

OCD-ARTESIA

ATS-10-176  
EA-10-271Form 3160-3  
(August 2007)

RECEIVED

FEB - 5 2010

FORM APPROVED  
OMB No 1004-0137  
Expires July 31, 2010UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

NMOCD ARTESIA

## APPLICATION FOR PERMIT TO DRILL OR REENTER

5 Lease Serial No.  
SHL:LS#NMNM98807 BHL:LS#VO5557

6. If Indian, Allottee or Tribe Name

N/A

7 If Unit or CA Agreement, Name and No.  
N/A8 Lease Name and Well No.  
CARBON VALLEY 25 FED COM #5H

9 API Well No.

30-015-37602

10 Field and Pool, or Exploratory  
DOG CANYON; WOLFCAMP

11. Sec., T. R. M. or Blk. and Survey or Area

SEC. 25, T16S, R27E

12 County or Parish  
EDDY13 State  
NM3a. Address 1100 MIRA VISTA BLVD.  
PLANO, TX. 75093-46983b Phone No. (include area code)  
972-931-0700

4. Location of Well (Report location clearly and in accordance with any State requirements \*)

At surface 1980' FSL &amp; 200' FEL, UNIT I

At proposed prod. zone BHL: 1980' FSL &amp; 330' FWL, UNIT L

UNORTHODOX  
LOCATION14 Distance in miles and direction from nearest town or post office\*  
Approximately 11 miles NE of Artesia, New Mexico15 Distance from proposed\*  
location to nearest  
property or lease line, ft  
(Also to nearest drig. unit line, if any)  
200' at surface  
688' at Top Wolfcamp16 No. of acres in lease  
20017. Spacing Unit dedicated to this well  
16018 Distance from proposed location\*  
to nearest well, drilling, completed,  
applied for, on this lease, ft  
349' at Wolfcamp  
Penetration Point19 Proposed Depth  
10779' MD 6325' TVD  
No Pilot Hole20 BLM/BIA Bond No. on file  
NM216321 Elevations (Show whether DF, KDB, RT, GL, etc.)  
3510' GL22 Approximate date work will start\*  
02/01/201023. Estimated duration  
30-35 days

## 24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No.1, must be attached to this form:

1. Well plat certified by a registered surveyor
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office)

4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification
6. Such other site specific information and/or plans as may be required by the BLM.

25 Signature

Name (Printed/Typed)

A. Arnold Nall

Date

12/31/2009

Title

VP Operations

Approved by (Signature)

Is/ Don Peterson

Name (Printed/Typed)

Date

FEB - 3 2010

Title

FIELD MANAGER

Office

CARLSBAD FIELD OFFICE

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Conditions of approval, if any, are attached.

APPROVAL FOR TWO YEARS

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2) well becomes orthodox @ approx 6150 MD

\*(Instructions on page 2)

SEE ATTACHED FOR  
CONDITIONS OF APPROVALAPPROVAL SUBJECT TO  
GENERAL REQUIREMENTS  
AND SPECIAL STIPULATIONS  
ATTACHED

## State of New Mexico

## DISTRICT I

1625 N. FRENCH DR., HOBBS, NM 88240

Energy, Minerals and Natural Resources Department

Form C-102

## DISTRICT II

1301 W. GRAND AVENUE, ARTESIA, NM 88210

## OIL CONSERVATION DIVISION

1220 SOUTH ST. FRANCIS DR.

Santa Fe, New Mexico 87505

Revised October 12, 2005

Submit to Appropriate District Office

State Lease - 4 Copies

Fee Lease - 3 Copies

## DISTRICT III

1000 Rio Brazos Rd., Aztec, NM 87410

## DISTRICT IV

1220 S. ST. FRANCIS DR., SANTA FE, NM 87505

## WELL LOCATION AND ACREAGE DEDICATION PLAT

☐ AMENDED REPORT

API Number <b>30-015-37602</b>	Pool Code <b>17970</b>	Pool Name DOG CANYON; WOLFCAMP	<input checked="" type="checkbox"/>
Property Code <b>37485</b>	Property Name CARBON VALLEY 25 FEDERAL COM		Well Number 5H
OGRID No. <b>15363</b>	Operator Name MURCHISON OIL & GAS, INC.		Elevation 3510'

## 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	25	16-S	27-E		1980	SOUTH	200	EAST	EDDY

## Bottom Hole Location If Different From Surface

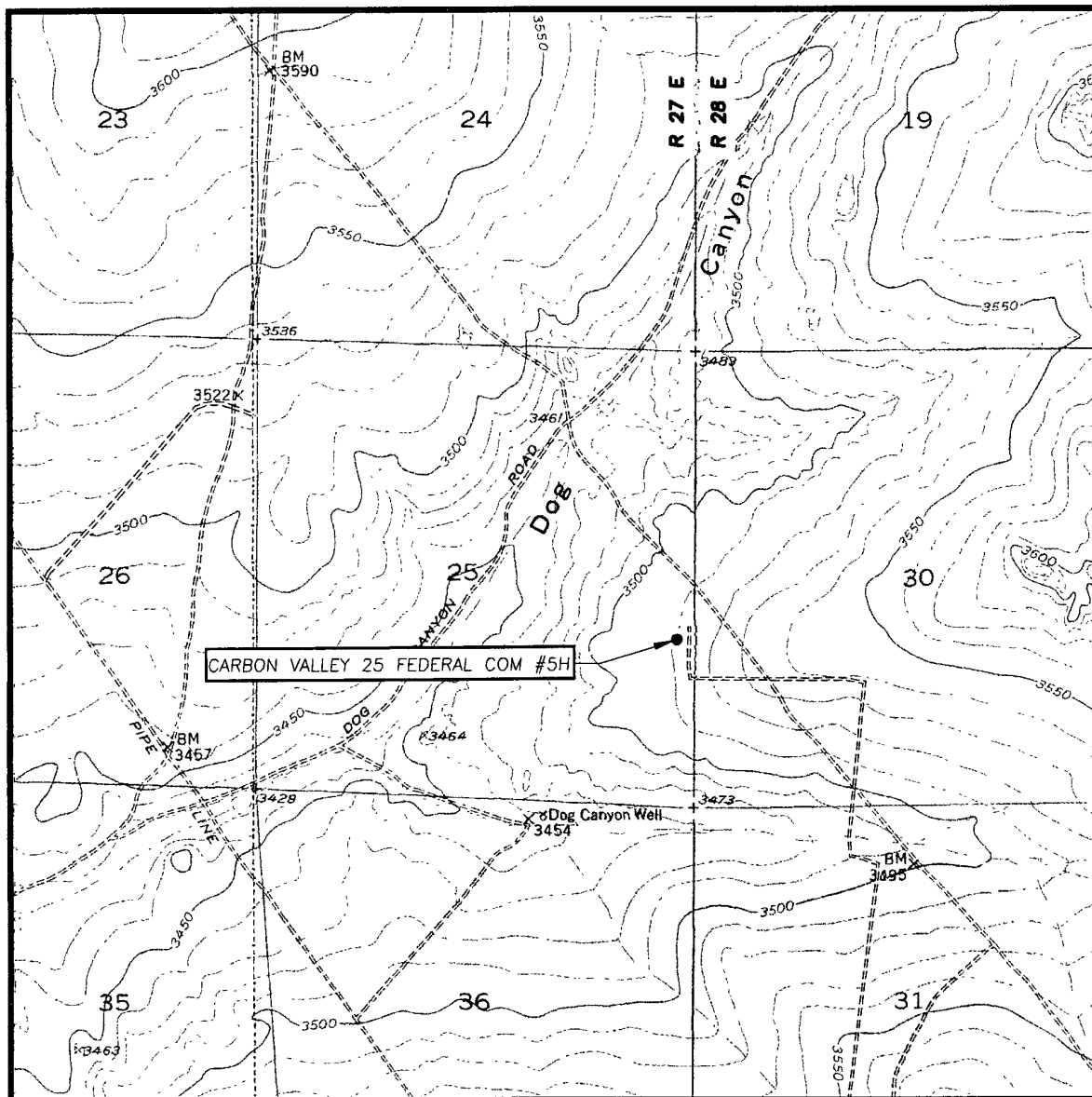
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
L	25	16-S	27-E		1980	SOUTH	330	WEST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
160			

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

<p>GEODETIC COORDINATES NAD 27 NME SURFACE LOCATION Y=687764.6 N X=533554.6 E LAT.=32.890697° N LONG.=104.224021° W</p> <p>BOTTOM HOLE LOCATION Y=687943.9 N X=528825.9 E LAT.=32.891264° N LONG.=104.241314° W</p> <p>PROJECT AREA</p> <p>PRODUCING AREA</p> <p>PAY INTERVAL HORZ. DIST. = 4225.9' GRID AZ. = 272°10'153"</p> <p>PENETRATION POINT Y=687783.06 N X=533067.43 E LAT.=32.890752° N LONG.=104.225672° W</p> <p>DETAIL 3506.2' 3516.3' 600' 3508.6' 3517.7'</p> <p>330' B.H. 707' 1980'</p> <p>507.4' 200' S.L. P.P.</p>	<p><b>OPERATOR CERTIFICATION</b></p> <p>I hereby certify that the information 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 mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</p> <p><i>[Signature]</i> 12/31/09 Signature Date A. Arnold Nall Printed Name</p> <p><b>SURVEYOR CERTIFICATION</b></p> <p>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.</p> <p>RONALD J. EIDSON DECEMBER 4, 2009 Date Surveyed 3238 Signature &amp; Seal of Professional Surveyor LA 12-28-09 09.13.1335</p> <p>Certificate No. GARY EIDSON 12641 RONALD J. EIDSON 3239</p>
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# LOCATION VERIFICATION MAP



SCALE: 1" = 2000'

CONTOUR INTERVAL:  
DIAMOND MOUND, N.M. - 10'SEC. 25 TWP. 16-S RGE. 27-ESURVEY N.M.P.M.COUNTY EDDY STATE NEW MEXICODESCRIPTION 1980' FSL & 200' FELELEVATION 3510'OPERATOR MURCHISON  
OIL & GAS, INC.LEASE CARBON VALLEY 25 FED. COM

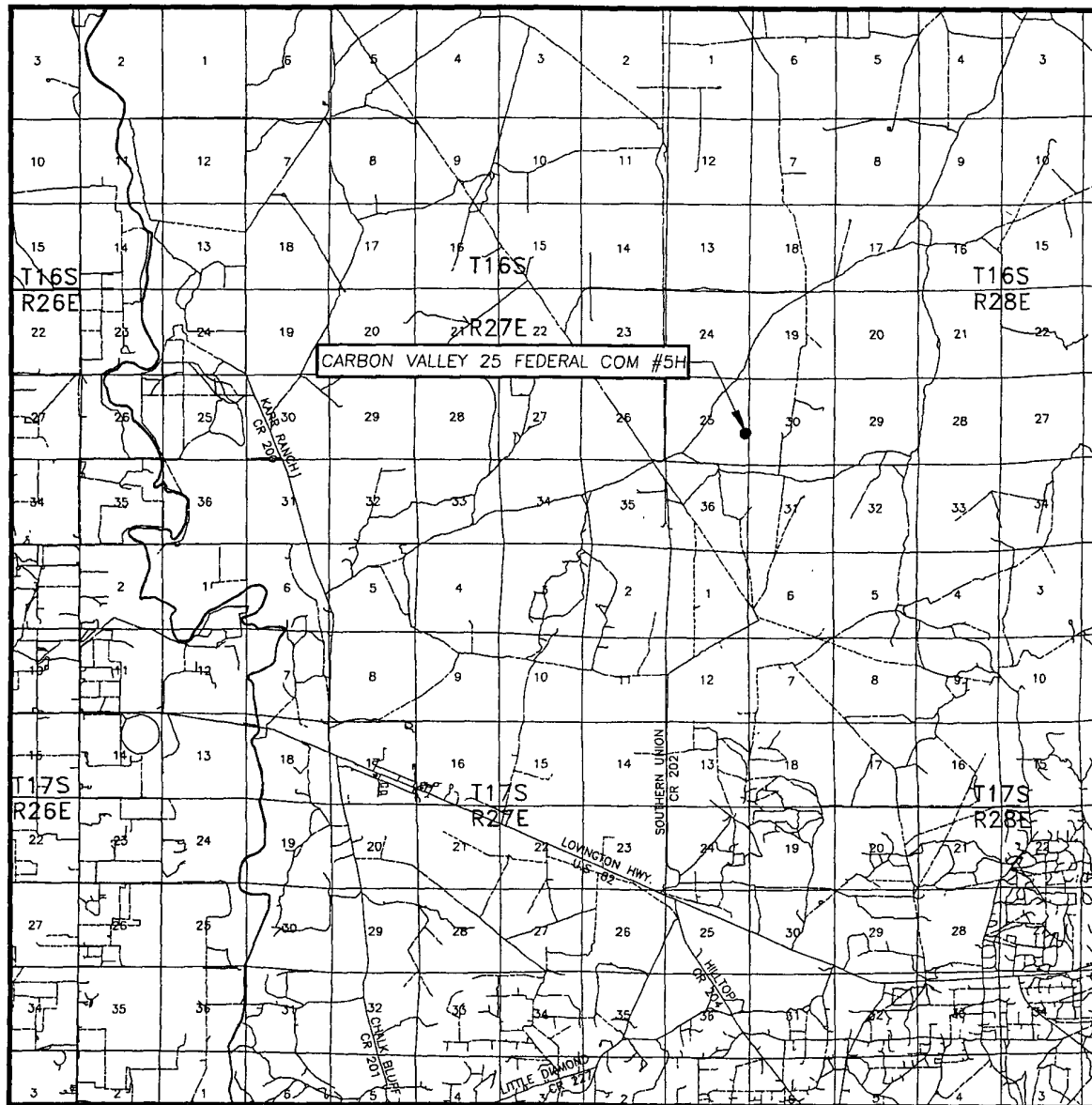
U.S.G.S. TOPOGRAPHIC MAP

DIAMOND MOUND, N.M.

PROVIDING SURVEYING SERVICES  
SINCE 1946  
**JOHN WEST SURVEYING COMPANY**  
412 N. DAL PASO  
HOBBS, N.M. 88240  
(575) 393-3117

# EXHIBIT B

## VICINITY MAP



SCALE: 1" = 2 MILES

SEC. 25 TWP. 16-S RGE. 27-E

SURVEY N.M.P.M.

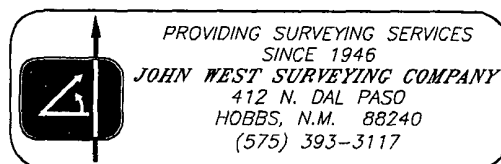
COUNTY EDDY STATE NEW MEXICO

DESCRIPTION 1980' FSL & 200' FEL

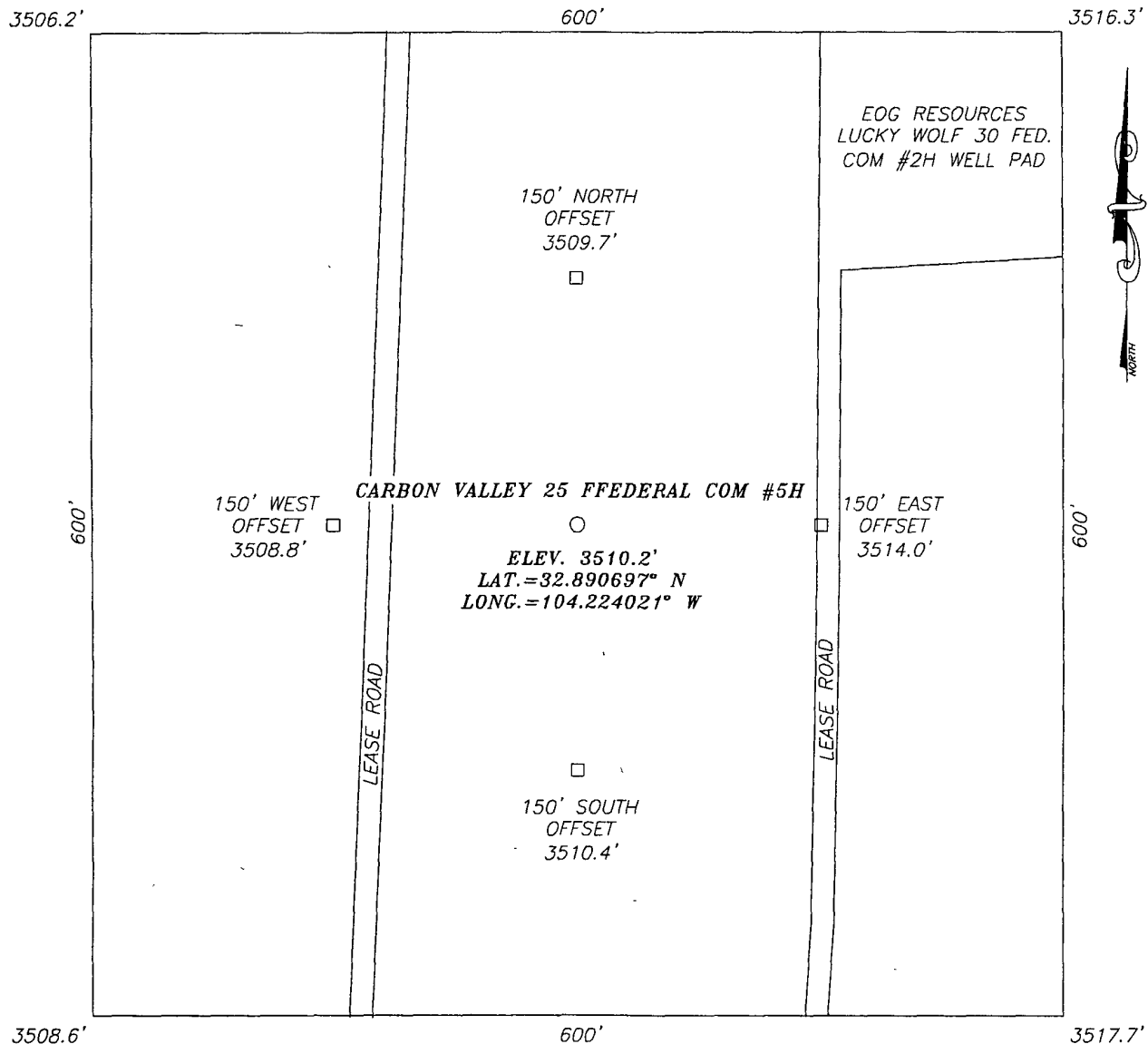
ELEVATION 3510'

OPERATOR MURCHISON  
OIL & GAS, INC.

