

TCS  
1-3-2014Form 3160-3  
(April 2004)

OCD Artesia


FORM APPROVED  
OMB No. 1004-0137  
Expires March 31, 2007UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

## APPLICATION FOR PERMIT TO DRILL OR REENTER

1a. Type of work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER		5. Lease Serial No. NMLC-029426B
1b. Type of Well: <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other <input checked="" type="checkbox"/> Single Zone <input type="checkbox"/> Multiple Zone		6. If Indian, Allottee or Tribe Name
2. Name of Operator APACHE CORPORATION		7. If Unit or CA Agreement, Name and No.
3a. Address 303 VETERANS AIRPARK LN #3000 MIDLAND, TX 79705		8. Lease Name and Well No. CROW FEDERAL #31H <308711>
3b. Phone No. (include area code) 432-818-1167		9. API Well No. 30-015- 41912
4. Location of Well (Report location clearly and in accordance with any State requirements.)* At surface 545' FNL & 475' FWL UL: D SEC: 10 At proposed prod. zone 545' FNL & 330' FEL UL: A SEC: 10		10. Field and Pool, or Exploratory FREN; GLORIETA-YESO <26770>
14. Distance in miles and direction from nearest town or post office* APPROX 4 MILES NORTHEAST OF LOCO HILLS, NM		11. Sec., T. R. M. or Blk. and Survey or Area SEC: 10 T17S R31E
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drg. unit line, if any) 330'	16. No. of acres in lease 1919.88 ACRES	12. County or Parish EDDY
17. Spacing Unit dedicated to this well 160 ACRES	13. State NM	
18. Distance from proposed location* to nearest well, drilling, completed, approved for, on this lease, ft. 25'	19. Proposed Depth TVD: ~ 5320' MD: ~ 9491'	20. BLM/BIA Bond No. on file BLM-CO-1463 NATIONWIDE / NMB000736
21. Elevations (Show whether DF, KDB, RT, GL, etc.) GL: 3919'	22. Approximate date work will start* As Soon As Approved	23. Estimated duration ~ 18 DAYS
24. Attachments		

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

- |   |  |
|---|--|
| 1. Well plat certified by a registered surveyor.  | 4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).    |
| 2. A Drilling Plan.   | 5. Operator certification  |
| 3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO shall be filed with the appropriate Forest Service Office). | 6. Such other site specific information and/or plans as may be required by the authorized officer. |

25. Signature 	Name (Printed/Typed) SORINA L. FLORES	Date 9/18/13
--	--	-----------------

Title  
SUPV OF DRILLING SERVICES

Approved by (Signature) /s/George MacDonell	Name (Printed/Typed)	Date DEC 30 2013
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.

\*(Instructions on page 2)

Roswell Controlled Water Basin

Approval Subject to General Requirements  
& Special Stipulations AttachedSEE ATTACHED FOR  
CONDITIONS OF APPROVAL

UNITED STATES DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
CARLSBAD FIELD OFFICE  
620 E. GREENE STREET  
CARLSBAD, NM 88220

OPERATOR CERTIFICATION

I HEARBY CERTIFY THAT I, OR SOMEONE UNDER MY DIRECT SUPERVISION, HAVE INSPECTED THE DRILL SITE AND ACCESS ROUTE PROPOSED HEREIN; THAT I AM FAMILIAR WITH THE CONDITIONS WHICH CURRENTLY EXIST; THAT I HAVE FULL KNOWLEDGE OF STATE AND FEDERAL laws applicable to this operation; that the statements made in the APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or the company I represent, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements.

Executed this 19 day of September

Well: CROW FEDERAL #31H

Operator Name: APACHE CORPORATION

Signature:  Printed Name: TRAVIS SHORT

Title: Drilling Engineer Date: 9/20/13

Email (optional): travis.short@apachecorp.com

Street or Box: 303 Veterans Airpark Ln., Ste. 3000

City, State, Zip Code: Midland, TX 79705

Telephone: 713-296-7277

Field Representative (if not above signatory): \_\_\_\_\_

Address (if different from above): \_\_\_\_\_

Telephone (if different from above): \_\_\_\_\_

Email (optional): \_\_\_\_\_

Agents not directly employed by the operator must submit a letter from the operator authorizing that the agent to act or file this application on their behalf.

DISTRICT I  
1625 N. French Dr., Hobbs, NM 88240  
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II  
811 S. First St., Artesia, NM 88210  
Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III  
1000 Rio Brazos Road, Aztec, NM 87410  
Phone: (505) 334-6178 Fax: (505) 334-6170

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

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

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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number <b>30-015-41912</b>	Pool Code <b>26770</b>	Pool Name <b>Fren ; Glorieta - Yeso</b>
Property Code <b>308711</b>	Property Name <b>CROW FEDERAL</b>	Well Number <b>31H</b>
OGRID No. <b>873</b>	Operator Name <b>APACHE CORPORATION</b>	Elevation <b>3919'</b>

Surface Location

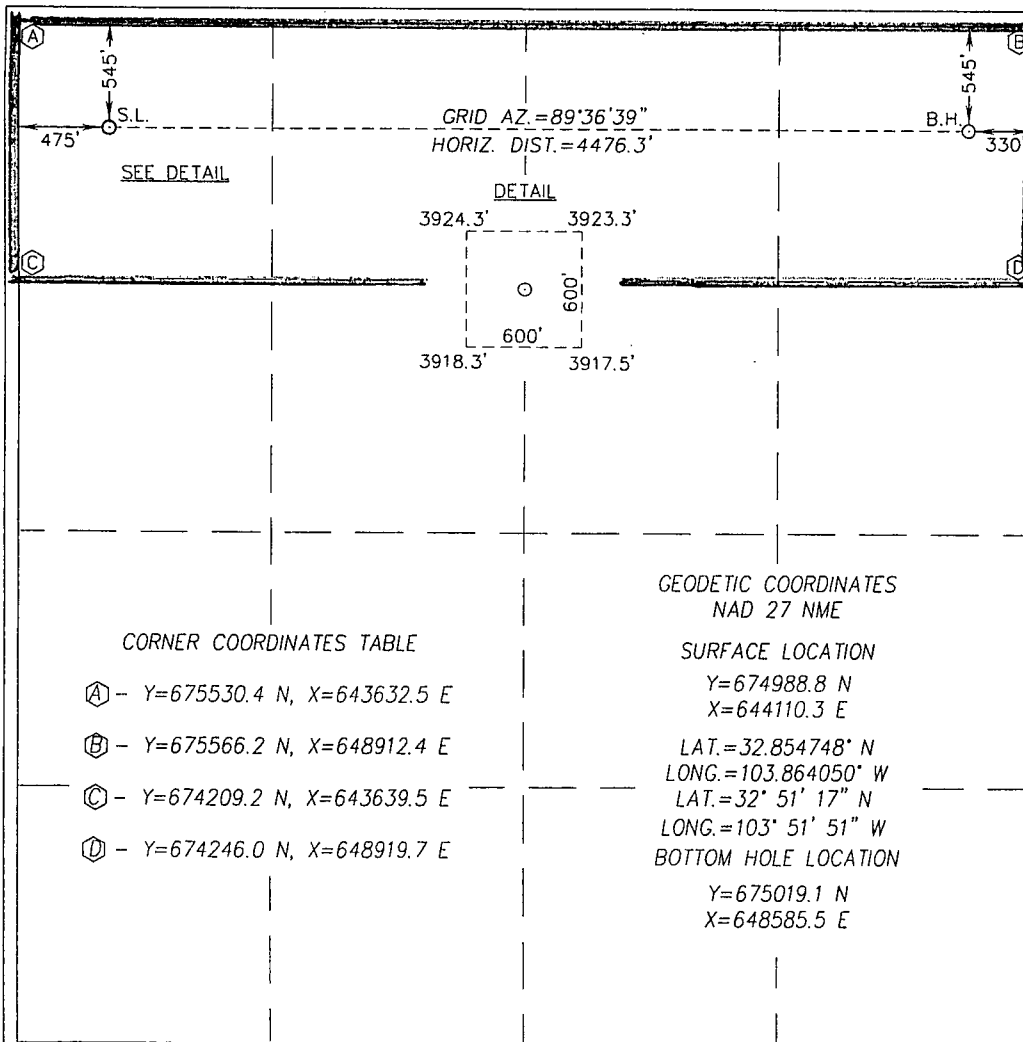
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	10	17-S	31-E		545	NORTH	475	WEST	EDDY

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	10	17-S	31-E		545	NORTH	330	EAST	EDDY

Dedicated Acres <b>160</b>	Joint or Infill	Consolidation Code	Order No.
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NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION



**OPERATOR CERTIFICATION**

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.

*Sorina L. Flores* 9/12/13  
Signature Date

*Sorina L. Flores*  
Printed Name

*sorina.flores@apachecorp.com*  
E-mail Address

**SURVEYOR CERTIFICATION**

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

APRIL 27, 2012

Date of Survey

Signature & Seal of Professional Surveyor:

*Ronald J. Eidson* 3239

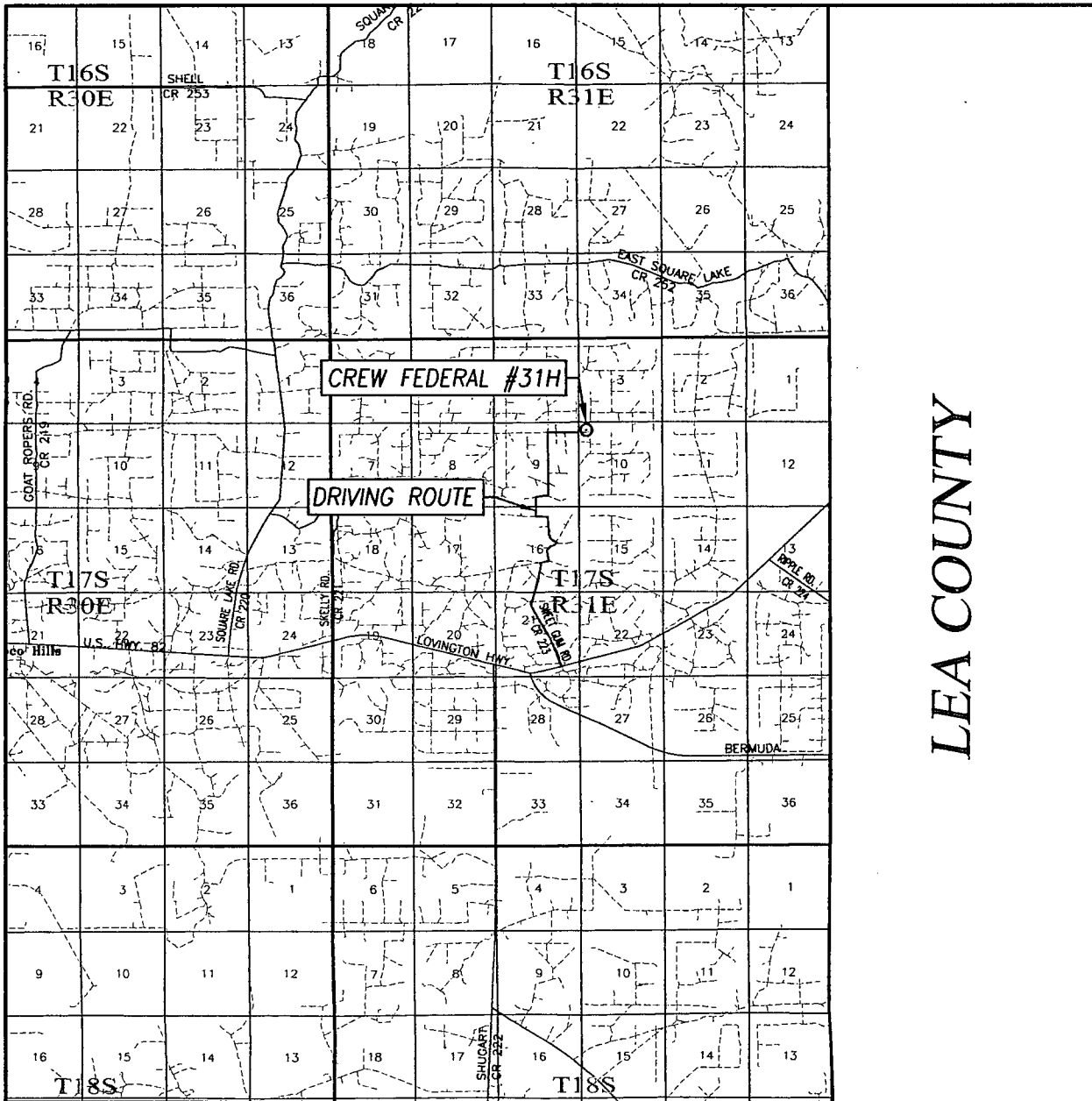
Certificate Number: 3239

Surveyor: Ronald J. Eidson

AF JWSC W.O.: 12.11.0486



# VICINITY MAP



DIRECTIONS TO LOCATION

SCALE: 1" = 2 MILES

SEC. 10 TWP. 17-S RGE. 31-E

SURVEY N.M.P.M.

COUNTY EDDY STATE NEW MEXICO

DESCRIPTION 545' FNL & 475' FWL

ELEVATION 3919'

