Statewide Rule 36: Operations in Hydrogen Sulfide Areas

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Our mission is to serve Texas by our stewardship of natural resources and the environment, our concern for personal and community safety, and our support of enhanced development and economic vitality for the benefit of Texans.
Session Description

Discussion of the Statewide Rule 36 including general requirements, H-9 Certificate of Compliance, radius of exposure, safety issues, and contingency plans.
H₂S

What is H₂S?

- Colorless gas with a flame that is practically invisible
- Heavier than air
- Soluble in oil and water
- Dangerous to health
- Sewer gas, stink damp, sour crude, rotten-egg gas
Where do you find H$_2$S?

- Variety of natural and industrial settings
- Natural gas and petroleum
- Most H$_2$S obtained as by-product
- Can be recovered from natural gas and refining operations and converted to sulfuric acid or high quality Sulfur
Statewide Rule 36

Texas Administrative Code (TAC)
Title 16, Part 1, Chapter 3
§3.36

Oil, Gas, or Geothermal Resource Operation in Hydrogen Sulfide Areas
Statewide Rule 36

Introduction

- Designed to protect public from hazards of hydrogen sulfide gas (H2S)
- Education and training are the best defenses
- Industry must protect themselves, public
- Denver City H2S tragedy, February 1975
Compliance requirements

- Exploration, production and transportation of hydrocarbon fluids that contain hydrogen sulfide gas
  - 100 ppm or greater concentration

- Exceptions:
  - gathering, storing and transporting stabilized liquid hydrocarbons (atmospheric pressure)
  - refining, petrochemical and chemical plants
  - operations where concentration of H2S is less than 100 ppm
General Provisions

- Testing to determine H$_2$S concentration in operation/system
  - color metric tubes (Storage Tanks Only)
  - Tutweiler (titration method)
  - Lead-acetate method (ASTM D4084)
General Provisions

• Done at random sites/wells

• The well must be in production a minimum of 24 hours prior to the test.

• Must be performed onsite. Samples cannot be taken into a lab.

• May include:
  • well tubing or casing
  • portable well tester
  • treater or other vessel with fluid/gas
  • gas sales meter (upstream of a scrubber)
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Form H-9 Certificate of Compliance required:

• H2S concentration is 100 ppm or greater in system/operation

• Producing/injection in designated H2S field

• Drilling into known H2S field near a public area

• Drilling into a wildcat field (H2S)

• NOTE: A field is designated as sour when an operator files a Production H-9 indicating 100 ppm or greater H2S concentration.
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Radius of Exposure (ROE)

- SWR 36 identifies two ROEs that identify potential danger, may require additional compliance.

- **100 ppm** ROE – distance from release to where \( \text{H}_2\text{S} \) concentration in air will dilute to 100 ppm.

- Identifies public areas within the ROE
Radius of Exposure (ROE)

- 500 ppm ROE – distance from release to where H₂S concentration in air will dilute to 500 ppm
- Identifies public roads within the ROE
  - public roads are tax supported or any road used for public access/use
## Compliance Requirements Based on ROE

### Case 1: 100 ppm ROE is < 50’

### Case 2: 100 ppm ROE ≥ 50’ but < 3,000’ & No Public Area

### Case 3:
- 100 ppm ROE ≥ 50’ & Public Area; or
- 500 ppm ROE contains Public Road; or
- 100 ppm ROE ≥ 3,000’

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Warning & Marker Provision

All new signs shall state “Caution” and “Poison Gas” with yellow and black contrast
Warning & marker provision

- Signs must be of sufficient size
- Signs must be posted:
  - at well or facility within city limits or close proximity to public
  - at public road crossings
  - along a line when located within public area
  - along a road at frequent intervals to avoid accidental excavation
Warning & Marker Provision

Examples

- Caution: H₂S Poisonous Gas May Be Present
- Danger: Poison
- Danger: H₂S May Be Present
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Security

• Facilities shall be fenced and locked
  • when located within \( \frac{1}{4} \) mile of a public area
  • for tank facilities within city/town limits

• The fencing provision will be considered satisfied where the fencing structure is a deterrent to public access.

• Specific fencing requirements required on case-by-case basis
  • District Office makes this determination
Materials & Equipment

- Manufactured to satisfy NACE MR-01-75 and API RP-14E requirements

- Materials not susceptible to H2S stress cracking may be used
  - fiberglass, plastics
  - when used for applicable industry standard, specifications or recommended practices

- Other materials may be used
  - Commission must approve case-by-case
Materials & Equipment

• Existing facilities shall be in compliance providing there has been no H2S stress related failure

• RRC shall be notified of a failure resulting from H2S stress cracking
  • notified in writing
  • compliance of system will be determined
• Control and safety equipment

• Operators subject to this provision include:
  • 100 ppm ROE is in excess of 50 ft., includes any public area
  • 500 ppm ROE is greater than 50 ft., includes any public road
  • 100 ppm ROE is 3,000 ft. or greater

• Operators subject to this provision shall:
  • install and maintain devices and safety procedures to prevent the undetected release of H2S gas
Contingency plan

- Plan of action for alerting, responding and protecting the public following release of potentially hazardous volume of H2S gas

- Required for any operations where:
  - 100 ppm ROE is in excess of 50 ft., includes any public area
  - 500 ppm ROE is greater than 50 ft., includes any public road
  - 100 ppm ROE is 3,000 ft. or greater
Contingency plan

