

ATS-14-567

**NM OIL CONSERVATION**  
**ALBUQUERQUE DISTRICT**

Form 3160-3  
(March 2012)

JUN 22 2015

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

**HIGH CAVEKARST**

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

**RECEIVED**

**APPLICATION FOR PERMIT TO DRILL OR REENTER**

1a. Type of work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER		5. Lease Serial No. NMNM-03677
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 <u>Harvey E. Yates</u> <u>Matador Prod. Co. (228937)</u>		7. If Unit or CA Agreement, Name and No.
3a. Address <u>P.O. Box 1936</u> <u>Roswell N.M. 88202</u>	3b. Phone No. (include area code) 575-623-6601	8. Lease Name and Well No. Stebbins 20 Federal 1H <u>(315007)</u>
4. Location of Well (Report location clearly and in accordance with any State requirements. *) At surface SHL; 1650' FSL & 50' FWL At proposed prod. zone 2250' FSL & 330' FEL		9. API Well No. <u>30-015-43201</u>
14. Distance in miles and direction from nearest town or post office* 15 Miles East of Carlsbad, N.M.		10. Field and Pool, or Exploratory Avalon E. Bone Spring <u>(70870)</u>
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 50'	16. No. of acres in lease 2150.97	11. Sec., T. R. M. or Blk. and Survey or Area UL-L, Sec 20, T20S, R29E
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 2370'	19. Proposed Depth MD-12575' Pilot Hole TVD- 8018' 9500'	12. County or Parish Eddy Co.
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3247'	22. Approximate date work will start* 01/15/2015	13. State NM
17. Spacing Unit dedicated to this well 160		
20. BLM/BIA Bond No. on file NMB000317		
23. Estimated duration 45 Days		

**24. Attachments**

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

- |  |   |
|--|---|
| 1. Well plat certified by a registered surveyor.   | 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 must be filed with the appropriate Forest Service Office). | 6. Such other site specific information and/or plans as may be required by the BLM.             |

25. Signature <u>Keith Cannon</u>	Name (Printed/Typed) Keith Cannon	Date 03/31/2014
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Title

Drilling Superintendent

Approved by (Signature) <u>Steve Caffey</u>	Name (Printed/Typed)	Date <b>JUN 16 2015</b>
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Title

FIELD MANAGER

Office

CARLSBAD FIELD OFFICE

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

Conditions of approval, if any, are attached.

**APPROVAL FOR TWO YEARS**

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

(Continued on page 2)

\*(Instructions on page 2)

7/2/15

Capitan Controlled Water Basin

Approval Subject to General Requirements  
& Special Stipulations Attached

SEE ATTACHED FOR  
CONDITIONS OF APPROVAL

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) 748-0720

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>30-015-43201</b>	Pool Code <b>70870</b>	Pool Name <b>Avalon; E Bone Spring</b>
Property Code <b>315007</b>	Property Name <b>STEBBINS 20 FEDERAL</b>	Well Number <b>1H</b>
UGRID No. <b>10179 228937</b>	Operator Name <b>HARVEY E. YATES MATADOR Prod Co</b>	Elevation <b>3245'</b>

Surface Location

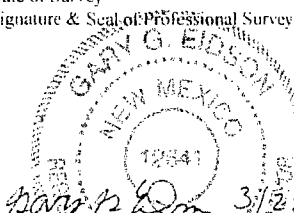
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
L	20	20-S	29-E		1650	SOUTH	50	WEST	EDDY

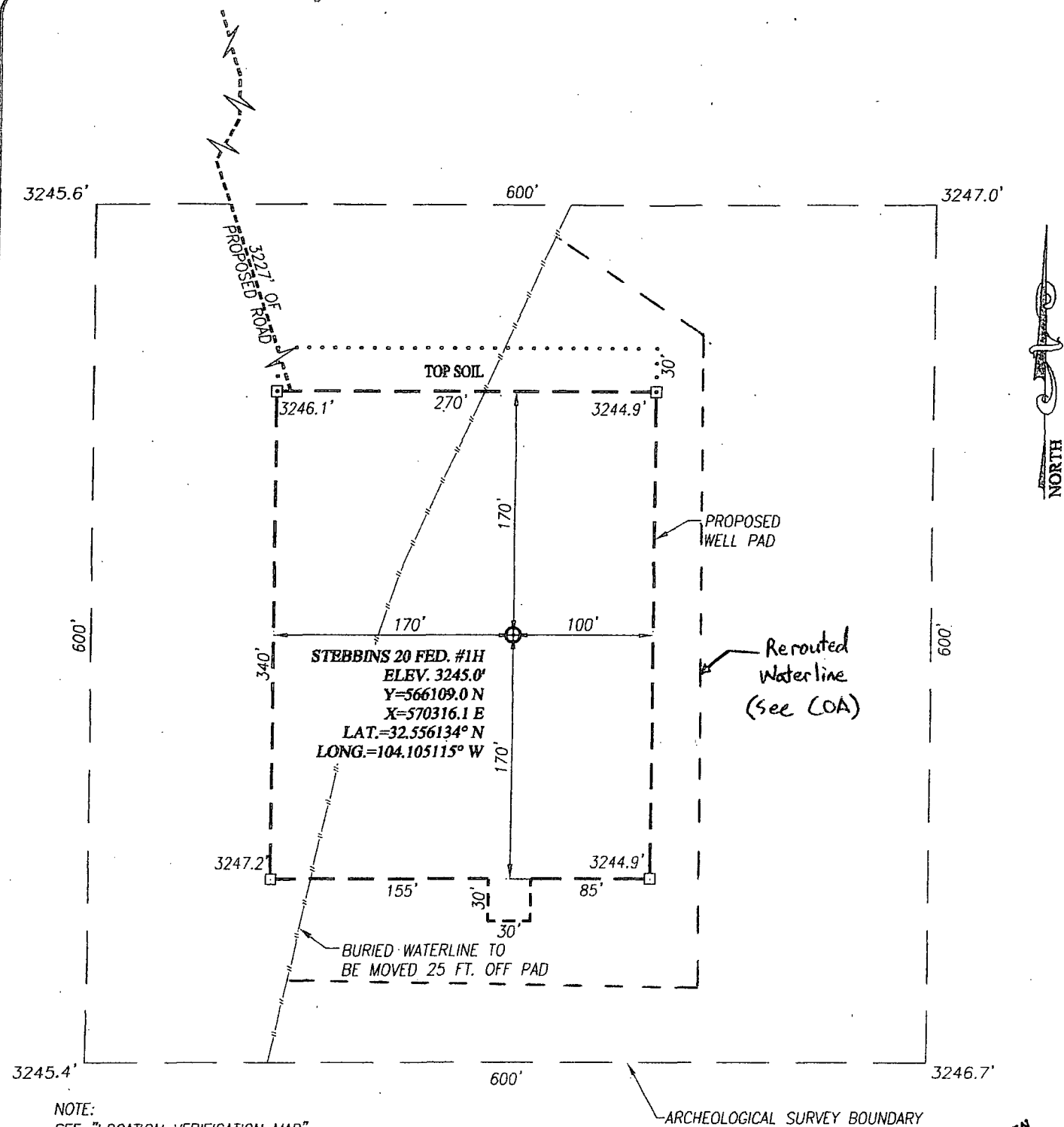
Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
I	20	20-S	29-E		2250	SOUTH	330	EAST	EDDY

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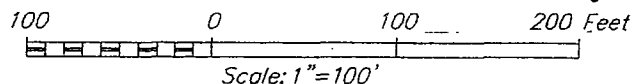
NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

<p><b>CORNER COORDINATES TABLE</b></p> <p>A - Y=567101.5 N, X=570263.7 E B - Y=567095.2 N, X=575553.7 E C - Y=565774.9 N, X=575556.9 E D - Y=565780.5 N, X=570266.9 E</p> <p><b>GEODETIC COORDINATES</b> NAD 27 NME</p> <p><b>SURFACE LOCATION</b> Y=566109.0 N X=570316.1 E</p> <p>LAT.=32.556134' N LONG.=104.105115' W</p> <p><b>BOTTOM HOLE LOCATION</b> Y=566704.4 N X=575224.7 E</p> <p>GRID AZ = 83°05'03" HORIZ. DIST. = 4945.8'</p> <p><b>DETAIL</b></p> <p>3245.6' 3247.0' 600' 3245.4' 3246.7'</p> <p>1650'</p> <p>50'</p> <p>S.L. SEE DETAIL</p> <p>330'</p> <p>B.H.</p> <p>2250'</p> <p><b>MMNM-03677</b></p>	<p><b>OPERATOR CERTIFICATION</b></p> <p>I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</p> <p><i>Keith Cannon</i> 3/31/14 Signature Date <b>Keith Cannon</b> Printed Name <b>kcannon@herocorenergy.com</b> E-mail 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>MARCH 20, 2014</p> <p>Date of Survey Signature &amp; Seal of Professional Surveyor:  <i>Gary G. Eidson</i> 3/28/14 Certificate Number Gary G. Eidson, 12641 Ronald J. Eidson, 3239 ACK REL W.O. 14130145 JVSC W.O. 14110289</p>
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#### DIRECTIONS TO STEBBINS 20 FEDERAL #1H:

FROM THE INTERSECTION OF U.S. HIGHWAY 62-180 AND CO. RD. 238 (BURTON FLATS) GO NORTH ON BURTON FLATS ROAD APPROX. 2.1 MILES; TURN LEFT AND GO WEST ON BURTON FLATS ROAD APPROX. 4.1 MILES TO A PROPOSED ROAD SURVEY LATH; FOLLOW ROAD SURVEY IN A SOUTHERLY DIRECTION APPROX. 3227 FEET TO THE NORTHWEST CORNER OF THIS STAKED WELL PAD. THIS WELL IS APPROX. 234 FEET SOUTHEAST.



## HARVEY E. YATES

**STEBBINS 20 FEDERAL #1H WELL**  
 LOCATED 1650 FEET FROM THE SOUTH LINE  
 AND 50 FEET FROM THE WEST LINE OF SECTION 20,  
 TOWNSHIP 20 SOUTH, RANGE 29 EAST, N.M.P.M.,  
 EDDY COUNTY, NEW MEXICO



PROVIDING SURVEYING SERVICES  
 SINCE 1946  
**JOHN WEST SURVEYING COMPANY**  
 412 N. DAL PASO HOBBS, N.M. 88240  
 (575) 393-3117 www.jwsc.biz  
 TBPLS# 10021000

