

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

¹ Operator Name and Address Enervest Operating LLC 1001 Fannin St. Suite 800, Houston, TX. 77002		² OGRID Number 443199
³ Property Code 302126-303923	⁴ Property Name State Com A	⁵ API Number 025-38670
⁹ Proposed Pool 1 Eumont Gas (Yates-7 Rivers- Queen)		¹⁰ Proposed Pool 2 8

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
X	5	21S	36E		660	South	475	East	LEA

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

Additional Well Information

¹¹ Work Type Code N	¹² Well Type Code G	¹³ Cable/Rotary R	¹⁴ Lease Type Code S	¹⁵ Ground Level Elevation 3608'
¹⁶ Multiple No	¹⁷ Proposed Depth 3800'	¹⁸ Formation Yates, 7Rivers, Queen	¹⁹ Contractor NA	²⁰ Spud Date NA
Depth to Groundwater 195		Distance from nearest fresh water well >1000'		Distance from nearest surface water >1000'
²¹ Proposed Casing and Cement Program				

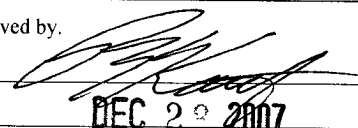
Hole Size	Casing Size	Casing weight/foot	Setting Depth	Sacks of Cement	Estimated TOC
11"	8-5/8"	24#	1,250'	400	Surface
7-7/8"	5-1/2"	15.5#	3,800'	720	Surface

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.

Permit requested as a "Work Only" drilling permit as the 40 acre spacing for this lease has been applied for but not yet approved.

1. Prepare surface location. Move in and rig up drilling rig, spud well and drill and set conductor. Install and test BOP's.
2. Drill 11" surface hole to a minimum depth of 1250'. Set 8 5/8" casing and cement.
3. Drill 7 7/8" production hole 3,800' TD and evaluate running mud logs as well as DLL/LD/CAL/GR to TD.
4. Set 5 1/2" to TD and tie cement back to surface. Perforate porosity and stimulate as necessary (specific procedure to be determined).
5. Place well on test.
6. H2S can be present in this area and an H2S contingency plan attached.

Permit Expires 1 Year From Approval
Date Unless Drilling Underway

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 ☐ .		OIL CONSERVATION DIVISION	
Printed name: Ronnie Young / by Gary Miller		Approved by: 	
Title: Regulatory Supervisor		Title: DEC 20 2007	
E-mail Address: ryoung@enervest.net		Approval Date: Expiration Date:	
Date: 12-26-07	Phone: 713-495-6530	Conditions of Approval Attached ☐	

State of New Mexico

DISTRICT I
1625 N FRENCH DR., HOBBS, NM 86240

Energy, Minerals and Natural Resources Department

Form C-102

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

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

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

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

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

WELL LOCATION AND ACREAGE DEDICATION PLAT

☐ AMENDED REPORT

API Number 30-025-38670	Pool Code 76480	Pool Name Eumont Y-SR-QN (Gas)
Property Code 303923	Property Name STATE COM A	Well Number 8
OGRID No. 143199	Operator Name ENERVEST OPERATING	Elevation 3576'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
X	5	21-S	36-E		660	SOUTH	475	EAST	LEA

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
Dedicated Acres 280		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

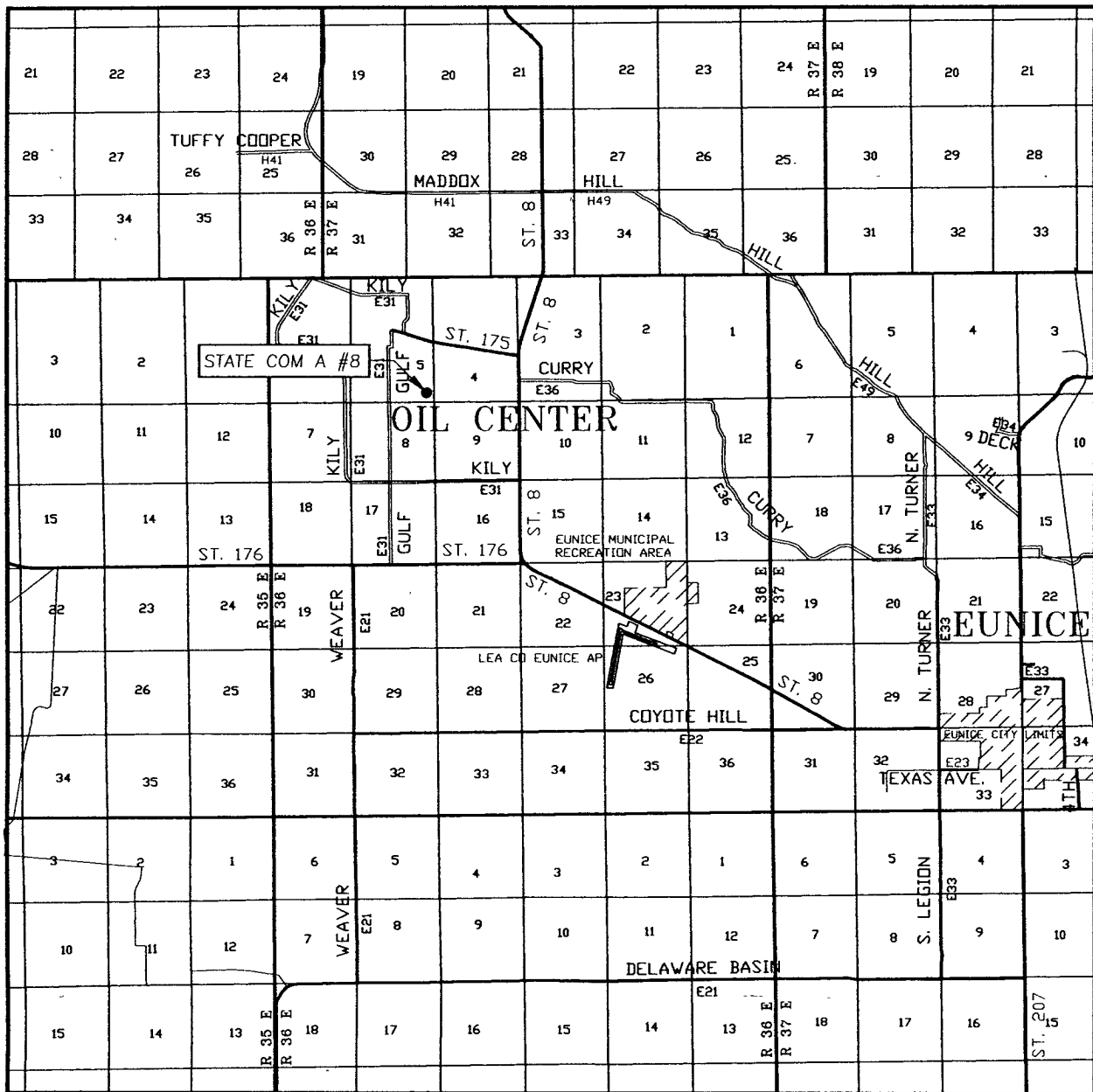
	LOT 4 39.47 A.C.	LOT 3 39.28 A.C.	LOT 2 39.10 A.C.	LOT 1 38.91 A.C.		OPERATOR CERTIFICATION I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division. Signature: <i>[Signature]</i> Date: 12-26-07 Printed Name: Gary Miller, Highland Agent
	LOT 5 40 A.C.	LOT 6 40 A.C.	LOT 7 40 A.C.	LOT 8 40 A.C.		SURVEYOR CERTIFICATION I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief. Date Surveyed: DECEMBER 7, 2007 Signature & Seal of Professional Surveyor: <i>[Signature]</i> Certificate No. GARY EIDSON 12841 RONALD J. EIDSON 3239
	LOT 12 40 A.C.	LOT 11 40 A.C.	LOT 10 40 A.C.	LOT 9 40 A.C.		
	LOT 13 40 A.C.	LOT 14 40 A.C.	LOT 15 40 A.C.	LOT 16 40 A.C.		

