HYDROGEN SULFIDE CONTINGENCY PLAN

Juliet Federal Com 504H

Section 22

T 24S R 34E 400’ FNL & 2160’ FWL

Lea County, NM

Initial Date: 10/2/18

Revision Date:

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INTRODUCTION

This plan specifies precautionary measures, safety equipment, emergency procedures, responsibilities, duties, and the compliance status pertaining to the production operations of Hydrogen Sulfide producing wells on:

Centennial Resource Development, Inc.

This plan will be in full effect prior to and continuing with all drilling operations for all wells producing potential Hydrogen Sulfide on the **Juliet Federal Com 504H Section 22, T24S, R34E, Lea County, NM.**

This plan was developed in response to the potential hazards involved when producing formations that may contain Hydrogen Sulfide (H_2S) It has been written in compliance with current New Mexico Oil Conservation Division Rule 118 and Bureau of Land Management 43 CFR 3160 Onshore Order No. 6.

This plan shall require the full cooperation and efforts of all individuals participating in the production of potential H_2S wells.

Each individual is required to know their assigned responsibilities and duties in regard to normal production operations and emergency procedures.

Each person should thoroughly understand and be able to use all safety related equipment on the production facility.

Each person should become familiar with the location of all safety equipment and become involved in ensuring that all equipment is properly stored, easily accessible, and routinely maintained.

An ongoing training program will remain in effect with regular training, equipment inspections, and annual certifications for all personnel.

Centennial Resource Development, Inc. shall make every reasonable effort to provide all possible safeguards to protect all personnel, both on this location and in the immediate vicinity, from the harmful effects of H_2S exposure, if a release to the atmosphere should occur.

SAFE BRIEFING AREAS

Two areas will be designated as “SAFE BRIEFING AREAS”.

The Primary Safe Briefing Area

If the Primary Safe Briefing Area cannot be used due to wind conditions; the designated secondary safe briefing area will be used.

These two areas are so designated for accessibility reasons related to self-contained safe breathing air device locations, evacuation muster point utility, and for ease of overall communication, organizational support, as well as the all-important prevailing wind directions. Drawings of the facility denoting these locations are included on Page 15.

If H_2S is detected in concentrations equal to or in excess of 15 PPM, all personnel not assigned emergency duties are to assemble in the appropriate “SAFE BRIEFING AREA” for instructions.

Wind Direction Indicators: A windsock, shall be positioned, allowing the wind direction to be observed from anywhere on the charted facility location.

Warning-DANGER SIGNS for Approaching Traffic: All signs shall also be illuminated under conditions of poor visibility.

DANGER
POISONOUS GAS
HYDROGEN SULFIDE
DO NOT APPROACH IF AMBER LIGHTS ARE FLASHING

An amber strobe light system will be activated for H_2S concentrations of 10 PPM or greater and an audible alarm will sound when H_2S exceeds 15 ppm, and. This condition will exist until the all clear is given.

GENERAL ACTION:

Be alert for condition change. There will be **NO SMOKING** except in approved designated areas as permitted by the Person in charge or the Centennial Designated Supervisor.

Keep all safety equipment available and all monitors functioning properly.

Perform all required training for familiarization and proficiency.

CONDITION I – NO IMMEDIATE H_2S PRESENT

Green flag placed on sign

CONDITION II – POTENTIAL DANGER TO LIFE – H_2S PRESENT AT 10 PPM

Warning Signs

For notification of general public and operations:

"DANGER--POISONOUS GAS--HYDROGEN SULFIDE"
"Poisonous Gas Do Not Approach If Amber Light is Flashing"
Yellow flag placed on sign

Continuous Flashing Amber Strobe Light above control panel.

A pinpoint alarm will activate showing the concentration and location of the detected H_2S gas. A Master system control card is located on location that shows the area location and PPM of H_2S at the alarming sensor head. The pinpoint alarm is depicted on the facility drawing / safety equipment layout.

