



COG Operating LLC

Lea County, NM (NAD27 NME)

MC Federal #64

MC Federal #64

HOBBS OCD

OH

OCT 24 2011

RECEIVED

Plan: Plan #2 - 7-7/8" Hole

SHL = 1838' FSL & 2167' FEL

BHL = 1660' FSL & 2300' FEL

Top of Paddock = 1660' FSL & 2300' FEL @ 5450' TVD

Standard Planning Report

20 October, 2011



Scientific Drilling
Directional Drilling Operations

OCT 25 2011



Scientific Drilling Planning Report



Database:	EDM-Julio	Local Co-ordinate Reference:	Well MC Federal #64
Company:	COG Operating LLC	TVD Reference:	GL Elev @ 4042.00usft
Project:	Lea County, NM (NAD27 NME)	MD Reference:	GL Elev @ 4042.00usft
Site:	MC Federal #64	North Reference:	Grid
Well:	MC Federal #64	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2 - 7-7/8" Hole		

Project	Lea County, NM (NAD27 NME)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	MC Federal #64		
Site Position:	Northing:	661,690.70 usft	Latitude: 32° 49' 4.098 N
From: Map	Easting:	673,253.10 usft	Longitude: 103° 46' 9.782 W
Position Uncertainty:	0.00 usft	Slot Radius: 13-3/16 "	Grid Convergence: 0.31 °

Well	MC Federal #64		
Well Position	+N-S	0.00 usft	Northing: 661,690.70 usft
	+E-W	0.00 usft	Easting: 673,253.10 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	Ground Level: 4,042.00 usft

Wellbore	OH		
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2011/10/20	7.68	60.69	48,913

Design	Plan #2 - 7-7/8" Hole		
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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	216.44

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	
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,408.64	4.17	216.44	2,408.46	-6.11	-4.51	2.00	2.00	0.00	216.44	
5,249.26	4.17	216.44	5,241.54	-172.39	-127.29	0.00	0.00	0.00	0.00	
5,457.90	0.00	0.01	5,450.00	-178.50	-131.80	2.00	-2.00	0.00	180.00	TG1-MC Fed #64
7,107.90	0.00	0.01	7,100.00	-178.50	-131.80	0.00	0.00	0.00	0.01	PBHL-MC Fed #64



Scientific Drilling
Planning Report



Database:	EDM-Julio	Local Co-ordinate Reference:	Well MC Federal #64
Company:	COG Operating,LLC	TVD Reference:	GL Elev @ 4042.00usft
Project:	Lea County, NM (NAD27 NME)	MD Reference:	GL Elev @ 4042.00usft
Site:	MC Federal #64	North Reference:	Grid
Well:	MC Federal #64	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2 - 7-7/8" Hole		