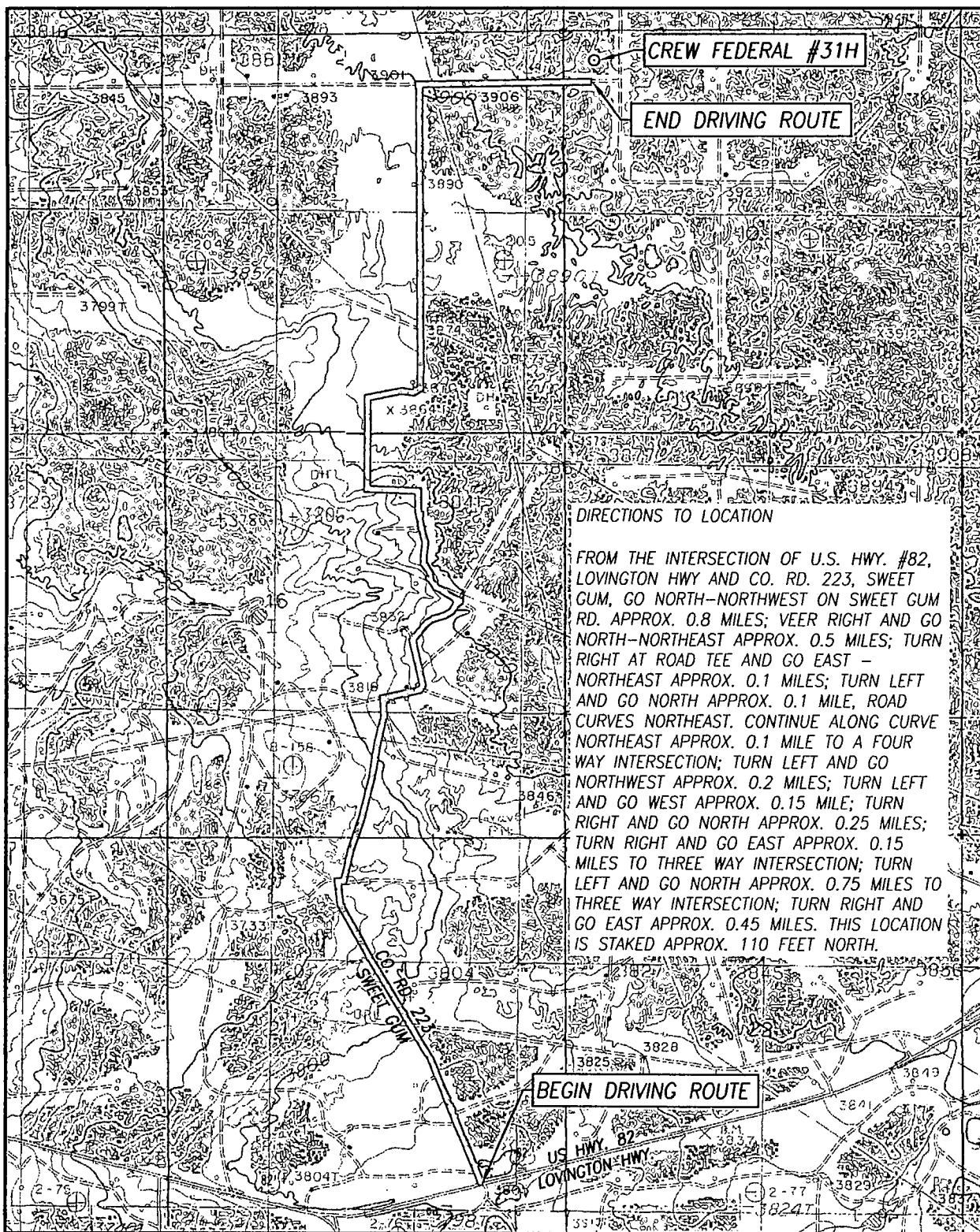
OPERATOR APACHE CORPORATION

LEASE CROW FEDERAL

FROM THE INTERSECTION OF U.S. HWY. #82, LOVINGTON HWY AND CO. RD. 223, SWEET GUM, GO NORTH-NORTHWEST ON SWEET GUM RD. APPROX. 0.8 MILES; VEER RIGHT AND GO NORTH-NORTHWEST APPROX. 0.5 MILES; TURN RIGHT AT ROAD TEE AND GO EAST-NORTHEAST APPROX. 0.1 MILES; TURN LEFT AND GO NORTH APPROX. 0.1 MILE, ROAD CURVES NORTHEAST. CONTINUE ALONG CURVE NORTHEAST APPROX. 0.1 MILE TO A FOUR WAY INTERSECTION; TURN LEFT AND GO NORTHWEST APPROX. 0.2 MILES; CONTINUE ON ROAD AND VEER RIGHT AND GO NORTH APPROX. 0.15 MILES; TURN LEFT AND GO WEST APPROX. 0.15 MILES; TURN RIGHT AND GO NORTH APPROX. 0.25 MILES; TURN RIGHT AND GO EAST APPROX. 0.15 MILES TO THREE WAY INTERSECTION; TURN LEFT AND GO NORTH APPROX. 0.75 MILES TO THREE WAY INTERSECTION; TURN RIGHT AND GO EAST APPROX. 0.45 MILES. THIS LOCATION IS STAKED APPROX. 110 FEET NORTH.

PROVIDING SURVEYING SERVICES  
SINCE 1946  
**JOHN WEST SURVEYING COMPANY**  
412 N. DAL PASO  
HOBBS, N.M. 88240  
(575) 393-3117 [www.jwsc.biz](http://www.jwsc.biz)

# LOCATION VERIFICATION MAP



SEC. 10 TWP. 17-S RGE. 31-E SCALE: 1" = 2000'

COUNTY EDDY STATE NEW MEXICO

DESCRIPTION 545' FNL & 475' FWL

ELEVATION 3919'

OPERATOR APACHE CORPORATION

LEASE CROW FEDERAL

U.S.G.S. TOPOGRAPHIC MAP

MALJAMAR, N.M. SURVEY N.M.P.M.

CONTOUR INTERVAL:

MALJAMAR, N.M. - 10'

LOCO HILLS, N.M. - 10'

PROVIDING SURVEYING SERVICES  
SINCE 1946

**JOHN WEST SURVEYING COMPANY**

412 N. DAL PASO  
HOBBS, N.M. 88240  
(575) 393-3117 www.jwsc.biz

# APACHE CORPORATION

CROW FEDERAL 28H,29H,30H,31H,32H,33H

Well Pad # - 1 Mile Radius

Sec 10 T17S R31E

POSTED WELL DATA

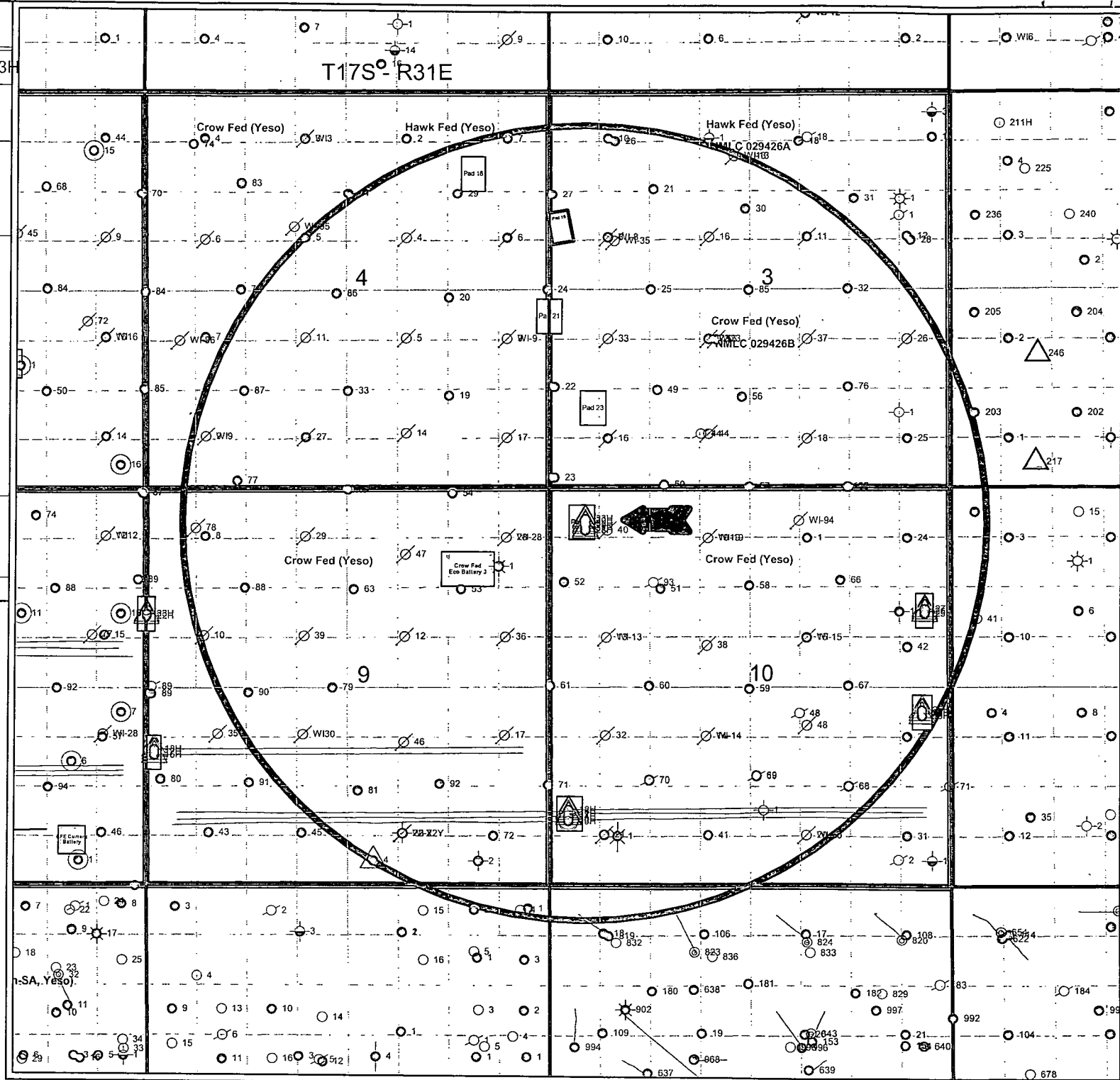
Well Number

- WELL SYMBOLS**
- Abandoned Well
  - Dry Hole, With Show of Oil
  - Dry Hole
  - Gas Well
  - Injection Well
  - Location
  - Proposed Drilling Location
  - Oil Well
  - P&A'd Gas Well
  - Plugged and Abandoned
  - Active Producer
  - Suspended Oil Well
  - PERMIT

0 1,803 3,606  
FEET

July 30, 2013

Exhibit #2



# APACHE CORPORATION

SHL: 545' FNL & 475' FWL UL: D SEC: 10

BHL: 545' FNL & 330' FEL UL: A SEC: 10

BHL 1 MILE RADIUS

## CROW FEDERAL #31H

### POSTED WELL DATA

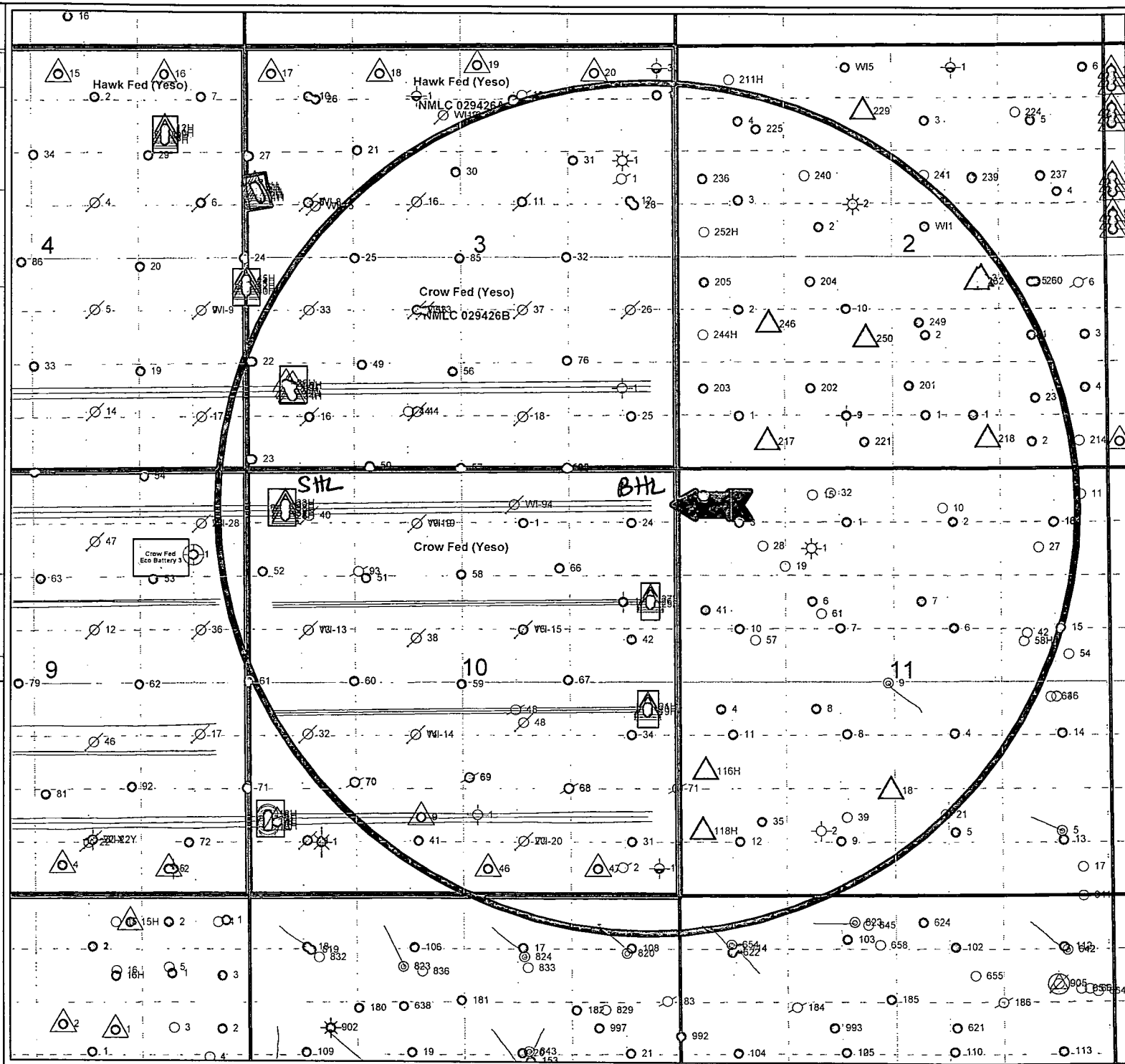
○ Well Number

- WELL SYMBOLS**
- Abandoned Well
  - Dry Hole, With Show of Oil
  - Dry Hole
  - Gas Well
  - Injection Well
  - Active Injection
  - Location
  - Proposed Drilling Location
  - Oil Well
  - P&A'd Gas Well
  - Plugged and Abandoned
  - Active Producer
  - Service Well
  - PERMIT

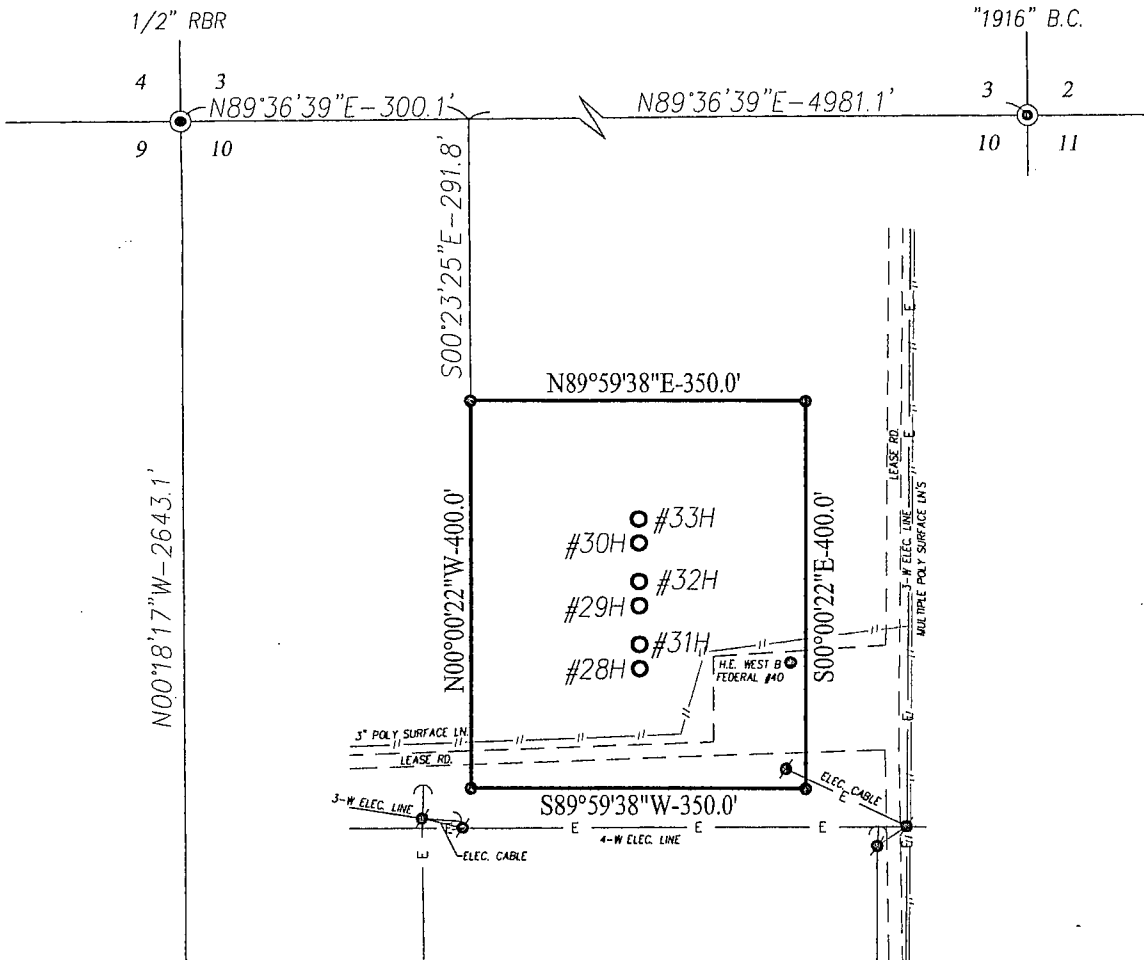


November 11, 2013

Exhibit #2



SECTION 10, TOWNSHIP 17 SOUTH, RANGE 31 EAST, N.M.P.M.  
EDDY COUNTY NEW MEXICO



**DESCRIPTION**

A PROPOSED WELL PAD SITUATED IN THE NORTHWEST QUARTER OF SECTION 10, TOWNSHIP 17 SOUTH, RANGE 31 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHWEST CORNER OF THIS TRACT, WHICH LIES N89°36'39\"E 300.1 FEET AND S00°23'25\"E 291.8 FEET FROM THE NORTHWEST CORNER. THEN N89°59'38\"E 350.0 FEET; THEN S00°00'22\"E 400.0 FEET; THEN S89°59'38\"W 350.0 FEET; THEN N00°00'22\"W 400.0 FEET, CONTAINING 3.214 ACRES, MORE OR LESS.