SCALE: 1"=2000'
GEODETIC COORDINATES
NAD 27 NME
Y=5480057 N
X=824743.0 E
LAT.=32.802168° N
LONG.=103.280001° W

Sec 8

Per Gm

VICINITY MAP



SCALE: 1" = 2 MILES

SEC. 5 TWP. 21-S RGE. 36-E

SURVEY N.M.P.M.

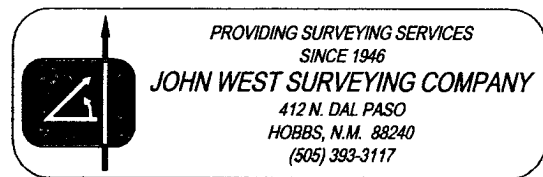
COUNTY LEA STATE NEW MEXICO

DESCRIPTION 600' FSL & 475' FEL

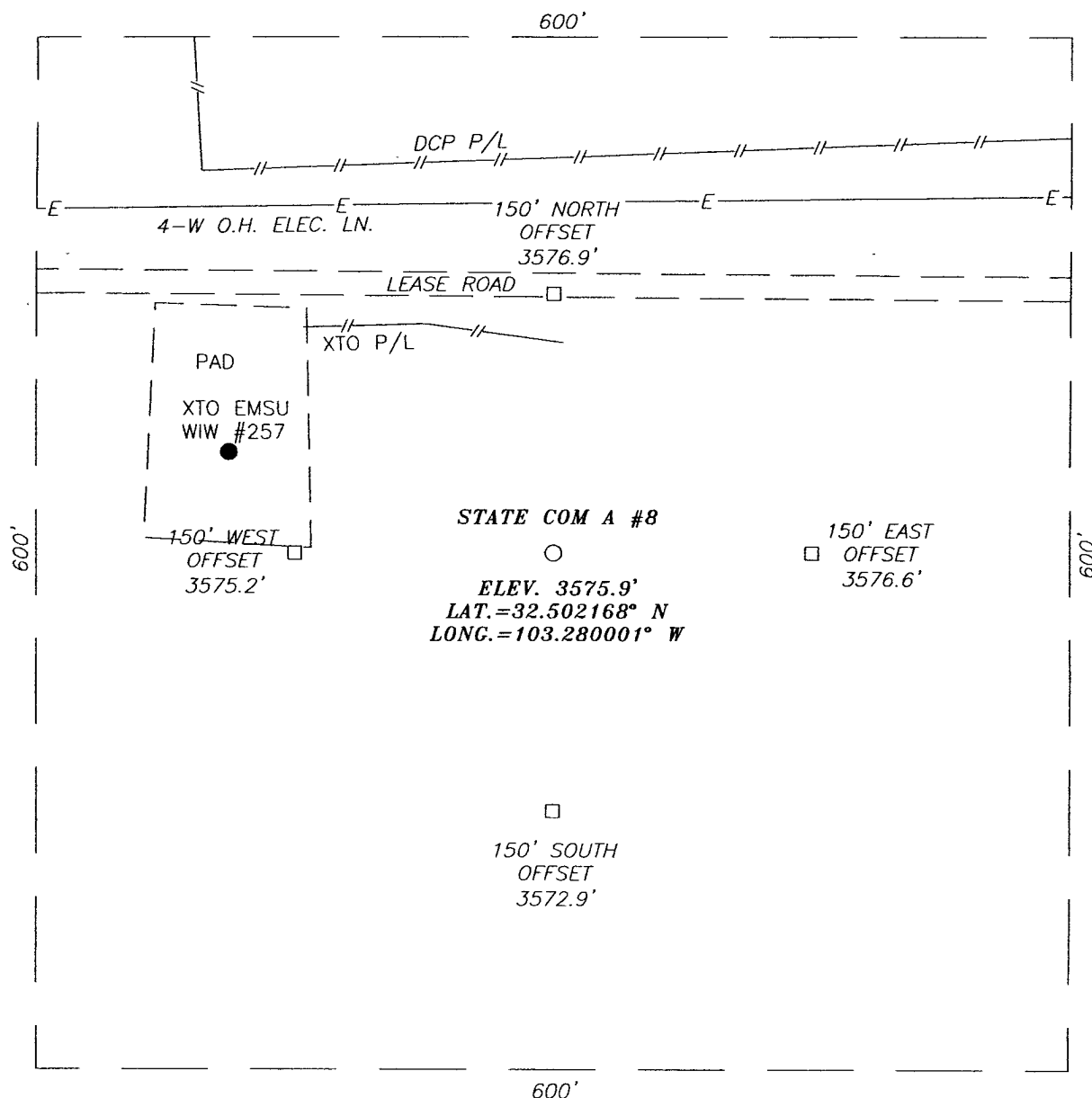
ELEVATION 3576'

OPERATOR ENERVEST OPERATING

LEASE STATE COM A

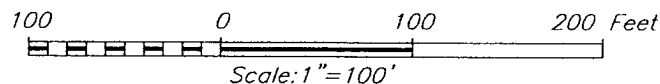


SECTION 5, TOWNSHIP 21 SOUTH, RANGE 36 EAST, N.M.P.M.,
 LEA COUNTY, NEW MEXICO



DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF ST. HWY. #8 AND ST. HWY. #175, GO WEST ON ST. HWY. #175 APPROX. 1.0 MILE TO LEASE ROAD. TURN LEFT AND GO SOUTH APPROX. 0.5 MILES TO LEASE ROAD. TURN RIGHT AND GO WEST APPROX. 0.2 MILES. THIS LOCATION IS APPROX. 150 FEET SOUTH.