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	
South HL-MC Fed #64 - East HL-MC Fed #64										
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00	
8-5/8" Casing										
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
KOP Start Build 2.00°/100°										
2,300.00	2.00	216.44	2,299.98	-1.40	-1.04	1.75	2.00	2.00	0.00	
2,400.00	4.00	216.44	2,399.84	-5.61	-4.15	6.98	2.00	2.00	0.00	
2,408.64	4.17	216.44	2,408.46	-8.11	-4.51	7.59	2.00	2.00	0.00	
EOC hold 4.17°										
2,500.00	4.17	216.44	2,499.57	-11.46	-8.46	14.24	0.00	0.00	0.00	
2,600.00	4.17	216.44	2,599.31	-17.31	-12.78	21.52	0.00	0.00	0.00	
2,700.00	4.17	216.44	2,699.04	-23.16	-17.10	28.80	0.00	0.00	0.00	
2,800.00	4.17	216.44	2,798.78	-29.02	-21.43	36.07	0.00	0.00	0.00	
2,900.00	4.17	216.44	2,898.51	-34.87	-25.75	43.35	0.00	0.00	0.00	
3,000.00	4.17	216.44	2,998.25	-40.73	-30.07	50.62	0.00	0.00	0.00	
3,100.00	4.17	216.44	3,097.98	-46.58	-34.39	57.90	0.00	0.00	0.00	
3,200.00	4.17	216.44	3,197.72	-52.43	-38.72	65.18	0.00	0.00	0.00	
3,300.00	4.17	216.44	3,297.45	-58.29	-43.04	72.45	0.00	0.00	0.00	
3,400.00	4.17	216.44	3,397.19	-64.14	-47.36	79.73	0.00	0.00	0.00	
3,500.00	4.17	216.44	3,496.92	-69.99	-51.68	87.01	0.00	0.00	0.00	
3,600.00	4.17	216.44	3,596.66	-75.85	-56.00	94.28	0.00	0.00	0.00	
3,700.00	4.17	216.44	3,696.39	-81.70	-60.33	101.56	0.00	0.00	0.00	
3,800.00	4.17	216.44	3,796.13	-87.56	-64.65	108.84	0.00	0.00	0.00	
3,900.00	4.17	216.44	3,895.86	-93.41	-68.97	116.11	0.00	0.00	0.00	
4,000.00	4.17	216.44	3,995.60	-99.26	-73.29	123.39	0.00	0.00	0.00	
4,100.00	4.17	216.44	4,095.33	-105.12	-77.62	130.67	0.00	0.00	0.00	
4,200.00	4.17	216.44	4,195.07	-110.97	-81.94	137.94	0.00	0.00	0.00	
4,300.00	4.17	216.44	4,294.80	-116.82	-86.26	145.22	0.00	0.00	0.00	
4,400.00	4.17	216.44	4,394.54	-122.68	-90.58	152.50	0.00	0.00	0.00	
4,500.00	4.17	216.44	4,494.27	-128.53	-94.90	159.77	0.00	0.00	0.00	
4,600.00	4.17	216.44	4,594.01	-134.39	-99.23	167.05	0.00	0.00	0.00	
4,700.00	4.17	216.44	4,693.74	-140.24	-103.55	174.33	0.00	0.00	0.00	
4,800.00	4.17	216.44	4,793.48	-146.09	-107.87	181.60	0.00	0.00	0.00	
4,900.00	4.17	216.44	4,893.21	-151.95	-112.19	188.88	0.00	0.00	0.00	
5,000.00	4.17	216.44	4,992.95	-157.80	-116.52	196.15	0.00	0.00	0.00	
5,100.00	4.17	216.44	5,092.68	-163.65	-120.84	203.43	0.00	0.00	0.00	
5,200.00	4.17	216.44	5,192.42	-169.51	-125.16	210.71	0.00	0.00	0.00	
5,249.26	4.17	216.44	5,241.55	-172.39	-127.29	214.29	0.00	0.00	0.00	
Start Drop 2.00°/100°										
5,300.00	3.16	216.44	5,292.18	-175.00	-129.22	217.54	2.00	-2.00	0.00	
5,400.00	1.16	216.44	5,392.11	-178.03	-131.45	221.30	2.00	-2.00	0.00	
5,457.90	0.00	0.01	5,450.00	-178.50	-131.80	221.89	2.00	-2.00	0.00	
EOC hold 0.00° - Top of Paddock - TG1-MC Fed #64										
7,107.90	0.00	0.01	7,100.00	-178.50	-131.80	221.89	0.00	0.00	0.00	
PBHL-MC Fed #64										



