District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

**NOTIFY OCD OF SPUD & TIME TO WITNESS CEMENTING OF SURFACE CASING**

ources

Form C-101
May 27, 2004

Submit to appropriate District Office

1220 South St. Francis Dr.
Santa Fe, NM 87505

SEP 10 2007
OCD-ARTESIA

☐ AMENDED REPORT

# APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE

| [1] Operator Name and Address | [2] OGRID Number |
|---|---|
| OGX Resources, LLC<br>POB 2064<br>Midland, TX 79702 | 217955 |
| | [3] API Number<br>30 - 015 - 35789 |

| [3] Property Code | [5] Property Name | [6] Well No. |
|---|---|---|
| 36722 | Weems | 001 |

| [9] Proposed Pool 1 | [10] Proposed Pool 2 |
|---|---|
| OTIS; MORROW (Gas) | |

## [7] Surface Location

| UL or lot no. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---|---|---|---|---|---|---|---|---|---|
| B | 34 | 22S | 27E | | 1073 | North | 1501 | East | Eddy |

## [8] Proposed Bottom Hole Location If Different From Surface

| UL or lot no. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---|---|---|---|---|---|---|---|---|---|
| A | 34 | 22S | 27E | | 660 | North | 660 | East | Eddy |

## Additional Well Information

| [11] Work Type Code | [12] Well Type Code | [13] Cable/Rotary | [14] Lease Type Code | [15] Ground Level Elevation |
|---|---|---|---|---|
| New | Gas | | State | 3106' |
| **[16] Multiple** | **[17] Proposed Depth** | **[18] Formation** | **[19] Contractor** | **[20] Spud Date** |
| N/A | 12,400' | Morrow | | 12/1/2007 |

| Depth to Groundwater | Distance from nearest fresh water well | Distance from nearest surface water |
|---|---|---|
| | | |

Pit: Liner: Synthetic ☒ 12 mils thick Clay ☐ Pit Volume: 28,500 bbls
Closed-Loop System ☐

Drilling Method:
Fresh Water ☒ Brine ☐ Diesel/Oil-based ☐ Gas/Air ☐

## [21] Proposed Casing and Cement Program

| Hole Size | Casing Size | Casing weight/foot | Setting Depth | Sacks of Cement | Estimated TOC |
|---|---|---|---|---|---|
| 17.5 | 13.375 | 54.5 | 325 | 605 | 0 |
| 12.25 | 9.625 | 40 | 5500 | 2135 | 0 |
| 8.75 | 7.625 | 33.7 | 9700 | 715 | 0 |
| 6.5 | 5.5 | 20 | 11600 | 305 | 9400 |
| 6.5 | 5.5 | 20 | 12400 | 305 | 0 |

[22] Describe the proposed program. If this application is to DEEPEN or PLUG BACK, give the data on the present productive zone and proposed new productive zone. Describe the blowout prevention program, if any. Use additional sheets if necessary.

13 3/8" casing set depth is 325', mud wt. 8.6-8.8, vis. 36-38, pH 9.0-10.0, FL/NC, lead slurry 200 sx Premium cmt. + 94 lbm/sk cmt. + 1% CaCl + 10 lbm/sk Glisonite + 0.25 lbm/sk Poly-E-Flake, tail slurry 180 sx Premium Plus cmt. + 94 lbm/sk Premium Plus cmt. + 2% CaCl. 9 5/8" casing set depth is 5500', mud wt. 10.0-10.1, vis. 29-30, pH 9.0-10.0, FL/NC, lead slurry 1480 sx 50/50 Poz Premium Plus + 10% Bentonite + 5% Salt + 5 lbm/sk Glisonite + 0.25 lbm/sk Poly-E-Flake, tail slurry 655 sx Premium Plus cmt. + 94 lbm/sk Premium Plus + 2% CaCl. 7 5/8" casing set depth is 9700', mud wt. 8.4-10.0, vis. 28-29, pH 9.0-10.0, FL/NC, lead slurry 550 sx 50/50 Poz Premium + 10% Bentonite + 0.3% Halad-9 + 5% Salt + 0.125 lbm/sk Poly-E-Flake, tail slurry 165 sx Premium + 94 lbm/sk Premium cmt. + 0.5% Halad-9. 5 ½" casing set depth is 12,400', mud wt. 10.0-11.5, vis. 36-45, pH 9-10, FL/10cc, 12 bbl Tuned spacer pumped, tail slurry 305 sx Premium cmt. + 94 lbm.sk Premium cmt. + 0.5% LAP-1 + 0.4% CFR-3 + 0.25 lbm.sk D-AIR 3000 + 0.2% HR-5. Mud up at 11,600-12,400', reduce API filtrate to <6cc w/ starch, raise vis. to 38-40 sec/1000cc with Dynazan, if abnormal pressures are encountered increase mud wt. and raise vis. to 45+ sec/1000cc.

Operator to set surface casing above the Salado. BG

[23] I hereby certify that the information given above is true and complete to the best of my knowledge and belief. **I further certify that the drilling pit will be constructed according to NMOCD guidelines ☒, a general permit ☐, or an (attached) alternative OCD-approved plan ☐.**

Signature: Angela Lightner

Printed name: Angela Lightner

Title: Consultant

E-mail Address: angela@rkford.com

Date: 9/10/2007 Phone: 432/682/0440

## OIL CONSERVATION DIVISION

Approved by:

Title: ~~BRYAN G. ARRANT~~ ~~DISTRICT II GEOLOGIST~~

Approval Date: SEP 12 2007 Expiration Date: SEP 12 2008

Conditions of Approval Attached ☐

## Arrant, Bryan, EMNRD

**From:** Arrant, Bryan, EMNRD
**Sent:** Tuesday, September 04, 2007 2:26 PM
**To:** 'Angela Lightner'
**Subject:** Weems # 1

Hi Angela,

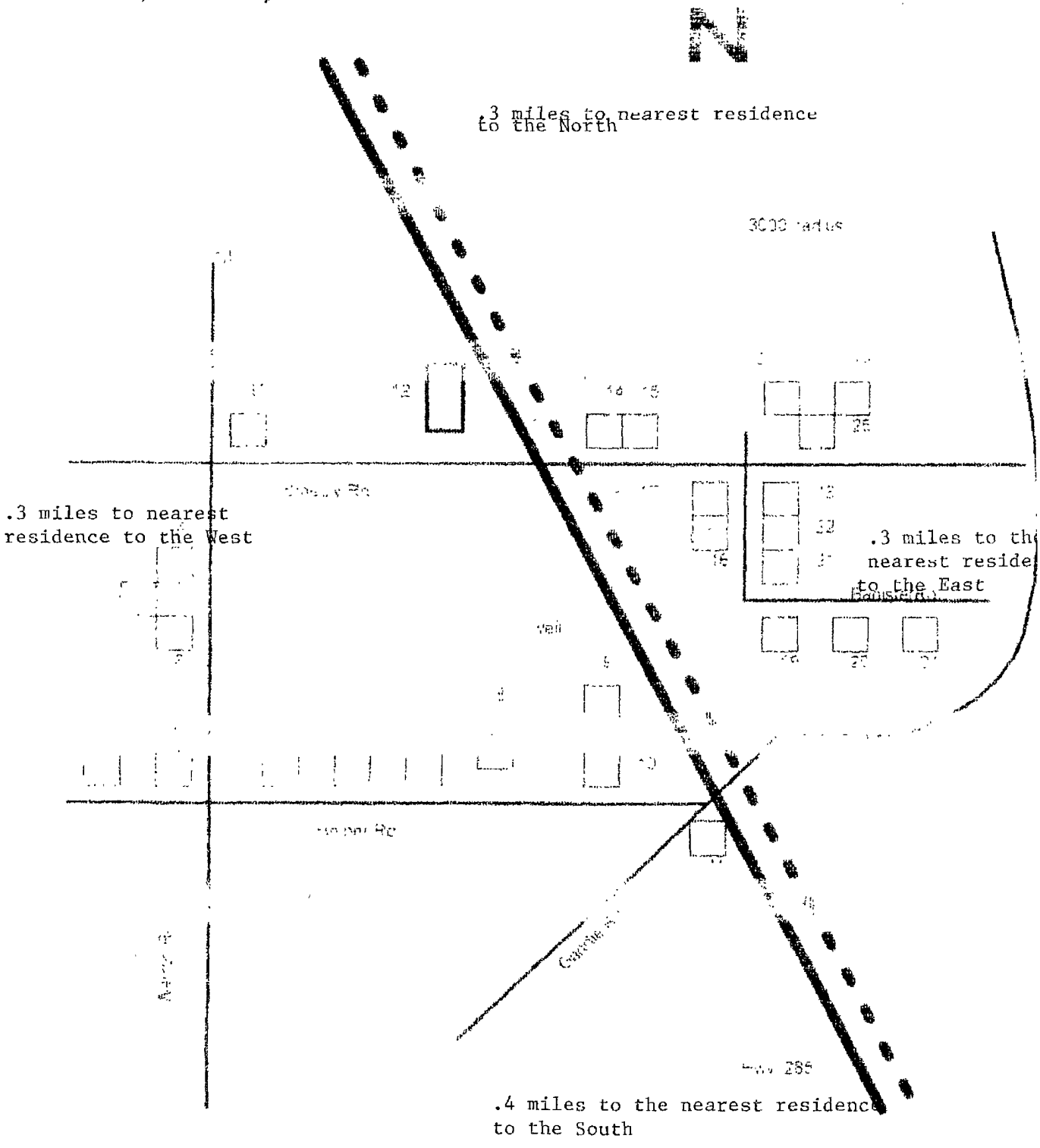
In order to further review and/or approve your APD for the above noted well, please provide the following:

The directional drill plan.
A H2S well contingency plan that meets the requirements of NMOCD Rule 118.
The distance to the nearest public dwelling.
Please resubmit page (1) of your application as the surface setting depth most likely will set your casing in the (Salado) salt section.
This could very well contaminate domestic and irrigation water wells that are in this area.
Also as has happened before with oil and gas wells drilled in the Delaware, one could have problems with their surface casing in setting it in the salt.
I need for someone in your company to research this area provide an appropriate setting depth.
Also, please be advised that the Capitan Reef lies miles away from here.

Yours truly,

*Bryan G. Arrant*
District II Geologist
New Mexico Oil Conservation Division
1301 West Grand Ave.
Artesia, NM 88210
505-748-1283 Ext. 103

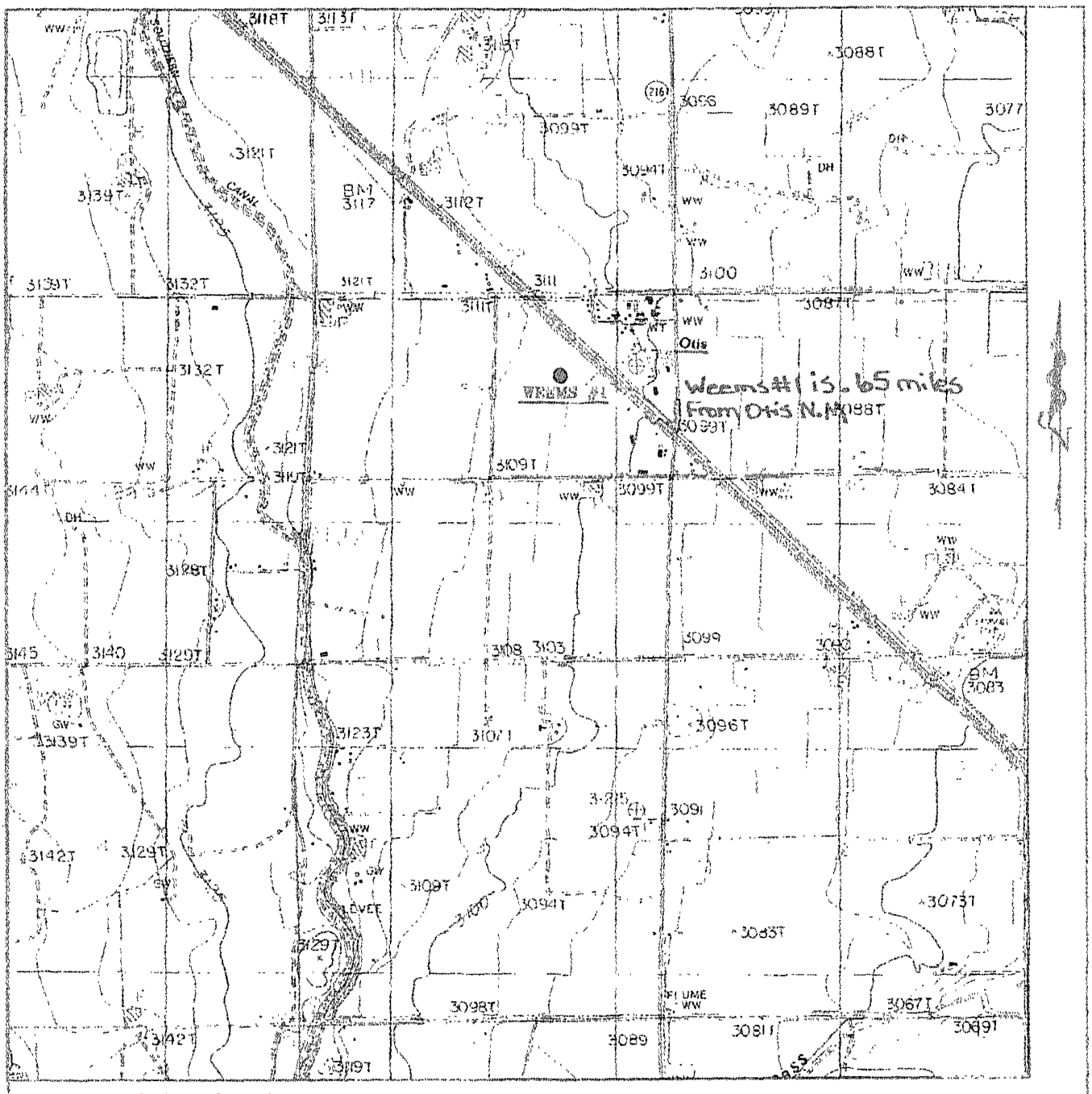
Weems # 1
Sec. 34, T-22-S, R-27-E
Eddy County, NM



## Arrant, Bryan, EMNRD

**From:** Angela Lightner [Angela@rkford.com]
**Sent:** Wednesday, September 12, 2007 10:27 AM
**To:** Arrant, Bryan, EMNRD
**Subject:** OGX Weems #1 residence map
**Attachments:** Weems #1 residence map 2.tif

Bryan,
I talked with Indian Fire & Safety on the distances to the nearest residences. This is the distances they measured. Since the well is so near a town we should have an H2S trailer on location.
Thank you for all the help on this one so near a town.
Angela




WEEMS #1
Located at 1200' FNL and 1650 FEL
Section 34, Township 22 South, Range 27 East,
N.M.P.M., Eddy County, New Mexico.

basin surveys
focused on excellence in the oilfield
P.O. Box 1786
1120 N. West County Rd.
Hobbs, New Mexico 88241
(505) 393-7316 - Office
(505) 392-3074 - Fax
basinsurveys.com

W.O. Number: 182211
Survey Date: 06-20-2007
Scale: 1" = 2000'
Date: 06-20-2007

OGX RESOURCES, L.L.C.

R. K. FORD & ASSOCIATES
*Engineering, Drilling & Completion*

415 West Wall
Suite 1700 • Wilco Building
Midland, Texas 79701

(432) 682-0440
Fax (432) 682-0441
e-mail: randell@rkford.com

SEP 10 2007
OCD-ARTESIA

September 7, 2007

Oil Conservation Division
1301 W. Grand Avenue
Artesia, NM 882210

Subject: OGX Resources, Weems #1, Eddy Co. NM

Bryan Arrant,

Enclosed is the C-101 reflecting surface casing set depth change, H2S Contingency plan and the Pathfinder directional drilling plan for the Weems #1 well.

Please include these documents you requested with the APD previously sent and submit for approval.

If you need further information regarding this well please contact me.

