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43 CFR Part 3160

Onshore Oil and Gas Operations; Federal and Indian Oil and Gas Leases; Onshore Oil and Gas Order No. 6, Hydrogen Sulfide Operations; Final Rule

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

43 CFR Part 3160

[AA-610-00-4111-02; Circular No. 2630]

RIN 1004-AA67

Onshore Oil and Gas Operations; Federal and Indian Oil and Gas Leases; Onshore Oil and Gas Order No. 6, Hydrogen Sulfide Operations

AGENCY: Bureau of Land Management, Interior.

ACTION: Final rule.

SUMMARY: This final rule provides for the issuance of Onshore Oil and Gas Order No. 6, Hydrogen Sulfide Operations, which implements and supplements the provisions of 43 CFR 3162.1, 3162.5–1, 3162.5–2, and 3162.5–3. The purpose of this order is to protect public health and safety and those personnel essential to maintaining control of the well. This Order addresses the requirements for conducting operations in a hydrogen sulfide environment. Specifically, it identifies the necessary applications, approvals, and reports required to conduct hydrogen sulfide operations and where necessary, the components required for a Public Protection Plan. It also identifies the specific operating requirements for conducting drilling, completion, workover, and production operations in a hydrogen sulfide environment. In addition, this Order details enforcement actions and allows for variances from the specific standards. This final rule also amends 43 CFR 3164.1, Onshore Oil and Gas Orders, paragraph (b).

EFFECTIVE DATE: January 22, 1991.

ADDRESSES: Inquiries or suggestions should be sent to: Director (610), Bureau of Land Management, Premier Building, Room 601, 1849 C Street NW., Washington, DC 20240.

FOR FURTHER INFORMATION CONTACT: Sie Ling Chiang, (202) 653–2133, or Chris Hanson, (414) 297–4421.

SUPPLEMENTARY INFORMATION: A proposed rule for issuing Onshore Oil and Gas Order No. 6, Hydrogen Sulfide Operations, was published in the Federal Register on May 16, 1989 (54 FR 21075), with a 60-day comment period. An extension for submission of comments until July 31, 1989, was granted and published July 24, 1989 (54 FR 30766). Comments were received from 12 sources, including 2 industry associations, 5 industrial entities, and 5 Government entities.

Several changes and additions were made in the definitions section for clarification in response to the comments. Changes were also made in the requirements section in response to comments.

Those comments relating directly to the proposed rule have been grouped by subject matter and will be discussed as a group rather than individually.

General Comments

One commenter suggested that drilling operations be discussed separately in the Order and that completions and workovers be discussed with production operations. This Order has delineated those provisions in the drilling section which have specific applicability to completions and workovers. In addition, the minimum standards identified for all operations will remain the same regardless of organizational format. Therefore, this suggestion was not adopted.

It was recommended that a discussion of the Forest Service's (FS) role in the Public Protection Plan should be presented in this Order. The Mineral Leasing Reform Act of 1987 did not grant any specific authority in this regard to the FS. The regulations that pertain to the FS under that Act were published on March 21, 1990 (55 FR 10423). These regulations acknowledge that compliance is required with applicable Onshore Oil and Gas Orders issued by the Department of the Interior, Bureau of Land Management (BLM) as specified under 36 CFR 228.112(c)(7). The requirement for a Public Protection Plan to be included in this Order is pursuant to BLM's regulatory authority set forth in 43 CFR 3161.2. The BLM assumes the primary role and responsibility for Public Protection Plans. In the development of a Public Protection Plan, however, the operator should consider the role of the FS where the agency is the primary Federal land manager. For operations where the FS is the surface managing agency, all plans required by this Order will be forwarded to the FS along with the applicable parts of the submitted Application for Permit to Drill in accordance with existing regulations, policy and procedures.

One commenter stated that the threshold criteria throughout the Order of 100 ppm of H_2S in the gas stream and 10 ppm of H_2S in the ambient air is confusing. The following is an explanation of the provision. In addition, the wording has been changed in Sections III.A.1. and III.C.1.c. for further clarification. The 100 ppm H_2S in the gas stream is used solely as a threshold criterion to identify those wells and facilities which are subject to the requirements of this Order. The criterion of 10 ppm of H_2S in the ambient air applies to situations where protection of essential personnel and/or the public health and safety is an issue. The Drilling Operations Plan is implemented at 500 feet above the first potential H_2S zone or 3 days prior to penetrating the first identified H_2S formation (whichever comes first) for all wells subject to this Order. In addition, if 10 ppm of H_2S in the ambient air is indicated at any of the sensing points, additional measures will be taken. It should be noted that the 10 ppm of H_2S in the ambient air is not used as a factor in determining which wells and/or facilities are subject to this Order.

One commenter stated that the BLM does not have any means of routinely verifying the threshold criterion of 100 ppm H_2S in the gas stream to ensure that all wells which meet the criterion are properly subjected to the requirements of this Order. The BLM conditionally accepts many types of data from oil and gas operators with respect to wells on Federal and Indian oil and gas leases. However, the BLM reserves the right to conduct or require an independent analysis of the gas.

Two comments were received regarding the limits of the authorized officer's discretionary authority with respect to enforcement where major isolations exist. This Order supplements the existing oil and gas operating regulations (43 CFR 3160), and the discretionary authority is defined throughout 43 CFR 3163. Further, the introductory paragraph in section III of this Order has been rewritten to clarify this authority and additional guidance will be provided to the BLM's authorized officers via internal manuals.

It was suggested that all specific references to Onshore Order No. 1 be removed. The BLM agrees with this recommendation since Order No. 1 is currently being revised. However, general references to Onshore Order No. 1 have been retained in this rulemaking because various provisions are applicable to Order No. 6.

One commenter suggested that the status of H_2S and SO_2 under the Comprehensive Environmental Resource Compensation and Liability Act (CERCLA) should be discussed. CERCLA specifically exempts natural gas. The Environmental Protection Agency has considered all constituents of natural gas, such as H_2S and SO_2 as meeting this exemption. Therefore, the comment was not adopted.

One commenter felt that it is undesirable for the BLM to classify the severity of each violation, state the

corrective action, and specify the normal abatement period in the Order. The oil and gas industry and its associations have indicated in numerous meetings with BLM representatives that they would like to know how the BLM will generally view non-compliances and the normal enforcement actions. Therefore, based on this consideration, the BLM has decided to incorporate these provisions in all its Onshore Oil and Gas Orders.

It was recommended that this rule be made effective at least 60 days after the date of publication to provide operators adequate notice. This suggestion has been adopted.

Specific Comments

I.A. Authority

One commenter contended that the terms of this Order should be promulgated either as an amendment to 43 CFR part 3162 or as an appendix to 43 CFR part 3160 so that it would be included in the Code of Federal Regulations. The commenter stated that publication of an Order results in redundancy and inconsistency, but did not identify any inconsistency. No redundancy or inconsistency has been found. As authorized by 43 CFR 3164.1, this Order implements and supplements the requirements of 43 CFR part 3162. It is being properly promulgated through the notice and comment procedures of the Administrative Procedures Act. The Code of Federal Regulations makes reference to the Order's existence and location in the Federal Register. Technical requirements of this type are more appropriately addressed in an Onshore Oil and Gas Order than in general regulations.

One commenter stated that to track the enabling statutes, this Order should take the form of operating guidelines with suggested violation levels, rather than strictly enforceable minimum standards. The commenter did not cite any provisions in the enabling statutes that prohibit the Secretary of the Interior from promulgating strictly enforceable minimum standards. The statutes cited in the authority section of this Order give broad rulemaking authority to the Secretary (See especially 30 U.S.C. 187 and 189). Numerous Orders imposing such minimum standards have been promulgated. Onshore Oil and Gas Orders No. 2 through 5 also contain strictly enforceable minimum standards with specified violation levels.

One commenter contended that the BLM lacks statutory authority to assess strict liability type penalties under 43 CFR 3163.1. The BLM did not propose any revision of 43 CFR 3163.1 in the current rulemaking; so no response is required. The commenter is referred to the preamble in the final rule promulgating 43 CFR 3163.1 published February 20, 1987 (52 FR 5384).

I.B. Purpose

Two commenters suggested that the BLM should enter into a Memorandum of Understanding (MOU) with the Federal Occupational Safety and Health Administration (OSHA) regarding protection of "essential personnel" to avoid confusion. The BLM has coordinated with OSHA in the development of this Order and both agencies agree that no conflict or overlap exists. The references to "essential personnel" in the Order are for control of the well (43 CFR 3162.5–2) and for protection of public health and safety (43 CFR 3162.5–3). An MOU is not necessary for either agency to implement regulations pertaining to their respective authorities, and therefore, this suggestion was not adopted.

The phrase referring to enforcement actions was removed and the wording changed to be consistent with the provisions contained in the Order. It is not the intent of this Order to specify enforcement actions, but rather the gravity of violations, probable corrective actions, and the normal abatement period for each requirement.

I.C. Scope

Two commenters recommended that the Order provide for a specific exclusion from the minimum standards for "remote facilities" where human life or property would not be in jeopardy. They further indicated that if an exclusion is not provided, operators would routinely request variances from minimum standards for such wells which would create unnecessary paperwork for the operator and the BLM. The purpose of the Order is to ensure control of the well and hence a conservation of the hydrocarbon resource as well as to protect public health and safety. The Order requires only a drilling operations plan for such "remote" wells and, in general, a variance from those minimum standards would not be granted.

One commenter stated that the Order should apply to Indian Mineral Development Agreements. The BLM provides technical assistance to the Bureau of Indian Affairs in the review and enforcement of these agreements. The BLM is presently developing a policy to address its operational responsibilities concerning such documents and the applicability of this Order.

It was also suggested that the Order should not apply to wells in unit agreements including American Petroleum Institute (API) unit agreements, except for those drilled on Federal or Indian lands. The applicability of this Order will be consistent with the provisions contained in individual agreements and the agency's current policy regarding the jurisdiction and enforcement of all oil and gas operating regulations for non-Federal wells committed to such agreements.

For consistency with the changes made in response to the comments on Section III.B.2.b.ii.(e), the words "or property" have been removed from the first sentence.

II. Definitions

Several comments indicated that confusion existed in use of the terms "release * * * that may endanger the public" and "potentially hazardous volume". For clarification, the term "release . . . that may endanger the public" has been removed and references are now made to the term "potentially hazardous volume" which has been defined in Section II, of the Order. The ambient air concentrations identified in this definition are derived through radius of exposure calculations and are used to determine if a potentially hazardous volume of H_2S exists.

It was recommended that a definition be included for the term "remote facilities" based on a suggested language change in the Requirements section of the Order. It is not prudent to classify wells subject to the Order by virtue of their distance from public facilities. Therefore, the suggestion was not adopted.

Authorized Representative. This term was not necessary for this Order and was removed. As a result, several definitions have been redesignated in the final rule.

Escape Rate. One commenter suggested a language change for item 1. of this definition. Such language was redundant to the criteria used in the definition of "Radius of exposure" and, therefore, was not adopted.

Two commenters felt that the use of "absolute open flow rate" (AOF) for an entire production facility was unreasonable while five commenters felt that it was unreasonable to use this standard in calculating the escape rate for a gas well. For drilling wells, the five commenters suggested alternative language of "maximum wellhead deliverability against zero back pressure." One commenter suggested

that the operator should be allowed a choice of methods to calculate the escape rate for wells. It was also suggested that a new subcategory be developed for exploratory wells. The BLM recognizes the commenters' desire for flexibility, but believes that its obligation for the protection of public health and safety is an overriding concern. Therefore, the agency used a more conservative approach in calculating the escape rate by using an AOF determination for individual wells and the maximum daily gas handling volumes for production facilities. One commenter suggested that the operator should be given a choice of methods to calculate the "escape rate" in developed areas. The commenter is referred to the definition which allows the operator to use data from offset wells in lieu of calculations, if satisfactory to the authorized officer.

Essential Personnel. It was suggested that the term "essential personnel" be removed since non-essential personnel may be required to stay at their station when H_2S is present. The definition of "essential personnel" indicates that persons who have a necessary function when H_2S is present, would be classified as "essential personnel." Further, the Order states that all personnel shall be trained and that non-essential personnel shall be moved to a safe area once 10 ppm of H_2S in the ambient air is reached at any detection point. Therefore, this suggestion was not adopted.

Two commenters indicated that OSHA rules adequately cover essential personnel. This Order augments OSHA requirements in that it provides for the protection of essential personnel from the standpoint of maintaining control of the well for the purposes of public health and safety and conservation of the hydrocarbon resources.

