

**UNITED STATES DEPARTMENT OF THE INTERIOR
MINERALS MANAGEMENT SERVICE
GULF OF MEXICO OCS REGION**

NTL No. 2009-G31

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NOTICE TO LESSEES AND OPERATORS OF FEDERAL OIL, GAS, AND SULPHUR
LEASES, OUTER CONTINENTAL SHELF, GULF OF MEXICO OCS REGION

Hydrogen Sulfide

This Notice to Lessees and Operators (NTL) supersedes NTL No. 98-16, dated August 10, 1998, on this topic. It establishes Standard Material Requirements, Materials for Sulfide Stress Cracking and Stress Corrosion Cracking Resistance in Sour Oilfield Environments (NACE Standard MR0175-2003) as best available and safest technology (BAST), provides further guidance on classifying an area for the presence of hydrogen sulfide (H₂S), includes guidance on H₂S detection, updates regulatory citations, and includes a guidance document statement.

Purpose

The Minerals Management Service (MMS) regulations at 30 CFR 250.490 require you to take all necessary and feasible precautions and measures to protect personnel from the toxic effects of H₂S and to mitigate damage to property and the environment caused by H₂S. In the following section of this NTL, the MMS Gulf of Mexico OCS Region (GOMR) clarifies and provides guidance and information regarding the interpretation of certain provisions of these regulations to ensure that you are fully prepared and capable of providing the necessary protection and mitigation.

A major focus of this NTL is to differentiate between the criteria for using NACE Standard MR0175-2003 materials and the criteria for determining an H₂S classification. The NACE standards that relate to an H₂S partial pressure of 0.05 pounds per square inch absolute (psia) primarily address stress cracking and stress corrosion resistance, while the MMS definition of "H₂S present" addresses human safety and protecting the environment for H₂S concentrations equal to or exceeding 20 parts per million (ppm). The MMS GOMR is concerned if either threshold is crossed. The criteria for using NACE materials and the MMS definition of "H₂S present" or "H₂S absent" are separate evaluations with discretely different parameters. At a pressure greater than 2,500 pounds per square inch gauge (psig), a well could be classified as "H₂S absent" because the concentration of H₂S is less than 20 ppm but still require NACE Standard MR0175-2003 materials because the partial pressure of H₂S is greater than 0.05 psia.

Regulations and Guidelines

1. **30 CFR 250.107(c) and (d) - Best Available and Safest Technology (NACE Standard MR0175-2003).**

The cited regulations require you to use the best available and safest technology (BAST) whenever practical on all exploration, development, and production operations and authorize the MMS to require additional measures to ensure the use of BAST to avoid failure of equipment that would have a significant effect on safety, health and the environment.

The MMS GOMR has determined that NACE Standard MR0175-2003 represents BAST with regard to determining when you must use equipment that is constructed of materials with metallurgical properties that resist or prevent sulfide stress cracking and stress corrosion cracking. Based on this document, the MMS GOMR has determined that you must apply NACE Standard MR0175 provisions for equipment and components that may encounter a partial pressure of H₂S that equals or exceeds 0.05 psia.

Appendix No. 1 of this NTL is a graph that shows the 0.05 psia threshold with respect to pressure and H₂S concentration. This graph is provided as an aid for understanding, but in no way is it intended to replace the provisions of NACE Standard MR0175-2003.

In the absence of direct measurement of H₂S concentrations and reservoir pressure in a well being drilled, completed, or recompleted, the MMS GOMR will now determine that NACE Standard MR0175 provisions are required for the well if any of the following apply:

- a. The well is drilled to a depth where the static reservoir temperature exceeds 275° F.
- b. The well is classified as “H₂S present” or “H₂S unknown.”
- c. A well located within five miles has been drilled to a similar depth and that well has an H₂S partial pressure equal to or greater than 0.05 psia.

When you have measured H₂S concentrations directly and the reservoir pressure within a reservoir, then NACE Standard MR0175-03 will determine the requirements for NACE materials for that reservoir and all other wells drilled within a 5-mile radius to the same formation.

2. **30 CFR 250.490(a)(1) - H₂S Contingency Plans.**

The cited regulation requires you to follow the requirements of 30 CFR 250.490, including the requirement to submit an H₂S Contingency Plan, when you conduct drilling, well-completion/well-workover, and production operations in zones classified as “H₂S present” and “H₂S unknown.” You do not need to submit an H₂S Contingency Plan for operations in zones classified as “H₂S absent.”