Thank you,

Angela Lightner
Angela Lightner
Enclosures/al

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

☐ AMENDED REPORT

## WELL LOCATION AND ACREAGE DEDICATION PLAT

| API Number | Pool Code | Pool Name |
|---|---|---|
| | 82360 | OTIS MORROW (GAS) |

| Property Code | Property Name | Well Number |
|---|---|---|
| | WEEMS | 1 |

| OGRID No. | Operator Name | Elevation |
|---|---|---|
| 271955 | OGX RESOURCES, L.L.C. | 3106' |

### Surface Location

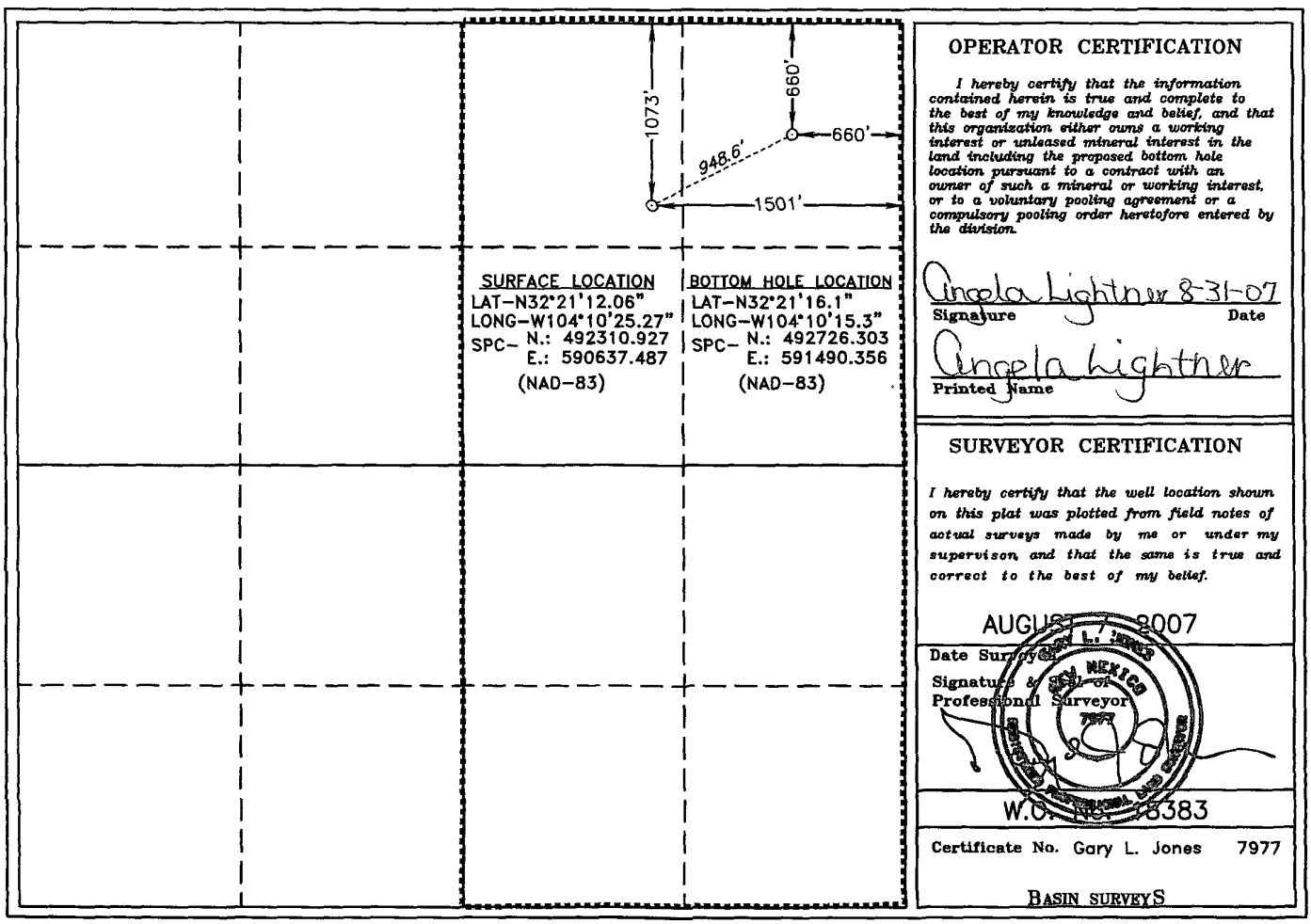
| UL or lot No. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---|---|---|---|---|---|---|---|---|---|
| B | 34 | 22 S | 27 E | | 1073 | NORTH | 1501 | EAST | EDDY |

### Bottom Hole Location If Different From Surface

| UL or lot No. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County |
|---|---|---|---|---|---|---|---|---|---|
| A | 34 | 22 S | 27 E | | 660 | NORTH | 660 | EAST | EDDY |

| Dedicated Acres | Joint or Infill | Consolidation Code | Order No. |
|---|---|---|---|
| 320 | | | |

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 contained 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 pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.*

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 supervison, and that the same is true and correct to the best of my belief.*

AUGUST 7, 2007
Date Surveyed

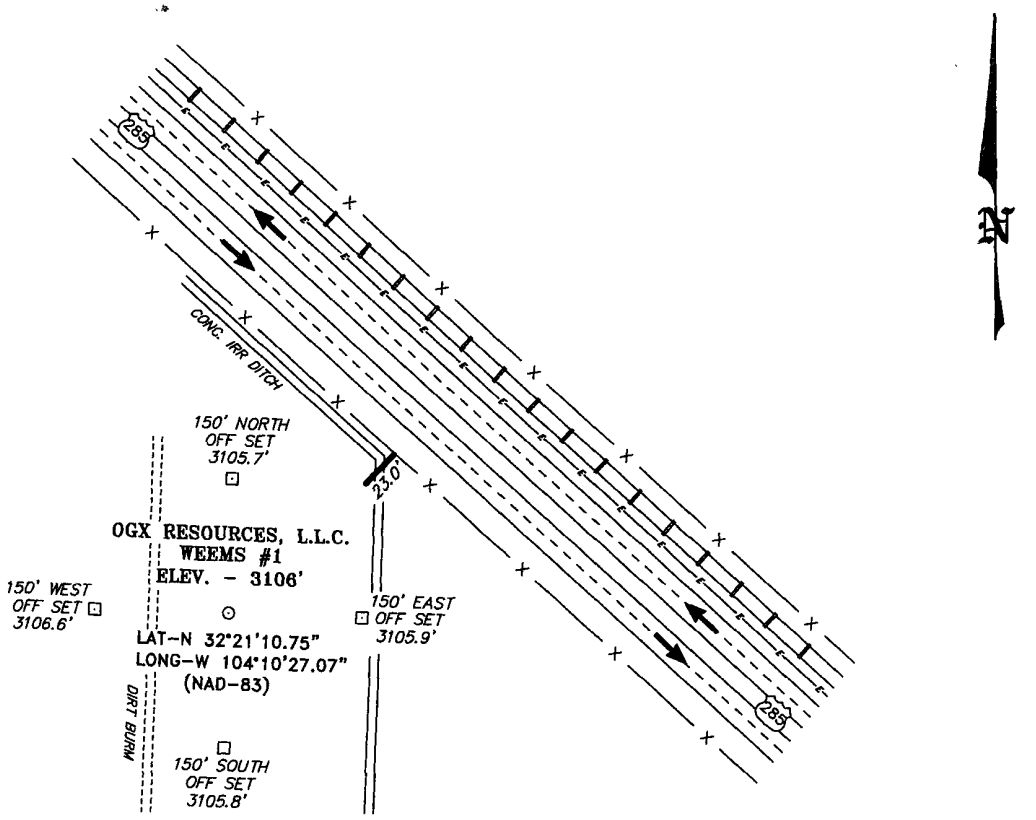
Signature & Seal of Professional Surveyor

W.O. No. 18383

Certificate No. Gary L. Jones 7977

BASIN SURVEYS

# SECTION 34, TOWNSHIP 22 SOUTH, RANGE 27 EAST, N.M.P.M.,
**EDDY COUNTY,** **NEW MEXICO.**




*DIRECTIONS TO LOCATION:*

*FROM MILE MARKER 27 OF STATE HWY 285, GO NORTHWEST 0.6 MILES TO PROPOSED LOCATION.*

200 0 200 400 FEET

SCALE: 1" = 200'

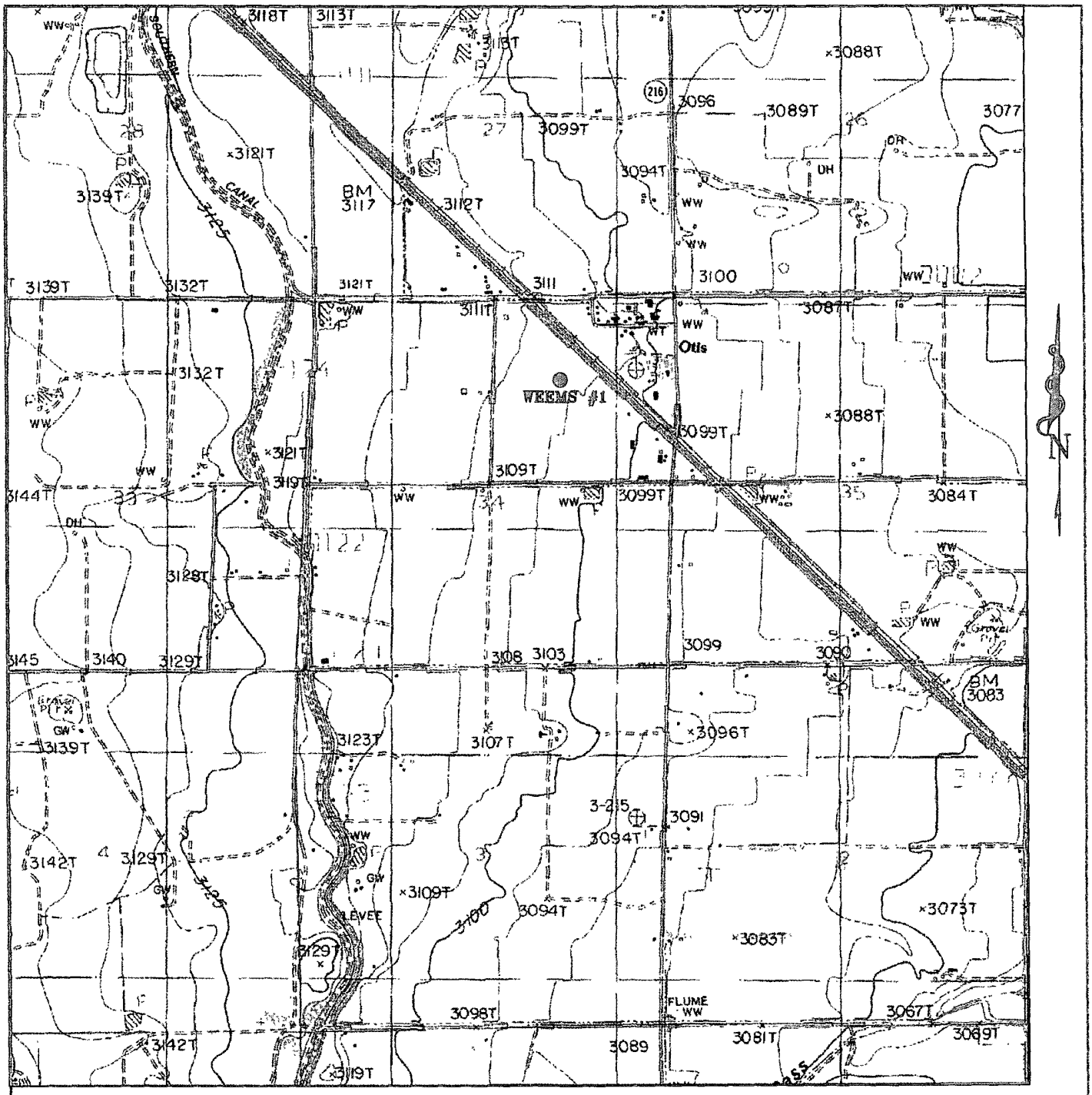
## *OGX RESOURCES, L.L.C.*

REF: WEEMS #1 / Well Pad Topo

THE WEEMS #1 LOCATED 1073' FROM THE NORTH LINE AND 1501' FROM THE EAST LINE OF SECTION 34, TOWNSHIP 22 SOUTH, RANGE 27 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO.

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

| | | | |
|---|---|---|---|
| W.O. Number: 18383 | Drawn By: J. M. SMALL | | |
| Date: 08-08-2007 | Disk: JMS 18383W | Survey Date: 08-07-2007 | Sheet 1 of 1 Sheets |

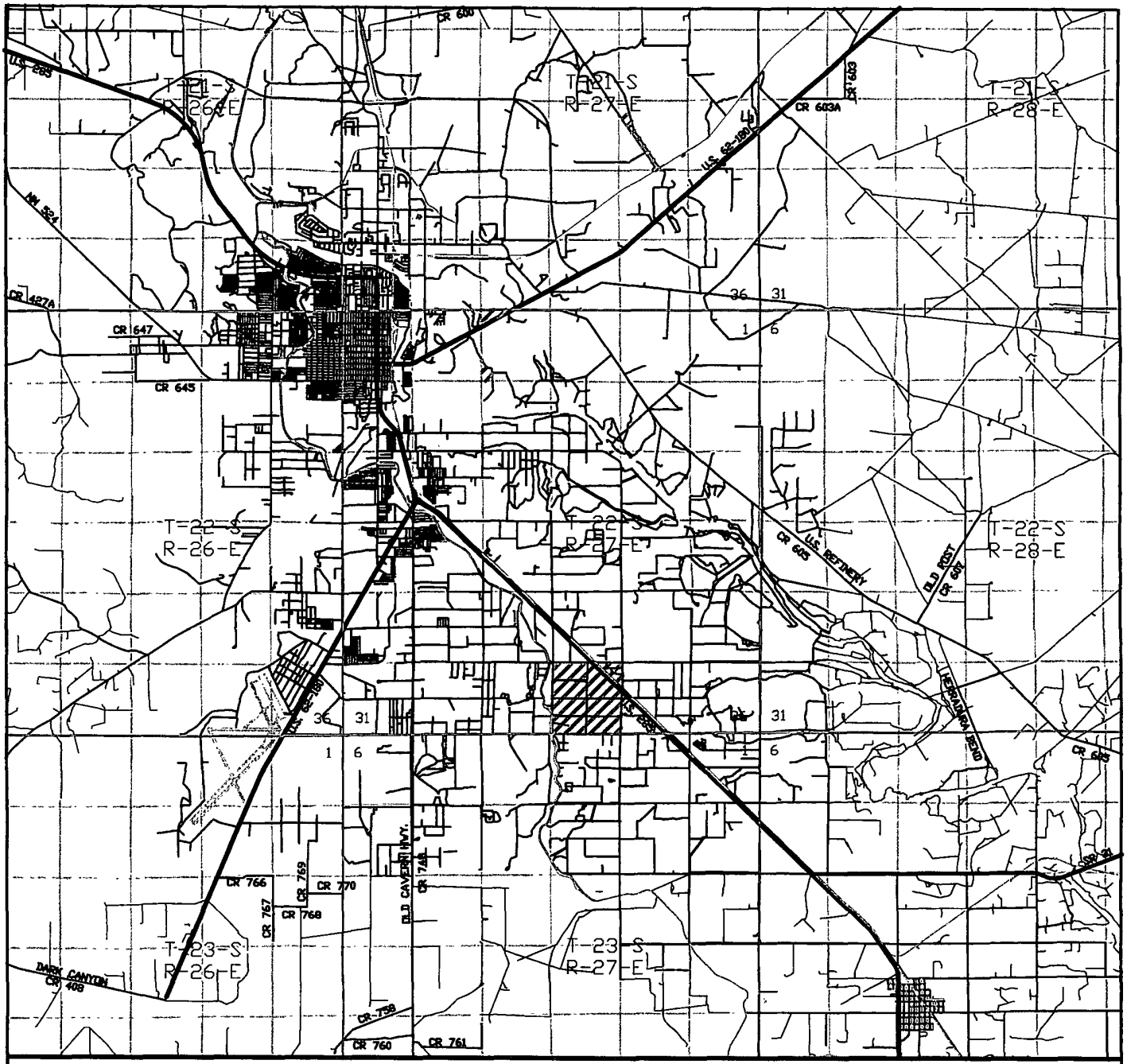



**WEEMS #1**
Located at 1200' FNL and 1650 FEL
Section 34, Township 22 South, Range 27 East,
N.M.P.M., Eddy County, New Mexico.

basin surveys
focused on excellence in the oilfield
P.O. Box 1786
1120 N. West County Rd.
Hobbs, New Mexico 88241
(505) 393-7316 - Office
(505) 392-3074 - Fax
basinsurveys.com

| | |
|---|---|
| W.O. Number: | 16221T |
| Survey Date: | 06-20-2007 |
| Scale: | 1" = 2000' |
| Date: | 06-20-2007 |

OGX RESOURCES, L.L.C.




WEEMS #1
Located at 1073' FNL and 1501 FEL
Section 34, Township 22 South, Range 27 East,
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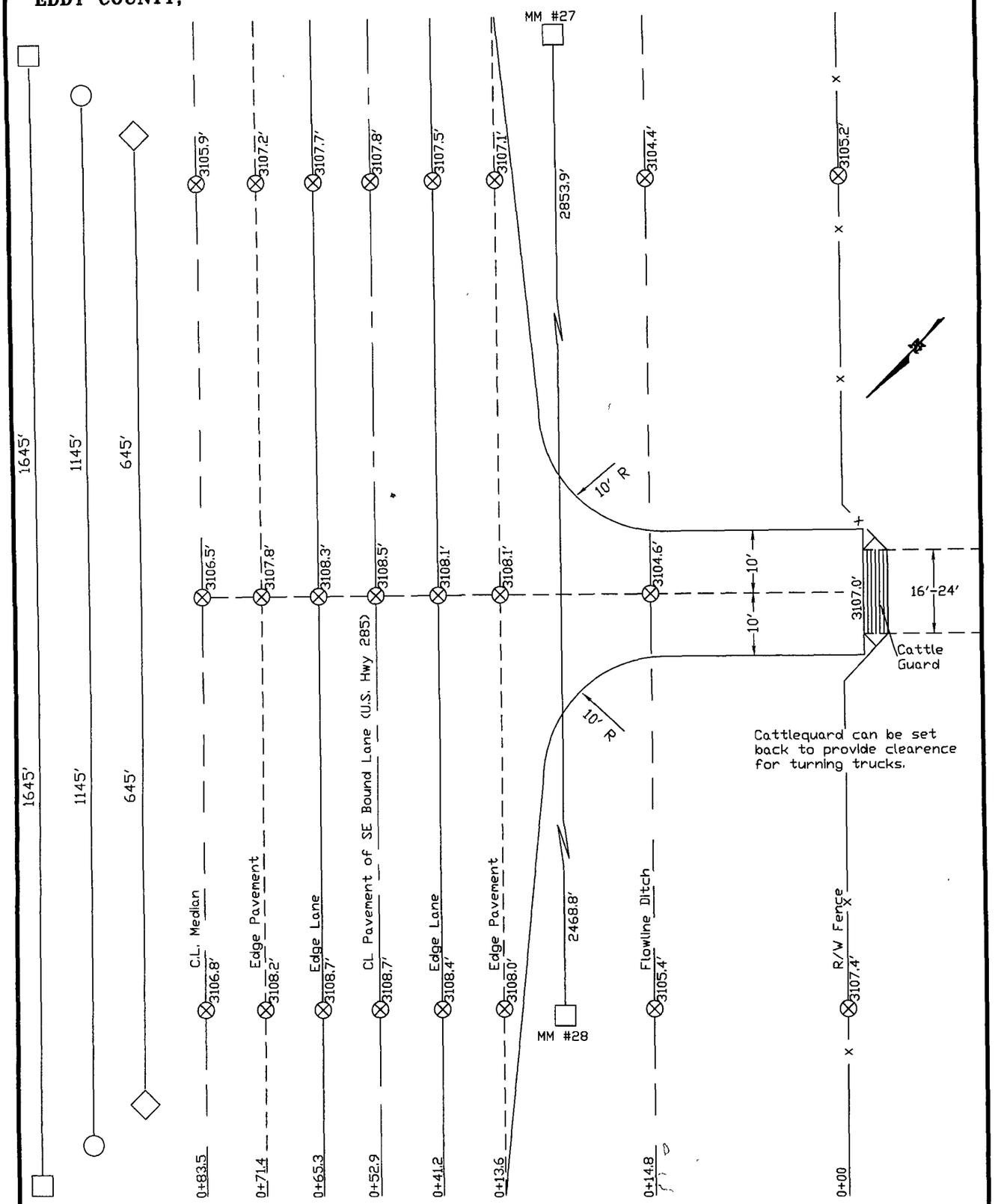
basin surveys
focused on excellence in the oilfield

P.O. Box 1786
1120 N. West County Rd.
Hobbs, New Mexico 88241
(505) 393-7316 - Office
(505) 392-3074 - Fax
basinsurveys.com

| | |
|---|---|
| W.O. Number: | JMS 18383TR |
| Survey Date: | 08-07-2007 |
| Scale: | 1" = 2 MILES |
| Date: | 08-08-2007 |

OGX RESOURCES, L.L.C.

