

Form 3160-3  
(March 2012)

OCD Artesia

FORM APPROVED  
OMB No. 1004-0137  
Expires October 31, 2014

UNITED 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. NM-102917	
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 RKI EXPLORATION & PRODUCTION, LLC.		7. If Unit or CA Agreement, Name and No. <i>TES 11/26/2012</i>	
3a. Address 210 PARK AVENUE, SUITE 900 OKLAHOMA CITY, OK. 73102		8. Lease Name and Well No. RDX FEDERAL 21-1H <i>C390727</i>	
3b. Phone No. (include area code) 405-996-5748 (BRENT UMBERHAM))		9. API Well No. <i>30-015-48849</i>	
4. Location of Well (Report location clearly and in accordance with any State requirements.)* At surface 330 FSL & 1500 FWL At proposed prod. zone 330 FNL & 1650 FWL <b>UNORTHODOX LOCATION</b>		10. Field and Pool or Exploratory <i>WC 13-03 5263016K; B.S.</i>	
11. Sec., T. R. M. or Blk. and Survey or Area SECTION 21, T. 26 S., R. 30 E. <i>C978633</i>		12. County or Parish EDDY	
13. State NM		14. Distance in miles and direction from nearest town or post office* 15 MILES SOUTHEAST OF MALAGA, NM	
15. Distance from proposed* 330' location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)		16. No. of acres in lease 640	
17. Spacing Unit dedicated to this well 160		18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. SHL: 330' BHL: 270'	
19. Proposed Depth TVD: 7800' MD: 12,207'		20. BLM/BIA Bond No. on file NLM-NMB-000460	
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3021' GL		22. Approximate date work will start*	
23. Estimated duration 30 DAYS		24. Attachments	

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

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

25. Signature <i>Barry W. Hunt</i>	Name (Printed/Typed) BARRY W. HUNT	Date <i>9/27/12</i>
Title PERMIT AGENT FOR RKI EXPLORATION & PRODUCTION, LLC.		
Approved by (Signature) <i>/s/ Don Peterson</i>	Name (Printed/Typed) <i>/s/ Don Peterson</i>	Date NOV 21 2012
Title <i>for</i> FIELD MANAGER	Office CARLSBAD FIELD OFFICE	

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.  
Conditions of approval, if any, are attached.

APPROVAL FOR TWO YEARS

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

(Continued on page 2)

\*(Instructions on page 2)

Carlsbad Controlled Water Basin



Approval Subject to General Requirements  
& Special Stipulations Attached

SEE ATTACHED FOR  
CONDITIONS OF APPROVAL

DISTRICT I  
1825 N. French Dr., Hobbs, NM 88240

DISTRICT II  
1301 W. Grand Avenue, Artesia, NM 88210

DISTRICT III  
1000 Rio Brazos Rd., Aztec, NM 87410

DISTRICT IV  
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico  
Energy, Minerals and Natural Resources Department

Form C-102  
Revised July 16, 2010

Submit one copy to appropriate  
District Office

OIL CONSERVATION DIVISION  
1220 South St. Francis Dr.  
Santa Fe, New Mexico 87505

WELL LOCATION AND ACREAGE DEDICATION PLAT

☐ AMENDED REPORT

API Number 30-015-40849	Pool Code 97863	Pool Name UNDESIGNATED BONE SPRING
Property Code 39672	Property Name RDX Federal 21	Well Number 1H
GRID No. 246289	Operator Name RKI EXPLORATION & PRODUCTION LLC	Elevation 3021'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	21	26 S	30 E		330	SOUTH	1500	WEST	EDDY

Bottom Hole Location If Different From Surface

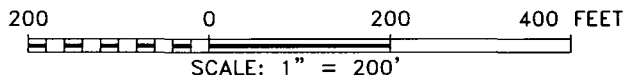
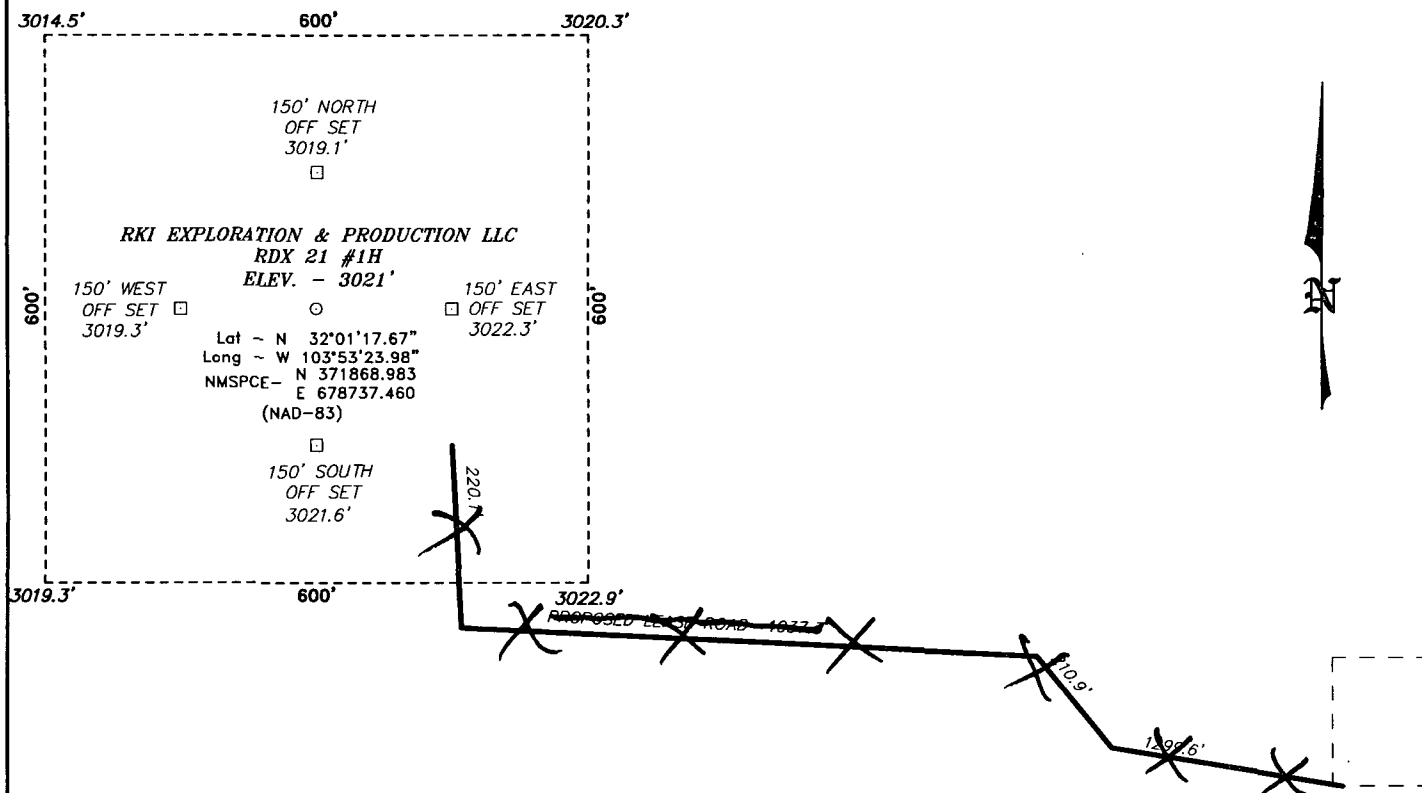
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
C	21	26 S	30 E		330	NORTH	1650	WEST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
160			NSL-

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED  
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

	<p><b>PROPOSED BOTTOM HOLE LOCATION</b> Lat - N 32°02'03.70" Long - W 103°53'22.52" NMSPCE - N 376521.475 E 678841.927 (NAD-83)</p> <p><b>SURFACE LOCATION</b> Lat - N 32°01'17.67" Long - W 103°53'23.98" NMSPCE - N 371868.983 E 678737.460 (NAD-83)</p>	<p><b>OPERATOR CERTIFICATION</b></p> <p>I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or undesignated mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</p> <p><i>Barry W. Hunt</i> 9/27/12 Signature Date <b>Barry W. Hunt</b> Printed Name Email Address</p> <p><b>SURVEYOR CERTIFICATION</b></p> <p>I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.</p> <p></p> <p>Date Surveyed Signature &amp; Seal of Professional Surveyor Certificate No. Gary L. Jones 7977 BASIN SURVEYS 23091</p>
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SECTION 21, TOWNSHIP 26 SOUTH, RANGE 30 EAST, N.M.P.M.,  
EDDY COUNTY, NEW MEXICO.



Directions to Location:

FROM THE JUNCTION OF BUCK JACKSON AND HEDGEHOG,  
GO SOUTH ON BUCK JACKSON FOR 1.7 MILES TO LEASE  
ROAD, ON LEASE ROAD GO SOUTHWESTERLY 5.3 MILES  
TURNING EAST 0.6 MILES THENCE NORTHWESTERLY 0.4  
MILES TO PROPOSED LEASE ROAD. TO THE RDX 28&1  
LOCATION.