LEASE CARBON VALLEY 25 FED. COM

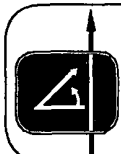


**SECTION 25, TOWNSHIP 16 SOUTH, RANGE 27 EAST, N.M.P.M.,**  
 EDDY COUNTY, NEW MEXICO

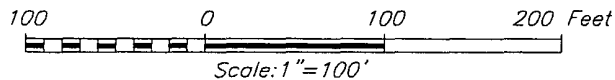


**DIRECTIONS TO LOCATION**

FROM THE INTERSECTION OF U.S. HWY. #82 AND CO. RD. #202 (SOUTHERN UNION), GO NORTH ON CO. RD. #202 APPROX. 2.6 MILES; TURN LEFT AND GO NORTHWEST APPROX. 2.4 MILES. TURN LEFT AND GO NORTH APPROX. 0.1 MILE TO A "Y" INTERSECTION. VEER RIGHT AND GO NORTHWEST APPROX. 1.6 MILES. TURN LEFT AND GO WEST APPROX. 0.1 MILE. TURN RIGHT AND GO NORTH APPROX. 0.4 MILES. TURN LEFT AND GO WEST APPROX. 0.4 MILES. TURN RIGHT AND GO NORTH APPROX. 0.1 MILE. THIS LOCATION STAKE IS APPROX. 140 FEET WEST OF LEASE ROAD.



PROVIDING SURVEYING SERVICES  
 SINCE 1946  
**JOHN WEST SURVEYING COMPANY**  
 412 N. DAL PASO  
 HOBBS, N.M. 88240  
 (575) 393-3117

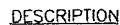


**MURCHISON OIL & GAS, INC.**

CARBON VALLEY 25 FEDERAL COM #5H WELL  
 LOCATED 1980 FEET FROM THE SOUTH LINE  
 AND 200 FEET FROM THE EAST LINE OF SECTION 25,  
 TOWNSHIP 16 SOUTH, RANGE 27 EAST, N.M.P.M.,  
 EDDY COUNTY, NEW MEXICO.

Survey Date: 12/4/09		Sheet 1 of 1 Sheets	
W.O. Number: 09.11.1149		Dr By: LA	Rev 1:N/A
Date: 12/7/09		09111149	Scale: 1"=100'


SECTION 25, TOWNSHIP 16 SOUTH, RANGE 27 EAST, N.M.P.M.,  
SECTION 30, TOWNSHIP 16 SOUTH, RANGE 28 EAST, N.M.P.M.,  
EDDY COUNTY, NEW MEXICO.



NOTE: BEARINGS SHOWN HEREON ARE  
MERCATOR GRID AND CONFORM TO THE  
NEW MEXICO COORDINATE SYSTEM  
"NEW MEXICO EAST ZONE" NORTH  
AMERICAN DATUM 1983. DISTANCES  
ARE SURFACE VALUES.

1000 0 1000 2000 FEET

Scale: 1" = 1000'



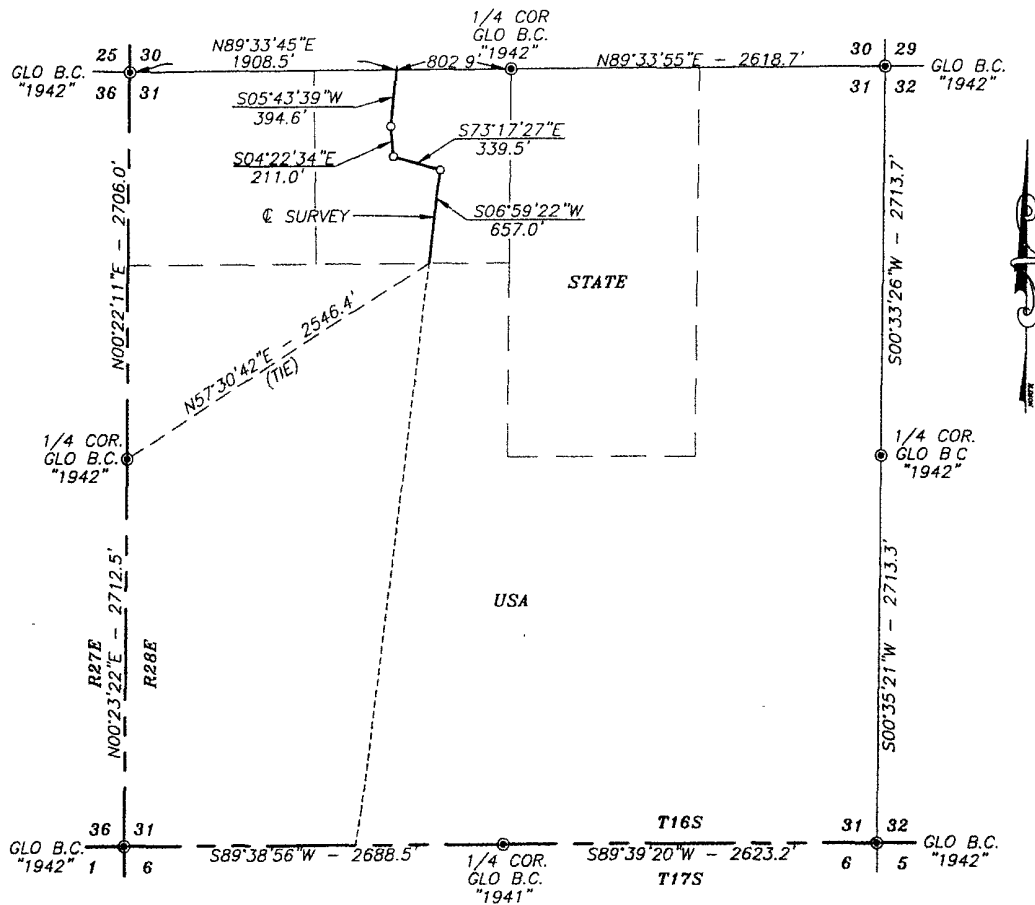
PROVIDING SURVEYING SERVICES  
SINCE 1946  
**JOHN WEST SURVEYING COMPANY**  
412 N. DAL PASO  
HOBBS, N.M. 88240  
(575) 393-3117

SURVEY OF AN ACCESS ROAD CROSSING  
SECTION 25, TOWNSHIP 16 SOUTH, RANGE 27 EAST,  
SECTION 30, TOWNSHIP 16 SOUTH, RANGE 28 EAST,  
N.M.P.M., EDDY COUNTY, NEW MEXICO

Survey Date: 12/4/09	Sheet 1 of 1 Sheets
W.O. Number: 09.13.1335	Drawn By: LA
Date: 12/24/09	09131335

# EXHIBIT E-3

SECTION 31, TOWNSHIP 16 SOUTH, RANGE 28 EAST, N.M.P.M.,  
EDDY COUNTY, NEW MEXICO.



## DESCRIPTION

A STRIP OF LAND 20.0 FEET WIDE CROSSING STATE OF NEW MEXICO LAND IN SECTION 31, TOWNSHIP 16 SOUTH, RANGE 28 EAST, NMPM, EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET RIGHT AND 15.0 FEET LEFT OF THE FOLLOWING DESCRIBED CENTERLINE SURVEY:

BEGINNING AT A POINT ON THE NORTH LINE OF SAID SECTION, WHICH LIES S89°33'45\"W 802.9 FEET FROM THE NORTH QUARTER CORNER OF SAID SECTION; THEN S05°43'39\"W 394.6 FEET; THEN S04°22'34\"E 211.0 FEET; THEN S73°17'27\"E 339.5 FEET; THEN S06°59'22\"W 657.0 FEET TO A POINT ON THE SOUTH LINE OF THE NORTHEAST QUARTER OF THE NORTHWEST QUARTER OF SAID SECTION, WHICH LIES N57°30'42\"E 2546.4 FEET FROM THE WEST QUARTER CORNER OF SAID SECTION.

SAID STRIP OF LAND BEING 1602.1 FEET OR 97.10 RODS IN LENGTH, CONTAINING 0.736 ACRES MORE OR LESS AND BEING ENTIRELY LOCATED IN THE NORTHEAST QUARTER OF THE NORTHWEST QUARTER.

NOTE: BEARINGS SHOWN HEREON ARE MERCATOR GRID AND CONFORM TO THE NEW MEXICO COORDINATE SYSTEM \"NEW MEXICO EAST ZONE\" NORTH AMERICAN DATUM 1983. DISTANCES ARE SURFACE VALUES.

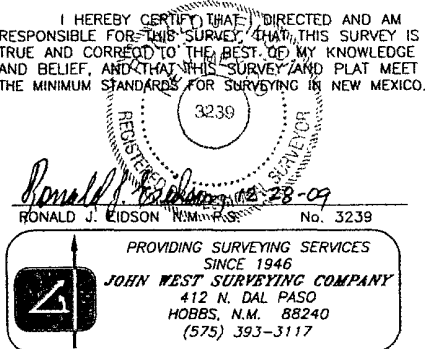
I HEREBY CERTIFY THAT I DIRECTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.

1000 0 1000 2000 FEET  
Scale: 1\"=1000'

MURCHISON OIL & GAS, INC.

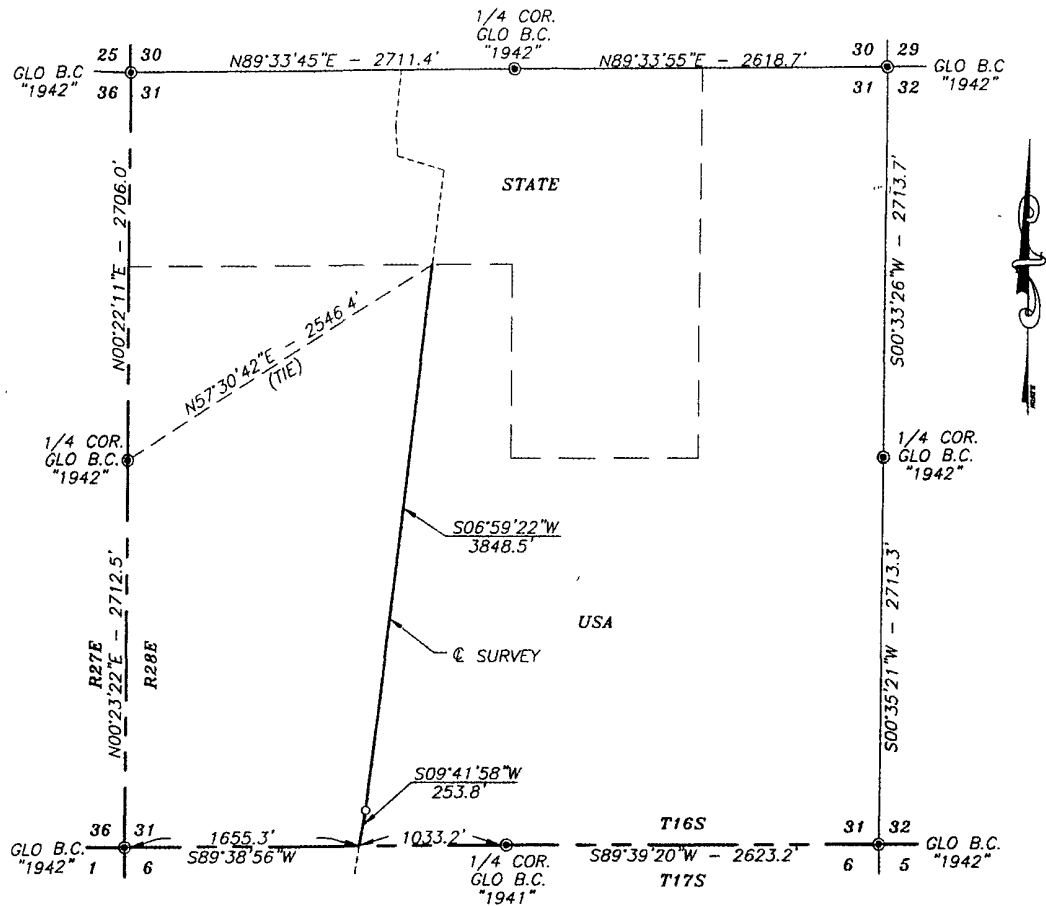
SURVEY OF AN ACCESS ROAD CROSSING  
SECTION 31, TOWNSHIP 16 SOUTH, RANGE 28 EAST,  
N.M.P.M., EDDY COUNTY, NEW MEXICO

Survey Date: 12/4/09	Sheet 1 of 1 Sheets
W.O. Number: 09.13.1335	Drawn By: LA
Date: 12/24/09	09131335



# EXHIBIT E-4

SECTION 31, TOWNSHIP 16 SOUTH, RANGE 28 EAST, N.M.P.M.,  
EDDY COUNTY, NEW MEXICO.



## DESCRIPTION

A STRIP OF LAND 50.0 FEET WIDE AND 4102.3 FEET OR 0.777 MILES IN LENGTH CROSSING USA LAND IN SECTION 31, TOWNSHIP 16 SOUTH, RANGE 28 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO AND BEING 25.0 FEET LEFT AND 25.0 FEET RIGHT OF THE ABOVE PLATTED CENTERLINE SURVEY.

NOTE: BEARINGS SHOWN HEREON ARE  
MERCATOR GRID AND CONFORM TO THE  
NEW MEXICO COORDINATE SYSTEM  
"NEW MEXICO EAST ZONE" NORTH  
AMERICAN DATUM 1983. DISTANCES  
ARE SURFACE VALUES.

I HEREBY CERTIFY THAT, DIRECTED AND AM  
RESPONSIBLE FOR THIS SURVEY THAT THIS SURVEY IS  
TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE  
AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET  
THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.

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

MURCHISON OIL & GAS, INC.

SURVEY OF AN ACCESS ROAD CROSSING  
SECTION 31, TOWNSHIP 16 SOUTH, RANGE 28 EAST,  
N.M.P.M., EDDY COUNTY, NEW MEXICO

Survey Date: 12/4/09	Sheet 1 of 1 Sheets
W.O. Number: 09.13.1335	Drawn By: LA
Date: 12/24/09	09131335

3239  
RONALD J. EDSON, N.M.P.S., No. 3239  
PROVIDING SURVEYING SERVICES  
SINCE 1946  
JOHN WEST SURVEYING COMPANY  
412 N. DAL PASO  
HOBBS, N.M. 88240  
(575) 393-3117



## STATEMENT ACCEPTING RESPONSIBILITY FOR OPERATIONS

Murchison Oil & Gas Inc.  
1100 Mira Vista Boulevard  
Plano, Texas 75093-4698

The undersigned accepts all applicable terms, conditions, stipulations and restrictions covering operations conducted on the leased land or portion thereof, as described below:

Lease No:	SHL: LS # NMNM 98807 BHL: STATE (LS #VO-5557)
Well Name:	Carbon Valley 25 Fed Com #5-H
Legal Description of Land:	SL: 1980' FSL & 200' FEL, Unit I BHL: 1980' FSL & 330' FWL, Unit L Sec 25, T16S, R27E Eddy County, New Mexico
Formation(s) (if applicable):	Wolfcamp
Bond Coverage:	\$25,000 statewide bond of Murchison Oil & Gas, Inc.
BLM Bond File No:	Personal Statewide Bond NM 2163

December 31, 2009  
Date

Arnold Nall  
Arnold Nall  
VP, Operations  
Murchison Oil & Gas Inc.