Three commenters recommended that all Government personnel, including the BLM's inspectors, be subject to the same training and provisions of this Order as apply to "essential personnel." Inspectors are considered non-essential personnel for purposes of this Order. However it is BLM policy that they be properly trained and equipped prior to inspecting H_2S operations.

Gas Well. It was suggested that this definition be consistent with other BLM policy. This suggestion was adopted and the definition changed accordingly.

H_2S Drilling Operations Plan. Three commenters suggested that this term be changed to "H_2S Contingency Plan" to be consistent with other BLM regulations and Orders. The citation in the regulations at 43 CFR 3162.5–1(d) is general in nature and is supplemented by this Order. Therefore, no change is necessary. The references to H_2S Contingency Plan in Order No. 1 have been removed and replaced by H_2S Drilling Operations Plan and Public Protection Plan, as applicable. Requiring only a Drilling Operations Plan and, when necessary, a Public Protection Plan will save submission of unnecessary paperwork and is more definitive in nature.

Major Violation and *Minor Violation.* It was suggested that the violations be incorporated as guidelines only. The commenter is referred to the BLM's previous response under Section I.A. of this preamble. Two commenters recommended that a "moderate" violation level be incorporated to better utilize the authorized officer's discretionary authority and to avoid upgrading minor violations to major ones. It is the intent of the BLM to upgrade minor violations to major where warranted. The BLM has determined that it will classify violations as either major or minor as defined in 43 CFR 3160.0–5. For further justification regarding violation levels, the commenter is referred to the preamble of the final rule implementing the Federal Oil and Gas Royalty Management Act published on February 20, 1987 (52 FR 5384).

Oil Well. It was suggested that this definition be consistent with other BLM policy. This suggestion was adopted and the definition changed accordingly.

Production Facilities. For consistency with BLM policy, the words "for royalty purposes" have been removed and replaced with "approved measurement point."

Prompt Correction. It was suggested that immediate correction of all alleged noncompliances should not be required, but that many "discrepancies could be safely delayed." The inclusion of this standard is necessary to resolve those noncompliance actions which cause or threaten immediate, substantial and adverse impacts on public health and safety. Therefore, this comment was not adopted.

Radius of Exposure. One commenter pointed out that use of different methods and calculations using the Pasquill-Gifford equation for the 100 and 500 ppm radii of exposure results in different radii of exposures. The BLM recognizes this and provides for use of other models if approved by the authorized officer. The operator would be required to demonstrate the applicability and acceptability of the model to the situation. Three commenters indicated that there is a high degree of variability in air quality models recommended for use when the H_2S concentration exceeds 10 percent. One of the commenters suggested that the Pasquill-Gifford equation coupled with the other assumptions is so conservative that it could not be applied to concentrations in excess of 10 percent, and that section II.S.3. should be removed. Another commenter questioned how one of a series of models is to be selected. The BLM agrees that there is a high degree of variability between models, and therefore the operator has the option to utilize the model most applicable to the specific situation. The EPA's "Guidelines on Air Quality Models—(EPA–450/2–78–027R)" is intended to assist operators in this selection. The BLM does not agree that the Pasquill-Gifford equation is extremely conservative, but rather that its assumptions become less valid at concentrations in excess of 10 percent in stable atmospheres. Therefore, the suggestion to remove section II.S.3. was not adopted. Alternative wording was also suggested for section II.S.3. so that the operator would not be limited to those models contained in the EPA publication previously referenced. This suggestion was adopted and the language incorporated into the Order.

III. Requirements

In reference to the opening paragraph, two commenters suggested that the discretionary authority of the authorized officer be limited. One of the commenters suggested that the authorized officer's authority to require measures that vary from the minimum standards in the Order be amended to require the mutual consent of the operator. The BLM assumes a regulatory role in setting the minimum standards and this rulemaking process provides for operator input. These are minimum standards that would apply on a national basis. The authorized officer will rely on staff for any additional requirements deemed necessary on a local or geographic basis and if warranted, issue a Notice to Lessees (NTL) pursuant to 43 CFR 3164.2. All additional requirements would be subject to review pursuant to 43 CFR 3165.3. Therefore, the suggestion was not adopted. However, for purposes of clarity, the introductory paragraph in section III. was rewritten.

A.1. Several commenters suggested that when there are multiple filings for wells in a single field, the operator should be allowed to submit one Drilling Operations Plan, supplemented by the well site diagram for each well as required in Onshore Oil and Gas Order No. 1. The BLM agrees that this would save paperwork for both the operator and the authorized officer. This

suggestion was adopted and expanded to include Public Protection Plans.

One commenter suggested that except where a general populace alert program is being used, the BLM should not require a Public Protection Plan for approval, but rather have the operator certify that one will be prepared and in place prior to the provisions of III.C.1.b. going into effect. The BLM has a regulatory responsibility to ensure that reasonable and prudent measures to protect public health and safety are in place before approving any action within its authority. Implementation of the suggested procedure would not fulfill that responsibility.

It was suggested that the following be required in the Drilling Operations Plan: duties, responsibilities, and procedures to be initiated at various H_2S concentrations; procedures for evacuation of personnel; agencies to be notified; and a list of medical personnel and facilities. The duties, responsibilities, and procedures for H_2S concentrations are required in section III.C.; the procedures for personnel evacuation in section III.C.3.e.; and the agencies to be notified in section III.A.3.b. of the Order. The requirements for medical personnel and facilities are covered by OSHA regulations and are not within the BLM's authority.

The scope of this section was expanded to include the BLM's intent that a single Public Protection Plan may also be submitted for a lease, communitization agreement, unit or field where applicable. To eliminate redundancy, the phrase "and the APD shall not be approved by the authorized officer" was removed from the last sentence of the first paragraph.

A.1.a. Several commenters stated that the requirement to include a statement of certification unnecessarily extends the normal contractor/operator working relationships and suggested alternative wording. The BLM agrees that certification is unnecessary since the contractor is obligated to provide such training and the operator is responsible for securing a written statement in accordance with the requirements of this Order. The phrase "of certification" has been removed from the provision.

A.1.b. Four commenters questioned the requirement of a map showing the terrain of the area surrounding the well site. It was suggested that the requirement be removed or that reference be made to Onshore Oil and Gas Order No. 1 which requires submission of a topographic map. Knowledge of the surrounding terrain is critical to evaluation of the H_2S Drilling Operations Plan. However, if the topographic map submitted in accordance with Order No. 1 is of sufficient clarity, scale and coverage, it would suffice in meeting this requirement. One commenter suggested that due to the long lead time between approval and actual drilling, the operator be allowed to submit two diagrams. The BLM agrees in part with this recommendation. If conditions change from the time an APD containing the initial diagram is approved to the time of actual drilling, a Sundry Notice with a revised diagram reflecting the necessary changes can be submitted for approval.

One commenter suggested that weather/seasonal changes be listed in this requirement. The dispersion models are conservative and deal with most temperature and weather conditions. In addition, the authorized officer may request additional information, when necessary. Therefore, this suggestion was not adopted. The same commenter suggested that "essential personnel" be specifically identified here and that all rig personnel be treated equally in the Order. The BLM is responsible only for those personnel necessary for well control (i.e., essential personnel) and OSHA is responsible for general worker safety. Therefore, the operator should have the latitude to determine which category of personnel are necessary to meet the minimum safety standards. It was also suggested that a requirement to include the location of permanent sensors and audible/visual alarms be identified here. The commenter is referred to section III.C.3.c. which specifically requires the location for such equipment.

A.1.c. Four commenters questioned the need for a complete description of the H_2S equipment/systems. They felt that it would be a burdensome submission of information. The BLM partially addressed this concern by removing the words "and their use." It is the BLM's intent for the operator to provide a complete description of specific equipment/systems required in the Order because such a description is necessary for the authorized officer to properly evaluate the acceptability of the H_2S Drilling Operations Plan to fulfill the BLM's public health and safety responsibilities.

Two commenters questioned the requirement for remote controlled chokes on all drilling wells. The BLM considers this equipment necessary for timely and efficient well control so as to minimize the release of H_2S. In areas where there are known low volume/low pressure reservoirs, variances should be requested by the operator.

Three commenters suggested that the word "permanent" in section III.A.1.c.iii. be changed. The BLM agrees that this word is not appropriate since the required duration of drilling operations is short term.

It was recommended that the heading "Mud program" be changed to "Mud program and scavengers". Scavengers are a type of additive which is included in the subsection. Such a change would be repetitive and therefore, was not adopted.

A.2.a. Two commenters suggested that the operator simply calculate the radii of exposure and advise the authorized officer when the criteria in Section III.B.1. have been exceeded rather than submit the calculations. The BLM considers this information necessary to identify all facilities subject to this Order and ensure compliance with the required radius of exposure calculation methods. It is the BLM's intent to review the submission on a timely basis. Therefore, this suggestion was not adopted.

It was suggested that the respective time periods of 180 days and one year for submission of radii exposure calculations and a Pacific Protection Plan for each existing production facility be significantly shortened. The BLM considers these time periods as being reasonable and consistent with the operational equipment requirements specified in section III.D. of the Order. The commenter also suggested that the time period of 60 days for submission of a Public Protection Plan for a new production facility, where applicable, should be increased. The BLM considers 60 days to be adequate time for the preparation and submission of this plan. The 60-day requirement is also commensurate with timeframes required by the BLM for other plans (e.g. site security plans).

Two commenters suggested that water flowlines be excluded from the calculations required in this paragraph. The BLM agrees and this change has been made in the final rule.

A.2.b. Two commenters suggested various timeframes for the operator to submit an H_2S component gas analysis for each well to the authorized officer. The authorized officer has the authority under 43 CFR 3162.4–2 to require tests when necessary.

A.2.c. Several commenters stated that the notification requirement for unspecified changes in H_2S concentration or the radius of exposure was not reasonable and suggested various limitations and timeframes. The BLM agrees in part and the requirement has been changed to apply only when increases of 5 percent or more of the H_2S concentration or radius of exposure

occurs over that initially required under sections III.A.2.a. and III.A.2.b. of the Order. The 60-day requirement for notification is considered reasonable and has been retained.

A.3.b. Three commenters questioned the meaning of the phrase "that may endanger the public" and suggested alternate wording. The BLM agrees in part and replaced it with "a potentially hazardous volume" which has been defined in the Order. In addition, for purposes of clarity, the phrase "accidental release" has been changed to "any release". One commenter stated that the notification requirement is redundant with the requirements of the Superfund Amendments and Reauthorization Act (SARA), Title III. SARA, Title III does not ensure that the authorized officer will be notified and, therefore, this requirement has been retained. Two commenters questioned the need to elaborate on subsequent violations. The BLM agrees and such wording has been removed. One commenter suggested that the violation be major. The BLM is primarily concerned with adequate operator implementation of the Public Protection Plan and control of the H_2S upon detection of a release that may affect public health and safety rather than a notification requirement that does not directly affect public health and safety. Therefore, this suggestion was not adopted. It was also recommended that the criteria for reporting and the category of violation be tied to the severity of the release similar to the criteria in the current Notice to Lessees—3A. Since public endangerment is the primary criteria and not necessarily the volume of release, this suggestion was not adopted.

For purposes of consistency with the definition of "potentially hazardous volume", the term "SO_2" has been removed from this requirement. Requirements regarding SO_2 are addressed in other sections of this Order. SO_2 is not associated with ordinary release of H_2S unless H_2S is ignited. However, the BLM does not intend by deleting this reference to imply that SO_2 is not potentially hazardous.

B.1. One reviewer felt that the phrase "and special precautions taken" in the introductory paragraph is superfluous. The BLM agrees and the phrase has been removed.

It was recommended that a single Public Protection Plan be required where wells and facilities exceeded an unspecified minimum level or are located within ¼ mile of a public place. The Order provides for a single plan in section III.B.2. The recommended criteria would be more stringent than the proposed minimum standard and radii of exposure is a more reasonable criterion for public safety than distance alone. Therefore, this suggestion was not adopted.

One commenter suggested that an exception to public notification be written into Public Protection Plans and accepted where releases of H_2S are common (e.g., plant upsets). Any releases resulting in H_2S levels as defined under "potentially hazardous volume" constitute a public hazard and warrant public notification. Therefore, this suggestion was not adopted.

It was recommended that the phrase "or other areas where the public could reasonably be expected to frequent" as used in this section and other sections of the Order be changed to "or other public areas that can expect to be populated". No reason was provided and the phrase did not appear to improve clarity. Therefore it was not adopted.