**RKI EXPLORATION & PRODUCTION LLC**

REF: RDX 21 #1H / WELL PAD TOPO

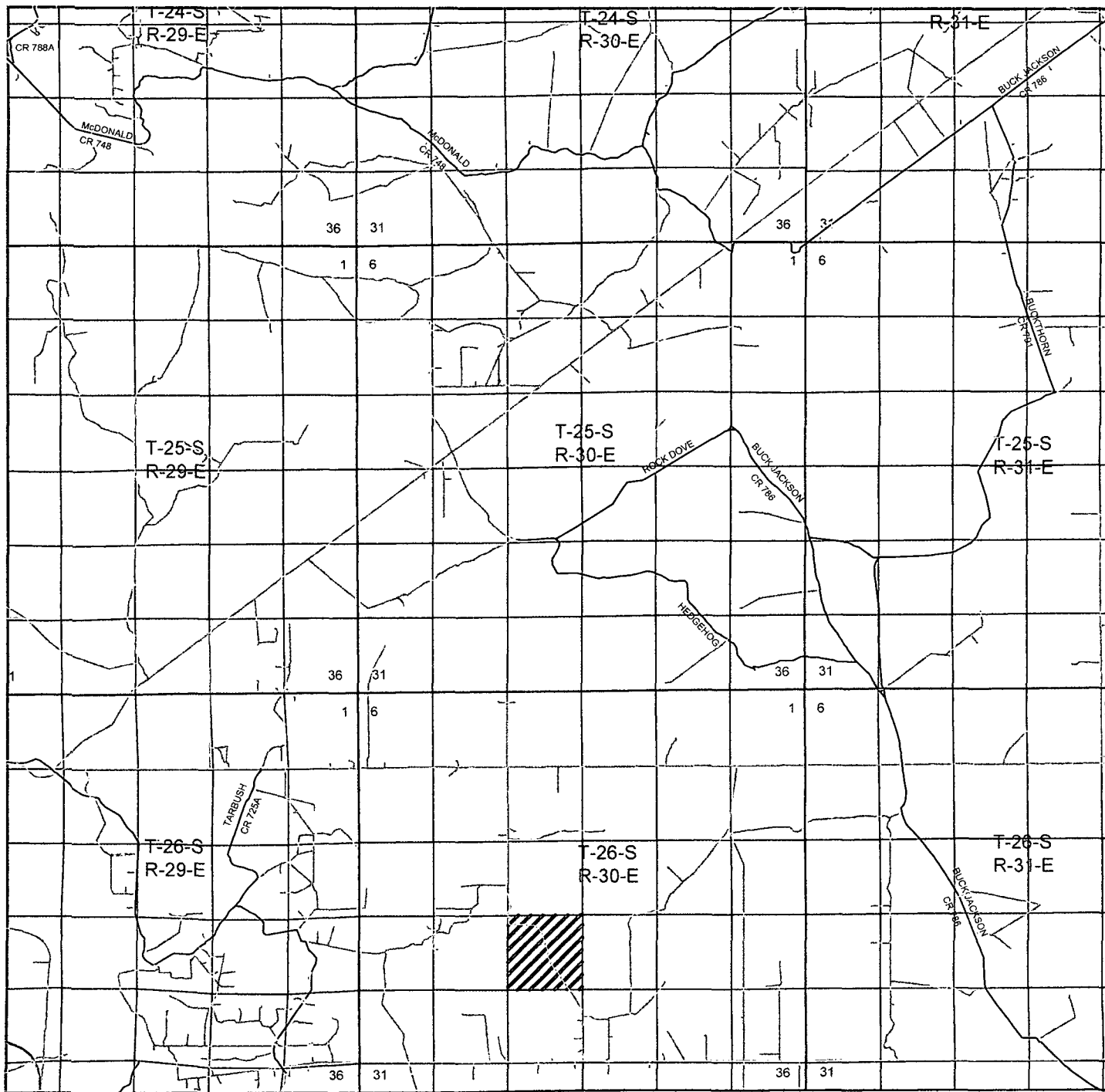
THE RDX 21 #1H LOCATED 330'  
FROM THE SOUTH LINE AND 1500' FROM THE WEST LINE OF  
SECTION 21, TOWNSHIP 26 SOUTH, RANGE 30 EAST,  
N.M.P.M., EDDY COUNTY, NEW MEXICO.

**BASIN SURVEYS** P.O. BOX 1786 - HOBBS, NEW MEXICO

W.O. Number: 23091 Drawn By: J. SMALL

Date: 08-03-2010 Disk: JMS 23091

Survey Date: 07-30-2010 Sheet 1 of 1 Sheets



**RDX 21 #1H**

Located 330' FSL and 1500' FWL

Section 21, Township 26 South, Range 30 East,  
N.M.P.M., Eddy County, New Mexico.

**basin**  
**surveys**  
focused on excellence  
in the oilfield

P.O. Box 1786  
1120 N. West County Rd.  
Hobbs, New Mexico 88241  
(575) 393-7316 - Office  
(575) 392-2206 - Fax  
basinsurveys.com

W.O. Number: JMS 23091

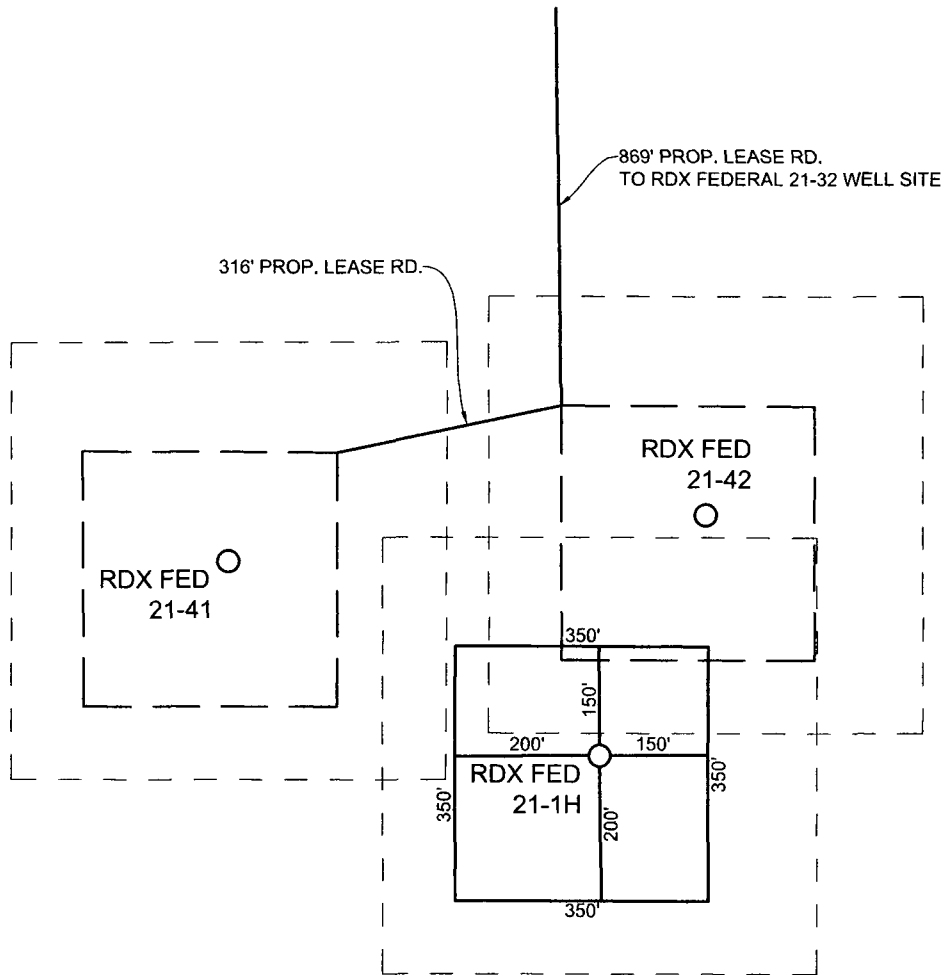
Survey Date: 07-30-2010

Scale: 1" = 2 Miles

Date: 08-03-2010

**RKI EXPLORATION  
& PRODUCTION  
LLC**

# SITE LOCATION



SCALE: 1" = 200'

SECTION 21, T-26-S, R-30-E, N.M.P.M.

COUNTY: EDDY STATE: NM

DESCRIPTION: 330' FSL & 1,500' FWL

OPERATOR: RKI EXPLORATION & PRODUCTION

WELL NAME: RDX FEDERAL 21-1H

## DRIVING DIRECTIONS:

Beginning at US 285 at the Texas-New Mexico State line go Northerly on SH 285 (Pecos Hwy.) approx. 3.7 miles to CR 725 (Longhorn Road). On CR 725 go NE, East approx. 4.12 miles around a bend to an 4-way intersection. Turn left and go NE, East on CR 725 now Pipeline Road for approx. 6.13 miles to a lease road intersection. Turn right and go South approx. 2.17 miles on lease road, turn left on lease road and go East, SE approx. 1.0 miles from which the location flag is  $\pm$  1,650 feet SW off lease road.