# SECTION 34, TOWNSHIP 22 SOUTH, RANGE 27 EAST, N.M.P.M., NEW MEXICO.
EDDY COUNTY,




'SHOULDER WORK AHEAD' and 'BE PREPARED TO STOP' signs shall remain in place from the time the construction starts until it is completed. 'FLAGMAN AHEAD' signs will be in place during the hours of construction men and equipment are working. A flagman will be on duty all the time that construction men and/or equipment are working
Signs will be 48" x 48" in size. Color will be black on orange and will meet the reflective quality specified in the New Mexico State Highway & Transportation Standard Specifications.

NOTE: Warning signs will be placed 1500 feet in both directions during construction.

- □ Shoulder Work Ahead
- ○ Be Prepared to Stop
- ◇ Flagman Ahead

30 0 30 60FEET

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

**OGX RESOURCES, L.L.C.**

| | | | |
|---|---|---|---|
| W.O. Number: 18383 | Drawn By: J. M. SMALL | REF: Highway turnout – U.S. Highway 285 | |
| Date: 08-08-2007 | Disk: JMS 18383TURN | Survey Date: 08-07-2007 | Sheet 1 of 1 Sheets |

HALLIBURTON

**OGX Resources LLC**
**PO Box 11148**
**Midland, Texas 79702**

Weems 1

Eddy County, New Mexico
United States of America
S:34 T:22S R:27E

# Cementing Recommendation

Prepared for: Randy Ford
August 13, 2007
Version: 1

Submitted by:
Dennis Page / Robert Reyes

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:
B. J. Wheeler
Scott Kerby / Joe Briseno

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: Phil Sheldon

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/100ft$^2$) decreasing down to about 5 lb/100 ft$^2$.

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 ft$^2$). 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 ft$^2$.

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

Weems 1

| | | |
|---|---|---|
| 17-1/2" Hole | 325 / 0 - 450 ft (MD) | Set Surface Casing above the Salado. BGJ |
| Inner Diameter | 17.500 in | |
| Job Excess | 100 % | |
| Surface Casing | 325 / 0 - 450 ft (MD) | |
| Outer Diameter | 13.375 in | |
| Inner Diameter | 12.715 in | |
| Linear Weight | 48 lbm/ft | |

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: Pump 10 bbl | | |
| Fresh Water | Fluid Volume: | 10 bbl |
| Fluid 2: Pump 30 bbl | | |
| MUD FLUSH | Fluid Volume: | 30 bbl |
| 3.3 lbm/bbl Gilsonite (Lost Circulation Additive) | | |
| Fluid 3: Pump 10 bbl | | |
| Fresh Water | Fluid Volume: | 10 bbl |
| Fluid 4: Scavenger with 200 sks | | |
| Premium Cement | Fluid Weight | 14.60 lbm/gal |
| 94 lbm/sk Premium Cement (Cement) | Slurry Yield: | 1.40 $ft^3$/sk |
| 1 % Calcium Chloride (Accelerator) | Total Mixing Fluid: | 5.76 Gal/sk |
| 10 lbm/sk Gilsonite (Lost Circulation Additive) | Volume: | 49.87 bbl |
| 0.25 lbm/sk Poly-E-Flake (Lost Circulation Additive) | Proposed Sacks: | 200 sks |
| Fluid 5: Lead with 225 sks | | |
| Halliburton Light Premium Plus | Fluid Weight | 12.70 lbm/gal |
| 2 % Calcium Chloride (Accelerator) | Slurry Yield: | 1.90 $ft^3$/sk |
| 0.25 lbm/sk Poly-E-Flake (Lost Circulation Additive) | Total Mixing Fluid: | 10.33 Gal/sk |
| | Top of Fluid: | 0 ft |
| | Calculated Fill: | 305 ft |
| | Volume: | 75.47 bbl |
| | Calculated Sacks: | 223.02 sks |
| | Proposed Sacks: | 225 sks |
| Fluid 6: Tail-in with 180 sks | | |
| Premium Plus Cement | Fluid Weight | 14.80 lbm/gal |
| 94 lbm/sk Premium Plus Cement (Cement) | Slurry Yield: | 1.35 $ft^3$/sk |
| 2 % Calcium Chloride (Accelerator) | Total Mixing Fluid: | 6.39 Gal/sk |
| | Top of Fluid: | 305 ft |
| | Calculated Fill: | 145 ft |
| | Volume: | 42.16 bbl |
| | Calculated Sacks: | 175.35 sks |
| | Proposed Sacks: | 180 sks |

## Job Information — 1st Intermediate Casing

Weems 1

| | |
|---|---|
| Surface Casing | 0 - 450 ft (MD) |
| Outer Diameter | 13.375 in |
| Inner Diameter | 12.715 in |
| Linear Weight | 48 lbm/ft |
| 12-1/4" Hole | 450 - 5500 ft (MD) |
| Inner Diameter | 12.250 in |
| Job Excess | 175 % |
| 1st Intermediate Casing | 0 - 5500 ft (MD) |
| Outer Diameter | 9.625 in |
| Inner Diameter | 8.921 in |
| Linear Weight | 36 lbm/ft |
| Thread | LTC |
| Casing Grade | J-55 |

## Calculations — 1st Intermediate Casing

Cement : (4500.00 ft fill)

| | |
|---|---|
| 450.00 ft * 0.3765 $ft^3$/ft * 10 % | = 186.37 $ft^3$ |
| 4050.00 ft * 0.3132 $ft^3$/ft * 175 % | = 3488.13 $ft^3$ |
| Total Lead Cement | = 3674.50 $ft^3$ |
| | = 654.45 bbl |
| Sacks of Cement | = 1475 sks |

Cement : (1000.00 ft fill)

| | |
|---|---|
| 1000.00 ft * 0.3132 $ft^3$/ft * 175 % | = 861.27 $ft^3$ |
| Tail Cement | = 861.27 $ft^3$ |
| | = 153.40 bbl |

Shoe Joint Volume: (40.00 ft fill)

| | |
|---|---|
| 40.00 ft * 0.4341 $ft^3$/ft | = 17.36 $ft^3$ |
| | = 3.09 bbl |
| Tail plus shoe joint | = 878.63 $ft^3$ |
| | = 156.49 bbl |
| Total Tail | = 651 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: Pump 10 bbl
Fresh Water — Fluid Volume: 10 bbl

Fluid 2: Pump 30 bbl
MUD FLUSH — Fluid Volume: 30 bbl
3.3 lbm/bbl Gilsonite (Lost Circulation Additive)

Fluid 3: Pump 10 bbl
Fresh Water — Fluid Volume: 10 bbl

Fluid 4: Lead with 1,480 sks
50/50 Poz Premium Plus Cement
10 % total Bentonite (Light Weight Additive)
5 % Salt (Salt)
5 lbm/sk Gilsonite (Low Fluid Loss Control)
0.25 lbm/sk Poly-E-Flake (Lost Circulation Additive)

| | |
|---|---|
| Fluid Weight | 11.80 lbm/gal |
| Slurry Yield: | 2.49 $ft^3$/sk |
| Total Mixing Fluid: | 13.97 Gal/sk |
| Top of Fluid: | 0 ft |
| Calculated Fill: | 4500 ft |
| Volume: | 654.45 bbl |
| Calculated Sacks: | 1475.11 sks |
| Proposed Sacks: | 1480 sks |

Fluid 5: Tail-in with 655 sks
Premium Plus Cement
94 lbm/sk Premium Plus Cement (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: | 4500 ft |
| Calculated Fill: | 1000 ft |
| Volume: | 156.49 bbl |
| Calculated Sacks: | 650.84 sks |
| Proposed Sacks: | 655 sks |

## Job Information — 2nd Intermediate Casing

Weems 1

| | |
|---|---|
| 1st Intermediate Casing | 0 - 5500 ft (MD) |
| Outer Diameter | 9.625 in |
| Inner Diameter | 8.921 in |
| Linear Weight | 36 lbm/ft |
| Thread | LTC |
| Casing Grade | J-55 |
| 8-3/4" Hole | 5500 - 9700 ft (MD) |
| Inner Diameter | 8.750 in |
| Job Excess | 130 % |
| 2nd Intermediate Casing | 0 - 9700 ft (MD) |
| Outer Diameter | 7.625 in |
| Linear Weight | 26 lbm/ft |
| Thread | LTC |
| Casing Grade | P-110 |
| BHST | 150 degF |

## Calculations — 2nd Intermediate Casing

Cement : (7900.00 ft fill)

| | |
|---|---|
| 4500.00 ft * 0.117 $ft^3/ft$ * 10 % | = 578.94 $ft^3$ |
| 3400.00 ft * 0.1005 $ft^3/ft$ * 130 % | = 785.72 $ft^3$ |
| Total Lead Cement | = 1364.66 $ft^3$ |
| | = 243.05 bbl |
| Sacks of Cement | = 546 sks |

Cement : (800.00 ft fill)

| | |
|---|---|
| 800.00 ft * 0.1005 $ft^3/ft$ * 130 % | = 184.88 $ft^3$ |
| Tail Cement | = 184.88 $ft^3$ |
| | = 32.93 bbl |

Shoe Joint Volume: (40.00 ft fill)

| | |
|---|---|
| 40.00 ft * 0.2649 $ft^3/ft$ | = 10.60 $ft^3$ |
| | = 1.89 bbl |
| Tail plus shoe joint | = 195.47 $ft^3$ |
| | = 34.81 bbl |
| Total Tail | = 164 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: Pump 10 bbl
Fresh Water

| | |
|---|---|
| Fluid Volume: | 10 bbl |

Fluid 2: Pump 30 bbl
MUD FLUSH
3.3 lbm/bbl Gilsonite (Lost Circulation Additive)

| | |
|---|---|
| Fluid Volume: | 30 bbl |

Fluid 3: Pump 10 bbl
Fresh Water

| | |
|---|---|
| Fluid Volume: | 10 bbl |

Fluid 4: Lead with 550 sks
50/50 Poz Premium Cement
10 % total Bentonite (Light Weight Additive)
0.3 % Halad(R)-9 (Low Fluid Loss Control)
5 % Salt (Salt)
0.125 lbm/sk Poly-E-Flake (Lost Circulation Additive)

| | |
|---|---|
| Fluid Weight | 11.80 lbm/gal |
| Slurry Yield: | 2.50 $ft^3$/sk |
| Total Mixing Fluid: | 14.60 Gal/sk |
| Top of Fluid: | 1000 ft |
| Calculated Fill: | 7900 ft |
| Volume: | 243.05 bbl |
| Calculated Sacks: | 545.86 sks |
| Proposed Sacks: | 550 sks |

Fluid 5: Tail-in with 165 sks
Premium Cement
94 lbm/sk Premium Cement (Cement)
0.5 % Halad(R)-9 (Low Fluid Loss Control)

| | |
|---|---|
| Fluid Weight | 15.60 lbm/gal |
| Slurry Yield: | 1.19 $ft^3$/sk |
| Total Mixing Fluid: | 5.35 Gal/sk |
| Top of Fluid: | 8900 ft |
| Calculated Fill: | 800 ft |
| Volume: | 34.81 bbl |
| Calculated Sacks: | 163.99 sks |
| Proposed Sacks: | 165 sks |

## Job Information — Production Liner

Weems 1

| | |
|---|---|
| 2nd Intermediate Casing | 0 - 9700 ft (MD) |
| Outer Diameter | 7.625 in |
| Inner Diameter | 6.969 in |
| Linear Weight | 26.40 lbm/ft |
| Thread | LTC |
| Casing Grade | P-110 |
| 6-1/2" Hole | 9700 - 12400 ft (MD) |
| Inner Diameter | 6.500 in |
| Job Excess | 35 % |
| Drill Pipe | 0 - 9400 ft (MD) |
| Production Liner | 9400 - 12400 ft (MD) |
| Outer Diameter | 5.500 in |
| Inner Diameter | 4.950 in |
| Linear Weight | 15.50 lbm/ft |
| Casing Grade | N-80 |
| Mud Type | Water Based Mud |
| Mud Weight | 10 lbm/gal |
| BHST | 180 degF |
| Lap | 300 ft |
| Cap | 300 ft |

## Calculations — Production Liner

Cement : (3300.00 ft fill)

| | |
|---|---|
| 300.00 ft * 0.2649 $ft^3/ft$ * 10 % | = 87.41 $ft^3$ |
| 300.00 ft * 0.0999 $ft^3/ft$ * 10 % | = 32.97 $ft^3$ |
| 2700.00 ft * 0.0654 $ft^3/ft$ * 35 % | = 238.56 $ft^3$ |
| Primary Cement | = 358.95 $ft^3$ |
| | = 63.93 bbl |

Shoe Joint Volume: (40.00 ft fill)

| | |
|---|---|
| 40.00 ft * 0.1336 $ft^3/ft$ | = 5.35 $ft^3$ |
| | = 0.95 bbl |
| Tail plus shoe joint | = 364.29 $ft^3$ |
| | = 64.88 bbl |
| Total Tail | = 304 sks |

## Job Recommendation — Production Liner

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 12 bbl
TUNED SPACER III

| | | | |
|---|---|---|---|
| 180 lbm/bbl | Barite (Heavy Weight Additive) | Fluid Density: | 12 lbm/gal |
| 0.4 gal/bbl | Dual Spacer Surfactant E (Surfactant) | Fluid Volume: | 12 bbl |
| 0.7 gal/bbl | Musol(R) A (Mutual Solvent) | | |
| 0.5 gal/bbl | SEM-7 (Emulsifier) | | |
| 3 lbm/bbl | Fe-2 (Buffer) | | |
| 0.12 gal/bbl | D-AIR 3000L (Defoamer) | | |

Fluid 2: Mix and pump with 305 sks
Premium Cement

| | | | |
|---|---|---|---|
| 94 lbm/sk | Premium Cement (Cement) | Fluid Weight | 15.60 lbm/gal |
| 1 % | LAP-1 (Low Fluid Loss Control) | Slurry Yield: | 1.20 $ft^3/sk$ |
| 0.3 % | CFR-3 (Dispersant) | Total Mixing Fluid: | 5.31 Gal/sk |
| 0.25 lbm/sk | D-AIR 3000 (Defoamer) | Top of Fluid: | 9100 ft |
| | | Calculated Fill: | 3300 ft |
| | | Volume: | 64.88 bbl |
| | | Calculated Sacks: | 303.58 sks |
| | | Proposed Sacks: | 305 sks |

## Conditions

**NOTE**

The cost in this analysis is good for the materials and/or services outlined within. These prices are based on Halliburton being awarded the work on a first call basis. Prices will be reviewed for adjustments if awarded on 2nd or 3rd call basis and/or after 30 days of this written analysis. This is in an effort to schedule our work and maintain a high quality of performance for our customers.

The unit prices stated in the proposal are based on our current published prices. The projected equipment, personnel, and material needs are only estimates based on information about the work presently available to us. At the time the work is actually performed, conditions then existing may require an increase or decrease in the equipment, personnel, and/or material needs. Charges will be based upon unit prices in effect at the time the work is performed and the amount of equipment, personnel, and/or material actually utilized in the work. Taxes, if any, are not included. Applicable taxes, if any, will be added to the actual invoice.

It is understood and agreed between the parties that with the exception of the subject discounts, all services performed and equipment and materials sold are provided subject to Halliburton's General Terms and Conditions contained in our current price list, (which include LIMITATION OF LIABILITY and WARRANTY provisions), and pursuant to the applicable Halliburton Work Order Contract (whether or not executed by you), unless a Master Service and/or Sales Contract applicable to the services, equipment, or materials supplied exists between your company and Halliburton, in which case the negotiated Master Contract shall govern the relationship between the parties. A copy of the latest version of our General Terms and Conditions is available from your Halliburton representative or at: http://www.halliburton.com/hes/general_terms_conditions.pdf for your convenient review, and we would appreciate receiving any questions you may have about them. Should your company be interested in negotiating a Master Contract with Halliburton, our Law Department would be pleased to work with you to finalize a mutually agreeable contract. In this connection, it is also understood and agreed that Customer will continue to execute Halliburton usual field work orders and/or tickets customarily required by Halliburton in connection with the furnishing of said services, equipment, and materials.
Any terms and conditions contained in purchase orders or other documents issued by the customer shall be of no effect except to confirm the type and quantity of services, equipment, and materials to be supplied to the customer.
If customer does not have an approved open account with Halliburton or a mutually executed written contract with Halliburton, which dictates payment terms different than those set forth in this clause, all sums due are payable in cash at the time of performance of services or delivery of equipment, products, or materials. If customer has an approved open account, invoices are payable on the twentieth day after date of invoice.

Customer agrees to pay interest on any unpaid balance from the date payable until paid at the highest lawful contract rate applicable, but never to exceed 18% per annum. In the event Halliburton employs an attorney for collection of any account, customer agrees to pay attorney fees of 20% of the unpaid account, plus all collection and court costs.

Newpark Drilling Fluids, LLC

# DRILLING FLUIDS RECAP

## PREPARED FOR:

Weems #1

Section 34, T-22-S, R-27-E
Eddy County, New Mexico

## SUBMITTED TO:

Mr. Kip Agar

OGX Resources, LLC
P.O. Box 2064
Midland, Texas 79702

## PREPARED BY:

Mike Davis

# Newpark Drilling Fluids, LLC

## OGX Resources, LLC
**Weems #1**
Section 34 T-22-S, R-27-E
Eddy County, New Mexico

**Interval 1:** 17-1/2" Hole
**Interval:** 0' – 450' 325
**Casing:** 13-3/8
**Days:** 2

### Drilling Fluid Properties:

Set Surface Casing above the Salado

| Depth (feet) | Weight (ppg) | Viscosity (sec/1000cc) | PV (cps) | YP (lb/100ft²) | pH (value) | Fluid Loss (cc/30min) | LG Solids (%) |
|---|---|---|---|---|---|---|---|
| 0' – 450' 325 | 8.6 – 8.8 | 36 – 38 | 6-10 | 6-20 | 9.0-10.0 | No Control | <6 |

### Drilling Fluid Recommendations:

A non-dispersed **NewGel** system is recommended for this interval, with pre-hydrated **NewGel** and **Soda Ash** as the primary system components for rheological control. Utilize **Paper** sweeps to aid in seepage control. If losses occur batch treat with 12-15 ppb **Fiber Seal** in a 50 bbl premix with 36-38 sec/1000cc viscosity.

At total depth, sweep the hole with 100-barrels of fresh water and **New Gel** for a 80-90 sec/1000cc viscosity and 0.25-ppb **Super Sweep**. Circulate hole clean prior to running casing.