CONDITION III – MODERATE DANGER TO LIFE – H_2S PRESENT AT 20 PPM OR ABOVE

Warning Signs
For notification of general public and operations:

"DANGER--POISONOUS GAS--HYDROGEN SULFIDE"
"Poisonous Gas Do Not Approach If Amber Light is Flashing"
Red flag placed on sign

Continuous sounding of the H_2S siren and amber strobe lights in designated areas. All audible alarms and red lights will sound as long as the H_2S concentration is present at 15 ppm or greater or until deactivated by the CENTENNIAL RESOURCE DEVELOPMENT, INC. Person in charge. The system can only be reset when H_2S concentration levels fall below 10 ppm. Location production will be terminated at 20 PPM atmospheric upset.

TRAINING
This H_2S Contingency Plan will be operational prior to producing wells at Company Production Well-site.

Lists of emergency phone numbers will be maintained on the location and shall be posted at the following places:

CENTENNIAL RESOURCE DEVELOPMENT, INC. Drilling Office
CENTENNIAL RESOURCE DEVELOPMENT, INC. Site Location Office
CENTENNIAL RESOURCE DEVELOPMENT, INC. Muster areas

All safety equipment and H_2S related hardware shall be set up as outlined on Page 14 "SAFETY EQUIPMENT." All safety equipment shall be inspected routinely, paying particular attention to resuscitators and breathing air equipment, with documentation of all inspections and service kept on file.

All personnel on site shall be assigned breathing air equipment and, as needed, personal H_2S detection devices. CENTENNIAL RESOURCE DEVELOPMENT, INC. and Contract personnel required to work on-site or in the areas where H2S sensors are located will be provided with SCBA's.

Prior to producing wells, and continuing, all CENTENNIAL RESOURCE DEVELOPMENT, INC. personnel, contract personnel, and all essential service company personnel shall be thoroughly trained in the hazardous nature of H2S within the production operations, and receive accredited certification from a certified, qualified technician instructor, in the use of breathing air equipment, emergency procedures, responsibilities, and first aid for H_2S victims.

The Location Person in Charge will have the authority to delegate H2S safety supervision responsibilities to a designated certified – qualified person in the interest of comprehensive, efficient, and thorough control and oversight of all activities related to H2S operations. This designated Centennial Supervisor will ensure that the integrity of this plan is fully adhered to, at all times, and that all personnel and activities remain within full compliance.

The Centennial Resource Development, Inc. Person in Charge shall keep a file listing all personnel that have completed the special training programs both off of, and onsite the production facility location. Copies of all H2S training certification of all personnel, service contractors, and visitors onsite shall also be kept on file with the; Centennial Resource Development, Inc. Regulatory/Compliance supervisor.

PROCEDURE FOR INFORMING PERSONNEL OF THE H_2S CONTINGENCY PLAN

There will be several copies of the complete "**H_2S Contingency Plan**" available in the CENTENNIAL RESOURCE DEVELOPMENT, INC. location Drilling Office in Pecos, TX.

All personnel arriving at the location will report immediately to the Centennial Resource Development, Inc. Person in Charge for familiarization with the "Safe Practices during the Production of Hydrogen Sulfide". Each person will be required to sign a log indicating that they have and do understand the "SAFE PRACTICES" syllabus.

All personnel entering the location during normal production operations will be required to have H2S safety certification. Specialist and or other temporary visitors not certified will receive orientation and participate in a JSA as required for their specific task, and will work under the direct supervision of the designated Task-Specific Centennial Designated Supervisor.

The Centennial Resource Development, Inc. Person in Charge will verify and document H2S training of all crews, personnel and familiarize them with the "Safe Practices during the Production of Hydrogen Sulfide". Written records will be maintained.

SAFE PRACTICES DURING THE PRODUCTION OF HYDROGEN SULFIDE

This document summarizes the steps to be taken during the three (3) conditions classifications, operational status, and personnel required responses.

This document lists general information about toxic gases, explains the physiological effects of H_2S, classifies operating conditions, and informs each reader of their general responsibilities concerning safety equipment and emergency procedures. The Centennial Resource Development, Inc. Person in Charge shall keep a file listing of all persons that have copies of the document, with their signatures, verifying that they have read and understand it thoroughly.