3. **30 CFR 250.490(b) - H₂S Classification Definitions.**

The cited regulation defines the three H₂S classifications as:

H₂S absent means (1) drilling, logging, coring, testing, or producing operations have confirmed the absence of H₂S in concentrations that could potentially result in atmospheric concentrations of 20 ppm or more of H₂S; or (2) drilling in the surrounding areas and correlation of geological and seismic data with equivalent stratigraphic units have confirmed an absence of H₂S throughout the area to be drilled.

H₂S present means drilling, logging, coring, testing, or producing operations have confirmed the presence of H₂S in concentrations and volumes that could potentially result in atmospheric concentrations of 20 ppm or more of H₂S.

H₂S unknown means the designation of a zone or geologic formation where neither the presence nor absence of H₂S in any concentration has been confirmed.

In view of the increased activity in deepwater (i.e., water depths greater than 1,000 feet), the drilling and completion of high pressure/high temperature (HP/HT) wells, and the anticipated deep gas prospects in shallow water for which the above definitions may not readily apply, the MMS GOMR has decided to supplement these definitions by establishing a process that more accurately determines the proper H₂S classification for wells in the Gulf of Mexico OCS. This process is presented in the flow chart in Appendix No. 2 of this NTL. This flow chart provides general guidance; it does not incorporate all possible scenarios and does not replace geologic knowledge of areas known or suspected to have H₂S present regardless of lithology, depth, temperature, or distance to nearby wells.

4. 30 CFR 250.490(c) - Classifying an Area for the Presence of H₂S.

The cited regulation outlines the procedures for obtaining an H₂S area classification. The MMS GOMR requires that a request to classify an area for the presence of H₂S be submitted in your Exploration Plan (EP) or your Development Operations Coordination Document (DOCD) (see 30 CFR 250.215(b) and 30 CFR 250.245(b)). Accordingly, a departure is granted from the requirement that you make a request to classify an area for the presence of H₂S in the Application for Permit to Drill (APD) as required by 30 CFR 250.490(c) provided that the APD does not deviate from the EP or DOCD and that no new data is available that would alter the H₂S area classification.

5. 30 CFR 250.490(d) - H₂S Detection.

The cited regulation describes what you must do if you encounter H₂S that could potentially result in atmospheric concentrations of 20 ppm or more while conducting operations.

a. *During Production Operations.* In the event you detect H₂S in concentrations that could potentially result in atmospheric concentrations of 20 ppm or more while conducting production operations, notify the appropriate MMS GOMR District Manager without delay and submit an H₂S Contingency Plan within 30 days following detection.

b. *During Drilling Operations.* For drilling in areas classified as “H₂S present” or “H₂S unknown,” your approved H₂S contingency plan must be implemented. If you encounter H₂S

that could potentially result in atmospheric concentrations of 20 ppm or more in an area classified as “H₂S absent,” stabilize the situation immediately by taking such measures as evacuating all non-essential personnel, raising the pH of water-based drilling fluids, or adding a scavenger to synthetic based drilling fluid. Once the situation is stabilized, notify the appropriate MMS GOMR District Manager and begin to follow the requirements for areas classified as “H₂S present.”

If you need more time to purchase, modify, or install equipment, submit a request with supporting documentation to the appropriate MMS GOMR District Manager to extend the time for implementation of the requirements for areas classified as “H₂S present.”

6. 30 CFR 250.490(f) - H₂S Contingency Plan.

The cited regulation outlines the contents of an H₂S Contingency Plan. When preparing your plan:

- a. Please use the following format:
 - i. General information relative and common to all types of operations.
 - ii. Drilling Operations.
 - iii. Workover Operations.
 - iv. Production Operations.
 - v. Pipeline Operations.
 - vi. Simultaneous Operations.
- b. Address all nearby manned facilities that a major release of product containing H₂S or SO₂ may affect and provide for the same measure of personal protection as the emitting facility for the appropriate concentrations. This protection includes H₂S and sulphur dioxide (SO₂) detectors connected to audible and visual alarms, breathing equipment, training, and an evacuation plan. Include a dispersion model depicting the worst case release that determines whether a manned facility will be affected.

Report immediately all changes to an H₂S Contingency Plan to the appropriate MMS GOMR District Manager.

7. 30 CFR 250.490(j)(5) - Sensor Location for Production Operations.

