



H₂S DRILLING OPERATIONS PLAN

NORTH HOBBS UNIT GRAYBURG/SAN ANDRES

Lea County, New Mexico

10 Well Package

INTRODUCTION

Oxy Permian LTD. plans to drill and complete 10 San Andres wells in the North Hobbs Unit in Lea County, New Mexico in close proximity to Hobbs. Oxy Permian operates offset wells producing out of the San Andres formation and has provided information on H₂S, a concentration of 45,000 to 65,000-ppm H₂S is a typical *production* rate for wells. The amounts of H₂S and gas encountered during drilling operations are expected to be significantly lower.

TRAINING

All personnel shall receive proper training in H₂S drilling and contingency procedures in accordance with the general training requirements outlined in the American Petroleum Institute's (API) Recommended Practice (RP) 49 (April 15, 1987 or subsequent editions) for Safe Drilling of Wells Containing Hydrogen Sulfide, Section 2. All training will be completed ***before*** any drilling operations commence. In addition to the requirements of API RP-49, a minimum of an initial training session and weekly H₂S and well control drills for all personnel in each working crew shall be conducted. The initial training session for each well shall include a review of the site specific H₂S Drilling Operations Plan . All service company personnel will be required to have proper H₂S training and be briefed on the site-specific plan before commencing operations.

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WELL SITE DIAGRAMS – posted at the start of each well

Each attached well site diagram will contain the following information:

- Drill rig orientation
- Prevailing wind direction
- Location of all briefing areas
- Location of access road(s)
- Location of flare line(s) and pit(s)
- Location of caution and/or danger signs
- Location of wind direction indicators

WELL CONTROL EQUIPMENT

Due to the shallow depth of the wells and that no abnormal pressures are expected during drilling operations, a 5M (5000 PSI) BOPE system will be installed and tested prior to drilling out from under surface casing. This will include a hydraulic accumulator and rotating head along with the following equipment.

Two rams with one being blind and one being a pipe ram (blind rams on top)

- Kill line (2-inch minimum)
- 1 kill line valve (2 inch minimum)
- 1 choke line valve
- 2 manual chokes, (Refer to diagram in Attachment 1)
- Upper kelly cock valve with handle available
- Safety valve and subs to fit all drill strings in use
- Pressure gauge on choke manifold
- 2 inch minimum choke line
- Fill-up line above the uppermost preventer

Pipe rams and blind rams will be functionally tested each time pipe is tripped out of the hole.

PROTECTIVE EQUIPMENT FOR ESSENTIAL PERSONNEL

There shall be a safety trailer, located on location, with 300 cubic foot cylinders located inside and approximately 8 hours worth of grade “D” breathing air available. Hoses shall be plumbed to the rig floor to allow for emergency control of the well.

Stored inside the trailer shall be 4 (SAR) workline units with egress capability to be used under IDLH conditions.

There shall be 2-SCBA, designed to last approximately 30 minutes duration for use in rescue or emergency conditions located at briefing areas 90° opposing sides of location.

These will be stored in hard plastic cases and sealed against weather conditions. Also 2-SCBA designated as backup shall be stored in the safety trailer making a total of four (4).

There will be 4 emergency escape units with approximately 5 minutes duration stored on the rig floor in the top dog house ready for emergency evacuation purposes. One unit will be placed with the derrick man during pipe tripping operations.

- All units shall be maintained and inspected monthly and after each use. Periodic rig checks shall include visual inspection of all breathing apparatus to insure emergency readiness.
- Communication while wearing breathing apparatus can be performed by normal speech through the speaking diaphragm, but if the noise level succeeds in “drowning out” speech, than communication shall alternately be performed through hand signals agreed upon.

H₂S DETECTION AND MONITORING EQUIPMENT

A stationary H₂S monitor shall be stationed in the top dog house (the recognized communications center) with remote audible and visual alarm located on the rig floor high enough up so as not to obscure being seen or heard readily. There shall be three H₂S detecting sensors (1) located on the rig floor, (2) located at the bell nipple and (3) located at the flow line/steel pits (where applicable) that are calibrated with the monitor prior to assembly at the rig and calibrated/checked weekly.

Sensors for the stationary monitor shall be either electro-chemical (EC) cell and/or Metal oxide (MOS).

A portable tri-range monitor (H₂S, O₂, LEL) (EC) and a portable SO₂ (EC) monitor shall be located in the safety trailer.

VISUAL WARNING SYSTEMS

Wind direction indicators will be visible at all times, a windsock will be attached to the rig floor, high enough to be seen from anyplace on location. In addition streamers will be attached to all guide wires at eye level.

Warning sign(s) will be placed at each entrance to the location at a minimum of 200' and a maximum of 500' from the well site. Each sign will read DANGER – POISON GAS – HYDROGEN SULFIDE, and employ a three flag (green = safe, yellow = caution, red = danger) warning system to alert personnel to the hazard level on location. A red flag will be displayed when H₂S in excess of 10 ppm is detected at any sensing point.