Condition II and III alerts and steps to be trained on and taken by all personnel are as follows:

The importance of wind direction when dealing with H_2S.
Proper use and storage of all types of breathing equipment.
Proper use and storage of oxygen resuscitators.
Proper use and storage of H_2S detectors
The "Buddy System" and the procedure for rescuing a person overcome by H_2S.
Responsibilities and duties.
Location of H_2S safety equipment.
Other parts of the **"H_2S Contingency Plan"** that should be reviewed

The table below lists various poisonous gases and the concentrations at which they become dangerous.

TOXICITY OF VARIOUS GASES

TOXICITY OF GASES (Taken from API RP-49 September 1974 – Re-issued August 1978)					
Common Name	**Chemical Formula**	**Gravity (Air = 1)**	**Threshold 1 Limit**	**Hazardous 2 Limit**	**Lethal 3 Limit**
Hydrogen Sulfide	H_2S	1.18	10 ppm	250 ppm/1hr	600 ppm
Sulfur Dioxide	SO_2	2.21	20 ppm	---	1000 ppm
Carbon Monoxide	CO	0.97	50 ppm	400 ppm/1hr	1000 ppm
Carbon Dioxide	CO_2	1.52	5000 ppm	5%	10%
Methane	CH_4	0.55	90000 ppm	Combustible Above 5% in Air	

1. Threshold concentration at which it is believed that all workers may repeatedly be exposed day after day, without adverse effect
2. Hazardous concentration that may cause death
3. Lethal concentration that will cause death with short-term exposure

Properties of Gases

The produced gas will probably be a mixture of Carbon Dioxide, Hydrogen Sulfide, and Methane.

Carbon Dioxide

Carbon Dioxide (CO_2) is usually considered inert and is commonly used to extinguish fires.

It is heavier than air (1.52 times) and it will concentrate in low areas of still air.

Humans cannot breathe air containing more than 10% CO_2 without losing consciousness. Air containing 5% CO_2 will cause disorientation in a few minutes.

Continued exposures to CO_2 after being affected will cause convulsions, coma, and respiratory failure.

The threshold limit of CO_2 is 5000 ppm.

Short-term exposure to 50,000 PPM (5%) is reasonable. This gas is colorless and odorless and can be tolerated in relatively high concentrations.

Hydrogen Sulfide

Hydrogen Sulfide (H_2S) itself is a colorless, transparent gas and is flammable. It is heavier than air and, hence, may accumulate in low places.

Although the slightest presence of H_2S in the air is normally detectable by its characteristic "rotten egg" odor, it is dangerous to rely on the odor as a means of detecting excessive concentrations because the sense of smell is rapidly lost, allowing lethal concentrations to be accumulated without warning. The following table indicates the poisonous nature of Hydrogen Sulfide.

HYDROGEN SULFIDE TOXICITY			
Concentration			Effects
$\%H_2S$	PPM	GR/100 SCF 1	
0.001	10	0.65	Safe for 8 hours without respirator. Obvious and unpleasant odor.
0.002	20	1.30	Burning in eyes and irritation of respiratory tract after on hour.
0.01	100	6.48	Kills smell in 3 to 15 minutes; may sting eyes and throat.
0.02	200	12.96	Kills smell shortly; stings eyes and throat.
0.05	500	32.96	Dizziness; breathing ceases in a few minutes; need prompt artificial respiration.
0.07	700	45.92	Unconscious quickly; death will result if not rescued promptly
0.10	1000	64.80	DEATH!
Note: 1 grain per 100 cubic feet			

Sulfur Dioxide

Sulfur Dioxide is a colorless, transparent gas and is non-flammable.

Sulfur Dioxide (SO_2) is produced during the burning of H_2S. Although SO_2 is heavier than air, it will be picked up by a breeze and carried downwind at elevated temperatures. Since Sulfur Dioxide is extremely irritating to the eyes and mucous membranes of the upper respiratory tract, it has exceptionally good warning powers in this respect. The following table indicates the toxic nature of the gas.

