.00	180.00	00-EON(BB27 123H)
6,956.65	0.00	0.00	6,916.02	-316.00	469.91	0.00	0.00	0.00	0.00	
7,870.35	91.37	269.59	7,488.81	-320.20	-116.73	10.00	10.00	0.00	269.59	
14,883.34	91.37	269.59	7,321.14	-370.37	-7,127.53	0.00	0.00	0.00	0.00	
14,894.83	91.60	269.59	7,320.84	-370.45	-7,139.03	2.00	2.00	0.00	0.07	
17,657.84	91.60	269.59	7,243.70	-390.20	-9,900.88	0.00	0.00	0.00	0.00	03-PBHL(BB27 123H)



Planning Report

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Company:	Colgate Energy	TVD Reference:	KB @ 3361.00usft (Permit)
Project:	Eddy County, NM (N83-NME)	MD Reference:	KB @ 3361.00usft (Permit)
Site:	Big Burro 27 State Com	North Reference:	Grid
Well:	Big Burro 27 State Com 123H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
138.00	0.00	0.00	138.00	0.00	0.00	0.00	0.00	0.00	0.00
Rustler									
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
246.00	0.00	0.00	246.00	0.00	0.00	0.00	0.00	0.00	0.00
Top of Salt									
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
578.00	0.00	0.00	578.00	0.00	0.00	0.00	0.00	0.00	0.00
Base of Salt									
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
815.00	0.00	0.00	815.00	0.00	0.00	0.00	0.00	0.00	0.00
Yates									
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	1.50	123.92	1,299.99	-0.73	1.09	-1.08	1.50	1.50	0.00
1,400.00	3.00	123.92	1,399.91	-2.92	4.34	-4.32	1.50	1.50	0.00
1,500.00	4.50	123.92	1,499.69	-6.57	9.77	-9.72	1.50	1.50	0.00
1,600.00	6.00	123.92	1,599.27	-11.68	17.36	-17.28	1.50	1.50	0.00
1,700.00	7.50	123.92	1,698.57	-18.24	27.12	-26.99	1.50	1.50	0.00
1,776.69	8.65	123.92	1,774.50	-24.25	36.06	-35.88	1.50	1.50	0.00
1,800.00	8.65	123.92	1,797.55	-26.20	38.97	-38.78	0.00	0.00	0.00
1,900.00	8.65	123.92	1,896.41	-34.60	51.45	-51.20	0.00	0.00	0.00
2,000.00	8.65	123.92	1,995.27	-42.99	63.93	-63.62	0.00	0.00	0.00
2,086.72	8.65	123.92	2,081.00	-50.27	74.75	-74.39	0.00	0.00	0.00
Capitan									
2,100.00	8.65	123.92	2,094.13	-51.38	76.41	-76.04	0.00	0.00	0.00
2,200.00	8.65	123.92	2,193.00	-59.78	88.89	-88.46	0.00	0.00	0.00
2,300.00	8.65	123.92	2,291.86	-68.17	101.37	-100.88	0.00	0.00	0.00
2,400.00	8.65	123.92	2,390.72	-76.56	113.85	-113.30	0.00	0.00	0.00
2,500.00	8.65	123.92	2,489.58	-84.95	126.33	-125.72	0.00	0.00	0.00
2,595.50	8.65	123.92	2,584.00	-92.97	138.25	-137.58	0.00	0.00	0.00
DLWR Mnt. Group									
2,600.00	8.65	123.92	2,588.45	-93.35	138.81	-138.14	0.00	0.00	0.00
2,700.00	8.65	123.92	2,687.31	-101.74	151.29	-150.56	0.00	0.00	0.00
2,800.00	8.65	123.92	2,786.17	-110.13	163.77	-162.98	0.00	0.00	0.00
2,900.00	8.65	123.92	2,885.03	-118.53	176.25	-175.40	0.00	0.00	0.00
3,000.00	8.65	123.92	2,983.90	-126.92	188.74	-187.82	0.00	0.00	0.00
3,100.00	8.65	123.92	3,082.76	-135.31	201.22	-200.24	0.00	0.00	0.00
3,200.00	8.65	123.92	3,181.62	-143.71	213.70	-212.66	0.00	0.00	0.00
3,300.00	8.65	123.92	3,280.48	-152.10	226.18	-225.08	0.00	0.00	0.00
3,323.79	8.65	123.92	3,304.00	-154.09	229.15	-228.04	0.00	0.00	0.00
Lower Brushy Canyon									
3,400.00	8.65	123.92	3,379.35	-160.49	238.66	-237.50	0.00	0.00	0.00
3,500.00	8.65	123.92	3,478.21	-168.88	251.14	-249.92	0.00	0.00	0.00
3,600.00	8.65	123.92	3,577.07	-177.28	263.62	-262.34	0.00	0.00	0.00
3,700.00	8.65	123.92	3,675.93	-185.67	276.10	-274.77	0.00	0.00	0.00



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Project:	Eddy County, NM (N83-NME)	MD Reference:	KB @ 3361.00usft (Permit)
Site:	Big Burro 27 State Com	North Reference:	Grid
Well:	Big Burro 27 State Com 123H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
3,800.00	8.65	123.92	3,774.80	-194.06	288.58	-287.19	0.00	0.00	0.00
3,900.00	8.65	123.92	3,873.66	-202.46	301.06	-299.61	0.00	0.00	0.00
3,937.77	8.65	123.92	3,911.00	-205.63	305.78	-304.30	0.00	0.00	0.00
Bone Spring Lime									
4,000.00	8.65	123.92	3,972.52	-210.85	313.54	-312.03	0.00	0.00	0.00
4,100.00	8.65	123.92	4,071.38	-219.24	326.02	-324.45	0.00	0.00	0.00
4,200.00	8.65	123.92	4,170.25	-227.64	338.50	-336.87	0.00	0.00	0.00
4,300.00	8.65	123.92	4,269.11	-236.03	350.99	-349.29	0.00	0.00	0.00
4,400.00	8.65	123.92	4,367.97	-244.42	363.47	-361.71	0.00	0.00	0.00
4,500.00	8.65	123.92	4,466.83	-252.81	375.95	-374.13	0.00	0.00	0.00
4,600.00	8.65	123.92	4,565.70	-261.21	388.43	-386.55	0.00	0.00	0.00
4,700.00	8.65	123.92	4,664.56	-269.60	400.91	-398.97	0.00	0.00	0.00
4,800.00	8.65	123.92	4,763.42	-277.99	413.39	-411.39	0.00	0.00	0.00
4,900.00	8.65	123.92	4,862.28	-286.39	425.87	-423.81	0.00	0.00	0.00
4,963.94	8.65	123.92	4,925.50	-291.75	433.85	-431.75	0.00	0.00	0.00
5,000.00	8.11	123.92	4,961.17	-294.69	438.21	-436.09	1.50	-1.50	0.00
5,100.00	6.61	123.92	5,060.34	-301.83	448.84	-446.67	1.50	-1.50	0.00
5,200.00	5.11	123.92	5,159.82	-307.53	457.31	-455.10	1.50	-1.50	0.00
5,300.00	3.61	123.92	5,259.53	-311.77	463.62	-461.38	1.50	-1.50	0.00
5,400.00	2.11	123.92	5,359.40	-314.56	467.76	-465.50	1.50	-1.50	0.00
5,500.00	0.61	123.92	5,459.37	-315.88	469.73	-467.46	1.50	-1.50	0.00
5,540.63	0.00	0.00	5,500.00	-316.00	469.91	-467.63	1.50	-1.50	0.00
00-EON(BB27 123H)									
5,600.00	0.00	0.00	5,559.37	-316.00	469.91	-467.63	0.00	0.00	0.00
5,700.00	0.00	0.00	5,659.37	-316.00	469.91	-467.63	0.00	0.00	0.00
5,800.00	0.00	0.00	5,759.37	-316.00	469.91	-467.63	0.00	0.00	0.00
5,900.00	0.00	0.00	5,859.37	-316.00	469.91	-467.63	0.00	0.00	0.00
6,000.00	0.00	0.00	5,959.37	-316.00	469.91	-467.63	0.00	0.00	0.00
6,100.00	0.00	0.00	6,059.37	-316.00	469.91	-467.63	0.00	0.00	0.00
6,200.00	0.00	0.00	6,159.37	-316.00	469.91	-467.63	0.00	0.00	0.00
6,300.00	0.00	0.00	6,259.37	-316.00	469.91	-467.63	0.00	0.00	0.00
6,400.00	0.00	0.00	6,359.37	-316.00	469.91	-467.63	0.00	0.00	0.00
6,426.63	0.00	0.00	6,386.00	-316.00	469.91	-467.63	0.00	0.00	0.00
1st Bone Spring SD									
6,500.00	0.00	0.00	6,459.37	-316.00	469.91	-467.63	0.00	0.00	0.00
6,576.63	0.00	0.00	6,536.00	-316.00	469.91	-467.63	0.00	0.00	0.00
2nd Bone Spring LM									
6,600.00	0.00	0.00	6,559.37	-316.00	469.91	-467.63	0.00	0.00	0.00
6,700.00	0.00	0.00	6,659.37	-316.00	469.91	-467.63	0.00	0.00	0.00
6,800.00	0.00	0.00	6,759.37	-316.00	469.91	-467.63	0.00	0.00	0.00
6,900.00	0.00	0.00	6,859.37	-316.00	469.91	-467.63	0.00	0.00	0.00
6,956.65	0.00	0.00	6,916.02	-316.00	469.91	-467.63	0.00	0.00	0.00
KOP: 6956.65' MD, -467.63 VS, 6916.02' TVD									
7,000.00	4.33	269.59	6,959.33	-316.01	468.27	-466.00	10.00	10.00	0.00
7,050.00	9.33	269.59	7,008.95	-316.05	462.32	-460.05	10.00	10.00	0.00
7,100.00	14.33	269.59	7,057.88	-316.13	452.07	-449.80	10.00	10.00	0.00
7,150.00	19.33	269.59	7,105.72	-316.23	437.59	-435.32	10.00	10.00	0.00
7,200.00	24.33	269.59	7,152.12	-316.36	419.00	-416.73	10.00	10.00	0.00
7,250.00	29.33	269.59	7,196.72	-316.53	396.44	-394.17	10.00	10.00	0.00
7,300.00	34.33	269.59	7,239.18	-316.71	370.08	-367.80	10.00	10.00	0.00
7,350.00	39.33	269.59	7,279.19	-316.93	340.11	-337.83	10.00	10.00	0.00
7,392.46	43.58	269.59	7,311.00	-317.13	312.01	-309.73	10.00	10.00	0.00
2nd Bone Spring SD									