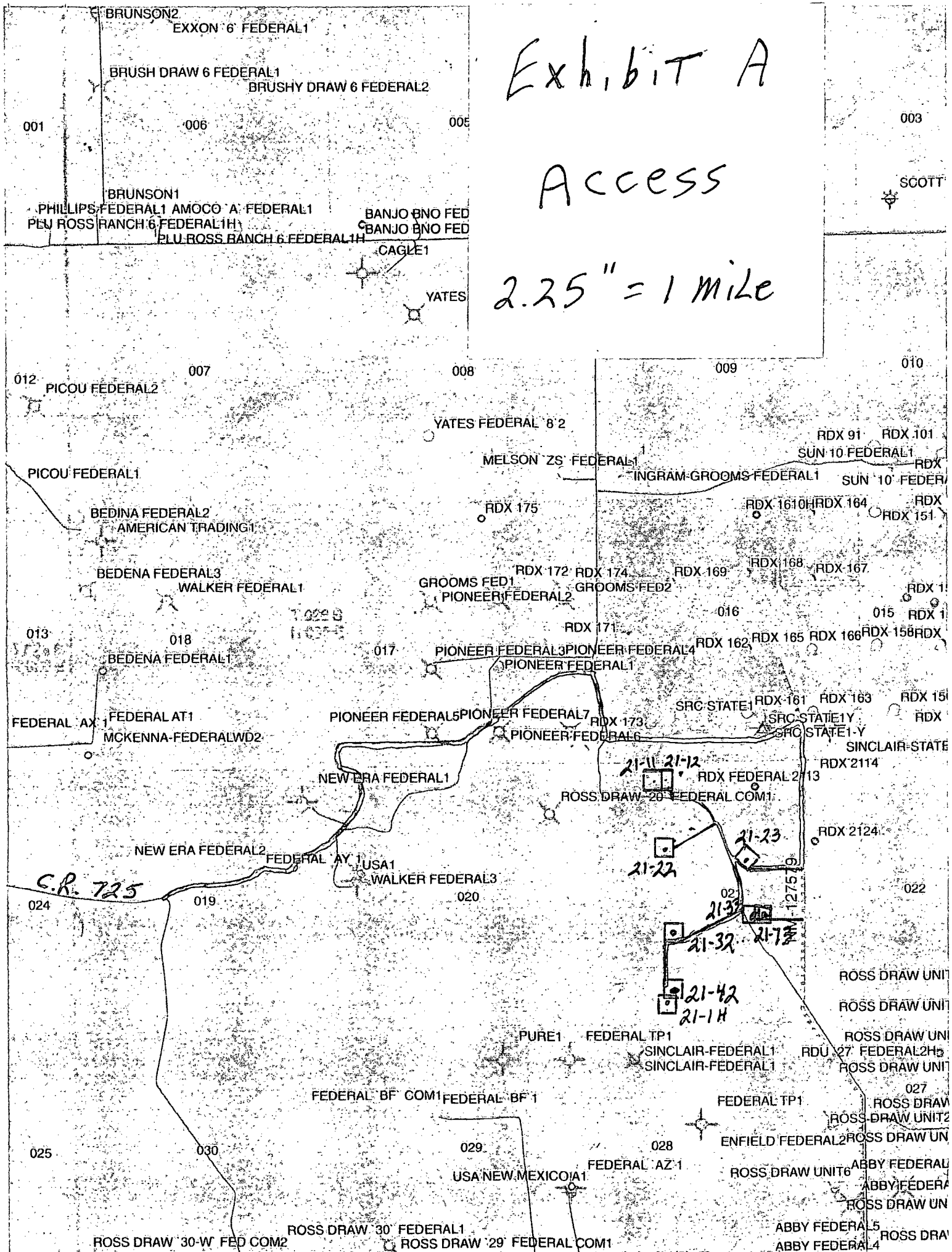


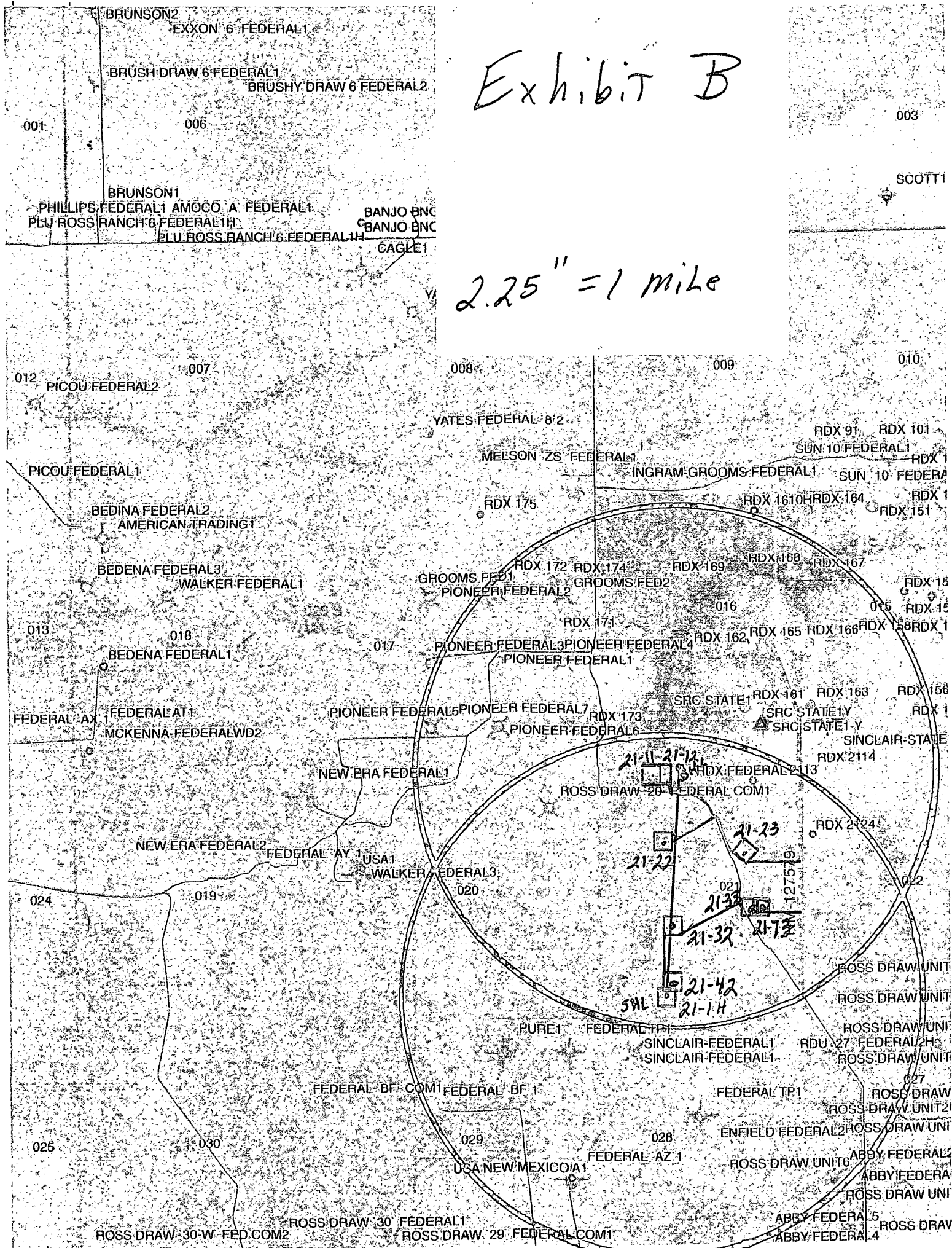
**WEST TEXAS CONSULTANTS, INC.**  
ENGINEERS PLANNERS SURVEYORS  
405 S.W. 1st. STREET  
ANDREWS, TEXAS 79714  
(432) 523-2181

**RKI EXPLORATION & PRODUCTION**

JOB No.:

# Access

$$2.25'' = 1 \text{ mile}$$


$$2.25'' = 1 \text{ mile}$$


DRILLING PLAN

Well RDX FEDERAL 21-1H  
Location Surface: 330 FSL 1,500 FWL  
Bottom Hole: 330 FNL 1,650 FWL  
County Eddy  
State New Mexico

- 1) The elevation of the unprepared ground is 3,021 feet above sea level.
- 2) The geologic name of the surface formation is Quaternary - Alluvium.
- 3) A rotary rig will be utilized to drill the well to 12,207 feet and run casing.  
This equipment will then be rigged down and the well will be completed with a workover rig.
- 4) Proposed depth is: 12,207 feet MD 7,800 feet TVD

5) Estimated tops:

	MD	TVD	
Alluvium	*		
<del>Rusler</del> <i>Ruotler</i>	800		
Salado	1,100		
Castile	1,650		
Lamar Lime	3,498		
Base of Lime	3,523		
Delaware Top	3,564		BHP = .44 psi/ft x depth
Bell Canyon Sand	3,564		Oil 1,568 psi
Cherry Canyon Sand	4,621		Oil 2,033 psi
Brushy Canyon Sand	5,670		Oil 2,495 psi
KOP	7,227	7,227	
Bone Spring	7,324	7,300	
Landing Point (Avalon Shale)	8,127	7,800	Oil 3,432 psi
TD	12,207	7,800	152 degree F

\* Fresh water anticipated at about 200 ft.

6) Pressure control equipment:

The blowout preventer equipment (BOP) shown in Exhibit #1 will consist of a double ram type (3,000 psi WP) preventer, a bag-type annular preventer (3,000 psi WP), and rotating head. Both units will be hydraulically operated and the ram type preventer will be equipped with blind rams on top and pipe rams (sized to accommodate the drill pipe size being utilized) on bottom. A 13 3/8" SOW x 13 5/8" 3M casing head will be installed on the 13 3/8" casing and utilized until total depth is reached. All BOP and associated equipment will be tested to 3,000 psi and the annular will be tested to 1,500 psi after setting the 13 3/8" string. The 13 3/8" and 9 5/8" casing will be tested to .22 psi per ft of casing string length or 1,500 psi whichever is greater, but not to exceed 70% of the minimum yield.

The 9 5/8" casing will be hung in the casing head and the stack will not be nipped down at this point. The stack will not be isolated and tested after running the 9 5/8" casing, but will be tested along with the 9 5/8" casing. Pipe rams will be operated and checked each 24 hour period and each time the drill string is out of the hole. These function test will be documented on the daily driller's log.

A drilling spool or blowout preventer with 2 side outlets (choke side shall be 3" minimum diameter, kill side shall be at least 2" diameter).

2 kill line valves, one of which will be a check valve.

2 chokes on the manifold along with a pressure gauge.

Upper kelly cock valve with handle available.

Safety valve and subs to fit all drill string connections in use.

All BOP equipment connections subjected to pressure will be flanged, welded, or clamped.

Fill up line above the upper most preventer.



## 7) Casing program: ALL NEW CASING

Hole Size	Top	Bottom	OD Csg	Wt/Grade	Connection	Collapse Design Factor	Burst Design Factor	Tension Design Factor
17 1/2"	0	900	13 3/8"	54.5#/J-55	ST&C	2.85	13.79	10.48
12 1/2"	0	3,500	9 5/8"	40#/J-55	LT&C	1.31	5.13	3.71
8 3/4"	0	12,207	5 1/2"	17#/HCP-110	LT&C	1.60	1.55	5.82

See COA

Collapse	1.125	All pipe will be new
Burst	1.0	
Tension	2.0	

## 8) Cement program:

<b>Surface</b>	17 1/2" hole
Pipe OD	13 3/8"
Setting Depth	900 ft
Annular Volume	0.69462 cf/ft
Excess	0.5

50 %

Lead	383 sx	1.75	cf/sk	13.5 ppg
Tail	200 sx	1.34	cf/sk	14.8 ppg

Lead: "C" + 4% PF20 (gel) + 2% PF1 (CC) + .125 pps PF29 (CelloFlake) + .2% PF46 (Antifoam)

Tail: "C" + 1% PF1 (CC)

Top of cement:
Surface

<b>Intermediate</b>	12 1/2" hole
Pipe OD	9 5/8"
Setting Depth	3,500 ft
Annular Volume	0.31318 cf/ft
Excess	0.5

0.3627 cf/ft

50 %

Lead	634 sx	2.07 cf/sk	12.6 ppg
Tail	200 sx	1.33 cf/sk	14.8 ppg

Lead: 35/65 Poz "C" + 5% PF44 (Salt) + 6% PF20 (Gel) + 3 pps PF42 (KoalSeal) + .125 pps PF29 (CelloFlake) + .2% PF46 (Antifoam) + 1% PF1 (CC)

Tail: "C" + .2% PF13 (Retarder)

Top of cement:
Surface

<b>Production</b>	8 3/4" hole
Pipe OD	5 1/2"
Setting Depth	12,207 ft
Annular Volume	0.2526 cf/ft
Excess	0.25
Total Annular Volume	2,278 cf
With Excess	2,847 cf
(DV Tool Depth	5,500 ft)

0.26074 cf/ft

25 %

300 ft

## Stage 1

Lead:	1,132 sx	1.87	cf/sk	13.0 ppg
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Lead: PVL + 1.3% PF44(BWOW) (Salt) + 5% PF174 (Expanding Agent) + .5% PF606 (Gel Suppressing Agent) + .1% PF153 (Anti Settling Agent) + .25 pps PF46 (Anti Foam) + .55% PF13 (Retarder)

Top of cement:

DV tool

## Stage 2

Lead:	243 sx	2.04	cf/sk	12.6 ppg
Tail:	175 sx	1.33	cf/sk	14.8 ppg

Lead: 35/65 Poz "C" + 5% PF44 (Salt) + 6% PF20 (Gel) + .2% PF13 (Retarder) + .125 pps PF29 (Cellophane) + .25 pps PF46 (Anti Foam)

Tail: "C" + .3% PF13 (Retarder)

Top of cement:
3,200 ft

9) Mud program:

Top	Bottom	Mud Wt.	Vis	PV	YP	Fluid Loss	Type System
0	900	8.5 to 8.9	32 to 36	1 - 6	1 - 6	NC	Fresh Water
900	3,500	9.8 to 10.0	28 to 30	1 - 3	1 - 3	NC	Brine
3,500	12,207	8.9 to 9.1	28 to 36	1 - 3	1 - 3	NC	Fresh Water

10) Logging, coring, and testing program: *\* See COA*

No drillstem test are planned

KOP to intermediate: CNL, Caliper, GR, DLL,

Intermediate to surface: CNL, GR

No coring is planned

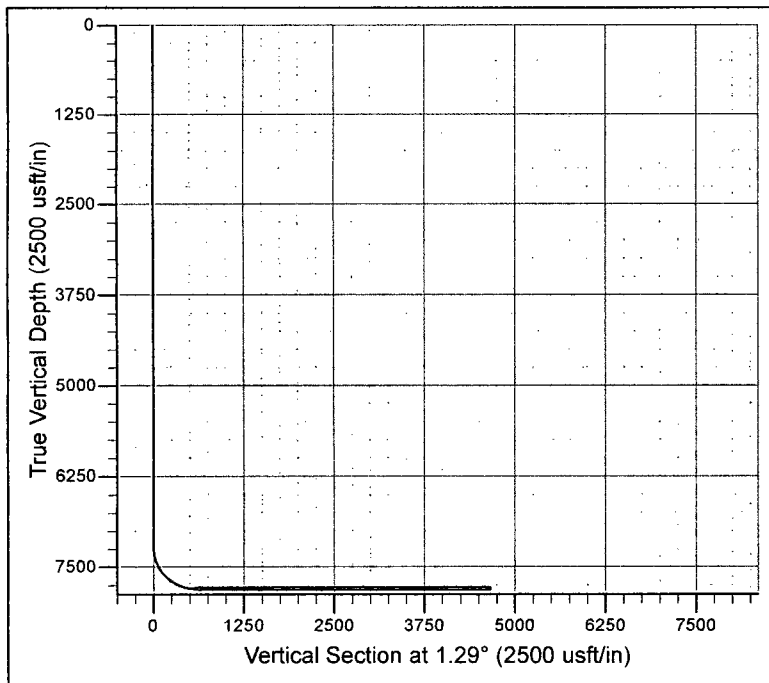
11) Potential hazards:

No abnormal pressure or temperature is expected. No H2S is known to exist in the area.

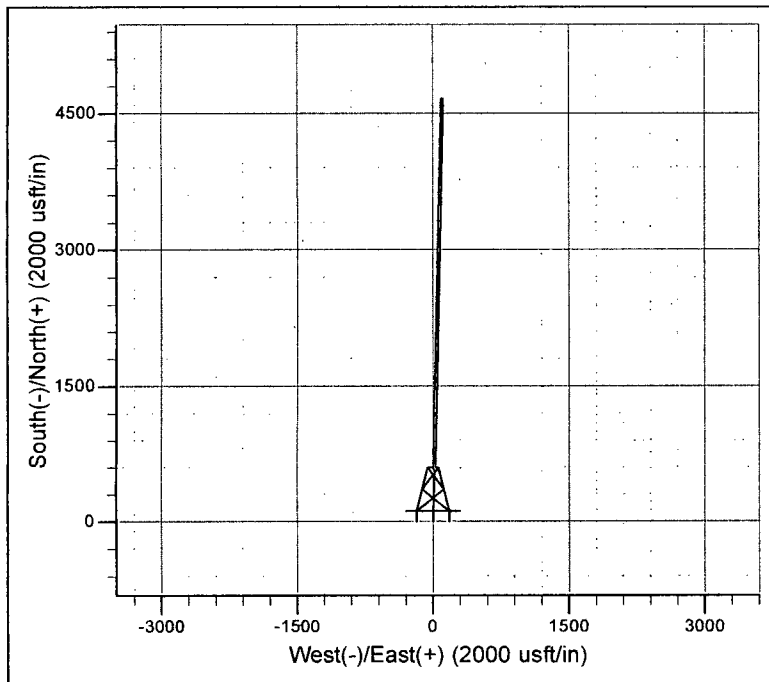
Lost circulation is not anticipated, but lost circulation equipment will be on location and readily available if needed.

12) Anticipated start date      Sept '12

Duration                              25 days



RDX 21-1H  
21-26N-30E  
Eddy County, NM



BHL

Surface Location

#### SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	7227	0.00	0.00	7227.0	0.0	0.0	0.00	0.00	0.0	
3	8127	90.00	1.29	7800.0	572.8	12.9	10.00	1.29	573.0	
4	12207	90.00	1.29	7800.0	4652.5	104.5	0.00	0.00	4653.7	RDX 21-1H

## RDX 21-1H Directional Sheet

## H HEADER INFORMATION -----

H COMPANY : RKI 2  
H FIELD : Eddy County, NM  
H SITE : Section 21-26S-30E  
H WELL : RDX 21-1H  
H WELLPATH: wellbore #1  
H DEPTHUNT: usft  
H SURVDATE: 1/1/1990

H-----

## H WELL INFORMATION

H WELL EW MAP : 678737.46  
H WELL NS MAP : 371868.98  
H DATUM ELEVN : 0.00  
H VSECT ANGLE : 1.29  
H VSECT NORTH : 0.00  
H VSECT EAST : 0.00

H-----

## H SURVEY TYPE INFORMATION

H 0.00 - 12207.75 DESIGN #1 :

H-----

## H SURVEY LIST

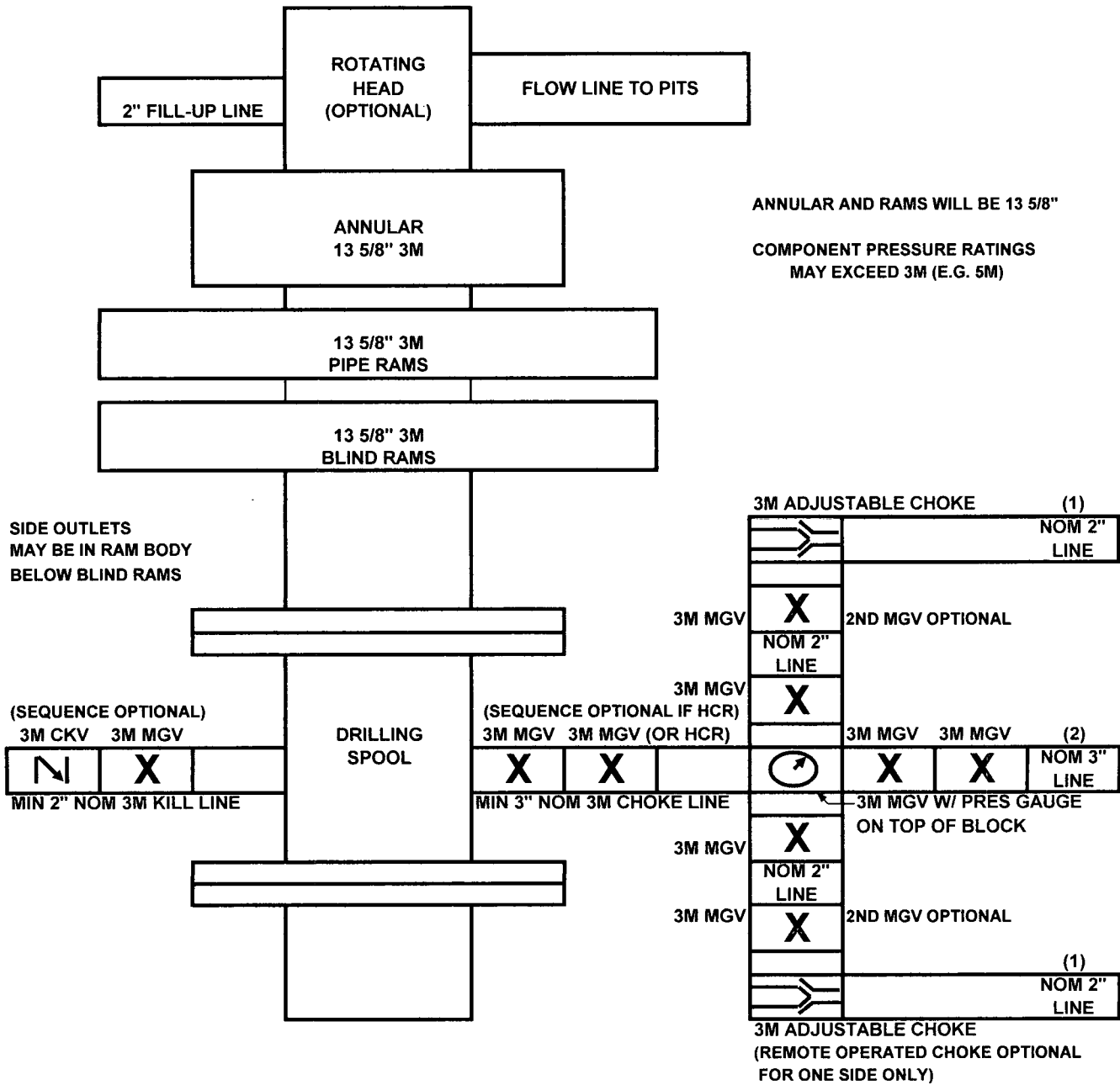
H MD	INC	AZI	TVD	NS	EW
0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00
1000.00	0.00	0.00	1000.00	0.00	0.00
1100.00	0.00	0.00	1100.00	0.00	0.00
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1300.00	0.00	0.00	1300.00	0.00	0.00
1400.00	0.00	0.00	1400.00	0.00	0.00
1500.00	0.00	0.00	1500.00	0.00	0.00
1600.00	0.00	0.00	1600.00	0.00	0.00
1700.00	0.00	0.00	1700.00	0.00	0.00
1800.00	0.00	0.00	1800.00	0.00	0.00
1900.00	0.00	0.00	1900.00	0.00	0.00
2000.00	0.00	0.00	2000.00	0.00	0.00
2100.00	0.00	0.00	2100.00	0.00	0.00
2200.00	0.00	0.00	2200.00	0.00	0.00
2300.00	0.00	0.00	2300.00	0.00	0.00
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2800.00	0.00	0.00	2800.00	0.00	0.00
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3000.00	0.00	0.00	3000.00	0.00	0.00
3100.00	0.00	0.00	3100.00	0.00	0.00
3200.00	0.00	0.00	3200.00	0.00	0.00
3300.00	0.00	0.00	3300.00	0.00	0.00
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3700.00	0.00	0.00	3700.00	0.00	0.00
3800.00	0.00	0.00	3800.00	0.00	0.00
3900.00	0.00	0.00	3900.00	0.00	0.00
4000.00	0.00	0.00	4000.00	0.00	0.00