EXHIBIT C-1

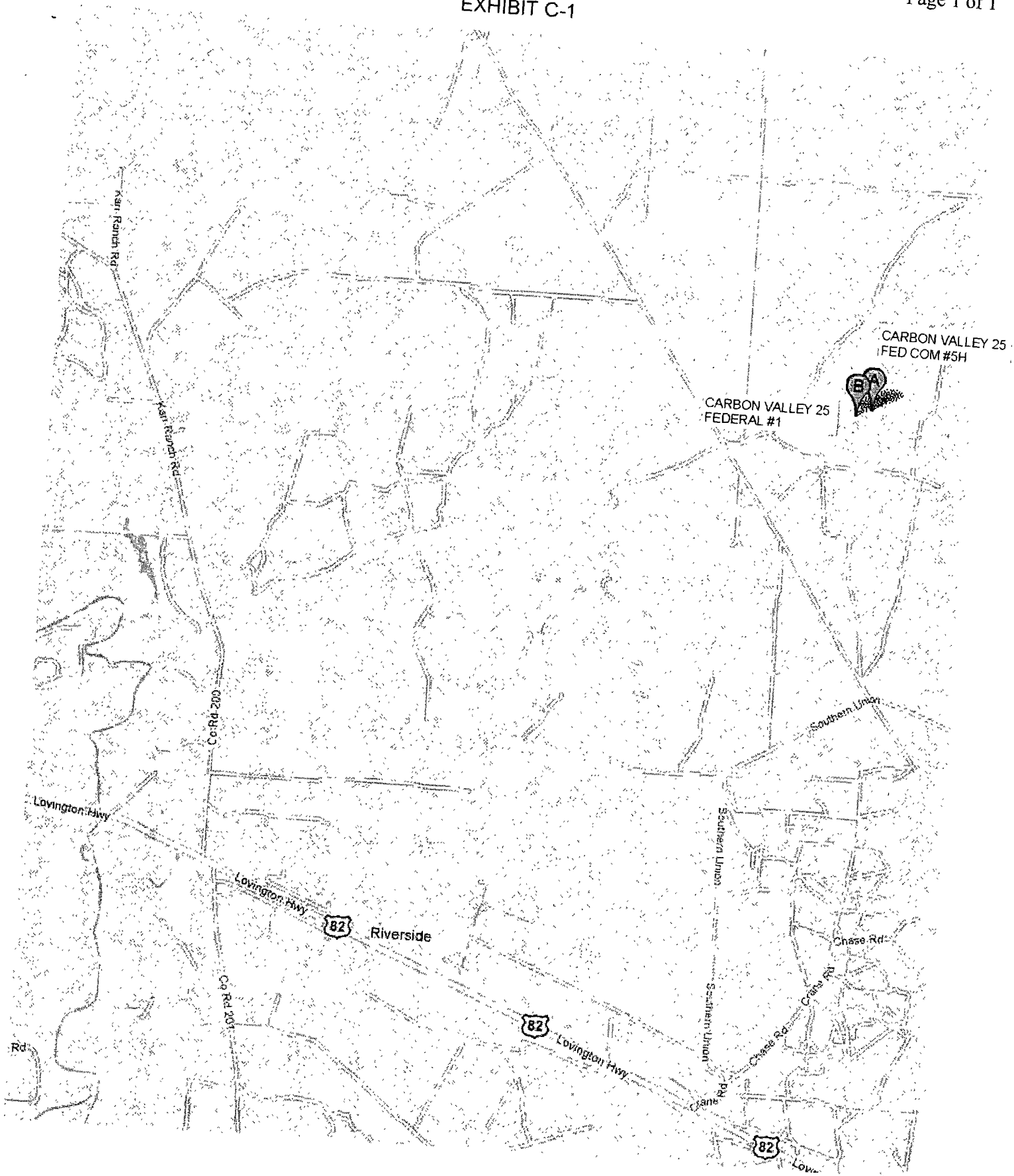
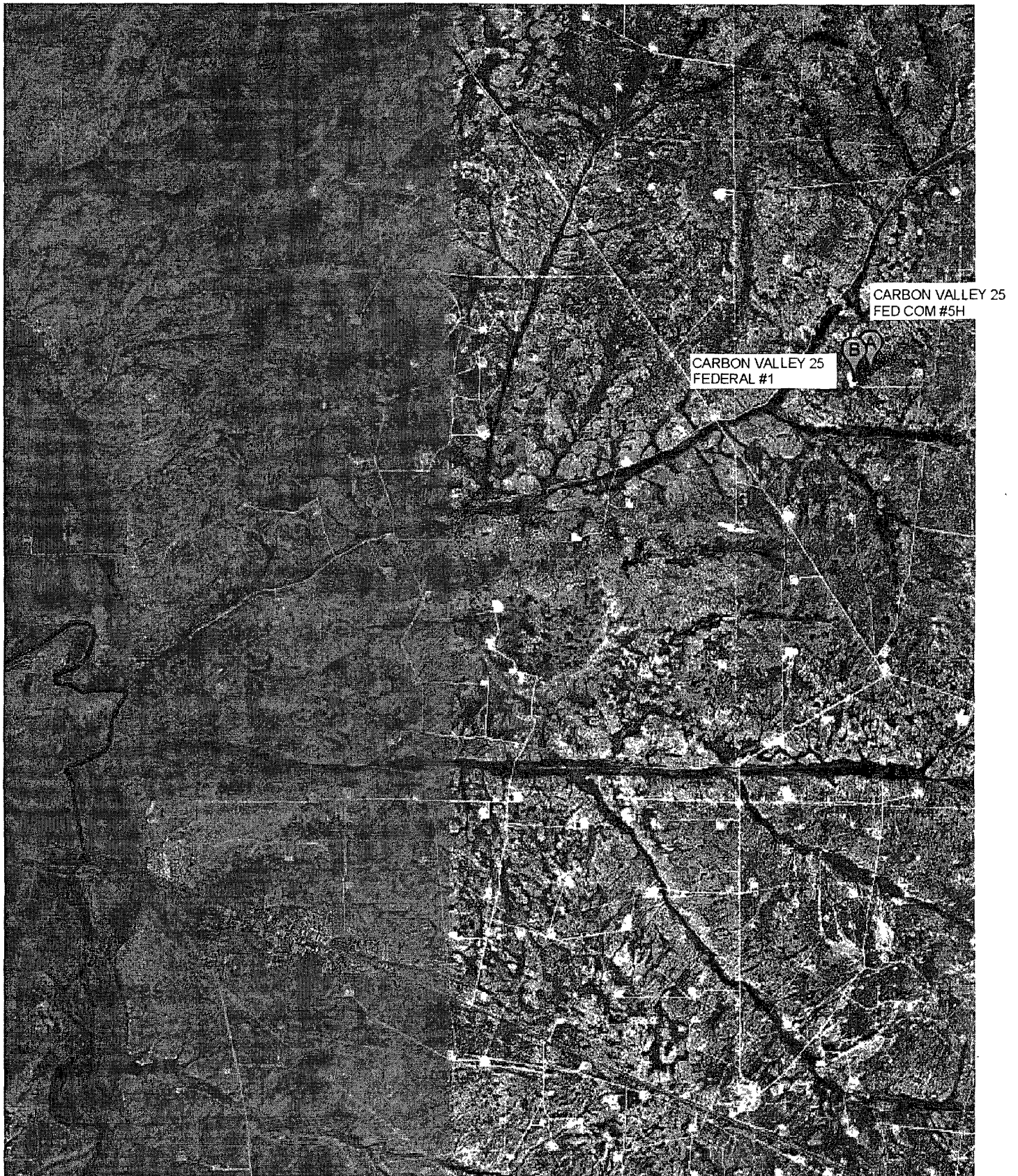


EXHIBIT C-2



Imagery ©2009 DigitalGlobe, Cnes/Spot Image, NMRGIS, GeoEye -

**ATTACHMENT TO FORM 3160-3**  
**Murchison Oil & Gas, Inc.**  
**Carbon Valley 25 Fed Com #5-H**  
**SL: 1980' FSL & 200' FEL, UNIT I**  
**BHL: 1980' FSL & 330' FWL, UNIT L**  
**Sec 25, T16S, R27E**  
**Eddy County, New Mexico**

1. Proration Unit Spacing: 160 acres
2. Ground Elevation: 3510'      Est. RKB 3528'

3. ESTIMATED TOPS OF IMPORTANT GEOLOGIC MARKERS

	<u>DEPTH (RKB)</u>	<u>SUBSURFACE</u>
Yates	152'	+3376'
Queen	852'	+2676'
Premier	1490'	+2038'
San Andres	1670'	+1858'
Glorietta	3110'	+418'
Yeso	3204'	+324'
Tubb	4418'	-890'
Abo	5138'	-1610'
Wolfcamp	6282'	-2754'

\*No Pilot Hole will be drilled: Horizontal KOP @ 5,740' +/- TVD

PROPOSED DEPTHS: TVD 6325' and MD 10779'

4. ESTIMATED DEPTHS OF ANTICIPATED FRESH WATER, OIL, OR GAS

Fresh Water	100' – 120'	Dewey Lake
Fresh Water	190' – 215'	Yates Sandstone
Fresh Water	340' – 360'	Seven Rivers Carbonate
Fresh Water	515' – 525'	Bowers Sand (Seven Rivers)
Oil/Gas	1670'	San Andres
Oil/Gas	3110'	Glorietta
Oil/Gas	4418'	Tubb
Oil/Gas	5138'	Abo
Oil/Gas	6282'	Wolfcamp

5. CASING AND CEMENTING PROGRAM

Casing Size	Hole Size	From To	Weight	Grade	Joint	Conditions
9-5/8"	12-1/4"	0' - 1100'	36.0#	J-55	ST&C	New
7"	8-3/4"	0' – 5600'	26.0#	HCP-110	LT&C	New
7"	8-3/4"	5600' – 6500'	26.0#	HCP-110	BT&C	New
4-1/2"	6-1/8"	5750'-10779'	11.6#	HCP-110	BT&C	New

Casing Size	Burst Rating, psi	Safety Factor	Collapse Rating, psi	Safety Factor	Tension Rating, 1000 lbs.	Safety Factor
9-5/8"	3520	1.25	2020	3.90	394	9.92
7"	9950	3.10	7800	2.40	693	4.10
4-1/2"	10690	3.20	8650	2.60	367	30+

Equivalent or adequate grades and weights of casing may be substituted at time casing is run, depending on availability.

Attachment to Form 3160-3  
Murchison Oil & Gas, Inc.  
Carbon Valley 25 Fed Com #5-H  
Page 2 of 3

6. CASING DEPTH AND CEMENTING PROGRAM: See COA

9.625" Surface Casing - Cementing Program

Cement lead with 150 sacks of Interfill Class C + additives with yield = 2.45 cu.ft./sack, tail with 175 sacks Premium Plus + additives with yield = 1.34 cu.ft./sack; sufficient volume of cement will be pumped to ensure cement is circulated to surface.

7" Intermediate Casing and ~~Fiberglass Tubing~~ - Cementing Program

Cement lead with 250 sacks of Interfill Class H + additives with yield = 2.77 cu.ft./sack, tail with 200 sacks Super Class H + additives with yield = 1.61 cu.ft./sack; sufficient volume of cement will be pumped to ensure cement is circulated to surface. May perform a 2-stage job utilizing DV tool if determined to be necessary to circulate cement to surface.

See  
COA

4.5" Production Casing - Cementing Program

Plan to utilize 4-1/2" 11.6# HCP-110 BTC Peak completion packer liner system from RSB packer @ 5750' to TD of 10779' MD. No cement required.

1100' – 10779' 11" 3000# ram type preventers with one set blind rams and one set pipe rams and a 3000# annular type preventer. A choke manifold and 120 gallon accumulator with floor and remote operating stations and auxiliary power system. Rotating head below 5500'. See attached Sketch of BOP Equipment.

A Kelly cock will be installed and maintained in operable condition and a drill string safety valve in the open position will be available on the rig floor.

After setting the 9 5/8" casing, the blowout preventers and related control equipment shall be pressure tested to 3000 psi and 1500 psi respectively. Any equipment failing to test satisfactorily shall be repaired or replaced. Results of the BOP test will be recorded in the Driller's Log.

The BOP's will be maintained ready for use until drilling operations are completed. Pipe and blind rams shall be activated each trip. Annular preventer shall be functionally operated at least weekly.

BOP drills will be conducted as necessary to assure that equipment is operational and each crew is properly trained to carry out emergency duties.

Accumulator shall maintain a pressure capacity reserve at all times to provide for the close-open-close sequence of the blind and pipe rams of the hydraulic preventers.

7. MUD PROGRAM

0 – 1100' Fresh water / native mud. Wt. 8.4 to 8.6 ppg, vis 28-34 sec, Lime for pH control. Paper for seepage. Lost circulation may be encountered.

1100' – 6200' Cut brine. Wt. 8.4 – 8.8 ppg, vis 28-29 sec, No control water loss, lime for pH control.

6200' – 10779' Mud up with XCD Polymer mud system. Wt. 9.0 – 9.5 ppg, Vis 32-40 sec, WL 8-10 cc.

**Attachment to Form 3160-3  
Murchison Oil & Gas, Inc.  
Carbon Valley 25 Fed Com #5-H  
Page 3 of 3**

Sufficient mud materials will be kept on location at all times in order to combat lost circulation, or unexpected kicks. In order to run open-hole logs and casing, the viscosity and water loss may have to be adjusted to meet these needs.

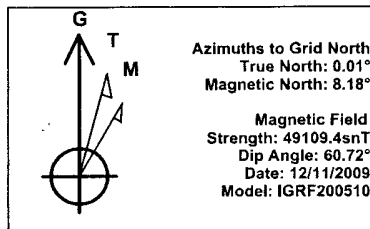
Mud system monitoring equipment with derrick floor indicators and visual / audio alarms shall be installed and operative prior to drilling into the Wolfcamp formation. This equipment will remain in use until the production casing is run and cemented. Monitoring equipment shall consist of the following:

- A recording pit level indicator.
- A pit volume totalizer.
- A flowline sensor.

9. TESTING, LOGGING AND CORING PROGRAM *See COA*

- A. Testing program: None planned.
  - B. Mud logging program. Two man unit from 1100' to TD.
  - C. Electric logging program: GR/LWD (Horizontal)
  - D. Coring program: None planned.
10. No abnormal temperatures or pressures are anticipated. Low levels of H<sub>2</sub>S have been monitored in producing wells in the area, so H<sub>2</sub>S may be present while drilling the well. An H<sub>2</sub>S Plan is attached to the Drilling Program. Anticipated Bottom Hole Pressure is 2700 PSI (maximum), and anticipated static Bottom Hole Temperature is 125 degrees Fahrenheit.
11. Anticipated starting date is February 1, 2010. It should take approximately 30–35 days to drill the well and another 10-15 days to complete.
12. A statement accepting responsibility for operations is attached.
13. The Multi-Point Surface Use & Operation Plan is attached.
14. If the Bureau of Land Management needs additional information to evaluate this application, please advise.