**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.

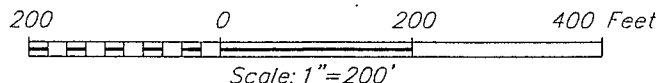
I, RONALD J. EIDSON, NEW MEXICO PROFESSIONAL SURVEYOR No. 3239, DO HEREBY CERTIFY THAT THIS SURVEY PLAT AND THE ACTUAL SURVEY ON THE GROUND UPON WHICH IT IS BASED WERE PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION, THAT I AM RESPONSIBLE FOR THIS SURVEY; THAT THIS SURVEY MEETS THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO, AND THAT IT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

RONALD J. EIDSON

DATE: 05/22/2012

**LEGEND**

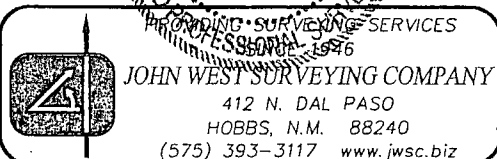
- ⊙ DENOTES FOUND CORNER AS NOTED
- DENOTES SET SPIKE NAIL



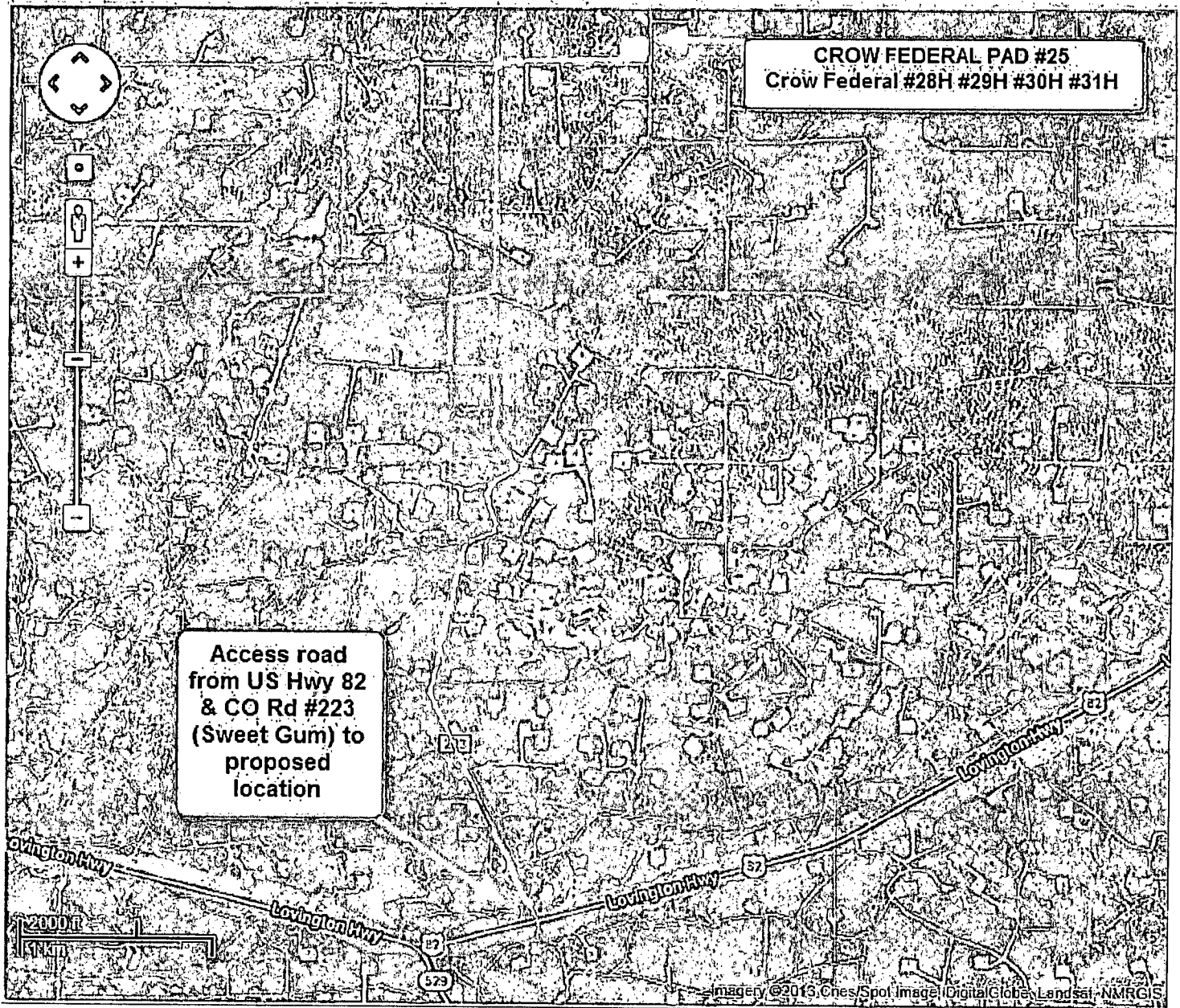
**APACHE CORPORATION**

SURVEY FOR THE CROW #24 WELL PAD  
SITUATED IN THE NW/4 OF SECTION 10,  
TOWNSHIP 17 SOUTH, RANGE 31 EAST, N.M.P.M.  
EDDY COUNTY, NEW MEXICO

Survey Date: 4/27/12	CAD Date: 5/17/12	Drawn By: AF
W.O. No.: 12110697	Rev: 12/10/12	Rel. W.O.:
Sheet 1 of 1		



ACCESS ROAD PLAT  
CROW FEDERAL #28H 29H 30H 31H 32H 33H  
EXHIBIT #1



**DESCRIPTION**

SURVEY OF A STRIP OF LAND 50.0 FEET WIDE AND 19713.9 FEET OR 3.734 MILES IN LENGTH CROSSING USA LAND IN SECTIONS 3, 4, 9 & 10, TOWNSHIP 17 SOUTH, RANGE 31 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO, AND BEING 25.0 FEET LEFT AND 25.0 FEET RIGHT OF THE ABOVE PLATED CENTERLINE SURVEY.

**LINE TO CROW FED. #31 PAD**

0+00 BEGIN SURVEY WEST  
 0+29 C.L. LEASE RD.  
 0+53 4-W O.H. ELEC. LN.  
 0+85.5 P.I. 61°36'28" RT.  
 8+66.1 P.I. 02°50'34" LT.  
 8+91.9 N-S SEC. LN.  
 10+30 J-W O.H. ELEC. LN.  
 15+50 O.H. ELEC. CABLE  
 15+57.0 P.I. 84°45'00" RT.  
 16+04 4-W O.H. ELEC. LN.  
 16+27.1 P.I. 07°42'39" RT.  
 20+87 2 POLY SURF. LN.  
 21+21 C.L. LEASE RD.  
 23+56 4-W O.H. ELEC. LN.  
 24+35 PLAINS BPL  
 27+30 PLAINS BPL  
 27+53.1 P.I. 61°39'01" LT.  
 28+12 J-W O.H. ELEC. LN.  
 28+33 C.L. LEASE RD.  
 28+58 J-W O.H. ELEC. LN.  
 29+63.4 P.I. 28°09'50" LT.  
 EQUATION 38+48.0 B.K.=0+00 FWD

**LINE TO CROW FED. #31 PAD**

0+00=17+33.2 ON LINE TO CROW FED. #31 PAD  
 0+84 PLAINS BPL  
 2+55 C.L. LEASE RD.  
 2+99 PLAINS BPL  
 14+68.5 P.I. 03°50'11" LT.  
 15+26.7 P.I. 73°28'45" LT.  
 22+14.3 P.I. 35°59'48" LT.  
 23+78.1 P.I. 76°31'12" RT.  
 31+59.2 P.I. 30°53'00" RT.  
 34+55.8 P.I. 33°17'11" LT.  
 34+67.4 END SURVEY AT CROW #7E WELL PAD

**LINE TO CROW #7E WELL PAD**

0+00=15+57.0 ON LINE TO CROW FED. #31 PAD  
 CROW FED. #27H  
 CROW FED. #28H  
 CROW FED. #31H  
 CROW #7E WELL PAD

**LINE TO CROW #7E WELL PAD**

0+00=15+57.0 ON LINE TO CROW #7E WELL PAD  
 2+68.0 CROW #7E WELL PAD  
 2+68.0 END SURVEY AT CROW #7E WELL PAD

LINE	BEARING	DISTANCE	LINE	BEARING	DISTANCE
L1	N87°21'27"E	85.1	L10	S22°53'59"W	534.5*
L2	S89°41'31"E	780.6*	L11	S60°48'46"W	584.1*
L3	N87°27'55"E	690.9*	L12	S89°14'14"W	520.1*
L4	S07°44'05"E	70.1*	L13	S39°42'35"W	203.1*
L5	S00°04'26"E	1126.0*	L14	S84°31'39"W	176.2*
L6	S62°03'27"E	210.3*	L15	S37°54'52"W	644.1*
L7	N89°46'43"E	884.6*	L16	S86°51'52"W	1034.5*
L8	S55°39'50"E	803.8*	L17	S00°00'00"E	125.2*
L9	S14°54'13"E	336.8*	L18	N24°40'51"W	2044.6* (NE)
			L19	N18°05'58"E	1203.2* (NE)

RONALD J. EIDSON *Ronald J. Eidson*  
DATE: 05/21/2013

TABLE FOR LINE TO HAWK FEDERAL #10 PAD		
LINE	BEARING	DISTANCE
L1	N1713.16°E	208.0'
L2	N000026°E	1002.6'
L3	N0943.21°E	205.6'
L4	N00336.20°W	1116.4'
L5	S8751.45°W	217.4'
L6	N3018.36°W	724.0'
L7	N3020.37°W	184.2'
L8	N0729.52°E	285.6'
L9	N4015.18°E	451.6'
L10	N3156.56°W	122.7'
L11	N7214.11°E	214.5'
L12	N0552.07°E	1175.2'
L13	N2627.30°W	126.8'
L14	S8923.26°W	1203.1'
L15	S4326.08°W	424.1'
L16	S6415.00°W	2010.0' (THE)

LINE	BEARING	DISTANCE
L1	N87°10'04"E	776.7'
L2	N77°19'21"E	1091.8'
L3	N01°09'24"W	945.8'
L4	N38°09'12"W	160.8'
L5	N38°14'00"E	177.1'
L6	N89°09'00"E	303.6'
L7	N53°41'11"E	11.6'
L8	N30°37'03"W	969.0' (TIE)

LINE	BEARING	DISTANCE
L1	S71°43'52"E	268.0'
L2	S48°57'47"W	720.0' (TIE

**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.

SURVEY OF PIPELINES CROSSING SECTIONS 3, 4, 9 & 10,  
TOWNSHIP 17 SOUTH, RANGE 31 EAST, N.M.P.M.,  
EDDY COUNTY, NEW MEXICO

Survey Date: 5/6/13	CAD Date: 5/17/13	Drawn By: ACR
W.O. No.: 13110499	Rev:	Rel. W.O.: 12111655 Sheet 1 of 1

DRILLING PLAN: BLM COMPLIANCE  
(Supplement to BLM 3160-3)

APACHE CORPORATION (OGRID: 873) CROW FEDERAL #31H

Lease #: NMLC-029426B Projected TVD: ~5320' MD: ~9491' GL: 3919'  
SHL: 545' FNL & 475' FWL UL: D SEC: 10 BHL: 545' FNL & 330' FEL UL: A SEC: 10  
T17S R31E EDDY COUNTY, NM

1. GEOLOGIC NAME OF SURFACE FORMATION: Eolian/Piedmond Alluvial Deposits

2. ESTIMATED TOPS OF GEOLOGICAL MARKERS & DEPTHS OF ANTICIPATED FRESH WATER, OIL OR GAS:

Quaternary Aeolian	Surf	Queen	2739'
Rustler	528'	Grayburg	3154'
Salt Top	721'	San Andres	3489' (Oil)
Salt Bottom	1682'	Glorieta	5953'
Yates	1844'	Yeso (Paddock)	5035' (Oil)
Seven Rivers	2126'	TD	TVD: 5320' MD: 9491'

Avg Depth to Ground Water: ~91'

All fresh water & prospectively valuable minerals, as described by BLM, encountered during drilling, will be recorded by depth and adequately protected. All oil & gas shows within zones of correlative rights will be tested to determine commercial potential. The surface fresh water sands will be protected by setting 13-3/8" csg @ 560' & circ cmt back to surface. All intervals will be isolated by setting 5-1/2" csg to TD & circ cmt above the base of 8-5/8" csg. 640'

3. CASING PROGRAM: All casing is new & API approved

STRING	HOLE SIZE	DEPTH	OD CSG	WEIGHT	COLLAR	GRADE	COLLAPSE	BURST	TENSION
Surface	17-1/2"	0' - 560'	13-3/8"	48#	STC	H-40	1.125	1.0	1.8
Intermediate	11"	0' - 3500'	8-5/8"	32#	STC	J-55	1.125	1.0	1.8
Production	7-7/8"	0' - 9491'	5-1/2"	17#	LTC	L-80	1.125	1.0	1.8

4. CEMENT PROGRAM:

A. Surface (TOC – Surface) \*\*100% excess cmt to surf\*\* Cmt with:

Lead: 670 sx Cl C w/1% CACL2 (14.8 wt, 1.33 yld)

Compressive Strengths: 12 hr – 1565 psi 24 hr – 2442 psi

B. Intermediate (TOC – Surface) \*\*50% excess cmt to surf\*\* Cmt with:

Lead: 530 sx 35/65 Poz C w/6% Gel + 5% Salt (12.4 wt, 2.10 yld)

Compressive Strengths: 12 hr – 589 psi 24 hr – 947 psi

Tail: 310 sx Class C (14.8 wt, 1.34 yld)

Compressive Strengths: 12 hr – 813 psi 24 hr – 1205 psi

(May use a DVT & modify cmt program for a 2 stage job, if a strong water flow is encountered)

C. Production (TOC: ~2500' from Surface) \*\*35% excess cmt\*\* Cmt with:

Lead: 120 sx 35-65 Poz C w/6% Gel + 5% Salt (12.4 wt, 2.10 yld)

Compressive Strengths: 12 hr – 589 psi 24 hr – 947 psi

Tail: 1010 sx PVL w/1.3% Salt + 0.6 Retarder (13.0 wt, 1.47 yld)

Compressive Strengths: 12 hr – 800 psi 24 psi – 1000 psi

\*\* The above cmt volumes could be revised pending caliper measurement from open hole logs. For Surface csg: If cmt does not circ to surface, the appropriate BLM office shall be notified. The TOC shall be determined as directed by the BLM for the specific set of circumstances. Cement will then be brought to surface via either 1" or ready mix operations, as specified by the BLM at that time.

