

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

State of New Mexico
Energy Minerals and Natural Resources

Form C-101
May 27, 2004

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Submit to appropriate District Office

☐ AMENDED REPORT

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

Operator Name and Address POGO PRODUCING COMPANY P.O. BOX 10340 MIDLAND, TEXAS 79702-7340		OGRID Number 017891
Property Code 35623		Property Name VORTEC "22"
Proposed Pool 1 BONE SPRING		Proposed Pool 2

UL or lot no. P	Section 22	Township 24S	Range 29E	Lot Idn	Feet from the 330'	North/South line SOUTH	Feet from the 330'	East/West line EAST	County EDDY
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UL or lot no. N	Section 22	Township 24S	Range 29E	Lot Idn	Feet from the 660'	North/South line SOUTH	Feet from the 1650'	East/West line WEST	County EDDY
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Work Type Code N	Well Type Code O	Cable/Rotary ROTARY	Lease Type Code P	Ground Level Elevation
Multiple NO	Proposed Depth MD10797 TVD7653	Formation BONE SPRING	Contractor PATTERSON	Spud Date WHEN APPROVED
Depth to Groundwater GREATER THAN 50' LESS THAN 100'		Distance from nearest fresh water well .6 mi SW?		Distance from nearest surface water PECOS RIVER .7 mi SOUTHWEST
Liner: Synthetic <input checked="" type="checkbox"/> 12 mils thick Clay <input type="checkbox"/>		Pit Volume: 18M bbls		Drilling Method: Fresh Water <input checked="" type="checkbox"/> Brine <input checked="" type="checkbox"/> Diesel/Oil-based <input type="checkbox"/> Gas/Air <input type="checkbox"/>
Closed-Loop System <input type="checkbox"/>				

Hole Size	Casing Size	Casing weight/foot	Setting Depth	Sacks of Cement	Estimated TOC
26"	20"	Conductor	40'	Redi-mix	Surface.
17 1/2"	13 3/8"	48#	550'	350 Sx.	Surface
12 1/4"	9 5/8"	40#	2900'	1000 Sx.	Surface
8 1/2" & 7 7/8"	5 1/2"	17#	MD10,797'TVD7653'	900 Sx.	2900' from surface

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.

SEE ATTACHED SHEET FOR DETAILS

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 <input checked="" type="checkbox"/> a general permit <input type="checkbox"/> or an (attached) alternative OCD-approved plan <input type="checkbox"/> .		OIL CONSERVATION DIVISION	
Printed name: Joe T. Janica		Approved by: BRYAN G. ARRANT	
Title: Agent		DISTRICT II GEOLOGIST	
E-mail Address: joejanica@valornet.com		Approval Date: APR 24 2006 Expiration Date: APR 24 2007	
Date: 04/21/06	Phone: 505-391-8503	Conditions of Approval Attached <input type="checkbox"/>	

DISTRICT I
1626 N. FRENCH DR., HOBBS, NM 88240

State of New Mexico
Energy, Minerals and Natural Resources Department

DISTRICT II
1301 W. GRAND AVENUE, ARTESIA, NM 88210

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

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

DISTRICT IV
1220 S. ST. FRANCIS DR., SANTA FE, NM 87505

WELL LOCATION AND ACREAGE DEDICATION PLAT

☐ AMENDED REPORT

API Number	Pool Code 96473	Pool Name PIERCE CROSSING-BONE SPRING, East
Property Code	Property Name VORTEC 22	Well Number 1
OGRID No. 017891	Operator Name POGO PRODUCING COMPANY	Elevation 2917'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	22	24-S	29-E		330	SOUTH	330	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
N	22	24-S	29-E		660	SOUTH	1650	WEST	EDDY
Dedicated Acres 120	Joint or Infill	Consolidation Code	Order No.						

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

	<p>OPERATOR CERTIFICATION</p> <p>I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</p> <p><i>Joe T. Janica</i> Signature Date 04/21/06 Joe T. Janica Printed Name Agent</p> <p>SURVEYOR CERTIFICATION</p> <p>I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.</p> <p>APRIL 18, 2006</p> <p>Date Surveyed LA REV: 4/21/06 Signature & Seal of Professional Surveyor GARY EIDSON 06.11.0672 Certificate No. GARY EIDSON 12641</p>
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POGO PRODUCING COMPANY

VORTEC "22" # 1

UNIT "P" SECTION 22

T24S-R29E EDDY CO. NM

1. Drill 26" hole to 40'. Set 40' of 20" conductor pipe and cement to surface with Redi-mix.
2. Drill 17½" hole to 550', drill surface hole with fresh water. Run and set 550' of 13 3/8" 48# H-40 ST&C casing. Cement with 150 Sx. of 35/65/6 Class "C" POZ/GEL, tail in with 200 Sx. of Class "C" cement + 2% CaCl, + ¼# Flocele/Sx., circulate cement to surface.
3. Drill 12½" hole with brine water to a depth of 2900'. Run and set 2900' of 9 5/8" 40# J-55 ST&C casing. Cement with 800 Sx. of 35/65/6 POZ/GEL Class "C" cement + 5% Salt, tail in with 200 Sx. of Class "C" cement + 2% CaCl, + ¼# Flocele/Sx. circulate cement to surface, volumes may be changed after fluid caliper is run.
4. Drill 8½" hole to 8200'. run logs and set a cement plug for kick off point at 7225', drill 8½" hole through curve to 7730'. Reduce hole to 7 7/8 and drill to 7 7/8" and drill to 10,797'. Run and set 10,800'± of 5½" 17# N-80 BTC & LT&C casing. Cement with 900 Sx. of Class "H" Premium Plus cement + additives, mixed at 15.7 PPG, estimate top of cement 2900' from surface.