RDX 21-1H Directional Sheet

4100.00	0.00	0.00	4100.00	0.00	0.00
4200.00	0.00	0.00	4200.00	0.00	0.00
4300.00	0.00	0.00	4300.00	0.00	0.00
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4500.00	0.00	0.00	4500.00	0.00	0.00
4600.00	0.00	0.00	4600.00	0.00	0.00
4700.00	0.00	0.00	4700.00	0.00	0.00
4800.00	0.00	0.00	4800.00	0.00	0.00
4900.00	0.00	0.00	4900.00	0.00	0.00
5000.00	0.00	0.00	5000.00	0.00	0.00
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5700.00	0.00	0.00	5700.00	0.00	0.00
5800.00	0.00	0.00	5800.00	0.00	0.00
5900.00	0.00	0.00	5900.00	0.00	0.00
6000.00	0.00	0.00	6000.00	0.00	0.00
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6600.00	0.00	0.00	6600.00	0.00	0.00
6700.00	0.00	0.00	6700.00	0.00	0.00
6800.00	0.00	0.00	6800.00	0.00	0.00
6900.00	0.00	0.00	6900.00	0.00	0.00
7000.00	0.00	0.00	7000.00	0.00	0.00
7100.00	0.00	0.00	7100.00	0.00	0.00
7200.00	0.00	0.00	7200.00	0.00	0.00
7227.04	0.00	0.00	7227.04	0.00	0.00
7250.00	2.30	1.29	7249.99	0.46	0.01
7300.00	7.30	1.29	7299.80	4.64	0.10
7350.00	12.30	1.29	7349.06	13.14	0.30
7400.00	17.30	1.29	7397.39	25.90	0.58
7450.00	22.30	1.29	7444.42	42.82	0.96
7500.00	27.30	1.29	7489.79	63.78	1.43
7550.00	32.30	1.29	7533.17	88.61	1.99
7600.00	37.30	1.29	7574.21	117.13	2.63
7650.00	42.30	1.29	7612.62	149.11	3.35
7700.00	47.30	1.29	7648.09	184.32	4.14
7750.00	52.30	1.29	7680.35	222.49	5.00
7800.00	57.30	1.29	7709.17	263.32	5.91
7850.00	62.30	1.29	7734.32	306.51	6.88
7900.00	67.30	1.29	7755.60	351.72	7.90
7950.00	72.30	1.29	7772.86	398.62	8.95
8000.00	77.30	1.29	7785.97	446.84	10.03
8050.00	82.30	1.29	7794.83	496.02	11.14
8100.00	87.30	1.29	7799.36	545.79	12.26
8127.04	90.00	1.29	7800.00	572.81	12.86
8200.00	90.00	1.29	7800.00	645.75	14.50
8300.00	90.00	1.29	7800.00	745.73	16.74
8400.00	90.00	1.29	7800.00	845.70	18.99
8500.00	90.00	1.29	7800.00	945.68	21.23
8600.00	90.00	1.29	7800.00	1045.65	23.48
8700.00	90.00	1.29	7800.00	1145.63	25.72
8800.00	90.00	1.29	7800.00	1245.60	27.97
8900.00	90.00	1.29	7800.00	1345.58	30.21
9000.00	90.00	1.29	7800.00	1445.55	32.46
9100.00	90.00	1.29	7800.00	1545.53	34.70
9200.00	90.00	1.29	7800.00	1645.50	36.95

			RDX 21-1H Directional Sheet		
9300.00	90.00	1.29	7800.00	1745.48	39.19
9400.00	90.00	1.29	7800.00	1845.45	41.44
9500.00	90.00	1.29	7800.00	1945.43	43.68
9600.00	90.00	1.29	7800.00	2045.40	45.93
9700.00	90.00	1.29	7800.00	2145.37	48.17
9800.00	90.00	1.29	7800.00	2245.35	50.42
9900.00	90.00	1.29	7800.00	2345.32	52.66
10000.00	90.00	1.29	7800.00	2445.30	54.91
10100.00	90.00	1.29	7800.00	2545.27	57.15
10200.00	90.00	1.29	7800.00	2645.25	59.40
10300.00	90.00	1.29	7800.00	2745.22	61.64
10400.00	90.00	1.29	7800.00	2845.20	63.89
10500.00	90.00	1.29	7800.00	2945.17	66.13
10600.00	90.00	1.29	7800.00	3045.15	68.38
10700.00	90.00	1.29	7800.00	3145.12	70.62
10800.00	90.00	1.29	7800.00	3245.10	72.87
10900.00	90.00	1.29	7800.00	3345.07	75.11
11000.00	90.00	1.29	7800.00	3445.05	77.36
11100.00	90.00	1.29	7800.00	3545.02	79.60
11200.00	90.00	1.29	7800.00	3645.00	81.84
11300.00	90.00	1.29	7800.00	3744.97	84.09
11400.00	90.00	1.29	7800.00	3844.95	86.33
11500.00	90.00	1.29	7800.00	3944.92	88.58
11600.00	90.00	1.29	7800.00	4044.90	90.82
11700.00	90.00	1.29	7800.00	4144.87	93.07
11800.00	90.00	1.29	7800.00	4244.85	95.31
11900.00	90.00	1.29	7800.00	4344.82	97.56
12000.00	90.00	1.29	7800.00	4444.80	99.80
12100.00	90.00	1.29	7800.00	4544.77	102.05
12207.75	90.00	1.29	7800.00	4652.49	104.47

## 3M BOP SCHEMATIC

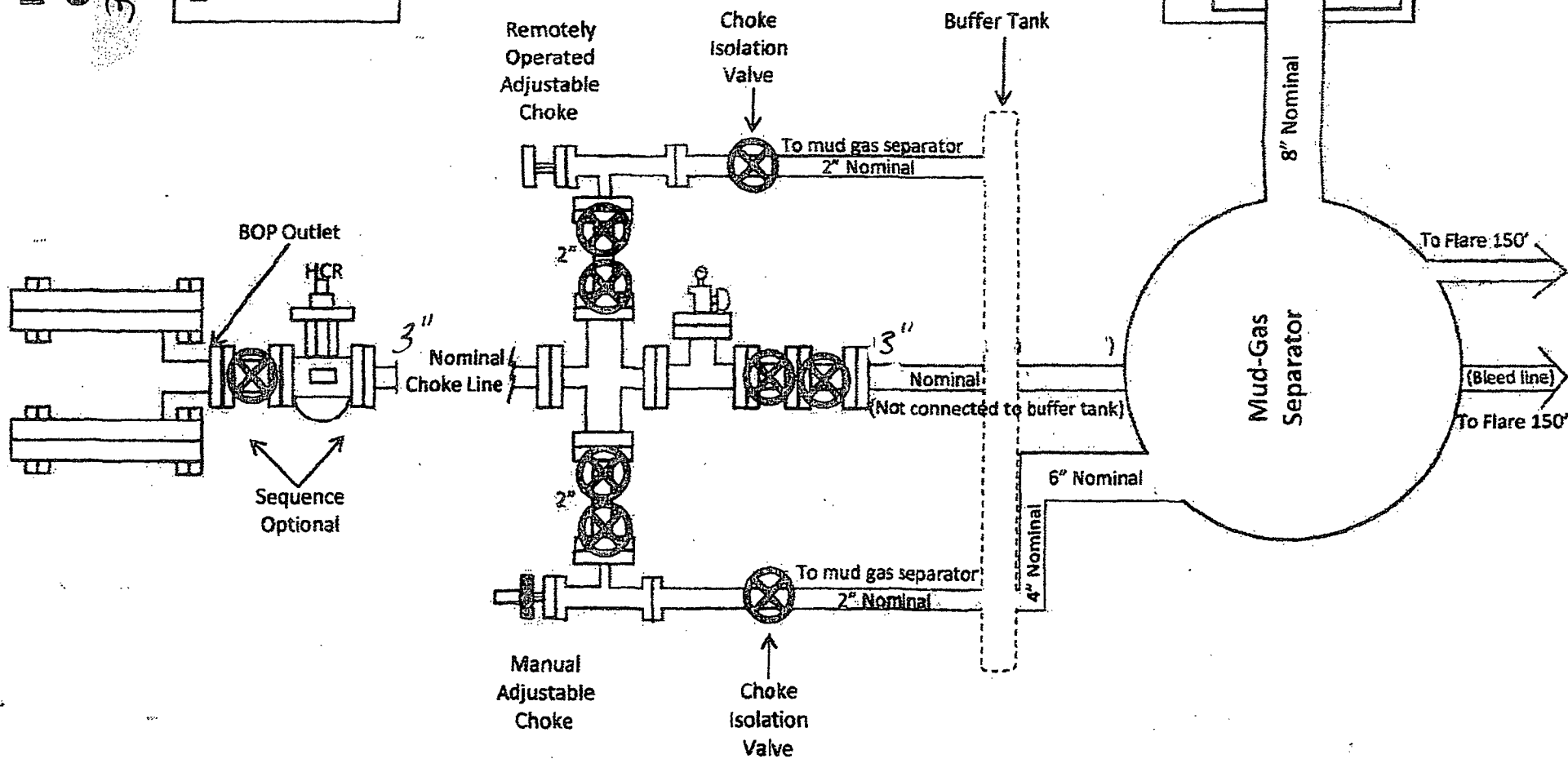


- (1) Line to mud gas separator and/or pit  
(2) Bleed line to pit

MGV - Manual Gate Valve  
CKV - Check Valve  
HCR - Hydraulically Controlled Remote Valve