## 5. PROPOSED CONTROL EQUIPMENT

5/4 COA  
"EXHIBIT 3" shows a 13-5/8" 3M psi WP BOP consisting of an annular bag type preventer. This BOP will be nipped up on the 13-3/8" surface csg head & tested to 2000psi using a test plug. After the 8-5/8" intermediate csg is set & cmt'd, an 11" 3M BOP consisting of an annular bag type preventer, middle blind rams & bottom pipe rams will be installed & utilized continuously until TD is reached "EXHIBIT 3A". The BOP will be tested at 2000 psi, maximum surface pressure is not expected to exceed 2M psi. BHP is calculated to be approximately 2340psi. \*All BOP's & associated equipment will be tested as per BLM Drilling Operations Order #2. The BOP will be operated & checked each 24 hr period & blind rams will be operated & checked when the drill pipe is out of the hole. Functional tests will be documented on the daily driller's log. "EXHIBIT 3 & 3A" also show a 3M psi choke manifold with a 3" blow down line. Full opening stabbing valve & Kelly cock will be on derrick floor in case of need. No abnormal pressures of temperatures are expected in this well. No nearby wells have encountered any well control problems.

## 6. AUXILIARY WELL CONTROL EQUIPMENT / MONITORING EQUIPMENT:

4-1/2" x 3000 psi Kelly valve  
11" x 3000 psi mud cross – H2S detector on production hole  
Gate-type safety valve 3" choke line from BOP to manifold  
2" adjustable chokes – 3" blow down line  
Fill up line as per Onshore Order 2

## 7. PROPOSED MUD CIRCULATION SYSTEM: (Closed Loop System)

3/4 COA

INTERVAL	MW (ppg)	VISC (sec/qt)	FLUID LOSS (cc)	MUD TYPE
0' - 560'	8.3 – 8.8	28 – 36	NC	FW
560' - 3500'	9.8 – 10.0	28 – 29	NC	Brine
3500' – 9491'	9.0 – 10.0	28 – 29	NC	Brine/Cut Brine

\*\* Visual mud monitoring equipment shall be in place to detect volume changes. A mud test shall be performed every 24 hrs after mudding up to determine, as applicable: density, visc, gel strength, filtration, and pH. The necessary mud products for weight addition & fluid loss control will be on location at all times. In order to run open hole logs & casing, the above mud properties may have to be altered to meet these needs.

## 8. LOGGING, CORING & TESTING PROGRAM:

- 5/4 COA
- A. No cores, DST's, mud logger or Open Hole logs are planned at this time.
  - B. Additional testing will be initiated subsequent to setting the 5-1/2" production casing. Specific intervals will be targeted based on log evaluation, geological sample shows

## 9. POTENTIAL HAZARDS:

See COA  
No abnormal pressures or temperatures are anticipated. In the event abnormal pressures are encountered, however, the proposed mud program will be modified to increase the mud-weight. There is known presence of H<sub>2</sub>S in this area. If H<sub>2</sub>S is encountered the operator will comply with the provisions of Onshore Oil & Gas Order No. 6. All personnel will be familiar with all aspects of safe operation of equipment being used to drill this well. Estimated BHP: 2340 psi and estimated BHT: 115°.

## 10. ANTICIPATED STARTING DATE AND DURATION OF OPERATIONS:

Road and location construction will begin after BLM has approved APD. Anticipated spud date will be after BLM approval and as soon as rig is available. Move in operations and drilling is expected to take ~18 days. If production casing is run then an additional 90 days will be needed to complete well and construct surface facilities and/or lay flow lines in order to place well on production.

## 11. OTHER FACETS OF OPERATION:

After running csg, cased hole Gamma Ray, Neutron Collar logs will be run from TD back to all possible productive zones. The Fren; Glorieta-Yeso formation will be perforated and stimulated in order to establish production. The well will be swab tested & potentialized as an oil well.

# **PERMIAN**

**EUNICE - NM EZ**

**CROW FEDERAL 31H**

**CROW FEDERAL 31H**

**CROW FEDERAL 31H**

**Plan: PLANNING v1**

## **Standard Planning Report**

**12 September, 2013**

**apachecorp**  
Planning Report

Database:	PEDM	Local Co-ordinate Reference:	Site CROW FEDERAL 31H
Company:	PERMIAN	TVD Reference:	RKB @ 3930.0ft (Original Well Elev)
Project:	EUNICE - NM EZ	MD Reference:	RKB @ 3930.0ft (Original Well Elev)
Site:	CROW FEDERAL 31H	North Reference:	Grid
Well:	CROW FEDERAL 31H	Survey Calculation Method:	Minimum Curvature
Wellbore:	CROW FEDERAL 31H		
Design:	PLANNING v1		

Project	EUNICE - NM EZ		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	CROW FEDERAL 31H		
Site Position:	Northing:	674,988.80 ft	Latitude: 32° 51' 17.080 N
From: Map	Easting:	644,110.30 ft	Longitude: 103° 51' 50.596 W
Position Uncertainty:	0.0 ft	Slot Radius: 13.200 in	Grid Convergence: 0.25 °

Well	CROW FEDERAL 31H		
Well Position	+N/-S	0.0 ft	Northing: 674,988.80 ft
	+E/-W	0.0 ft	Easting: 644,110.30 ft
Position Uncertainty	0.0 ft	Wellhead Elevation:	Ground Level: 3,919.0 ft

Wellbore	CROW FEDERAL 31H		
Magnetics	Model Name	Sample Date	Declination (°)
	BGGM2013	9/12/2013	7.61
			Dip Angle (°)
			60.66
			Field Strength (nT)
			48,721

Design	PLANNING v1		
Audit Notes:			
Version:	Phase:	PROTOTYPE	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD)	+N/-S (ft)	+E/-W (ft)
	0.0	0.0	0.0
			Direction (°)
			89.61

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
4,742.4	0.00	0.00	4,742.4	0.0	0.0	0.00	0.00	0.00	0.00	
5,480.5	88.57	90.00	5,219.7	0.0	465.5	12.00	12.00	0.00	90.00	
5,492.4	88.57	90.00	5,220.0	0.0	477.5	0.00	0.00	0.00	0.00	31H Heel
5,514.2	88.57	89.56	5,220.5	0.1	499.3	2.00	-0.01	-2.00	-90.39	
9,491.5	88.57	89.56	5,320.0	30.3	4,475.2	0.00	0.00	0.00	0.00	31H Toe

**apachecorp**  
Planning Report

Database:	PEDM	Local Coordinate Reference:	Site CROW FEDERAL 31H
Company:	PERMIAN	TVD Reference:	RKB @ 3930.0ft (Original Well Elev)
Project:	EUNICE - NM EZ	MD Reference:	RKB @ 3930.0ft (Original Well Elev)
Site:	CROW FEDERAL 31H	North Reference:	Grid
Well:	CROW FEDERAL 31H	Survey/Calculation Method:	Minimum Curvature
Wellbore:	CROW FEDERAL 31H		
Design:	PLANNING v1		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
528.0	0.00	0.00	528.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>Rustler</b>									
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
721.0	0.00	0.00	721.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>Top Salt</b>									
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,682.0	0.00	0.00	1,682.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>Base Salt</b>									
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,844.0	0.00	0.00	1,844.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>Yates</b>									
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,126.0	0.00	0.00	2,126.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>Seven Rivers</b>									
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	0.00
2,739.0	0.00	0.00	2,739.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>Queen</b>									
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	0.00
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	0.00
3,154.0	0.00	0.00	3,154.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>Grayburg</b>									
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	0.00
3,300.0	0.00	0.00	3,300.0	0.0	0.0	0.0	0.00	0.00	0.00
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	0.00
3,489.0	0.00	0.00	3,489.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>San Andres</b>									
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	0.00
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	0.00

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Planning Report

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Wellbore:	CROW FEDERAL 31H		
Désign:	PLANNING v1		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
4,100.0	0.00	0.00	4,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
4,500.0	0.00	0.00	4,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
4,742.4	0.00	0.00	4,742.4	0.0	0.0	0.0	0.00	0.00	0.00	
31H Kick Off Point										
4,800.0	6.91	90.00	4,799.9	0.0	3.5	3.5	12.00	12.00	0.00	
4,900.0	18.91	90.00	4,897.2	0.0	25.8	25.8	12.00	12.00	0.00	
4,961.9	26.34	90.00	4,954.2	0.0	49.6	49.6	12.00	12.00	0.00	
Glorieta										
5,000.0	30.91	90.00	4,987.7	0.0	67.8	67.8	12.00	12.00	0.00	
5,060.6	38.18	90.00	5,037.6	0.0	102.2	102.2	12.00	12.00	0.00	
(Yeso) Paddock										
5,100.0	42.91	90.00	5,067.5	0.0	127.8	127.8	12.00	12.00	0.00	
5,200.0	54.91	90.00	5,133.1	0.0	203.0	203.0	12.00	12.00	0.00	
5,300.0	66.91	90.00	5,181.6	0.0	290.2	290.2	12.00	12.00	0.00	
5,400.0	78.91	90.00	5,210.9	0.0	385.7	385.6	12.00	12.00	0.00	
5,480.5	88.57	90.00	5,219.7	0.0	465.5	465.5	12.00	12.00	0.00	
5,492.4	88.57	90.00	5,220.0	0.0	477.5	477.5	0.00	0.00	0.00	
31H Heel										
5,500.0	88.57	89.85	5,220.2	0.0	485.1	485.1	2.00	-0.01	-2.00	
5,514.2	88.57	89.56	5,220.5	0.1	499.3	499.2	2.00	-0.01	-2.00	
5,600.0	88.57	89.56	5,222.7	0.7	585.0	585.0	0.00	0.00	0.00	
5,700.0	88.57	89.56	5,225.2	1.5	685.0	685.0	0.00	0.00	0.00	
5,800.0	88.57	89.56	5,227.7	2.3	785.0	785.0	0.00	0.00	0.00	
5,900.0	88.57	89.56	5,230.2	3.0	884.9	884.9	0.00	0.00	0.00	
6,000.0	88.57	89.56	5,232.7	3.8	984.9	984.9	0.00	0.00	0.00	
6,100.0	88.57	89.56	5,235.2	4.5	1,084.9	1,084.9	0.00	0.00	0.00	
6,200.0	88.57	89.56	5,237.7	5.3	1,184.8	1,184.8	0.00	0.00	0.00	
6,300.0	88.57	89.56	5,240.2	6.1	1,284.8	1,284.8	0.00	0.00	0.00	
6,400.0	88.57	89.56	5,242.7	6.8	1,384.8	1,384.8	0.00	0.00	0.00	
6,500.0	88.57	89.56	5,245.2	7.6	1,484.7	1,484.8	0.00	0.00	0.00	
6,600.0	88.57	89.56	5,247.7	8.3	1,584.7	1,584.7	0.00	0.00	0.00	
6,700.0	88.57	89.56	5,250.2	9.1	1,684.7	1,684.7	0.00	0.00	0.00	
6,800.0	88.57	89.56	5,252.7	9.9	1,784.6	1,784.7	0.00	0.00	0.00	
6,900.0	88.57	89.56	5,255.2	10.6	1,884.6	1,884.6	0.00	0.00	0.00	
7,000.0	88.57	89.56	5,257.7	11.4	1,984.6	1,984.6	0.00	0.00	0.00	
7,100.0	88.57	89.56	5,260.2	12.1	2,084.5	2,084.6	0.00	0.00	0.00	
7,200.0	88.57	89.56	5,262.7	12.9	2,184.5	2,184.5	0.00	0.00	0.00	
7,300.0	88.57	89.56	5,265.2	13.7	2,284.5	2,284.5	0.00	0.00	0.00	
7,400.0	88.57	89.56	5,267.7	14.4	2,384.4	2,384.5	0.00	0.00	0.00	
7,500.0	88.57	89.56	5,270.2	15.2	2,484.4	2,484.4	0.00	0.00	0.00	
7,600.0	88.57	89.56	5,272.7	15.9	2,584.4	2,584.4	0.00	0.00	0.00	
7,700.0	88.57	89.56	5,275.2	16.7	2,684.3	2,684.4	0.00	0.00	0.00	
7,800.0	88.57	89.56	5,277.7	17.4	2,784.3	2,784.3	0.00	0.00	0.00	
7,900.0	88.57	89.56	5,280.2	18.2	2,884.3	2,884.3	0.00	0.00	0.00	
8,000.0	88.57	89.56	5,282.7	19.0	2,984.2	2,984.3	0.00	0.00	0.00	

**apachecorp**  
Planning Report

Database:	PEDM	Local Co-ordinate Reference:	Site CROW FEDERAL 31H
Company:	PERMIAN	TVD Reference:	RKB @ 3930.0ft (Original Well Elev)
Project:	EUNICE - NM EZ.	MD Reference:	RKB @ 3930.0ft (Original Well Elev)
Site:	CROW FEDERAL 31H	North Reference:	Grid
Well:	CROW FEDERAL 31H	Survey Calculation Method:	Minimum Curvature
Wellbore:	CROW FEDERAL 31H		
Design:	PLANNING v1		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
8,100.0	88.57	89.56	5,285.2	19.7	3,084.2	3,084.2	0.00	0.00	0.00
8,200.0	88.57	89.56	5,287.7	20.5	3,184.2	3,184.2	0.00	0.00	0.00
8,300.0	88.57	89.56	5,290.2	21.2	3,284.1	3,284.2	0.00	0.00	0.00
8,400.0	88.57	89.56	5,292.7	22.0	3,384.1	3,384.2	0.00	0.00	0.00
8,500.0	88.57	89.56	5,295.2	22.8	3,484.0	3,484.1	0.00	0.00	0.00
8,600.0	88.57	89.56	5,297.7	23.5	3,584.0	3,584.1	0.00	0.00	0.00
8,700.0	88.57	89.56	5,300.2	24.3	3,684.0	3,684.1	0.00	0.00	0.00
8,800.0	88.57	89.56	5,302.7	25.0	3,783.9	3,784.0	0.00	0.00	0.00
8,900.0	88.57	89.56	5,305.2	25.8	3,883.9	3,884.0	0.00	0.00	0.00
9,000.0	88.57	89.56	5,307.7	26.6	3,983.9	3,984.0	0.00	0.00	0.00
9,100.0	88.57	89.56	5,310.2	27.3	4,083.8	4,083.9	0.00	0.00	0.00
9,200.0	88.57	89.56	5,312.7	28.1	4,183.8	4,183.9	0.00	0.00	0.00
9,300.0	88.57	89.56	5,315.2	28.8	4,283.8	4,283.9	0.00	0.00	0.00
9,400.0	88.57	89.56	5,317.7	29.6	4,383.7	4,383.8	0.00	0.00	0.00
9,491.5	88.57	89.56	5,320.0	30.3	4,475.2	4,475.3	0.00	0.00	0.00
31H Toe									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
31H Kick Off Point	0.00	0.01	4,742.4	0.0	0.0	674,988.80	644,110.30	32° 51' 17.080 N	103° 51' 50.596 W
- hit/miss target									
- plan hits target center									
- Point									
31H Heel	0.00	0.01	5,220.0	0.0	477.5	674,988.80	644,587.80	32° 51' 17.059 N	103° 51' 44.998 W
- plan hits target center									
- Point									
31H Toe	0.00	0.00	5,320.0	30.3	4,475.2	675,019.10	648,585.50	32° 51' 17.180 N	103° 50' 58.133 W
- plan hits target center									
- Point									

Formations							Dip (°)	Dip Direction (°)
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology					
528.0	528.0	Rustler					1.43	89.56
721.0	721.0	Top Salt					1.43	89.56
1,682.0	1,682.0	Base Salt					1.43	89.56
1,844.0	1,844.0	Yates					1.43	89.56
2,126.0	2,126.0	Seven Rivers					1.43	89.56
2,739.0	2,739.0	Queen					1.43	89.56
3,154.0	3,154.0	Grayburg					1.43	89.56
3,489.0	3,489.0	San Andres					1.43	89.56
4,961.9	4,954.2	Glorieta					1.43	89.56
5,060.6	5,037.6	(Yeso) Paddock					1.43	89.56

**apachecorp**  
Planning Report

Database:	PEDM	Local Co-ordinate Reference:	Site CROW FEDERAL 31H
Company:	PERMIAN	TVD Reference:	RKB @ 3930.0ft (Original Well Elev)
Project:	EUNICE - NM EZ	MD Reference:	RKB @ 3930.0ft (Original Well Elev)
Site:	CROW FEDERAL 31H	North Reference:	Grid
Well:	CROW FEDERAL 31H	Survey Calculation Method:	Minimum Curvature
Wellbore:	CROW FEDERAL 31H		
Design:	PLANNING v1		