### Materials Consumption

| | | |
|---|---|---|
| 175 | sx | New Gel |
| 10 | sx | Soda Ash |
| 10 | sx | Paper |
| 1 | bx | Super Sweep |

# Newpark Drilling Fluids, LLC

## OGX Resources, LLC

**Weems #1**

Section 34 T-22-S, R-27-E
Eddy County, New Mexico

## PROGRAM HIGHLIGHTS:

| | | |
|---|---|---|
| **TOTAL DEPTH** | : | **12,400'** |
| **CASING REQUIREMENTS** | : | **Interval 1: 17-1/2" hole to 450', set 13-3/8" casing.** |
| | : | **Interval 2: 12-1/4" hole to 5,500', set 9-5/8" casing.** |
| | : | **Interval 3: 8-3/4" hole to 9,700', set 7-5/8" casing.** |
| | : | **Interval 4: 6-1/2" hole to 12,400', set 5-1/2" liner.** |
| **MUD WEIGHT REQUIREMENTS** | : | **8.6 – 8.8 ppg @ 450'** |
| | : | **10.0 – 10.1 ppg @ 5,500'** |
| | : | **8.4 – 10.0 ppg @ 9,700'** |
| | : | **10.0 – 11.5 ppg @ 12,400'** |
| **DAYS TO REACH TD** | : | **45 – 48** |
| **COST ESTIMATE** | : | **$110,000.00 to $120,000.00** |
| **WAREHOUSE** | : | **Midland, Texas** (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' – 450'** **Set 13-3/8" Casing** | 8.6 – 8.8 | 36 – 38 | N/C | 6 – 10 | 6 – 20 | **Spud Mud** |
| **450' – 5,500'** **Set 9-5/8" Casing** | 10.0 – 10.1 | 29 – 30 | N/C | 0 – 1 | 0 – 1 | **Brine** |
| **5,500' – 9,700'** **Set 7-5/8" Liner** | 8.4 – 10.0 | 28 – 29 | N/C | 0 – 1 | 0 – 1 | **Fresh Water to Brine** |
| **9,700' – 12,400'** **Set 5-1/2"** | 10.0 – 11.5 | 38 – 45 | 10 – 6 | 6 – 20 | 14 – 24 | **Dynazan / Starch** **Barite** ***Calcium Carbonate** |

**Note:** The mud weight schedule is intended as a guideline only. Actual mud weights used should be determined by hole conditions and drilling parameters.

***Calcium Carbonate will be used as the weighting agent in all pipe slugs and mud weight increases after the Strawn formation.**

**OGX Resources, LLC**
**Weems #1**
Section 34 T-22-S, R-27-E
Eddy County, New Mexico

## PROGRAM HIGHLIGHTS (CONT'D):

### HOLE & CASING DESIGN:

| INTERVAL | DEPTH (feet) | BIT SIZE | CASING (OD) | ANTICIPATED MUD WT. (ppg) |
|---|---|---|---|---|
| INTERVAL 1 | 450' | 17-1/2" | 13-3/8" | 8.6 – 8.8 |
| INTERVAL 2 | 5,500' | 12-1/4" | 9-5/8" | 10.0 – 10.1 |
| INTERVAL 3 | 9,700' | 8-3/4" | 7-5/8" | 8.4 – 10.0 |
| INTERVAL 4 | 12,400' | 6-1/2" | 5-1/2" | 10.0 – 11.5 |

### SOLIDS CONTROL:

| INTERVAL | RECOMMENDED SOLIDS CONTROL EQUIPMENT |
|---|---|
| INTERVAL 1 | Two linear motion shale shakers and one desander. |
| INTERVAL 2 | Reserve. |
| INTERVAL 3 | Reserve. |
| INTERVAL 4 | Reserve. |
| INTERVAL 5 | Two linear motion shale shakers and centrifuges. |

### ESTIMATED FORMATION TOPS:

| FORMATION | DEPTH | |
|---|---|---|
| Salt | 457' | |
| Capitan Reef | 951' | Reef does not exist here BD |
| B/Salt | 2,292' | |
| Lamar Lime | 2,582' | |
| Delaware | 3,152' | |
| Indian Draw Sand | 3,502' | |
| Bone Springs | 6,032' | |
| 1st Bone Spring Sand | 6,864' | |
| 2nd Bone Spring Sand | 7,548' | |
| 3rd Bone Spring Sand | 8,800' | |
| Wolfcamp | 9,392' | |
| Strawn | 10,699' | |
| Atoka | 11,142' | |
| Upper Morrow | 11,667' | |
| Middle Morrow | 12,042' | |
| Lower Morrow | 12,352' | |
| **Total Depth** | **12,400'** | |

Newpark Drilling Fluids, LLC

**OGX Resources, LLC**

**Weems #1**

Section 34 T-22-S, R-27-E

Eddy County, New Mexico

## Maintenance Procedure: Interval 1

***Fluid Loss*** - Fluid loss control is unnecessary through this interval.

***Mud Weight*** - Run water and premixes as needed to maintain volume and weight as specified.

***Rheology*** - Solids content is the primary factor that will affect rheology. Maintain viscosity as needed for this interval.

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

***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.

Newpark Drilling Fluids, LLC

# OGX Resources, LLC

**Weems #1**

Section 34 T-22-S, R-27-E
Eddy County, New Mexico

**Interval 2:** **12-1/4" Hole**
**Interval:** **450' – 5,500'**
**Casing:** **9-5/8"**
**Days:** **8**

## Drilling Fluid Properties:

| Depth (feet) | Weight (ppg) | Viscosity (sec/1000cc) | PV (cps) | YP (lb/100ft²) | pH (value) | Fluid Loss (cc/30min) | LG Solids (%) |
|---|---|---|---|---|---|---|---|
| ~~450~~ 425' – 5,500' | 10.0 – 10.1 | 29 – 30 | 0-1 | 0-1 | 9.0-10.0 | No Control | <6 |

Set Surface casing above Salado

## Drilling Fluid Recommendations:

Drill out from the 13-3/8" casing with brine water circulating a controlled portion of the reserve pit for gravitational solids control. Utilize **Paper** sweeps to aid in seepage control. The pH should be maintained at 9.0-10.0 with additions of **Caustic Soda**. Utilize **New-55** sweeps (2-3 quarts per connection) to aid in cuttings removal. Sweep the hole with 100 barrels of fresh water with **New Gel** for a 80-90 sec/1000cc viscosity and 0.25-lbs of **Super Sweep** every 500 feet drilled to aid in cuttings removal. If losses occur batch treat with 12-15 ppb **Fiber Seal** in a 50 bbl premix with 36-40 sec/1000cc viscosity.

At total depth sweep the hole with 100-barrels of fresh water and **New Gel** for a 80-90 sec/1000cc viscosity and 0.25-ppb **Super Sweep**. Circulate hole clean prior to running casing.

## Materials Consumption

| | | |
|---|---|---|
| 250 | sx | New Gel |
| 40 | sx | Paper |
| 40 | sx | Caustic Soda |
| 6 | pl | New-55 |
| 4 | bx | Super Sweep |

Newpark Drilling Fluids, LLC

# OGX Resources, LLC

**Weems #1**

Section 34 T-22-S, R-27-E
Eddy County, New Mexico

## Maintenance Procedure: Interval 2

***Fluid Loss*** - Fluid loss control is unnecessary through this interval.

***Mud Weight*** - Maintain minimum fluid densities.

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

***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.

Newpark Drilling Fluids, LLC

# OGX Resources, LLC

**Weems #1**

Section 34 T-22-S, R-27-E
Eddy County, New Mexico

**Interval 3:** **8-3/4" Hole**
**Interval:** **5,500' – 9,700' TVD**
**Casing:** **7-5/8"**
**Days:** **16**

## Drilling Fluid Properties:

| Depth (feet) | Weight (ppg) | Viscosity (sec/1000cc) | PV (cps) | YP ($lb/100ft^2$) | pH (value) | Fluid Loss (cc/30min) | LG Solids (%) |
|---|---|---|---|---|---|---|---|
| 5,500' – 9,700' | 8.4 – 10.0 | 28 – 29 | 0 –1 | 0 – 1 | 9.0-10.0 | N/C | <6 |

## Drilling Fluid Recommendations:

Drill out from the 9-5/8" casing with Fresh water circulating the remaining portion of the reserve. The pH should be maintained at 9.0-10.0 with additions of **Caustic Soda**. Sweep the hole with 100 barrels of fresh water with **New Gel** for a 80-90 sec/1000cc viscosity and 0.25-lbs of **Super Sweep** every 500 feet drilled to aid in cuttings removal. If losses occur batch treat with 12-15 ppb **Dynafiber** in a 50 bbl premix with 36-40 sec/1000cc viscosity. For torque and Drag use **HB-411**. Mix 1 drum HB-411 in a 100-bbl sweep and sweep hole with 25 bbls as needed.

Maintain sufficient brine on location to raise the mud weight in the event of abnormal pressure in the Bone Springs.

KOP is **5,700'**. Will average 1-1/2° to 2° per 100' to 12° to 14° of deviation. Moving bottom of hole 1,000' to the Northeast.

At total depth fill premix pit with 100 barrels of fresh water and **New Gel** for a 80-90 sec/1000cc viscosity and 0.25-lbs of **Super Sweep.** Sweep prior to casing operations.

## Materials Consumption

| | | |
|---|---|---|
| 200 | sx | New Gel |
| 60 | sx | Paper |
| 40 | sx | Caustic Soda |
| 4 | dm | HB-411 |
| 2 | bx | Super Sweep |

# OGX Resources, LLC

## Weems #1

Section 34 T-22-S, R-27-E
Eddy County, New Mexico

## Maintenance Procedure: Interval 3

***Fluid Loss*** - Fluid loss control is unnecessary through 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. Sweep the hole with fresh water mud pills made of **New Gel** for a 80-90 sec/1000cc viscosity and 0.25 ppb of **Super Sweep** every 500'.

***Mud Losses Down hole*** - Loss of circulation is a possibility through this interval. Use **Mica** and **Dynafiber**. 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.

Newpark Drilling Fluids, LLC

# OGX Resources, LLC

**Weems #1**

Section 34 T-22-S, R-27-E
Eddy County, New Mexico

**Interval 4:** **6-1/8" Hole**
**Interval:** **9,700' TVD – 12,400' TVD**
**Casing:** **5-1/2"**
**Days:** **15**

## Drilling Fluid Properties:

| Depth (feet) | Weight (ppg) | Viscosity (sec/1000cc) | PV (cps) | YP (lb/100ft$^2$) | HPHT Fluid Loss (cc/30min) | pH (value) | LG Solids (%) |
|---|---|---|---|---|---|---|---|
| 9,700' – 12,400' | 10.0 – 11.5 | 36 – 45 | 14 – 24 | 8 – 20 | 10 – 6 cc | 9 – 10 | <6 |

## Drilling Fluid Recommendations:

After drilling cement and shoe at **9,700' TVD** confine circulation to steel pits and begin mud up. Treat the system with **Newcide** to prevent bacterial degradation of organic materials. Adjust and maintain pH with **Caustic Soda**. Add **Starch** (White) to control API filtrate at <10cc. Mix **Dynazan** to increase the viscosity to 38-40 sec/1000cc. Use **S-10 Defoamer** to reduce foaming. Mix **Barite** as needed to increase fluid density for the Strawn Foramtion.

At **11,600' TVD** prior to drilling Morrow, reduce API filtrate to <6cc with **Starch** (White). Raise viscosity to 38 – 40 sec/1000cc with **Dynazan**. If abnormal pressures are encountered mix **Calcium Carbonate** to increase mud weight and raise viscosity to 45+ sec/1000cc with **Dynazan**.

***Calcium Carbonate will be used as the weighting agent in all pipe slugs and mud weight increases after the Strawn formation.**

**Note: Offset wells have shown abnormal pressure in the Strawn formation requiring up to 11.0-ppg mud weight.*

## Materials Consumption:

- 250 sx White Starch
- 100 tn Calcium Carbonate (Bulk)
- 100 tn Barite (Bulk)
- 80 sx Dynazan
- 40 sx Caustic Soda
- 25 cn S-10 Defoamer
- 25 cn Newcide

# OGX Resources, LLC
## Weems #1
Section 34 T-22-S, R-27-E
Eddy County, New Mexico

## Maintenance Procedure: Interval 4

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

***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.

***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 **New 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. The shakers should be equipped with the finest mesh screens that will handle the circulating volume.

Newpark Drilling Fluids, LLC

**OGX Resources, LLC**
**Weems #1**
Section 34 T-22-S, R-27-E
Eddy County, New Mexico

# ENGINEER / WAREHOUSE INFORMATION

WELL NAME: Weems #1

LOCATION: Section 34, T-22-S, R-27-E
Eddy County, New Mexico

MUD ENGINEER: Wally Pearson Artesia, New Mexico
Bill Stewart Hobbs, New Mexico

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

WAREHOUSE: Artesia & Lovington, New Mexico
Oil Base Mud Plant Monahans, Texas
Water Base Mud Plant Monahans, Texas

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

# 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 8-3/4" 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 Calcium Carbonate. 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.

**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.

# Solids Control

The most important contributing factor to good mud properties is a low native solids content. Conventional means of solids control (dilution, desanders, and desilters), used for water based muds are not economical because these methods can cause loss of liquid portion of the mud and increase chemical consumption. The solids control equipment for this well should include:

- High Speed shale shaker with fine mesh screens.
- Mud Cleaners

## Shale Shaker

Use a high-speed 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.

## Mud Cleaner

Use a mud cleaner using the smallest screen possible (200 mesh). Monitor the discharge to avoid stripping excess amounts of product from the mud.

# 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)

$\tau C$ = Critical Velocity in feet per second.

## 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.

## 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.

# Pathfinder Energy
## Planning Report

SEP 10 2007
OCD-ARTESIA

| | | | |
|---|---|---|---|
| **Company:** | OGX Resources LLC | **Date:** 09/05/2007 **Time:** 08:47:58 | **Page:** 1 |
| **Field:** | Weems #1 | **Co-ordinate(NE) Reference:** | Site: Weems #1, Grid North |
| **Site:** | Weems #1 | **Vertical (TVD) Reference:** | RKB 3120.0 |
| **Well:** | Weems #1 | **Section (VS) Reference:** | Well (0.00N,0.00E,62.24Azi) |
| **Wellpath:** | OH | **Plan:** | Plan #1 6-11-07 |

**Field:** Weems #1

| | | | |
|---|---|---|---|
| **Map System:** | US State Plane Coordinate System 1983 | **Map Zone:** | New Mexico, Eastern Zone |
| **Geo Datum:** | GRS 1980 | **Coordinate System:** | Site Centre |
| **Sys Datum:** | Mean Sea Level | **Geomagnetic Model:** | igrf2005 |

**Site:** Weems #1

| | | | | | |
|---|---|---|---|---|---|
| **Site Position:** | | **Northing:** | 492183.01 ft | **Latitude:** | 32 21 10.723 N |
| **From:** | Map | **Easting:** | 590484.07 ft | **Longitude:** | 104 10 27.052 W |
| **Position Uncertainty:** | 0 00 ft | | | **North Reference:** | Grid |
| **Ground Level:** | 3106.00 ft | | | **Grid Convergence:** | 0.09 deg |

**Well:** Weems #1 **Slot Name:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **Well Position:** | +N/-S | 0.00 ft | **Northing:** | 492183.01 ft | **Latitude:** | 32 21 10.723 N |
| | +E/-W | 0.00 ft | **Easting :** | 590484.07 ft | **Longitude:** | 104 10 27.052 W |
| **Position Uncertainty:** | | 0.00 ft | | | | |

**Wellpath:** OH

| | | | | | |
|---|---|---|---|---|---|
| **Current Datum:** | RKB | **Height** | 3120.00 ft | **Drilled From:** | Surface |
| **Magnetic Data:** | 06/11/2007 | | | **Tie-on Depth:** | 0.00 ft |
| **Field Strength:** | 0 nT | | | **Above System Datum:** | Mean Sea Level |
| | | | | **Declination:** | 0.00 deg |
| | | | | **Mag Dip Angle:** | 0.00 deg |

| **Vertical Section:** | **Depth From (TVD)** | **+N/-S** | **+E/-W** | **Direction** |
|---|---|---|---|---|
| | ft | ft | ft | deg |
| | 0.00 | 0 00 | 0.00 | 62.24 |

**Plan:** Plan #1 6-11-07 **Date Composed:** 06/11/2007

**Version:** 1

**Principal:** No **Tied-to:** From Surface

**Plan Section Information**

| MD ft | Incl deg | Azim deg | TVD ft | +N/-S ft | +E/-W ft | DLS deg/100ft | Build deg/100ft | Turn deg/100ft | TFO deg | Target |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 5600 00 | 0.00 | 0.00 | 5600.00 | 0 00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 5964.42 | 14.58 | 62.24 | 5960.50 | 21 47 | 40.80 | 4.00 | 4.00 | 0.00 | 0.00 | |
| 9558.27 | 14.58 | 62.24 | 9438.67 | 442.74 | 841.20 | 0.00 | 0.00 | 0.00 | 0 00 | |
| 10530.05 | 0.00 | 0.00 | 10400.00 | 500.00 | 950.00 | 1.50 | -1.50 | 0.00 | 180.00 | Vertical Point |
| 11030.05 | 0.00 | 0.00 | 10900.00 | 500.00 | 950.00 | 0.00 | 0.00 | 0.00 | 0.00 | |

**Survey**

| MD ft | Incl deg | Azim deg | TVD ft | +N/-S ft | +E/-W ft | VS ft | DLS deg/100ft | Build deg/100ft | Turn deg/100ft | Tool/Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 0.00 | 0 00 | 0.00 | 0 00 | 0.00 | 0.00 | 0 00 | 0.00 | |
| 100.00 | 0.00 | 0.00 | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 00 | |
| 200.00 | 0.00 | 0.00 | 200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 300.00 | 0.00 | 0.00 | 300.00 | 0.00 | 0.00 | 0 00 | 0.00 | 0.00 | 0.00 | |
| 400.00 | 0.00 | 0.00 | 400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 500.00 | 0.00 | 0.00 | 500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 00 | 0.00 | |
| 600.00 | 0.00 | 0.00 | 600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 700.00 | 0.00 | 0.00 | 700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 800.00 | 0.00 | 0.00 | 800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 00 | 0.00 | |
| 900.00 | 0.00 | 0 00 | 900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 1000.00 | 0.00 | 0.00 | 1000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 1100.00 | 0.00 | 0.00 | 1100.00 | 0.00 | 0 00 | 0.00 | 0.00 | 0 00 | 0.00 | |
| 1200.00 | 0.00 | 0.00 | 1200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 1300.00 | 0.00 | 0.00 | 1300.00 | 0 00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 1400.00 | 0.00 | 0.00 | 1400.00 | 0.00 | 0.00 | 0 00 | 0.00 | 0.00 | 0.00 | |

