

# H<sub>2</sub>S Contingency Plan

(Emergency Response and Public Protection Plan)

Summit Point Federal 1

**CCI Paradox Upstream LLC**

## **H<sub>2</sub>S Contingency Plan**

<b>Company Name:</b>	CCI Paradox Upstream LLC
<b>Address:</b>	600 17 <sup>th</sup> St, Suite 1900S Denver, CO 80202
<b>Phone:</b>	303-825-0685
<b>Well Name:</b>	Summit Point Federal 1
<b>TD:</b>	9,750'
<b>Location:</b>	NENW Sec 6, T43N, R19W
<b>Field Name:</b>	SE Lisbon
<b>County :</b>	San Miguel County, Colorado
<b>Surface Casing Depth:</b>	2,050' MD
<b>H<sub>2</sub>S Formation and Depth:</b>	Leadville, 9,484' TVD / 10,150' MD

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## **1.0 PURPOSE**

This Emergency Response Plan and Public Protection Plan (Plan) is specific to the Summit Point Federal 1 well location operated by CCI Paradox Upstream LLC (CCI). This document is designed to provide for the safety and welfare of CCI personnel and contract personnel, the community, the environment, and property.

This Plan establishes evacuation procedures, assigns response duties to specific individuals, provides for notification of outside agencies, and provides details of actions to alert and protect the public. This Plan will be activated immediately upon the release of a potentially hazardous volume of hydrogen sulfide ( $H_2S$ ).

## **2.0 GENERAL INFORMATION ON AND PHYSIOLOGICAL RESPONSES TO HYDROGEN SULFIDE ( $H_2S$ ) AND SULFUR DIOXIDE ( $SO_2$ )**

### **2.1 Hydrogen Sulfide ( $H_2S$ )**

Hydrogen sulfide is a flammable, highly toxic, colorless gas that is heavier than air, with the odor of rotten eggs. It can be detected by smell at a concentration in air of only 0.002 parts per million (ppm). Above concentrations of 100 ppm, it will deaden the sense of smell in a few minutes, and at a concentration of 700 ppm, a single breath can be fatal. If ignited, it burns with a blue flame. In still air it tends to accumulate in low places in dangerous concentrations. However, if it is warmer than the surrounding air, it may tend to rise. The upper flammability limit of  $H_2S$  in air is 44% and the lower flammability in air is 4%.

Breathing low concentrations of  $H_2S$  can cause headaches. Higher concentrations (0.01 percent by volume) cause irritation of the eyes, nose, throat, and lungs. Eyes become red and swollen, accompanied by sharp pain in more severe cases. Still higher concentrations (0.05 percent by volume) cause dizziness, unconsciousness, and failure of respiration.

The Threshold Limit Value (TLV) is 10 ppm (0.001%) in air. This is the limit for eight hours of continuous exposure as recommended by the American Conference of Governmental Industrial Hygienists. The health and safety reference values of various concentrations of  $H_2S$  are listed in the toxicity chart below. A Manufacturers Safety Data Sheet (MSDS) for hydrogen sulfide will be kept onsite.

### **2.2 Sulfur Dioxide ( $SO_2$ )**

Sulfur dioxide is formed with the burning of hydrogen sulfide gas. Sulfur dioxide is a pungent, irritating, suffocating, colorless gas. This gas is normally heavier than air and concentrations above 400 ppm are considered dangerous for even brief exposures.

Under special circumstances hydrogen sulfide gas may be ignited in order to dissipate a gas cloud and reduce the impact on a local area. Often these burning temperatures are enough to raise and mix the  $SO_2$  with air in a ratio well below toxic levels. However, great care and proper monitoring should be used when this is attempted.

Due to the irritating effect of  $SO_2$  at low concentrations of less than 5 ppm, there is usually no doubt as to its presence in an area, which provides better warning characteristics than  $H_2S$ .