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
4,742.5	4,742.5	0.0	0.0	31H Kick Off Point

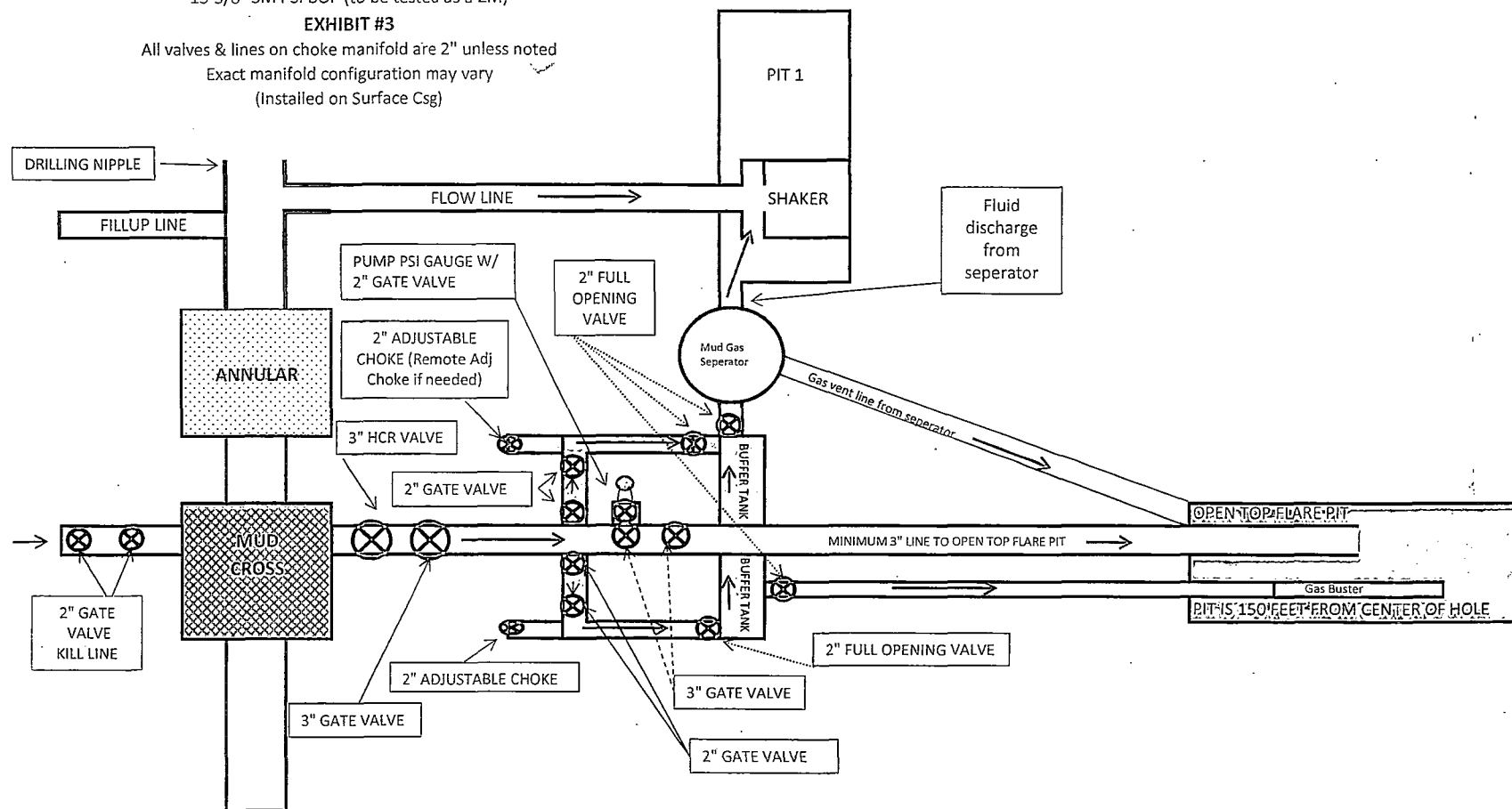
# APACHE BOP AND CHOKE MANIFOLD SCHEMATIC

CROW FEDERAL #28H #29H #30H #31H #32H #33H

13-5/8" 3M PSI BOP (to be tested as a 2M)

## EXHIBIT #3

All valves & lines on choke manifold are 2" unless noted  
Exact manifold configuration may vary  
(Installed on Surface Csg)

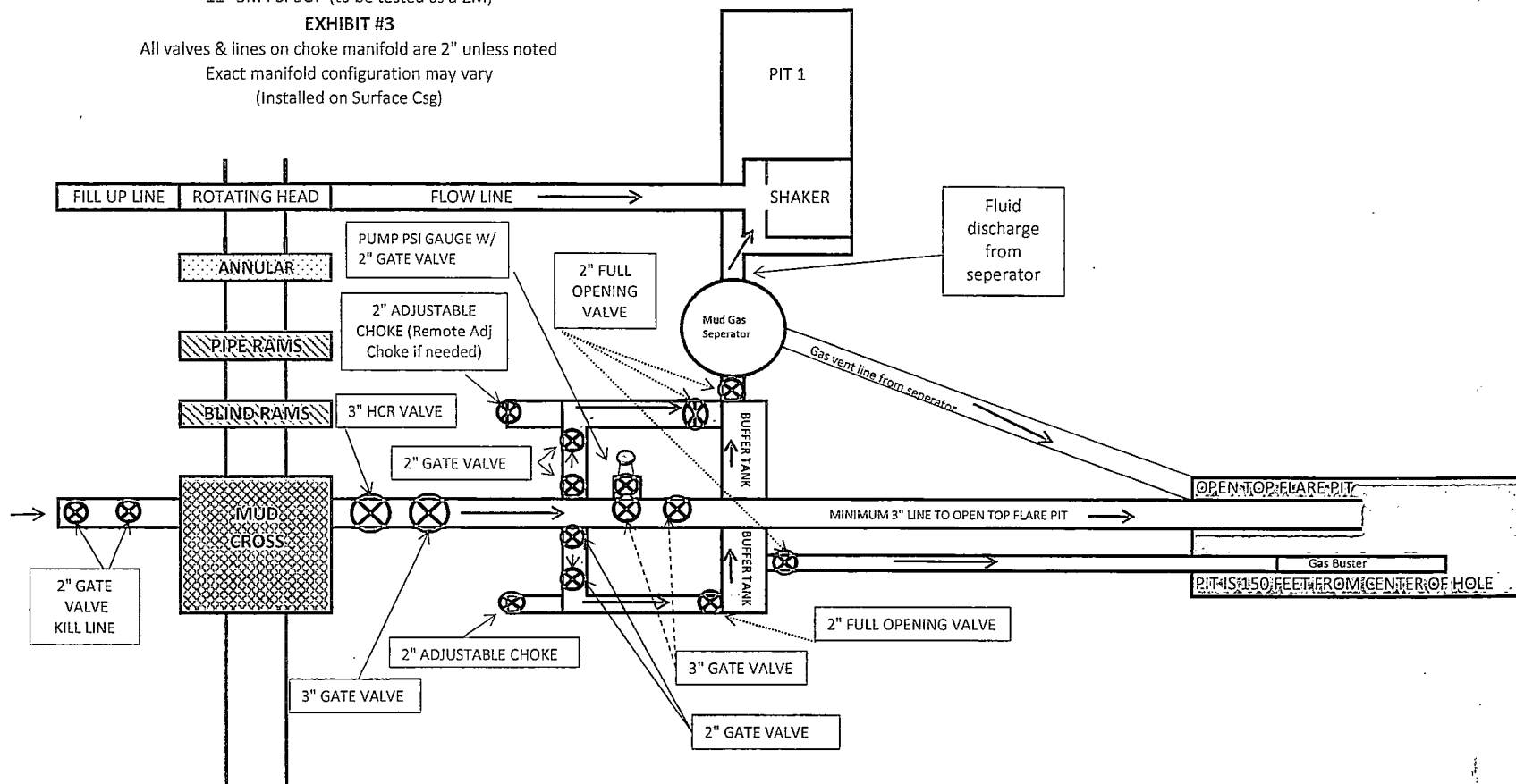


\*\*\* If H2S is encountered in quantities greater than 100ppm, Apache will shut in well & install a remote operated choke \*\*\*

CROW FEDERAL #28H #29H #30H #31H #32H #33H

EXHIBIT #3

All valves & lines on choke manifold are 2" unless noted  
Exact manifold configuration may vary  
(Installed on Surface Csg)



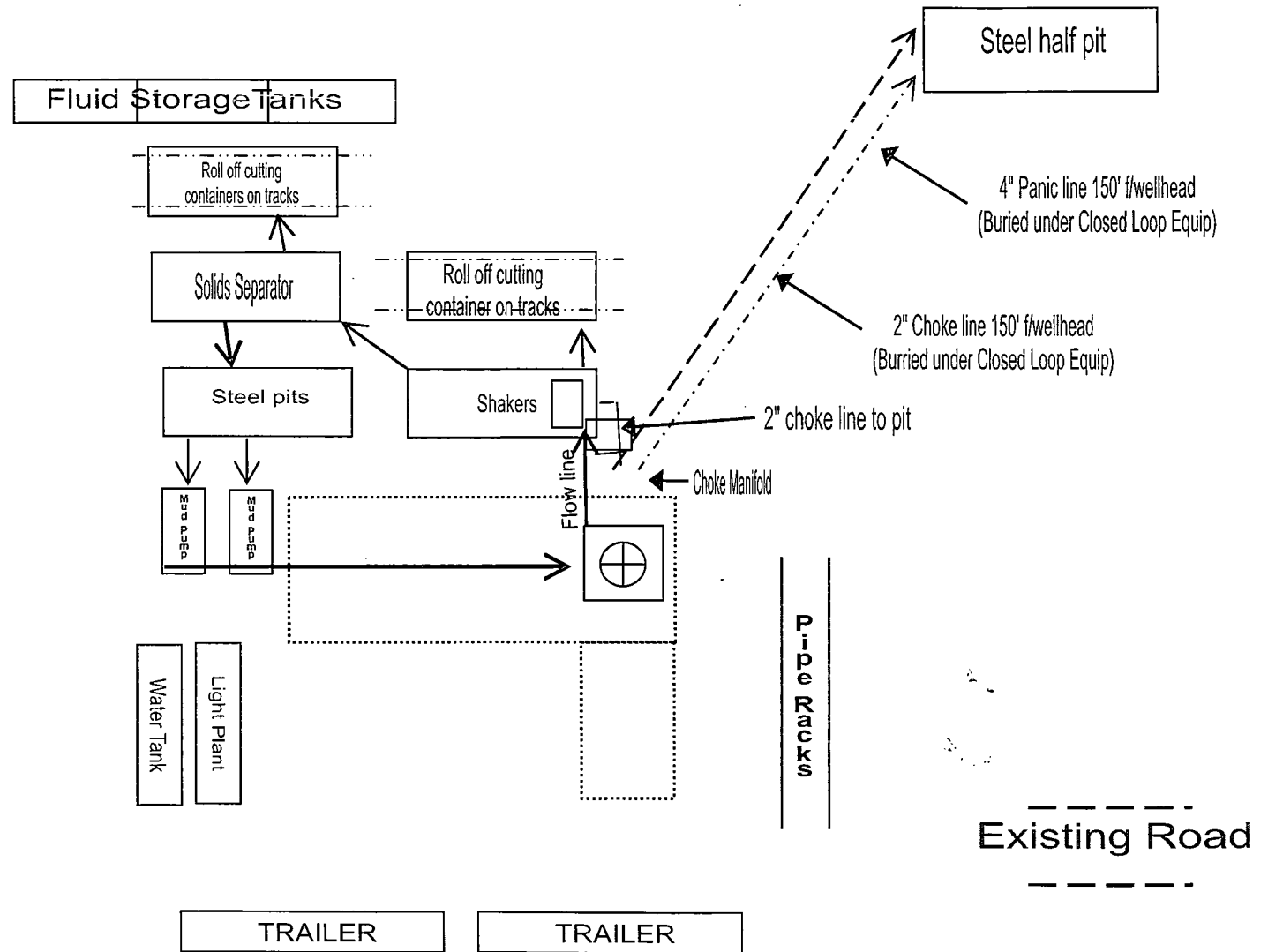
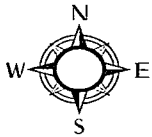
\*\*\* If H2S is encountered in quantities greater than 100ppm, Apache will shut in well & install a remote operated choke \*\*\*

# Apache

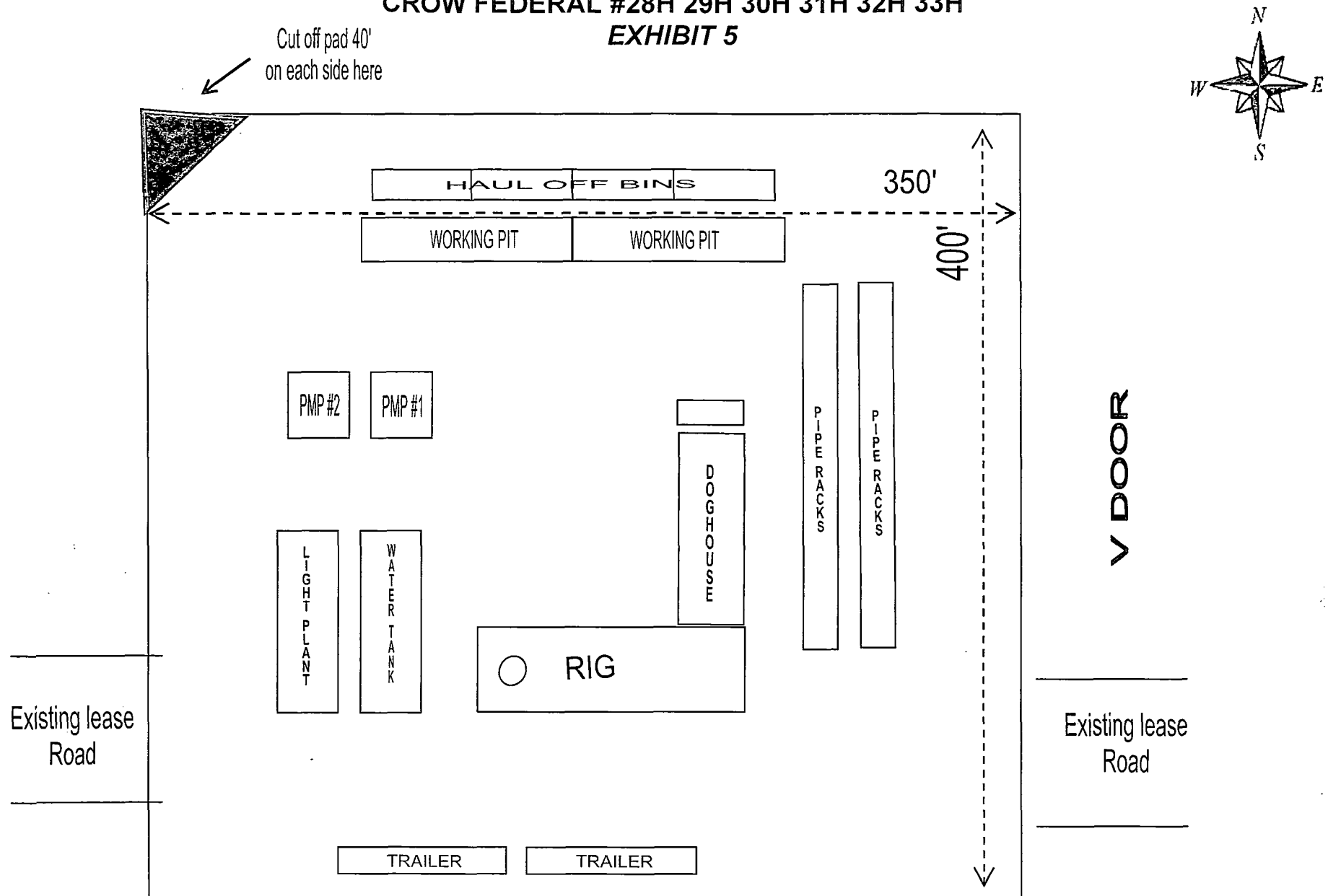
## Closed Loop Equipment Diagram

### Exhibit 4

Crow Federal #28H #29H #30H #31H #32H #33H



**RIG ORIENTATION & LAYOUT**  
**CROW FEDERAL #28H 29H 30H 31H 32H 33H**  
**EXHIBIT 5**



## **HYDROGEN SULFIDE (H<sub>2</sub>S) DRILLING OPERATIONS PLAN**

### **Hydrogen Sulfide Training:**

All regularly assigned personnel, contracted or employed by Apache Corporation will receive training from qualified instructor(s) in the following areas prior to commencing drilling possible hydrogen sulfide bearing formations in this well:

- The hazards and characteristics of hydrogen sulfide (H<sub>2</sub>S)
- The proper use and maintenance of personal protective equipment and life support systems.
- The proper use of H<sub>2</sub>S detectors, alarms, warning systems, briefing area, evacuation procedures & prevailing winds.
- The proper techniques for first aid and rescue procedures.