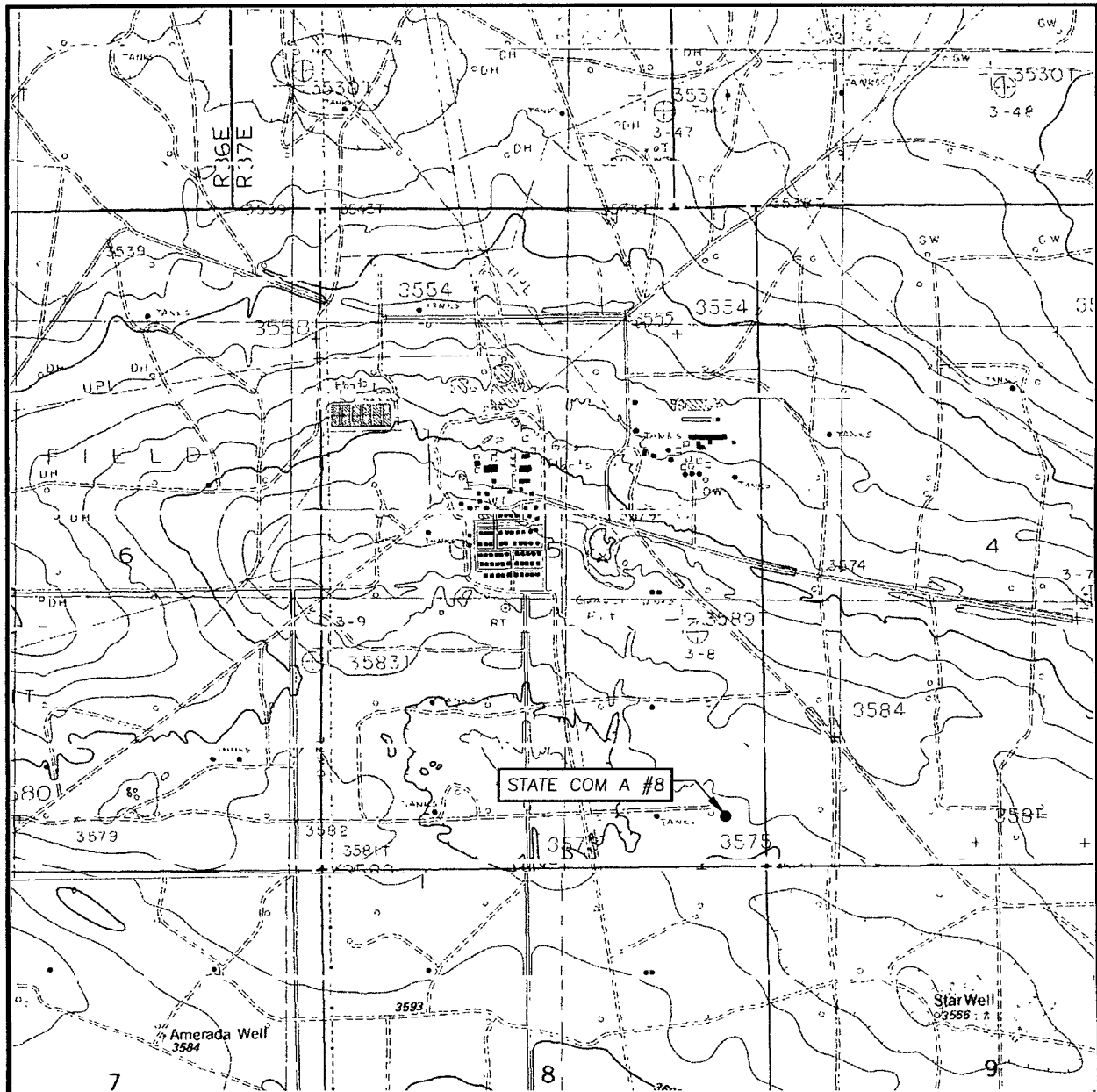
ENERVEST OPERATING

STATE COM A #8 WELL
 LOCATED 600 FEET FROM THE SOUTH LINE
 AND 475 FEET FROM THE EAST LINE OF SECTION 5,
 TOWNSHIP 21 SOUTH, RANGE 36 EAST, N.M.P.M.,
 LEA COUNTY, NEW MEXICO.

Survey Date: 12/7/07	Sheet 1 of 1 Sheets
W.O. Number: 07.11.1831	Dr By: AR
Date: 12/10/07	Disk: 07111831
	Rev 1: N/A
	Scale: 1"=100'

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

LOCATION VERIFICATION MAP



SCALE: 1" = 2000'

CONTOUR INTERVAL:
MONUMENT SOUTH, N.M. - 5'

SEC. 5 TWP. 21-S RGE. 36-E

SURVEY N.M.P.M.

COUNTY LEA STATE NEW MEXICO

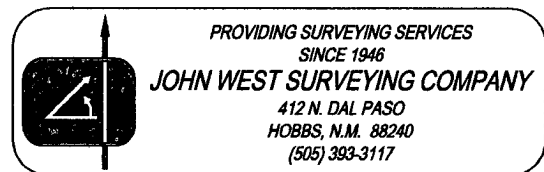
DESCRIPTION 600' FSL & 475' FEL

ELEVATION 3576'

OPERATOR ENERVEST OPERATING

LEASE STATE COM A

U.S.G.S. TOPOGRAPHIC MAP
MONUMENT SOUTH, N.M.



WELL	State COM A #8				ENERVEST					
TYPE	VERTICAL		RIG	UDI #201		DATE	12/19/2007			
FIELD	JALMAT		COUNTY	LEA COUNTY, NEW MEXICO		ELEVATION	3,578' est			
GAS/OIL	GAS		MUD	TBD		CEMENT	TBD			
LOCATION	600' FSL & 475' FEL SEC 5 T21S R36E					SBHT	99° F			
COMMENTS	OBJECTIVE FORMATIONS: TANSIL, YATES, SEVEN RIVERS & QUEEN									
NOTE										
MUD- LOGGER	SURVEYS	WOB/GPM BIT	FORMATION TOPS HOLE SIZE	VERTICAL DEPTH		MUD WEIGHT	OPEN HOLE LOGS	CEMENT	WELLHEAD	REMARKS
14" CONDUCTOR				40'						
INCLINATIONS 5K/300 400' & 1,250' 10K/350 11" HOLE 15K/450 NO MUD LOGGER BHA #1 TYPE 2 INSERT RED BEDS						8.5 - 8.8 PPG NATIVE LEAD: 200 Sks 35:65:6 POZ:C:GEL (2.00 Yld, 12.6 PPG) TAIL: 200 Sks Class C 2% CaCl ₂ (1.32 Yld, 14.8 PPG) (100 % Excess) TOP OUT: IF NEEDED				
8-5/8" 24# J55 STC				1,250'						
INCLINATIONS 1,800', 2,800', 3,800' 10K/350 7-7/8" HOLE OR AS NEEDED HCC 506ZX 15K/500 NO MUD LOGGER BHA #2 SALADO SALT / ANHYD >				1,412'		9.8 - 10.1 PPG BRINE				
				1,502'						
20K/500				2,000'						
22K/500				2,400'		< ADD STARCH FOR 15 - 20 CC WL				
<u>PRIMARY OBJECTIVES</u>										
POS LR - DEPLETION						< POS LOST RETURNS 2,700' - 3,600'				
25K/500 YATES (SS / DOLO) >				2,680'		OPEN HOLE LOGS: HALLIBURTON TD TO SC: GR / LITHO DENSITY / DUAL LATEROLOG TD TO SURFACE: GR / NEUTRON				
SEVEN RIVERS (SS / DOLO) >				2,983' 3,400'		< POSSIBLE LOST RETURNS				
QUEEN (ANHYD / SS / DOLO) >				3,393'		LEAD: 300 SKS 35:65 POZ:H (12.5 PPG 1.90 CF/SK) TAIL: 420 SKS CLASS H (14.8 PPG 1.32 CF/SK) (15% EXCESS OVER CALIPER) CEMENT TO SURFACE				
PENROSE (LOWER QUEEN) >				3,530'						
GRAYBURG (DOLOMITIC SS) >				3,692'						
5-1/2 15.50# J55 LTC				3,800'						
						OFFICE		HOME		
AFE #	C0-1107-292	REGULATORY	RONNIE YOUNG			(713) 495-6530		(832) 559-8128		
EV #	45168.004	ENGINEER	EARL WAHRMUND			(713) 495-5367		(281) 360-6494		
API #	30-025-	GEOLOGIST	ROGER TREJO			(713) 495-5317		(281) 265-5973		



EnerVest Operating, Ltd.

