ECMC Hydrogen Sulfide Drilling Operations Plan Operator Guidance

Form 2A

Rule 304.c.(10). - Hydrogen Sulfide Drilling Operations Plan

Document Control

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Rule Citation

Rule 304.c.(10). Hydrogen Sulfide Drilling Operations Plan

If operating in zones known or suspected to contain hydrogen sulfide gas ("H_2S"), a H_2S drilling operations plan consistent with the requirements of Rule 612.d.

Rule 612.d. H_2S Drilling Operations Plan

(1) When proposing to drill a Well in areas where H_2S gas can reasonably be expected to be encountered, Operators will submit a H_2S drilling operations plan with their Form 2, unless the plan was already submitted with their Form 2A, pursuant to Rule 304.c.(10).

(2) Operators will prepare the H_2S drilling operations plan pursuant to BLM Onshore Order No. 6, as incorporated by reference in Rule 612.b.(1) [referenced in Appendix A of this guidance document].

Purpose of Rule

Hydrogen sulfide ("H_2S") is a toxic, poisonous gas that could cause death or injury. The purpose of the Hydrogen Sulfide Drilling Operations Plan is to provide ECMC with a detailed organized plan of action for preventing and protecting the Operator's staff, contractors, subcontractors, and anyone else on-site during operations, including the Commission's inspectors, from H_2S exposure. The Operator's drilling superintendent (or other designee) is responsible for initiating and carrying out the plan.

This plan is required when drilling, completing, testing, reworking, producing, injecting, gathering, storing, or treating operations are being conducted in geologic zones which are known or could reasonably be expected to contain H_2S or which, when flared, could produce sulfur dioxide ("SO_2") in such concentrations that upon release could constitute a hazard to human life. The plan should guide personnel in recognizing, preparing, and mitigating potentially dangerous H_2S situations during drilling operations. Not all situations can be foreseen on location, nor can detailed instructions be provided for every situation that might be encountered. The policies and guidelines set forth in this plan should be considered as a minimum set of requirements for preparing and dealing with H_2S exposure.

Implementation

When drilling, the plan shall be implemented prior to drilling within 500 feet of the H_2S-bearing formation or at least three (3) days prior to encountering the formation, based on average drilling rates for the production hole, whichever occurs first. Notify ECMC, the LGD, and local emergency dispatch of operator's intent to implement the H_2S Operations Plan prior to commencing drilling/completions, workover, completion, or servicing operations on production or gathering equipment.

An H_2S Operations Plan should also be in place when servicing production equipment or gathering equipment, including flow lines, if H_2S gas is reasonably expected to be encountered during the servicing operation.

Documentation

Copies of the plan should be submitted to ECMC, the Local Government Designee (LGD), and the local emergency dispatch office prior to commencing the operation.

Operators are also required to follow the reporting and documentation requirements outlined in ECMC Rule 612. It is recommended that this written plan should also comply with the American National Standards Institute (ANSI) Standard Z390.1-1997: Accepted Practices for Hydrogen Sulfide Safety Training Programs, and American Petroleum Institute (API) Recommended Practice (RP) 49: Recommended Practices for Drilling and Well Servicing Operations Involving Hydrogen Sulfide.

Guidance/Requirements

The operator will develop a Hydrogen Sulfide Drilling Operations Plan, and an associated set of BMPs to ensure the protection of operator's personnel as well as public health, safety, and welfare during drilling operations.

This document should address the following information, operations, procedures, and documentation requirements.

1. Site Description: Provide a brief description of the Oil and Gas Location, including location name, well names, and API numbers, legal location, and latitude/longitude; whether on fee or federal surface; site elevation and surrounding topography; potential sources of H_2S (geologic formations, drilling mud returns, well stimulation flowback); and proposed timeframes and duration of all oil and gas operations.
2. Personnel Training: Describe training to be delivered to all personnel associated with the drilling operations to ensure efficient and correct action in all situations. Training will be provided in the general areas of:

a. Personnel safety - hazards and characteristics of H_2S, effect on metal components of the system, safety precautions, fixed monitors at critical points such as possum belly, rotating head and rig floor, operation of safety equipment and escape packs, self contained breathing apparatus and work unit air systems, and corrective action and shutdown procedures;

b. Rig operations - location of hydrogen sulfide within the area of exposure at the drilling location; use of the buddy system and the requirement for standby personnel under certain condition; the existence of sulfur dioxide (SO_2) and the hazards it presents during H_2S flaring); use of hack tests to detect presence of dissolved H_2S in drilling fluids; use of chemical scavengers in mud system to control H_2S while still dissolved in drilling fluids; use of H_2S sensors in conjunction with total gas detectors while monitoring hydrocarbons in drilling fluid; and

c. Well control procedures, including a plan for handling gas kicks and other drilling problems and when flaring will commence to control H_2S during kicks.