Planning Report

Database:	EDM 5000.14 Single User Db	Local Co-ordinate Reference:	Well Big Burro 27 State Com 123H
Company:	Colgate Energy	TVD Reference:	KB @ 3361.00usft (Permit)
Project:	Eddy County, NM (N83-NME)	MD Reference:	KB @ 3361.00usft (Permit)
Site:	Big Burro 27 State Com	North Reference:	Grid
Well:	Big Burro 27 State Com 123H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
7,400.00	44.33	269.59	7,316.43	-317.17	306.77	-304.50	10.00	10.00	0.00
7,436.90	48.02	269.59	7,341.98	-317.36	280.15	-277.87	10.00	10.00	0.00
01-FTP(BB27 123H)									
7,450.00	49.33	269.59	7,350.63	-317.43	270.32	-268.04	10.00	10.00	0.00
7,500.00	54.33	269.59	7,381.51	-317.71	231.02	-228.74	10.00	10.00	0.00
7,550.00	59.33	269.59	7,408.86	-318.01	189.18	-186.90	10.00	10.00	0.00
7,600.00	64.33	269.59	7,432.45	-318.32	145.11	-142.83	10.00	10.00	0.00
7,650.00	69.33	269.59	7,452.11	-318.65	99.16	-96.88	10.00	10.00	0.00
7,700.00	74.33	269.59	7,467.70	-318.99	51.67	-49.38	10.00	10.00	0.00
7,750.00	79.33	269.59	7,479.08	-319.34	3.00	-0.71	10.00	10.00	0.00
7,800.00	84.33	269.59	7,486.18	-319.70	-46.48	48.76	10.00	10.00	0.00
7,850.00	89.33	269.59	7,488.94	-320.05	-96.38	98.67	10.00	10.00	0.00
7,870.35	91.37	269.59	7,488.81	-320.20	-116.73	119.02	10.00	10.00	0.00
EOC: 7870.35' MD, 119.02 VS, 7488.81' TVD									
7,900.00	91.37	269.59	7,488.11	-320.41	-146.37	148.66	0.00	0.00	0.00
8,000.00	91.37	269.59	7,485.71	-321.13	-246.34	248.63	0.00	0.00	0.00
8,100.00	91.37	269.59	7,483.32	-321.84	-346.31	348.60	0.00	0.00	0.00
8,200.00	91.37	269.59	7,480.93	-322.56	-446.28	448.58	0.00	0.00	0.00
8,300.00	91.37	269.59	7,478.54	-323.27	-546.25	548.55	0.00	0.00	0.00
8,400.00	91.37	269.59	7,476.15	-323.99	-646.22	648.52	0.00	0.00	0.00
8,500.00	91.37	269.59	7,473.76	-324.70	-746.19	748.49	0.00	0.00	0.00
8,600.00	91.37	269.59	7,471.37	-325.42	-846.15	848.46	0.00	0.00	0.00
8,700.00	91.37	269.59	7,468.98	-326.13	-946.12	948.43	0.00	0.00	0.00
8,800.00	91.37	269.59	7,466.59	-326.85	-1,046.09	1,048.40	0.00	0.00	0.00
8,900.00	91.37	269.59	7,464.20	-327.56	-1,146.06	1,148.38	0.00	0.00	0.00
9,000.00	91.37	269.59	7,461.81	-328.28	-1,246.03	1,248.35	0.00	0.00	0.00
9,100.00	91.37	269.59	7,459.41	-328.99	-1,346.00	1,348.32	0.00	0.00	0.00
9,200.00	91.37	269.59	7,457.02	-329.71	-1,445.97	1,448.29	0.00	0.00	0.00
9,300.00	91.37	269.59	7,454.63	-330.43	-1,545.94	1,548.26	0.00	0.00	0.00
9,400.00	91.37	269.59	7,452.24	-331.14	-1,645.90	1,648.23	0.00	0.00	0.00
9,500.00	91.37	269.59	7,449.85	-331.86	-1,745.87	1,748.20	0.00	0.00	0.00
9,600.00	91.37	269.59	7,447.46	-332.57	-1,845.84	1,848.18	0.00	0.00	0.00
9,700.00	91.37	269.59	7,445.07	-333.29	-1,945.81	1,948.15	0.00	0.00	0.00
9,800.00	91.37	269.59	7,442.68	-334.00	-2,045.78	2,048.12	0.00	0.00	0.00
9,900.00	91.37	269.59	7,440.29	-334.72	-2,145.75	2,148.09	0.00	0.00	0.00
10,000.00	91.37	269.59	7,437.90	-335.43	-2,245.72	2,248.06	0.00	0.00	0.00
10,100.00	91.37	269.59	7,435.51	-336.15	-2,345.69	2,348.03	0.00	0.00	0.00
10,200.00	91.37	269.59	7,433.12	-336.86	-2,445.66	2,448.00	0.00	0.00	0.00
10,300.00	91.37	269.59	7,430.72	-337.58	-2,545.62	2,547.97	0.00	0.00	0.00
10,400.00	91.37	269.59	7,428.33	-338.29	-2,645.59	2,647.95	0.00	0.00	0.00
10,500.00	91.37	269.59	7,425.94	-339.01	-2,745.56	2,747.92	0.00	0.00	0.00
10,600.00	91.37	269.59	7,423.55	-339.73	-2,845.53	2,847.89	0.00	0.00	0.00
10,700.00	91.37	269.59	7,421.16	-340.44	-2,945.50	2,947.86	0.00	0.00	0.00
10,800.00	91.37	269.59	7,418.77	-341.16	-3,045.47	3,047.83	0.00	0.00	0.00
10,900.00	91.37	269.59	7,416.38	-341.87	-3,145.44	3,147.80	0.00	0.00	0.00
11,000.00	91.37	269.59	7,413.99	-342.59	-3,245.41	3,247.77	0.00	0.00	0.00
11,100.00	91.37	269.59	7,411.60	-343.30	-3,345.38	3,347.75	0.00	0.00	0.00
11,200.00	91.37	269.59	7,409.21	-344.02	-3,445.34	3,447.72	0.00	0.00	0.00
11,300.00	91.37	269.59	7,406.82	-344.73	-3,545.31	3,547.69	0.00	0.00	0.00
11,400.00	91.37	269.59	7,404.42	-345.45	-3,645.28	3,647.66	0.00	0.00	0.00
11,500.00	91.37	269.59	7,402.03	-346.16	-3,745.25	3,747.63	0.00	0.00	0.00
11,600.00	91.37	269.59	7,399.64	-346.88	-3,845.22	3,847.60	0.00	0.00	0.00
11,700.00	91.37	269.59	7,397.25	-347.59	-3,945.19	3,947.57	0.00	0.00	0.00
11,800.00	91.37	269.59	7,394.86	-348.31	-4,045.16	4,047.55	0.00	0.00	0.00



Planning Report

Database:	EDM 5000.14 Single User Db	Local Co-ordinate Reference:	Well Big Burro 27 State Com 123H
Company:	Colgate Energy	TVD Reference:	KB @ 3361.00usft (Permit)
Project:	Eddy County, NM (N83-NME)	MD Reference:	KB @ 3361.00usft (Permit)
Site:	Big Burro 27 State Com	North Reference:	Grid
Well:	Big Burro 27 State Com 123H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
11,900.00	91.37	269.59	7,392.47	-349.03	-4,145.13	4,147.52	0.00	0.00	0.00
12,000.00	91.37	269.59	7,390.08	-349.74	-4,245.10	4,247.49	0.00	0.00	0.00
12,100.00	91.37	269.59	7,387.69	-350.46	-4,345.06	4,347.46	0.00	0.00	0.00
12,200.00	91.37	269.59	7,385.30	-351.17	-4,445.03	4,447.43	0.00	0.00	0.00
12,300.00	91.37	269.59	7,382.91	-351.89	-4,545.00	4,547.40	0.00	0.00	0.00
12,400.00	91.37	269.59	7,380.52	-352.60	-4,644.97	4,647.37	0.00	0.00	0.00
12,500.00	91.37	269.59	7,378.13	-353.32	-4,744.94	4,747.35	0.00	0.00	0.00
12,600.00	91.37	269.59	7,375.73	-354.03	-4,844.91	4,847.32	0.00	0.00	0.00
12,700.00	91.37	269.59	7,373.34	-354.75	-4,944.88	4,947.29	0.00	0.00	0.00
12,800.00	91.37	269.59	7,370.95	-355.46	-5,044.85	5,047.26	0.00	0.00	0.00
12,900.00	91.37	269.59	7,368.56	-356.18	-5,144.81	5,147.23	0.00	0.00	0.00
13,000.00	91.37	269.59	7,366.17	-356.89	-5,244.78	5,247.20	0.00	0.00	0.00
13,100.00	91.37	269.59	7,363.78	-357.61	-5,344.75	5,347.17	0.00	0.00	0.00
13,200.00	91.37	269.59	7,361.39	-358.32	-5,444.72	5,447.15	0.00	0.00	0.00
13,300.00	91.37	269.59	7,359.00	-359.04	-5,544.69	5,547.12	0.00	0.00	0.00
13,400.00	91.37	269.59	7,356.61	-359.76	-5,644.66	5,647.09	0.00	0.00	0.00
13,500.00	91.37	269.59	7,354.22	-360.47	-5,744.63	5,747.06	0.00	0.00	0.00
13,600.00	91.37	269.59	7,351.83	-361.19	-5,844.60	5,847.03	0.00	0.00	0.00
13,700.00	91.37	269.59	7,349.43	-361.90	-5,944.57	5,947.00	0.00	0.00	0.00
13,800.00	91.37	269.59	7,347.04	-362.62	-6,044.53	6,046.97	0.00	0.00	0.00
13,900.00	91.37	269.59	7,344.65	-363.33	-6,144.50	6,146.95	0.00	0.00	0.00
14,000.00	91.37	269.59	7,342.26	-364.05	-6,244.47	6,246.92	0.00	0.00	0.00
14,100.00	91.37	269.59	7,339.87	-364.76	-6,344.44	6,346.89	0.00	0.00	0.00
14,200.00	91.37	269.59	7,337.48	-365.48	-6,444.41	6,446.86	0.00	0.00	0.00
14,300.00	91.37	269.59	7,335.09	-366.19	-6,544.38	6,546.83	0.00	0.00	0.00
14,400.00	91.37	269.59	7,332.70	-366.91	-6,644.35	6,646.80	0.00	0.00	0.00
14,500.00	91.37	269.59	7,330.31	-367.62	-6,744.32	6,746.77	0.00	0.00	0.00
14,600.00	91.37	269.59	7,327.92	-368.34	-6,844.29	6,846.75	0.00	0.00	0.00
14,700.00	91.37	269.59	7,325.53	-369.06	-6,944.25	6,946.72	0.00	0.00	0.00
14,800.00	91.37	269.59	7,323.14	-369.77	-7,044.22	7,046.69	0.00	0.00	0.00
14,883.34	91.37	269.59	7,321.14	-370.37	-7,127.54	7,130.00	0.00	0.00	0.00
Start DLS 2.00 TFO 0.07									
14,894.83	91.60	269.59	7,320.84	-370.45	-7,139.03	7,141.49	2.00	2.00	0.00
14,900.00	91.60	269.59	7,320.70	-370.49	-7,144.19	7,146.66	0.00	0.00	0.00
15,000.00	91.60	269.59	7,317.91	-371.20	-7,244.15	7,246.62	0.00	0.00	0.00
15,100.00	91.60	269.59	7,315.12	-371.92	-7,344.11	7,346.58	0.00	0.00	0.00
15,200.00	91.60	269.59	7,312.32	-372.63	-7,444.07	7,446.54	0.00	0.00	0.00
15,300.00	91.60	269.59	7,309.53	-373.35	-7,544.02	7,546.50	0.00	0.00	0.00
15,400.00	91.60	269.59	7,306.74	-374.06	-7,643.98	7,646.46	0.00	0.00	0.00
15,500.00	91.60	269.59	7,303.95	-374.78	-7,743.94	7,746.43	0.00	0.00	0.00
15,600.00	91.60	269.59	7,301.16	-375.49	-7,843.90	7,846.39	0.00	0.00	0.00
15,700.00	91.60	269.59	7,298.36	-376.20	-7,943.86	7,946.35	0.00	0.00	0.00
15,800.00	91.60	269.59	7,295.57	-376.92	-8,043.82	8,046.31	0.00	0.00	0.00
15,900.00	91.60	269.59	7,292.78	-377.63	-8,143.78	8,146.27	0.00	0.00	0.00
16,000.00	91.60	269.59	7,289.99	-378.35	-8,243.73	8,246.23	0.00	0.00	0.00
16,100.00	91.60	269.59	7,287.20	-379.06	-8,343.69	8,346.19	0.00	0.00	0.00
16,200.00	91.60	269.59	7,284.40	-379.78	-8,443.65	8,446.15	0.00	0.00	0.00
16,300.00	91.60	269.59	7,281.61	-380.49	-8,543.61	8,546.11	0.00	0.00	0.00
16,400.00	91.60	269.59	7,278.82	-381.21	-8,643.57	8,646.07	0.00	0.00	0.00
16,500.00	91.60	269.59	7,276.03	-381.92	-8,743.53	8,746.04	0.00	0.00	0.00
16,600.00	91.60	269.59	7,273.24	-382.64	-8,843.48	8,846.00	0.00	0.00	0.00
16,700.00	91.60	269.59	7,270.44	-383.35	-8,943.44	8,945.96	0.00	0.00	0.00
16,800.00	91.60	269.59	7,267.65	-384.07	-9,043.40	9,045.92	0.00	0.00	0.00