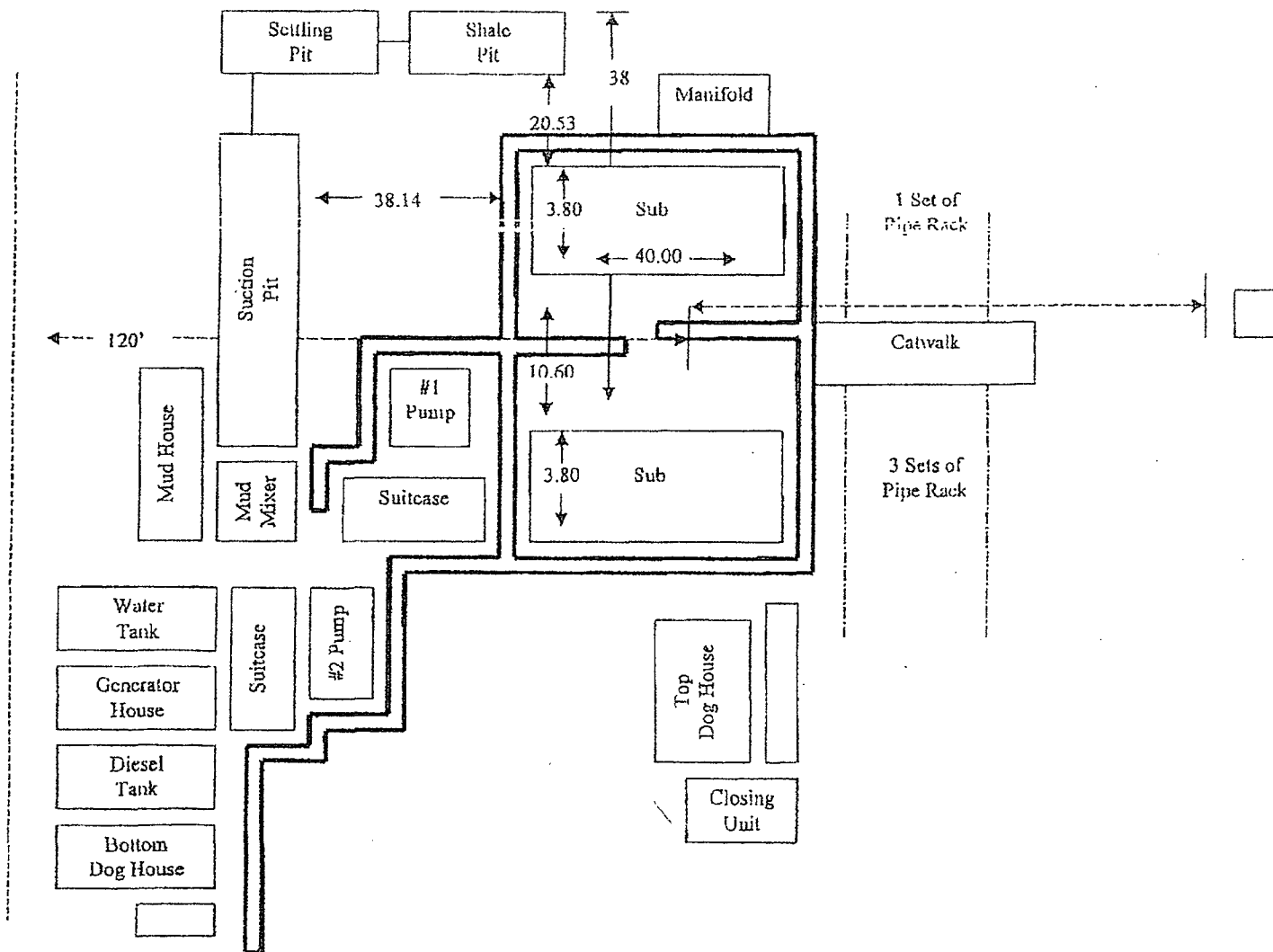
Drilling Operations  
Choke Manifold  
3M Service

Exhibit E-1 -- Choke Manifold Diagram





# Plat for Closed Loop System



RKI Exploration and Production  
3817 N. W. Expressway, Suite 950  
Oklahoma City, OK. 73112

## **Closed Loop System**

### Design Plan

#### *Equipment List*

- 2 – 414 Swaco Centrifuges
- 2 – 4 screen Mongoose shale shakers
- 2 – 250 bbl. tanks to hold fluid
- 2 – CRI Bins with track system
- 2 – 500 bbl. frac tanks for fresh water
- 2 – 500 bbl. frac tanks for brine water

### Operation and Maintenance

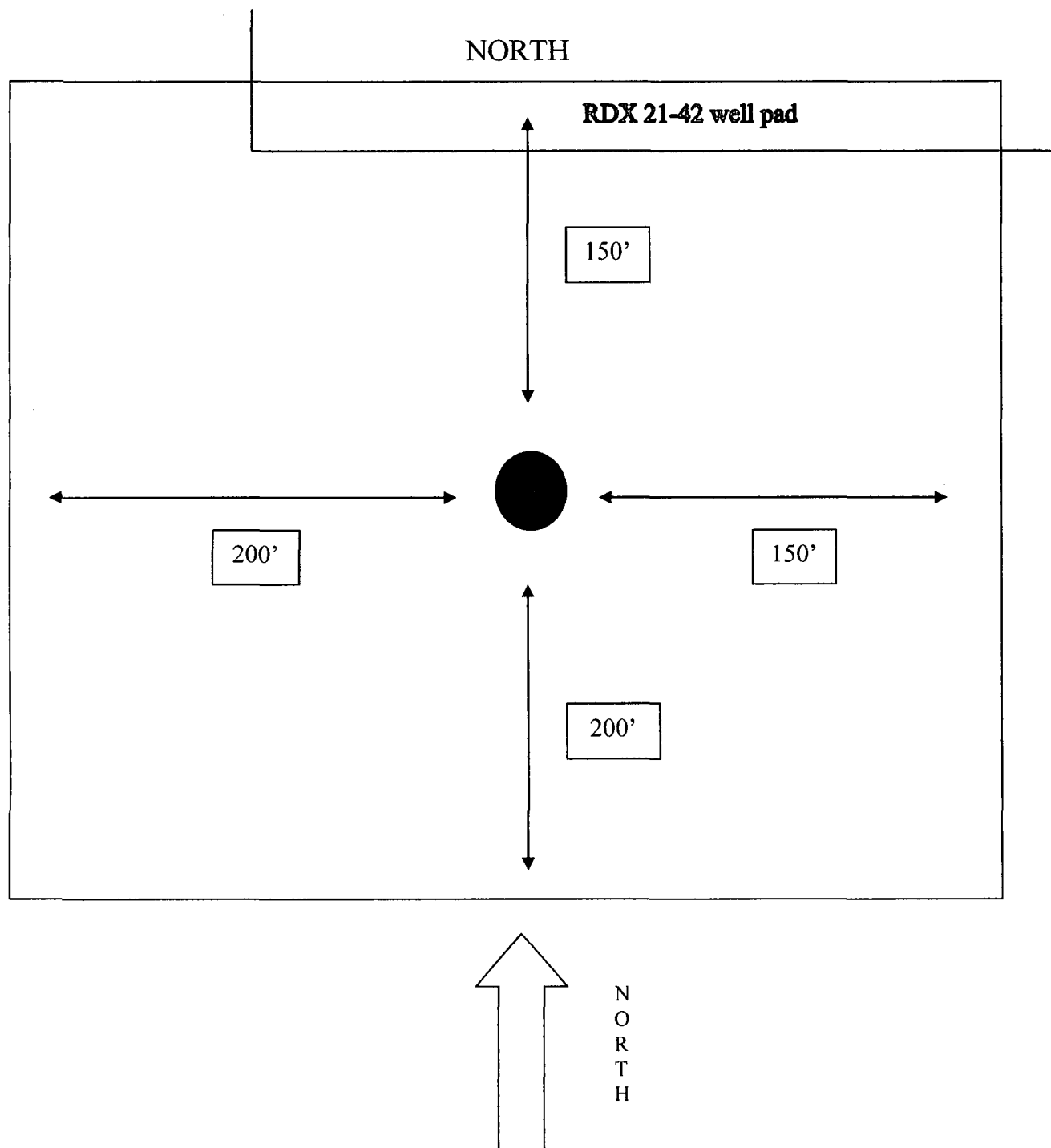
- Closed Loop equipment will be inspected daily by each tour and any necessary maintenance performed
- Any leak in system will be repaired and/or contained immediately
- OCD notified within 48 hours
- Remediation process started

### Closure Plan

During drilling operations, all liquids, drilling fluids and cuttings will be hauled off via CRI (Controlled Recovery Incorporated). Permit #: R-9166.

**EXHIBIT D**

**Rig Plat Only  
RDX FEDERAL 21-1H  
V-DOOR EAST**



## SURFACE USE PLAN

**RKI Exploration & Production, LLC**  
**RDX Federal 21-1H**  
**Surface Hole: 330' FSL & 1500' FWL**  
**Bottom Hole: 330' FNL & 1650' FWL**  
**Section 21, T. 26 S., R. 30 E**  
**Eddy County, New Mexico**

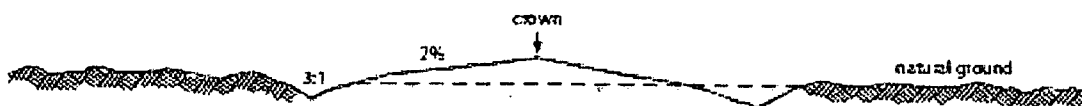
This plan is submitted with form 3160-3, Application for Permit to Drill, covering the above described well. The purpose of this plan is to describe the location of the proposed well, the proposed construction activities and operations plan, the magnitude of the surface disturbance involved and the procedures to be followed in rehabilitating the surface after completion of the operations, so that a complete appraisal can be made of the environmental effect associated with the operations.

### 1. EXISTING ROADS:

- A. DIRECTIONS: Go south of Carlsbad, NM, on Highway 285, for 30 miles. Turn east onto the Longhorn road (County Road 725) for 12.6 miles. Turn east on lease road for 2.2 miles. Turn south 1/4 mile, then east for 3/4 mile, then south for 3/4 mile. Turn west on access road to RDX Fed 21-23 for 1/4 mile. Turn south for 1/4 mile, then west for 1/4 mile, then south for 869 ft. to the RDX 21-42 location. The proposed well is just southwest of the #42 well (Pads will share or overlap one another). All existing roads are either paved or a caliche lease road.
- B. See attached plats and maps provided by Basin and WTC Surveys.
- C. The access routes from Eddy County Road 725 to the well location is depicted on **Exhibit A**. The route highlighted in red has been authorized under a ROW permit.
- D. Existing roads on the access route will be improved and maintained to the standard set forth in Section 2 of this Surface Use Plan of Operations.
- E. A right-of-way (ROW) was obtained in September of 2010 to access this well and other leases within the RDX and RDU field.

### 2. NEW OR RECONSTRUCTED ACCESS ROADS:

- A. There will be no new access road due to proposed location being 330 ft. southsouthwest of the RDX 21-42 well.
- B. The maximum width of the driving surface will be 14 feet. The road will be crowned and ditched with a 2% slope from the tip of the crown to the edge of the driving surface. The ditches will be 1 foot deep with 3:1 slopes. The driving surface will be made of 6" rolled and compacted caliche.



**Level Ground Section**

- C. Surface material will be native caliche. The average grade of the entire road will be approximately 3%.
- D. Fence Cuts: No

- E. Cattle guards: No
- F. Turnouts: No
- G. Culverts: No
- H. Cuts and Fills: Not significant
- I. Approximately 6 inches of topsoil (root zone) will be stripped from the proposed access road prior to any further construction activity. The topsoil that was stripped will be spread along the edge of the road and within the ditch. The topsoil will be seeded with the proper seed mix designated by the BLM.
- J. The access road will be constructed and maintained as necessary to prevent soil erosion and accommodate all-weather traffic. The road will be crowned and ditched with water turnouts installed as necessary to provide for proper drainage along the access road route.
- K. The access road and associated drainage structures will be constructed and maintained in accordance with road guidelines contained in the joint BLM/USFS publication: Surface Operating Standards for Oil and Gas Exploration and Development, The Gold Book, Fourth Edition and/or BLM Manual Section 9113 concerning road construction standards on projects subject to federal jurisdiction.