Drilling Plan

Jalmat Area

660' FSL & 475' FEL Sec 5 T21S R36E

Lea County, NM

GL = 3,576'

Rig Telephone #:

Rig FAX #:

STATE COM A #8 - DRILLING PROGRAM

1 Geologic Name of Surface Formation & Directions to Well

Quaternary

Directions to well:

2 Estimated Tops of Important Geologic Markers

MD	SS	Formation	Objective	Rock Type
2,690	888	Yates	Primary	(Sandstone & Dolomite)
2,983	595	Seven Rive	Primary	(Sandstone & Dolomite)
3,393	185	Queen	Primary	(Anhydrite, SS & Dolomite)
3,530	-48	Penrose	Primary	(Lower Queen)
3,692	-114	Grayburg		(Dolomitic SS)

3 Estimated Depths of Anticipated Fresh Water, Oil and Gas

MD	SS	Formation	Objective	Fluid Type
2,690	888	Yates	Primary	(Sandstone & Dolomite)
2,983	595	Seven Rive	Primary	(Sandstone & Dolomite)
3,393	185	Queen	Primary	(Anhydrite, SS & Dolomite)
3,530	-48	Penrose	Primary	(Lower Queen)
3,692	-114	Grayburg		(Dolomitic SS)

No other formations are expected to give up oil, gas or fresh water in measurable quantities. Setting 8-5/8" casing to 1,250' and circulating cement back to the surface will protect the surface fresh water sand. All zones containing commercial quantities of oil or gas will have cement circulated across them by cementing the 5-1/2" production casing back to at least the 8-5/8" casing shoe. Cement volumes will be pumped to provide cement back to surface.



EnerVest Operating, Ltd.

Drilling Plan

Jalmat Area

660' FSL & 475' FEL Sec 5 T21S R36E

Lea County, NM

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Rig Telephone #:

Rig FAX #:

4 Casing Program

Hole Size	Interval	OD Casing	Weight	Grade	Conn./New?	Bur/Col/Tens
11"	0-1,250'	8-5/8"	24#	J-55	STC/New	2.00 / 2.40 / 9.35
7-7/8"	0-3,800'	5-1/2"	15.50#	J-55	LTC/New	1.12 / 2.38 / 4/24

5 Cement Program

8-5/8" Surface Casing
100% XS

LEAD 200 SX, 35/65/6, C/Poz/Gel, 2.00 cf/sk, 12.6 PPG
TAIL 200 SX, Class "C", 1.32 cf/sk, 14.8 PPG

5-1/2" Production Csg

LEAD 300 SX, 35/65, Poz/H, 1.90 cf/sk, 12.5 PPG
TAIL 420 SX, Class H, 1.32 cf/sk, 14.8 PPG

6 Minimum Specifications for Pressure Control & Wellhead Equipment

The blowout preventer equipment (BOPE) shown in Exhibit #9 will consist of a double ram-type (2,000 psi WP) preventer. This unit will be hydraulically operated and the ram type preventer will be equipped with blind rams on bottom and 4-1/2" drill pipe rams on top. The BOPE will be nipped up on the 8-5/8" surface casing and tested to 2,000 psi by a third party. Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment (Exhibit #10) will include a kelly cock and floor safety valve, choke lines and a choke manifold (Exhibit #11) and will have a 2,000 psi WP rating.

A 2,000 psi WP Larkin Type Wellhead will be used.

7 Types and Characteristics of the Proposed Mud System

The surface hole will be drilled with a fresh water mud.

The production hole will be drilled with saturated brine water.

DEPTH	TYPE	WEIGHT	VISCOSITY	WATER LOSS
0-1,250'	FW Mud	8.7	28	N.C.
1,250'-TD	Brine	10	30	12 cc



EnerVest Operating, Ltd.

Drilling Plan

Jalmat Area

660' FSL & 475' FEL Sec 5 T21S R36E

Lea County, NM

GL = 3,576'

Rig Telephone #:

Rig FAX #:

Sufficient mud materials will be kept at the well site to maintain mud properties and meet minimum lost circulation and weight increase requirements at all times.

8 Auxillary Well Control and Monitoring Equipment

- A. Kelly cock will be kept in the drill string at all times.
- B. A full opening drill pipe-stabbing valve with proper drill pipe connections will be on the rig floor at all times.

9 Logging, Testing and Coring Program

- A. The electric logging program will consist of a GR-Dual Laterolog Litho Density log run from TD to the surface casing shoe.
- B. A GR-Neutron will be run to surface.
- C. No mud logger will be used.
- D. No conventional coring is anticipated.
Further testing procedures will be determined after the 5-1/2" production casing has been cemented at TD, based on drill shows and log evaluation.

10 Abnormal conditions, Pressure, Temperatures and Potential Hazards

No abnormal pressures or temperatures are anticipated. The estimated bottom hole at TD is 97°F and the estimated maximum bottom hole pressure is 1,700 psi. Lost returns have been experienced in offset wells. Losses have occurred below 2,700'.

11 Anticipated Starting Date and Duration of Operations

Road and location work will not begin until approval has been received from the Surface Owner. Anticipated Start Date is January 1, 2008. Once commenced, drilling operations should be finished in approximately 12 days. If the well is productive, an additional 30 days will be required for completion and testing before a decision is made to install permanent facilities.



EnerVest Operating, Ltd.

Drilling Plan

Jalmat Area

660' FSL & 475' FEL Sec 5 T21S R36E

Lea County, NM

GL = 3,576'

Rig Telephone #:

Rig FAX #:

12 Safety

Conduct Tour Safety Meetings with all crews and record topics of these meetings on the IADC and morning reports. Document all personnel in attendance and topics of these Safety Meetings. Keep these documents on file in company representative's office for inspection.

13 Notes

Stamp, Code and Sign all Invoices

H₂S Area? If yes, attach contingency plan.

Inclinations: Survey every 500' or bit trip

Drop Totco every trip out to check the angle. Max inclination = 3°

Call Houston if survey is $\geq 3^\circ$

Mud Disposal: Closed Loop system will be used. Haul off all cuttings and fluids.