Planning Report

Database:	EDM 5000.14 Single User Db	Local Co-ordinate Reference:	Well Big Burro 27 State Com 123H
Company:	Colgate Energy	TVD Reference:	KB @ 3361.00usft (Permit)
Project:	Eddy County, NM (N83-NME)	MD Reference:	KB @ 3361.00usft (Permit)
Site:	Big Burro 27 State Com	North Reference:	Grid
Well:	Big Burro 27 State Com 123H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
16,900.00	91.60	269.59	7,264.86	-384.78	-9,143.36	9,145.88	0.00	0.00	0.00
17,000.00	91.60	269.59	7,262.07	-385.50	-9,243.32	9,245.84	0.00	0.00	0.00
17,100.00	91.60	269.59	7,259.28	-386.21	-9,343.28	9,345.80	0.00	0.00	0.00
17,200.00	91.60	269.59	7,256.48	-386.93	-9,443.24	9,445.76	0.00	0.00	0.00
17,300.00	91.60	269.59	7,253.69	-387.64	-9,543.19	9,545.72	0.00	0.00	0.00
17,400.00	91.60	269.59	7,250.90	-388.36	-9,643.15	9,645.68	0.00	0.00	0.00
17,500.00	91.60	269.59	7,248.11	-389.07	-9,743.11	9,745.65	0.00	0.00	0.00
17,567.82	91.60	269.59	7,246.21	-389.56	-9,810.90	9,813.44	0.00	0.00	0.00
02-LTP(BB27 123H)									
17,600.00	91.60	269.59	7,245.31	-389.79	-9,843.07	9,845.61	0.00	0.00	0.00
17,657.84	91.60	269.59	7,243.70	-390.20	-9,900.88	9,903.42	0.00	0.00	0.00
TD: 17657.84' MD, 9903.42 VS, 7243.70' TVD - 03-PBHL(BB27 123H)									

Design Targets									
Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
00-EON(BB27 123H) - plan hits target center - Point	0.00	0.00	5,500.00	-316.00	469.91	592,630.93	595,934.10	32.62906687	-104.15598711
03-PBHL(BB27 123H) - plan hits target center - Point	0.00	0.00	7,243.70	-390.20	-9,900.88	592,556.73	585,563.31	32.62890597	-104.18967478
02-LTP(BB27 123H) - plan hits target center - Point	0.00	0.00	7,246.21	-389.56	-9,810.90	592,557.37	585,653.29	32.62890739	-104.18938250
01-FTP(BB27 123H) - plan misses target center by 204.32usft at 7436.90usft MD (7341.98 TVD, -317.36 N, 280.15 E) - Point	0.00	0.00	7,491.00	-317.02	419.93	592,629.91	595,884.12	32.62906429	-104.15614945

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
138.00	138.00	Rustler		0.00		
246.00	246.00	Top of Salt		0.00		
578.00	578.00	Base of Salt		0.00		
815.00	815.00	Yates		0.00		
2,086.72	2,081.00	Capitan		0.00		
2,595.50	2,584.00	DLWR Mnt. Group		0.00		
3,323.79	3,304.00	Lower Brushy Canyon		0.00		
3,937.77	3,911.00	Bone Spring Lime		0.00		
6,426.63	6,386.00	1st Bone Spring SD		0.00		
6,576.63	6,536.00	2nd Bone Spring LM		0.00		
7,392.46	7,311.00	2nd Bone Spring SD		0.00		



Planning Report

Database:	EDM 5000.14 Single User Db	Local Co-ordinate Reference:	Well Big Burro 27 State Com 123H
Company:	Colgate Energy	TVD Reference:	KB @ 3361.00usft (Permit)
Project:	Eddy County, NM (N83-NME)	MD Reference:	KB @ 3361.00usft (Permit)
Site:	Big Burro 27 State Com	North Reference:	Grid
Well:	Big Burro 27 State Com 123H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
6,956.65	6,916.02	-316.00	469.91	KOP: 6956.65' MD, -467.63 VS, 6916.02' TVD
7,870.35	7,488.81	-320.20	-116.73	EOC: 7870.35' MD, 119.02 VS, 7488.81' TVD
14,883.34	7,321.14	-370.37	-7,127.54	Start DLS 2.00 TFO 0.07
17,657.84	7,243.70	-390.20	-9,900.88	TD: 17657.84' MD, 9903.42 VS, 7243.70' TVD

Drilling Program**Colgate Energy**

Big Burro 27 State Com 123H

1,970' FSL & 520' FEL (SHL)

Sec 27-T19S-R28E

Eddy County, New Mexico

The estimated tops of geologic formations are as follows:

Formation:	TVD	Subsea
Rustler	139	3223
Top of Salt	247	3115
Base of Salt	579	2783
Yates	816	2546
Capitan	-	-
Delaware Mountain Group	2585	777
Lower Brushy Canyon*	3305	57
Bone Spring Lime	3912	-550
1st Bone Spring Sand*	6387	-3025
2nd Bone Spring Sand*	7312	-3950
3rd Bone Spring Sand*	8412	-5050
Wolfcamp A*	8812	-5450

Formations anticipated to contain fresh water, oil or gas are as follows:

Water	Fresh water is anticipated at 65' and will be protected by setting a water string at 200' and cementing to surface.
Hydrocarbons	Oil and gas are anticipated in the above (*) formations. These zones will be protected by casing as necessary.

Proposed casing program is as follows:

<u>Name</u>	<u>Hole Size</u>	<u>Casing Size</u>	<u>Weight & Grade</u>	<u>Thread Collar</u>	<u>Top Csg</u>	<u>Setting Depth</u>	<u>Collapse</u>	<u>Burst</u>	<u>Tension</u>
Surface	17 1/2	13 3/8	54.5# J-55 (new)	BTC	0	200'	1.125	1.2	1.6
Intermediate	12 1/4	9 5/8	36# J-55 (new)	BTC	0	3,050'	1.125	1.2	1.6
Production	8 3/4	5 1/2	20# HCP-110 (new)	CDC HTQ	0	17,658'	1.125	1.2	1.6

SF Values will meet or exceed

Proposed cementing program is as follows:

<u>Name</u>	<u>Slurry</u>	<u>Sacks</u>	<u>Yield</u>	<u>Weight</u>	<u>Excess</u>	<u>Top Cement</u>	<u>Blend</u>
Surface	Tail	131	1.8	13.5	100%	0'	Class C w/ salt, accelerator, extender and LCM additives
Intermediate	Lead	674	2.19	12.7	100%	0'	Class C w/ salt, extender and LCM additives
	Tail	180	1.33	14.8	25%		Class C w/ accelerator & LCM additives
Production	Tail	3781	1.24	14.2	20%	2,050'	Class H w/ Fluid Loss, Dispersant, Retarder & LCM additives

Proposed casing and cementing accessories are as follows: (Casing will be centralized per Onshore Order 2.III.B.1.f)

Surface:	1 centralizer 5' above shoe held in place with stop ring; 1 centralizer per joint for following 2 joints then every other joint to surface
Intermediate:	2 centralizers on 1st joint, 1 centralizer on 2nd joint, 1 centralizer every 4th joint to surface
Production:	2 centralizers on bottom joint, 1 centralizer on 2nd joint, 1 centralizer every 3rd joint to 2550'

If a DV tool is used, depth(s) will be adjusted based on hole conditions and cement volumes will be adjusted proportionally. The DV tool will be set a minimum of 50 feet below previous casing and a minimum of 200 feet above current shoe.

If lost circulation is encountered below intermediate setting depth, a contingency casing and cementing program will be implemented as follows:

<u>Name</u>	<u>Hole Size</u>	<u>Casing Size</u>	<u>Weight & Grade</u>	<u>Thread Collar</u>	<u>Top Csg</u>	<u>Setting Depth</u>	<u>Collapse</u>	<u>Burst</u>	<u>Tension</u>
Drilling Liner	8-3/4"	7 5/8	26.4# HCL-80 (new)	Semi-flush	2,850'	6,800'	1.25	1.2	1.6
SF Values will meet or exceed									
<u>Name</u>	<u>Slurry</u>	<u>Sacks</u>	<u>Yield</u>	<u>Weight</u>	<u>Excess</u>	<u>Top Cement</u>	<u>Blend</u>		
Drilling Liner	Lead	282	2.19	12.7	100%	2,850'	Class C w/ salt, extender and LCM additives		
	Tail	75	1.33	14.8	25%		Class C w/ accelerator & LCM additives		

Proposed casing and cementing accessories would be as follows: (Casing will be centralized per Onshore Order 2.III.B.1.f)

Drilling Liner: 2 centralizers on bottom joint, 1 centralizer on 2nd joint, 1 centralizer every 4th joint to top of liner

Proposed pressure control equipment is as follows (see schematics below):

BOPE with working pressure ratings in excess of anticipated maximum surface pressure will be utilized for well control from drill out of surface casing to TMD. A rotating head will also be installed and utilized as needed. All BOPE connections shall be flanged, welded or clamped. All choke lines shall be straight unless targeted with running tees or tee blocks are used, and choke lines shall be anchored to prevent whip and reduce vibrations. All valves in the choke line & the choke manifold shall be full opening as to not cause restrictions and to allow for straight fluid paths to minimize potential erosion. All gauges utilized in the well control system shall be of a type designed for drilling fluid service. A top drive inside BOP valve will be utilized at all times. Subs equipped with full opening valves sized to fit the drill pipe and collars will be available on the rig floor in the open position. The key to operate said valve equipped subs will be on the rig floor at all times. The accumulator system will have sufficient capacity to open the HCR and close all three sets of rams plus the annular preventer while retaining at least 300 psi above precharge on the closing manifold (accumulator system shall be capable of doing so without using the closing unit pumps). The fluid reservoir capacity will be double the usable fluid volume of the accumulator system capacity, and the fluid level will be maintained at the manufacturer's recommended level. Prior to connecting the closing unit to the BOP stack, an accumulator precharge pressure test shall be performed to ensure the precharge pressure is within 100 psi of the desired precharge pressure (only nitrogen gas will be used to precharge). Two independent power sources will be made available at all times to power the closing unit pumps so that the pumps can automatically start when the closing valve manifold pressure has decreased to the pre-set level. Closing unit pumps will be sized to allow opening of HCR and closing of annular preventer on 5" drill pipe achieving at least 200 psi above precharge pressure with the accumulator system isolated from service in less than two minutes. A valve shall be installed in the closing line as close to the annular preventer as possible to act as a locking device; the valve shall be maintained in the open position and shall be closed only when the power source for the accumulator system is inoperative. Remote controls capable of opening and closing all preventers & the HCR shall be readily accessible to the driller; master controls with the same capability will be operable at the accumulator. The wellhead will be a multi-bowl speed head allowing for hang-off of intermediate casing & isolation of the 13-3/8" x 9-5/8" annulus without breaking the connection between the BOP & wellhead to install an additional casing head. A wear bushing will be installed & inspected frequently to guard against internal wear to wellhead.

A request for variance of pressure control equipment as follows:

Colgate Energy requests a variance to drill this well using a co-flex line between the BOP and choke manifold. Certification for proposed co-flex hose is attached. The hose is not required by the manufacturer to be anchored. In the event the specific hose is not available, one of equal or higher rating will be used.

BOPE will be tested per the following procedure:

After surface casing is set and the BOPE installed, pressure tests of BOPE will be performed by a third party tester utilizing water and a test plug to 250 psi low and 10,000 psi high (besides the annular preventer which will be tested to 5,000 psi). To deem a pressure test successful, pressure must be maintained for ten minutes without any bleed-off. A valve on the wellhead below seat of test plug will be open at all time during BOPE tests to guard against damage to casing. The BOPE will be re-tested in this manner after any connection breaks or passage of allotted time (25 days). Any BOPE which fails to pass pressure tests after initial install will be replaced prior to drilling out of surface casing shoe. If at any time a BOPE component cannot function to secure the hole, the hole shall be secured utilizing a retrievable packer, and the non-functioning BOPE component shall be repair or replaced. After repair or replacement, a pressure test of the repaired or replaced component and any connections broken to repair or replace the non-functioning component will be tested in the same manner as described for initial install of BOPE. The annular preventer will be function tested at least weekly, and the ram-type preventers will be function tested on each trip. BOPE pit level drills will be conducted weekly with each drilling crews. All pressure tests performed on BOPE and BOPE pit level drills will be logged in the drilling log. Isolation of 13-3/8" x 9-5/8" casing annulus shall be confirmed by pressure testing of wellhead sealing component after said sealing component is installed.

