## 19.15.2. Hydrogen Sulfide Gas (Hydrogen Sulfide)

A. In General. Hydrogen Sulfide Gas, known by its chemical abbreviation " $H_2S$ " or as "sulfurated hydrogen" or "hydrosulfuric acid," is a flammable, poisonous gas that occurs naturally as a component of crude petroleum and natural gas. The gas, and its combustion product, sulfur dioxide (S0<sub>2</sub>), present severe threats to human health and can be fatal when a person is exposed to high concentrations. The gas has a distinct and characteristic odor of rotten eggs.

**B.** Applicability. This Section applies to any person, operator or facility subject to the jurisdiction of the Division, including, but not limited to, any person, operator or facility engaged in drilling, stimulating, completing, working over or producing any oil, natural gas, carbon dioxide or geothermal well, or any person, operator or facility engaged in gathering, transporting, storing, processing, or refining of crude oil, natural gas or carbon dioxide. [does this apply to surface waste facilities?]

C. Definitions (specific to this Rule).

1. API. "API" means the American Petroleum Institute, 300 Corrigan Tower Building, Dallas, Texas, 75201.

**2.** Dispersion Technique. "Dispersion technique" is a mathematical representation of the physical and chemical transportation characteristics, dilution characteristics, and transformation characteristics of hydrogen sulfide gas emitted into the atmosphere.

**3.** Escape Rate. The "escape rate" is the maximum volume (Q) used as the escape rate in determining a radius of exposure to certain concentrations of hydrogen sulfide. The escape rate shall be calculated using the maximum daily rate of the gaseous mixture produced or the best estimate thereof. For a natural gas well, the escape rate shall be calculated by using the current daily absolute openflow rate against atmospheric pressure. For an oil well, the escape rate shall be calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or best estimate thereof. For an oil or natural gas well being drilled in a developed area, the escape rate may be determined by using the offset wells that are completed in the interval(s) in question. For facilities not mentioned, the escape rate shall be calculated using the actual flow of gaseous mixture through the facility or operation.

4. PPM. The abbreviation "ppm" means "parts per million."

**5.** Potentially Hazardous Volume. The phrase "potentially hazardous volume" as used in this Section means a volume of hydrogen sulfide gas whose volume, concentration and flow rate is such that, if released, any of the following conditions would exist: (a) a concentration of 100 ppm or greater at any residence, school, church, park, school bus stop, place of business or other area where any person could reasonably be expected to be present; (b) a concentration of 300 ppm or greater at any federal, state, county, municipal or public road or highway; or (c) a concentration of 100 ppm or greater of hydrogen sulfide at a distance of 3,000 feet from the site of the release.

**6. Radius of Exposure.** The radius constructed from a point of escape as its starting point and its length calculated using the following Pasquill-Gifford derived equation, or by such other method(s) as may be approved by the Division:

a. For determining the 100 ppm radius of exposure where the hydrogen sulfide concentration in the gaseous mixture is less than 10 percent: X = [1.589)(hydrogen sulfide concentration)(Q)]<sup>(0.625)</sup>, or

b. For determining the 300 ppm radius of exposure where the hydrogen sulfide concentration in the gaseous mixture is less than 10 percent:  $X=[(0.4546)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$  (.4546 is for 500 ppm will be corrected for 300 ppm) Where: X= radius of exposure in feet: hydrogen sulfide concentration = decimal equivalent of the mole or volume fractions of hydrogen sulfide in the gaseous mixture; Q= maximum volume of gas determined to be available for escape in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

c. For determining the 100 ppm or the 300 ppm radius of exposure in gaseous mixtures containing hydrogen sulfide concentrations of 10 percent or greater, a dispersion technique that takes into account representative wind speed, direction, atmospheric stability, complex terrain, and 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)."

d. Where multiple sources of hydrogen sulfide are present (e.g. wells, treatment equipment, flow lines, etc.), the radius of exposure may encompass a larger area than would otherwise be calculated using radius of exposure formula for each component part. For a well being drilled in an area where insufficient data exits to calculate a radius of exposure, but where hydrogen sulfide could reasonably be expected to be present in concentrations in excess of 100 ppm in the gaseous mixture, a 100 ppm radius of exposure equal to 3,000 feet shall be assumed.

# D. Determination of Hydrogen Sulfide Risk.

**1. Required Determination.** Each person, operator or facility to which this Section applies shall determine the hydrogen sulfide concentration in the gaseous mixture in the well, operation, facility or system.

**2. Testing.** Each person, operator or facility to which this Section applies shall test the hydrogen sulfide concentration of the gaseous mixture at least once using a method approved by the Division. Records of the test shall be forwarded to the Division.

**3.** Calculation of the Radius of Exposure. If the testing described in the previous subparagraph determines that the gaseous mixture contains hydrogen sulfide in a concentration of 100 ppm or greater and within 180 days of the effective date of this Section, a calculation of the radius of exposure shall be made and the results submitted to the Division.

**4. Recalculation.** If operational or production alterations are made that result in a 5% or greater increase in the hydrogen sulfide concentration or the radius of exposure changes, the new radius of exposure shall be recalculated and the results submitted to the Division and similarly retained.

# E. Public Contingency Plan.

**1. In General.** A Public Contingency Plan is a written plan that shall provide an organized and effective plan of action to alert and protect persons at risk in the event of a release of a potentially hazardous volume of hydrogen sulfide.

**2. When Required.** A Public Contingency Plan must be prepared and maintained at any well, operation, facility or system where a potentially hazardous volume of hydrogen sulfide is present or may be present.

**3. Development.** A Public Contingency Plan shall be developed in conjunction with the Division, any person potentially at risk in the event of a release, emergency response authorities including, but not limited to, police and fire departments near the well, operation or facility, the New Mexico State Police and/or the New Mexico Department of Public Safety, and the Local Emergency Planning Committee.

4. Contents. A Public Contingency Plan shall, at a minimum, contain the following elements:

a. Division Guidelines; Site-specific Factors. A Public Contingency Plan shall be prepared according to Division Guidelines. The contents of a Public Contingency Plan may vary according to the site-specific conditions. The Division may impose additional requirements based on population density or special circumstances.

b. Actions to be Taken Upon Release. A Public Contingency plan shall detail actions to be taken to alert and protect persons in the event of a release of a potentially hazardous volume of hydrogen sulfide. A Public Contingency Plan shall include instructions and procedures for alerting persons at risk and emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide.

c. Call List. The plan shall include a call list that shall include the following as applicable:

d. Coordination of Response. A Public Contingency Plan shall stipulate how emergency response actions will be coordinated with the Division and the New Mexico State Police, a Division of the Department of Public Safety, as required pursuant to the New Mexico Emergency Management Act, NMSA 1978, Sections 74-48-1 through 74-4B-14 and the New Mexico Hazardous Material Emergency Response Plan (HMER Plan).

5. Submission. A copy of a Public Contingency Plan shall be submitted to the Division.

6. Annual Review. A Public Contingency Plan(s) shall be reviewed on an annual basis and a copy of any necessary revisions shall be submitted to the Division.

**7. Retention and On-Site Inspection.** A Public Contingency Plan shall be maintained on file at all times and shall be available during a release of a potentially hazardous volume of hydrogen sulfide.

### F. Drilling Contingency Plan.

**1. In General.** A Drilling Contingency Plan is a written plan that describes emergency actions which must be taken to alert and protect persons at risk in the event of a release of a potentially hazardous volume of hydrogen sulfide, to provide for the safety of any persons at the site of the release, and to maintain control of the well with regard to hydrogen sulfide.

2. When Required. Any drilling, completion or workover operation that is conducted in formations that contain, or that could reasonably be expected to contain, a concentration of hydrogen sulfide in the gaseous mixture of 100 ppm or more, must complete and file a Drilling Contingency Plan and, if a Public Contingency Plan if a potentially hazardous volume of hydrogen sulfide is present. A Drilling Contingency Plan shall be submitted along with the Application for Permit to Drill (APD) (form C-101).

**3.** Contents of the Drilling Contingency Plan. A Drilling Contingency Plan shall, at a minimum, contain the following elements:

a. Division Guidelines; Site-specific Factors. A Drilling Contingency Plan shall be prepared according to Division Guidelines. The details may vary according to the site-specific conditions or the population potentially at risk. The Division may impose additional safety and engineering control requirements to provide for public safety.

b. Actions to be Taken Upon Release. A Drilling Contingency plan shall detail actions to be taken to alert and protect persons in the event of a release of a potentially hazardous volume of hydrogen sulfide.

4. Combined Drilling Contingency Plan and Public Contingency Plan. A combined Drilling Contingency Plan and Public Contingency Plan may be submitted where multiple APD's are filed for a lease, communitization agreement, unit or field.

**5.** Submission. A copy of a Drilling Contingency Plan shall be submitted to the Division.

6. Failure to Submit Plan. Failure to submit either a Drilling Contingency Plan or the Public Contingency Plan, or both when required, shall result in denial of the Application to Drill.

6. Annual Review. A Drilling Contingency Plan(s) shall be reviewed on an annual basis and a copy of any necessary revisions shall be submitted to the Division.

**7. Retention and On-Site Inspection.** A Drilling Contingency Plan shall be maintained on file at all times and shall be available during a release of a potentially hazardous volume of hydrogen sulfide.

G. Protection from Hydrogen Sulfide During Drilling, Workover and Servicing Operations.

1. Adherence to API Standards. At a minimum, all drilling, completion, workover and well servicing operations shall be conducted in accordance with the publications of the American Petroleum Institute (API) entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Safe Drilling of Wells Containing Hydrogen Sulfide," RP-49, most recent edition.

**2.** Additional Standards. At a minimum, and in addition to the foregoing API standards, each drilling, completion, workover and well servicing operation shall also be conducted in accordance with the following:

a. Before Commencing Operations. A Drilling Contingency Plan and. if applicable, a Public Contingency Plan, shall be completed before commencement of operations. In addition, hydrogen sulfide training shall be completed and all related safety equipment and warning systems shall be operational before to commencing operations.

b. Egress Routes. Egress routes shall be maintained at all times during operations, as follows:

i. Two roads, one at each end of the location or as dictated by prevailing winds and terrain shall be established as emergency egress routes. If a second road is not practical, a clearly marked footpath to a safe area shall be provided; and

ii. The egress routes shall be kept passable at all times.

c. Detection and Monitoring. Hydrogen sulfide detection and monitoring equipment shall be provided, as follows:

i. Each drilling and completion site shall have a hydrogen sulfide detection and monitoring system that automatically activates visible and audible alarms when the ambient air concentration of hydrogen sulfide reaches 10 ppm. At a minimum, there shall be a sensing point 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.

ii. The detection system shall be calibrated and periodically tested [according to manufacturer's recommendations]. Each test of the hydrogen sulfide monitoring system shall be recorded on the driller's log or its equivalent.

iii. For workover and well servicing operations, one 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.

d. Wind Indicators and Signs.

i. Equipment to indicate wind direction shall be present and visible at all times during operations. At least two devices to indicate wind direction shall be installed at separate elevations and visible from all principal working areas at all times.

ii. During operations, danger or caution sign(s) shall be displayed along all accesses to the site. 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 approved by the Division. Each sign shall be painted with high visibility red, black and white, or yellow paint with black lettering. The sign(s) shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 300 feet from the well site and at a location which allows vehicles to turn around at a safe distance prior to reaching the site.

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

e. If Hydrogen Sulfide Encountered During Operations. If hydrogen sulfide was not anticipated at the time the APD was approved, but is encountered in excess of 100 ppm in the gaseous mixture, the operator shall immediately ensure control of the well, suspend drilling operations (unless detrimental to well control), and obtain materials and safety equipment to bring the operations into compliance with the following paragraphs of this Rule. The operator shall notify the Division of the event and the mitigating steps that have or are being taken as soon as possible, but no later than 24 hours after discovery.

**3.** Operating Practices in Known Hydrogen Sulfide Areas. General operating procedures and equipment for operations in areas known to contain a concentration of hydrogen sulfide gas of 100 ppm or greater in the gaseous mixture, shall be subject to the following minimum requirements.

a. Hydrogen Sulfide Gas Encountered During Drilling Operations With Air, Gas, Mist or Other Non-Mud Circulating Media. If hydrogen sulfide gas in excess of 100 ppm is encountered while drilling with air, gas, mist or other non-mud circulating mediums for 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.

b. Flare System. A flare system shall be designed and installed to safely gather and burn hydrogen sulfide-bearing gas. Flare outlets shall be located as far from the well bore as feasible (but not less than 150 feet). Flare lines shall be as straight as practical. The flare system shall be equipped with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall be provided supplemental fuel to maintain ignition.

c. Sulfur Dioxide.

i. Detection Equipment. At any well site where sulfur dioxide (hereinafter referred to as "SO<sub>2</sub>") may be released as a result of flaring of hydrogen sulfide, the operator shall place SO<sub>2</sub> portable detection equipment and check the SO<sub>2</sub> level in the flare impact area.

ii. Activation of Public Contingency Plan. If the flare impact area reaches a sustained ambient threshold level of 2 ppm or greater of  $SO_2$  in air and includes any residence, school or church. park, or place of business, or area where any person could reasonably be expected to be present, the Public Contingency Plan shall be activated. **[ROADS?]** 

d. Remote Controlled Choke.

i. When Required. A remote controlled choke shall be installed during drilling and, where feasible, for completion and well servicing operations conducted within a municipality of within 1/4 mile of the outer boundaries of any municipality, or when conducted within 1/4 mile of a residence, school, church, park, playground, school bus stop, place of business, or any other area where any person could reasonably be expected to be present. **[ROADS]** 

ii. Remote Controlled Valve. A remote controlled valve may be used in lieu of this requirement, but only for completion operations.

iii. Remote Controlled Choke, Requirements. When required, a remote controlled choke or remote controlled valve shall have, at a minimum, a pressure and hydrogen sulfiderated well control choke and kill system including manifold and blowout preventer (hereinafter referred to as "BOP") pursuant to specifications API-16C and API-RP 53. The BOP stack shall have a least one spool for the kill and choke lines, two pipe rams, one blind ram, one annual device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced or other Division Rules, if more stringent.

e. Mud Program. The mud programs shall adhere to the following minimum requirements:

i. pH. A pH of 10 or above in a fresh water-base mud system shall be maintained to control corrosion, to insure that hydrogen sulfide gas returns to surface, and to minimize sulfide stress cracking and embrittlement, unless the Division finds that formation conditions or mud types justify a lesser pH level.

ii. Degassing. Drilling mud containing hydrogen sulfide gas shall be degassed in accordance with current industry standards and practices. These gases shall be piped into the flare system.

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

iv. Well Testing. Well testing shall be performed with a minimum number of personnel in the immediate vicinity to safely and adequately operate the test equipment. Except with prior approval by the Division, the drill-stem testing shall be conducted only during daylight hours and formation fluids shall not be permitted to flow to the surface (closed chamber only). An operator shall notify the Division 24 hours in advance of a drill-stem test if a Public Contingency Plan is required pursuant to this Rule. **4.** Activation of Drilling Contingency Plan. The Drilling Contingency Plan shall be activated immediately when hydrogen sulfide is detected in excess of 10 ppm at any detection point.

# H. Protection from Hydrogen Sulfide at Producing Wells, Tank Batteries and Associated Production Facilities.

1. Adherence to American Petroleum Institute (API) Standards. Operations at producing wells, tank batteries and associated production facilities shall be conducted in accordance with American Petroleum Institute (API) publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

**2.** Additional Standards. At a minimum, and in addition to the foregoing API standards, production from wells, operation of tank batteries and associated production equipment shall also be conducted in accordance with the following:

a. Gaseous Mixtures Containing 100 ppm or more. Producing wells containing 100 ppm or more of hydrogen sulfide in the gaseous mixture, tank batteries and associated production facilities at such sites, shall be subject to the following:

i. Public Contingency Plan. A determination must be made of the radius of exposure pursuant to this Rule and, if required based on the calculated radius of exposure, a Public Contingency Plan will also be required.

ii. Signage. A danger sign or signs shall be posted within 50 feet of each facility to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gate(s) shall suffice. Danger signs shall be posted at each flowline and gathering line that contains hydrogen sulfide gas as specified in Subparagraph. A sign shall be placed at each point where

such a line crosses a public road or lease road. Each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

iii. Fencing. Fencing and gate(s) shall be required when producing wells, associated tank batteries and associated production facilities are located within a municipality, within 1/4 mile of the outside boundary of a municipality or within 1/4 mile of an residence, school, church, park, playground, school bus stop, place of business, or where any person could reasonably be expected to be present. The Division shall approve the method and type of fencing. Gate(s) shall be locked when unattended by the operator.

iv. Wind Direction Indicators. Wind direction indicator(s) shall be required. In the event the producing well and associated tank battery is located at the same site, one such indicator shall suffice.

v. Secondary Well Control. All wells 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 a potentially hazardous volume exists, well head configuration shall be in accordance with API specifications and at least two entry points provided in the casing/tubing annulus.

vi. Automatic Safety Valve or Shutdown. If a potentially hazardous volume exists, an automatic safety valve or shutdown shall be installed at the wellhead or other appropriate shut-in control shall be installed. The automatic safety valve shall be set to activate upon a release of a potentially hazardous volume of hydrogen sulfide.

b. Tank Batteries With Hydrogen Sulfide Concentrations of 300 ppm or Greater. Any tank battery serving a well whose gaseous mixture contains a concentration of 300 ppm of hydrogen sulfide or greater shall be subject to the following additional requirements:

i. Each stair or ladder leading to the top of any storage tank shall be chained and/or marked to restrict entry. For any tank battery that requires fencing pursuant to this Section, a danger sign posted at the gate(s) shall suffice.

ii. A danger sign shall be posted on or within 50 feet of any storage tank to alert persons of the potential hydrogen sulfide danger. For any storage tank for which fencing is required, a danger sign posted at the locked gates shall suffice. Each sign shall read: "DANGER: POISON GAS HYDROGEN SULFIDE." iii. At least one permanent wind direction indicator shall be installed so that wind direction can be easily determined at or approaching the storage tank(s).

iv. Each tank battery shall be enclosed with a Division-approved fence to restrict access when located within a municipality or within 1/4 mile of the outer boundaries of a municipality, or within 1/4 mile of a residence, school, church, park, playground, school bus stop, place of business, or an area where any person could reasonably be expected to be present. Gates shall be locked when unattended.

**3.** Modification or Repair. The Division may require modification or repair of a producing well, associated tank battery or associated production facilities if the sustained ambient concentration of hydrogen sulfide reaches 1 ppm at any residence, school, church, park, playground, school bus stop, place of business, or area where any person could reasonably be expected to present.

4. Compliance Schedule. Each existing producing well and associated tank battery not currently meeting the requirements and minimum standards set forth herein shall be brought into compliance within 1 year of the effective date of this Rule. Each producing well and tank battery constructed following the effective date of this Rule shall be designed, constructed and operated to meet the requirements set forth herein.

I. Personnel Protection and Training. All persons working at a facility for which a Public Contingency Plan or a Drilling Contingency Plan is required to be submitted pursuant to this Section, shall be trained in hydrogen sulfide hazards, detection and contingency procedures, the requirements of the Public Contingency Plan and the Drilling Contingency Plan, and shall be provided with adequate protective equipment. Records of such training shall be retained and shall be made available to the Division upon request.

## J. Standards for Equipment That May Be Exposed to Hydrogen Sulfide.

1. Metallurgical Equipment. All metallurgical equipment that may be exposed to hydrogen sulfide shall be suitable for hydrogen sulfide service. The metallurgical properties of the materials used shall conform to the current National Association of Corrosion Engineers (NACE) Standard MR 0175-90, Material Requirement, Sulfide Stress Cracking Resistant Metallic Material for Oil Field Equipment.

2. Other Equipment. Elastomers, packing, and similar inner parts exposed to hydrogen sulfide shall be resistant at the maximum anticipated temperature of exposure. The manufacturer's verification of design for use in an environment containing hydrogen sulfide shall be sufficient verification of suitable service in accordance with this Section. If applicable, adequate protection by chemical inhibition or other such method that controls or limits the corrosive effects of hydrogen sulfide shall be used.

**K. Hydrogen Sulfide Injection Prohibited.** Injection of fluids containing hydrogen sulfide is prohibited where the injection fluids are a gaseous mixture, or would be a gaseous mixture in the event of a release to the atmosphere, and where the 100 ppm radius of exposure includes any residence, school, church, park, school bus stop, place of business, an area where any person could reasonably be expected to be present, within a municipality, or within a 1/4 mile of the outer boundary of a municipality.

L. Exemptions. An exemption to the requirements of this Section may only be requested by petitioning the Director. Any such petition shall provide specific information as to the circumstances, which warrant approval of the variance requested, and the proposed alternative methods by which the related requirements of this Section are to be satisfied. The Director, after considering all relevant factors, may approve an exemption if it is determined that the proposed alternative meets or exceeds the requirements of this Section and otherwise protects the health, safety and welfare of potentially affected persons.

M. Release. Upon a release of hydrogen sulfide the following actions must be taken:

**1.** Activation of the Public Contingency Plan or the Drilling Contingency Plan, or Both. The Public Contingency Plan or the Drilling Contingency Plan, or both, shall be activated immediately upon detection of release of a potentially hazardous volume of hydrogen sulfide or if any

person is subjected to an atmosphere exposure exceeding 30 ppm of hydrogen sulfide or 10 ppm of sulfur dioxide.

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**2. Notification of the Division.** Upon release of a potentially hazardous volume of hydrogen sulfide, or, alternatively, upon exposure of any person to an atmosphere exposure exceeding 30 ppm of hydrogen sulfide or 2 ppm of sulfur dioxide, the Division shall be notified as soon as practicable, but no later than within one hour of the discovery of the release. A full report of the incident shall be submitted to the OCD on a C-141 form within 15 days of the incident.

**N. Minimum Standards.** The Division may require more stringent standards on a case-by-case basis, or require corrective actions if necessary, to maintain control of a well or any other facility, to prevent waste, provide for public safety, protect public health and the environment.

19.15.2.\_\_\_ Hydrogen Sulfide Gas (Hydrogen Sulfide)

A. In General. Hydrogen Sulfide Gas (known by its chemical abbreviation " $H_2S$ " or as "sulfurated hydrogen" or "hydrosulfuric acid") is a flammable, poisonous gas that occurs naturally as a component of crude petroleum and natural gas. The gas presents severe threats to human health and can be fatal in high concentrations. The gas has a distinct and characteristic odor of rotten eggs.

B. Applicability. This Section applies to any person, operator or facility subject to the jurisdiction of the Division, including, but not limited to, any person, operator or facility engaged in drilling, stimulating, completing, working over or producing any oil, natural gas or carbon dioxide well, or any person, operator or facility engaged in gathering, transporting, storing, processing, or refining of crude oil, natural gas or carbon dioxide.

C. Definitions (specific to this Section).

1. API. "API" means the American Petroleum Institute, 300 Corrigan Tower Building, Dallas, Texas, 75201.

2. Dispersion Technique. A "dispersion technique" is a mathematical representation of the physical and chemical transportation characteristics, dilution characteristics, and transformation characteristics of  $H_2S$  gas in the atmosphere.

3. Escape Rate. The "escape rate" is the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing  $H_2S$ . The escape rate is calculated using the maximum daily rate of the gaseous mixture produced or the best estimate thereof. For a natural gas well, the escape rate shall be calculated by using the current daily absolute open flow rate against atmospheric pressure. For an oil well, the escape rate shall be calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or best estimate thereof. For an oil or natural gas well drilled in an undeveloped area (a wildcat well), the escape rate may be determined by using offset wells completed in the interval(s) in question, or using some other reasonable means to calculate the escape rate. For facilities or operations not mentioned, the escape rate shall be calculated using the actual flow of gaseous mixture through the facility or operation.

4. LEPC. The acronym "LEPC" means the local emergency planning committee established pursuant to the Emergency Planning and Community Right-to-Know Act, 42 U.S. C. § 11001.

5. PPM. The abbreviation "ppm" means "parts per million."

6. Potentially Hazardous Volume (hereinafter referred to as a "potentially hazardous volume" or by the acronym "PHV") means the volume of hydrogen sulfide gas of such concentration that:

a. the 100 ppm radius of exposure includes any public area as defined herein (except for facilities directly involved in oil and gas production, such as producing oil and gas wells, pipelines, tank batteries, production equipment, gas plants, refineries);

b. the 300 ppm radius of exposure includes any public road; or

c. the 100 ppm radius of exposure is in excess of 3,000 feet.

7. Public Area. A "public area" is any dwelling, office, place of business, church, school, hospital, school bus stop, government building, public road, any portion of a park, city, town, village, or other similar populated area.

8. Public Road. A "public road" is any state, municipal or county road or highway, postal route or other public road. A public road is not a private road or a road whose access to members of the general public is restricted.

9. Radius of Exposure. The radius of exposure (hereinafter referred to as "radius of exposure" or "ROE") is an imaginary circle constructed around a point of escape whose radius is calculated using the following Pasquill-Gifford derived equation, or by such other method(s) as may be approved by the Division:

a. For determining the 100-ppm radius of exposure where the hydrogen sulfide concentration in the gaseous mixture is less than 10 percent: X = I(1.580) (budregen sulfide concentration) (O)  $I^{(0.625)}$  or

 $X = [(1.589)(hydrogen sulfide concentration)(Q)]^{(0.625)}, or$ 

b. For determining the 300-ppm radius of exposure where the hydrogen sulfide concentration in the gaseous mixture is less than 10 percent:  $X=[(0.77)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ 

Where: X= radius of exposure in feet: hydrogen sulfide concentration = decimal equivalent of the mole or volume fractions of hydrogen sulfide in the gaseous mixture; Q= maximum volume of gas determined to be available for escape in cubic feet per day (corrected for standard conditions of 14.73 psia and  $60^{\circ}$ F).

c. For determining the 100 ppm or the 300 ppm radius of exposure in gaseous mixtures containing hydrogen sulfide concentrations of 10 percent or greater, a dispersion technique that takes into account representative wind speed, direction, atmospheric stability, complex terrain, and 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)."

d. Where multiple sources of hydrogen sulfide are present (e.g. wells, treatment equipment, flow lines, etc.), the radius of exposure may encompass a larger area than would otherwise be calculated using a radius of exposure computation for each component part.

e. For a well being drilled in an area where insufficient data exits to calculate a radius of exposure, but where hydrogen sulfide could reasonably be expected to be present in concentrations in excess of 100 ppm in the gaseous mixture, a 100 ppm radius of exposure equal to 3,000 feet shall be assumed.

D. Determination of Hydrogen Sulfide Risk.

1. Determination of Hydrogen Sulfide Concentration.

a. Each person, operator or facility to which this Section applies shall determine the hydrogen sulfide concentration within its operations or systems. A representative sample for each system or operation may be used for testing provided that the person, operator or facility can demonstrate that the concentration derived from a test of the representative sample is reasonably representative of the hydrogen sulfide concentration within the operation or system.

b. Tests shall be conducted in accordance with applicable ASTM and GPA standards or by other methods approved by the Division.

2. Tested Concentrations Below 100 ppm. If the testing described in the previous Paragraph determines that the hydrogen sulfide concentration in a given operation or system is less than 100 ppm, no further actions are required pursuant to this Section.

3. Tested Concentrations Above 100 ppm; Calculation of the Radius of Exposure.

a. If the testing described in Paragraph 1 of this Subsection determines that the concentration of hydrogen sulfide in a gaseous mixture is 100 ppm or greater, then the person, operator or facility must calculate the radius of exposure pursuant to this Section.

b. The person, operator or facility shall provide the results of all radius of exposure determinations to the Division within 180 days of commencing operations or, for existing facilities, within 180 days of the effective date of this Section. The Division may disapprove the test methodology and require additional testing if the test methodology did not conform to the requirements of this Section.

4. Recalculation. If operational or production alterations are made that result in a 25% or greater increase in the hydrogen sulfide concentration in a given operation or facility, new testing shall be conducted and the radius of exposure shall be recalculated and the results submitted to the Division and retained.

E. H<sub>2</sub>S Contingency Plan.

1. In General. The  $H_2S$  Contingency Plan is a written document that provides a plan of action which will be used to alert and protect persons at risk in the event of a potentially significant release of hydrogen sulfide gas.

2. When Required. An  $H_2S$  Contingency Plan must be prepared whenever a potentially hazardous volume of hydrogen sulfide is present.

3. Submission. An  $H_2S$  Contingency Plan must be submitted to the Division, and may be submitted separately or along with the Application for Permit to Drill (APD).

4. Input From Emergency Response Authorities and the Division. The  $H_2S$ Contingency Plan shall be developed with input from the Division, the New Mexico Department of Public Safety (and/or as appropriate the New Mexico State police), and the Local Emergency Planning Committee, except that where the 300 ppm radius of exposure encompasses any public road, input shall also be sought from the county sheriff and (as applicable) the city (municipal) police, and where the 100 ppm radius of exposure encompasses a public area, input shall also be sought from police and fire departments near the well, operation or facility. The  $H_2S$  Contingency shall identify the agency from which input was received pursuant to this paragraph, identify the person at the agency contacted (with telephone number) and briefly describe the nature of the input provided.

5. Elements. The  $H_2S$  Contingency Plan will consist of different elements depending on the risks present.

a. Elements Required for Each Plan:

i. A detailed description of each Action to be taken in the event of a release of a potentially hazardous volume of hydrogen sulfide;

ii. A call list including the following as applicable:

- aa. local supervisory personnel;
- bb. county sheriff;
- cc. the Department of Public Safety and State Police;
- dd. city (municipal) police;
- ee. the appropriate Division district office; and
- ff. other public agencies as appropriate.
- iii. A plat or map detailing the area within the radius of exposure; and
- iv. A list of the names and telephone numbers of all personnel to be contacted when a release is reported or suspected.

b. Where the 300 ppm radius of exposure encompasses any public road, the following additional elements shall be included in the H<sub>2</sub>S Contingency Plan:

i. Instructions and procedures for alerting and coordinating with emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide at any public road;

ii. A plat or map detailing the area of exposure, including the locations of public roads within the radius of exposure;

iii. A plan to divert traffic and safely get existing traffic off the road and

c. Where the 100 ppm radius of exposure encompasses any public area, the following additional elements shall be included in the  $H_2S$  Contingency Plan:

out of danger.

i. Detailed plans of action to alert and protect persons in the event of a release of a potentially hazardous volume of hydrogen sulfide, including instructions and procedures for alerting persons at risk and emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide;

ii. A call list including all the persons set forth in subsubparagraph E(5)(a)(ii), above, and the following:

- aa. ambulance services;
- bb. hospitals;

cc. county and city fire departments;

- dd. doctors;
- ee. contractors for supplemental or emergency equipment; and
- ff. other public agencies as appropriate.

iii. A statement describing how emergency response actions will be coordinated with the Division and the New Mexico State Police, consistent with the New Mexico Hazardous Materials Emergency Response Plan (HMER);

iv. A plat or map detailing the area of exposure, including the locations of private dwellings or residences, public facilities such as schools, businesses, public roads or other similar areas where the public may be reasonably expected to be present within the radius of exposure;

v. The names and telephone numbers of all persons living within the radius of exposure of 100 ppm hydrogen sulfide and contact persons for each public area, such as churches, schools, and businesses;

vi. Provisions for advance briefing of affected and responsible persons within the radius of exposure. Such advance briefing shall include the hazards and characteristics of hydrogen sulfide, the necessity for an  $H_2S$  Contingency Plan, the possible sources of hydrogen sulfide with the radius of exposure, instructions for reporting a gas leak, the manner in which persons will be notified in the event of an emergency, and steps to be taken in an emergency; and

vii. Additional support information, if applicable, such as the location of emergency evacuation routes, the location of safety and life support equipment, the location of hydrogen sulfide containing facilities, the location of nearby telephones and/or other means of communication, and special instructions for conditions at a particular installation such as local terrain and the effect of various weather conditions.

d. Additional Requirements. The Division may impose additional requirements or modify requirements based on site-specific conditions, population density or special circumstances.

6. Submission. When the 100 ppm radius of exposure includes any public area, the  $H_2S$ Contingency Plan shall be submitted to the Division and Local Emergency Planning Committee. Otherwise,  $H_2S$  Contingency Plans shall not be submitted, but shall be reasonably accessible in the event of a release, maintained on file and provided to the Division upon request.

7. Failure to Submit Plan. Failure to submit an  $H_2S$  Contingency Plan when required may result in denial of an Application to Drill, cancellation of an allowable or other appropriate enforcement action.

8. Annual Review, Amendment. An  $H_2S$  Contingency Plan shall be reviewed on an annual basis or earlier if activation of a plan reveals a deficiency. If the 100 ppm radius of exposure includes any public area, any amendments shall be submitted to the Division and the Local Emergency Planning Committee; otherwise, amendments shall not be submitted, but shall be maintained on file and provided to the Division upon request.

9. Retention and On-Site Inspection. An  $H_2S$  Contingency Plan shall be reasonably accessible in the event of a release and maintained on file at all times and shall be available for inspection by the Division during normal business hours.

10. Activation Levels. An  $H_2S$  Contingency Plan shall be activated in the event of a release of a potentially hazardous volume of  $H_2S$  above the respective thresholds (i.e. 300 ppm radius at any public road, 100 ppm radius at any public area, etc.) or if a sustained concentration of  $H_2S$  exceeds 50 ppm at the property line of any facility, well or operation.

F. Protection from Hydrogen Sulfide During Drilling, Workover and Servicing Operations.

1. API Standards. All drilling, completion, workover and well servicing operations shall be conducted with due consideration of the guidelines published by the American Petroleum Institute (API) entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Safe Drilling of Wells Containing Hydrogen Sulfide," RP-49, most recent edition.

2. Minimum Standards. At a minimum, and possibly in addition to the foregoing API standards, each drilling, completion, workover and well servicing operation shall also be conducted in accordance with the following:

a. Before Commencing Operations. An  $H_2S$  Contingency Plan (where required) shall be completed before commencement of operations. In addition, hydrogen sulfide training shall be completed and all related safety equipment and warning systems shall be operational.

b. Egress Routes. Passable egress routes shall be maintained at all times during operations.

c. Detection and Monitoring. Hydrogen sulfide detection and monitoring equipment shall be provided as follows:

i. Each drilling and completion site shall have hydrogen sulfide detection and monitoring that automatically activates visible and audible alarms when the ambient air concentration of hydrogen sulfide reaches 10 ppm. There shall be a sensing point 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.

ii. The detection system shall be calibrated and tested monthly. Each test of the hydrogen sulfide monitoring system shall be recorded on the driller's log or its equivalent.

iii. For workover and well servicing operations, one operational sensing point shall be located as close to the well bore as practical. Additional sensing points may be necessary for large and/or long-term operations.

iv. Hydrogen sulfide detection and monitoring equipment must be provided during drilling when drilling is within 500 feet of the zone anticipated to contain hydrogen sulfide and continuously thereafter through all subsequent drilling. Detection and monitoring equipment is not required for drilling from the surface to within 500 feet of the zone anticipated to contain hydrogen sulfide.

d. Wind Indicators and Signs.

i. Equipment to indicate wind direction shall be present and visible at all times. At least two devices to indicate wind direction shall be installed at separate elevations and visible from all principal working areas at all times.

ii. Danger or caution sign(s) shall be displayed along all accesses to the site. 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 approved by the Division. Each sign shall be painted with high visibility red, black and white, or yellow paint with black lettering. The sign(s) shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 300 feet from the well site and at a location which allows vehicles to turn around at a safe distance prior to reaching the site.

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

e. If Hydrogen Sulfide Encountered During Operations. If hydrogen sulfide was not anticipated at the time the APD was approved but is encountered during drilling in excess of 100 ppm in the gaseous mixture, the operator shall immediately ensure control of the well, suspend drilling operations (unless detrimental to well control), and obtain materials and safety equipment to bring the operations into compliance with this Section. The operator shall notify the Division of the event and the mitigating steps that have or are being taken as soon as possible, but no later than 24 hours following discovery.

3. Operating Practices In Hydrogen Sulfide Concentrations of 100 ppm or Greater. Operating practices in areas known to contain a concentration of hydrogen sulfide gas of 100 ppm or greater in the gaseous mixture shall be subject to the following requirements:

a. If Hydrogen Sulfide Is Encountered During Use of Air, Gas, Mist or Other Non-Mud Circulating Media. If hydrogen sulfide gas in excess of 100 ppm is encountered while drilling with air, gas, mist or other non-mud circulating mediums for 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. b. Flare System. For drilling and completion operations, a flare system shall be installed to safely gather and burn hydrogen sulfide-bearing gas, unless exempted pursuant to Subsection K. of this Section. Flare outlets shall be located as far from the well bore as feasible (but not less than 150 feet from the well). Flare lines shall be as straight as practical. The flare system shall be equipped with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall be provided supplemental fuel to maintain ignition.

c. Remote Controlled Choke.

i. A remote controlled choke shall be installed during drilling and during completion and well servicing operations when the 100-ppm  $H_2S$  radius of exposure includes a public area, unless exempted pursuant to Subsection K. of this Section.

ii. A remote controlled valve may be used in lieu of use of a remote controlled choke, but only for completion operations.

iii. A remote controlled choke or remote controlled valve shall have, at a minimum, a pressure and hydrogen sulfide-rated well control choke and kill system including manifold and blowout preventer (hereinafter referred to as "BOP") pursuant to specifications API-16C and API-RP 53. The BOP stack shall have at least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced or other Division Rules, if more stringent. Variations to BOP stack arrangements may be granted by the Division for good cause shown.

d. Mud Program. A mud program, including de-gassing and flaring, capable of handling H<sub>2</sub>S conditions and well control shall be utilized.

e. Well Testing. Except with prior approval by the Division, the drill-stem testing shall be conducted only during daylight hours and formation fluids shall not be permitted to flow to the surface (closed chamber only). An operator shall notify the Division 24 hours in advance of a drill-stem test if an  $H_2S$  Contingency Plan is required pursuant to this Section.

G. Protection from Hydrogen Sulfide at Producing Wells, Tank Batteries and Associated Production Facilities, Refineries, Gas Plants, and Compressor Stations.

1. American Petroleum Institute (API) Standards. Operations at producing wells, tank batteries and associated production facilities shall conducted according to the guidelines published by the American Petroleum Institute (API) in its\_publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

2. Minimum Standards. At a minimum, production from wells, operation of tank batteries and associated production equipment shall also be conducted in accordance with the following. Where API standards referred to in the previous paragraph are less stringent than the following, the more stringent standards shall apply.

a. Gaseous Mixtures Containing 100 ppm or more. Producing wells containing 100 ppm or more of hydrogen sulfide in the gaseous mixture, tank batteries and associated production facilities at such sites, shall be subject to the following:

i.  $H_2S$  Contingency Plan. A determination must be made of the radius of exposure pursuant to this Section and, if required based on the calculated radius of exposure, a  $H_2S$  Contingency Plan will also be required.

ii. Signage. A danger sign or signs shall be posted within 50 feet of each facility to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gate(s) shall suffice. Danger signs shall be posted at each flow line and gathering line on the well pad that contains hydrogen sulfide gas. The sign(s) shall read "DANGER - POISON GAS - HYDROGEN SULFIDE" or equivalent language approved by the Division. Each sign shall be painted with high visibility red, black and white, or yellow paint with black lettering. The sign(s) shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 300 feet from the well site and at a location which allows vehicles to turn around at a safe distance prior to reaching the site. A sign shall be placed at each point where a flow line or gathering

line crosses a public road. Each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

iii. Fencing. Fencing and gate(s) shall be required when producing wells, associated tank batteries and associated production facilities are located within a 1/4 mile of a residence, school, church, park, playground, school bus stop, or place of business. The fence shall consist of a 5-foot chain link topped by two stands of barbed wire or other methods approved by the Division. Gate(s) shall be locked when unattended.

iv. Wind Direction Indicators. Wind direction indicator(s) shall be required at every facility (tank battery, water injection station, production satellite) where  $H_2S$  concentration in a gaseous state exceeds 100 PPM.

v. Secondary Well Control. Wells where the 100-ppm  $H_2S$  radius of exposure incorporates a public area 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.

vi. Automatic Safety Valve or Shutdown. If the 100-ppm radius of exposure involves a public area, an automatic safety valve or shutdown shall be installed at the facility or wellhead or other appropriate shut-in control shall be installed. The automatic safety valve shall be set to activate upon a release of a potentially hazardous volume of hydrogen sulfide.

b. Tanks or vessels containing 300 ppm or more of hydrogen sulfide in the gaseous mixture shall be subject to the following additional requirements:

1. Each stair or ladder leading to the top of any storage tank shall be chained and/or marked to restrict entry. For any tank battery that requires fencing pursuant to this Section, a danger sign posted at the gate(s) may be substituted for chaining and signage.