# Pathfinder Energy
## Planning Report

| | | | | | |
|---|---|---|---|---|---|
| **Company:** | OGX Resources LLC | **Date:** 09/05/2007 | **Time:** 08:47:58 | **Page:** | 2 |
| **Field:** | Weems #1 | **Co-ordinate(NE) Reference:** | Site: Weems #1, Grid North | | |
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| **Wellpath:** | OH | **Plan:** | Plan #1 6-11-07 | | |

**Survey**

| MD ft | Incl deg | Azim deg | TVD ft | +N/-S ft | +E/-W ft | VS ft | DLS deg/100ft | Build deg/100ft | Turn deg/100ft | Tool/Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| 1500.00 | 0.00 | 0.00 | 1500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 1600.00 | 0.00 | 0.00 | 1600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 1700.00 | 0.00 | 0.00 | 1700 00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 1800.00 | 0.00 | 0.00 | 1800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 1900.00 | 0.00 | 0.00 | 1900.00 | 0 00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 2000.00 | 0.00 | 0.00 | 2000.00 | 0 00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 2100.00 | 0.00 | 0.00 | 2100.00 | 0.00 | 0 00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 2200.00 | 0 00 | 0 00 | 2200.00 | 0.00 | 0.00 | 0.00 | 0 00 | 0.00 | 0.00 | |
| 2300.00 | 0.00 | 0.00 | 2300.00 | 0.00 | 0.00 | 0.00 | 0 00 | 0 00 | 0.00 | |
| 2400.00 | 0.00 | 0.00 | 2400.00 | 0.00 | 0.00 | 0 00 | 0.00 | 0.00 | 0.00 | |
| 2500.00 | 0.00 | 0.00 | 2500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 2600 00 | 0 00 | 0.00 | 2600.00 | 0.00 | 0 00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 2700.00 | 0.00 | 0.00 | 2700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 2800.00 | 0.00 | 0.00 | 2800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 2900.00 | 0.00 | 0.00 | 2900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 3000.00 | 0.00 | 0.00 | 3000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 3100.00 | 0.00 | 0.00 | 3100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 00 | 0 00 | |
| 3200.00 | 0.00 | 0.00 | 3200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 3300.00 | 0.00 | 0.00 | 3300.00 | 0.00 | 0.00 | 0 00 | 0.00 | 0 00 | 0.00 | |
| 3400.00 | 0.00 | 0.00 | 3400.00 | 0 00 | 0.00 | 0 00 | 0.00 | 0 00 | 0 00 | |
| 3500.00 | 0.00 | 0.00 | 3500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 3600 00 | 0.00 | 0.00 | 3600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 3700.00 | 0.00 | 0.00 | 3700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 3800.00 | 0.00 | 0.00 | 3800.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 00 | |
| 3900.00 | 0.00 | 0.00 | 3900.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 00 | 0.00 | |
| 4000.00 | 0.00 | 0.00 | 4000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 4100 00 | 0.00 | 0.00 | 4100.00 | 0.00 | 0 00 | 0.00 | 0 00 | 0.00 | 0.00 | |
| 4200.00 | 0.00 | 0.00 | 4200.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 4300.00 | 0.00 | 0.00 | 4300.00 | 0 00 | 0.00 | 0 00 | 0.00 | 0.00 | 0.00 | |
| 4400.00 | 0.00 | 0.00 | 4400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 4500.00 | 0.00 | 0.00 | 4500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 00 | |
| 4600 00 | 0.00 | 0.00 | 4600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 4700.00 | 0.00 | 0.00 | 4700.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 4800.00 | 0.00 | 0.00 | 4800.00 | 0 00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 4900.00 | 0.00 | 0.00 | 4900.00 | 0.00 | 0.00 | 0 00 | 0 00 | 0.00 | 0.00 | |
| 5000.00 | 0.00 | 0.00 | 5000 00 | 0 00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 5100.00 | 0 00 | 0.00 | 5100.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 5200 00 | 0.00 | 0.00 | 5200.00 | 0 00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 5300.00 | 0.00 | 0.00 | 5300.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 00 | 0 00 | |
| 5400.00 | 0.00 | 0.00 | 5400.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 00 | 0.00 | |
| 5500.00 | 0.00 | 0.00 | 5500.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 5600.00 | 0.00 | 0.00 | 5600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | KOP @ 5600' MD/TVD, Begin |
| 5700.00 | 4.00 | 62.24 | 5699.92 | 1.63 | 3.09 | 3.49 | 4.00 | 4.00 | 0.00 | |
| 5800.00 | 8 00 | 62.24 | 5799.35 | 6.49 | 12.34 | 13.94 | 4.00 | 4.00 | 0.00 | |
| 5900.00 | 12.00 | 62 24 | 5897.81 | 14.58 | 27.70 | 31.30 | 4.00 | 4.00 | 0.00 | |
| 5964.42 | 14.58 | 62.24 | 5960.50 | 21.47 | 40.80 | 46.11 | 4.00 | 4.00 | 0.00 | EOB @ 5964' MD, 14.58° IN |
| 6000.00 | 14.58 | 62.24 | 5994.94 | 25.64 | 48.73 | 55.06 | 0.00 | 0.00 | 0.00 | |
| 6100.00 | 14.58 | 62.24 | 6091.72 | 37.37 | 71.00 | 80.23 | 0.00 | 0.00 | 0.00 | |
| 6200 00 | 14.58 | 62.24 | 6188.50 | 49.09 | 93.27 | 105.40 | 0.00 | 0.00 | 0.00 | |
| 6300.00 | 14.58 | 62 24 | 6285.28 | 60.81 | 115.54 | 130.56 | 0.00 | 0.00 | 0.00 | |
| 6400 00 | 14.58 | 62.24 | 6382.06 | 72.53 | 137.81 | 155.73 | 0.00 | 0.00 | 0.00 | |
| 6500 00 | 14.58 | 62.24 | 6478.84 | 84.25 | 160.08 | 180.90 | 0.00 | 0.00 | 0.00 | |
| 6600.00 | 14.58 | 62.24 | 6575.62 | 95.98 | 182.35 | 206.07 | 0.00 | 0.00 | 0 00 | |
| 6700.00 | 14.58 | 62.24 | 6672.40 | 107.70 | 204.62 | 231.24 | 0.00 | 0.00 | 0.00 | |

# Pathfinder Energy
## Planning Report

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|---|---|---|---|---|---|
| **Company:** | OGX Resources LLC | **Date:** 09/05/2007 | **Time:** 08:47:58 | **Page:** | 3 |
| **Field:** | Weems #1 | **Co-ordinate(NE) Reference:** | Site: Weems #1, Grid North | | |
| **Site:** | Weems #1 | **Vertical (TVD) Reference:** | RKB 3120.0 | | |
| **Well:** | Weems #1 | **Section (VS) Reference:** | Well (0.00N,0.00E,62.24Azi) | | |
| **Wellpath:** | OH | **Plan:** | Plan #1 6-11-07 | | |

**Survey**

| MD ft | Incl deg | Azim deg | TVD ft | +N/-S ft | +E/-W ft | VS ft | DLS deg/100ft | Build deg/100ft | Turn deg/100ft | Tool/Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| 6800.00 | 14.58 | 62.24 | 6769.19 | 119.42 | 226.90 | 256.40 | 0.00 | 0.00 | 0.00 | |
| 6900.00 | 14.58 | 62.24 | 6865 97 | 131 14 | 249.17 | 281.57 | 0.00 | 0 00 | 0.00 | |
| 7000.00 | 14 58 | 62.24 | 6962.75 | 142.86 | 271.44 | 306.74 | 0.00 | 0.00 | 0.00 | |
| 7100.00 | 14.58 | 62.24 | 7059.53 | 154.58 | 293.71 | 331.91 | 0.00 | 0.00 | 0.00 | |
| 7200.00 | 14.58 | 62.24 | 7156 31 | 166.31 | 315.98 | 357.07 | 0.00 | 0.00 | 0.00 | |
| 7300.00 | 14.58 | 62.24 | 7253.09 | 178 03 | 338.25 | 382.24 | 0.00 | 0.00 | 0.00 | |
| 7400.00 | 14.58 | 62.24 | 7349.87 | 189.75 | 360.52 | 407.41 | 0.00 | 0.00 | 0.00 | |
| 7500.00 | 14.58 | 62.24 | 7446.65 | 201.47 | 382.80 | 432.58 | 0.00 | 0.00 | 0 00 | |
| 7600.00 | 14.58 | 62.24 | 7543.43 | 213 19 | 405.07 | 457.74 | 0.00 | 0.00 | 0 00 | |
| 7700.00 | 14.58 | 62.24 | 7640.22 | 224.91 | 427.34 | 482.91 | 0.00 | 0.00 | 0 00 | |
| 7800.00 | 14.58 | 62.24 | 7737.00 | 236.64 | 449.61 | 508.08 | 0.00 | 0.00 | 0.00 | |
| 7900.00 | 14.58 | 62 24 | 7833 78 | 248 36 | 471.88 | 533.25 | 0 00 | 0.00 | 0 00 | |
| 8000.00 | 14.58 | 62.24 | 7930.56 | 260.08 | 494.15 | 558.42 | 0.00 | 0.00 | 0.00 | |
| 8100.00 | 14 58 | 62.24 | 8027.34 | 271.80 | 516.42 | 583.58 | 0.00 | 0.00 | 0.00 | |
| 8200.00 | 14.58 | 62.24 | 8124.12 | 283.52 | 538.69 | 608.75 | 0.00 | 0.00 | 0.00 | |
| 8300.00 | 14.58 | 62 24 | 8220 90 | 295.25 | 560.97 | 633.92 | 0.00 | 0.00 | 0.00 | |
| 8400.00 | 14.58 | 62.24 | 8317.68 | 306.97 | 583.24 | 659.09 | 0.00 | 0.00 | 0.00 | |
| 8500.00 | 14.58 | 62.24 | 8414 46 | 318.69 | 605.51 | 684.25 | 0.00 | 0 00 | 0.00 | |
| 8600.00 | 14.58 | 62.24 | 8511.25 | 330.41 | 627.78 | 709.42 | 0.00 | 0.00 | 0.00 | |
| 8700.00 | 14.58 | 62.24 | 8608.03 | 342.13 | 650.05 | 734.59 | 0.00 | 0 00 | 0.00 | |
| 8800.00 | 14.58 | 62.24 | 8704.81 | 353.85 | 672.32 | 759 76 | 0.00 | 0.00 | 0.00 | |
| 8900.00 | 14.58 | 62.24 | 8801.59 | 365.58 | 694.59 | 784.92 | 0.00 | 0.00 | 0.00 | |
| 9000.00 | 14.58 | 62.24 | 8898.37 | 377.30 | 716.86 | 810.09 | 0.00 | 0.00 | 0.00 | |
| 9100.00 | 14.58 | 62.24 | 8995.15 | 389.02 | 739.14 | 835.26 | 0.00 | 0 00 | 0.00 | |
| 9200 00 | 14.58 | 62.24 | 9091.93 | 400.74 | 761.41 | 860 43 | 0.00 | 0 00 | 0.00 | |
| 9300.00 | 14.58 | 62.24 | 9188 71 | 412 46 | 783.68 | 885.59 | 0.00 | 0.00 | 0.00 | |
| 9400.00 | 14 58 | 62.24 | 9285.49 | 424.18 | 805.95 | 910.76 | 0.00 | 0.00 | 0.00 | |
| 9500.00 | 14.58 | 62.24 | 9382.28 | 435.91 | 828.22 | 935 93 | 0.00 | 0.00 | 0.00 | |
| 9558 27 | 14.58 | 62.24 | 9438.67 | 442.74 | 841.20 | 950.59 | 0.00 | 0.00 | 0.00 | EOH @ 9558' MD, Begin dro |
| 9600.00 | 13.95 | 62.24 | 9479.11 | 447.52 | 850.30 | 960.88 | 1 50 | -1.50 | 0.00 | |
| 9700.00 | 12.45 | 62 24 | 9576.47 | 458.16 | 870.51 | 983.71 | 1 50 | -1 50 | 0.00 | |
| 9800 00 | 10.95 | 62.24 | 9674.39 | 467.61 | 888.45 | 1003.99 | 1.50 | -1 50 | 0.00 | |
| 9900.00 | 9.45 | 62.24 | 9772.80 | 475.85 | 904.12 | 1021.70 | 1.50 | -1 50 | 0.00 | |
| 10000.00 | 7.95 | 62.24 | 9871.65 | 482.90 | 917.51 | 1036.83 | 1.50 | -1 50 | 0.00 | |
| 10100 00 | 6.45 | 62.24 | 9970.86 | 488.74 | 928.60 | 1049.36 | 1.50 | -1.50 | 0.00 | |
| 10200.00 | 4 95 | 62.24 | 10070.36 | 493 36 | 937.39 | 1059.30 | 1.50 | -1.50 | 0.00 | |
| 10300.00 | 3.45 | 62.24 | 10170.09 | 496 77 | 943.87 | 1066.62 | 1.50 | -1.50 | 0.00 | |
| 10400.00 | 1.95 | 62.24 | 10269.98 | 498.97 | 948 04 | 1071.33 | 1.50 | -1.50 | 0.00 | |
| 10500.00 | 0.45 | 62.24 | 10369.95 | 499.94 | 949.90 | 1073.43 | 1.50 | -1.50 | 0.00 | |
| 10530 05 | 0.00 | 0 00 | 10400.00 | 500.00 | 950.00 | 1073.55 | 1.50 | -1.50 | 0.00 | Vertical Point |
| 10555.05 | 0.00 | 0 00 | 10425.00 | 500.00 | 950.00 | 1073.55 | 0.00 | 0.00 | 0.00 | Top of Strawn @ 10425' TV |
| 10600.00 | 0.00 | 0.00 | 10469.95 | 500.00 | 950.00 | 1073.55 | 0.00 | 0.00 | 0.00 | |
| 10700.00 | 0.00 | 0 00 | 10569.95 | 500.00 | 950.00 | 1073.55 | 0.00 | 0.00 | 0.00 | |
| 10800.00 | 0.00 | 0 00 | 10669 95 | 500.00 | 950.00 | 1073.55 | 0.00 | 0.00 | 0 00 | |
| 10900.00 | 0.00 | 0.00 | 10769.95 | 500.00 | 950.00 | 1073 55 | 0.00 | 0.00 | 0.00 | |
| 11000.00 | 0.00 | 0.00 | 10869.95 | 500.00 | 950.00 | 1073.55 | 0.00 | 0.00 | 0.00 | |
| 11030.05 | 0.00 | 0.00 | 10900.00 | 500.00 | 950.00 | 1073.55 | 0.00 | 0.00 | 0.00 | |

# Pathfinder Energy
## Planning Report

| | | | |
|---|---|---|---|
| **Company:** | OGX Resources LLC | **Date:** 09/05/2007 **Time:** 08:47:58 | **Page:** 4 |
| **Field:** | Weems #1 | **Co-ordinate(NE) Reference:** Site: Weems #1, Grid North | |
| **Site:** | Weems #1 | **Vertical (TVD) Reference:** RKB 3120.0 | |
| **Well:** | Weems #1 | **Section (VS) Reference:** Well (0.00N,0.00E,62.24Azi) | |
| **Wellpath:** | OH | **Plan:** Plan #1 6-11-07 | |

**Targets**

| Name | Description Dip. | Dir. | TVD ft | +N/-S ft | +E/-W ft | Map Northing ft | Map Easting ft | <---- Latitude ----> Deg Min Sec | <--- Longitude ---> Deg Min Sec |
|---|---|---|---|---|---|---|---|---|---|
| Vertical Point -Plan hit target | | | 10400.00 | 500.00 | 950.00 | 492683.01 | 591434 07 | 32 21 15.657 N | 104 10 15.968 W |

**Annotation**

| MD ft | TVD ft | |
|---|---|---|
| 5600.00 | 5600.00 | KOP @ 5600' MD/TVD, Begin Build @ 4°/100' |
| 5964.42 | 5960.50 | EOB @ 5964' MD, 14.58° INC, Begin Hold |
| 9558.27 | 9438.67 | EOH @ 9558' MD, Begin drop @ 1 5°/100' |
| 10530.05 | 10400.00 | End drop @ 10530' MD, 10400' TVD |
| 10555.05 | 10425 00 | Top of Strawn @ 10425' TVD, Drill to TD |

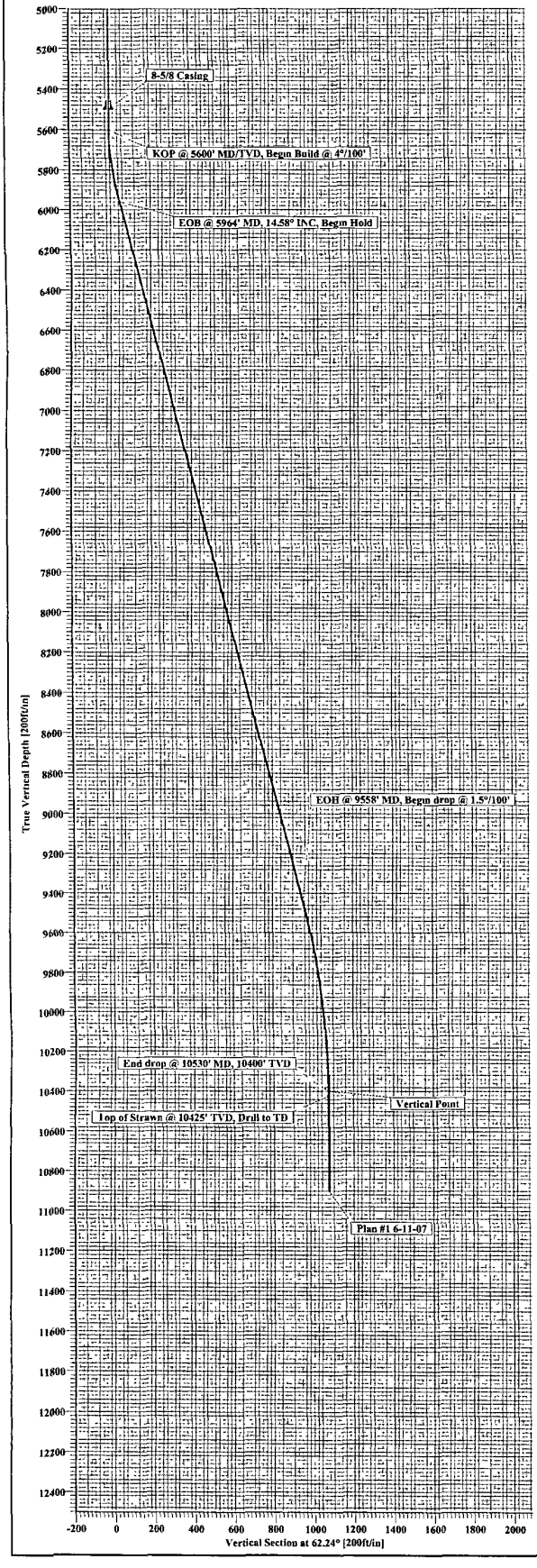
LEGEND

Plan #1 6-11-07

# Field: Weems #1
# Site: Weems #1
# Well: Weems #1
# Wellpath: OH
# Plan: Plan #1 6-11-07

OGX Resources LLC

PATHFINDER




WELLPATH DETAILS

OH

| Rig Ref Datum | | RKB | 3120.00ft |
|---|---|---|---|
| V Section Angle | Origin +N/-S | Origin +E/-W | Starting From TVD |
| 62.24° | 0.00 | 0.00 | 0.00 |