Each casing string will be tested once installed in the wellbore per the following procedure:

Casing will be tested by pressuring up to 1,500 psi and holding pressure for thirty minutes. A casing test will be deemed successful if test pressure does not decline more than 10% over the thirty minute period. Cement will be allowed to sit undisturbed for eight hours and reach a minimum of 500 psi compressive strength across the "zone of interest" prior to testing casing and drilling out. Lab reports with the 500 psi compressive strength time for the cement will be onsite for review.

Each casing string will be cemented per the following cementing procedure:

Cement will be placed on all casing strings utilizing the pump and plug method. A float will be installed in the casing shoe and float collar on all casing strings to hold cement in place once pumping is completed. A top plug will be utilized on all casing strings to prevent contamination of the cement by the displacement fluid. A preflush fluid will be pumped prior to cement to aid in removal of drilling mud from the wellbore, eliminate drilling mud contamination of the cement slurry and prepare the surface of both the wellbore and casing for cement.

Proposed mud system is as follows:

<u>Name</u>	<u>Hole Size</u>	<u>Mud Weight</u>	<u>Viscosity</u>	<u>Fluid Loss</u>	<u>Type Mud</u>
Surface	17-1/2"	8.6 - 9.0	28 - 34	NC	FW Spud Mud
Intermediate	12-1/4"	10.0 - 10.2	30 - 32	NC	Brine Water
Production	8-3/4"	9.0 - 10.0	32 - 35	NC	Cut-brine poly-oil mud

All necessary mud products for weight addition and fluid loss control will be on location at all times. Mud program is subject to change due to hole conditions. The mud monitoring system is an electronic Pason system satisfying requirements of Onshore Order #1. Both visual and electronic mud monitoring equipment will be utilized to detect volume changes indicating loss or gain of circulating system fluid volume. Slow pump rates will be taken & recorded hourly in the drilling log. Mud engineer will perform tests and provide written report at least every 12 hours while circulating. A trip tank will be utilized and trip sheet will be recorded to ensure wellbore is taking proper fill or displacing proper fluid volume during all tripping operations. Gas detecting equipment will be utilized to monitor for hydrocarbon gas at the shakers while drilling and/or circulating. H₂S monitoring equipment with both visual & auditory alarms will be installed and operational at the shakers, rig floor and cellar while drilling and/or circulating. A flare system with an effective method for ignition & discharge more than 100 feet from the wellbore will be utilized to gather and burn all gas; lines will be straight unless targeted with running tees. A mud gas separator will be installed and operable at least 500 feet before first anticipated hydrocarbon zone.

Proposed testing, surveying, logging and coring program is as follows:

No open-hole logs are planned at this time. Directional surveys will be collected at no greater than 200' intervals while drilling through the MWD tools. A GR log will be collected while drilling through the MWD tools from intermediate casing to TD. No DSTs or cores are planned at this time. No CBL or temperature logs planned at this time. A formation integrity test (FIT) will be performed on all casing strings after BOPE is installed to at least 1 ppg over planned section mud weight after drilling ten feet of new hole.

Anticipated potential hazards are as follows:

No abnormal pressures or temperatures are expected. In accordance with Onshore Order No. 6, Colgate Energy does not anticipate that there will be enough H₂S from the surface to the Wolfcamp formations to meet the BLM's minimum requirements for the submission of an "H₂S Drilling Operation Plan" or "Public Protection Plan" for the drilling and completion of this well. Since we have an H₂S safety package on all wells, attached is an "H₂S Drilling Operations Plan". Adequate flare lines will be installed off the mud/gas separator where gas may be flared safely. All personnel will be familiar with all aspects of safe operation of equipment being used.

Estimated BHP: 8.3 lbs/gal gradient or less

Estimated BHT: 120° F

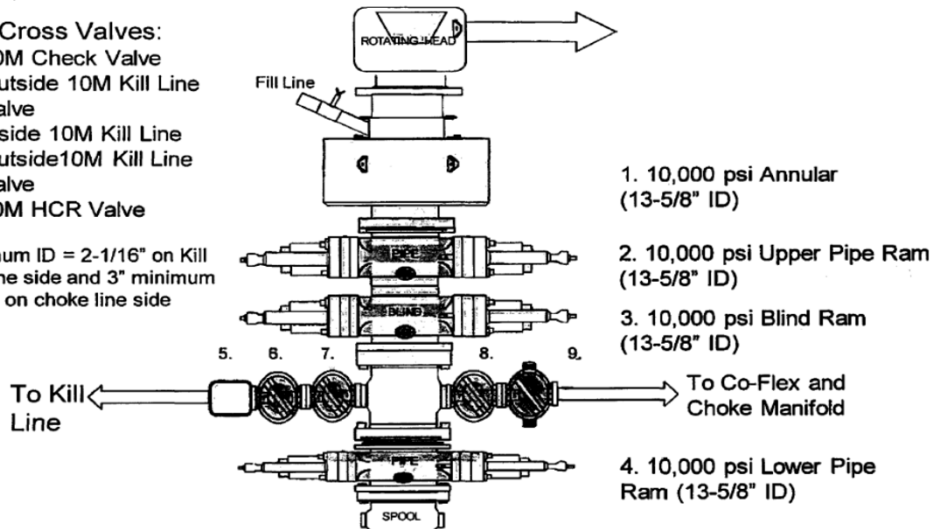
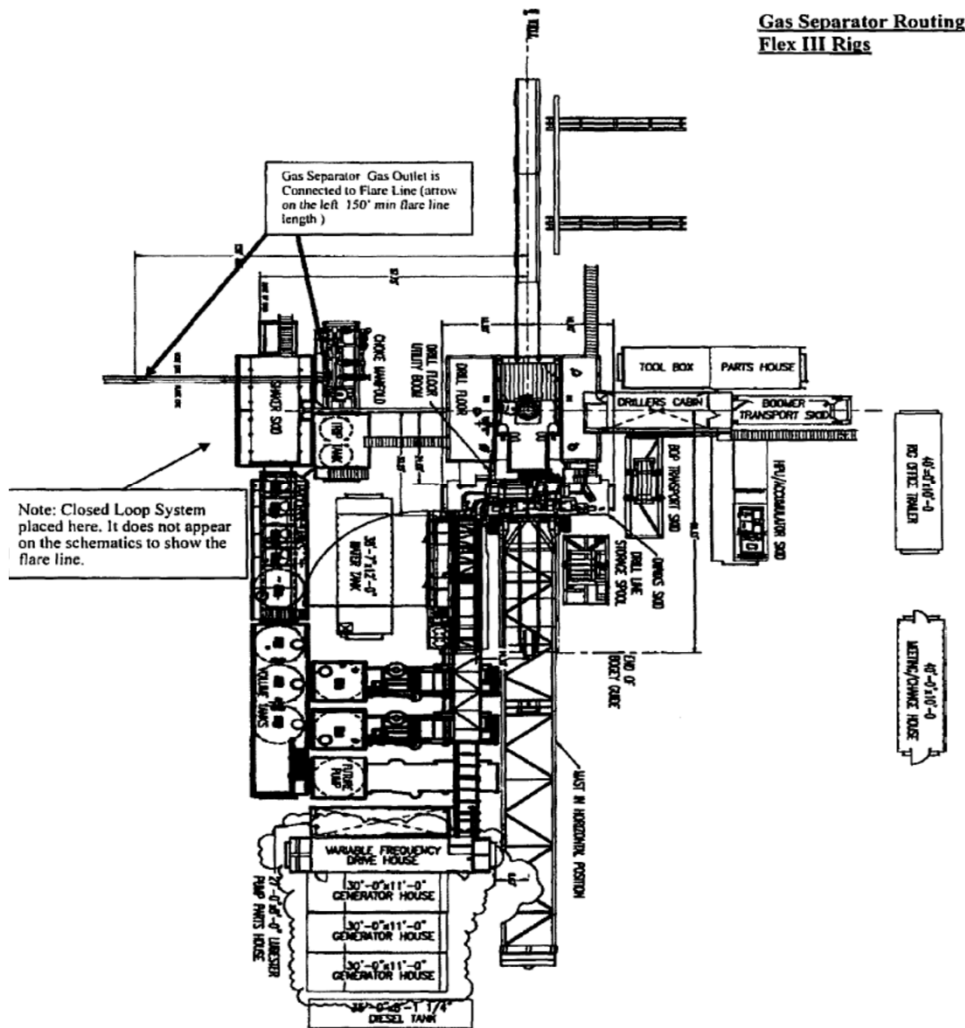
Planned commencement of operations is as follows:

Road and location construction will begin after BLM approval of APD. Anticipated spud date as soon as approved. Drilling expected to take 30 days. If production casing is run an additional 60 days will be required to complete and construct surface facilities.

10,000 psi BOP Stack:**Mud Cross Valves:**

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

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

**Closed Loop System Layout:**

Gas Separator Routing
Flex III Rigs

7-1/16 15M

1-13/16 15M

29.0

13-5/8 10M

24.8

13-5/8 5M

25.4

CASING HANGER, C-22, 13-5/8 NOM X 5-1/2 CSG W/ EXTRA CAPACITY PLATE

1-13/16 10M

2 LP 5M

13-3/8 CASING

9-5/8 CASING

5-1/2 CASING

CASING HANGER, MBS-W, MANDREL FLTD, 13-5/8 X 9-5/8, 40# BC BTM W/SEAL ASSEMBLY

26 OD BASEPLATE

State of New Mexico
Energy, Minerals and Natural Resources Department

Submit Electronically
Via E-permitting

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

NATURAL GAS MANAGEMENT PLAN

This Natural Gas Management Plan must be submitted with each Application for Permit to Drill (APD) for a new or recompleted well.

Section 1 – Plan Description

Effective May 25, 2021

I. Operator: Colgate Operating, LLC **OGRID:** 371449 **Date:** 08/15/2022

II. Type: ☒ Original ☐ Amendment due to ☐ 19.15.27.9.D(6)(a) NMAC ☐ 19.15.27.9.D(6)(b) NMAC ☐ Other.

If Other, please describe: _____

III. Well(s): Provide the following information for each new or recompleted well or set of wells proposed to be drilled or proposed to be recompleted from a single well pad or connected to a central delivery point.

Well Name	API	ULSTR	Footages	Anticipated Oil BBL/D	Anticipated Gas MCF/D	Anticipated Produced Water BBL/D
Big Burro 27 State Com 123H	30-015-	P – 27 – 19S – 28E	1390 FSL 164 FEL	2100	3600	3600
Big Burro 27 State Com 124H	30-015-	P – 27 – 19S – 28E	1300 FSL 160 FEL	2100	3600	3600
Big Burro 27 State Com 133H	30-015-46766	P – 27 – 19S – 28E	1139 FSL 104 FEL	2100	3600	3600
Big Burro 27 State Com 134H	30-015-46765	P – 27 – 19S – 28E	1139 FSL 134 FEL	2100	3600	3600
Weaver 27 State Com 121H	30-015-46803	A – 27 – 19S – 28E	1248 FNL 185 FEL	2100	3600	3600
Weaver 27 State Com 121H	30-015-46804	H – 27 – 19S – 28E	1383 FNL 185 FEL	2100	3600	3600
Weaver 27 State Com 131H	30-015-46768	A – 27 – 19S – 28E	1293 FNL 185 FEL	2100	3600	3600
Weaver 27 State Com 132H	30-015-46769	H – 27 – 19S – 28E	1338 FNL 315 FEL	2100	3600	3600

IV. Central Delivery Point Name: Big Burro-Weaver Battery [See 19.15.27.9(D)(1) NMAC]

V. Anticipated Schedule: Provide the following information for each new or recompleted well or set of wells proposed to be drilled or proposed to be recompleted from a single well pad or connected to a central delivery point.