## 2.3 Toxicity Chart

Name	Specific Gravity <sup>1</sup>	TLV <sup>2</sup> (Ppm)	Hazardous Limit <sup>3</sup>	Lethal Concentration <sup>4</sup>
Hydrogen Sulfide	1.18	10	100 ppm/1 hr.	700 ppm
Sulfur Dioxide	2.21	2	50 ppm/1 hr.	400 ppm

Notes:

<sup>1</sup> Specific gravity of air = 1.00

<sup>2</sup> TLV - Threshold Limit Value

<sup>3</sup> Hazardous Limit - concentration that may cause death with short term exposure

<sup>4</sup> Lethal Concentration - Concentration that may cause death with only a few breaths

## 3.0 TREATMENT PROCEDURES FOR H<sub>2</sub>S AND SO<sub>2</sub> EXPOSURE

- A. Remove the patient to fresh air. Personnel should **always** use fresh air breathing equipment when entering an area to retrieve a person who has been overcome with H<sub>2</sub>S.
- B. Call a physician and get patient under his care as soon as possible.
- C. If breathing has ceased, begin artificial respiration immediately. Give cardiopulmonary resuscitation (CPR) only if there is no pulse and no breathing. Continue revival efforts until physician arrives or, if patient is mobile and it is determined that he should go to the hospital, continue oxygen inhalation under the physician's direction.
- D. Administer oxygen to help eliminate toxic substances from blood stream.
- E. Keep the patient at rest and protect from chilling.

## 4.0 INDIVIDUAL RESPONSIBILITIES

It is the responsibility of ***all personnel*** on the location to familiarize themselves with the procedures outlined in this contingency plan.

- A. All Personnel:
  1. Responsible for their assigned safety equipment;
  2. Responsible for familiarizing themselves with the location of all safety equipment; and
  3. Responsible for reporting any indications of H<sub>2</sub>S to those in the area and to a supervisor.
- B. Operations Supervisor:
  1. Responsible for thoroughly understanding and seeing that all aspects of this contingency plan are enforced;
  2. Responsible for implementing all phases of this contingency plan;

3. Responsible for keeping a minimum of personnel on the location during expected hazardous operations;
4. Responsible for coordinating all well site operations and communications in the event that an emergency condition develops; and
5. Responsible for ensuring that all visitors are in approved respiratory protection programs. A visitors log will be maintained by the air monitoring service provider, as well as a list of all personnel on location after work over operations have started.

## 4.1 LOCATION LAYOUT

The location will consist of at least two pre-determined safe muster areas to assemble at in the event of an emergency. These locations should be located 180 degrees to one another, and located up wind and or up hill from well bore if possible.

H<sub>2</sub>S monitor system with at least four heads. One located at or near the well head, one located at or near the reserve pit or blow down tank, a third one at or near the rig floor (if applicable) and lastly one located at on near the rig operators control platform (Head level).

### 4.1.1 Locations and Types of All Air Masks

Self-contained breathing apparatus for use by rig personnel for this well will be kept in the following location(s):

Type	Location
1-30 min rescue unit	Rig site Supervisor's Trailer
2-30 min rescue unit	Briefing Area #1
2-30 min rescue unit	Briefing Area #2
5-Hoseline work unit	Safety Trailer
5-5 min escape unit	Rig Floor (if applicable)
1-5 min escape unit	Tubing board (derrick if applicable)

If a cascade system is utilized, indicate the location(s):

Type	Location
12 cylinder cascade	Safety Trailer with 12 cylinder cascade is to be located at or near the rig sub structure.

### 4.1.2 Locations of Windssocks and Streamers

The wind direction indicators for this well will be located at:

Type	Location
Windssock	Briefing Area #1

Type	Location
Windsock	Briefing Area #2
Streamers	On floor & pits or tanks

#### 4.1.3 Location of Any Other Safety Equipment Used

Type	Location
Flare gun	Safety Trailer
Bug Blowers	On location for use if needed

#### 4.1.4 Location of All Telephones and/or Means of Communications:

Type	Location
Cell-Sat phone	Rigsite Supervisor's Trailer

#### 4.1.5 Warning Signs

All warning signs should be of readable size at a distance.

"No Smoking" signs should be strategically located around the location. The following locations are appropriate:

- Entrance to location,
- Rig Floor (If applicable),
- Dog House (If applicable), and
- Lower landing of all stairs to rig floor.