AFE VORTEC 22 # 1H.xls

MITCHELL ENGINEERING PROGRAMS

COPYRIGHT 1990 MITCHELL ENGINEERING, PO BOX 1492, GOLDEN, CO, 80402, USA (303) 273 3744

LONG'S METHOD OF SURVEY COMPUTATION**OBLIQUE CIRCULAR ARC INTERPOLATION**

0	MD OF INTERPOLATION DEPTH, (feet)
#N/A	TVD COORDINATE OF THE DEPTH (feet)
#N/A	N/S COORDINATE OF DEPTH (feet)
#N/A	E/W COORDINATE OF DEPTH (feet)

3 D DISTANCE BETWEEN STATION A AND STATION B

DISTANCE TABLE

STATION A	STATION B
0.00	ft

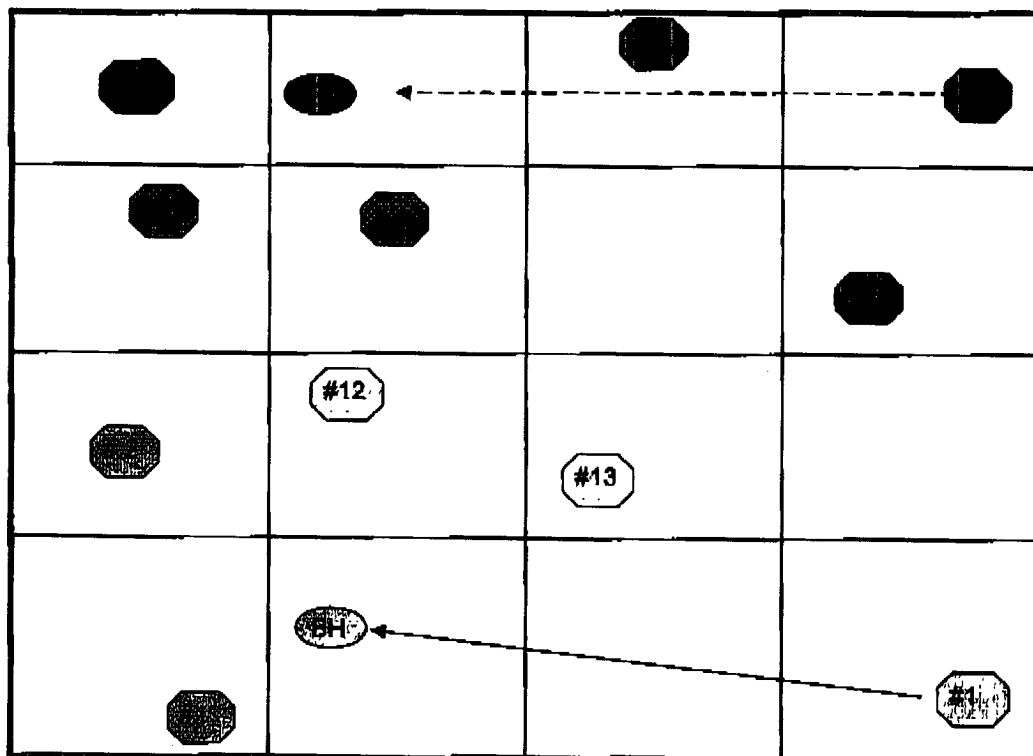
Calculator =

TABLE OF SURVEY STATIONS

STA #	AMD ft	INCL deg	AZIM deg	MD ft	TVD ft	N-S ft	E-W ft	DLS deg/100FT
1	TIE POINT →	0	0	7225.00	7225.00	0.00	0.00	-
2	100	12	275.711	7325.00	7324.27	1.04	-10.38	12.00
3	100	24	275.711	7425.00	7419.20	4.11	-41.07	12.00
4	100	36	275.711	7525.00	7506.65	9.07	-90.74	12.00
5	100	48	275.711	7625.00	7579.83	15.72	-157.19	12.00
6	100	60	275.711	7725.00	7638.50	23.75	-237.55	12.00
7	100	72	275.711	7825.00	7679.10	32.83	-328.28	12.00
8	100	84	275.711	7925.00	7699.85	42.54	-425.43	12.00
9	50	91	275.711	7975.00	7702.03	47.51	-475.11	14.00
10	100	91	275.711	8075.00	7700.28	57.48	-574.60	0.00
11	100	91	275.711	8175.00	7698.54	67.41	-674.09	0.00
12	100	91	275.711	8275.00	7696.79	77.36	-773.57	0.00
13	100	91	275.711	8375.00	7695.05	87.31	-873.08	0.00
14	100	91	275.711	8475.00	7693.30	97.28	-972.55	0.00
15	100	91	275.711	8575.00	7691.56	107.20	-1072.04	0.00
16	100	91	275.711	8675.00	7689.81	117.15	-1171.53	0.00
17	100	91	275.711	8775.00	7688.07	127.10	-1271.02	0.00
18	100	91	275.711	8875.00	7686.32	137.05	-1370.50	0.00
19	100	91	275.711	8975.00	7684.58	147.00	-1469.99	0.00
20	100	91	275.711	9075.00	7682.83	156.95	-1569.48	0.00
21	100	91	275.711	9175.00	7681.09	166.90	-1668.97	0.00
22	100	91	275.711	9275.00	7679.34	176.85	-1768.46	0.00
23	100	91	275.711	9375.00	7677.60	186.79	-1867.95	0.00
24	100	91	275.711	9475.00	7675.85	196.74	-1967.44	0.00
25	100	91	275.711	9575.00	7674.10	206.69	-2066.92	0.00
26	100	91	275.711	9675.00	7672.36	216.64	-2166.41	0.00
27	100	91	275.711	9775.00	7670.61	226.59	-2265.90	0.00
28	100	91	275.711	9875.00	7668.87	236.54	-2365.39	0.00
29	100	91	275.711	9975.00	7667.12	246.49	-2464.88	0.00
30	100	91	275.711	10075.00	7665.38	256.44	-2564.37	0.00
31	100	91	275.711	10175.00	7663.63	266.39	-2663.86	0.00
32	100	91	275.711	10275.00	7661.89	276.33	-2763.34	0.00
33	100	91	275.711	10375.00	7660.14	286.28	-2862.83	0.00
34	100	91	275.711	10475.00	7658.40	296.23	-2962.32	0.00
35	100	91	275.711	10575.00	7656.65	306.18	-3061.81	0.00
36	100	91	275.711	10675.00	7654.91	316.13	-3161.30	0.00
37	100	91	275.711	10775.00	7653.16	326.08	-3260.79	0.00
38	22	91	275.711	10797.00	7652.78	328.27	-3262.68	0.00