### **Supervisory personnel will be trained in the following areas:**

- The effects of H<sub>2</sub>S on metal components. If high tensile tubulars are to be utilized, personnel will be trained in their special maintenance requirements.
- Corrective action & shut-in procedures when drilling or reworking a well & blowout prevention / well control procedures.
- The contents and requirements of the H<sub>2</sub>S Drilling Operations Plan

There will be an initial training session just prior to encountering a known or probable H<sub>2</sub>S zone (within 3 days or 500') and weekly H<sub>2</sub>S and well control drills for all personnel in each crew. The initial training session shall include a review of the site specific H<sub>2</sub>S Drilling Operations Plan and the Public Protection Plan. This plan shall be available at the well site. All personnel will be required to carry documentation that they have received proper training.

## **H<sub>2</sub>S SAFETY EQUIPMENT AND SYSTEMS:**

### **Well Control Equipment that will be available & installed if H<sub>2</sub>S is encountered:**

- Flare Line with electronic igniter or continuous pilot.
- Choke manifold with a minimum of one remote choke.
- Blind rams & pipe rams to accommodate all pipe sizes with properly sized closing unit.
- Auxiliary equipment to include: annular preventer, mud-gas separator, rotating head & flare gun with flares

### **Protective Equipment for Essential Personnel:**

- Mark II Survive-air 30 minute units located in dog house & at briefing areas, as indicated on wellsite diagram.

### **H<sub>2</sub>S Detection and Monitoring Equipment:**

- Two portable H<sub>2</sub>S monitors positioned on location for best coverage & response. These units have warning lights & audible sirens when H<sub>2</sub>S levels of 20 ppm are reached.
- One portable H<sub>2</sub>S monitor positioned near flare line.

### **H<sub>2</sub>S Visual Warning Systems:**

- Wind direction indicators are shown on wellsite diagram.
- Caution / Danger signs shall be posted on roads providing direct access to location. Signs will be painted a high visibility yellow with black lettering of sufficient size to be readable at a reasonable distance from the immediate location. Bilingual signs will be used when appropriate.

### **Mud Program:**

- The Mud Program has been designed to minimize the volume of H<sub>2</sub>S circulated to the surface. Proper mud weights, safe drilling practices & the use of H<sub>2</sub>S scavengers will minimize hazards when penetrating H<sub>2</sub>S bearing zones.
- A mud-gas separator and H<sub>2</sub>S gas buster will be utilized as needed.

### **Metallurgy:**

- All drill strings, casing, tubing, wellhead, blowout preventers, drilling spool, kill lines, choke manifold & lines, & valves will be suitable for H<sub>2</sub>S service.
- All elastomers used for packing & seals shall be H<sub>2</sub>S trim.

### **Communication:**

- Cellular telephone and 2-way radio communications in company vehicles, rig floor and mud logging trailer.

# HYDROGEN SULFIDE (H<sub>2</sub>S) CONTINGENCY PLAN

**Assumed 100 ppm ROE = 3000'**

100 ppm H<sub>2</sub>S concentration shall trigger activation of this plan.

## Emergency Procedures

In the event of a release of gas containing H<sub>2</sub>S, the first responder(s) must

- Isolate the area and prevent entry by other persons into the 100 ppm ROE.
- Evacuate any public places encompassed by the 100 ppm ROE.
- Be equipped with H<sub>2</sub>S monitors and air packs in order to control the release.
- Use the "buddy system" to ensure no injuries occur during the response
- Take precautions to avoid personal injury during this operation.
- Contact operators and/or local officials to aid in operation. See list of phone numbers attached.
- Have received training in the :
  - Detection of H<sub>2</sub>S, and
  - Measures for protection against the gas,
  - Equipment used for protection and emergency response.

## Ignition of Gas source

Should control of the well be considered lost and ignition considered, take care to protect against exposure to Sulfur Dioxide (SO<sub>2</sub>). Intentional ignition must be coordinated with the NMOCD and local officials. Additionally the NM State Police may become involved. NM State Police shall be the Incident Command on scene of any major release. Take care to protect downwind whenever this is an ignition of the gas.

### **Characteristics of H<sub>2</sub>S and SO<sub>2</sub>**

Common Name	Chemical Formula	Specific Gravity	Threshold Limit	Hazardous Limit	Lethal Concentration
Hydrogen Sulfide	H <sub>2</sub> S	1.189 Air = 1	10 ppm	100 ppm/hr	600 ppm
Sulfur Dioxide	SO <sub>2</sub>	2.21 Air = 1	2 ppm	N/A	1000 ppm

## **Contacting Authorities**

Apache Corporation personnel must liaison with local and state agencies to ensure a proper response to a major release. Additionally, the OCD must be notified of the release as soon as possible but no later than 4 hours. Agencies will ask for information such as type and volume of release, wind direction, location of release, etc. Be prepared with all information available including directions to site. The following call list of essential and potential responders has been prepared for use during a release. Apache's response must be in coordination with the State of New Mexico's "Hazardous Materials Emergency Response Plan" (HMER).

# WELL CONTROL EMERGENCY RESPONSE PLAN

## **I. GENERAL PHILOSOPHY**

Our objective is to ensure that during an emergency, a predetermined procedure is followed so that prompt decisions can be made based on accurate information.

The best way to handle an emergency is with an experienced organization set up for the sole purpose of solving the problem. The *Well Control Emergency Response Team* was organized to handle dangerous & expensive well control problems. The *Team* is structured such that each individual can contribute the most from his area of expertise. Key decision-makers are determined prior to an emergency to avoid confusion about who is in charge.

If the well is flowing uncontrolled at the surface or subsurface, *The Emergency Response Team* will be mobilized. The *Team* is customized for the people currently on the Apache staff. Staff changes may require a change in the plan.

## **II. EMERGENCY PROCEDURE ON DRILLING OR COMPLETION OPERATIONS**

- A. In the event of an emergency the *Drilling Foreman or Tool-Pusher* will immediately contact only one of the following starting with the first name listed:

Name	Office	Mobile	Home
Danny Laman – Drlg Superintendent	432-818-1022	432-634-0288	432-520-3528
Travis Short – Drilling Engineer	713-296-7277	832-202-5137	
Bobby Smith – Drilling Manager	432-818-1020	432-556-7701	
Jeff Burt – EH&S Coordinator		432-631-9081	

*\*\*This one phone call will free the Drilling Foreman to devote his full time to securing the safety of personnel & equipment. This call will initiate the process to mobilize the Well Control Emergency Response Team. Apache maintains an Emergency Telephone Conference Room in the Houston office. This room is available for us by the Permian Region. The room has 50 separate telephone lines.*

- B. The Apache employee contacted by the Drilling Foreman will begin contacting the rest of the *Team*. If **Danny Laman** is out of contact, **Bob Lange** will be notified.
- C. If a member of the *Emergency Response Team* is away from the job, he must be available for call back. Telephone numbers should be left with secretaries or a key decision-maker.
- D. Apache's reporting procedure for spills or releases of oil or hazardous materials will be implemented when spills or releases have occurred or are probable.

### **EMERGENCY RESPONSE NUMBERS:**

SHERIFF DEPARTMENT	
Eddy County	575-887-7551
Lea County	575-396-3611
FIRE DEPARTMENT	
	911
Artesia	575-746-5050
Carlsbad	575-885-2111
Eunice	575-394-2111
Hobbs	575-397-9308
Jal	575-395-2221
Lovington	575-396-2359
HOSPITALS	
	911
Artesia Medical Emergency	575-746-5050
Carlsbad Medical Emergency	575-885-2111
Eunice Medical Emergency	575-394-2112
Hobbs Medical Emergency	575-397-9308
Jal Medical Emergency	575-395-2221
Lovington Medical Emergency	575-396-2359
AGENT NOTIFICATIONS	
Bureau of Land Management	575-393-3612
New Mexico Oil Conservation Division	575-393-6161

## **EXHIBIT #8**

### **WARNING**

**YOU ARE ENTERING AN H2S AREA  
AUTHORIZED PERSONNEL ONLY**

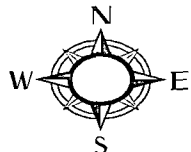
- 1. BEARDS OR CONTACT LENSES NOT ALLOWED**
- 2. HARD HATS REQUIRED**
- 3. SMOKING DESIGNATED AREAS ONLY**
- 4. BE WIND CONSCIOUS AT ALL TIMES**
- 5. CHECK WITH APACHE CORPORATION**