"Poison Gas" signs should also be strategically located around the rig and well location. The following locations are appropriate:

- All entrance's leading onto location,
- Lower landings of all stairs leading to rig floor, and
- Various points along the perimeter of the radius of exposure.

## 4.2 OPERATING PROCEDURES

The following operating procedures will be utilized for drilling and work over operation in areas with H<sub>2</sub>S.

### 4.2.1 Plan of operation for handling gas kicks and other problems

Any gas kick will be controlled by using approved well control techniques. Upon evidence that ambient H<sub>2</sub>S concentrations have reached 10 ppm, all non-essential personnel will be evacuated to pre-determined safe areas. Personnel remaining on the rig floor will don appropriate respiratory protection equipment and continue to control the well until the situation indicates the area is safe to re-enter.

#### **Special Operations:**

All equipment with potential for H<sub>2</sub>S exposure shall be suitable for H<sub>2</sub>S service, e.g., casing, well head, blowout preventer (BOP) equipment, kill lines, choke manifold and lines.

A flare pit may need to be located a minimum of 100' from wellhead and 30' from the reserve pit or blow down tank.

### **4.3 OPERATING CONDITIONS**

Operating conditions are defined in three categories. A description of each of these conditions and the required action to take for each are provided below.

#### **A. Condition I – Normal Operating Conditions, Potential Danger**

<b>Characterized by:</b>	Normal Operations in zones which contain or may contain H <sub>2</sub> S
<b>Warning Flag:</b>	Yellow
<b>Alarm:</b>	None
<b>Probable Occurrence:</b>	No detectable gas present at surface
<b>General Action:</b>	Know location of safety equipment
	Check safety equipment for proper function. Keep it available
	Be alert for a condition change
	Follow instructions of supervisor

#### **B. Condition II – Moderate Danger to Life**

<b>Characterized by:</b>	H <sub>2</sub> S gas present – concentration less than 10 ppm
<b>Warning Flag:</b>	Orange
<b>Alarm:</b>	Flashing light at 10 ppm H <sub>2</sub> S
	Intermittent blasts on horn at 10 ppm H <sub>2</sub> S
<b>Probable Occurrence:</b>	As trip gas when circulating bottoms up
	When a well kick is circulated out
	Surface pressure, well flow or lost operations
	Equipment failure during testing operations
<b>General Action:</b>	Follow instructions of supervisor
	Put on breathing equipment if directed, or if conditions warrant it
	Stay in "SAFE BRIEFING AREA" if instructed and not working to correct the problem
	The Drilling or Completions Consultant will initiate action plans to reduce the H <sub>2</sub> S concentration to acceptable levels

### C. Condition III - Moderate to Extreme Danger to Life

<b>Characterized by:</b>	H <sub>2</sub> S present in concentrations at or above 10 ppm. Critical well operations or well control problems. In the extreme, loss of well control.
<b>Warning Flag:</b>	Red
<b>Alarm:</b>	Flashing light and continuous blast on horn at 10 ppm H <sub>2</sub> S
<b>Probable Occurrence:</b>	As trip gas when circulating bottoms up.
	When a well kick is circulated out.
	Surface pressure, well flow or lost return problems.
	Equipment failure during testing operations.
<b>General Action:</b>	Put on breathing equipment. Move to "SAFE BRIEFING AREA" and remain there if not working to correct or control problem.
	Follow instructions of the Drilling or Completions Consultant or other supervisor.
	The Drilling or Completions Consultant will initiate emergency action as provided in the contingency plan and as appropriate to the actual conditions. If testing operations are in progress, the well will be shut in.
	The Drilling or Completions Consultant will conduct any necessary operations with an absolute minimum level of personnel. All persons in the immediate area will wear breathing apparatus. All other personnel will restrict their movements to those directed by the Drilling or Completions Consultant.
	If gas containing hydrogen sulfide (H <sub>2</sub> S) is ignited, the burning hydrogen sulfide will be converted to sulfur dioxide which is poisonous.

## 5.0 HYDROGEN SULFIDE EMERGENCY PROCEDURES

The procedures listed below apply to Drilling and Completions and testing operations.