2. A danger sign shall be posted on or within 50 feet of any storage tank to alert persons of the potential hydrogen sulfide danger. For any storage tank for which fencing is required, a danger sign posted at the locked gates shall suffice. The sign(s) shall read "DANGER - POISON GAS - HYDROGEN SULFIDE" or equivalent language approved by the Division. Each sign shall be painted with high visibility red, black and white, or yellow paint with black lettering. The sign(s) shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 300 feet from the well site and at a location which allows vehicles to turn around at a safe distance prior to reaching the site.

3. Modification or Repair. The Division may require modification or repair of a producing well, associated tank battery or associated production facilities if the sustained ambient concentration of hydrogen sulfide is 1 ppm or greater at any public area.

4. Compliance Schedule. Each existing producing well and associated tank battery not currently meeting the requirements and minimum standards set forth herein shall be brought into compliance within one (1) year of the effective date of this Section. Each producing well and tank battery constructed following the effective date of this Section shall be designed, constructed and operated to meet the requirements set forth herein.

H. Personnel Protection and Training. All persons responsible for the implementation of any H<sub>2</sub>S Contingency Plan shall be provided training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.

I. Standards for Equipment That May Be Exposed to Hydrogen Sulfide. All equipment shall be chosen with consideration for both the  $H_2S$  working environment and anticipated stresses. NACE Standard MR-01-75 (latest edition) shall be used for metallic equipment selection or, if applicable, adequate protection by chemical inhibition or other methods that controls or limits the corrosive effects of  $H_2S$  shall be used.

J. Hydrogen Sulfide Injection. Injection of fluids containing hydrogen sulfide where the injection fluids are a gaseous mixture, or would be a gaseous mixture in the event of a release to the atmosphere, and where the 100 ppm radius of exposure from the injection point\_includes any public area, excluding public roads, shall not be allowed unless first approved by the division after public hearing.

K. Exemptions. An exemption to the requirements of this Section may be granted by petitioning the Director. Any such petition shall provide specific information as to the circumstances that warrant approval of the exemption requested and the proposed alternative methods by which the requirements of this Section are to be satisfied. The Director, after considering all relevant factors, may approve an exemption if it is determined that the proposed alternative meets or exceeds the requirements of this Section and otherwise protects the health, safety and welfare of potentially affected persons.

L. Release. Upon a release of hydrogen sulfide the following actions must be taken:

1. Activation of the  $H_2S$  Contingency Plan. The  $H_2S$  Contingency Plan shall be activated immediately upon a  $H_2S$  release where the potential exists for exposure to a potentially hazardous volume of  $H_2S$ , or where a concentration of  $H_2S$  greater than 50 ppm exists at the property line of any well, facility or operation.

2. Notification of the Division. Upon release of hydrogen sulfide requiring activation of the  $H_2S$  Contingency Plan, the Division shall be notified as soon as practicable, preferably within one hour of discovery of the release or as soon as possible in cases where prompt response should supercede notification. A full report of the incident shall be submitted to the Division on Form C-141 no later than fifteen (15) days following the release.

M. Additional Standards. The Division may require more stringent standards on a case-by-case basis than those set forth in this Section, or require corrective actions if necessary, to maintain control of a well or any other facility, or to safeguard public health or safety.

Deborah suggested I write a draft of a rule that might be more palatable to independents and still address some of the concerns you all have mentioned. I have found it is better to provide the regulatory agency with a draft of a rule that the group can accept. So here is my shot at a draft rule.

## 19.15 Hydrogen Sulfide Gas

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- A. Scope. The intent of this Rule is to provide for the public safety in areas where hydrogen sulfide gas, H2S, in concentrations greater than those listed below are present.
- B. Each operator, person, or facility who conducts operations as described below shallbe subject to this section and shall provide safeguards to protect the general public from the harmful effects of hydrogen sulfide. This section applies to any releases of hydrogen sulfide.

(1) Operations including drilling, working over, producing, injecting, gathering, processing, transporting, and storage of hydrocarbon fluids that are part of, or directly related to, field production, transportation, and handling of hydrocarbon fluids that contain gas in the system which has hydrogen sulfide as a constituent of the gas, to the extent as specified in subsection (c) of this section, general provisions.

(2) This section shall not apply to:

- (A) operations involving processing oil, gas, or hydrocarbon fluids which are either an industrial modification or products from industrial modification, such as refining, petrochemical plants, or chemical plants;
- (B) operations involving gathering, storing, and transporting stabilized liquid hydrocarbons;
- (C) operations where the concentration of hydrogen sulfide in the system is less than 100 ppm.
- (b) Definitions.

(1) Industrial modification--This term is used to identify those operations related to refining, petrochemical plants, and chemical plants. The term does not include field processing such as that performed by gasoline plants and their associated gathering systems.

(2) Stabilized liquid hydrocarbon--The product of a production operation in which the entrained gaseous hydrocarbons have been removed to the degree that said liquid may be stored at atmospheric conditions.

(3) Radius of exposure--That radius constructed with the point of escape as its starting point and its length calculated as provided for in subsection(c)(2) of this section.

(4) Area of exposure--The area within a circle constructed with the point of escape as its center and the radius of exposure as its radius.

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(5) Public area-An occupied dwelling, occupied place of business, church, school, hospital, school bus stop, occupied government building, a public road, all or any portion of a park, or other similar populated area but does not include facilities directly involved in oil and gas production such as producing or and gas wells pipelines, tank batteries, production equipment, gas plants, refineries.

(6) Public road-A public road is any road or highway that is under the jurisdiction of a federal, state, county or municipal government for maintenance or public use. A public road is not a private road, two track, ranch, or oig and gas lease road.

(10) Potentially hazardous volume of hydrogen sulfide--A volume of hydrogen sulfide gas of such concentration that:

- (A) the 100 ppm radius of exposure is in excess of 50 feet and includes any part of a "public area" except a public road; or
- (B) the 500 ppm radius of exposure is greater than 50 feet and includes any part of a public road; or
- (C) the 100 ppm radius of exposure is greater than 3,000 feet.

(11) Contingency plan--A written document maintained at the local office of a facility engaged in transporting, storing, processing or refining of crude or natural gas, that shall provide an organized plan of action for alerting and protecting the public within an area of exposure prior to an intentional release, or following the accidental release of a potentially hazardous volume of hydrogen sulfide.

(13) Definition of referenced organizations and publications.

- (A) ANSI--American National Standard Institute, 1430 Broadway, New York, New York 10018, Table I, Standard 253.1-1967.
- (B) API--American Petroleum Institute, 300 Corrigan Tower Building, Dallas, New Mexico 75201, Publication API RP-49, Publication API RP-14E, Sections 1.7(c), 2.1(c) 4.7.
- (C) ASTM--American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103, Standard D-2385-66.
- (D) GPA--Gas Processors Association, 1812 First Place, Tulsa, Oklahoma 74120, Plant Operation Test Manual C-1, GPA Publication 2265-68.
- (E) NACE--National Association of Corrosion Engineers, P.O. Box 1499, Houston, New Mexico 77001, Standard MR-01-75.
- (H) OCD-Oil Conservation Division Santa Fe, New Mexico 87501,

# (c) General provisions.

(1) Each operator shall determine the hydrogen sulfide concentration in the gaseous mixture in the operation or system.

- (A) Tests shall be made in accordance with standards as set by ASTM Standard D-2385-66, or GPA Plant Operation Test Manual C-1, GPA Publication 2265-68, or other methods approved by the commission.
- (B) Test of vapor accumulation in storage tanks may be made with industry accepted colormetric tubes.

(2) For all operations subject to this section, the radius of exposure shall be determined, except in the cases of storage tanks, by the following Pasquill-Gifford equations, or by other methods that have been approved by the commission.

- (A) For determining the location of the 100 ppm radius of exposure: x = [(1.589) (mole fraction H2 S)(Q)] to the power of (.6258).
- (B) For determining the location of the 500 ppm radius of exposure: x = [(0.4546) (mole fraction H2 S)(Q)] to the power of (.6258). Where x = radius of exposure in feet; Q = maximum volume determined to be available for escape in cubic feet per day; H2 S = mole fraction of hydrogen sulfide in the gaseous mixture available for escape.

(3) The volume used as the escape rate in determining the radius of exposure shall be that specified in subparagraph (A)-(E) of this paragraph, as applicable.

- (A) The maximum daily volume rate of gas containing hydrogen sulfide handled by that system element for which the radius of exposure is calculated.
- (B) For existing gas wells, the current adjusted open-flow rate, or the operator's estimate of the well's capacity to flow against zero back-pressure at the wellhead shall be used.
- (C) For new wells drilled in developed areas, the escape rate shall be determined by using the current adjusted open-flow rate of offset wells, or the field average current adjusted open-flow rate, whichever is larger.
- (D) The escape rate used in determining the radius of exposure shall be corrected to standard conditions of 14.65 pounds per square inch (psia) and 60 degrees
   Fahrenheit.
- (E) For intentional releases from pipelines and pressurized vessels, the operator's estimate of the volume and release rate based on the gas contained in the system elements to be de-pressured.

(4) For the drilling of a well in an area where insufficient data exists to calculate a radius of exposure, but where hydrogen sulfide may be expected, then a 100 ppm radius of exposure equal to 3,000 feet shall be assumed. A lesser-assumed radius may be considered upon written request setting out the justification for same.

(5) Storage tank provision: storage tanks which are utilized as a part of a production operation, and which are operated at or near atmospheric pressure, and where the vapor

accumulation has a hydrogen sulfide concentration in excess of 500 ppm, shall be subject to the following.

- (A) No determination of a radius of exposure shall be made for storage tanks as herein described.
- (B) A warning sign shall be posted on or within 50 feet of the facility to alert the general public of the potential danger.
- (C) Fencing as a security measure is required when storage tanks are located inside the limits of a townsite or city.
- (D) The warning and marker provision, paragraph (6)(A)(i), (ii), and (iv) of this subsection.

(6) All operators whose operations are subject to this section, and where the 100 ppm radius of exposure is in excess of 50 feet, shall be subject to the following.

- (A) Warning and marker provision.
- (i) For above-ground and fixed surface facilities, the operator shall post, where permitted by law, clearly visible warning signs on access roads or public streets, or roads which provide direct access to facilities located within the area of exposure.
- (ii) In populated areas such as cases of townsites and cities where the use of signs is not considered to be acceptable, then an alternative warning plan may be approved upon written request to the Division.
- (iii) For buried lines subject to this section, the operator shall comply with the following.
- (I) A marker sign shall be installed at public road crossings.
- (II) Marker signs shall be installed along the line, when it is located within a public area or along a public road, at intervals frequent enough in the judgment of the operator so as to provide warning to avoid the accidental rupturing of line by excavation.
- (III) The marker sign shall contain sufficient information to establish the ownership and existence of the line and shall indicate by the use of the words "Poison Gas" that a potential danger exists. Markers installed in compliance with the regulations of the federal Department of Transportation shall satisfy the requirements of this provision. Marker signs installed prior to the effective date of this section shall be acceptable provided they indicate the existence of a potential hazard.
- (iv) In satisfying the sign requirement of clause (i) of this subparagraph, the following will be acceptable.
- (I) Sign of sufficient size to be readable at a reasonable distance from the facility.
- (II) New signs constructed to satisfy this section shall use the language of "Caution" and "Poison Gas" with a black and yellow color contrast.
- (III) Existing signs installed prior to the effective date of this section will be acceptable if they indicate the existence of a potential hazard. (B) Security provision.
- (i) Unattended fixed surface facilities shall be protected from public access when located within 1/4 mile of a occupied dwelling, occupied place of business, hospital, school, church, government building, school bus stop, public park, or similarly populated area. This protection shall be provided by fencing and

locking, or removal of pressure gauges and plugging of valve opening, or other similar means. For the purpose of this provision, surface pipelines, producing oil and gas wells, tank batteries, production eqipment, shall not be considered as a fixed surface facility.

- (ii) For well sites, fencing as a security measure is required when a well is located inside the limits of a townsite or city.
- (iii) The fencing provision will be considered satisfied where the fencing structure is a deterrent to public access.

(7) All operations subject to subsection (a) of this section shall be subject to the additional control and equipment safety provision, paragraph (8) of this subsection, and the contingency plan provision, paragraph (9) of this subsection, if any of the following conditions apply:

- (A) the 100 ppm radius of exposure is in excess of 50 feet and includes any part of a "public area" except a public road;
- (B) the 500 ppm radius of exposure is greater than 50 feet and includes any part of a public road;
- (C) the 100 ppm radius of exposure is greater than 3,000 feet.

(8) Control and equipment safety provision. Operators subject to this provision shall install safety devices and maintain them in an operable condition or shall establish safety procedures designed to prevent the undetected continuing escape of hydrogen sulfide. For intentional releases of a potentially hazardous volume of hydrogen sulfide gas, the gas must be flared unless permission to vent is obtained from the commission or its delegate. Venting will be allowed only upon a showing that the venting will not pose an unreasonable risk of harm to the public.

(9) Contingency plan provision.

- (A) All operators whose operations are subject to this provision shall develop a written contingency plan complete with all requirements before hydrogen sulfide operations are begun.
- (B) The purpose of the contingency plan shall be to provide an organized plan of action for alerting and protecting the public prior to an intentional release, or following the accidental release of a potentially hazardous volume of hydrogen sulfide.
- (C) The contingency plan shall be activated prior to an intentional release, or immediately upon the detection of an accidental release of a potentially hazardous volume of hydrogen sulfide.
- (D) Conditions that might exist in each area of exposure shall be considered when preparing a contingency plan.
- (E) The plan shall include instructions and procedures for alerting the general public and public safety personnel of the existence of an emergency.
- (F) The plan shall include procedures for requesting assistance and for follow-up action to remove the public from an area of exposure.

 $(\mathscr{C})$  The plan shall include a call list which shall include the following as they may be applicable:

(i) local supervisory personnel;

(ii) county sheriff;

(iii) Department of Public Safety;

(iv) city police;

(v) ambulance service;

(vi) hospital;

(vii) fire department;

(viii) doctors;

(ix) contractors for supplemental equipment;

(x) district OCD office;

/(H) The plan shall include a plat detailing the area of exposure. The plat shall include the locations of private dwellings or residential areas, public facilities, such as schools, business locations, public roads, or other similar areas where the public might reasonably be expected within the area of exposure.

(I) The plan shall include names and telephone numbers of residents within the area of exposure, except in cases where the reaction plan option has been approved by the commission in accordance with subparagraph (L) of this paragraph.

The plan shall include a list of the names and telephone numbers of the responsible parties for each of the possibly occupied public areas, such as schools, churches, businesses, or other public areas or facilities within the area of exposure.

(K) The plan shall include provisions for advance briefing of the public within an area of exposure. Such advance briefing shall include the following elements:

(i) the hazards and characteristics of hydrogen sulfide;

- (ii) the necessity for an emergency action plan;
- reed (iii) the possible sources of hydrogen sulfide within the area of exposure;

(iv) instructions for reporting a gas leak;

(v) the manner in which the public will be notified of an emergency;

(vi) steps to be taken in case of an emergency.

(L) In the event of a high density of population, or the case where the population density may be unpredictable, a reaction type of plan, in lieu of advance briefing

for public notification, will be acceptable. The reaction plan option must be approved by the commission. phone bet not aller

«Divisin approval (M) The plan shall include additional support information, if applicable, such as:

- (i) location of evacuation routes;
- (ii) location of safety and life support equipment;
- (iii) location of hydrogen sulfide containing facilities;
- (iv) location of nearby telephones and/or other means of communication; and
- (v) special instructions for conditions at a particular installation such as local terrain and the effect of various weather conditions.
- (N) The Oil Conservation Division District Office shall be notified if the contingency plan is activated:

- (i) 12 hours in advance of an intentional release or as soon as a decision is made to release if such decision could not reasonably have been made more than 12 hours prior to the release;
- (ii) immediately in the case of an accidental release;
- (iii) as soon as possible before or after an unplanned intentional release made in an emergency situation to prevent a possible uncontrolled release.
- (O) The retention of the contingency plan shall be as follows.
  - (i) The plan shall be available for District OCD inspection at the local operational location.
  - (ii) The plan shall be retained at the location which lends itself best to activation of the plan.
- (P) In the event that, due to particular situations, a contingency plan cannot be developed consistent with the provisions of this paragraph, relating to the contingency plan, then the operator may develop an adjusted plan to fit the situation, and submit same with the certificate of compliance. Approval of the certificate of compliance so submitted will constitute approval of the contingency plan.
- (Q) The plan shall be kept updated to insure its current applicability.
- (10) Injection provision.

• ~

- (A) Injection of fluids containing hydrogen sulfide shall not be allowed under the conditions specified in this provision unless first approved by the commission after public hearing:
  - (i) where injection fluid is a gaseous mixture, or would be a gaseous mixture in the event of a release to the atmosphere, and where the 100 ppm radius of exposure is in excess of 50 feet and includes any part of a public area except a public road; or, if the 500 ppm radius of exposure is in excess of 50 feet and includes any part of a public road; or if the 100 ppm radius of exposure is 3,000 feet or greater

## 19.15.2. Hydrogen Sulfide Gas $(H_2S)$

A. In General. Hydrogen Sulfide Gas, otherwise known by its chemical abbreviation " $H_2S$ ", or as "sulfurated hydrogen" or "hydrosulfuric acid", is a flammable, poisonous gas that occurs naturally as a component of crude petroleum and natural gas. The gas, and its combustion product, sulfur dioxide (S0<sub>2</sub>), present severe threats to human health, safety and welfare and can be fatal when a person is exposed to high concentrations of the gas. The gas has a distinct and characteristic odor of rotten eggs.

B. Definitions (specific to this Rule).

1. Dispersion Technique. "Dispersion technique" is a mathematical

representation of the physical and chemical transportation <u>characteristics</u>, dilution <u>characteristics</u>, Hybra, Sulfide  $\mathfrak{F}$ and transformation <u>characteristics</u> of  $H_2S$  gas emitted into the atmosphere.

2. Escape Rate. The "escape rate" is the maximum volume (Q) used as the escape rate in determining the radius of exposure. For a facility, the escape rate shall be calculated using the maximum daily rate of gas produced through that facility or the best estimate thereof. For a natural gas well, the escape rate shall be calculated by using the current daily absolute openflow rate against atmospheric pressure. For an oil well, the escape rate shall be calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or best estimate thereof. For an **For an 
For an oil or gas??> 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.
3. PPM. The abbreviation "ppm" means "parts per million."** 

4. Radius of Exposure. The radius of exposure referred to in this <SECTION?> is derived from a calculation using the following Pasquill-Gifford derived equation, or by such other method(s) as may be approved by the Division:

a. For determining the 100 ppm radius of exposure where the H<sub>2</sub>S

concentration in the gas stream is less than 10 percent:  $X = [1.589)(H_2S \text{ concentration})(Q)]^{(0.625)}$ , or

b. For determining the 300 ppm radius of exposure where the H<sub>2</sub>S concentration in the gas stream is less than 10 percent:  $X=[(0.4546)(H_2S \text{ concentration})(Q)]^{(0.6258)}$  (.4546 is for 500 ppm will be corrected for 300 ppm) Where: X= radius of exposure in feet: H<sub>2</sub>S Concentration = decimal equivalent of the mole or volume fractions of H<sub>2</sub>S in the gaseous mixture; Q= maximum volume of gas determined to be available for escape in cubic feet per day (at standard condition of 14.73 psia and 60°F).

c. For determining the 100 ppm or the 300 ppm radius of exposure in gas streams containing H<sub>2</sub>S concentrations of 10 percent or greater, a dispersion technique that takes into account representative wind speed, direction, atmospheric stability, complex terrain, and 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)." d. Where multiple H<sub>2</sub>S sources (i.e., wells, treatment equipment, flow the multiple H<sub>2</sub>S sources (i.e., wells, treatment equipment, flow the set of the drilling, completion, workover or production system. For a well being drilled in an area where insufficient data exits to calculate a radius of exposure, but where H<sub>2</sub>S 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. Mathematical Stream Wolf Contingency Plan.

2

1. Defined. A Public Contingency Plan is a written plan that describes

emergency actions which must be taken to alert and protect persons at risk in the event of a

release of a Potentially Hazardous Volume of Hydrogen Sulfide Gas (H2S).

2. When Required. A Public Contingency Plan must be prepared and maintained

in force at any facility where Hydrogen Sulfide Gas  $(H_2S)$  is present whose volume,

concentration and flow rate is such that, if released, it would result in a concentration of 100 work the present ppm or greater at any occupied residence, school, church, park, school bus stop, place of a concentration of 100 ppm or greater at any federal, state, county, municipal or public road or highway, or where a concentration of 100 ppm or greater of Hydrogen Sulfide Gas would be present after a release at a distance of 3,000 feet form the facility. Each facility shall be required to perform testing  $\int_{a} \int_{a} \int_{a}$ 

3. Required Testing.

a. Required Annual <???NO TIME PERIOD SPECIFIED > Testing for

a Potentially Hazardous Volume of H2S. Each facility shall test the H2S concentration of affre-

see As

natural gas stream using a method approved by the Division at least once and all with and shall retain the records of the test for the life of the field < facility and make them available to the Division upon request. No requirement to another OCD?

b. Exposure Radius Calculation. Within 180 days of the effective date of this rule each facility all operators whose testing pursuant to the preceding paragraph

demonstrated having an H<sub>2</sub>S concentration of 100 ppm or more in the **natural gas stream** shall calculate the radius of exposure for each existing facility and retain these records for the life of the field. If operational or production alterations result in a 5% or greater more increase in the H<sub>2</sub>S concentration or the radius of exposure changes for any reason, the facility operator shall recacluate the radius of exposure modify the plan to reflect the latest changes. <**No requirement** to notify OCD?>

4. Contents of the Public Contingency Plan.

a. Division Guidelines; Site-specific Factors. The Public Contingency Plan shall be prepared according to Division Guidelines. The details may vary according to thesite-specific conditions. The Division may impose additional requirements based on population density or special circumstances. Actions to be taken theor belows to

b. Alert and Protection of Persons. At a minimum, the Public

Contingency plan shall detail each action to be taken to alert and protect persons in the event of a release of a Potentially Hazardous Volume of  $H_2S$ : hydrogen galling Sign galling is a second s

c. Coordination of Response. At a minimum, the <u>Public Contingency</u> Plan shall stipulate how <u>emergency response</u> actions will be coordinated with the Division and the New Mexico State Police, a Division of the Department of Public Safety, as required pursuant to the New Mexico Emergency Management Act, NMSA 1978, Subsection 74-48-1 through 74-4B-14 and the New Mexico Hazardous Material Emergency Response Plan (HMER Plan).

annual basis and a copy of any necessary revisions shall be submitted to the Division, upon request.

?<?Posting. The Public Contingency Plan shall be maintained on file at all times, shall be available during emergencies and shall be submitted to the Division upon request. A copy of the Public Contingency Plan shall be available for inspection at any facility subject to this rule.</p>

D. Drilling Contingency Plan In Gever 1. Defined.

2. When Required.

means a written plan which <u>describes how</u> ???? provides for the safety of <u>any on-site</u> persons <del>nel</del> and for maintaining control of the well with regard to  $H_2S$ . <MOVE><<u>A</u> Drilling Contingency Plan(s) shall be prepared accordingly to Division Guidelines. The details may vary according to the site-specific conditions or the population potentially at risk. The Division may impose additional safety and engineering control requirements in order to provide for public safety.> 3. <u>Contents of Plan – Drilling, Completion and Workover Operations</u>. For drilling and workover operations <u>that are conducted in</u> formations <u>that</u> contain or which could reasonably be expected to contain concentrations of  $H_2S$  of 100 ppm or more, a Drilling Contingency Plan and, if <u>applicable</u>, a Public Contingency Plan shall be submitted as part of the Application for Permit to Drill (APD) on form C-101.

1. <u>Drilling Contingency Plan Required</u> Drilling, completion and workover operations that are conducted in formations that contain or which could reasonably be expected to contain concentrations of  $H_2S$  of 100 ppm or more, must complete and file a Drilling Contingency Plan and, if applicable, a Public Contingency Plan along with the Application for Permit to Drill (APD) on form C-101.

4. Combined Drilling Contingeny Plan and Public Contingency Plan. A combined single Drilling Contingency Plan and a single Public Contingency Plan may be submitted where multiple APD's are filed for a lease, communitization agreement, unit or field.

5. Failure to Submit Plan. Failure to submit either the Drilling Contingency Plan or the Public Contingency Plan, or both, when required by this Rule shall result in an incomplete APD and denial of the Application to Drill.

**4**. Annual Review. The Drilling Contingency Plan(s) shall be reviewed on an annual basis and a copy of any necessary revisions shall be submitted to the Division, upon request.

 $\Lambda$ . Posting of Plan. The Public Contingency Plan and the Drilling > Plan shall be maintained on file at all times, shall be available during emergencies, and shall be submitted to the Division upon request. A copy of the Public Contingency Plan and the Drilling <> Plan shall be available for inspection at any facility subject to this rule.

6. Combining Plans A Drilling > Plan may be prepared for a each well, lease, communitization agreement, unit, or field E. Protection from H2S During Drilling, Workover and Servicing Operations

1. Adherence to American Petorleum Institute (API) Standards. At a minimum, all drilling, completion, workover and well servicing operations shall be conducted in accordance with the publications of the American Petroleum Institute (API) entitiled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide,"

RP-68, and "Recommended Practices for Safe Drilling of Wells Containing Hydrogen Sulfide,"

RP-49, most recent edition.

a. Prior to Commencement of Operations. A copy of the H<sub>2</sub>S Drilling shill be completed before commencent for fration. In addition, al Contingency Plan, completed H2S training, and all related safety equipment and warning  $f_{1}^{H_{2}}$  Local be completed I

b. Egress Routes. Egress routes shall be maintained at all times during operations, as follows:

i. Two roads, one at each end of the location or as dictated by

prevailing winds and terrain, shall be established as emergency egress routes. If a second road is not practical, a clearly marked footpath to a safe area shall be provided; and

ii. The egress routes shall be kept passable at all times.

c. Detection and Monitoring. H<sub>2</sub>S Detection and Monitoring Equipment

shall be provided as follows:

i. Each drilling and completion site shall have an  $H_2S$  detection

and monitoring system that automatically activates visible and audible alarms when the ambient air concentration of  $H_2S$  reaches 10 ppm. At a minimum, there shall be a sensing point 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. ii. The detection system shall be calibrated and tested **how** often??>.(All tests of the H<sub>2</sub>S monitoring system shall be recorded on the driller's log or it's equivalent.

iii. For workover and well servicing operations, one 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.

d. Wind Indicators and Signs.

i. Equipment to indicate wind direction shall be present and visible at all times during operations. At least two devices to indicate wind direction shall be installed at separate elevations and visible from all principal working areas at all times.

ii. During operations, danger or caution sign(s) shall be displayed along all accesses to the site. 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 Division. Each sign shall be painted a high visibility red, black and white, or yellow with black lettering. The sign(s) shall be legible and large enough to be read by all persons entering the well site and placed a minimum of 200 feet but no more than 300 feet from the well site and at a location which allows vehicles to turn around at a safe distance prior to reaching the site.

iii. When  $H_2$  is detected in excess of 10 ppm at any detection point, red flag(s) shall be displayed.

e. If H2S Encountered During Operations. If H2S was not anticipated at fr  $P_{2}$  and  $p_{2}$  by  $D_{2}$  was approved, but is encountered in excess of 100 ppm in the gas stream, the operator shall immediately ensure control of the well, suspend drilling operations (unless detrimental to well control), and obtain materials and safety equipment to bring the operations into compliance with the next paragraphs of this Rule. The operator shall notify the Division of the event and the mitigating steps that have or are being taken as soon as possible, but no later than 24 hours after discovery.

3. Operating Practices in Known H28 Areas. General Operating Procedures and Future + Contract H25 Secs
Equipment for operations in H28 areas shall be subject to the following minimum requirements:
a. H28 Gas Encountered During Drilling Operations With Air, Gas, Mist or Other Non-Mud Circulating Media. If H29 gas in excess of 100 ppm is encountered while drilling with air, gas, mist or other non-mud circulating mediums for 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.

b. Flare System. A flare system shall be designed and installed to safely gather and burn  $H_2$  bearing gas. Flare outlets shall be located as far from the well bore as feasible (but not less than 150 feet). Flare lines shall be as straight as practical. The flare system shall be equipped with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall be provided supplemental fuel to maintain ignition.

i. Detection Equipment. At any well site where  $SO_2$  may be

released as a result of flaring of  $H_2S$  the operator shall make  $SO_2$  portable detection equipment available for checking the  $SO_2$  level in the flare impact area.

ii. Activation of Public Protection Plan. If the flare impact area reaches a sustained ambient threshold level of two 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

<activated???>.

d. Remote Controlled Choke.

i. When Required. A remote controlled choke shall be installed for all (H2) drilling and, where feasible, for completion and well servicing operations conducted within 1/4 mile of or contained inside a municipality or within 1/4 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 <conform to above>. ii. Remote Controlled Valve. A remote controlled valve may becoold but a chy used in lieu of this requirement for completion operations.  $\beta emble controlled Custom$ iii. Requirements. When required, a remote controlled choke or

remote controlled valve shall have, at a minimum, a pressure and H<sub>2</sub>S-rated well control choke and kill system including manifold and blowout preventer (BOP) pursuant to specifications APIblows f percent 16C and API-RP 53. The BOP stack shall have a least one spool for the kill and choke lines, two pipe rams, one blind ram, one annual device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced or other Division Rules, if more stringent.

e. Mud Program. The mud programs shall adhere to the following

minimum requirements:

i. pH. A pH of 10 or above in a fresh water-base mud system shall

be maintained to control corrosion, to insure that  $H_2S$  gas returns to surface, and to minimize sulfide stress cracking and embrittlement unless the Division finds that formation conditions or mud types justify a lesser pH level. ii. Degassing. Drilling mud containing  $H_2$  gas shall be degassed

in accordance with current industry standards and practices. These gases shall be piped into the flare system.

iii. Additives. Sufficient quantities of mud additives shall be

maintained on location to scavenge and/or neutralize  $H_2S$  where formation pressures are unknown.

iv. Well Testing. Well Testing in an HS environment shall be performed with a minimum number of personnel in the immediate vicinity to safely and adequately operate the test equipment. Except with prior approval by the Division, the drill-stem testing of (H<sub>2</sub>S) cones shall be conducted only during daylight hours and formation fluids shall not be flowed to the surface (closed chamber only), Operator must notify the Division 24 hours in advance of all drill-stem test which are conducted when a Public Contingency Plan is required the prior of Drilling Contingency Plan. The Drilling Contingency Plan shall be activated immediately when H<sub>2</sub>S is detected in excess of 10 ppm at any detection point. F. Protection from (H2S) at Producing Wells and Tank Batteries

1. Adherence to American Peterleum Institute (API) Standards. Operations at producing wells and tank batteries shall be conducted in accordance with American Petroleum Institute (API) publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

2. Additional Standards. At a minimum, and in addition to the foregoing API standards, production from existing wells and operation of tank batteries and like production equipment shall also be conducted in accordance with the following:

a. Gas Streams Containing 100 ppm or more. Producing wells containing 100 ppm or more of  $H_2$  in the gas stream, and tank batteries at such sites, shall be subject to the following:

i. Public Contingency Plan. A determination must be made of the and, if required on the Calculated radius of exposure pursuant to this Rule. Based on this determination, a Public Contingency radius of Plan may be required.

ii. Signage. A danger sign or signs shall be posted within 50 feet

of each facility to alert the public of the potential H<sub>2</sub>S danger. If fenced, a danger sign at the gate(s) shall suffice. Danger signs shall be posted at each flowline and gathering line that Garcian H<sub>2</sub>S gash Signs shall be placed at each point where such a line crosses a public road or lease road. Each sign shall be legible and shall contain the name of the owner/operator and an emergency telephone number.

iii. Fencing. Fencing and gate(s) shall be required when LSSOCIATED FORMUL FACILIES?? producing wells and associated tank batteries are located within a municipality or within 1/4 mile of the outside boundary of a municipality or within 1/4 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 <conform to earlier>. The method and type F1 of fencing shall be approved by the Division. Gate(s) shall be locked when unattended by the

operator.

iv. Wind Direction Indiactors. Wind direction indicator(s) shall be

required. In the event the producing well and associated tank battery is located at the same site, one such indicator shall suffice.

v. Secondary Well Control. All wells 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 a **potentiALLY HAZARDOUS volume** <???> of H2S is present as set forth in this Rule, well head configuration shall be in accordance with API specifications and at least two entry points provided in the casing/tubing annulus.

vi. Automatic Safety Valve or Shutdown. Where the 100 ppm

radius of exposure for H<sub>2</sub>S includes any occupied residence, place of business, school, or other an area 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. The automatic safety valves shall be set to activate upon a release of a Potentially Hazardous Volume of H<sub>2</sub>S. vii. Tank Batteries With H<sub>2</sub>S Concentrations of 300 ppm or Greater. Tank batteries with concentrations of 300 ppm of H<sub>2</sub>S or greated in the gas stream shall be subject to the following additional requirements:

tank shall be chained and/or marked to restrict entry. For any tank batteries that require fencing, fright to the state of the state of

bb. A danger sign shall be posted on or within 50 feet of any storage tank to alert persons of the potential  $H_2S$  danger. For any storage tank for which fencing is required, a danger sign posted at the locked gates shall suffice. Each sign shall read: DANGER POISON GAS HYDROGEN SULFIDE. cc. At least one permanent wind direction indicator shall

be installed so that wind direction can be easily determined at or approaching the storage tank(s).

dd. Each tank battery shall be enclosed with a Division-

approved fence to restrict public access when located within a municipality or within 1/4 mile of a municipality or within 1/4 mile of an occupied residence, school, church, park, playground, a a rea school bus stop, place of business, or where the public could reasonably be expected to frequent: Gates shall be locked when unattended by the operator.

3. Modification or Repair. The Division may require modification or repair of a associated productive families producing well or associated tank battery if the sustained ambient concentration of H2S at any occupied residence, school, church, park, playground, school bus stop, place of business, or other area where the public could reasonably be expected to frequent, reaches one ppm.

4. Compliance Schedule. Each existing producing well and associated tank
battery not currently meeting the requirements and minimum standards set forth herein shall be
brought into compliance within 1 year of the effective date of this Rule. Each producing well
and tank battery constructed after the effective date of this Rule shall be designed, constructed
and operated to meet the requirements set forth herein.
G. Personnel Protection and Training. All persone working in an H2S

G. Personnel Protection and Training. All person working in an H2S S = S = S = 1environbinement <222 / shall be trained in H<sub>2</sub>S hazards, detection and contingency procedures, drand shall be provided with adequate protective equipment. Operators and managers of DCP profacilities governed by this Rule shall maintain records of such training activities and make them available to the Division upon request.

H. Standards for Equipment That May Be Exposed to H2S.

1. Mettalurgical Equipment. All mettalurgical equipment that may be exposed to  $H_2S$  shall be suitable for  $H_2S$  service. The metallurgical properties of the materials used shall conform to the current National Association of Corrosion Engineers (NACE) Standard MR 0175-90, Material Requirement, Sulfide Stress Cracking Resistant Metallic Material for Oil Field Equipment.

2. Other Equipment. 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  $H_2$  environment shall be sufficient verification of suitable service in accordance with this Section, or if applicable, adequate protection by chemical inhibition or other such method that controls or limits the corrosive effects of  $H_2S$  shall be used.

I. H29 Injection Prohibited. Injection of fluids containing hydrogen sulfide is prohibited where the injection fluids are a gaseous mixture, or would be a gaseous mixture in the event of a release to the atmosphere and where the 100 ppm Radius of Exposure includes any occupied residence, school, church, park, school bus stop, place of business, or other areas where any be  $p \in Sec_{+}$ person could reasonably be expected to frequent <coform>, within a municipality or within a 1/4 mile of a municipality.

EXCEPTIONS. M. Exception An exception to the requirements of this Section approved a variance of the requirements prescribed in this Section All such requests shall be submitted in writing to the Director and provide information as to the circumstances which warrant approval of the variance requested and the proposed alternative methods by which the related requirements of this Section are to be satisfied. The Director, after considering all relevant factors, may approve the requested variance if it is determined that the proposed alternative meets or exceeds the objectives of this Section, al profects public ualt.

J. Release **Solution Requirements**. Long Structure and a structure of the Public Contingency Plan. The Public Contingency Plan shall

be activated immediately upon detection of release of a Potentially Hazardous Volume of  $H_2S$  or if any <u>person</u> member of the public is being subjected to an atmosphere exposure exceeding 30 ppm of hydrogen sulfide or 10 ppm of sulfur dioxide.

ppm of hydrogen sulfide or 10 ppm of sulfur dioxide. 4 3. Notification Required. Upon Any release of a Potentially Hazardous Volume of H<sub>2</sub>S, or, alternatively, upon exposure of any person member of the public being or has been subjected to an atmosphere exposure exceeding 30 ppm of hydrogen sulfide or 2 ppm of sulfur dioxide, shall be reported to the Division shall be notified as soon as practicable, but no later than within one hour of the discovery of the release. A full report of the incident shall be submitted to the OCD on a C-141 form within 15 days of the incident.

<why is it 2 ppm of sulfur dioxide in this section and 10 ppm in the preceding section??</p>
Oppose

:  $\langle MOVE \rangle$  The requirements of this rule are the minimum acceptable standards with regard to H<sub>2</sub>S operations. The Division may require more stringent standards and require corrective actions in a timely manner to maintain control of a well or any other OCD regulated facility in order to prevent waste, provide for public safety, protect public health and the environment.

I. All Other Regulated Facilities: The H2S requirements for all other facilities regulated by the New Mexico Oil Conservation Division are the same as those in subsection H above.

19.15.2. Hydrogen Sulfide Gas (Hydrogen Sulfide)

A. In General. Hydrogen Sulfide Gas (known by its chemical abbreviation " $H_2S$ " or as "sulfurated hydrogen" or "hydrosulfuric acid") is a flammable, poisonous gas that occurs naturally as a component of crude petroleum and natural gas. The gas presents severe threats to human health and can be fatal in high concentrations. The gas has a distinct and characteristic odor of rotten eggs.

B. Applicability. This Section applies to any person, operator or facility subject to the jurisdiction of the Division, including, but not limited to, any person, operator or facility engaged in drilling, stimulating, completing, working over or producing any oil, natural gas or carbon dioxide well, or any person, operator or facility engaged in gathering, transporting, storing, processing, or refining of crude oil, natural gas or carbon dioxide where it is determined pursuant to D.1 below that H2S concentrations exceed 100 ppm.

C. Definitions (specific to this Rule).

1. API. "API" means the American Petroleum Institute, 300 Corrigan Tower Building, Dallas, Texas, 75201.

2. Dispersion Technique. A "dispersion technique" is a mathematical representation of the physical and chemical transportation characteristics, dilution characteristics, and transformation characteristics of hydrogen sulfide gas in the atmosphere.

3. Escape Rate. The "escape rate" is the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing hydrogen sulfide. The escape rate is calculated using the maximum daily rate of the gaseous mixture produced or the best estimate thereof. For a natural gas well, the escape rate shall be calculated by using the current daily absolute open flow rate against atmospheric pressure. For an oil well, the escape rate shall be calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or best estimate thereof. For an oil or natural gas well drilled in an undeveloped area (a wildcat well), the escape rate may be determined by using offset wells completed in the interval(s) in question, or using some other reasonable means to calculate the escape rate. For facilities or operations not mentioned, the escape rate shall be calculated using the actual flow of gaseous mixture through the facility or operation.

<u>4. LEPC. The acronym "LEPC" means the local emergency planning committee</u> established pursuant to the Emergency Planning and Community Right-to-Know Act, 42 U.S. C. § 11001.

5. PPM. The abbreviation "ppm" means "parts per million."

6. Potentially Hazardous Volume (hereinafter referred to as a "potentially hazardous volume" or by the acronym "PHV") means the volume of hydrogen sulfide gas of such concentration that: a. the 100 ppm radius of exposure includes any public area as defined herein the

(except for facilities directly involved in oil and gas production, such as producing oil and gas wells, pipelines, tank batteries, production equipment, gas plants, refineries);

b. the 300 ppm radius of exposure includes any public road; or

c. the 100 ppm radius of exposure is in excess of 3,000 feet.

7. Public Area. A "public area" is any dwelling, office, place of business, church, school, hospital, school bus stop, government building, public road, any portion of a park, city, town, village, or similar area where members of the public can reasonably be expected to be present.