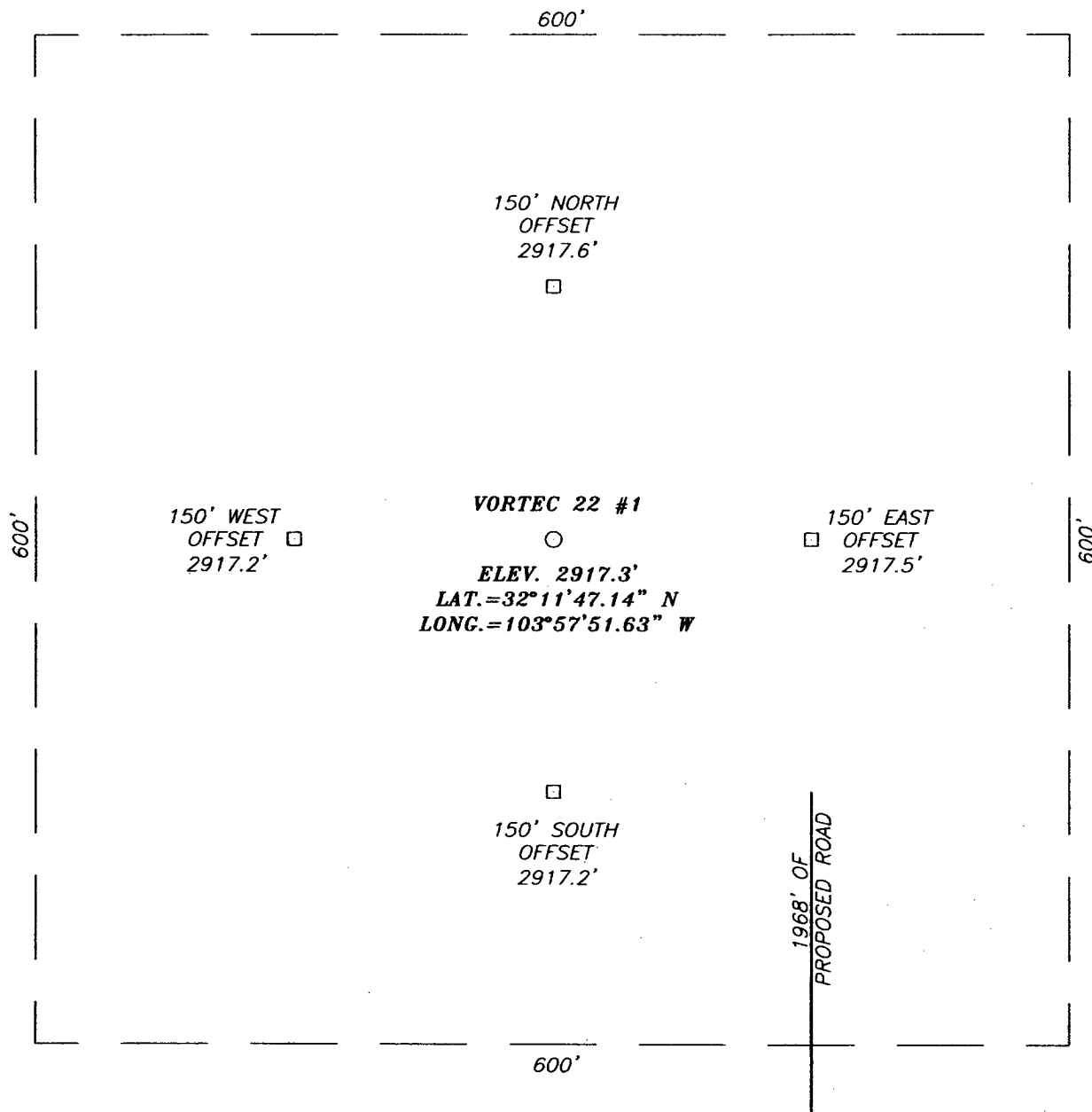
VORTEC 22 # 1 WELL GROUPINGS

Sec 22, T-24-S, R-29-E, Eddy County, New Mexico



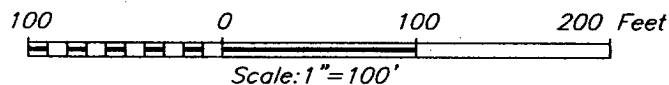
Well Name	Legal Location in 22	Depth and Strata	Current Prod Zone
VORTEC 22 # 1	330 FSL & 330 FEL	TD= 8200', HORIZONTAL	PROPOSED
Harroun 22 # 1	660 FNL & 660 FWL	TD= 5360' LCC sand	Delaware Production
Harroun 22 # 2	330 FNL & 1980 FEL	TD= 5500 LCC sand	Delaware Production
Harroun 22 # 3 H	660 FNL & 330 FEL	TD= 10864 Hz 1st Bone Sd	1st Bone Production
Jackal 22 Fed # 1	990 FSL & 230 FWL	NOT DRILLED	NOT DRILLED
Jackal 22 Fed # 2	1710 FSL & 630 FWL	TD= 5450 G-3, LCC	Delaware Production
Riverbend Fed # 1	1650 FNL & 1650 FWL	TD= 5500 G-3	Delaware Production
Riverbend Fed # 5	2310 FNL & 860 FEL	TD= 5420 G-6, G-3, LCC	Delaware Production
Riverbend Fed # 9	1650 FNL & 330 FWL	TD= 7900 1st Bone Sd,	Delaware Production
Riverbend 22 Fd # 12	2310 FSL & 1750 FWL	NOT DRILLED	NOT DRILLED
Riverbend 22 Fd # 13	1650 FSL & 2310 FEL	NOT DRILLED	NOT DRILLED

SECTION 22, TOWNSHIP 24 SOUTH, RANGE 29 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO



DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF CO. RD. #720 AND
CO. RD. #746 (MCDONALD RD.) GO SOUTH &
SOUTHEAST ON CO. RD. #746 FOR APPROX. 5.5
MILES. TURN RIGHT AND GO EAST APPROX. 0.9
MILES TO A PROPOSED ROAD SURVEY. FOLLOW
ROAD SURVEY NORTH APPROX. 1968 FEET TO
THIS LOCATION.