3. Operator's Key Personnel: Provide a list of names; titles; responsibilities, duties, and jobs; and telephone numbers.

4. Properties of Hydrogen Sulfide: Provide a description of the physical properties of H_2S, the toxicity levels of H_2S, OSHA and NIOSH exposure limits, effects of H_2S on personnel, effects of H_2S on personnel, and effects of sulfur dioxide (SO_2).

5. H_2S Operating Conditions or Area Designations, Recommended Work Practices, and Emergency Procedures: Provide a description of the various operating conditions or area designations (based on the absence or presence of H_2S) should be provided, along with recommended work practices and the

appropriate emergency procedures for each condition (level of danger posed by H_2S concentrations). These should include:

a. Level I Designated Area - Normal Operating Conditions, Potential Danger, Operations Under Control (no detectable gas present at surface);

b. Level II Designated Area - Potential to Moderate Danger to Life (H_2S gas present at concentration less than 10 parts per million [ppm]); and

c. Level III Designated Area - Moderate to Extreme Danger to Life (H_2S present in concentrations at or above 10 ppm; critical well operations or well control problems; or in the extreme, loss of well control).

6. Rescue and Management Personnel (including jurisdictional law enforcement, fire, hospital, ECMC, BLM): Provide a description of the manner in which the public will be notified of an emergency (by telephone or in person); steps to be taken in case of an emergency, such as abandoning the danger area; the necessary notifications of agencies; and requesting assistance for controlling traffic and evacuating people. Include relevant organization names, phone numbers, and addresses.

7. Location Layout/Well Site Diagram: Provide the location (or location site diagram) of at least two pre-determined safe areas where people can assemble in the event of an emergency. These locations should be located 180 degrees to one another and in the direction of the prevailing winds. Identify other components, including:

a. rig orientation;

b. rig H_2S detection and monitoring equipment including location of fixed H_2S sensors (at the bell nipple, at the shale shaker, wellhead cellar, on the rig floor, or any other additional H_2S detector locations for the well), location of audible alarms, location of visual alarms, portable H_2S monitors, and portable SO_2 monitors;

c. drilling mud tanks or pits;

d. all other equipment;

e. prevailing wind direction;

f. surrounding terrain and topographic features;

g. briefing areas;

h. primary briefing area, based on prevailing wind direction;

i. location of all telephones and/or means of communication;

j. access/egress points and roads (including at least one access road, at least one egress [exit] road, site security, traffic control, attendance roster, and fencing where public access is possible or likely);

k. flare line;

l. visual warning systems including wind direction indicators, caution signs, and danger signs (easily seen within 50 feet of storage vessels or potential points of exposure); and

m. wind socks.

8. Personal Protective Equipment (PPE) for Essential Personnel: Provide a description of the location, type, storage, and maintenance of all working monitors and escape packs on-site; the means of communication when using breathing equipment; and the program for testing, calibration, and maintenance records for all PPE.

9. Metallurgy: Provide a description of the metallurgical properties of all temporary and fixed tubular goods; the metallurgical properties of well control equipment potentially exposed to H_2S during drilling operations; the metallurgical properties of production and gathering equipment; and inspection

and maintenance schedules to check for corrosion, cracks or leaks. Records should be maintained by the operator for ECMC inspection upon request.

10. Well Control (Drilling and Workover Operations): Provide a description of the various well control procedures and devices, including flare lines and means of ignition, remote controlled choke, flare guns/flares, mud-gas separator, and blowout preventer and flow control.

11. Mud Program (Drilling Operations): Provide a description of the various drilling mud systems and additives for controlling H_2S, the mud degassing system, and H_2S scavengers (chemicals) that provide rapid, non-reversible removal of H_2S.

Additional Information

Common Errors and Issues Encountered by ECMC Staff

1. N/A

General Notes

1. In addition to the H_2S Drilling Operations Plan pursuant by Rule 304.c.(10)., an H_2S Public Protection Plan may be required pursuant to Rule 612.c.
2. Operators will submit an H_2S Drilling Operations Plan with their Form 2, unless the Plan was already submitted with their Form 2A, pursuant to Rule 304.c.(10).

Frequently Asked Questions

1. N/A

Document Change Log

Change Date	Description of Changes
July 23, 2025	Updated to reflect Dec. 2024 Rules update
July 31, 2025	Reviewed, ADA accessibility verified, Prepared for publication

Appendix A - Associated Rule

612.b.(1).

1. Rule 612.b.(1). Radius of exposure will be calculated pursuant to Bureau of Land Management ("BLM") Onshore Order No. 6 (Jan. 22, 1991). Only the 1991 version of Onshore Order 6 applies to this Rule; later amendments do not apply. All materials incorporated by reference in this Rule are available for public inspection during normal business hours from the Public Room Administrator at the office of the Commission, 1120 Lincoln Street, Suite 801, Denver, CO 80203. In addition, these materials are available from the BLM Colorado State Office, 2850 Youngfield St., Lakewood, CO 80215, and are available online at https://www.blm.gov/sites/blm.gov/files/energy_onshoreorder6.pdf.