8. Public Road. <u>A "public road" is any state, municipal or county road or highway,</u> postal route or other public road. A public road is not a private road or a road whose access to members of the general public is restricted.

9. Radius of Exposure. The radius of exposure (hereinafter referred to as "radius of exposure" or "ROE") is an imaginary circle constructed around a point of escape whose radius is calculated using the following Pasquill-Gifford derived equation, or by such other method(s) as may be approved by the Division:

a. For determining the 100-ppm radius of exposure where the hydrogen sulfide concentration in the gaseous mixture is less than 10 percent:  $X = [(1.589)(hydrogen sulfide concentration)(Q)]^{(0.625)}$ , or

b. For determining the 300-ppm radius of exposure where the hydrogen sulfide concentration in the gaseous mixture is less than 10 percent: X = [(0.7700)(hydrogen sulfide)]concentration)(Q)]<sup>(0.6258)</sup>

Where: X= radius of exposure in feet: hydrogen sulfide concentration = decimal equivalent of the mole or volume fractions of hydrogen sulfide in the gaseous mixture; Q= maximum volume of gas determined to be available for escape in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

c. For determining the 100 ppm or the 300 ppm radius of exposure in gaseous mixtures containing hydrogen sulfide concentrations of 10 percent or greater, a dispersion technique that takes into account representative wind speed, direction, atmospheric stability, complex terrain, and 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)."

d. Where multiple sources of hydrogen sulfide are present (e.g. wells, treatment equipment, flow lines, etc.), the radius of exposure may encompass a larger area than would otherwise be calculated using a radius of exposure computation for each component part.

e. For a well being drilled in an area where insufficient data exits to calculate a radius of exposure, but where hydrogen sulfide could reasonably be expected to be present in concentrations in excess of 100 ppm in the gaseous mixture, a 100 ppm radius of exposure equal to 3,000 feet shall be assumed.

D. Determination of Hydrogen Sulfide Risk.

1. Determination of Hydrogen Sulfide Concentration.

a. Each person, operator or facility to which this Section applies shall determine the hydrogen sulfide concentration within the operation or system. A representative sample for each system or operation <u>may be used for testing</u> provided that the <u>person</u>, operator <u>or facility</u> can <u>demonstrate</u> that the concentration derived <u>from a test of the representative sample</u> is reasonably accurate. the hydrogen sil fide concerdate with the the openation or system.

b. Tests shall be conducted in accordance with applicable ASTM and GPA standards or by other methods approved by the Division.

2. Tested Concentrations Below 100 ppm. If the testing described in the previous Paragraph determines that the hydrogen sulfide concentration in a given operation or system is less than 100 ppm, no further actions are required pursuant to this Section.

3. Tested Concentrations Above 100 ppm; Calculation of the Radius of Exposure.

a. If the testing described in Paragraph 1 of this Subsection determines that the concentration of hydrogen sulfide in a gaseous mixture is 100 ppm or greater, then the person, operator or facility must calculate the radius of exposure pursuant to this Section.

b. The person, operator or facility shall provide the results of all radius of exposure determinations to the Division within 180 days of commencing operations or, for existing facilities, within 180 days of the effective date of this Section. The Division may disapprove the test methodology and require fe-testing if testing did not conform to the requirements of this Section.

4. Recalculation. If operational or production alterations are made that result in a 25% or greater increase in the hydrogen sulfide concentration in a given operation or facility, new testing shall be conducted and the radius of exposure shall be recalculated and the results submitted to the Division and retained.

E. H<sub>2</sub>S Contingency Plans.

1. In General. The H<sub>2</sub>S Contingency Plan is a written document that provides an organized and effective plan of action which will be used to alert and protect persons at risk in the event of a potentially significant release of hydrogen sulfide gas.

significant release of hydrogen sulfide gas. 2. When Required. An H<sub>2</sub>S Contingency Plan is required when a potentially hazardous  $d = \frac{1}{16\pi}$ volume, is present. any new or existing well, operation, facility, area or system generates a 100 ppm 3,000 feet from the site of a release any public area, or any public road.

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Prise Cuntrigen Subrutter Plu alors to Divisio 3. Submission. An H<sub>2</sub>S Contingency Plan must be submitted to the Division, and may be submitted separately or along with the Application for Permit to Drill (APD). for a well that is not covered by an existing H<sub>2</sub>S Contingency Plan. [???] - -4. Elements. The H<sub>2</sub>S Contingency Plan will consist of different elements depending on the risks encountered. provide a tiered response to the risks present. The three possible elements of an H2S Contingency Plan are the H2S Release Plan, the H2S Traffic Plan and the H2S Public Contingency Plan. The H.S.Contingency Plan should merge the applicable elements into a single plan. Le there should only be one Map or Plat and one Call List. An H2S Contingency Plan should be developed according to the requirements for each applicable element of the plan. a. When Required. An H<sub>2</sub>S Release Plan is required for every H<sub>2</sub>S Contingency  $10^{-1}$ 5. The  $\underline{H}_2\underline{S}$  Release Plan. b. Development. The H<sub>2</sub>S Release Plan shall be developed by the operator, with input from the Division, the New Mexico Department of Public Safety, and the Local Emergency Planning Committee. c. Contents. The Release Plan shall, at a minimum, contain the following: i. Actions to be taken in the event of a release of a potentially hazardous volume of hydrogen sulfide; ii. A call list including the following as applicable: 1. local supervisory personnel; 2. county sheriff; 3 the Department of Public Safety and State Police; 4. city (municipal) police; 5. the appropriate Division district office; and 6. other public agencies as appropriate; iii. A plat or map detailing the area within the radius of exposure; and iv. A list of the names and telephone numbers of all operator  $\frac{1}{7}$ personnel to be contacted when a release is reported or suspected. 6. The H<sub>2</sub>S Traffic Plan. a. When Required. An H<sub>2</sub>S Traffic Plan is required at any well, operation, facility, area or system where the 300 ppm radius of exposure of H<sub>2</sub>S encompasses any public road. b. Development. The H<sub>2</sub>S Traffic Plan shall be developed by the operator with input from the Division, the New Mexico State Police and/or the New Mexico Department of Public Safety, county sheriff, city (municipal) police, and the Local Emergency Planning Committee, as required pursuant to the New Mexico Emergency Management Act, NMSA 1978, Sections 74-48-1 through 744B-14 and the New Mexico Hazardous Materials Emergency Response Plan (HMER Plan). c. Contents. The H<sub>2</sub>S Traffic Plan shall, at a minimum, contain the following: i. Instructions and procedures for alerting and coordinating with and the emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide that has the potential to affect the public on at any public road; don't need-dupliates Released. Plan is always required ii. A call list including the following as applicable: 1. ldcal supervisory personnel; 2. county sheriff; 3 the Department of Public Safety and State Police; 4. city (municipal) police; 5. the appropriate Division district office; and 6. other public agencies as appropriate; and iii. A plat or map detailing the area of exposure, including the locations of public roads within the radius of exposure. IV. plan to duent mitter al sately xet existing the ned

7. The H<sub>2</sub>S Public Contingency Plan.

a. When Required. A Public Contingency Plan must be prepared and maintained at any well, operation, facility, area or system where the 100-ppm radius of exposure of H<sub>2</sub>S encompasses a public area.

b. Development. A Public Contingency Plan shall be developed with input from the Division and emergency response authorities (including, but not limited to, police and fire departments near the well, operation or facility, the New Mexico State Police and/or the New Mexico Department of Public Safety, and the Local Emergency Planning Committee).

c. Contents. A Public Contingency Plan shall, at a minimum, contain the

following:

i. Detailed plans of action to be taken to alert and protect persons in the event of a release of a potentially hazardous volume of hydrogen sulfide. A Public Contingency Plan shall include instructions and procedures for alerting persons at risk and emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide;

ii. A call list including the following as applicable:

1. local supervisory personnel;

2. county sheriff;

3\_the Department of Public Safety and State Police;

4. city (municipal) police;

5, ambulance services;

6. hospitals;

7. county and city fire departments; 8. doctors;

9. contractors for supplemental or emergency equipment: 10. the appropriate Division district office;

11. other public agencies as appropriate;

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iii. A statement describing how emergency response actions will be

coordinated with the Division and the New Mexico State Police, consistent with the New Mexico Hazardous Materials Emergency Response Plan (HMER): , a Division of the Department of Public Safety, as required pursuant to the New Mexico Emergency Management Act, NMSA-1978, Sections 74-48-1 through 74-4B-14 and the New Mexico Hazardous Material Emergency Response Plan (HMER Plan).

iv. A plat or map detailing the area of exposure, including the

locations of private dwellings or residences, public facilities such as schools, businesses, public roads or other similar areas where the public may be reasonably expected to be present within the radius of exposure;

v. The names and telephone numbers of all persons living within the radius of exposure of 100 ppm hydrogen sulfide and <u>contact persons</u> all responsible parties for each public area, such as churches, schools, and businesses;

vi. Provisions for advance briefing of affected and responsible persons within the radius of exposure. Such advance briefing shall include the hazards and characteristics of hydrogen sulfide, the necessity for an H<sub>2</sub>S Contingency Plan, the possible sources of hydrogen sulfide with the radius of exposure, instructions for reporting a gas leak, the manner in which persons will be notified in the event of an emergency, and steps to be taken in an emergency; and

vii. Additional support information, if applicable, such as the location of emergency evacuation routes, the location of safety and life support equipment, the location of hydrogen sulfide containing facilities, the location of nearby telephones and/or other means of communication, and special instructions for conditions at a particular installation such as local terrain and the effect of various weather conditions.

d. Additional Requirements. The Division may impose additional requirements or modify requirements based on site-specific conditions, population density or special circumstances.

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8. Submission. Where a Public Contingency Plan is required for a new well or facility, the H<sub>2</sub>S Contingency Plan shall be submitted to the Division and Local Emergency Planning Committee. All other Hydrogen Sulfide Contingency Plans shall not be submitted, but shall be maintained by the operator and provided to the Division upon request when requested. [conflicts with other language in the rule -- find and make consistent]  $\longrightarrow \varepsilon.3$ .

9. Failure to Submit Plan. Failure to submit an  $H_2S$  Contingency Plan when required may result in denial of an Application to Drill, cancellation of an allowable or other appropriate enforcement action.

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11. Retention and On-Site Inspection. An  $H_2S$  Contingency Plan shall be maintained on file at all times and shall be available <u>for inspection by the Division during normal business hours</u>.

12. Activation Levels for an  $H_2S$  Traffic Plan and <u>the Public Contingency Plan PCP</u>. The Traffic Plan and Public Contingency Plan shall be activated by the operator in the event <u>of that a</u> release of a Potentially Hazardous Volume of  $H_2S$  <del>occurs</del> above the respective thresholds (i.e. 300 ppm radius of exposure for the Traffic Plan, and 100 ppm radius of exposure for the Public Contingency Plan) or if a sustained concentration of  $H_2S$  exceeds 50 ppm at the property line of any <u>facility, well or</u> <u>operation</u>.

F. Protection from Hydrogen Sulfide During Drilling, Workover and Servicing Operations.

1. API Standards. All drilling, completion, workover and well servicing operations shall be conducted with due consideration of the guidelines published by the American Petroleum Institute (API) entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Safe Drilling of Wells Containing Hydrogen Sulfide," RP-49, most recent edition.

2. Minimum Standards. At a minimum, and possibly in addition to the foregoing API standards, each drilling, completion, workover and well servicing operation shall also be conducted in accordance with the following:

a. Before Commencing Operations. An H<sub>2</sub>S Contingency Plan (where required) shall be completed before commencement of operations. In addition, hydrogen sulfide training shall be completed as required in sub-section H.(Personnel Protection and Training) and including all related safety equipment and warning systems shall be operational.

b. Egress Routes. Passable egress routes shall be maintained at all times during operations.

c. Detection and Monitoring. Hydrogen sulfide detection and monitoring equipment shall be provided as follows:

i. Each drilling and completion site shall have hydrogen sulfide detection and monitoring that automatically activates visible and audible alarms when the ambient air concentration of hydrogen sulfide reaches 10 ppm. There shall be a sensing point 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.

ii. The detection system shall be calibrated and tested monthly. Each test of the hydrogen sulfide monitoring system shall be recorded on the driller's log or its equivalent.

iii. For workover and well servicing operations, one operational sensing point shall be located as close to the well bore as practical. Additional sensing points may be necessary for large and/or long-term operations.

iv. Hydrogen sulfide detection and monitoring equipment must be provided during drilling when drilling is within 500 feet of the zone anticipated to contain hydrogen sulfide and continuously thereafter through all subsequent drilling. Detection and monitoring equipment is not required for drilling from the surface to within 500 feet of the zone anticipated to contain hydrogen sulfide.

d. Wind Indicators and Signs.

i. Equipment to indicate wind direction shall be present and visible at all times. At least two devices to indicate wind direction shall be installed at separate elevations and visible from all principal working areas at all times.

ii. Danger or caution sign(s) shall be displayed along all accesses to the site. 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 approved by the Division. Each sign shall be painted with high visibility red, black and white, or yellow paint with black lettering. The sign(s) shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 300 feet from the well site and at a location which allows vehicles to turn around at a safe distance prior to reaching the site.

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

e. If Hydrogen Sulfide Encountered During Operations. If hydrogen sulfide was not anticipated at the time the APD was approved but is encountered during drilling in excess of 100 ppm in the gaseous mixture, the operator shall immediately ensure control of the well, suspend drilling operations (unless detrimental to well control), and obtain materials and safety equipment to bring the operations into compliance with this <u>Section Rule</u>. The operator shall notify the Division of the event and the mitigating steps that have or are being taken as soon as possible, but no later than 24 hours following discovery.

3. Operating Practices In Hydrogen Sulfide Concentrations of 100 ppm or Greater. Operating practices in areas known to contain a concentration of hydrogen sulfide gas of 100 ppm or greater in the gaseous mixture shall be subject to the following requirements:

a. If Hydrogen Sulfide Is Encountered During Use of Air, Gas, Mist or Other Non-Mud Circulating Media. If hydrogen sulfide gas in excess of 100 ppm is encountered while drilling with air, gas, mist or other non-mud circulating mediums for 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.

b. Flare System. For drilling and completion operations, a flare system shall be installed, unless exempted <u>pursuant to Subsection L. of this Section</u>, to safely gather and burn hydrogen sulfide-bearing gas. Flare outlets shall be located as far from the well bore as feasible (but not less than 150 feet from the well). Flare lines shall be as straight as practical. The flare system shall be equipped with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall be provided supplemental fuel to maintain ignition.

c. Remote Controlled Choke.

i. A remote controlled choke shall be installed during drilling and during completion and well servicing operations when the 100-ppm  $H_2S$  ROE impacts a public area, unless exempted pursuant to Subsection L. of this Section.

ii. A remote controlled valve may be used in lieu of use of a remote controlled choke, but only for completion operations.

iii. A remote controlled choke or remote controlled valve shall have, at a minimum, a pressure and hydrogen sulfide-rated well control choke and kill system including manifold and blowout preventer (hereinafter referred to as "BOP") pursuant to specifications API-16C and API-RP 53. The BOP stack shall have a least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced or other Division Rules, if more stringent. Variations to BOP stack arrangements may be granted by the Division for good cause shown.

d. Mud Program. A mud program, including de-gassing and flaring, capable of handling H<sub>2</sub>S conditions and well control shall be utilized.

e. Well Testing. Except with prior approval by the Division, the drill-stem testing shall be conducted only during daylight hours and formation fluids shall not be permitted to flow to the surface (closed chamber only). An operator shall notify the Division 24 hours in advance of a drill-stem test if an  $H_2S$  Contingency Plan is required pursuant to this Rule.

G. Protection from Hydrogen Sulfide at Producing Wells, Tank Batteries and Associated Production Facilities, Refineries, Gas Plants, and Compressor Stations.

1. American Petroleum Institute (API) Standards. Operations at producing wells, tank batteries and associated production facilities shall considered the guidelines published by the American Petroleum Institute (API) publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

2. Minimum Standards. At a minimum, and possibly in addition to the foregoing API standards, production from wells, operation of tank batteries and associated production equipment shall also be conducted in accordance with the following:

a. Gaseous Mixtures Containing 100 ppm or more. Producing wells containing 100 ppm or more of hydrogen sulfide in the gaseous mixture, tank batteries and associated production facilities at such sites, shall be subject to the following:

i.  $H_2S$  Contingency Plan. A determination must be made of the radius of exposure pursuant to this Rule and, if required based on the calculated radius of exposure, a  $H_2S$  Contingency Plan will also be required.

ii. Signage. A danger sign or signs shall be posted within 50 feet of each facility to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gate(s) shall suffice. Danger signs shall be posted at each flow line and gathering line on the well pad that contains hydrogen sulfide gas as specified in Subparagraph <u>of this Section</u>. A sign shall be placed at each point where such a line crosses a public road. Each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

iii. Fencing. Fencing and gate(s) shall be required when producing wells, associated tank batteries and associated production facilities are located within a 1/4 mile of a residence, school, church, park, playground, school bus stop, or place of business. The fence shall consist of a 5-foot chain link topped by two stands of barbed wire or other methods approved by the Division. Gate(s) shall be locked when unattended by the operator.

iv. Wind Direction Indicators. Wind direction indicator(s) shall be

required

at every facility (tank battery, water injection station, production satellite) where  $H_2S$  concentration in a gaseous state exceeds 100 PPM.

v. Secondary Well Control. Wells where the 100-ppm  $H_2S$  radius of exposure incorporates a public area 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.

vi. Automatic Safety Valve or Shutdown. If the 100-ppm radius of exposure involves a public area, an automatic safety valve or shutdown shall be installed at the facility or wellhead or other appropriate shut-in control shall be installed. The automatic safety valve shall be set to activate upon a release of a potentially hazardous volume of hydrogen sulfide.

b. Tanks or vessels containing 300 ppm or more of hydrogen sulfide in the gaseous mixture shall be subject to the following additional requirements:

1. Each stair or ladder leading to the top of any storage tank shall be chained and/or marked to restrict entry. For any tank battery that requires fencing pursuant to this Section, a danger sign posted at the gate(s) may be substituted for chaining and signage.

2. A danger sign shall be posted on or within 50 feet of any storage tank to alert persons of the potential hydrogen sulfide danger. For any storage tank for which

fencing is required, a danger sign posted at the locked gates shall suffice. Each sign shall read: "DANGER: POISON GAS HYDROGEN SULFIDE."

3. Modification or Repair. The Division may require modification or repair of a producing well, associated tank battery or associated production facilities if the sustained ambient concentration of hydrogen sulfide is 1 ppm or greater at any public area.

4. Compliance Schedule. Each existing producing well and associated tank battery not currently meeting the requirements and minimum standards set forth herein shall be brought into compliance within one (1) year of the effective date of this Rule. Each producing well and tank battery constructed following the effective date of this Rule shall be designed, constructed and operated to meet the requirements set forth herein.

H. Personnel Protection and Training. All persons responsible for the implementation of any H<sub>2</sub>S Contingency Plan shall be provided training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.

I. Standards for Equipment That May Be Exposed to Hydrogen Sulfide. Proper materials and/or appropriate protective measures for equipment exposed to hydrogen sulfide shall be utilized. Records shall be retained and shall be made available to the Division upon request. The Division may require additional requirements on any facility that may pose a threat to public health and/or the environment.

J. Hydrogen Sulfide Injection. Injection of fluids containing hydrogen sulfide where the injection fluids are a gaseous mixture, or would be a gaseous mixture in the event of a release to the atmosphere, and where the 100 ppm radius of exposure includes any public area, excluding public roads, shall not be allowed unless first approved by the division after public hearing.

K. Exemptions. An exemption to the requirements of this Section may be granted by petitioning the Director. Any such petition shall provide specific information as to the circumstances that warrant approval of the variance requested and the proposed alternative methods by which the related requirements of this Section are to be satisfied. The Director, after considering all relevant factors, may approve an exemption if it is determined that the proposed alternative meets or exceeds the requirements of this Section and otherwise protects the health, safety and welfare of potentially affected persons.

L. Release. Upon a release of hydrogen sulfide the following actions must be taken:

1. Activation of the  $H_2S$  Contingency Plan. The  $H_2S$  Contingency Plan shall be activated immediately upon a  $H_2S$  release where the if there is potential exists to expose any public area to a concentration of  $H_2S$  greater than 100 ppm or a concentration, an  $H_2S$  concentration greater than 300 ppm  $H_2S$  at any public road, a concentration of  $H_2S$  greater than 100 ppm at three thousand (3000) feet from the well, facility or operation, or a concentration of  $H_2S$  greater than 50 ppm at the property line of any well, facility or operation.

2. Notification of the Division. Upon release of a hydrogen sulfide requiring activation of the  $H_2S$  Contingency Plan, the Division shall be notified as soon as practicable, preferably within one hour of the discovery of the release or as soon as possible in cases where recognizing that prompt response should supercede notification. A full report of the incident shall be submitted to the OCD on a C-141 form no later than fifteen (15) days following the incident.

M. Additional Standards. The Division may require more stringent standards on a case-by-case basis than those set forth in this Section, or require corrective actions if necessary, to maintain control of a well or any other facility, or to safeguard public health or safety.



19.15.2. Hydrogen Sulfide Gas (Hydrogen Sulfide)

A. In General. Hydrogen Sulfide Gas (known by its chemical abbreviation " $H_2S$ " or as "sulfurated hydrogen" or "hydrosulfuric acid") is a flammable, poisonous gas that occurs naturally as a component of crude petroleum and natural gas. The gas presents severe threats to human health and can be fatal in high concentrations. The gas has a distinct and characteristic odor of rotten eggs.

B. Applicability. This Section applies to any person, operator or facility subject to the jurisdiction of the Division, including, but not limited to, any person, operator or facility engaged in drilling, stimulating, completing, working over or producing any oil, natural gas or carbon dioxide well, or any person, operator or facility engaged in gathering, transporting, storing, processing, or refining of crude oil, natural gas or carbon dioxide where it is determined pursuant to D.1 below that H2S concentrations exceed 100 ppm. [The rule applies to these persons --- they still have to test to verify that a PHV will not be created --- THEN they are free to ignore the rest of the Rule]

C. Definitions (specific to this Rule).

1. API. "API" means the American Petroleum Institute, 300 Corrigan Tower Building, Dallas, Texas, 75201.

2. Dispersion Technique. A "dispersion technique" is a mathematical representation of the physical and chemical transportation characteristics, dilution characteristics, and transformation characteristics of hydrogen sulfide gas in the atmosphere.

3. Escape Rate. The "escape rate" is the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing hydrogen sulfide. The escape rate is calculated using the maximum daily rate of the gaseous mixture produced or the best estimate thereof. For a natural gas well, the escape rate shall be calculated by using the current daily absolute open flow rate against atmospheric pressure. For an oil well, the escape rate shall be calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or best estimate thereof. For an oil or natural gas well drilled in an undeveloped area (a wildcat well), the escape rate may be determined by using offset wells completed in the interval(s) in question, or using some other reasonable means to calculate the escape rate. For facilities or operations not mentioned, the escape rate shall be calculated using the actual flow of gaseous mixture through the facility or operation.

4. LEPC. The acronym "LEPC" means the local emergency planning committee established pursuant to the Emergency Planning and Community Right-to-Know Act, 42 U.S. C. § 11001. [We should define this acronym - I didn't catch it in the earlier drafts]

5. PPM. The abbreviation "ppm" means "parts per million."

6. Potentially Hazardous Volume (hereinafter referred to as a "potentially hazardous volume" or by the acronym "PHV") means the volume of hydrogen sulfide gas of such concentration that:

a. the 100 ppm radius of exposure <u>includes any public area as defined herein</u> (except for facilities directly involved in oil and gas production, such as producing oil and gas wells, pipelines, tank batteries, production equipment, gas plants, refineries) [this is a very tough concept to incorporate in a rule, and I'll continue to think about how best to do this];

b. the 300 ppm radius of exposure includes any public road; or

c. the 100 ppm radius of exposure is in excess of 3,000 feet.

7. Public Area. A "public area" is any dwelling, office, place of business, church, school, hospital, school bus stop, government building, public road, any portion of a park, city, town, village, or similar area where members of the public can reasonably be expected to be present. [this last clause got lost --- this protects us if we haven't named all possible places where the public copuld be por events present]

present] 8. Public Road. <u>A "public road" is any state, municipal or county road or highway.</u> postal route or other public road. <u>A public road is not a private road or a road whose access to members</u> of the general public is restricted. [this is the legal definition of public road in this state] 9. Radius of Exposure. The radius of exposure (hereinafter referred to as "radius of

exposure" or "ROE") is an imaginary circle constructed around a point of escape whose radius is

calculated using the following Pasquill-Gifford derived equation, or by such other method(s) as may be approved by the Division:

a. For determining the 100-ppm radius of exposure where the hydrogen sulfide concentration in the gaseous mixture is less than 10 percent:  $X = [(1.589)(hydrogen sulfide concentration)(Q)]^{(0.625)}$ , or

b. For determining the 300-ppm radius of exposure where the hydrogen sulfide concentration in the gaseous mixture is less than 10 percent:  $X=[(0.7790)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ 

Where: X= radius of exposure in feet: hydrogen sulfide concentration = decimal equivalent of the mole or volume fractions of hydrogen sulfide in the gaseous mixture; Q= maximum volume of gas determined to be available for escape in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

c. For determining the 100 ppm or the 300 ppm radius of exposure in gaseous mixtures containing hydrogen sulfide concentrations of 10 percent or greater, a dispersion technique that takes into account representative wind speed, direction, atmospheric stability, complex terrain, and 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)."

d. Where multiple sources of hydrogen sulfide are present (e.g. wells, treatment equipment, flow lines, etc.), the radius of exposure may encompass a larger area than would otherwise be calculated using a radius of exposure computation for each component part.

e. For a well being drilled in an area where insufficient data exits to calculate a radius of exposure, but where hydrogen sulfide could reasonably be expected to be present in concentrations in excess of 100 ppm in the gaseous mixture, a 100 ppm radius of exposure equal to 3,000 feet shall be assumed.

D. Determination of Hydrogen Sulfide Risk.

1. Determination of Hydrogen Sulfide Concentration.

a. Each <u>person</u>, <u>operator or facility to which this Section applies</u> shall determine the hydrogen sulfide concentration within the operation or system. A representative sample for each system or operation <u>may be used for testing</u> provided that the <u>person</u>, <u>operator or facility</u> can <u>demonstrate</u> that the concentration derived from a test of the representative sample is reasonably <u>representative of the</u> <u>hydrogen sulfide concentration within the operation or system</u>. [we should avoid referring to "operators" only --- gas plants don't have "operators" in the sense that we usually use the word]

b. Tests shall be conducted in accordance with applicable ASTM and GPA standards or by other methods approved by the Division.

2. Tested Concentrations Below 100 ppm. If the testing described in the previous Paragraph determines that the hydrogen sulfide concentration in a given operation or system is less than 100 ppm, no further actions are required pursuant to this Section. [this should help clarify the concerns that led to the additional language in paragraph B --- once testing verifies concentrations are below 100 ppm, no further obligations exist]

3. <u>Tested Concentrations Above 100 ppm</u>; Calculation of the Radius of Exposure.

a. If <u>the</u> testing described in <u>Paragraph 1 of this Subsection</u> determines that the concentration of hydrogen sulfide in a gaseous mixture is 100 ppm or greater, then the <u>person</u>, operator <u>or</u> <u>facility</u> must calculate the radius of exposure <u>pursuant to this Section</u>. [same comments as before]

b. The <u>person</u>, operator <u>or facility</u> shall provide the results of all radius of exposure determinations to the Division within 180 days of commencing operations or, for existing facilities, within 180 days of the effective date of this <u>Section</u>. The Division may disapprove the test <u>methodology and require additional testing if the test methodology did not conform to the requirements of</u> <u>this Section</u>. [this change should permit us to reject test results where the operator used a methodology that we feel is inadequate - like the smell test]

4. Recalculation. If operational or production alterations are made that result in a 25% or greater increase in the hydrogen sulfide concentration in a given operation or facility, new testing shall be

<u>conducted and the radius of exposure shall be recalculated</u> and the results submitted to the Division and retained. [trying to make the language as clear as possible here]

E.  $H_2S$  Contingency Plan. [I simplified this further because I found the section very confusing --- we were trying to combine three plans into one, but still had vestiges of the old tripartite plan system in place; I tried to phrase the additional elements required for public places and roads as additions to the basic plan that was always required --- see what you think]

1. In General. The  $H_2S$  Contingency Plan is a written document that provides a plan of action which will be used to alert and protect persons at risk in the event of a potentially significant release of hydrogen sulfide gas.

2. When Required. An H<sub>2</sub>S Contingency Plan must be prepared whenever a potentially hazardous volume of hydrogen sulfide is present.

3. Submission. An H<sub>2</sub>S Contingency Plan must be submitted to the Division, and may be submitted separately or along with the Application for Permit to Drill (APD).

4. Input From Emergency Response Authorities and the Division. The  $H_2S$ Contingency Plan shall be developed with input from the Division, the New Mexico Department of Public Safety (and/or as appropriate the New Mexico State police), and the Local Emergency Planning Committee, except that where the 300 ppm radius of exposure encompasses any public road, input shall also be sought from the county sheriff and (as applicable) the city (municipal) police, and except that where the 100 ppm radius of exposure encompasses a public area, input shall also be sought from police and fire departments near the well, operation or facility. [should we also states that "The H2S Contingency Plan shall reflect input from these sources."???]

<u>Contingency Plan shall reflect input from these sources."???]</u> <u>5. Elements. The H<sub>2</sub>S Contingency Plan will consist of different elements depending on the risks present.</u>

a. Elements Required for Each Plan: i. A detailed description of each Action to be taken in the event of a release of a potentially hazardous volume of hydrogen sulfide; ii. A call list including the following as applicable: aa. local supervisory personnel; bb. county sheriff; cc. the Department of Public Safety and State Police; dd. city (municipal) police; ee. the appropriate Division district office; and ff. other public agencies as appropriate. iii. A plat or map detailing the area within the radius of exposure; and iv. A list of the names and telephone numbers of all personnel to be contacted when a release is reported or suspected. b. Where the 300 ppm radius of exposure encompasses any public road, the following additional elements shall be included in the H<sub>2</sub>S Contingency Plan: i. Instructions and procedures for alerting and coordinating with emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide at any public road; ii. A plat or map detailing the area of exposure, including the locations of public roads within the radius of exposure; iii. A plan to divert traffic and safely get existing traffic off the road and c. Where the 200 ppm radius of exposure encompasses any public area, the -11 100? out of danger. following additional elements shall be included in the H<sub>2</sub>S Contingency Plan: i. Detailed plans of action to alert and protect persons in the event of a release of a potentially hazardous volume of hydrogen sulfide, including instructions and procedures for alerting persons at risk and emergency response authorities in the event of a release of a potentially

hazardous volume of hydrogen sulfide;

ii. A call list including all the persons set forth in subsubparagraph E(5)(a)(ii), above, and the following:

aa. ambulance services;         bb. hospitals;         cc. county and city fire departments;         dd. doctors;         ee. contractors for supplemental or emergency equipment; and         ff. other public agencies as appropriate.         iii. A statement describing how emergency response actions will be         ordinated with the Division and the New Mexico State Police, consistent with the New Mexico         zardous Materials Emergency Response Plan (HMER);         iv. A plat or map detailing the area of exposure, including the locations
cc. county and city fire departments;         dd. doctors;         ee. contractors for supplemental or emergency equipment; and         ff. other public agencies as appropriate.         iii. A statement describing how emergency response actions will be         ordinated with the Division and the New Mexico State Police, consistent with the New Mexico         zardous Materials Emergency Response Plan (HMER);
dd. doctors;         ee. contractors for supplemental or emergency equipment; and         ff. other public agencies as appropriate.         iii. A statement describing how emergency response actions will be         ordinated with the Division and the New Mexico State Police, consistent with the New Mexico         zardous Materials Emergency Response Plan (HMER);
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zardous Materials Emergency Response Plan (HMER);
11. A plat of map dotating the area of exposure, morading the focutions
private dwellings or residences, public facilities such as schools, businesses, public roads or other
filar areas where the public may be reasonably expected to be present within the radius of exposure;
v. The names and telephone numbers of all persons living within the
lius of exposure of 100 ppm hydrogen sulfide and contact persons for each public area, such as
irches, schools, and businesses;
vi. Provisions for advance briefing of affected and responsible persons hin the radius of exposure. Such advance briefing shall include the hazards and characteristics of
drogen sulfide, the necessity for an $H_2S$ Contingency Plan, the possible sources of hydrogen sulfide
h the radius of exposure, instructions for reporting a gas leak, the manner in which persons will be
ified in the event of an emergency, and steps to be taken in an emergency; and
vii. Additional support information, if applicable, such as the location of
ergency evacuation routes, the location of safety and life support equipment, the location of hydrogen
fide containing facilities, the location of nearby telephones and/or other means of communication, and
cial instructions for conditions at a particular installation such as local terrain and the effect of various
ather conditions.
d. Additional Requirements. The Division may impose additional requirements
modify requirements based on site-specific conditions, population density or special circumstances.
6. Submission. When the $300$ ppm radius of exposure includes any public area, the H <sub>2</sub> S
ntingency Plan shall be submitted to the Division and Local Emergency Planning Committee.
herwise, H <sub>2</sub> S Contingency Plans shall not be submitted, but shall be maintained on file and provided to
7. Failure to Submit Plan. Failure to submit an H <sub>2</sub> S Contingency Plan when required
y result in denial of an Application to Drill, cancellation of an allowable or other appropriate
forcement action. 7
8. Annual Review, Amendment. An H <sub>2</sub> S Contingency Plan shall be reviewed on an
nual basis or earlier if activation of a plan reveals a deficiency. If the 300 ppm radius of exposure
ludes any public area, any amendments shall be submitted to the Division and the Local Emergency
unning Committee: otherwise, amendments shall not be submitted, but shall be maintained on file and
ovided to the Division upon request.
by ided to the Division upon request. 9. Retention and On-Site Inspection. An H <sub>2</sub> S Contingency Plan shall be refs. accessible intained on file at all times twhere? I and shall be available for inspection by the Division during
rmal business hours.
10. Activation Levels. An H <sub>2</sub> S Contingency Plan shall be activated in the event of a
ease of a potentially hazardous volume of H <sub>2</sub> S above the respective thresholds (i.e. 300 ppm radius at
y public road, 100 ppm radius at any public area, etc.) or if a sustained concentration of H <sub>2</sub> S exceeds 50
m at the property line of any facility, well or operation. [the 50 ppm threshold is not consistent with
e definition of potentially hazardous volume in C.6.a fawe're going to use this activation
eshold, shouldn't the definition of PHV be revised to include it? You could have a situation

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in the event of a release,

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where an operator, after testing, determines that a PHV is not present, but this requires "activation" of a plan that the operator is not even required to prepare ...]

F. Protection from Hydrogen Sulfide During Drilling, Workover and Servicing Operations.

1. API Standards. All drilling, completion, workover and well servicing operations shall be conducted with due consideration of the guidelines published by the American Petroleum Institute (API) entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Safe Drilling of Wells Containing Hydrogen Sulfide," RP-49, most recent edition.

2. Minimum Standards. At a minimum, and possibly in addition to the foregoing API standards, each drilling, completion, workover and well servicing operation shall also be conducted in accordance with the following:

a. Before Commencing Operations. An H<sub>2</sub>S Contingency Plan (where required) shall be completed before commencement of operations. In addition, hydrogen sulfide training shall be completed as required in sub-section H.(Personnel Protection and Training) and including all related safety equipment and warning systems shall be operational. [try and keep cross references to a minimum]

...

b. Egress Routes. Passable egress routes shall be maintained at all times during

operations.

c. Detection and Monitoring. Hydrogen sulfide detection and monitoring equipment shall be provided as follows:

i. Each drilling and completion site shall have hydrogen sulfide detection and monitoring that automatically activates visible and audible alarms when the ambient air concentration of hydrogen sulfide reaches 10 ppm. There shall be a sensing point 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.

ii. The detection system shall be calibrated and tested monthly. Each test of the hydrogen sulfide monitoring system shall be recorded on the driller's log or its equivalent. iii. For workover and well servicing operations, one operational sensing

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

iv. Hydrogen sulfide detection and monitoring equipment must be provided during drilling when drilling is within 500 feet of the zone anticipated to contain hydrogen sulfide and continuously thereafter through all subsequent drilling. Detection and monitoring equipment is not required for drilling from the surface to within 500 feet of the zone anticipated to contain hydrogen sulfide. [sommthing the language out to make it as clear as possible]

d. Wind Indicators and Signs.

i. Equipment to indicate wind direction shall be present and visible at all times. At least two devices to indicate wind direction shall be installed at separate elevations and visible from all principal working areas at all times.

ii. Danger or caution sign(s) shall be displayed along all accesses to the site. 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 approved by the Division. Each sign shall be painted with high visibility red, black and white, or yellow paint with black lettering. The sign(s) shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 300 feet from the well site and at a location which allows vehicles to turn around at a safe distance prior to reaching the site.

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

e. If Hydrogen Sulfide Encountered During Operations. If hydrogen sulfide was not anticipated at the time the APD was approved but is encountered during drilling in excess of 100 ppm in the gaseous mixture, the operator shall immediately ensure control of the well, suspend drilling

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operations (unless detrimental to well control), and obtain materials and safety equipment to bring the operations into compliance with this <u>Section Rule</u>. The operator shall notify the Division of the event and the mitigating steps that have or are being taken as soon as possible, but no later than 24 hours following discovery.

3. Operating Practices In Hydrogen Sulfide Concentrations of 100 ppm or Greater. Operating practices in areas known to contain a concentration of hydrogen sulfide gas of 100 ppm or greater in the gaseous mixture shall be subject to the following requirements:

a. If Hydrogen Sulfide Is Encountered During Use of Air, Gas, Mist or Other Non-Mud Circulating Media. If hydrogen sulfide gas in excess of 100 ppm is encountered while drilling with air, gas, mist or other non-mud circulating mediums for 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.

b. Flare System. For drilling and completion operations, a flare system shall be installed, unless exempted <u>pursuant to Subsection (V) of this Section</u>, to safely gather and burn hydrogen sulfide-bearing gas. Flare outlets shall be located as far from the well bore as feasible (but not less than 150 feet from the well). Flare lines shall be as straight as practical. The flare system shall be equipped with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall be provided supplemental fuel to maintain ignition. [Parallel references are always dangerous, but since the industry people are nervous about the ability to obtain exemptions, we should probably have this one]

c. Remote Controlled Choke.

i. A remote controlled choke shall be installed during drilling and during completion and well servicing operations when the 100-ppm  $H_2S$  ROE impacts a public area, unless exempted <u>pursuant to Subsection</u> (P) of this Section. [Parallel references are always dangerous, but since the industry people are nervous about the ability to obtain exemptions, we should probably have this one]

ii. A remote controlled valve may be used in lieu of use of a remote controlled choke, but only for completion operations.

iii. A remote controlled choke or remote controlled valve shall have, at a minimum, a pressure and hydrogen sulfide-rated well control choke and kill system including manifold and blowout preventer (hereinafter referred to as "BOP") pursuant to specifications API-16C and API-RP 53. The BOP stack shall have a least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced or other Division Rules, if more stringent. Variations to BOP stack arrangements may be granted by the Division for good cause shown.

d. Mud Program. A mud program, including de-gassing and flaring, capable of handling H<sub>2</sub>S conditions and well control shall be utilized.

e. Well Testing. Except with prior approval by the Division, the drill-stem testing shall be conducted only during daylight hours and formation fluids shall not be permitted to flow to the surface (closed chamber only). An operator shall notify the Division 24 hours in advance of a drill-stem test if an  $H_2S$  Contingency Plan is required pursuant to this Rule.

G. Protection from Hydrogen Sulfide at Producing Wells, Tank Batteries and Associated Production Facilities, Refineries, Gas Plants, and Compressor Stations.

