

HYDROGEN SULFIDE DRILLING OPERATIONS PLAN
APACHE CORP. – PERMIAN BASIN

revised 4/9/2009

This Hydrogen Sulfide Drilling Operations Plan shall be implemented prior to drilling out from under casing (surface or intermediate) set above potential H₂S bearing formations.

I. Hydrogen Sulfide Training

All personnel, whether regularly assigned, contracted, or employed on an unscheduled basis, will receive training from a qualified instructor in the following areas prior to commencing drilling operations on this well:

1. The hazards and characteristics of hydrogen sulfide (H₂S).
2. The proper use and maintenance of personal protective equipment and life support systems.
3. The proper use of H₂S detectors, alarms, warning systems, briefing areas, evacuation procedures, and prevailing winds.
4. The proper techniques for first aid and rescue procedures.

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

1. The effects of H₂S on metal components. If high tensile tubulars are to be used, personnel will be trained in their special maintenance requirements.
2. Corrective action and shut-in procedures when drilling or reworking a well and blowout prevention and well control procedures.
3. The contents and requirements of the H₂S Drilling Operations Plan and the Public Protection Plan.

All personnel entering a location posted with the potential of Hydrogen Sulfide shall be required to carry documentation that they have received the proper training. (Training certificate typically valid for 1 year after training)

II. Site Specific Information:

Upon installation of H₂S Safety Equipment and Systems on a well, and prior to drilling out of casing above potential Hydrogen Sulfide bearing formations a briefing with all personnel on location shall be held. The briefing should include a review of H₂S Drilling Operations Plan and the Public Protection Plan. This briefing should include site specific elements such as;

- Identification of the briefing areas.
- Discussion of rig orientation and prevailing wind direction.

- Identification of access roads, including secondary egress.
- Confirmation that all personnel have current training.
- Formation tops of potential H₂S bearing formations.

The H₂S Drilling Operations Plan and the Public Protection Plan shall be available at the well site.

III. H₂S Safety Equipment and Systems

1. Well Control Equipment that will be installed prior to drilling out of casing above potential Hydrogen Sulfide bearing formations:
 - A. Choke manifold with a minimum of one adjustable choke.
 - B. At least one choke line must be directed away from the drilling unit and secured at the end. (For closed-loop operations this should be directed to containment bin at the back edge of the location.)
 - C. Blind rams and pipe rams to accommodate all pipe sizes
 - D. Annular preventor
 - E. Properly sized closing unit.
- 1.1 Well control equipment to be available to install as needed should H₂S be encountered;
 - A. Flare line with electronic igniter or continuous pilot.
 - B. Mud gas separator
 - C. Flare gun with flares.
 - D. One portable S₀₂ monitor positioned near flare line.
2. Protective equipment for essential personnel:
 - A. 30-minute air pack units located in the dog house and at briefing areas.
3. H₂S detection and monitoring equipment:
 - A. Two portable H₂S monitors positioned on location for best coverage and response. These units have warning lights and audible sirens when H₂S levels of 20 ppm are reached.
4. Visual warning systems:
 - A. Wind direction indicators.
 - B. Caution/Danger signs shall be posted on roads providing direct access to location. Signs will be painted a high visibility yellow with black lettering of sufficient size to be readable at a reasonable distance from the immediate location. Bilingual signs will be used when appropriate.

5. Mud program:
 - A. The mud program shall be designed to minimize the volume of H₂S circulated to the surface. Proper mud weight, safe drilling practices, and the use of H₂S scavengers will minimize hazards when penetrating H₂S-bearing zones.
 - B. A mud-gas separator and an H₂S gas buster will be utilized as required if H₂S is encountered.
6. Metallurgy:
 - A. All drill strings, casings, tubing, wellhead, blowout preventers, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H₂S service.
 - B. All elastomers used for packing and seals shall be H₂S trim.
7. Communication:
 - A. Communications shall be available on the rig site and in company vehicles. Communications equipment may include one or more of the following; land lines, satellite phones, cellular telephone and 2-way radios.

PUBLIC PROTECTION PLAN FOR HYDROGEN SULFIDE (H₂S)

Assumed 100 ppm Radius of Exposure (ROE) = 3000'

100 ppm H₂S concentration shall trigger activation of this plan.

Emergency Procedures

In the event of a release of gas containing 100 ppm H₂S, the first responder(s) must;

- Isolate the area and prevent entry by other persons into the 100 ppm ROE.
- Evacuate any public places encompassed by the 100 ppm ROE.
- Be equipped with H₂S monitors and air packs in order to safely conduct efforts to control the release.
- Use the "buddy system" to ensure no injuries during the response operations.
- Take precautions to avoid personal injury during the operation.
- Contact operator and/or local officials to aid in operations. See list of phone numbers attached.
- Have received training in the
 - a. Detection of H₂S
 - b. Measures for protection against H₂S gas
 - c. Equipment used for protection and emergency response to H₂S gas

Ignition of Gas Source

Should control of the well be considered lost and ignition considered, take care to protect against exposure to Sulfur Dioxide (SO₂). Intentional ignition must be coordinated with the NMOCD and local officials. Additionally the New Mexico State Police may be involved. The New Mexico State Police shall be the Incident Command on scene of any major release. Take care to protect downwind whenever there is an ignition of gas.