Survey Date: 3/20/14

CAD Date: 3/25/14

Drawn By: ACK

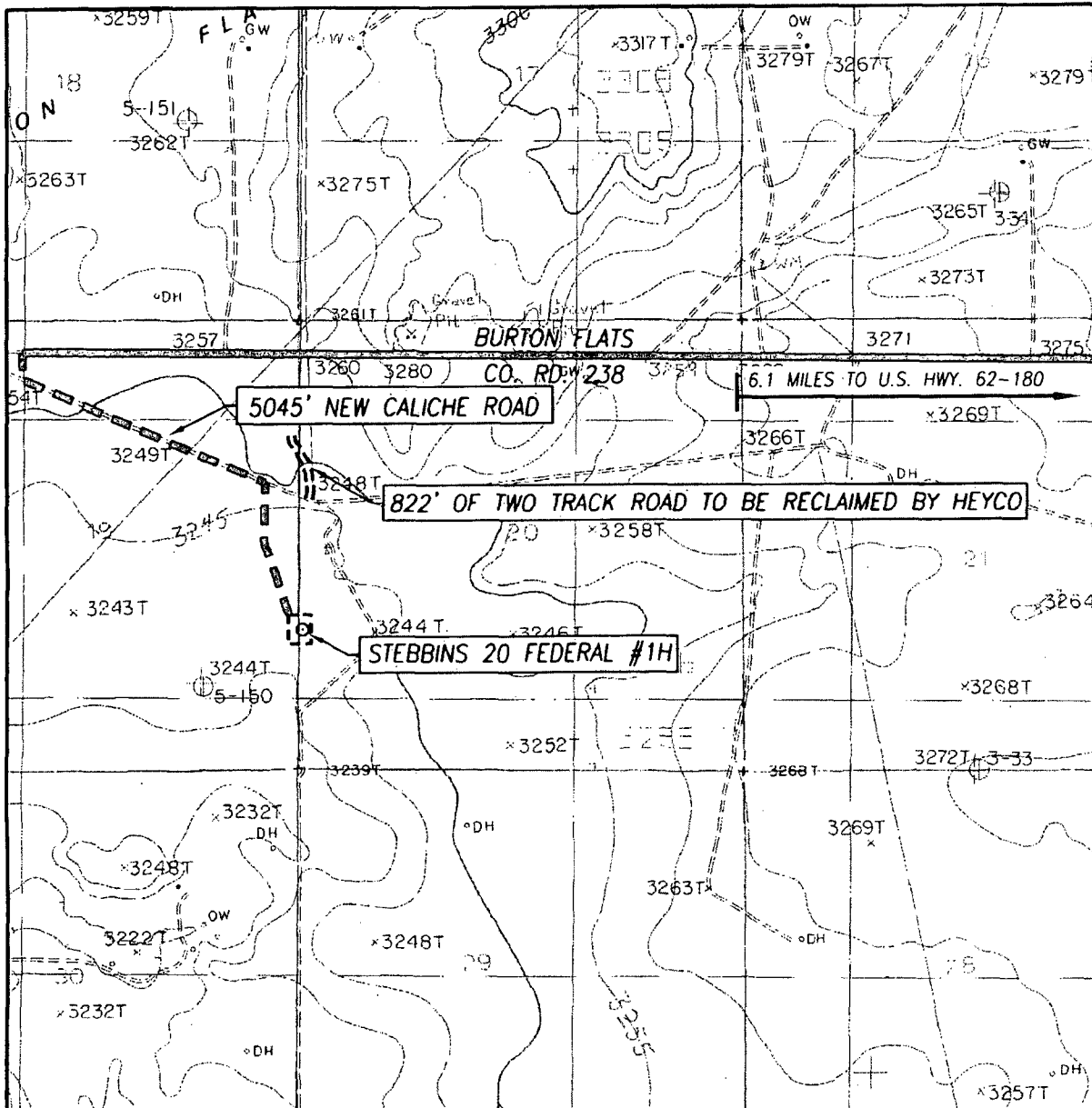
W.O. No.: 14110289

Rev.:

Rel. W.O.: 14130145

Sheet 1 of 1

# LOCATION VERIFICATION MAP



SCALE: 1" = 2000'

SEC. 20 TWP. 20-S RGE. 29-E

SURVEY N.M.P.M.

COUNTY EDDY STATE NEW MEXICO

DESCRIPTION 1650' FSL & 50' FWL

ELEVATION 3245'

OPERATOR HARVEY E. YATES

LEASE STEBBINS 20 FEDERAL

U.S.G.S. TOPOGRAPHIC MAP

ILLINOIS CAMP SE., N.M.

CONTOUR INTERVAL:

ILLINOIS CAMP SE., N.M. - 5'

DIRECTIONS TO STEBBINS 20 FEDERAL #1H:

FROM THE INTERSECTION OF U.S. HIGHWAY 62-180 AND CO. RD. 238 (BURTON FLATS) GO NORTH ON BURTON FLATS ROAD APPROX. 2.1 MILES; TURN LEFT AND GO WEST ON BURTON FLATS ROAD APPROX. 4.1 MILES TO A PROPOSED ROAD SURVEY LATH; FOLLOW ROAD SURVEY IN A SOUTHERLY DIRECTION APPROX. 5045 FEET TO THE NORTHWEST CORNER OF THIS STAKED WELL PAD.



PROVIDING SURVEYING SERVICES  
SINCE 1946

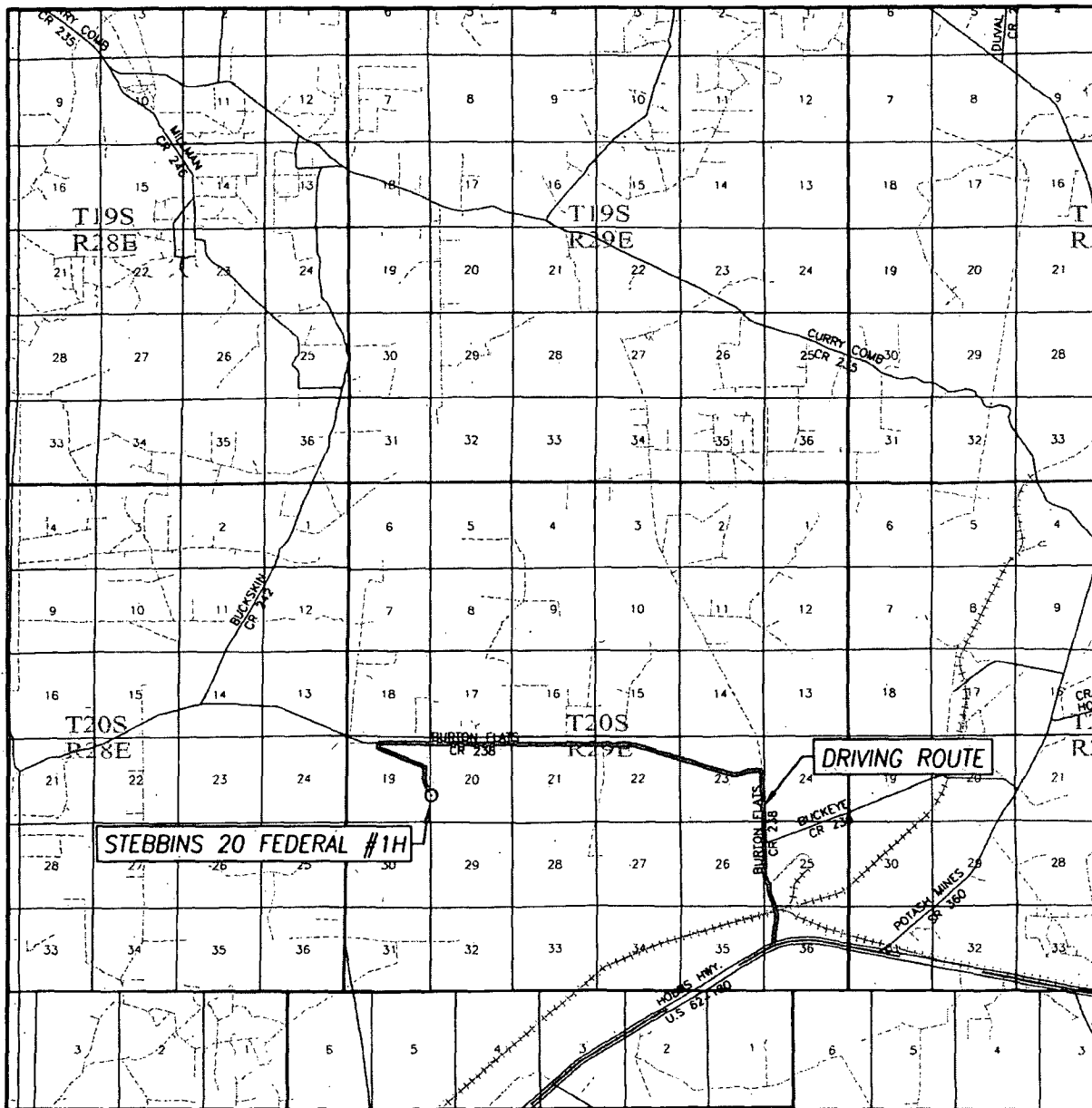
JOHN WEST SURVEYING COMPANY

412 N. DAL PASO HOBBS, N.M. 88240

(575) 393-3117 www.jwsc.biz

TBPLS# 10021000

# VICINITY MAP



SCALE: 1" = 2 MILES

DRIVING ROUTE: SEE LOCATION VERIFICATION MAP

SEC. 20 TWP. 20-S RGE. 29-E

SURVEY N.M.P.M.

COUNTY EDDY STATE NEW MEXICO

DESCRIPTION 1650' FSL & 50' FWL

ELEVATION 3245'

OPERATOR HARVEY E. YATES

LEASE STEBBINS 20 FEDERAL

PROVIDING SURVEYING SERVICES  
SINCE 1946

**JOHN WEST SURVEYING COMPANY**

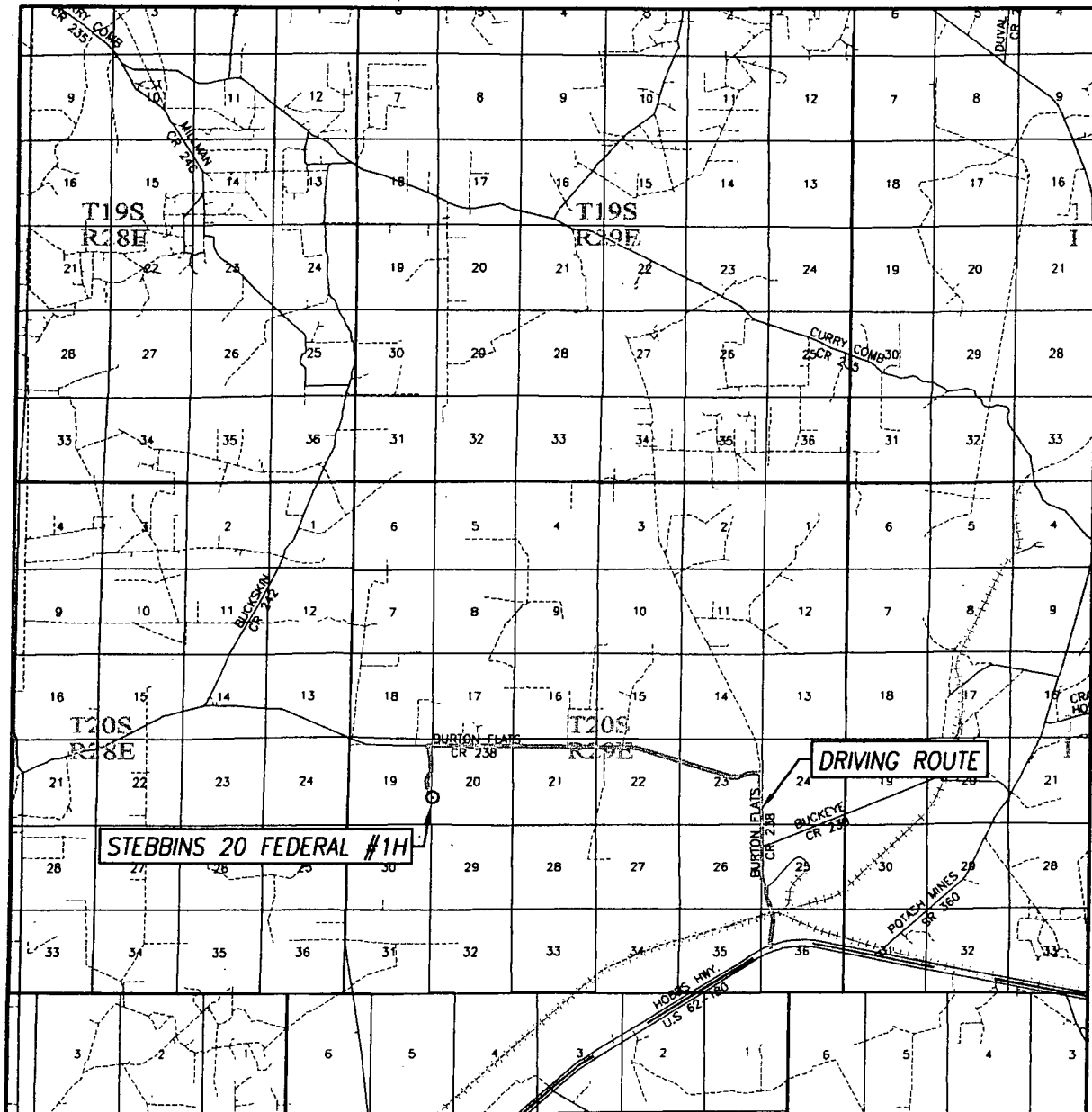
412 N. DAL PASO HOBBS, N.M. 88240

(575) 393-3117 [www.jwsc.biz](http://www.jwsc.biz)

TBPLS# 10021000

# VICINITY MAP

## Exhibit 1



SCALE: 1" = 2 MILES

DRIVING ROUTE: SEE LOCATION VERIFICATION MAP

SEC. 20 TWP. 20-S RGE. 29-E

SURVEY N.M.P.M.