1. American Petroleum Institute (API) Standards. Operations at producing wells, tank batteries and associated production facilities shall considered the guidelines published by the American Petroleum Institute (API) publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

2. Minimum Standards. At a minimum, and possibly in addition to the foregoing API standards, production from wells, operation of tank batteries and associated production equipment shall also be conducted in accordance with the following:

a. Gaseous Mixtures Containing 100 ppm or more. Producing wells containing 100 ppm or more of hydrogen sulfide in the gaseous mixture, tank batteries and associated production facilities at such sites, shall be subject to the following:

i.  $H_2S$  Contingency Plan. A determination must be made of the radius of exposure pursuant to this Rule and, if required based on the calculated radius of exposure, a  $H_2S$  Contingency Plan will also be required.

ii. Signage. A danger sign or signs shall be posted within 50 feet of each facility to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gate(s) shall suffice. Danger signs shall be posted at each flow line and gathering line on the well pad that contains hydrogen sulfide gas as specified in Subparagraph and the subparagraph we should refer to A sign shall be placed at each point where such a line crosses a public road. Each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number. THE signs. Fencing and gate(s) shall be required when producing wells,

associated tank batteries and associated production facilities are located within a 1/4 mile of a residence, school, church, park, playground, school bus stop, or place of business. The fence shall consist of a 5-foot chain link topped by two stands of barbed wire or other methods approved by the Division. Gate(s) shall be a be locked when unattended by the operator. [there's that "operator" word again]

iv. Wind Direction Indicators. Wind direction indicator(s) shall be required

at every facility (tank battery, water injection station, production satellite) where  $H_2S$  concentration in a gaseous state exceeds 100 PPM.

v. Secondary Well Control. Wells where the 100-ppm  $H_2S$  radius of exposure incorporates a public area 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.

vi. Automatic Safety Valve or Shutdown. If the 100-ppm radius of exposure involves a public area, an automatic safety valve or shutdown shall be installed at the facility or wellhead or other appropriate shut-in control shall be installed. The automatic safety valve shall be set to activate upon a release of a potentially hazardous volume of hydrogen sulfide.

b. Tanks or vessels containing 300 ppm or more of hydrogen sulfide in the gaseous mixture shall be subject to the following additional requirements:

1. Each stair or ladder leading to the top of any storage tank shall be chained and/or marked to restrict entry. For any tank battery that requires fencing pursuant to this Section, a danger sign posted at the gate(s) may be substituted for chaining and signage.

2. A danger sign shall be posted on or within 50 feet of any storage tank to alert persons of the potential hydrogen sulfide danger. For any storage tank for which fencing is required, a danger sign posted at the locked gates shall suffice. Each sign shall required. "DANGER: POISON GAS HYDROGEN SULFIDE."

3. Modification or Repair. The Division may require modification or repair of a producing well, associated tank battery or associated production facilities if the sustained ambient concentration of hydrogen sulfide is 1 ppm or greater at any public area.

4. Compliance Schedule. Each existing producing well and associated tank battery not currently meeting the requirements and minimum standards set forth herein shall be brought into compliance within one (1) year of the effective date of this Rule. Each producing well and tank battery constructed following the effective date of this Rule shall be designed, constructed and operated to meet the requirements set forth herein.

H. Personnel Protection and Training. All persons responsible for the implementation of any H<sub>2</sub>S Contingency Plan shall be provided training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.

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1. Standards for Equipment That May Be Exposed to Hydrogen Sulfide. Proper materials and/or appropriate protective measures for equipment exposed to/hydrogen sulfide shall be utilized. Records shall be retained and shall be made available to the Division upon request. The Division may require additional requirements on any facility that may pose a threat to public health and/or the environment.

J. Hydrogen Sulfide Injection. Injection of fluids containing hydrogen sulfide where the injection fluids are a gaseous mixture, or would be a gaseous mixture in the event of a release to the atmosphere, and where the 100 ppm radius of exposure includes any public area, excluding public roads, shall not be allowed unless first approved by the division after public hearing.

K. Exemptions. An exemption to the requirements of this Section may be granted by petitioning the Director. Any such petition shall provide specific information as to the circumstances that warrant approval of the variance requested and the proposed alternative methods by which the related requirements of this Section are to be satisfied. The Director, after considering all relevant factors, may approve an exemption if it is determined that the proposed alternative meets or exceeds the requirements of this Section and otherwise protects the health, safety and welfare of potentially affected persons.

L. Release. Upon a release of hydrogen sulfide the following actions must be taken:

1. Activation of the  $H_2S$  Contingency Plan. The  $H_2S$  Contingency Plan shall be activated immediately upon a  $H_2S$  release where the if there is potential exists to expose any public area to a concentration of  $H_2S$  greater than 100 ppm, or a concentration and  $H_2S$  concentration greater than 300 ppm  $H_2S$  at any public road, a concentration of  $H_2S$  greater than 100 ppm at three thousand (3000) feet from the well, facility or operation, or a concentration of  $H_2S$  greater than 50 ppm at the property line of any well, facility or operation. [same comments as before; we should probably deal with this in C.6 if appropriate]

2. Notification of the Division. Upon release of a hydrogen sulfide requiring activation of the  $H_2S$  Contingency Plan, the Division shall be notified as soon as practicable, preferably within one hour of the discovery of the release or as soon as possible in cases where recognizing that prompt response should supercede notification. A full report of the incident shall be submitted to the OCD on a C-141 form no later than fifteen (15) days following the incident. [clarity]

M. Additional Standards. The Division may require more stringent standards on a case-by-case basis than those set forth in this Section, or require corrective actions if necessary, to maintain control of a well or any other facility, or to safeguard public health or safety.

## 19.15.2. Hydrogen Sulfide Gas (Hydrogen Sulfide)

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A. In General. Hydrogen Sulfide Gas (known by its chemical abbreviation " $H_2S$ " or as "sulfurated hydrogen" or "hydrosulfuric acid") is a flammable, poisonous gas that occurs naturally as a component of crude petroleum and natural gas. The gas present secure threats to human health and canbe fatal in high concentrations. The gas has a distinct and characteristic odor of rotten eggs.

B. Applicability. This Section applies to any person, operator or facility subject to the jurisdiction of the Division, including, but not limited to, any person, operator or facility engaged in drilling, stimulating, completing, working over or producing any oil, natural gas or carbon dioxide well, or any person, operator or facility engaged in gathering, transporting, storing, processing, or refining of crude oil, natural gas or carbon dioxide.

C. Definitions (specific to this Section).

1. API. "API" means the American Petroleum Institute, 300 Corrigan Tower Building, allas, Texas, 75201.

2. Dispersion Technique. A "dispersion technique" is a mathematical representation of the physical and chemical transportation characteristics, dilution characteristics, and transformation characteristics of  $H_2S$  gas in the atmosphere.

3. Escape Rate. The "escape rate" is the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing  $H_2S$ . The escape rate is calculated using the maximum daily rate of the gaseous mixture produced or the best estimate thereof. For a natural gas well, the escape rate shall be calculated by using the current daily absolute open flow rate against atmospheric pressure. For an oil well, the escape rate shall be calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or best estimate thereof. For an oil or natural gas well drilled in an undeveloped area (a wildcat well), the escape rate may be determined by using offset wells completed in the interval(s) in question, or using some other reasonable means to calculate the escape rate. For facilities or operations not mentioned, the escape rate shall be calculated using the actual flow of gaseous mixture through the facility or operation.

4. LEPC. The acronym "LEPC" means the local emergency planning committee established pursuant to the Emergency Planning and Community Right-to-Know Act, 42 U.S. C. § 11001.

5. PPM. The abbreviation "ppm" means "parts per million."

6. Potentially Hazardous Volume (hereinafter referred to as a "potentially hazardous volume" or by the acronym "PHV") means the volume of hydrogen sulfide gas of such concentration that:

a. the 100 ppm radius of exposure includes any public area as defined herein (except for facilities directly involved in oil and gas production, such as producing oil and gas wells, pipelines, tank batteries, production equipment, gas plants, refineries);

b. the 300 ppm radius of exposure includes any public road; or

c. the 100 ppm radius of exposure is in excess of 3,000 feet.

7. Public Area. A "public area" is any dwelling, office, place of business, church, school, hospital, school bus stop, government building public road any portion of a park, city, town, village, or other similar populated area.

8. Public Road. A "public road" is any state, municipal or county road or highway, postal route or other public road. A public road is not a private road or a road whose access to members of the general public is restricted.

9. Radius of Exposure. The radius of exposure (hereinafter referred to as "radius of exposure" or "ROE") is an imaginary circle constructed around a point of escape where radius is calculated using the following Pasquill-Gifford derived equation, or by such other method(s) as may be approved by the Division:

a. For determining the 100-ppm radius of exposure where the hydrogen sulfide concentration in the gaseous mixture is less than 10 percent:  $X = [(1.589)(hydrogen sulfide concentration)(Q)]^{(0.625)}$ , or

b. For determining the 300-ppm radius of exposure where the hydrogen sulfide concentration in the gaseous mixture is less than 10 percent: X = [(0.77)(hydrogen sulfide)]concentration)(Q)](0.6258)

Where: X= radius of exposure in feet: hydrogen sulfide concentration = decimal equivalent of the mole or volume fractions of hydrogen sulfide in the gaseous mixture; Q= maximum volume of gas determined to be available for escape in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

c. For determining the 100 ppm or the 300 ppm radius of exposure in gaseous mixtures containing hydrogen sulfide concentrations of 10 percent or greater, a dispersion technique that takes into account representative wind speed, direction, atmospheric stability, complex terrain, and 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)."

d. Where multiple sources of hydrogen sulfide are present (e.g. wells, treatment equipment, flow lines, etc.), the radius of exposure may encompass a larger area than would otherwise be calculated using a radius of exposure computation for each component part.

e. For a well being drilled in an area where insufficient data exits to calculate a radius of exposure, but where hydrogen sulfide could reasonably be expected to be present in concentrations in excess of 100 ppm in the gaseous mixture, a 100 ppm radius of exposure equal to 3,000 feet shall be assumed.

D. Determination of Hydrogen Sulfide Risk.

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1. Determination of Hydrogen Sulfide Concentration.

a. Each person, operator or facility to which this Section applies shall determine the hydrogen sulfide concentration within its operations or systems. A representative sample for each system or operation may be used for testing provided that the person, operator or facility can demonstrate that the concentration derived from a test of the representative sample is reasonably representative of the hydrogen sulfide concentration within the operation or system.

b. Tests shall be conducted in accordance with applicable ASTM and GPA standards or by other methods approved by the Division.

2. Tested Concentrations Below 100 ppm. If the testing described in the previous Paragraph determines that the hydrogen sulfide concentration in a given operation or system is less than 100 ppm, no further actions are required pursuant to this Section.

3. Tested Concentrations Above 100 ppm; Calculation of the Radius of Exposure.

a. If the testing described in Paragraph 1 of this Subsection determines that the concentration of hydrogen sulfide in a gaseous mixture is 100 ppm or greater, then the person, operator or facility must calculate the radius of exposure pursuant to this Section.

b. The person, operator or facility shall provide the results of all radius of exposure determinations to the Division within 180 days of commencing operations or, for existing facilities, within 180 days of the effective date of this Section. The Division may disapprove the test methodology and require additional testing if the test methodology did not conform to the requirements of 4. Recalculation. If operational or production alterations are made that result in a 25% or this Section

greater increase in the hydrogen sulfide concentration in a given operation or facility, new testing shall be conducted and the radius of exposure shall be recalculated and the results submitted to the Division and retained. If AD public and public was of in excess of 3000-E. H2S Contingency Plan. E. H<sub>2</sub>S Contingency Plan.

1. In General. The H<sub>2</sub>S Contingency Plan is a written document that provides a plan of action which will be used to alert and protect persons at risk in the event of a potentially significant release of hydrogen sulfide gas.

t be proper 2. When Required. An H<sub>2</sub>S Contingency Plan must be prepared whenever a potentially hazardous volume of hydrogen sulfide is present.

3. Submission. An H<sub>2</sub>S Contingency Plan must be submitted to the Division, and may be submitted separately or along with the Application for Permitto Drill (APD).

4. Input From Emergency Response Authorities and the Division. The  $H_2S$ Contingency Plan shall be developed with input from the Division, the New Mexico Department of Public Safety (and/or as appropriate the New Mexico State police), and the Local Emergency Planning Committee, except that where the 300 ppm radius of exposure encompasses any public road, input shall also be sought from the county sheriff and (as applicable) the city (municipal) police, and where the 100 ppm radius of exposure encompasses a public area, input shall also be sought from police and fire departments near the well, operation or facility. The  $H_2S$  Contingency shall identify the agency from which input was received pursuant to this paragraph, identify the person at the agency contacted (with telephone number) and briefly describe the nature of the input provided.

5. Elements. The H<sub>2</sub>S Contingency Plan will consist of different elements depending on the risks present.

a. Elements Required for Each Plan:

i. A detailed description of each Action to be taken in the event of a release of a potentially hazardous volume of hydrogen sulfide;

ii. A call list including the following as applicable:

- aa. local supervisory personnel;
- bb. county sheriff;
- cc. the Department of Public Safety and State Police;
- dd. city (municipal) police;
- ee. the appropriate Division district office; and
- ff. other public agencies as appropriate.
- iii. A plat or map detailing the area within the radius of exposure; and

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iv. A list of the names and telephone numbers of all personnel to be

contacted when a release is reported or suspected.

b. Where the 300 ppm radius of exposure encompasses any public road, the following additional elements shall be included in the  $H_2S$  Contingency Plan:

i. Instructions and procedures for alerting and coordinating with emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide at any public road;

ii. A plat or map detailing the area of exposure, including the locations of public roads within the radius of exposure;

iii. A plan to divert traffic and safely get existing traffic off the road and out of danger.

c. Where the 100 ppm radius of exposure encompasses any public area, the following additional elements shall be included in the  $H_2S$  Contingency Plan:

i. Detailed plans of action to alert and protect persons in the event of a release of a potentially hazardous volume of hydrogen sulfide, including instructions and procedures for alerting persons at risk and emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide;

ii. A call list including all the persons set forth in subsubparagraph E(5)(a)(ii), above, and the following:

- aa. ambulance services;
- bb. hospitals;
- cc. county and city fire departments;
- dd. doctors;
- ee. contractors for supplemental or emergency equipment; and
- ff. other public agencies as appropriate.

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iii. A statement describing how emergency response actions will be coordinated with the Division and the New Mexico State Police, consistent with the New Mexico Hazardous Materials Emergency Response Plan (HMER);

iv. A plat or map detailing the area of exposure, including the locations of private dwellings or residences, public facilities such as schools, businesses, public roads or other similar areas where the public may be reasonably expected to be present within the radius of exposure;

v. The names and telephone numbers of all persons living within the radius of exposure of 100 ppm hydrogen sulfide and contact persons for each public area, such as churches, schools, and businesses;

vi. Provisions for advance briefing of affected and responsible persons within the radius of exposure. Such advance briefing shall include the hazards and characteristics of hydrogen sulfide, the necessity for an H<sub>2</sub>S Contingency Plan, the possible sources of hydrogen sulfide with the radius of exposure, instructions for reporting a gas leak, the manner in which persons will be notified in the event of an emergency, and steps to be taken in an emergency; and

vii. Additional support information, if applicable, such as the location of emergency evacuation routes, the location of safety and life support equipment, the location of hydrogen sulfide containing facilities, the location of nearby telephones and/or other means of communication, and special instructions for conditions at a particular installation such as local terrain and the effect of various weather conditions.

d. Additional Requirements. The Division may impose additional requirements or modify requirements based on site-specific conditions, population density or special circumstances.

Otherwise,  $H_2S$  Contingency Plans shall not be submitted, but shall be reasonably accessible in the event of a release, maintained on file and provided to the Division upon request 6. Submission. When the 100 ppm radius of exposure includes any public area, the H<sub>2</sub>S

7. Failure to Submit Plan. Failure to submit an H<sub>2</sub>S Contingency Plan when required may result in denial of an Application to Drill, cancellation of an allowable or other appropriate enforcement action.

8. Annual Review, Amendment. An H<sub>2</sub>S Contingency Plan shall be reviewed on an annual basis or earlier if activation of a plan reveals a deficiency. If the 100 ppm radius of exposure includes any public area, any amendments shall be submitted to the Division and the Local Emergency Planning Committee; otherwise, amendments shall not be submitted, but shall be maintained on file and provided to the Division upon request.

9. Retention and On-Site Inspection. An H<sub>2</sub>S Contingency Plan shall be reasonably accessible in the event of a release and maintained on file at all times and shall be available for inspection by the Division during normal business hours.

10. Activation Levels. An H<sub>2</sub>S Contingency Plan shall be activated in the event of a release of a potentially hazardous volume of H<sub>2</sub>S above the respective thresholds (i.e. 300 ppm radius at any public road, 100 ppm radius at any public area, etc.) or if a sustained concentration of H<sub>2</sub>S exceeds 50 ppm at the property line of any facility, well or operation.

F. Protection from Hydrogen Sulfide During Drilling, Workover and Servicing Operations.

1. API Standards. All drilling, completion, workover and well servicing operations shall be conducted with due consideration of the guidelines published by the American Petroleum Institute (API) entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Safe Drilling of Wells Containing Hydrogen Sulfide," RP-49, most recent edition.

2. Minimum Standards. At a minimum, and possibly in addition to the foregoing API standards, each drilling, completion, workover and well servicing operation shall also be conducted in accordance with the following:

[]

a. Before Commencing Operations. An H<sub>2</sub>S Contingency Plan (where required) shall be completed before commencement of operations. In addition, hydrogen sulfide training shall be completed and all related safety equipment and warning systems shall be operational.

b. Egress Routes. Passable egress routes shall be maintained at all times during operations.

c. Detection and Monitoring. Hydrogen sulfide detection and monitoring equipment shall be provided as follows:

i. Each drilling and completion site shall have hydrogen sulfide detection and monitoring that automatically activates visible and audible alarms when the ambient air concentration of hydrogen sulfide reaches 10 ppm. There shall be a sensing point 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.

ii. The detection system shall be calibrated and tested monthly. Each test of the hydrogen sulfide monitoring system shall be recorded on the driller's log or its equivalent.

iii. For workover and well servicing operations, one operational sensing point shall be located as close to the well bore as practical. Additional sensing points may be necessary for large and/or long-term operations.

iv. Hydrogen sulfide detection and monitoring equipment must be provided during drilling when drilling is within 500 feet of the zone anticipated to contain hydrogen sulfide and continuously thereafter through all subsequent drilling. Detection and monitoring equipment is not required for drilling from the surface to within 500 feet of the zone anticipated to contain hydrogen sulfide.

d. Wind Indicators and Signs.

i. Equipment to indicate wind direction shall be present and visible at all times. At least two devices to indicate wind direction shall be installed at separate elevations and visible from all principal working areas at all times.

ii. Danger or caution sign(s) shall be displayed along all accesses to the site. 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 approved by the Division. Each sign shall be painted with high visibility red, black and white, or yellow paint-with black-lettering. The sign(s) shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 300 feet from the well site and at a location which allows vehicles to turn around at a safe distance prior to reaching the site.

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

e. If Hydrogen Sulfide Encountered During Operations. If hydrogen sulfide was not anticipated at the time the APD was approved but is encountered during drilling in excess of 100 ppm in the gaseous mixture, the operator shall immediately ensure control of the well, suspend drilling operations (unless detrimental to well control), and obtain materials and safety equipment to bring the operations into compliance with this Section. The operator shall notify the Division of the event and the mitigating steps that have or are being taken as soon as possible, but no later than 24 hours following discovery.

3. Operating Practices In Hydrogen Sulfide Concentrations of 100 ppm or Greater. Operating practices in areas known to contain a concentration of hydrogen sulfide gas of 100 ppm or greater in the gaseous mixture shall be subject to the following requirements:

a. If Hydrogen Sulfide Is Encountered During Use of Air, Gas, Mist or Other Non-Mud Circulating Media. If hydrogen sulfide gas in excess of 100 ppm is encountered while drilling with air, gas, mist or other non-mud circulating mediums for 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. b. Flare System. For drilling and completion operations, a flare system shall be installed to safely gather and burn hydrogen sulfide-bearing gas, unless exempted pursuant to Subsection K. of this Section. Flare outlets shall be located as far from the well bore as feasible (but not less than 150 feet from the well). Flare lines shall be as straight as practical. The flare system shall be equipped with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall be provided supplemental fuel to maintain ignition.

c. Remote Controlled Choke.

i. A remote controlled choke shall be installed during drilling and during completion and well servicing operations when the 100-ppm  $H_2S$  radius of exposure includes a public area, unless exempted pursuant to Subsection K. of this Section.

ii. A remote controlled valve may be used in lieu of use of a remote controlled choke, but only for completion operations.

iii. A remote controlled choke or remote controlled valve shall have, at a minimum, a pressure and hydrogen sulfide-rated well control choke and kill system including manifold and blowout preventer (hereinafter referred to as "BOP") pursuant to specifications API-16C and API-RP 53. The BOP stack shall have at least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced or other Division Rules, if more stringent. Variations to BOP stack arrangements may be granted by the Division for good cause shown.

d. Mud Program. A mud program, including de-gassing and flaring, capable of handling  $H_2S$  conditions and well control shall be utilized.

e. Well Testing. Except with prior approval by the Division, the drill-stem testing shall be conducted only during daylight hours and formation fluids shall not be permitted to flow to the surface (closed chamber only). An operator shall notify the Division 24 hours in advance of a drill-stem test if an  $H_2S$  Contingency Plan is required pursuant to this Section.

G. Protection from Hydrogen Sulfide at Producing Wells, Tank Batteries and Associated Production Facilities, Refineries, Gas Plants, and Compressor Stations.

1. American Petroleum Institute (API) Standards. Operations at producing wells, tank batteries and associated production facilities shall conducted according to the guidelines published by the American Petroleum Institute (API) in its\_publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55 datest edition.

2. Minimum Standards. At a minimum, production from wells, operation of tank batteries and associated production equipment shall also be conducted in accordance with the following. Where API standards referred to in the previous paragraph are less stringent than the following, the more stringent standards shall apply.

a. Gaseous Mixtures Containing 100 ppm or more. Producing wells containing 100 ppm or more of hydrogen sulfide in the gaseous mixture, tank batteries and associated production facilities at such sites, shall be subject to the following:

i.  $H_2S$  Contingency Plan. A determination must be made of the radius of exposure pursuant to this Section and, if required based on the calculated radius of exposure, a  $H_2S$  Contingency Plan will also be required.

ii. Signage. A danger sign or signs shall be posted within 50 feet of each facility to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gate(s) shall suffice. Danger signs shall be posted at each flow line and gathering line on the well pad that contains hydrogen sulfide gas. The sign(s) shall read "DANGER - POISON GAS - HYDROGEN SULFIDE" or equivalent language approved by the Division. Each sign shall be painted with high visibility red, black and white, or yellow paint with black lettering. The sign(s) shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 300 feet from the well site and at a location which allows vehicles to turn around at a safe distance prior to reaching the site. A sign shall be placed at each point where a flow line or gathering

line crosses a public road. Each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

iii. Fencing. Fencing and gate(s) shall be required when producing wells, associated tank batteries and associated production facilities are located within a 1(4-mile of a residence, school, church, park, playground, school bus stop, or place of business. The fence shall consist of a 5-foot chain link topped by two stands of barbed wire or other methods approved by the Division. Gate(s) shall be locked when unattended.

iv. Wind Direction Indicators. Wind direction indicator(s) shall be required at every facility (tank battery, water injection station, production satellite) where  $H_2S$  concentration in a gaseous state exceeds 100 PPM.

v. Secondary Well Control. Wells where the 100-ppm  $H_2S$  radius of exposure incorporates a public area 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.

vi. Automatic Safety Valve or Shutdown. If the 100-ppm radius of exposure involves a public area, an automatic safety valve or shutdown shall be installed at the facility or wellhead or other appropriate shut-in control shall be installed. The automatic safety valve shall be set to activate upon a release of a potentially hazardous volume of hydrogen sulfide.

b. Tanks or vessels containing 300 ppm or more of hydrogen sulfide in the gaseous mixture shall be subject to the following additional requirements:

1. Each stair or ladder leading to the top of any storage tank shall be chained and/or marked to restrict entry. For any tank battery that requires fencing pursuant to this Section, a danger sign posted at the gate(s) may be substituted for chaining and signage.

2. A danger sign shall be posted on or within 50 feet of any storage tank to alert persons of the potential hydrogen sulfide danger. For any storage tank for which fencing is required, a danger sign posted at the locked gates shall suffice. The sign(s) shall read "DANGER - POISON GAS - HYDROGEN SULFIDE" or equivalent language approved by the Division. Each sign shall be painted with high visibility red, black and white, or yellow paint with black lettering. The sign(s) shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 300 feet from the well site and at a location which allows vehicles to turn around at a safe distance prior to reaching the site.

3. Modification of Repair. The Division may require modification or repair of a producing well, associated tank battery or associated production facilities if the sustained ambient concentration of hydrogen sulfiders 1 ppm or greater at any public area

4. Compliance Schedule. Each existing producing well and associated tank battery not currently meeting the requirements and minimum standards set forth herein shall be brought into compliance within one (1) year of the effective date of this Section. Each producing well and tank battery constructed following the effective date of this Section shall be designed, constructed and operated to meet the requirements set forth herein.

H. Personnel Protection and Training. All persons responsible for the implementation of any H<sub>2</sub>S Contingency Plan shall be provided training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.

I. Standards for Equipment That May Be Exposed to Hydrogen Sulfide. All equipment shall be chosen with consideration for both the  $H_2S$  working environment and anticipated stresses. NACE Standard MR-01-75 latest edition shall be used for metallic equipment selection or, if applicable, adequate protection by chemical inhibition or other methods that controls or limits the corrosive effects of  $H_2S$  shall be used.

J. Hydrogen Sulfide Injection. Injection of fluids containing hydrogen sulfide where the injection fluids are a gaseous mixture, or would be a gaseous mixture in the event of a release to the atmosphere, and where the 100 ppm radius of exposure from the injection point\_includes any public area, excluding public roads, shall not be allowed unless first approved by the division after public hearing.

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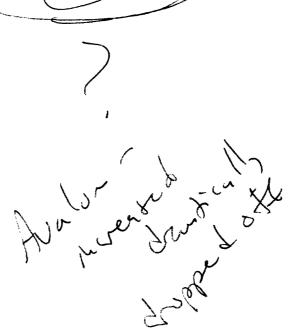
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K. Exemptions. An exemption to the requirements of this Section may be granted by petitioning the Director. Any such petition shall provide specific information as to the circumstances that warrant approval of the exemption requested and the proposed alternative methods by which the <u>requirements of this Section are to be satisfied</u>. The Director, after considering all relevant factors, may approve an exemption if it is determined that the proposed alternative meets or exceeds the requirements of this Section and otherwise protects the healty, safety and welfare of potentially affected persons. L. Release. Upon a release of hydrogen sulfide the following actions must be taken:

1. Activation of the  $H_2S$  Contingency Plan. The  $H_2S$  Contingency Plan shall be activated immediately upon a  $H_2S$  release where the potential exists for exposure to a potentially hazardous volume of  $H_2S$ , or where a concentration of  $H_2S$  greater than 50 ppm exists at the property line of any well, facility or operation.

2. Notification of the Division. Upon release of hydrogen sulfide requiring activation of the  $H_2S$  Contingency Plan, the Division shall be notified as soon as practicable, preferably within one hour of discovery of the release or as soon as possible in cases where prompt response should supercede notification. A full report of the incident shall be submitted to the Division on Form C-141 no later than fifteen (15) days following the release.

M. Additional Standards. The Division may require more stringent standards on a case-by-case basis than those set forth in this Section, or require corrective action if necessary, to maintain control of a well or any other facility, or to safeguard public health or safety.



I'm assuming Sally will format this to meet state Records requirements:

19.15.2. / Hydrogen Sulfide Gas (Hydrogen Sulfide)

OBJECTIVE ?

A. In General. Hydrogen Sulfide Gas (known by its chemical abbreviation " $H_2S$ " or as "sulfurated hydrogen" or "hydrosulfuric acid") is a flammable, poisonous gas that occurs naturally as a component of crude petroleum and natural gas. The gas presents severe threats to human health and can be fatal in high concentrations. The gas has a distinct and characteristic odor of rotten eggs.

B. Applicability. This Section applies to any person, operator or facility subject to the jurisdiction of the Division, including, but not limited to, any person, operator or facility engaged in drilling, stimulating, completing, working over or producing any oil, natural gas or carbon dioxide well, or any person, operator or facility engaged in gathering, transporting, storing, processing, or refining of crude oil, natural gas or carbon dioxide.

C. Definitions (specific to this Rule).

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1. API. "API" means the American Petroleum Institute, 300 Corrigan Tower Building, Dallas, Texas, 75201.

2. Dispersion Technique. A "dispersion technique" is a mathematical representation of the physical and chemical transportation characteristics, dilution characteristics, and transformation characteristics of hydrogen sulfide gas in the atmosphere.

3. Escape Rate. The "escape rate" is the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing hydrogen sulfide. The escape rate is calculated using the maximum daily rate of the gaseous mixture produced or the best estimate thereof. For a natural gas well, the escape rate shall be calculated by using the current daily absolute open flow rate against atmospheric pressure. For an oil well, the escape rate shall be calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or best estimate thereof. For an oil or natural gas well drilled in an undeveloped area (a wildcat well), the escape rate may be determined by using offset wells completed in the interval(s) in question, or using some other reasonable means to calculate the escape rate. For facilities or operations not mentioned, the escape rate shall be calculated using the actual flow of gaseous mixture through the facility or operation.

4. LEPC. The acronym "LEPC" means the local emergency planning committee established pursuant to the Emergency Planning and Community Right-to-Know Act, 42 U.S. C. § 11001.

5. PPM. The abbreviation "ppm" means "parts per million."

6. Potentially Hazardous Volume (hereinafter referred to as a "potentially hazardous volume" or by the acronym "PHV") means the volume of hydrogen sulfide gas of such concentration that:

a. the 100 ppm radius of exposure includes any public area as defined herein, except for facilities directly involved in oil and gas production, such as producing oil and gas wells, pipelines, tank batteries, production equipment, gas plants, refineries);

b. the 300 ppm radius of exposure includes any public road; or

c. the 100 ppm radius of exposure is in excess of 3,000 feet.

7. Public Area. A "public area" is any dwelling; office; place of business; church; school; hospital; school bus stop; government building; public road; any portion of a park, city, town, village, or similar area where members of the public can reasonably be expected to be present.

8. Public Road. A "public road" is any state, municipal or county road or highway, postal route or other public road. A public road is not a private road or a road whose access to members of the general public is restricted.

9. Radius of Exposure. The radius of exposure (hereinafter referred to as "radius of exposure" or "ROE") is an imaginary circle constructed around a point of escape whose radius is calculated using the following Pasquill-Gifford derived equation, or by such other method(s) as may be approved by the Division:

a. For determining the 100-ppm radius of exposure where the hydrogen sulfide concentration in the gaseous mixture is less than 10 percent:  $X = [(1.589)(hydrogen sulfide concentration)(Q)]^{(0.625)}$ , or

b. For determining the 300-ppm radius of exposure where the hydrogen sulfide what concentration in the gaseous mixture is less than 10 percent: X=[(0.7700)(hydrogen sulfide concentration)(Q)]<sup>(0.6258)</sup>

Where: X= radius of exposure in feet: hydrogen sulfide concentration = decimal equivalent of the mole or volume fractions of hydrogen sulfide in the gaseous mixture; Q= maximum volume of gas determined to be available for escape in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

c. For determining the 100 ppm or the 300 ppm radius of exposure in gaseous mixtures containing hydrogen sulfide concentrations of 10 percent or greater, a dispersion technique that takes into account representative wind speed, direction, atmospheric stability, complex terrain, and 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)." Ρ 6

d. Where multiple sources of hydrogen sulfide are present (e.g. wells, treatment equipment, flow lines, etc.), the radius of exposure may encompass a larger area than would otherwise be calculated using a radius of exposure computation for each component part.

e. For a well being drilled in an area where insufficient data exits to calculate a radius of exposure, but where hydrogen sulfide could reasonably be expected to be present in concentrations in excess of 100 ppm in the gaseous mixture, a 100 ppm radius of exposure equal to 3,000 D. Determination of Hydrogen Sulfide Risk. feet shall be assumed.

1. Determination of Hydrogen Sulfide Concentration.

a. Each person, operator or facility to which this Section applies shall determine the hydrogen sulfide concentration within the operation or system. A representative sample for each system or operation may be used for testing provided that the person, operator or facility can demonstrate that the concentration derived from a test of the representative sample is reasonably representative of the hydrogen sulfide concentration within the operation or system. what

b. Tests shall be conducted in accordance with applicable ASTM and GPA standards or by other methods approved by the Division.

2. Tested Concentrations Below 100 ppm. If the testing described in the previous Paragraph determines that the hydrogen sulfide concentration in a given operation or system is less than 100 ppm, no further actions are required pursuant to this Section.

3. Tested Concentrations Above 100 ppm; Calculation of the Radius of Exposure.

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a. If the testing described in Paragraph 1 of this Subsection determines that the concentration of hydrogen sulfide in a gaseous mixture is 100 ppm or greater, then the person, operator or facility must calculate the radius of exposure pursuant to this Section.

b. The person, operator or facility shall provide the results of all radius of exposure determinations to the pivision within 180 days of commencing operations or, for existing facilities, within 180 days of the effective date of this Section. The Division may disapprove the test methodology and require additional testing if the test methodology did not conform to the requirements of 4. Recalculation. If operational or production alterations are made that result in a 25% or this Section.

greater increase in the hydrogen sulfide concentration in a given operation or facility, hew testing shall be conducted and the radius of exposure shall be recalculated and the results submitted to the Division and retained - way the results of the re -lewercase

 $H_2S$  Contingency Plan.

1. In General. The H<sub>2</sub>S  $\mathcal{C}$  ontingency  $\mathbf{P}$  lan is a written document that provides a plan of action which will be used to alert and protect persons at risk in the event of a potentially significant release of hydrogen sulfide gas.

2. When Required. An H<sub>2</sub>S  $\mathcal{Q}$  ontingency  $\mathcal{P}$  lan must be prepared whenever a potentially hazardous volume of hydrogen sulfide is present. Charles and the stand of the stand

H2S Know Submission. An H<sub>2</sub>S Contingency Plan must be submitted to the Division, and may be submitted separately or along with the Application for Permit to Prill (APD).

4. Input From Emergency Response Authorities and the Division. The  $H_2S$ Contingency Plan shall be developed with input from the Division, the New Mexico Bepartment of Jublic Safety, (and/or as appropriate the New Mexico State police), and the Local Emergency Planning Committee, except that where the 300 ppm radius of exposure encompasses any public road, input shall also be sought from the county sheriff and (as applicable) the city (municipal) police, and except that where the 100 ppm radius of exposure encompasses a public area, input shall also be sought from police and fire departments near the well, operation or facility.

5. Elements. The H<sub>2</sub>S Contingency Plan will consist of different elements depending on the risks present.

a. Elements Required for Each Plan:

i. A detailed description of each Action to be taken in the event of a release of a potentially hazardous volume of hydrogen sulfide;

ii. A call list including the following as applicable:

aa. local supervisory personnel;

bb. county sheriff;

cc. the Department of Public Safety and State Police;

dd. city (municipal) police;

ee. the appropriate Division district office; and

ff. other public agencies as appropriate.

iii. A plat or map detailing the area within the radius of exposure; and

iv. A list of the names and telephone numbers of all personnel to be contacted when a release is reported or suspected.

b. Where the 300 ppm radius of exposure encompasses any public road, the  $\rho$ following additional elements shall be included in the H<sub>2</sub>S Contingency Plan:

i. Instructions and procedures for alerting and coordinating with emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide at any public road;

ii. A plat or map detailing the area of exposure, including the locations of public roads within the radius of exposure;

iii. A plan to divert traffic and safely get existing traffic off the road and

c. Where the 300 ppm radius of exposure encompasses any public area, the

following additional elements shall be included in the H<sub>2</sub>S Contingency Plan: i. Detailed plans of action to alert and protect persons in the event of a release of a potentially hazardous volume of hydrogen sulfide, including instructions and procedures for

out of danger.

alerting persons at risk and emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide;

ii. A call list including all the persons set forth in subsubparagraph E(5)(a)(ii), above, and the following:

aa. ambulance services;

bb. hospitals;

cc. county and city fire departments;

dd. doctors:

ee. contractors for supplemental or emergency equipment; and

ff. other public agencies as appropriate.

iii. A statement describing how emergency response actions will be coordinated with the Division and the New Mexico State Police, consistent with the New Mexico Hazardous Materials Emergency Response Plan (HMER); n

iv. A plat or map detailing the area of exposure, including the locations of private dwellings or residences, public facilities such as schools, businesses, public roads or other similar areas where the public may be reasonably expected to be present within the radius of exposure;

v. The names and telephone numbers of all persons living within the radius of exposure of 100 ppm hydrogen sulfide and contact persons for each public area, such as -7 churches, schools/and businesses;

vi. Provisions for advance briefing of affected and responsible persons within the radius of exposure. Such advance briefing shall include the hazards and characteristics of hydrogen sulfide, the necessity for an H<sub>2</sub>S Contingency  $\mathcal{P}$  lan, the possible sources of hydrogen sulfide with the radius of exposure, instructions for reporting a gas leak, the manner in which persons will be , notified in the event of an emergency, and steps to be taken in an emergency; and

vii. Additional support information, if applicable, such as the location of emergency evacuation routes, the location of safety and life support equipment, the location of hydrogen sulfide containing facilities, the location of nearby telephones-and/or other means of communication, and special instructions for conditions at a particular installation such as local terrain and the effect of various weather conditions.

d. Additional Requirements. The **Q**ivision may impose additional requirements or modify requirements based on site-specific conditions, population density or special circumstances.  $_{..}6$ . Submission. When the 300 ppm radius of exposure includes any public area, the H<sub>2</sub>S Contingency Plan shall be submitted to the Division and Local Emergency Planning Committee. Otherwise,  $H_2S \not C$  ontingency Plans shall not be submitted, but shall be maintained on file and provided to the Division upon request.

7. Failure to Submit Plan. Failure to submit an  $H_2S \mathscr{D}$  ontingency Plan when required may result in denial of an Application to Prill, cancellation of an allowable or other appropriate, the enforcement action.

8. Annual Review, Amendment. An H2S Contingency Plan shall be reviewed on an annual basis or earlier if activation of a plan reveals a deficiency. If the 300 ppm radius of exposure includes any public area, any amendments shall be submitted to the Division and the Local Emergency

Planning Committee; otherwise, amendments shall be submitted to the Division and the Local Emergency Planning Committee; otherwise, amendments shall not be submitted, but shall be maintained on file and provided to the Division upon request. The person operation of facely where and the person operation of the shall be maintained on file at all times and shall be available for inspection by the Division during normal and business hours. The person, operation of the person of

release of a potentially hazardous volume of  $H_2S$  above the respective thresholds (i.e. 300 ppm radius at any public road, 100 ppm radius at any public area, etc.) or if a sustained concentration of  $H_2S$  exceeds 50 ppm at the property line of any facility, well or operation.

F. Protection from Hydrogen Sulfide During Drilling, Workover and Servicing Operations.

1. API Standards. All drilling, completion, workover and well servicing operations shall be conducted with due consideration of the guidelines published by the American Petroleum Institute (API) entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Safe Drilling of Wells Containing Hydrogen Sulfide," RP-49, most recent edition.

2. Minimum Standards. At a minimum, and possibly in addition to the foregoing API standards, each drilling, completion, workover and well servicing operation shall also be conducted in accordance with the following:

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b. Egress Routes. Passable egress routes shall be maintained at all times during

operations.

The person, operator or facility shall maintain

equipment shall be provided as follows:

c. Detection and Monitoring. Hydrogen sulfide detection and monitoring ided as follows: i. Each drilling and completion site about 3 that automatically active detection and monitoring that automatically activates visible and audible alarms when the ambient air concentration of hydrogen sulfide reaches 10 ppm. There shall be a sensing point 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.

ii. The detection system shall be calibrated and tested monthly. Each test of the hydrogen sulfide monitoring system shall be recorded on the driller's log or its equivalent.

iii. For workover and well servicing operations, one operational sensing point shall be located as close to the well bore as practical. Additional sensing points may be necessary for large and/or long-term operations.

iv. Hydrogen sulfide detection and monitoring equipment must be provided during drilling when drilling is within 500 feet of the zone anticipated to contain hydrogen sulfide and continuously thereafter through all subsequent drilling. Detection and monitoring equipment is not required for drilling from the surface to within 500 feet of the zone anticipated to contain hydrogen sulfide.

d. Wind Indicators and Signs.

i. Equipment to indicate wind direction shall be present and visible at all times. At least two devices to indicate wind direction shall be installed at separate elevations and visible from all principal working areas at all times.

ii. Danger or caution sign(s) shall be displayed along all accesses to the site. 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 approved by the Division. Each sign shall be painted with high visibility red, black and white, or yellow paint with black lettering. The sign(s) shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 300 feet from the well site and at a location which allows vehicles to turn around at a safe distance prior to reaching the site.