TARGET DETAILS

| Name | TVD | +N/-S | +E/-W | Shape |
|---|---|---|---|---|
| Vertical Point | 10400.00 | 500.00 | 950.00 | Point |

SITE DETAILS

Weems #1

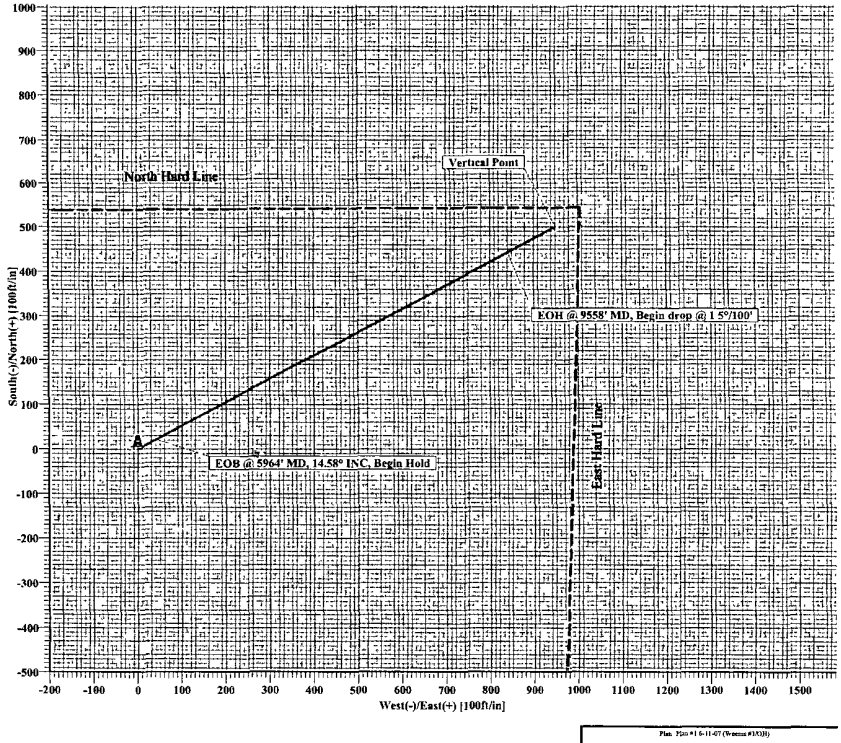
| | |
|---|---|
| Site Centre Northing | 492183.01 |
| Easting | 590484.07 |
| Ground Level | 3106.00 |
| Positional Uncertainty | 0.00 |
| Convergence | 0.09 |

ANNOTATIONS

| No | TVD | MD | Annotation |
|---|---|---|---|
| 1 | 5600.00 | 5600.00 | KOP @ 5600' MD/TVD, Begin Build @ 4°/100' |
| 2 | 5960.50 | 5964.42 | EOB @ 5964' MD, 14.58° INC, Begin Hold |
| 3 | 9438.67 | 9558.27 | EOH @ 9558' MD, Begin drop @ 1.5°/100' |
| 4 | 10400.00 | 10530.05 | End drop @ 10530' MD, 10400' TVD |
| 5 | 10425.00 | 10555.05 | Top of Strawn @ 10425' TVD, Drill to TD |

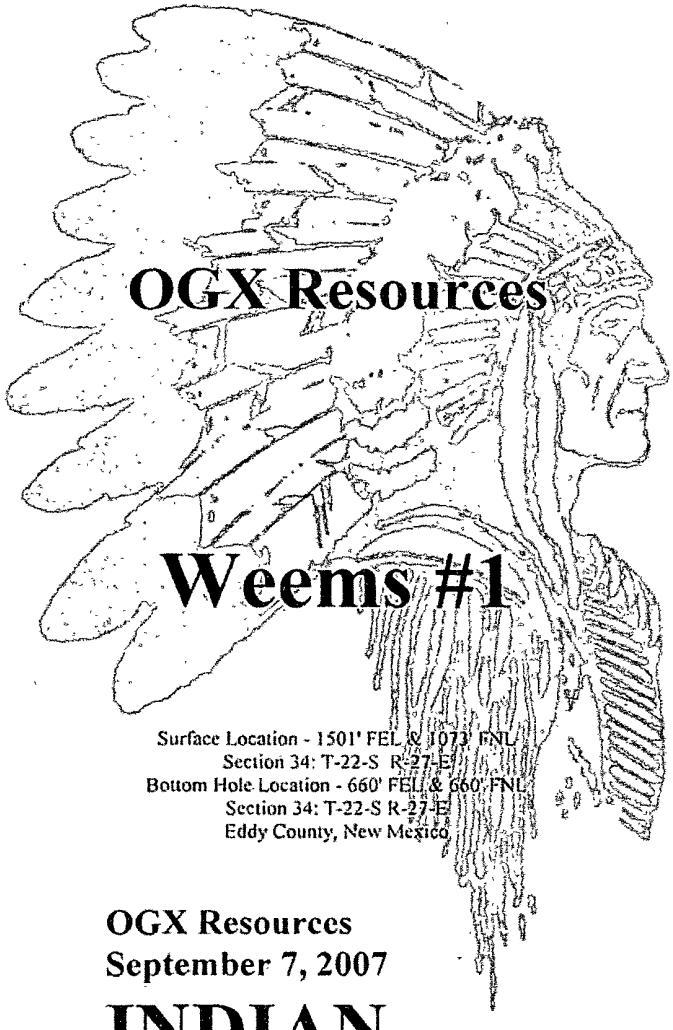
SECTION DETAILS

| Sec | MD | Inc | Azi | TVD | +N/-S | +E/-W | DLeg | TFace | VSec | Target |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 2 | 5600.00 | 0.00 | 0.00 | 5600.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 3 | 5964.42 | 14.58 | 62.24 | 5960.50 | 21.47 | 40.80 | 4.00 | 0.00 | 46.11 | |
| 4 | 9558.27 | 14.58 | 62.24 | 9438.67 | 442.74 | 841.20 | 0.00 | 0.00 | 950.59 | |
| 5 | 10530.05 | 0.00 | 0.00 | 10400.00 | 500.00 | 950.00 | 1.50 | 180.00 | 1073.55 | Vertical Point |
| 6 | 11030.05 | 0.00 | 0.00 | 10900.00 | 500.00 | 950.00 | 0.00 | 0.00 | 1073.55 | |




Plan: Plan #1 6-11-07 (Weems #1/OH)
Created By: Darrel Crocker Date: 09/05/2007
Checked Date:

# *CONTINGENCY PLAN*



## OGX Resources

## Weems #1

Surface Location - 1501' FEL & 1073' FNL
Section 34: T-22-S R-27-E
Bottom Hole Location - 660' FEL & 660' FNL
Section 34: T-22-S R-27-E
Eddy County, New Mexico

**Prepared For:** OGX Resources
**Date Prepared:** September 7, 2007

**Prepared By:**

# INDIAN
# Fire & Safety, Inc.

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HYDROGEN SULFIDE CONTINGENCY PLAN

## SCOPE

THIS CONTINGENCY PLAN ESTABLISHES GUIDELINES FOR THE PUBLIC, ALL COMPANY EMPLOYEES WHO'S WORK ACTIVITIES MAY INVOLVE EXPOSURE TO HYDROGEN SULFIDE (H2S) GAS.

## OBJECTIVE

1. PREVENT ANY AND ALL ACCIDENTS, AND PREVENT THE UNCONTROLLED RELEASE OF HYDROGEN SULFIDE INTO THE ATMOSPHERE.

2. PROVIDE PROPER EVACUATION PROCEDURES TO COPE WITH EMERGENCIES.

3. PROVIDE IMMEDIATE AND ADEQUATE MEDICAL ATTENTION SHOULD AN INJURY OCCUR.

## DISCUSSION

GEOLOGICAL PROGNOSIS

| | |
|---|---|
| IMPLEMENTATION: | THIS PLAN WITH ALL DETAILS IS TO BE FULLY IMPLEMENTED BEFORE DRILLING TO PRODUCTION CASING POINT. |
| EMERGENCY RESPONSE PROCEDURE: | THIS SECTION OUTLINES THE CONDITIONS AND DENOTES STEPS TO BE TAKEN IN THE EVENT OF AN EMERGENCY. |
| EMERGENCY EQUIPMENT PROCEDURE: | THIS SECTION OUTLINES THE SAFETY AND EMERGENCY EQUIPMENT THAT WILL BE REQUIRED FOR THE DRILLING OF THIS WELL. |
| TRAINING PROVISIONS: | THIS SECTION OUTLINES THE TRAINING PROVISIONS THAT MUST BE ADHERED TO PRIOR TO DRILLING TO PRODUCTION CASING POINT. |
| DRILLING EMERGENCY CALL LISTS: | INCLUDED ARE THE TELEPHONE NUMBERS OF ALL PERSONS TO BE CONTACTED SHOULD AN EMERGENCY EXIST. |
| BRIEFING: | THIS SECTION DEALS WITH THE BRIEFING OF ALL PEOPLE INVOLVED IN THE DRILLING OPERATION. |
| PUBLIC SAFETY: | PUBLIC SAFETY PERSONNEL WILL BE MADE AWARE OF THE DRILLING OF THIS WELL. |
| CHECK LISTS: | STATUS CHECK LISTS AND PROCEDURAL CHECK LISTS HAVE BEEN INCLUDED TO INSURE ADHERENCE TO THE PLAN. |
| GENERAL INFORMATION: | A GENERAL INFORMATION SECTION HAS BEEN INCLUDED TO SUPPLY SUPPORT INFORMATION. |

## EMERGENCY PROCEDURES

A. IN THE EVENT OF ANY EVIDENCE OF H2S LEVEL ABOVE 10 PPM, TAKE THE FOLLOWING STEPS:

1. SECURE BREATHING EQUIPMENT.

2. ORDER NON-ESSENTIAL PERSONNEL OUT OF DANGER ZONE.

3. TAKE STEPS TO DETERMINE IF THE H2S LEVEL CAN BE CORRECTED OR SUPPRESSED AND, IF SO, PROCEED IN NORMAL OPERATION.

B. IF UNCONTROLLABLE CONDITIONS OCCUR:

1. TAKE STEPS TO PROTECT AND/OR REMOVE ANY PUBLIC IN THE DOWN-WIND AREA FROM THE RIG – PARTIAL EVACUATION AND ISOLATION. NOTIFY NECESSARY PUBLIC SAFETY PERSONNEL AND THE BUREAU OF LAND MANAGEMENT OF THE SITUATION.

2. REMOVE ALL PERSONNEL TO SAFE BREATHING AREA.

3. NOTIFY PUBLIC SAFETY PERSONNEL TO SAFE BREATHING AREA.

4. PROCEED WITH BEST PLAN (AT THE TIME) TO REGAIN CONTROL OF THE WELL. MAINTAIN TIGHT SECURITY AND SAFETY PROCEDURES.

C. RESPONSIBILITY:

1. DESIGNATED PERSONNEL.

a. SHALL BE RESPONSIBLE FOR THE TOTAL IMPLEMENTATION OF THIS PLAN.

b. SHALL BE IN COMPLETE COMMAND DURING ANY EMERGENCY.

c. SHALL DESIGNATE A BACK-UP.

## EMERGENCY PROCEDURES

*(Procedures are the same for both Drilling and Tripping)

ALL PERSONNEL:

1. ON ALARM, DON ESCAPE UNIT AND REPORT IN UP WIND BRIEFING AREA.
2. CHECK STATUS OF PERSONNEL (BUDDY SYSTEM).
3. SECURE BREATHING EQUIPMENT.
4. AWAIT ORDERS FROM SUPERVISOR.

DRILLING FOREMAN:

1. REPORT TO UP WIND BRIEFING AREA.
2. DON BREATHING EQUIPMENT AND RETURN TO POINT OF RELEASE WITH TOOL PUSHER OR DRILLER (BUDDY SYSTEM).
3. DETERMINE H2S CONCENTRATIONS.
4. ASSESS SITUATION AND TAKE CONTROL MEASURES.

TOOL PUSHER:

1. REPORT TO UP WIND BRIEFING AREA.
2. DON BREATHING EQUIPMENT AND RETURN TO POINT OF RELEASE WITH DRILLING FOREMAN OR DRILLER (BUDDY SYSTEM).
3. DETERMINE H2S CONCENTRATION.
4. ASSESS SITUATION AND TAKE CONTROL MEASURES.

DRILLER:

1. DON ESCAPE UNIT.
2. CHECK MONITOR FOR POINT OF RELEASE.
3. REPORT TO BRIEFING AREA.
4. CHECK STATUS OF PERSONNEL (IN AN ATTEMPT TO RESCUE, USE THE BUDDY SYSTEM).
5. ASSIGNS LEAST ESSENTIAL PERSON TO NOTIFY DRILLING FOREMAN AND TOOL PUSHER BY QUICKEST MEANS IN CASE OF THEIR ABSENCE.
6. ASSUMES THE RESPONSIBILITIES OF THE DRILLING FORMAN AND TOOL PUSHER UNTIL THEY ARRIVE SHOULD THEY BE ABSENT.

## EMERGENCY PROCEDURES

| | |
|---|---|
| DERRICK MAN<br>FLOOR MAN #1<br>FLOOR MAN #2 | 1. WILL REMAIN IN BRIEFING AREA UNTIL INSTRUCTED BY SUPERVISOR. |
| MUD ENGINEER: | 1. REPORT TO BRIEFING AREA.<br>2. WHEN INSTRUCTED, BEGIN CHECK OF MUD FOR PH AND H2S LEVEL. (GARETT GAS TRAIN.) |
| SAFETY PERSONNEL: | 1. MASK UP AND CHECK STATUS OF ALL PERSONNEL AND SECURE OPERATIONS AS INSTRUCTED BY DRILLING FOREMAN AND REPORT TO BRIEFING AREA. |

## TAKING A KICK

WHEN TAKING A KICK DURING AN H2S EMERGENCY, ALL PERSONNEL WILL FOLLOW STANDARD BOP PROCEDURES AFTER REPORTING TO BRIEFING AREA AND MASKING UP.

## OPEN-HOLE LOGGING

ALL UNNECESSARY PERSONNEL OFF FLOOR. DRILLING FOREMAN AND SAFETY PERSONNEL SHOULD MONITOR CONDITION, ADVISE STATUS AND DETERMINE NEED FOR USE OF AID EQUIPMENT.

## RUNNING CASING OR PLUGGING

FOLLOWING THE SAME "TRIPPING" PROCEDURE AS ABOVE. DRILLING FOREMAN AND SAFETY PERSONNEL SHOULD DETERMINE IF ALL PERSONNEL HAVE ACCESS TO PROTECTIVE EQUIPMENT.

## IGNITION PROCEDURES

THE DECISION TO IGNITE THE WELL IS THE RESPONSIBILITY OF COMPANY FOREMAN. IN THE EVENT HE IS INCAPACITATED, IT BECOMES THE RESPONSIBILITY OF THE CONTRACT RIG TOOL PUSHER. THE DECISION SHOULD BE MADE ONLY AS A LAST RESORT AND IN A SITUATION WHERE IT IS CLEAR THAT:

1. HUMAN LIFE AND PROPERTY ARE ENDANGERED.
2. THERE IS NO HOPE CONTROLLING THE BLOWOUT UNDER THE PREVAILING CONDITIONS AT THE WELL.

NOTIFY THE DISTRICT OFFICE IF TIME PERMITS, BUT DO NOT DELAY IF HUMAN LIFE IS IN DANGER.

INITIATE FIRST PHASE OF EVACUATION PLAN.

## IGNITION PROCEDURES

INSTRUCTIONS FOR IGNITING THE WELL

1. TWO PEOPLE ARE REQUIRED FOR THE ACTUAL IGNITING OPERATION. THEY MUST WEAR SELF-CONTAINED BREATHING UNITS AND HAVE SAFETY ROPE ATTACHED. ONE MAN (TOOL PUSHER OR SAFETY ENGINEER) WILL CHECK THE ATMOSPHERE FOR EXPLOSIVE GASES WITH THE EXPLOSIMETER. THE OTHER MAN (DRILLING FOREMAN) IS RESPONSIBLE FOR IGNITING THE WELL.
2. PRIMARY METHOD TO IGNITE: 25 MM FLARE GUN WITH RANGE OF APPROXIMATELY 500 FEET.
3. IGNITE UP WIND AND DO NOT APPROACH ANY CLOSER THAN IS WARRANTED.
4. SELECT THE IGNITION SITE BEST FOR PROTECTION, AND WHICH OFFERS AN EASY ESCAPE ROUTE.
5. BEFORE FIRING, CHECK FOR PRESENCE OF COMBUSTIBLE GAS.
6. AFTER LIGHTING, CONTINUE EMERGENCY ACTION AND PROCEDURE AS BEFORE.
7. ALL UNASSIGNED PERSONNEL WILL LIMIT THEIR ACTIONS TO THOSE DIRECTED BY THE DRILLING FOREMAN.

**REMEMBER**: AFTER WELL IS IGNITED, BURNING HYDROGEN SULFIDE WILL CONVERT TO SULFUR DIOXIDE, WHICH IS ALSO HIGHLY TOXIC. DO NOT ASSUME THE AREA IS SAFE AFTER THE WELL IS IGNITED.

## TRAINING REQUIREMENTS

WHEN WORKING IN AN AREA WHERE HYDROGEN SULFIDE GAS (H2S) MIGHT BE ENCOUNTERED, DEFINITE TRAINING REQUIREMENTS MUST BE CARRIED OUT. ALL COMPANIES WILL INSURE THAT ALL PERSONNEL AT THE WELL SITE WILL HAVE HAD ADEQUATE TRAINING IN THE FOLLOWING:

1. HAZARDS AND CHARACTERISTICS OF H2S.
2. PHYSICAL EFFECTS OF HYDROGEN SULFIDE ON THE HUMAN BODY.
3. TOXICITY OF HYDROGEN SULFIDE AND SULFUR DIOXIDE.
4. H2S DETECTION.
5. EMERGENCY RESCUE.
6. RESUSCITATORS.
7. FIRST AID AND ARTIFICIAL RESPIRATION.
8. EFFECTS OF H2S ON METALS.
9. LOCATION SAFETY.