Characteristics of H₂S and SO₂

Common Name	Chemical Formula	Specific Gravity	Threshold Limit	Hazardous Limit	Lethal Concentration
Hydrogen Sulfide	H ₂ S	1.189 Air = 1.0	10 ppm	100 ppm/hr	600 ppm
Sulfur Dioxide	SO ₂	2.21 Air = 1.0	2 ppm	N/A	1000 ppm

Contacting Authorities

Apache Corporation's personnel must liaison with local and state agencies to ensure proper response to a major release. Additionally, the OCD must be notified of the release as soon as possible but no later than 4 hours after the release. Agencies will ask for information such as type and volume of release, wind direction, location of release, etc. Be prepared with all information available including directions to site. The following call list of essential and potential responders has been prepared for use during a release. Apache Corporation's response must be in coordination with the State of New Mexico's "Hazardous Materials Emergency Response Plan" (HMER).

(Note: Apache Corporation's Central Region Well Control Emergency Response Team should have already been notified. See Central Region Well Control Emergency Response Plan with drilling prognosis)

PUBLIC PROTECTION PLAN FOR H₂S - EMERGENCY CONTACTS

LOCATION	ENTITIY	PHONE NUMBER
	Ambulance	911
Eunice, NM	Apache Corp	(575) 394-1503
Eunice, NM	Apache Corp	(575) 394-2743
Eunice, NM	Sheriff's Office	(575) 394-2020
Hobbs, NM	State Police	(575) 392-5588
Eunice, NM	Fire Department	(575) 394-3258
Hobbs, NM	Fire Department	(575) 397-9308
Hobbs, NM	Local Emergency Mgmt. Safety	(575) 397-9231
Hobbs, NM	NM Oil Conservation Division	(575) 393-6161
Carlsbad, NM	Bureau of Land Management	(575) 887-6544
Santa Fe, NM	NM Emergency Response Commission	(505) 476-9600 24 hr, (505) 827-9126
Washington, DC	Nat'l Emergency Response Center	(800) 424-8802
Other Services		
Well Control	GSM Engineering	(806) 358-6894
Snubbing	Cudd Pressure Control	(915) 699-0139
Pumping	BJ Services	(575) 392-5556

Hawk A #27

SURFACE USE PLAN OF OPERATIONS

Apache Corporation

Hawk A #27

Section 8, T 21S, R 38E, UL H

1. Existing Roads:

Exhibit 'A' is a well pad Topo map showing 150' offsets to the East, West, South and North. This topographic map demonstrates that the area of the well pad is essentially flat and will not require any significant cuts or fills. This map also shows the well pad proximity to existing electric lines, fences and pipe lines. No obstructions to location construction are indicated.

The size of the drilling pad will depend upon the rig selected to drill the well, but it is anticipated that the outer limits of the area to be disturbed will be no larger than 100' to the North, 125' to the East, 125' to the South, and 110' to the West.

Exhibit 'B' is a Topo/Location General Highway map of the Lea County, New Mexico area surrounding the proposed well pad. Directions to location are: From the intersection of Turner Rd. (Co. Rd. #33) and Hill Rd. (Co. Rd. #34), go north on lease road approx. 300 ft, turn right and go east approx. 600 ft, turn left and go north approx. 400 ft to the existing WBDU #28 well. This location is approx. 325 ft southwest of existing well.

Exhibit 'C' is the Vicinity Map, showing area townships and ranges. All existing roads will be maintained in a condition to or better than the current conditions. Any new roads will be constructed to BLM specifications.

2. New or Reconstructed Access Roads:

The existing lease roads will be used to the extent possible. See Exhibit 'B'.

3. Locations of Existing Wells in a One-mile radius – Exhibit 'D'

1. Water Wells – None known
2. Disposal wells – None known
3. Drilling wells – None known
4. Producing wells- As shown on Exhibit 'D'
5. Abandoned wells – As shown on Exhibit 'D'

4. Location of Existing and / or Proposed Production Facilities

If this well is a producer, Apache Corporation will furnish maps and / or plats showing on site facilities and any additional off site facilities if needed.

5. Location and Type of Water Supply:

Apache Corporation plans to drill the proposed well with fresh and brine water which will be transported by truck over the proposed and existing roads.

6. Source of Construction Material:

If possible, construction will be obtained from excavation of drill site. If additional material is needed, it will be purchased from a local source. Material will be transported over the access route as described above.

7. Methods of Handling Waste Material:

A. Drill cuttings will be separated by a series of solids removal equipment and stored in steel containment pits and then hauled to a state- approved disposal facility.

B. All trash, junk and other waste material will be contained in trash cages or bins to prevent scattering. When the job is completed all contents will be removed and disposed of in an approved sanitary land fill.

C. Salts remaining after completion of well will be picked up by supplier including broken sacks.

D. Sewage from any living quarters will drain into holding tanks and be cleaned out periodically. A Porta-John will be provided for the rig crews. This equipment will be properly maintained during the drilling operations and removed upon completion of the well.

E. Drilling fluids will be contained in the steel pits in a closed circulating system. Fluids will be cleaned and reused. Water produced during testing will be contained in the steel pits and disposed of at a state approved disposal facility. Any oil or condensate produced will be stored in test tanks until sold and hauled from the site.