**APACHE CORPORATION**

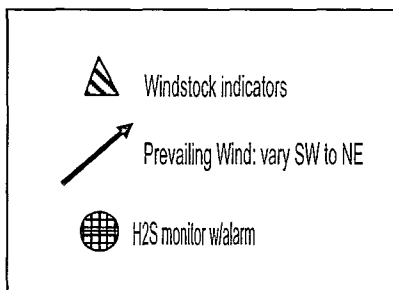
**1-888-257-6840**

# Apache

Drilling Location  
H2S Safety Equipment Diagram  
Exhibit 6

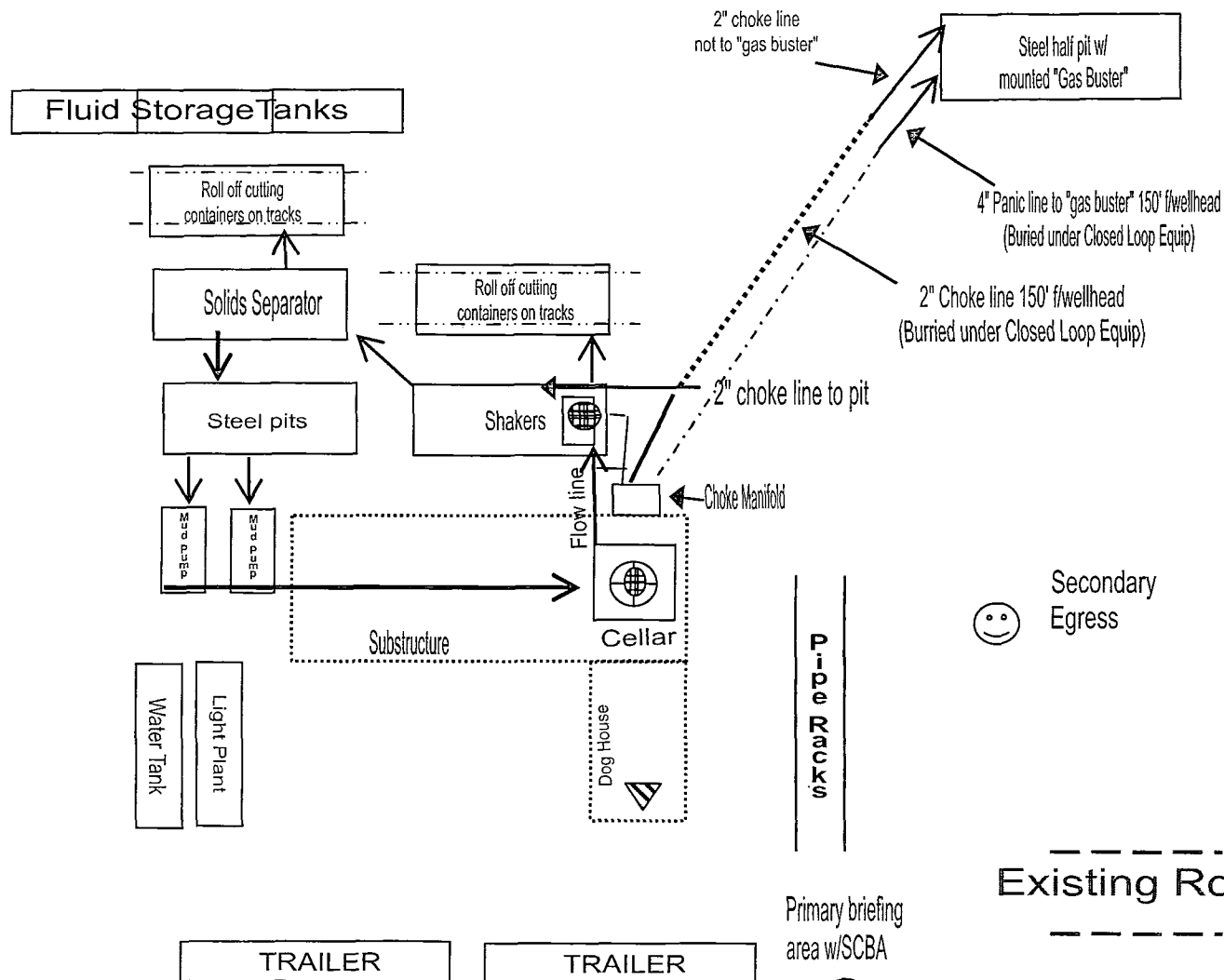


Crow Federal #28H #29H #30H #31H #32H #33H



H2S Warning Sign  
~ 200' but no  
more than 500'  
from well location

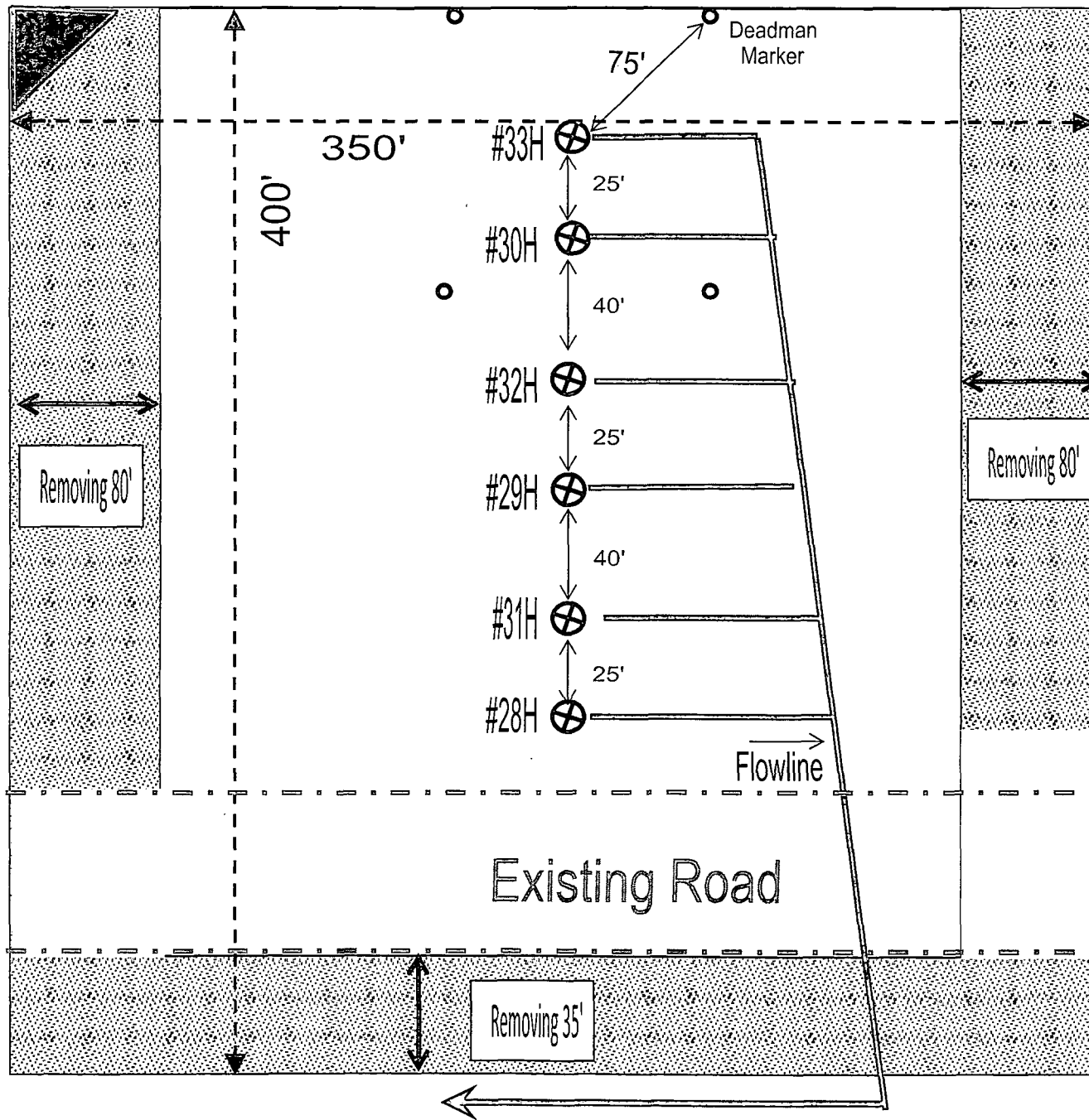
Existing Road



Existing Road

INTERIM RECLAMATION LAYOUT  
CROW FEDERAL #28H #29H #30H #31 #32H #33H  
EXHIBIT # 7

Cut off pad 40'  
on each side here





## SURFACE USE PLAN OF OPERATIONS

Crow Federal #31H Lease #: NMLC – 029426B

SHL: 545' FNL & 475' FWL UL: D SEC: 10 BHL: 545' FNL & 330' FEL UL: A SEC: 10  
T17S R31E Eddy County, NM

### EXISTING ROADS

#### A. Proposed Well Site Location:

- a. The well site & elevation plat for the proposed well are reflected on the well site layout (form C-102). Well staked by John West Surveying Company.

#### B. Existing Roads

- a. From the intersection of US Hwy #82, Lovington Hwy & CoRd #223, Sweet Gum, Go NW on Sweet Gum Rd approx 0.8 miles, veer Right, go NNW approx 0.5 miles, turn Right @ road tee, go ENE approx 0.1 miles, turn Left, go North approx 0.1 mile, road curves NE, continue along curve NE approx 0.1 mile to a four way intersection, turn Left, go NW approx 0.2 miles, continue on road, veer Right, go North approx 0.15 miles, turn Left, go West approx 0.15 miles, turn Right, go North approx 0.25 miles, turn Right, go East approx 0.15 miles to three way intersection, turn Left, go North approx 0.75 miles to three way intersection, turn Right, go East approx 0.45 miles, this location is staked approx 86' North.

#### C. Route Location

- a. No new road is expected to be constructed. The existing lease road will be used to the extent possible. If a lease/access road needs to be constructed, all lease roads will be graded in compliance with BLM standards. See E (a).

#### D. Existing Road Maintenance or Improvement Plan

- a. *EXHIBIT 1* is a portion of a topo map showing the well & roads in the vicinity of the proposed location. The proposed well site & access route to the location are indicated in BLUE on *EXHIBIT 1*. Right of way using this proposed route will be requested if necessary.
- b. Routing grading & maintenance of existing roads will be conducted as necessary to maintain their condition as long as any operations continue on this lease. Roads will be maintained according to specifications in "EXISTING ROADS Section E (a)" of this Surface Use Plan.

#### E. Width, Max Grade, Turnout Ditches, Culverts, Cattle Guards, & Surface Equipment

- a. All lease roads will be graded in compliance with BLM standards. All new & reconstructed roads will have a width & "crown design" (i.e. The max width of the driving surface will be 14'. The road will be crowned & ditched with a 2% slope from the tip of the crown to the edge of the driving surface. The ditches will be 1' deep with 3:1 slopes. The driving surface will be made of 6" rolled & compacted caliche.) If required, culverts and cattle guards will be set per BLM Specs.

### LOCATION OF EXISTING WELLS

- A. "EXHIBIT 2" indicates existing wells within a one mile radius of the proposed location.

### LOCATION OF EXISTING AND/OR PROPOSED FACILITIES

- A. Existing production facilities are located at the Crow Federal Battery #3.

#### B. New Facilities in the Event of Production

In the event well is productive, APACHE will install approx 40' of ~~8"~~ <sup>4"</sup> surface pipeline from well to existing 12" buried pipeline (1 for liquid, 1 for gas) internal poly liner, externally wrapped with synergy, to the proposed Crow Federal Battery following existing lease roads. Pipeline has been applied for under ROW #NM-129708. (No pumping units will be used, fluid will be lifted with Electronic Submersible Pump.) If electricity is needed, power will be obtained from Central Valley Electric. Central Valley Electric will apply for ROW for their power lines. "SEE EXHIBIT 1A".

TN  
12/4/13

### C. Rehabilitation of Disturbed Areas Unnecessary for Production

Following the construction, those access areas required for continued production will be graded to provide drainage and minimize erosion. The areas unnecessary for use will be graded to blend in with the surrounding topography  
*"SEE PLANS FOR RESTORATION OF THE SURFACE"*

## LOCATION AND TYPE OF WATER SUPPLY

- A. All water (fresh or otherwise) needed for the drilling and completion of this well will be purchased from a commercial source and trucked to the location via existing and/or proposed access roads. No water source wells will be drilled and no surface water will be utilized.

## CONSTRUCTION MATERIALS

### A. Materials

On-site caliche will be used for any required access road and/or well site pad. If necessary, caliche will be hauled from a BLM approved pit. No surface materials will be disturbed except those necessary for actual grading and construction of the drill site and access road.

## METHODS FOR HANDLING WASTE DISPOSAL

### A. Cuttings

Apache will use a Closed Loop System. Cuttings will be contained in roll off bins, hauled & disposed of to a state approved disposal facility.

### B. Drilling Fluids

Drilling fluids will be contained in steel pits, frac tanks and disposed at licensed disposal sites and/or will be cleaned and reused.

### C. Produced Fluids

Water production will be contained in steel pits. Fluids may be cleaned and reused and/or disposed at a state approved facility. Hydrocarbon fluid or other fluids that may be produced during testing will be retained in test tanks until sold and hauled from site.

### D. Salts

Salts remaining after completion will be picked up by supplier, including broken sacks.

### E. Sewage

Current laws and regulations pertaining to the disposal of human waste will be complied with. A Port-a-John will be provided for the crews. This will be properly maintained during the drilling operations and removed upon completion of the well. Port-a-John will be cleaned out periodically.

### F. Garbage

Receptacles for garbage disposal during the drilling of this well will be provided and equipped to prevent scattering by wind, animals, etc. This waste will be hauled to an approved landfill site.

### G. Cleanup of Well Site

Upon release of the drilling rig, the surface of the drilling pad will be graded to accommodate a completion rig if electric log analysis indicates potential productive zones. Reasonable cleanup will be performed prior to the final restoration of the site.

## ANCILLARY FACILITIES

- A. Upon completion, and/or testing of this well, rental tank facilities will be utilized until permanent storage is established. No camps, airstrips or staging are anticipated to be constructed.

## WELLSITE LAYOUT

### A. Rig Orientation and Layout

*"EXHIBIT 5"* shows the dimensions of the well pad, closed loop system and the location of the major rig components. Only minor leveling of the well site will be required. No significant cuts or fills will be necessary.

B. Closed Loop System

A Closed Loop System will be used. Cuttings will be stored in steel roll off bins until they are hauled to a state approved disposal facility. "SEE EXHIBIT 4"

C. Location of Access Road

"SEE EXHIBIT 1 & John West Surveying well site pad location plat "

**PLANS FOR SURFACE RECLAMATION**

A. Reserve Pit Cleanup

Not applicable. Closed Loop System will be used.

B. Restoration Plans (Production Developed) "SEE EXHIBIT 7 "

Those areas not required for production will be graded & recontoured to match surrounding topography and surfacing material will be removed. Topsoil from the soil pile will be loaded over the disturbed area to the extent possible and will be seeded. The portion of the site required for production will be graded to minimize erosion and provide access during inclement conditions. This may need to be modified in certain circumstances to prevent inundation of the locations' pad and surface facilities. Due to the topography of the area, no problems are anticipated and no erosion or other detrimental effects are expected as a result of this operation. Following depletion and abandonment of the site, restoration procedures will be those that follow under "ITEM C" of "PLANS FOR SURFACE RECLAMATION".

C. Restoration Plans (No Production Developed)

With no production developed, the entire surface disturbed by construction of the well site will be restored as closely as possible to its pre-operation appearance, including re-vegetation. Surfacing material will be removed and the site will be recontoured to match surrounding topography with provisions made to minimize erosion. The topsoil, as available, shall be placed in a uniform layer and seeded according to the Bureau of Land Management's stipulations. Due to the topography of the area, no problems are anticipated and no erosion or other detrimental effects are expected as a result of this operation.

D. Rehabilitation's Timetable

Upon completion of drilling operations, the initial cleanup of the site will be performed as soon as weather and site conditions allow economic execution of the work.

**SURFACE OWNERSHIP**

A. Surface Ownership of drill site & access routes:

**United States Department of the Interior  
c/o Bureau of Land Management  
620 E. Greene St.  
Carlsbad, NM 88220**

**OTHER INFORMATION**

A. Terrain, Soil, Vegetation, Wildlife, Surface Use

Slightly rolling hills; Topsoil is made up of caliche and sand; Plants are sparse, primarily grasses, some mesquite & shinnery oak; No wildlife observed but likely that deer, rabbits, coyotes & rodents traverse the area, which are all typical of the semi-arid desert land; Land primarily used for grazing.

B. Surface Water

There are no ponds, lakes, streams or rivers within several miles of the proposed location.

C. Water Wells

No known water wells within 1-1/2 miles of the proposed location.

D. Residences and Buildings

No dwellings within the immediate vicinity of the proposed location.

E. Historical Sites

None observed.

F. Archeological Resources

An Apache agrees to contribute funding to the Permian Basin Cultural Resource Fund in lieu of being required to conduct a Class III survey for cultural resources associated with this project. Any location or construction conflicts will be resolved before construction begins.

G. Onsite: Onsite by John Fast, BLM Specialist.

H. Well Signs: Well signs will be in compliance per State requirements and specifications.

I. Drilling Contractor: Pending

**OPERATOR'S FIELD REPRESENTATIVE**

(Field personnel responsible for compliance with development plan for surface use)

**DRILLING**

Danny Laman  
Drilling Superintendent  
303 Veterans Airpark Ln #3000  
Midland, TX 79705  
432-818-1022 - office  
432-634-0288 – cell

**PRODUCTION**

Craig Maxwell  
Sr. Production Foreman  
2350 W. Marland Blvd  
Hobbs, NM 88240  
575-393-7106 – w  
575-441-2568 – c

## PECOS DISTRICT CONDITIONS OF APPROVAL

<b>OPERATOR'S NAME:</b>	<b>Apache Corporation</b>
<b>LEASE NO.:</b>	<b>NMLC-029426B</b>
<b>WELL NAME &amp; NO.:</b>	<b>Crow Federal 31H</b>
<b>SURFACE HOLE FOOTAGE:</b>	<b>0545' FNL &amp; 0475' FWL</b>
<b>BOTTOM HOLE FOOTAGE:</b>	<b>0545' FNL &amp; 0330' FEL</b>
<b>LOCATION:</b>	<b>Section 10, T. 17 S., R 31 E., NMPM</b>
<b>COUNTY:</b>	<b>Eddy County, New Mexico</b>

### 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**
  - Lesser Prairie-Chicken Timing Stipulations
  - Ground-level Abandoned Well Marker
- ☐ **Construction**
  - Notification
  - Topsoil
  - Closed Loop System
  - Federal Mineral Material Pits
  - Well Pads
  - Roads
- ☐ **Road Section Diagram**
- ☒ **Drilling**
  - Cement Requirements
  - H2S Requirements
  - Logging Requirements
  - Waste Material and Fluids
- ☒ **Production (Post Drilling)**
  - Well Structures & Facilities
  - Pipelines
- ☐ **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)**

### **Timing Limitation Stipulation / Condition of Approval for lesser prairie-chicken:**

Oil and gas activities including 3-D geophysical exploration, and drilling will not be allowed in lesser prairie-chicken habitat during the period from March 1st through June 15th annually. During that period, other activities that produce noise or involve human activity, such as the maintenance of oil and gas facilities, pipeline, road, and well pad construction, will be allowed except between 3:00 am and 9:00 am. The 3:00 am to 9:00 am restriction will not apply to normal, around-the-clock operations, such as venting, flaring, or pumping, which do not require a human presence during this period.

Additionally, no new drilling will be allowed within up to 200 meters of leks known at the time of permitting. Normal vehicle use on existing roads will not be restricted.

Exhaust noise from pump jack engines must be muffled or otherwise controlled so as not to exceed 75 db measured at 30 feet from the source of the noise.

**Ground-level Abandoned Well Marker to avoid raptor perching:** Upon the plugging and subsequent abandonment of the well, the well marker will be installed at ground level on a plate containing the pertinent information for the plugged well. For more installation details, contact the Carlsbad Field Office at 575-234-5972.

## **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) 234-5909 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. TOPSOIL**

The operator shall strip the top portion of the soil (root zone) from the entire well pad area and stockpile the topsoil along the edge of the well pad as depicted in the APD. The root zone is typically six (6) inches in depth. All the stockpiled topsoil will be redistributed over the interim reclamation areas. Topsoil shall not be used for berming the pad or facilities. For final reclamation, the topsoil shall be spread over the entire pad area for seeding preparation.

Other subsoil (below six inches) stockpiles must be completely segregated from the topsoil stockpile. Large rocks or subsoil clods (not evident in the surrounding terrain) must be buried within the approved area for interim and final reclamation.

### **C. CLOSED LOOP SYSTEM**

Tanks are required for drilling operations: No Pits.

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

### **D. 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.

### **E. 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.

### **F. EXCLOSURE FENCING (CELLARS & PITS)**

#### **Exclosure Fencing**

The operator will install and maintain exclosure fencing for all open well cellars to prevent access to public, livestock, and large forms of wildlife before and after drilling operations until the pit is free of fluids and the operator initiates backfilling. (For examples of exclosure fencing design, refer to BLM's Oil and Gas Gold Book, Exclosure Fence Illustrations, Figure 1, Page 18.)

### **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 twenty-five (25) 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**

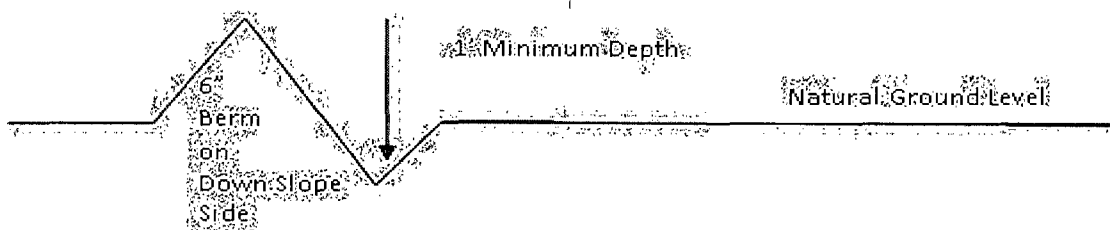
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

### **Drainage**

Drainage control systems shall be constructed on the entire length of road (e.g. ditches, sidehill outloping 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:

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

### **Cattleguards**

An appropriately sized cattleguard sufficient to carry out the project shall be installed and maintained at fence/road crossings. Any existing cattleguards on the access road route 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 cattleguards that are in place and are utilized during lease operations.