SERVICE COMPANY AND VISITING PERSONNEL

A. EACH SERVICE COMPANY THAT WILL BE ON THIS WELL WILL BE NOTIFIED IF THE ZONE CONTAINS H2S.

B. EACH SERVICE COMPANY MUST PROVIDE FOR THE TRAINING AND EQUIPMENT OF THEIR EMPLOYEES BEFORE THEY ARRIVE AT THE WELL SITE.

C. EACH SERVICE COMPANY WILL BE EXPECTED TO ATTEND A WELL SITE BRIEFING.

## EMERGENCY EQUIPMENT REQUIREMENTS

1. SIGNS

   A. ONE SIGN LOCATED AT LOCATION ENTRANCE WITH THE FOLLOWING LANGUAGE:

**(LEASE)**
**CAUTION – POTENTIAL POISON GAS**
**HYDROGEN SULFIDE**
**NO ADMITTANCE WITHOUT AUTHORIZATION**

2. WIND SOCK – WIND STREAMERS

   A. ONE 36" (IN LENGTH) WIND SOCK LOCATED AT PROTECTION CENTER, AT HEIGHT VISIBLE FROM RIG FLOOR.
   B. ONE 36" (IN LENGTH) WIND SOCK LOCATED AT HEIGHT VISIBLE FROM PIT AREAS.

3. HYDROGEN SULFIDE DETECTOR AND ALARMS

   A. H2S MONITORS WITH ALARMS WILL BE LOCATED ON THE RIG FLOOR, AT THE BELL NIPPLE, AND AT THE FLOW LINE. THESE MONITORS WILL BE SET TO ALARM AT 10 PPM WITH RED LIGHT, AND TO ALARM AT 15 PPM WITH RED LIGHT AND AUDIBLE ALARM.
   B. HAND OPERATED DETECTORS WITH TUBES.
   C. H2S MONITOR TESTER.

4. CONDITION FLAGS

   A. ONE EACH OF ORANGE, YELLOW, AND RED CONDITION FLAGS TO BE DISPLAYED TO DENOTE CONDITIONS.

**GREEN – NORMAL CONDITIONS**
**YELLOW – POTENTIAL DANGER**
**RED – DANGER, H2S PRESENT**

   B. CONDITION FLAG SHALL BE POSTED AT LOCATION SIGN ENTRANCE.

## EMERGENCY EQUIPMENT REQUIREMENTS

5. AUXILIARY RESCUE EQUIPMENT

   A. STRETCHER
   B. 100' LENGTH OF 5/8" NYLON ROPE.

6. MUD INSPECTION DEVICES

   GARRETT GAS TRAIN OR HACH TESTER FOR INSPECTION OF SULFIDE CONCENTRATION IN MUD SYSTEM.

7. FIRE EXTINGUISHER

   ADEQUATE FIRE EXTINGUISHERS SHALL BE LOCATED AT STRATEGIC LOCATIONS.

8. BLOW OUT PREVENTION EQUIPMENT

   THE WELL SHALL HAVE HYDRAULIC BOP EQUIPMENT FOR THE ANTICIPATED BHP OF 1500 PSI. EQUIPMENT IS TO BE TESTED ON INSTALLATION.

9. COMBUSTIBLE GAS DETECTOR

   THERE SHALL BE ONE COMBUSTIBLE GAS DETECTOR ON LOCATION AT ALL TIMES.

10. BOP TESTING

    BOP AND CHOKE LINE AND KILL LINE WILL BE TESTED.

11. AUDIO SYSTEM

    RADIO COMMUNICATION WILL BE AVAILABLE AT THE RIG.
    A. RIG FLOOR OR TRAILER
    B. VEHICLE

12. SPECIAL CONTROL EQUIPMENT

    A. HYDRAULIC BOP EQUIPMENT WITH REMOTE CONTROL ON GROUND.
    B. ROTATING HEAD

## EMERGENCY EQUIPMENT REQUIREMENTS

13. EVACUATION PLAN

EVACUATION ROUTES SHOULD BE ESTABLISHED PRIOR TO SPUDDING EACH WELL AND DISCUSSED WITH ALL RIG PERSONNEL.

14. DESIGNATED AREA

A. PARKING AND VISITOR AREA: ALL VEHICLES ARE TO BE PARKED AT A PREDETERMINED SAFE DISTANCE FROM THE WELLHEAD. THIS WILL BE THE DESIGNATED SMOKING AREA.

B. TWO BRIEFING AREAS ON EITHER SIDE OF THE LOCATION AT THE MAXIMUM ALLOWABLE DISTANCE FROM THE WELL BORE SO THEY OFFSET PREVAILING WINDS PERPENDICULARLY, OR AT A 45-DEGREE ANGLE IF WIND DIRECTION TENDS TO SHIFT IN THE AREA.

C. PROTECTION CENTERS OR IF A MOVABLE TRAILER IS USED, IT SHOULD BE DEPT UPWIND OF EXISTING WINDS. WHEN WIND IS FROM THE PREVAILING DIRECTIONS, BOTH PROTECTION CENTERS SHOULD BE ACCESSIBLE.

## STATUS CHECK LIST

NOTE: ALL ITEMS ON THIS LIST MUST BE COMPLETED BEFORE DRILLING TO PRODUCTION CASING POINT .

1. SIGN AT LOCATION ENTRANCE.
2. TWO (2) WIND SOCKS LOCATED AS REQUIRED.
3. TWO (2) 30-MINUTE PRESSURE DEMAND AIR PACKS ON LOCATION FOR ALL RIG PERSONNEL AND MUD LOGGERS.
4. AIR PACK INSPECTED FOR READY USE.
5. CASCADE SYSTEM AND HOSE LINE HOOK-UP.
6. CASCADE SYSTEM FOR REFILLING AIR BOTTLES.
7. SAFE BREATHING AREAS SET UP.
8. CONDITION FLAG ON LOCATION AND READY FOR USE.
9. H2S DETECTION SYSTEM HOOKED UP.
10. H2S ALARM SYSTEM HOOKED UP AND READY.
11. OXYGEN RESUSCITATOR ON LOCATION AND TESTED FOR USE.
12. STRETCHER ON LOCATION AT SAFETY TRAILER.
13. 1 – 100' LENGTH OF NYLON ROPE ON LOCATION.
14. ALL RIG CREW AND SUPERVISORS TRAINED AS REQUIRED.
15. ALL OUTSIDE SERVICE CONTRACTORS ADVISED OF POTENTIAL H2S HAZARD ON WELL.
16. NO SMOKING SIGN POSTED.
17. HAND OPERATED H2S DETECTOR WITH TUBES ON LOCATION.

CHECKED BY:_____ DATE:_____

## PROCEDURAL CHECK LIST

**PERFORM EACH TOUR:**

1. CHECK FIRE EXTINGUISHERS TO SEE THAT THEY HAVE THE PROPER CHARGE.

2. CHECK BREATHING EQUIPMENT TO ENSURE THAT IT HAS NOT BEEN TAMPERED WITH.

3. MAKE SURE ALL THE H2S DETECTION SYSTEM IS OPERATIVE.

**PERFORM EACH WEEK:**

1. CHECK EACH PIECE OF BREATHING EQUIPMENT TO MAKE SURE THAT DEMAND REGULATOR IS WORKING. THIS REQUIRES THAT THE BOTTLE BE OPENED AND THE MASK ASSEMBLY BE PUT ON TIGHT ENOUGH SO THAT WHEN YOU INHALE, YOU RECEIVE AIR.

2. BLOW OUT PREVENTER SKILLS.

3. CHECK SUPPLY PRESSURE ON BOP ACCUMULATOR STAND BY SOURCE.

4. CHECK ALL SKA-PAC UNITS FOR OPERATION: DEMAND REGULATOR, ESCAPE BOTTLE AIR VOLUMES, SUPPLY BOTTLE OF AIR VOLUME.

5. CHECK BREATHING EQUIPMENT MASK ASSEMBLY TO SEE THAT STRAPS ARE LOOSENED AND TURNED BACK, READY TO PUT ON.

6. CHECK PRESSURE ON BREATHING EQUIPMENT AIR BOTTLES TO MAKE SURE THEY ARE CHARGED TO FULL VOLUME.

7. CONFIRM PRESSURE ON ALL SUPPLY AIR BOTTLES.

8. PERFORM BREATHING EQUIPMENT DRILLS WITH ON-SITE PERSONNEL.

9. CHECK THE FOLLOWING SUPPLIES FOR AVAILABILITY.

   A. EMERGENCY TELEPHONE LIST.
   B. HAND OPERATED H2S DETECTORS AND TUBES.

## GENERAL EVACUATION PLAN

THE DIRECT LINES OF ACTION PREPARED BY **INDIAN FIRE & SAFETY, INC.** TO PROTECT THE PUBLIC FROM HAZARDOUS GAS SITUATIONS ARE AS FOLLOWS:

1. WHEN THE COMPANY APPROVED SUPERVISOR (DRILLING FOREMAN, CONSULTANT, RIG PUSHER, OR DRILLER) DETERMINES THE H2S GAS CANNOT BE LIMITED TO THE WELL LOCATION AND THE PUBLIC WILL BE INVOLVED, HE WILL ACTIVATE THE EVACUATION PLAN. ESCAPE ROUTES ARE NOTED ON AREA MAP.

2. "COMPANY MAN" OR DESIGNEE WILL NOTIFY LOCAL GOVERNMENT AGENCY THAT A HAZARDOUS CONDITION EXISTS AND EVACUATION NEEDS TO BE IMPLEMENTED.

3. COMPANY SAFETY PERSONNEL THAT HAVE BEEN TRAINED IN THE USE OF H2S DETECTION EQUIPMENT AND SELF-CONTAINED BREATHING EQUIPMENT WILL MONITOR H2S CONCENTRATIONS, WIND DIRECTIONS, AND AREA OF EXPOSURE. THEY WILL DELINEATE THE OUTER PERIMETER OF THE HAZARDOUS GAS AREA. EXTENSION TO THE EVACUATION AREA WILL BE DETERMINED FROM INFORMATION GATHERED.

4. LAW ENFORCEMENT PERSONNEL (STATE POLICE, POLICE DEPT., FIRE DEPT., AND SHERIFF'S DEPT.) WILL BE CALLED TO AID IN SETTING UP AND MAINTAINING ROAD BLOCKS. ALSO, THEY WILL AID IN EVACUATION OF THE PUBLIC IF NECESSARY.

**IMPORTANT: LAW ENFORCEMENT PERSONNEL WILL NOT BE ASKED TO COME INTO A CONTAMINATED AREA. THEIR ASSISTANCE WILL BE LIMITED TO UNCONTAMINATED AREAS. CONSTANT RADIO CONTACT WILL BE MAINTAINED WITH THEM.**

5. AFTER THE DISCHARGE OF GAS HAS BEEN CONTROLLED, COMPANY SAFETY PERSONNEL WILL DETERMINE WHEN THE AREA IS SAFE FOR RE-ENTRY.

## EMERGENCY ACTIONS

WELL BLOWOUT – IF EMERGENCY

1. EVACUATE ALL PERSONNEL IF POSSIBLE.

2. IF SOUR GAS – EVACUATE RIG PERSONNEL.

3. IF SOUR GAS – EVACUATE PUBLIC WITHIN 3000 FT RADIUS OF EXPOSURE.

4. DON SCBA AND RESCUE.

5. CALL 911 FOR EMERGENCY HELP (FIRE DEPT AND AMBULANCE) AND NOTIFY SR. DRILLING FOREMAN AND DISTRICT FOREMAN.

6. GIVE FIRST AID.

PERSON DOWN LOCATION/FACILITY

1. IF IMMEDIATELY POSSIBLE, CONTACT 911. GIVE LOCATION AND WAIT FOR CONFIRMATION.

2. DON SCBA AND RESCUE.

# EMERGENCY PHONE LIST

## GOVERNMENTAL AGENCIES

| | | |
|---|---|---|
| Eddy County Sheriff's Office | | 911 |
| Non emergency ..... | 505-746-9888 | |
| Fire Departments | | 911 |
| Carlsbad – Non-emergency..... | 505-885-2111 | |
| BLM | | |
| Carlsbad ..... | 505-361-2822 | |
| State Police Department | | 911 |
| Non-emergency ..... | 505-437-1313 | |
| City of Carlsbad | | |
| ..... | 505-885-2111 | |
| Ambulance | | 911 |
| Carlsbad – Non Emergency..... | 505-885-2111 | |
| Hospitals | | |
| Carlsbad ..... | 505-887-4100 | |
| AEROCARE ..... | 806-747-8923 | |
| CHEMTREC ..... | 1-800-424-9300 | |
| OSHA | | |
| Lubbock TX ..... | 1-800-692-4204 | |

# Emergency Contact List

**OGX Resources**

Jim Auld – Consultant on Location: 432-209-2431
Randy Ford – R.K. Ford & Associates, Inc.: 432-682-0440
Steven Douglas – OGX Company Man: 432-934-6800 (cell)
Kip Agar – OGX President: 432-685-1287 (office) 432-631-1736 (cell)

**Permian Drilling**

R.C. Castillo: Supt
Cell: 505-631-2919

Walt Evans: Asst. Supt
Cell: 505-441-3700

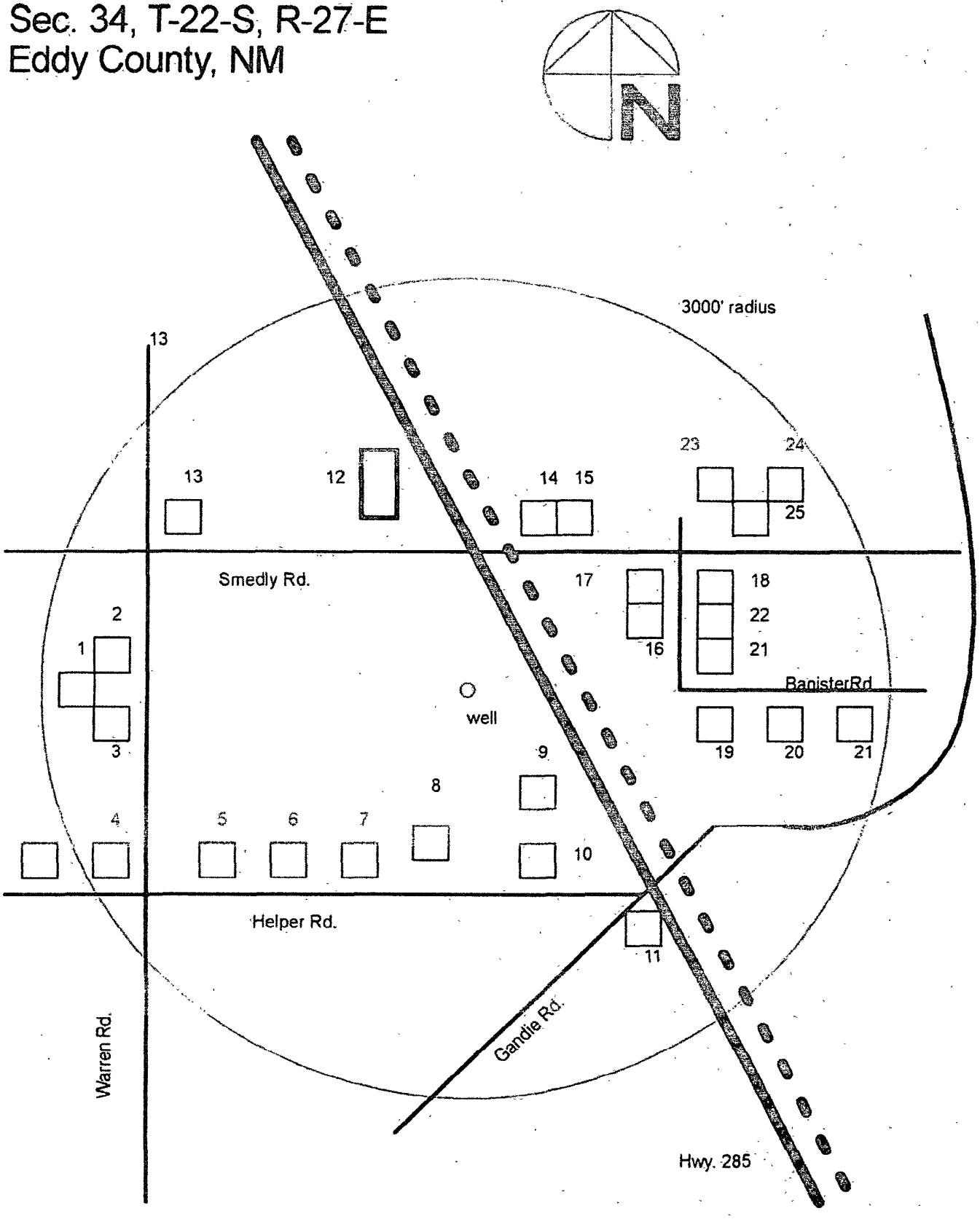
Rig 3: 505-390-0901

**Indian Fire & Safety, Inc.**
**3317 W. County Road**
**505-393-3093 - office**
**800-530-8693 – toll free**
**505-392-6274 – fax**

**Personnel Contact List**

| | Cell Phone | Home Phone |
|---|---|---|
| Lanny Taylor | 631-9755 | 392-6161 |
| James Spurgeon | 390-8582 | 492-9354 |
| Scott Dudenhoeffer | 631-9753 | 392-4833 |
| Sam Abney | 631-9712 | 393-5427 |
| Curtis Newton | 631-1255 | 393-3762 |
| Chris Spurgeon | 806-215-1087 | 806-592-0079 |