Scientific Drilling Planning Report



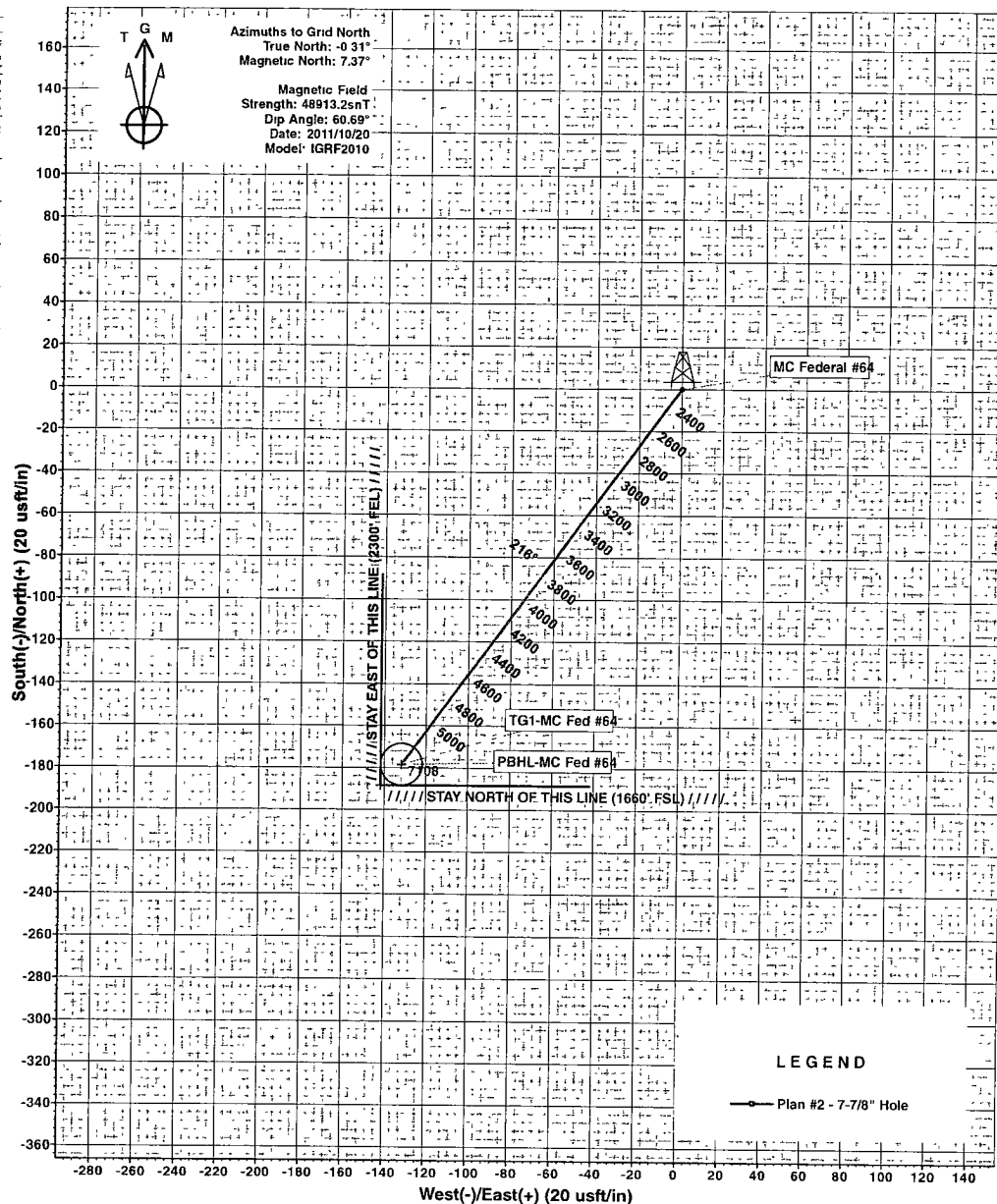
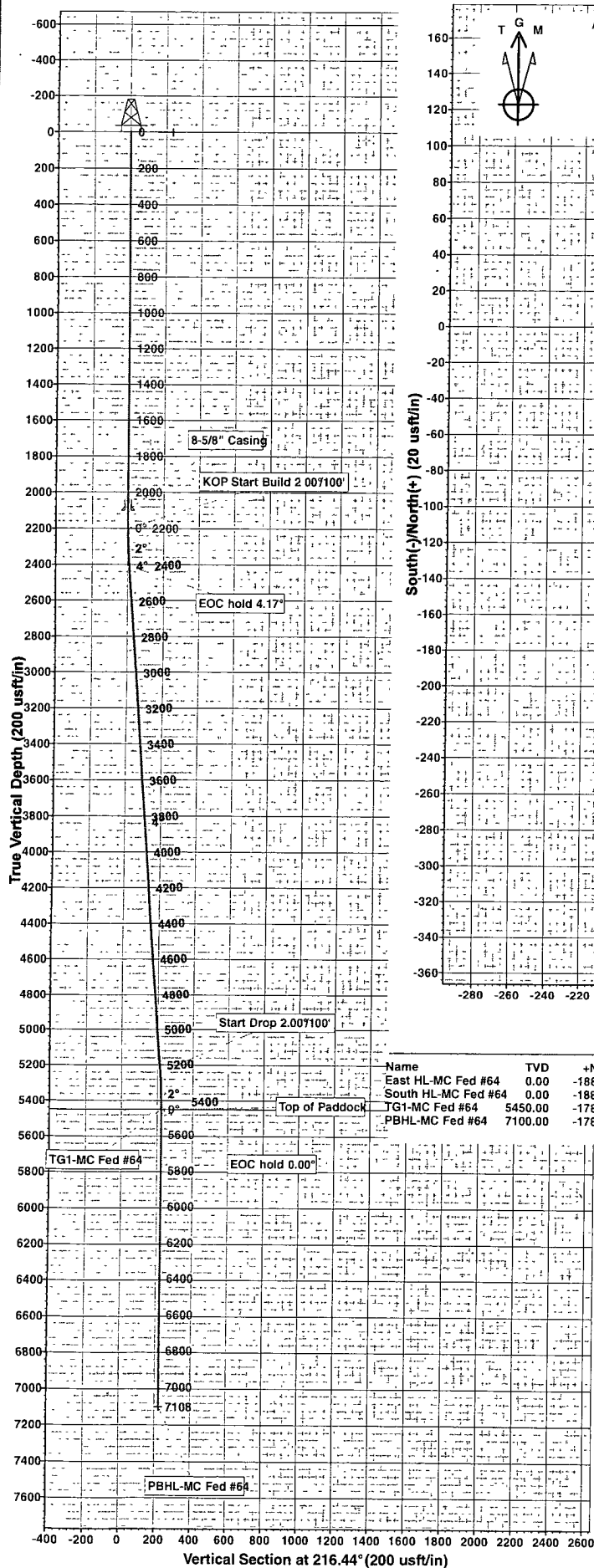
Database:	EDM-Julio	Local Co-ordinate Reference:	Well MC Federal #64
Company:	COG Operating LLC	TVD Reference:	GL Elev @ 4042.00usft
Project:	Lea County, NM (NAD27-NME)	MD Reference:	GL Elev @ 4042.00usft
Site:	MC Federal #64	North Reference:	Grid
Well:	MC Federal #64	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #2 - 7-7/8" Hole		

