ATS-07-602

OCD-HOBBS

Form 3160-3
(April 2004)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SECRETARY'S POTASH -1244

FORM APPROVED
OMB No 1004-0137
Expires March 31 2007

APPLICATION FOR PERMIT TO DRILL OR REENTER

1a Type of work: ☑ DRILL ☐ REENTER	5 Lease Serial No: NM 12412 DM
	6 If Indian, Allotee or Tribe Name: N/A
	7 If Unit or CA Agreement, Name and No: N/A
1b Type of Well: ☑ Oil Well ☐ Gas Well ☐ Other ☑ Single Zone ☐ Multiple Zone	8 Lease Name and Well No: Southeast Lusk 27 Federal #1 <36920>
2 Name of Operator: Edge Petroleum Operating Company, Inc. <224400>	9 API Well No: 30-025-38678
3a Address: 1301 Travis, Suite 2000, Houston, TX 77002	3b Phone No. (include area code): 713-654-8960
	10 Field and Pool, or Exploratory: Lusk Bone Springs South <41460>
4 Location of Well (Report location clearly and in accordance with any State requirements.) At surface: 457' FSL & 1980' FWL	11 Sec., T., R., M., or Blk. and Survey or Area: Sec. 27, T-19S, R-32E
At proposed prod. zone: Unit N Capitan Controlled Water Basin	
14 Distance in miles and direction from nearest town or post office: 6 miles in a southwest direction from Malaga, NM	12 County or Parish: Lea County; 13 State: NM

15 Distance from proposed location to nearest property or lease line, ft (Also to nearest drlg. unit line, if any): 1984'	16 No. of acres in lease: 2320 ~~40~~	17 Spacing Unit dedicated to this well: SE/4 of the SW/4 of Sec. 27 — 40
18 Distance from proposed location to nearest well, drilling, completed, applied for, on this lease, ft: 800'	19 Proposed Depth: 8,000'	20 BLM/BIA Bond No. on file: NMB 000121
21 Elevations (Show whether DF, KDB, RT, GL, etc.): 3570.2'	22 Approximate date work will start*: 09/15/2007	23 Estimated duration: 30 days

24 Attachments

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

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

25 Signature: Angela Lightner	Name (Printed/Typed): Angela Lightner	Date: 08/31/2007
Title: Consultant 432 682-0440		
Approved by (Signature): /s/ Linda S.C. Rundell	Name (Printed/Typed): /s/ Linda S.C. Rundell	Date: DEC 19 2007
Title: STATE DIRECTOR	Office: NM STATE OFFICE	

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

APPROVAL FOR TWO YEARS

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

*(Instructions on page 2)

SEE ATTACHED FOR CONDITIONS OF APPROVAL

APPROVAL SUBJECT TO GENERAL REQUIREMENTS AND SPECIAL STIPULATIONS ATTACHED

RECEIVED

JAN - 3 2008

HOBBS OCD

United States Department of the Interior
Bureau of Land Management
Roswell Field Office
2909 Second Street
Roswell, New Mexico 88201-1287

Statement Accepting Responsibility for Operations

Operator Name:	Edge Petroleum Operating Company, Inc.
Street or Box:	1301 Travis, Suite 2000
City, State:	Houston, Texas
Zip Code:	77002

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

Lease No: ~~NM-01135~~ NM 13410

Legal Description of Land:

Township 19 South, Range 32 East, Eddy, New Mexico

SE/4 SW/4 of Section 27

Bond Coverage:

Statewide Oil and Gas Surety Bond, Edge Petroleum Operating Company, Inc.

BLM Bond File No.: NMB-000121

Angela Lightner

Angela Lightner
Agent
August 31, 2007

Edge Petroleum Operating Company, Inc.
Southeast Lusk "27" Federal #1
Response Only Letter

DISTRICT I
1625 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

OIL CONSERVATION DIVISION
1220 SOUTH ST. FRANCIS DR.
Santa Fe, New Mexico 87505

Form C-102
Revised October 12, 2005
Submit to Appropriate District Office
State Lease - 4 Copies
Fee Lease - 3 Copies

WELL LOCATION AND ACREAGE DEDICATION PLAT

☐ AMENDED REPORT

API Number	Pool Code	Pool Name
30-025-38678	41460	Lusk Bone Spring South

Property Code	Property Name	Well Number
36920	SOUTHEAST LUSK 27 FEDERAL	1

OGRID No.	Operator Name	Elevation
224400	EDGE PETROLEUM OPERATING CO.	3570'

Surface Location

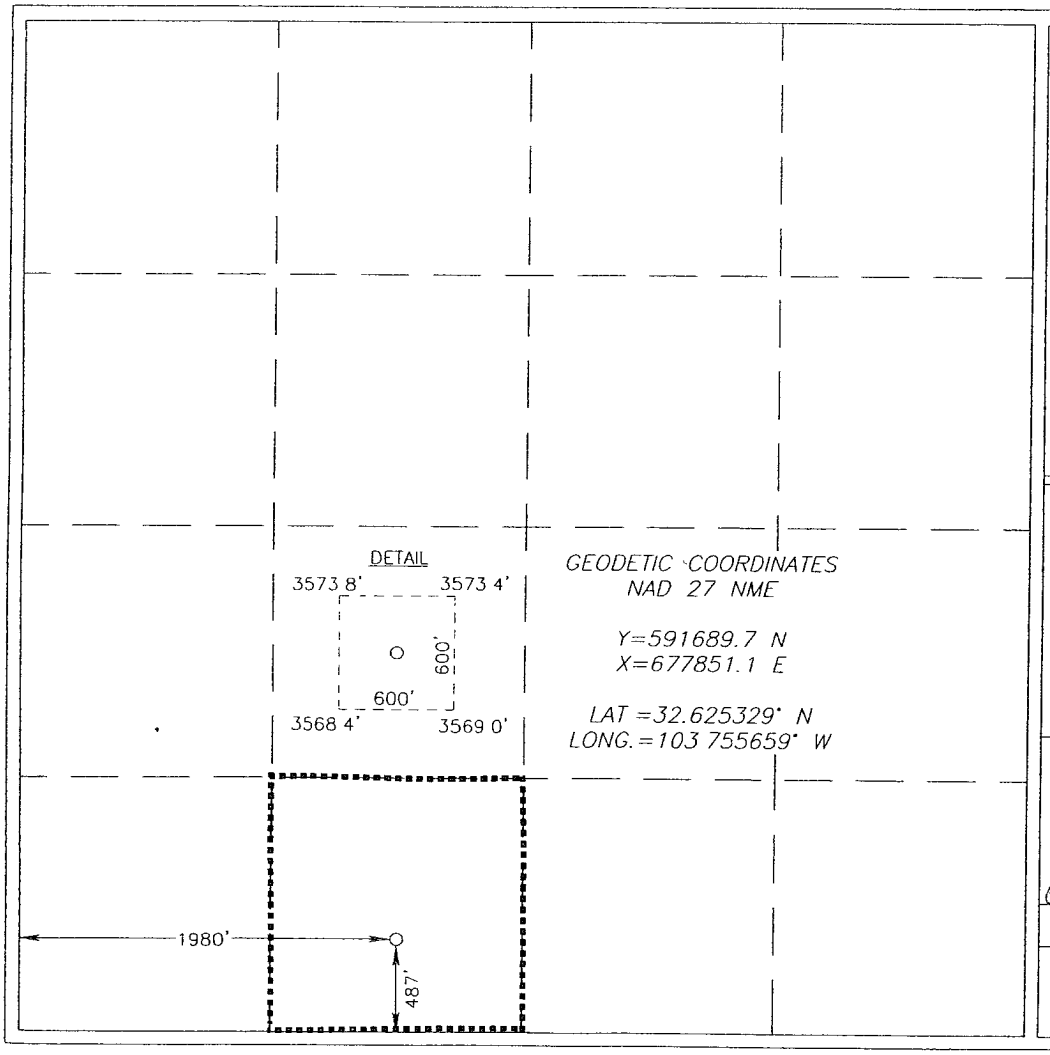
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	27	19-S	32-E		487	SOUTH	1980	WEST	LEA

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

Dedicated Acres	Joint or Infill	Consolidation Code	Order No
40			

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



OPERATOR CERTIFICATION

I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division

Angela Lightner 8-31-07
Signature Date

Angela Lightner
Printed Name

SURVEYOR CERTIFICATION

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

RONALD J. EIDSON
NEW MEXICO
3239
REGISTERED PROFESSIONAL SURVEYOR

Date Surveyed: AUGUST 17, 2007
Signature & Seal of Professional Surveyor: 8/27/07

Certificate No. GARY EIDSON 12641
RONALD J. EIDSON 3239

DRILLING PROGRAM

EDGE PETROLEUM OPERATING COMPANY, INC.
SOUTHEAST LUSK "27" FEDERAL #1
Section 27 T-19-S, R-32-E
Lea County, New Mexico

The following items supplement Form 3160-3 in accordance with instructions contained in Onshore Oil and Gas Orders #1 and #2, and all other applicable federal and state regulations.

1. **ESTIMATED TOPS OF GEOLOGIC MARKERS (TVD)**

Anhydrite	Water	890'
Yates	Water	2,665'
Capitan	Water	3,525'
Delaware	Oil	4,240'
Cherry Canyon	Oil	4,748'
Brushy Canyon	Oil	5,877'
Lwr Brushy Canyon	Oil	7,174'
1st Bone Springs Lm	Oil	7,424'
Bone Springs Lm Pay	Oil	7,616'
Total Depth		8,000'

2. **PRESSURE CONTROL EQUIPMENT** The blow out preventer equipment (BOP) shown in Exhibit #1 will consist of a 3000 psi double ram type preventer for drilling the 12-1/4" hole. The blowout preventer stack for the production 6-3/4" hole as shown on Exhibit #2 will consist of at least a double-ram blowout preventer and annular preventer rated to 3000 psi working pressure. A diagram of the BOPs and choke manifold is attached. All BOPs and accessory equipment will be tested according to Onshore Order #2 before drilling out.

3. **PROPOSED CASING PROGRAM**

Hole Sz	Interval	Csg	Wt	Grade, Joint	Collapse	Tension	Burst
20"	0 – 40'	20"	52.8#	X-42, BPE			
17-1/2"	0 – 890'	13-3/8"	54.5#	J-55, BTC	1,130	514	2,730
12-1/4"	0 – 3,080'	10-3/4"	45.5#	J-55, STC	2,090	493	3,580
9-1/2"	0 – 4,270'	7-5/8"	29.7#	HPC-110, LTC	5,340	769	9,470
6-3/4"	0 – 8,000'	5-1/2"	17#	P-110, Ultra FJ	7,460	445	10,640

All casing is for this project is new casing

There will be a DV Tool (Stage Collar) above an External Casing Packer (ECP) which is to be set inside the 10-3/4" casing at 3000 +/-. Cement will be circulated to surface. Equivalent or adequate grades and weights of casing may be substituted at time casing is run, depending on availability. Changes will be relayed to BLM prior to running.