B.2.a.i. Several commenters were received suggesting that the phrase "potentially hazardous release" be changed or defined. The BLM agrees and the phrase has been changed to "potentially hazardous volume". In addition, the term "SO_2" has been removed for consistency with the definition of "potentially hazardous volume".

For purposes of consistency with section III.A.1. and to clarify the BLM's intent, the phrase "For production" has been removed from the beginning of the second sentence.

B.2.a.ii. One commenter felt that release of a potentially hazardous volume of H_2S should not be classified as a violation. The Order does not provide for a violation for the incidental release of H_2S because it could occur at anytime beyond the operator's control. However, the Order does provide that, upon detection of such a release, the operator is responsible for implementing the Public Protection Plan in order to protect public health and safety. Failure to implement this plan in the event of a release constitutes a violation. The same commenter suggested that the operator should have strong input in the Public Protection Plan. Since the operator is responsible for preparing the plan, he/she is the primary contributor to the document.

The term "SO_2" has been removed for consistency with the definition of "potentially hazardous volume".

B.2.a.iii. One commenter suggested that the abatement period for workover operations be changed to 24 hours. The BLM agrees and has adopted this recommendation.

B.2.b.i. One commenter suggested that the second sentence of this paragraph be removed and wording added in the following section to allow the use of general populace alert plan as is used in Texas. Another commenter felt that the wording was ambiguous. It is the BLM's intent that alternate plans may be used and latitude for alternatives is provided in the existing wording. However, if the operator proposes to use a populace alert plan only, a variance should be requested. Further, the language provides latitude to the operator to submit an adequate plan in areas of high population density, given the variety of conditions that may occur nationwide.

B.2.b.ii.(b) Four commenters suggested the use of "exposed to H_2S concentrations of 100 ppm" in this provision since the term "area of exposure" is not defined. The suggestion was adopted in part and the wording changed to "the 100 ppm radius of exposure". For clarity, the phrases "those responsible for safety of public roadways" and " as defined by the applicability criteria in section III.B.1." were incorporated into the first sentence. Two commenters suggested removing the last sentence, since the operating provisions of the Order provide adequate protection for nearby residents, while another commenter felt that the requirement was not stringent enough to provide adequate public protection. The BLM agrees that adequate public protection measures are provided in other sections of the Order, and therefore the sentence has been removed.

B.2.b.ii.(e) One reviewer recommended that the words "by visit or letter" be added after the words "Advance briefing". This suggestion was adopted and modified to read "Advance briefings, by visit, meeting, or letter . . ." Several commenters suggested that the phrase "or things that may be endangered" be removed from the end of the section since one of the primary purposes of the Order is to protect the public. The BLM agrees and it has been removed.

B.2.b.ii.(g) In order to clarify the BLM's intent to provide protection from the hazards of SO_2 and for consistency with section III.C.4.a.iv., a reference to SO_2 monitoring has been added for inclusion in the Public Protection Plan.

C.1. One commenter expressed confusion over the applicability of the 100 ppm in the gas stream criterion and the 20 ppm ambient concentration and stated that the Order appears to differ from the criteria specified in Onshore Oil and Gas Order No. 2. The reviewer is directed to the General Comments

section of this preamble for clarification on the applicability criteria. The 10 ppm ambient concentration for taking measures to protect personnel is based on the revised OSHA criteria published in the Federal Register on January 19, 1989 (54 FR 2490). For consistency, the BLM will make appropriate changes to Order No. 2.

It was suggested that the Drilling Operations Plan be available at the well site only when operations are actually being conducted. The BLM agrees and the words "during operations" have been added to this section. The section has been further expanded to make clear when the operator is subject to this requirement.

C.1.b. One commenter disagreed that H_2S training should be completed and equipment be made operational at 500 feet above or 3 days prior to the first potential H_2S zone while another commenter endorsed the requirement, but suggested that the violation be classified as minor. It is critical that operating personnel be adequately trained a reasonable amount of time prior to the date it is expected that H_2S will be encountered so that they can respond competently and quickly to protect public health and safety. The BLM considers the requirement reasonable and that the violation classification for failure to take these measures is consistent with the definition of "major".

It was recommended that the caveat of "or the atmospheric concentration of H_2S reaches 10 ppm" be added to the criteria in this section. The 100 ppm criterion is used solely for determining which wells are subject to the provisions of this Order, and should not be confused with the ambient standards to which the operator is subject once the Order is in effect. Since this section deals with the basic applicability of the Order rather than ambient concentration, this suggestion was not adopted.

It was recommended that the phrase "unless detrimental to well control" be removed from subsection i. The BLM believes that situations do exist where shutting the well in may be detrimental to well control, which is one of the primary lines of defense to prevent a release of a hazardous volume of H_2S gas. Therefore, the suggestion was not adopted.

One reviewer suggested that for consistency, the time periods for notifying the authorized officer as used in this section should be stated in terms of business days. The BLM agrees and the wording has been changed in subsection iii. Time periods for corrective actions are properly stated as hours or calendar days.

Two commenters suggested that the authorized officer be authorized to approve interim resumption of operations prior to the requirements being met in this section where the operator can show that adequate safeguards are being employed to protect the public. It was recommended that the words "general populace alert plan" also be inserted here. The BLM considers the minimum standards to be reasonable. In addition, the authorized officer may approve resumption of drilling operations in emergency situations, or a variance could be requested by the operator. Therefore, these suggestions were not adopted.

C.2.a. Two commenters disagreed that two means of egress should be required at all well sites. The BLM considers this requirement important to maximize safe egress from drilling and completion sites. The Order provides for only one road and a foot path when a secondary road is not practical. Three commenters suggested that the violation should be changed from major to minor. The Bureau agrees with this recommendation since failure to meet this requirement does not meet the criteria for a major violation as defined in this Order.

C.2.b. Two reviewers suggested that the violation be changed from major to minor. The BLM agrees with this recommendation since failure to meet this requirement does not meet the criteria for a major violation as defined in this Order.

Two commenters stated that secondary escape routes are just as important in workover operations as they are for drilling and completion operations. The BLM believes that more unknown factors such as H_2S concentration, pressures, and flow rates exist in drilling and completion operations and therefore, require more safety contingencies.

C.3.a. One commenter reiterated earlier concerns that the BLM is establishing recommended practices as enforceable regulations here. The commenter is referred to the discussion in this preamble on section 1.A.

Three commenters suggested that the requirement to "certify" training of all personnel be removed for various reasons related to contract relationships and numerous suggestions for alternate wording were made. The BLM recognizes the potential contractual problems associated with the word "certify" and has replaced it with the word "ensure".

Two commenters suggested that the training requirements should apply only to essential personnel. The BLM believes that all personnel working around H_2S should be trained although additional provisions are made for "essential" personnel. Therefore, this suggestion was not adopted.

One commenter questioned the jurisdiction of this Order since specific operations were not listed. This Order extends to the same operations that are subject to the oil and gas regulations contained in 43 CFR part 3160.

It was suggested that the phrase "or its equivalent" in subsection i. be removed. No rationale was provided and since the driller's log recommended by the International Association of Drilling Contractors is not used in all geographic areas, this suggestion was not adopted.

It was recommended that the violation in subsection iii. be changed from major to minor. The BLM agrees with this recommendation since failure to meet this requirement does not meet the criteria for a major violation as defined in this Order.

C.3.b.i. Several commenters suggested that the word "ensure" be changed to "require" for various reasons relating to the operator's ability to oversee subcontractors. It is the BLM's intent that the word "ensure" as used in this Order means that an operator will mointor contractor/subcontractor operations on site such that they meet the minimum standards as set forth in this Order. Therefore, this suggestion was not adopted.

It was recommended that the word "shall" be changed to "must" with respect to providing a breathing apparatus for the derrickman. The word "shall" means that it is required, and therefore this suggestion was not adopted. It was also suggested that provisions for a line from a cascade system be added here. The Order does not preclude the use of this system. However, the BLM considers this proposal to be unreasonable as a minimum standard. Therefore, this suggestion was not adopted.

One commenter suggested that the Order specifically require the use of "pressure-demand type" breathing apparatus. The cited standard (ANSI Z88.2-1980) includes this requirement as well as other standards for this equipment. This standard sufficiently describes the requirements; however, this section of the Order was modified to clarify that all working equipment must be a pressure-demand type.

The first sentence of this requirement was modified to clarify that the curent edition of the ANSI standard is applicable.

C.3.b.ii. It was recommended that breathing apparatus be required for all personnel. The BLM believes that a prudent operator will provide equipment for all personnel, but as a minimum standard, given the BLM's limited authority, it will be required for essential personnel only.

C.3.b.iii. Two commenters suggested that the violation for a lack of communication devices should be changed from major to minor. The BLM considers communication essential to the proper implementation of a Drilling Operations and/or Public Protection Plan. Since communication has a direct bearing on public health and safety, the violation of major was retained.

C.3.c. Three commenters suggested that the threshold limits for the visual and audible alarms of 10 and 15 ppm, respectively, were not appropriate, especially the 15 ppm level. The BLM recognizes the standard of 20 ppm as used in industry and advocated by the American Petroleum Institute. However, to be consistent with the Federal OSHA requirements, the BLM adopted the limits of 10 ppm time-weighted average and 15 ppm short-term exposure for H_2S.

It was recommended that a sensor be required in the cellar in lieu of the bell nipple, and that a sensor be placed in the mud house. It is logical that H_2S would break out at the bell nipple and be sensed earlier than in the cellar itself. A sensor at the bell nipple should sense any H_2S breaking out of the mud before it reaches the shale shaker. Therefore, this suggestion was not adopted.

One commenter suggested that a requirement for a public address system be added. This requirement may be appropriate for confined operations but not in unconfined areas such as the majority of onshore locations. The majority of onshore locations do not have camp facilities associated with the drilling operation, and for those that do, the authorized officer may require such a provision on a site-specific basis. Further, the briefing areas provide a place for communication with workers. Therefore, this suggestion was not adopted. The same commenter also stated that testing of the monitoring equipment to manufacturer's standards was not appropriate since it would allow the manufacturer to determine testing and calibration standards. The BLM currently considers the manufacturer's recommended standards to be reasonable as minimum standards for testing. Another commenter suggested that the Order incorporate calibration standards. BLM agrees and modified the text to include the calibration of H_2S detection and monitoring equipment in accordance with the manufacturer's recommendation. Also, the Minerals Management Service of the Department of the Interior is conducting an evaluation of calibration frequencies. BLM will consider the results of this evaluation and possibly develop calibration frequency standards. Any alternative methods of calibration or suggestions regarding calibration frequency requirements may be sent to the Director of BLM at the address specified in the beginning of this preamble.

C.3.d. One commenter suggested that the wind direction indicators be placed at the briefing areas since they may not be visible if the light plant fails. This possibility was considered, and the present wording "shall be visible at all times" provides the operator with latitude to meet this requirement on a site-specific basis. Therefore, this suggestion was not adopted.

Two commenters suggested that it may be necessary to have two signs posted on the access routes leading to a drilling site to allow large vehicles or those with trailers adequate time and space to turn around safely. This suggestion was adopted in part and the provision has been amended to allow vehicles adequate opportunity to turn around prior to reaching the well site.

Two commenters expressed concern as to the requirement for bilingual or multilingual signs. One commenter questioned the authorized officer's knowledge to determine where such a requirement is appropriate and the other requested that the current, in-place signs be accepted or grandfathered to minimize economic impacts to industry. The authorized officer is aware of those areas where bilingual or multilingual signing would be appropriate and the number of areas is considered to be minimal. Therefore, the economic impact would be minimal.

Several commenters stated that the requirement to have essential personnel put on their masks, move non-essential personnel, and display red flags when 10 ppm of H_2S is detected at any sensing point was unnecessarily restrictive. The commenters further suggested alternative wording. The BLM believes that such measures are essential to ensure adequate well control and public health and safety. The BLM agrees with one reviewer that operations should be allowed to proceed once these measures are implemented. This recommendation was incorporated by separating part of the language from section 3.C.d.vii and placing it into the new section 3.C.e. which provides for securing the area and allowing operations to proceed once non-essential personnel have been moved and essential personnel have donned protective breathing apparatus. One commenter suggested that this requirement only be applicable to detection points as required by the Order. The BLM believes that any prudent operator will not ignore readings from any detection point which indicates a problem. These requirements are minimum standards, and inspection and enforcement will be in accordance with the approved Application for Permit to Drill. Therefore, this suggestion was not adopted.