- A. If at any time during Condition I, any person who detects H<sub>2</sub>S, will notify the Drilling or Completions Consultant. All personnel should keep alert to the Drilling or Completions Consultant's orders. He/She will do the following:
1. Immediately begin to ascertain the cause or the source of the H<sub>2</sub>S and take steps to reduce the H<sub>2</sub>S concentration to zero;
  2. Order non-essential personnel out of the potential danger area;
  3. Order all personnel to check their safety equipment to see that it is working properly and in the proper location. Persons without breathing equipment will not be allowed to work in a hazard area;

4. Notify immediate Supervisor of condition and action taken;
  5. Continue gas monitoring activities and continue with caution; and
  6. Display the orange warning flag.
- B. If the H<sub>2</sub>S concentrations exceed 10 PPM the following steps will be taken:
1. Put on breathing equipment;
  2. Display red flag;
  3. Rig Crew – prepare to shut the well in, close BOP's if necessary;
  4. If testing operations are in progress, the well will be shut-in;
  5. Help anyone who may be affected by gas; and
  6. Evacuate quickly to the "SAFE BRIEFING AREA" if instructed or conditions warrant.
- C. In the event a potentially hazardous volume of H<sub>2</sub>S is released into the atmosphere, the following steps must be taken to alert the public:
1. Remove all rig personnel from the danger area and assembly at a pre-determined safe area, preferable upwind from the well site;
  2. Alert public safety personnel, regulatory agencies, and the general public of the existence and location of an H<sub>2</sub>S release. See List of Emergency Telephone Numbers;
  3. Assign personnel to block any public road (and access road to location) at the boundary of the area of exposure. Any unauthorized people within the area should be informed that an emergency exists and be advised to leave immediately; and
  4. Request assistance from public safety personnel to control traffic and/or evacuate people from the threatened area.
- D. Procedure and Reporting Changes:
1. Whenever H<sub>2</sub>S is encountered the Operator shall notify state and federal regulatory officials of its presence as soon as possible but in no event shall notification take longer than 24 hours. The results of all field measurements shall be included.  
  
**Contact:** COGCC SW Area Engineer Mark Weems at 970-749-0624,  
BLM Area Engineer Dan Rabinowitz at 970-385-1363
  2. The Operator shall capture a gas sample and have compositional analysis performed on it to quantify the percentage of H<sub>2</sub>S present. The Operator shall report the results of

this analysis, the depth from which the sample came and the name of the formation on a sundry notice to the area UDOGM and BLM offices within 24 hours of receipt of the results.

## 6.0 TRAINING PROGRAM

All personnel associated with the drilling and completions operations will receive training to ensure efficient and correct action in all situations. This training will be in the general areas of A) Personnel Safety, B) Respiratory Protection, and C) Well Control Procedures.

A. **Personnel Safety Training.** All Personnel shall have received H<sub>2</sub>S training in the following areas:

1. Hazards and characteristics of H<sub>2</sub>S;
2. Effect on mental components of the system;
3. Safety precautions;
4. Operation of safety equipment and life support systems;
5. Corrective action and shutdown procedures; and
6. Respiratory Protection.

B. **Rig Operations.** All rig personnel shall have received training in the following areas:

1. Well control procedures (for rig operator);
2. Layout and operations of the well control equipment; and
3. Respiratory Protection.

*NOTE: Proficiency will be developed through BOP drills which will be documented by the Completions Consultant.*

C. **Service Company Personnel.** All service personnel shall have been trained by their employers in the hazards and characteristics of H<sub>2</sub>S and the operation of safety equipment and life support systems in addition to the following:

1. Respiratory Protection

*VISITORS: All first time visitors to the location will be required to have training in and be current with a Patara approved respiratory protection program.*

## 7.0 PROTECTION OF THE GENERAL PUBLIC

**Public.** The public within the area of exposure may be given an advance briefing by CCI safety personnel if deemed necessary. This briefing must include the following elements:

- A. Hazards and characteristics of hydrogen sulfide. It is an extremely dangerous gas. It is normally detectable by its "rotten egg" odor, but odor is not a reliable means of detections because the sense of smell may be dulled or lost due to intake of the gas. It is colorless, transparent and flammable. It is heavier than air and may accumulate in low places.
- B. The necessity of an emergency action plan. Due to the danger of persons exposed to hydrogen sulfide and the need for expeditious action should an emergency occur, this action plan will be put into effect if and when a leak should occur.
- C. The manner in which the public will be notified of an emergency.
- D. Steps to be taken in case of an emergency.
- E. Notify necessary agencies and request assistance for controlling traffic and evacuating people.