4. PROPOSED CEMENTING PROGRAM

20" conductor	cemented with ready mix to surface
13-3/8" surf.	Lead Slurry - 450 sxs Light Premium Plus cement, 0.125 lbm/sk Poly-E-Flake, slurry yield – 1.83 ft³/sk Tail Slurry - 2% calcium chloride, slurry yield – 1.35 ft³/sk, TOC - surface 340 sxs Premium Plus cement per operator 9/26/07 MH
10-3/4"1st inter.	Lead Slurry - 355 sxs Interfill "C" cement, slurry yield – 2.47 ft³/sk Tail Slurry - 160 sxs Premium Plus cement, 1% Calcium Chloride, slurry yield – 1.34 ft³/sk, TOC – surface. 100% excess.
7-5/8" 2nd inter.	Lead Slurry - 420 sxs Interfill "C" cement, slurry yield – 2.47 ft³/sk Tail Slurry - 140 sxs Premium Plus cement, slurry yield – 1.33 1.33 ft³/sk, TOC – surface. 100% excess.
5-1/2" prod.	Lead Slurry- 95 sxs Interfill "H" cement, slurry yield – 2.48 ft³/sk Tail Slurry - 125 sxs 50/50 Poz Premium, 0.4% LAP-1, 0.4% CFR-3, 0.25 lbm/sk D-AIR 3000, 0.1% HR-7, slurry yield – 1.25 ft³/sk, TOC surface. 50% excess ← see COA

5. PROPOSED MUD SYSTEM

DEPTH	DESCRIPTION	MUD WEIGHT	VISCOSITY	WATER LOSS
see COA → 0 – 890'	Fresh water	8.6 – 8.8 ppg	36 – 38	NC
890' – 3,080'	Brine water	10.0 – 10.2 ppg	29 – 30	NC
3,080' – 7,300'	Fresh water	8.4 – 8.5 ppg	28 – 29	NC
7,300' – 8,000'	NewGel/Pac	8.4 – 8.7 ppg	28 – 36	8-10 cc

6. TESTING, LOGGING AND CORING PROGRAM

Samples	None are planned
DST's	None are planned
Logging	Neutron/Density and Resistivity
Coring	Possible sidewall core

7. ABNORMAL PRESSURES AND TEMPERATURES

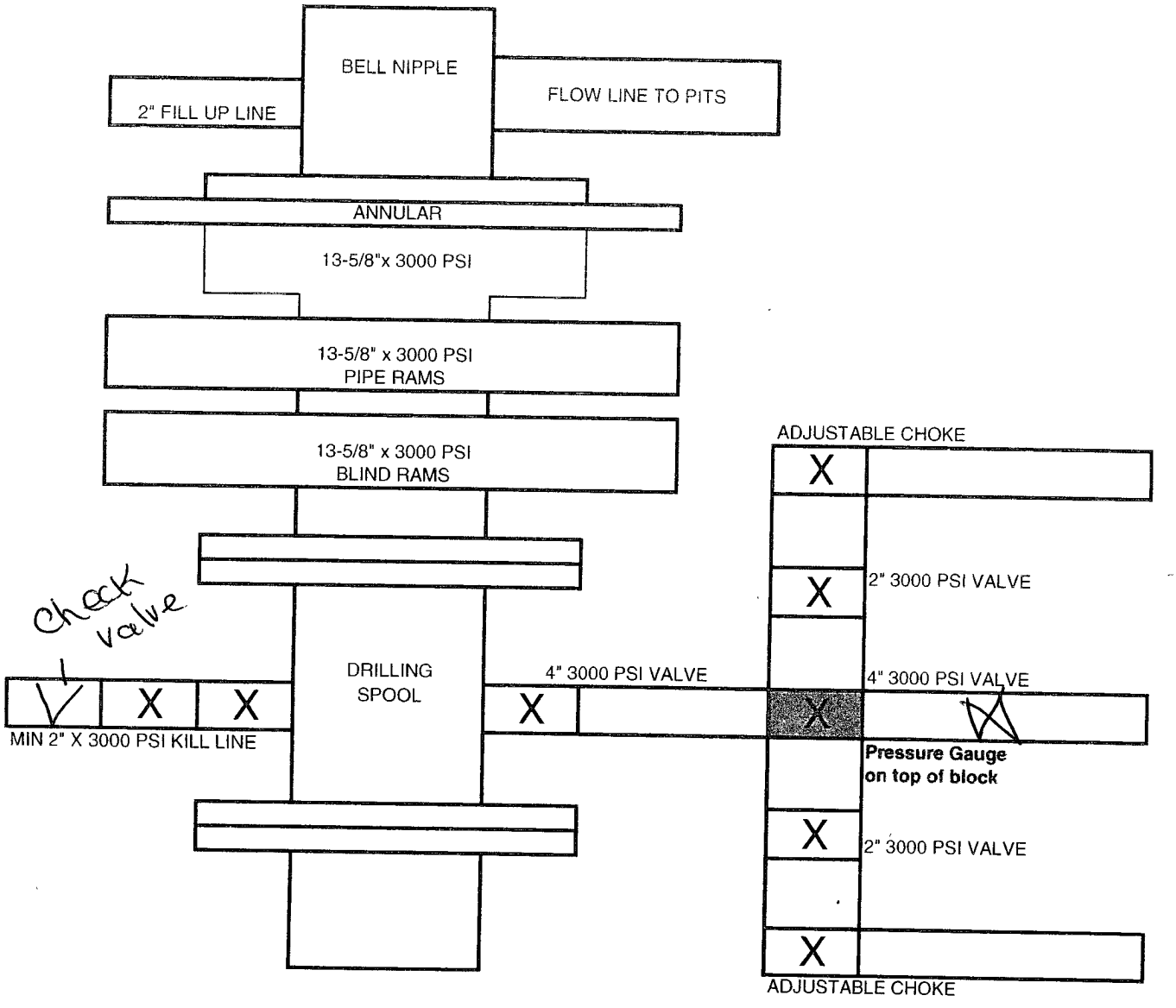
None anticipated. Maximum bottom hole pressure should not exceed 4,000 psi.

This area has a potential H_2S hazard. An H_2S drilling plan is attached.

ANTICIPATED STARTING DATE AND DURATION OF OPERATIONS

It is planned that operations will commence on or about October 15, 2007. Drilling should be completed within 30 days followed by completion operations.

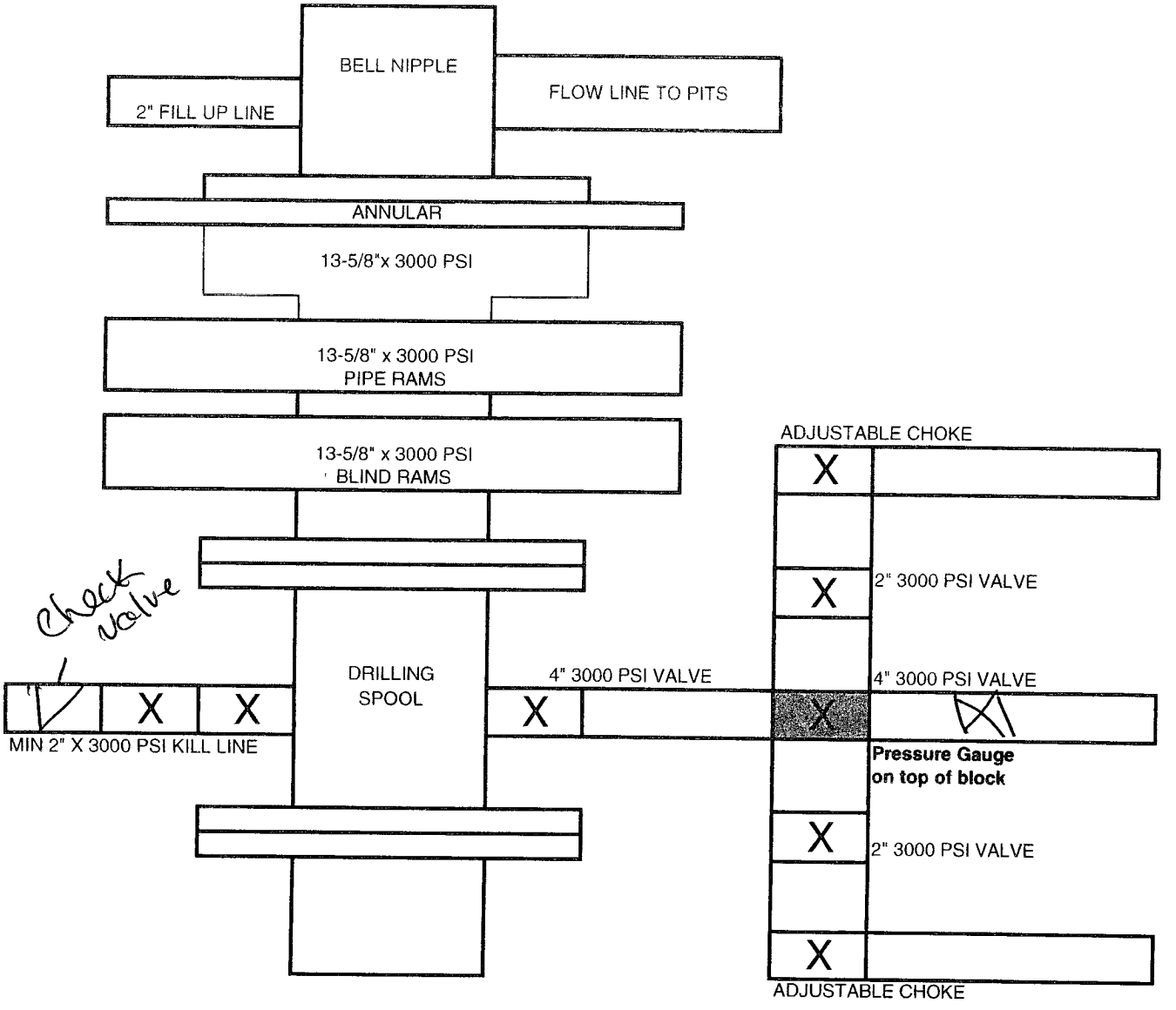
BOP SCHEMATIC FOR
12-1/4" HOLE



Edge Petroleum Operating Company, Inc.
Southeast Lusk "27" Federal #1
Lea County, New Mexico

Exhibit 1

BOP SCHEMATIC FOR
7-7/8" HOLE



Edge Petroleum Operating Company, Inc.
Southeast Lusk "27" Federal #1
Lea County, New Mexico

Exhibit 2

HYDROGEN SULFIDE DRILLING OPERATIONS PLAN

EDGE PETROLEUM OPERATING COMPANY, INC.

Southeast Lusk "27" Federal #1

I. HYDROGEN SULFIDE TRAINING

A. All regularly assigned personnel, contracted or employed by Edge Petroleum Corporation, will receive training from a qualified instructor in the following areas prior to commencing drilling potential hydrogen sulfide bearing formations in this well:

1. The hazards and characteristics of hydrogen sulfide (H_2S).
2. The proper use and maintenance of personal protective equipment and life support systems.
3. The proper use of H_2S detectors, alarms, warning systems, briefing areas, evacuation procedures and prevailing winds.
4. The proper techniques for first aid and rescue procedures.

B. In addition, supervisory personnel will be trained in the following areas:

1. The effects of H_2S on metal components. If high tensile tubulars are to be used, personnel will be trained in their special maintenance requirements.
2. Corrective action and shut-in procedures when drilling or reworking a well and blowout prevention and well control procedures.
3. The contents and requirements of the H_2S Drilling Operations Plan.

C. There will be an initial training session just prior to encountering a known or probable H_2S zone (within 3 days or 500 feet) and weekly H_2S and well control drills for all personnel in each crew. The initial training session shall include a review of the site specific H_2S Drilling Operations Plan. This plan shall be available at the well site. All personnel will be required to carry documentation that they have received the proper training.

II. H_2S SAFETY EQUIPMENT AND SYSTEMS

Note: All H_2S safety equipment and systems will be installed, tested and operational when drilling reaches a depth of 500 feet above, or three days prior to penetrating the first zone containing or reasonably expected to contain H_2S.

A. Well Control Equipment

1. Flare line with continuous pilot.

2. Choke manifold with a minimum of one remote choke.

3. Blind rams and pipe rams to accommodate all pipe sizes with properly sized closing unit.

4. Auxiliary equipment to include: annular preventer, mud-gas separator, rotating head and flare.

B. Protective Equipment for Essential Personnel

Mark II Surviveair 30-minute units located in the doghouse and at briefing areas, as indicated on well site diagram.

C. H_2S Detection and Monitoring Equipment

1. Two portable H_2S monitors positioned on location for best coverage and response. These units have warning lights and audible sirens when H_2S levels of 20 ppm are reached.

2. One portable SO_2 monitor positioned near flare line.

D. Visual Warning Systems

1. Wind direction indicators are shown on well site diagram.

2. Caution/Danger signs shall be posted on roads providing direct access to location. Signs will be painted a high visibility yellow with black lettering of sufficient size to be readable at a reasonable distance form the immediate location. Bilingual signs will be used when appropriate. See example attached.

E. Mud Program

1. The Mud Program has been designed to minimize the volume of H_2S circulated to the surface. Proper mud weights, safe drilling practices and the use of H_2S scavengers will minimize hazards when penetrating H_2S bearing zones.

2. A mud-gas separator will be utilized as needed.

F. Metallurgy

All drill strings, casing, tubing, wellhead, blowout preventers, drilling spool, kill lines, choke manifold and line and valves shall be suitable for H_2S service.

G. Communication

Cellular telephone communications in company vehicles, rig floor and mud logging trailer.

H. Well Testing

Drill stem testing will be performed with a minimum number of personnel in the immediate vicinity, which are necessary to safely and adequately conduct the test. The drill stem testing and an H_2S environment will be conducted during the daylight hours.

HALLIBURTON

Edge Petroleum Corp
1301 Travis, Ste 2000
Houston, Texas 77002

SE Lusk 27 1

Lea County, New Mexico
United States of America

Cementing Recommendation

Prepared for: Randy Ford
July 27, 2007
Version: 1

Submitted by:
Dennis Page

Halliburton Energy Services
4000 N. Big Spring, Ste. 200
Midland, Texas 79705
432.683.0210

HALLIBURTON

Halliburton appreciates the opportunity to present this proposal and looks forward to being of service to you.

Foreword

Halliburton Energy Services is pleased to have this opportunity to present this proposal for your consideration. We earnestly request the service work to be performed on this well.