C.3.e. For purposes of clarity, the phrase "an area secured and conditions are below 10 ppm" has been removed and replaced with the word "accomplished".

C.4.a. It was suggested that well testing and swabbing during completion and workover operations should be specifically discussed and the operator should be granted more flexibility. The BLM believes there is little basic difference in operating procedures here and that the minimum standards are applicable to workovers and completions. Furthermore, where differences do exist, they have been stated. Therefore, this suggestion was not adopted.

C.4.a.i. Several commenters disagreed that the use of a mud system should be the minimum standard for drilling, completions, and workovers. All commenters contended that aerated mud and non-mud systems can be used in some situations, primarily in low-pressure H_2S zones. The BLM recognizes that these situations exist. However, in the interest of public health and safety, the use of mud systems as the minimum standard is considered appropriate. The operator may request a variance in those cases cited by the commenters.

C.4.a.ii. Two commenters suggested that this provision be amended to read "where operating pressures are sufficient". Neither commenter provided any rationale for their suggestion and the term "sufficient" is ambiguous. The existing wording as a minimum standard meets the intent of protecting public health and safety.

C.4.a.iii. Three commenters suggested that the flare line lengths should be changed to 100 feet to be consistent with Order No. 2. Flare lines of 150 feet are considered reasonable for H_2S locations due to the additional risk involved and that larger locations may be necessary. The BLM does not agree that this provision needs to be consistent with Order No. 2 since the two Orders deal with different conditions. Therefore, this suggestion was not adopted.

C.4.a.v. Two commenters felt that this requirement was unnecessary and that the violation should not be major. The BLM considers that this measure is reasonable for the protection of public health and safety and that the potential hazard to the public if it is violated is significant. Therefore, the violation gravity of major is appropriate.

C.4.a.vi. It was suggested that the wording be changed to require SO_2 monitoring equipment only when there is a reasonable expectation that the public may be exposed to 2 ppm or greater of SO_2. It is the BLM's intent that this provision include "essential personnel" who are necessary for well control as well as the public. Therefore, this suggestion was not adopted.

One commenter stated that the 2 ppm SO_2 level should not be a threshold, but a continuous level. It is the BLM's intent that the minimum standards used in this Order are for sustained levels. In addition, the reference to 2 ppm or greater of SO_2 in parentheses was removed since it was unnecessary.

C.4.a.vii. One commenter pointed out that the BLM did not use any SO_2 applicability criteria in determining when a public protection plan is to be submitted. The BLM used only H_2S concentration in developing the applicability criteria, but recognizes that SO_2 results from flaring the H_2S and is hazardous. Therefore, keying solely on H_2S also includes safety measures for SO_2 as a burned by-product of H_2S.

C.4.a.viii. Three commenters suggested that the requirement for a remote controlled choke for all operations was unnecessary and made various suggestions as to the conditions in which it should be required, including specific pressures, abnormal pressures, or proximity to public areas. In addition, it was suggested that the violation gravity be changed from major to minor. The remote controlled choke is considered necessary for well control not only for purposes of public health and safety, but also for conservation of the resources. For these reasons, the violation gravity has been retained as major.

C.4.a.ix. Several commenters suggested that requiring rotating heads for all exploratory wells is overly restrictive and that they should only be required when drilling in an underbalanced condition or where formation pressure cannot be reliably estimated. Exploratory drilling necessarily involves a high degree of uncertainty as to the pressures, conditions, or formations that may be encountered during drilling operations. Therefore, in the interest of public health and safety this requirement is considered necessary.

C.4.b.i. Two commenters urged that the requirement for maintaining a pH of 10 or greater in mud systems containing polymers be eliminated or an exception be granted for polymer muds. The commenters failed to be specific about the type of polymer system and polymer use. The term "polymer mud" includes many different types and chemically different polymer compounds. Since most polymers are mainly used for viscosity development, versus fluid loss control or shale stabilization, higher pH in many polymer systems yields maximum viscosity development. Individual mud system proposals contained in an Application for Permit to Drill (APD) are required to consider the necessity of higher mud pH when inhibiting H_2S returns to the surface and to weigh the expense of eliminating some mud additives not conducive in high pH mud environments to those that are. This minimum standard also contains a provision for the use of lesser pH muds if formation conditions or mud types justify it. The commenters also stated that corrosion control can be achieved by means other than increased pH. Another purpose of increasing pH is to prevent H_2S from reaching the surface by formation of sulfide radicals and increased scavenger efficiency. Therefore, the minimum standard for maintaining a mud pH of at least 10 is retained unless specifically approved in the APD or through a variance request.

It was suggested that the Order state that clear fluids may be used for workover and completion activities when such fluids are adequate for well control. The Order is silent on this point, and therefore such fluids may be used during those activities.

The first sentence has been reworded to clarify the BLM's intent to require a pH of 10 as a minimum standard, unless formation conditions dictate otherwise. In addition, the word "prevent" has been changed to "minimize" to more accurately describe the effects of pH with respect to H_2S.

C.4.b.iii. One commenter was confused by this requirement since it appeared to duplicate C.4.b.i. There is a significant differences between controlling the pH of the mud and the addition of scavengers and additives to the mud to control surface observed H_2S. It is because additional measures may be necessary when drilling unknown formations to control H_2S reaching the surface even if the 10 ph standard is met. The commenter also suggested that the violation gravity be changed from major to minor but provided no rationale. This suggestion was not adopted.

C.4.c. It was suggested that the word "suitable" in the first sentence be replaced with "designed per the requirements of API Recommended Practice 49 (RP-49)". This Order and RP-49 both utilize NACE standards. However, RP-49 utilizes additional standards not applicable to this requirement, therefore the more specific NACE standards have been referenced.

Several commenters suggested that the word "prevent" in the first sentence of the second paragraph be changed to "minimize" since these measures do not assure the prevention of stress corrosion cracking or embrittlement. The BLM agrees and the wording was changed.

Two commenters pointed out that NACE Standard MR-01-75 is not applicable in concentrations of less than 100 ppm of H_2S. The BLM recognizes this and it should be understood that the requirements of this Order do not apply unless 100 ppm or greater of H_2S is anticipated in the gas stream. However, this standard is deemed appropriate when the applicability criteria for this Order have been met.

It was suggested that the last sentence of the second paragraph be removed since obtaining the manufacturer's verification for H_2S service may be difficult for some existing equipment. The BLM does not see a reasonable alternative approach to determining suitability for H_2S service and considers it necessary for protecting public health and safety. Further, such verification would be difficult only in a very few cases, resulting in a negligible impact to industry overall. Therefore, the BLM considers this requirement to be reasonable and the suggestion was not adopted.

The fourth sentence of this requirement was modified to clarify that the current edition of the NACE standard is applicable.

C.4.d. Two commenters suggested that the paragraph be changed to allow for drill stem tests under certain conditions other than closed-chamber tests during daylight hours. The BLM recognizes that with proper planning and use of appropriate facilities, these tests can be conducted under other conditions. The existing language in the Order provides this latitude, and therefore no changes are necessary.

It was suggested that this paragraph be more specific to ensure that all gas is run through a separator and flared. The requirements of section III.C.4. are applicable to all operations, including testing, completions, and workovers. Therefore, no changes are necessary.

D.1.a. One commenter suggested that the words "that meet the criteria for requirement of H_2S controls but" be inserted between the words "facilities" and "which" to clarify what facilities are meant by the word "all". The initial criterion of 100 ppm H_2S in the gas stream for the applicability of this Order is sufficiently clear to determine the facilities included in this paragraph. Therefore, this suggestion was not adopted.

It was suggested that the timeframe for conformance be changed from 1 year to 6 months. Information submitted to the BLM indicates that it may take as long as 6 months to acquire some of the necessary equipment and since the commenter offered no rationale for the suggestion, the 1-year requirement is considered reasonable.

One commenter suggested that this paragraph make it clear to which equipment this requirement applies. The commenter is referred to the response provided under D.1.a. above.

D.2. It was recommended that the criteria for applicability be changed from 500 to 100 ppm H_2S for storage tank vapors. The commenter did not provide any rationale and the data submitted in response to proposed Order No. 2 in 1984 indicates that with the volumes of gas involved and using standard operating procedures, less than 500 ppm in this situation does not constitute a hazard to public health and safety.

D.2.d. Two commenters suggested that signs with colors of yellow and black should also be allowed under this requirement to be consistent with III.C.3.d.iii. The BLM believes that during production, H_2S hazards are known to be present. Therefore, danger signs (red, white and black) are appropriate rather than using caution signs (yellow and black) which are required during the drilling stage when H_2S may be, but is not necessarily known to be, present. Therefore, this suggestion was not adopted. One commenter suggested that it should be left to the operator's discretion as to the appropriate use of bilingual or multilingual signs. The authorized officers of the Bureau are very cognizant of those areas where such signs are appropriate, and therefore this suggestion was not adopted.

D.2.f. One commenter expressed that flexibility should be provided for those areas where the population adjacent to the H_2S operations is sparse and primarily consists of businesses associated with the oil and gas industry. This provision is intended to protect the general public, and if a situation as described occurs, a variance with appropriate alternate measures could be approved by the authorized officer.

Two commenters suggested that the words "other equivalent means" be added to this paragraph and section III.D.3.c. to provide more flexibility to the operator. This minimum requirement is considered reasonable when the specified criteria are met. The BLM recognizes that special cases will arise where alternative measures may be acceptable but has determined that a variance should be requested in such cases.

In reference to this paragraph and section III.D.3.c., one commenter expressed the view that the criteria of being within ¼ mile of an incorporated area may not be reasonable since some municipalities have incorporated large amounts of undeveloped land. The BLM recognizes this concern, but this would not be true for the majority of field situations. In situations where it does occur, the operator should request a variance.

Two commenters stated that the requirement to keep gates locked could endanger authorized personnel working at the site. The BLM agrees and has added Section III.D.2.g. to make it clear that the gates are to be locked when unattended by the operator. This section also specifies the degree of violation, corrective action, and the normal abatement period.

D.3.b. Several commenters questioned the reasonableness of requiring danger signs at all points where the well flowlines and lease gathering lines cross public or lease roads. They expressed concern that this requirement would cause an unnecessary cost and create potential visual degradation. They also stated that the placement of a sign at the entrance to each field or lease area would be adequate. It is the BLM's intent to identify sources where 100 ppm or more of H_2S in the gas stream may constitute a potential hazard. Therefore, the signing requirement is considered a reasonable measure to protect public health and safety. One of the same commenters also questioned the scope of this requirement. This requirement is applicable to all flowlines up to the approved measurement point.

D.3.d. For consistency with section III.D.2.g., the same requirement concerning locked gates has been established for production facilities under section III.D.3.d. Subsequent sections were redesignated accordingly.

D.3.e. (Redesignated D.3.f.) One commenter questioned what is meant by a "secondary means of immediate well control". The BLM intends this to mean that it is required to be on the stem of the christmas tree and that a wing valve would not meet this requirement. The same commenter recommended that this provision should only be applied to high volume/high pressure wells. All wells subject to the terms of this Order have the potential to create a hazardous environment, not just high volume/high pressure wells. Therefore, this suggestion was not adopted.

Two commenters also suggested that the requirement should be more flexible by specifically allowing the use of remotely operated valves triggered by a fixed ambient monitor. The existing wording provides the flexibility requested, and therefore this suggestion was not adopted.

It was recommended that the requirement for automatic shut-in equipment should be at the discretion of the authorized officer. However, the commenter did not offer any rationale for this suggestion. The BLM considers this requirement to be the appropriate minimum standard in order to promote conservation of the oil and gas resource, protect public health and safety, and prevent environment degradation. Therefore, this suggestion was not adopted.

One commenter suggested that existing wells be "grandfathered" and reviewed on a case-by-case basis with respect to the secondary means of well control specified in this section and the automatic safety valves or shutdowns specified in D.3.g. (Redesignated D.3.h.). Existing wells potentially constitute the majority of the hazards and to "grandfather" them does not meet one of the primary purposes of this Order, which is to protect public health and safety. Therefore, this suggestion was not adopted.

D.3.f. (Redesignated D.3.g.) It was recommended that all existing equipment that is in a safe working condition be specifically accepted as meeting the metallurgy standards, and that equipment which is not in a safe working condition be replaced. By safe the BLM means the equipment is operating as intended. The BLM agrees with this recommendation and has incorporated wording under section D.1.a. to exempt certain production equipment from metallurgical requirements. This exemption would not apply to new operational equipment, equipment that is unsafe, or repair and/or replacement parts.