• Instructions/procedures for alerting public/safety personnel of emergency

• Procedures for requesting assistance to remove public

• Call list
  • supervisory personnel, sheriff, DPS, ambulance, fire department, doctors, RRC District Office, etc.
Contingency plan*

- Plat detailing area of exposure
- Names & telephone numbers of responsible parties
- Provisions for advance briefing of the public
- RRC District Office phone number

*Refer to SWR 36 “Contingency Plan Provisions” for a complete list of requirements.
Injection of H2S Gas

- Injection of fluids containing H2S is not allowed unless:
  - approved by Commission after public hearing
  - approved by District Office

- Contingency plan and control and safety equipment required

- Injection of sour produced water is not H2S injection
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Training

• Operations with 100 ppm or greater H₂S shall train employees working in potentially affected areas in H₂S safety

• Operators shall require service companies in H₂S affected areas to utilize only personnel trained in H₂S safety

• Training **MUST** be done on an annual basis
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Training

- Training **SHALL** include:
  - hazards and characteristics of H2S safety precautions
  - operations of safety and life support equipment

- Additional training for on-site supervisory personnel:
  - effects of H2S on metal components
  - corrective action and shutdown procedures
  - full knowledge of contingency plan
Accident notification

• Operator is responsible for notifying RRC District Office:
  • accidental release of H2S gas that may present a hazard
  • activation of contingency plan
  • incident/accident involving H2S gas

• A written report shall be furnished to the RRC District Office within 10 days of these conditions.
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Drilling and workover provisions

• Infield drilling and workovers

• Drilling into known H2S zone

• Wildcat drilling

• Drilling or workover operations where:
  • 100 ppm ROE is in excess of 50 ft., includes any public area
  • 500 ppm ROE is greater than 50 ft., includes any public road
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Infield drilling and workovers

• Requirements for drilling or workovers on leases with Production Form H-9 filed:
  • protective breathing equipment (SCBA)
  • maintained at two or more locations
  • wind indicators and H2S signs on site
  • automatic H2S sensors/alarms
  • personnel trained in H2S and safety equipment
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Infield drilling and workovers

• Minimum compliance depth for drilling: 1,000 feet above known H2S zone

• Compliance for workovers is when a rig moves in to rig up
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Drilling into known H2S zone

• File Form H-9 with District Office
  • at least 30 days prior to drilling
  • waiver may be requested in writing to DO

• Protective breathing equipment (SCBA) shall be maintained at two or more locations
Drilling into known H2S zone

- Visible wind indicators
- H2S signs posted at entrance
- Automatic, audible H2S sensors/alarms
- Personnel trained in H2S and safety equipment
- Compliance depth for drilling: 1,000 ft. above known H2S zone
Wildcat drilling

• “Wildcat” designation may require operator to comply if District Office determines conditions warrant compliance.

• Call District Office for specific requirements

• Requirements vary by District Office.
Wildcat drilling

• “Full compliance” requires:
  • infield drilling and workover requirements
  • sufficient breathing equipment
  • minimum 3 audible H2S sensors
  • method of igniting gas in event of emergency
  • choke manifold, mud-gas separator, flare line and method for lighting the flare
Wildcat drilling

- “Full compliance” requires:
  - secondary remote control of blowout prevention and choke equipment located a safe distance from well

- Drill Stem Test of H2S zone
  - during daylight hours
  - RRC DO notified before test

- BOP and well control systems pressure tested
  - at or near compliance depth
  - RRC DO notified 4 hours prior
Drilling or workover operations

• When 100 ppm ROE includes public area or 500 ROE includes a road:
  • call RRC District Office
  • file Form H-9 for Drilling with the RRC DO 30 days prior
  • file Contingency Plan with RRC DO

• Full compliance/same requirements as Wildcat drilling
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Form H-9 Certificate of Compliance

• Certified operator has or will comply with the provisions

• H-9’s are not transferable, each operator must test each lease/gas well or system and file H-9
  • file in triplicate with the District Office
  • file 30 days prior to commencement of drilling;
  • file within 30 days after P-4 certificate of transfer;

• New/amended H-9 filed if change in public exposure

• Signed by a person trained, experienced and qualified to make the certification
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Completion report required

• Shall report on the initial completion report for oil well and gas well gas the \( \text{H}_2\text{S} \) concentration when completed either in a designated \( \text{H}_2\text{S} \) field or the \( \text{H}_2\text{S} \) is 100 ppm or greater

• Shall file a Drilling Form H-9 or provide a copy of a certified copy of a Production Form H-9 when submitting a drilling application that requires one to be filed
RRC District Office H2S Coordinators

- San Antonio (01/02), Wesley Dresch* (210) 227-1313
- Houston (03), Pete Fisher (713) 869-5001
- Corpus Christi (04), Rick Silguero (361) 242-3113
- Kilgore (05/06), Ronny Russell (903) 984-3026
- Abilene (7B), Sam Birdwell** (325) 677-3545
- San Angelo (7C), Bill Spraggins (325) 657-7450
- Midland (08/8A), Tom Fouts (432) 684-5581
- Wichita Falls (09), Kim Peterson (940) 723-2153
- Pampa (10), Alan Leach (806) 665-1653

*State Coordinator for Districts 1, 2, 3, 4, 5, & 6
**State Coordinator for Districts 7B, 7C, 8/8A, 9 & 10
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H2S Information:

http://www.rrc.state.tx.us/oil-gas/research-and-statistics/field-data/h2s/

http://www.rrc.state.tx.us/media/2943/outlinerule36.pdf