These Service Coordinators can be reached in our District, at the following phone numbers:

MIDLAND SALES OFFICE
1-800-844-8451

ODESSA DISTRICT
1-800-417-5096

CEMENTING:
Scott Kerby / Joe Briseno
BJ Wheeler

STIMULATION:
Mel Holt / Larry Staples
Basil Hacker

LOGGING &
PERFORATING
Allen Avera / Keith Drake
Daryl Nations

COILED TUBING
& NITROGEN
Michael Ybaben

TOOLS & TESTING,
PROD. SVCS., TCP,
COMPL. PRODUCTS
Steve Engleman

BAROID
Fernando Arizpe

HOBBS DISTRICT
1-800-416-6081

CEMENTING
Pete Garza / Ronald Arnold
Jaime Gonzales

STIMULATION:
Freddy Casillas / Jerry Thurman
Travis Laman

LOGGING &
PERFORATING
Darrell Merrell / Vernon Reever

TOOLS & TESTING,
PROD. SVCS., TCP,
COMPL. PRODUCTS
Mike McWilliams

BAROID
Freddy Redmon

PREPARED BY: Bruce Day

We look forward to working with you to provide the very best quality services available in the Permian Basin.

Dennis Page, Sr. Technical Advisor

Cementing Best Practices

1. **Cement quality and weight**: You must choose cement slurry that is designed to solve the problems specific to each string of pipe.

2. **Waiting time**: You must hold the cement slurry in place and under pressure until it hardens. A cement slurry is a time-dependent liquid and must be allowed to undergo a hydration reaction to produce a competent cement sheath. A fresh cement slurry can be worked (thickening or pump time) as long as it is plastic, and the initial set of cement occurs during the rapid reaction stage. If the cement is not allowed to hydrate, it will be subject to changes in density, dilution, settling, water separation, and gas cutting that can lead to lack of zonal isolation with resultant bridging in the annulus.

3. **Pipe movement**: Pipe movement may be one of the single most influential factors in mud removal. Reciprocation and/or rotation mechanically breaks up gelled mud and constantly changes the flow patterns in the annulus for better cement bonding.

4. **Mud properties**: Plastic viscosity (PV) should be less than 15 centipoise (cp), and less than 10 cp, if possible, yield point (YP) should be less than 10 pound/100-square feet (lb/100ft²) decreasing down to about 5 lb/100 ft².

5. **Mud gel strength**: A nonthixotropic mud is desirable for good mud removal. Mud left in the hole prior to running casing should have 10-second/10-minute/30-minute gel strength such that the 10-minute is less than double the 10-second and the 30-minute is less than 20 lb/100 ft². Sufficient shear strength may not be achieved on a primary cement job to remove mud left in the hole should the mud develop more than 25 lb/100 ft².

6. **Mud fluid loss**: Decreasing the filtrate loss into a permeable zone enhances the creation of a thin filter cake. This increases the fluid mud in the hole, which is more easily removed. Generally an API fluid loss of 7 or 8 milliliter (ml) is sufficient with high-temperature/high-pressure fluid loss (HTHP) no more than double this amount

7. **Circulation**. Circulate bottoms up twice, or until well conditioned mud is being returned to the surface. There should be no cutting in the mud returns. An annular velocity of 260 feet per minute is optimum (SPE/IADC 18617), if possible.

8. **Flow rate**: Turbulent flow is more desirable flow regime for mud removal. If turbulence cannot be achieved, better mud removal is found when maximum flow energy is used. The maximum pump rate should be determined to obtain the best flow regime

9. **Hole size**: The optimum hole size recommended for good mud removal is 1.5 to 2 inches larger than the casing or liner size. Hole sizes larger than 2 inches annular space can be dealt with, but those that are smaller than 1.5 inches present difficult problems.

10. **Pipe Centralization**: This helps to create a uniform flow area perpendicular to flow direction. Cement will take the path of least resistance so that centralization is important in keeping the pipe off the walls of the hole. At least a 70 percent standoff should be achieved for centralization

11. **Rat hole**. When applicable, a weighted viscous pill in the rat hole prevents cement from swapping with lighter weight mud when displacement stops

12. **Shoe joint**: A shoe joint is recommended on all primary casings and liners. The length of the shoe joint will vary, although the absolute minimum length is one joint of pipe. If conditions exist, such as not running a bottom plus, two joints should be the minimum lengths

Job Information — Surface Casing

SE Lusk 27	1
17-1/2" Hole	0 - 890 ft (MD)
Inner Diameter	17.500 in
Surface Casing	0 - 890 ft (MD)
Outer Diameter	13.375 in

Calculations

Cement : (590.00 ft fill)

590.00 ft * 0.6946 ft^3/ft * 100 %	= 819.67 ft^3
Total Lead Cement	= 819.67 ft^3
	= 145.99 bbl
Sacks of Cement	= 448 sks

Cement : (300.00 ft fill)

300.00 ft * 0.6946 ft^3/ft * 100 %	= 416.78 ft^3
Tail Cement	= 416.78 ft^3
	= 74.23 bbl

Shoe Joint Volume: (40.00 ft fill)

40.00 ft * 0.868 ft^3/ft	= 34.72 ft^3
	= 6.18 bbl
Tail plus shoe joint	= 451.50 ft^3
	= 80.42 bbl
Total Tail	= 335 sks

Job Recommendation — Surface Casing

Install floating equipment, run casing to bottom, and circulate a minimum of 2-3 hole volumes prior to cementing as follows:

Fluid Instructions

Fluid 1: Precede cement with 20 bbl
Fresh Water

Fluid Volume:	20 bbl

Fluid 2: Lead with 450 sks
Halliburton Light Premium Plus
0.125 lbm/sk Poly-E-Flake (Lost Circulation Additive)

Fluid Weight	12.80 lbm/gal
Slurry Yield:	1.83 ft^3/sk
Total Mixing Fluid:	9.92 Gal/sk
Top of Fluid:	0 ft
Calculated Fill:	590 ft
Volume.	145.99 bbl
Calculated Sacks:	448.40 sks
Proposed Sacks:	450 sks

Fluid 3: Tail-in with 340 sks
Premium Plus Cement
2 % Calcium Chloride (Accelerator)

Fluid Weight	14.80 lbm/gal
Slurry Yield:	1.35 ft^3/sk
Total Mixing Fluid:	6.39 Gal/sk
Top of Fluid	590 ft
Calculated Fill:	300 ft
Volume.	80.42 bbl
Calculated Sacks.	335.19 sks
Proposed Sacks:	340 sks

HALLIBURTON

Job Information — 1st Intermediate Casing

SE Lusk 27 1

Surface Casing	0 - 890 ft (MD)
Outer Diameter	13.375 in
12-1/4" Hole	890 - 3080 ft (MD)
Inner Diameter	12.250 in
Job Excess	100 %
1st Intermediate Casing	0 - 3080 ft (MD)
Outer Diameter	10.750 in

Calculations

Cement : (2580.00 ft fill)

890.00 ft * 0.2377 ft^3/ft * 10 %	= 232.68 ft^3
1690.00 ft * 0.1882 ft^3/ft * 100 %	= 636.01 ft^3
Total Lead Cement	= 868.69 ft^3
	= 154.72 bbl
Sacks of Cement	= 352 sks

Cement : (500.00 ft fill)

500.00 ft * 0.1882 ft^3/ft * 100 %	= 188.17 ft^3
Tail Cement	= 188.17 ft^3
	= 33.51 bbl

Shoe Joint Volume: (40.00 ft fill)

40.00 ft * 0.5509 ft^3/ft	= 22.04 ft^3
	= 3.92 bbl
Tail plus shoe joint	= 210.20 ft^3
	= 37.44 bbl
Total Tail	= 157 sks

Job Recommendation — 1st Intermediate Casing

Install floating equipment, run casing to bottom and circulate a minimum of 2-3 hole volumes prior to cementing as follows.

Fluid Instructions

Fluid 1: Precede cement with 20 bbl
Fresh Water

Fluid Volume:	20 bbl

Fluid 2. Lead with 355 sks
Interfill C

Fluid Weight	11.90 lbm/gal
Slurry Yield:	2.47 ft^3/sk
Total Mixing Fluid:	14.30 Gal/sk
Top of Fluid:	0 ft
Calculated Fill:	2580 ft
Volume.	154.72 bbl
Calculated Sacks:	352.27 sks
Proposed Sacks:	355 sks

Fluid 3: Tail-in with 160 sks
Premium Plus Cement
1 % Calcium Chloride (Accelerator)

Fluid Weight	14.80 lbm/gal
Slurry Yield:	1.34 ft^3/sk
Total Mixing Fluid:	6.36 Gal/sk
Top of Fluid:	2580 ft
Calculated Fill:	500 ft
Volume:	37.44 bbl
Calculated Sacks:	157.34 sks
Proposed Sacks:	160 sks

Job Information — 2nd Intermediate Casing

SE Lusk 27 1

1st Intermediate Casing	0 - 3080 ft (MD)
Outer Diameter	10.750 in
9-1/2" Hole	3080 - 4270 ft (MD)
Inner Diameter	9.500 in
Job Excess	100 %
2nd Intermediate Casing	0 - 4270 ft (MD)
Outer Diameter	7.625 in

Calculations

Cement - (3770.00 ft fill)

3080.00 ft * 0.2338 ft³/ft * 10 %	= 792.03 ft³
690.00 ft * 0.1751 ft³/ft * 100 %	= 241.68 ft³
Total Lead Cement	= 1033.71 ft³
	= 184.11 bbl
Sacks of Cement	= 419 sks

Cement - (500.00 ft fill)

500.00 ft * 0.1751 ft³/ft * 100 %	= 175.13 ft³
Tail Cement	= 175.13 ft³
	= 31.19 bbl

Shoe Joint Volume: (40.00 ft fill)

40.00 ft * 0.2588 ft³/ft	= 10.35 ft³
	= 1.84 bbl
Tail plus shoe joint	= 185.48 ft³
	= 33.04 bbl
Total Tail	= 140 sks

Job Recommendation — 2nd Intermediate Casing

Install floating equipment, run casing to bottom, and circulate a minimum of 2-3 hole volumes prior to cementing as follows:

Fluid Instructions

Fluid 1: Precede cement with 20 bbl
Fresh Water

Fluid Volume:	20 bbl

Fluid 2: Lead with 420 sks
Interfill C

Fluid Weight:	11.90 lbm/gal
Slurry Yield:	2.47 ft^3/sk
Total Mixing Fluid:	14.30 Gal/sk
Top of Fluid:	0 ft
Calculated Fill:	3770 ft
Volume:	184.11 bbl
Calculated Sacks:	419.18 sks
Proposed Sacks:	420 sks

Fluid 3: Tail-in with 140 sks
Premium Plus Cement

Fluid Weight:	14.80 lbm/gal
Slurry Yield:	1.33 ft^3/sk
Total Mixing Fluid:	6.34 Gal/sk
Top of Fluid:	3770 ft
Calculated Fill:	500 ft
Volume:	33.04 bbl
Calculated Sacks:	139.88 sks
Proposed Sacks:	140 sks

Job Information — Production Casing

SE Lusk 27	1
2nd Intermediate Casing	0 - 4270 ft (MD)
Outer Diameter	7.625 in
6-1/2" Hole	4270 - 7800 ft (MD)
Inner Diameter	6.500 in
Job Excess	50 %
Production Casing	0 - 7800 ft (MD)
Outer Diameter	5.500 in

Calculations

Cement : (2300.00 ft fill)

270.00 ft * 0.0939 ft^3/ft * 10 %	= 27.88 ft^3
2030.00 ft * 0.0654 ft^3/ft * 50 %	= 199.29 ft^3
Total Lead Cement	= 227.17 ft^3
	= 40.46 bbl
Sacks of Cement	= 92 sks

Cement : (1500.00 ft fill)

1500.00 ft * 0.0654 ft^3/ft * 50 %	= 147.26 ft^3
Tail Cement	= 147.26 ft^3
	= 26.23 bbl

Shoe Joint Volume: (40.00 ft fill)

40.00 ft * 0.1305 ft^3/ft	= 5.22 ft^3
	= 0.93 bbl
Tail plus shoe joint	= 152.48 ft^3
	= 27.16 bbl
Total Tail	= 122 sks

Job Recommendation — Production Casing

Install floating equipment, run casing to bottom, and circulate a minimum of 2-3 hole volumes prior to cementing as follows.