8. Ancillary Facilities:

A. No camps or airstrips to be constructed.

9. Well Site Layout:

A. Exhibit 'E' shows a typical location and rig layout. No specific rig has been identified or contracted to drill this well at the time of this application.

B. Mud pits in the closed circulating system will be steel pits and the cuttings will be stored in steel containment pits. NMOCD form C-144 has been submitted to the OCD for approval.

C. Cuttings will be stored in steel pits until they are hauled to a state-approved disposal facility.

D. If the well is a producer, those areas of the location not essential to production facilities will be reclaimed and seeded per BLM requirements.

10. Plans for Restoration of Surface:

Rehabilitation of the location will start in a timely manner after all drilling operations cease. The type of reclamation will depend on whether the well is a producer or a dry hole.

Drainage systems, if any, will be reshaped to the original configuration with provisions made to alleviate erosion. These may need to be notified in certain circumstances to prevent inundation of the location's pad and surface facilities. After the area has been shaped and contoured, topsoil from the soil pile will be loaded over the disturbed area to the extent possible. Re-vegetation. Procedures will comply with BLM standards.

If the well is a dry hole, the pad and road area will be re-contoured to match the existing terrain. Topsoil will be spread to the extent possible. Re-vegetation will comply with BLM standards.

Should the well be a producer, the previously noted procedures will apply to those areas which are not required from production facilities.

11. Surface and Mineral Ownership:

The surface land is owned by **Deck Estate, C/O Bank of America, N.A., Attn: Tim Wolters, P.O. Box 270 Midland, TX 79702**. The sub surface minerals are Federal, owned by USA, Department of Interior, managed by the Bureau of Land Management.

Leases Issued	NMLC 031741(a)
Operating Rights	Apache Corp 50%
	BP 25%
	Chevron 25%

Lease Acreage Description:

Township 21 South, Range 37 East

Section 4: W/2SW/4

Section 5: SE/4

Section 8: NE/4, N/2NW/4

Section 9: W/2NW/4

Total Lease Acreage:

560

12. Other Information:

- A. Topography consists of a sloping plane with loose tan sands. Vegetation is mainly Yucca, Mesquite and Shin Oak.
- B. The well site is on the surface owned by Deck Estate, C/O Bank of America, N.A., Attn: Tim Wolters, P.O. Box 270 Midland, TX 79702. The land is used mainly for cattle ranching, and oil and gas production. A surface use agreement is in place for the drilling of this well (surface damages \$10,000).
- C. John West Surveying Company, Hobbs, New Mexico will be conducting an archaeological survey of the proposed well which covers the drilling location, production facilities, and access road, including a corridor along said access road for power and flow lines. His report will be filed under separate cover.
- D. There are no known occupancies within 1 ½ miles of this location.

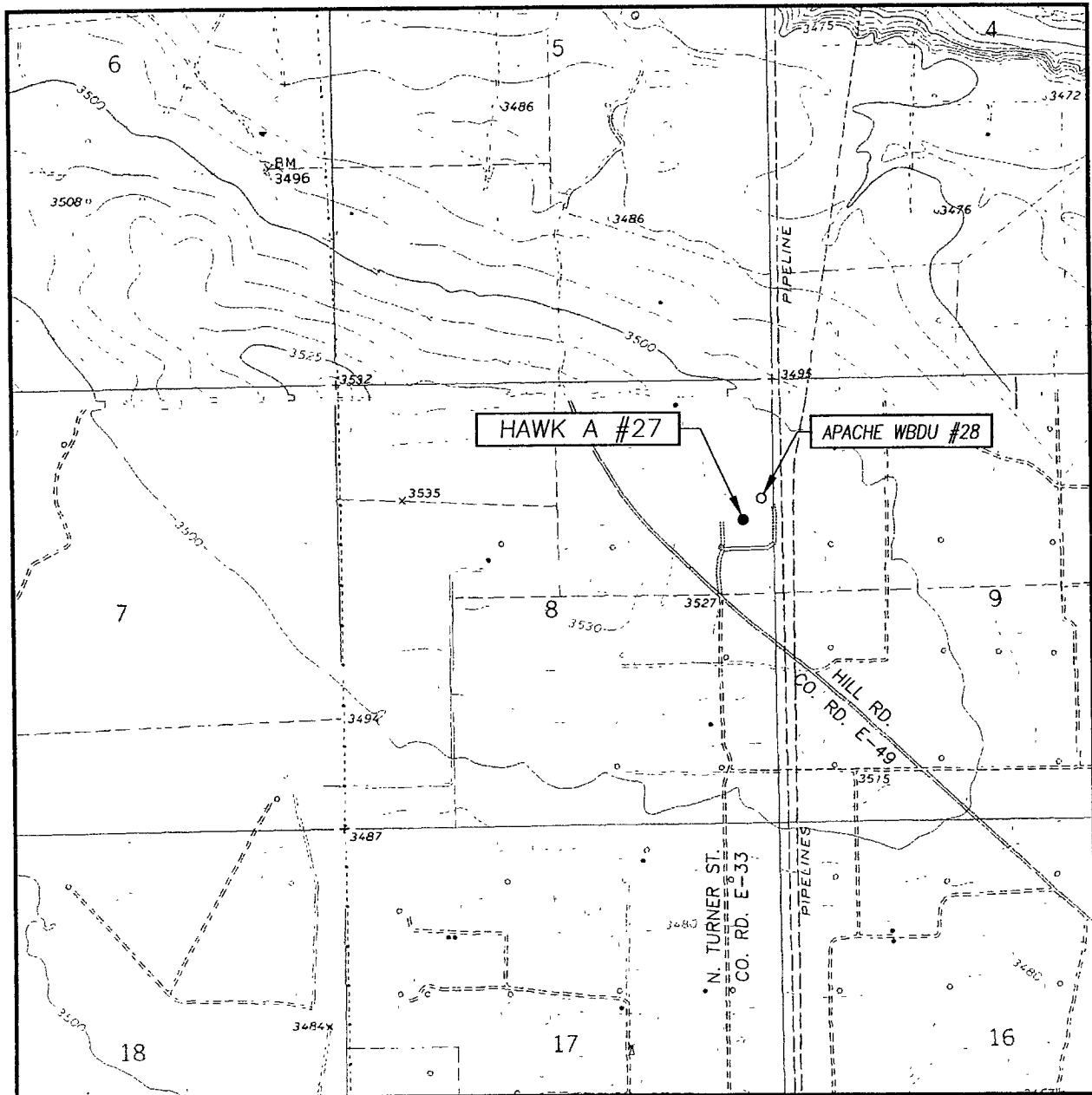
Operator Certification:

I hereby certify that I, or persons under my direct supervision, have inspected the drill site and access roads proposed herein; that I am familiar with the conditions which presently exist; that I have knowledge of State and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with operations proposed herein will be performed in conformity with this plan and the terms and conditions under which it is approved. I also certify that I, or APACHE CORPORATION am responsible for the operations conducted under this application. This statement is subject to the provisions of 18 U.S.C. 1001 for the filing of a false statement.

Date May 24, 2010

Name and Title Samuel Shoun – Drilling Engineer

LOCATION VERIFICATION MAP



SCALE: 1" = 2000'

CONTOUR INTERVAL:
HOBBS SW, N.M. - 5'
EUNICE, N.M. - 10'

SEC. 8 TWP. 21-S RGE. 37-E

SURVEY N.M.P.M.

COUNTY LEA STATE NEW MEXICO


DESCRIPTION 1650' FNL & 380' FEL

ELEVATION 3516'

OPERATOR APACHE CORPORATION

LEASE HAWK A

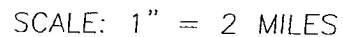
U.S.G.S. TOPOGRAPHIC MAP
EUNICE, N.M.



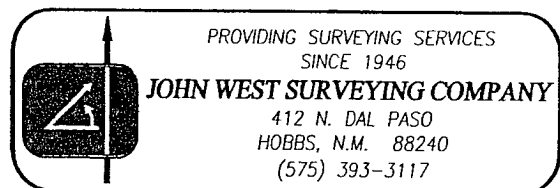
PROVIDING SURVEYING SERVICES
SINCE 1946

JOHN WEST SURVEYING COMPANY

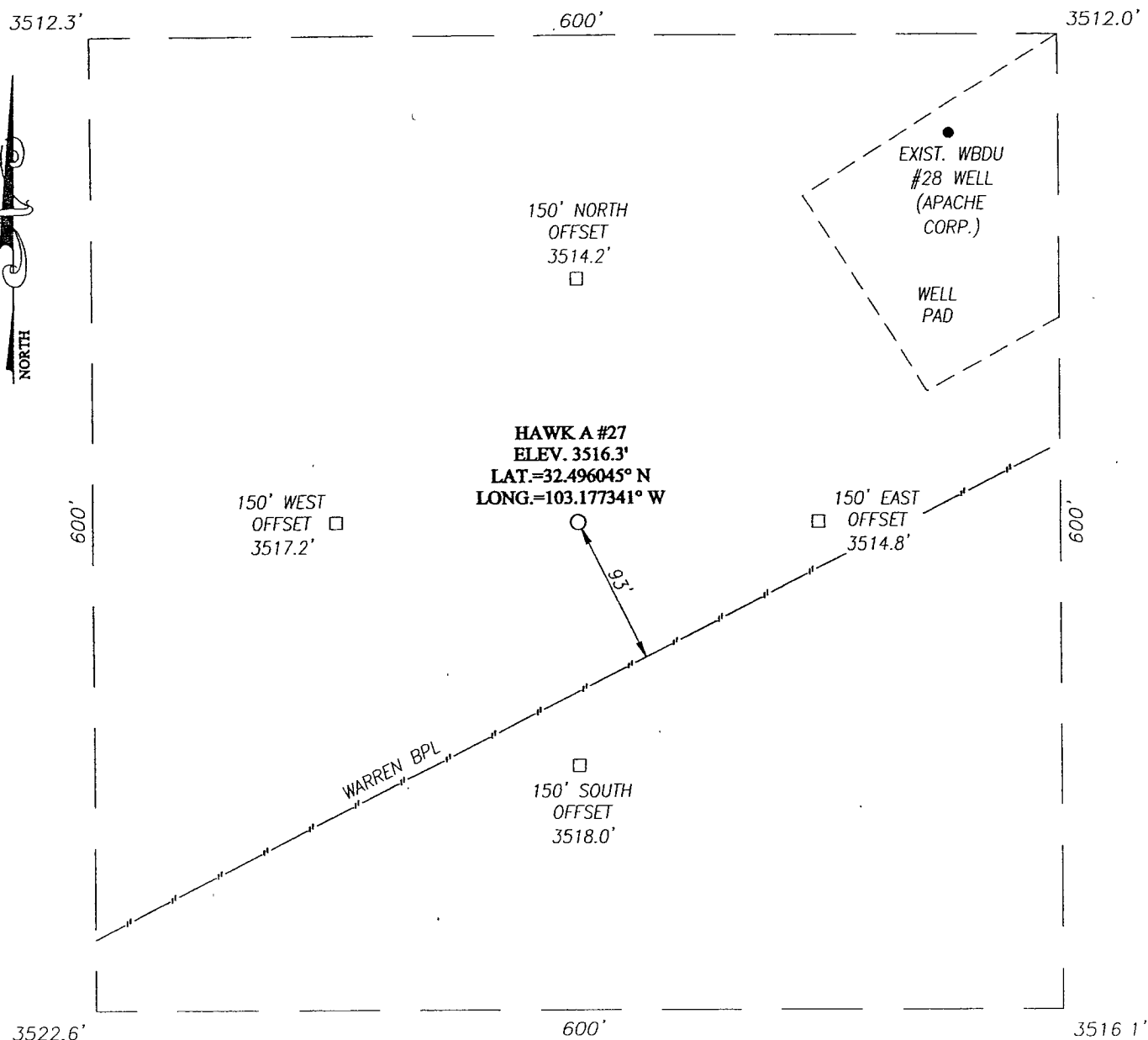
412 N DAL PASO
HOBBS, N.M. 88240
(575) 393-3117