# Murchison Oil & Gas



## PATHFINDER

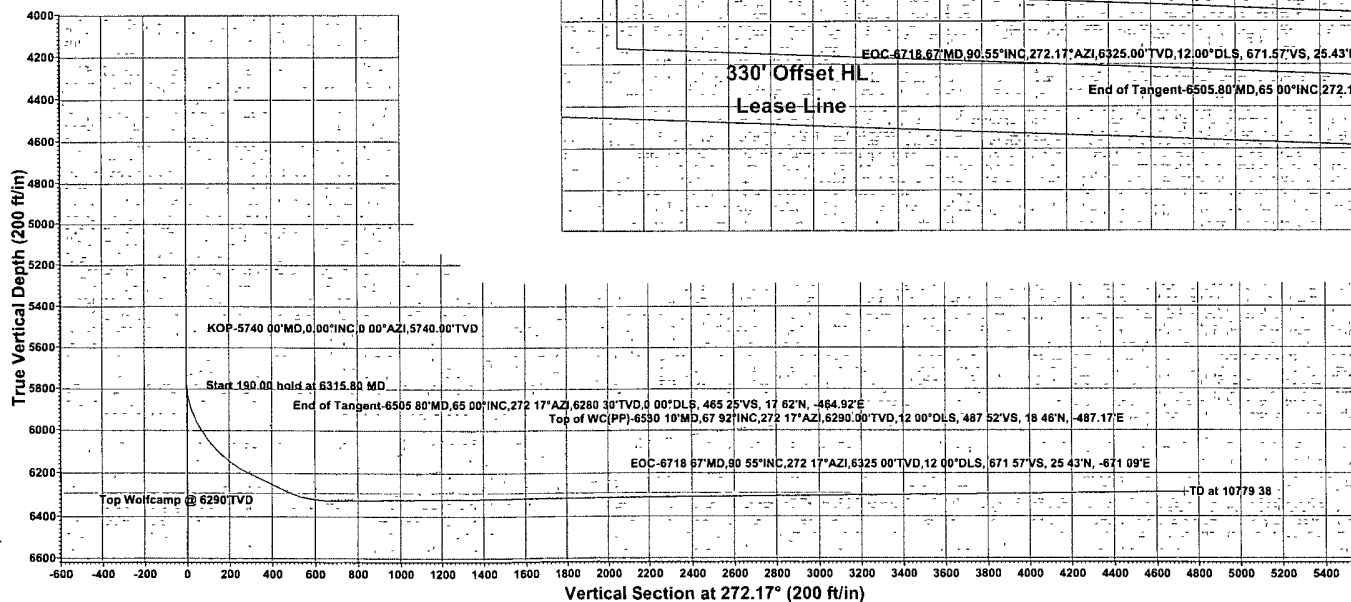
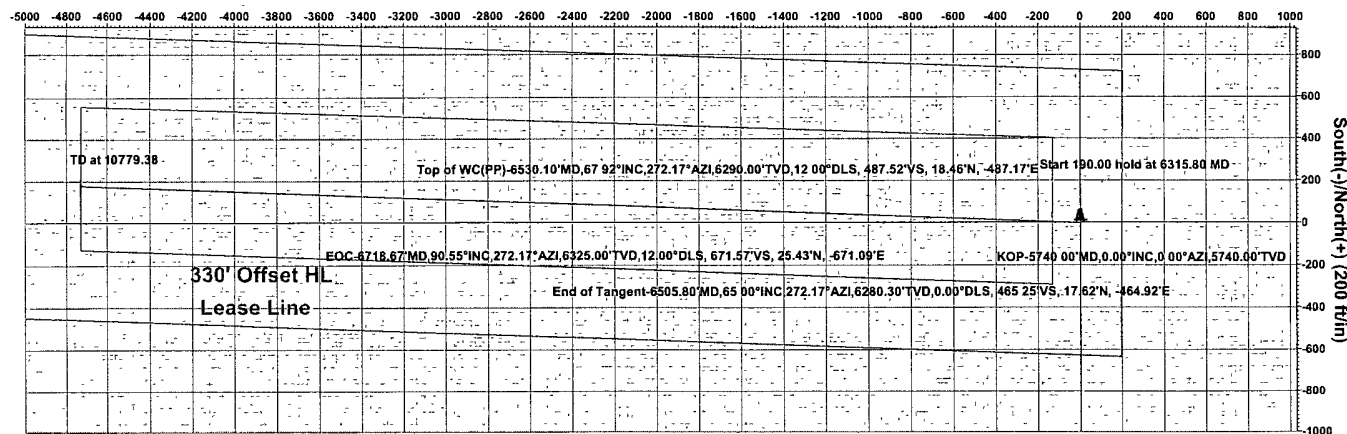
WELL DETAILS #5H						
Ground Elevation: 3510.00						
RKB Elevation: WELL @ 3528.00ft (Original Well Elev)						
Rig Name: Original Well Elev						
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	687764.600	533554.600	32° 53' 28.451 N	104° 21' 31.279 W	

SECTION DETAILS									
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5740.00	0.00	0.00	5740.00	0.00	0.00	0.00	0.00	0.00
3	6315.80	65.00	272.17	6200.00	11.10	-292.84	11.29	272.17	293.05
4	6505.80	65.00	272.17	6280.30	17.62	-464.92	0.00	0.00	465.25
5	6718.67	90.55	272.17	6325.00	25.43	-671.09	12.00	0.00	671.57
6	10779.38	90.55	272.17	6286.02	178.18	-4728.70	0.00	0.00	4732.10 PBHL(CV#5H)

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)						
Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape Point
PBHL(CV#5H)	6286.50	179.30	-4728.70	687943.900	528825.900	

Project: Eddy County  
Site: Carbon Valley '25' Fed Com  
Well: #5H  
Wellbore: OH  
Plan: Plan #1 (#5H/OH)

West(-)/East(+) (200 ft/in)



PROJECT DETAILS: Eddy County  
Geodetic System: US State Plane 1983  
Datum: North American Datum 1983  
Ellipsoid: GRS 1980  
Zone: New Mexico Eastern Zone  
System Datum: Mean Sea Level  
Local North: Grid

Plan Plan #1 (#5H/OH)	
Created By: Nate Bingham	Date: 9 49, December 15 2009
Checked: _____	Date: _____

# **Murchison Oil & Gas**

**Eddy County**

**Carbon Valley '25' Fed Com**

**#5H**

**OH**

**Plan: Plan #1**

## **Pathfinder X & Y Planning Report**

**15 December, 2009**

The logo for Pathfinder, featuring the word "PATH" in a bold, sans-serif font, followed by "FINDER" in a larger, bold, sans-serif font. A thick, black, curved line sweeps under the word "FINDER" from the left, ending under the letter "R".



# Pathfinder Energy Services

## Pathfinder X & Y Planning Report



<b>Company:</b>	Murchison Oil & Gas	<b>Local Co-ordinate Reference:</b>	Well #5H
<b>Project:</b>	Eddy County	<b>TVD Reference:</b>	WELL @ 3528.00ft (Original Well Elev)
<b>Site:</b>	Carbon Valley '25' Fed Com	<b>MD Reference:</b>	WELL @ 3528.00ft (Original Well Elev)
<b>Well:</b>	#5H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Plan #1	<b>Database:</b>	Midland Database

<b>Project</b>	Eddy County	<b>System Datum:</b>	Mean Sea Level
<b>Map System:</b>	US State Plane 1983		
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	New Mexico Eastern Zone		

<b>Site</b>	Carbon Valley '25' Fed Com		
<b>Site Position:</b>		<b>Northing:</b>	688,624.502 ft
<b>From:</b>	Map	<b>Easting:</b>	574,796.208 ft
<b>Position Uncertainty:</b>	0.00 ft	<b>Slot Radius:</b>	"
		<b>Latitude:</b>	32° 53' 34.798 N
		<b>Longitude:</b>	104° 13' 27.581 W
		<b>Grid Convergence:</b>	0.06 °

Well	#5H					
Well Position	+N-S	0.00 ft	Northing:	687,764.600 ft	Latitude:	32° 53' 26.451 N
	+E-W	0.00 ft	Easting:	533,554.600 ft	Longitude:	104° 21' 31.279 W
Position Uncertainty	0.00 ft		Wellhead Elevation:	ft	Ground Level:	3,510.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	12/11/2009	8.17	60.72	49,109

Design		Plan #1		
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N-S	+E-W	Direction
	(ft)	(ft)	(ft)	(°)
	0.00	0.00	0.00	272.17

<b>Survey Tool Program</b>	<b>Date</b>	12/14/2009		
<b>From</b>	<b>To</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
(ft)	(ft)			
0.00	10,779.38	Plan #1 (OH)	MWD	MWD - Standard

**Pathfinder Energy Services**  
Pathfinder X & Y Planning Report



**Company:** Murchison Oil & Gas  
**Project:** Eddy County  
**Site:** Carbon Valley '25' Fed Com  
**Well:** #5H  
**Wellbore:** OH  
**Design:** Plan #1

**Local Co-ordinate Reference:** Well #5H  
**TVD Reference:** WELL @ 3528.00ft (Original Well Elev)  
**MD Reference:** WELL @ 3528.00ft (Original Well Elev)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Midland Database

**Planned Survey**

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
0.00	0.00	0.00	0.00	-3,528.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
100.00	0.00	0.00	100.00	-3,428.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
200.00	0.00	0.00	200.00	-3,328.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
300.00	0.00	0.00	300.00	-3,228.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
400.00	0.00	0.00	400.00	-3,128.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
500.00	0.00	0.00	500.00	-3,028.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
600.00	0.00	0.00	600.00	-2,928.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
700.00	0.00	0.00	700.00	-2,828.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
800.00	0.00	0.00	800.00	-2,728.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
900.00	0.00	0.00	900.00	-2,628.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
1,000.00	0.00	0.00	1,000.00	-2,528.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
1,100.00	0.00	0.00	1,100.00	-2,428.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
1,200.00	0.00	0.00	1,200.00	-2,328.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
1,300.00	0.00	0.00	1,300.00	-2,228.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
1,400.00	0.00	0.00	1,400.00	-2,128.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
1,500.00	0.00	0.00	1,500.00	-2,028.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
1,600.00	0.00	0.00	1,600.00	-1,928.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
1,700.00	0.00	0.00	1,700.00	-1,828.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
1,800.00	0.00	0.00	1,800.00	-1,728.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
1,900.00	0.00	0.00	1,900.00	-1,628.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
2,000.00	0.00	0.00	2,000.00	-1,528.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
2,100.00	0.00	0.00	2,100.00	-1,428.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
2,200.00	0.00	0.00	2,200.00	-1,328.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
2,300.00	0.00	0.00	2,300.00	-1,228.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
2,400.00	0.00	0.00	2,400.00	-1,128.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
2,500.00	0.00	0.00	2,500.00	-1,028.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
2,600.00	0.00	0.00	2,600.00	-928.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60

Pathfinder Energy Services  
Pathfinder X & Y Planning Report



<b>Company:</b>	Murchison Oil & Gas	<b>Local Co-ordinate Reference:</b>	Well #5H
<b>Project:</b>	Eddy County	<b>TVD Reference:</b>	WELL @ 3528.00ft (Original Well Elev)
<b>Site:</b>	Carbon Valley '25' Fed Com	<b>MD Reference:</b>	WELL @ 3528.00ft (Original Well Elev)
<b>Well:</b>	#5H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Plan #1	<b>Database:</b>	Midland Database

Planned Survey											
MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (%/100ft)	Northing (ft)	Easting (ft)	
2,700.00	0.00	0.00	2,700.00	-828.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
2,800.00	0.00	0.00	2,800.00	-728.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
2,900.00	0.00	0.00	2,900.00	-628.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
3,000.00	0.00	0.00	3,000.00	-528.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
3,100.00	0.00	0.00	3,100.00	-428.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
3,200.00	0.00	0.00	3,200.00	-328.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
3,300.00	0.00	0.00	3,300.00	-228.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
3,400.00	0.00	0.00	3,400.00	-128.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
3,500.00	0.00	0.00	3,500.00	-28.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
3,600.00	0.00	0.00	3,600.00	72.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
3,700.00	0.00	0.00	3,700.00	172.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
3,800.00	0.00	0.00	3,800.00	272.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
3,900.00	0.00	0.00	3,900.00	372.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
4,000.00	0.00	0.00	4,000.00	472.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
4,100.00	0.00	0.00	4,100.00	572.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
4,200.00	0.00	0.00	4,200.00	672.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
4,300.00	0.00	0.00	4,300.00	772.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
4,400.00	0.00	0.00	4,400.00	872.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
4,500.00	0.00	0.00	4,500.00	972.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
4,600.00	0.00	0.00	4,600.00	1,072.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
4,700.00	0.00	0.00	4,700.00	1,172.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
4,800.00	0.00	0.00	4,800.00	1,272.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
4,900.00	0.00	0.00	4,900.00	1,372.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
5,000.00	0.00	0.00	5,000.00	1,472.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
5,100.00	0.00	0.00	5,100.00	1,572.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
5,200.00	0.00	0.00	5,200.00	1,672.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	
5,300.00	0.00	0.00	5,300.00	1,772.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60	

**Pathfinder Energy Services**  
Pathfinder X & Y Planning Report



**Company:** Murchison Oil & Gas  
**Project:** Eddy County  
**Site:** Carbon Valley '25' Fed Com  
**Well:** #5H  
**Wellbore:** OH  
**Design:** Plan #1

**Local Co-ordinate Reference:** Well #5H  
**TVD Reference:** WELL @ 3528.00ft (Original Well Elev)  
**MD Reference:** WELL @ 3528.00ft (Original Well Elev)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Midland Database

**Planned Survey**

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
5,400.00	0.00	0.00	5,400.00	1,872.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
5,500.00	0.00	0.00	5,500.00	1,972.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
5,600.00	0.00	0.00	5,600.00	2,072.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
5,700.00	0.00	0.00	5,700.00	2,172.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
5,740.00	0.00	0.00	5,740.00	2,212.00	0.00	0.00	0.00	0.00	687,764.60	533,554.60
<b>KOP-5740.00°MD,0.00°INC,0.00°AZI,5740.00°TVD</b>										
5,750.00	1.13	272.17	5,750.00	2,222.00	0.00	-0.10	0.10	11.29	687,764.60	533,554.50
5,800.00	6.77	272.17	5,799.86	2,271.86	0.13	-3.54	3.54	11.29	687,764.73	533,551.06
5,850.00	12.42	272.17	5,849.14	2,321.14	0.45	-11.86	11.87	11.29	687,765.05	533,542.74
5,900.00	18.06	272.17	5,897.36	2,369.36	0.95	-24.99	25.01	11.29	687,765.55	533,529.61
5,950.00	23.71	272.17	5,944.06	2,416.06	1.62	-42.80	42.83	11.29	687,766.22	533,511.80
6,000.00	29.35	272.17	5,988.78	2,460.78	2.47	-65.10	65.15	11.29	687,767.07	533,489.50
6,050.00	34.99	272.17	6,031.08	2,503.08	3.47	-91.70	91.76	11.29	687,768.07	533,462.90
6,100.00	40.64	272.17	6,070.57	2,542.57	4.63	-122.32	122.41	11.29	687,769.23	533,432.28
6,150.00	46.28	272.17	6,106.84	2,578.84	5.94	-156.67	156.79	11.29	687,770.54	533,397.93
6,200.00	51.93	272.17	6,139.56	2,611.56	7.37	-194.43	194.57	11.29	687,771.97	533,360.17
6,250.00	57.57	272.17	6,168.41	2,640.41	8.91	-235.21	235.38	11.29	687,773.51	533,319.39
6,300.00	63.22	272.17	6,193.10	2,665.10	10.56	-278.64	278.84	11.29	687,775.16	533,275.96
6,315.80	65.00	272.17	6,200.00	2,672.00	11.10	-292.84	293.05	11.29	687,775.70	533,261.76
<b>Start 190.00 hold at 6315.80 MD</b>										
6,400.00	65.00	272.17	6,235.58	2,707.58	13.99	-369.10	369.36	0.00	687,778.59	533,185.50
6,505.80	65.00	272.17	6,280.30	2,752.30	17.62	-464.92	465.25	0.00	687,782.22	533,089.68
<b>End of Tangent-6505.80°MD,65.00°INC,272.17°AZI,6280.30°TVD,0.00°DLS, 465.25°VS, 17.62°N, -464.92°E</b>										
6,525.00	67.30	272.17	6,288.06	2,760.06	18.28	-482.46	482.81	12.00	687,782.88	533,072.14
6,530.10	67.92	272.17	6,290.00	2,762.00	18.46	-487.17	487.52	12.00	687,783.06	533,067.43
<b>Top of WC(PP)-6530.10°MD,67.92°INC,272.17°AZI,6290.00°TVD,12.00°DLS, 487.52°VS, 18.46°N, -487.17°E - Top Wolfcamp @ 6290°TVD.</b>										
6,550.00	70.31	272.17	6,297.10	2,769.10	19.16	-505.75	506.12	12.00	687,783.76	533,048.85

Pathfinder Energy Services  
Pathfinder X & Y Planning Report



**Company:** Murchison Oil & Gas  
**Project:** Eddy County  
**Site:** Carbon Valley '25' Fed Com  
**Well:** #5H  
**Wellbore:** OH  
**Design:** Plan #1

**Local Co-ordinate Reference:** Well #5H  
**TVD Reference:** WELL @ 3528.00ft (Original Well Elev)  
**MD Reference:** WELL @ 3528.00ft (Original Well Elev)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Midland Database

**Planned Survey**

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
6,575.00	73.31	272.17	6,304.90	2,776.90	20.06	-529.48	529.86	12.00	687,784.66	533,025.12
6,600.00	76.31	272.17	6,311.45	2,783.45	20.98	-553.59	553.99	12.00	687,785.58	533,001.01
6,625.00	79.31	272.17	6,316.73	2,788.73	21.90	-578.00	578.42	12.00	687,786.50	532,976.60
6,650.00	82.31	272.17	6,320.73	2,792.73	22.84	-602.66	603.10	12.00	687,787.44	532,951.94
6,675.00	85.31	272.17	6,323.42	2,795.42	23.78	-627.50	627.95	12.00	687,788.38	532,927.10
6,700.00	88.31	272.17	6,324.81	2,796.81	24.72	-652.44	652.90	12.00	687,789.32	532,902.16
6,718.67	90.55	272.17	6,325.00	2,797.00	25.43	-671.09	671.57	12.00	687,790.03	532,883.51
<b>EOC-6718.67°MD,90.55°INC,272.17°AZI,6325.00°TVD,12.00°DLS, 671.57°VS, 25.43°N, -671.09°E</b>										
6,800.00	90.55	272.17	6,324.22	2,796.22	28.51	-752.36	752.90	0.00	687,793.11	532,802.24
6,900.00	90.55	272.17	6,323.26	2,795.26	32.29	-852.28	852.89	0.00	687,796.89	532,702.32
7,000.00	90.55	272.17	6,322.30	2,794.30	36.08	-952.21	952.89	0.00	687,800.68	532,602.39
7,100.00	90.55	272.17	6,321.34	2,793.34	39.87	-1,052.13	1,052.89	0.00	687,804.47	532,502.47
7,200.00	90.55	272.17	6,320.38	2,792.38	43.65	-1,152.05	1,152.88	0.00	687,808.25	532,402.55
7,300.00	90.55	272.17	6,319.42	2,791.42	47.44	-1,251.98	1,252.88	0.00	687,812.04	532,302.62
7,400.00	90.55	272.17	6,318.46	2,790.46	51.23	-1,351.90	1,352.87	0.00	687,815.83	532,202.70
7,500.00	90.55	272.17	6,317.50	2,789.50	55.01	-1,451.82	1,452.87	0.00	687,819.61	532,102.78
7,600.00	90.55	272.17	6,316.54	2,788.54	58.80	-1,551.75	1,552.86	0.00	687,823.40	532,002.85
7,700.00	90.55	272.17	6,315.58	2,787.58	62.58	-1,651.67	1,652.86	0.00	687,827.18	531,902.93
7,800.00	90.55	272.17	6,314.62	2,786.62	66.37	-1,751.60	1,752.85	0.00	687,830.97	531,803.00
7,900.00	90.55	272.17	6,313.66	2,785.66	70.16	-1,851.52	1,852.85	0.00	687,834.76	531,703.08
8,000.00	90.55	272.17	6,312.70	2,784.70	73.94	-1,951.44	1,952.84	0.00	687,838.54	531,603.16
8,100.00	90.55	272.17	6,311.74	2,783.74	77.73	-2,051.37	2,052.84	0.00	687,842.33	531,503.23
8,200.00	90.55	272.17	6,310.78	2,782.78	81.52	-2,151.29	2,152.83	0.00	687,846.12	531,403.31
8,300.00	90.55	272.17	6,309.82	2,781.82	85.30	-2,251.21	2,252.83	0.00	687,849.90	531,303.39
8,400.00	90.55	272.17	6,308.86	2,780.86	89.09	-2,351.14	2,352.83	0.00	687,853.69	531,203.46
8,500.00	90.55	272.17	6,307.90	2,779.90	92.88	-2,451.06	2,452.82	0.00	687,857.48	531,103.54
8,600.00	90.55	272.17	6,306.94	2,778.94	96.66	-2,550.99	2,552.82	0.00	687,861.26	531,003.61