Well Name	API	Spud Date	TD Reached Date	Completion Commencement Date	Initial Flow Back Date	First Production Date
Big Burro 27 State Com 123H	30-015-	05/01/2022 (Estimated)	07/01/2022 (Estimated)	Not Yet Scheduled	Not Yet Scheduled	Not Yet Scheduled

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Big Burro 27 State Com 124H	30-015-	05/01/2022 (Estimated)	07/01/2022 (Estimated)	Not Yet Scheduled	Not Yet Scheduled	Not Yet Scheduled
Big Burro 27 State Com 133H	30-015-46766	02/09/2022	04/01/2022 (Estimated)	Not Yet Scheduled	Not Yet Scheduled	Not Yet Scheduled
Big Burro 27 State Com 134H	30-015-46765	02/28/2022	04/01/2022 (Estimated)	Not Yet Scheduled	Not Yet Scheduled	Not Yet Scheduled
Weaver 27 State Com 121H	30-015-46803	05/01/2022 (Estimated)	07/01/2022 (Estimated)	Not Yet Scheduled	Not Yet Scheduled	Not Yet Scheduled
Weaver 27 State Com 121H	30-015-46804	05/01/2022 (Estimated)	07/01/2022 (Estimated)	Not Yet Scheduled	Not Yet Scheduled	Not Yet Scheduled
Weaver 27 State Com 131H	30-015-46768	02/03/2022	04/01/2022 (Estimated)	Not Yet Scheduled	Not Yet Scheduled	Not Yet Scheduled
Weaver 27 State Com 132H	30-015-46769	02/02/2022	04/01/2022 (Estimated)	Not Yet Scheduled	Not Yet Scheduled	Not Yet Scheduled

VI. Separation Equipment: x Attach a complete description of how Operator will size separation equipment to optimize gas capture.

VII. Operational Practices: x Attach a complete description of the actions Operator will take to comply with the requirements of Subsection A through F of 19.15.27.8 NMAC.

VIII. Best Management Practices: x Attach a complete description of Operator's best management practices to minimize venting during active and planned maintenance.

Section 2 – Enhanced Plan

EFFECTIVE APRIL 1, 2022

Beginning April 1, 2022, an operator that is not in compliance with its statewide natural gas capture requirement for the applicable reporting area must complete this section.

x Operator certifies that it is not required to complete this section because Operator is in compliance with its statewide natural gas capture requirement for the applicable reporting area.

IX. Anticipated Natural Gas Production:

Well	API	Anticipated Average Natural Gas Rate MCF/D	Anticipated Volume of Natural Gas for the First Year MCF

X. Natural Gas Gathering System (NGGS):

Operator	System	ULSTR of Tie-in	Anticipated Gathering Start Date	Available Maximum Daily Capacity of System Segment Tie-in

XI. Map. ☐ Attach an accurate and legible map depicting the location of the well(s), the anticipated pipeline route(s) connecting the production operations to the existing or planned interconnect of the natural gas gathering system(s), and the maximum daily capacity of the segment or portion of the natural gas gathering system(s) to which the well(s) will be connected.

XII. Line Capacity. The natural gas gathering system ☐ will ☐ will not have capacity to gather 100% of the anticipated natural gas production volume from the well prior to the date of first production.

XIII. Line Pressure. Operator ☐ does ☐ does not anticipate that its existing well(s) connected to the same segment, or portion, of the natural gas gathering system(s) described above will continue to meet anticipated increases in line pressure caused by the new well(s).

☐ Attach Operator's plan to manage production in response to the increased line pressure.

XIV. Confidentiality: ☐ Operator asserts confidentiality pursuant to Section 71-2-8 NMSA 1978 for the information provided in Section 2 as provided in Paragraph (2) of Subsection D of 19.15.27.9 NMAC, and attaches a full description of the specific information for which confidentiality is asserted and the basis for such assertion.

Section 3 - Certifications

Effective May 25, 2021

Operator certifies that, after reasonable inquiry and based on the available information at the time of submittal:

x Operator will be able to connect the well(s) to a natural gas gathering system in the general area with sufficient capacity to transport one hundred percent of the anticipated volume of natural gas produced from the well(s) commencing on the date of first production, taking into account the current and anticipated volumes of produced natural gas from other wells connected to the pipeline gathering system; or

☐ Operator will not be able to connect to a natural gas gathering system in the general area with sufficient capacity to transport one hundred percent of the anticipated volume of natural gas produced from the well(s) commencing on the date of first production, taking into account the current and anticipated volumes of produced natural gas from other wells connected to the pipeline gathering system. *If Operator checks this box, Operator will select one of the following:*

Well Shut-In. ☐ Operator will shut-in and not produce the well until it submits the certification required by Paragraph (4) of Subsection D of 19.15.27.9 NMAC; or

Venting and Flaring Plan. ☐ Operator has attached a venting and flaring plan that evaluates and selects one or more of the potential alternative beneficial uses for the natural gas until a natural gas gathering system is available, including:

- (a) power generation on lease;
- (b) power generation for grid;
- (c) compression on lease;
- (d) liquids removal on lease;
- (e) reinjection for underground storage;
- (f) reinjection for temporary storage;
- (g) reinjection for enhanced oil recovery;
- (h) fuel cell production; and
- (i) other alternative beneficial uses approved by the division.

Section 4 - Notices

1. If, at any time after Operator submits this Natural Gas Management Plan and before the well is spud:

(a) Operator becomes aware that the natural gas gathering system it planned to connect the well(s) to has become unavailable or will not have capacity to transport one hundred percent of the production from the well(s), no later than 20 days after becoming aware of such information, Operator shall submit for OCD's approval a new or revised venting and flaring plan containing the information specified in Paragraph (5) of Subsection D of 19.15.27.9 NMAC; or

(b) Operator becomes aware that it has, cumulatively for the year, become out of compliance with its baseline natural gas capture rate or natural gas capture requirement, no later than 20 days after becoming aware of such information, Operator shall submit for OCD's approval a new or revised Natural Gas Management Plan for each well it plans to spud during the next 90 days containing the information specified in Paragraph (2) of Subsection D of 19.15.27.9 NMAC, and shall file an update for each Natural Gas Management Plan until Operator is back in compliance with its baseline natural gas capture rate or natural gas capture requirement.

2. OCD may deny or conditionally approve an APD if Operator does not make a certification, fails to submit an adequate venting and flaring plan which includes alternative beneficial uses for the anticipated volume of natural gas produced, or if OCD determines that Operator will not have adequate natural gas takeaway capacity at the time a well will be spud.

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I certify that, after reasonable inquiry, the statements in and attached to this Natural Gas Management Plan are true and correct to the best of my knowledge and acknowledge that a false statement may be subject to civil and criminal penalties under the Oil and Gas Act.

Signature: 
Printed Name: Mikah Thomas
Title: Sr. Regulatory Analyst
E-mail Address: mthomas@colgateenergy.com
Date: 08.15.2022
Phone: 432-695-4272
OIL CONSERVATION DIVISION (Only applicable when submitted as a standalone form)
Approved By:
Title:
Approval Date:
Conditions of Approval:

VI. Separation Equipment:

Colgate Operating, LLC production tank batteries include separation equipment designed to efficiently separate gas from liquid phases to optimize gas capture based on projected and estimated volumes from the targeted pool in conjunction with the total number of wells planned to or existing within the facility. Separation equipment is upgraded prior to well being drilled or completed, if determined to be undersized or needed. The separation equipment is designed and built according to the relevant industry specifications (API Specification 12J and ASME Sec VIII Div I). Other recognized industry publications such as the Gas Processors Suppliers Association (GPSA) are referenced when designing separation equipment to optimize gas capture.

VII. Operational Practices:

1. Subsection B.

- During drilling, flare stacks will be located a minimum of 150 feet from the nearest surface hole location. All gas is captured or combusted. If an emergency or malfunction occurs, gas will be flared or vented for public health, safety and the environment and be properly reported to the NMOCD pursuant to 19.15.27.8.G.
- Measure or estimate the volume of natural gas that is vented, flared or beneficially used during drilling, completion and production operations, regardless of the reason or authorization for such venting or flaring.
- At any point in the well life (drilling, completion, production, inactive) an audio, visual and olfactory (AVO) inspection will be performed weekly (at minimum) to confirm that all production equipment is operating properly and there are no leaks or releases except as allowed in Subsection D of 19.15.27.8 NMAC.

2. Subsection C.

- During completion operations, operator does not produce oil or gas but maintains adequate well control through completion operations.

For emergencies, equipment malfunction, or if the operator decides to produce oil and gas during well completion:

- Flowlines will be routed for flowback fluids into a completion or storage tank and, if feasible under well conditions, flare rather than vent and commence operation of a separator as soon as it is technically feasible for a separator to function.

- Measure or estimate the volume of natural gas that is vented, flared or beneficially used during drilling, completion and production operations, regardless of the reason or authorization for such venting or flaring.
- At any point in the well life (drilling, completion, production, inactive) an audio, visual and olfactory (AVO) inspection will be performed weekly (at minimum) to confirm that all production equipment is operating properly and there are no leaks or releases except as allowed in Subsection D of 19.15.27.8 NMAC.

3. Subsection D.

- At any point in the well life (drilling, completion, production, inactive) an audio, visual and olfactory (AVO) inspection will be performed weekly (at minimum) to confirm that all production equipment is operating properly and there are no leaks or releases except as allowed in Subsection D of 19.15.27.8 NMAC.
- Monitor manual liquid unloading for wells on-site or in close proximity (<30 minutes' drive time), take reasonable actions to achieve a stabilized rate and pressure at the earliest practical time, and take reasonable actions to minimize venting to the maximum extent practicable.
- Measure or estimate the volume of natural gas that is vented, flared or beneficially used during drilling, completion and production operations, regardless of the reason or authorization for such venting or flaring.

4. Subsection E.

- All tanks and separation equipment are designed for maximum throughput and pressure to minimize waste.
- Flare stack has been designed for proper size and combustion efficiency. Flare currently has a continuous pilot and is located more than 100 feet from any known well and storage tanks.
- At any point in the well life (drilling, completion, production, inactive) an audio, visual and olfactory (AVO) inspection will be performed weekly (at minimum) to confirm that all production equipment is operating properly and there are no leaks or releases except as allowed in Subsection D of 19.15.27.8 NMAC.

5. Subsection F.

- Measurement equipment is installed to measure the volume of natural gas flared from process piping or a flowline piped from the equipment associated with a well and facility associated with the approved application for permit

- to drill that has an average daily production greater than 60 mcf of natural gas.
- Measurement equipment installed is not designed or equipped with a manifold to allow diversion of natural gas around the metering equipment, except for the sole purpose of inspecting and servicing the measurement equipment, as noted in NMAC 19.15.27.8 Subsection G.

VIII. Best Management Practices:

1. During completion operations, operator does not produce oil or gas but maintains adequate well control through completion operations.
2. Operator does not flow well (well shut in) during initial production until all flowlines, tank batteries, and oil/gas takeaway are installed, tested, and determined operational.
3. Operator equips storage tanks with an automatic gauging system to reduce venting of natural gas.
4. Operator reduces the number of blowdowns by looking for opportunities to coordinate repair and maintenance activities.
5. Operator combusts natural gas that would otherwise be vented or flared, when feasible.
6. Operator has a flare stack designed in accordance with need and to handle sufficient volume to ensure proper combustion efficiency. Flare stacks are equipped with continuous pilots and securely anchored at least 100 feet (at minimum) from storage tanks and wells.
7. Operator minimizes venting (when feasible) through pump downs of vessels and reducing time required to purge equipment before returning equipment to service.
8. Operator will shut in wells (when feasible) in the event of a takeaway disruption, emergency situations, or other operations where venting or flaring may occur due to equipment failures.
9. Operator utilizes compressed air to operate pneumatic equipment instead of gas.
10. Operator utilizes vapor recovery towers and VRU's to increase gas capture efficiency.