BHA #1 **Surface** BIT-2 DC-STAB-DC as needed (60' Pendulum)

BHA #2 **Production** BIT-DC-STAB-DC-STAB-DC as needed (30/60 Pendulum)

BIT PROGRAM

			RPM	WOB
Surface	11"	Smith F29	90	35k
Production	7-7/8"	HC 506ZX	50-75	50-75k



H2S Contingency Plan

***EnerVest Operating
State Com A #8
Lea County, New Mexico***

***Surface Location
Section 5
Township 21S
Range 36E
660' From South Line
475' From East Line***

Contingency Plan Prepared by: Callaway Safety Equipment 505-392-2973

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- C. Simulated Blowout Control Drills

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- B. Instructions

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V. Emergency Equipment

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- B. Map to Location
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- B. New Mexico OCD Approval
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- D. Toxicity Table
- E. Physical Properties
- F. Respirator Use
- G. Emergency Rescue

H₂S CONTINGENCY PLAN SECTION

Scope:

This contingency plan provides an organized plan of action for alerting and protecting the public within an area of exposure prior to an intentional release, or following the accidental release of a potentially hazardous volume of hydrogen sulfide. The plan establishes guidelines for all personnel whose work activity may involve exposure to Hydrogen Sulfide Gas (H₂S).

Objective:

Prevent any and all accidents, and prevent the uncontrolled release of H₂S into the atmosphere.

Provide proper evacuation procedures to cope with emergencies.

Provide immediate and adequate medical attention should an injury occur.

Install H₂S equipment prior to drilling out under surface pipe.

Discussion of Plan:

Suspected Problem Zones:

Implementation: This plan, with all details, is to be fully implemented 1000' before drilling into the first sour zone.

Emergency Response Procedure: This section outlines the conditions and denotes steps to be taken in the event of an emergency.

Emergency Equipment and 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 1000' before drilling into the first sour zone.

Emergency call lists: Included are the telephone numbers of all persons that would need to be contacted, should an H₂S emergency occur.

Briefing: This section deals with the briefing of all persons involved with the drilling of this well.

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 ensure adherence to the plan.

General Information: A general information section has been included to supply support information.

EMERGENCY PROCEDURES SECTION

- I. In the event of any evidence of H₂S level above 10 ppm, take the following steps immediately:
 - A. Secure breathing apparatus.
 - B. Order non-essential personnel out of the danger zone.
 - C. Take steps to determine if the H₂S level can be corrected or suppressed, and if so, proceed with normal operations.
- II. If uncontrollable conditions occur, proceed with the following:
 - A. Take steps to protect and/or remove any public downwind of the rig, including partial evacuation or isolation. Notify necessary public safety personnel and the N.M. Railroad Commission of the situation.
 - B. Remove all personnel to the Safe Briefing Area.
 - C. Notify public safety personnel for help with maintaining roadblocks and implementing evacuation.
 - D. Determine and proceed with the best possible plan to regain control of the well. Maintain tight security and safety measures.
- III. Responsibility:
 - A. The Company Approved Supervisor shall be responsible for the total implementation of the plan.
 - B. The Company Approved Supervisor shall be in complete command during any emergency.
 - C. The Company Approved Supervisor shall designate a back up Supervisor in the event that he/she is not available.

EMERGENCY PROCEDURE IMPLEMENTATION

I. Drilling or Tripping

A. All Personnel

1. When alarm sounds, don escape unit and report to upwind Safe Briefing Area.
2. Check status of other personnel (buddy system).
3. Secure breathing apparatus.
4. Wait for orders from supervisor.

B. Drilling Foreman

1. Report to the upwind Safe Briefing Area.
2. Don Breathing Apparatus and return to the point of release with the Tool Pusher or Driller (buddy system).
3. Determine the concentration of H₂S.
4. Assess the situation and take appropriate control measures.

C. Tool Pusher

1. Report to the upwind Safe Briefing Area.
2. Don breathing apparatus and return to the point of release with the Drilling Foreman or the Driller (buddy system).
3. Determine the concentration.
4. Assess the situation and take appropriate control measures.

D. Driller

1. Check the status of other personnel (in a rescue attempt, always use the buddy system).
2. Assign the least essential person to notify the Drilling Foreman and Tool Pusher, in the event of their absence.

3. Assume the responsibility of the Drilling Foreman and the Tool Pusher until they arrive, in the event of their absence.

E. Derrick Man and Floor Hands

1. Remain in the upwind Safe Briefing Area until otherwise instructed by a supervisor.

F. Mud Engineer

1. Report to the upwind Safe Briefing Area.
2. When instructed, begin check of mud for pH level and H₂S level.

G. Safety Personnel

1. Don Breathing Apparatus.
2. Check status of all personnel.
3. Wait for instructions from Drilling Foreman or Tool Pusher.

II. Taking a Kick

- A. All personnel report to the upwind Safe Briefing Area.
- B. Follow standard BOP procedures.

III. Open Hole Logging

- A. All unnecessary personnel should leave the rig floor.
- B. Drilling Foreman and Safety Personnel should monitor the conditions and make necessary safety equipment recommendations.

IV. Running Casing or Plugging

- A. Follow "Drilling or Tripping" procedures.
- B. Assure that all personnel have access to protective equipment.

SIMULATED BLOWOUT CONTROL DRILLS

All drills will be initiated by activating alarm devices (air horn). One long blast, on the air horn, for ACTUAL and SIMULATED Blowout Control Drills. This operation will be performed by the Drilling Foreman or Tool Pusher at least one time per week for each of the following conditions, with each crew:

Drill # 1 Bottom Drilling

Drill # 2 Tripping Drill Pipe

In each of these drills, the initial reaction time to shutting in the well shall be timed as well as the total time for the crew to complete its entire pit drill assignment. The times must be recorded on the IADC Driller's Log as "Blowout Control Drill".

Drill No.:			
Reaction Time to Shut-In:	minutes,		seconds.
Total Time to Complete Assignment:	minutes,		seconds.

I. Drill Overviews

A. Drill No. 1- Bottom Drilling

1. Sound the alarm immediately.
2. Stop the rotary and hoist kelly joint above the rotary table.
3. Stop the circulatory pump.
4. Close the drill pipe rams.
5. Record casing and drill pipe shut-in pressures and pit volume increases.

B. Drill No. 2 – Tripping Drill Pipe

1. Sound the alarm immediately.
2. Position the upper tool joint just above the rotary table and set the slips.

3. Install a full opening valve or inside blowout preventor tool in order to close the drill pipe.
4. Close the drill pipe rams.
5. Record the shut-in annular pressure.

II. Crew Assignments

A. Drill No. 1 – Bottom Drilling

1. Driller
 - a) Stop the rotary and hoist kelly joint above the rotary table.
 - b) Stop the circulatory pump.
 - c) Check flow.
 - d) If flowing, sound the alarm immediately.
 - e) Record the shut-in drill pipe pressure.
 - f) Determine the mud weight increase needed or other courses of action.
2. Derrickman
 - a) Open choke line valve at BOP.
 - b) Signal Floor Man # 1 at accumulator that choke line is open.
 - c) Close choke and upstream valve after pipe tams have been closed.
 - d) Read the shut-in annular pressure and report readings to Driller.
3. Floor Man # 1
 - a) Close the pipe rams after receiving the signal from the Derrickman.
 - b) Report to Driller for further instructions.
4. Floor Man # 2

- a) Notify the Tool Pusher and Operator Representative of the H₂S alarms.
- b) Check for open fires and, if safe to do so, extinguish them.
- c) Stop all welding operations.
- d) Turn-off all non-explosion proof lights and instruments.
- e) Report to Driller for further instructions.