### 7.1 Notification of potential danger

Warning signs will be prominently displayed at the well site and at all access points.

### 7.2 Emergency Evacuation and isolation of danger area

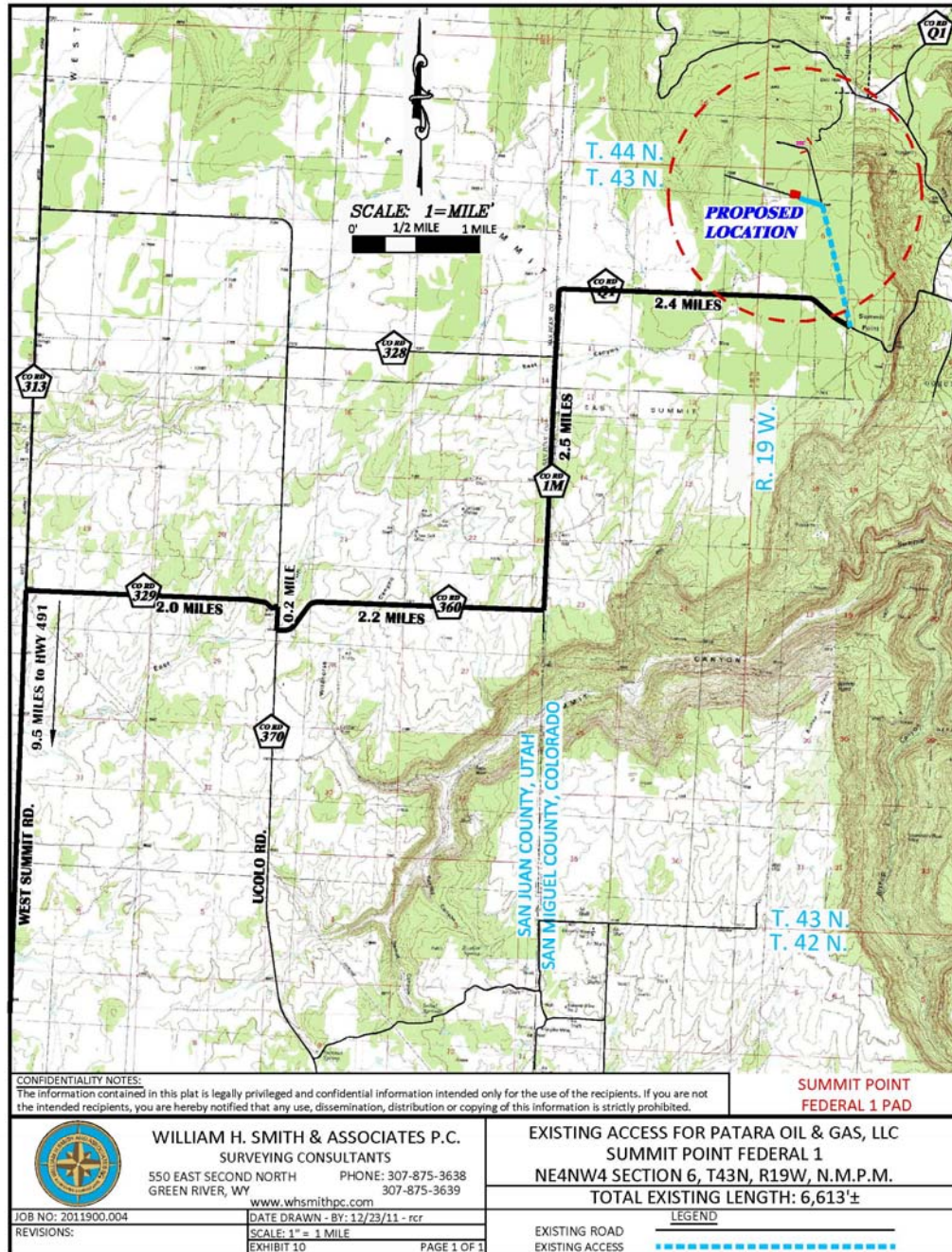
In the event toxic gases are released in such quantities as to be a possible hazard to the public the following steps (in addition to the procedure outlined in Section 5.0) will be taken by the person in charge:

- A. Evacuate all unnecessary personnel from the immediate hazardous area of the release.
- B. Choose a command post site in a safe area, and assume Incident Command.
- C. Alert by telephone or radio the Safety Field Coordinator and notify the person of the situation and your choice of a command post.
- D. Notify local Law Enforcement Officials of the need to restrict entry to the area and the **location of your command post**. Request their assistance in restricting entry into the danger area by placing roadblocks or barriers in safe areas.

NOTE: Alternate command posts and roadblocks may be required; the Incident Commander may make changes in the locations listed above. Care should be taken to notify all responders of the changes.

- E. If evacuation cannot be accomplished in a timely manner and the H<sub>2</sub>S release is posing an immediate threat to human life, the Incident Commander may choose to ignite the gas. Because of the increased risks igniting the gas can pose for response personnel, only the Incident Commander can give this order.

## APPENDIX A: Proposed Road



**DIRECTIONS TO:  
PATARA OIL & GAS, LLC  
SUMMIT POINT FEDERAL 1  
NE4NW4 SECTION 6, T43N, R19W, NMPM  
SAN MIGUEL COUNTY, COLORADO  
MAY 31, 2013**

Starting at the town of Dove Creek, Colorado, travel northwesterly on U. S. Highway 491 for 2.0 miles to the intersection of U. S. Highway 141 with U. S. Highway 491, then continue travel northwesterly on U. S. Highway no. 491 for 7.0 miles to the state line for Colorado and Utah, entering into Utah, continue traveling northwesterly on U. S. Highway for 4.4 miles (total 13.4 miles from Dove Creek) to its intersection with West Summit Road (aka, San Juan County Road 313).

Then turn right and travel north on West Summit Road for 9.5 miles to its intersection with San Juan County Road 329.

Then turn right and travel east on San Juan County Road 329 for 2.0 miles to its intersection with UCOLO Road (aka San Juan County Road 370).

Then turn right on UCOLO Road and travel south for 0.2 mile to its intersection with San Juan County Road 360.

Then turn left on San Juan County Road 360 and travel east for 2.2 miles, crossing the state line into Colorado, to its intersection with San Miguel County Road 1M.