H₂S Contingency Plan



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I. EMERGENCY ASSISTANCE TELEPHONE LIST**PUBLIC SAFETY****911 or****Sheriff's Department:**

Eddy County Sheriff's Office (575) 887-7551

Fire Department:

Carlsbad Fire Department (575) 885-3125

Artesia Fire Department (575) 746-5051

Ambulance:

Elite Medical Transport (Carlsbad) (915) 542-1144

Trans Aero MedEvac (Artesia) (970) 657-7449

Hospitals:

Carlsbad Medical Center (575) 887-4100

Artesia General Hospital (575) 748-3333

New Mexico Dept. of Transportation:

Highway & Transportation Department (505) 795- 1401

New Mexico Railroad Commission:

Main Line (505) 476-3441

OSHA 24 Hr. Reporting

(800) 321-6742

(8 hrs. after death or 24 hrs. after in-patient, amputation, loss of an eye)

Office Contacts**911 or**

Colgate Energy LLC. (432) 695-4222
Vice President of Operations:

Casey McCain (432) 664-6140

Drilling Engineering Supervisor

Rafael Madrid (432) 556-6387

Drilling Engineering Technical Adviser

Steven Segrest (405) 550-0277

Operations Superintendent

Rick Lawson (432) 530- 3188

Drilling Superintendent

Daniel Cameron (405) 933-0435

Onsite Supervision (H&P 481 Rig Managers)

Juan Gutierrez (970)394-4768

Jonathan Jackson (970)394-4768

Onsite Supervision (H&P 481 Company Men)

Pierre Dupuis (432)438-0114

Eric Rutherford (432)438-0114

Rolando Torres (432)438-0114

Trevor Hein (432)438-0114

Emergency Accommodations

Safety Solutions Office (432) 563-0400

Safety Solutions Dispatch (432) 556-2002

Craig Strasner (432) 894-0341 (Cell)

II. H₂S CONTINGENCY PLAN SECTION

Scope:

This contingency plan provides an organized plan of action for alerting and protecting the public within an area of exposure prior to an intentional release or following the accidental release of a potentially hazardous volume of hydrogen sulfide. The plan establishes guidelines for all personnel whose work activity may involve exposure to Hydrogen Sulfide Gas (H₂S).

Objective:

Prevent any and all accidents and prevent the uncontrolled release of H₂S into the atmosphere.

Provide proper evacuation procedures to cope with emergencies.

Provide immediate and adequate medical attention should an injury occur.

Purpose, Distribution and Updating of Contingency Plan:

The Purpose of this contingency plan is to protect the general public from the harmful effects of H₂S accidentally escaping from the subject producing well. This plan is designed to accomplish its purpose by assuring the preparedness necessary to:

1. Minimize the possibility of releasing H₂S into the atmosphere during related operations.
2. Provide for the logical, efficient, and safe emergency actions required to protect the general public in the event of an accidental release of a potentially hazardous quantity of H₂S.

Supplemental information is included with this plan and is intended as reference material for anyone needing a more detailed understanding of the many factors pertinent to H₂S drilling operations safety. The release of a potentially hazardous quantity of H₂S is highly unlikely. If such a release should occur however, obviously the exact time, rate, duration, and other pertinent facts will be known in advance thus, this contingency plan must necessarily be somewhat general. The plan does review in detail, as is reasonably possible, the type of accidental release that could possibly endanger the general public, the probable extent of such danger, and the emergency actions generally appropriate. In the event of such an accidental release, the specific actions to be taken will have to be determined at the time of release by the responsible personnel at the drilling location. Complete familiarity with this plan will help such personnel make the proper decisions rapidly. Familiarity with this plan is so required all operators, operator representatives, and drilling contractor supervisory personnel who could possibly be on duty at the drilling location at the time of an H₂S emergency.

IT IS THE RESPONSIBILITY OF THE OPERATOR TO ASSURE SUCH FAMILIARITY BEFORE DRILLING WITHIN 1000' OR THREE DAYS PRIOR TO PENETRATION OF THE SHALLOWEST FORMATION KNOWN OR SUSPECTED TO CONTAIN H₂S IN POTENTIALLY HAZARDOUS QUANTITIES, AND ALSO TO ASSURE THE TIMELY ACCOMPLISHMENT OF ALL THE OTHER ACTION SPECIFIED HERE IN.

As this contingency plan was prepared considerably in advance of the anticipated H₂S operation, the plan must be kept current if it is to effectively serve its purpose. The operators will be responsible for seeing that all copies are updated. Updating the plan is required when any changes to the personnel Call List (Section) including telephone numbers occur or when any pertinent data or plans for the well are altered. The plan must also be updated when any changes in the general public likely to be within the exposure area in the event of an

accidental release from the well bore of a potentially hazardous quantity of H₂S. Two copies of this plan shall be retained at the office of Colgate Energy. Two copies shall be retained at the drilling location.

Discussion of Plan:

Suspected Problem Zones:

Implementation: This plan, with all details, is to be fully implemented 1000' before drilling into the first sour zone.

Emergency Response Procedure: This section outlines the conditions and denotes steps to be taken in the event of an emergency.

Emergency Equipment and 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 1000' before drilling into the first sour zone.

Emergency call list: Included are the telephone numbers of all persons that would need to be contacted, should an H₂S emergency occur.

Briefing: This section deals with the briefing of all persons involved with the drilling of this well.

Public Safety: Public Safety Personnel will be made aware of the drilling of this well.

Check Lists: Status check lists and procedural check lists have been included to ensure adherence to the plan.

General Information: A general information section has been included to supply support information.

III. OPERATING PROCEDURES

A. Blowout Preventer Drills

Due to the special piping and Mani folding necessary to handle poisonous gas, particular care will be taken to ensure that all rig personnel are completely familiar with their jobs during the drills. The Drilling Consultant and Tool Pusher (Rig Superintendent) are thoroughly familiar with the additional controls and piping necessary.

B. H₂S Alarm Drills

The Company Man and/ or designee will conduct frequent H₂S alarm drills for each crew by injecting a trace of H₂S where the detector will give an alarm. Under these conditions all personnel on location will put on air equipment and remain masked until all clear is announced.

C. Surface Annular Preventer/ Diverter System Testing

After installation of the surface annular preventer, Hydraulic Control Valve and diverter system, both are to be function tested. They also should be function tested frequently while drilling surface hole.

D. Blowout Preventer

After installation of the Blowout Preventer Stack, the stack will be pressure tested. The Choke manifold is also to be pressure tested at this time. This procedure will be repeated as required by the NMOCD, the BLM, or if any of the stack is nipped down. Also, at this time, the Blind and Pipe Rams are checked for correct operation.

E. Well Control Practice Drills and Safety Meeting for Crew Members

Pit drills are for the purpose of acquainting each member of the drilling crew with his duties in the event of an emergency. Drills will be held with each crew as frequently as required to thoroughly familiarize each man with his duties. Drills are to be held at least weekly from that time forward.

1. BOP Drill while on Bottom Drilling:

A. Signal will be three or more long blast given by driller on the horn.

B. Procedure will be as follows:

1. Tool Pusher: Supervises entire operation.

2. Driller

a. Gives signal.

b. Picks up Kelly.

c. Stops pumps.

d. Observes flow.

e. Signal to close (pipe rams if necessary).

f. Check that Choke Manifold is closed.

g. Record drill pipe pressure, casing pressure and determine mud volume gain.

3. Motorman

a. Go to closing unit and standby for signal to close BOP.

b. Close BOP in signal.

c. Check on BOP closing.

d. Go to floor to assist driller. (NOTE: During test drills the BOP

need not be completely closed at the discretion of the supervisor. Supervisor should make it very clear that it is a test drill only!)

4. Derrickman
 - a. Check pumps.
 - b. Go to floor for directions from the driller.
5. Floorman
 - a. Go to manifold.
 - b. Observe and record pressure.
 - c. Check manifold and BOP for leaks.
 - d. Check with driller for additional instructions.
2. BOP Drill While Making Trip:
 - A. During trip driller will fill hole every five (5) stands and check the pits to be sure hole is taking mud.
 - B. Drill Procedure is as follows:
 1. Driller
 - a. Order Safety valve installed.
 - b. Alert those not on the floor.
 - c. Go to stations as described in above drill.
3. Safety Meetings
 - A. Every person involved in the operating will be informed of the characteristics of H₂S, its danger and safety procedures to be used when it is encountered, and recommended first-aid procedure for regular rig personnel. This will be done through a series of talks made before spud.
 - B. The Safety Advisor or Drilling Supervisor will conduct these training sessions and will repeat them as deemed necessary by him or as instructed by Colgate Energy. Talks may include the following subjects:
 1. Dangers of Hydrogen Sulfide (H₂S).
 2. Use and limitations of air equipment.
 3. Use of resuscitator.
 4. Organize Buddy System.
 5. First Aid procedures.
 6. Use of H₂S detection devices.
 7. Designate responsible people.
 8. Explain rig layout and policy to visitors.
 - a. Designate smoking and safety or Muster area.
 - b. Emphasize the importance of wind directions.
 9. Describe and explain operation of BOP stack, manifold, separator, and pit piping. Include maximum allowable pressure for casing procedure.
 10. Explain functions of Safety Supervisor.
 11. Explain organize H₂S Drills.
 12. Explain the overall emergency plan with emphasis given to the evacuation phase of the plans.

- Note: The above talks will be attended by every person involved in the operation. When drilling has reached a depth where H₂S is anticipated, temporary service personnel and visitors will be directed to the Drilling Consultant, who will designate the air equipment to be used by them in case of emergency, acquaint them with the dangers involved and be sure of their safety while they are in the area. He will point out the Briefing Areas, Windsocks, and Smoking Areas. He may refuse entrance to anyone, who in his opinion should not be admitted because of lack of safety equipment, special operations in progress or for other reasons involving personnel safety.

F. Outside Service Personnel

All service people such as cementing crews, logging crews, specialist, mechanics, and welders will furnish their own safety equipment. The Company Man/ or designee will be sure that the number of people on location does not exceed the number of masks on location, and they have been briefed regarding safety procedures. He will also be sure each of these people know about smoking and "Briefing Areas" and know what to do in case of an emergency alert or drill. Visitors will be restricted, except with special permission from the Drilling Consultant, when H₂S might be encountered. They will be briefed as to what to do in case of an alert or drill.

G. Onsite/ off shift workers

All workers that are staying on site must be identified as to where they are staying while off tour. If a drill/ or emergency takes place related to an H₂S release, each crew must have a designated person(s) that will wake them up and ensure that they are cleared to the appropriate muster area immediately.

H. Simultaneous Operations (SIMOPS)

If work is going on adjacent to the location is the responsibility of the Drilling Consultant or designee to communicate any applicable risks that may affect personnel working on that adjacent location. In the case of an H₂S drill or event, there should be a designated crew member that is responsible for contacting personnel on adjacent locations. This could include just communication on potential events or in case of an event, notification to evacuate location. Drilling Consultant or designee are the Point of Contact and oversee all activities at such point of an H₂S event occurrence.

I. Area Residences/ Occupied Locations/ Public Roads

Any occupied residences/ businesses that are within a reasonable perimeter of the location (attached map will identify a 3000' radius around location) should be identified as part of this contingency and a reasonable effort will be made to gain contact information for them. As part of the briefing of the contingency plan, the team reviewing should identify where these potential receptors are and plan on who will contact them in case of a release that may impact that area.

J. Drilling Fluids

Drilling Fluid Monitoring – On Any Hazardous H₂S gas well, the earlier the warning of danger the better chance to control operations. Mud Company will be in daily contact with Colgate Energy Consultant. The Mud Engineer will take samples of the mud, analyze these samples, and make necessary recommendations to prevent H₂S gas from the formation, the pH will be increased as necessary for corrosion control.

pH Control – For normal drilling, pH of 10.5 – 11.5. Would be enough for corrosion protection. If there is an influx of H₂S gas from the formation, the pH will be increased as necessary for corrosion control.

H₂S Scavengers – If necessary H₂S scavengers will be added to the drilling mud.