POGO PRODUCING COMPANY

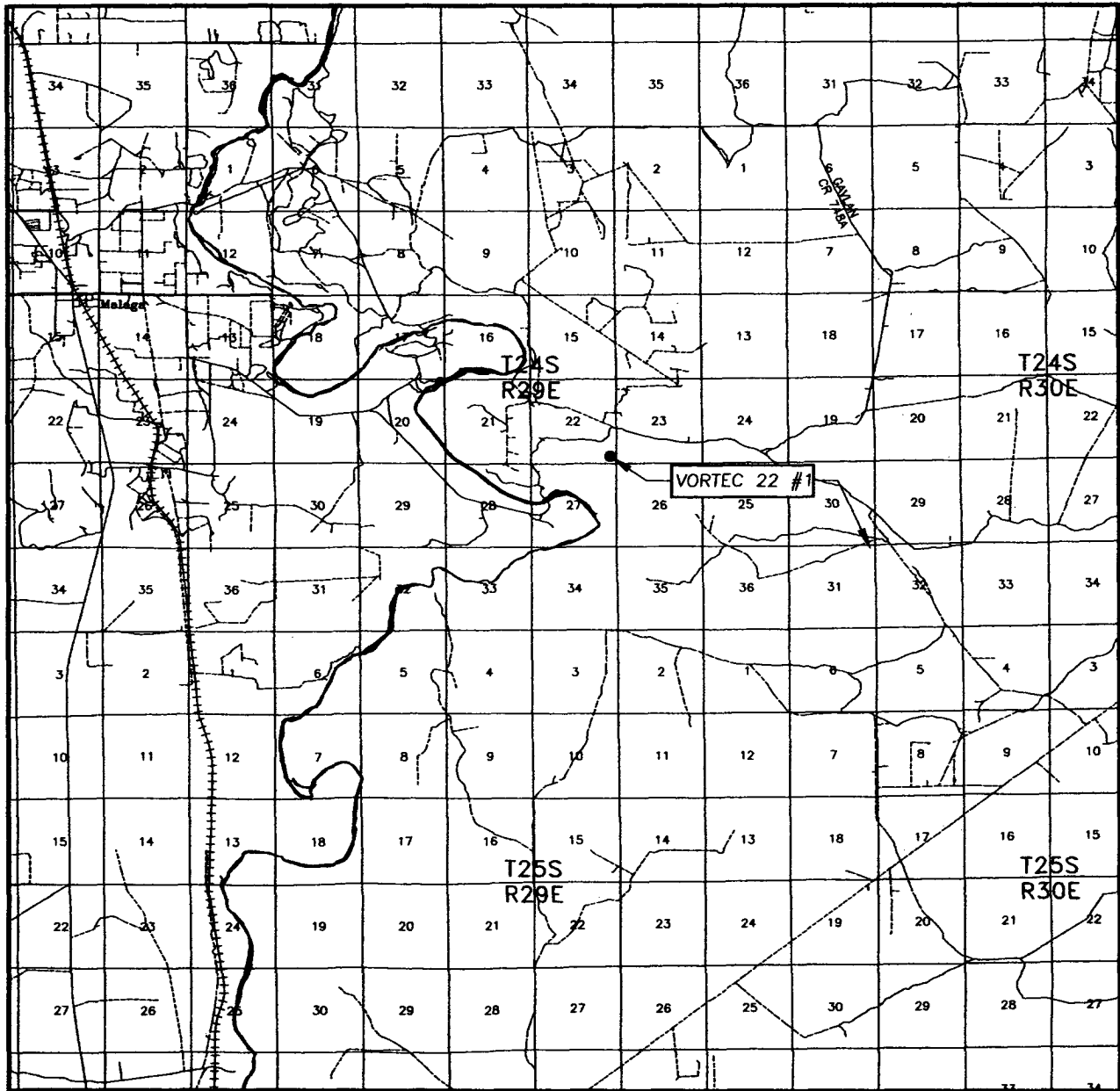
VORTEC 22 #1 WELL
LOCATED 330 FEET FROM THE SOUTH LINE
AND 330 FEET FROM THE EAST LINE OF SECTION 22,
TOWNSHIP 24 SOUTH, RANGE 29 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.

Survey Date: 4/18/06	Sheet 1 of 1 Sheets
W.O. Number: 06.11.0672	Dr By: LA
Date: 4/20/06	Rev 1: N/A
Disk: CD#5	06110672
	Scale: 1"=100'



PROVIDING SURVEYING SERVICES
SINCE 1946
JOHN WEST SURVEYING COMPANY
412 N. DAL PASO
HOBBS, N.M. 88240
(505) 383-3117

VICINITY MAP



SCALE: 1" = 2 MILES

SEC. 22 TWP. 24-S RGE. 29-E

SURVEY N.M.P.M.