Pathfinder Energy Services  
Pathfinder X & Y Planning Report



**Company:** Murchison Oil & Gas  
**Project:** Eddy County  
**Site:** Carbon Valley '25' Fed Com  
**Well:** #5H  
**Wellbore:** OH  
**Design:** Plan #1

**Local Co-ordinate Reference:** Well #5H  
**TVD Reference:** WELL @ 3528.00ft (Original Well Elev)  
**MD Reference:** WELL @ 3528.00ft (Original Well Elev)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Midland Database

**Planned Survey**

MD (ft)	Inc (°)	Azi (°)	TVD (ft)	TVDSS (ft)	N/S (ft)	E/W (ft)	V. Sec (ft)	DLeg (°/100ft)	Northing (ft)	Easting (ft)
8,700.00	90.55	272.17	6,305.98	2,777.98	100.45	-2,650.91	2,652.81	0.00	687,865.05	530,903.69
8,800.00	90.55	272.17	6,305.02	2,777.02	104.23	-2,750.83	2,752.81	0.00	687,868.83	530,803.77
8,900.00	90.55	272.17	6,304.06	2,776.06	108.02	-2,850.76	2,852.80	0.00	687,872.62	530,703.84
9,000.00	90.55	272.17	6,303.10	2,775.10	111.81	-2,950.68	2,952.80	0.00	687,876.41	530,603.92
9,100.00	90.55	272.17	6,302.14	2,774.14	115.59	-3,050.60	3,052.79	0.00	687,880.19	530,504.00
9,200.00	90.55	272.17	6,301.18	2,773.18	119.38	-3,150.53	3,152.79	0.00	687,883.98	530,404.07
9,300.00	90.55	272.17	6,300.22	2,772.22	123.17	-3,250.45	3,252.78	0.00	687,887.77	530,304.15
9,400.00	90.55	272.17	6,299.26	2,771.26	126.95	-3,350.37	3,352.78	0.00	687,891.55	530,204.23
9,500.00	90.55	272.17	6,298.30	2,770.30	130.74	-3,450.30	3,452.77	0.00	687,895.34	530,104.30
9,600.00	90.55	272.17	6,297.34	2,769.34	134.52	-3,550.22	3,552.77	0.00	687,899.12	530,004.38
9,700.00	90.55	272.17	6,296.38	2,768.38	138.31	-3,650.15	3,652.77	0.00	687,902.91	529,904.45
9,800.00	90.55	272.17	6,295.42	2,767.42	142.10	-3,750.07	3,752.76	0.00	687,906.70	529,804.53
9,900.00	90.55	272.17	6,294.46	2,766.46	145.88	-3,849.99	3,852.76	0.00	687,910.48	529,704.61
10,000.00	90.55	272.17	6,293.50	2,765.50	149.67	-3,949.92	3,952.75	0.00	687,914.27	529,604.68
10,100.00	90.55	272.17	6,292.54	2,764.54	153.46	-4,049.84	4,052.75	0.00	687,918.06	529,504.76
10,200.00	90.55	272.17	6,291.58	2,763.58	157.24	-4,149.76	4,152.74	0.00	687,921.84	529,404.84
10,300.00	90.55	272.17	6,290.62	2,762.62	161.03	-4,249.69	4,252.74	0.00	687,925.63	529,304.91
10,400.00	90.55	272.17	6,289.66	2,761.66	164.81	-4,349.61	4,352.73	0.00	687,929.41	529,204.99
10,500.00	90.55	272.17	6,288.70	2,760.70	168.60	-4,449.54	4,452.73	0.00	687,933.20	529,105.06
10,600.00	90.55	272.17	6,287.74	2,759.74	172.39	-4,549.46	4,552.72	0.00	687,936.99	529,005.14
10,700.00	90.55	272.17	6,286.78	2,758.78	176.17	-4,649.38	4,652.72	0.00	687,940.77	528,905.22
10,779.38	90.55	272.17	6,286.02	2,758.02	179.18	-4,728.70	4,732.09	0.00	687,943.78	528,825.90

TD at 10779.38 - PBHL(CV#5H)

Pathfinder Energy Services  
Pathfinder X & Y Planning Report



<b>Company:</b>	Murchison Oil & Gas	<b>Local Co-ordinate Reference:</b>	Well #5H
<b>Project:</b>	Eddy County	<b>TVD Reference:</b>	WELL @ 3528.00ft (Original Well Elev)
<b>Site:</b>	Carbon Valley '25' Fed Com	<b>MD Reference:</b>	WELL @ 3528.00ft (Original Well Elev)
<b>Well:</b>	#5H	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Plan #1	<b>Database:</b>	Midland Database

Targets									
Target Name	Dip Angle	Dip Dir	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
- Shape									
PBHL(CV#5H)	0.00	360.00	6,286.50	179.30	-4,728.70	687,943.900	528,825.900	32° 53' 28.211 N	104° 22' 26.739 W
- plan hits target									
- Point									

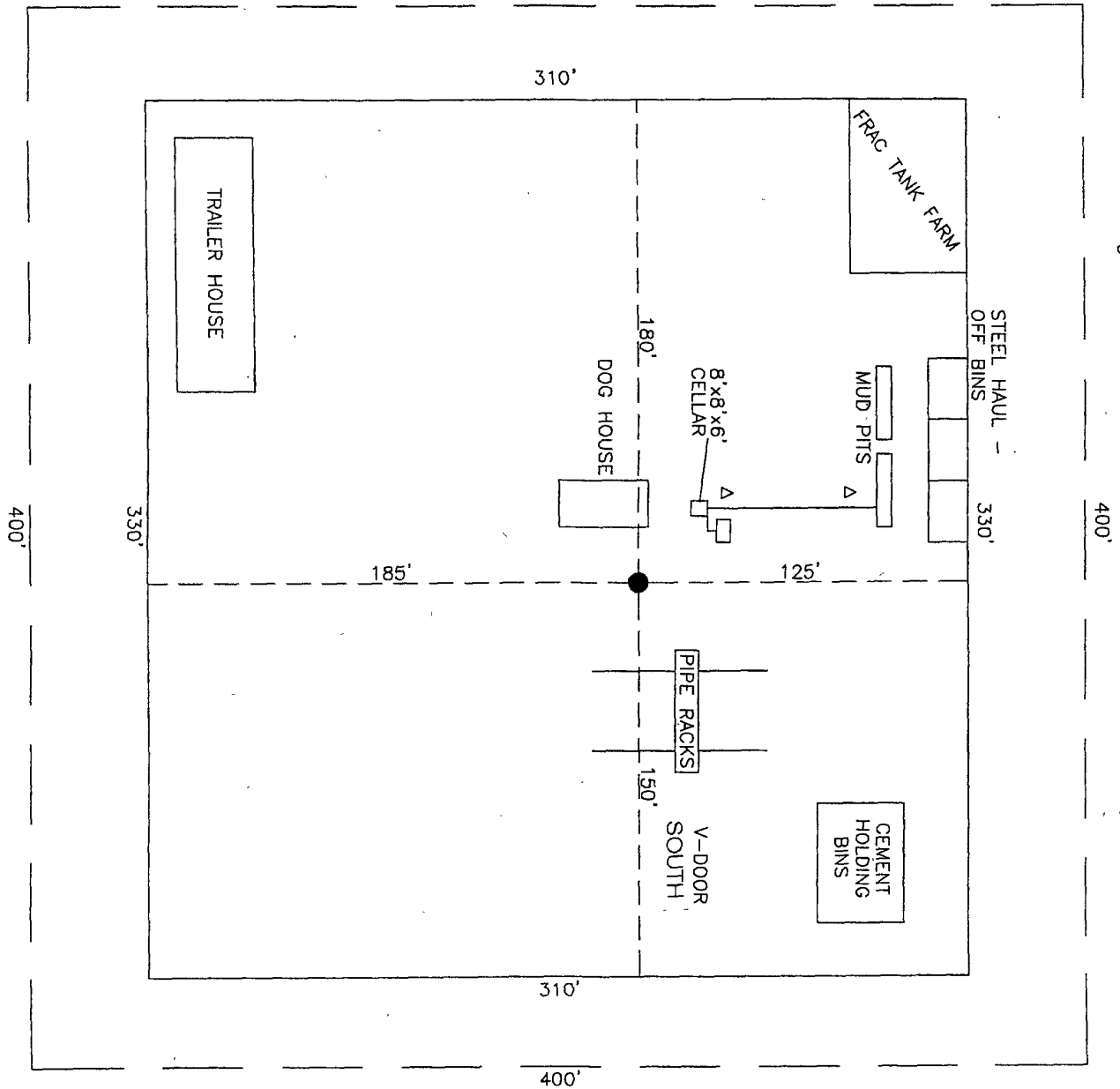
Formations					
Measured Depth	Vertical Depth	Name	Lithology	Dip	Dip Direction
(ft)	(ft)			(°)	(°)
6,530.10	6,290.00	Top Wolfcamp @ 6290'TVD		0.00	

Plan Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(ft)	(ft)	+N/-S (ft)	+E/-W (ft)	
5,740.00	5,740.00	0.00	0.00	KOP-5740.00'MD,0.00°INC,0.00°AZI,5740.00'TVD
6,315.80	6,200.00	11.10	-292.84	Start 190.00 hold at 6315.80 MD
6,505.80	6,280.30	17.62	-464.92	End of Tangent-6505.80'MD,65.00°INC,272.17°AZI,6280.30'TVD,0.00°
6,530.10	6,290.00	18.46	-487.17	Top of WC(PP)-6530.10'MD,67.92°INC,272.17°AZI,6290.00'TVD,12.00
6,718.67	6,325.00	25.43	-671.09	EOC-6718.67'MD,90.55°INC,272.17°AZI,6325.00'TVD,12.00°DLS, 671
10,779.38	6,286.02	179.18	-4,728.70	TD at 10779.38

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_

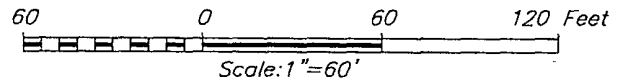
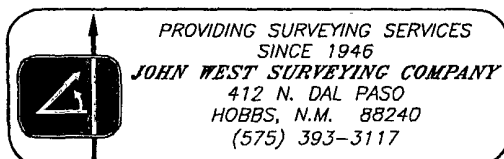
# EXHIBIT F

SECTION 25, TOWNSHIP 16 SOUTH, RANGE 27 EAST, N.M.P.M.,  
EDDY COUNTY, NEW MEXICO.



MURCHISON OIL & GAS, INC.  
CARBON VALLEY 25 FEDERAL COM #5H  
ELEV. 3510.2'

GEODETIC COORDINATES  
NAD 27 NME  
Y=687764.6 N  
X=533554.6 E  
LAT.=32.890697° N  
LONG.=104.224021° W



## MURCHISON OIL & GAS, INC.

CARBON VALLEY 25 FEDERAL COM #5H WELL  
LOCATED 1980 FEET FROM THE SOUTH LINE  
AND 200 FEET FROM THE EAST LINE OF SECTION 25,  
TOWNSHIP 16 SOUTH, RANGE 27 EAST, N.M.P.M.,  
EDDY COUNTY, NEW MEXICO.

Survey Date: 12/4/09	Sheet 1 of 1 Sheets
W.O. Number: 09.13.1335	Dr By: LA
Date: 12/23/09	09131335
	Scale: 1"=100'



EXHIBIT G

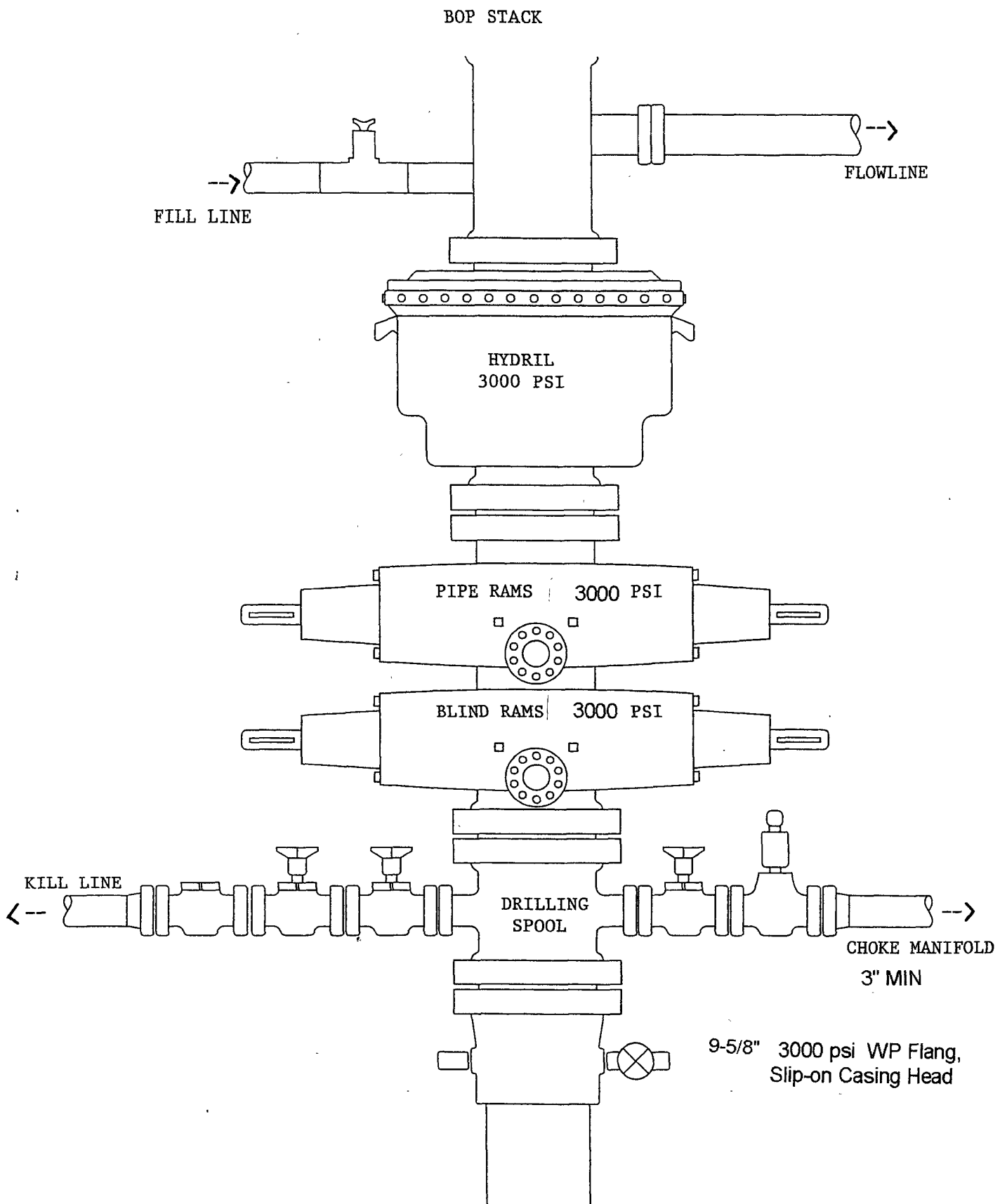
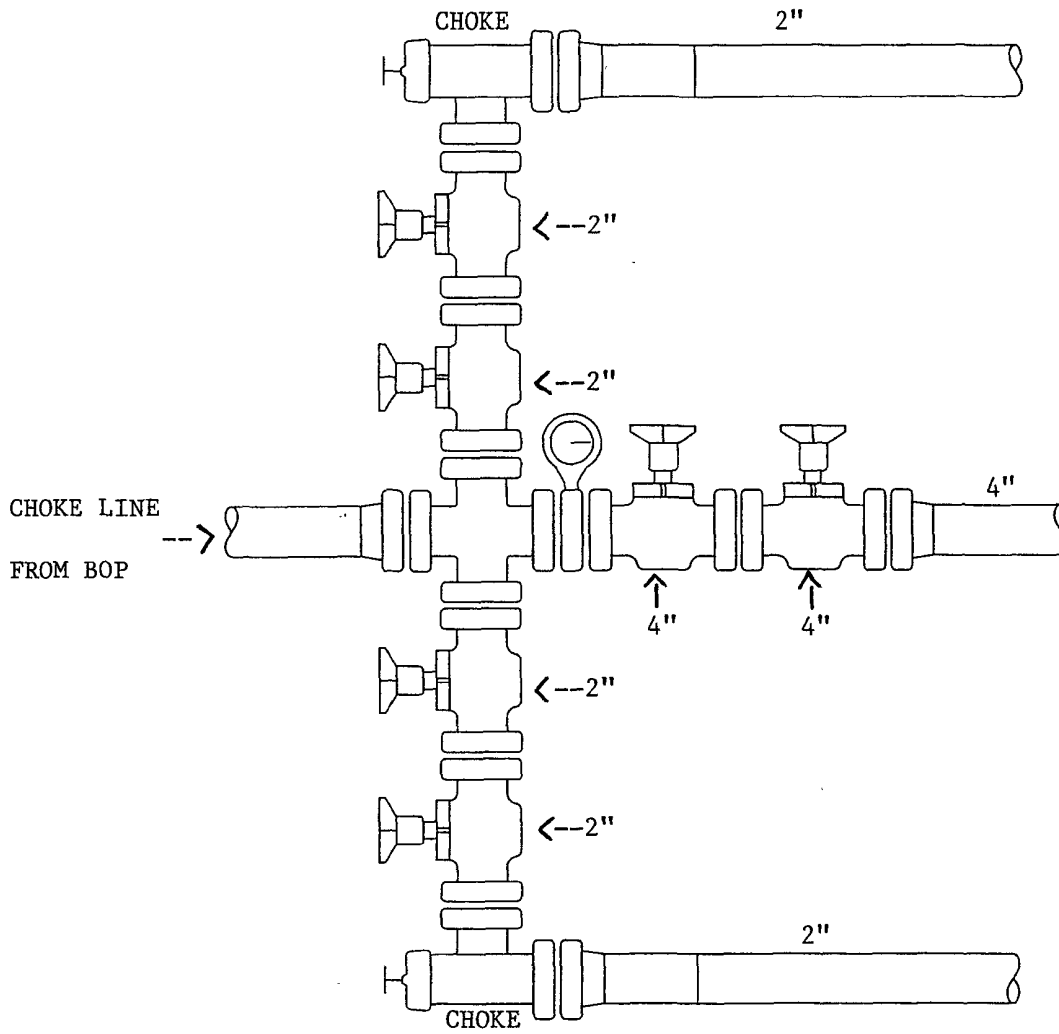