COUNTY EDDY STATE NEW MEXICO

DESCRIPTION 1650' FSL & 50' FWL

ELEVATION 3245'

OPERATOR HARVEY E. YATES

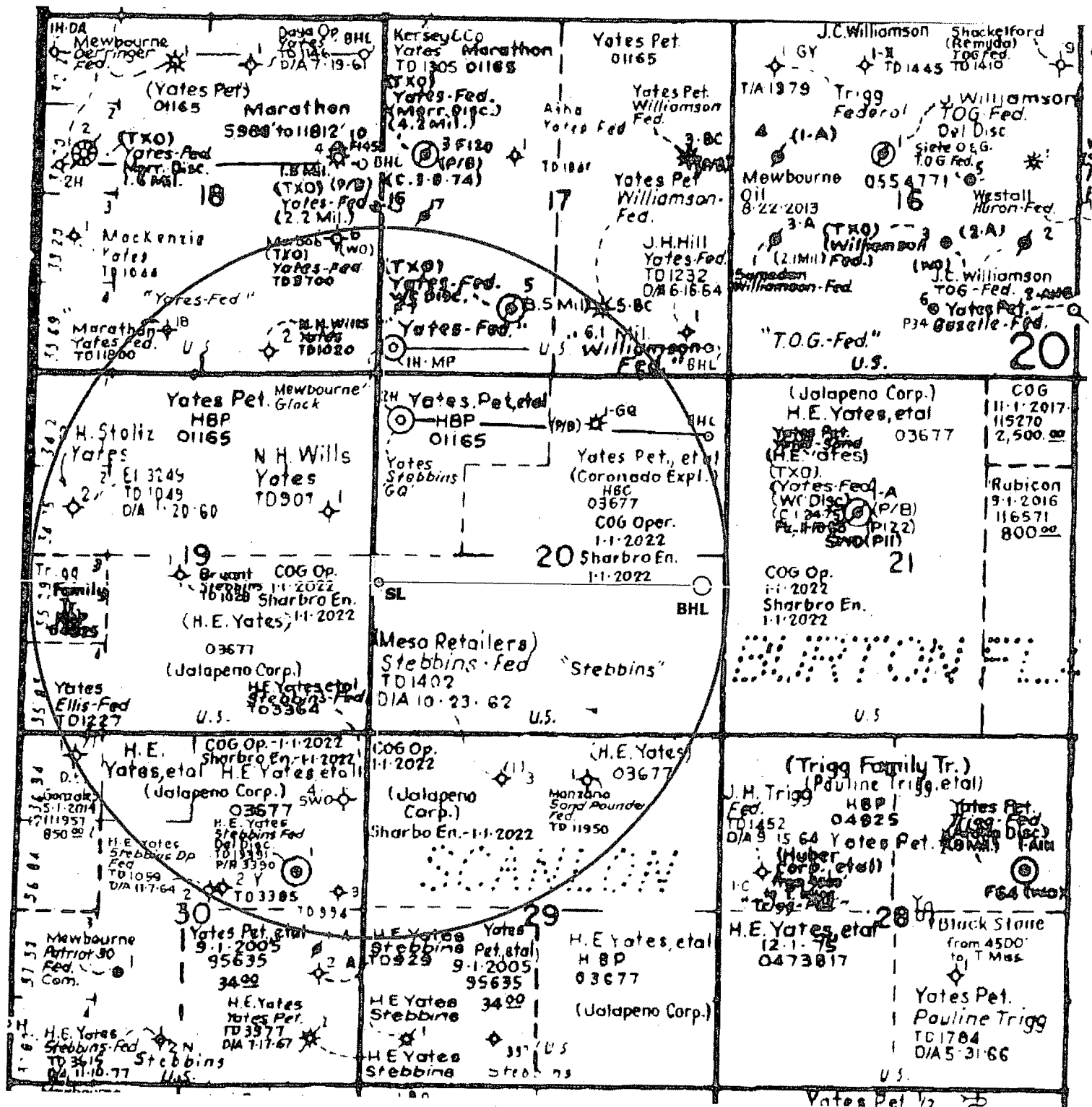
LEASE STEBBINS 20 FEDERAL

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)  
TBPLS# 10021000

# Stebbins 20 Federal #1H



1 mi. radius from SL

**HARVEY E. YATES****DRILLING AND OPERATIONS PLAN****STEBBINS 20 FEDERAL 1H**

Surface: 1650' FSL &amp; 50' FWL

UL L, Sec 20, T-20-S, R-29-E

BHL: 2250' FSL &amp; 330' FEL

UL I, Sec 20, T-20-S, R-29-E

Eddy County, New Mexico.

**ELEVATION:** GL 3247'**GEOLOGICAL NAME OF SURFACE FORMATION:** PERMIAN**Type of Well:** Oil Horizontal**PROPOSED DRILLING DEPTH:** 12,575' MD, 8015' TVD, Kick off point at 7380', drill a lateral of 4295' see directional plan: Exhibit #2, Vertical TD of possible pilot hole 9500 MD'.**TOPS OF IMPORTANT GEOLOGICAL MARKERS:**

Rustler	Surface'	
Saldo/Salt	440'	
Base of Salt	1000'	
Yates	1190'	
Seven Rivers	1440'	
Capitan Reef	1510' Water	
Cherry Canyon	3750' Oil	
Brushy Canyon	4250' Oil	
Bone Spring Lime	5850' Oil	
Avalon Shale	6140' Oil	
Bone Spring 1 <sup>st</sup> sd	6900' Oil	
Bone Spring 2 <sup>nd</sup> carb	7140' Oil	
	<b>MD</b>	<b>TVD</b>
<b>KOP</b>	<b>7380'</b>	
Bone Spring 2 <sup>nd</sup> SD	7565	7560'
BSPG- Pay interval	8130'	7930'
BSPG2 Target line	8280'	7950'
HZ BHL – PTD	12575'	8015'
Wolfcamp	9340'	
Pilot Hole TD	9500'	

**Estimated Depth of Anticipated Water, Oil or Gas:**

Fresh Water      400' & 1510'  
Oil & Gas:      See above –all Potential Zone

No other formations are expected to yield oil, gas or fresh water in measurable volumes. The surface fresh water will be protected by setting 20" casing at 400' and circulating cement back to surface, all other intervals will be isolated by the 13 3/8" 1<sup>ST</sup> intermediate, 9 5/8" 2<sup>nd</sup> intermediate and 5 1/2" production casing.



**CASING PROGRAM:****Proposed Casing Program; ALL CASING WILL BE NEW API APPROVED**

1.

HOLE SIZE	CASING SIZE	WT./GRADE	THREAD/COLLAR	SETTING DEPTH (MD)	TOP CEMENT
26"	20" (new)	94# H-40	BTC	400' ✓	Surface
17.5"	13 3/8" (new)	48# H-40	8rd STC	<del>1400'</del> 1200'	Surface
12.25"	9 5/8" (new)	40# J-55	8rd STC	3100' ✓	Surface
8.75"	5.5" (new)	17# P-110HC	8rd LTC	12,575'	1450'

**MINIMUM SAFETY FACTORS:****BURST 1.125****COLLAPSE 1.125****TENSION 1.6****CEMENT PROGRAM-ALL CEMENT BLENDS WILL BE TESTED TO BLM MINIMUM REQUIREMENTS.****A. 20" SURFACE**

**CEMENT TO SURFACE 100% EXCESS OVER CALCULATED**  
LEAD: 590 SACKS CLASS "C" +4% PF020 +2% PF001 ( 13.5 PPG, 1.74 YIELD, WTR 9.11 GAL/SKS )  
TAIL: 150 SACKS CLASS "C" +2%PF001 ( 14.8 PPG, 1.34 YIELD, WTR 6.30 GAL/SKS )

**B. 13 3/8" INTERMEDIATE**

**CEMENT TO SURFACE 50% EXCESS OVER CALCULATED**  
LEAD: 1400 SACKS CLASS "C" +5%PF044BWOW+6%PF020+1%0 PF001 (12.9 PPG, 1.92 YIELD, WTR 9.95 GAL/SKS)  
TAIL: 200 SACKS CLASS "C" +.2%PF013 (14.8 PPG, 1.33 YIELD WTR 6.32 GAL/SKS)

**C. 9 5/8" INTERMEDIATE**

**CEMENT TO SURFACE' 50% EXCESS OVER CALCULATED**  
LEAD: 995 SX 50/50 POZ C + 5%PF044BWOW+.10%PF020+.2 %PF153+.2%PF013 (11.9 PPG, 2.48 YIELD, WTR 13.877 GAL/SKS)  
TAIL: 200 SX CLASS C+2%PF020+.7%PF606A+.2%PF65 ( 14.4 PPG, 1.26 YIELD, WTR 5.559 GAL/SKS )

**EXCESS AND ADDITIVES AS RECOMMENDED BY CEMENT COMPANY DETERMINED BY WELLBORE CONDITIONS**

**A. 5 1/2" PRODUCTION**

**CEMENT TO 1450FT (WILL RUN FLUID CALIPER) 25% EXCESS OVER FLUID CALIPER, OR 50% OVER CALCULATED.**

**CEMENT TO 1450" 25% EXCESS OVER CALCULATED**

LEAD: 1050, SACKS 50/50, P/H+5%PF44(BWOW)(SALT)+10%PF20(BENTONITE)+0.1% PF13(RETARDER)+0.5%PF79(EXTENDER)+0.125#/SK

PF29(CELLOFLAKE)+0.4#/SK,PF46)DEFOAMER)+3#/SK,PF  
42(KOLSEAL) 11.9 PPG, 2.48 YIELD, H2O 13.878

TAIL:250,SACKS CLASS "H"+0.1%  
PF65(DISPERSANT)+0.3%PF13(RETARDER), 15.6 PPG,  
1.18 YIELD, H2O 5.228

EXCESS AND ADDITIVES AS RECOMMENDED BY CEMENT COMPANY  
DETERMINED BY WELLBORE CONDITIONS

### PILOT HOLE PLUGS

BOTTOM HOLE PLUG  
TOC @ 9175'

150 SACKS CLASS H, 2%PF01, 16.5 PPG. 1.05 YIELD  
ADDITIVES AS RECOMMENDED BY CEMENT COMPANY

KICK OFF PLUG  
BTM OF CMT PLUG @ 7742'  
TOC @ 7180'

225 SACKS CLASS H, 2%PF-01, 16.5 PPG. 1.05 YIELD  
ADDITIVES AS RECOMMENDED BY CEMENT COMPANY

### SPECIFICATIONS FOR PRESSURE CONTROL EQUIPMENT: (EXHIBIT #5)

A 2000# WP rotating head will be installed before drilling out the 20" casing shoe. A 2000# annular will be installed after running 13-3/8" casing. A 3000# WP Double Ram BOP and 3,000 annular will be installed after running the 9-5/8" casing. Pressure test will be conducted prior to drilling out under all casing strings. BOP controls will be installed prior to drilling under surface casing and will remain in use until completion of drilling operations. BOP's will be inspected and operated as recommended in Onshore Order #2. A Kelly cock and a sub equipped with a full opening valve sized to fit the drill pipe and collars will be available on the rig floor in the open position when the Kelly is not in use. BOPE will be tested to 250psi low & 3000psi high and the annular to 250psi low & 1500psi high with a third party testing company before drilling below 9 5/8" casing shoe. If operations last more than 30 days from 1st test, will test again as per BLM Onshore Oil and Gas order #2,

### MUD PROGRAM:

Spud and drill 26" surface hole with **fresh water (8.4 to 8.7 ppg)** to a depth of approx 400'. Control lost circulation with paper and LCM pills. Viscosity 32-34, no fluid loss control. Fresh water gel sweeps.