5. Tool Pusher

- a) Report to the rig floor.
- b) Have a meeting with all crews.
- c) Compile and summarize all information.
- d) Calculate the proper kill weight.
- e) Ensure that proper well procedures are put into action.

6. Operator Representative

- a) Notify the Drilling Superintendent.
- b) Determine if an emergency exists and if so, activate the contingency plan.

B. Drill No. 2 – Tripping Pipe

1. Driller

- a) Sound the alarm immediately when mud volume increase has been detected.
- b) Position the upper tool joint just above the rotary table and set slips.
- c) Install a full opening valve or inside blowout preventor tool to close the drill pipe.
- d) Check flow.
- e) Record all data reported by the crew.

- f) Determine the course of action.

2. Derrickman

- a) Come down out of derrick.
- b) Notify Tool Pusher and Operator Representative.
- c) Check for open fires and, if safe to do so, extinguish them.
- d) Stop all welding operations.
- e) Report to Driller for further instructions.

3. Floor Man # 1

- a) Pick up full opening valve or inside blowout preventor tool and stab into tool joint above rotary table (with Floor Man # 2).
- b) Tighten valve with back-up tongs.
- c) Close pipe rams after signal from Floor Man # 2.
- d) Read accumulator pressure and check for possible high pressure fluid leaks in valves or piping.
- e) Report to Driller for further instructions.

4. Floor Man # 2

- a) Pick-up full opening valve or inside blowout preventor tool and stab into tool joint above rotary table (with Floor Man # 1).
- b) Position back-up tongs on drill pipe.
- c) Open choke line valve at BOP.
- d) Signal Floor Man # 1 at accumulator that choke line is open.
- e) Close choke and upstream valve after pipe rams have been closed.
- f) Check for leaks on BOP stack and choke manifold.
- g) Read annular pressure.

h) Report readings to the Driller.

5. Tool Pusher

a) Report to the rig floor.

b) Have a meeting with all of the crews.

c) Compile and summarize all information.

d) See that proper well kill procedures are put into action.

6. Operator Representative

a) Notify Drilling Superintendent

b) Determine if an emergency exists, and if so, activate the contingency plan.

IGNITION PROCEDURES

Responsibility:

The decision to ignite the well is the responsibility of the DRILLING FOREMAN in concurrence with the STATE POLICE. In the event the Drilling Foreman is incapacitated, it becomes the responsibility of the RIG TOOL PUSHER. This 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 of controlling the blowout under the prevailing conditions.

If time permits, notify the main office, but do not delay if human life is in danger. Initiate the first phase of the evacuation plan.

Instructions for Igniting the Well:

1. Two people are required for the actual igniting operation. Both men must wear self-contained breathing apparatus and must use a full body harness and attach a retrievable safety line to the D-Ring in the back. One man must monitor the atmosphere for explosive gases with the LEL monitor, while the Drilling Foreman is responsible for igniting the well.
2. The primary method to ignite is a 25mm flare gun with a range of approximately 500 feet.
3. Ignite from upwind and do not approach any closer than is warranted.
4. Select the ignition site best suited for protection and which offers an easy escape route.
5. Before igniting, check for the presence of combustible gases.
6. After igniting, continue emergency actions and procedures as before.
7. All unassigned personnel will limit their actions to those directed by the Drilling Foreman.

NOTE: After the 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 PROGRAM

When working in an area where Hydrogen Sulfide (H₂S) might be encountered, definite training requirements must be carried out. The Company Supervisor will ensure that all personnel, at the well site, have had adequate training in the following:

1. Hazards and Characteristics of Hydrogen Sulfide.
2. Physical effects of Hydrogen Sulfide on the human body.
3. Toxicity of Hydrogen Sulfide and Sulfur Dioxide.
4. H₂S detection, emergency alarm and sensor location.
5. Emergency rescue.
6. Resuscitators.
7. First aid and artificial resuscitation.
8. The effects of Hydrogen Sulfide on metals.
9. Location safety.

Service company personnel and visiting personnel must be notified if the zone contains H₂S, and each service company must provide adequate training and equipment for their employees before they arrive at the well site.

EMERGENCY EQUIPMENT REQUIREMENTS

Lease Entrance Sign:

Should be located at the lease entrance with the following information:

CAUTION-POTENTIAL POISON GAS
HYDROGEN SULFIDE
NO ADMITTANCE WITHOUT AUTHORIZATION

Respiratory Equipment:

- Fresh air breathing equipment should be placed at the safe briefing areas and should include the following:
- Two SCBA's at each briefing area.
- Enough air line units to operate safely, anytime the H₂S concentration reaches the IDLH level (100 PPM).
- Cascade system with enough breathing air hose and manifolds to reach the rig floor, the derrickman and the other operation areas.

Windssocks or Wind Streamers:

- A minimum of two 10" windssocks located at strategic locations so that they may be seen from any point on location.
- Wind streamers (if preferred) should be placed at various locations on the well site to ensure wind consciousness at all times. (Corners of location).

Hydrogen Sulfide Detector and Alarms:

- 1-Four channel H₂S monitor with alarms.
- Four (4) sensors located as follows: # 1 – Rig Floor, # 2 – Bell Nipple, # 3 – Shale Shaker, # 4 – Mud Pits.
- Gastec or Draeger pump with tubes.
- Sensor test gas.

Well Condition Sign and Flags:

The Well Condition Sign w/flags should be placed a minimum of 150' before you enter the location. It should have three (3) color coded flags (green, yellow and red) that will be used to denote the following location conditions:

GREEN – Normal Operating Conditions

YELLOW – Potential Danger

RED – Danger, H₂S Gas Present

Auxiliary Rescue Equipment:

- Stretcher
- 2 – 100' Rescue lines
- First Aid Kit properly stocked.

Mud Inspection Equipment:

Garret Gas Train or Hach Tester for inspection of Hydrogen Sulfide in the drilling mud system.

Fire Extinguishers:

Adequate fire extinguishers shall be located at strategic locations.

Blowout Preventor:

- The well shall have hydraulic BOP equipment for the anticipated BHP.
- The BOP should be tested upon installation.
- BOP, Choke Line and Kill Line will be tested as specified by Operator.

Confined Space Monitor:

There should be a portable multi-gas monitor with at least 3 sensors (O₂, LEL & H₂S). This instrument should be used to test the atmosphere of any confined space before entering. It should also be used for atmospheric testing for LEL gas before beginning any type of Hot Work. Proper calibration documentation will need to be provided.

Communication Equipment:

- Proper communication equipment such as cell phones or 2 – way radios should be available at the rig.
- Radio communication shall be available for communication between the company man's trailer, rig floor and the tool pusher's trailer.
- Communication equipment shall be available on the vehicles.

Special Control Equipment:

- Hydraulic BOP equipment with remote control on the ground.
- Rotating head at the surface casing point.