EXHIBIT H

CHOKE MANIFOLD



# **MURCHISON OIL & GAS, INC.**

## **HYDROGEN SULFIDE (H<sub>2</sub>S) CONTINGENCY PLAN FOR DRILLING/COMPLETING/WORKOVER/FACILITY WITH THE EXCEPTION OF H<sub>2</sub>S IN EXCESS OF 100 PPM**

**MURCHISON OIL & GAS, INC.  
NEW DRILL WELL  
CARBON VALLEY 25 FED COM #5-H  
SL: 1980' FSL & 200' FEL, UNIT I  
BHL: 1980' FSL & 330' FWL, UNIT L  
SEC 25, T16S, R27E  
EDDY COUNTY, NEW MEXICO**

**This well/facility is not expected to have H<sub>2</sub>S, but the following is submitted as requested.**

## TABLE OF CONTENTS

I.	General Emergency Plan	Page 3
II.	Emergency Procedures for Uncontrolled Release of H <sub>2</sub> S	Page 3
III.	Emergency Call List	Page 3
IV.	Emergency Response Numbers	Page 4
V.	Protection of the General (ROE) Radius of Exposure	Page 4
Vi.	Public Evacuation Plan	Page 5
VII.	Procedure for Igniting an Uncontrollable Condition	Page 5
VIII.	Required Emergency Equipment	Page 6
IX.	Using Self-Contained Breathing Air Equipment (SCBA)	Page 7
X.	Rescue & First Aid for Victims of H <sub>2</sub> S Poisoning	Page 7
XI.	H <sub>2</sub> S Toxic Effects	Pages 8
XII.	H <sub>2</sub> S Physical Properties	Pages 9
XIII.	Location Map	Page 10
XIV.	Vicinity Map	Page 11

## **GENERAL H2S EMERGENCY ACTIONS**

In the event of any evidence of H2S emergency, the following plan will be initiated:

1. All personnel will immediately evacuate to an upwind and if possible uphill "safe area".
2. If for any reason a person must enter the hazardous area, they must wear a SCBA (self-contained breathing apparatus).
3. Always use the "buddy system."
4. Isolate the well/problem if possible.
5. Account for all personnel.
6. Display the proper colors warning all unsuspecting personnel of the danger at hand.
7. Contact the company representative as soon as possible if not at the location (use the enclosed call list as instructed).

At this point the company representative will evaluate the situation and coordinate the necessary duties to bring the situation under control, and if necessary, the notification of emergency response agencies and residents.

## **EMERGENCY PROCEDURES FOR AN UNCONTROLLABLE RELEASE OF H2S**

1. All personnel will don the self-contained breathing apparatus.
2. Remove all personnel to the "safe area": (always use the "buddy system").
3. Contact company representative if not on location.
4. Set in motion the steps to protect and/or remove the general public to any upwind "safe area." Maintain strict security and safety procedures while dealing with the source.
5. No entry to any unauthorized personnel.
6. Notify the appropriate agencies:      City Police - City streets  
   State Police - State Roads  
   County Sheriff - County Roads
7. Call the NMOCD.

If at this time the supervising person determines the release of H2S cannot be contained to the site location and the general public is in harm's way, he will immediately notify public safety personnel.

## **EMERGENCY CALL LIST**

	<u>Office</u>	<u>Cell</u>	<u>Home</u>
Arnold Nall	972-931-0700	214-415-3010	972-596-8504
Tommy Folsom	575-628-3932	575-706-0667	575-885-3474
Randy Ford	432-682-0440	432-599-2222	432-684-4334

## **EMERGENCY RESPONSE NUMBERS**

**Eddy County, New Mexico**

<b>State Police</b>	<b>888-442-6677</b>
<b>Eddy County Sheriff - Carlsbad</b>	<b>575-396-3611</b>
<b>Eddy County Emergency Management - Carlsbad</b>	<b>575-887-7551</b>
<b>State Emergency Response Center (SERC)</b>	<b>575-476-9620</b>
<b>Artesia Police / Fire / Ambulance Department</b>	<b>575-746-5000</b>
<b>New Mexico Oil Conservation Division - Artesia</b>	<b>575-748-1283</b>
<b>Callaway Safety Equipment, Inc.</b>	<b>575-392-2973</b>

### **PROTECTION OF THE GENERAL (ROE) RADIUS OF EXPOSURE**

In the event greater than 100 ppm H<sub>2</sub>S is present, the ROE calculations will be done to determine if the following conditions exist and whether the Plan must be activated:

- \* 100 ppm at any public area (any place not associated with this site)
- \* 500 ppm at any public road (any road which the general public may travel).
- \* 100 ppm radius of 3000' will be assumed if there is insufficient data to do the calculations, and there is a reasonable expectation that H<sub>2</sub>S could be present in concentrations greater than 100 ppm in the gas mixture.

**Calculation for the 100 ppm ROE:** (H<sub>2</sub>S concentrations in decimal form)

$$\text{ROE} = [(1.589)(\text{H}_2\text{S concentration})(Q)]^{(.6258)}$$

10,000 ppm + = .01  
1,000 ppm + = .001

**Calculation for the 500 ppm ROE:**

100 ppm + = .0001  
10 ppm + = .00001

$$\text{ROE} = [(0.4546)(\text{H}_2\text{S concentration})(Q)]^{(.6258)}$$

EXAMPLE: If a well/facility has been determined to have 650 ppm H<sub>2</sub>S in the gas mixture and the well/facility is producing at a gas rate of 200 MCFD then:

ROE for 100 ppm      $\text{ROE} = [(1.589)(.00065)(200,000)]^{.6258}$   
ROE=28.1'

ROE for 500 ppm      $\text{ROE} = [(0.4546)(.00065)(200,000)]^{.6258}$   
ROE=12.8'

These calculations will be forwarded to the appropriate NMOCD district office when applicable.

## **PUBLIC EVACUATION PLAN**

When the supervisor has determined that the general public will be involved, the following plan will be implemented.

1. Notification of the emergency response agencies of the hazardous condition and implement evacuation procedures.
2. A trained person in H<sub>2</sub>S safety shall monitor with detection equipment the H<sub>2</sub>S concentration, wind and area of exposure. This person will determine the outer perimeter of the hazardous area. The extent of the evacuation area will be determined from the data being collected. Monitoring shall continue until the situation has been resolved. All monitoring equipment shall be UL approved for use in Class I Groups A, B, C & D, Division I hazardous locations. All monitors will have a minimum capability of measuring H<sub>2</sub>S, oxygen, and flammable values.
3. Law enforcement shall be notified to set up necessary barriers and maintain such for the duration of the situation as well as aid in the evacuation procedure.
4. The company representative shall stay in communication with all agencies throughout the duration of the situation and inform such agencies when the situation has been contained and the affected area is safe to enter.

## **PROCEDURE FOR IGNITING AN UNCONTROLLABLE CONDITION**

The decision to ignite a well should be a last resort with one, if not both, of the following conditions:

1. Human life and/or property are endangered.
2. There is no hope of bringing the situation under control with the prevailing conditions at the site.

### **Instructions for Igniting the Well:**

1. Two people are required. They must be equipped with positive pressure, self-contained breathing apparatus and "D"-ring style, full body, OSHA approved safety harness. Non-flammable rope will be attached.
2. One of the people will be a qualified safety person who will test the atmosphere for H<sub>2</sub>S, oxygen and LFL. The other person will be the designated company representative.
3. Ignite upwind from a distance no closer than necessary. Make sure that the ignition site has the maximum escape avenue available. A 25mm flare gun with a range of approximately +/- 500 feet shall be used to ignite the gas.
4. Before igniting, check for the presence of combustible gases.
5. After igniting, continue emergency actions and procedures as before.

## **REQUIRED EMERGENCY EQUIPMENT**

### **1. Breathing Apparatus**

- Rescue Packs (SCBA) – 1 unit shall be placed at each breathing area, 2 shall be stored in the safety trailer.
- Work / Escape Packs – 4 packs shall be stored on the rig floor with sufficient air hose not to restrict work activity.
- Emergency Escape Packs – 4 packs shall be stored in the doghouse for emergency evacuation.

### **2. Signage and Flagging**

- One Color Code Condition Sign will be placed at the entrance to the site reflecting the possible conditions at the site.
- A Colored Condition flag will be on display reflecting the condition at the site at that time.

### **3. Briefing Area**

- Two perpendicular areas will be designated by signs and readily accessible.

### **4. Windsocks**

- Two windsocks will be placed in strategic locations, visible from all angles.

### **5. H2S Detectors and Alarms**

- The stationary detector with three (3) sensors will be placed in the upper dog house if equipped, set to visually alarm @ 10 ppm and audible alarm @ 15 ppm. Calibrate a minimum of every 30 days or as needed. The three sensors will be placed in the following places: (Gas sample tubes will be stored in the safety trailer):
  - Rig Floor
  - Bell Nipple
  - End of flow line or where well bore fluid is being discharged

### **6. Auxiliary Rescue Equipment**

- Stretcher
- Two OSHA full body harnesses
- 100' of 5/8" OSHA approved rope
- One 20 lb. Class ABC fire extinguisher
- Communication via cell phones on location and vehicles on location



### **USING SELF-CONTAINED BREATHING AIR EQUIPMENT (SCBA)**

1. SCBA should be worn when any of the following are performed:
  - Working near the top or on top of a tank
  - Disconnecting any line where H<sub>2</sub>S can reasonably be expected.
  - Sampling air in the area to determine if toxic concentrations of H<sub>2</sub>S exist.
  - Working in areas where over 10 ppm of H<sub>2</sub>S has been detected.
  - At any time there is a doubt of the level of H<sub>2</sub>S in the area.
2. All personnel shall be trained in the use of SCBA prior to working in a potentially hazardous location.
3. Facial hair and standard eyeglasses are not allowed with SCBA.
4. Contact lenses are never allowed with SCBA.
5. When breaking out any line where H<sub>2</sub>S can reasonably be expected.
6. After each use, the SCBA unit shall be cleaned, disinfected, serviced and inspected.
7. All SCBA shall be inspected monthly.

### **RESCUE & FIRST AID FOR VICTIMS OF H<sub>2</sub>S POISONING**

- Do not panic.
- Remain calm and think.
- Put on the breathing apparatus.
- Remove the victim to the safe breathing area as quickly as possible, upwind and uphill from source or crosswind to achieve upwind.
- Notify emergency response personnel.
- Provide artificial respiration and/or CPR as necessary.
- Remove all contaminated clothing to avoid further exposure.
- A minimum of two (2) personnel on location shall be trained in CPR and First Aid.

## 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 gasses are compared below in Table 1. Toxicity table for H2S and physical effects are shown in Table II.

**Table 1**  
Permissible Exposure Limits of Various Gasses

Common Name	Symbol	Sp. Gravity	TLV	STEL	IDLH
Hydrogen Cyanide	HCN	.94	4.7 ppm	C	
Hydrogen Sulfide	H2S	1.192	10 ppm	15 ppm	100 ppm
Sulfide Dioxide	SO2	2.21	2 ppm	5 ppm	
Chlorine	CL	2.45	.5 ppm	1 ppm	
Carbon Monoxide	CO	.97	25 ppm	200 ppm	
Carbon Dioxide	CO2	1.52	5000 ppm	30,000 ppm	
Methane	CH4	.55	4.7% LEL	14% UEL	

### Definitions

- A. TLV – Threshold Limit Value is the concentration employees may be exposed to 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 19 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 to based on an TWA.

**TABLE II**  
Toxicity Table of H2S

Percent %	PPM	Physical Effects
.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 H<sub>2</sub>S**

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 fairly 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, a fact that makes the gas extremely dangerous to be around.

### **ODOR – ROTTEN EGGS**

Hydrogen Sulfide has a distinctive offensive smell, similar to "rotten eggs." For this reason it earned its common name "sour gas." However, H<sub>2</sub>S, 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 H<sub>2</sub>S is known to exist, protect yourself. Whenever possible, work in an area upwind and keep to higher ground.

### **EXPLOSIVE LIMITS – 4.3% TO 46%**

Mixed with the right proportion of air or oxygen, H<sub>2</sub>S 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 (SO<sub>2</sub>), another hazardous gas that irritates the eyes and lungs.