IV. OPERATING CONDITIONS

A. Posting Well Condition Flags

Post the green, yellow or red well condition flag, as appropriate, on the well condition sign at the location entrance, and take necessary precautions as indicated below:

1. **Green Flag:** Potential Danger- When Drilling in known H₂S zones or when H₂S has been detected in the drilling fluid atmosphere. Protective breathing equipment shall be inspected, and all personnel on duty shall be alerted to be ready to use this equipment.
2. **Yellow Flag:** Potential Danger- When the threshold limit value of H₂S (10 PPM) or of SO₂ (5 PPM) is reached. If the concentration of H₂S or SO₂ reaches 10 PPM, protective breathing equipment shall be worn by all working personnel, and non-working personnel shall go to the upwind Safe Briefing Area.
3. **Red Flag:** Extreme danger*- When the ambient concentration of H₂S or SO₂ is reasonably believed or determined to have exceeded the potentially hazardous level. All non-essential personnel shall leave the drilling location taking the route most likely to exposure to escaping gas.

B. Requiring Air Masks Conditions

1. Whenever air masks are used, the person must be clean shaven as shown in the APC Guidelines
2. When breaking out any line where H₂S can reasonably be expected.
3. When sampling air in areas to determine if toxic concentrations of H₂S exist.
4. When working in areas where 10 PPM or more of H₂S has been detected.
5. At any time, there is doubt as to the H₂S level in the area to be entered.

C. Kick Procedure

1. It is very important that the driller be continuously alert, especially when approaching a gas formation.
2. Should gas come into the well bore, it is very important to be aware of a kick at the earliest time.
3. If a kick is identified, follow appropriate diverter or shut in procedures according to the situation that is presented utilizing appropriate kick procedures.

V. EMERGENCY PROCEDURES

- I. In the event of any evidence of H₂S level above 10ppm, take the following steps immediately:
 - a. Secure breathing apparatus.
 - b. Order non-essential personnel out of the danger zone.
 - c. Take steps to determine if the H₂S level can be corrected or suppressed, and if so, proceed with normal operations.
- II. If uncontrollable conditions occur, proceed with the following:
 - a. Take steps to protect and/or remove any public downwind of the rig, including partial evacuation or isolation. Notify necessary public safety personnel.
 - b. Remove all personnel to the Safe Briefing Area.
 - c. Notify public safety personnel for help with maintaining roadblocks, thus limiting traffic and implementing evacuation.
 - d. Determine and proceed with the best possible plan to regain control of the well. Maintain tight security and safety measures.
- III. Responsibility
 - a. The Company Approved Supervisor shall be responsible for the total implementation of the plan.
 - b. The Company Approved Supervisor shall be in complete command during any emergency.
 - c. The Company Approved Supervisor shall designate a backup Supervisor if he/she is not available.
- IV. Actions to be taken
 - a. Assign specific tasks to drilling location personnel
 - b. Evacuate the general public from the exposure area
 - c. Cordon off the exposure area to prevent entry by unauthorized persons
 - d. Request assistance if and as needed and initiate emergency notifications
 - e. Stop the dispersion of H₂S
 - f. Complete emergency notifications as required
 - g. Return the situation to normal

EMERGENCY PROCEDURE IMPLEMENTATION**I. Drilling or Tripping****a. All Personnel**

- i. When alarm sounds, don escape unit and report to upwind Safe Briefing Area.
- ii. Check status of other personnel (buddy system).
- iii. Secure breathing apparatus.
- iv. Wait for orders from supervisor.

b. Drilling Consultant

- i. Report to the upwind Safe Briefing Area.
- ii. Don Breathing Apparatus and return to the point of release with the Tool Pusher or Driller (buddy system).
- iii. Determine the concentration of H₂S.
- iv. Assess the situation and take appropriate control measures.

c. Tool Pusher

- i. Report to the upwind Safe Briefing Area.
- ii. Don Breathing Apparatus and return to the point of release with the Drilling Consultant or the Driller (buddy system).
- iii. Determine the concentration of H₂S.
- iv. Assess the situation and take appropriate control measures.

d. Driller

- i. Check the status of other personnel (in a rescue attempt, always use the buddy system).
- ii. Assign the least essential person to notify the Drilling Consultant and Tool Pusher, in the event of their absence.
- iii. Assume the responsibility of the Drilling Consultant and the Tool Pusher until they arrive, in the event of their absence.

e. Derrick Man and Floor Hands

- i. Remain in the upwind Safe Briefing Area until otherwise instructed by a supervisor.

f. Mud Engineer

- i. Report to the upwind Safe Briefing Area.
- ii. When instructed, begin check of mud for pH level and H₂S level.

g. Safety Personnel

- i. Don Breathing Apparatus.
- ii. Check status of personnel.
- iii. Wait for instructions from Drilling Consultant or Tool Pusher.

II. Taking a Kick

- a.* All Personnel report to the upwind Safe Briefing Area.
- b.* Follow standard BOP/ diverter procedures.

III. Open Hole Logging

- a.* All unnecessary personnel should leave the rig floor.
- b.* Drilling Consultant and Safety Personnel should monitor the conditions and make necessary safety equipment recommendations.

IV. Running Casing or Plugging

- a.* Follow “Drilling or Tripping” procedures.
- b.* Assure that all personnel have access to protective equipment.

VI. POST EMERGENCY ACTIONS

In the event this plan is activated, the following post emergency actions shall be taken in an effort to reduce the possibility of a reoccurrence of the type of problem that required its activation, and/or assure that any future activation of a similar plan will be as effective as possible.

- A. Review the factors that caused or permitted the emergency occur, and if the need is indicated, modify operating, maintenance and/or surveillance procedures.
- B. If the need is indicated, retrain employees in blowout prevention, H₂S emergency procedures and etc.
- C. Clean up, recharge, restock, repair, and/ or replace H₂S emergency equipment as necessary, and return it to its proper place. (For whatever rental equipment is used, this will be the responsibility of Rental Company).
- D. See that future H₂S drilling contingency plans are modified accordingly, if the need is indicated.

VII. IGNITION PROCEDURES

Responsibilities:

The decision to ignite the well is the responsibility of the DRILLING CONSULTANT in concurrence with the STATE POLICE. In the event the Drilling Consultant is incapacitated, it becomes the responsibility of the RIG TOOL PUSHER. This 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 of controlling the blowout under the prevailing conditions.

If time permits, notify the main office, but do not delay if human life is in danger. Initiate the first phase of the evacuation plan.

Instructions for Igniting the Well:

1. Two people are required for the actual igniting operation. Both men must wear self-contained breathing apparatus and must use a full body harness and attach a retrievable safety line to the D-Ring in the back. One man must monitor the atmosphere for explosive gases with the LEL monitor, while the Drilling Consultant is responsible for igniting the well.
2. The primary method to ignite is a 25mm flare gun with a range of approximately 500 feet.
3. Ignite from upwind and do not approach any closer than is warranted.
4. Select the ignition site best suited for protection and which offers an easy escape route.
5. Before igniting, check for the presence of combustible gases.
6. After igniting, continue emergency actions and procedures as before.
7. All unassigned personnel will limit their actions to those directed by the Drilling Consultant.

Note: After the well is ignited, burning Hydrogen Sulfide will convert to Sulfur Dioxide, which is also highly toxic. Also, both are heavier than air. Do not assume the area is safe even after the well is ignited.

VIII. TRAINING PROGRAM

When working in an area where Hydrogen Sulfide (H₂S) might be encountered, definite training requirements must be carried out. The Company Supervisor will ensure that all personnel, at the well site, have had adequate training in the following:

1. Hazards and characteristics of Hydrogen Sulfide (H₂S).
2. Physicals effects of Hydrogen Sulfide on the human body.
3. Toxicity of Hydrogen Sulfide and Sulfur Dioxide.
4. H₂S detection, Emergency alarm and sensor location.
5. Don and Doff of SCBA and be clean shaven.
6. Emergency rescue.
7. Resuscitators.
8. First aid and artificial resuscitation.
9. The effects of Hydrogen Sulfide on metals.
10. Location safety.

Service company personnel and visiting personnel must be notified if the zone contains H₂S, and each service company must provide adequate training and equipment for their employees before they arrive at the well site.

IX. EMERGENCY EQUIPMENT

Lease Entrance Sign:

Should be located at the lease entrance with the following information:

CAUTION – POTENTIAL POISON GAS
HYDROGEN SULFIDE
NO ADMITTANCE WITHOUT AUTHORIZATION

Respiratory Equipment:

- Fresh air breathing equipment should be placed at the safe briefing areas and should include the following:
- Two SCBA's at each briefing area.
- Enough airline units to operate safely, anytime the H₂S concentration reaches the IDLH level (100 ppm).

- Cascade system with enough breathing air hose and manifolds to reach the rig floor, the derrickman and the other operation areas.

Windssocks or Wind Streamers:

- A minimum of two 10" windssocks located at strategic locations so that they may be seen from any point on location.
- Wind streamers (if preferred) should always be placed at various locations on the well site to ensure wind consciousness. (Corners of location).

Hydrogen Sulfide Detector and Alarms:

- 1 - Four channel H₂S monitor with alarms.
- Three (3) sensors located as follows: #1 – Rig Floor, #2 – Shale Shaker, #3 – Cellar.
- Gastec or Draeger pump with tubes.
- Sensor test gas.

Well Condition Sign and Flags:

The Well Condition Sign w/flags should be placed a minimum of 150' before you enter the location. It should have three (3) color coded flags (green, yellow and red) that will be used to denote the following location conditions:

GREEN – Normal Operating Conditions
YELLOW – Potential Danger
RED – Danger, H₂S Gas Present

Auxiliary Rescue Equipment:

- Stretcher
- 2 – 100' Rescue lines.
- First Aid kit properly stocked.

Mud Inspection Equipment:

Garret Gas Train or Hach Tester for inspection of Hydrogen Sulfide in the drilling mud system.

Fire Extinguishers:

Adequate fire extinguishers shall be located at strategic locations.

Blowout Preventer:

- The well shall have hydraulic BOP equipment for the anticipated bottom hole pressure (BHP).
- The BOP should be tested upon installation.
- BOP, Choke Line and Kill Line will be tested as specified by Operator.

Confined Space Monitor:

There should be a portable multi-gas monitor with at least 3 sensors (O₂, LEL H₂S), preferably 4 (O₂, LEL, H₂S, CO). This instrument should be used to test the atmosphere of any confined space before entering. It should also be used for atmospheric testing for LEL gas before beginning any type of Hot Work. Proper calibration documentation will need to be provided.

Communication Equipment:

- Proper communication equipment such as cell phones or 2-way radios should be available at the rig.
- Radio communication shall be available for communication between the company man's trailer, rig floor and the tool pusher's trailer.
- Communication equipment shall be available on the vehicles.

Special Control Equipment:

- Hydraulic BOP equipment with remote control on the ground.
- Rotating head at the surface casing point.

Evacuation Plan:

- Evacuation routes should be established prior to spudding the well.
- Should be discussed with all rig personnel.

Designated Areas:***Parking and Visitor area:***

- All vehicles are to be parked at a pre-determined safe distance from the wellhead.
- Designated smoking area.

Safe Briefing Areas:

- Two Safe Briefing Areas shall be designated on either side of the location at the maximum allowable distance from the well bore so they offset prevailing winds, or they are at a 180-degree angle if wind directions tend to shift in the area.
- Personal protective equipment should be stored at both briefing areas and if a moveable cascade trailer is used, it should be kept upwind of existing winds. When wind is from the prevailing direction, both briefing areas should be accessible.

Note:

- Additional equipment will be available at the H₂S Provider Safety office.
- Additional personal H₂S monitors are available for all employees on location.
- Automatic Flare Igniters are recommended for installation on the rig.