Evacuation Plan:

- Evacuation routes should be established prior to spudding the well.
- Should be discussed with all rig personnel.

Designated Areas:***Parking and Visitor area:***

- All vehicles are to be parked at a pre-determined safe distance from the wellhead.
- Designated smoking area.

Safe Briefing Areas:

- Two Safe Briefing Areas shall be designated on either side of the location at the maximum allowable distance from the well bore so they offset prevailing winds or they are at a 180 degree angle if wind directions tend to shift in the area.
- Personal protective equipment should be stored at both briefing areas or if a moveable cascade trailer is used, it should be kept upwind of existing winds. When wind is from the prevailing direction, both briefing areas should be accessible.

NOTE:

- Additional equipment will be available at the nearest Callaway Safety Office.
- Additional personal H₂S monitors are available for all employees on location.
- Automatic Flare Igniters are recommended for installation on the rig.

CHECK LISTS

Status Check List

Note: Date each item as they are implemented.

1. Sign at location entrance. _____
2. Two (2) wind socks (in required locations). _____
3. Wind Streamers (if required). _____
4. SCBA's on location for all rig personnel and mud loggers. _____
5. Air packs, inspected and ready for use. _____
6. Spare bottles for each air pack (if required). _____
7. Cascade system for refilling air bottles. _____
8. Cascade system and hose line hook up. _____
9. Choke manifold hooked-up and tested.
(Before drilling out surface casing.) _____
10. Remote Hydraulic BOP control (hooked-up and
tested before drilling out surface casing). _____
11. BOP tested (before drilling out surface casing). _____
12. Mud engineer on location with equipment to test
mud for H₂S. _____
13. Safe Briefing Areas set-up. _____
14. Well Condition sign and flags on location and ready. _____
15. Hydrogen Sulfide detection system hooked-up & tested. _____
16. Hydrogen Sulfide alarm system hooked-up & tested. _____
17. Stretcher on location at Safe Briefing Area. _____
18. 2-100' Life Lines on location. _____

- 19. 1-20# Fire Extinguisher in safety trailer. _____
- 20. Confined Space Monitor on location and tested. _____
- 21. All rig crews and supervisor trained (as required). _____
- 22. Access restricted for unauthorized personnel. _____
- 23. Drills on H₂S and well control procedures. _____
- 24. All outside service contractors advised of potential H₂S on the well. _____
- 25. NO SMOKING sign posted. _____
- 26. H₂S Detector Pump w/tubes on location. _____
- 27. 25mm Flare Gun on location w/flammes. _____
- 28. Automatic Flare Ignitor installed on rig. _____

Procedural Check List

Perform the following on each tour:

1. Check fire extinguishers to see that they have the proper charge.
2. Check Breathing equipment to insure that they have not been tampered with.
3. Check pressure on the supply air bottles to make sure they are capable of recharging.
4. Make sure all of the Hydrogen Sulfide detection systems are operative.

Perform the following each week:

1. Check each piece of breathing equipment to make sure that they are fully charged and operational. This requires that the air cylinder be opened and the mask assembly be put on and tested to make sure that the regulators and masks are properly working. Negative and Positive pressure should be conducted on all masks.
2. BOP skills.
3. Check supply pressure on BOP accumulator stand-by source.
4. Check all breathing air mask assemblies to see that straps are loosened and turned back, ready to use.
5. Check pressure on cascade air cylinders to make sure they are fully charged and ready to use for refill purposes if necessary.
6. Check all cascade system regulators to make sure they work properly.
7. Perform breathing drills with on-site personnel.
8. Check the following supplies for availability:
 - Stretcher
 - Safety Belts and ropes.
 - Spare air bottles.
 - Spare oxygen bottles (if resuscitator required).
 - Gas Detector Pump and tubes.
 - Emergency telephone lists.
9. Test the Confined Space Monitor to verify the batteries are good.

BRIEFING PROCEDURES

The following scheduled briefings will be held to ensure the effective drilling and operation of this project:

Pre-Spud Meeting

Date: Prior to spudding the well.

Attendance: Drilling Supervisor
Drilling Engineer
Drilling Foreman
Rig Tool Pushers
Rig Drillers
Mud Engineer
All Safety Personnel
Key Service Company Personnel

Purpose: Review and discuss the well program, step-by-step, to insure complete understanding of assignments and responsibilities.

EVACUATION PLAN

General Plan

The direct lines of action prepared by CALLAWAY SAFETY EQUIPMENT CO., INC., to protect the public from hazardous gas situations are as follows:

1. When the company approved supervisor (Drilling Foremen, Tool Pusher or Driller) determine that Hydrogen Sulfide 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 the Area Map.
2. Company safety personnel or designee will notify the appropriate local government agency that a hazardous condition exists and evacuation need to be implemented.
3. Company approved safety personnel that have been trained in the use of the proper emergency equipment will be utilized.
4. Law enforcement personnel (State Police, Local Police Department, Fire Department, and the Sheriff's Department) will be called to aid in setting up and maintaining road blocks. Also, they will aid in evacuation of the public if necessary.

NOTE: 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.

See Emergency Action Plan

Emergency Assistance Telephone List

<u>PUBLIC SAFETY:</u>		<u>911 or</u>
Lea Co. Sheriff's		(505) 393-2515
Lovington Sheriff's		(505) 396-3611
Hobbs Fire Department		911
Hobbs Fire Department		(505) 397-9311
Lea Regional Medical Center Hospital		(505) 492-5000
Life Flight:		
Southwest Air-Med E Vac.		(800) 242-6199
New Mexico State Police		(505) 392-5588
New Mexico D.O.T.		(505) 827-5100
Bureau of Land Management		(505) 393-3612
U. S. Dept. of Labor		(505) 248-5302
New Mexico Poison Center		(800) 222-1222
New Mexico OCD		(505) 393-6161
New Mexico/After Hours Pager		(505) 370-7106

EnerVest

EnerVest	Office	(713) 495-5367
<i>Pete McGuire-Hobbs Consultant</i>	Cell	(575) 390-4998
<i>Gene Lee-Drilling Consultant</i>	Cell	(575) 626-4292

Union Drilling Texas

Union Drilling Texas	Office	(325) 698-9864
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Callaway Safety Equipment

Odessa	Office	(432) 561-5049
Hobbs	Office	(877) 422-6345

Affected Notification List

(within a _____' radius of exposure @100ppm)

The geologic zones that will be encountered during drilling are known to contain hazardous quantities of H₂S. The accompanying map illustrates the affected areas of the community. The residents within this radius will be notified via a hand delivered written notice describing the activities, potential hazards, conditions of evacuation, evacuation drill siren alarms and other precautionary measures.

Evacuee Description:

Residents: **N/A**

Notification Process:

A continuous siren audible to all residence will be activated, signaling evacuation of previously notified and informed residents.

Evacuation Plan:

All evacuees will migrate lateral to the wind direction.

The Oil Company will identify all home bound or highly susceptible individuals and make special evacuation preparations, interfacing with the local and emergency medical service as necessary.