Drill 17.5" hole from 400' to 1400' with **Brine (9.5 to 10.0 ppg)**. Control lost circulation with paper and LCM pills. Viscosity 28-30, no fluid loss control. Salt water gel sweeps.

Drill 12.25" production hole from 1400' to 3100' with **fresh water (8.4 to 8.7 ppg)**. Control lost circulation with fresh water gel sweep paper and LCM pills. Viscosity 32-34

Drill 8.75" production hole from 3100'-TD' with **cut brine (8.7-9.0 ppg)**, control filtrate and increase viscosity with Xanthan gum and Poly Anionic Cellulose. Clean hole with high viscosity sweeps and lubricants as necessary. System Properties viscosity 32-34, fluid loss <20 ml/30min.

All necessary mud products for weight addition and fluid loss control will be on location at all times. Mud program subject to change due to hole conditions. A PVT will be used to monitor the mud system

### Mud monitoring system:

Mud will be maintained and checked daily for mud weight, viscosity, API water loss, pH, etc. Additional electronic monitoring will include a pit volume totalizer to monitor mud volume in active system, pump rate, and mud return flow

percentage. H<sub>2</sub>S monitors will be located on rig floor, shale shakers, and mud tanks. Gas chromatograph with monitor hydrocarbon gas content of mud from 1400' to TD.

### Auxiliary Equipment

- A. A Kelly cock will be in the drill string at all times. BOP and fittings must be in good condition with minimum of 2000 psi working pressure on 13-3/8" casing and 3000 psi working pressure on 9-5/8" and 7" casing. Accumulator will be at least 40 gallon capacity with 2 independent sources of pressure on closing unit and meet all other API specifications.
- B. A full opening drill pipe stabbing valve having the appropriate connections will be on the rig floor at all times with 3000 psi working pressure.
- C. Hydrogen Sulfide detection equipment will be in operation after drilling out the 13 3/8" casing shoe until the production casing liner is run and set and rigging down operations have begun.

### TESTING, LOGGING & CORING PROGRAM:

*\* See COA*

- a. Testing: No DST. Possible sidewall core in pilot hole
- b. Open hole logs are planned for the pilot hole from 9500' to 9 5/8" casing shoe. Halliburton Triple Combo,
- c. Mud logging will take place from 3100ft to TD 10ft samples
- d. Gyro survey will be run at KOP of 7380'
- e. MWD (directional) and LWD (gamma) surveys will be taken from KOP (7380') to TD

### POTENTIAL HAZARDS:

No significant hazards are expected to MD of 12,575ft, no abnormal pressures or temperatures are expected, **Expected pressure gradient will be .35 psi/ft, estimated BHP is 2805 psi at TVD of 8015ft, Estimated BHT is 135 degrees F, estimated from static pressure test conducted on nearby wells.** Lost circulation may occur, no H<sub>2</sub>S is expected, but the operator will utilize a 3<sup>rd</sup> party H<sub>2</sub>S monitoring package from 1400' to TD. If H<sub>2</sub>S is encountered the operator will comply with the provisions of onshore oil and gas order no 6. All personnel will be familiar with all aspects of safe operation of equipment being used to drill this well.

### ANTICIPATED STARTING DATE & DURATION:

Harvey E. Yates (Heyco) anticipates drilling operations to begin after receiving approved APD. Expected time to complete is approximately 45 days. An additional 15 days will be needed for completion activities. Road and location construction will begin after the BLM has approved the APD.

  
\_\_\_\_\_  
Keith Cannon, Drilling Superintendent  
Harvey E. Yates

3/31/2014  
Date

12/18/13

WELL NAME: Stebbins 20 Federal #1H

COUNTY: Eddy

STATE: NM

**FORMATION:** Bone Spring 2nd, Sd

MAXIMUM ROB: 10 DEG/100 FT

FORMATION DIP: 1 DEGREES

DIRECTION: 150 AZIMUTH

DECLINATION: N9E DEGREES

STARTING PT: 0.001 DEGREES

AT 1400 FEET

## BEGINNING SURVEY

COMPANY: 0

**SURVEY TYPE:**

0

DEPTH	FROM	0 FT
	TO	0 FT

## TIE IN POINT

MD	INCL	AZIMUTH	TVD	COORDINATES		VERT.SEC
(Ft)	(deg)	(deg)	(Ft)	(N+/-S)	(E+/-W)	(Ft)
3000.00	0.20	150.00	3000.00	-0.01	0.01	0.01

MEASURED DEPTH (ft)	INCL ANGLE (degrees)	HOLE AZIMUTH (degrees)	COURSE LENGTH (ft)	T.V.D. (ft)	TOTAL VERT.SEC (ft)	COORDINATES (N+S-) (ft)	(E+W-) (ft)	CLOSURE DISTANCE (ft)	DOGLEG SEVERITY (deg/100)	BUILD RATE (deg/100)
3250.0	0.25	120.0	250.0	3250.0	0.7	-0.7	0.7	1.0	0.1	0.0
3500.0	0.30	110.0	250.0	3500.0	1.8	-1.2	1.8	2.2	0.0	0.0
3750.0	0.35	100.0	250.0	3750.0	3.2	-1.6	3.2	3.5	0.0	0.0
4000.0	0.40	90.0	250.0	4000.0	4.8	-1.7	4.8	5.1	0.0	0.0
4250.0	0.45	80.0	250.0	4250.0	6.6	-1.6	6.6	6.8	0.0	0.0
4500.0	0.50	70.0	250.0	4500.0	8.6	-1.0	8.6	8.7	0.0	0.0
4750.0	0.55	60.0	250.0	4750.0	10.7	0.0	10.7	10.7	0.0	0.0
5000.0	0.60	50.0	250.0	4699.8	12.7	1.4	12.7	12.8	0.0	0.0
5250.0	0.65	40.0	250.0	5249.8	14.7	3.3	14.7	15.0	0.0	0.0
5500.0	0.70	30.0	250.0	5499.9	18.4	5.7	16.4	17.3	0.1	0.0
5750.0	0.75	20.0	250.0	5749.9	17.7	8.6	17.7	19.7	0.1	0.0
6000.0	0.80	10.0	250.0	5999.9	18.6	11.9	18.6	22.0	0.1	0.0
6250.0	0.85	20.0	250.0	6249.8	19.5	15.3	19.5	24.8	0.1	0.0
6500.0	0.9	40.0	250.0	6499.8	21.4	18.6	21.4	28.4	0.1	0.0
6750.0	1.0	60.0	250.0	6749.8	24.5	21.2	24.5	32.4	0.1	0.0
7000.0	1.0	80.0	250.0	6999.7	28.5	22.6	28.5	36.4	0.1	0.0
7250.0	1.1	90.0	250.0	7249.7	32.9	23.0	32.9	40.2	0.1	0.0

'CO

Ing 20 Federat #1 H

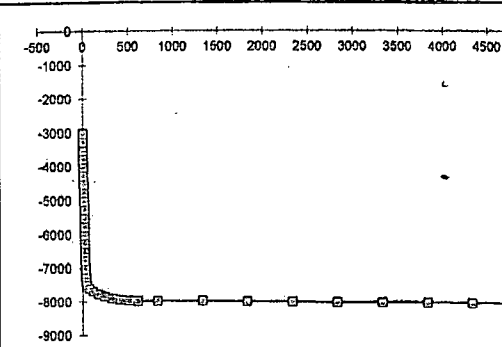
12/18/13

MEASURED DEPTH (ft)	INCL ANGLE (degrees)	HOLE AZIMUTH (degrees)	COURSE LENGTH (ft)	T.V.D. (ft)	TOTAL VERT.SEC (ft)	COORDINATES (N+/-) (ft)	(E+/-) (ft)	CLOSURE DISTANCE (ft)	DOGLEG SEVERITY (deg/100)	BUILD RATE (deg/100)
7380.0	1.1	90.2	130.0	7379.7	35.3	23.0	35.3	42.2	0.0	0.0
7480.0	10.0	90.3	100.0	7479.1	45.0	23.0	45.0	50.5	8.9	8.9
7580.0	20.0	90.2	100.0	7575.6	70.9	22.9	70.9	74.5	10.0	10.0
7880.0	30.0	90.1	100.0	7866.1	113.1	22.8	113.1	115.3	10.0	10.0
7780.0	40.0	90.2	100.0	7747.9	170.3	22.6	170.3	171.8	10.0	10.0
7860.0	50.0	90.3	100.0	7818.5	241.0	22.3	241.0	242.0	10.0	10.0
7980.0	60.0	90.2	100.0	7875.8	322.8	21.9	322.8	323.5	10.0	10.0
8080.0	70.0	90.1	100.0	7918.0	413.3	21.7	413.3	413.9	10.0	10.0
8180.0	80.0	90.2	100.0	7943.9	509.8	21.5	509.8	510.2	10.0	10.0
8280.0	90.0	90.3	100.0	7952.8	609.3	21.0	609.3	609.6	10.0	10.0
8500.0	89.1	90.2	220.0	7954.3	829.2	20.1	829.2	829.5	0.4	-0.4
9000.0	89.1	90.1	500.0	7992.2	1329.2	18.8	1329.2	1329.3	0.0	0.0
9500.0	89.1	90.2	500.0	7970.0	1829.1	17.4	1829.1	1829.2	0.0	0.0
10000.0	89.1	90.3	500.0	7977.8	2329.0	15.3	2329.0	2329.1	0.0	0.0
10500.0	89.1	90.2	500.0	7985.7	2829.0	13.1	2829.0	2829.0	0.0	0.0
11000.0	89.1	90.1	500.0	7993.6	3328.9	11.8	3328.9	3328.9	0.0	0.0
11500.0	89.1	90.2	500.0	8001.4	3828.9	10.5	3828.9	3828.9	0.0	0.0
12000.0	89.1	90.3	500.0	8009.3	4328.8	8.3	4328.8	4328.8	0.0	0.0
12575.0	89.1	90.2	575.0	8018.3	4903.7	5.8	4903.7	4903.7	0.0	0.0