Fluid Instructions

Fluid 1: Precede cement with 500 gallons
SUPER FLUSH 102

Fluid Volume:	11.90 bbl

Fluid 2: Lead with 95 sks
Interfill H

Fluid Weight	11.90 lbm/gal
Slurry Yield:	2.48 ft^3/sk
Total Mixing Fluid:	14.41 Gal/sk
Top of Fluid:	4000 ft
Calculated Fill:	2300 ft
Volume:	40.46 bbl
Calculated Sacks:	91.75 sks
Proposed Sacks:	95 sks

Fluid 3: Tail-in with 125 sks
50/50 Poz Premium

0.4 %	LAP-1 (Low Fluid Loss Control)
0.4 %	CFR-3 (Dispersant)
0.25 lbm/sk	D-AIR 3000 (Defoamer)
0.1 %	HR-7 (Retarder)

Fluid Weight	14.40 lbm/gal
Slurry Yield:	1.25 ft^3/sk
Total Mixing Fluid:	5.76 Gal/sk
Top of Fluid:	6300 ft
Calculated Fill:	1500 ft
Volume:	27.16 bbl
Calculated Sacks:	121.99 sks
Proposed Sacks:	125 sks

DRILLING FLUIDS PROGRAM

PREPARED FOR:

Southeast Lusk Federal 27 #1

Section 27, T-19-S, R-32-E
Lea County, New Mexico

SUBMITTED TO:

Ryan Price

Edge Petroleum Operating Company, Inc
1301 Travis
Suite 2000
Houston, Texas 77002

PREPARED BY:

Mike Davis

Newpark Drilling Fluids, L.L.C.

August 2, 2007

Mr. Ryan Price
Edge Petroleum Operating Company, Inc
1301 Travis
Suite 2000
Houston, Texas 77002

Dear Mr. Price,

Enclosed are our drilling fluids recommendations for your Southeast Lusk Federal 27 #1 in Section 27, T-19-S, R-32-E, of Lea County, New Mexico. They are derived from information from your office, offset well data, and our knowledge of the area.

Prices include mud products, engineering service, taxes and trucking. Estimated mud cost is $8,000.00 to $11,000.00 based on 21 – 23 total days with ideal conditions. Excessive pressure, lost circulation, stuck pipe, water flows, or extended days on the well will increase the estimated cost.

For questions or comments, call (800) 592-4627 or (432) 697-8661. Both are 24-hour numbers.

Sincerely,

Mike Davis

Note: Some of the chemicals and mud additives specified in this program may have toxic properties. All personnel should be familiar with the inherent dangers and appropriate safeguards to prevent accidental injury. Use of the chemicals may be governed by certain laws and regulations and should only be used in accordance with such. Please refer to the MSDS sheets for the recommended safety precautions and required minimum personal protective equipment.

Newpark Drilling Fluids, L.L.C.

Edge Petroleum Operating Company, Inc
Southeast Lusk Federal 27 #1
Section 27, T-19-S, R-32-E
Lea County, New Mexico

PROGRAM HIGHLIGHTS:

TOTAL DEPTH : 7,800'

CASING REQUIREMENTS
: Interval 1: 0' – 980' set 13-3/8" casing.
: Interval 2: 980' – 3,080' set 10-3/4" casing.
: Interval 3: 3,080' – 4,270' set 7-5/8" casing.
: Interval 4: 4,270' – 7,800' set 5-1/2" casing.

MUD WEIGHT REQUIREMENTS
: 8.6 – 8.8 ppg @ 0' – 980'
: 10.0 – 10.2 ppg @ 980' – 3,080'
: 8.4 – 8.5 ppg @ 3,080' – 4,270'
: 8.4 – 8.5 ppg @ 4,270' – 7,200'
: 8.5 – 8.7 ppg @ 7,300' – 7,800'

DAYS TO REACH TD : 21 – 23

COST ESTIMATE : $8,000.00 – $11,000.00

WAREHOUSE
: **Lovington, New Mexico** (800) 592-4627
: **David Volz**, Distribution Manager

PERMIAN BASIN PERSONNEL
: **Midland, Texas** (800) 592-4627
: **Joe Henderson**, Permian Basin Business Unit Manager
: **Al Boudreaux**, Sales Manager
: **Doug Thomas**, Sales
: **Ken Anthony**, Technical Engineer
: **Mike Davis**, Technical Engineer

MUD PROPERTIES SUMMARY:

Depth (feet)	Weight (ppg)	Viscosity (sec/1000cc)	Fluid Loss (cc/30min)	PV (cps)	YP (lb/100ft²)	Mud Type
0' – 980' 13-3/8" Casing	8.6 – 8.8	36 –38	N/C	6 – 10	6 – 20	**Spud Mud**
980' – 3,080' 10-3/4" Casing	10.0 – 10.2	29 – 30	N/C	0 – 1	0 – 1	**Brine**
3,080' – 4,270' 7-5/8" Casing	8.4 – 8.5	28 –29	NC	0 – 1	0 – 1	**Fresh Water**
4,270' – 7,200' --	8.4 – 8.5	28 – 29	NC	0 – 1	0 – 1	**Fresh Water**
7,200' – 7,800' 5-1/2" Casing	8.5 – 8.7	34 – 36	10 – 12	2 – 4	4 – 10	**NewGel/Pac**

Note: The mud weight schedule is intended as a guideline only. Actual mud weights used should be determined by hole conditions and drilling parameters. Drilling with a minimum amount of overbalance will reduce the possibility of losing returns and/or of differentially sticking the drill string.

PROGRAM HIGHLIGHTS (CONT'D):

HOLE & CASING DESIGN:

INTERVAL	DEPTH (feet)	BIT SIZE	CASING (OD)	ANTICIPATED MUD WT. (ppg)
INTERVAL 1	0' – 980'	17-1/4"	13-3/8"	8.6 – 8.8
INTERVAL 2	980' – 3,080'	12-1/4"	10-3/4"	10.0 – 10.2
INTERVAL 3	3,080' – 4,270'	9-1/2"	7-5/8"	8.4 – 8.5
INTERVAL 4	4,270' – 7,200'	6-1/2"	--	8.4 – 8.5
INTERVAL 5	7,200' – 7,800'	6-1/2"	5-1/2"	8.5 – 8.7

SOLIDS CONTROL:

INTERVAL	RECOMMENDED SOLIDS CONTROL EQUIPMENT
INTERVAL 1	One linear motion shale shaker.
INTERVAL 2	Reserve.
INTERVAL 3	Reserve.
INTERVAL 4	Reserve.
INTERVAL 5	One linear motion shale shaker.

ESTIMATED FORMATION TOPS:

FORMATION	DEPTH
Anhydrite	980'
Yates	2,655'
Capitan	3,062'
Delaware	4,270'
Cherry Canyon	4,755'
Bone Springs	7,200'
Total Depth	**7,800'**

Edge Petroleum Operating Company, Inc
Southeast Lusk Federal 27 #1
Section 27, T-19-S, R-32-E
Lea County, New Mexico

Interval 1: 17-1/2" Hole
Interval: 0' – 980'
Casing: 13-3/8"
Days: 1

Drilling Fluid Properties:

Depth (feet)	Weight (ppg)	Viscosity (sec/1000cc)	PV (cps)	YP (lb/100ft²)	pH (value)	Fluid Loss (cc/30min)	LG Solids (%)
0' – 980'	8.6 – 8.8	36 – 38	6-10	6-20	9 – 10	N/C	<6

Drilling Fluid Recommendations:

Spud with a conventional "spud mud". Use **NewGel** and native solids to maintain a sufficient viscosity to keep the hole clean. Compound pumps to provide adequate volume to produce required annular velocity to clean hole. Mix **Soda Ash** for pH control. Mix **Paper** as needed to control seepage loss. Run fresh water at flowline for dilution and volume.

At total depth of interval, mix in pre-mix pit, 100 barrels of fresh water; **NewGel** for a viscosity of 70 sec/1000cc, add 0.25 ppb of **Super Sweep**. Pump this pill prior to trip to run surface casing.

Materials Consumption

100	sx	New Gel
15	sx	Paper
5	sx	Soda Ash
1	bx	Super Sweep

Edge Petroleum Operating Company, Inc
Southeast Lusk Federal 27 #1
Section 27, T-19-S, R-32-E
Lea County, New Mexico

Maintenance Procedure: Interval 1

Fluid Loss - Fluid loss control is not necessary in this interval

Mud Weight - Maintain minimum fluid densities. Run water and premixes as needed to maintain volume and weight as specified. Drilling with a minimum amount of overbalance will reduce the possibility of losing returns and/or of differentially sticking the drill string.

Rheology - Solids content is the primary factor that will affect rheology

Alkalinity - Maintain pH in the 9.0-10.0 range with **Soda Ash**.

Hole Cleaning - Optimum hydraulics and rheological properties should be maintained to provide maximum hole cleaning and minimize washout of the well bore..

Mud Losses Down hole - Loss of circulation is a possibility through this interval. Use **Fiber Plug** and **Fiber Seal**. Keep the hole full at all times, and avoid excessive swabbing and/or surge actions when tripping pipe. Bring pumps on the hole gradually anytime circulation has been interrupted, increasing pump strokes only after full returns are established.

Solids Control - Maintain low gravity solids at <6% by volume. The shakers should be equipped with the finest mesh screens that will handle the circulating volume.

Edge Petroleum Operating Company, Inc
Southeast Lusk Federal 27 #1
Section 27, T-19-S, R-32-E
Lea County, New Mexico

Interval 2: **12-1/4" Hole**
Interval: **980' – 3,080'**
Casing: **10-3/4"**
Days: **7**

Drilling Fluid Properties:

Depth (feet)	Weight (ppg)	Viscosity (sec/1000cc)	PV (cps)	YP (lb/100ft²)	pH (value)	Fluid Loss (cc/30min)	LG Solids (%)
980' – 3,080'	10.0 – 10.2	29 – 30	0 – 1	0 – 1	9.0-10.0	N/C	<6

Drilling Fluid Recommendations:

Drill out below 13-3/8" casing with Brine Water, circulating through the reserve pit for maximum gravitational removal of solids. Use sweeps of **Paper** to control seepage loss. Use **Lime** for pH control. For hole sweeps mix one gallon of **New-55** with 30 gallons water in chemical barrel and slug thru pump every 500'.

For hole sweeps use 100 barrels of system water in a premix pit. Add **Salt Gel** for a viscosity of 70-80 sec/1000cc and add 0.25 ppb of **Super Sweep**. Sweep hole with 50 bbls every 500'.

At total depth of interval use 100 barrels of system water in a premix pit. Mix **Salt Gel** for a viscosity of 70-80 sec/1000cc and add 0.25 ppb of **Super Sweep**. Pump this pill prior to trip to run casing.

Materials Consumption

200	sx	Salt Gel
50	sx	Paper
25	sx	Caustic
5	cn	New 55
2	bx	Super Sweep

Edge Petroleum Operating Company, Inc
Southeast Lusk Federal 27 #1
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Lea County, New Mexico

Maintenance Procedure: Interval 2

Fluid Loss - Fluid loss control is not necessary in this interval.

Mud Weight -. Drilling with a minimum amount of overbalance will reduce the possibility of losing returns and/or of differentially sticking the drill string.

Alkalinity - Maintain pH in the 9.0-10 0 range with **Caustic**.

Hole Cleaning - Optimum hydraulics and rheological properties should be maintained to provide maximum hole cleaning and minimize washout of the well bore. Sweeping the hole with fresh water mud pills made of fresh water, **Salt Gel** for a 80-90 sec/1000cc viscosity and 0.25 ppb of **Super Sweep** every 500' will provide additional hole cleaning.

Mud Losses Down hole - Loss of circulation is a possibility through this interval. Use **Fiber Plug** and **Fiber Seal**. Keep the hole full at all times, and avoid excessive swabbing and/or surge actions when tripping pipe Bring pumps on the hole gradually anytime circulation has been interrupted, increasing pump strokes only after full returns are established.

Solids Control - Maintain low gravity solids at <6% by volume. Circulating the reserve will provide gravitational solids control.

Edge Petroleum Operating Company, Inc
Southeast Lusk Federal 27 #1
Section 27, T-19-S, R-32-E
Lea County, New Mexico

Interval 3: 9-1/2" Hole
Interval: 3,080' – 4,270'
Casing: 7-5/8"
Days: 5

Drilling Fluid Properties:

Depth (feet)	Weight (ppg)	Viscosity (sec/1000cc)	PV (cps)	YP (lb/100ft²)	pH (value)	Fluid Loss (cc/30min)	LG Solids (%)
3,080 – 4,270'	8.4 – 8.5	28 – 29	0 – 1	0 – 1	9.0-10.0	N/C	<6

Drilling Fluid Recommendations:

Drill out below 10-3/4" casing with Fresh Water, circulating through the remaining portion of the reserve pit for maximum gravitational removal of solids. Use sweeps of **Paper** to control seepage loss. Use **Caustic Soda** for pH control. For hole sweeps mix one gallon of **New-55** with 30 gallons water in chemical barrel and slug thru pump every 500'. Sweep hole with 5 pounds of **Super Sweep** every 500'.

For hole sweeps use 100 barrels of system water in a premix pit. Add **New Gel** for a viscosity of 70-80 sec/1000cc and add 0.25 ppb of **Super Sweep**. Sweep hole with 25 bbls every 250'.