The cited regulation requires that you have one H₂S sensor per 400 square feet of deck area and a sensor within 10 feet of each vessel, compressor, wellhead, manifold, or pump that could release enough H₂S to result in atmospheric concentrations of 20 ppm. You may conduct a design analysis including dispersion modeling to determine a more effective or a more efficient placement of sensors. In that case, the MMS GOMR may approve under 30 CFR 250.141 an alternate placement or choice of sensors if the analysis shows that such a placement or sensor choice provides level of safety that equals or surpasses that provided by the specified requirements.

8. 30 CFR 250.490(j)(6)(ii) - Calibration of H₂S Sensors.

The cited regulation specifies that an H₂S sensor tolerance of 2 ppm or 10 percent during a functional test is acceptable. Alternatively, you may use sensors with a greater test tolerance, provided that you adjust the activation point so that the sensor alarm will activate at an H₂S atmospheric concentration no higher than 22 ppm. For example, if the tolerance of the instrument is 25 percent (5 ppm for a reading of 20 ppm), you may set the sensor alarm to activate at 17 ppm. With the possible 5 ppm error, the alarm could activate between 12 and 22 ppm. The level of safety for the worst case of 22 ppm would then be the same as the level of safety specified in the cited regulation.

9. 30 CFR 250.490(j)(12) - Alternative Measures for Protection Against SO₂.

30 CFR 250.490(j)(11) lists the actions that you must take to protect against SO₂ if you burn gas containing H₂S. The cited regulation allows you to follow alternative measures instead of those in paragraph (j)(11) if you propose and the appropriate MMS GOMR District Manager (authority delegated from the Regional Supervisor) approves the alternative measures.

10. 30 CFR 250.490(j)(13)(i) - Respirator Breathing Time.

The cited regulation requires that you provide all personnel, including contractors and visitors on the facility, with immediate access to self-contained, pressure-demand-type respirators with hoseline capability and breathing time of at least 15 minutes. Under 30 CFR 250.141, the appropriate MMS GOMR District Manager may approve the use of self-contained, pressure-demand-type respirators with hoseline capability that have a breathing time less than 15 minutes in those cases where you show that the overall protection equals or surpasses that provided by the specified requirements. In your request for alternate compliance, provide information regarding:

- a. The number of excess breathing devices that are on the platform (i.e., number of devices in excess of the number of personnel).
- b. Quick access to stationary breathing supply.
- c. Anticipated egress time for all personnel who might end up with less than a 15-minute supply.
- d. Effective duration of respirator air supply in a panic situation.

11. 30 CFR 250.490(i) - Signs, Visual Alert Devices, and Audible Warning Devices.

The cited regulation provides the requirements for visual and audible warning systems. Make sure that any visual device can be seen from the helideck and from all boat landings. Also, make sure that any audible warning alert is recognizable at the helideck and at all boat landings.

12. 30 CFR 250.490(q)(9) - Fuel and/or Instrument Gas.

The cited regulation prohibits you from using gas containing H₂S for fuel gas without receiving prior approval from the appropriate MMS GOMR District Manager. The District Manager may grant a departure for you to use fuel gas with up to 50 ppm of H₂S on a case-by-case basis.

When requesting approval, indicate the H₂S concentration in the fuel gas and comply with the requirements for protection against SO₂ in 30 CFR 250.490(j)(11).

13. 30 CFR 250.1105(f) - Flaring and Venting of Gas Containing H₂S

The cited regulation details the requirements for flaring, venting, and the reporting of flared gas containing H₂S. It also authorizes the MMS GOMR, for safety or air pollution prevention purposes, to further restrict the flaring of gas containing H₂S. When determining the need for such restrictions, the MMS GOMR may require you to:

- a. Provide dispersion models of the toxic effects on downwind constituents for all well tests whose product contains H₂S concentrations greater than 500 ppm. Make sure that these models include contours of H₂S concentrations and SO₂ concentrations as determined by the District Manager and depict the relationship of these concentrations to known structures, shipping lanes, and proximity to shore.
- b. The estimated burner efficiency ratings of the flare systems, the estimated maximum flow rate, the H₂S concentration at the maximum rate of the well stream, and the H₂S and SO₂ concentrations after the burn.