D.3.g. (Redesignated D.3.h.) One commenter expressed that this requirement was ambiguously worded and suggested alternate wording. The BLM adopted the suggestion in part by adding "or other appropriate shut-in controls for wells equipped with

artificial lifts" at the end of the sentence.

It was noted that no requirement existed for utilizing the safety valves or shutdowns as required by this section. Therefore, a section requiring these controls to be activated upon a release of a potentially hazardous volume of H_2S was created and numbered as section III.D.3.i. in the final rule. All subsequent sections were redesignated accordingly.

D.3.h. (Redesignated as III.D.1.c.) The provisions of this section were intended to apply to both production facilities and storage tanks. Therefore, this section was moved and redesignated as section III.D.1.c. in the final rule. In addition, the wording was slightly modified to clarify the intent of this requirement.

Several commenters stated that the requirement for vapor recovery when the H_2S concentration reached 10 ppm or more at 50 feet from the facility was overly restrictive primarily because it does not constitute a hazard at that level, and the applicability criteria for the Order of 100 ppm in the gas stream was sufficiently restrictive. The 100 ppm concentration in the gas stream cannot be equated to the 10 ppm radius of exposure. A 10 ppm ambient concentration of H_2S implies a flow that could subject the public to a sustained level of H_2S. The 10 ppm level is the maximum acceptable for 8-hour working conditions, but is not acceptable for general public exposure. Further, such facilities are not fenced unless the criteria in D.2.f. or D.3.c. are met. Therefore, the requirement is considered reasonable in view of the concern for public health and safety.

It was suggested that the word "boundary" be added here to clarify the external limit of the facility. The term "production facility" has been adequately defined in the Order, and therefore the suggestion was not adopted.

D.3.i. (Redesignated (D.3.j.) Two commenters stated that although they supported the intent of this section, they felt the wording was awkward and questioned the authorized officer's qualifications to specify the design for modifying the facility. The BLM agrees that the wording is awkward. Further, the intent was not to have the authorized officer specify the facility design. Therefore, the wording was changed for clarity and to indicate that the authorized officer will retain approval authority over, but not specify the design for modifying, the facility.

One commenter suggested that the phrase "or other areas where the public could reasonably be expected to frequent" needed to have limits placed on it. The BLM disagrees and this suggestion was not adopted.

It was suggested that this requirement be amended to make it clear that the limits do not apply in emergency or upset conditions. The BLM has partially adopted this suggestion by adding wording to show that it applies to sustained concentrations, but that modifications are subject to review by the authorized officer.

D.4. It was noted that no Violation, Corrective Action, or Normal Abatement Period existed for this requirement. These provisions were added in the final rule.

IV. Variances from Requirements

For consistency with Order No. 2, two commenters suggested that this Order specifically provide for verbal variances to be followed up by written requests. This Order, where appropriate, makes provisions for verbal variances, so that a general provision to that effect is not necessary here. It was also suggested that the Order require that variances be documented for the protection of the operator. This is provided for in the section which requires that variances "shall be submitted in writing" to the authorized officer.

Editorial and grammatical corrections and changes have been made as necessary.

The principal authors of this final rule are Chris Hanson of the Milwaukee District Office, Wisconsin; Hank Szymanski of the Washington, DC, Office; Bill Douglas of the Wyoming State Office, Ken Baker of the Great Falls Resource Area Office, Montana and Jim Rasmussen, formerly of the Elko District Office, Nevada, assisted by Al Riebau of the Wyoming State Office and the Orders Task Group; Mike Pool of the Division of Legislation and Regulatory Management, and the Office of the Solicitor, Department of the Interior.

It is hereby determined that this final rule does not constitute a major Federal action significantly affecting the quality of the human environment and that no detailed statement pursuant to section 102(2)(C) of the National Environmental Policy Act of 1969 (42 U.S.C. 4332(2)(C)) is required.

The Department of the Interior has determined that this document is not a major rule under Executive Order 12291 and will not have a significant economic impact on a substantial number of small entities under the Regulatory Flexibility Act (5 U.S.C. 601 et seq.).

The information collection requirements contained in this rulemaking have been approved by the Office of Management and Budget under 44 U.S.C. 3501 *et seq.* and are included in one of the following approvals: 1004–0134, 1004–0135 or 1004–0136.

List of Subjects in 43 CFR Part 3160

Government contracts, Mineral Royalties, Oil and gas exploration, Oil and gas production, Public lands-mineral resources, Indian lands-mineral resources, Reporting requirements.

Under the authorities stated below, part 3160, Group 3100, subchapter C, chapter II of title 43 of the Code of Federal Regulations is amended as set forth below:

Dated: October 12, 1990.

James M. Hughes,

Deputy Assistant Secretary of the Interior.

PART 3160—[AMENDED]

1. The authority citation for 43 CFR part 3160 continues to read:

§ 3164.1 [Amended]

2. Section 3164.1(b) is amended by revising the table which is part of § 3164.1(b):

* * * * *

(b) * * *

Order No.	Subject	Effective date	Federal Register reference	Supersedes
1.	Approval of operations	Nov. 21, 1983	48 FR 48916, and 48 FR 56226.	NTL–6.
2.	Drilling operations	Dec. 19, 1988	53 FR 46798.	None.
3.	Site security	Mar. 27, 1989	54 FR 8060.	NTL–7.

Order No.	Subject	Effective date	Federal Register reference	Supersedes
4.	Measurement of oil	Aug. 23, 1989	54 FR 8086.	None.
5.	Measurement of Gas	March 27, 1989 for new facilities; August 23, 1989 for existing facilities measuring 200 MCF or more per day of gas; February 26, 1990 for existing facilities producing less than 200 MCF per day of gas.	54 FR 8100.	None.
6.	Hydrogen sulfide operations	January 22, 1991	55 FR	None.

Note: Numbers will be assigned by the Washington Office, Bureau of Land Management, to additional Orders as they are prepared for publication and added to this table.

Authority: The Mineral Leasing Act, as amended and supplemented (30 U.S.C. 181 et seq.); the Mineral Leasing Act for Acquired Lands of 1947, as amended (30 U.S.C. 351–359); the Act of May 31, 1930 (30 U.S.C. 301–306); the Act of March 3, 1909, as amended (25 U.S.C. 396); the Act of May 11, 1938, as amended (25 U.S.C. 396a–396q); the Act of February 28, 1891, as amended (25 U.S.C. 397); the Act of May 29, 1924 (25 U.S.C. 398); the Act of March 3, 1927 (25 U.S.C. 398a–398e); the Act of June 30, 1919, as amended (25 U.S.C. 399); R.S. 441 (43 U.S.C. 1457); Attorney General's Opinion of April 2, 1941 (40 Op.Atty.Gen. 41); the Federal Property and Administrative Services Act of 1949, as amended (40 U.S.C. 471 et seq.); the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4331 et seq.); the Act of December 12, 1980 (42 U.S.C. 6508); the Combined Hydrocarbon Leasing Act of 1981 (95 Stat. 1070); the Federal Oil and Gas Royalty Management Act of 1982 (30 U.S.C. 1701 et seq.); and the Indian Mineral Development Act of 1982 (25 U.S.C. 2102 et seq.).

Appendix—Text of Oil and Gas Order No. 6

Note: This appendix is published for information only and will not appear in the Code of Federal Regulations.

I. Introduction

A. Authority

This Order is established pursuant to the authority granted to the Secretary of the Interior through various Federal and Indian mineral leasing statutes and the Federal Oil and Gas Royalty Management Act of 1982. This authority has been delegated to the Bureau of Land Management and is implemented by the onshore oil and gas operating regulations contained in 43 CFR part 3160. More specifically, this Order implements and supplements the provisions of § 3162.1—General Requirements; § 3162.5–1(a)(c)(d)—Environmental Obligations; § 3162.5–2(a)—Control of Wells; and § 3162.5–3—Safety Precautions.

43 CFR 3164.1 specifically authorizes the Director, Bureau of Land Management, to issue Onshore Oil and Gas Orders, when necessary, to implement or supplement the operating regulations and provides that all such Orders shall be binding on the operator(s) of all Federal and Indian (except Osage Tribe) oil and gas leases which have been, or may hereafter be, issued. The authorized officer has the authority pursuant to 43 CFR 3161.2 to implement the provisions of this Order, require additional information, and approve any plans, applications, or variances required or allowed by the Order.

The authorized officer may, pursuant to 43 CFR 3164.2, issue Notices to Lessees and Operators (NTL's), after notice and comment, to supplement or provide variances of this Order as necessary to accommodate special conditions on a State or area-wide basis. Further information concerning variances may be found in section IV. of this Order.

B. Purpose

The purpose of this Order is to protect public health and safety and those personnel essential to maintaining control of the well. This Order identifies the Bureau of Land Management's uniform national requirements and minimum standards of performance expected from operators when conducting operations involving oil or gas that is known or could reasonably be expected to contain hydrogen sulfide (H_2S) or which results in the emission of sulfur dioxide (SO_2) as a result of flaring H_2S. This Order also identifies the gravity of violations, probable corrective action(s), and normal abatement periods.

C. Scope

This Order is applicable to all onshore Federal and Indian (except Osage Tribe) oil and gas leases when drilling, completing, testing, reworking, producing, injecting, gathering, storing, or treating operations are being conducted in zones which are known or could reasonably be expected to contain H_2S or which, when flared, could produce SO_2, in such concentrations that upon release they could constitute a hazard to human life. The requirements and minimum standards of this Order do not apply when operating in zones where H_2S is presently known not to be present or cannot reasonably be expected to be present in concentrations of 100 parts per million (ppm) or more in the gas stream.

The requirements and minimum standards in this Order do not relieve an operator from compliance with any applicable Federal, State, or local requirement(s) regarding H_2S or SO_2 which are more stringent.

II. Definitions

A. "Authorized officer" means any employee of the Bureau of Land Management authorized to perform the duties described in 43 CFR Groups 3000 and 3100 (3000.0–5).

B. *Christmas tree* means an assembly of valves and fittings used to control production and provide access to the producing tubing string. The assembly includes all equipment above the tubing-head top flange.

C. *Dispersion technique* means a mathematical representation of the physical and chemical transportation, dilution, and transformation of H_2S gas emitted into the atmosphere.

D. *Escape rate* means that the maximum volume (Q) used as the escape rate in determining the radius of exposure shall be that specified below, as applicable:

1. For a production facility, the escape rate shall be calculated using the maximum daily rate of gas produced through that facility or the best estimate thereof;

2. For gas wells, the escape rate shall be calculated by using the current daily

absolute open-flow rate against atmospheric pressure;

3. For oil wells, the escape rate shall be calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or best estimate thereof;

4. For a well being drilled in a developed area, the escape rate may be determined by using the offset wells completed in the interval(s) in question.

E. *Essential personnel* means those on-site personnel directly associated with the operation being conducted and necessary to maintain control of the well.

F. *Exploratory well* means any well drilled beyond the known producing limits of a pool.

G. *Gas well* means a well for which the energy equivalent of the gas produced, including the entrained liquid hydrocarbons, exceeds the energy equivalent of the oil produced.

H. *H_2S Drilling Operations Plan* means a written plan which provides for safety of essential personnel and for maintaining control of the well with regard to H_2S and SO_2.

I. *Lessee* means a person or entity holding record title in a lease issued by the United States (3160.0–5).

J. *Major violation* means noncompliance which causes or threatens immediate, substantial, and adverse impacts on public health and safety, the environment, production accountability, or royalty income (3160.0–5).

K. *Minor violation* means noncompliance which does not rise to the level of a major violation (3160.0–5).

L. *Oil well* means a well for which the energy equivalent of the oil produced exceeds the energy equivalent of the gas produced, including the entrained liquid hydrocarbons.

M. *Operating rights owner* means a person or entity holding operating rights in a lease issued by the United States. A lessee may also be an operating rights owner if the operating rights in a lease or portion thereof have not been severed from record title (3160.0–5).

N. *Operator* means any person or entity including but not limited to the lessee or operating rights owner who has stated in writing to the authorized officer that he/she is responsible under the terms of the lease for the operations conducted on the leased lands or a portion thereof (3160.0–5).

O. *Potentially hazardous volume* means a volume of gas of such H_2S concentration and flow rate that it may result in radius of exposure calculated ambient concentrations of 100 ppm H_2S at any occupied residence, school, church, park, school bus stop, place of business or other area where the public could reasonably to expected to frequent, or 500 ppm H_2S at any Federal, State, County or municipal road or highway.