Design Targets									
Target Name	hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	
	Shape	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)	
South HL-MC Fed #64		0.00	0.00	0.00	-188.50	-141.80	661,502.20	673,111.30	Latitude Longitude
- plan misses target center by 235.88usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Rectangle (sides W100.00 H0.00 D0.00)									
East HL-MC Fed #64		0.00	0.00	0.00	-188.50	-141.80	661,502.20	673,111.30	Latitude Longitude
- plan misses target center by 235.88usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Rectangle (sides W0.00 H100.00 D0.00)									
TG1-MC Fed #64		0.00	0.00	5,450.00	-178.50	-131.80	661,512.20	673,121.30	Latitude Longitude
- plan hits target center									
- Circle (radius 10.00)									
PBHL-MC Fed #64		0.00	0.00	7,100.00	-178.50	-131.80	661,512.20	673,121.30	Latitude Longitude
- plan hits target center									
- Circle (radius 10.00)									

Casing Points				
Measured Depth	Vertical Depth		Casing Diameter	Hole Diameter
(usft)	(usft)	Name	(")	(")
2,100.00	2,100.00	8-5/8" Casing	8-5/8	12-1/4

Formations				
Measured Depth	Vertical Depth	Name	Lithology	Dip Direction
(usft)	(usft)			(°) (°)
5,457.90	5,450.00	Top of Paddock		0.00

Plan Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(usft)	(usft)	+N/-S	+E/-W	
		(usft)	(usft)	
2,200.00	2,200.00	0.00	0.00	KOP Start Build 2.00°/100'
2,408.64	2,408.46	-6.11	-4.51	EOC hold 4.17°
5,249.26	5,241.55	-172.39	-127.29	Start Drop 2.00°/100'
5,457.90	5,450.00	-178.50	-131.80	EOC hold 0.00°



WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
East HL-MC Fed #64	0.00	-188.50	-141.80	661502.20	673111.30	32°49' 2.241 N	103°46' 11.455 W	Rectangle (Sides : L 100.00 W 00.00)
South HL-MC Fed #64	0.00	-188.50	-141.80	661502.20	673111.30	32°49' 2.241 N	103°46' 11.455 W	Rectangle (Side s: L 0 0 W 100.00)
GBH-MC Fed #64	5450.00	-178.50	-131.80	661512.20	673121.30	32°49' 2.339 N	103°46' 11.337 W	Circle (Radius: 1 0 00)
PBHL-MC Fed #64	7100.00	-178.50	-131.80	661512.20	673121.30	32°49' 2.339 N	103°46' 11.337 W	Circle (Radius: 10.00)