LEASE HAWK A

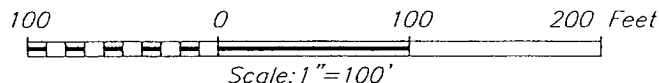


SECTION 8, TOWNSHIP 21 SOUTH, RANGE 37 EAST, N.M.P.M.,
LEA COUNTY **NEW MEXICO**



DIRECTIONS TO LOCATION

FROM THE INTERSECTION CO. RD. #33 (TURNER RD.) AND CO. RD. #34 (HILL RD.), GO NORTH ON LEASE ROAD APPROX. 300 FEET, TURN LEFT AND GO EAST APPROX. 600 FEET. TURN LEFT AND GO NORTH APPROX. 400 FEET TO THE EXISTING WBDU #28 WELL. THIS LOCATION IS APPROX. 325 FEET SOUTHWEST OF EXISTING WELL.



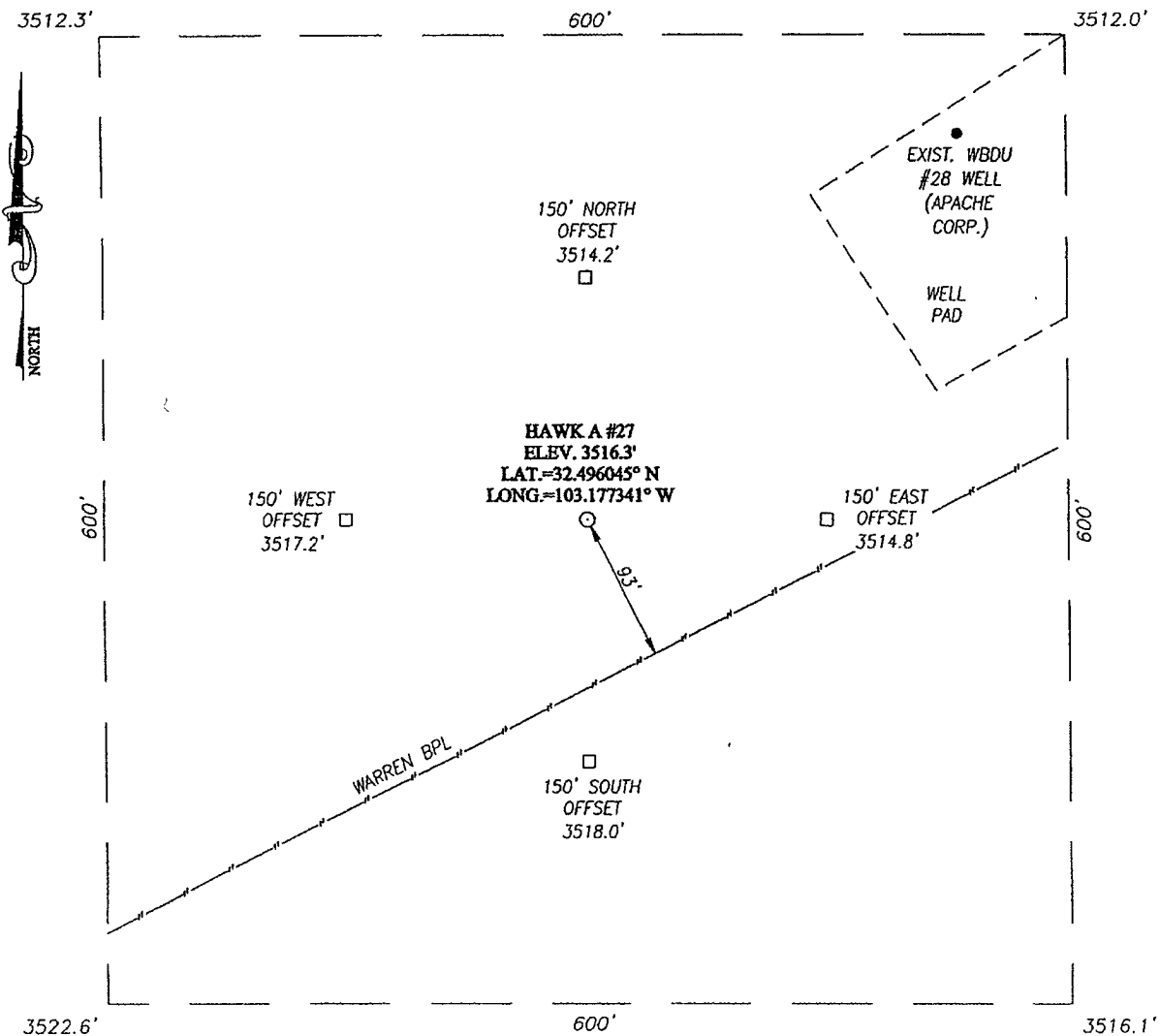
APACHE CORPORATION

HAWK A #27 WELL
 LOCATED 1650 FEET FROM THE NORTH LINE
 AND 380 FEET FROM THE EAST LINE OF SECTION 8,
 TOWNSHIP 21 SOUTH, RANGE 37 EAST, N.M.P.M.,
 LEA COUNTY, NEW MEXICO.

Survey Date: 4/28/10	Sheet 1 of 1 Sheets
W.O. Number: 10.11.0637	Dr By: LA