GENERAL INFORMATION

Toxic Effects of H₂S Poisoning

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 is colorless and transparent. Hydrogen Sulfide is almost as toxic as Hydrogen Cyanide and is 5-6 times more toxic than Carbon Monoxide. Occupational exposure limits for Hydrogen sulfide and other gasses are compared below in Table 1. Toxicity table for H₂S and physical effects are shown in Table II.

Table 1
Permissible Exposure Limits of Various Gasses

Common Name	Symbol	Sp. Gravity	TLV	STEL	IDLH
Hydrogen Cyanide	HCN	.94	4.7 ppm	C	
Hydrogen Sulfide	H ₂ S	1.192	10 ppm	15 ppm	100 ppm
Sulfide Dioxide	SO ₂	2.21	2 ppm	5 ppm	
Chlorine	CL	2.45	.5 ppm	1 ppm	
Carbon Monoxide	CO	0.97	25 ppm	200 ppm	
Carbon Dioxide	CO ₂	1.52	5000 ppm	30,000 ppm	
Methane	CH ₄	0.55	4.7% LEL	14% UEL	

Definitions

- A. TLV – Threshold Limit Value is the concentration employees may be exposed to based on a TWA (time weighted average) for eight (8) hours in one day for 40 hours in one (1) week. This is set by ACGIH (American Conference of Governmental Hygienists and regulated by OSHA.
- B. STEL – Short Term Exposure Limit is the 15 minute average concentration an employee may be exposed to providing that the highest exposure never exceeds the OEL (Occupational Exposure Limit). The OEL for H₂S is 19 PPM.
- C. IDLH – Immediately Dangerous to Life and Health is the concentration that has been determined by the ACGIH to cause serious health problems or death if exposed to this level. The IDLH for H₂S is 100 PPM.

- D. TWA – Time Weighted Average is the average concentration of any chemical or gas for an eight (8) hour period. This is the concentration that any employee may be exposed to based on an TWA.

TABLE II
Toxicity Table of H₂S

Percent %	PPM	Physical Effects
.0001	1	Can smell less than 1 ppm.
.001	10	TLV for 8 hours of exposure
.0015	15	STEL for 15 minutes of exposure
.01	100	Immediately Dangerous to Life & Health. Kills sense of smell in 3 to 5 minutes.
.02	200	Kills sense of smell quickly, may burn eyes and throat.
.05	500	Dizziness, cessation of breathing begins in a few minutes.
.07	700	Unconscious quickly, death will result if not rescued promptly.
.10	1000	Death will result unless rescued promptly. Artificial resuscitation may be necessary.

PHYSICAL PROPERTIES OF H₂S

The properties of all gasses are usually described in the context of seven major categories:

COLOR
ODOR
VAPOR DENSITY
EXPLOSIVE LIMITS
FLAMMABILITY
SOLUBILITY (IN WATER)
BOILING POINT

Hydrogen Sulfide is no exception. Information from these categories should be considered in order to provide a fairly complete picture of the properties of the gas.

COLOR – TRANSPARENT

Hydrogen Sulfide is colorless so it is invisible. This fact simply means that you can't rely on your eyes to detect its presence. a fact that makes the gas extremely dangerous to be around.

ODOR – ROTTEN EGGS

Hydrogen Sulfide has a distinctive offensive smell, similar to "rotten eggs". For this reason it earned its common name "sour gas". However, H₂S, even in low concentrations, is so toxic that it attacks and quickly impairs a victim's sense of smell, so it could be fatal to rely on your nose as a detection device.

VAPOR DENSITY – SPECIFIC GRAVITY OF 1.192

Hydrogen Sulfide is heavier than air so it tends to settle in low-lying areas like pits, cellars or tanks. If you find yourself in a location where H₂S is known to exist, protect yourself. Whenever possible, work in an area upwind and keep to higher ground.

EXPLOSIVE LIMITS – 4.3% TO 46%

Mixed with the right proportion of air or oxygen, H₂S will ignite and burn or explode, producing another alarming element of danger besides poisoning.

FLAMMABILITY

Hydrogen Sulfide will burn readily with a distinctive clear blue flame, producing Sulfur Dioxide (SO₂), another hazardous gas that irritates the eyes and lungs.

SOLUBILITY – 4 TO 1 RATIO WITH WATER

Hydrogen Sulfide can be dissolved in liquids, which means that it can be present in any container or vessel used to carry or hold well fluids including oil, water, emulsion and sludge. The solubility of H₂S is dependent on temperature and pressure, but if conditions are right, simply agitating a fluid containing H₂S may release the gas into the air.

BOILING POINT – (-76 degrees Fahrenheit)

Liquefied Hydrogen Sulfide boils at a very low temperature, so it is usually found as a gas.

RESPIRATOR USE

The Occupational Safety and Health Administration (OSHA) regulates the use of respiratory protection to protect the health of employees. OSHA's requirements are written in the Code of Federal Regulations, Title 29, Part 1910, Section 134, Respiratory Protection. This regulation requires that all employees who might be required to wear respirators, shall complete an OSHA mandated medical evaluation questionnaire. The employee then should be fit tested prior to wearing any respirator while being exposed to hazardous gasses.

Written procedures shall be prepared covering safe use of respirators in dangerous atmospheric situations, which might be encountered in normal operations or in emergencies. Personnel shall be familiar with these procedures and the available respirators.

Respirators shall be inspected prior to and after each use to make sure that the respirator has been properly cleaned, disinfected and that the respirator works properly. The unit should be fully charged prior to being used.

Anyone who may use respirators shall be properly trained in how to properly seal the face piece. They shall wear respirators in normal air and then in a test atmosphere. (Note: Such items as facial hair (beard or sideburns) and eyeglass temple pieces will not allow a proper seal.) Anyone that may be expected to wear respirators should have these items removed before entering a toxic atmosphere. A special mask must be obtained for anyone who must wear eyeglasses. Contact lenses should not be allowed.

Respirators shall be worn during the following conditions:

- A. Any employee who works near the top or on the top of any tank unless tests reveal less than 20 ppm of H₂S.
- B. When breaking out any line where H₂S can reasonably be expected.
- C. When sampling air in areas where H₂S may be present.
- D. When working in areas where the concentration of H₂S exceeds the Threshold Limit Value for H₂S (10 ppm).
- E. At any time where there is a doubt as to the H₂S level in the area to be entered.

EMERGENCY RESCUE PROCEDURES

DO NOT PANIC!!!

Remain Calm - THINK

1. Before attempting any rescue you must first get out of the hazardous area yourself. Go to a safe briefing area.
2. Sound an alarm and activate the 911 system.
3. Put on breathing apparatus. At least two persons should do this, when available use the buddy system.
4. Rescue the victim and return them to a safe briefing area.
5. Perform an initial assessment and begin proper First Aid/CPR procedures.
6. Keep the victim lying down with a blanket or coat, etc..., under the shoulders to keep airway open. Conserve body heat and do not leave unattended.
7. If the eyes are affected by H₂S, wash them thoroughly with potable water. For slight irritation, cold compresses are helpful.
8. In case a person has only minor exposure and does not lose consciousness totally, it's best if he doesn't return to work until the following day.
9. Any personnel overcome by H₂S should always be examined by medical personnel. They should always be transported to a hospital or doctor.