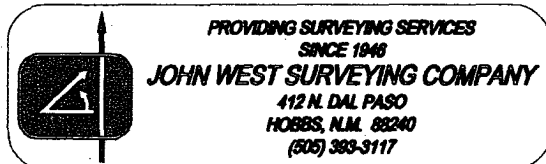
COUNTY EDDY STATE NEW MEXICO

DESCRIPTION 330' FSL & 330' FEL

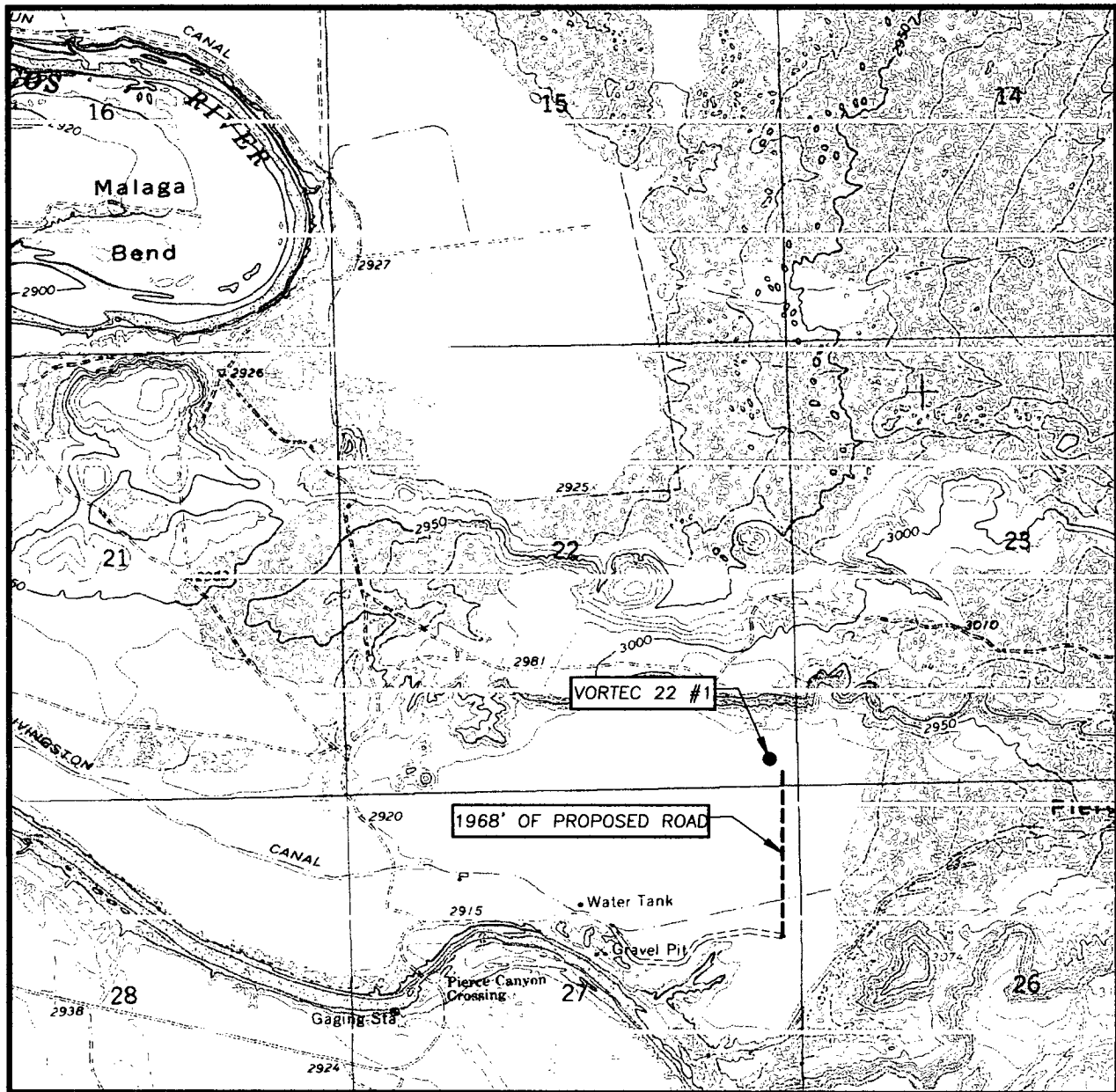
ELEVATION 2917'

OPERATOR POGO PRODUCING COMPANY

LEASE VORTEC 22



LOCATION VERIFICATION MAP



SCALE: 1" = 2000'

CONTOUR INTERVAL:
PIERCE CANYON, N.M. - 10'

SEC. 22 TWP. 24-S RGE. 29-E

SURVEY N.M.P.M.

COUNTY EDDY STATE NEW MEXICO

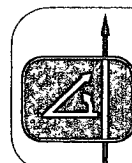
DESCRIPTION 330' FSL & 330' FEL

ELEVATION 2917'

OPERATOR POGO PRODUCING
COMPANY

LEASE VORTEC 22

U.S.G.S. TOPOGRAPHIC MAP
PIERCE CANYON, N.M.