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

e. If Hydrogen Sulfide Encountered During Operations. If hydrogen sulfide was not anticipated at the time the APD was approved but is encountered during drilling in excess of 100 ppm in the gaseous mixture, the operator shall immediately ensure control of the well, suspend drilling operations (unless detrimental to well control), and obtain materials and safety equipment to bring the operations into compliance with this Section. The operator shall notify the **\$\vec{V}\$** ivision of the event and the mitigating steps that have or are being taken as soon as possible, but no later than 24 hours following discovery.

3. Operating Practices In Hydrogen Sulfide Concentrations of 100 ppm or Greater. Operating practices in areas known to contain a concentration of hydrogen sulfide gas of 100 ppm or greater in the gaseous mixture shall be subject to the following requirements:

a. If Hydrogen Sulfide Is Encountered During Use of Air, Gas, Mist or Other Non-Mud Circulating Media. If hydrogen sulfide gas in excess of 100 ppm is encountered while drilling with air, gas, mist or other non-mud circulating mediums for 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. b. Flare System. For drilling and completion operations, a flare system shall be

installed, unless exempted pursuant to Subsection L. of this Section, to safely gather and burn hydrogen sulfide-bearing gas. Flare outlets shall be located as far from the well bore as feasible (but not less than 150 feet from the well). Flare lines shall be as straight as practical. The flare system shall be equipped with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall be provided supplemental fuel to maintain ignition.

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c. Remote Controlled Choke.

i. A remote controlled choke shall be installed during drilling and during completion and well servicing operations when the 100-ppm  $H_2S$  ROE impacts a public area, unless exempted pursuant to Subsection L of this Section.

ii. A remote controlled valve may be used in lieu of use of a remote controlled choke, but only for completion operations.

iii. A remote controlled choke or remote controlled valve shall have, at a minimum, a pressure and hydrogen sulfide-rated well control choke and kill system including manifold and blowout preventer (hereinafter referred to as "BOP") pursuant to specifications API-16C and API-RP 53. The BOP stack shall have a least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced or other Division Rules, if more stringent. Variations to BOP stack arrangements may be granted by the Division for good cause shown.

d. Mud Program. A mud program, including de-gassing and flaring, capable of handling  $H_2S$  conditions and well control shall be utilized.  $\forall s \approx 1$ .

e. Well Testing. Except with prior approval by the Division, the drill-stem testing shall be conducted only during daylight hours and formation fluids shall not be permitted to flow to the surface (closed chamber only). An operator shall notify the Division 24 hours in advance of a drill-stem test if an H<sub>2</sub>S Q ontingency Plan is required pursuant to this Rule.

G. Protection from Hydrogen Sulfide at Producing Wells, Tank Batteries and Associated Production Facilities, Refineries, Gas Plants, and Compressor Stations.

 American Petroleum Institute (API) Standards. Operations at producing wells, tank batteries and associated production facilities shall considered the guidelines published by the American Petroleum Institute (API) publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

2. Minimum Standards. At a minimum, and possibly in addition to the foregoing API standards, production from wells, operation of tank batteries and associated production equipment shall also be conducted in accordance with the following:

a. Gaseous Mixtures Containing 100 ppm or more. Producing wells containing 100 ppm or more of hydrogen sulfide in the gaseous mixture, tank batteries and associated production facilities at such sites, shall be subject to the following:

 $\hat{r}$  i. H<sub>2</sub>S Contingency Plan. A determination must be made of the radius of exposure pursuant to this Kule and, if required based on the calculated radius of exposure, a H<sub>2</sub>S  $\mathscr{O}$  ontingency Plan will also be required.

ii. Signage. A danger sign or signs shall be posted within 50 feet of each facility to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gate(s) shall suffice. Danger signs shall be posted at each flow line and gathering line on the well pad that contains hydrogen sulfide gas as specified in Subparagraph <u>i</u> of this Section. A sign shall be placed at each point where such a line crosses a public road. Each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

iii. Fencing. Fencing and gate(s) shall be required when producing wells, associated tank batteries and associated production facilities are located within a 1/4 mile of a residence, school, church, park, playground, school bus stop, or place of business. The fence shall consist of a 5-foot chain link topped by two stands of barbed wire or other methods approved by the Division. Gate(s) shall be locked when unattended.

iv. Wind Direction Indicators. Wind direction indicator(s) shall be required at every facility (tank battery, water injection station, production satellite) where  $H_2S$  concentration in a gaseous state exceeds 100 PPM.

v. Secondary Well Control. Wells where the 100-ppm H<sub>2</sub>S radius of exposure incorporates a public area shall possess a secondary means of immediate well control through

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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.

vi. Automatic Safety Valve or Shutdown. If the 100-ppm radius of exposure involves a public area, an automatic safety valve or shutdown shall be installed at the facility or wellhead or other appropriate shut-in control shall be installed. The automatic safety valve shall be set to activate upon a release of a potentially hazardous volume of hydrogen sulfide.

b. Tanks or vessels containing 300 ppm or more of hydrogen sulfide in the gaseous mixture shall be subject to the following additional requirements:

be chained and/or marked to restrict entry. For any tank battery that requires fencing pursuant to this Section, a danger sign posted at the gate(s) may be substituted for chaining and signage.

2. A danger sign shall be posted on or within 50 feet of any storage tank to alert persons of the potential hydrogen sulfide danger. For any storage tank for which fencing is required, a danger sign posted at the locked gates shall suffice. Each sign shall read: "DANGER: POISON GAS HYDROGEN SULFIDE."

3. Modification or Repair. The **D**ivision may require modification or repair of a producing well, associated tank battery or associated production facilities if the sustained ambient concentration of hydrogen sulfide is 1 ppm or greater at any public area.

4. Compliance Schedule. Each existing producing well and associated tank battery not currently meeting the requirements and minimum standards set forth herein shall be brought into compliance within one (1) year of the effective date of this Rule. Each producing well and tank battery constructed following the effective date of this Rule shall be designed, constructed and operated to meet the requirements set forth herein.

H. Personnel Protection and Training. All persons responsible for the implementation of any H<sub>2</sub>S Contingency Plan shall be provided training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.

I. Standards for Equipment That May Be Exposed to Hydrogen Sulfide. Proper materials and/or appropriate protective measures for equipment exposed to hydrogen sulfide shall be utilized. Records shall be retained and shall be made available to the Division upon request. The Division may require additional requirements on any facility that may pose a threat to public health and/or the environment.

J. Hydrogen Sulfide Injection. Injection of fluids containing hydrogen sulfide where the injection fluids are a gaseous mixture, or would be a gaseous mixture in the event of a release to the atmosphere, and where the 100 ppm radius of exposure includes any public area, excluding public roads, shall not be allowed unless first approved by the division after public hearing.

K. Exemptions. An exemption to the requirements of this Section may be granted by petitioning the Director. Any such petition shall provide specific information as to the circumstances that warrant approval of the variance requested and the proposed alternative methods by which the related requirements of this Section are to be satisfied. The Director, after considering all relevant factors, may approve an exemption if it is determined that the proposed alternative meets or exceeds the requirements of this Section and otherwise protects the health, safety and welfare of potentially affected persons and otherwise protects the health.

L. Release. Upon a release of hydrogen sulfide the following actions must be taken:

1. Activation of the  $H_2S$  Contingency Plan. The  $H_2S$  Contingency Plan shall be activated immediately upon a  $H_2S$  release where the potential exists to expose any public area to a concentration of  $H_2S$  greater than 100 ppm or a concentration, an  $H_2S$  concentration greater than 300 ppm  $H_2S$  at any public road, a concentration of  $H_2S$  greater than 100 ppm at three thousand (3000) feet from the well, facility or operation, or a concentration of  $H_2S$  greater than 50 ppm at the property line of any well, facility or operation.

2. Notification of the Jivision. Upon release of a hydrogen sulfide requiring activation of the  $H_2S$  contingency, and the Jivision shall be notified as soon as practicable, preferably within one hour of the discovery of the release or as soon as possible in cases where prompt response should

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supercede notification. A full report of the incident shall be submitted to the OCD on a C-141 form no later than fifteen (15) days following the incident.

M. Additional Standards. The Division may require more stringent standards on a case-by-case basis than those set forth in this Section, or require corrective actions if necessary, to maintain control of a well or any other facility, for to safeguard public health or safety.

## 19.15.\_\_\_\_ Hydrogen Sulfide Gas (Hydrogen Sulfide)

A. In General. Hydrogen sulfide gas (known by its chemical abbreviation " $H_2S$ " or as "sulfurated hydrogen" or "hydrosulfuric acid") is a flammable, poisonous gas that occurs naturally as a component of crude petroleum and natural gas. The gas has a distinct and characteristic odor of rotten eggs.

B. Scope. This Section applies to any person, operator or facility subject to the jurisdiction of the Division, including, but not limited to, any person, operator or facility engaged in drilling, stimulating, completing, working over or producing any oil, natural gas or carbon dioxide well or any person, operator or facility engaged in gathering, transporting, storing, processing or refining of crude oil, natural gas or carbon dioxide.

C. Definitions (specific to this Section).

- 1. ANSI. The acronym "ANSI" means the american national standard institute.
- 2. API. The acronym "API" means the american petroleum institute.
- 3. ASTM. The acronym "ASTM" means the american society for testing and materials.

4. Dispersion Technique. A "dispersion technique" is a mathematical representation of the physical and chemical transportation characteristics, dilution characteristics and transformation characteristics of  $H_2S$  gas in the atmosphere.

5. Escape Rate. The "escape rate" is the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing  $H_2S$ . The escape rate is calculated using the maximum daily rate of the gaseous mixture produced or the best estimate thereof. For a natural gas well, the escape rate shall be calculated by using the current daily absolute open flow rate against atmospheric pressure. For an oil well, the escape rate shall be calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or best estimate thereof. For an oil or natural gas well drilled in an undeveloped area, a wildcat well, the escape rate may be determined by using offset wells completed in the interval in question, or using some other reasonable means to calculate the escape rate. For facilities or operations not mentioned, the escape rate shall be calculated using the actual flow of gaseous mixture through the facility or operation.

6. GPA. The acronym "GPA" means the gas processors association.

7. LEPC. The acronym "LEPC" means the local emergency planning committee
 established pursuant to the emergency planning and community right-to-know act, 42 U.S. C. § 11001.
 8. NACE. The acronym "NACE" refers to the national association of corrosion

engineers.

9. PPM. The acronym "ppm" means "parts per million."

10. Potentially Hazardous Volume (hereinafter referred to as a "potentially hazardous volume" or by the acronym "PHV") means the volume of hydrogen sulfide gas of such concentration that:

- a. the 100 ppm radius of exposure includes any public area as defined herein;
- b. the 300 ppm radius of exposure includes any public road as defined herein; or

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c. the 100 ppm radius of exposure is in excess of 3,000 feet.

11. Public Area. A "public area" is any dwelling; office; place of business; church; school; hospital; school bus stop; government building; or any portion of a park, city, town, village or other similar populated area, but does not include facilities directly involved in oil and gas production, such as producing oil and gas wells, pipelines, tank batteries, production equipment, gas plants; refineries.

12. Public Road. A "public road" is any state, municipal or county road or highway, postal route or other public road. A public road is not a private road or a road to which access to members of the general public is restricted.

13. Radius of Exposure. The radius of exposure (hereinafter referred to as "radius of exposure" or "ROE") is an imaginary circle constructed around a point of escape the radius of which is calculated using the following Pasquill-Gifford derived equation, or by such other method as may be approved by the division:

a. For determining the 100-ppm radius of exposure where the hydrogen sulfide concentration in the gaseous mixture is less than 10 percent:  $X = [(1.589)(hydrogen sulfide concentration)(Q)]^{(0.625)}$ , or

b. For determining the 300-ppm radius of exposure where the hydrogen sulfide concentration in the gaseous mixture is less than 10 percent:  $X=[(0.77)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ 

Where: X= radius of exposure in feet: hydrogen sulfide concentration = decimal equivalent of the mole or volume fractions of hydrogen sulfide in the gaseous mixture; Q= maximum volume of gas determined to be available for escape in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

c. For determining the 100 ppm or the 300 ppm radius of exposure in gaseous mixtures containing hydrogen sulfide concentrations of 10 percent or greater, a dispersion technique that takes into account representative wind speed, direction, atmospheric stability, complex terrain and 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)."

d. Where multiple sources of hydrogen sulfide are present (e.g. wells, treatment equipment, flow lines, etc.), the radius of exposure may encompass a larger area than would otherwise be calculated using a radius of exposure computation for each component part.

e. For a well being drilled in an area where insufficient data exits to calculate a radius of exposure, but where hydrogen sulfide could reasonably be expected to be present in concentrations in excess of 100 ppm in the gaseous mixture, a 100 ppm radius of exposure equal to 3,000 feet shall be assumed.

D. Determination of Hydrogen Sulfide Risk.

1. Determination of Hydrogen Sulfide Concentration.

a. Each person, operator or facility to which this Section applies shall determine the hydrogen sulfide concentration within each of its operations or systems. A representative sample for each system or operation may be used for testing provided that the person, operator or facility can demonstrate that the concentration derived from a test of the representative sample is reasonably representative of the hydrogen sulfide concentration within the operation or system.

b. The tests referred to in the previous Subparagraph shall be conducted in accordance with applicable ASTM and GPA standards or by other methods approved by the division.

2. Tested Concentrations Below 100 ppm. If the testing described in the previous Paragraph determines that the hydrogen sulfide concentration in a given operation or system is less than 100 ppm, no further actions are required pursuant to this Section.

3. Tested Concentrations Above 100 ppm; Calculation of the Radius of Exposure.

a. If the testing described in Paragraph 1 of this Subsection determines that the concentration of hydrogen sulfide in a gaseous mixture is 100 ppm or greater, then the person, operator or facility must calculate the radius of exposure pursuant to this Section.

MAY be ? b. If calculation of the radius of exposure reveals that a potentially hazardous volume is present, the person, operator or facility shall provide the results of the radius of exposure determinations to the division electronically in a form that is compatible with the division's systems within 180 days of commencing operations or, for existing facilities, within 180 days of the effective date of this Section. The division may disapprove the test methodology and require additional testing if the test methodology did not conform to the requirements of this Section. The division is for the requirements of this Section. The division is to the requirements of this Section. The division is disapprove the test methodology and require additional testing if the test methodology did not conform to the requirements of this Section. The division is disapproved to the requirements of this Section. The division is disapproved to the requirements of this Section. The division is disapproved to the requirements of this Section. The division is disapproved to the requirements of this Section.

4. Recalculation. If operational or production alterations are made that, through  $\mathcal{W}\mathcal{H}^{\mathcal{U}}$  application of generally accepted engineering principles and generally accepted operating practices, indicate that a 25% or greater increase in the hydrogen sulfide concentration may occur in a given operation or facility, the person, operator or facility shall recalculate the radius of exposure and submit the results to the division electronically in a form that is compatible with the division's systems.

E. H<sub>2</sub>S Contingency Plan.

1. In General. The  $H_2S$  contingency plan is a written document that provides a plan of action that will be used to alert and protect persons at risk in the event of a potentially significant release of hydrogen sulfide gas.

2. When Required. An  $H_2S$  contingency plan must be prepared whenever a potentially hazardous volume of hydrogen sulfide may be present.

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3. Input From Emergency Response Authorities and the Division. The person, operator or facility shall develop the  $H_2S$  contingency plan with input from the division, the New Mexico department of public safety (and as appropriate the New Mexico state police) and the local emergency planning committee, except that where the 300 ppm radius of exposure encompasses any public road, input shall also be sought from the county sheriff and, as applicable, the city or municipal police, and where the 100 ppm radius of exposure encompasses a public area, input shall also be sought from police and fire departments near the well, operation or facility. The  $H_2S$  contingency plan shall identify the agency from which input was received pursuant to this paragraph, identify the person at the agency contacted (with telephone number) and briefly describe the nature of the input provided.

4. Elements. The  $H_2S$  contingency plan shall consist of different elements depending on the risks present.

a. Elements Required for Each Plan:

i. A detailed description of each action to be taken in the event of a release of a potentially hazardous volume of hydrogen sulfide, including an immediate action plan that substantially conforms to paragraph 7.6 of guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, most recent edition;

ii. A call list including the following as applicable:

- aa. local supervisory personnel;
- bb. county sheriff;
- cc. the department of public safety and state police;
- dd. city or municipal police;
- ee. the appropriate division district office; and
- ff. other public agencies as appropriate.

iii. A plat or map detailing the area within the radius of exposure of a potentially hazardous volume; and

iv. A list of the names and telephone numbers of all personnel to be contacted when a release is reported or suspected.

b. Where the 300-ppm radius of exposure encompasses any public road, the person, operator or facility shall include the following additional elements in the H<sub>2</sub>S contingency plan:

i. Instructions and procedures for alerting and coordinating with emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide at any public road;

ii. A plat or map detailing the area of exposure, including the locations of public roads within the radius of exposure of a potentially hazardous volume;

iii. A plan to divert traffic and safely get existing traffic off the road and out of danger.

c. Where the 100-ppm radius of exposure encompasses any public area, the following additional elements shall be included in the  $H_2S$  contingency plan:

i. detailed plans of action to alert and protect persons in the event of a release of a potentially hazardous volume of hydrogen sulfide, including instructions and procedures for alerting persons at risk and emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide;

ii. a call list including all the persons set forth in Sub subparagraph

E(4)(a)(ii), above, and the following:

- aa. ambulance services;
- bb. hospitals;
- cc. county and city fire departments;
- dd. doctors;
- ee. contractors for supplemental or emergency equipment; and
- ff. other public agencies as appropriate.

iii. a statement describing how emergency response actions will be coordinated with the division and the New Mexico state police, consistent with the New Mexico hazardous materials emergency response plan (HMER);

iv. a plat or map detailing the area of exposure, including the locations of private dwellings or residences, public facilities such as schools, businesses, public roads or other similar areas where the public may be reasonably expected to be present within the radius of exposure;

v. the names and telephone numbers of all persons living within the radius of exposure of 100 ppm hydrogen sulfide and contact persons for each public area, such as churches, schools and businesses;

vi. provisions for advance briefing of affected and responsible persons within the radius of exposure. Such advance briefing shall include the hazards and characteristics of hydrogen sulfide, the necessity for an  $H_2S$  contingency plan, the possible sources of hydrogen sulfide within the radius of exposure, instructions for reporting a gas leak, the manner in which persons will be notified in the event of an emergency and steps to be taken in an emergency; and

vii. additional support information, if applicable, such as the location of emergency evacuation routes, the location of safety and life support equipment, the location of hydrogen sulfide containing facilities, the location of nearby telephones or other means of communication and special instructions for conditions at a particular installation such as local terrain and the effect of various weather conditions.

d. Additional Requirements. The division may impose additional requirements or modify requirements based on site-specific conditions, population density or special circumstances.
 5. Submission. The H<sub>2</sub>S contingency plan shall be submitted to the division

electronically in a form that is compatible with the division's systems and to the local emergency planning committee no later than 180 days following submission of the radius of exposure required in Subsection D of this Section. The  $H_2S$  contingency plan may be submitted separately or along with the application for permit to drill (APD).

6. Failure to Submit Plan. Failure to submit an  $H_2S$  contingency plan when required may result in denial of an application for permit to drill, cancellation of an allowable or other appropriate enforcement action.

7. Annual Review, Amendment. The person, operator or facility shall review the  $H_2S$  contingency plan on an annual basis or earlier if activation of a plan reveals a deficiency. The person, operator or facility shall submit any amendments to the division electronically in a form that is compatible with the division's systems and to the local emergency planning committee.

8. Retention and On-Site Inspection. An  $H_2S$  contingency plan shall be reasonably accessible in the event of a release and maintained on file at all times and shall be available for inspection by the Division-during normal business hours.

9. Activation Levels. The  $H_2S$  contingency plan shall be activated in the event of a release of a potentially hazardous volume of  $H_2S$  above the respective thresholds (i.e. 300 ppm radius at any public road, 100 ppm radius at any public area, etc.) or if a sustained concentration of  $H_2S$  exceeds 50 ppm at the property line of any facility, well or operation.

F. Protection from Hydrogen Sulfide During Drilling, Workover and Servicing Operations.

1. API Standards. All drilling, completion, workover and well servicing operations shall be conducted with due consideration to the guidelines published by the API entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Safe Drilling of Wells Containing Hydrogen Sulfide," RP-49, most recent edition.

2. Minimum Standards. At a minimum, and possibly in addition to the foregoing API standards, each drilling, completion, workover and well servicing operation shall also be conducted in accordance with the following:

a. Before Commencing Operations. The person, operator or facility shall complete an  $H_2S$  contingency plan, where required, before commencement of operations. In addition,



hydrogen sulfide training shall be completed and all related safety equipment and warning systems shall be operational before commencement of operations.

b. Egress Routes. The person, operator or facility shall maintain passable egress routes at all times during operations.

c. Detection and Monitoring. The person, operator or facility shall provide hydrogen sulfide detection and monitoring equipment as follows:

i. Each drilling and completion site shall have hydrogen sulfide detection and monitoring that automatically activates visible and audible alarms when the ambient air concentration of hydrogen sulfide reaches 10 ppm. There shall be a sensing point 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.

ii. The detection system shall be calibrated and tested monthly. Each test of the hydrogen sulfide monitoring system shall be recorded on the driller's log or its equivalent.

iii. For workover and well servicing operations, one operational sensing point shall be located as close to the well bore as practical. Additional sensing points may be necessary for large or long-term operations.

iv. Hydrogen sulfide detection and monitoring equipment must be provided during drilling when drilling is within 500 feet of the zone anticipated to contain hydrogen sulfide and continuously thereafter through all subsequent drilling. Detection and monitoring equipment is not required for drilling from the surface to within 500 feet of the zone anticipated to contain hydrogen

Non-Mud Circulating Media. If hydrogen sulfide gas in excess of 100 ppm is encountered while drilling with air, gas, mist or other non-mud circulating mediums for 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.

b. Flare System. For drilling and completion operations, the person, operator or facility shall install a flare system to safely gather and burn hydrogen sulfide-bearing gas, unless exempted pursuant to Subsection K. Flare outlets shall be located as far from the well bore as feasible but not less than 150 feet from the well. Flare lines shall be as straight as practical. The flare system shall be equipped with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall be provided supplemental fuel to maintain ignition.

c. Remote Controlled Choke.

i. The person, operator or facility shall install a remote controlled choke during drilling and during completion and well servicing operations when the 100-ppm  $H_2S$  radius of exposure includes a public area, unless exempted pursuant to Subsection K.

ii. A remote controlled valve may be used in lieu of use of a remote controlled choke, but only for completion operations.

iii. A remote controlled choke or remote controlled valve shall have, at a minimum, a pressure and hydrogen sulfide-rated well control choke and kill system including manifold and blowout preventer pursuant to specifications API-16C and API-RP 53. The blowout preventer stack shall have at least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced or other division rules, if more stringent. Variations to blowout preventer stack arrangements may be granted by the division for good cause shown.

d. Mud Program. A mud program, including de-gassing and flaring, capable of handling H<sub>2</sub>S conditions and well control shall be used.

e. Well Testing. Except with prior approval by the division, the drill-stem testing shall be conducted only during daylight hours and formation fluids shall not be permitted to flow to the surface (closed chamber only). An operator shall notify the division 24 hours in advance of a drill-stem test if an  $H_2S$  contingency plan is required pursuant to this Section.

\* G. Protection from Hydrogen Sulfide a Crude Oil Pump Stations, Producing Wells, Tank Batteries and Associated Production Facilities, Refineries, Gas Plants and Compressor Stations

1. API Standards. Operations at crude oil pump stations and producing wells, tank batteries and associated production facilities shall be conducted according to the guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

2. Minimum Standards. At a minimum, production from wells and operation of tank batteries and associated production equipment shall also be conducted in accordance with the following Subparagraphs and Sub subparagraphs. Where API standards referred to in the previous paragraph are less stringent than the following, the more stringent standards shall apply.

a. Gaseous Mixtures Containing 100 ppm or more. Producing wells containing 100 ppm or more of hydrogen sulfide in the gaseous mixture, tank batteries and **associated production** facilities at such sites, shall be subject to the following:

 $\angle GHS \ \beta LAsts, \beta te$  i. H<sub>2</sub>S Contingency Plan. If required based on the radius of exposure calculated pursuant to Subsection D, an H<sub>2</sub>S contingency plan shall be required.

ii. Signage. A danger sign or signs shall be posted within 50 feet of each facility to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gates shall suffice. Danger signs shall be posted at each flow line and gathering line on the well pad that contains hydrogen sulfide gas. The signs shall read "DANGER - POISON GAS", "DANGER - HYDROGEN SULFIDE", or, as appropriate "CAUTION - POISON GAS" or "CAUTION - HYDROGEN SULFIDE" and in smaller lettering: "Do Not Approach If Red Flag is Flying" or equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration. The signs shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 300 feet from the read of the and at a location which allows wehicles to turn around at a safe distance prior to reaching the site. A sign shall be placed at each point

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where a flow line or gathering line crosses a public road. Each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

iii. Fencing. Fencing and gates shall be required when producing wells, associated tank batteries and associated production facilities are located within a 1/4-mile of a residence, school, church, park, playground, school bus stop or place of business. The fence shall consist of a 5-foot chain link topped by two stands of barbed wire or other designs approved by the division. Gates shall be locked when unattended.

iv. Wind Direction Indicators. Wind direction indicators shall be required at every facility (tank battery, water injection station, production satellite) where  $H_2S$  - concentration in a gaseous state exceeds 100 PPM.

v. Secondary Well Control. Wells where the 100-ppm  $H_2S$  radius of exposure incorporates a public area shall possess a secondary means of immediate well control through the use of appropriate christmas tree or downhole completion equipment. Such equipment shall allow downhole accessibility (reentry) under pressure for permanent well control operations.

vi. Automatic Safety Valve or Shutdown. If the 100-ppm radius of exposure involves a public area, the person, operator or facility shall install an automatic safety valve or shutdown at the facility or wellhead or shall install other appropriate shut-in control. The automatic safety valve shall be set to activate upon a release of a potentially hazardous volume of hydrogen sulfide.

b. Tanks or vessels containing 300 ppm or more of hydrogen sulfide in the gaseous mixture shall be subject to the following additional requirements:

1. Each stair or ladder leading to the top of any storage tank shall be chained or marked to restrict entry. For any tank battery that requires fencing pursuant to this Section, a danger sign posted at the gates may be substituted for chaining and signs.

2. The person, operator or facility shall post a danger sign on or within 50 feet of any storage tank to alert persons of the potential hydrogen sulfide danger. For any storage tank for which fencing is required, a danger sign posted at the locked gates shall suffice. The signs shall read "DANGER - POISON GAS", "DANGER - HYDROGEN SULFIDE", or, as appropriate "CAUTION - POISON GAS" or "CAUTION - HYDROGEN SULFIDE" and in smaller lettering: "Do-Not Approach If Red Flag is Flying", or equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration. The sign(s) shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 300 feet from the well site and at a location which allows vehicles to turn around at a safe distance prior to reaching the site.

3. Modification or Repair. The division may require modification or repair of a crude oil pump station, producing well, tank battery or associated production facilities, refinery, gas plant or compressor station if the sustained ambient concentration of hydrogen sulfide is 1 ppm or greater within a public area and the crude oil pump station, producing well, tank battery or associated production facility, refinery, gas plant or compressor station is the source of the hydrogen sulfide detected.

4. Compliance Schedule. Each existing producing well and associated tank battery not currently meeting the requirements and minimum standards set forth herein shall be brought into compliance within one year of the effective date of this Section. Each producing well and tank battery constructed following the effective date of this Section shall be designed, constructed and operated to meet the requirements set forth herein.

H. Personnel Protection and Training. All persons responsible for the implementation of any H<sub>2</sub>S contingency plan shall be provided training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.

I. Standards for Equipment That May Be Exposed to Hydrogen Sulfide. Persons, operators and facilities shall chose equipment with consideration for both the  $H_2S$  working environment and anticipated stresses. NACE Standard MR0175 (latest edition) shall be used for metallic equipment selection or, if applicable, adequate protection by chemical inhibition or other methods that controls or limits the corrosive effects of  $H_2S$  shall be used.

J. Hydrogen Sulfide Injection. Injection of fluids containing hydrogen sulfide where the injection fluids are a gaseous mixture, or would be a gaseous mixture in the event of a release to the atmosphere, and where the 100-ppm radius of exposure from the injection point includes any public area, shall not be permitted unless first approved by the division after public hearing. Injection facilities that are permitted as of the effective date of this Section are exempt from the provisions of this subsection.

K. Exemptions. An exemption to the requirements of this Section may be granted by petitioning the director. Any such petition shall provide specific information as to the circumstances that warrant approval of the exemption requested and how the public safety will be protected. The director, after considering all relevant factors, may approve an exemption if the circumstances warrant an exemption, if the requirements of this Section are met, and public safety will be protected.

L. Release. Upon a release of hydrogen sulfide the following actions must be taken:

1. Activation of the H<sub>2</sub>S contingency plan. The person, operator or facility shall activate the H<sub>2</sub>S contingency plan immediately upon an H<sub>2</sub>S release where the potential exists for exposure to a potentially hazardous volume of H<sub>2</sub>S, or where a concentration of H<sub>2</sub>S greater than 50 ppm exists at the property line of any well, facility or operation.  $\mathcal{I}$ 

2. Notification of the Division. The person, operator or facility shall notify the division upon a release of hydrogen sulfide requiring activation of the  $H_2S$  contingency plan as soon as practicable, preferably within one hour of discovery of the release or as soon as possible in cases where prompt response should supercede notification. The person, operator or facility shall submit a full report of the incident to the division on Form C-141 no later than fifteen (15) days following the release.

M. Additional Standards. The division may require more stringent standards on a case-by-case basis than those set forth in this Section, or require corrective actions if necessary, to maintain control of a well or any other facility or to safeguard public safety.

#### 19.15.2.52 Hydrogen Sulfide Gas (Hydrogen Sulfide)

A. In General. Hydrogen sulfide gas (known by its chemical abbreviation "H<sub>2</sub>S" or as "sulfurated hydrogen" or "hydrosulfuric acid") is a flammable, poisonous gas that may occur naturally as a component of crude petroleum and natural gas. The gas has a distinct and characteristic odor of rotten eggs but due to olfactory fatigue may not be sensed by the human sense of smell.

B. Applicability Scope. This Section provides for public safety in areas where hydrogen sulfide gas (H<sub>2</sub>S) may exists in concentrations greater than 100 ppm or in a potentially hazardous volume. This section applies to any person, operator or facility subject to the jurisdiction of the Division, including, but not limited to, any person, operator or facility engaged in drilling, stimulating, injecting into, completing, working over or producing any oil, natural gas or carbon dioxide well or any person, operator or facility engaged in gathering, transporting, storing, processing or refining of crude oil, natural gas or carbon dioxide. This section shall not act to exempt or otherwise excuse Exempt from this rule are surface waste management facilities permitted by the division pursuant to 19 NMAC 15.I.711 from more stringent conditions on the handling of hydrogen sulfide required of such facilities by 19 NMAC 15.I.711 or more stringent conditions existing in permits issued thereunder, nor shall such facilities be exemptifrom the requirements set forth in this section by virtue of permitting under 19 NMAC 15.I.711.

C. Definitions (specific to this section).

- 1. ANSI. The acronym "ANSI" means the american national standards institute.
- 2. API. The acronym "API" means the american petroleum institute.
- 3. ASTM. The acronym "ASTM" means the american society for testing and materials.

4. Dispersion Technique. A "dispersion technique" is a mathematical representation of the physical and chemical transportation characteristics, dilution characteristics and transformation characteristics of hydrogen sulfide gas in the atmosphere.

5. Escape Rate. The "escape rate" is the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing hydrogen sulfide. The escape rate is calculated using the maximum daily rate of the gaseous mixture produced or the best estimate thereof. For a natural gas well, the escape rate shall be calculated by using the current daily absolute open flow rate against atmospheric pressure or best estimate thereof. For an oil well, the escape rate shall be calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or best estimate thereof. For an oil or natural gas well drilled in a previous indeveloped area ta window No. the escape rate may be determined by using data from offset wells completed in the interval in question, or using some other reasonable means to calculate the escape rate. For wildcat wells, subparagraph C.13.d shall apply. For facilities or operations not mentioned, the escape rate shall be calculated using the actual flow of baseous mixture through the facility or operation.

6. GPA. The acronym "GPA" means the gas processors association.

7. LEPC. The acronym "LEPC" means the local emergency planning committee established pursuant to the emergency planning and community right-to-know act, 42 U.S. C. § 11001.

8. NACE. The acronym "NACE" refers to the national association of corrosion engineers.

9. PPM. The acronym "ppm" means "parts per million" by volume.

10. Potentially Hazardous Volume (hereinafter referred to as a "potentially hazardous volume" or by the acronym "PHY") means the volume of hydrogen sulfide gas of such concentration that: a. the 100-ppm radius of exposure includes any public area as defined herein;

b. the 500-ppm radius of exposure includes any public road

c. the 100 ppm radius of exposure is in excess of 3,000 feet. as defined herein; or

11. Public Area. A "public area" is any area where members of the public may. -reasonably be expected to be present such as a dwelling, office, place of business, church, school, or hospital, school bus stop, government building inv portion of a park, eity, town, village or other similar.

area or any portion or a pure, reasonably be expected to be present. Ster area for any portion of a park, city, town, village or other similar area where members of the public may

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( that is not associated with the well, operation, or syste for which the radius dexposures :

12. Public Road. A "public road" is any federal, state, municipal or county road or highway or postal route.

13. Radius of Exposure. The radius of exposure (hereinafter referred to as "radius of exposure" or "ROE") is an imaginary circle constructed around a point of escape the radius of which is calculated using the following Pasquill-Gifford derived equation, or by such other method as may be approved by the division:

a. For determining the 100-ppm radius of exposure:  $X = [(1.589)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ , where "X" is the radius of exposure in feet, the "hydrogen sulfide concentration" is the decimal equivalent of the mole or volume fraction of hydrogen sulfide in the gaseous mixture, and "Q" is the escape rate expressed in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

b. For determining the 500-ppm radius of exposure:  $X=[(0.4546)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ , where "X" is the radius of exposure in feet, the "hydrogen sulfide concentration" is the decimal equivalent of the mole or volume fraction of hydrogen sulfide in the gaseous mixture, and "Q" is the escape rate expressed in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

e. Where multiple sources of hydrogen sulfide are present (e.g. wells, treatment equipment, flow lines, etc.), the radius of exposure may encompass a larger area than would otherwise be calculated using a radius of exposure computation for each component part.

<u>c.</u> d. For a well being drilled in an area where insufficient data <u>exists</u> to calculate a radius of exposure but where hydrogen sulfide could reasonably be expected to be present in concentrations in excess of 100 ppm in the gaseous mixture, a 00 ppm radius of exposure equal to 3,000 feet shall be assumed.

D. Determination of Hydrogen Sulfide Risk.

1. Determination of Hydrogen Sulfide Concentration.

a. Each person, operator or facility to which this section applies shall determine the hydrogen sulfide concentration within each of its <u>wells</u>, operations or systems. A representative sample or <del>previous</del> process knowledge for each system or operation may be used <u>in lieu of individual for</u> testing <u>of wells</u>, <u>operations or systems</u> provided that the person, operator or facility can demonstrate that the concentration derived from a test or process knowledge of the representative sample is reasonably

representative of the hydrogen sulfide concentration within the operation, pool or system. Within the b. The tests referred to in the previous subparagraph shall be conducted in accordance with applicable ASTM or GPA standards or by other methods approved by the division. etermination c. If a representative sample from a system of operation was tested within one

(1) year of the effective date of this section, new testing shall not be required; provided, however, new testing shall not be required for a producing well that was tested at any time prior to the effective date of this section.

d. The Division may disapprove the test methodology and require additional testing if the testing methodology did not conform to the requirements of this Section.

2. Tested Concentrations Below 100 ppm. If the testing described in the previous paragraph determines that the hydrogen sulfide concentration in a given well, operation or system is less than 100 ppm, no further actions shall be are required pursuant to this section.

3. Tested Concentrations Above 100 ppm; Calculation of the Radius of Exposure. 9. 3. Tested Concentrations Above 100 ppm; Calculation of the Radius of Exposure. a. If the testing described in paragraph 1 of this subsection determines that the concentration of hydrogen sulfide in a gaseous mixture is 100 ppm or greater, then the person, operator or facility must calculate the radius of exposure pursuant to this section. b. If calculation of the radius of exposure reveals that a potentially hazardous volume is may be present the person, operator or facility shall provide the results of the testing and the

b. If calculation of the radius of exposure reveals that a potentially hazardous volume <u>is may be</u> present, the person, operator or facility shall provide the results of the totting and the resulting radius of exposure determinations to the division electronically in a generally accepted or Supferm electronic format that is compatible with the division's systems. For a well, facility or operation existing on the effective date of this section, the calculation and submission required herein shall be accomplished

determination.

# BULLETIN

The Occupational Safety and Health Administration (OSHA) has determined that the maximum safe load capacity on my butt is two persons at one time, unless I install handrails or safety straps. As you have arrived sixth in line to ride my ass today, please take a number and wait your turn.

## Thank You.

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before commencing operations or, for existing facilities, within 180 days of the effective date of this section; any well, facility or operation that commences operations after the effective date of this section, shall calculate the radius of exposure and submit the results prior to beginning operations. Operators may petition the Division for an extension of the submission date, or for an exception to the electronic submission requirement pursuant to subsection J of this Section.

4. Recalculation. The person, operator or facility shall recalculate the radius of exposure if any of the following occurs: an operational change or production alterations are made then recalculations may be made caused the hydrogen sulfide concentration to increase to 100 ppm or greater application of generally accepted engineering principles and generally accepted operating practices indicate - If recalculations indicate that the a hydrogen sulfide H2S concentration has increased to becomegreater than 100 ppm or greater; a 25% or greater increase in the actual volume fraction of hydrogen, sulfide has occurred; in a given operation or facility, the person, operator or facility shall recalculate the radius of exposure or, and, changed eircumstances result in a the ROE reveals that a potentially hazardous volume where one was not previously present PHV may be present. If recalculation is performed, the results shall be submitted submit the results to the division electronically in a generally accepted electronic format that is compatible with the division's systems.

E. Hydrogen Sulfide H<sub>2</sub>S Contingency Plan.

1. In General. A <u>hydrogen sulfide</u>  $n H_2S$  contingency plan is a written document that provides a plan of action that will be used to alert and protect persons at risk in the event of a potentially significant release of hydrogen sulfide gas. The <u>hydrogen sulfide contingency plan</u> must be developed in accordance with the following paragraphs.

2. When Required. A <u>hydrogen sulfide</u>  $n H_2S$  contingency plan must be prepared whenever a potentially hazardous volume of hydrogen sulfide is may be present.

3. Input of Emergency Response Authorities and the Division. The person, operator or facility shall develop a proposed hydrogen sulfide contingency plan and provide a copy to ecordinate the proposed H<sub>2</sub>S contingency plan with the division, the New Mexico department of public safety (i.e. the New Mexico state police), and the local emergency planning committee. If the potential source of release is within a municipality, a copy shall be provided to the municipal police and fire department. If the potential source of the release is within a county, a copy shall also be provided to as appropriate, the county sheriff and the eity or municipal police, and/or police and fire departments. Input on the proposed plan shall be sought from each of the foregoing; if an emergency response authority provided with a copy of the proposed plan fails to provide input or fails to respond at all, that fact shall be stated in the proposed hydrogen sulfide contingency plan submitted to the division. The input provided by the emergency response authorities shall be considered when preparing the final plan for submission to the division but failure to include any specific suggestion shall not affect the validity of the plan or cause disapproval of the plan by the division. A statement in the contingency plan indicating which ageneies have been notified shall suffice as proof of coordination.