SULFUR DIOXIDE TOXICITY		
Concentration		Effects
$\%SO_2$	PPM	
0.0005	3 to 5	Pungent odor-normally a person can detect SO_2 in this range.
0.0012	12	Throat irritation, coughing, and constriction of the chest tearing and smarting of eyes.
0.15	150	So irritating that it can only be endured for a few minutes.
0.05	500	Causes a sense of suffocation, even with first breath.

WELL CONTROL

All efforts should be made to maintain control of the H2S well(s), in the event the release exceeds 20 PPM, the well(s) will be controlled through the appropriate kill method:

When the primary and secondary ignition system on the flare fails the well(s) shall will be shut in.

When a Hydrogen Sulfide Condition II or III occurs audible and visual alarms will be activated.

When a Hydrogen Sulfide Condition III occurs, the location will automatically shut-in.

All system upsets due to H2S detection will be reported to the CENTENNIAL RESOURCE DEVELOPMENT, INC. AREA PRODUCTION SUPERVISOR.

EVACUATION PLAN

The following general plan has been developed in the event that any public evacuation becomes necessary:
Centennial Resource Development, Inc. has requested and been assured the support of various public safety entities in the area.

The Sheriff's Department & State Police will conduct any evacuations of local residents. Assistance from other public safety entities may be requested if required. The included maps detail the area of the well site, including the inventory of public homes within the radius of exposure of the well **(There is no residence within the ROE)**. In the event there is a suspected problem on the well, the well site supervisor will notify the Sheriff & State Police for alert status. Alert status will require that available public support personnel will proceed to the Sheriff and State Police and stand by for instructions. If isolation and evacuation are necessary, then units will be dispatched to points marked on the map with instructions to maintain roadblocks. Evacuation teams will then proceed to sectors to be evacuated. Evacuation procedures will follow appropriate consideration for wind conditions. Personnel from the prime contractor on the site will establish safe perimeters using H2S detectors. The New Mexico H2S Governing Agency and other authorities will be notified as soon as possible. Other supplemental contractors will be contacted and called as needed.

Company guidelines state that where hydrogen sulfide concentrations could exceed 10 ppm, contractors shall follow minimum requirements for protecting personnel. Company's action level is in agreement with the NIOSH Recommended Exposure Limit. Company shall notify contractors of locations where hydrogen sulfide concentrations could exceed 10 ppm and a plan to address site design and emergency response will be addressed in the contingency plan where hydrogen sulfide is known or suspected.

DETERMINING EXPOSURE RADIUS FOR DRILLING LOCATION

Potentially hazardous volume means a volume of gas of such H2S concentration and flow rate that it may result in radius of exposure-calculated ambient concentrations of 100 ppm H2S at any occupied residence, school, church, park, school bus stop, place of business or other area where the public could reasonably be expected to frequent, or 500 ppm H2S at any Federal, State, County or municipal road or highway.

Currently there are no residence located within the ROE
NOTE: State Highway 128 runs close to the location

Radius of exposure means the calculation resulting from using the Pasquill -Gifford derived equation, or by such other method(s) that may be approved by the authorized officer.
Advanced Fire and Safety has provided the Pasquill-Gifford formula in excel format for simple calculations.