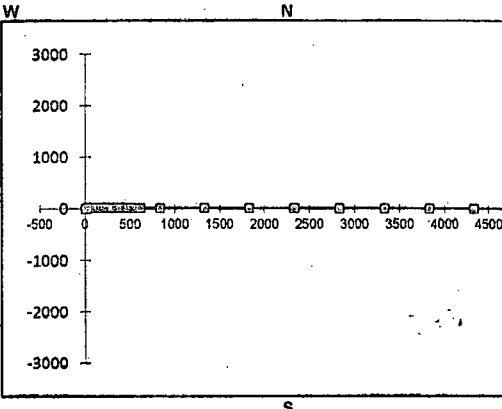
MD	VERT	TVD	ROB	+E/-W	+N/-S
3000	0	-3000	0.0	0.01	-0.01
3250	1	-3250	0.0	0.696296	-0.696296
3500	2	-3500	0.0	1.782403	-1.202706
3750	3	-3750	0.0	3.150418	-1.569333
4000	5	-4000	0.0	4.778358	-1.711171
4250	7	-4250	0.0	6.623353	-1.550303
4500	9	-4500	0.0	8.622747	-1.014545
4750	11	-4750	0.0	10.6982	-0.047777
5000	13	-5000	0.0	12.74874	1.389488
5250	15	-5250	0.0	14.87459	3.315333
5500	16	-5500	0.0	16.38173	5.724811
5750	18	-5750	0.0	17.96891	8.588121
6000	19	-6000	0.0	18.57099	11.85022
6250	20	-6250	0.0	19.50148	15.32277
6500	21	-6500	0.0	21.40066	18.61212
6750	24	-6750	0.0	24.47667	21.19333
7000	28	-7000	0.0	28.45389	22.64099
7250	33	-7250	0.0	32.90339	23.03022
7380	35	-7380	0.0	35.34233	23.02599
7480	45	-7478	8.9	45.00396	22.98388
7580	71	-7576	10.0	70.86277	22.87101
7680	113	-7668	10.0	113.0608	22.78055
7780	170	-7748	10.0	170.3455	22.81055
7880	241	-7819	10.0	240.9858	22.30244
7980	323	-7876	10.0	322.7763	21.94544
8080	413	-7918	10.0	413.2817	21.70844
8180	510	-7944	10.0	509.7814	21.45599
8280	609	-7953	10.0	609.2535	21.02188
8500	829	-7954	-0.4	829.2422	20.06199
9000	1329	-7962	0.0	1329.178	18.753
9500	1829	-7970	0.0	1829.115	17.44422
10000	2329	-7978	0.0	2329.049	15.26288
10500	2829	-7986	0.0	2828.982	13.08144
11000	3329	-7994	0.0	3328.918	11.77266
11500	3829	-8001	0.0	3828.855	10.46388
12000	4329	-8009	0.0	4328.789	8.282434
12575	4804	-8018	0.0	4903.712	5.77384

[illegible]