X. CHECKLISTS**Rig-up & Equipment Status Check List**

Note: Initial & Date each item as they are implemented. Multiple wells require additional Columns to be Dated/ Initialed

	Date & Initial 1 st Well	Date & Initial 2 nd Well	Date & Initial 3 rd Well	Date & Initial 4 th Well
Sign at location entrance.				
Two (2) windsocks (in required locations).				
Wind Streamers (if required).				
SCBA's on location (Minimum of 2 @ each Muster Area)				
Air packs (working packs and escape packs), inspected and ready for use.				
Spare bottles for each air pack (if required).				
Cascade system and hose line hook up.				
Choke manifold hooked-up and tested. (before drilling out surface casing.)				
Remote Hydraulic BOP control tested (before drilling out surface casing).				
BOP tested (before drilling out surface casing).				
Safe Briefing Areas set-up				
Well Condition sign and flags on location and ready.				
Hydrogen Sulfide detection/ alarm system hooked-up & tested.				
Stretcher on location				
2 – 100' Lifelines on location.				
1 – 20# Fire Extinguisher in safety trailer.				
Confined Space monitor on location and tested.				
All rig crews and supervisor trained (as required).				
All rig crews and supervision medically qualified and fit tested on proper respirators				
Access restricted for unauthorized personnel.				
Pre-spud meeting held reviewing Contingencies				
Drills on H ₂ S and well control procedures.				
All outside service contractors advised of potential H ₂ S on the well.				
25mm Flare Gun on location w/flares.				

Procedural Check List

Perform the following on each tour:

1. Check fire extinguishers to see that they have the proper charge.
2. Check breathing equipment to ensure that they have not been tampered with.
3. Check pressure on the supply air bottles to make sure they are capable of recharging.
4. Make sure all the Hydrogen Sulfide detection systems are operative.
5. Ensure that all BOP/ Surface Annular/ Diverter systems are functioning and operational.

Perform the following each week:

1. Check each piece of breathing equipment to make sure that they are fully charged and operational. This requires that the air cylinder be opened, and the mask assembly be put on and tested to make sure that the regulators and masks are properly working. Negative and Positive pressure should be conducted on all masks.
2. BOP skills.
3. Check supply pressure on BOP accumulator stand-by source.
4. Check all breathing air mask assemblies to see that straps are loosened and turned back, ready for use.
5. Check pressure on cascade air cylinders to make sure they are fully charged and ready to use for refill purposes if necessary.
6. Check all cascade system regulators to make sure they work properly.
7. Perform breathing drills with on-site personnel.
8. Check the following supplies for availability (may be with H₂S Techs On-call):
 - Stretcher
 - Safety Belts and Ropes
 - Spare air Bottles
 - Spare Oxygen Bottles (if resuscitator required)
 - Gas Detector Pump and Tubes
 - Emergency telephone lists
 - Test the Confined Space Monitor to verify the batteries are good.

XI. BRIEFING PROCEDURES

The following scheduled briefings will be held to ensure the effective drilling and operation of this project:

Pre-Spud Meeting

Date: Prior to spudding the well.

Attendance: Drilling Supervisor
 Drilling Engineer
 Drilling Consultant
 Rig Tool Pushers
 Rig Drillers
 Mud Engineer
 All Safety Personnel
 Key Service Company Personnel

Purpose: Review and discuss the well program, step-by-step, to insure complete understanding of assignments and responsibilities.

XII. EVACUATION PLAN

General Plan

The direct lines of action prepared by Colgate Energy to protect the public from hazardous gas situations are as follows:

1. When the company approved supervisor (Drilling Consultant, Tool Pusher or Driller) determine that Hydrogen Sulfide gas cannot be limited to the well location, and the public will be involved, he will activate the evacuation plan. Escape routes are noted on the area map.
2. Company safety personnel or designee will notify the appropriate local government agency that a hazardous condition exists, and evacuation needs to be implemented.
3. Company approved safety personnel that have been trained in the use of the proper emergency equipment will be utilized.
4. Law enforcement personnel (State Police, Local Police Department, Fire Department, and the Sheriff's Department) will be called to aid in setting up and maintaining roadblocks. Also, they will aid in evacuation of the public if necessary.

NOTE: 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.

5. After the discharge of gas has been controlled, "Company" personnel will determine when the area is safe for re-entry.
6. If a major release is secured, all exposed housing, vehicles, rig buildings, and low-lying areas and other structures downwind must be tested and clear with SCBAs donned to ensure that all residual H₂S is cleared. Fans, or opening of doors is recommended to ensure that areas are cleared out as part of this process.

XIII. APPENDICES AND GENERAL INFORMATION

Radius of Exposure Affected Notification List

(within a 65' radius of exposure @100ppm)

The geologic zones that will be encountered during drilling are known to contain hazardous quantities of H₂S. The accompanying map illustrates the affected areas of the community. The residents within this radius will be notified via a hand delivered written notice describing the activities, potential hazards, conditions of evacuation, evacuation drill siren alarms and other precautionary measures.

Evacuee Description:

Residents:

Notification Process:

A continuous siren audible to all residence will be activated, signaling evacuation of previously notified and informed residents.

Evacuation Plan:

All evacuees will migrate lateral to the wind direction.

The Operating Company will identify all home bound or highly susceptible individuals and make special evacuation preparations, interfacing with the local and emergency medical service as necessary.

Toxic Effects of H₂S Poisoning

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 is colorless and transparent. Hydrogen Sulfide is almost as toxic as Hydrogen Cyanide and is 5-6 times more toxic than Carbon Monoxide. Occupational exposure limits for Hydrogen Sulfide and other gases are compared below in Table 1. Toxicity table for H₂S and physical effects are shown in Table 2.

Table 1
Permissible Exposure Limits of Various Gases

<u>Common Name</u>	<u>Symbol</u>	<u>Sp. Gravity</u>	<u>TLV</u>	<u>STEL</u>	<u>IDLH</u>
Hydrogen Cyanide	HCN	.94	4.7 ppm	4.7 ppm	50 ppm
Hydrogen Sulfide	H ₂ S	1.192	10 ppm	15 ppm	100 ppm
Sulfide Dioxide	SO ₂	2.21	2 ppm	5 ppm	100 ppm
Chlorine	CL	2.45	.5 ppm	1 ppm	10 ppm
Carbon Monoxide	CO	.97	25 ppm	200 ppm	1200 ppm
Carbon Dioxide	CO ₂	1.52	5000 ppm	30,000 ppm	40,000 ppm
Methane	CH ₄	.55	5% LEL	15% UEL	

Definitions

- A. TLV – Threshold Limit Value is the concentration employees may be exposed based on a TWA (time weighted average) for eight (8) hours in one day for 40 hours in one (1) week. This is set by ACGIH (American Conference of Governmental Hygienists) and regulated by OSHA.
- B. STEL – Short Term Exposure Limit is the 15-minute average concentration an employee may be exposed to providing that the highest exposure never exceeds the OEL (Occupational Exposure Limit). The OEL for H₂S is 20 PPM.
- C. IDLH – Immediately Dangerous to Life and Health is the concentration that has been determined by the ACGIH to cause serious health problems or death if exposed to this level. The IDLH for H₂S is 100 PPM.
- D. TWA – Time Weighted Average is the average concentration of any chemical or gas for an eight (8) hour period. This is the concentration that any employee may be exposed based on a TWA.

Toxicity Table of H₂S

<u>Percent %</u>	<u>PPM</u>	<u>Physical Effects</u>
.0001	1	Can smell less than 1 ppm.
.001	10	TLV for 8 hours of exposure.
.0015	15	STEL for 15 minutes of exposure.
.01	100	Immediately Dangerous to Life & Health. Kills sense of smell in 3 to 5 minutes.
.02	200	Kills sense of smell quickly, may burn eyes and throat.
.05	500	Dizziness, cessation of breathing begins in a few minutes .
.07	700	Unconscious quickly, death will result if not rescued promptly.
.10	1000	Death will result unless rescued promptly. Artificial resuscitation may be necessary.

PHYSICAL PROPERTIES OF H₂S

The properties of all gases are usually described in the context of seven major categories:

- COLOR
- ODOR
- VAPOR DENSITY
- EXPLOSIVE LIMITS
- FLAMMABILITY
- SOLUBILITY (IN WATER)
- BOILING POINT

Hydrogen Sulfide is no exception. Information from these categories should be considered in order to provide a complete picture of the properties of the gas.

COLOR – TRANSPARENT

Hydrogen Sulfide is colorless, so it is invisible. This fact simply means that you can't rely on your eyes to detect its presence. In fact, that makes this gas extremely dangerous to be around.

ODOR – ROTTEN EGGS

Hydrogen Sulfide has a distinctive offensive smell, like "rotten eggs". For this reason, it earned its common name "sour gas". However, H₂S, even in low concentrations, is so toxic that it attacks and quickly impairs a victim's sense of smell, so it could be fatal to rely on your nose as a detection device.

VAPOR DENSITY – SPECIFIC GRAVITY OF 1.192

Hydrogen Sulfide is heavier than air, so it tends to settle in low-lying areas like pits, cellars or tanks. If you find yourself in a location where H₂S is known to exist, protect yourself. Whenever possible, work in an area upwind and keep to higher ground.

EXPLOSIVE LIMITS – 4.0% TO 44%

Mixed with the right proportion of air or oxygen, H₂S will ignite and burn or explode, producing another alarming element of danger besides poisoning.

FLAMMABILITY

Hydrogen Sulfide will burn readily with a distinctive clear blue flame, producing Sulfur Dioxide (SO₂), another hazardous gas that irritates the eyes and lungs.

SOLUBILITY – 4 TO 1 RATIO WITH WATER

Hydrogen Sulfide can be dissolved in liquids, which means that it can be present in any container or vessel used to carry or hold well fluids including oil, water, emulsion and sludge. The solubility of H₂S is dependent on temperature and pressure, but if conditions are right, simply agitating a fluid containing H₂S may release the gas into the air.

BOILING POINT – (-77° Fahrenheit)

Liquefied Hydrogen Sulfide boils at a very low temperature, so it is usually found as a gas.

RESPIRATOR USE

The Occupational Safety and Health Administration (OSHA) regulate the use of respiratory protection to protect the health of employees. OSHA's requirements are written in the Code of Federal Regulations, Title 29, Part 1910, Section 134, Respiratory Protection. This regulation requires that all employees who might be required to wear respirators, shall complete an OSHA mandated medical evaluation questionnaire. The employee then should be fit tested prior to wearing any respirator while being exposed to hazardous gases.

Written procedures shall be prepared covering safe use of respirators in dangerous atmospheric situations, which might be encountered in normal operations or in emergencies. Personnel shall be familiar with these procedures and the available respirators.

Respirators shall be inspected prior to and after each use to make sure that the respirator has been properly cleaned, disinfected and that the respirator works properly. The unit should be fully charged prior to being used.

Anyone who may use respirators shall be properly trained in how to properly seal the face piece. They shall wear respirators in normal air and then in a test atmosphere. (Note: Such items as facial hair (beard or sideburns) and eyeglass temple pieces will not allow a proper seal.) Anyone who may be expected to wear respirators should have these items removed before entering a toxic atmosphere. A special mask must be obtained for anyone who must wear eyeglasses. Contact lenses should not be allowed.

Respirators shall be worn during the following conditions:

- A. Any employee who works near the top or on the top of any tank unless tests reveal less than 20 ppm of H₂S.
- B. When breaking out any line where H₂S can reasonably be expected.
- C. When sampling air in areas where H₂S may be present.
- D. When working in areas where the concentration of H₂S exceeds the Threshold Limit Value for H₂S (10 ppm).
- E. At any time where there is a doubt as to the H₂S level in the area to be entered.

EMERGENCY RESCUE PROCEDURES

DO NOT PANIC!!!

Remain Calm – Think

1. Before attempting any rescue, you must first get out of the hazardous area yourself. Go to a safe briefing area.
2. Sound alarm and activate the 911 system.
3. Put on breathing apparatus. At least two persons should do this, when available use the buddy system.
4. Rescue the victim and return them to a safe briefing area.
5. Perform an initial assessment and begin proper First Aid/CPR procedures.
6. Keep victim lying down with a blanket or coat, etc., under the shoulders to keep airway open. Conserve body heat and do not leave unattended.
7. If the eyes are affected by H₂S, wash them thoroughly with potable water. For slight irritation, cold compresses are helpful.
8. In case a person has only minor exposure and does not lose consciousness totally, it's best if he doesn't return to work until the following day.
9. Any personnel overcome by H₂S should always be examined by medical personnel. They should always be transported to a hospital or doctor.

Facial Hair – Clean Shaven Examples

Purpose: To define clean shaven expectations in the field for: 1) Respirator Use, if applicable and 2) First Aid Administration, if situation occurs related to H₂S exposure, having no facial hair can greatly benefit response time and treatment ability.