NEW MEXICO OIL & GAS CONSERVATION DIVISION 118

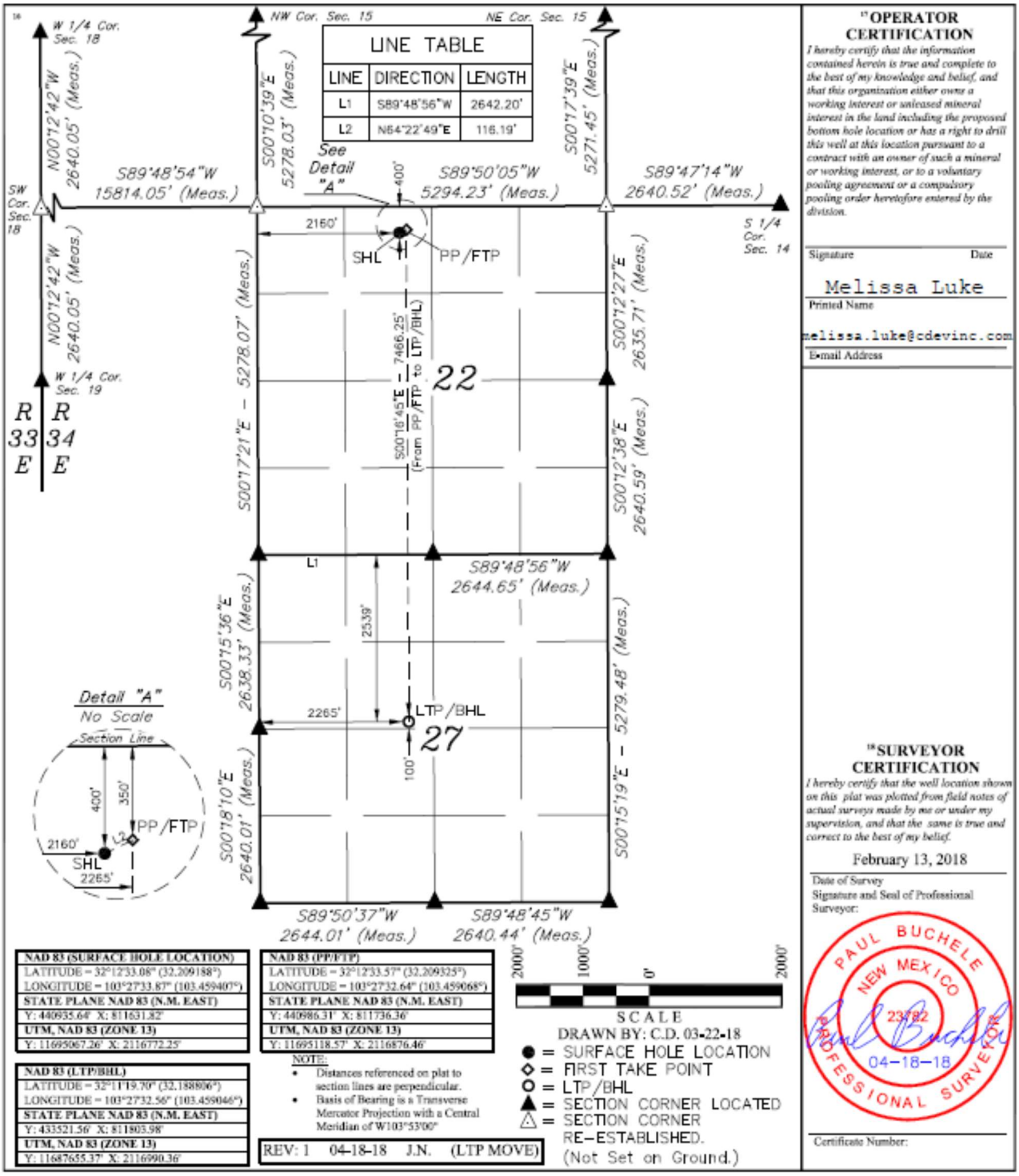
Juliet Federal Com 504H Section 22, T24S, R34E, Lea County, NM

H2S Concentration- 80 PPM (Block 13)

Maximum Escape Volume- 2400 MCF/Day (Block 13)

100 PPM Radius of Exposure (Block 15)- 36
(Formula= 1.589 x (B5/1000000) x (B6 x 1000) x .6258

500 PPM Radius of Exposure (Block 16)- 16
Formula= .4546 x (B5/1000000) x (B6 x 1000) x .6258



NAD 83 (SURFACE HOLE LOCATION)
LATITUDE = 32°12'33.08" (32.209188°)
LONGITUDE = 103°27'33.87" (103.459407°)
STATE PLANE NAD 83 (N.M. EAST)
Y: 440935.64' X: 811631.82'
UTM, NAD 83 (ZONE 13)
Y: 11695067.26' X: 2116772.25'