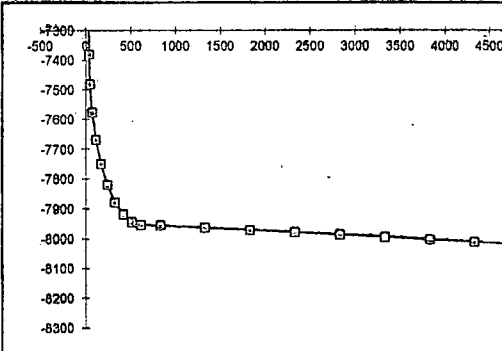
**X-SECTIONAL VIEW**



### MAP VIEW



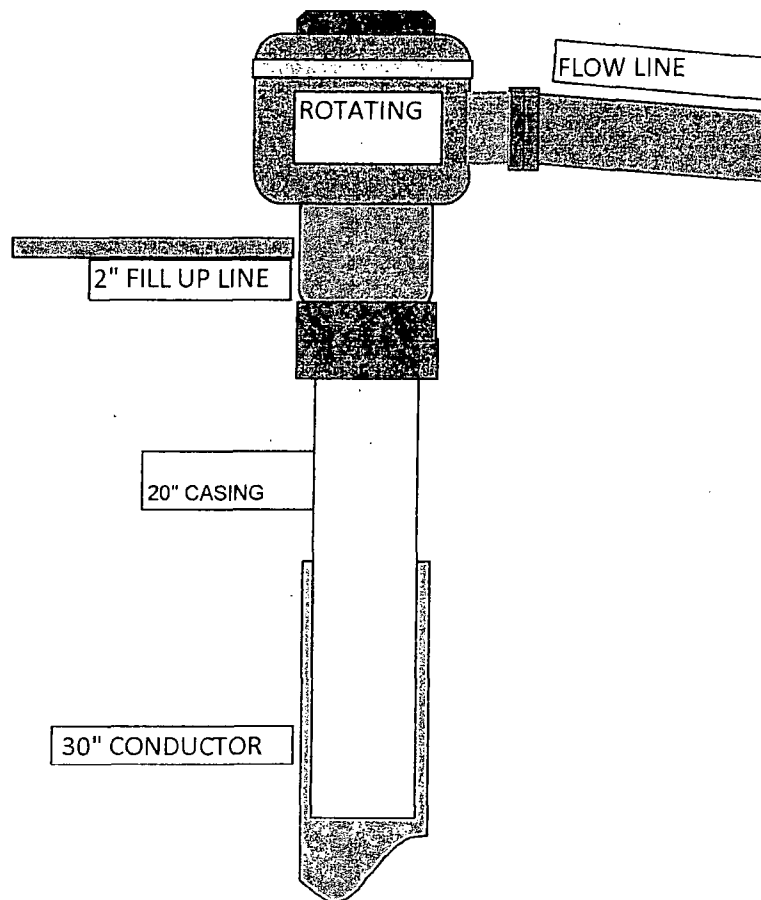
**DETAILED X-SECTIONAL VIEW**



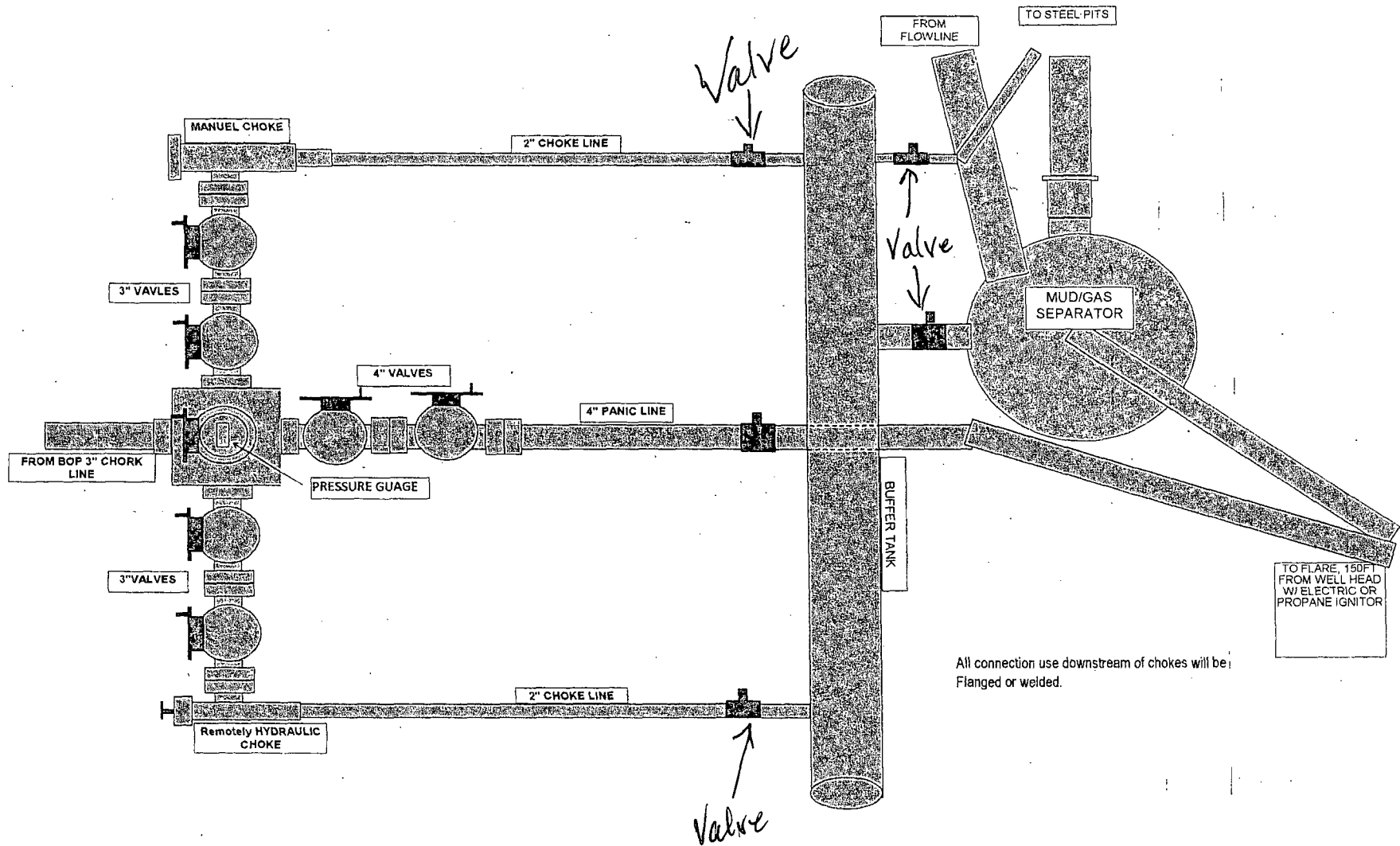
HARVEY E. YATES

2M BOP SYSTEM  
20" CASING DIVERTER

STEBBINS 20 FEDERAL 1H  
SEC 20, T20S, R29E  
2250' FSL & 50' FWL  
EDDY COUNTY, NEW MEXICO



**HARVEY E. YATES**  
**Stebbins 20 Federal #1H**  
**3000 psi BOP Manifold System**



**EXHIBIT "D" LOCATION DIAGRAM**

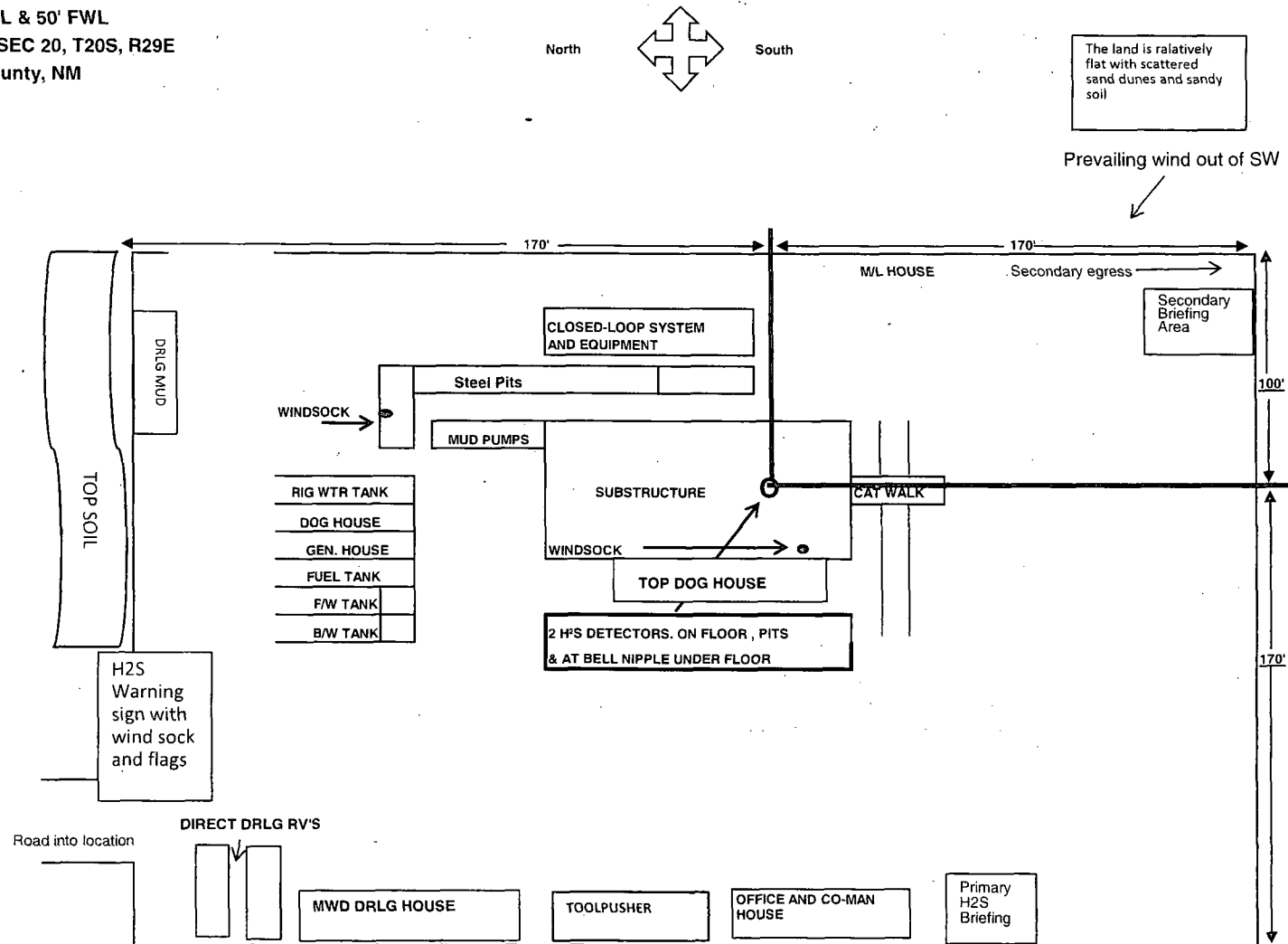
Harvey E. Yates

Stebbins 20 Federal 1H

2250' FSL & 50' FWL

UNIT L, SEC 20, T20S, R29E

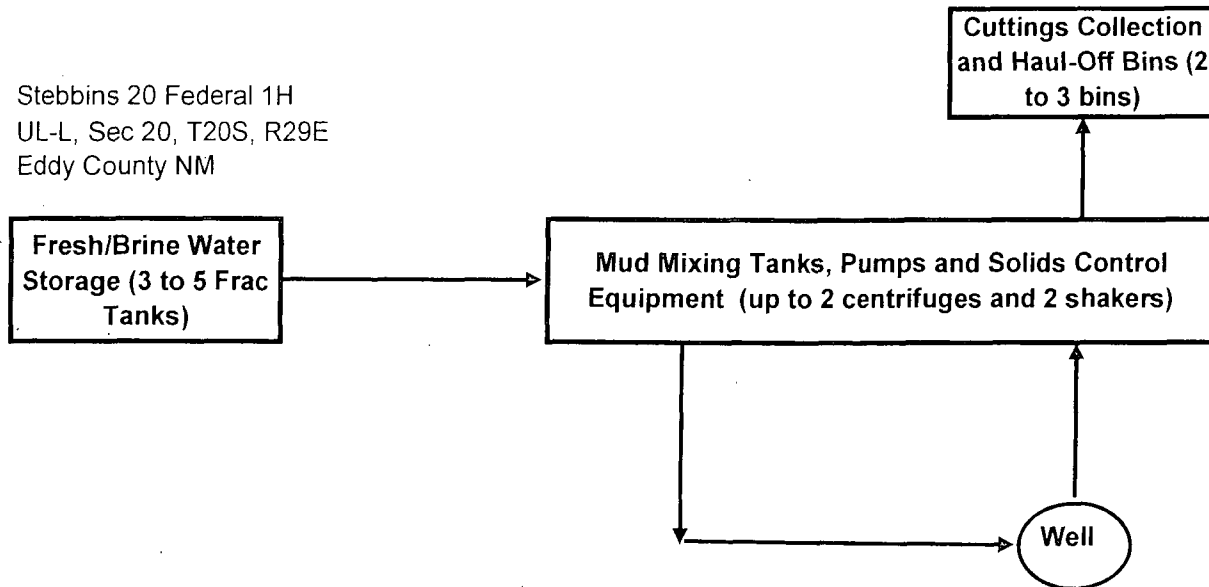
Eddy County, NM



# **CLOSED-LOOP SYSTEM**

## **Design Plan:**

Stebbins 20 Federal 1H  
UL-L, Sec 20, T20S, R29E  
Eddy County NM



## **Operating and Maintenance Plan:**

During drilling operations, third party service companies will utilize solids control equipment to remove cuttings from the drilling fluid and collect it in haul-off bins. Equipment will be closely monitored at all times while drilling by the derrick man and the service company employees.

## **Closure Plan:**

During drilling operations, third party service companies will haul-off drill solids and fluids to an approved disposal facility as noted on the C-144 form. At the end of the well, all closed loop equipment will be removed from the location.



**NADEL AND GUSSMAN HEYCO, L.L.C.**  
**P.O. Box 1936**  
**Roswell, NM 88202**  
**(575) 623-6601 (Office)**

2/10/2014

Mr. Ingram  
Carlsbad BLM Field Office  
620 E. Greene St.  
Carlsbad, NM 88220

**Re: Stebbins 20 Federal # 1H**  
**UL-L, Sec. 20, T20S, R29E**  
**Eddy, NM**  
**Rule 118 H2S Exposure**

Dear Mr. Ingram,

Harvey E. Yates (Heyco). Have evaluated this well with other well in the area and we do not expect to encounter hydrogen sulfide. However, we will employ a third party monitoring system. We will begin monitoring prior to drilling out the 13 3/8" casing shoe and will continue monitoring the remainder of the well.

Please contact me if you have any additional questions.

Sincerely,

Keith Cannon  
Drilling Superintendent

**Hydrogen Sulfide Drilling Operations Plan**  
**Stebbins 20 Federal # 1H**  
**Sec 20, T20S, R29E**  
**Eddy County N.M.**

1. Company and contract personnel admitted on location should be trained by a qualified H<sub>2</sub>S safety instructor to recognize and handle following:
  - A. Characteristics of H<sub>2</sub>S gas
  - B. Physical effects and hazards
  - C. Proper use of safety equipment and life support systems
  - D. Principle and operation of H<sub>2</sub>S detectors, warning system and briefing knowledge
  - E. Evacuation procedure, routes and first aid support
  - F. Proper use of 30 minutes Pressure-on-Demand Air Pack
2. Supervisory personnel will be trained in the following areas:
  - A. Effects of H<sub>2</sub>S on metal components.
  - B. Corrective action and shut in procedures, blowout prevention, and well control procedure.
  - C. Contents of Hydrogen Sulfide Drilling Operations Plan.
3. H<sub>2</sub>S Detection and Alarm Systems will be in place before commencing any operations.
  - A. H<sub>2</sub>S detectors and audio alarm system to be located at wellhead, shale shaker and mud pits. Will be installed and maintained by third party safety company.
  - B. Thirty minute self-contained work unit located in at briefing areas.
3. Windsack and/or Wind Streamers
  - A. Windsack at mud pit area (high enough to be visible)
  - B. Windsack on dog house (high enough to be visible)
4. Condition Flags and Signs
  - A. H<sub>2</sub>S warning signs on lease access road into location
  - B. Flags displayed on sign at location entrance
    1. Green flag indicates "Normal Safe Conditions"
    2. Yellow Flag indicates "Potential Pressure and Danger"
    3. Red Flag indicates "Danger - H<sub>2</sub>S Present in High Concentrations" *admit only emergency personnel*
5. Well Control Equipment
  - A. - Annular preventers\*
    - Double ram with blind rams and pipe rams\*
    - Drilling spool, or blowout preventer with 2 side outlets (choke side shall be a 3-inch minimum diameter, kill side shall be at least 2-inch diameter)\*
    - Kill line (2 inch minimum)
    - A minimum of 2 choke line valves (3 inch minimum)\*
    - 3 inch diameter choke line
    - 2 kill line valves, one of which shall be a check valve (2 inch minimum)\*
    - 2 chokes (refer to diagram in Attachment 1)
    - Pressure gauge on choke manifold
    - Upper Kelly cock valve with handle available
    - Safety valve and subs to fit all drill string connections in use
    - All BOPE connections subjected to well pressure shall be flanged, welded, or clamped\*
    - Fill-up line above the uppermost preventer.
  - B. Also see BOP and Choke exhibit.

6. Communication

- A. While working under masks chalkboards will be used for communication
- B. Hand signals will be used where chalk board is inappropriate
- C. Two -way radios or cell phones used to communicate off location or minimally in Drilling Foreman's trailer or living quarters
- D.

7. Drill Stem Testing (**not planned**)

- A. Exhausts watered
- B. Flare line equipped with electric igniter/propane pilot light in case gas reaches surface
- C. If location near dwelling closed DST will be performed

9. If  $H_2S$  encountered, mud system shall be addressed to maintain control of formation. A mud gas separator will be brought into service along with  $H_2S$  scavengers, if necessary. pH will be maintained at 10, to minimize  $H_2S$  in the system. Hydrogen sulfide scavengers will also be used to minimize hazards while drilling the well.

## PUBLIC PROTECTION PLAN FOR EMERGENCY CONTACTS

### Harvey E. Yates

(575) 623-6601

### Company Personnel

Jim Ward	Drilling Engineer	432-684-0009 .o 432-425-3760 .c
Keith Cannon	Drilling Supt.	575-623-6601 .o 575-626-1936 .c

#### ARTESIA N.M.

Ambulance	911
State Police	575-746-5000
City Police	575-746-5000
Sheriff's Office	575-746-9888
Fire Department	575-746-5050 or 575-746-5051
N.M.O.C.D	575-748-1283

#### CARLSBAD N.M.

Ambulance	911
State Police	575-885-3137
City Police	575-885-2111
Sheriff's Office	575-887-7551
Fire Department	575-885-3125 or 575-885-2111
Carlsbad BLM	575-887-6544

#### HOBBS N.M.

Ambulance	911
State Police	575-392-5588
City Police	575-397-9265
Sheriff's Office	575-396-3611
Fire Department	575-397-9308
N.M.O.C.D	575-393-6161
Hobbs BLM	575-393-3612

Flight for Life (Lubbock Tx)	806-743-9911
Aerocare (Lubbock Tx)	806-747-8923
Med flight air Ambulance (Albuq NM)	505-842-4433
SB air Med Services (Albuq NM)	505-842-4949

Boots & Coots IWC	800-256-9688 or 281-931-8884
Cudd Pressure Control	915-699-0139 or 915-563-3356
BJ Services (Artesia NM)	575-746-3569
(Hobbs NM)	575-392-5556

New Mexico Emergency Response Commission (Santa Fe)	505-476-9600
24 Hour	505-827-9126
New Mexico State Emergency Operations Center	505-476-9635