P. *Production facilities* means any wellhead, flowline, piping, treating, or separating equipment, water disposal pits, processing plant or combination thereof prior to the approved measurement point for any lease, communitization agreement, or unit participating area.

Q. *Prompt correction* means immediate correction of violations, with operation suspended if required at the discretion of the authorized officer.

R. *Public Protection Plan* means a written plan which provides for the safety of the potentially affected public with regard to H_2S and SO_2.

S. *Radius of exposure* means the calculation resulting from using the following Pasquill-Gifford derived equation, or by such other method(s) as may be approved by the authorized officer:

1. For determining the 100 ppm radius of exposure where the H_2S concentration in the gas stream is less than 10 percent:

$$X=[1.589(H_2S \text{ concentration})(Q)]^{(0.625)}$$

or

2. For determining the 500 ppm radius of exposure where the H_2S concentration in the gas stream is less than 10 percent:

$$X=[(0.4546)(H_2S \text{ concentration})(Q)]^{(0.625)}$$

where:

X=radius of exposure in feet;

H_2S Concentration=decimal equivalent of the mole or volume fractions (percent) of H_2S in the gaseous mixture;

Q=maximum volume of gas determined to be available for escape in cubic feet per day (at standard conditions of 14.73 psia and 60°F).

3. For determining the 100 ppm or the 500 ppm radius of exposure in gas streams containing H_2S concentrations of 10 percent or greater, a dispersion technique that takes into account representative wind speed, direction, atmospheric stability, complex terrain, other dispersion features shall be utilized. Such techniques may include, but shall not be limited to one of a series of computer models outlined in The Environmental Protection Agency's "Guidelines on Air Quality Models—(EPA–450/2–78–027R)."

4. Where multiple H_2S sources (i.e., wells, treatment equipment, flowlines, etc.) are present, the operator may elect to utilize a radius of exposure which covers a larger area than would be calculated using radius of exposure formula for each component part of the drilling/completion/workover/production system.

5. For a well being drilled in an area where insufficient data exists to calculate a radius of exposure, but where H_2S could reasonably be expected to be present in concentrations in excess of 100 ppm in the gas stream, a 100 ppm radius of exposure equal to 3,000 feet shall be assumed.

T. *Zones known to contain H_2S* means geological formations in a field where prior drilling, logging, coring, testing, or producing operations have confirmed that H_2S-bearing zones will be encountered that contain 100 ppm or more of H_2S in the gas stream.

U. *Zones known not to contain H_2S* means geological formations in a field where prior drilling, logging, coring, testing, or producing operations have confirmed the absence of H_2S-bearing zones that contain 100 ppm or more of H_2S in the gas stream.

V. *Zones which can reasonably be expected to contain H_2S* means geological formations in the area which have not had prior drilling, but prior drilling to the same formations in similar field(s) within the same geologic basin indicates there is a potential for 100 ppm or more of H_2S in the gas stream.

W. *Zones which cannot reasonably be expected to contain H_2S* means geological formations in the area which have not had prior drilling, but prior drilling to the same formations in similar field(s) within the same geologic basin indicates there is not a potential for 100 ppm or more of H_2S in the gas stream.

III. Requirements

The requirements of this Order are the minimum acceptable standards with regard to H_2S operations. This Order also classifies violations as major or minor for purposes of the assessment and penalty provisions of 43 CFR part 3163, specifies the corrective action which will probably be required, and establishes the normal abatement period following detection of a major or minor violation in which the violator may take such corrective action without incurring an assessment. However, the authorized officer may, after consideration of all appropriate factors, require reasonable and necessary standards, corrective actions and abatement periods that may in some cases, vary from those specified in this Order that he/she determines to be necessary to protect public health and safety, the environment, or to maintain control of a well to prevent waste of Federal mineral resources. To the extent such standards, actions or abatement periods differ from those set forth in this Order, they may be subject to review pursuant to 43 CFR 3165.3.

A. Applications, Approvals, and Reports

1. Drilling

For proposed drilling operations where formations will be penetrated which have zones known to contain or which could reasonably be expected to contain concentrations of H_2S of 100 ppm or more in the gas stream, H_2S Drilling Operation Plan and if the applicability criteria in section III.B.1 are met, a Public Protection Plan as outlined in section III.B.2.b, shall be submitted as part of the Application for Permit to Drill (APD) (refer to Oil and Gas Order No. 1). In cases where multiple filings are being made with a single drilling plan, a single H_2S Drilling Operations Plan and, if applicable, a single Public Protection Plan may be submitted for the lease, communitization agreement, unit or field in accordance with Order No. 1. Failure to submit either the H_2S Drilling Operations Plan or the Public Protection Plan when required by this Order shall result in an incomplete APD pursuant to 43 CFR 3162.3–1.

The H_2S Drilling Operations Plan shall fully describe the manner in which the requirements and minimum standards in section III.C. shall be met and implemented. As required by this Order (section III.C.), the following must be submitted in the H_2S Drilling Operations Plan:

a. Statement that all personnel shall receive proper H_2S training in accordance with section III.C.3.a.

b. A legible well site diagram of accurate scale (may be included as part of the Well Site Layout as required by Onshore Order No. 1) showing the following:

i. Drill rig orientation
ii. Prevailing wind direction
iii. Terrain of surrounding area
iv. Location of all briefing areas (designate primary briefing area)
v. Location of access road(s) (including secondary egress)
vi. Location of flare line(s) and pit(s)
vii. Location of caution and/or danger signs
viii. Location of wind direction indicators

c. As required by this Order, a complete description of the following H_2S safety equipment/systems:

i. Well control equipment.
—Flare line(s) and means of ignition
—Remote controlled choke
—Flare gun/flares
—Mud-gas separator and rotating head (if exploratory well)

ii. Protective equipment for essential personnel.
—Location, type, storage and maintenance of all working and escape breathing apparatus
—Means of communication when using protective breathing apparatus

iii. H_2S detection and monitoring equipment.
—H_2S sensors and associated audible/visual alarm(s)
—Portable H_2S and SO_2 monitor(s)

iv. Visual warning systems.
—Wind direction indicators
—Caution/danger sign(s) and flag(s)

v. Mud program.
—Mud system and additives
—Mud degassing system

vi. Metallurgy.
—Metallurgical properties of all tubular goods and well control equipment which could be exposed to H_2S (section III.C.4.c.)

vii. Means of communication from wellsite.

d. Plans for well testing.

2. Production

a. For each existing production facility having an H_2S concentration of 100 ppm or more in the gas stream, the operator shall calculate and submit the calculations to the authorized officer within 180 days of the effective date of this Order, the 100 and, if applicable, the 500 ppm radii of exposure for all facilities to determine if the applicability criteria section III.B.1. of this order are met. Radii of exposure calculations shall not be required for oil or water flowlines. Further, if any of the applicability criteria (section III.B.1.) are met, the operator shall submit a complete Public Protection Plan which meets the requirements of section III.B.2.b. to the authorized officer within 1 year of the effective date of this Order. For production facilities constructed after the effective date of this Order and meeting the above minimum concentration (100 ppm in gas stream), the operator shall report the radii of exposure calculations, and if the applicability criteria (section III.B.1) are met, submit a complete Public Protection Plan (section III.B.2.b.) to the authorized officer within 60 days after completion of production facilities.

Violation: Minor for failure to submit required information.

Corrective Action: Submit required information (radii of exposure and/or complete Public Protection Plan).

Normal Abatement Period: 20 to 40 days.

b. The operator shall initially test the H_2S concentration of the gas stream for each well or production facility and shall make the results available to the authorized officer, upon request.

Violation: Minor.

Corrective Action: Test gas from well or production facility.

Normal Abatement Period: 20 to 40 days.

c. If operational or production alterations result in a 5% or more increase in the H_2S concentration (i.e., well recompletion, increased GOR's) or the radius of exposure as calculated under sections III.A.2.a. and III.A.2.b., notification of such changes shall be submitted to the authorized officer within 60 days after identification of the change.

Violation: Minor.

Corrective Action: Submit information to authorized officer.

Normal Abatement Period: 20 to 40 days.

3. Plans and Reports

a. H_2S Drilling Operations Plan(s) or Public Protection Plan(s) shall be reviewed by the operator on an annual basis and a copy of any necessary revisions shall be submitted to the authorized officer upon request.

Violation: Minor.

Corrective Action: Submit information to authorized officer.

Normal Abatement Period: 20 to 40 days.

b. Any release of a potentially hazardous volume of H_2S shall be reported to the authorized officer as soon as practicable, but no later than 24 hours following identification of the release.

Violation: Minor.

Corrective Action: Report undesirable event to the authorized officer.

Normal Abatement Period: 24 hours.

B. Public Protection

1. Applicability Criteria

For both drilling/completion/workover and production operations, the H_2S radius of exposure shall be determined on all wells and production facilities subject to this Order. A Public Protection Plan (Section III.B.2) shall be required when any of the following conditions apply:

a. The 100 ppm radius of exposure is greater than 50 feet and includes any occupied residence, school, church, park, school bus stop, place of business, or other areas where the public could reasonably be expected to frequent;

b. The 500 ppm radius of exposure is greater than 50 feet and includes any part of a Federal, State, County, or municipal road or highway owned and principally maintained for public use; or

c. The 100 ppm radius of exposure is equal to or greater than 3,000 feet where facilities or roads are maintained for direct public access.

Additional specific requirements for drilling/completion/workover or producing operations are described in sections III.C. and III.D. of this Order, respectively.

2. Public Protection Plan

a. Plan Submission/Implementation/Availability—i. A Public Protection Plan providing details of actions to alert and protect the public in the event of a release of a potentially hazardous volume of H_2S shall be submitted to the authorized officer as required by Section III.A.1. for drilling or by section III.A.2.a. for producing operations when the applicability criteria established in section III.B.1. of this Order are met. One plan may be submitted for each well, lease, communitization agreement, unit, or field, at the operator's discretion. The Public Protection Plan shall be maintained and updated, in accordance with section III.A.3.a.

ii. The Public Protection Plan shall be activated immediately upon detection of release of a potentially hazardous volume of H_2S.

Violation: Major.

Corrective Action: Immediate implementation of the public protection plan.

Normal Abatement Period: Prompt correction required.

iii. A copy of the Public Protection Plan shall be available at the drilling/completion site for such wells and at the facility, field office, or with the pumper, as appropriate, for producing wells, facilities, and during workover operations.

Violation: Minor.

Corrective Action: Make copy of Plan available.

Normal Abatement Period: 24 hours (drilling/completion/workover), 5 to 7 days (production).

b. Plan Content. i. The details of the Public Protection Plan may vary according to the site specific characteristics (concentration, volume, terrain, etc.) expected to be encountered and the number and proximity of the population potentially at risk. In the areas of high population density or in other special cases, the authorized officer may require more stringent plans to be developed. These may include public education seminars, mass alert systems, and use of sirens, telephone, radio, and television depending on the number of people at risk and their location with respect to the well site.

ii. The Public Protection Plan shall include:

(a) The responsibilities and duties of key personnel, and instructions for alerting the public and requesting assistance;

(b) A list of names and telephone numbers of residents, those responsible for safety of public roadways, and individuals responsible for the safety of occupants of buildings within the 100 ppm radius of exposure (e.g. school principals, building managers, etc.) as defined by the applicability criteria in section III.B.1. The operator shall ensure that those who are at the greatest risk are notified first. The plan shall define when and how people are to be notified in case of an H_2S emergency.

(c) A telephone call list (including telephone numbers) for requesting assistance from law enforcement, fire department, and medical personnel and Federal and State regulatory agencies, as required. Necessary information to be communicated and the emergency responses that may be required shall be listed. This information shall be based on previous contacts with these organizations;

(d) A legible 100 ppm (or 3,000 feet, if conditions unknown) radius plat of all private and public dwellings, schools, roads, recreational areas, and other areas where the public might reasonably be expected to frequent;

(e) Advance briefings, by visit, meeting or letter to the people identified in section III.B.2.b.ii(b), including:

—Hazards of H_2S and SO_2;
—Necessity for an emergency action plan;
—Possible sources of H_2S and SO_2;
—Instructions for reporting a leak to the operator;
—The manner in which the public shall be notified of an emergency; and
—Steps to be taken in case of an emergency, including evacuation of any people;

(f) Guidelines for the ignition of the H_2S-bearing gas. The Plan shall designate the title or position of the person(s) who has the authority to ignite the escaping gas and define when, how, and by whom the gas is to be ignited;

(g) Additional measures necessary following the release of H_2S and SO_2 until the release is contained are as follows:

—Monitoring of H_2S and SO_2 levels and wind direction in the affected area;
—Maintenance of site security and access control;
—Communication of status of well control; and
—Other necessary measures as required by the authorized officer; and

(h) For production facilities, a description of the detection system(s) utilized to determine the concentration of H_2S released.