Guidance Document Statement

The MMS issues NTL's as guidance documents in accordance with 30 CFR 250.103 to clarify, supplement, and provide more detail about certain MMS regulatory requirements and to outline the information you provide in your various submittals. Under that authority, this NTL sets forth a policy on and an interpretation of a regulatory requirement that provides a clear and consistent approach to complying with that requirement. However, if you wish to use an alternate approach for compliance, you may do so, after you receive approval from the appropriate MMS office under 30 CFR 250.141.

Paperwork Reduction Act of 1995 Statement

The information referred to in this NTL is intended to provide clarification, description, or interpretation of requirements contained in 30 CFR Part 250, Subparts A, D, and K. The Office of Management and Budget (OMB) has approved the information collection requirements in these regulations under OMB Control Numbers 1010-0114, 1010-0141 and 1010-0041, respectively. This NTL does not impose any additional information collection requirements subject to the Paperwork Reduction Act of 1995.

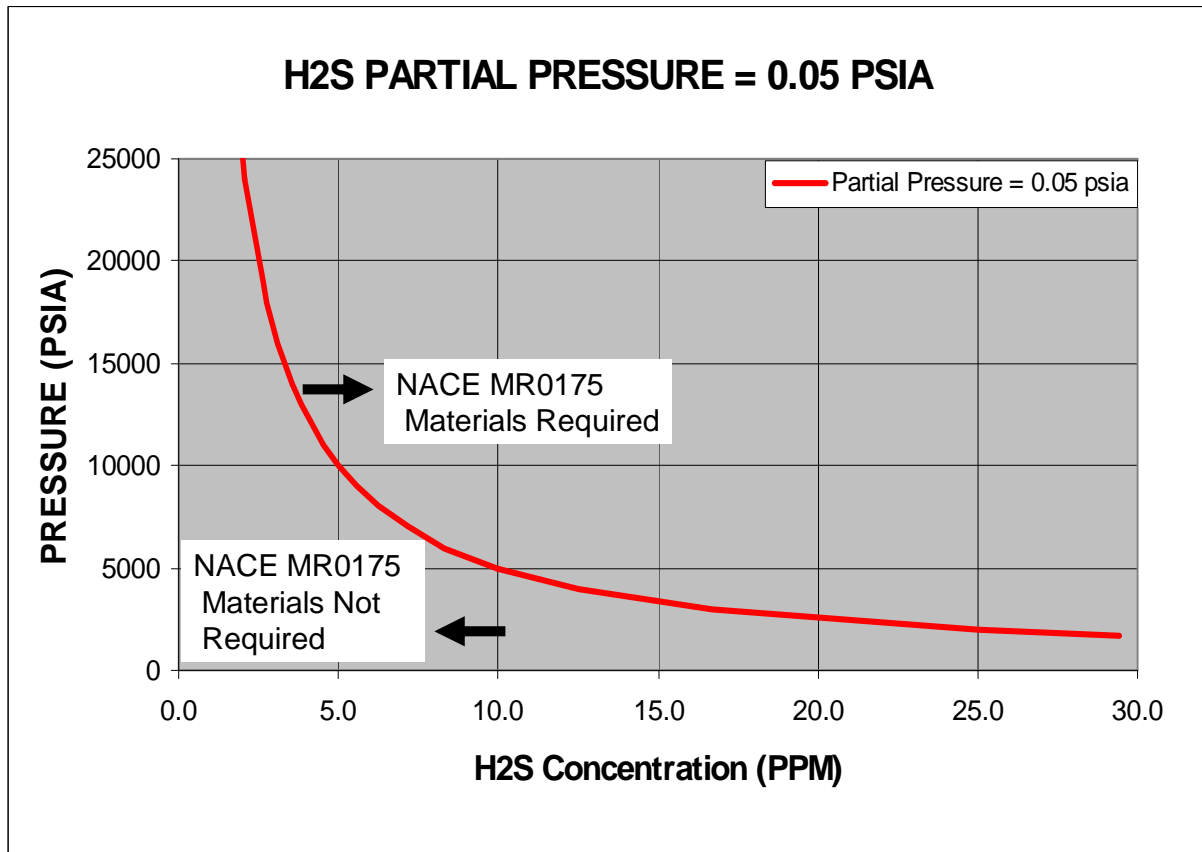
Contact

If you have any questions regarding this NTL, please contact the appropriate MMS GOMR District Office.

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Lars T. Herbst
Regional Director

Attachment No. 1



Attachment No. 2

H2S Classification Flow Chart Clarification for CFR 250.490 (b)