Weems # 1
Sec. 34, T-22-S, R-27-E
Eddy County, NM



21. Otis Water
2501 Bannister
236-6351

22. CID
5117 Grandi
885-5580
236-6336

23. Joe Corona
5117 Grandi #3
236-6688
499-9662

24. Timothy J Waltersheid
5107 Grandi
236-6424

25. Tillman &Wayne Taylor
5027 Grandi
236-6137

26. Veronica Perez
2573 Smedley
236-6248

27. Gerry Bannister
2505 Smedley
236-6221

# RESIDENTS LIST

1. Cecil M. Daniell Jr.
   5119 Warren
   361-6271

2. Gregg Dawn Bowen
   5117 Warren

3. Monty McWilliams
   5201 Warren
   236-6289
   361-7037

4. Glen Hedgecock
   2220 Helper
   706-5901
   200-5858

5. Glen Porter
   2414 Helper
   236-6513

6. Mike & Annette Lucero
   2422 Helper
   236-6077
   361-8211

7. Allen & Shirley Miller
   2430 Helper
   236-6655
   361-6655

8. Jacqueline Nichols
   2502 Helper
   236-6035

9. Gloria A. Maley
   2508 Helper
   236-6010

10. David Maley – MMX
    2737 Pecos Hwy
    236-6600

11. Jerry Hanway - Basic
    5662 Grandi
    236-1782

12. Danny's Automotive
    Danny Bass
    2797 Pecos Hwy
    236-6034
    361-3062

13. Moffett Truck Trailer
    C.M. Moffett
    2216 Smedley Rd
    236-6482
    361-3065

14. Rick Justine
    2404 Smedley

15. Henry Anaya
    2414 Smedley Rd
    236-6339
    302-1263

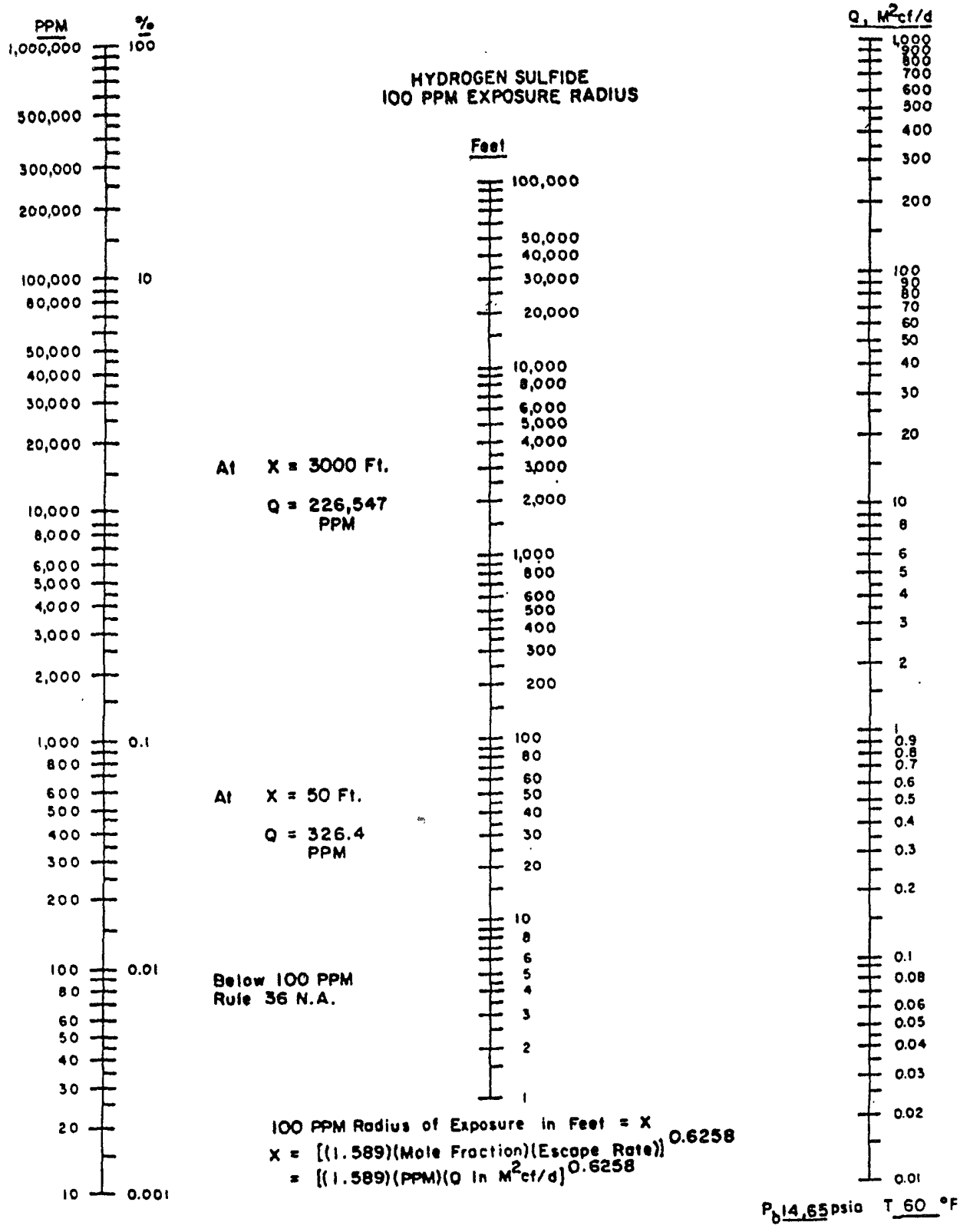
16. 2419 Smedley

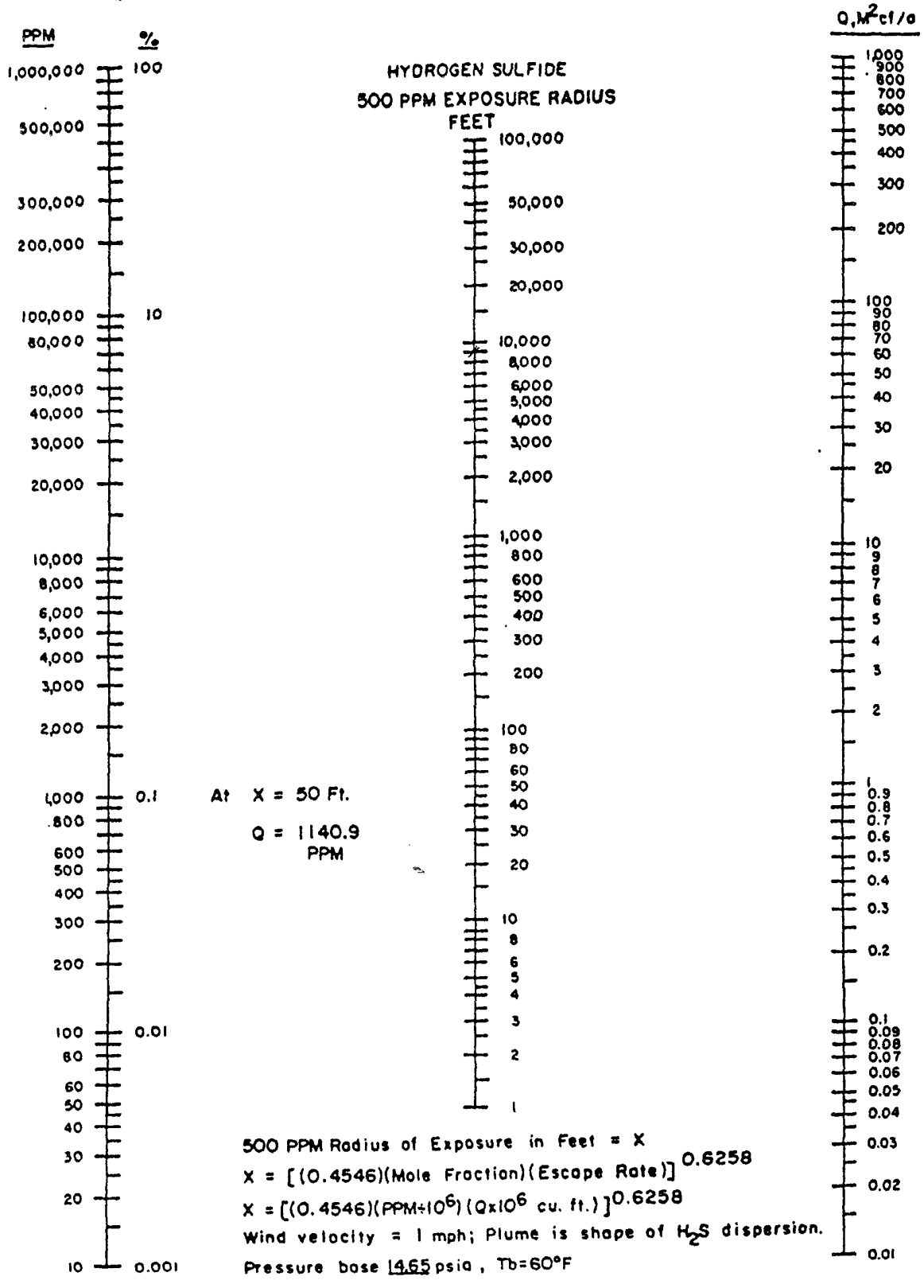
17. Margaret Perry
    5007 Bannister Rd
    236-6243

18. Kelly Cox
    5008 Bannister Rd

19. Eugene Ray
    2420 Bannister Rd
    236-6331

20. Dusty or Lacey Williams
    2502 Bannister
    706-1095


HYDROGEN SULFIDE
100 PPM EXPOSURE RADIUS
PPM
%
Feet
Q, M²cf/d
At X = 3000 Ft.
Q = 226,547 PPM
At X = 50 Ft.
Q = 326.4 PPM
Below 100 PPM
Rule 36 N.A.
100 PPM Radius of Exposure in Feet = X
X = [(1.589)(Mole Fraction)(Escape Rate)]^0.6258
= [(1.589)(PPM)(Q in M²cf/d]^0.6258
P_b 14.65 psia T 60 °F


PPM
%
Q, M²cf/a
HYDROGEN SULFIDE
500 PPM EXPOSURE RADIUS
FEET
1,000,000
500,000
300,000
200,000
100,000
80,000
50,000
40,000
30,000
20,000
10,000
8,000
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4
3
2
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
At X = 50 Ft.
Q = 1140.9 PPM
500 PPM Radius of Exposure in Feet = X
X = [(0.4546)(Mole Fraction)(Escape Rate)]^0.6258
X = [(0.4546)(PPM÷10^6)(Qx10^6 cu. ft.)]^0.6258
Wind velocity = 1 mph; Plume is shape of H2S dispersion.
Pressure base 14.65 psia, Tb=60°F

## TOXIC EFFECTS OF HYDROGEN SULFIDE

HYDROGEN SULFIDE IS EXTREMELY TOXIC. THE ACCEPTABLE CEILING CONCENTRATION FOR EIGHT-HOUR EXPOSURE IS 10 PPM, WHICH IS .001% BY VOLUME. HYDROGEN SULFIDE IS HEAVIER THAN AIR (SPECIFIC GRAVITY – 1.192) AND COLORLESS. IT FORMS AN EXPLOSIVE MIXTURE WITH AIR BETWEEN 4.3 AND 46.0 PERCENT BY VOLUME. HYDROGEN SULFIDE IS ALMOST AS TOXIC AS HYDROGEN CYANIDE AND IS BETWEEN FIVE AND SIX TIMES MORE TOXIC THAN CARBON MONOXIDE. TOXICITY DATA FOR HYDROGEN SULFIDE AND VARIOUS OTHER GASES ARE COMPARED IN TABLE I. PHYSICAL EFFECTS AT VARIOUS HYDROGEN SULFIDE EXPOSURE LEVELS ARE SHOWN IN TABLE II.

TABLE I
TOXICITY OF VARIOUS GASES

| COMMON NAME | CHEMICAL FORMULA | SPECIFIC GRAVITY (SC=1) | THRESHOLD LIMIT (1) | HAZARDOUS LIMIT (2) | LETHAL CONCENTRATION (3) |
|---|---|---|---|---|---|
| HYDROGEN CYANIDE | HCN | 0.94 | 10 PPM | 150 PPM/HR | 300 PPM |
| HYDROGEN SULFIDE | H2S | 1.18 | 10 PPM | 250 PPM/HR | 600 PPM |
| SULFUR DIOXIDE | SO2 | 2.21 | 5 PPM | - | 1000 PPM |
| CHLORINE | CL2 | 2.45 | 1 PPM | 4 PPM/HR | 1000 PPM |
| CARBON MONOXIDE | CO | 0.97 | 50 PPM | 400 PPM/HR | 1000 PPM |
| CARBON DIOXIDE | CO2 | 1.52 | 5000 PPM | 5% | 10% |
| METHANE | CH4 | 0.55 | 90,000 PPM | COMBUSTIBLE ABOVE 5% IN AIR | |

1) THRESHOLD LIMIT – CONCENTRATION AT WHICH IT IS BELIEVED THAT ALL WORKERS MAY BE REPEATEDLY EXPOSED DAY AFTER DAY WITHOUT ADVERSE EFFECTS.

2) HAZARDOUS LIMIT – CONCENTRATION THAT WILL CAUSE DEATH WITH SHORT-TERM EXPOSURE.

3) LETHAL CONCENTRATION – CONCENTRATION THAT WILL CAUSE DEATH WITH SHORT-TERM EXPOSURE.

## TOXIC EFFECTS OF HYDROGEN SULFIDE

TABLE II
PHYSICAL EFFECTS OF HYDROGEN SULFIDE

| PERCENT (%) | PPM | CONCENTRATION GRAINS 100 STD. FT3* | PHYSICAL EFFECTS |
|---|---|---|---|
| 0.001 | <10 | 00.65 | Obvious and unpleasant odor. |
| 0.002 | 10 | 01.30 | Safe for 8 hours of exposure. |
| 0.010 | 100 | 06.48 | Kill smell in 3 – 15 minutes. May sting eyes and throat. |
| 0.020 | 200 | 12.96 | Kills smell shortly; Stings eyes and throat. |
| 0.050 | 500 | 32.96 | Dizziness; Breathing ceases in a few minutes; Needs prompt artificial respiration. |
| 0.070 | 700 | 45.36 | Unconscious quickly; Death will result if not rescued promptly. |
| 0.100 | 1000 | 64.30 | Unconscious at once; Followed by death within minutes. |

*AT 15.00 PSIA AND 60'F.

## USE OF SELF-CONTAINED BREATHING EQUIPMENT

1. WRITTEN PROCEDURES SHALL BE PREPARED COVERING SAFE USE OF SCBA'S IN DANGEROUS ATMOSPHERE, WHICH MIGHT BE ENCOUNTERED IN NORMAL OPERATIONS OR IN EMERGENCIES. PERSONNEL SHALL BE FAMILIAR WITH THESE PROCEDURES AND THE AVAILABLE SCBA.

2. SCBA'S SHALL BE INSPECTED FREQUENTLY AT RANDOM TO INSURE THAT THEY ARE PROPERLY USED, CLEANED, AND MAINTAINED.

3. ANYONE WHO MAY USE THE SCBA'S SHALL BE TRAINED IN HOW TO INSURE PROPER FACE-PIECE TO FACE SEAL. THEY SHALL WEAR SCBA'S IN NORMAL AIR AND THEN WEAR THEM IN A TEST ATMOSPHERE. (NOTE: SUCH ITEMS AS FACIAL HAIR {BEARD OR SIDEBURNS} AND EYEGLASSES WILL NOT ALLOW PROPER SEAL.) ANYONE THAT MAY BE REASONABLY EXPECTED TO WEAR SCBA'S SHOULD HAVE THESE ITEMS REMOVED BEFORE ENTERING A TOXIC ATMOSPHERE. A SPECIAL MASK MUST BE OBTAINED FOR ANYONE WHO MUST WEAR EYEGLASSES OR CONTACT LENSES.

4. MAINTENANCE AND CARE OF SCBA'S:

   A. A PROGRAM FOR MAINTENANCE AND CARE OF SCBA'S SHALL INCLUDE THE FOLLOWING:
      1. INSPECTION FOR DEFECTS, INCLUDING LEAK CHECKS.
      2. CLEANING AND DISINFECTING.
      3. REPAIR.
      4. STORAGE.

   B. INSPECTION; SELF-CONTAINED BREATHING APPARATUS FOR EMERGENCY USE SHALL BE INSPECTED MONTHLY FOR THE FOLLOWING PERMANENT RECORDS KEPT OF THESE INSPECTIONS.
      1. FULLY CHARGED CYLINDERS.
      2. REGULATOR AND WARNING DEVICE OPERATION.
      3. CONDITION OF FACE PIECE AND CONNECTIONS.
      4. ELASTOMER OR RUBBER PARTS SHALL BE STRETCHED OR MASSAGED TO KEEP THEM PLIABLE AND PREVENT DETERIORATION.

   C. ROUTINELY USED SCBA'S SHALL BE COLLECTED, CLEANED AND DISINFECTED AS FREQUENTLY AS NECESSARY TO INSURE PROPER PROTECTION IS PROVIDED. (22)

## USE OF SELF-CONTAINED BREATHING EQUIPMENT

5. PERSONS ASSIGNED TASKS THAT REQUIRES USE OF SELF-CONTAINED BREATHING EQUIPMENT SHALL BE CERTIFIED PHYSICALLY FIT FOR BREATHING EQUIPMENT USAGE BY THE LOCAL COMPANY PHYSICIAN AT LEAST ANNUALLY.

6. SCBA'S SHOULD BE WORN WHEN:

   A. ANY EMPLOYEE WORKS NEAR THE TOP OR ON TOP OF ANY TANK UNLESS TEST REVEALS LESS THAN 10 PPM OF H2S.

   B. WHEN BREAKING OUT ANY LINE WHERE H2S CAN REASONABLY BE EXPECTED.

   C. WHEN SAMPLING AIR IN AREAS TO DETERMINE IF TOXIC CONCENTRATIONS OF H2S EXISTS.

   D. WHEN WORKING IN AREAS WHERE OVER 10 PPM H2S HAS BEEN DETECTED.

   E. AT ANY TIME THERE IS A DOUBT AS TO THE H2S LEVEL IN THE AREA TO BE ENTERED.

## RESCUE
## FIRST AID FOR H2S POISONING

DO NOT PANIC!

REMAIN CALM – THINK!

1. HOLD YOUR BREATH. (DO NOT INHALE FIRST; STOP BREATHING.)

2. PUT ON BREATHING APPARATUS.

3. REMOVE VICTIM(S) TO FRESH AIR AS QUICKLY AS POSSIBLE. (GO UP-WIND FROM SOURCE OR AT RIGHT ANGLE TO THE WIND. NOT DOWN WIND.)

4. BRIEFLY APPLY CHEST PRESSURE – ARM LIFT METHOD OF ARTIFICIAL RESPIRATION TO CLEAN THE VICTIM'S LUNGS AND TO AVOID INHALING ANY TOXIC GAS DIRECTLY FROM THE VICTIM'S LUNGS.

5. PROVIDE FOR PROMPT TRANSPORTATION TO THE HOSPITAL, AND CONTINUE GIVING ARTIFICIAL RESPIRATION IF NEEDED.

6. HOSPITAL(S) OR MEDICAL FACILITIES NEED TO BE INFORMED, BEFORE-HAND, OF THE POSSIBILITY OF H2S GAS POISONING – NO MATTER HOW REMOTE THE POSSIBILITY IS.

7. NOTIFY EMERGENCY ROOM PERSONNEL THAT THE VICTIM(S) HAS BEEN EXPOSED TO H2S GAS.

BESIDES BASIC FIRST AID, EVERYONE ON LOCATION SHOULD HAVE A GOOD WORKING KNOWLEDGE OF ARTIFICIAL RESPIRATION, AS WELL AS FIRST AID FOR EYES AND SKIN CONTACT WITH LIQUID H2S. EVERYONE NEEDS TO MASTER THESE NECESSARY SKILLS.