C. Drilling/Completion/Workover Requirements

1. General

a. A copy of the H_2S Drilling Operations Plan shall be available during operations at the well site beginning when the operation is subject to the terms of this Order (i.e., 3 days or 500 feet of known or probable H_2S zone).

Violation: Minor.

Corrective Action: Make copy of Plan available.

Normal Abatement Period: 24 hours.

b. Initial H_2S training shall be completed and all H_2S related safety equipment shall be installed, tested, and operational when drilling reaches a depth of 500 feet above, or 3 days prior to penetrating (whichever comes first) the first zone containing or reasonably expected to contain H_2S. A specific H_2S operations plan for completion and workover operations will not be required for approval. For completion and workover operations, all required equipment and warning systems shall be operational and training completed prior to commencing operations.

Violation: Major.

Corrective Action: Implement H_2S operational requirements, such as completion of training and/or installation, repair, or replacement of equipment, as necessary.

Normal Abatement Period: Prompt correction required.

c. If H_2S was not anticipated at the time the APD was approved, but is encountered in excess of 100 ppm in the gas stream, the following measures shall be taken:

(i) the operator shall immediately ensure control of the well, suspend drilling ahead operations (unless detrimental to well control), and obtain materials and safety equipment to bring the operations into compliance with the applicable provisions of this Order.

Violation: Major.

Corrective Action: Implement H_2S operational requirements, as applicable.

Normal Abatement Period: Prompt correction required.

ii. The operator shall notify the authorized officer of the event and the mitigating steps that have or are being taken as soon as possible, but no later than the next business day. If said notification is subsequent to actual resumption of drilling operations, the operator shall notify the authorized officer of the date that drilling was

resumed no later than the next business day.

Violation: Minor.

Corrective Action: Notify authorized officer.

Normal Abatement Period: 24 hours.

iii. It is the operator's responsibility to ensure that the applicable requirements of this Order have been met prior to the resumption of drilling ahead operations. Drilling ahead operations will not be suspended pending receipt of a written H_2S Drilling Operations Plan(s) and, if necessary, Public Protection Plan(s) provided that complete copies of the applicable Plan(s) are filed with the authorized officer for approval within 5 business days following resumption of drilling ahead operations.

Violation: Minor.

Corrective Action: Submit plans to authorization officer.

Normal Abatement Period: 5 days.

2. Locations.

a. Where practical, 2 roads shall be established, 1 at each end of the location, or as dictated by prevailing winds and terrain. If an alternate road is not practical, a clearly marked footpath shall be provided to a safe area. The purpose of such an alternate escape route is only to provide a means of egress to a safe area.

Violation: Minor.

Corrective Action: Designate or establish an alternate escape route.

Normal Abatement Period: 24 hours.

b. The alternate escape route shall be kept passable at all times.

Violation: Minor.

Corrective Action: Make alternate escape route passable.

Normal Abatement Period: 24 hours.

c. For workovers, a secondary means of egress shall be designated.

Violation: Minor.

Corrective Action: Designate secondary means of egress.

Normal Abatement Period: 24 hours.

3. Personnel Protection

a. Training Program. The operator shall ensure that all personnel who will be working at the wellsite will be properly trained in H_2S drilling and contingency procedures in accordance with the general training requirements outlined in the American Petroleum Institute's (API) *Recommended Practice (RP) 49 (April 15, 1987 or subsequent editions) for Safe Drilling of Wells Containing Hydrogen Sulfide, Section 2.* The operator also shall ensure that the training will be accomplished prior to a well coming under the terms of this Order (i.e., 3 days or 500 feet of known or probable H_2S zone). In addition to the requirements of API–RP49, a minimum of an initial training session and weekly H_2S and well control drills for all personnel in each working crew shall be conducted. The initial training session for each well shall include a review of the site specific Drilling Operations Plan and, if applicable, the Public Protection Plan.

Violation: Major.

Corrective Action: Train all personnel and conduct drills.

Normal Abatement Period: Prompt correction required.

i. All training sessions and drills shall be recorded on the driller's log or its equivalent.

Violation: Minor.

Corrective Action: Record on driller's log or equivalent.

Normal Abatement Period: 24 hours.

ii. For drilling/completion/workover wells, at least 2 briefing areas shall be designated for assembly of personnel during emergency conditions, located a minimum of 150 feet from the well bore and 1 of the briefing areas shall be upwind of the well at all times. The briefing area located most normally upwind shall be designated as the "Primary Briefing Area."

Violation: Major.

Corrective Action: Designate briefing areas.

Normal Abatement Period: 24 hours.

iii. One person (by job title) shall be designated and identified to all on-site personnel as the person primarily responsible for the overall operation of the on-site safety and training programs.

Violation: Minor.

Corrective Action: Designate safety responsibilities.

Normal Abatement Period: 24 hours.

b. Protective Equipment: i. The operator shall ensure that proper respirator protection equipment program is implemented, in accordance with the current American National Standards Institute (ANSI) Standard Z.88.2–1980 *"Practices for Respiratory Protection."* Proper protective breathing apparatus shall be readily accessible to all essential personnel on a drilling/completion/workover site. Escape and pressure-demand type working equipment shall be provided for essential personnel in the H_2S environment to maintain or regain control of the well. For pressure-demand type working equipment those essential personnel shall be able to obtain a continuous seal to the face with the equipment. The operator shall ensure that service companies have the proper respiratory protection equipment when called to the location. Lightweight, escape-type, self-contained breathing apparatus with a minimum of 5-minute rated supply shall be readily accessible at a location for the derrickman and at any other location(s) where escape from an H_2S contaminated atmosphere would be difficult.

Violation: Major.

Corrective Action: Acquire, repair, or replace equipment, as necessary.

Normal Abatement Period: Prompt correction required.

ii. Storage and maintenance of protective breathing apparatus shall be planned to ensure that at least 1 working apparatus per person is readily available for all essential personnel.

Violation: Major.

Corrective Action: Acquire or rearrange equipment, as necessary.

Normal Abatement Period: Prompt correction required.

iii. The following additional safety equipment shall be available for use:

(a) Effective means of communication when using protective breathing apparatus;

(b) Flare gun and flares to ignite the well;

(c) Telephone, radio, mobile phone, or any other device that provides communication from a safe area at the rig location, where practical.

Violation: Major.

Corrective Action: Acquire, repair, or replace equipment.

Normal Abatement Period: 24 hours.

c. H_2S Detection and Monitoring Equipment. i. Each drilling/completion site shall have an H_2S detection and monitoring system that automatically activates visible and audible alarms when the ambient air concentration H_2S reaches the threshold limits of 10 and 15 ppm in air, respectively. The sensors shall have a rapid response time and be capable of sensing a minimum of 10 ppm of H_2S in ambient air, with at least 3 sensing points located at the shale shaker, rig floor, and bell nipple for a drilling site and the cellar, rig floor, and circulating tanks or shale shaker for a completion site. The detection system shall be installed, calibrated, tested, and maintained in accordance with the manufacturer's recommendations.

Violation: Major.

Corrective Action: Install, repair, calibrate, or replace equipment, as necessary.

Normal Abatement Period: Prompt correction required.

ii. All tests of the H_2S monitoring system shall be recorded on the driller's log or its equivalent.

Violation: Minor.

Corrective Action: Record on driller's log or equivalent.

Normal Abatement Period: 24 hours.

iii. For workover operations, 1 operational sensing point shall be

located as close to the wellbore as practical. Additional sensing points may be necessary for large and/or long-term operations.

Violation: Major.

Corrective Action: Install, repair, calibrate, or replace equipment, as necessary.

Normal Abatement Period: Prompt correction required.

d. Visible Warning System. i. Equipment to indicate wind direction at all times shall be installed at prominent locations and shall be visible at all times during drilling operations. At least 2 such wind direction indicators (i.e., windsocks, windvanes, pennants with tailstreamers, etc.) shall be located at separate elevations (i.e., near ground level, rig floor, and/or treetop height). At least 1 wind direction indicator shall be clearly visible from all principal working areas at all times so that wind direction can be easily determined. For completion/workover operations, 1 wind direction indicator shall suffice, provided it is visible from all principal working areas on the location. In addition, a wind direction indicator at each of the 2 briefing areas shall be provided if the wind direction indicator(s) previously required in this paragraph are not visible from the briefing areas.

Violation: Minor.

Corrective Action: Install, repair, move, or replace wind direction indicator(s), as necessary.

Normal Abatement Period: 24 hours.

ii. At any time when the terms of this Order are in effect, operational danger or caution sign(s) shall be displayed along all controlled accesses to the site.

Violation: Minor.

Corrective Action: Erect appropriate signs.

Normal Abatement Period: 24 hours.

iii. Each sign shall be painted a high-visibility red, black and white, or yellow with black lettering.

Violation: Minor.

Corrective Action: Replace or alter sign, as necessary.

Normal Abatement Period: 5 to 20 days.

iv. The sign(s) shall be legible and large enough to be read by all persons entering the well site and be placed a minimum of 200 feet but no more than 500 feet from the well site which allows vehicles to turn around at a safe distance prior to reaching the site.

Violation: Major.

Corrective Action: Replace, alter, or move sign, as necessary.

Normal Abatement Period: 24 hours.

v. The sign(s) shall read:

DANGER—POISON GAS—HYDROGEN SULFIDE

and in smaller lettering:

Do Not Approach If Red Flag is Flying

or equivalent language if approved by the authorized officer.

Where appropriate, bilingual or multilingual danger sign(s) shall be used.

Violation: Minor.

Corrective Action: Alter sign(s) as necessary.

Normal Abatement Period: 5 to 20 days.

vi. All sign(s) and, when appropriate, flag(s) shall be visible to all personnel approaching the location under normal lighting and weather conditions.

Violation: Major.

Corrective Action: Erect or move sign(s) and/or flag(s), as necessary.

Normal Abatement Period: 24 hours.

vii. When H_2S is detected in excess of 10 ppm at any detection point, red flag(s) shall be displayed.

Violation: Major.

Corrective Action: Display red flag.

Normal Abatement Period: Prompt correction required.

e. Warning System Response. When H_2S is detected in excess of 10 ppm at any detection point, all non-essential personnel shall be moved to a safe area and essential personnel (i.e., those necessary to maintain control of the well) shall wear pressure-demand type protective breathing apparatus. Once accomplished, operations may proceed.

Violation: Major.

Corrective Action: Move non-essential personnel to safe area and mask-up essential personnel.

Normal Abatement Period: Prompt correction required.

4. Operating Procedures and Equipment

a. General/Operations. Drilling/completion/workover operations in H_2S areas shall be subject to the following requirements:

i. If zones containing in excess of 100 ppm of H_2S gas are encountered while drilling with air, gas, mist, other non-mud circulating mediums or aerated mud, the well shall be killed with a water or oil-based mud and mud shall be used thereafter as the circulating medium for continued drilling.

Violation: Major.

Corrective Action: Convert to appropriate fluid medium.

Normal Abatement Period: Prompt correction required.

ii. A flare system shall be designed and installed to safely gather and burn H_2S-bearing gas.

Violation: Major.

Corrective Action: Install flare system.

Normal Abatement Period: Prompt correction required.

iii. Flare lines shall be located as far from the operating site as feasible and in a manner to compensate for wind changes. The flare line(s) mouth(s) shall be located not less than 150 feet from the wellbore unless otherwise approved by the authorized officer. Flare lines shall be straight unless targeted with running tees.

Violation: Minor.

Corrective Action: Adjust flare line(s) as necessary.

Normal Abatement Period: 24 hours.

iv. The flare system shall be equipped with a suitable and safe means of ignition.

Violation: Major.

Corrective Action: Install, repair, or replace equipment, as necessary.

Normal Abatement Period: 24 hours.

v. Where noncombustible gas is to be flared, the system shall be provided supplemental fuel to maintain ignition.

Violation: Major.

Corrective Action: Acquire supplemental fuel.

Normal Abatement Period: 24 hours.

vi. At any wellsite where SO_2 may be released as a result of flaring of H_2S during drilling, completion, or workover operations, the operator shall make SO_2 portable detection equipment available for checking the SO_2 level in the flare impact area.