Materials Consumption

200	sx	New Gel
40	sx	Paper
30	sx	Caustic Soda
5	cn	New 55
3	bx	Super Sweep

Edge Petroleum Operating Company, Inc
Southeast Lusk Federal 27 #1
Section 27, T-19-S, R-32-E
Lea County, New Mexico

Maintenance Procedure: Interval 3

Fluid Loss - Fluid loss control is not necessary in this interval

Mud Weight - Drilling with a minimum amount of overbalance will reduce the possibility of losing returns and/or of differentially sticking the drill string

Alkalinity - Maintain pH in the 9.0-10.0 range with **Caustic**.

Hole Cleaning - Sweep the hole with fresh water mud pills made of fresh water, **New Gel** for a 80-90 sec/1000cc viscosity and 0.25 ppb of **Super Sweep** every 250' will provide additional hole cleaning.

Mud Losses Down hole - Loss of circulation is a possibility through this interval. Use **Fiber Plug** and **Fiber Seal**. Keep the hole full at all times, and avoid excessive swabbing and/or surge actions when tripping pipe. Bring pumps on the hole gradually anytime circulation has been interrupted, increasing pump strokes only after full returns are established.

Solids Control - Maintain low gravity solids at <6% by volume. Circulating the reserve will provide gravitational solids control.

Edge Petroleum Operating Company, Inc
Southeast Lusk Federal 27 #1
Section 27, T-19-S, R-32-E
Lea County New Mexico

Interval 4: **6-1/2" Hole**
Interval: **4,270' – 7,200'**
Casing: --
Days: **10**

Drilling Fluid Properties:

Depth (feet)	Weight (ppg)	Viscosity (sec/1000cc)	PV (cps)	YP (lb/100ft²)	API Fluid Loss (cc/30min)	pH (value)	LG Solids (%)
4,270' – 7,200'	8.4 – 8.5	28 – 29	0 – 1	0 – 1	9.0-10.0	N/C	<6

Drilling Fluid Recommendations:

Drill out below 7-5/8" casing with Fresh Water, circulating through the remaining portion of the reserve pit for maximum gravitational removal of solids. Use sweeps of **Paper** to control seepage loss. Use **Caustic Soda** for pH control. For hole sweeps mix one gallon of **New-55** with 30 gallons water in chemical barrel and slug thru pump every 500'. Sweep hole with 5 pounds of **Super Sweep** every 500'.

For hole sweeps use 100 barrels of system water in a premix pit. Add **New Gel** for a viscosity of 70-80 sec/1000cc and add 0.25 ppb of **Super Sweep**. Sweep hole with 25 bbls every 250'.

Materials Consumption

200 sx New Gel
40 sx Paper
30 sx Caustic Soda
5 cn New 55
3 bx Super Sweep

Edge Petroleum Operating Company, Inc
Southeast Lusk Federal 27 #1
Section 27, T-19-S, R-32-E
Lea County, New Mexico

Maintenance Procedure: Interval 4

Fluid Loss - Fluid loss control should be maintained with **White Starch**.

Mud Weight - Drilling with a minimum amount of overbalance will reduce the possibility of losing returns and/or of differentially sticking the drill string.

Alkalinity - Maintain pH in the 9.0-10.0 range with **Caustic**

Hole Cleaning - Sweeping the hole with fresh water mud pills made of fresh water, **New Gel** for a 80-90 sec/1000cc viscosity and 0.25 ppb of **Super Sweep** every 250' will provide additional hole cleaning

Mud Losses Down hole - Loss of circulation is a possibility through this interval. Use **Fiber Plug** and **Fiber Seal**. Keep the hole full at all times, and avoid excessive swabbing and/or surge actions when tripping pipe. Bring pumps on the hole gradually anytime circulation has been interrupted, increasing pump strokes only after full returns are established.

Solids Control - Maintain low gravity solids at <6% by volume. Circulating the reserve will provide gravitational solids control. The shakers should be equipped with 150-200 mesh screens at displacement. An attempt to screen down to the finest mesh possible that will handle the volume being circulated.

Edge Petroleum Operating Company, Inc
Southeast Lusk Federal 27 #1
Section 27, T-19-S, R-32-E
Lea County, New Mexico

Interval 5: **6-1/2" Hole**
Interval: **7,200' – 7,800'**
Casing: **5-1/2"**
Days: **8**

Drilling Fluid Properties:

Depth (feet)	Weight (ppg)	Viscosity (sec/1000cc)	PV (cps)	YP (lb/100ft²)	API Fluid Loss (cc/30min)	pH (value)	LG Solids (%)
7,200' – 7,800'	8.5 – 8.7	34 – 36	2 – 6	2 – 6	10 – 12 cc	9 – 10	<6

Drilling Fluid Recommendations:

At **7,200'** confine circulation to the working pits and begin mud up with a **NewGel/Pac** system. Mix **Soda Ash** to reduce total hardness to 200ppm. Mix **NewGel** for a 34 – 36 sec/1000cc viscosity. Mix **NewPac** to lower API filtrate to 10-12cc/30 min. Maintain pH with **Caustic Soda**. Use **Desco** to modify rheology as needed.

At total depth sweep hole with a 50 bbls high viscosity sweep. Pull 50bbls of system fluid into the premix pit and add **NewGel** for 70-80 sec/1000cc viscosity.

Materials Consumption

350 sx New Gel
50 sx Soda Ash
25 sx NewPac
10 sx Caustic Soda
10 sx Desco

Edge Petroleum Operating Company, Inc
Southeast Lusk Federal 27 #1
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Lea County, New Mexico

Maintenance Procedure: Interval 4

Fluid Loss - Fluid loss control should be maintained with **NewPac**.

Mud Weight - Drilling with a minimum amount of overbalance will reduce the possibility of losing returns and/or of differentially sticking the drill string.

Alkalinity - Maintain pH in the 9.0-10.0 range with **Caustic**.

Hole Cleaning - Optimum hydraulics and rheological properties should be maintained to provide maximum hole cleaning and minimize washout of the well bore. Sweeping the hole with fresh water mud pills made of fresh water, **New Gel** for a 80-90 sec/1000cc viscosity and 0.25 ppb of **Super Sweep** every 250' will provide additional hole cleaning.

Mud Losses Down hole - Loss of circulation is a possibility through this interval. Use **Fiber Plug** and **Fiber Seal**. Keep the hole full at all times, and avoid excessive swabbing and/or surge actions when tripping pipe. Bring pumps on the hole gradually anytime circulation has been interrupted, increasing pump strokes only after full returns are established.

Solids Control - Maintain low gravity solids at <6% by volume. Circulating the reserve will provide gravitational solids control. The shakers should be equipped with 150-200 mesh screens at displacement. An attempt to screen down to the finest mesh possible that will handle the volume being circulated.

Newpark Drilling Fluids, LLC

Edge Petroleum Operating Company, Inc
Southeast Lusk Federal 27 #1
Section 27, T-19-S, R-32-E
Lea County, New Mexico

ENGINEER / WAREHOUSE INFORMATION

WELL NAME: Southeast Lusk 27 #1

LOCATION: Section 27, T-18-S, R-32-E

Lea County, New Mexico

MUD ENGINEER: Bill Stewart Hobbs, New Mexico

Lynn Pearson Carlsbad, New Mexico

(800) 592-4627 or (432) 697-8661. Both 24 hours.

WAREHOUSE: Lovington, New Mexico

Artesia, New Mexico

Water Base Mud Plant Monahans, Texas

Oil Base Mud Plant Monahans, Texas

(800) 592-4627 or (432) 697-8661. Both 24 hours.

Edge Petroleum Operating Company, Inc
Southeast Lusk Federal 27 #1
Section 27, T-19-S, R-32-E
Lea County, New Mexico

Lost Circulation Procedures

Seepage Losses – Mud consumed at the rate of 2.0-2.5 barrels per barrel of hole drilled (18.5± bbls of mud per 100' of 8-1/2" hole drilled) can be expected. The 1.0-1.5 bbls lost per barrel of hole drilled is due to mud retained on cuttings and filtration losses down hole. Volumes in excess of 20 bbls per 100' of hole should be considered seepage losses and the following remedial action taken:

1. Discontinue drilling and circulate cuttings out of the hole at a reduced rate for 5 minutes. Pull one stand and stop pumps to see if the hole is standing full. Keep pipe moving while checking fluid level.

2. If the hole is standing full while static, the seepage losses may be from excessive cuttings, out of gauge hole or circulating pressure losses (ECD). Break circulation slowly and return to drilling, carefully monitoring mud consumption rates and static hole conditions on connections.

3. If the hole is taking fluid while static, prepare a 50-60 bbl pill of 45-50 viscosity mud with 10-20 ppb of Fiber-Plug and 10-20 ppb of Fiber-Seal, and spot near bottom. Pull five stands and check static level of fluid in the hole. Keep hole full at all times and monitor the mud loss rate.

4. If little or no improvement is noted after pumping the 50-60 barrel LCM pill, prepare a balanced, high-filtrate (50cc/30min@100psi) water based pill (40 bbls). This pill can be formulated with Dynazan or New Gel (flocculated with CaCl2 or Lime) and Barite. Pull pipe above the suspected loss zone and spot the pill outside the drill pipe at 1 barrel per minute. Pull out of the pill, close the hydril and if a float collar is in the string, pump down the annulus until sufficient backpressure is established. Hold the maximum allowable backpressure (300-900 psi) for 2-4 hours, open the hydril and establish full circulation before going to bottom.

Edge Petroleum Operating Company, Inc
Southeast Lusk Federal 27 #1
Section 27, T-19-S, R-32-E
Lea County, New Mexico

Severe Losses:

1. Should complete returns be lost, stop the pumps and pull the pipe into the casing while pumping through the fill-up line to keep the hole full.

2. Allow the hole to remain static while filling with mud on the annulus side, monitoring the rate of mud loss.

3. Build 50-60 bbl pill of 45-50-viscosity mud with 10-20 ppb of Fiber-Plug and 10-20 ppb of Fiber-Seal, and spot near bottom. Pull five stands and check static level of fluid in the hole. Keep hole full at all times and monitor the mud loss rate. Should the hole stand full, allow 4-6 hours of healing time before staging back to bottom slowly and resuming drilling.

4. Should only partial returns be established, repeat the LCM pill once more. If complete loss of circulation persist, or if only partial returns can be established after the 2nd LCM pill, prepare a balanced, high-filtrate (50cc/30min@100psi) water based pill (40 bbls). Pull pipe above the suspected loss zone and spot the pill outside the drill pipe at 1 barrel per minute. Pull out of the pill, close the hydril and if a float collar is in the string, pump down the annulus until sufficient backpressure is established. Hold the maximum allowable backpressure (300-900 psi) for 2-4 hours, open the hydril and establish full circulation before going to bottom.

5. Should the LCM pills fail to establish returns, be prepared to squeeze cement into loss zone.

Loss of circulation is a possibility on any well. Although each well is different, there are some basic procedures and drilling practices that can aid in reducing the severity and in some, cases prevent lost circulation. Below is a list of several parameters, which may prove helpful.

1. Maintain viscosities as low as possible and still clean the hole.

2. Maintain mud weights as low as possible without jeopardizing safety.

3. Use slower tripping speeds to prevent swabbing and surging.

4. Break circulation in stages while tripping in the hole.

5. Rotate pipe while breaking circulation.

Edge Petroleum Operating Company, Inc
Southeast Lusk Federal 27 #1
Section 27, T-19-S, R-32-E
Lea County, New Mexico

Solids Control

The most important contributing factor to good mud properties for this well, is a low native solids content. A good solids control plan can reduce over-all cost with increased penetration rates, lower cost on chemical additions and whole mud replacement.

The solids control equipment for this well should include:

- High Speed Linear Motion shale shaker with fine mesh screens.
- Desilter.

Shale Shaker

Use a high-speed linear motion shale shaker with fine mesh screens. It is imperative to remove cuttings as quickly as possible before they have a chance to mechanically break up in the circulating system. Initial screen sizes should be 80-100 mesh. Screen down to smaller mesh screens as soon as practicable to reduce the amount of solids being dispersed into the fluid system.

Desilter

Will be employed to remove solids in the 176 to 74 micron range. The desilter should have 6-8 hydro clones (six inch or larger) to work properly. A centrifugal pump should supply the feed line with a minimum of 35 psi on the desilter chamber.

Edge Petroleum Operating Company, Inc
Southeast Lusk Federal 27 #1
Section 27, T-19-S, R-32-E
Lea County, New Mexico

Hydraulics

While drilling the deep mature shales in the Permian Basin, it is important to maintain an API filtrate to prevent hydration of the clays contained in those shales. Equally important is to maintain a Laminar Hydraulic Profile in the annulus while drilling those shales. These shale exhibit a high degree of erosion when the annular profile is in turbulent flow.

The annular velocity in the well bore is a measure to control hole cleaning and to determine the annular hydraulic profile. Critical velocity is the point at which flow transitions from laminar to turbulent flow. Mud weight, Plastic Viscosity, Yield Point, Pump Rate, Hole Diameter and tool diameter all are factors in determining critical velocity.