4. Elements.

a. Elements Required for Each Plan:

i. A detailed description of each action to be taken in the event of a release of a potentially hazardous volume of hydrogen sulfide shall be included in each hydrogen sulfide contingency plan, including an immediate action plan that provisions for alerting and accounting for personnel, controlling any release of hydrogen sulfide gas, eliminating possible ignition sources, alerting the public (directly or through appropriate government agencies), evacuating persons in the affected area. Use of the call list to alert company officials and assure coordination with emergency response authorities making recommendations to public officials to block access to affected areas and evacuations and coordination of emergency response with emergency response authorities. Alternatively, a plan that addresses the items described in paragraph 7.6 of guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, most recent edition shall be adequate for this purpose;

ii. A call list including the following as applicable: aa. local supervisory personnel;

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before dommencing operations or, for existing facilities, within 180 days of the effective date of this section: any well, facility or operation that commences operations after the effective date of this section that submit the results prior to beginning operations. Operators -shall calculate the radius of exposure and submit the results prior to beginning operations. may petition the Division for an extension of the submission date, or for an exception to the electronic submission requirement pursuant to subsection J of this Section. calculate or

detar mena 4. Recalculation. The person, operator or facility shall recalculate the radius of exposure if any of the following occurs: an operational change or production alterations are made then recalculations may be made causes the hydrogen sulfide concentration to increase to 100 ppm or greater -application of generally accepted engineering principles and generally becepted operating practices -indicate - If recalculations indicate that the a hydrogen sulfide H2S concentration has increased to become greater than 100 ppm or greater; a 25% or greater increase in the actual volume fraction of hydrogen. -sulfide has occurred; in a given operation or facility, the person, operator or facility shall recalculate the - radius of exposure or, and, changed circumstances result in a the ROE reveals that a potentially hazardous volume where one was not previously present PHV may be present. If recalculation is performed, the -results shall be submitted submit the results to the division electronically in a generally accepted electronic format that is compatible with the division's systems.

E. Hydrogen Sulfide H<sub>2</sub>S Contingency Plan.

1. In General. A hydrogen sulfide n H<sub>2</sub>S contingency plan is a written document that provides a plan of action that will be used to alert and protect persons at risk in the event of a potentially significant release of hydrogen sulfide gas. The hydrogen sulfide contingency plan must be developed in accordance with the following paragraphs.

2. When Required. A hydrogen sulfide n H<sub>2</sub>S contingency plan must be prepared whenever a potentially hazardous volume of hydrogen sulfide is may be present.

3. Input of Emergency Response Authorities and the Division. The person, operator or facility shall develop a proposed hydrogen sulfide contingency plan and provide a copy to coordinate the proposed H<sub>2</sub>S contingency plan with the division, the New Mexico department of public safety (i.e. the New Mexico state police), and the local emergency planning committee. If the potential source of release is within a municipality, a copy shall be provided to the municipal police and fire department. If the potential source of the release is within a convex a copy shall are be provided to as appropriate, the county sheriff and the city or municipal police, and/or police and fire departments. Input on the proposed plan shall be sought from each of the foregoing; if an emergency response authority provided with a copy of the proposed plan fails to provide input or fails to respond at all, that fact shall be stated in the provided hydrogen sulfide contingency plan submitted to the division. The input provided by the emergency response authorities shall be considered when preparing the final plan for submission to the division but failure to include any specific suggestion shall not affect the validity of the plan or cause disapproval of the plan by the division. A statement in the contingency plan indicating which agencies have been notified shall suffice as proof of coordination.

4. Elements.

a. Elements Required for Each Plan:

release of a potentially hereretet volume of hydrogen sulfide shall be included in each hydrogen sulfide. contingency plan, including an immediate action plan that provisions for alerting and accounting for personnel, controlling any release of hydrogen sulfide gas, eliminating possible ignition sources, alerting the public (directly or through appropriate government agencies), evacuating persons in the affected area the call list to alert company officials and assure coordination with emergency/response authorities making recommendations to public officials to block access to affected areas and evacuations and coordination of emergency response with emergency response authorities. Alternatively, Aplan that addresses the items described in paragraph 7.6 of buildelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, most recent edition, shall be adequate for this purpose; ii. A call list including the following as applicable:

local supervisory personnel; aa.

bb. county sheriff; cc. *Alle* department of public safety and state police: dd. city or municipal police; ee. My appropriate division district office; and ff. other public agencies as appropriate. iii. A plat or map detailing the area within the radius of exposure of a potentially hazardous volume; and iv. A list of the names and telephone numbers of all personnel to be contacted when a release is reported or suspected. b. Where the 500-ppm radius of exposure encompasses any public road, the person, operator or facility shall include the following additional elements in the hydrogen sulfide H<sub>2</sub>S contingency plan: -i.-Instructions and procedures for alerting and coordinating entergenery response to a release with omorgency response authorities in the event of a release of a potentially <u>hazardous volume of trydrogen sulfide-at-any public read</u>: i N. A plat or map detailing the area of exposure, including the locations of public roads within the radius of exposure of a potentially hazardous volume; and i N. A plan to divert traffic and safely get existing traffic off the road and out of danger. c. Where the 100-ppm radius of exposure encompasses any public area, the following additional elements shall be included in the hydrogen sulfide H<sub>2</sub>S contingency plan: ditto ·i. Detailed plans of action to alert and protect persons in the event of a release of a potentially hazardous volume of hydrogen sulfide, including instructions and procedures for alerting persons at risk and emergency response authorities in the event of a release of a potentially -hazardous volume of hydrogen sulfide; -XA call list including all the persons set forth in Sub subparagraph E(4)(a)(ii), above, and the following: aa. ambulance services: bb. hospitals; cc. county and city fire departments; dd. doctors: ee. contractors for supplemental or emergency equipment; and ff. other public agencies as appropriate. 11 ju. A statement describing how emergency response actions will be coordinated with the division and the New Mexico state police, consistent with the New Mexico

hazardous materials emergency response plan (HMER);

onthe areas and in w. A plat or map detailing the area of exposure, including the locations of private dwellings or residences, public facilities such as schools, businesses, public roads or other similar areas where the public may be reasonably expected to be present within the radius of exposure;

y. The names and telephone numbers of all persons within a public area ŧ۷ subject to a potentially hazardous volume living within the radius of exposure of 100 ppm hydrogen sulfide and contact persons for areas of public concentration each public area, such as churches, schools, and businesse;

Y. Provision for advance briefing of affected and responsible persons Y within the radius of exposure. Such advance briefing shall include the hazards and characteristics of hydrogen sulfide, the necessity for a hydrogen sulfide  $n H_2S$  contingency plan, the possible sources of hydrogen sulfide within the radius of exposure, instructions for reporting a gas leak, the manner in which persons will be notified in the event of an emergency and steps to be taken in an emergency; vir. In lieu of provision for advance briefing or persons within the radius YI

of exposure described in the previous subsubparagraph, a reaction-type plan may be prepared and submitted that provides for mass notification of a release of hydrogen sulfide and for evacuation of affected areas where the operator can demonstrate that the risk to public safety is minimal such as in

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remote locations, a simplified a reaction-type plan may be prepared and submitted that provides for mass notification of a hydrogen sulfide leak and for an evacuation of affected areas; and

 $\sqrt{11}$  will. Additional support information, if applicable, such as the location of emergency evacuation routes, the location of safety and life-support equipment, the location of <u>factilities</u> <u>containing hydrogen sulfide containing facilities</u>, the location of nearby telephones or other means of communication and special instructions for conditions at a particular installation such as local terrain and the effect of various weather conditions.

d. Additional Requirements. The division may impose additional requirements or modify requirements based on site specific conditions, population density or special circumstances.

5. Submission, When Submitted The hydrogen sulfide contingency plan shall be submitted to the division and a copy shall be submitted to the local emergency planning committee, if one exists. Existing For crude oil pump stations, producing wells, tank batteries and associated production facilities, refineries, gas plants and compressor stations shall submit existing subsection G facilities. the hydrogen sulfide H<sub>2</sub>S contingency plan shall be submitted no later than 180 days from the effective date. of this section. Existing drilling, workover and servicing operations shall submit the hydrogen sulfide, contingency plan for the relevant well no later than 180 days after the effective date of this section. New order oil pump stations, producing wells, tank batteries and associated production facilities, refineries, gas plants and compressor stations shall submit the H<sub>2</sub>S contingency plan for the relevant well no later than 180 days after the effective date of this section. New order oil pump stations, producing wells, tank batteries and associated production facilities, refineries, gas plants and compressor stations shall submit the H<sub>2</sub>S contingency plan prior to beginning operations. New order oil pump stations, producing operations that commence after the effective date of this section. New shall submit the hydrogen sulfide contingency plan prior to commencing work, the division electronically in a form that is compatible with the division's systems and to the local emergency planning committee, no later than 180 days following submission of the radius of exposure required in Subsection D of this Section For subsection F operations and shall be submitted to the division electronically in a generally accepted electronic format that is compatible with the division's daystems before comp@ncement of

 $c_{n}$  may be submitted separately or along with the application for permit to drill (APD).  $f_{n}$  may be submitted separately or along with the application for permit to drill (APD).  $f_{n}$  Evilve to Submit Plan Failure to submit at H<sub>2</sub>S dontingency plan when required matching

 $\kappa$  6. Failure to Submit Plan. Failure to submit a  $41_{2}$  sontingency plan when required may result in denial of an application for permit to drill that well, cancellation of an allowable or other appropriate enforcement action.

7. Annual Review, Amendment. The person, operator or facility shall review the <u>hydrogen sulfide</u> H<sub>2</sub>S contingency plan on an annual basis, <u>or more frequently</u> if activation of a plan reveals a deficiency or, if changes to processes, concentrations of hydrogen sulfide or other circumstances occur. The person, operator or facility shall submit any amendments to the division electronically in a form that is compatible with the division's systems and to the local emergency planning committee. Reasonable efforts shall be taken to update on an annual basis the fames and telephone numbers of <u>persons within a public area subject to a potentially hazardous volume designated in E.4.c.v. within the 100 ppm radius of exposure</u>. In the Wydrogen Sulfide Contingney Law,

8 Retention and Inspection. A <u>The hydrogen sulfide</u> n H<sub>2</sub>S contingency plan shall be reasonably accessible in the event of a release and maintained on file at all times and shall be available for inspection by the Division.

9. Activation Levels. The <u>hydrogen sulfide H<sub>2</sub>S</u> contingency plan shall be activated in the event of a release that may create a concentration of hydrogen sulfide of 100 ppm in any public area.
 500 ppm at any public road or if a concentration of 100 ppm hydrogen sulfide may be present 3,000 feet from the site of release of a potentially hazardous volume of H<sub>2</sub>S above the respective thresholds (i.e. 500 ppm radius at any public road, 100 ppm radius at any public area, etc.) or if a sustained concentration of

H<sub>2</sub>S exceeds 50 ppm at the facility boundary of any facility, well or operation. F. Protection from Hydrogen Sulfide During Drilling, Workover and Servicing Operations.

1. API Standards. All drilling, completion, workover and well servicing operations where it is reasonably expected that a concentration of hydrogen sulfide in a gaseous mixture of 100 ppm or greater will be encountered shall be conducted with due consideration to the guidelines published by the API entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Safe Drilling and Well Servicing)

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before commencing operations or, for existing facilities, within 180 days of the effective date of this section; any well, facility or operation that commences operations after the effective date of this section. shall calculate the radius of exposure and submit the results phior to beginning operations. Operators may petition the Division for an extension of the submission date, or for an exception to the electronic submission requirement pursuant to subsection J of this Section. calculate on

the detainents 4. Recalculation. <u>The person, operator or facility shall recalculate the radius of exposure</u> if any of the following occurs: an operational change or production alterations are made then recalculations may be made cause the hydrogen sulfide concentration to increase to 100 ppm or greater -application of generally accepted engineering principles and generally becepted operating practices -indicate - If recalculations indicate that the a hydrogen sulfide H2S concentration has increased to become erenter than 100 ppm or greater; a 25% or greater increase in the actual volume fraction of hydrogen, -sulfide has occurred; in a given operation or facility, the person, operator or facility shall recalculate the -radius of exposure or, and, changed circumstances result in a the ROE reveals that a potentially hazardous volume where one was not previously present PHV may be present. If recalculation is performed, the -results shall be submitted submit the results to the division electronically in a generally accepted electronic format that is compatible with the division's systems. KX

E. Hydrogen Sulfide H<sub>2</sub>S Contingency Plan.

1. In General. A hydrogen sulfide n H2S contingency plan is a written document that provides a plan of action that will be used to alert and protect persons at risk in the event of a potentially significant release of hydrogen sulfide gas. The hydrogen sulfide contingency plan must be developed in accordance with the following paragraphs.

2. When Required. A hydrogen sulfide n H<sub>2</sub>S contingency-plan must be prepared whenever a potentially hazardous volume of hydrogen sulfide is may be present,

3. Input of Emergency Response Authorities and the Division. The person, operator or facility shall develop a proposed hydrogen sulfide contingency plan and provide a copy to coordinate the proposed H<sub>2</sub>S contingency plan with the division, the New Mexico department of public safety (i.e. the New Mexico state police), and the local emergency planzing committee. If the potential source of release is within a municipality, a copy shall be provided to the municipal police and fire department. If the potential source of the release is within a copy shall a copy shall be provided to as appropriate, the county sheriff and the oity or municipal police, and/or police and fire departments. Input on the proposed plan shall be sought from each of the foregoing; if an emergency response authority provided with a copy of the proposed plan fails to provide input or fails to respond at all, that fact shall be stated in the problems and a submitted to the division. The input provided by the emergency response authorities shall be considered when preparing the final plan for submission to the division but failure to include any specific suggestion shall not affect the validity of the plan or cause disapproval of the plan by the division. A statement in the contingency plan indicating which agencies have been notified shall suffice as proof of opordination.

4. Elements.

a. Elements Required for Each Plan:

release of a potentially hereited to hydrogen sulfide shall be included in each hydrogen sulfide. contingency plan, including an immediate action plan that provisions for alerting and accounting for personnel, controlling any release of hydrogen sulfide gas, eliminating possible ignition sources, alerting the public (directly or through appropriate government agencies), evacuating persons in the affected area. Fine call list to alert company officials and assure coordination with emergency/response authorities making recommendations to public officials to block access to affected areas and evacuations and coordination of emergency response with emergency response authorities. Alternatively, Aplan that addresses the items described in paragraph 7.6 of guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, most recent edition shall be adequate for this purpose;

ii. A call list including the following as applicable: aa. local supervisory personnel;

or may reasonably to expected \$33

remote locations, a simplified a reaction-type plan may be prepared and submitted that provides for mass notification of a hydrogen sulfide leak and for an evacuation of affected areas; and

will. diditional support information, if applicable, such as the location of V II emergency evacuation routes, the location of safety and life-support equipment, the location of facilities containing hydrogen sulfide containing facilities, the location of nearby telephones or other means of communication and special instructions for conditions at a particular installation such as local terrain and the effect of various weather conditions.

d. Additional Requirements. The division may impose additional requirements or modify requirements based on site specific conditions, population density or special circumstances.

5. Submission, When Submitted The hydrogen sulfide contingency plan shall be submitted to the division and a copy shall be submitted to the local emergency planning committee, if one exists. Existing For crude oil pump stations, producing wells, tank batterics and associated production -facilities, refinerics, gas plants and compressor stations shall submit existing subsection G facilities. hydrogen sulfide H.S contingency plan shall be submitted no later than 180 days from the effective date. of this section. Existing drilling, workover and servicing operations shall submit the hydrogen sulfide -contingency plan for the relevant well no later than 180 days after the effective date of this section. New -erude oil pump stations, producing wells, tank batteries and associated production facilities, refineries, gas plants and compressor stations shall submit the H2S contingency plan prior to beginning operations. New wells and workover and servicing operations that commence after the effective date of this section shall submit the hydrogen sulfide contingency plan prior to commencing work. the division electronical in a form that is compatible with the division's systems and to the local emergency planning committee. no later than 180 days following submission of the radius of exposure required in Subsection D of this Section For subsection F operations and shall be submitted to the division electronically in a generally accepted electronic format that is compatible with the division's cystems before componcement of operations. The hydrogen sulfide H2S contingency plan for a drilling, workover of servicing operation may be submitted separately or along with the application for permit to drill (APD). Metio

6. Failure to Submit Plan. Failure to submit an H2S contingency plan when required may result in denial of an application for permit to drill that well, cancellation of an allowable or other appropriate enforcement action.

7. Annual Review, Amendment. The person, operator or facility shall review the hydrogen sulfide H<sub>2</sub>S contingency plan on an annual basis, or more frequently if activation of a plan reveals a deficiency or, if changes to processes, concentrations of hydrogen sulfide or other circumstances occur. The person, operator or facility shall submit any amendments to the division electronically in a form that is compatible with the division's systems and to the local emergency planning committee. 100 ppm radius of exposure. in the hydrogen sulfide contingency skan.

8\_ Retention and Inspection. A The hydrogen sulfide n H2S contingency plan shall be reasonably accessible in the event of a release and maintained on file at all times and shall be available for inspection by the Division.

 $\overline{P}$ . Activation Levels. The hydrogen sulfide H<sub>2</sub>S contingency plan shall be activated in the event of a release that may create a concentration of hydrogen sulfide of 100 ppm in any public area € 500 ppm at any public road or if a concentration of 100 ppm hydrogen sulfide may be present 3,000 fee from the site of release of a potentially hazardous volume of H<sub>2</sub>S above the respective thresholds (i.e. 500 ppm radius at any public road, 100 ppm radius at any public area, etc.) or if a sustained concentration of H2S exceeds 50 ppm at the facility boundary of any facility, well or operation

F. Protection from Hydrogen Sulfide During Drilling, Workover and Servicing Operations. 1. API Standards. All drilling, completion, workover and well servicing operations

where it is reasonably expected that a concentration of try and the consideration to the guidelines published by the API entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Safe Drilling and Well Servicing P

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Operations Involving of Wells Containing Hydrogen Sulfide," RP-49, most recent edition.

2. Minimum Standards. At a minimum, and possibly in addition to the foregoing API standards, each drilling, completion, workover and well servicing operation shall also be conducted in accordance with the following:

a Before Commencing Operations. The person, operator of facility shall complete a the hydrogen sulfide n H<sub>2</sub>S contingency plan, where required, before commencement of operations. In addition, hydrogen sulfide training shall be completed and all related safety equipment and warning systems shall be operational before commencement of operations. Detection and monitoring equipment is not required for drilling from the surface to within 500 feet of the zone anticipated to contain hydrogen sulfide.

b. Egress Routes The person, operator or facility shall maintain passable egress routes at all times during operations.

shall provide hydrogen sulfide detection and monitoring equipment as follows:

i. Each drilling and completion site shall have a hydrogen sulfide detection and monitoring system that automatically activates visible and audible alarms when the ambient air concentration of hydrogen sulfide reaches 20 ppm. There shall be a sensing point 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.

ii. The detection system shall be calibrated tested and the results recorded monthly. Each test of the hydrogen sulfide monitoring system shall be recorded on the driller's log or its equivalent.

iii. For workover and well servicing operations, one operational sensing point shall be located as close to the well bore as practical. Additional sensing points may be necessary for large or long-term operations.

iv. Hydrogen sulfide detection safety and monitoring equipment must be provided and the prescribed safety equipment must be made operational during drilling when drilling is within 500 feet of <u>a the zone anticipated to contain hydrogen sulfide and continuously thereafter</u> through all subsequent drilling.

d. Wind Indicators and Signs.

i. Equipment to indicate wind direction shall be present and visible at all times. At least two devices to indicate wind direction shall be installed at separate elevations and visible from all principal working areas at all times.

ii. Danger or caution signs shall be displayed along all accesses to the site. The signs shall read "DANGER - POISON GAS, HYDROGEN SULFIDE PRESENT" or, as appropriate, "CAUTION - POISON GAS \_ HYDROGEN SULFIDE MAY BE PRESENT" of equivalent language approved by the division, and in smaller lettering: "Do Not Approach If Red Flag is Flying" or equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967, or regulations of the federal occupational safety and health administration or in another color approved by the division. The signs shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 500 feet from the well site and at a location which allows vehicles to turn around at a safe distance prior to reaching the site.

iii. When a sustained concentration of hydrogen sulfide is detected in excess of 20 ppm at any detection point, red flags shall be displayed.

3. If Hydrogen Sulfide Encountered During Operations. If hydrogen sulfide was not anticipated at the time the division <u>issued a permit to drill approved the APD but</u> is encountered during drilling in <u>a concentration excess</u> of 100 ppm <u>or greater</u> in the gaseous mixture, the operator shall immediately ensure control of the well, suspend drilling operations unless detrimental to well control, <u>takey whatever measures are necessary under the circumstances to assure public safety</u>, and obtain materials and the pare a hydrogen sulfide contingency plan if a potentially hazardous volume is

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prepare a hydrogen sultide >> contingnes plan and obtain materials and equipment to bring the operations.

<u>present</u>. The operator shall notify the division of the event and the mitigating steps that have or are being taken as soon as possible, but no later than 24 hours following discovery.

- 4. X Operating Practices In Hydrogen Sulfide Concentrations of 100 ppm or Greater. - Operating practices in areas known to contain a concentration of hydrogen sulfide gas of 100 ppm or \_\_\_\_\_\_ - greater in the gaseous mixture shall be subject to the following requirements: \_\_\_\_\_\_

(1) If Hydrogen Sulfide Is Encountered During Use of Air, Gas, Mist or Other Non-Mud Circulating Media. If hydrogen sulfide gas in excess of 100 ppm is encountered while drilling with air, gas, mist or other non-mud circulating mediums for 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. An alternate drilling method may be used after <u>encountering hydrogen sulfide in excess of 100</u> <u>ppm but only if the alternate method is specifically approved by the Division.</u> the Division specifically approves encountering hydrogen sulfide in excess of 100 ppm, but only if the alternative method.

**7.2.** K. Flare System. For drilling and completion operations, the person, operator or facility shall install a flare system to safely gather and burn hydrogen sulfide-bearing gas, unless exempted pursuant to Subsection J. Flare outlets shall be located at least 150 feet from as far from the well bore, if as feasible given terrain at the site but not less than 150 feet from the well. Flare lines shall be as straight as practical. The flare system shall be equipped with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall be provided supplemental fuel to maintain ignition.

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Z.f. <u>Use of Well Control Equipment</u>. Remote Controlled Choke. When a potentially hazardous volume of H<sub>2</sub>S may be present in any public area, the following measures shall be taken:

i. <u>Drilling.</u> The person, operator or facility shall install A remote controlled choke and accumulator shall be installed and operational at all times beginning within five formation believed to contain hydrogen sulfide and continuously thereafter during drilling and during completion and well servicing operations what the 100-ppm with radius of exposure includes a public area..., unless exempted pursuant to Subsection J; The remote controlled choke or remote controlled valve that must include, at a minimum, a pressure and hydrogen sulfide-rated well control choke and kill system including manifold and blowout preventer that meets or exceeds the pursuant to specifications API-16C and API-RP 53 or other specifications approved by the division. The blowout preventer stack shall have at least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced, and with a cording to the requirements of this part, or otherwise as approved by the division. or other division rules, if more stringent. Variations to blowout preventer stack arrangements may be granted by the division for good cause shown.

ii. <u>Completion Service and Workover</u> If feasible, the equipment described in the previous subsubparagraph shall be installed and operational at all times during completion, service and workover of a well containing a potentially hazardous volume or when recompleting an existing well into a formation reasonably believed to contain a concentration of hydrogen sulfide in the gaseous mixture equal to or greater than 100 ppm. and during completion and well servicing operations when the 100 ppm H<sub>2</sub>S radius of exposure includes a public area. If not feasible, unless exempted pursuant to Subsection J; For completion or workover operations, the person, operator or facility may install a suitable alternative to a remote choke such as (i.e. a remote controlled valve or blow out preventer with remote accumulator may be used, so long as the alternative equipment will be protective of public safety as set forth in this section, etc. may be used); and

iii. For drilling operations, the person, operator or facility shall install a remote controlled choke or remote controlled value that includes, at a minimum, a pressure and hydrogen sulfide-rated well control choke and kill system including manifold and blowout preventer pursuant to specifications API-16C and API-RP 53. The blowout preventer stack shall have at least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications

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referenced or other division rules, if more stringent. Variations to blowout preventer stack arrangements may be granted by the division for good cause shown.

7.9 Mud Program. A mud program, including de-gassing and flaring, capable of handling H<sub>2</sub>S conditions and well control shall be used.

**2.** h. Well Testing. Except with prior approval by the division, the drill-stem testing shall be <u>closed chamber only</u>, in that conducted only during daylight hours and formation fluids shall not be permitted to flow to the surface. (closed chamber only). An operator shall notify the division <u>twenty-four (24)</u> hours in advance of a drill-stem test if a <u>hydrogen sulfide n H2</u>S contingency-plan is required pursuant to this section.

G. Protection from Hydrogen Sulfide at Crude Oil Pump Stations, Producing Wells, Tank Batteries and Associated Production Facilities, Refineries, Gas Plants and Compressor Stations.

1. API Standards. Operations at crude oil pump stations and producing wells, tank batteries and associated production facilities <u>containing a potentially hazardous volume of hydrogen</u> <u>sulfide</u> shall be conducted <u>with due consideration according</u> to the guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

2. Minimum Standards. At a minimum, production from crude oil pump stations and producing wells, tank batteries and associated production facilities shall also be conducted in accordance with the following subparagraphs and subsubparagraphs. Where API standards referred to in the previous paragraph are less stringent than the following, the more stringent standards shall apply.

a. Gaseous Mixtures Containing 100 ppm or more. Producing wells containing 100 ppm or more of hydrogen sulfide in the gaseous mixture, crude oil pump stations, tank batteries and associated production facilities, refineries, gas plants and compressor stations, shall be subject to the following:

i.  $H_2S$  Contingency Plan. If a potentially hazardous volume of  $H_2S$  exists, an  $H_2S$  contingency plan shall be required.

ii. Signage. A danger sign or signs shall be posted within 50 feet of each facility to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gates shall suffice. The signs shall read "DANGER - POISON GAS - HYDROGEN SULFIDE PRESENT", or, as appropriate "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967, or-regulations of the federal occupational safety and health administration or in another color approved by the division. The signs shall be legible and large enough to be read by all persons entering the well site. A sign shall be placed at each point where a flow line or gathering line crosses a public road. Each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

iii. Fencing. Fencing and gates shall be required when crude oil pump stations and producing wells, tank batteries and associated production facilities are located in a public area or within a 1/4-mile of a residence, school, church, park, playground, school bus stop or place of business. The fence shall consist of a 5-foot chain link topped by two stands of barbed wire or other designs approved by the division. Gates shall be locked when unattended.

iv. Wind Direction Indicators. Wind direction indicators shall be required at every crude oil pump station, producing well, tank battery and associated production facility where the  $H_2S$  concentration in a gaseous state exceeds 100 PPM.

v. Secondary Well Control. <u>Any well where the 100-ppm H<sub>2</sub>S radius of</u> exposure incorporates a public area shall possess a secondary means of immediate well control through the use of appropriate christmas tree or downhole completion equipment <u>if a potentially hazardous</u> volume exists at any public area. Such equipment shall allow downhole accessibility (reentry) under pressure for permanent well control operations.

vi. Automatic Safety Valve or Shutdown. <u>Any well If the 100-ppm</u> radius of exposure involves a public area, the person, operator or facility shall possess install an automatic safety valve or shutdown at the facility or wellhead or shall install other appropriate shut-in control <u>if a</u> <u>potentially hazardous volume exists at any public area</u>. The automatic safety valve shall be set to activate upon a release of a potentially hazardous volume of hydrogen sulfide

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3. Tanks or vessels containing 300 ppm or more of hydrogen sulfide: Tanks or vessels containing 300 ppm or more of hydrogen sulfide in the gaseous mixture shall be subject to the following additional requirements:

i. Each stair or ladder leading to the top of any storage tank shall be chained or marked to restrict entry. For-Any tank <u>or tank</u> battery that requires fencing pursuant to this section <u>may substitute</u> a danger sign posted at the gates <del>may be substituted</del> for chaining and signs.

ii. The person, operator or facility shall post a danger sign on or within 50 feet of any storage tank to alert persons of the potential hydrogen sulfide danger. For any storage tank for which fencing is required, a danger sign posted at the locked gates shall suffice. The signs shall read "DANGER - POISON GAS - HYDROGEN SULFIDE PRESENT" or as appropriate "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967

 $\mathcal{L}$  Compliance Schedule. Each existing crude oil pump station and producing well, tank battery and associated production facility not currently meeting the requirements and minimum standards set forth herein shall be brought into compliance within one year of the effective date of this section except that contingency plans shall be submitted within 180 days. Each crude oil pump station and producing well, tank battery and associated production facility constructed following the effective date of this section shall be designed, constructed and operated to meet the requirements set forth herein.

H. Personnel Protection and Training. All persons responsible for the implementation of any <u>hydrogen sulfide H<sub>2</sub>S</u> contingency plan shall be provided training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.

I. Standards for Equipment That May Be Exposed to Hydrogen Sulfide. Persons, operators and facilities shall choose equipment with consideration for both the <u>hydrogen sulfide H<sub>2</sub>S</u> working environment and anticipated stresses. NACE Standard MR0175 (latest edition) or some other standard approved by the division shall be used for selection of metallic equipment or, if applicable, adequate protection by chemical inhibition or other methods that control or limits the corrosive effects of <u>hydrogen</u> sulfide H<sub>2</sub>S shall be used. A management of this section may be granted by the division. An exemption to any certain requirements of this section may be granted by

J. Exemptions. An exemption to <u>any</u> certain requirements of this section may be glanted bypetitioning the director. Any such petition shall provide specific information as to the circumstances that warrant approval of the exemption requested and how the public safety will be protected. Submission of asafety plan required by other governmental agencies may accompany the petition for exemption. The director, after considering all relevant factors, may approve an exemption if the circumstances warrant an exemption.

K. Release. Upon a release of hydrogen sulfide the following actions must be taken:

1. Activation of the <u>Hydrogen Sulfide H<sub>2</sub>S</u> Contingency Plan. The person, operator or facility shall activate the H<sub>2</sub>S contingency plan immediately upon an H<sub>2</sub>S release where the potential exists for exposure to The <u>hydrogen sulfide H<sub>2</sub>S</u> contingency plan shall be activated in the event of a release that may create a concentration of hydrogen sulfide of 100 ppm in any public area, 500 ppm at any public road or 100 ppm 3,000 feet from the site of release.

2. Notification of the Division. The person, operator or facility shall notify the division upon a release of hydrogen sulfide requiring activation of the <u>hydrogen sulfide</u> H<sub>2</sub>S contingency plan as soon as practicable, preferably within one hour of discovery of the release as soon as possible in cases where prompt response should supercede notification. The person, operator or facility shall submit a full report of the incident to the division on Form C-141 no later than fifteen (15) days following the release.

L. Electronic Submission. Any submission to the division required by this section shall be made electronically in a generally accepted format that is compatible with the division's systems.

<u>M. L.</u> Corrective Actions. The division may require corrective actions if necessary to maintain control of a well or any other facility or to safeguard public safety.



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referenced or other division rules, if more stringent. Variations to blowout preventer stack arrangements may be granted by the division for good cause shown.

Z.J. Mud Program. A mud program, including de-gassing and flaring, capable of handling H<sub>2</sub>S conditions and well control shall be used.

**2.** *L*. Well Testing. Except with prior approval by the division, the drill-stem testing shall be <u>closed chamber only</u>, in that conducted only during daylight hours and formation fluids shall not be permitted to flow to the surface. (closed chamber only). An operator shall notify the division <u>twenty-four (24)</u> hours in advance of a drill-stem test if a <u>hydrogen sulfide n H2S contingency</u> plan is required pursuant to this section.

G. Protection from Hydrogen Sulfide at Crude Oil Pump Stations, Producing Wells, Tank Batteries and Associated Production Facilities, Refineries, Gas Plants and Compressor Stations.

1. API Standards. Operations at crude oil pump stations and producing wells, tank batteries and associated production facilities <u>containing a potentially hazardous volume of hydrogen</u> <u>sulfide</u> shall be conducted <u>with due consideration according</u> to the guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

2. Minimum Standards. At a minimum, production from crude oil pump stations and producing wells, tank batteries and associated production facilities shall also be conducted in accordance with the following subparagraphs and subsubparagraphs. Where API standards referred to in the previous paragraph are less stringent than the following, the more stringent standards shall apply.

-a. Gaseous Mixtures Containing 100 ppm or more. Producing wells containing 100 ppm or more of hydrogen sulfide in the gaseous mixture, crude oil pump stations, tank batteries and associated production facilities, refineries, gas plants and compressor stations, shall be subject to the following.

i. H<sub>2</sub>S Contingency Plan. If a potentially hazardous volume of H<sub>2</sub>S exists, an H<sub>2</sub>S contingency plan shall be required.

A danger sign or signs shall be posted within 50 feet of each facility to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gates shall suffice. The signs shall read "DANGER - POISON GAS - HYDROGEN SULFIDE PRESENT", or, as appropriate, "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967, or regulations of the federal occupational safety and health administration or in another color approved by the division. The signs shall be legible and large enough to be read by all persons entering the site. A sign shall be placed at each point where a flow line or gathering line crosses a public road. Each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

stations and producing wells, tank batteries and associated production facilities are located in a public area or within 1/4-mile of a feasible of a social course, park, playground school bus stop or players. business. The fence shall consist of a 5-foot chain link topped by two stands of barbed wire or other design, approved by the division. Gates shall be locked when unattended.

Wind Direction Indicators. Wind direction indicators shall be required at every crude oil pump station, producing well, tank battery and associated production facility where the H<sub>2</sub>S concentration in a gaseous state exceeds 100 PPM.
Secondary Well Control. Any well where the 100 ppm H<sub>2</sub>S radius of through

Secondary Well Control. <u>Any well where the 100 ppm H<sub>2</sub>S radius of</u> exposure incorporates a public area shall possess a secondary means of immediate well control through the use of appropriate christmas tree or downhole completion equipment <u>if a potentially hazardous</u>. <u>volume exists at any public area</u>. Such equipment shall allow downhole accessibility (reentry) under pressure for permanent well control operations.

radius of exposure involves a public area, the person, operator or facility shall possess install an automatic safety valve or shutdown at the facility or wellhead or shall other appropriate shut-in control

remote locations, a simplified a reaction-type plan may be prepared and submitted that provides for mass notification of a hydrogen sulfide leak and for an evacuation of affected areas; and

VII viil fiditional support information, if applicable, such as the location of emergency evacuation routes, the location of safety and life support equipment, the location of <u>facilities</u> <u>containing hydrogen sulfide containing facilities</u>, the location of nearby telephones or other means of communication and special instructions for conditions at a particular installation such as local terrain and the effect of various weather conditions.

d. Additional Requirements. The division may impose additional requirements or modify requirements based on site specific conditions, population density or special circumstances.

5 Submission, When Submitted The hydrogen sulfide contingency plan shall be submitted to the division and a copy shall be submitted to the local emergency planning committee, if one exists. Existing For erude oil pump stations, producing wells, tank batteries and associated production facilities, refineries, gas plants and compressor stations shall submit hydrogen sulfide H.S contingency plan shall be submitted no later than 180 days from the effective date

-of this section. Existing drilling, workover and servicing operations shall submit the hydrogen sulfide. -contingency plan for the relevant well no later than 180 days after the effective date of this section. New -erude oil pump stations, producing wells, tank batteries and associated production facilities, refineries,

<u>shall submit the hydrogen sulfide contingency plan prior to commencing work.</u> the division electronically in a form that is compatible with the division's systems and to the local emergency planming sommittee, no later than 180 days following submission of the radius of exposure required in Subsection D of this Section For subsection F operations and shall be submitted to the division electronically accepted electronic format that is compatible with the division's for a division electronically operations. The hydrogen sulfide H<sub>2</sub>S contingency plan for a division's effort companies before companies of operations. The hydrogen sulfide H<sub>2</sub>S contingency plan for a division's effort companies before companies of may be submitted separately or along with the application for permit to drill (APD).

 $\sim$  6. Failure to Submit Plan. Failure to submit a  $12^{\circ}$  gontingency plan when required may result in denial of an application for permit to drill that well, cancellation of an allowable or other appropriate enforcement action.

7. Annual Review, Amendment. The person, operator or facility shall review the <u>hydrogen sulfide H<sub>2</sub>S</u> contingency plan on an annual basis, <u>or more frequently</u> if activation of a plan reveals a deficiency or, if changes to processes, concentrations of hydrogen sulfide or other circumstances occur. The person, operator or facility shall submit any amendments to the division electronically in a form that is compatible with the division's systems and to the local emergency planning committee. Reasonable efforts shall be taken to update on an annual basis the names and telephone numbers of persons within a public area subject to a potentially hazardous volume designated in E.4.o.v. within the 100 ppm radius of exposure. in the Ward con sulfide of the Contingency plan shall be

8 Retention and Inspection. A <u>The hydrogen sulfide n H<sub>2</sub>S</u> contingency plan shall be reasonably accessible in the event of a release and maintained on file at all times and shall be available for inspection by the Division.

Activation Levels. The <u>hydrogen sulfide</u> H<sub>2</sub>S contingency plan shall be activated in the event of a release that may create a concentration of hydrogen sulfide of 100 ppm in any public area 500 ppm at any public toad or if a concentration of 100 ppm hydrogen sulfide may be present 3,000 feet from the site of release of a potentially hazardous volume of H<sub>2</sub>S above the respective thresholds (i.e. 500 ppm radius at any public road, 100 ppm radius at any public area, etc.) or if a sustained concentration of H<sub>2</sub>S exceeds 50 ppm at the facility boundary of any facility, well of potential.

F. Protection from Hydrogen Sulfide During Drilling, Workover and Servicing Operations. 1. API Standards. All drilling, completion, workover and well servicing operations where it is reasonably expected that a concentration of hydrogen sulfide in a gaseous trixture of 100 none or greater will be encountered shall be conducted with due consideration to the guidelines published by the API entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Safe Drilling and Well Servicing"

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### 19.15.2.52 Hydrogen Sulfide Gas (Hydrogen Sulfide)

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A. In General. Hydrogen sulfide gas (known by its chemical abbreviation "H<sub>2</sub>S" or as "sulfurated hydrogen" or "hydrosulfuric acid") is a flammable, poisonous gas that may occur naturally as a component of crude petroleum and natural gas. The gas has a distinct and characteristic odor of rotten eggs but due to olfactory fatigue may not be sensed by the human sense of smell.

B. <u>Applicability</u> Scope. This Section provides for public safety in areas where hydrogen sulfide gas (H<sub>2</sub>S) may exists in concentrations greater than 100 ppm or in a potentially hazardous volume. This section applies to any person, operator or facility subject to the jurisdiction of the Division, including, but not limited to, any person, operator or facility engaged in drilling, stimulating, injecting into, completing, working over or producing any oil, natural gas or carbon dioxide well or any person, operator or facility engaged in gathering, transporting, storing, processing or refining of crude oil, natural gas or carbon dioxide. This section shall not act to exempt or otherwise excuse Exempt from this rule are surface waste management facilities permitted by the division pursuant to 19 NMAC 15.I.711 from more stringent conditions on the handling of hydrogen sulfide required of such facilities by 19 NMAC 15.I.711 or more stringent conditions existing in permits issued thereunder, nor shall such facilities be exempt or otherwise excused from the requirements set forth in this section by virtue of permitting under 19 NMAC 15.I.711.

C. Definitions (specific to this section).

1. ANSI. The acronym "ANSI" means the american national standards institute.

2. API. The acronym "API" means the american petroleum institute.

<u>3. Area of Exposure. The phrase "area of exposure" means the area within a circle constructed with the point of escape at its center and the radius of exposure as its radius.</u>

<u>4.</u> <u>3.</u> ASTM. The acronym "ASTM" means the american society for testing and materials.

5.4. Dispersion Technique. A "dispersion technique" is a mathematical representation of the physical and chemical transportation characteristics, dilution characteristics and transformation characteristics of hydrogen sulfide gas in the atmosphere.

<u>6.</u> 5. Escape Rate. The "escape rate" is the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing hydrogen sulfide. The escape rate is calculated using the maximum daily rate of the gaseous mixture produced or the best estimate thereof. For a natural gas well, the escape rate shall be calculated by using the current daily absolute open flow rate against atmospheric pressure or the best estimate of that rate. For an oil well, the escape rate shall be calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or the best estimate thereof. For an oil or natural gas well drilled in a developed area, the escape rate may be determined by using data from offset wells completed in the interval in question, or using some other reasonable means to calculate the escape rate. For wildeat wells, subparagraph C.13.d shall apply. For facilities or operations not mentioned, the escape rate shall be calculated using the actual flow of the gaseous mixture through the facility or operation.

7. 6. GPA. The acronym "GPA" means the gas processors association.

<u>8.</u> 7. LEPC. The acronym "LEPC" means the local emergency planning committee established pursuant to the emergency planning and community right-to-know act, 42 U.S. C. § 11001.

9. 8. NACE. The acronym "NACE" refers to the national association of corrosion

<u>10.</u> 9. PPM. The acronym "ppm" means "parts per million" by volume.