Date: 5/5/10	10110637
	Scale: 1"=100'

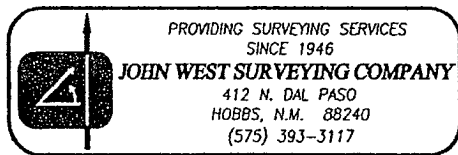
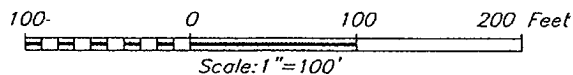
PROVIDING SURVEYING SERVICES
 SINCE 1946
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 412 N. DAL PASO
 HOBBS, N.M. 88240
 (575) 393-3117

SECTION 8, TOWNSHIP 21 SOUTH, RANGE 37 EAST, N.M.P.M.,
LEA COUNTY **NEW MEXICO**



DIRECTIONS TO LOCATION

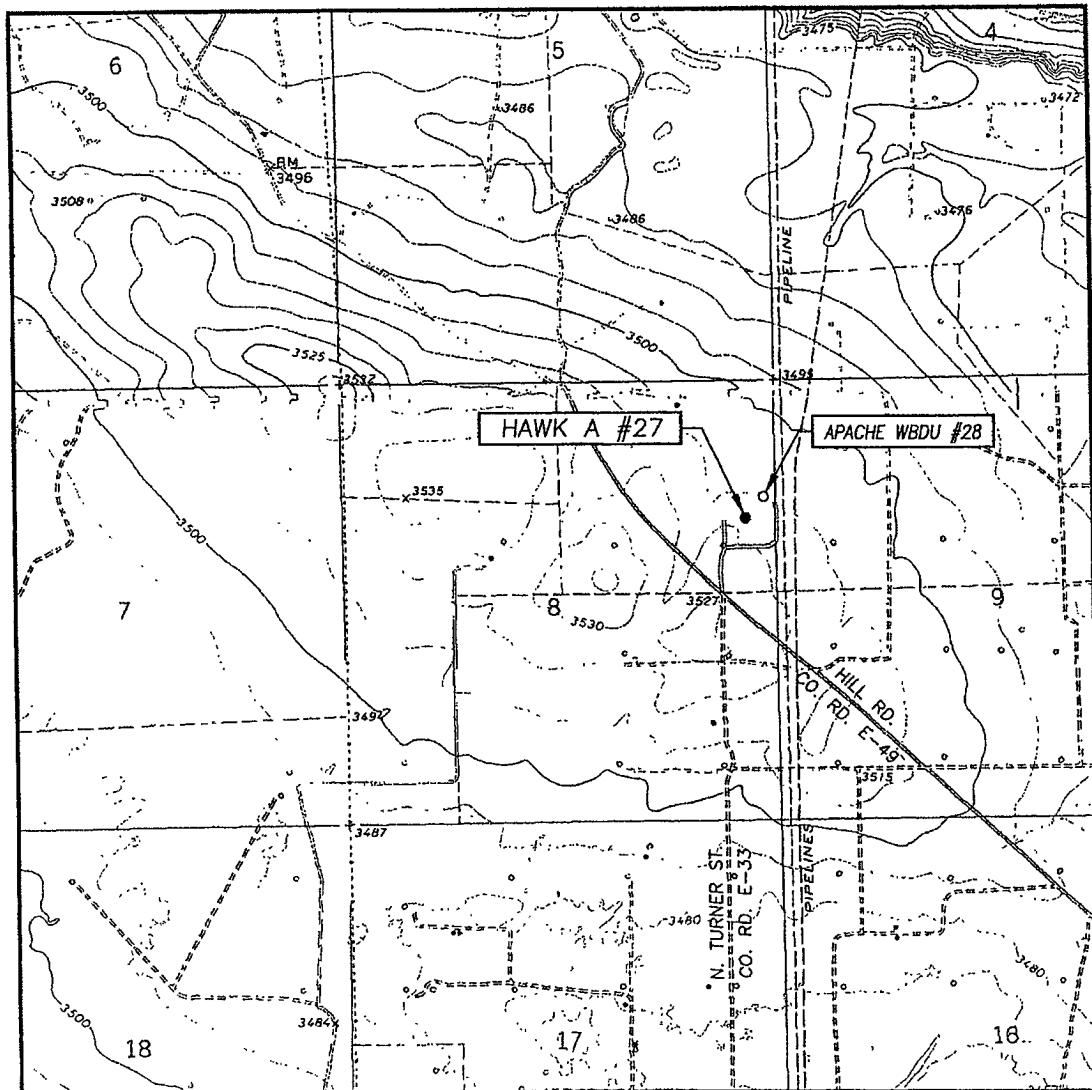
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APACHE CORPORATION			
HAWK A #27 WELL LOCATED 1650 FEET FROM THE NORTH LINE AND 380 FEET FROM THE EAST LINE OF SECTION 8, TOWNSHIP 21 SOUTH, RANGE 37 EAST, N.M.P.M., LEA COUNTY, NEW MEXICO.			
Survey Date: 4/28/10		Sheet 1 of 1 Sheets	
W.O. Number: 10.11.0637		Dr By: LA	
Date: 5/5/10		10110637	
Scale: 1"=100'			