If adjusting the pump rate will affect the bit nozzle optimization, then the rheology can be adjusted to bring the annular profile into laminar flow.

$$\tau C = \frac{1.08\ PV + 1.08\sqrt{PV^2 + 9.26(dh-dp)^2\ YP\ M}}{M\ (dh-dp)}$$

PV = Plastic Viscosity
YP = Yield Point
M = Mud Weight (ppg)
Dh = Diameter of hole (inches)
Dp = Diameter of pipe (inches)

τC = Critical Velocity in feet per second.

Edge Petroleum Operating Company, Inc
Southeast Lusk Federal 27 #1
Section 27, T-19-S, R-32-E
Lea County, New Mexico

Filtration Control & Filter Cake Quality:

Sealing permeable zones in the well bore has long been accepted as a major function of a drilling fluid. The cost of the filtration control represents a major portion of the mud cost. Traditionally, most of this cost has resulted from controlling the filtration rate as opposed to controlling the filter cake quality. This is understandable since a definitive number is more a comfortable target than a subjective evaluation of a filter cake.

The primary objectives of filtration are:
- Minimize damage to the production zones.
- Optimize formation evaluation.
- Avoid differential pressure sticking of the pipe.
- Avoid under gauged holes due to thick filter cakes.

These objectives are achieved by focusing on important design factors:
- Compatibility of filtrate with formation solids.
- Thin, impermeable, and deformable filter cakes.
- Lubricious and shearable filter cakes.

Filtration Control Mechanisms:

There are four basic mechanisms for controlling filtration control and reducing the filter cake permeability. Understanding these mechanisms along with how filtration control products function is important.

1. **Bridging**- Bridging reduces filtration rates and permeability by plugging or blocking the pore spaces at the face of the filter medium. It generally requires solids about one-third the diameter of the pore space to form a bridge. New Gel, Calcium Carbonate, Lost Circulation Materials, Starch, and Soltex (LST-MD) are primary bridging materials.

2. **Bonding**- Bonding is the connecting or binding of solids together. New Pac, Dynazan, WL-100 and other high molecular weight polymers function as bonding materials. Secondarily, these materials function as bridging materials as well as increasing the viscosity of the filtrate.

3. **Deflocculation**- Deflocculants reduce the electro-chemical attraction between solids. This allows solids to be filtered individually, as opposed to flocs, and also reduces the void spaces in the cake created by flocs of solids. Lignite, Chrome Ligno-Sulphonates, Desco, and other low molecular weight polymers perform as deflocculants.

4. **Viscosity**- Fluid loss decreases proportional to the increase in viscosity of the filtrate. Temperature alone will change the filtrate viscosity. Therefore, filtration control is more difficult at high temperatures. Any soluble material added to the fluid will viscosify the filtrate.

Edge Petroleum Operating Company, Inc
Southeast Lusk Federal 27 #1
Section 27, T-19-S, R-32-E
Lea County, New Mexico

Hydration, Flocculation, and Deflocculation

The degree of hydration and flocculation of the filtered solids influence filter cake permeability. The effectiveness in permeability reduction may be demonstrated by ranking of clay solids according to their surface characteristics:

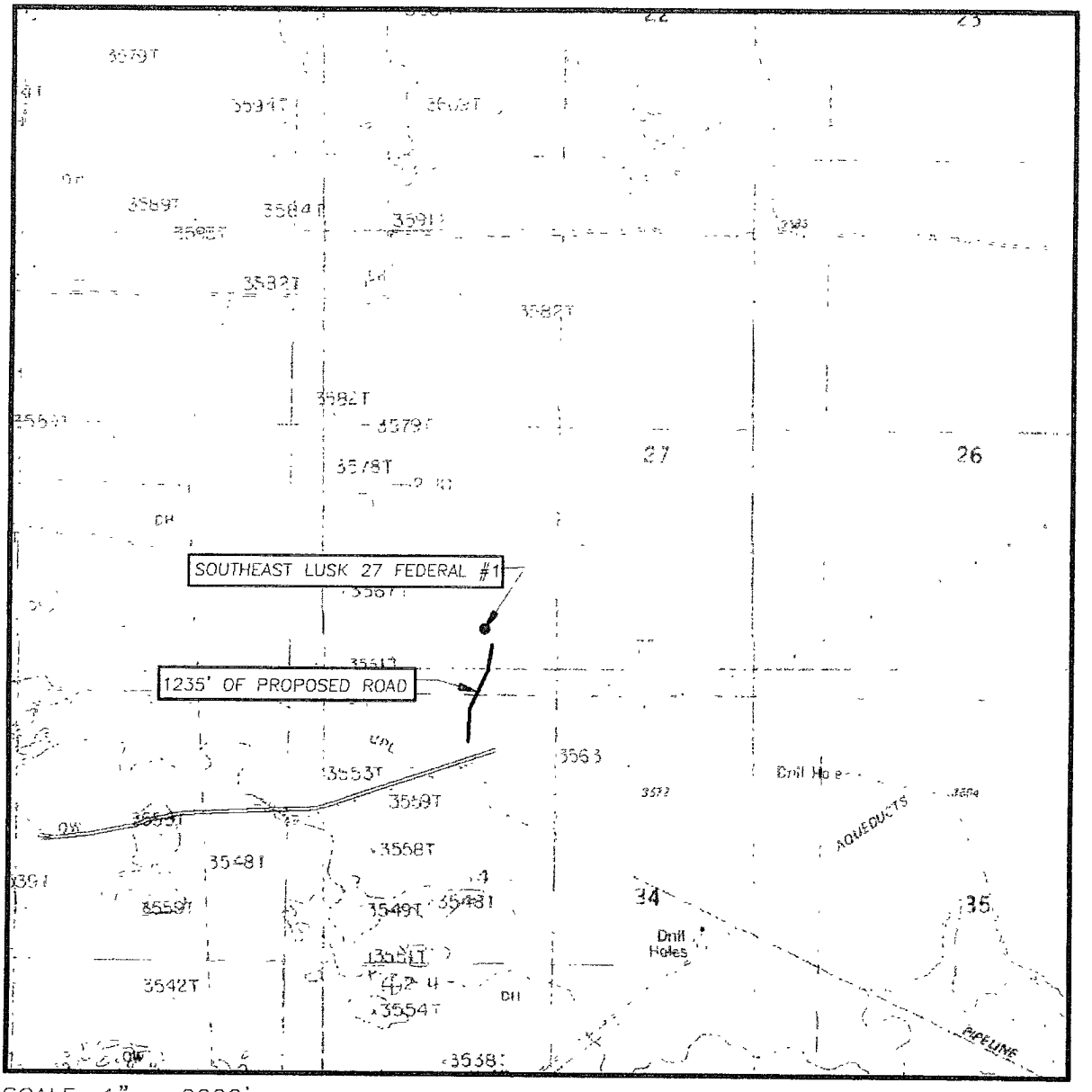
1. Dehydration/Aggregated/Flocculated (high permeability)
2. Hydrated/Flocculated (medium permeability)
3. Hydrated/Deflocculated (low permeability)

Since fluid loss and filter cake quality are important design factors, it is important to understand the predominate electro-chemical state of the solids. Initially, cake permeability is reduced as pre-hydrated bentonite is added to the system. When flocculated, these hydrated solids promote deformability or permeability reduction with increased pressure. This results from the compaction of hydrated flocs. With deflocculation, permeability is further decreased, as the void spaces created by the flocs diminish.

During drilling operations, hydrated solids are eventually dehydrated as the solids content increases and/or the system is converted to an inhibitive fluid. At this point, a decision must be made on the basis of economic and operational objectives. More pre-hydrated bentonite and/or other products may be added. These other products include New Pac, Calcium Carbonate, CMC, starch, or one of the new generation polymers.

Fluid loss control is a very complex process. The major factors that affect the process include time, pressure, temperature, filtrate viscosity, solids hydration, flocculation and filter cake erodability. Effective evaluation of the process requires that all factors be given strong consideration. Testing the fluids relative to the various factors is necessary to understand how a fluid may perform under down-hole conditions.

LOCATION VERIFICATION MAP



SCALE: 1" = 2000'

CONTOUP INTERVAL:
WILLIAMS SINK, N.M. – 10'
LAGUNA GATUNA, N.M. – 10'
LAGUNA GATUNA NW, N.M. – 10'
GREENWOOD LAKE, N.M. – 10'

SEC. 27 TWP. 19-S RGE. 32-E

SURVEY N.M.P.M.

COUNTY LEA STATE NEW MEXICO

DESCRIPTION 487' FSL & 1980' FWL

ELEVATION 3570'

OPERATOR EDGE PETROLEUM OPERATING CO.

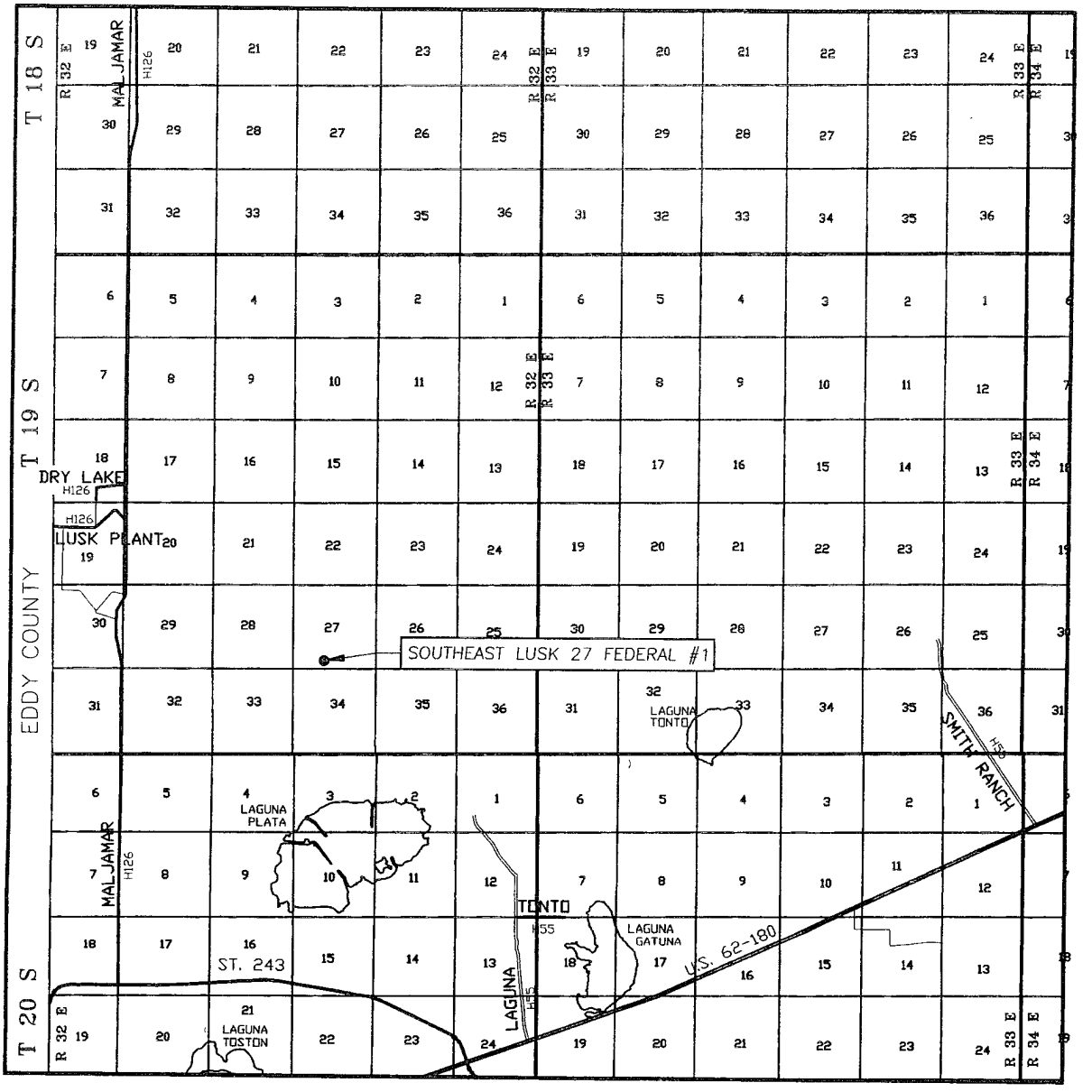
LEASE SOUTHEAST LUSK 27 FEDERAL

U.S.G.S. TOPOGRAPHIC MAP
WILLIAMS SINK, N.M.

PROVIDING SURVEYING SERVICES
SINCE 1946
JOHN WEST SURVEYING COMPANY
412 N. DAL PASO
HOBBS, N.M. 88240
(505) 393-3117

Exhibit A

VICINITY MAP



SCALE: 1" = 2 MILES

SEC. 27 TWP. 19--S RGE. 32--E

SURVEY N.M.P.M.