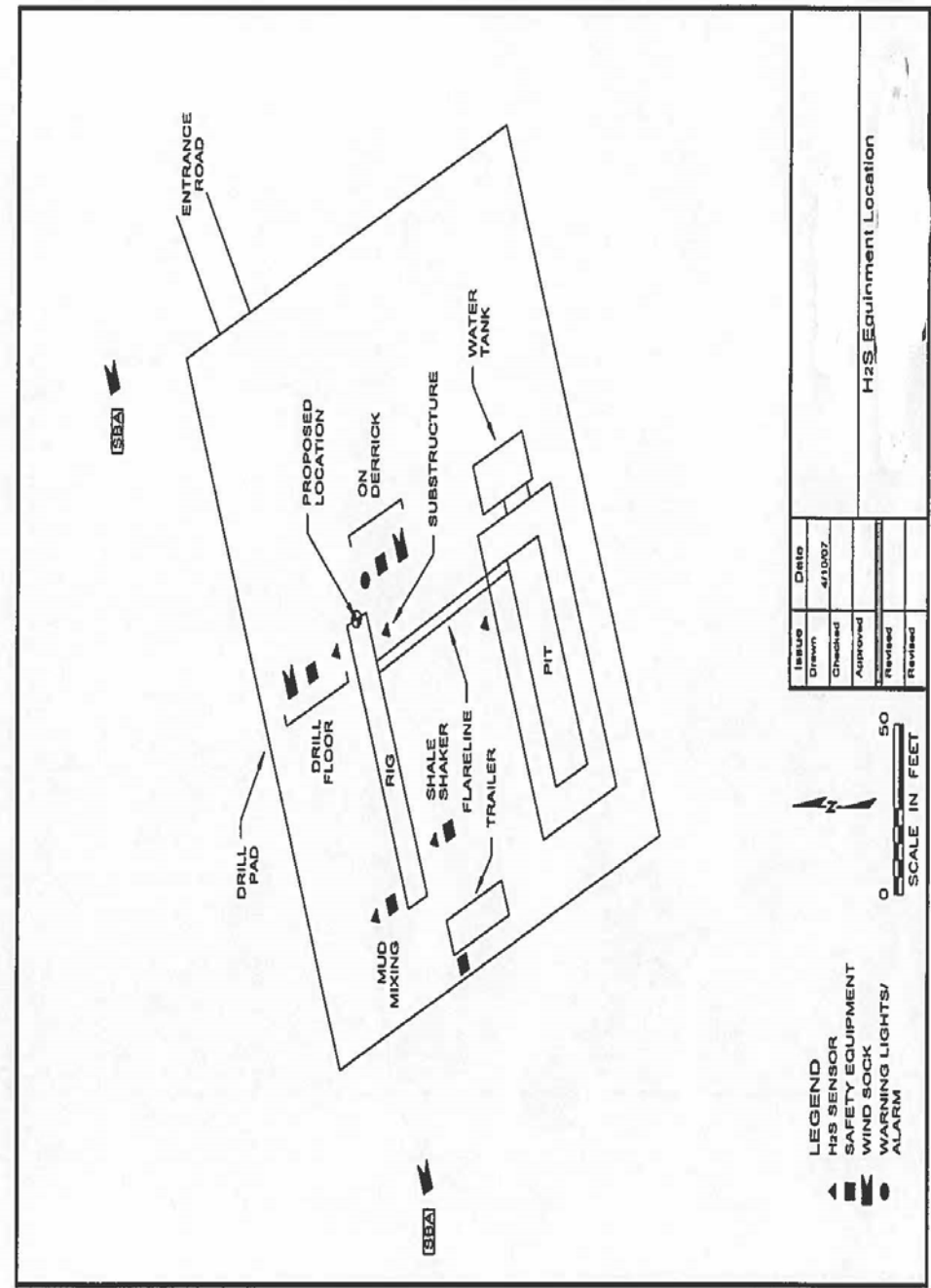
Then turn left on San Miguel County Road 1M and travel north for 2.5 miles to its intersection with San Miguel County Road Q1.

Then turn right on San Miguel County Road Q1 and travel east for 2.4 miles to its intersection with the access road for the Big Mac Federal 6-12 well, same being the access road for the proposed Summit Point Federal Point 1 well location.

Then turn left on the said access road and travel northwesterly 1.0 mile to a "T" intersection with the said access road to the location.

Then turn left on the said access road and travel west 0.25 mile to the location.

B: H<sub>2</sub>S Emergency Response Layout



## APPENDIX C: Emergency Contact

Emergency Contact List	
Contact Name	Telephone Number
EPA 24-Hour Spill Notification Number	303.293.1788
Department of Transportation National Response Center	800.424.8802
Naturita Area Fire Department	970.864.7333
Monticello Ambulance	435.587.2237
Fire (Monticello, Utah)	435.587.2237
St Mary's Care Flight	800.332.4923
U.S. Dept. of Interior, Bureau of Land Management	970.878.5555
CCI Paradox Upstream, LLC Corporate Office	303.825.0685
CCI Paradox Upstream, LLC Lisbon Gas Plant Office	435.686.7600
CCI Paradox Upstream, LLC Lisbon Gas Plant Control Room	866.774.8385
CCI Paradox Upstream, LLC Lone Cone Field Office	970.864.7591
Dax Jacobsen, EHS Field Coordinator	435.686.7608
San Miguel County Sheriff	970.728.1911
San Juan County Sheriff	435.587.2237

**Emergency calls should dial 911 (reference surface location Lat: 38.023266°N, Lon: 109.008889°W)**

**NOTE: If 911 is unavailable, call the applicable county Sheriff Dispatch number.**