3. LOCATION OF EXISTING WELLS:

See attached map (**Exhibit B**) showing all wells within a one-mile radius.

4. LOCATION OF EXISTING AND/OR PROPOSED FACILITIES:

- A. In the event the well is found productive, a production facility (tank battery) will be placed on the east side of the location. (**SEE EXHIBIT C**).
- B. All permanent (on site six months or longer) aboveground structures constructed or installed on location and not subject to safety requirements will be painted to BLM specifications.
- C. Containment berms will be constructed completely around production facilities designed to hold fluids. The containment berms will be constructed or compacted subsoil, be sufficiently impervious, hold 1 ½ times the capacity of the largest tank and away from cut or fill areas.

5. LOCATION AND TYPE OF WATER SUPPLY:

The well will be drilled using a combination of water mud systems as outlined in the Drilling Program. The water will be obtained from commercial water stations in the area and hauled to the location by transport truck using the existing and proposed roads shown in the attached survey plats. If a commercial water well is nearby, a temporary, surface poly line, will be laid along existing roads or other ROW easements and the water pumped to the well. No water well will be drilled on the location.

6. SOURCE OF CONSTRUCTION MATERIALS:

Any construction material that may be required for surfacing of the drill pad and access road will be from a contractor having a permitted source of materials within the general area. No construction materials will be removed from Federal lands without prior approval from the appropriate surface management agency. All roads will be constructed of 6" rolled and compacted caliche.

7. METHODS OF HANDLING WASTE DISPOSAL:

- A. The well will be drilled utilizing a closed loop mud system. Drill cuttings will be held in roll-off style mud boxes and taken to an NMOCD approved disposal site.
- B. Drilling fluids will be contained in steel mud pits.
- C. Water produced from the well during completion will be held temporarily in steel tanks

- and then taken to an NMOCD approved commercial disposal facility.
- D. Oil produced during operations will be stored in tanks until sold.
  - E. Portable, self-contained chemical toilets will be provided for human waste disposal. Upon completion of operations, or as required, the toilet holding tanks will be pumped and the contents thereof disposed of in an approved sewage disposal facility. All state and local laws and regulations pertaining to disposal of human and solid waste will be complied with. This equipment will be properly maintained during the drilling and completion operations and will be removed when all operations are complete.
  - F. All trash, junk, and other waste materials will be contained in trash cages or bins to prevent scattering and will be removed and deposited in an approved sanitary landfill. Immediately after drilling all debris and other waste materials on and around the well location, not contained in the trash cage will be cleaned up and removed from the location. No potentially adverse materials or substances will be left on the location.

8. ANCILLARY FACILITIES:

No campsite, airstrip, or other facilities will be built as a result of the operation of this well. No staging areas are needed.

9. WELL SITE LAYOUT:

- A. Exhibit A shows the dimensions of the proposed well pad.
- B. The proposed well pad size will be 350' x 350' (**See Exhibit D**). There will be no reserve pit due to the well being drilled utilizing a closed loop mud system. The closed loop system will meet the NMOCD requirements 19.15.17.
- C. The **Exhibit D**, shows how the well will be turned to a V-Door East.
- D. A 600' x 600' area has been staked and flagged.
- E. All equipment and vehicles will be confined to the approved disturbed areas of this APD (i.e., access road, well pad, and topsoil storage areas)

10. PLANS FOR SURFACE RECLAMATION:

- A. After concluding the drilling and/or completion operations, if the well is found non-commercial, all the equipment will be removed, the surface material, caliche, will be removed from the well pad and road and transported to the original caliche pit or used for other roads. The original stock piled top soil will be returned to the pad and contoured, as close as possible, to the original topography. The access road will have the caliche removed and the road ripped, barricaded and seeded as directed by the BLM.
- B. If the well is a producer, the portions of the location not essential to production facilities or space required for workover operations, will be reclaimed and seeded as per BLM requirements. (**SEE EXHIBIT C FOR INTERIM RECLAMATION PLAT FOR THIS WELL**)
- C. Reclamation Performance Standards  
The following reclamation performance standards will be met:

*Interim Reclamation* – Includes disturbed areas that may be redisturbed during operations and will be redisturbed at final reclamation to achieve restoration of the original landform and a natural vegetative community.

- Disturbed areas not needed for active, long-term production operations or vehicle travel will be recontoured, protected from erosion, and revegetated with a self-sustaining, vigorous, diverse, native (or as otherwise approved) plant community sufficient to minimize visual

impacts, provide forage, stabilize soils, and impede the invasion of noxious, invasive, and non-native weeds.

*Final Reclamation* – Includes disturbed areas where the original landform and a natural vegetative community will be restored and it is anticipated the site will not be redisturbed for future development.

- The original landform will be restored for all disturbed areas including well pads, production facilities, roads, pipelines, and utility corridors.
- A self-sustaining, vigorous, diverse, native (or otherwise approved) plant community will be established on the site, with a density sufficient to control erosion and invasion by non-native plants and to re-establish wildlife habitat or forage production. At a minimum, the established plant community will consist of species included in the seed mix and/or desirable species occurring in the surrounding natural vegetation.
- Erosion features are equal to or less than surrounding area and erosion control is sufficient so that water naturally infiltrates into the soil and gullying, headcutting, slumping, and deep or excessive rills (greater than 3 inches) are not observed.
- The site will be free of State- or county-listed noxious weeds, oil field debris and equipment, and contaminated soil. Invasive and non-native weeds are controlled.

#### D. Reclamation Actions

Earthwork for interim and final reclamation will be completed within 6 months of well completion or plugging unless a delay is approved in writing by the BLM authorized officer.

The following minimum reclamation actions will be taken to ensure that the reclamation objectives and standards are met. It may be necessary to take additional reclamation actions beyond the minimum in order to achieve the Reclamation Standards.

#### Reclamation – General

##### Notification:

- The BLM will be notified at least 3 days prior to commencement of any reclamation operations.

##### Housekeeping:

- Within 30 days of well completion, the well location and surrounding areas(s) will be cleared of, and maintained free of, all debris, materials, trash, and equipment not required for production.
- No hazardous substances, trash, or litter will be buried or placed in pits.

##### Topsoil Management:

- Operations will disturb the minimum amount of surface area necessary to conduct safe and efficient operations.
- Topsoil depth is defined as the top layer of soil that contains 80% of the roots. In areas to be heavily disturbed, the topsoil will be stripped and stockpiled around the perimeter of the well location and along the perimeter of the access road to control run-on and run-off, to keep topsoil viable, and to make redistribution of topsoil more efficient during interim reclamation. Stockpiled

topsoil will include vegetative material. Topsoil will be clearly segregated and stored separately from subsoils.

- Salvaging and spreading topsoil will not be performed when the ground or topsoil is frozen or too wet to adequately support construction equipment or so dry that dust clouds greater than 30 feet tall are created. If such equipment creates ruts in excess of four (4) inches deep, the soil will be deemed too wet.
- No major depressions will be left that would trap water and cause ponding unless the intended purpose is to trap runoff and sediment.

Seeding:

- Seedbed Preparation. Initial seedbed preparation will consist of recontouring to the appropriate interim or final reclamation standard. All compacted areas to be seeded will be ripped to a minimum depth of 18 inches with a minimum furrow spacing of 2 feet, followed by recontouring the surface and then evenly spreading the stockpiled topsoil. Prior to seeding, the seedbed will be scarified to a depth of no less than 4 – 6 inches. If the site is to be broadcast seeded, the surface will be left rough enough to trap seed and snow, control erosion, and increase water infiltration.
- If broadcast seeding is to be used and is delayed, final seedbed preparation will consist of contour cultivating to a depth of 4 to 6 inches within 24 hours prior to seeding, dozer tracking, or other imprinting in order to break the soil crust and create seed germination micro-sites.
- Seed Application. Seeding will be conducted no more than two weeks following completion of final seedbed preparation. A certified weed-free seed mix designed by the BLM to meet reclamation standards will be used.
- If the site is harrowed or dragged, seed will be covered by no more than 0.25 inch of soil.

11. SURFACE OWNERSHIP:

- A. The surface is owned by the U. S. Government and is administered by the Bureau of Land Management. The surface is multiple use with the primary uses of the region for the grazing of livestock and the production of oil and gas.
- B. The grazing lessee is Lower Tucker Draw grazing allotment.

12. OTHER INFORMATION:

- A. The area surrounding the well site is in a gentle sloped, shallow gravelly loam, rolling hills type area. The vegetation consists of Mesquite, Creosote, White-Thorn Acacia with three-awns and some dropseed species.
- B. There is no permanent or live water in the immediate area.
- C. There are no dwellings within 2 miles of this location.
- D. The location and access road (original access will not be followed but utilize the new road to the RDX 21-42 well) were archaeologically surveyed by Boone Archaeological Services and a report filed with the Carlsbad Field Office.

13. BOND COVERAGE:

Bond Coverage is Nationwide; Bond Number NMB-000460.



OPERATORS REPRESENTATIVE:

The RKI Exploration and Production, LLC representatives responsible for ensuring compliance of the surface use plan are listed below:

Surface:

Barry W. Hunt – Permitting Agent  
1403 Springs Farm Place  
Carlsbad, NM 88220  
(575) 885-1417 (Home)  
(575) 361-4078 (Cell)

Drilling & Production:

Bill Aubrey – RKI Exploration and Production, LLC.  
3817 NW Expressway, Suite 950  
Oklahoma City, Ok. 73112  
(405) 996-5748 (Office)  
(405) 625-7838 (Cell)

**ON-SITE PERFORMED ON 7/22/10 RESULTED IN PROPOSED LOCATION BEING MOVED, 810 FT. WEST, DUE TO AN ARCHAEOLOGICAL SITE AT THE 2310 FWL. IT WAS AGREED TO TURN THE LOCATION TO A V-DOOR EAST AND RUN ACCESS ROAD EAST SOUTHEAST TO THE RDX 28-1H BUT SINCE 2010 THERE IS NEW ACCESS TO THE NORTH AND AN APPROVED RDX 21-42 WELL 330 FT. NORTH FOR ACCESS. IT WAS FURTHER AGREED TO PLACE BATTERY ON THE EAST SIDE OF LOCATION AND RECLAIM THE SOUTH AND WEST PORTION OF THE PAD.**

**PRESENT AT ON-SITE:**

**BARRY HUNT – PERMITTING AGENT FOR RKI EXPLORATION & PRODUCTION**  
**RANDY RUST – BLM**  
**JEFF PANGBURN – BOONE ARCHAEOLOGICAL SERVICES**  
**BASIN SURVEYORS**

## CERTIFICATION

I hereby certify that I, or persons under my direct supervision, have inspected the proposed drill site and access road proposed herein; that I am familiar with the conditions that presently exist; that I have full knowledge of State and Federal laws applicable to this operation; that the statements made in this 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 RKI Exploration and Production, LLC 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 27th day of September 2012.