# Harvey E. Yates

## Exhibit 6

Stebbins 20 Federal 1H

SHL: UL.L, Sec 20, T20S, R29E

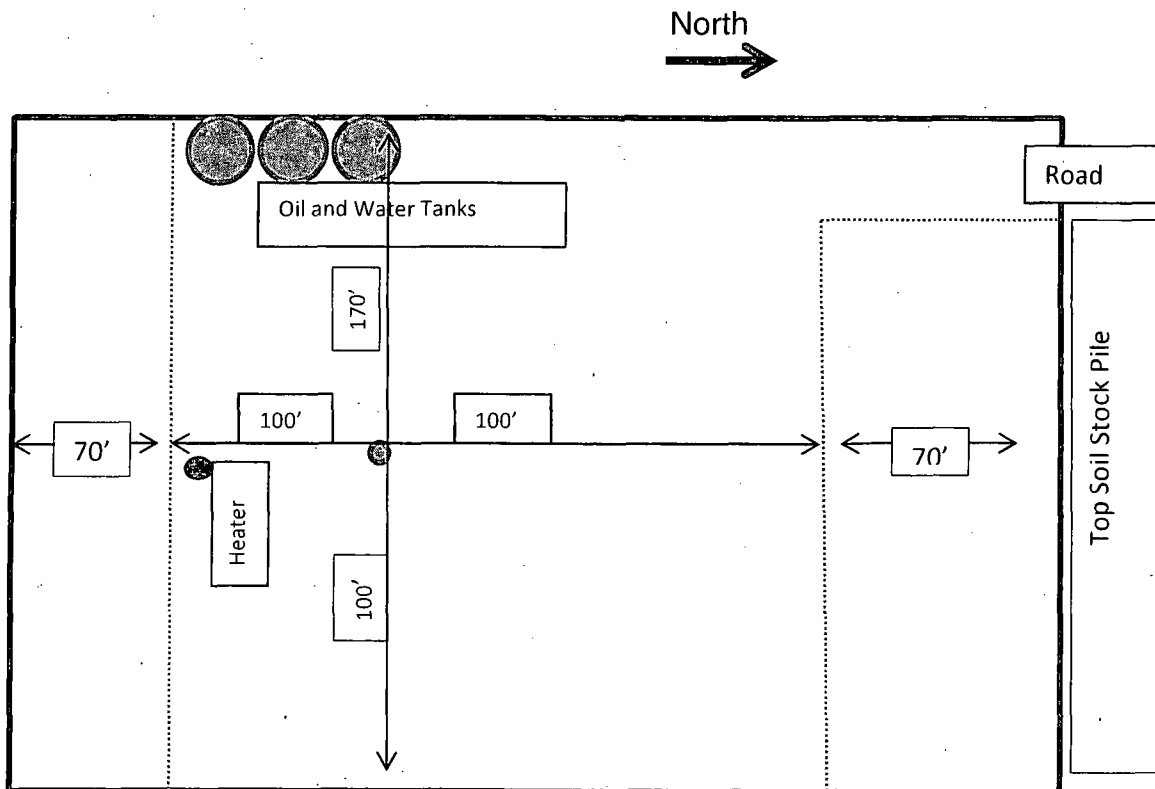
2250' FSL & 50' FWL

BHL: UL. I, Sec 20, T20S, R29E

2250' FSL & 330' FEL

Eddy Co. N.M

1. V-Door to the South
2. Top soil pile on the North side of location.
3. Road coming into the Northwest corner of location.
4. Tank Battery, 6 x 20 Heater to the south side 500bbls steel oil tank & 500bbls fiberglass water tanks on the southwest side of location
5. Down size location to 200' x 270'



Start road where two-track  
leaves the pavement

1580 FNL 70FEL

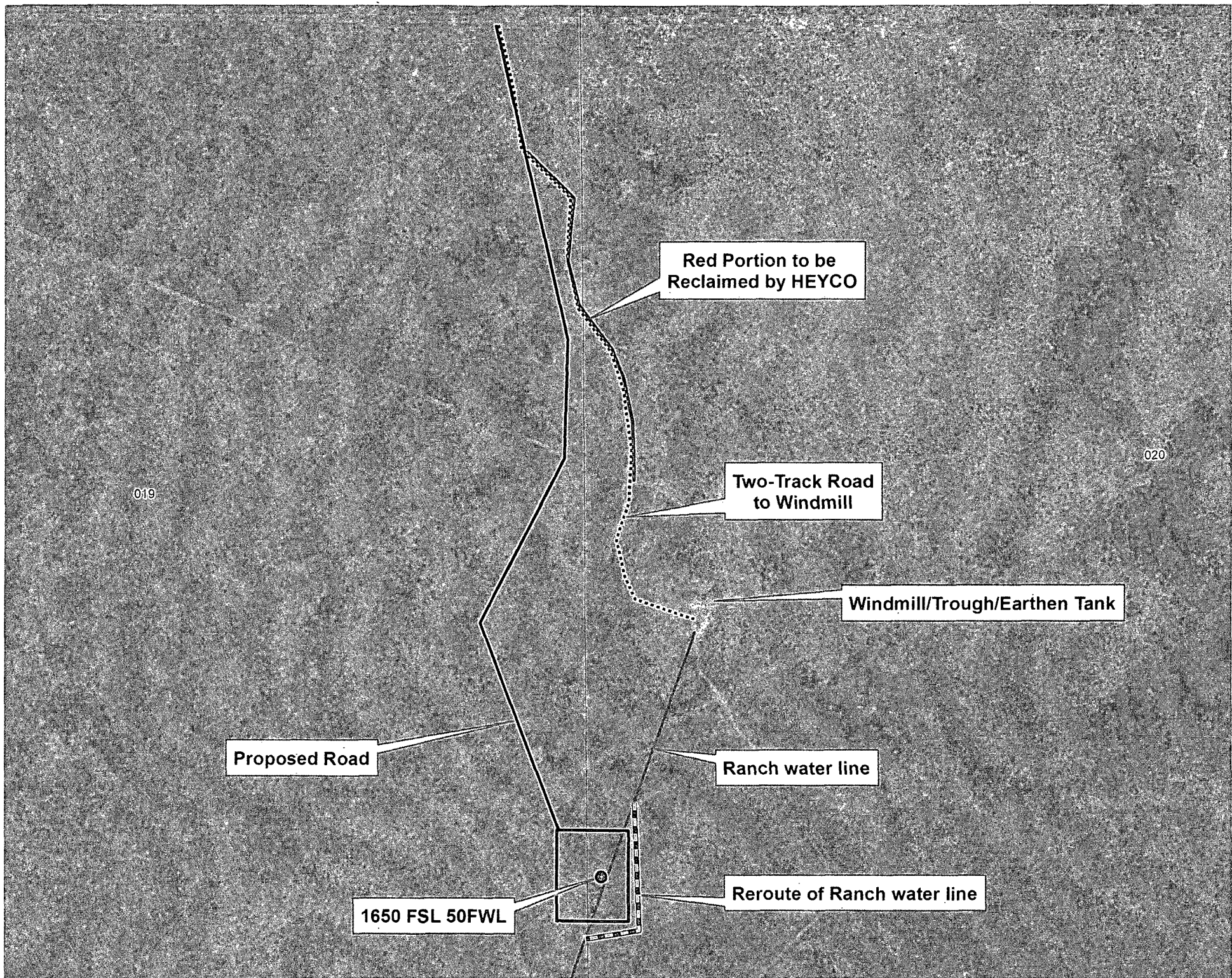
2040 FNL 70FEL

2630 FNL 400FEL

Windmill/Trough/Earthen Tank







**Surface Use Plan**  
Harvey E. Yates  
Stebbins 20 Federal 1H  
UL-L, Section 20, T20S, R29E  
2250' FSL & 50' FWL  
Eddy County, New Mexico

**1. Existing Roads:**

Exhibit 1 contains the surveys and a maps with proposed location and lease roads. The location is approximately 15 miles south of Carlsbad, NM. From Intersection of St Hwy 62/180 and Co. Road 238,(burton flate) Go north on Co. road 238 approx 2.1 miles. Turn left ( west ) go 4.1 miles; Turn left and go 0.5 miles to location.

**2. Planned Access Roads:**

Approximatly 3227' of new road will be built to access this location. Maximum width of driving surface will be 14' and maximum surface disurbance needed for construct the road will be 25'. The road will be crowned and the ditched with a 2% slope from tip of the crown to yhe edge or driving surface. Ditches will be 3' wide with 3:1 slopes. The driving surface will be made of 6" rolled and compacted caliche. 822' of the two track road not be use will be reclaimed by berming up both ends, rip and re seeded with blm #3 seed mix.

**3. Location of Existing Wells:**

See EXHIBIT #3 Existing wells within 1 mile.

**4. Location of Tank Batteries, Electric Lines, Etc:**

- a. In the event the well is found productive, the tank battery would be utilized and the necessary production equipment will be installed see exhibit #6
- b. Will tie to CVE electric line to the north of location.

**5. Location and Type of Water Supply:**

This location will be drilled using a combination of water mud systems (outlined in the drilling program). Water will be obtained from commercial water stations in the area. Fast line And/or hauled in by transport truck using the existing and proposed roads shown in the Vicinty Map.

**6. Source of Construction Material:**

- a. Top soil will be stock piled on the north side of location and will be used after drilling and completion operations to reduce location size on north and east side and reseeded to BLM specifications. See location map.
- b. All caliche utilized for the drilling pad and proposed access road will be obtained from an existing BLM / State approved pit or from deposits found under the location. All roads will be constructed of 6" rolled and compacted caliche.

**7. Methods of Handling Waste Disposal:**

- a. All trash, junk, and other waste material will be contained in trash cages or trash bin to prevent scattering. When the job is completed, all contents will be removed and disposed of in an approved sanitary landfill. The wellsite will be cleaned of all waste within 30 days of final completion of the well.
- b. A portable toilet will be provided for the rig crews. This equipment will be properly maintained during the drilling and completion operations and will be removed when all operations are complete.
- c. Disposal of fluids to be transported by trucks to a nearby approved disposal.
- d. We will be using a Close Loop System on this well. During drilling operation a third party service will be utilize solids control equipment to remove cutting from drilling fluid and collect in haul off bins. Equipment will closely monitored at all times while drilling by the derrick hand and the service company employees.



## **8. Ancillary Facilities:**

Harvey E. Yates (Heyco) will explore all options for obtaining water storage for stimulation before constructing a frac pit. Heyco will look to utilize offset Frac pits built by nearby operators, next option will be temporary Poisidon Frac tanks if a nearby source of water is available, if this is not possible a Frac Pit will be built. When operations are complete the Frac pit will be reclaimed and reseeded to BLM requirements.

## **9. Wellsite Layout:**

- a. EXHIBIT #D shows the relative location and dimensions of the well pad and major rig components.
- b. The land is relatively flat with scattered sand dunes and sandy soil.
- c. The pad area has been staked.
- d. We will reroute a rancher water line 25" off north side of well pad prior to construction.

## **10. Plan for Restoration of the Surface:**

- a. After drilling and completion operations are completed, all equipment and other materials not needed for further operations will be removed. The location cleaned of all trash to leave the wellsite as pleasant in appearance as possible.
- b. If the proposed operation is nonproductive, all restoration and/or vegetation requirements of the BLM will be complied with, and will be accomplished as quickly as possible.
- c. Interim reclamation consists of minimizing the footprint of disturbance by reclaiming the north side by 70' and the south side by 70'. all portions of the well site not needed for production operations. Topsoil is respread over areas not needed for production operations and recontoured to the surrounding area and reseeded. See exhibit 6.

## **11. Other Information:**

- a. The mineral and surface owner is the Federal Government and Grazing leases ( Winston Ballard) will be contacted .
- b. The topography consists of slightly sandy soil with native grasses. No wildlife was observed, but the usual inhabitants of this region are Jackrabbits, Reptiles, Coyotes, etc.
- c. There are no ponds, lakes, or rivers in this area.
- d. An Archaeological Survey has been made and a copy will be sent to the Carlsbad BLM office. There is no evidence of any significant archaeological, historical, or cultural sites in the area. Further, there are no occupied dwellings or windmills in the area.
- e. Should any incidental oil be recovered during testing of this well, this oil will be considered waste oil and not sellable due to contamination by drilling and/or completion fluids.

## **12. Operator's Representative:**

The Harvey E. Yates (Heyco) Company representatives responsible for ensuring compliance of the surface Use plan are listed below.

Keith Cannon, Drilling Superintendent

Harvey E. Yates  
500 N. Main, Suite one  
P.O Box 1933  
Roswell N.M 88202  
(575) 623-6601

## OPERATOR CERTIFICATION

I 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 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 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 the 10 day of February 2014.