COUNTY LEA STATE NEW MEXICO

DESCRIPTION 487' FSL & 1980' FWL

ELEVATION 3570'

OPERATOR EDGE PETROLEUM OPERATING CO.

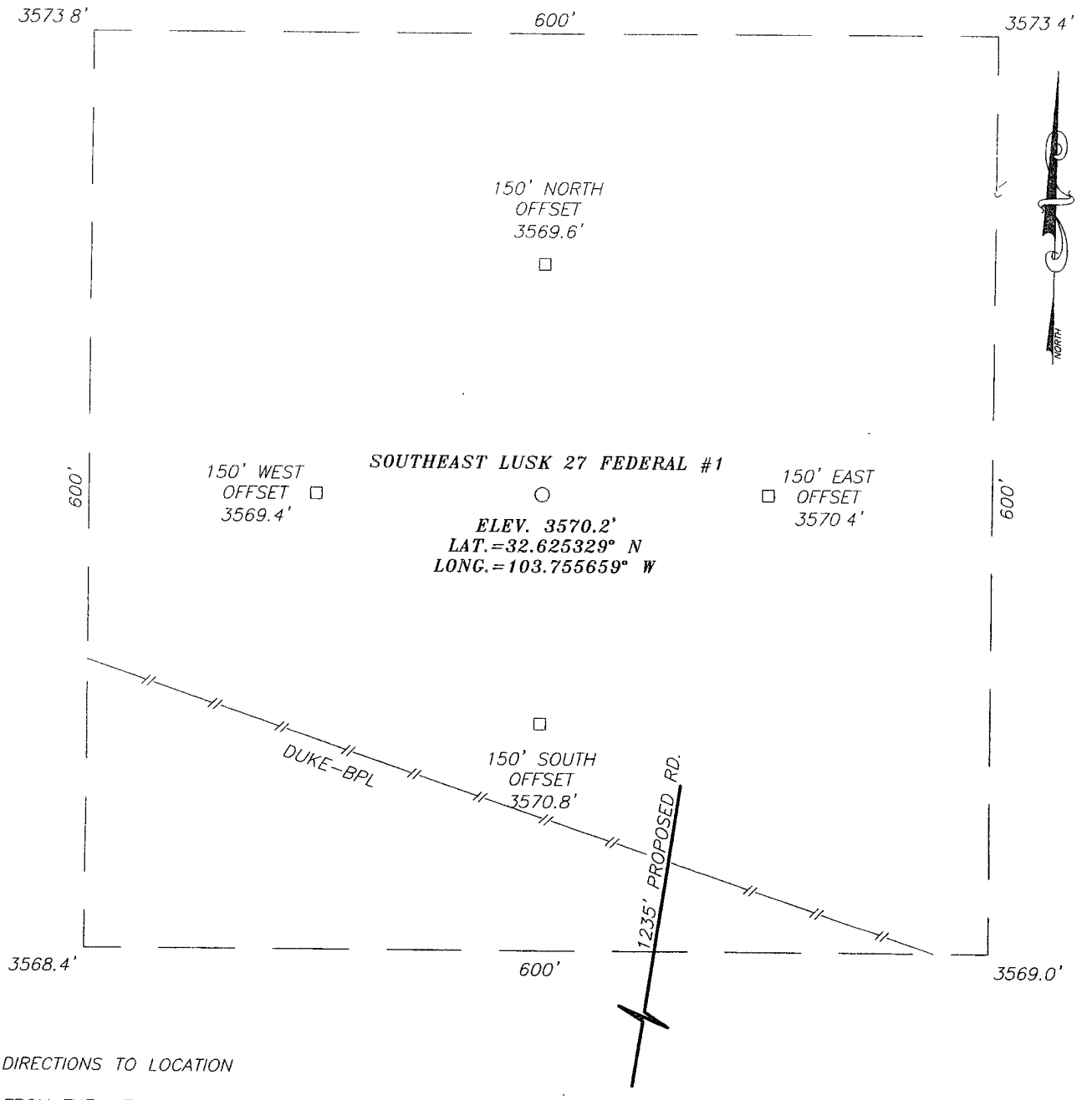
LEASE SOUTHEAST LUSK 27 FEDERAL

PROVIDING SURVEYING SERVICES
SINCE 1946
JOHN WEST SURVEYING COMPANY
412 N. DAL PASO
HOBBS, N.M. 88240
(505) 393-3117

Exhibit B

SECTION 27, TOWNSHIP 19 SOUTH, RANGE 32 EAST, N.M.P.M.,

LEA COUNTY, NEW MEXICO



DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF ST. HWY. #243 AND CO. RD. #H26 (MALJAMAR) GO NORTH ON H-26 APPROX. 3.8 MILES TURN RIGHT AND GO EAST APPROX. 1.1 MILE. BEND RIGHT AND GO SOUTH-SOUTHEAST APPROX. 0.5 MILES TO THE LUSK RED 5. BEND LEFT AND GO 1.1 MILE EASTERLY TO A PROPOSED ROAD SURVEY. FOLLOW ROAD SURVEY NORTH-NORTHEAST APPROX 1235 FEET TO THIS CORNER LOCATION.

100 0 100 200 Feet

Scale: 1"=100'

PROVIDING SURVEYING SERVICES SINCE 1946

JOHN WEST SURVEYING COMPANY

412 N. DAL PASO

HOBBS, N.M. 88240

(505) 393-3117

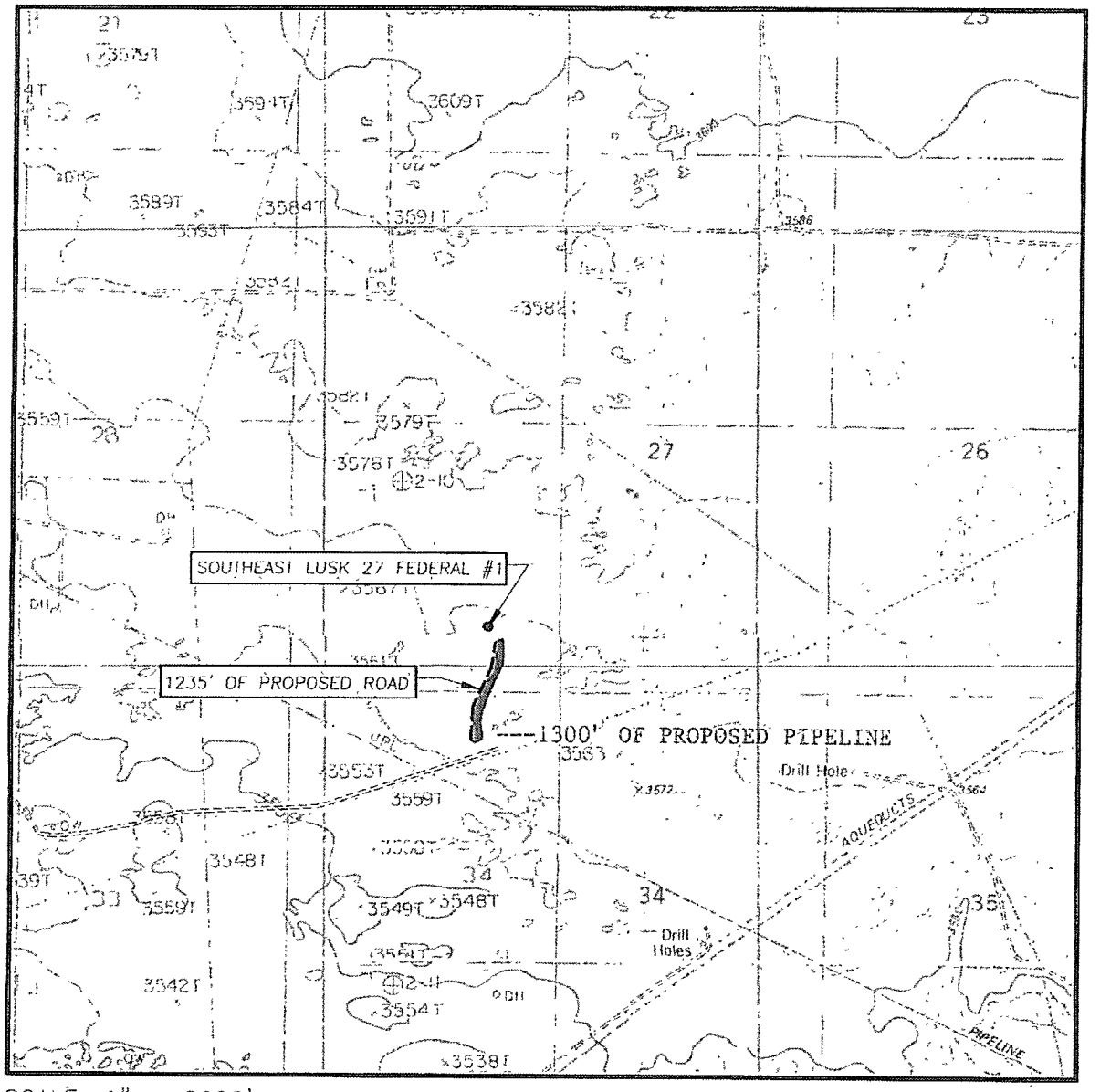
EDGE PETROLEUM OPERATING CO.

SOUTHEAST LUSK 27 FEDERAL #1 WELL
LOCATED 487 FEET FROM THE SOUTH LINE
AND 1980 FEET FROM THE WEST LINE OF SECTION 27
TOWNSHIP 19 SOUTH, RANGE 32 EAST, N.M.P.M.,
LEA COUNTY, NEW MEXICO.

Survey Date: 8/17/07	Sheet 1 of 1 Sheets		
W.O. Number: 07.11.1067	AR		Rev 1:
Date: 8/27/07	Disk:	07111067	Scale: 1"=100'

Exhibit C

LOCATION VERIFICATION MAP



SCALE: 1" = 2000'

CONTOUR INTERVAL:
WILLIAMS SINK, N.M. – 10'
LAGUNA GATUNA, N.M. – 10'
LAGUNA GATUNA NW, N.M. – 10'
GREENWOOD LAKE, N.M. – 10'

SEC. 27 TWP. 19-S RGE. 32-E

SURVEY N.M.P.M.

COUNTY LEA STATE NEW MEXICO

DESCRIPTION 487' FSL & 1980' FWL

ELEVATION 3570'

OPERATOR EDGE PETROLEUM OPERATING CO.

LEASE SOUTHEAST LUSK 27 FEDERAL

U.S.G.S. TOPOGRAPHIC MAP
WILLIAMS SINK, N.M.

PROVIDING SURVEYING SERVICES
SINCE 1946
JOHN WEST SURVEYING COMPANY
412 N. DAL PASO
HOBBS, N.M. 88240
(505) 393-3117

EDGE PETROLEUM CORPORATION

August 29, 2007

Bureau of Land Management
620 E. Greene Street
Carlsbad, NM 88220

To Whom It May Concern:

For purposes of securing regulatory permits for oil and gas drilling on federal lands in the state of New Mexico, Edge Petroleum Operating Company, Inc. has contracted R.K. Ford & Associates. Angela Lightner is authorized to act and file applications for Edge.

Should you have any questions, feel free to contact me at 713-335-9808.

Sincerely,

Ryan Price
Operations Engineer

1301 Travis, Suite 2000, Houston, Texas 77002 Phone: 713/654-8960 Fax: 713/654-7722

PECOS DISTRICT
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	Edge Petroleum Operating Company, Inc.
LEASE NO.:	NMNM 12412
WELL NAME & NO.:	Southeast Lusk 27 Federal #1
SURFACE HOLE FOOTAGE:	0487' FSL & 1980' FWL
BOTTOM HOLE FOOTAGE	
LOCATION:	Section 27, T. 19 S., R 32 E., NMPM
COUNTY:	Lea 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

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)

SENM-S-22

PRAIRIE CHICKENS

No surface use is allowed during the following time periods; unless otherwise specified, this stipulation does not apply to operation and maintenance of production facilities.

On the locations described below:

All of Section 27, T. 19S., R. 32E.

For the purpose of: Protecting Prairie Chickens:

Activities that produce noise or involve human activity will not be allowed between 3:00 am and 9:00 am in lesser prairie-chicken habitat during the period from March 15 through June 15 annually. Additionally, no new drilling will be allowed within 200 meters of leks known at the time of permitting. Normal vehicle use on existing roads will not be restricted. The proposed action will be allowed during the period from March 15 through June 15, provided that no personnel are on site between the hours of 3:00 am and 9:00 am. Furthermore, no equipment (including mud pumps and generators) will be allowed to operate during these hours.

Bureau of Land Management

SENM
-S-22

Carlsbad Field Office

December 1997

Modified 2007

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 (505) 234-5972 at least 3 working days prior to commencing construction of the access road and/or well pad.