EXHIBIT 'A'

LOCATION VERIFICATION MAP



SCALE: 1" = 2000'

CONTOUR INTERVAL:
HOBBS SW, N.M. - 5'
EUNICE, N.M. - 10'

SEC. 8 TWP. 21-S RGE. 37-E

SURVEY N.M.P.M.

COUNTY LEA STATE NEW MEXICO

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LEASE HAWK A

U.S.G.S. TOPOGRAPHIC MAP
EUNICE, N.M.

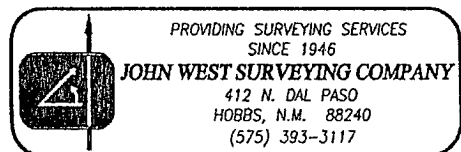
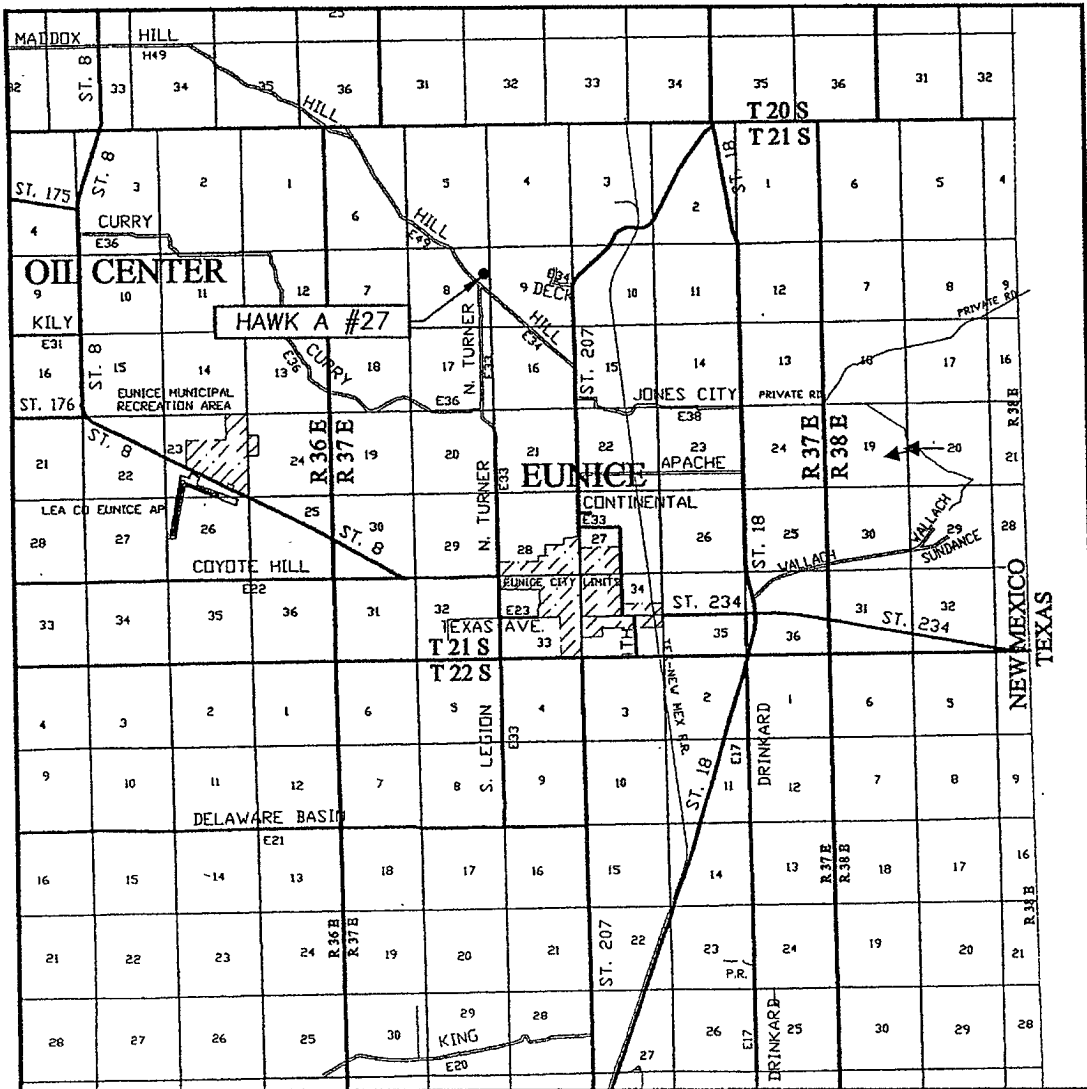