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	2200.00	0.00	0.00	2200.00	0.00	0.00	0.00	0.00	0.00	
3	2408.64	4.17	216.44	2408.46	-6.11	-4.51	2.00	216.44	7.59	
4	5249.26	4.17	216.44	5241.54	-172.39	-127.29	0.00	0.00	214.29	
5	5457.90	0.00	0.00	5450.00	-178.50	-131.80	2.00	180.00	221.89	TG1-MC Fed #64
6	7107.90	0.00	0.00	7100.00	-178.50	-131.80	0.00	0.00	221.89	PBHL-MC Fed #64

WELL DETAILS: MC Federal #64

		Ground Level:		4042.00		
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	661690.70	673253.10	32°49' 4.098 N	103°46' 9.782 W	

PROJECT DETAILS: Lea County, NM (NAD27 NME)

Plan: Plan #2 - 7-7/8" Hole (MC Federal #64/OH)

Geodetic System:	US State Plane 1927 (Exact solution)	Created By:	Julio Pina	Date:	20-Oct-11
Datum:	NAD 1927 (NADCON CONUS)				
Ellipsoid:	Clarke 1866	Checked:	_____	Date:	_____
Zone:	New Mexico East 3001				
System Datum:	Mean Sea Level	Reviewed:	_____	Date:	_____
		Approved:	_____	Date:	_____



New Mexico Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

John H. Bemis
Cabinet Secretary-Designate

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

Jami Bailey
Division Director
Oil Conservation Division



Bureau of Land Management

ATT: Craig Cranston
P O Box 1778
Carlsbad, NM 88221

State Land Office

ATT: Joe Mraz
P O Box 1148
Santa Fe, NM 87504

RE: APPLICATION FOR PERMIT TO DRILL IN POTASH AREA

OPERATOR Three Rivers Operating Co. LLC

LEASE NAME Lobo 26 State #1H

PROPOSED LOCATION D-26-21s-33e, 660/N & 330/W

PROPOSED DEPTH Bone Spring, 15500'

Gentlemen:

The application for permit to drill identified above has been filed with this office of the New Mexico Oil Conservation Division. Pursuant to the provisions of Oil Conservation Division Order R - 111 - P, please advise this office whether the location is within an established Life-of-Mine-Reserve area filed with and approved by your office. If not, please advise whether it is within the buffer zone established by the order.

Thank you for your assistance. Please return as soon as possible.

Very truly yours,

OIL CONSERVATION DIVISION

EL Gonzales
Acting Supervisor, District I

Response:

The above reference location is in the LMR (2011) year ----- Yes _____ No ✓

The above reference location is within the Buffer Zone ----- Yes _____ No ✓

Signed _____

Date 10-21-11

Printed Signature JAMES RUTLEY

Representing BLM-CFO





New Mexico Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

John H. Bemis
Cabinet Secretary-Designate

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

Jami Bailey
Division Director
Oil Conservation Division



Bureau of Land Management

ATT: Craig Cranston
P O Box 1778
Carlsbad, NM 88221

State Land Office

ATT: Joe Mraz
P O Box 1148
Santa Fe, NM 87504

RE: APPLICATION FOR PERMIT TO DRILL IN POTASH AREA

OPERATOR Three Rivers Operating Co LLC

LEASE NAME Lobo 26 State #2H

PROPOSED LOCATION E-26-21s-33e, 1980/N & 330/W

PROPOSED DEPTH Bone Springs, 15500'

Gentlemen:

The application for permit to drill identified above has been filed with this office of the New Mexico Oil Conservation Division. Pursuant to the provisions of Oil Conservation Division Order R - 111 - P, please advise this office whether the location is within an established Life-of-Mine-Reserve area filed with and approved by your office. If not, please advise whether it is within the buffer zone established by the order.

Thank you for your assistance. Please return as soon as possible.

Very truly yours,

OIL CONSERVATION DIVISION

EL Gonzales
Acting Supervisor, District I

Response:

The above reference location is in the LMR 2011 year ----- Yes _____ No ☒

The above reference location is within the Buffer Zone ----- Yes _____ No ☒

Signed

Date 10-21-11

Printed Signature

JAMES RUTLEY

Representing

BLM- CFO