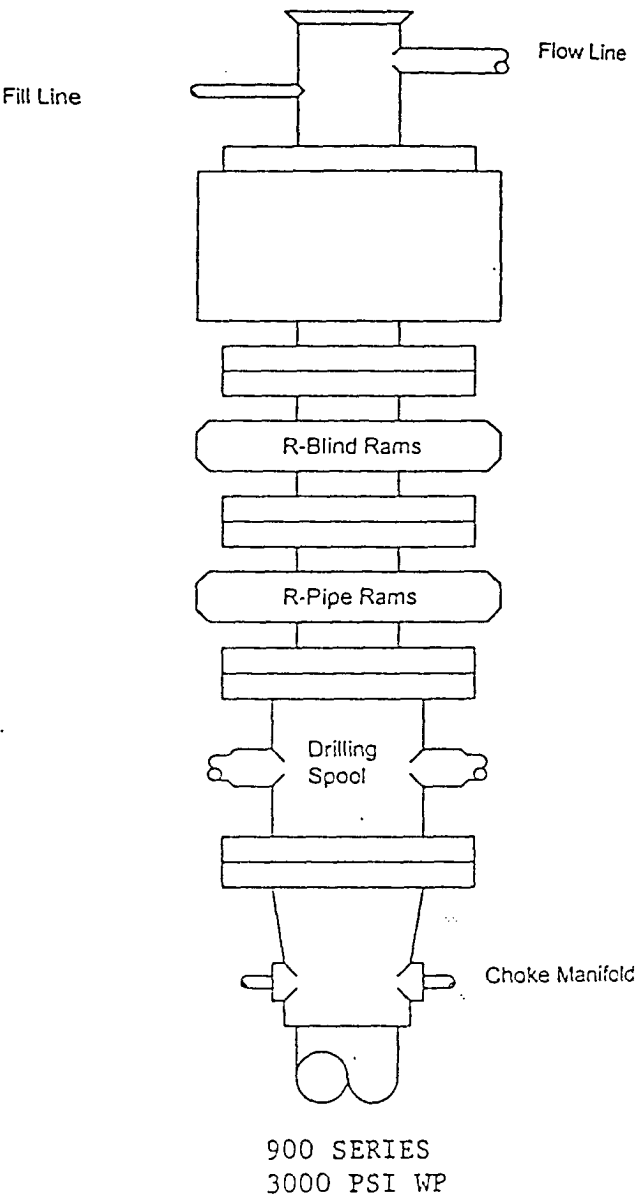
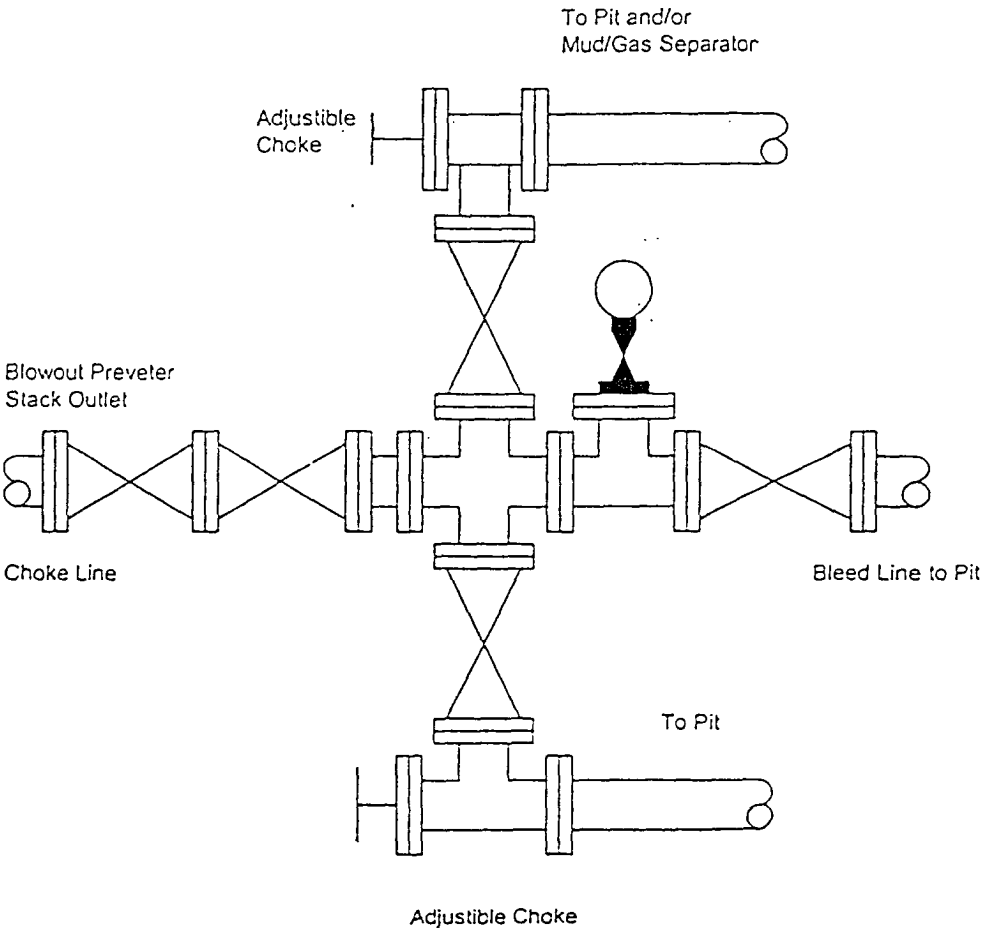


PROVIDING SURVEYING SERVICES
SINCE 1946
JOHN WEST SURVEYING COMPANY
412 N. DAL PASO
HOBBS, N.M. 88240
(505) 383-3117

BLOWOUT PREVENTER SYSTEM

3000 PSI

Choke Manifold Assembly for 5M WP System



POGO PRODUCING COMPANY

VORTEC "22" # 1

UNIT "P" SECTION 22

T24S-R29E EDDY CO. NM

HYDROGEN SULFIDE CONTINGENCY PLAN
FOR DRILLING/WORKOVER/FACILITY

This well and its anticipated facility are not expected to have Hydrogen Sulfide releases. However, there may be Hydrogen Sulfide production in the nearby area. There are no private Residences in the area but a contingency plan has been orchestrated. Pogo Producing Company will have a Company Representative living on location through out the drilling of this well. An un-manned H₂S safety trailer and monitoring equipment will also be station on location during the drilling operation below the Surface Casing depth of \pm 550 ft. until the completion of the subject well at \pm 10,700 ft.

POGO PRODUCING COMPANY

VORTEC "22" # 1

UNIT "P" SECTION 22

T24S-R29E EDDY CO. NM

**HYDROGEN SULFIDE CONTINGENCY PLAN
FOR DRILLING/WORKOVER/FACILITY**

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POGO PRODUCING COMPANY

VORTEC "22" # 1

UNIT "P" SECTION 22

T24S-R29E EDDY CO. NM

HYDROGEN SULFIDE CONTINGENCY PLAN FOR DRILLING/WORKOVER/FACILITY

General H2S Emergency Actions:

1. All personnel will immediately evacuate to an up-wind and if possible up-hill "safe area"
2. If for any reason a person must enter the hazardous area, they must wear a SCBA (Self Contained Breathing Apparatus)
3. Always use the "buddy system"
4. Isolate the well/problem if possible
5. Account for all personnel
6. Display the proper colors warning all unsuspecting personnel of the danger at hand.
7. Contact the Company personnel as soon as possible if not at the location. (use the enclosed call list as instructed

At this point the company representative will evaluate the situation and coordinate the necessary duties to bring the situation under control, and if necessary, the notification of the emergency response agencies and nearby residents.

EMERGENCY PROCEDURES FOR AN UNCONTROLLABLE RELEASE OF H2S

1. All personnel will don the self contained breathing apparatus.
2. Remove all personnel to the "safe area". (always use the buddy system).
3. Contact company personnel if not on location.
4. Set in motion the steps to protect and or remove the general public to an upwind "safe area". Maintain strict security & safety procedures while dealing with the source.
5. No entry to any unauthorized personnel.
6. Notify the appropriate agencies: City Police-City Street (s)
State Police- State Rd
County Sheriff – County Rd.
7. Call the NMOCD

POGO PRODUCING COMPANY

VORTEC "22" # 1

UNIT "P" SECTION 22
T24S-R29E EDDY CO. NM

HYDROGEN SULFIDE CONTINGENCY PLAN
FOR DRILLING/WORKOVER/FACILITY

If at this time the supervising person determines the release of H₂S cannot be contained to the site location and the general public is in harms way he will take the necessary steps to protect the workers and the public.