### **SOLUBILITY – 4 TO 1 RATIO WITH WATER**

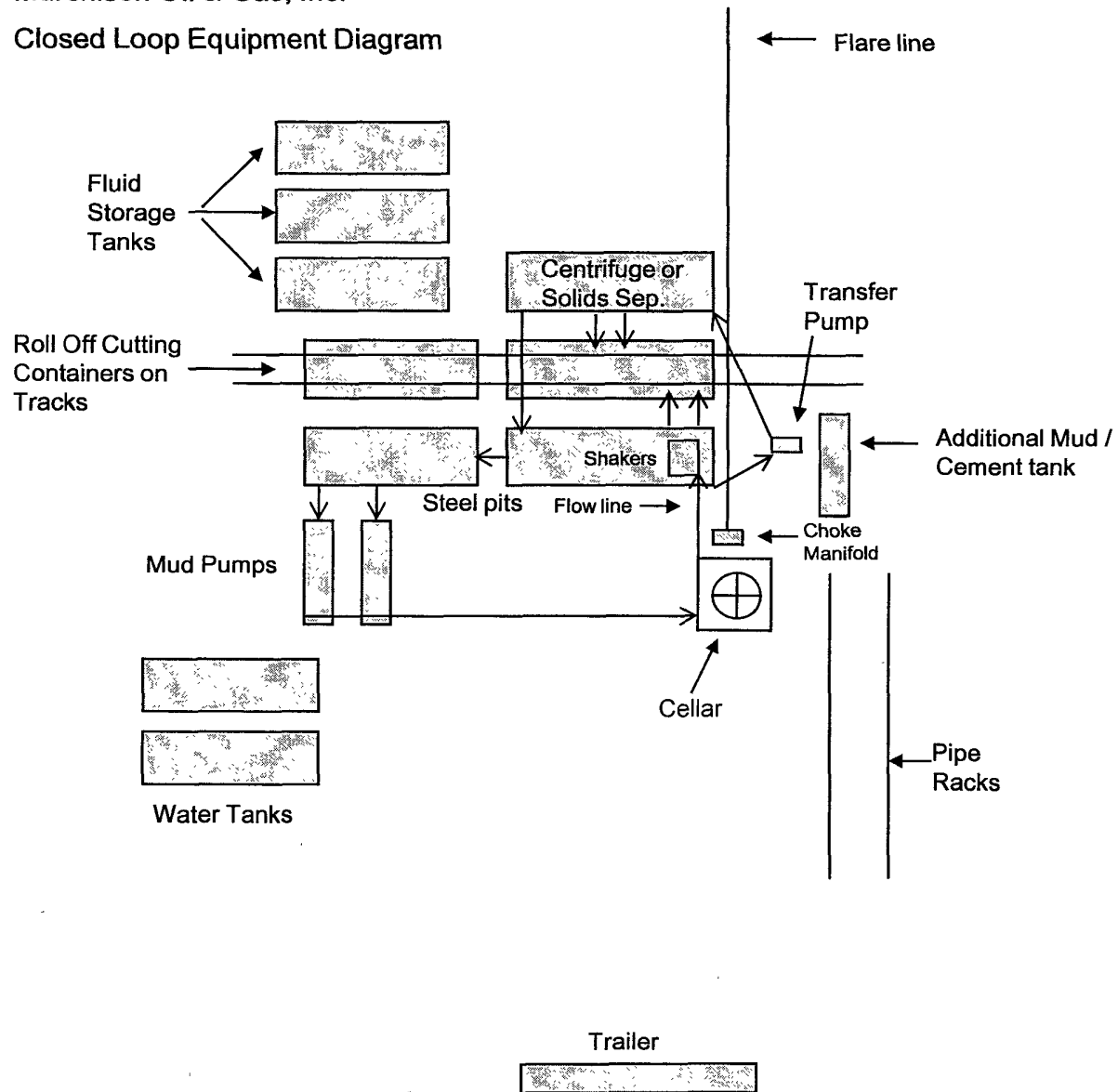
Hydrogen Sulfide can be dissolved in liquids, which means that it can be present in any container or vessel used to carry or hold well fluids including oil, water, emulsion and sludge. The solubility of H<sub>2</sub>S is dependent on temperature and pressure, but if conditions are right, simply agitating a fluid containing H<sub>2</sub>S may release the gas into the air.

### **BOILING POINT – (-76 degrees Fahrenheit)**

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

Murchison Oil & Gas, Inc.

Closed Loop Equipment Diagram



1 N

**SURFACE USE AND OPERATIONS PLAN FOR  
DRILLING, COMPLETION, AND PRODUCING**

**Murchison Oil & Gas, Inc.  
Carbon Valley 25 Fed Com #5-H  
SL: 1980' FSL & 200' FEL, UNIT I  
BHL: 1980' FSL & 330' FWL, UNIT L  
Sec 25, T16S, R27E  
Eddy County, New Mexico**

**LOCATED**

Approximately 11 miles NE of Artesia, New Mexico.

**OIL & GAS LEASE**

SHL: LS# NM NM 98807

BHL: STATE (LS# VO-5557)

**BOND COVERAGE**

NM 2163

**POOL**

Dog Canyon; Wolfcamp

**OIL & GAS RECORD LESSEE**

Lessee: Devon Energy Prod. Co., 20 North Broadway, Ste. 1500, Oklahoma City, OK 73102  
Operating Rights: Devon Energy Prod. Co., 20 North Broadway, Ste. 1500, Oklahoma City, OK 73102. Murchison Oil & Gas, Inc., 1100 Mira Vista Blvd., Plano, TX 75093 earned operating rights under Cross Assignment of Operating Rights dated May 1, 2009 filed in Eddy Co., NM.

**SURFACE OWNER**

Bureau of Land Management

**MINERAL OWNER**

Bureau of Land Management

**GRAZING TENANT**

Bogle Ltd Co. LLC, P.O. Box 460, Dexter, NM 88230 (575) 433-3500 ???

**EXHIBITS**

- |           |   |
|-----------|---|
| A.        | Well Location & Acreage Dedication Map  |
| B.        | Area Road Map                           |
| C-1 & C-2 | Vicinity Oil & Gas Map                  |
| D.        | Topographic & Location Verification Map |
| E-1---E-4 | Proposed Lease Road and Pad Layout Map  |
| F.        | Drilling Rig Layout                     |
| G.        | BOPE Schematic                          |
| H.        | Choke Manifold Schematic                |

This well will be drilled to a BHL of approximately 6286' TVD, and approximately 10779' MD.

### **EXISTING ROADS**

Exhibit A is a portion of a section map showing the location of the proposed well as staked.

Exhibit B is a map showing existing roads in the vicinity of the proposed well site.

Directions to well location: From the junction of Hwy. 82 and Southern Union (CR 202), go North on Co. Rd. #202 approx. 2.6 miles; turn left and go Northwest approx. 2.4 miles. Turn left and go North approx. 0.1 miles to a "Y" intersection; veer right and go Northwest approx. 1.6 miles. Turn left and go West approx. 0.1 mile. Turn right and go North approx. 0.4 miles. Turn left and go West approx. 0.4 miles. Turn right and go North approx. 0.1 mile.

### **ACCESS ROADS**

#### **Length and Width**

Proposed access road is approximately 9569.2' of existing road (approx. 2 miles) long and 30' wide (Exhibit E-1 thru E-4). Murchison Oil & Gas, Inc. has agreements with the surface owners for right-of-way up to proposed lease road and agreement with other operator for use of existing road to proposed well.

#### **Surface Material**

Six inches of caliche and water, compacted and graded.

#### **Maximum Grade**

Less than three percent

#### **Turnouts**

None needed

#### **Drainage Design**

N/A

#### **Culverts**

None needed

#### **Gates and Cattle Guards**

None required

### **LOCATION OF EXISTING WELLS**

The locations of existing wells in Section 25 are shown on Exhibit C-1 and C-2.

### **LOCATION OF EXISTING AND/OR PROPOSED FACILITIES**

Necessary production facilities for this well will be located on the well pad.

### **LOCATION AND TYPE OF WATER SUPPLY**

It is planned to drill the proposed well with a cut-brine water system or with produced water. The water will be obtained from either a private water well owner or a commercial source and will either be piped to location from a nearby water well or will be hauled to location by truck over existing and proposed lease roads as shown on Exhibit E.

### **SOURCE OF CONSTRUCTION MATERIALS**

Caliche required for the construction of the location pad and access road will be obtained from caliche on the location or from the nearest BLM-approved pit.

**METHODS OF HANDLING WASTE DISPOSAL**

All drilling fluid will be circulated over shaker(s) with cuttings discharged into roll off container.

Fluid and fines below shaker(s) will be circulated with transfer pump through centrifuge(s) or solids separator with cuttings and fines discharged into roll off container.

Fluid will be continuously re-circulated through equipment with polymer added to aid separation of cutting fines.

Roll-off containers will be lined and de-watered with fluids re-circulated into system.

Additional tank will be used to capture unused drilling fluid or cement returns from casing jobs.

This equipment will be maintained by solids control personnel and/or rig crews on location.

Cuttings will be hauled to one of the following, depending on which rig is available to drill well:

CRI (permit number R9166)  
or  
GMI (permit number 711-019-001)

**ANCILLARY FACILITIES**

None required.

**WELL SITE LAYOUT**

Exhibit F shows the relative location and dimensions of the well pad, mud pits, cuttings containers and trash pit, and the location of major rig components. Operator requests V-door be positioned to the South, and the steel pits located to the East in order to accommodate existing road in East side of Section to minimize further surface disturbance.

The ground surface at the drilling location is essentially flat.

A Closed-Loop System will be used.

The pad area has been staked and flagged.

**PLANS FOR RESTORATION OF THE SURFACE**

After finishing drilling and/or completion operations, all equipment and other material not needed for further operations will be removed. The location will be cleared of all trash and junk to leave the site in an as aesthetically pleasing condition as possible.

Any unguarded pits containing fluids will be fenced until they are filled.

If the proposed well is non productive, all rehabilitation and/or vegetation requirements of the Bureau of Land Management and the United States Geological Survey will be complied with and will be accomplished as expeditiously as possible.

**OTHER INFORMATION**

**Topography**

The land surface at the well site is small, rolling hills.

**Soil**

Loamy soil shallow to caliche and raw Gypsum.

**Flora and Fauna**

The vegetation consists of creosote, mesquite, yucca, prickly pear, Mormon tea, cane cholla, pencil cholla, horse creeper and various grasses. Faunal species include pronghorn antelope, mule deer, coyote, badger, rabbits, and various snakes, small mammals, birds and reptiles.

**Ponds and Streams**

There are no rivers, lakes, ponds, or streams in the area.

**Residences and Other Structures**

There are no residences within one mile of the proposed well site.

**Archaeological, Historical, and Cultural sites**

An Archaeological Survey has been sent to the BLM Office.

**Land Use**

Grazing.

**OPERATOR'S REPRESENTATIVES**

Arnold Nall  
1100 Mira Vista Blvd.  
Plano, TX 75093-4698  
Office Phone: (972) 931-0700  
Cell Phone: (214) 415-3010

Randy Ford  
415 W. Wall Street, Suite 1700  
Midland, TX 79701  
Office Phone: (432) 682-0440  
Cell Phone: (432) 559-2222



**Murchison Oil & Gas, Inc.**  
**Carbon Valley 25 Fed Com #5-H**  
**SL: 1980' FSL & 200' FEL, UNIT I**  
**BHL: 1980' FSL & 330' FWL, UNIT L**  
**Sec 25, T16S, R27E**  
**Eddy County, New Mexico**

**CERTIFICATION**

I hereby certify that I, or persons under my direct supervision, have inspected the proposed drill site and access route; that I am familiar with the conditions which presently exist; that the statements made in this plan are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed by Murchison Oil & Gas, Inc. and its contractors and subcontractors in conformity with this plan and the terms and conditions under which it is approved.

December 31, 2009  
Date

Arnold Nall  
Arnold Nall  
VP, Operations  
Murchison Oil & Gas, Inc.

# PECOS DISTRICT CONDITIONS OF APPROVAL

OPERATOR'S NAME:	Murchison Oil & Gas
LEASE NO.:	NM98807
WELL NAME & NO.:	5H Carbon Valley 25 Fed Com
SURFACE HOLE FOOTAGE:	1980' FSL & 200' FEL
BOTTOM HOLE FOOTAGE:	1980' FSL & 330' FWL
LOCATION:	Section 25, T. 16 S., R 27 E., NMPM
COUNTY:	Eddy County, New Mexico

## TABLE OF CONTENTS

Standard Conditions of Approval (COA) apply to this APD. If any deviations to these standards exist or special COAs are required, the section with the deviation or requirement will be checked below.

- ☐ **General Provisions**
- ☐ **Permit Expiration**
- ☐ **Archaeology, Paleontology, and Historical Sites**
- ☐ **Noxious Weeds**
- ☒ **Special Requirements**
  - Cave/Karst**
  - Communitization Agreement**
- ☐ **Construction**
  - Notification
  - V-Door Direction
  - Topsoil
  - Closed Loop System
  - Federal Mineral Material Pits
  - Well Pads
  - Roads
- ☐ **Road Section Diagram**
- ☒ **Drilling**
  - High Cave/Karst
  - Logging Requirements
- ☐ **Production (Post Drilling)**
  - Well Structures & Facilities
  - Pipelines
  - Electric Lines
- ☒ **Interim Reclamation**
- ☒ **Final Abandonment & Reclamation**

## **I. GENERAL PROVISIONS**

The approval of the Application For Permit To Drill (APD) is in compliance with all applicable laws and regulations: 43 Code of Federal Regulations 3160, the lease terms, Onshore Oil and Gas Orders, Notices To Lessees, New Mexico Oil Conservation Division (NMOCD) Rules, National Historical Preservation Act As Amended, and instructions and orders of the Authorized Officer. Any request for a variance shall be submitted to the Authorized Officer on Form 3160-5, Sundry Notices and Report on Wells.

## **II. PERMIT EXPIRATION**

If the permit terminates prior to drilling and drilling cannot be commenced within 60 days after expiration, an operator is required to submit Form 3160-5, Sundry Notices and Reports on Wells, requesting surface reclamation requirements for any surface disturbance. However, if the operator will be able to initiate drilling within 60 days after the expiration of the permit, the operator must have set the conductor pipe in order to allow for an extension of 60 days beyond the expiration date of the APD. (Filing of a Sundry Notice is required for this 60 day extension.)

## **III. ARCHAEOLOGICAL, PALEONTOLOGY & HISTORICAL SITES**

Any cultural and/or paleontological resource discovered by the operator or by any person working on the operator's behalf shall immediately report such findings to the Authorized Officer. The operator is fully accountable for the actions of their contractors and subcontractors. The operator shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery shall be made by the Authorized Officer to determine the appropriate actions that shall be required to prevent the loss of significant cultural or scientific values of the discovery. The operator shall be held responsible for the cost of the proper mitigation measures that the Authorized Officer assesses after consultation with the operator on the evaluation and decisions of the discovery. Any unauthorized collection or disturbance of cultural or paleontological resources may result in a shutdown order by the Authorized Officer.

## **IV. NOXIOUS WEEDS**

The operator shall be held responsible if noxious weeds become established within the areas of operations. Weed control shall be required on the disturbed land where noxious weeds exist, which includes the roads, pads, associated pipeline corridor, and adjacent land affected by the establishment of weeds due to this action. The operator shall consult with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies.

## V. SPECIAL REQUIREMENT(S)

### **Cave and Karst**

\*\* Depending on location, additional Drilling, Casing, and Cementing procedures may be required by engineering to protect critical karst groundwater recharge areas.

#### **Cave/Karst Surface Mitigation**

The following stipulations will be applied to minimize impacts during construction, drilling and production.

##### **Construction:**

In the advent that any underground voids are opened up during construction activities, construction activities will be halted and the BLM will be notified immediately.

##### **No Blasting:**

No blasting will be utilized for pad construction. The pad will be constructed and leveled by adding the necessary fill and caliche.

##### **Pad Berming:**

The pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the pad. All sides will be bermed.

##### **Tank Battery Liners and Berms:**

Tank battery locations will be lined and bermed. A 20 mil permanent liner will be installed with a 4 oz. felt backing to prevent tears or punctures. Tank battery berms must be large enough to contain 1 ½ times the content of the largest tank.

##### **Leak Detection System:**

A method of detecting leaks is required. The method could incorporate gauges to measure loss, siting valves and lines so they can be visually inspected, or installing electronic sensors to alarm when a leak is present. Leak detection plan will be submitted to BLM for approval.

##### **Automatic Shut-off Systems:**

Automatic shut off, check valves, or similar systems will be installed for pipelines and tanks to minimize the effects of catastrophic line failures used in production or drilling.

#### **Cave/Karst Subsurface Mitigation**

The following stipulations will be applied to protect cave/karst and ground water concerns:

##### **Rotary Drilling with Fresh Water:**

Fresh water will be used as a circulating medium in zones where caves or karst features are expected. SEE ALSO: Drilling COAs for this well.

**Directional Drilling:**

Kick off for directional drilling will occur at least 100 feet below the bottom of the cave occurrence zone. SEE ALSO: Drilling COAs for this well.

**Lost Circulation:**

ALL lost circulation zones from the surface to the base of the cave occurrence zone will be logged and reported in the drilling report.

Regardless of the type of drilling machinery used, if a void of four feet or more and circulation losses greater than 70 percent occur simultaneously while drilling in any cave-bearing zone, the BLM will be notified immediately by the operator. The BLM will assess the situation and work with the operator on corrective actions to resolve the problem.

**Abandonment Cementing:**

Upon well abandonment in high cave karst areas additional plugging conditions of approval may be required. The BLM will assess the situation and work with the operator to ensure proper plugging of the wellbore.

**Pressure Testing:**

Annual pressure monitoring will be performed by the operator on all casing annuli and reported in a sundry notice. If the test results indicated a casing failure has occurred, remedial action will be undertaken to correct the problem to the BLM's approval.

**Communitization Agreement**

A Communitization Agreement covering the acreage dedicated to this well must be filed for approval with the BLM. The effective date of the agreement shall be prior to any sales.

**VI. CONSTRUCTION****A. NOTIFICATION**

The BLM shall administer compliance and monitor construction of the access road and well pad. Notify the Carlsbad Field Office at (575) 234-5972 at least 3 working days prior to commencing construction of the access road and/or well pad.

When construction operations are being conducted on this well, the operator shall have the approved APD and Conditions of Approval (COA) on the well site and they shall be made available upon request by the Authorized Officer.

**B. V-DOOR DIRECTION: East****C. TOPSOIL**

The operator shall stockpile the topsoil in a low profile manner in order to prevent wind/water erosion of the topsoil. The topsoil will be used for interim and final reclamation.

**D. CLOSED LOOP SYSTEM**

Tanks are required for drilling operations: No Pits.

The operator shall properly dispose of drilling contents at an authorized disposal site.