Violation: Minor.

Corrective Action: Acquire, repair, or replace equipment as necessary.

Normal Abatement Period: 24 hours to 3 days.

vii. If the flare impact area reaches a sustained ambient threshold level of 2 ppm or greater of SO_2 in air and includes any occupied residence, school, church, park, or place of business, or other area where the public could reasonably be expected to frequent, the Public Protection Plan shall be implemented.

Violation: Major.

Corrective Action: Contain SO_2 release and/or implement Public Protection Plan.

Normal Abatement Period: Prompt correction required.

viii. A remote controlled choke shall be installed for all H_2S drilling and, where feasible, for completion operations. A remote controlled valve may be used in lieu of this requirement for completion operations.

Violation: Major.

Corrective Action: Install, repair, or replace equipment, as necessary.

Normal Abatement Period: Prompt correction required.

ix. Mud-gas separators and rotating heads shall be installed and operable for all exploratory wells.

Violation: Major.

Corrective Action: Install, repair, or replace equipment, as necessary.

Normal Abatement Period: Prompt correction required.

b. Mud Program. i. A pH of 10 or above in a fresh water-base mud system shall be maintained to control corrosion, H_2S gas returns to surface, and minimize sulfide stress cracking and embrittlement unless other formation conditions or mud types justify a lesser pH level.

Violation: Major.

Corrective Action: Adjust pH.

Normal Abatement Period: Prompt correction required.

ii. Drilling mud containing H_2S gas shall be degassed in accordance with API's RP-49, § 5.14, at an optimum location for the rig configuration. These gases shall be piped into the flare system.

Violation: Major.

Corrective Action: Install, repair, or replace equipment, as necessary.

Normal Abatement Period: 24 hours.

iii. Sufficient quantities of mud additives shall be maintained on location to scavenge and/or neutralize H_2S where formation pressures are unknown.

Violation: Major.

Corrective Action: Obtain proper mud additives.

Normal Abatement Period: 24 hours.

c. *Metallurgical Equipment.* All equipment that has the potential to be exposed to H_2S shall be suitable for H_2S service. Equipment which shall meet these metallurgical standards include the drill string, casing, wellhead, blowout preventer assembly, casing head and spool, rotating head, kill lines, choke, choke manifold and lines, valves, mud-gas separators, drill-stem test tools, test units, tubing, flanges, and other related equipment.

To minimize stress corrosion cracking and/or H_2S embrittlement, the equipment shall be constructed of material whose metallurgical properties are chosen with consideration for both an H_2S working environment and the anticipated stress. The metallurgical properties of the materials used shall conform to the current National Association of Corrosion Engineers (NACE) Standard MR-01-75, *Material Requirement, Sulfide Stress Cracking Resistant Metallic Material for Oil Field Equipment.* These metallurgical properties include the grade of steel, the processing method (rolled, normalized, tempered, and/or quenched), and the resulting strength properties. The working environment considerations include the H_2S concentration, the well fluid pH, and the wellbore pressures and temperatures. Elastomers, packing, and similar inner parts exposed to H_2S shall be resistant at the maximum anticipated temperature of exposure. The manufacturer's verification of design for use in an H_2S environment shall be sufficient verification of suitable service in accordance with this Order.

Violation: Major.

Corrective Action: Install, repair, or replace appropriate equipment, as necessary.

Normal Abatement Period: Prompt correction required.

d. Well Testing in an H_2S Environment. Testing shall be performed with a minimum number of personnel in the immediate vicinity which are necessary to safely and adequately operate the test equipment. Except with prior approval by the authorized officer, the drill-stem testing of H_2S zones shall be conducted only during daylight hours and formation fluids shall not be flowed to the surface (closed chamber only).

Violation: Major

Corrective Action: Terminate the well test.

Normal Abatement Period: Prompt correction required.

D. Production Requirements

1. General

a. All existing production facilities which do not currently meet the requirements and minimum standards set forth in this section shall be brought into conformance within 1 year after the effective date of this Order. All existing equipment that is in a safe working condition as of the effective date of this Order is specifically exempt from the metallurgical requirements prescribed in section III D.3.g.

Violation: Minor.

Corrective Action: Bring facility into compliance.

Normal Abatement Period: 60 days.

b. Production facilities constructed after the effective date of this Order shall be designed, constructed, and operated to meet the requirements and minimum standards set forth in this section. Any variations from the standards or established time frames shall be approved by the authorized officer in accordance with the provisions of section IV. of this Order. Except for storage tanks, a determination of the radius of exposure for all production facilities shall be made in the manner prescribed in section II. S. of this Order.

Violation: Minor.

Corrective Action: Bring facility into compliance.

Normal Abatement Period: 60 days.

c. At any production facility or storage tank(s) where the sustained ambient H_2S concentration is in excess of 10 ppm at 50 feet from the production facility or storage tank(s) as measured at ground level under calm (1 mph) conditions, the operator shall collect or reduce vapors from the system and they shall be sold, beneficially used, reinjected, or flared provided terrain and conditions permit.

Violation: Major, if a health or safety problem to the public is imminent, otherwise minor.

Corrective Action: Bring facility into compliance.

Normal Abatement Period: 3 days for major, 30 days for minor.

2. Storage Tanks.

Storage tanks containing produced fluids and utilized as part of a production operation and operated at or near atmospheric pressure, where the vapor accumulation has an H_2S concentration in excess of 500 ppm in the tank, shall be subject to the following:

a. No determination of a radius of exposure need be made for storage tanks.

b. All stairs/ladders leading to the top of storage tanks shall be chained and/or marked to restrict entry. For any storage tank(s) which require fencing (Section III.D.2.f), a danger sign posted at the gate(s) shall suffice in lieu of this requirement.

Violation: Minor.

Corrective Action: Chain or mark stair(s)/ladder(s) or post sign, as necessary.

Normal Abatement Period: 5 to 20 days.

c. A danger sign shall be posted on or within 50 feet of the storage tank(s) to alert the public of the potential H_2S danger. For any storage tank(s) which require fencing (section III.D.2.f.), a danger sign posted at the locked gate(s) shall suffice in lieu of this requirement.

Violation: Minor.

Corrective Action: Post or move sign(s), as necessary.

Normal Abatement Period: 5 to 20 days.

d. The sign(s) shall be painted in high-visibility red, black, and white. The sign(s) shall read:

DANGER—POISON GAS-HYDROGEN SULFIDE

or equivalent language if approved by the authorized officer. Where

appropriate, bilingual or multilingual warning signs shall be used.

Violation: Minor.

Corrective Action: Post, move, replace, or alter sign(s), as necessary.

Normal Abatement Period: 20 to 40 days.

e. At least 1 permanent wind direction indicator shall be installed so that wind direction can be easily determined at or approaching the storage tank(s).

Violation: Minor.

Corrective Action: Install, repair, or replace wind direction indicator, as necessary.

Normal Abatement Period: 20 to 40 days.

f. A minimum 5-foot chain-link, 5-strand barbed wire, or comparable type fence and gate(s) that restrict(s) public access shall be required when storage tanks are located within ¼ mile of or contained inside a city or incorporated limits of a town or within ¼ mile of an occupied residence, school, church, park, playground, school bus stop, place of business, or where the public could reasonably he expected to frequent.

Violation: Minor.

Corrective Action: Install, repair, or replace fence and/or gate(s), as necessary.

Normal Abatement Period: 20 to 40 days.

g. Gate(s), as required by section III.D.2.f. shall be locked when unattended by the operator.

Violation: Minor.

Corrective Action: Lock gate.

Normal Abatement Period: 24 hours.

3. Production Facilities

Production facilities containing 100 ppm or more of H_2S in the gas stream shall be subject to the following:

a. Danger signs as specified in section III.D.2.d. of this Order shall be posted on or within 50 feet of each production facility to alert the public of the potential H_2S danger. In the event the storage tanks and production facilities are located at the same site. 1 such danger sign shall suffice. Further, for any facilities which require fencing (section III.D.2.f.), 1 such danger sign at the gate(s) shall suffice in lieu of this requirement.

Violation: Minor.

Corrective Action: Post, move, or alter sign(s), as necessary.

Normal Abatement Period: 5 to 20 days.

b. Danger signs, as specified in section III.D.2.d. of this Order, shall be required for well flowlines and lease gathering lines that carry H_2S gas. Placement shall be where said lines cross public or lease roads. The signs shall be legible and shall contain sufficient additional information to permit a determination of the owner of the line.

Violation: Minor.

Corrective Action: Post, move, or alter sign(s), as necessary.

Normal Abatement Period: 5 to 20 days.

c. Fencing, as specified in section III.D.2.f., shall be required when production facilities are located within ¼ mile of or contained inside a city or incorporated limits of a town or within ¼ mile of an occupied residence, school, church, park, playground, school bus stop, place of business, or any other area where the public could reasonably be expected to frequent. Flowlines are exempted from this additional fencing requirement.

Violation: Minor.

Corrective Action: Install, repair, or replace fence, and/or gate(s), as necessary.

Normal Abatement Period: 20 to 40 days.

d. Gate(s), as required by section III.D.3.c. shall be locked when unattended by the operator.

Violation: Minor.

Corrective Action: Lock gate.

Normal Abatement Period: 24 hours.

e. Wind direction indicator(s) as specified in section III.D.2.e. of this Order shall be required. In the event the storage tanks and production facilities are located at the same site, 1 such indicator shall suffice. Flowlines are exempt from this requirement.

Violation: Minor.

Corrective Action: Install, repair, or replace wind direction indicator(s), as necessary.

Normal Abatement Period: 20 to 40 days.

f. All wells, unless produced by artificial lift, shall possess a secondary means of immediate well control through the use of appropriate christmas tree and/or downhole completion equipment. Such equipment shall allow downhole accessibility (reentry) under pressure for permanent well control operations. If the applicability criteria stated in Section III.B.1. of this Order are met, a minimum of 2 master valves shall be installed.

Violation: Minor.

Corrective Action: Install, repair, or replace equipment, as necessary.

Normal Abatement Period: 20 to 40 days.

g. All equipment shall be chosen with consideration for both a H_2S working environment and anticipated stresses. NACE Standard MR-01-75 shall be used for metallic equipment selection and, if applicable, adequate protection by chemical inhibition or other such method that controls or limits the corrosive effects of H_2S shall be used.

Violation: Minor.

Corrective Action: Install, repair, or replace equipment, as necessary.

Normal Abatement Period: 20 to 40 days.

h. Where the 100 ppm radius of exposure for H_2S includes any occupied residence, place of business, school, or other inhabited structure or any area where the public may reasonably be expected to frequent, the operator shall install automatic safety valves or shutdowns at the wellhead, or other appropriate shut-in controls for wells equipped with artificial lift.

Violation: Minor.

Corrective Action: Install, repair, or replace equipment, as necessary.

Normal Abatement Period: 20 to 40 days.

i. The automatic safety valves or shutdowns, as required by section III.D.3.h. shall be set to activate upon a release of a potentially hazardous volume of H_2S.

Violation: Major.

Corrective Action: Repair, replace or adjust equipment, as necessary.

Normal Abatement Period: Prompt correction required.

j. If the sustained ambient concentration of H_2S or SO_2 from a production facility which is venting or flaring reaches a concentration of H_2S (10ppm) or SO_2 (2ppm), respectively, at any of the following locations, the operator shall modify the production facility as approved by the authorized officer. The locations include any occupied residence, school, church, park, playground, school bus stop, place of business, or other areas where the public could reasonably be expected to frequent.

Violation: Major.

Corrective Action: Repair facility to bring into compliance.

Normal Abatement Period: Prompt correction required.

4. Public Protection.

When conditions as defined in section III.B.1. of this Order exist, a Public Protection Plan for producing operations shall be submitted to the authorized officer in accordance with section III.B.2.a. of this Order which includes the provisions of section III.B.2.b.

Violation: Minor.

Corrective Action: Submit Public Protection Plan.

Normal Abatement Period: 20 to 40 days.

IV. Variances from Requirements

An operator may request the authorized officer to approve a variance from any of the requirements prescribed in section III hereof. All such requests shall be submitted in writing to the appropriate authorized officer and provide information as to the circumstances which warrant approval of the variance(s) requested and the proposed alternative methods by which the related requirement(s) of minimum standard(s) are to be satisfied. The authorized officer, after considering all relevant factors, may approve the requested variance(s) if it is determined that the proposed alternative(s) meets or exceeds the objectives of the applicable requirement(s) or minimum standard(s).

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