Name: Keith Cannon

Position: Drilling Superintendent

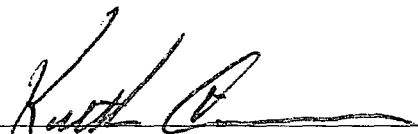
Address: P.O. BOX 1936

Roswell NM 88202

Telephone: 575-623-6601

Email: kcannon@heycoenergy.com

Signed: \_\_\_\_\_

 2/10/14

# PECOS DISTRICT CONDITIONS OF APPROVAL

OPERATOR'S NAME:	Harvey E Yates
LEASE NO.:	NM03677
WELL NAME & NO.:	1H-Stebbins 20 Federal
SURFACE HOLE FOOTAGE:	1650' FSL & 50' FWL
BOTTOM HOLE FOOTAGE:	2250' FSL & 330' FEL,
LOCATION:	Section 20, T. 20 S., R 29 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**
  - Berm Well Pad
  - Livestock Water Pipeline Reroute Requirements
  - Two-Track Road Reclamation Requirements
  - Cave/Karst
- ☐ **Construction**
  - Notification
  - Topsoil
  - Closed Loop System
  - Federal Mineral Material Pits
  - Well Pads
  - Roads
- ☐ **Road Section Diagram**
- ☒ **Drilling**
  - High Cave/Karst
  - Capitan Reef
  - Casing/Cement Requirements
  - Logging Requirements
  - Waste Material and Fluids
- ☐ **Production (Post Drilling)**
  - Well Structures & Facilities
- ☐ **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)**

### **Berm Well Pad:**

The entire perimeter of the well pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad.

- The compacted berm shall be constructed at a minimum of 12 inches high with impermeable mineral material (e.g. caliche).
- No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad.
- The topsoil stockpile shall be located outside the bermed well pad.
- Topsoil, either from the well pad or surrounding area, shall not be used to construct the berm.
- No storm drains, tubing or openings shall be placed in the berm.
- If fluid collects within the bermed area, the fluid must be vacuumed into a safe container and disposed of properly at a state approved facility.
- The integrity of the berm shall be maintained around the surfaced pad throughout the life of the well and around the downsized pad after interim reclamation has been completed.
- Any access road entering the well pad shall be constructed so that the integrity of the berm height surrounding the well pad is not compromised. (Any access road crossing the berm cannot be lower than the berm height.)

### **Livestock Water Pipeline Reroute Requirements**

The buried livestock water pipeline located underneath the proposed well pad must be rerouted around the east side of the well location as depicted in the survey plat in the APD. The operator/contractor must coordinate with the rancher (Winston Ballard) prior to pipeline reroute installation to work out details on installation procedures. The operator is responsible for the integrity of the rerouted pipeline for the life of the Stebbins 20 Fed #1H well.

### **Two-Track Road Reclamation Requirements**

The two track road identified in the "Location Verification Map" in the APD and "Figure 1" in this document must be reclaimed during the same time as the new road construction. Reclamation procedures shall include ripping or disking the two-track road to break up the soil. The edges of the road and roadbed need to be contoured to match the surrounding terrain. The two ends of the portion of two-track road to be reclaimed must be sufficiently barricaded to prevent vehicle traffic on the reclamation.

## **Cave and Karst**

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

## **Cave/Karst Surface Mitigation**

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

### **Construction:**

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

### **No Blasting:**

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

### **Pad Berming:**

The entire perimeter of the well pad will be bermed to prevent oil, salt, and other chemical contaminants from leaving the well pad.

- The compacted berm shall be constructed at a minimum of 12 inches high with impermeable mineral material (e.g. caliche).
- No water flow from the uphill side(s) of the pad shall be allowed to enter the well pad.
- The topsoil stockpile shall be located outside the bermed well pad.
- Topsoil, either from the well pad or surrounding area, shall not be used to construct the berm.
- No storm drains, tubing or openings shall be placed in the berm.
- If fluid collects within the bermed area, the fluid must be vacuumed into a safe container and disposed of properly at a state approved facility.
- The integrity of the berm shall be maintained around the surfaced pad throughout the life of the well and around the downsized pad after interim reclamation has been completed.
- Any access road entering the well pad shall be constructed so that the integrity of the berm height surrounding the well pad is not compromised. (Any access road crossing the berm cannot be lower than the berm height.)

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

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

### **Leak Detection System:**

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

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

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

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

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

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

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

#### **Directional Drilling:**

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

#### **Lost Circulation:**

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

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

#### **Abandonment Cementing:**

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

#### **Pressure Testing:**

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

## **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**

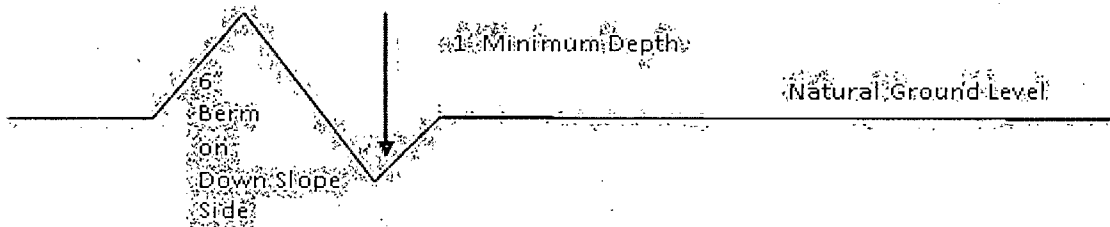
Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall conform to Figure 1; cross section and plans for typical road construction.

### **Drainage**

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

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

### **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

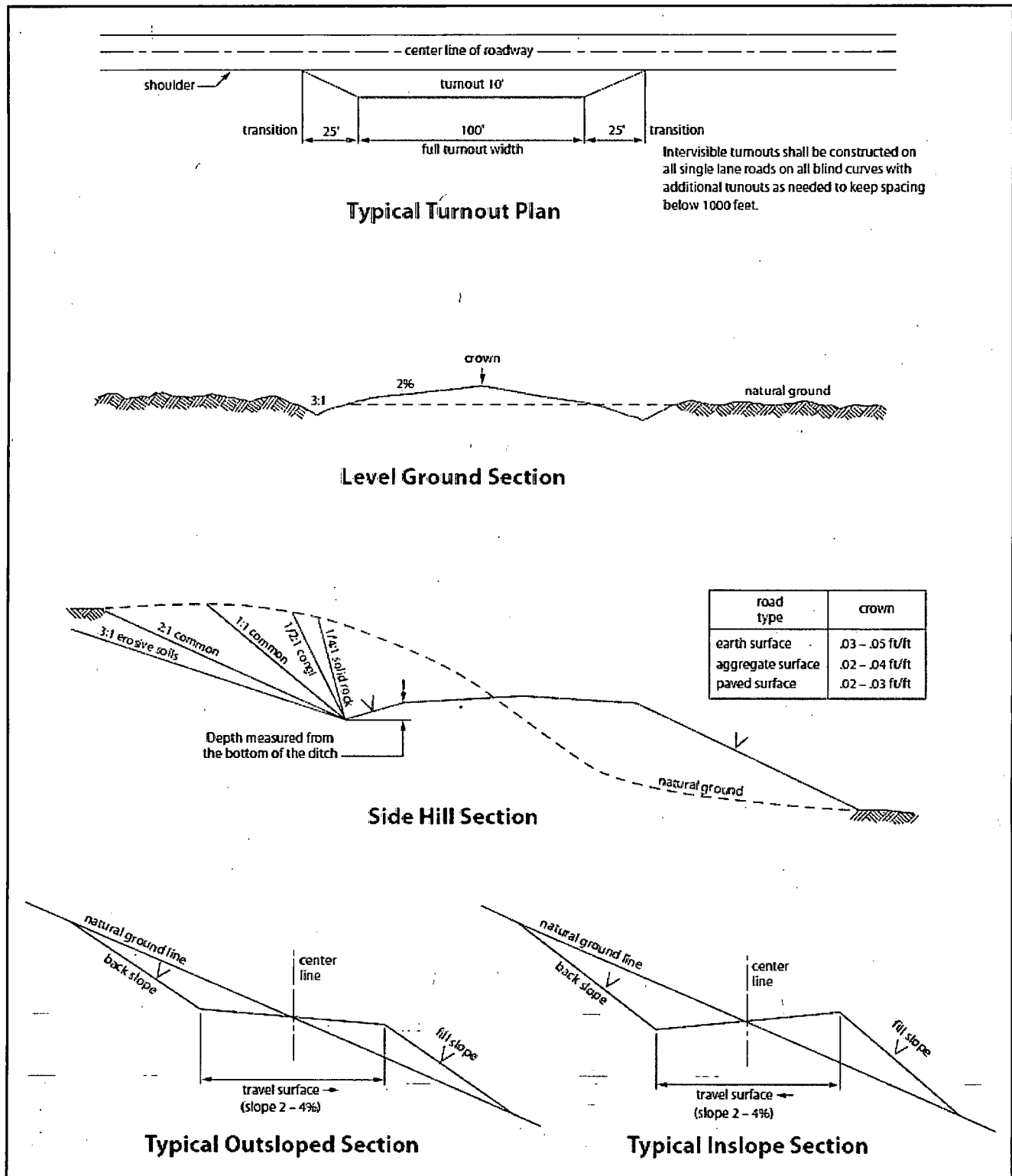


Figure 1. Cross-sections and plans for typical road sections representative of BLM resource or FS local and higher-class roads.

## VII. DRILLING

### A. DRILLING OPERATIONS REQUIREMENTS

The BLM is to be notified 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, 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 is 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 or are Non-API. 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.).

The initial wellhead installed on the well will remain on the well with spools used as needed.

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.

#### **High Cave/Karst**

**Possible water flows in the Queen, Salado and Artesia Group**

**Possibility lost circulation in the Capitan Reef, Cherry Canyon, Salado and Artesia Group.**

1. The **20 inch** surface casing shall be set at approximately **400 feet** (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface. **If salt is encountered, set casing at least 25 feet above the salt.**
  - 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 **13-3/8** inch first intermediate casing, which shall be set at approximately **1200** feet (base of the Yates), 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 **9-5/8** inch second intermediate casing, which shall be set at **3100** feet in the base of the Capitan Reef, 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.**

**Pilot hole is required to have a plug at the bottom of the hole. Plug is approved as written, however the plug shall be tag at least 50 feet above the Wolfcamp or approximately 9,117'. The BLM is to be contacted (575-361-2822) prior to tag of bottom plug.**

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

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

☒ Cement should tie-back **at least 50 feet above the top of the Capitan Reef** (TOC at approx. 1217 or approx.. 1883 feet into previous casing string). Operator shall provide method of verification. **Additional cement shall be required as excess calculates to 0%.**

5. 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.

**Note: A diverter requires a variance if it is only a diverter as shown on the submitted diagram with no request for a variance. If it is combined with an annular the variance is not required. – Operator can submit a sundry requesting a variance.**

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.

**In the case where the only BOP installed is an annular preventer, it shall be tested to a minimum of 2000 psi (which may require upgrading to 3M or 5M annular).**

3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **13-3/8** intermediate casing shoe shall be **2000 (2M)** psi.
4. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **9-5/8** intermediate casing shoe shall be **3000 (3M)** psi.
5. 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. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two 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.
- g. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the **Wolfcamp** formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

#### **D. 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 110314**



## **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).

## **IX. INTERIM RECLAMATION**

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

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

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

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

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

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

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

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

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

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

#### Seed Mixture 1, for Loamy Sites

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

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

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

<u>Species</u>	<u>lb/acre</u>
Plains lovegrass ( <i>Eragrostis intermedia</i> )	0.5
Sand dropseed ( <i>Sporobolus cryptandrus</i> )	1.0
Sideoats grama ( <i>Bouteloua curtipendula</i> )	5.0
Plains bristlegrass ( <i>Setaria macrostachya</i> )	2.0

\*Pounds of pure live seed:

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