<u>11.</u> 10. Potentially Hazardous Volume (hereinafter referred to as a "potentially hazardous volume" or by the acronym "PHV") means the volume of hydrogen sulfide gas of such concentration that:

a. the 100-ppm radius of exposure includes any public area as defined herein;b. the 500-ppm radius of exposure includes any public road

as defined herein; or

engineers.

c. the 100-ppm radius of exposure is equal to or in excess of 3,000 feet.

<u>12.</u> <u>11.</u> Public Area. A "public area" is any <u>building or structure that is not associated</u> with the well, operation or system for which the radius of exposure is being calculated and that is used as <u>a</u> dwelling, office, place of business, church, school, hospital, school bus stop, or government building, or any portion of a park, city, town, village or school bus stop or other similar area where members of the public may reasonably be expected to be present.

<u>13.</u> <u>12.</u> Public Road. A "public road" is any federal, state, municipal or county road or highway or postal route.

<u>14.</u> 13. Radius of Exposure. The radius of exposure (hereinafter referred to as "radius of exposure" or "ROE") is <u>that radius constructed with the an imaginary circle constructed around a</u> point of escape <u>as its starting point and its length the radius of which is calculated using the following Pasquill-Gifford derived equation, or by such other method as may be approved by the division:</u>

a. For determining the 100-ppm radius of exposure:  $X = [(1.589)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ , where "X" is the radius of exposure in feet, the "hydrogen sulfide concentration" is the decimal equivalent of the mole or volume fraction of hydrogen sulfide in the gaseous mixture, and "Q" is the escape rate expressed in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

<del>or</del>

b. For determining the 500-ppm radius of exposure:  $X=[(0.4546)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ , where "X" is the radius of exposure in feet, the "hydrogen sulfide concentration" is the decimal equivalent of the mole or volume fraction of hydrogen sulfide in the gaseous mixture, and "Q" is the escape rate expressed in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

c. Where multiple sources of hydrogen sulfide are present (e.g. wells, treatment equipment, flow lines, etc.), the radius of exposure may encompass a larger area than would otherwise be calculated using a radius of exposure computation for each component part.

<u>c. d.</u> For a well being drilled, <u>completed</u>, <u>recompleted</u>, <u>worked</u> <u>over or serviced</u> in an area where insufficient data <u>exists</u> to calculate a radius of exposure but where hydrogen sulfide could reasonably be expected to be present in concentrations in excess of 100 ppm in the gaseous mixture, a 100-ppm radius of exposure equal to 3,000 feet shall be assumed.

D. Determination of Hydrogen Sulfide Risk.

1. Determination of Hydrogen Sulfide Concentration.

a. Each person, operator or facility to which this section applies shall determine the hydrogen sulfide concentration within each of its <u>wells</u> operations or systems. A representative sample or <del>previous</del> process knowledge for each system or operation may be used <u>in lieu of individual for</u> testing <u>of wells</u>, <u>operations or systems</u> provided that the person, operator or facility can demonstrate that the concentration derived from a test or process knowledge of the representative sample <u>or process</u> <u>knowledge</u> is reasonably representative of the hydrogen sulfide concentration within the <u>well</u>, operation<del>,</del> <del>pool</del> or system.

b. The tests <u>used to make the determination</u> referred to in the previous subparagraph shall be conducted in accordance with applicable ASTM or GPA standards or by other methods approved by the division.

before c. If a representative sample from a <u>well operation or</u> system was tested within one (1) year of the effective date of this section, new testing shall not be required provided, however, new testing shall not be required for a producing well that was tested at any time prior to the effective date of this section.

d. The Division may disapprove the test methodology and require additional testing if the testing methodology did not conform to the requirements of this Section.

2. Tested Concentrations Below 100 ppm. If the testing described in the previous paragraph determines that the <u>concentration of</u> hydrogen sulfide <del>concentration</del> in a given <u>well</u>, operation or system is less than 100 ppm, no further actions <u>shall be are</u> required pursuant to this section.

3. Tested Concentrations Above 100 ppm; Calculation of the Radius of Exposure.

a. If the testing described in paragraph 1 of this subsection determines that the concentration of hydrogen sulfide in a given well, operation or system gaseous mixture is 100 ppm or greater, then the person, operator or facility must calculate the radius of exposure pursuant to this section.

b. If calculation of the radius of exposure reveals that a potentially hazardous volume <u>is may be</u> present, the person, operator or facility shall provide the results of the <u>determination of</u> the hydrogen sulfide concentration and the calculation of the <u>testing</u> and the resulting radius of exposure determinations to the division electronically in a generally accepted electronic format that is compatible with the division's systems. For a well, operation or system existing on the effective date of this section, the determination, calculation and submission required herein shall be accomplished before commencing operation or system that commences operations after the effective date of this section, the determination, calculation and submission required herein shall be accomplished before operations, calculation and submission required herein shall be accomplished before operations, the determination, calculation and submission required herein shall be accomplished before operations, the determination, calculation and submission required herein shall be accomplished before operations, the determination, calculation and submission required herein shall be accomplished before operations, the determination, calculation and submission required herein shall be accomplished before operations begin. Operators may petition the Division for an extension of the submission date, or for an exception to the electronic submission requirement pursuant to subsection.

4. Recalculation. The person, operator or facility shall calculate or recalculate the radius of exposure if an operational change or production alterations are made then recalculations may be made causes the hydrogen sulfide concentration in a well, operation or system to increase to 100 ppm or greater or, if the hydrogen sulfide concentration in a well, operation or system was already 100 ppm or greater, causes a 25% or greater increase in the actual volume fraction of hydrogen sulfide. If calculation or recalculation of the radius of exposure reveals that a potentially hazardous volume is present, the person, operator or facility shall provide the results to the division within thirty (30) days. application of generally accepted engineering principles and generally accepted operating practices. If recalculations indicate that a hydrogen sulfide H2S concentration has become greater than 100 ppm a 25% or greater increase in the actual volume fraction or facility, the person, operator or facility shall recalculate the radius of exposure and, the ROE reveals that a PHV may be present submit the results to the division electronically in a generally accepted electronic format that is compatible with the division's systems.

E. <u>Hydrogen Sulfide</u> H<sub>2</sub>S Contingency Plan.

1. In General. A <u>hydrogen sulfide</u>  $n H_2S$  contingency plan is a written document that provides a plan of action that will be used to alert and protect persons at risk in the event of a potentially significant release of hydrogen sulfide gas. The <u>hydrogen sulfide contingency plan</u> must be developed in accordance with the following paragraphs.

2. When Required. A hydrogen sulfide  $n H_2S$  contingency plan must be prepared whenever a potentially hazardous volume of hydrogen sulfide is may be present or may reasonably expected to be encountered.

3. Input of Emergency Response Authorities and the Division. The person, operator or facility shall develop a proposed hydrogen sulfide contingency plan and provide a copy to ecordinate the proposed H<sub>2</sub>S contingency plan with the division, the New Mexico department of public safety (*i.e.*, the New Mexico state police), and the local emergency planning committee. If the potential source of release is within a municipality, a copy shall be provided to the municipal police and fire department. If the potential source of the release is outside the boundaries of a municipality, a copy shall instead be provided to as appropriate, the county sheriff and the eity or municipal police, and/or police and county fire department or departments. Input on the proposed plan shall be sought from each of the foregoing; if an emergency response authority provided with a copy of the proposed plan fails to provide input or fails to respond at all, that fact shall be stated in the final hydrogen sulfide contingency plan submitted to the division. The input provided by the emergency response authorities shall be considered when preparing the final plan for submission to the division but failure to include any specific suggestion shall not affect the validity of the plan or cause disapproval of the plan by the division. A statement in the contingency plan indicating which agencies have been notified shall suffice as proof of coordination.

4. Elements.

a. Elements Required for Each Plan:

#### i. A detailed description of each action to be taken in the event of a

release of a potentially hazardous volume of hydrogen sulfide requiring activation shall be included in each hydrogen sulfide contingency plan, including an immediate action plan that provisions for alerting and accounting for personnel, controlling any release of hydrogen sulfide gas, eliminating possible ignition sources, alerting the public (directly or through appropriate government agencies), evacuating persons in the affected area, using the call list to alert company officials and emergency response authorities, making recommendations to public officials to block access to affected areas and conducting evacuations and coordinating emergency response with emergency response authorities. A plan that addresses the items described in paragraph 7.6 of the guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, most recent edition, shall be adequate for this purpose;

ii. A call list including the following as applicable:

- aa. local supervisory personnel;
- bb. county sheriff;
- cc. the department of public safety and state police;
- dd. city or municipal police;
- ee. the appropriate division district office; and
- ff. other public agencies as appropriate;

iii. A plat or map detailing the area within the radius of exposure of a potentially hazardous volume; and

iv. A list of the names and telephone numbers of all personnel to be contacted when a release is reported or suspected.

b. Where the 500-ppm radius of exposure encompasses any public road, the person, operator or facility shall include the following additional elements in the <u>hydrogen sulfide  $H_2S$ </u> contingency plan:

i. Instructions and procedures for alerting and coordinating <u>emergency</u> <u>response to a release</u> with emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide at any public road;

ii. A plat or map detailing the area of exposure, including the locations of public roads within the radius of exposure of a potentially hazardous volume; and

<u>ii.</u> iii. A plan to divert traffic and safely get existing traffic off the road and out of danger.

c. Where the 100-ppm radius of exposure encompasses any public area, the following additional elements shall be included in the <u>hydrogen sulfide  $H_2S$  contingency plan:</u>

i. Detailed plans of action to alert and protect persons in the event of a release of a potentially hazardous volume of hydrogen sulfide, including instructions and procedures for alerting persons at risk and emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide;

- aa. ambulance services;
- bb. hospitals;
- cc. county and city fire departments;
- dd. doctors;
- ee. contractors for supplemental or emergency equipment; and
- ff. other public agencies as appropriate;

<u>ii.</u> iii. A statement describing how emergency response actions will be coordinated with the division and the New Mexico state police, consistent with the New Mexico hazardous materials emergency response plan (HMER);

<u>iii.</u> iv. A plat or map detailing the area of exposure, including the locations of <u>public areas and private dwellings or residences</u>, <u>public facilities such as schools</u>, <u>businesses</u>,

public roads or other similar areas where the public may be reasonably expected to be present within the radius of exposure;

<u>iv.</u> <del>v.</del> The names and telephone numbers of all persons living within the area of exposure radius of exposure of 100 ppm hydrogen sulfide</del> and contact persons for <u>areas of public</u> <u>concentration</u> <u>each public area</u>, such as churches, schools, <u>hospitals</u>, <u>offices and places of</u> businesses;

<u>v. vi.</u> Provision for advance briefing of affected and responsible persons within the radius of exposure. Such advance briefing shall include the hazards and characteristics of hydrogen sulfide, the necessity for a <u>hydrogen sulfide n H<sub>2</sub>S</u> contingency plan, the possible sources of hydrogen sulfide within the radius of exposure, instructions for reporting a gas leak, the manner in which persons will be notified in the event of an emergency and steps to be taken in an emergency; and

vi. vii. In lieu of the provision for advance briefing of persons within the radius of exposure described in the previous subsubparagraph, a reaction-type plan may be prepared and submitted that provides for mass notification of a release of hydrogen sulfide and for evacuation of affected areas where the operator can demonstrate that the risk to public safety is minimal such as in remote locations, a simplified a reaction type plan may be prepared and submitted that provides for mass notification of a hydrogen sulfide leak and for an evacuation of affected areas; and

<u>vii.</u> viii. Additional support information, if applicable, such as the location of emergency evacuation routes, the location of safety and life-support equipment, the location of facilities <u>containing hydrogen sulfide</u>, the location of nearby telephones or other means of communication and special instructions for conditions at a particular installation such as local terrain and the effect of various weather conditions.

d. Additional Requirements. The division may impose additional requirements or modify requirements based on site-specific conditions, population density or special circumstances.

5. Submission. <u>The hydrogen sulfide contingency plan shall be submitted to the division</u> and a copy shall be submitted to the local emergency planning committee, if one exists. A hydrogen sulfide contingency plan for a well, system or operation existing on the effective date of this section shall be submitted within 180 days from the effective date of this section. A hydrogen sulfide contingency plan for a new well, system or operation shall be submitted before operations commence. A hydrogen sulfide contingency plan shall be submitted within 180 days if a public area or public road is established that creates a potentially hazardous volume where none previously existed. For subsection G facilities. H<sub>2</sub>S shall be submitted to the division electronically in a form that is compatible with the division's systems and to the local emergency planning committee, no later than 180 days following submission of the radius of exposure required in Subsection D of this Section For subsection F operations and shall be submitted to the division electronically in a generally accepted electronic format that is compatible with the division's systems before commencement of operations. The hydrogen sulfide H<sub>2</sub>S contingency plan for a drilling, completion, workover or well servicing operation may be submitted separately or along with the application for permit to drill (APD).

6. Failure to Submit Plan. Failure to submit a <u>hydrogen sulfide</u>  $n H_2S$  contingency plan when required may result in denial of an application for permit to drill that well, cancellation of an allowable or other appropriate enforcement action.

7. Annual Review, Amendment. The person, operator or facility shall review the <u>hydrogen sulfide H<sub>2</sub>S</u> contingency plan on an annual basis, <u>or more frequently</u> if activation of a plan reveals a deficiency <del>or,</del> if changes to processes, concentrations of hydrogen sulfide or other circumstances occur, <u>or if a new public area and/or a new public road is established that creates a potentially hazardous volume</u>. The person, operator or facility shall submit any amendments to the division <del>electronically in a</del> form that is compatible with the division's systems and to the local emergency planning committee. Reasonable efforts shall be taken to update on an annual basis the <u>lists of</u> names and telephone numbers <u>in the hydrogen sulfide contingency plan designated in E.4.c.v.within the 100 ppm radius of exposure</u>.

8. Retention and Inspection. A <u>The hydrogen sulfide  $n H_2S$ </u> contingency plan shall be reasonably accessible in the event of a release and maintained on file at all times and shall be available for inspection by the division.

9. Activation Levels. The  $H_2S$  contingency plan shall be activated in the event of a release a potentially hazardous volume of  $H_2S$  above the respective thresholds (i.e. 500 ppm radius at any public road, 100 ppm radius at any public area, etc.) or if a sustained concentration of  $H_2S$  exceeds 50 ppm at the facility boundary of any facility, well or operation.

F. Signage at Wells, Facilities or Operations. For every well, operation or system to which this section applies that contains a concentration of hydrogen sulfide of 100 ppm or greater, the person, operator or facility must provide signage as set forth herein.

1. Drilling, Completion, Workover, and Well Servicing Operations. A danger or caution sign shall be displayed at each drilling, completion, workover and well servicing operation along each point of access to the site. The signs shall read "DANGER - POISON GAS, HYDROGEN SULFIDE PRESENT" or, as appropriate, "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or use equivalent language approved by the division, and shall state in smaller lettering: "Do Not Approach If Red Flag is Flying" or use equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration, or in another color approved by the division. The signs shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 500 feet from the well site and at a location that allows vehicles to turn around at a safe distance prior to reaching the site.

2. Crude Oil Pump Stations, Producing Wells, Tank Batteries and Associated Production Facilities, Refineries, Gas Plants and Compressor Stations. A danger sign or signs shall be posted within 50 feet of each crude oil pump station, producing well, tank battery and associated production facility, refinery, gas plant and compressor station to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gates shall suffice. The signs shall read "DANGER - POISON GAS -HYDROGEN SULFIDE PRESENT," or, as appropriate, "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or use equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration, or in another color approved by the division. The signs shall be legible and large enough to be read by all persons entering the site. A sign shall be placed at each point where a flow line or gathering line crosses a public road; each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

3. Tanks or Vessels. A danger sign or signs shall be posted on or within 50 feet of any storage tank to alert persons of the potential hydrogen sulfide danger. For any storage tank for which fencing is required, a danger sign posted at the locked gates shall suffice. The signs shall read "DANGER - POISON GAS - HYDROGEN SULFIDE PRESENT," or, as appropriate "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT," or equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration or another color approved by the division. The sign(s) shall be legible and large enough to be read by all persons entering the site.

<u>G. F.</u> Protection from Hydrogen Sulfide During Drilling, <u>Completion</u>, Workover, and <u>Well</u> Servicing Operations.

1. API Standards. All drilling, completion, workover and well servicing operations where it is reasonably expected that a potentially hazardous volume of hydrogen sulfide will be encountered shall be conducted with due consideration to the guidelines published by the API entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Safe Drilling and Well Servicing Operations Involving of Wells Containing Hydrogen Sulfide," RP-49, most recent edition.

2. Minimum Standards. At a minimum, and possibly in addition to the foregoing API standards, each drilling, completion, workover and well servicing operation where a potentially hazardous volume of hydrogen sulfide may reasonably be expected to be encountered shall also be conducted in accordance with the following:

a. Before Commencing Operations. The person, operator or facility shall complete an H<sub>2</sub>S contingency plan, where required, before commencement of operations. In addition,

Hydrogen sulfide training shall be completed and all related safety equipment and warning systems shall be operational before commencement of operations. Detection and monitoring equipment is not required for drilling from the surface to within 500 feet of the zone anticipated to contain hydrogen sulfide.

b. Egress Routes. The person, operator or facility shall maintain passable egress routes at all times during operations.

c. Safety, Detection and Monitoring Equipment. The person, operator or facility shall provide hydrogen sulfide detection and monitoring equipment as follows:

i. Each drilling and completion site shall have a hydrogen sulfide detection and monitoring system that automatically activates visible and audible alarms when the ambient air concentration of hydrogen sulfide reaches 20 ppm. There shall be a sensing point 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.

ii. The detection system shall be calibrated <u>and</u> tested and the results recorded monthly. Each test of the hydrogen sulfide monitoring system shall be recorded on the driller's log or its equivalent.

iii. For workover and well servicing operations, one operational sensing point shall be located as close to the well bore as practical. Additional sensing points may be necessary for large or long-term operations.

iv. Hydrogen sulfide detection, safety and monitoring equipment must be provided and the prescribed safety equipment must be made operational during drilling when drilling is within 500 feet of <u>a the</u> zone anticipated to contain hydrogen sulfide and continuously thereafter through all subsequent drilling.

d. Wind Indicators and Signs.

i. Equipment to indicate wind direction shall be present and visible at all times. At least two devices to indicate wind direction shall be installed at separate elevations and visible from all principal working areas at all times.

ii.—Danger or caution signs shall be displayed along all accesses to the site. The signs shall read "DANGER—POISON GAS, HYDROGEN SULFIDE PRESENT" or, as appropriate, "CAUTION—POISON GAS—HYDROGEN SULFIDE MAY BE PRESENT" or use equivalent language approved by the division, and <u>shall state in smaller lettering</u>: "Do Not Approach If Red Flag is Flying" or <u>use</u> equivalent language approved by the division.—Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1–1967 or regulations of the federal occupational safety and health administration, or in another color approved by the division.—The signs shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 500 feet from the well site and at a location <u>that</u> which allows vehicles to turn around at a safe distance prior to reaching the site.

iii. When a sustained concentration of hydrogen sulfide is detected in excess of 20 ppm at any detection point, red flags shall be displayed.

<u>e. b.</u> Flare System. For drilling and completion operations, the person, operator or facility shall install a flare system to safely gather and burn hydrogen sulfide-bearing gas, unless exempted pursuant to Subsection J. Flare outlets shall be located <u>at least 150 feet from as far from</u> the well bore as feasible but not less than 150 feet from the well. Flare lines shall be as straight as practical. The flare system shall be provided supplemental fuel to maintain ignition.

<u>f.</u> e. <u>Use of Well Control Equipment</u>. Remote Controlled Choke. When a potentially hazardous volume of  $H_2S$  may be present in any public area, the following measures shall be taken:

i. <u>Drilling</u>. The person, operator or facility shall install A remote controlled choke and accumulator shall be installed and operational at all times beginning when drilling is within 500 feet of the formation believed to contain hydrogen sulfide and continuously thereafter during drilling and during completion, workover and well servicing operations when the 100-ppm H<sub>2</sub>S radius of exposure includes a public area.., unless exempted pursuant to Subsection J; The remote controlled

choke or remote controlled valve that <u>must</u> include, at a minimum, a pressure and hydrogen sulfide-rated well control choke and kill system including manifold and blowout preventer <u>that meets or exceeds the</u> pursuant to specifications API-16C and API-RP 53 or other specifications approved by the division. The blowout preventer stack shall have at least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced, according to the requirements of this part, or otherwise as approved by the division. or other division rules, if more stringent. Variations to blowout preventer stack arrangements may be granted by the division for good cause shown.

ii. <u>Completion, Workover and Well Servicing</u>. If feasible, the equipment described in the previous subsubparagraph shall be installed and operational at all times during completion, workover and well servicing of a well and during completion and well servicing operations when the 100 ppm H<sub>2</sub>S radius of exposure includes a public area. If not feasible, unless exempted pursuant to Subsection J; For completion or workover operations, the person, operator or facility may install a suitable alternative to a remote choke <u>such as (i.e.</u> a remote-controlled valve <u>or</u> blow out preventer with remote accumulator may be used, so long as the alternative equipment will be protective of public safety., etc. may be used); and

iii. For drilling operations, the person, operator or facility shall install a remote controlled choke or remote controlled valve that includes, at a minimum, a pressure and hydrogen sulfide-rated well control choke and kill system including manifold and blowout preventer pursuant to specifications API-16C and API-RP 53. The blowout preventer stack shall have at least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced or other division rules, if more stringent. Variations to blowout preventer stack arrangements may be granted by the division for good cause shown.

<u>g. d.</u> Mud Program. A mud program, including de-gassing and flaring, capable of handling <u>hydrogen sulfide  $H_2S$ -conditions and well control shall be used.</u>

<u>h. e.</u> Well Testing. Except with prior approval by the division, the drill-stem testing of a zone that contains hydrogen sulfide shall be closed chamber only, in that conducted only during daylight hours and formation fluids shall not be permitted to flow to the surface. (closed chamber only). An operator shall notify the division (24) hours in advance of a drill stem test if an  $H_2S$  contingency plan is required pursuant to this section.

<u>3. e.</u> If Hydrogen Sulfide Encountered During Operations.

a. If hydrogen sulfide was not anticipated at the time the division <u>issued a permit</u> to drill approved the APD but is encountered during drilling in <u>a concentration</u> excess of 100 ppm <u>or</u> greater in the gaseous mixture, the operator shall immediately ensure control of the well, suspend drilling operations unless detrimental to well control, <u>take whatever measures are necessary under the</u> <u>circumstances to assure public safety</u>, and obtain materials and safety equipment to bring the operations into compliance with this section, <u>calculate the radius of exposure and</u>, if a potentially hazardous volume is present, prepare a hydrogen sulfide contingency plan and obtain materials and equipment to bring operations into compliance with this section. The operator shall notify the division of the event and the mitigating steps that have or are being taken as soon as possible, but no later than 24 hours following discovery.

<u>b.</u> a. If Hydrogen Sulfide Is Encountered During Use of Air, Gas, Mist or Other Non-Mud Circulating Media. If hydrogen sulfide gas in excess of 100 ppm is encountered while drilling with air, gas, mist or other non-mud circulating mediums for 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. An alternate drilling method may be used <u>if specifically approved by the division after the</u> Division specifically approves encountering hydrogen sulfide in excess of 100 ppm, but only if the alternative method. <u>H.</u> G. Protection from Hydrogen Sulfide at Crude Oil Pump Stations, Producing Wells, Tank Batteries and Associated Production Facilities, Refineries, Gas Plants and Compressor Stations.

1. API Standards. Operations at crude oil pump stations and producing wells, tank batteries and associated production facilities, refineries, gas plants and compressor stations containing a potentially hazardous volume of hydrogen sulfide shall be conducted with due consideration according to the guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

2. Minimum Standards. At a minimum, <u>operations at production from</u> crude oil pump stations and producing wells, tank batteries and associated production facilities, <u>refineries</u>, <u>gas plants and</u> <u>compressor stations containing a potentially hazardous volume of hydrogen sulfide</u> shall also be conducted in accordance with the following subparagraphs and subsubparagraphs. Where API standards referred to in the previous paragraph are less stringent than the following, the more stringent standards shall apply.

a. Gaseous Mixtures Containing 100 ppm or more. Producing wells containing 100 ppm or more of hydrogen sulfide in the gaseous mixture, crude oil pump stations, tank batteries and associated production facilities, refineries, gas plants and compressor stations, shall be subject to the following:

i.  $H_2S$  Contingency Plan. If a potentially hazardous volume of  $H_2S$  exists, an  $H_2S$  contingency plan shall be required.

<u>a. ii. Signage. A danger sign or signs shall be posted within 50 feet of each</u> facility to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gates shall suffice. The signs shall read "DANGER-POISON GAS - HYDROGEN SULFIDE PRESENT," or, as appropriate, "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or <u>use</u> equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1 1967 or regulations of the federal occupational safety and health administration, <u>or</u> <u>in another color approved by the division</u>. The signs shall be legible and large enough to be read by all persons entering the well site. A sign shall be placed at each point where a flow line or gathering line erosses a public road within the area of exposure. Each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

iii. Fencing. Fencing and gates shall be required when crude oil pump stations and producing wells, tank batteries and associated production facilities are located in a public area or within a-1/4 mile of a <u>building or structure used as a dwelling, office, place of business, church, school, hospital or government building or within 1/4 mile of a residence, school, church, park, playground or school bus stop or place of business. The fence shall consist of a 5-foot chain link topped by two stands of barbed wire or other design approved by the division. Gates shall be locked when unattended.</u>

<u>b.</u> iv. Wind Direction Indicators. Wind direction indicators shall be required where the  $H_2S$  concentration in a gaseous state exceeds 100 PPM.

<u>c.</u> v. Secondary Well Control. <u>Any well where the 100 ppm H<sub>2</sub>S radius of</u> exposure incorporates a public area shall possess a secondary means of immediate well control through the use of appropriate christmas tree or downhole completion equipment. Such equipment shall allow downhole accessibility (reentry) under pressure for permanent well control operations.

<u>d. vi.</u> Automatic Safety Valve or Shutdown. <u>Any well If the 100 ppm radius of exposure involves a public area, the person, operator or facility shall <u>possess</u> install an automatic safety valve or shutdown at the facility or wellhead or shall install other appropriate shut-in control. The automatic safety valve shall be set to activate upon a release of a potentially hazardous volume of hydrogen sulfide <u>that may create a concentration of hydrogen sulfide of 100 ppm in any public area, 500 ppm at any public road or 100 ppm 3,000 feet from the site of release.</u></u>

<u>3. b.</u> Tanks or vessels containing 300 ppm or more of hydrogen sulfide.\_Each stair or ladder leading to the top of any tank or vessel containing 300 ppm or more of hydrogen sulfide in the gaseous mixture shall be subject to the following additional requirements:

<u>a.</u>-i. Each stair or ladder leading to the top of any storage tank shall be chained or marked to restrict entry. For Any tank <u>or tank</u> battery that requires fencing pursuant to this section <u>may</u> substitute a danger sign posted at the gates may be substituted for chaining and signs.

ii. The person, operator or facility shall post a danger sign on or within 50 feet of any storage tank to alert persons of the potential hydrogen sulfide danger. For any storage tank for which fencing is required, a danger sign posted at the locked gates shall suffice. The signs shall read "DANGER -POISON GAS - HYDROGEN SULFIDE PRESENT," or, as appropriate "CAUTION - POISON GAS -HYDROGEN SULFIDE MAY BE PRESENT," or equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration or another color approved by the division. The sign(s) shall be legible and large enough to be read by all persons entering the site.

<u>4.</u> Compliance Schedule. Each existing crude oil pump station and producing well, tank battery and associated production facility, refinery, gas plant and compressor station not currently meeting the requirements and minimum standards set forth herein shall be brought into compliance within one year of the effective date of this section except that contingency plans shall be submitted within 180 days. Each crude oil pump station and producing well, tank battery and associated production facility constructed following the effective date of this section shall be designed, constructed and operated to meet the requirements set forth herein.

<u>I.</u> <u>H.</u> Personnel Protection and Training. All persons responsible for the implementation of any <u>hydrogen sulfide</u>  $H_2S$  contingency plan shall be provided training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.

<u>J. I.</u> Standards for Equipment That May Be Exposed to Hydrogen Sulfide. Persons, operators and facilities shall choose equipment with consideration for both the <u>hydrogen sulfide H<sub>2</sub>S</u> working environment and anticipated stresses. NACE Standard MR0175 (latest edition) or some other standard <u>approved by the division</u> shall be used for selection of metallic equipment or, if applicable, adequate protection by chemical inhibition or other methods that control or limits the corrosive effects of <u>hydrogen sulfide H<sub>2</sub>S</u> shall be used.

<u>K.</u> J. Exemptions. Any person, operator or facility may petition the director for an exemption to any certain requirements of this section may be granted by petitioning the director. Any such petition shall provide specific information as to the circumstances that warrant approval of the exemption requested and how the public safety will be protected. Submission of A safety plan required by other governmental agencies may accompany the petition for exemption. The director, after considering all relevant factors, may approve an exemption if the circumstances warrant an exemption.

L. K. Release. Upon a release of hydrogen sulfide the following actions must be taken:

1. Activation of the <u>Hydrogen Sulfide H<sub>2</sub>S</u> Contingency Plan. The person, operator or facility shall activate the H<sub>2</sub>S contingency plan immediately upon an H<sub>2</sub>S release where the potential exists for exposure to The <u>hydrogen sulfide H<sub>2</sub>S</u> contingency plan shall be activated in the event of a release that may create a concentration of hydrogen sulfide of 100 ppm in any public area, 500 ppm at any public road or 100 ppm 3,000 feet from the site of release.

2. Notification of the Division. The person, operator or facility shall notify the division upon a release of hydrogen sulfide requiring activation of the <u>hydrogen sulfide H<sub>2</sub>S</u>-contingency plan, as soon as practicable, preferably within one hour of discovery of the release, but or as soon as possible in cases where prompt response should supercede notification. The person, operator or facility shall submit a full report of the incident to the division on Form C-141 no later than fifteen (15) days following the release.

<u>M. Electronic Submission.</u> Any submission to the division required by this section shall be made electronically in a generally accepted format that is compatible with the division's systems.

<u>N. L.</u> Corrective Actions. The division may require corrective actions if necessary to maintain control of a well or any other facility or to safeguard public safety.

workgroup language not accepted

Urder Suggestion

#### **EXHIBIT A**

#### 19.15.2.52 Hydrogen Sulfide Gas (Hydrogen Sulfide) A. Applicability. This section applies to any person, operator or facility subject to the

jurisdiction of the Division, including, but not limited to, any person, operator or facility engaged in drilling, stimulating, injecting into, completing, working over or producing any oil, natural gas or carbon dioxide well or any person, operator or facility engaged in gathering, transporting, storing, processing or refining of crude oil, natural gas or carbon dioxide (referred to herein as "person, operator or facility" or "well, facility or operation"). This section shall not act to exempt or otherwise excuse surface waste management facilities permitted by the division pursuant to 19.15.9.711 NMAC from more stringent conditions on the handling of hydrogen sulfide required of such facilities by 19.15.9.711 NMAC or more stringent conditions in permits issued thereunder, nor shall such facilities be exempt or otherwise excused from the requirements set forth in this section by virtue of permitting under 19.15.9.711 NMAC.

B. Definitions (specific to this section).

1. ANSI. The acronym "ANSI" means the american national standards institute.

2. API. The acronym "API" means the american petroleum institute.

3. Area of Exposure. The phrase "area of exposure" means the area within a circle constructed with a point of escape at its center and the radius of exposure as its radius.

4. ASTM. The acronym "ASTM" means the american society for testing and materials.

5. Dispersion Technique. A "dispersion technique" is a mathematical representation of the physical and chemical transportation characteristics, dilution characteristics and transformation characteristics of hydrogen sulfide gas in the atmosphere.

6. Escape Rate. The "escape rate" is the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing hydrogen sulfide, as set forth herein.

a. For existing gas facilities or operations, the escape rate shall be calculated using the maximum daily rate of the gaseous mixture produced or handled or the best estimate thereof. For an existing gas well, the escape rate shall be calculated using the current daily absolute open flow rate against atmospheric pressure or the best estimate of that rate.

b. For new gas operations or facilities, the escape rate shall be calculated as the maximum anticipated flow rate through the system. For a new gas well, the escape rate shall be calculated using the maximum open-flow rate of offset wells in the pool or reservoir, or the pool or reservoir average of maximum open-flow rates.

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

d. For new oil wells, the escape rate shall be calculated by multiplying the producing gas/oil ratio by the maximum daily production rate of offset wells in the pool or reservoir, or the pool of reservoir average of the producing gas/oil ratio multiplied by the maximum daily production rate

e. For facilities or operations not mentioned, the escape rate shall be calculated using the actual flow of the gaseous mixture through the system or the best estimate thereof.

7. GPA. The acronym "GPA" means the gas processors association.

8. LEPC. The acronym "LEPC" means the local emergency planning committee established pursuant to the emergency planning and community right-to-know act, 42 U.S. C. § 11001. 9. NACE. The acronym "NACE" refers to the national association of corrosion

engineers.

10. PPM. The acronym "ppm" means "parts per million" by volume.

10. Privil The actonym ppin mount parts per formed to as a "potentially hazardous" PH// 4 volume") means the volume of hydrogen sulfide gas of such concentration that:

a. the 100-ppm radius of exposure includes any public area;

b. the 500-ppm radius of exposure includes any public road; or

c. the 100-ppm radius of exposure exceeds 3,000 feet.

15 equal to or

occupied

12. Public Area. A "public area" is any building or structure that is not associated with the well, facility or operation for which the radius of exposure is being calculated and that is used as a dwelling, office, place of business, church, school, hospital, or government building, or any portion of a park, city, town, village or designated school bus stop or other similar area where members of the public may reasonably be expected to be present.

delice highway or postal route.

14. Radius of Exposure. The radius of exposure is that radius constructed with the point of escape as its starting point and its length calculated using the following Pasquill-Gifford derived equation, or by such other method as may be approved by the division:

a. For determining the 100-ppm radius of exposure:  $X = [(1.589)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ , where "X" is the radius of exposure in feet, the "hydrogen sulfide concentration" is the decimal equivalent of the mole or volume fraction of hydrogen sulfide in the gaseous mixture, and "Q" is the escape rate expressed in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

b. For determining the 500-ppm radius of exposure:  $X=[(0.4546)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ , where "X" is the radius of exposure in feet, the "hydrogen sulfide concentration" is the decimal equivalent of the mole or volume fraction of hydrogen sulfide in the gaseous mixture, and "Q" is the escape rate expressed in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

c. For a well being drilled, completed, recompleted, worked over or serviced in an area where insufficient data exists to calculate a radius of exposure but where hydrogen sulfide could reasonably be expected to be present in concentrations in excess of 100 ppm in the gaseous mixture, a 100-ppm radius of exposure equal to 3,000 feet shall be assumed.

C. Regulatory Threshold.

1. Determination of Hydrogen Sulfide Concentration.

a Each person, operator or facility shall determine the hydrogen sulfide concentration within each well, facility or operation either by testing, using a sample from each well, facility or operation, testing a representative sample, or using process knowledge in lieu of testing. If a representative sample or process knowledge is used, the concentration derived from the representative sample or process knowledge must be reasonably representative of the hydrogen sulfide concentration within the well, facility or operation.

b. The tests used to make the determination referred to in the previous subparagraph shall be conducted in accordance with applicable ASTM or GPA standards or by another method approved by the division.

c. If a sample from a well, facility or operation was tested prior to the effective date of this section and otherwise meets the requirements of the previous subparagraphs, new testing shall not be required.

d. If any change or alteration may materially increase the concentration of hydrogen sulfide in a well, facility or operation, a new determination shall be required in accordance with this section.

2. Concentrations Determined to be Below 100 ppm. If the concentration of hydrogen sulfide in a given well, facility or operation is less than 100 ppm, no further actions shall be required pursuant to this section.

3. Concentrations Determined to be Above 100 ppm.

a. If the concentration of hydrogen sulfide in a given well, facility or operation is determined to be 100 ppm or greater, then the person, operator or facility must calculate the radius of exposure and comply with applicable requirements of this section.

b. If calculation of the radius of exposure reveals that a potentially hazardous volume is present, the results of the determination of the hydrogen sulfide concentration and the calculation of the radius of exposure shall be provided to the division. For a well, facility or operation existing on the effective date of this section, the determination, calculation and submission required

herein shall be accomplished within 180 days of the effective date of this section; for any well, facility or operation that commences operations after the effective date of this section, the determination, calculation and submission required herein shall be accomplished before operations begin. but no later than

4. Recalculation. The person, operator or facility shall calculate or recalculate the radius of exposure if the hydrogen sulfide concentration in a well, facility or operation increases to 100 ppm or greater. The person, operator or facility shall also recalculate the radius of exposure if the actual volume fraction of hydrogen sulfide increases by a factor of twenty-five percent in a well, facility or operation that was previously 100 ppm or greater. If calculation or recalculation of the radius of exposure reveals that a potentially hazardous volume is present, the results shall be provided to the division within sixty (60) days.

D. Hydrogen Sulfide Contingency Plan.

1. When Required. If a well, facility or operation involves potentially hazardous volume of hydrogen sulfide, a hydrogen sulfide contingency plan that will be used to alert and protect the public must be developed in accordance with the following paragraphs.

2. Plan Contents.

a. API Guidelines. The hydrogen sulfide contingency plan shall be developed with due consideration of paragraph 7.6 of the guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, most recent edition, or with due consideration to another standard approved by the division.

b. Required Contents. The hydrogen sulfide contingency plan shall contain, but shall not be limited to, information on the following subjects, as appropriate to the well, facility or operation to which it applies:

i. Emergency procedures. The hydrogen sulfide contingency plan shall contain information on emergency procedures to be followed in the event of a release and shall include, at a minimum, information concerning the responsibilities and duties of personnel during the emergency, an immediate action plan as described in the API document referenced in the previous subsubparagraph, and telephone numbers of emergency responders, public agencies, local government and other appropriate public authorities. The plan shall also include the locations of potentially affected public areas and public roads and shall describe proposed evacuation routes, location of any road blocks and procedures for notifying the public, either through direct telephone notification using telephone number lists or by means of mass notification and reaction plans. The plan shall include information on the availability and location of necessary safety equipment and supplies.

ii. Characteristics of hydrogen sulfide and sulfur dioxide. The hydrogen sulfide contingency plan shall include a discussion of the characteristics of hydrogen sulfide and sulfur dioxide.

Stand and

iii. Maps and drawings. The hydrogen sulfide contingency plan shall include maps and drawings that depict the area of exposure and public areas and public roads within the area of exposure.

iv. Training and Drills. The hydrogen sulfide contingency plan shall provide for training and drills, including training in the responsibilities and duties of essential personnel, provide for periodic on-site or classroom drills or exercises that simulate a release, and a description how the training, drills and attendance will be documented. The hydrogen sulfide contingency plan shall also provide for training of residents as appropriate on the proper protective measures to be taken in the event of a release, and shall provide for briefing of public officials on issues such as evacuation or shelter-inplace plans.

v. Coordination with State Emergency Plans. The hydrogen sulfide contingency plan shall describe how emergency response actions under the plan will be coordinated with the division and with the New Mexico state police consistent with the New Mexico hazardous materials emergency response plan (HMER).

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vi. Activation Levels. The hydrogen sulfide contingency plan shall include the activation level and a description of events that could lead to a release of hydrogen sulfide sufficient to create a concentration in excess of the activation level.

c. Plans Required by Other Jurisdictions. A hydrogen sulfide contingency plan required by the Bureau of Land Management or other jurisdiction that meets the requirements of this subsection may be submitted to the division in satisfaction of this subsection.

3. Plan Activation. The hydrogen sulfide contingency plan shall be activated when a release causes a concentration of hydrogen sulfide greater than the activation level set forth in the hydrogen sulfide contingency plan. At a minimum, the plan must be activated whenever a release may create a concentration of hydrogen sulfide of more than 100 ppm in any public area, 500 ppm at any 3,000 feet from the site of release. (50 ppm at boundary) a. Where Submitted. The hydrogen sulfide contingency plan shall be submitted public road or 100 ppm 3,000 feet from the site of release.