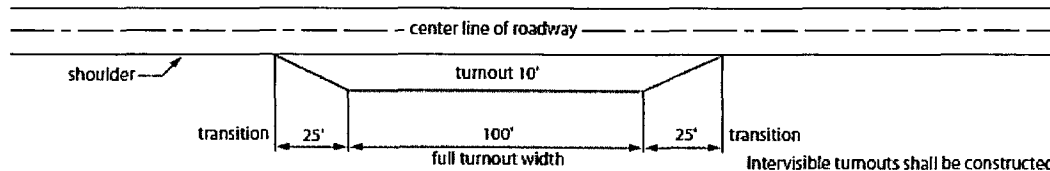
### **Public Access**

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

### Construction Steps

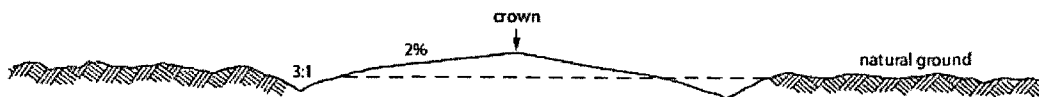
1. Salvage topsoil
2. Construct road

3. Redistribute topsoil
4. Revegetate slopes

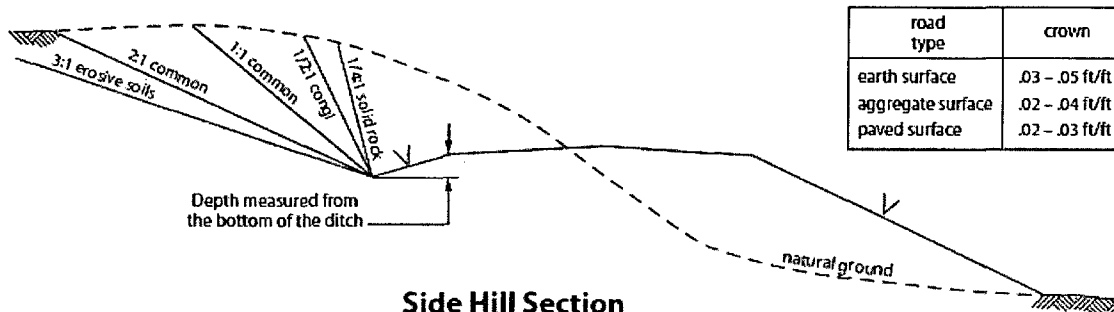


**Typical Turnout Plan**

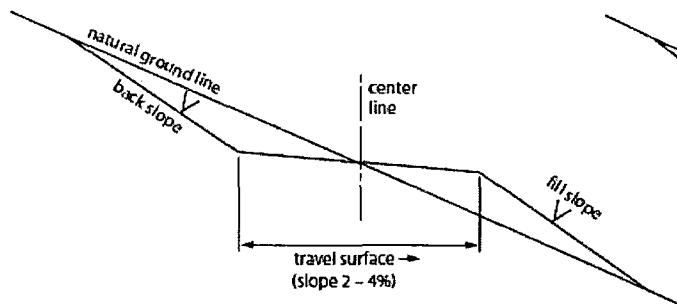
Intervisble turnouts shall be constructed on all single lane roads on all blind curves with additional tunouts as needed to keep spacing below 1000 feet.



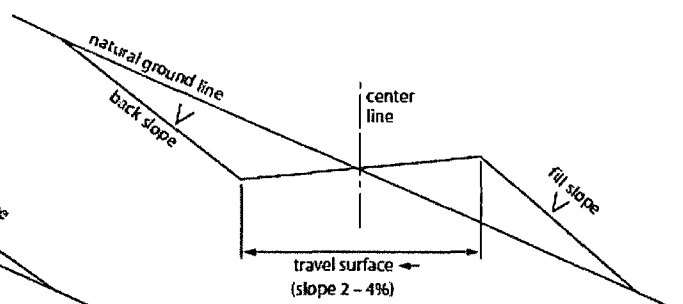
**Level Ground Section**



**Side Hill Section**



**Typical Outslope Section**



**Typical Inslope Section**

Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

## VII. DRILLING

### A. DRILLING OPERATIONS REQUIREMENTS

The BLM is to be notified in advance for a representative to witness:

- a. Spudding well (minimum of 24 hours)
- b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
- c. BOPE tests (minimum of 4 hours)

☒ **Eddy County**

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

1. A Hydrogen Sulfide (H<sub>2</sub>S) Drilling Plan shall be activated 500 feet prior to drilling into the **Grayburg** formation. **As a result, the Hydrogen Sulfide area must meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, please provide measured values 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. **If the drilling rig is removed without approval – an Incident of Non-Compliance will be written and will be a “Major” violation.**
3. **The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall 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. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.**

### B. CASING

Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.).

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

**Wait on cement (WOC) time prior to drilling out 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. DURING THIS WOC TIME, NO DRILL PIPE, ETC. SHALL BE RUN IN THE HOLE. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. IF OPERATOR DOES NOT HAVE THE WELL SPECIFIC CEMENT DETAILS ONSITE PRIOR TO PUMPING THE CEMENT FOR EACH CASING STRING, THE WOC WILL BE 30 HOURS. 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.**

**Possibility of water flows in the Rustler, Artesia Group, San Andres, and Queen.  
Possibility of lost circulation in the Red Beds, Rustler, Grayburg, and San Andres.**

**1. The 13-3/8 inch surface casing shall be set at approximately 640 feet (in a competent bed below the Magenta Dolomite, which is a Member of the Rustler, and if salt is encountered, set casing at least 25 feet above the salt) and cemented to the surface. Fresh water mud to be used to setting depth.**

- 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 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.

**2. The minimum required fill of cement behind the 8-5/8 inch intermediate casing is:**

- ☒ Cement to surface. If cement does not circulate see B.1.a, c-d above.

**Operator does NOT have approval to use a DV tool. A sundry must be submitted to the BLM with the appropriate information.**

**Centralizers required on horizontal leg, must be type for horizontal service and a minimum of one every other joint.**

3. The minimum required fill of cement behind the **5-1/2** inch production casing is:

☒ Cement as proposed by operator. Operator shall provide method of verification.

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 **2000 (2M) psi (Installing 3M annular, testing to 2,000 psi).**

3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **8-5/8** intermediate casing shoe shall be **2000 (2M) psi (Installing a 3M, testing to 2,000 psi).**

4. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.

a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).

b. The tests shall be done by an independent service company utilizing a test plug **not a cup or J-packer.**

- c. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock.
- d. The results of the test shall be reported to the appropriate BLM office.
- e. 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.**
- f. 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. This test shall be performed prior to the test at full stack pressure.

#### **D. DRILL STEM TEST**

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

#### **E. WASTE MATERIAL AND FLUIDS**

All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.

Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

**JAM 121813**

## **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.

#### **Exclosure Netting (Open-top Tanks)**

Immediately following active drilling or completion operations, the operator will take actions necessary to prevent wildlife and livestock access, including avian wildlife, to all open-topped tanks that contain or have the potential to contain salinity sufficient to cause harm to wildlife or livestock, hydrocarbons, or Resource Conservation and Recovery Act of 1976-exempt hazardous substances. At a minimum, the operator will net, screen, or cover open-topped tanks to exclude wildlife and livestock and prevent mortality. If the operator uses netting, the operator will cover and secure the open portion of the tank to prevent wildlife entry. The operator will net, screen, or cover the tanks until the operator removes the tanks from the location or the tanks no longer contain substances that could be harmful to wildlife or livestock. Use a maximum netting mesh size of 1 ½ inches. The netting must not be in contact with fluids and must not have holes or gaps.

#### **Chemical and Fuel Secondary Containment and Exclosure Screening**

The operator will prevent all hazardous, poisonous, flammable, and toxic substances from coming into contact with soil and water. At a minimum, the operator will install and maintain an impervious secondary containment system for any tank or barrel containing hazardous, poisonous, flammable, or toxic substances sufficient to contain the contents of the tank or barrel and any drips, leaks, and anticipated precipitation. The operator will dispose of fluids within the containment system that do not meet applicable state or U. S. Environmental Protection Agency livestock water standards in accordance with state law; the operator must not drain the fluids to the soil or ground. The operator will design, construct, and maintain all secondary containment systems to prevent wildlife and livestock exposure to harmful substances. At a minimum, the operator will install effective wildlife and livestock exclosure systems such as fencing, netting, expanded metal mesh, lids, and grate covers. Use a maximum netting mesh size of 1 ½ inches.

#### **Open-Vent Exhaust Stack Exclosures**

The operator will construct, modify, equip, and maintain all open-vent exhaust stacks on production equipment to prevent birds and bats from entering, and to discourage perching, roosting, and nesting. (*Recommended exclosure structures on open-vent exhaust stacks are in the shape of a cone.*) Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, in-line units, and compressor mufflers.

#### **Containment Structures**

Proposed production facilities such as storage tanks and other vessels will have a secondary containment structure that is constructed to hold the capacity of 1.5 times the

largest tank, plus freeboard to account for precipitation, unless more stringent protective requirements are deemed necessary.

#### **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** from the BLM Standard Environmental Color Chart (CC-001: June 2008).

### **B. PIPELINES**

#### **STANDARD STIPULATIONS FOR SURFACE INSTALLED PIPELINES**

**A copy of the application (Grant, Sundry Notice, APD) and attachments, including stipulations, survey plat and/or map, will be on location during construction. BLM personnel may request to you a copy of your permit during construction to ensure compliance with all stipulations.**

Holder agrees to comply with the following stipulations to the satisfaction of the Authorized Officer:

1. The holder shall indemnify the United States against any liability for damage to life or property arising from the occupancy or use of public lands under this grant.
2. The holder shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, the holder shall comply with the Toxic Substances Control Act of 1976 as amended, 15 USC 2601 et seq. (1982) with regards to any toxic substances that are used, generated by or stored on the right-of-way or on facilities authorized under this right-of-way grant. (See 40 CFR, Part 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193.) Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act, section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances shall be furnished to the authorized officer concurrent with the filing of the reports to the involved Federal agency or State government.
3. The holder agrees to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. 9601, et seq. or the Resource Conservation and Recovery Act, 42 U.S.C. 6901, et seq.) on the Right-of-Way (unless the release or threatened release is wholly unrelated to activity of the Right-of-Way holder's activity on the Right-of-Way), or resulting from the activity of the Right-of-Way holder on the Right-of-Way. This agreement applies without regard to whether a release is caused by the holder, its agent, or unrelated third parties.

4. The holder shall be liable for damage or injury to the United States to the extent provided by 43 CFR Sec. 2883.1-4. The holder shall be held to a standard of strict liability for damage or injury to the United States resulting from pipe rupture, fire, or spills caused or substantially aggravated by any of the following within the right-of-way or permit area:

- a. Activities of the holder including, but not limited to construction, operation, maintenance, and termination of the facility.
- b. Activities of other parties including, but not limited to:
  - (1) Land clearing.
  - (2) Earth-disturbing and earth-moving work.
  - (3) Blasting.
  - (4) Vandalism and sabotage.
- c. Acts of God.

The maximum limitation for such strict liability damages shall not exceed one million dollars (\$1,000,000) for any one event, and any liability in excess of such amount shall be determined by the ordinary rules of negligence of the jurisdiction in which the damage or injury occurred.

This section shall not impose strict liability for damage or injury resulting primarily from an act of war or from the negligent acts or omissions of the United States.

5. If, during any phase of the construction, operation, maintenance, or termination of the pipeline, any oil, salt water, or other pollutant should be discharged from the pipeline system, impacting Federal lands, the control and total removal, disposal, and cleaning up of such oil, salt water, or other pollutant, wherever found, shall be the responsibility of the holder, regardless of fault. Upon failure of the holder to control, dispose of, or clean up such discharge on or affecting Federal lands, or to repair all damages resulting therefrom, on the Federal lands, the Authorized Officer may take such measures as he deems necessary to control and clean up the discharge and restore the area, including, where appropriate, the aquatic environment and fish and wildlife habitats, at the full expense of the holder. Such action by the Authorized Officer shall not relieve the holder of any responsibility as provided herein.

6. All construction and maintenance activity will be confined to the authorized right-of-way width of 20 feet. If the pipeline route follows an existing road or buried pipeline right-of-way, the surface pipeline must be installed no farther than 10 feet from the edge of the road or buried pipeline right-of-way. If existing surface pipelines prevent this distance, the proposed surface pipeline must be installed immediately adjacent to the outer surface pipeline. All construction and maintenance activity will be confined to existing roads or right-of-ways.

7. No blading or clearing of any vegetation will be allowed unless approved in writing by the Authorized Officer.

8. The holder shall install the pipeline on the surface in such a manner that will minimize suspension of the pipeline across low areas in the terrain. In hummocky or dune areas, the pipeline will be "snaked" around hummocks and dunes rather than suspended across these features.

9. The pipeline shall be buried with a minimum of 24 inches under all roads, "two-tracks," and trails. Burial of the pipe will continue for 20 feet on each side of each crossing. The condition of the road, upon completion of construction, shall be returned to at least its former state with no bumps or dips remaining in the road surface.

10. The holder shall minimize disturbance to existing fences and other improvements on public lands. The holder is required to promptly repair improvements to at least their former state. Functional use of these improvements will be maintained at all times. The holder will contact the owner of any improvements prior to disturbing them. When necessary to pass through a fence line, the fence shall be braced on both sides of the passageway prior to cutting of the fence. No permanent gates will be allowed unless approved by the Authorized Officer.

11. In those areas where erosion control structures are required to stabilize soil conditions, the holder will install such structures as are suitable for the specific soil conditions being encountered and which are in accordance with sound resource management practices.

12. Excluding the pipe, all above-ground structures not subject to safety requirement shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be a color which simulates "Standard Environmental Colors" – **Shale Green**, Munsell Soil Color No. 5Y 4/2; designated by the Rocky Mountain Five State Interagency Committee.

13. The pipeline will be identified by signs at the point of origin and completion of the right-of-way and at all road crossings. At a minimum, signs will state the holder's name, BLM serial number, and the product being transported. Signs will be maintained in a legible condition for the life of the pipeline.

14. The holder shall not use the pipeline route as a road for purposes other than routine maintenance as determined necessary by the Authorized Officer in consultation with the holder. The holder will take whatever steps are necessary to ensure that the pipeline route is not used as a roadway.

15. Any cultural and/or paleontological resource (historic or prehistoric site or object) discovered by the holder, or any person working on his behalf, on public or Federal land shall be immediately reported to the authorized officer. Holder 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 will be made by the authorized officer to determine appropriate cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to proper mitigation.

measures will be made by the authorized officer after consulting with the holder.

16. 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, powerline 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.

17. Surface pipelines must be less than or equal to 4 inches and a working pressure below 125 psi.

## **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).

Ground-level Abandoned Well Marker to avoid raptor perching: Upon the plugging and subsequent abandonment of the well, the well marker will be installed at ground level on a plate containing the pertinent information for the plugged well.

## Seed Mixture for LPC Sand/Shinnery 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 of planting where drilling is possible. The seed mixture will be evenly and uniformly planted over the disturbed area (smaller/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 Bristlegrass	5lbs/A
Sand Bluestem	5lbs/A
Little Bluestem	3lbs/A
Big Bluestem	6lbs/A
Plains Coreopsis	2lbs/A
Sand Dropseed	1lbs/A

\*Pounds of pure live seed:

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