EMERGENCY CALL LIST: (Start and continue until ONE of these people have been contacted)

	OFFICE	MOBILE	HOME
POGO Producing Co.	432 685 8100		
Richard Wright	432 685 8140	432 556 7595	432 699 7108
Barrett Smith	432 685 8141	432 425 0149	432 520 7337
Rex Jasper	432 685 8143	432 631 0127	432 694 1839
Donny Davis	pgr 432 563 6944	432 556 5927	432 570 9555
Jerry Cooper	432 685 8101		432 697 4629

EMERGENCY RESPONSE NUMBERS:

State Police:	Eddy County		505 748 9718
State Police:	Lea County		505 392 5588
Sheriff	Eddy County		505 746 2701
Sheriff	Lea County		
Emergency Medical Ser (Ambulance)	Eddy County		911 or 505 746 2701
	Lea County	Eunice	911 or 505 394 3258
Emergency Response	Eddy County SERC		505 476 9620
	Lea County		
Artesia Police Dept			505 746 5001
Artesia Fire Dept			505 746 5001

POGO PRODUCING COMPANY

VORTEC "22" # 1

UNIT "P" SECTION 22

T24S-R29E EDDY CO. NM

**HYDROGEN SULFIDE CONTINGENCY PLAN
FOR DRILLING/WORKOVER/FACILITY**

Carlsbad Police Dept		505 885 2111
Carlsbad Fire Dept		505 885 3125
Loco Hills Police Dept		505 677 2349
Jal Police Dept		505 395 2501
Jal Fire Dept		505 395 2221
Jal ambulance		505 395 2221
Eunice Police Dept		505 394 0112
Eunice Fire Dept		505 394 3258
Eunice Ambulance		505 394 3258
Hobbs Police Dept		
NMOCD	District 1 (Lea, Roosevelt, Curry)	505 393 6161
	District 2 (Eddy Chavez)	505 748 1283
Lea County Information		505 393 8203
Callaway Safety	Lea/Eddy County	505 392 2973
BJ Services	Artesia	505 746 3140
	Hobbs	505 392 5556
Halliburton	Artesia	1 800 523 2482
	Hobbs	1 800 523 2482
Wild Well Control	Midland	432 550 6202
	Mobile	432 553 1166

POGO PRODUCING COMPANY

VORTEC "22" # 1

UNIT "P" SECTION 22

T24S-R29E EDDY CO. NM

HYDROGEN SULFIDE CONTINGENCY PLAN FOR DRILLING/WORKOVER/FACILITY

PROTECTION OF THE GENERAL PUBLIC (ROE):

- 100 ppm at any public area (any place not associated with this site)
- 500 ppm at any public road (any road which the general public may travel)
- 100 ppm radius of ¼ mile in New Mexico will be assumed if there is insufficient data to do the calculations, and there is a reasonable expectation that H₂S could be present in concentrations greater than 100 ppm in the gas mixture

CALCULATIONS FOR THE 100 PPM (ROE) "Pasquill-Gifford equation"

$X = [(1.589) (\text{mole fraction}) (Q - \text{volume in std cu ft})] \text{ to the power of } (0.6258)$

CALCULATION FOR THE 500 PPM ROE:

$X = [(.4546) (\text{mole fraction}) (Q - \text{volume in std cu ft})] \text{ to the power of } (0.6258)$

Example:

If a well/facility has been determined to have 150 / 500 ppm H₂S in the gas mixture and the well/facility is producing at a gas rate of 100 MCFPD then:

150 ppm $X = [(1.589) (.00015) (100,000 \text{ cfd})] \text{ to the power of } (.6258)$
 $X = 7 \text{ ft}$

500 ppm $X = [(.4546) (.0005) (100,000 \text{ cfd})] \text{ to the power of } (.6258)$
 $X = 3.3 \text{ ft.}$

(These calculations will be forwarded to the appropriate District NMOCD office when Applicable)

PUBLIC EVACUATION PLAN:

- 1. Notification of the emergency response agencies of the hazardous condition and implement evacuation procedures.
- A trained person in H₂S safety, shall monitor with detection equipment the H₂S concentration, wind and area exposure (ROE). This person will determine the outer perimeter of the hazardous area. The extent of the evacuation area will be determined from the data being collected. Monitoring shall continue until the situation has been resolved. (All monitoring equipment shall be UL approved, for use in class 1

POGO PRODUCING COMPANY

VORTEC "22" # 1

UNIT "P" SECTION 22

T24S-R29E EDDY CO. NM

HYDROGEN SULFIDE CONTINGENCY PLAN FOR DRILLING/WORKOVER/FACILITY

groups A,B,C &D, Division 1, hazardous locations. All monitor will have a minimum capability of measuring H₂S , oxygen, and flammable values).

- Law enforcement shall be notified to set up necessary barriers and maintain such for the duration of the situation as well as aid in the evacuation procedure.
- The company supervising personnel shall stay in communication with all agencies through out the duration of the situation and inform such agencies when the situation has been contained and the effected area(s) is safe to enter.

PROCEDURE FOR IGNITING AN UNCONTROLLABLE CONDITION:

- 1. Human life and/or property are in danger
- 2. There is no hope of bringing the situation under control with the prevailing conditions at the site.

INSTRUCTION FOR IGNITION:

- 1. Two people are required. They must be equipped with positive pressure, self contained breathing apparatus and a "D" ring style full body, OSHA approved safety harness. Non flammable rope will be attached.
- 2. One of the people will be qualified safety person who will test the atmosphere for H₂S, Oxygen & LFL. The other person will be the company supervisor; he is responsible for igniting the well.
- 3. Ignite up wind from a distance no closer than necessary. Make sure that where you ignite from has the maximum escape avenue available. A 25 mm flare gun shall be used, with a \pm 500 ft. range to ignite the gas.
- 4. Prior to ignition, make a final check for combustible gases.
- 5. Following ignition, continue with the emergency actions & procedures as before.