Signed: Barry W. Hunt

Printed Name: Barry Hunt

Position: Agent for RKI Exploration & Production, LLC.

Address: 1403 Springs Farm Place, Carlsbad, NM 88220

Telephone: (575) 361-4078

E-mail: specialtpermitting@gmail.com

# **RKI** Exploration & Production LLC

3817 NW Expressway, Suite 950, Oklahoma City, OK 73112  
405-949-2221 Fax 405-949-2223

June 25<sup>th</sup>, 2012

To Whom It May Concern:

Please be advised that Mr. Barry Hunt has been retained by RKI Exploration & Production to sign as our agent on Application for Permit to Drill (APD) as well as Right of Way applications within the States of New Mexico and Texas.

If you have any questions or require additional information, please feel free to contact me at (405) 996-5771.

Sincerely,

A handwritten signature in cursive script, appearing to read "Charles K. Ahn".

Charles K. Ahn  
EH&S/Regulatory Manager

## PECOS DISTRICT CONDITIONS OF APPROVAL

OPERATOR'S NAME:	RKI Exploration & Prod
LEASE NO.:	NM102917
WELL NAME & NO.:	RDX Federal 21-1H
SURFACE HOLE FOOTAGE:	330' FSL & 1500' FWL
BOTTOM HOLE FOOTAGE:	330' FNL & 1650' FWL
LOCATION:	Section 21, T.26 S., R.30 E., NMPM
COUNTY:	Eddy County, New Mexico

### TABLE OF CONTENTS

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

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

## **I. GENERAL PROVISIONS**

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

## **II. PERMIT EXPIRATION**

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

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

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

## **IV. NOXIOUS WEEDS**

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

## **V. SPECIAL REQUIREMENT(S)**

Stipulations/Condition of Approval for Phantom Banks Heronries: Surface disturbance will not be allowed within up to 200 meters of active heronries or by delaying activity for up to 120 days, or a combination of both. Exhaust noise from pump jack engines must be muffled or otherwise controlled so as not to exceed 75 db measured at 30 ft. from the source of the noise

## **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 stockpile the topsoil in a low profile manner in order to prevent wind/water erosion of the topsoil. The topsoil to be stripped is approximately 4 inches in depth. The topsoil will be used 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. 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 (20) feet.

### **Surfacing**

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

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

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

### **Crowning**

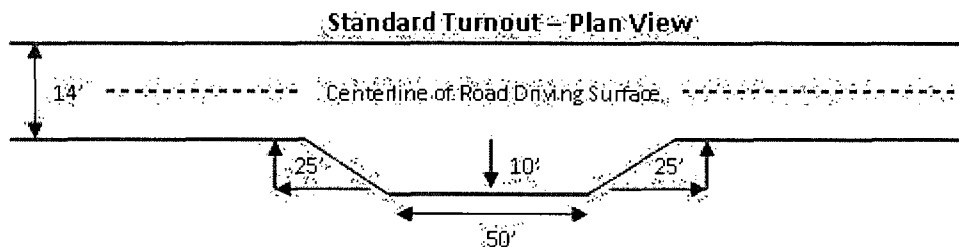
Crowning shall be done on the access road driving surface. The road crown shall have a grade of approximately 2% (i.e., a 1" crown on a 14' wide road). The road shall conform to Figure 1; cross section and plans for typical road construction.

### **Ditching**

Ditching shall be required on both sides of the road.

### **Turnouts**

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

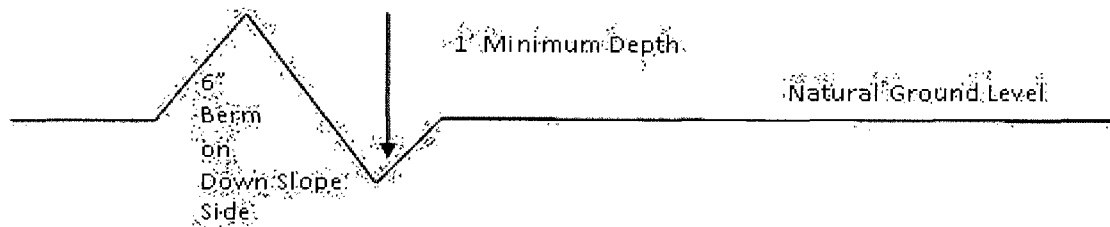


## Drainage

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

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

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



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

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

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

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

## Culvert Installations

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

## Cattleguards

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

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

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



## Fence Requirement

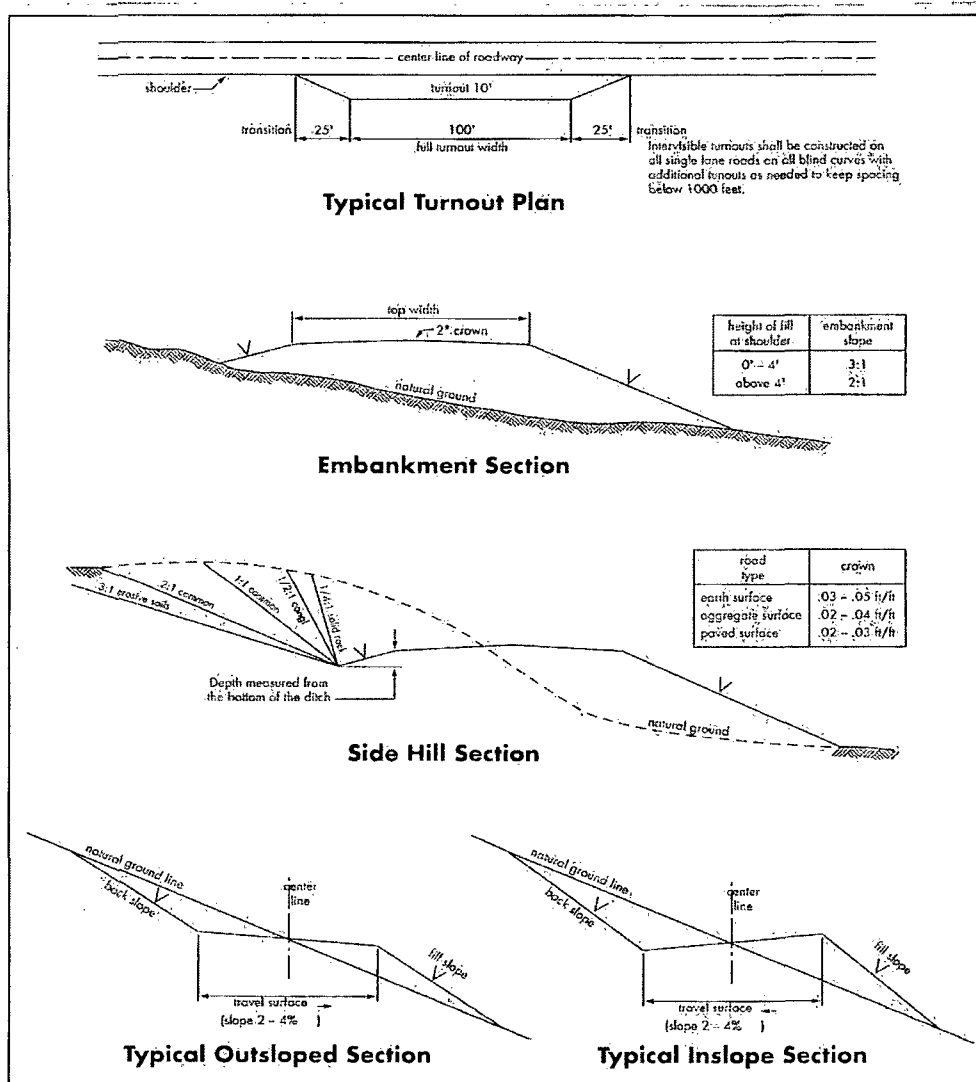
Where entry is required across a fence line, the fence shall be braced and tied off on both sides of the passageway prior to cutting.

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

## Public Access

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

Figure 1 – Cross Sections and Plans For Typical Road Sections



## VII. DRILLING

### A. DRILLING OPERATIONS REQUIREMENTS

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

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

☒ **Eddy County**

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

1. **Although there are no measured amounts of Hydrogen Sulfide reported, it is always a potential hazard. 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. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.
4. **The record of the drilling rate along with the 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. 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.**

### **Medium Cave/Karst**

**Possible lost circulation in Redbeds and evaporates to the base of the Castile group; and in the Delaware and Bone Spring groups.**

1. The **13-3/8** inch surface casing shall be set at approximately **680** feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface.
  - 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.

**If 75% or greater lost circulation occurs while drilling the intermediate casing hole, the cement on the production casing must come to surface.**

2. The minimum required fill of cement behind the **9-5/8** inch intermediate casing is:

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

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

a. First stage to DV tool, cement shall:

- ☒ Cement to circulate. If cement does not circulate, contact the appropriate BLM office before proceeding with second stage cement job. Operator should have plans as to how they will achieve circulation on the next stage.

b. Second stage above DV tool, cement shall:

- ☒ Cement should tie-back at least **300 feet** into previous casing string. 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. **Operator has proposed a multi-bowl wellhead assembly. BLM review of the actual installation procedure of this assembly does not eliminate the testing of the BOP/BOPE for the successive casing strings. A seal is broken when the lock screws are used and when the observation port is opened. There is no guarantee that when these are tightened that a pressure seal exists without performing another test is performed on this segment of the BOP/BOPE. BOP/BOPE is still required for the successive casing strings.**
3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **3000 (3M)** psi.

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 results of the test shall be reported to the appropriate BLM office.
  - d. All tests are required to be recorded on a calibrated test chart. **A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.**
  - e. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug.

#### **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.

**EGF 112012**

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

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

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

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

#### **Containment Structures**

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

#### **Painting Requirement**

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

### **B. PIPELINES**

Not applied for in APD.

### **C. ELECTRIC LINES**

Not applied for in APD.

## **IX. INTERIM RECLAMATION**

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

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

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

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

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

## **X. FINAL ABANDONMENT & RECLAMATION**

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

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

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

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

#### Seed Mixture 4, for Gypsum 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>
Alkali Sacaton ( <i>Sporobolus airoides</i> )	1.0
DWS Four-wing saltbush ( <i>Atriplex canescens</i> )	5.0

DWS: DeWinged Seed

\*Pounds of pure live seed:

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