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

B. TOPSOIL

There is no measurable soil on this well pad to stockpile. No topsoil stockpile is required.

C. RESERVE PITS

The reserve pit shall be constructed and closed in accordance with the NMOCD rules.

The reserve pit shall be constructed 150' X 150' on the North side of the well pad.

The reserve pit shall be constructed, so that upon completion of drilling operations, the dried pit contents shall be buried a minimum depth of three feet below ground level. Should the pit content level not meet the three foot minimum depth requirement, the excess contents shall be removed until the required minimum depth of three feet below ground level has been met. The operator shall properly dispose of the excess contents at an authorized disposal site.

The reserve pit shall be constructed and maintained so that runoff water from outside the location is not allowed to enter the pit. The berms surrounding the entire perimeter of the pit shall extend a minimum of two (2) feet above ground level. At no time will standing fluids in the pit be allowed to rise above ground level.

The reserve pit shall be fenced on three (3) sides during drilling operations. The fourth side shall be fenced immediately upon rig release.

D. FEDERAL MINERAL MATERIALS PIT

If the operator elects to surface the access road and/or well pad, mineral materials extracted during construction of the reserve pit may be used for surfacing the well pad and access road and other facilities on the lease.

Payment shall be made to the BLM prior to removal of any additional federal mineral materials from any site other than the reserve pit. Call the Carlsbad Field Office at (505) 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 thirty (30) feet.

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

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

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

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

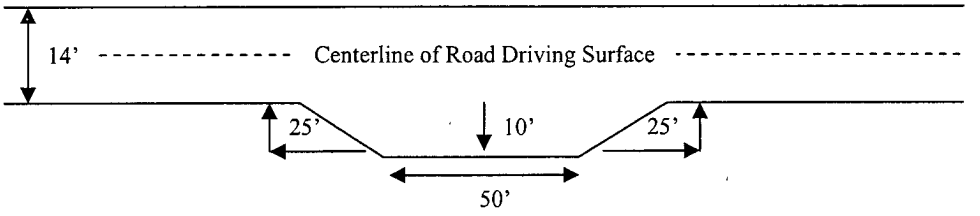
Ditching

Ditching shall be required on both sides of the road.

Turnouts

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

Standard Turnout – Plan View

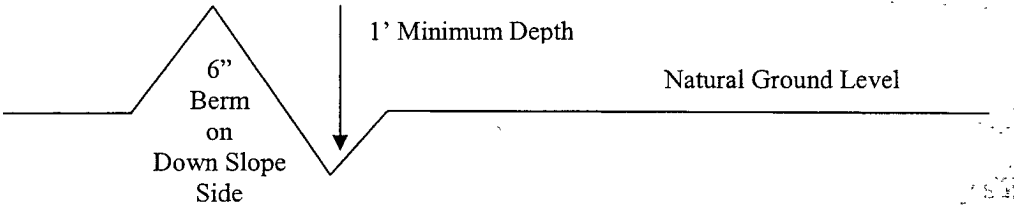


Drainage

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:

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

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.

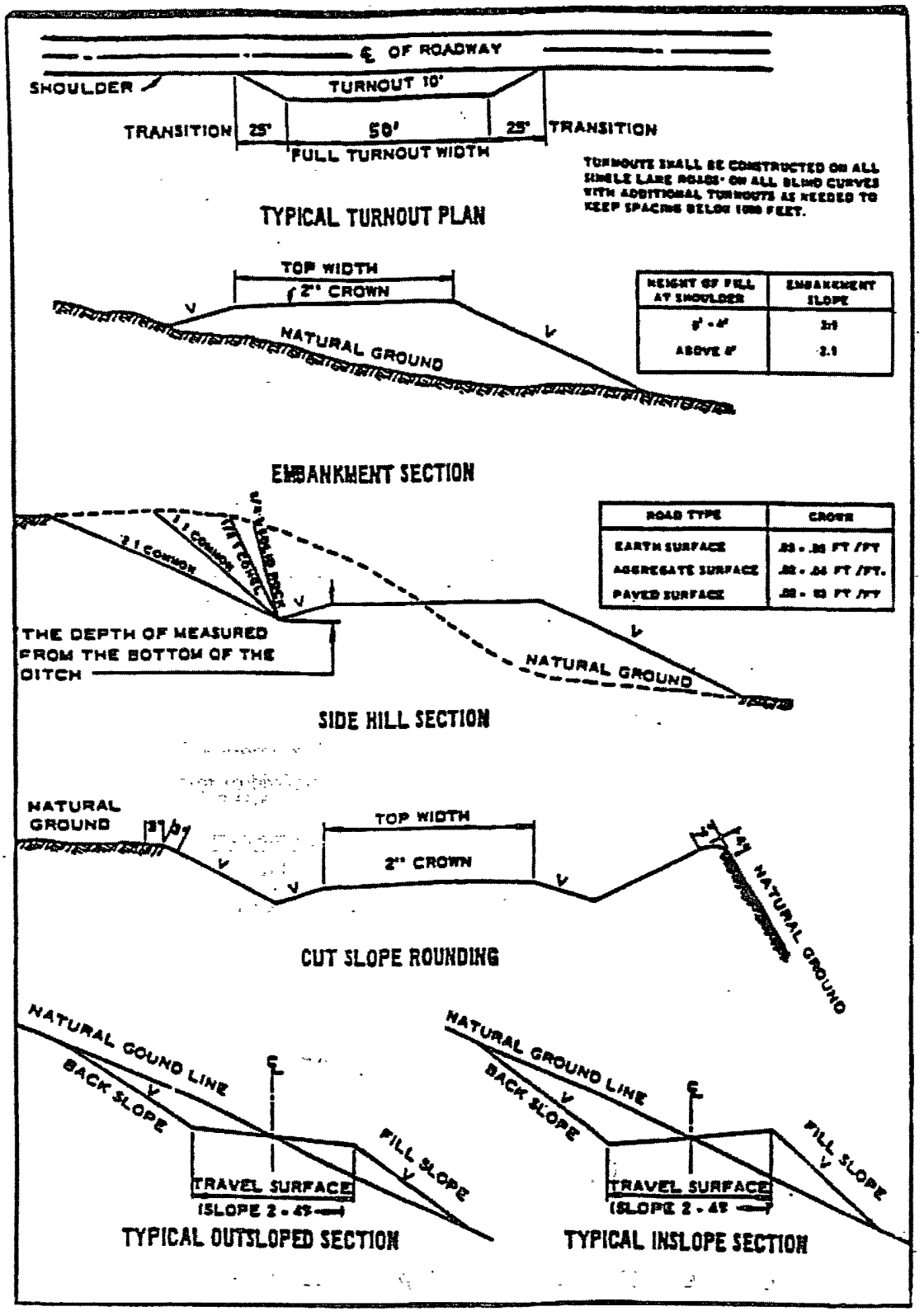
A gate shall be constructed and fastened securely to H-braces.

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

☒ **Lea County**
Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240,
(505) 393-3612

1. A Hydrogen Sulfide (H2S) Drilling Plan should be activated 500 feet prior to drilling into the **Yates** formation. **Hydrogen Sulfide has been reported in sections 19, 21, 24 measuring 200-3000 ppm in gas streams and 200-3000 ppm in STVs.**

2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.

3. When floor controls are required, (3M or Greater) 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.

B. CASING

1. The **13-3/8** inch surface casing shall be set **a minimum of 25 feet into the Rustler Anhydrite and above the salt at approximately 890** feet 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 a surface log readout will be used or a cement bond log shall be run to verify the top of the cement.

   b. Wait on cement (WOC) time for a primary cement job will be a minimum 18 hours for a water basin, 24 hours in the potash area, or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement).

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 action will be done prior to drilling out that string.

Possible lost circulation in the Artesia Group and the Capitan Reef.
Possible water flows in the Artesia and Salado Groups.

2. The minimum required fill of cement behind the **10-3/4** inch intermediate casing is: **Casing to be set at approximately 2750' in the basal anhydrite below the salt.**

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

3. The minimum required fill of cement behind the **7-5/8** inch intermediate casing is: **Casing to be set at approximately 4270' at the base of the Goat Seep Reef above the hydrocarbon bearing Delaware Mountain Group.**

   ☒ Cement to surface. Operator shall provide method of verification of cement behind pipe prior to drilling more than 20 feet of new hole.

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

   ☒ Cement to surface. If cement does not circulate, contact the appropriate BLM office. **Additional cement will be required to circulate as described in cementing program.**

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.

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

   a. The tests shall be done by an independent service company.

b. The results of the test shall be reported to the appropriate BLM office.

c. 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.

d. 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. DRILLING MUD

Brine water to be used from setting of 13.375" casing to setting of 10.75" casing at approximately 2750 feet.

Engineer on call phone (after hours): Carlsbad: (505) 706-2779

WWI 092407

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

VRM Facility Requirement

B. PIPELINES

STANDARD STIPULATIONS FOR SURFACE INSTALLED PIPELINES

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

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

1. The holder shall indemnify the United States against any liability for damage to life or property arising from the occupancy or use of public lands under this grant.

2. The holder shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, the holder shall comply with the Toxic Substances Control Act of 1976 as amended, 15 USC 2601 et seq. (1982) with regards to any toxic substances that are used, generated by or stored on the right-of-way or on facilities authorized under this right-of-way grant. (See 40 CFR, Part 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193.) Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act, section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances shall be furnished to the authorized officer concurrent with the filing of the reports to the involved Federal agency or State government.

3. The holder agrees to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. 9601, et seq. or the Resource Conservation and Recovery Act, 42 U.S.C. 6901, et seq.) on the Right-of-Way (unless the release or threatened release is wholly unrelated to activity of the Right-of-Way holder's activity on the Right-of-Way), or resulting from the activity of the Right-of-Way holder on the Right-of-Way. This agreement applies without regard to whether a release is caused by the holder, its agent, or unrelated third parties.

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

a. Activities of the holder including, but not limited to construction, operation, maintenance, and termination of the facility.

b. Activities of other parties including, but not limited to:

(1) Land clearing.
(2) Earth-disturbing and earth-moving work.
(3) Blasting.
(4) Vandalism and sabotage.

c. Acts of God.

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

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

5. If, during any phase of the construction, operation, maintenance, or termination of the pipeline, any oil, salt water, or other pollutant should be discharged from the pipeline system, impacting Federal lands, the control and total removal, disposal, and cleaning up of such oil, salt water, or other pollutant, wherever found, shall be the responsibility of the holder, regardless of fault. Upon failure of the holder to control, dispose of, or clean up such discharge on or affecting Federal lands, or to repair all damages resulting therefrom, on the Federal lands, the Authorized Officer may take such measures as he deems necessary to control and clean up the discharge and restore the area, including, where appropriate, the aquatic environment and fish and wildlife habitats, at the full

expense of the holder. Such action by the Authorized Officer shall not relieve the holder of any responsibility as provided herein.

6. All construction and maintenance activity will be confined to the authorized right-of-way width of **25** feet.

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

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

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

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

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

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

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

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

route is not used as a roadway.

15. Any cultural and/or paleontological resource (historic or prehistoric site or object) discovered by the holder, or any person working on his behalf, on public or Federal land shall be immediately reported to the authorized officer. Holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the authorized officer. An evaluation of the discovery will be made by the authorized officer to determine appropriate cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to proper mitigation measures will be made by the authorized officer after consulting with the holder.

(March 1989)

IX. INTERIM RECLAMATION & RESERVE PIT CLOSURE

A. INTERIM RECLAMATION

If the well is a producer, interim reclamation shall be conducted on the well site in accordance with the orders of the Authorized Officer. The operator shall submit a Sundry Notices and Reports on Wells (Notice of Intent), Form 3160-5, prior to conducting 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.

At the time reserve pits are to be reclaimed, operators should work with BLM surface management specialists to devise the best strategies to reduce the size of the location. Any reductions 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 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.

B. RESERVE PIT CLOSURE

The reserve pit, when dried and closed, shall be recontoured, all trash removed, and reseeded as follows:

Seed Mixture for LPC Sand/Shinnery Sites

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

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

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

Species	lb/acre
Plains Bristlegrass	5lbs/A
Sand Bluestem	5lbs/A
Little Bluestem	3lbs/A
Big Bluestem	6lbs/A
Plains Coreopsis	2lbs/A
Sand Dropseed	1lbs/A
**Four-winged Saltbush	5lbs/A

* This can be used around well pads and other areas where caliche cannot be removed.

*Pounds of pure live seed:

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

X. FINAL ABANDONMENT & REHABILITATION REQUIREMENTS

Upon abandonment of the well and/or when the access road is no longer in service the Authorized Officer shall issue instructions and/or orders for surface reclamation and restoration of all disturbed areas.

On private surface/federal mineral estate land the reclamation procedures on the road and well pad shall be accomplished in accordance with the private surface land owner agreement.