EXHIBIT 'B'

VICINITY MAP



SCALE: 1" = 2 MILES

SEC. 8 TWP. 21-S RGE. 37-E
SURVEY _____ N.M.P.M. _____
COUNTY LEA STATE NEW MEXICO
DESCRIPTION 1650' FNL & 380' FEL
ELEVATION 3516'
OPERATOR APACHE CORPORATION
LEASE HAWK A

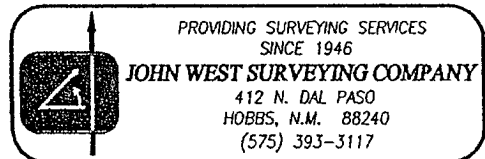


EXHIBIT 'C'

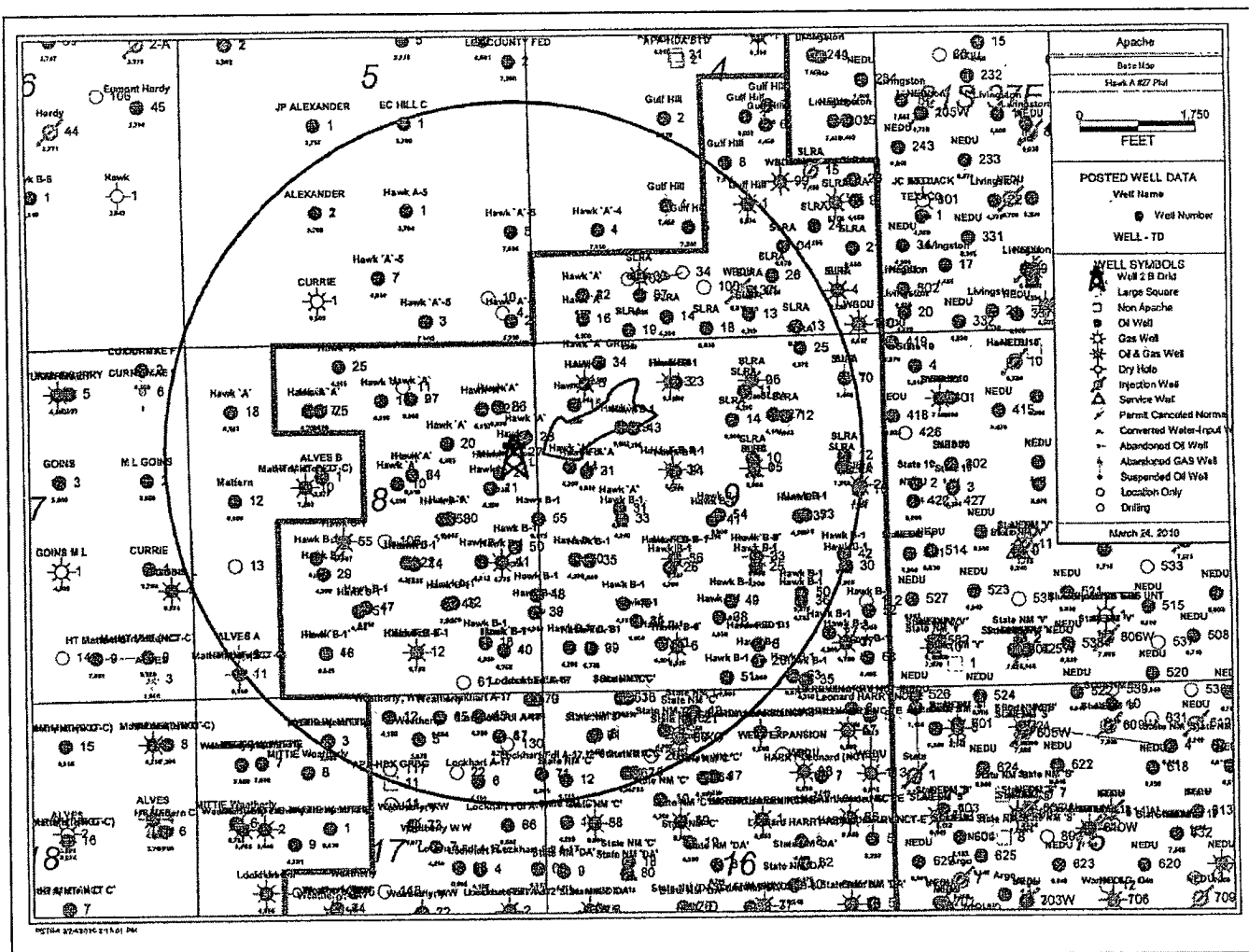


EXHIBIT 'D'