POGO PRODUCING COMPANY

VORTEC "22" # 1

UNIT "P" SECTION 22
T24S-R29E EDDY CO. NM

HYDROGEN SULFIDE CONTINGENCY PLAN FOR DRILLING/WORKOVER/FACILITY

REQUIRED EMERGENCY EQUIPMENT:

- **1. Breathing apparatus:**
 - Rescue Packs (SCBA) – 1 unit shall be placed at each breathing area, 2 shall be stored in the safety trailer.
 - Work/Escapes packs – 4 packs shall be stored on the rig floor with sufficient air hose not to restrict work activity.
 - Emergency Escape Packs – 4 packs shall be stored in the doghouse for emergency evacuation.
- **2. Signage & Flagging:**
 - One color code condition sign will be placed at the entrance to the site reflecting the possible conditions at the site.
 - A colored condition flag will be on display, reflecting the condition at the site at the time.
- **3. Briefing Area:** two perpendicular areas will be designated by signs and readily accessible.
- **4. Wind Socks:** Two wind socks will be placed in strategic locations, visible from all angles.
- **5. H₂S detectors and alarms:** The stationary detector with three sensors will be placed in the upper dog house if equipped, set to visually alarm @ 10 ppm and audible @ 14 ppm. Calibrate a minimum of every 30 days or as needed. The sensors will be placed in the following places: (Gas sample tubes will be stored in the safety trailer)
 - Rig Floor
 - Bell Nipple
 - End of Flow line or where well bore fluid are being discharged.
- **6. Auxiliary Rescue Equipment:**
 - Stretcher
 - Two OSHA full body harness
 - 100 ft 5/8 inch OSHA approved rope

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VORTEC "22" # 1

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HYDROGEN SULFIDE CONTINGENCY PLAN FOR DRILLING/WORKOVER/FACILITY

- 1-20# class ABC fire extinguisher
- Communication via cell phones on location and vehicles on location.

USING SELF CONTAINED BREATHING AIR EQUIPMENT (SCBA):

- (SCBA) SHOULD BE WORN WHEN ANY OF THE FOLLOWING ARE PERFORMED:
 - Working near the top or on top of a tank
 - Disconnecting any line where H₂S can reasonably be expected
 - Sampling air in the area to determine if toxic concentrations of H₂S exist.
 - Working in areas where over 10 ppm on H₂S has been detected.
 - At any time there is a doubt as the level of H₂S in the area.
- All personnel shall be trained in the use of SCBA prior to working in a potentially hazardous location.
- Facial hair and standard eyeglasses are not allowed with SCBA.
- Contact lenses are never allowed with SCBA.
- Air quality shall be continuously be checked during the entire operation.
- After each use, the SCBA unit shall be cleaned, disinfected, serviced and inspected
- All SCBA shall be inspected monthly.

RESCUE AND FIRST AID FOR VICTIMS OF HYDROGEN SULFIDE (H₂S) POISONING:

- Do not panic
- Remain Calm & think
- Get on the breathing apparatus

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HYDROGEN SULFIDE CONTINGENCY PLAN
FOR DRILLING/WORKOVER/FACILITY

- Remove the victim to the safe breathing area as quickly as possible. Up wind and uphill from source or cross wind to achieve upwind.
- Notify emergency response personnel.
- Provide artificial respiration and or CPR, as necessary
- Remove all contaminated clothing to avoid further exposure.
- A minimum of two personnel on location shall be trained in CPR and First Aid.

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HYDROGEN SULFIDE CONTINGENCY PLAN FOR DRILLING/WORKOVER/FACILITY

HYDROGEN SULFIDE TOXIC EFFECTS

H₂S is extremely toxic. The acceptable ceiling for eight hours of exposure is 10 ppm, which is .001% by volume. H₂S is approximately 20% heavier than air (Sp. Gr= 1.19)(Air = 1) and colorless. It forms an explosive mixture with air between 4.3% and 46%. By volume hydrogen sulfide is almost as toxic as hydrogen cyanide and is 5-6 times more toxic than carbon monoxide.

Various Gases

COMMON NAME	CHEMICAL ABBREV.	SPECIFIC GRVTY.	THRESHOLD LIMITS	HAZARDOUS LIMITS	LETHAL CONCENTRATIONS
Hydrogen Sulfide	H ₂ S	1.19	10ppm 15 ppm	100 ppm/hr	600 ppm
Hydrogen Cyanide	HCN	0.94	10 ppm	150 ppm/hr	300 ppm
Sulfur Dioxide	SO ₂	2.21	2 ppm	N/A	1000 ppm
Chlorine	CL ₂	2.45	1 ppm	4 ppm/hr	1000 ppm
Carbon Monoxide	CO	0.97	50 ppm	400 ppm/hr	1000 ppm
Carbon Dioxide	CO ₂	1.52	5000 ppm	5%	10%
Methane	CH ₄	0.55	90,000	Combustible @ 5%	N/A

Threshold limit: Concentrations at which it is believed that all workers may be repeatedly exposed, day after day without adverse effects.

Hazardous Limit: Concentrations that may cause death

Lethal

Concentrations: Concentrations that will cause death with short term exposure

Threshold limit -

10 ppm: NIOSH guide to chemical hazards

PHYSICAL EFFECTS OF HYDROGEN SULFIDE:

CONCENTRATION	PHYSICAL EFFECTS
.001% 10 PPM	Obvious and unpleasant odor. Safe for 8 hr exposure
.005% 50 ppm	Can cause some flu like symptoms and can cause pneumonia
.01% 100 ppm	Kills the sense of smell in 3-15 minutes. May irritate the eyes and throat.
.02% 200 ppm	Kills the sense of smell rapidly. Severly irritates the eyes and throat. Severe flu like symptoms after 4 or more ours. May cause lung damage and or death.
.06% 600 ppm	Loss of consciousness quickly, death will result if not rescued promptly.