NAD 83 (PP/FTP)
LATITUDE = 32°12'33.57" (32.209325°)
LONGITUDE = 103°27'32.64" (103.459068°)
STATE PLANE NAD 83 (N.M. EAST)
Y: 440986.31' X: 811736.36'
UTM, NAD 83 (ZONE 13)
Y: 11695118.57' X: 2116876.46'

NAD 83 (LTP/BHL)
LATITUDE = 32°11'19.70" (32.188806°)
LONGITUDE = 103°27'32.56" (103.459046°)
STATE PLANE NAD 83 (N.M. EAST)
Y: 433521.56' X: 811803.98'
UTM, NAD 83 (ZONE 13)
Y: 11687655.37' X: 2116990.36'

NOTE:
- Distances referenced on plat to section lines are perpendicular.
- Basis of Bearing is a Transverse Mercator Projection with a Central Meridian of W103°53'00"

REV: 1 04-18-18 J.N. (LTP MOVE)

17 OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature Date

Melissa Luke

Printed Name

melissa.luke@cdevinc.com

E-mail Address

18 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.

February 13, 2018

Date of Survey

Signature and Seal of Professional Surveyor:

PAUL BUCHELE NEW MEXICO 23782 PROFESSIONAL SURVEYOR 04-18-18

Certificate Number:

H_2S REQUIRED EQUIPMENT LIST

RESPIRATORY SAFETY SYSTEMS
- Working cascade system available on rig floor and pit system
- Rescue Packs (SCBA) available at each breathing area, muster location, and extra stored in safety trailer
- Work escape packs available on rig floor and pit system
- Emergency escape packs (5 min) stored in doghouse for emergency evacuation

DETECTION AND ALARM SYSTEM
- 4 channel H2S monitor
- 4 wireless H2S monitors
- H2S alarm system (Audible/Red strobe)
- Personal gas monitor for each person on location
- Gas sample tubes

WELL CONTROL EQUIPMENT
- Flare line with remote ignitor and backup flare gun, placed 150' from wellhead
- Choke manifold with remotely operated choke
- Mud gas separator

VISUAL WARNING SYSTEMS
- One color code condition sign will be placed at each entrance reflecting possible conditions at the site
- A colored condition flag will be on display, reflecting current condition at the site at the time
- At least 4 wind socks placed on location, visible at all angles and locations

MUD PROGRAM
- Mud will contain sufficient weight and additives to control and minimize H2S

METALLURGY
- All drill strings, casing, tubing, wellhead, BOP, spools, kill lines, choke manifold and lines, and valves shall be suitable for anticipated H2S volume and pressure

COMMUNICATION
- Cell phones, intercoms, and satellite phones will be available on location

ADDITIONAL SAFETY RELATED ITEMS
- Stretcher
- 2 OSHA full body harness
- 20# class ABC fire extinguisher

EMERGENCY CONTACT NUMBERS

Initial detection, but less than 10 ppm – Initiate verification and notification actions 911 is Available

Centennial Employee List:
Centennial Office:
500 West Illinois Suit
Midland, TX 79701
Phone: 432-203-0029

Drilling Engineer – Jeremy Ray – 303-263-7872

Drilling Superintendent – Ricky Mills/John Helm – 432-305-1068

Drilling Field Superintendent – Mike Ponder/Wayne Miller – 432-287-3003

Drilling MGR – Brett Thompson – 720-656-7027

Completions MGR – Clayton Smith – 432-203-0028

NM Production Foreman – Dana Giananni – 575-441-6302

TX Superintendent – Corey Lewis – 432-634-5328

HSE MGR – Reggie Phillips – 432-203-2352

Local Emergency Response:

Fire Department - 575-395-2221

Jal Community Hospital – 505-395-2511

State Police – 505-827-9000

Lea County Sheriff's Department – 575-396-3611

Safety Contractor (Advanced Fire & Safety):

Office – 833-296-3913 or 337-330-8186

Joe Gadway (Permian Supervisor) – 318-446-3716

Clint Hudson (Operations Manager) – 337-552-8330