MUD PROGRAM

The mud system will utilize a conventional pit system, solids control will be maintained by circulating the reserve pits. The mud system will be fresh water/brine water with additions of Lime and Caustic soda to maintain a pH level of 10 or greater. A mud test shall be performed every 24 hours after mudding up to determine, as applicable: density, viscosity, gel strength, filtration, and pH. A sufficient quantity of Zinc Lignosulfonate H₂S scavenger on location to neutralize any H₂S that may be encountered. Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept at the wellsite at all times

METALLURGY

Metallurgical Equipment. All equipment that has the potential to be exposed to H₂S shall be suitable for H₂S service. Equipment which shall meet these metallurgical standards include the drill string, casing, wellhead, blowout preventer assembly, casing head and spool, rotating head, kill lines, choke, choke manifold and lines, valves, mud-gas separators, drill-stem test tools, test units, tubing, flanges, and other related equipment.

To minimize stress corrosion cracking and/or H₂S embrittlement, the equipment shall be constructed of material whose metallurgical properties are chosen with consideration for both an H₂S working environment and the anticipated stress. The metallurgical properties of the materials used shall conform to the current National Association of Corrosion Engineers (NACE) Standard MR 0175-90, Material Requirement, Sulfide Stress Cracking Resistant Metallic Material for Oil Field Equipment.

A drill fluid treatment and corrosion inhibitor program as per API's RP-49, § 6.2.2. will be in use.

MEANS OF COMMUNICATION FROM THE WELL SITE.

A telephone will be on location at all times, this will be either cellular, radio, or satellite connection. Key Rig #27 (806) 781-693

PLANS FOR WELL TESTING

Testing shall be performed with a minimum number of personnel in the immediate vicinity, which are necessary to safely and adequately operate the test equipment. No drill stem testing will be conducted on any of these wells. At this time the well test will be conducted through the completed surface facilities.

EMERGENCY PROCEDURES

In the event of detection of H₂S the following procedures will be in use. (Excerpt from the Oxy DHS Reaction Plan)

Emergency Procedures

Emergency Reaction Steps

	Drilling	Tripping
All Personnel	<ol style="list-style-type: none">1. On alarm don escape unit and report to upwind briefing area.2. Check status of personnel (buddy system)3. Secure breathing equipment and shut well in.4. Await orders from Supervisor.	<p>Same</p> <p>Same</p> <p>Same</p> <p>Same</p>
Altura Representative	<ol style="list-style-type: none">1. Report to upwind briefing area.2. Don breathing equipment and return to point of release with Pusher or Driller (buddy system)3. Determine H₂S concentration.4. Assess situation and take control measures.	<p>Same</p> <p>Same</p> <p>Same</p> <p>Same</p>
Tool Pusher	<ol style="list-style-type: none">1. Report to upwind briefing area.2. Don breathing equipment and return to point of release with Oxy Rep or driller. (buddy system)3. Determine H₂S concentration4. Assess situation and take control measures.	<p>Same</p> <p>Same</p> <p>Same</p> <p>Same</p>
Driller	<ol style="list-style-type: none">1. Don escape unit.2. Check monitor for point of release.3. Report to briefing area.4. Check status of personnel: (in an attempted rescue use buddy system)	<p>Same</p> <p>Same</p> <p>Same</p> <p>Same</p>

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| 5. Assign least essential person to notify Oxy Rep and Tool Pusher by quickest means in the case of their absence. | Same |
| 6. Assume the responsibilities of the Oxy Rep and Tool Pusher until they arrive should they be absent. | Same |

Emergency Reaction Steps

<u>Drilling</u>	<u>Tripping</u>
Derrick Man Floor Man #1 Floor Man #2	1. Remain in briefing area until instructed by supervisor. Same
Mud Engineer	1. Report to briefing area. Same 2. When instructed, begin check of mud for Ph and H2S levels. (Garnett Gas Train)
Safety Personnel	1. Mask up and check status of same for all personnel and secure operations as instructed by Oxy Rep. Same

Taking A Kick

When taking a kick during an H2S emergency, all personnel will follow standard BOP Procedures after reporting to briefing area and masking up.

Open Hole Logging

All unnecessary personnel off the floor Oxy Representative and Safety Personnel should monitor condition, advise status and determine the need for use of emergency equipment.

Running Casing or Plugging

Following the same procedures as above. Oxy Representative and Safety Personnel should determine if all personnel have access to protective equipment.

Notes:

- Warning System Response. When H₂S is detected in excess of 10 ppm at any detection point, all non-essential personnel shall be moved to a safe area and essential personnel (i.e., those necessary to maintain control of the well) shall wear pressure-demand type protective breathing apparatus. Once accomplished, operations may proceed.
- Anytime a SCBA is used a minimum of two people shall don equipment and a "buddy system" will be used, under no circumstances should any rescue or emergency operations be undertaken without backup personnel.

EMERGENCY PHONE NUMBERS

	FIRE	AMBULANCE	POLICE	SHERIFF	STATE POLICE	HOSPITAL
	911	911	911	911	911	
Hobbs	505-397- 9308	505-397- 9308	505-397- 9265	505-393- 2515	505-392- 5588	505-392- 6581

NMOCD Hobbs - OFFICE: (505) 393-6161 FAX: (505) 393-0720

Downhole Services Team Leader Randy Pennington 281-552-1215

Team Leader - Hobbs Gary Bullock 505-397-8203

(A complete list of all emergency contacts will be posted on the rig board)