**E. FEDERAL MINERAL MATERIALS PIT**

Payment shall be made to the BLM prior to removal of any federal mineral materials. Call the Carlsbad Field Office at (575) 234-5972.

**F. WELL PAD SURFACING**

Surfacing of the well pad is not required.

If the operator elects to surface the well pad, the surfacing material may be required to be removed at the time of reclamation.

The well pad shall be constructed in a manner which creates the smallest possible surface disturbance, consistent with safety and operational needs.

**G. ON LEASE ACCESS ROADS**

**Road Width**

The access road shall have a driving surface that creates the smallest possible surface disturbance and does not exceed fourteen (14) feet in width. The maximum width of surface disturbance, when constructing the access road, shall not exceed thirty (30) feet.

**Surfacing**

Surfacing material is not required on the new access road driving surface. If the operator elects to surface the new access road or pad, the surfacing material may be required to be removed at the time of reclamation.

Where possible, no improvements should be made on the unsurfaced access road other than to remove vegetation as necessary, road irregularities, safety issues, or to fill low areas that may sustain standing water.

The Authorized Officer reserves the right to require surfacing of any portion of the access road at any time deemed necessary. Surfacing may be required in the event the road deteriorates, erodes, road traffic increases, or it is determined to be beneficial for future field development. The surfacing depth and type of material will be determined at the time of notification.

### **Crowning**

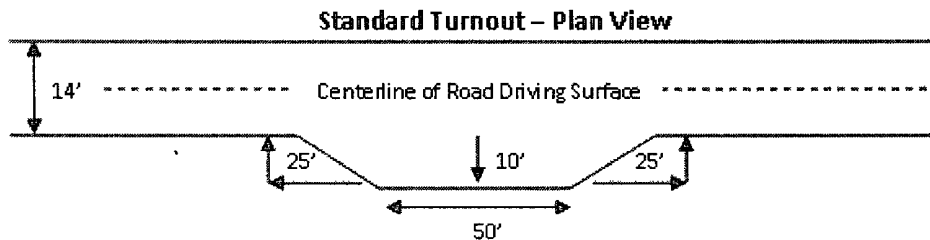
Crowning shall be done on the access road driving surface. The road crown shall have a grade of approximately 2% (i.e., a 1" crown on a 14' wide road). The road shall conform to Figure 1; cross section and plans for typical road construction.

### **Ditching**

Ditching shall be required on both sides of the road.

### **Turnouts**

Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall be constructed on all blind curves. Turnouts shall conform to the following diagram:

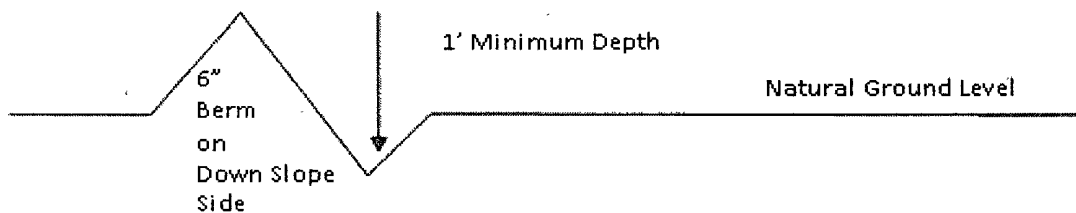


### **Drainage**

Drainage control systems shall be constructed on the entire length of road (e.g. ditches, sidehill out sloping and insloping, lead-off ditches, culvert installation, and low water crossings).

A typical lead-off ditch has a minimum depth of 1 foot below and a berm of 6 inches above natural ground level. The berm shall be on the down-slope side of the lead-off ditch.

### **Cross Section of a Typical Lead-off Ditch**



All lead-off ditches shall be graded to drain water with a 1 percent minimum to 3 percent maximum ditch slope. The spacing interval are variable for lead-off ditches and shall be determined according to the formula for spacing intervals of lead-off ditches, but may be amended depending upon existing soil types and centerline road slope (in %);

### **Formula for Spacing Interval of Lead-off Ditches**

Example - On a 4% road slope that is 400 feet long, the water flow shall drain water into a lead-off ditch. Spacing interval shall be determined by the following formula:

$$400 \text{ foot road with } 4\% \text{ road slope: } \frac{400'}{4\%} + 100' = 200' \text{ lead-off ditch interval}$$

### **Culvert Installations**

Appropriately sized culvert(s) shall be installed at the deep waterway channel flow crossing.

### **Cattleguards**

An appropriately sized cattleguard(s) sufficient to carry out the project shall be installed and maintained at fence crossing(s).

Any existing cattleguard(s) on the access road shall be repaired or replaced if they are damaged or have deteriorated beyond practical use. The operator shall be responsible for the condition of the existing cattleguard(s) that are in place and are utilized during lease operations.

A gate shall be constructed and fastened securely to H-braces.

### **Fence Requirement**

Where entry is required across a fence line, the fence shall be braced and tied off on both sides of the passageway prior to cutting.

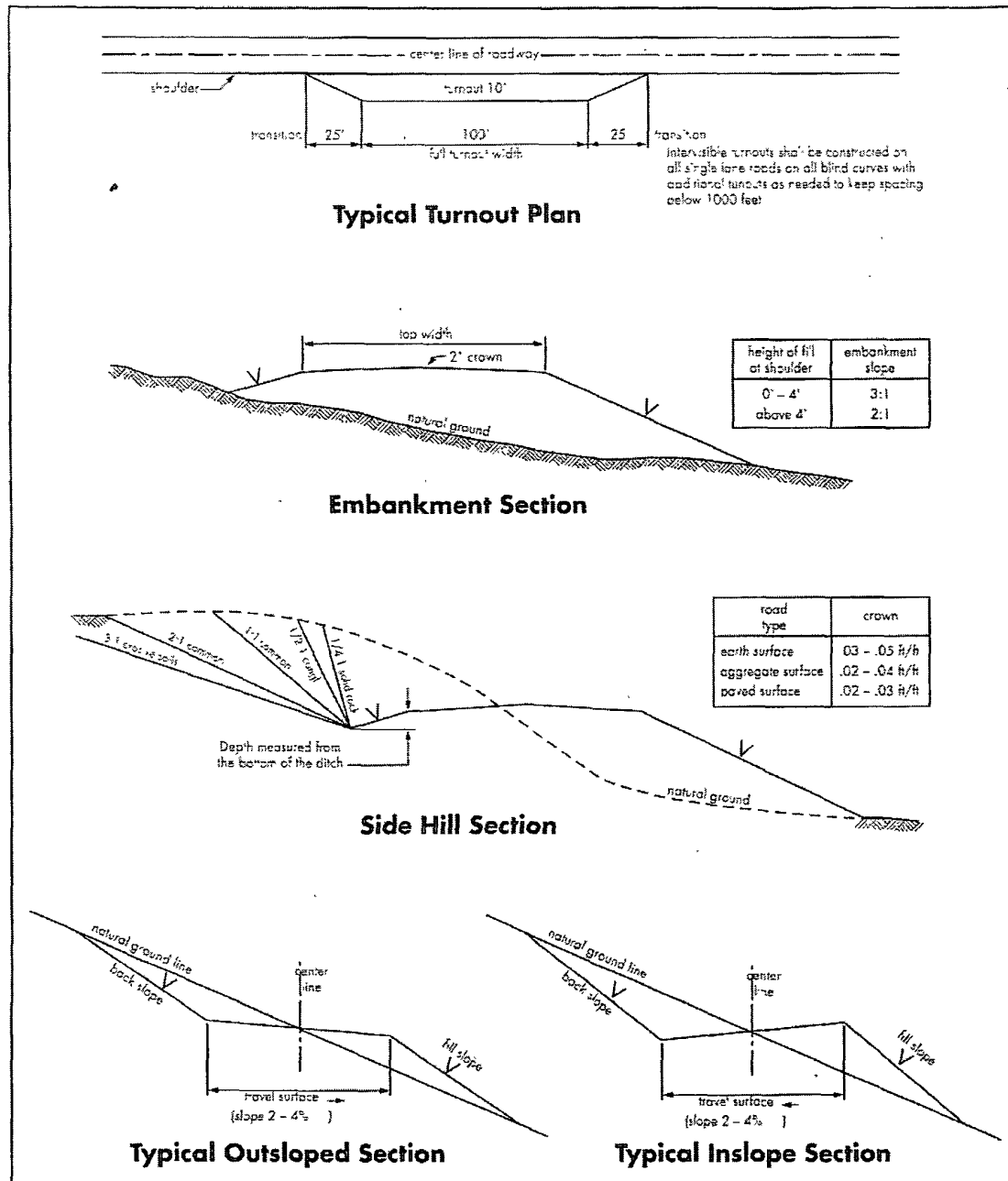
The operator shall notify the private surface landowner or the grazing allotment holder prior to crossing any fence(s).

### **Public Access**

Public access on this road shall not be restricted by the operator without specific written approval granted by the Authorized Officer.



Figure 1 – Cross Sections and Plans For Typical Road Sections



## VII. DRILLING

### A. DRILLING OPERATIONS REQUIREMENTS

The BLM is to be notified a minimum of 4 hours in advance for a representative to witness:

- a. Spudding well
- b. Setting and/or Cementing of all casing strings
- c. BOPE tests

☒ **Eddy County**

Call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220,  
(575) 361-2822

1. **Although Hydrogen Sulfide has not been reported in this section, it is always a potential hazard. If Hydrogen Sulfide is encountered, please report measured amounts and formations to the BLM.**
2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.
3. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.
4. **The record of the drilling rate along with the CAL/GR/N well log run from TD to surface will be submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a digital copy of the logs is to be submitted in addition to the paper copies.**

### B. CASING

**Changes to the approved APD casing and cement program require submitting a sundry and receiving approval prior to work. Failure to obtain approval prior to work will result in an Incident of Non-Compliance being issued.**

**Centralizers required on surface casing per Onshore Order 2.III.B.1.f.**

Wait on cement (WOC) time for a primary cement job will be a minimum 18 hours for a water basin, 24 hours in the potash area, or 500 pounds compressive strength, whichever is greater for all casing strings. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. See individual casing strings for details regarding lead cement slurry requirements.

No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.

Possible lost circulation in the Tansill, Grayburg, and San Andres formations.

Possible brine flows in the Salado Formation, if encountered.

Possible high pressure gas bursts in the Wolfcamp formation.

**HIGH CAVE/KARST – IF LOST CIRCULATION OCCURS WHILE DRILLING THE SURFACE HOLE, THE BLM IS TO BE NOTIFIED PRIOR TO RUNNING THE SURFACE CASING. REVISED CEMENTING PROGRAM OR CONTINGENCY CASING MAY BE REQUIRED.**

1. The 9-5/8 inch surface casing shall be set at approximately 1100 feet and cemented to the surface. **Casing is to be set in a competent formation, which may be difficult in the Artesia group. Onshore Order II requires casing to be set across a competent bed.**
  - a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with a surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.
  - b. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry.**
  - c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
  - d. If cement falls back, remedial cementing will be done prior to drilling out that string.

**IF LOST CIRCULATION OCCURS WHILE DRILLING THE 8-3/4" HOLE, THE CEMENT PROGRAM FOR THE 7" CASING WILL NEED TO BE MODIFIED AND THE BLM IS TO BE CONTACTED PRIOR TO RUNNING THE CASING. A MINIMUM OF TWO CASING STRINGS CEMENTED TO SURFACE IS REQUIRED IN HIGH CAVE/KARST AREAS. THE CEMENT MUST BE IN A SOLID SHEATH THEREFORE, ONE INCH OPERATIONS WILL NOT BE PERMITTED. A DV TOOL WILL BE REQUIRED.**

2. The minimum required fill of cement behind the 7 inch intermediate casing is:

- ☒ Cement to surface. If cement does not circulate see B.1.a, c-d above.  
**Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst. Additional cement may be required as the excess calculates to 1%.**

**A two-stage job will require submitting a sundry and receiving approval prior to commencement of work.**

3. The minimum required fill of cement behind the 4-1/2 inch production liner is:

- ☒ No cement required. Operator is using Peak Completion Liner.

4. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

### **C. PRESSURE CONTROL**

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.
2. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **3000 (3M)** psi.
3. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
  - a. Casing cut-off and BOP installation will not be initiated until the cement has had 4-6 hours of setup time in a water basin and 12 hours in the potash areas. This time will start after the cement plug is bumped. Testing the BOP/BOPE against a plug can commence after meeting the above conditions plus the BOP installation time.

- b. The tests shall be done by an independent service company utilizing a test plug.
- c. The results of the test shall be reported to the appropriate BLM office.
- d. All tests are required to be recorded on a calibrated test chart. **A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.**
- e. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug.
- f. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the **Wolfcamp** formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

#### **D. DRILLING MUD**

Mud system monitoring equipment, with derrick floor indicators and visual and audio alarms, shall be operating before drilling into the **Wolfcamp** formation, and shall be used until production casing is run and cemented.

#### **E. DRILL STEM TEST**

If drill stem tests are performed, Onshore Order 2.III.D shall be followed.

**CRW 012710**

### **VIII. PRODUCTION (POST DRILLING)**

#### **A. WELL STRUCTURES & FACILITIES**

##### **Placement of Production Facilities**

Production facilities should be placed on the well pad to allow for maximum interim recontouring and revegetation of the well location.

##### **Containment Structures**

The containment structure shall be constructed to hold the capacity of the entire contents of the largest tank, plus 24 hour production, unless more stringent protective requirements are deemed necessary by the Authorized Officer.

**Painting Requirement**

All above-ground structures including meter housing that are not subject to safety requirements shall be painted a flat non-reflective paint color  
Shale Green, Munsell Soil Color Chart # 5Y 4/2

**B. PIPELINES**

(Not Applied for in APD)

**C. ELECTRIC LINES**

(Not Applied for in APD)

**IX. INTERIM RECLAMATION**

During the life of the development, all disturbed areas not needed for active support of production operations should undergo interim reclamation in order to minimize the environmental impacts of development on other resources and uses.

Within six (6) months of well completion, operators should work with BLM surface management specialists (Jim Amos: 575-234-5909) to devise the best strategies to reduce the size of the location. Interim reclamation should allow for remedial well operations, as well as safe and efficient removal of oil and gas.

During reclamation, the removal of caliche is important to increasing the success of revegetating the site. Removed caliche that is free of contaminants may be used for road repairs, fire walls or for building other roads and locations. In order to operate the well or complete workover operations, it may be necessary to drive, park and operate on restored interim vegetation within the previously disturbed area. Disturbing revegetated areas for production or workover operations will be allowed. If there is significant disturbance and loss of vegetation, the area will need to be revegetated. Communicate with the appropriate BLM office for any exceptions/exemptions if needed.

All disturbed areas after they have been satisfactorily prepared need to be reseeded with the seed mixture provided below.

Upon completion of interim reclamation, the operator shall submit a Sundry Notices and Reports on Wells, Subsequent Report of Reclamation (Form 3160-5).

**X. FINAL ABANDONMENT & RECLAMATION**

At final abandonment, well locations, production facilities, and access roads must undergo "final" reclamation so that the character and productivity of the land are restored.

Earthwork for final reclamation must be completed within six (6) months of well plugging. All pads, pits, facility locations and roads must be reclaimed to a satisfactory revegetated, safe, and stable condition, unless an agreement is made with the landowner or BLM to keep the road and/or pad intact.

After all disturbed areas have been satisfactorily prepared; these areas need to be revegetated with the seed mixture provided below. Seeding should be accomplished by drilling on the contour whenever practical or by other approved methods. Seeding may need to be repeated until revegetation is successful, as determined by the BLM.

Operators shall contact a BLM surface protection specialist prior to surface abandonment operations for site specific objectives (Jim Amos: 575-234-5909).

#### Seed Mixture 1, for Loamy Sites

The holder shall seed all disturbed areas with the seed mixture listed below. The seed mixture shall be planted in the amounts specified in pounds of pure live seed (PLS)\* per acre. There shall be no primary or secondary noxious weeds in the seed mixture. Seed will be tested and the viability testing of seed will be done in accordance with State law(s) and within nine (9) months prior to purchase. Commercial seed will be either certified or registered seed. The seed container will be tagged in accordance with State law(s) and available for inspection by the authorized officer.

Seed will be planted using a drill equipped with a depth regulator to ensure proper depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture will be evenly and uniformly planted over the disturbed area (small/heavier seeds have a tendency to drop the bottom of the drill and are planted first). The holder shall take appropriate measures to ensure this does not occur. Where drilling is not possible, seed will be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre are to be doubled. The seeding will be repeated until a satisfactory stand is established as determined by the authorized officer. Evaluation of growth will not be made before completion of at least one full growing season after seeding.

Species to be planted in pounds of pure live seed\* per acre:

<u>Species</u>	<u>lb/acre</u>
Plains lovegrass ( <i>Eragrostis intermedia</i> )	0.5
Sand dropseed ( <i>Sporobolus cryptandrus</i> )	1.0
Sideoats grama ( <i>Bouteloua curtipendula</i> )	5.0

\*Pounds of pure live seed:

Pounds of seed x percent purity x percent germination = pounds pure live seed