4. Submission.

to the division.

b. When Submitted. A hydrogen sulfide contingency plan for a well, facility or operation existing on the effective date of this section shall be submitted within one year of the effective date of this section. A hydrogen sulfide contingency plan for a new (well.) facility or operation shall be than com. 60 may be on within 180 days public area or public on Men or who operates a hydrogen sulfider mitted throug' so long submitted before operations commence. The hydrogen sulfide contingency plan for a drilling, completion, workover or well servicing operation must be on file with the division before operations commence and may be submitted separately or along with the application for permit to drill (APD) or may be on file from a previous submission. A hydrogen sulfide contingency plan shall also be submitted within 180 days after the person, operator or facility becomes aware or should have become aware that a --public area or public road is established that creates a potentially hazardous volume where none.

c. Electronic Submission. Any filer who operates more than one hundred wells or who operates a crude oil pump station, compressor station, refinery or gas plant must submit each Tydrogen sulfide contingency plan in electronic format. The hydrogen sulfide contingency plan may be Fubmitted through electronic mail, through an Internet filing or by delivering electronic media to the • <del>division, so long as the electronic submission is compatible with the division's systems.</del>

5. Failure to Submit Plan. Failure to submit a hydrogen sulfide contingency plan when required may result in denial of an application for permit to drill, cancellation of an allowable for the subject well or other enforcement action appropriate to the operation or facility.

6. Review, Amendment. The person, operator or facility shall review the hydrogen sulfide contingency plan any time a subject addressed in the plan materially changes and make appropriate amendments. If the division determines that a hydrogen sulfide contingency plan is inadequate to protect public safety, the division may require the person, operator or facility to add provisions to the plan or amend the plan as necessary to protect public safety. II'd delete the bolded reference --- it will make it difficult to enforce]

7. Retention and Inspection. The hydrogen sulfide contingency plan shall be reasonably accessible in the event of a release, maintained on file at all times, and available for inspection by the division.

8. Annual Inventory of Contingency Plans. On an annual basis, each person, operator or facility required to prepare one or more hydrogen sulfide contingency plans pursuant to this section shall file with the appropriate local emergency planning committee and the state emergency response commission an inventory of the wells, facilities and operations for which plans are on file with the division and the name, address and telephone number of a point of contact.

9. Plans Required by Other Jurisdictions. A hydrogen sulfide contingency plan required by the Bureau of Land Management or other jurisdiction that meets the requirements of this subsection may be submitted to the division in satisfaction of this subsection.

E. Signage, Markers. For each well, facility or operation involving a concentration of hydrogen sulfide of 100 ppm or greater, signs and/or markers shall be installed and maintained. Each sign or marker shall conform with the current ANSI standard Z53.1 or some other standard approved by the

division fthis additional purase will make this reference consistent with the rest of the rule, eliminate due process concerns related to the reference, and hopefully eliminate the requirement that we attach the material to the rule] and shall provide information sufficient to warn the public that a potential danger exists. Signs or markers shall be prominently posted at locations, including but not limited to entrance points and road crossings, sufficient to alert the public that a potential danger exists.

Signs and/or markers that conform with this subsection on its effective date shall be installed or replaced no later than one year from the effective date of this section.

F. Protection from Hydrogen Sulfide During Drilling, Completion, Workover, and Well Servicing Operations.

1. API Standards. All drilling, completion, workover and well servicing operations involving a hydrogen sulfide concentration of 100 ppm or greater shall be conducted with due consideration to the guidelines published by the API entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Drilling and Well Servicing Operations Involving Wells Containing Hydrogen Sulfide," RP-49, most recent editions.

2. Detection and Monitoring Equipment. Drilling, completion, workover and well servicing operations involving a hydrogen sulfide concentration of 100 ppm or greater shall include hydrogen sulfide detection and monitoring equipment as follows:

a. Each drilling and completion site shall have an accurate and precise hydrogen sulfide detection and monitoring system that will automatically activate visible and audible alarms when the ambient air concentration of hydrogen sulfide reaches a predetermined value set by the operator, not to exceed 20 ppm. There shall be a sensing point 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.

b. For workover and well servicing operations, one operational sensing point shall be located as close to the well bore as practical. Additional sensing points may be necessary for large or long-term operations.

c. Hydrogen sulfide detection and monitoring equipment must be provided and must be made operational during drilling when drilling is within 500 feet of a zone anticipated to contain hydrogen sulfide and continuously thereafter through all subsequent drilling.

3. Wind Indicators. All drilling, completion, workover and well servicing operations involving a hydrogen sulfide concentration of 100 ppm or greater shall include wind indicators. Equipment to indicate wind direction shall be present and visible at all times. At least two devices to indicate wind direction shall be installed at separate elevations and visible from all principal working areas at all times. When a sustained concentration of hydrogen sulfide is detected in excess of 20 ppm at any detection point, red flags shall be displayed.

4. Flare System. For drilling and completion operations in an area where it is reasonably expected that a potentially hazardous volume of hydrogen sulfide will be encountered, the person, operator or facility shall install a flare system to safely gather and burn hydrogen sulfide-bearing gas. Flare outlets shall be located at least 150 feet from the well bore. Flare lines shall be as straight as practical. The flare system shall be equipped with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall provide supplemental fuel to maintain ignition.

5. Well Control Equipment. When the 100 ppm radius of exposure includes a public area, the following well control equipment shall be required:

a. Drilling. A remote-controlled well control system shall be installed and operational at all times beginning when drilling is within 500 feet of the formation believed to contain hydrogen sulfide and continuously thereafter during drilling. The well control system must include, at a minimum, a pressure and hydrogen-sulfide-rated well control choke and kill system including manifold and blowout preventer that meets or exceeds the specifications API-16C and API-RP 53 or other specifications approved by the division. Mud-gas separators shall be used. These systems shall be tested and maintained pursuant to the specifications referenced, according to the requirements of this part, or otherwise as approved by the division.

b. Completion, Workover and Well Servicing. A remote controlled pressure and hydrogen-sulfide-rated well control system that meets or exceeds API specifications or other specifications approved by the division shall be installed and shall be operational at all times during completion, workover and servicing bha well.

6. Mud Program. All drilling, completion, workover and well servicing operation involving a hydrogen sulfide concentration of 100 ppm or greater shall provide a hydrogen sulfide mud program capable of handling hydrogen sulfide conditions and well control, including de-gassing find -flaring

7. Well Testing. Except with prior approval of the division, drill-stem testing of a zone that contains hydrogen sulfide concentration of 100 ppm or greater shall be conducted only during davlight hours and formation fluids shall not be permitted to flow to the surface.

not of making Right 8. If Hvdrogen Sulfide Encountered During Operations. If hydrogen sulfide was not anticipated at the time the division issued a permit to drill but is encountered during drilling in a concentration of 100 ppm or greater in the gaseous mixture, the operator must satisfy the requirements of this section before continuing drilling operations. The operator shall notify the division of the event and the mitigating steps that have or are being taken as soon as possible, but no later than 24 hours following discovery. The division may grant verbal approval to continue drilling operations pending preparation of any required hydrogen sulfide contingency plan.

G. Protection from Hydrogen Sulfide at Crude Oil Pump Stations, Producing Wells, Tank Batteries and Associated Production Facilities, Pipelines, Refineries, Gas Plants and Compressor Stations.

1. API Standards. Operations at crude oil pump stations and producing wells, tank batteries and associated production facilities, refineries, gas plants and compressor stations involving a concentration of hydrogen sulfide of 100 ppm or greater shall be conducted with due consideration to the guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

2. Security. Well sites and other unattended, fixed surface facilities shall be protected from public access by fencing with locking gates when the location is within 1/4 mile of a public area. A surface pipeline shall not be considered a fixed surface facility for purposes of this paragraph.

3. Wind Direction Indicators. All crude oil pump stations, producing wells, tank batteries and associated production facilities, pipelines, refineries, gas plants and compressor stations where a concentration of hydrogen sulfide of 100 ppm or greater is present shall provide equipment to indicate wind direction. The wind direction equipment shall be installed and visible from all principal working areas at all times.

4. Well Control Equipment. When the 100 ppm radius of exposure includes a public area, the following additional measures are required:

a. Safety devices, such as automatic shut-down devices, shall be installed and maintained in good operating condition to prevent the continuing escape of hydrogen sulfide. Alternatively, safety procedures shall be established to achieve the same purpose. [I can't remember why the word "continuing" appears; it could be interpreted as requiring safety devices that protect only against continuing releases and not one-time releases, no matter what the concentration or volume of the release

b. Any well shall possess a secondary means of immediate well control through the use of an appropriate christmas tree or downhole completion equipment. Such equipment shall allow downhole accessibility (reentry) under pressure for permanent well control.

5. Tanks or vessels. Each stair or ladder leading to the top of any tank or vessel containing 300 ppm or more of hydrogen sulfide in the gaseous mixture shall be chained or marked to restrict entry.

6. Compliance Schedule. Each existing crude oil pump station, producing well, tank battery and associated production facility, pipeline, refinery, gas plant and compressor station not currently meeting the requirements of this subsection shall be brought into compliance within one year of the effective date of this section.



H. Personnel Protection and Training. All persons responsible for the implementation of any hydrogen sulfide contingency plan shall be provided training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.

I. Standards for Equipment That May Be Exposed to Hydrogen Sulfide. Whenever a well, facility or operation involves a potentially hazardous volume of hydrogen sulfide, equipment shall be selected with consideration for both the hydrogen sulfide working environment and anticipated stresses and shall use NACE Standard MR0175 (latest edition) or some other standard approved by the division for selection of metallic equipment or, if applicable, shall use adequate protection by chemical inhibition or other methods that control or limit the corrosive effects of hydrogen sulfide.

J. Exemptions. Any person, operator or facility may petition the director or the director's designee for an exemption to any requirement of this section. Any such petition shall provide specific information as to the circumstances that warrant approval of the exemption requested and how the public safety will be protected. The director or the director's designee, after considering all relevant factors, may approve an exemption if the circumstances warrant and so long as the public safety will be protected.

K. Notification of the Division. The person, operator or facility shall notify the division upon a release of hydrogen sulfide requiring activation of the hydrogen sulfide contingency plan, as soon as possible, but no more than four hours after plan activation, recognizing that a prompt response should supercede notification. The person, operator or facility shall submit a full report of the incident to the division on Form C-141 no later than fifteen (15) days following the release.

Multiple Jurisdictions Corrective Actions

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# 19.15.2.52 Hydrogen Sulfide Gas (Hydrogen Sulfide)

TAB A. Applicability. This section applies to any person, operator or facility subject to the jurisdiction of the Division, including, but not limited to, any person, operator or facility engaged in drilling, stimulating, injecting into, completing, working over or producing any oil, natural gas or carbon dioxide well or any person, operator or facility engaged in gathering, transporting, storing, processing or refining of crude oil, natural gas or carbon dioxide (referred to herein as "person, operator or facility" or "well, facility or operation"). This section shall not act to exempt or otherwise excuse surface waste management facilities permitted by the division pursuant to 19.15.9.711 NMAC from more stringent conditions on the handling of hydrogen sulfide required of such facilities by 19.15.9.711 NMAC or more stringent conditions in permits issued thereunder, nor shall such facilities be exempt or otherwise excused from the requirements set forth in this section by virtue of permitting under 19.15.9.711 NMAC.

B. Definitions (specific to this section).

(1.) ANSI. The acronym "ANSI" means the american national standards institute.

(2.) API. The acronym "API" means the american petroleum institute.

(3.) Area of Exposure. The phrase "area of exposure" means the area within a circle constructed with a point of escape at its center and the radius of exposure as its radius.

(4.) ASTM. The acronym "ASTM" means the american society for testing and materials.

(5.) Dispersion Technique. A "dispersion technique" is a mathematical representation of the physical and chemical transportation characteristics, dilution characteristics and transformation characteristics of hydrogen sulfide gas in the atmosphere.

(6) Escape Rate. The "escape rate" is the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing hydrogen sulfide, as set forth herein.

 $(Space 30 \le pars)$  (a.) For existing gas facilities or operations, the escape rate shall be calculated using the maximum daily rate of the gaseous mixture produced or handled or the best estimate thereof. For an existing gas well, the escape rate shall be calculated using the current daily absolute open flow rate against atmospheric pressure or the best estimate of that rate.

(b.) For new gas operations or facilities, the escape rate shall be calculated as the maximum anticipated flow rate through the system. For a new gas well, the escape rate shall be calculated using the maximum open-flow rate of offset wells in the pool or reservoir, or the pool or reservoir average of maximum open-flow rates.

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

(d.) For new oil wells, the escape rate shall be calculated by multiplying the producing gas/oil ration by the maximum daily production rate of offset wells in the pool or reservoir, or the pool or reservoir average of the producing gas/oil ratio multiplied by the maximum daily production rate.

(e.) For facilities or operations not mentioned, the escape rate shall be calculated using the actual flow of the gaseous mixture through the system or the best estimate thereof.

 $\langle 7. \rangle$  GPA. The acronym "GPA" means the gas processors association.

(8.) LEPC. The acronym "LEPC" means the local emergency planning committee established pursuant to the emergency planning and community right-to-know act, 42 U.S. C. § 11001.

(9.)NACE. The acronym "NACE" refers to the national association of corrosion engineers.

(10.) PPM. The acronym "ppm" means "parts per million" by volume.

(11.) Potentially Hazardous Volume (hereinafter referred to as a "potentially hazardous volume") means the volume of hydrogen sulfide gas of such concentration that:

(a.) the 100-ppm radius of exposure includes any public area;

(b.) the 500-ppm radius of exposure includes any public road;

as defined herein; or

(c.) the 100-ppm radius of exposure exceeds 3,000 feet.

(12.) Public Area. A "public area" is any building or structure that is not associated with the well, operation or system for which the radius of exposure is being calculated and that is used as a dwelling, office, place of business, church, school, hospital, or government building, or any portion of a park, city, town, village or designated school bus stop or other similar area where members of the public may reasonably be expected to be present.

(13.)Public Road. A "public road" is any federal, state, municipal or county road or highway or postal route.

(14.) Radius of Exposure. The radius of exposure is that radius constructed with the point of escape as its starting point and its length calculated using the following Pasquill-Gifford derived equation, or by such other method as may be approved by the division:

(a.) For determining the 100-ppm radius of exposure:  $X = [(1.589)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ , where "X" is the radius of exposure in feet, the "hydrogen sulfide concentration" is the decimal equivalent of the mole or volume fraction of hydrogen sulfide in the gaseous mixture, and "Q" is the escape rate expressed in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

(b.) For determining the 500-ppm radius of exposure:  $X=[(0.4546)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ , where "X" is the radius of exposure in feet, the "hydrogen sulfide concentration" is the decimal equivalent of the mole or volume fraction of hydrogen sulfide in the gaseous mixture, and "Q" is the escape rate expressed in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

(c.)For a well being drilled, completed, recompleted, worked over or serviced in an area where insufficient data exists to calculate a radius of exposure but where hydrogen sulfide could reasonably be expected to be present in concentrations in excess of 100 ppm in the gaseous mixture, a 100-ppm radius of exposure equal to 3,000 feet shall be assumed.

C. Presence of Hydrogen Sulfide.

(1.) Determination of Hydrogen Sulfide Concentration.

(a.) Each person, operator or facility shall determine the hydrogen sulfide concentration within each well, facility or operation either by testing, using a sample from each well, facility or operation, testing a representative sample, or using process knowledge in lieu of testing. If a representative sample or process knowledge is used, the concentration derived from the representative sample or process knowledge must be reasonably representative of the hydrogen sulfide concentration within the well, facility or operation.

(b.) The tests used to make the determination referred to in the previous subparagraph shall be conducted in accordance with applicable ASTM or GPA standards or by other method approved by the division.

(c.) If a sample for a well, facility or operation was tested prior to the effective date of this section and otherwise meets the requirements of the previous subparagraphs, new testing shall not be required.

(d.) If any change or alteration may materially increase the concentration of hydrogen sulfide in a well, facility or operation, a new determination shall be required in accordance with this section.

(2.) Concentrations Determined to be Below 100 ppm. If the concentration of hydrogen sulfide in a given well, facility or operation is less than 100 ppm, no further actions shall be required pursuant to this section.

(3.)Concentrations Determined to be Above 100 ppm.

(a.) If the concentration of hydrogen sulfide in a given well, facility or operation is determined to be 100 ppm or greater, then the person, operator or facility must calculate the radius of exposure and comply with applicable requirements of this section.

(b.) If calculation of the radius of exposure reveals that a potentially hazardous volume is present, the results of the determination of the hydrogen sulfide concentration and the calculation of the radius of exposure shall be provided to the division. For a well, facility or operation existing on the effective date of this section, the determination, calculation and submission required

herein shall be accomplished within 180 days of the effective date of this section; for any well, facility or operation that commences operations after the effective date of this section, the determination, calculation and submission required herein shall be accomplished before operations begin.

(4.) Recalculation. The person, operator or facility shall calculate or recalculate the radius of exposure if the hydrogen sulfide concentration in a well, facility or operation increases to 100 ppm or greater or, if the hydrogen sulfide concentration in a well, facility or operation was already 100 ppm or greater, there is a twenty-five percent or greater increase in the actual volume fraction of hydrogen sulfide. If calculation or recalculation of the radius of exposure reveals that a potentially hazardous volume is present, the results shall be provided to the division within sixty (60) days.

D. Hydrogen Sulfide Contingency Plan

(1.) When Required. If a well, facility or operation involves potentially hazardous volume of hydrogen sulfide, a hydrogen sulfide contingency plan that will be used to alert and protect the public must be developed in accordance with the following paragraphs.

(2) Plan Contents.

(a.) API Guidelines. The hydrogen sulfide contingency plan shall be developed with due consideration of paragraph 7.6 of the guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, most recent edition.

(b.) Required Contents. The hydrogen sulfide contingency plan shall contain, but shall not be limited to, information on the following subjects, as appropriate to the well, facility or operation to which it applies:

(i.) Emergency procedures. The hydrogen sulfide contingency plan shall contain information on emergency procedures to be followed in the event of a release and shall include, at a minimum, information concerning the responsibilities and duties of personnel during the emergency, an immediate action plan as described in the API document referenced in the previous subsubparagraph, and telephone numbers of emergency responders, public agencies, local government and other appropriate public authorities. The plan shall also include the locations of potentially affected public areas and public roads and shall describe proposed evacuation routes and locations of road blocks and procedures for notifying the public, either through direct telephone notification using telephone number lists or by means of mass notification and reaction plans. The plan shall include information on the availability and location of necessary safety equipment and supplies.

(ii.) Characteristics of hydrogen sulfide and sulfur dioxide. The hydrogen sulfide contingency plan shall include a discussion of the characteristics of hydrogen sulfide and sulfur dioxide.

(iii.) Maps and drawings. The hydrogen sulfide contingency plan shall include maps and drawings that depict the area of exposure and public areas and public roads within the area of exposure.

(iv.) Training and Drills. The hydrogen sulfide contingency plan shall provide for training and drills, including training in the responsibilities and duties of essential personnel, provision for periodic on-site or classroom drills or exercises that simulate a release, and a description how the training, drills and attendance will be documented. The hydrogen sulfide contingency plan shall also provide for training of residents as appropriate on the proper protective measures to be taken in the event of a release, and shall include provisions for briefing public officials on issues such as evacuation or shelter-in-place plans.

(v.)Coordination with State Emergency Plans. The hydrogen sulfide contingency plan shall describe how emergency response actions under the plan will be coordinated with the division and with the New Mexico state police consistent with the New Mexico hazardous materials emergency response plan (HMER).

(vi.) Activation Levels. The hydrogen sulfide contingency plan shall include the activation level and a description of events that could lead to a release of hydrogen sulfide sufficient to create a concentration in excess of the activation level.

(c.) Plans Required by Other Jurisdictions. A hydrogen sulfide contingency plan required by the Bureau of Land Management or other jurisdiction that meets the requirements of this subsection may be submitted to the division in satisfaction of this subsection.

(3.)Plan Activation. The hydrogen sulfide contingency plan shall be activated when a release causes a concentration of hydrogen sulfide greater than the activation level set forth in the hydrogen sulfide contingency plan. At a minimum, the plan must be activated whenever a release may create a concentration of hydrogen sulfide of more than 100 ppm in any public area, 500 ppm at any public road or 100 ppm 3,000 feet from the site of release.

(4.) Submission.

to the division.

(a.) Where Submitted. The hydrogen sulfide contingency plan shall be submitted

(b) When Submitted. A hydrogen sulfide contingency plan for a well, facility or operation existing on the effective date of this section shall be submitted within one year of the effective date of this section. A hydrogen sulfide contingency plan for a new well, facility or operation shall be submitted before operations commence. A hydrogen sulfide contingency plan shall be submitted within 180 days after the person, operator or facility becomes aware or should have become aware that a public area or public road is established that creates a potentially hazardous volume where none previously existed. The hydrogen sulfide contingency plan for a drilling, completion, workover or well servicing operation must be on file with the division before operations commence and may be submitted separately or along with the application for permit to drill (APD) or may be on file from a previous submission.

(c. Electronic Submission. Any filer who operates more than one hundred wells or who operates a crude oil pump station, compressor station, refinery or gas plant must submit each hydrogen sulfide contingency plan in electronic format. The hydrogen sulfide contingency plan may be submitted through electronic mail, through an Internet filing or by delivering electronic media to the division, so long as the electronic submission is compatible with the division's systems.

(5.) Failure to Submit Plan. Failure to submit a hydrogen sulfide contingency plan when required may result in denial of an application for permit to drill, cancellation of an allowable for the subject well or other appropriate enforcement action.

(6.) Review, Amendment. The person, operator or facility shall review the hydrogen sulfide contingency plan any time a subject addressed in the plan materially changes and make appropriate amendments. If the division determines that a hydrogen sulfide contingency plan is inadequate to protect public safety, the division may require the person, operator or facility to add provisions to the plan or amend the plan as necessary to protect public safety. [I'd delete the bolded reference --- it will make it difficult to enforce]

(7.)Retention and Inspection. The hydrogen sulfide contingency plan shall be reasonably accessible in the event of a release, maintained on file at all times, and available for inspection by the division.

(8.) Annual Inventory of Contingency Plans. On an annual basis, each person, operator or facility required to prepare one or more hydrogen sulfide contingency plans pursuant to this section shall file with the appropriate local emergency planning committee and the state emergency response commission an inventory of the wells, facilities and operations for which plans are on file with the division and the name, address and telephone number of a point of contact.

(9.)Plans Required by Other Jurisdictions. A hydrogen sulfide contingency plan required by the Bureau of Land Management or other jurisdiction that meets the requirements of this subsection may be submitted to the division in satisfaction of this subsection.

E. Signage, Markers. For each well, facility or operation involving a concentration of hydrogen sulfide of 100 ppm or greater, signs and/or markers shall be installed and maintained. Each sign or marker shall conform with the current ANSI standard Z53.1 or some other standard approved by the division [this additional phrase will make this reference consistent with the rest of the rule, eliminate due process concerns related to the reference, and hopefully eliminate the requirement that we attach the material to the rule] and shall provide information sufficient to warn the public that a potential danger exists. Signs or markers shall be prominently posted at locations, including but not

limited to entrance points and road crossings, sufficient to alert the public that a potential danger exists. Signs and/or markers that conform with this subsection on its effective date shall be installed or replaced no later than one year from the effective date of this section.

F. Protection from Hydrogen Sulfide During Drilling, Completion, Workover, and Well Servicing Operations.

(1.) API Standards. All drilling, completion, workover and well servicing operations involving a hydrogen sulfide concentration of 100 ppm or greater shall be conducted with due consideration to the guidelines published by the API entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Drilling and Well Servicing Operations Involving of Wells Containing Hydrogen Sulfide," RP-49, most recent editions.

(2.) Detection and Monitoring Equipment. Drilling, completion, workover and well servicing operations involving a hydrogen sulfide concentration of 100 ppm or greater shall include hydrogen sulfide detection and monitoring equipment as follows:

(a.) Each drilling and completion site shall have an accurate and precise hydrogen sulfide detection and monitoring system that will automatically activate visible and audible alarms when the ambient air concentration of hydrogen sulfide reaches a predetermined value set by the operator, not to exceed 20 ppm. There shall be a sensing point 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.

(b.) For workover and well servicing operations, one operational sensing point shall be located as close to the well bore as practical. Additional sensing points may be necessary for large or long-term operations.

(c.) Hydrogen sulfide detection and monitoring equipment must be provided and must be made operational during drilling when drilling is within 500 feet of a zone anticipated to contain hydrogen sulfide and continuously thereafter through all subsequent drilling.

(3.) Wind Indicators. All drilling, completion, workover and well servicing operations involving a hydrogen sulfide concentration of 100 ppm or greater shall include wind indicators. Equipment to indicate wind direction shall be present and visible at all times. At least two devices to indicate wind direction shall be installed at separate elevations and visible from all principal working areas at all times. When a sustained concentration of hydrogen sulfide is detected in excess of 20 ppm at any detection point, red flags shall be displayed.

(4.) Flare System. For drilling and completion operations in an area where it is reasonably expected that a potentially hazardous volume of hydrogen sulfide will be encountered, the person, operator or facility shall install a flare system to safely gather and burn hydrogen sulfide-bearing gas. Flare outlets shall be located at least 150 feet from the well bore. Flare lines shall be as straight as practical. The flare system shall be equipped with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall be provided supplemental fuel to maintain ignition.

(5.) Well Control Equipment. When the 100 ppm radius of exposure includes a public area, the following additional measures shall be required:

(a.) Drilling. A remote controlled well control system shall be installed and operational at all times beginning when drilling is within 500 feet of the formation believed to contain hydrogen sulfide and continuously thereafter during drilling. The well control system must include, at a minimum, a pressure and hydrogen-sulfide-rated well control choke and kill system including manifold and blowout preventer that meets or exceeds the specifications API-16C and API-RP 53 or other specifications approved by the division. Mud-gas separators shall be used. These systems shall be tested and maintained pursuant to the specifications referenced, according to the requirements of this part, or otherwise as approved by the division.

(b.) Completion, Workover and Well Servicing. A remote controlled pressure and hydrogen-sulfide-rated well control system that meets or exceeds API specifications or other specifications approved by the division shall be installed and operational at all times during completion, workover and servicing of a well.

(6.) Mud Program. All drilling, completion, workover and well servicing operation involving a hydrogen sulfide concentration of 100 ppm or greater shall provide a hydrogen sulfide mud program capable of handling hydrogen sulfide conditions and well control, including de-gassing and flaring.

(7.)Well Testing. Except with prior approval of the division, drill-stem testing of a zone that contains hydrogen sulfide concentration of 100 ppm or greater shall be conducted only during daylight hours and formation fluids shall not be permitted to flow to the surface.

(8.) If Hydrogen Sulfide Encountered During Operations. If hydrogen sulfide was not anticipated at the time the division issued a permit to drill but is encountered during drilling in a concentration of 100 ppm or greater in the gaseous mixture, the operator must satisfy the requirements of this section before continuing drilling operations. The operator shall notify the division of the event and the mitigating steps that have or are being taken as soon as possible, but no later than 24 hours following discovery. The division may grant verbal approval to continue drilling operations pending preparation of any required hydrogen sulfide contingency plan.

G\_Protection from Hydrogen Sulfide at Crude Oil Pump Stations, Producing Wells, Tank Batteries and Associated Production Facilities, Pipelines, Refineries, Gas Plants and Compressor Stations.

(1.) API Standards. Operations at crude oil pump stations and producing wells, tank batteries and associated production facilities, refineries, gas plants and compressor stations involving a concentration of hydrogen sulfide of 100 ppm or greater shall be conducted with due consideration to the guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

(2.) Security. Well sites and other unattended, fixed surface facilities shall be protected from public access by fencing with locking gates when the location is within 1/4 mile of a public area. A surface pipeline shall not be considered a fixed surface facility for purposes of this paragraph.

(3.) Wind Direction Indicators. All crude oil pump stations, producing wells, tank batteries and associated production facilities, pipelines, refineries, gas plants and compressor stations where a concentration of hydrogen sulfide of 100 ppm or greater is present shall provide equipment to indicate wind direction. The wind direction equipment shall be installed and visible from all principal working areas at all times.

(4.) Well Control Equipment. When the 100 ppm radius of exposure includes a public area, the following additional measures are required:

(a.) Safety devices, such as automatic shut-down devices, shall be installed and maintained in good operating condition to prevent the **continuing** escape of hydrogen sulfide. Alternatively, safety procedures shall be established to achieve the same purpose. <u>II can't remember</u> why the word "continuing" appears; it could be interpreted as requiring safety devices that protect only against continuing releases and not one-time releases, no matter what the concentration or volume of the release]

(b) Any well shall possess a secondary means of immediate well control through the use of appropriate christmas tree or downhole completion equipment. Such equipment shall allow downhole accessibility (reentry) under pressure for permanent well control.

(5.) Tanks or vessels. Each stair or ladder leading to the top of any tank or vessel containing 300 ppm or more of hydrogen sulfide in the gaseous mixture shall be chained or marked to restrict entry.

(6.)Compliance Schedule. Each existing crude oil pump station, producing well, tank battery and associated production facility, pipeline, refinery, gas plant and compressor station not currently meeting the requirements of this subsection shall be brought into compliance within one year of the effective date of this section.

H. Personnel Protection and Training. All persons responsible for the implementation of any hydrogen sulfide contingency plan shall be provided training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.

-I. Standards for Equipment That May Be Exposed to Hydrogen Sulfide. Whenever a well, facility or operation involves a potentially hazardous volume of hydrogen sulfide, equipment shall be

selected with consideration for both the hydrogen sulfide working environment and anticipated stresses and use NACE Standard MR0175 (latest edition) or some other standard approved by the division shall be used for selection of metallic equipment or, if applicable, adequate protection by chemical inhibition or other methods that control or limit the corrosive effects of hydrogen sulfide shall be used.

J/Exemptions. Any person, operator or facility may petition the director or the director's designee for an exemption to any requirement of this section. Any such petition shall provide specific information as to the circumstances that warrant approval of the exemption requested and how the public safety will be protected. The director or the director's designee, after considering all relevant factors, may approve an exemption if the circumstances warrant an exemption.

 $-K_{>}$  Notification of the Division. The person, operator or facility shall notify the division upon a release of hydrogen sulfide requiring activation of the hydrogen sulfide contingency plan, as soon as possible, but no more than four hours after plan activation, recognizing that a prompt response should supercede notification. The person, operator or facility shall submit a full report of the incident to the division on Form C-141 no later than fifteen (15) days following the release.

F. Where citation below the level of a section is desired, designations below the section shall precede 9 the citation. Example: Subsection A of 3.1.3.8 NMAC. [1.24.10.9 NMAC - Rp 1 NMAC 3.3.10.8, 2/29/2000]

#### 1.24.10.10 ISSUING AUTHORITY:

A. The issuing authority is responsible for ensuring compliance with the requirements set forth in this part.

**B.** Where delegation is authorized, the agency may, by rule or formal appointment, specify an issuing authority other than that named in statute. The agency shall forward, in writing, the title, name and signature of the designee to the records center. The agency shall notify, in writing, the records center of any change in the designation.

C. The records center shall not accept a rule filing signed by other than the issuing authority, or a formally appointed designee.

[1.24.10.10 NMAC - Rp 1 NMAC 3.3.10.9, 2/29/2000]

#### 1.24.10.11 WHAT CONSTITUTES A RULE:

A. Agency directives that affect persons outside the agency or have significant indirect affect upon such persons are rules.

**B.** Manuals of procedure may contain material that affects other state agencies, the public or agency clients. Such material shall be filed as a rule. If it cannot be separated from other material, the entire manual shall be filed. Agencies are encouraged to separate rule material even if it is later included in a manual of procedure.

C. Procedures for public hearings and open meetings shall be filed as a rule.

**D.** Contracts, requests for proposals (RFPs) or requests for information (RFIs), including form contracts, are not rules; however, agencies may issue rules that require contractual terms.

E. Materials specifically exempted by statute from the State Rules Act are not rules.

F. Computations of annual assessments based on rule or statute are not rules - i.e., tax tables. [1.24.10.11 NMAC - N, 2/29/2000]

#### 1.24.10.12 STYLE:

A. Style shall be guided by relevant portions of the current edition of the legislative drafting manual of the New Mexico legislature published by the New Mexico legislative council service. The following provisions are specifically adopted.

(1) Chapter 4, Bill Drafting, the portion dealing with brackets, line-through and underscoring shall apply to proposed amendments and amendments for publication in the New Mexico register. This style shall not be applied to the integrated part.

(2) Chapter 7, Legislative Style and Language Provisions, except for the portion dealing with numbers, formulas and charts.

(3) Figures and symbols may represent amounts of money. It is not necessary to spell out the number.

**B.** Special symbols shall be avoided and the common abbreviation or full spelling used instead. For example, deg. for degree and lbs. for pounds.

C. No rule filing shall be typed in all capital letters.

**D.** Indentions shall be standardized as follows.

(1) Section numbers shall be flush with the part's one-inch margin.

(2) One tab shall be used to indent the first line of a subsection. Tab once after the subsection designation before beginning the text.

(3) Paragraphs shall be indented 20 spaces. Do not use tabs.

(4) Subdivisions below the paragraph shall be indented 30 spaces. Do not use tabs.

(5) After the numeric or alphabetic designation for a paragraph or subparagraph, indent five spaces before the beginning of the text.

(6) Hanging indents are not permitted.

E. Sections shall be clearly separated.

F. The name of the issuing agency in Section 1 and in full citation shall be typed in title case.

G. The heading of the first page shall contain the title, chapter and part numbers and names. The header and related information shall be typed in all capital letters. Example:

#### 1.24.10 NMAC

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## FILED WITH STATE RECORDS CENTER

# 2000 FEB 15 AM 10: 59

# TITLE 3 TAXATION

## CHAPTER 1 TAX ADMINISTRTION

## PART 3 DISCLOSURE OF TAXPAYER INFORMATION

H. Use of tables shall be limited. The agency shall be guided by the following considerations in

determining whether to use tables.

- (1) The text in tables will not be searchable.
- (2) Tables will require extra keystrokes to access.
- (3) Tables increase publication costs.
- I. No rule filing shall contain footnotes.

[1.24.10.12 NMAC - N, 2/29/2000]

#### 1.24.10.13 ELECTRONIC STANDARDS:

- A. Electronic storage media for rule filings shall be:
  - (1) diskette shall be 3.5 inches IBM format, high density; or
  - (2) CD-ROM, IBM format.

B. For rule filings, the electronic format shall be MS Windows version of MS Word software using

Times New Roman, 10-point font.

- C. Special coding, such as hanging indents, shall not be used.
- D. Tables shall be included in the electronic version of the documents as GIF or PDF files.

E. Use of images shall be limited. If necessary, they shall be included in the electronic version of the document as GIF or PDF files.

document as GIF of PDF files.

# [1.24.10.13 NMAC - Rp 1 NMAC 3.3.10.13, 2/29/2000]

## 1.24.10.14 PAPER VERSION STANDARDS:

- A. Paper:
  - (1) Output shall be produced from, and not vary from, the electronic version of the rule filing.
  - (2) Size shall be  $8.5 \times 11$  inches.
  - (3) Weight shall be a minimum of 20-lb. bond or copier paper.
  - (4) Color shall be white.
- **B.** Ink: Color shall be black and uniform throughout.
- C. Binding: Rule filings shall be unbound and consist of individual sheets.
- D. Page Layout:
  - (1) A rule filing shall be single-spaced with increased or double spacing between sections.
  - (2) The original paper version of a rule filing shall be single-sided.
  - (3) Margins shall be a minimum of one inch on all four sides, excluding the footer.
  - (4) Tabs shall be set at 0.5 inches.

(5) The word processing document shall have a footer for page identification which shall appear at the foot of every page. The footer shall contain the NMAC number down through the part number in the bottom left corner of the footer. The page number shall be located at the bottom right corner of the footer. [1.24.10.14 NMAC - Rp 1 NMAC 3.3.10.13, 2/29/2000]

#### 1.24.10.15 NMAC TRANSMITTAL FORM:

A. Each rule filing delivered to the records center shall be accompanied by a completed NMAC transmittal form in both hard copy and electronic format.

**B.** The records center shall provide agencies with blank NMAC transmittal forms in both hard copy and electronic format.

C. The filing agency shall complete the NMAC transmittal form prior to filing.

D. The NMAC transmittal form shall not be handwritten and shall be suitable for reproduction.

E. The NMAC name and number shall appear on the NMAC transmittal form.

F. The NMAC transmittal form shall state the type of filing - i.e., original filing, amendment, repeal or emergency filing.

G. If a rule filing affects a pre-NMAC rule, the name, number and filing date of the pre-NMAC rule shall also be noted on the NMAC transmittal form.

H. The NMAC transmittal form shall state the date(s) of any public hearing(s) on the proposed rule or

#### Hydrogen Sulfide Gas (H<sub>2</sub>S) 19.15.2.

A. In General. Hydrogen Sulfide Gas, known by its chemical above eviation H<sub>2</sub>S," or as "sulfurated hydrogen" or "hydrosulfuric acid" (hereinafter referred to as " H<sub>2</sub>S"), is a flammable, poisonous gas that occurs naturally as a component of crude petroleum and natural gas. The gas, and its combustion product, sulfur dioxide  $(S0_2)$ , present severe threats to human health, safety and welfare and can be fatal when a person is exposed to high concentrations. The gas has a distinct and characteristic odor of rotten eggs.

of

B. Definitions (specific to this Rule).

1. Dispersion Technique. "Dispersion technique" is a mathematical representation of the pplizalih physical and chemical transportation characteristics, dilution characteristics, and transformation characteristics of H<sub>2</sub>S gas emitted into the atmosphere.

2. Escape Rate. The "escape rate" is the maximum volume (Q) used as the escape rate in determining the radius of exposure. The escape rate shall be calculated using the maximum daily rate of gas produced through a facility or the best estimate thereof. For a natural gas well, the escape rate shall be calculated by using the current daily absolute openflow rate against atmospheric pressure. For an oil well, the escape rate shall be calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or best estimate thereof. For an oil or natural gas 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.

3. PPM. The abbreviation "ppm" means "parts per million."

4. Potentially Hazardous Volumer The phrase "potentially hazardous volume" as used in this Section means a volume of H<sub>2</sub>S gas is present whose volume, concentration and flow rate is such that, if released, it would result in a concentration of 100 ppm or greater at any occupied residence, school, church, park, school by stop, place of business or other area where any person could reasonably be expected to be present, a concentration of 300 ppm or greater would be present at any federal, state, county, municipal or public road or highway, oga concentration of 100 ppm or greater of H<sub>2</sub>S would be present after a release at a distance of 3 000 feetifrom the site of the release. 5. Radius of Exposure. A the radius of exposure to the the section is derived sta

from a calculation using the following Pasquill-Gifford derived equation, or by such other method(s) as may be approved by the Division:

a. For determining the 100 ppm radius of exposure where the H<sub>2</sub>S concentration  $f_{1}$  than 10 percent: X = [1, 580] (17.5) in the gas stream is less than 10 percent:  $X = [1.589)(H_2S \text{ concentration})(Q)]^{(0.625)}$ , or

b. For determining the 300 ppm radius of exposure where the H<sub>2</sub>S concentration 41 in the gas stream is less than 10 percent:  $X = [(0.4546)(H_2S \text{ concentration})(Q)]^{(0.6258)}$  (.4546 is for 500 fillows: ppm will be corrected for 300 ppm)

Where: X = radius of exposure in feet:  $H_2S$  Concentration = decimal equivalent of the mole or volume fractions 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 condition of 14.73 psia and 60°F).

c. For determining the 100 ppm or the 300 ppm radius of exposure in gas streams containing H<sub>2</sub>S concentrations of 10 percent or greater, a dispersion technique that takes into account representative wind speed, direction, atmospheric stability, complex terrain, and 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)."

d. Where multiple sources of  $H_2S$  are present (e.g. wells, treatment equipment, flow lines, etc.), a radius of exposure may be utilized that covers a larger area than would otherwise be calculated using radius of exposure formula for each component part of a drilling, completion, workover or production system. For a well being drilled in an area where insufficient data exits 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.

C. Public Contingency Plan. - transition provisions -- gas stream = H2S concentration where facility located? - submit plan to Division upon completion

1. In General, A Public Contingency Plan is a written plan that describes emergency actions which must be taken to alert and protect persons at risk in the event of a release of a Potentially Hazardous Volume of H<sub>2</sub>S.

minution of #23 Kigh: (1802)

2. When Required. A Public Contingency Plan must be prepared and maintained at any facility where a potentially hazardous volume of  $H_2S$  is present or may be present.

3. Required Testing.

a. Required Testing for a Potentially Hazardous Volume of H2S. Each facility shall test the H<sub>2</sub>S concentration of the natural gas stream once using a method approved by the Division. Records of the test shall be made available to the Division upon request and shall be retained so long as the facility is in operation. Logo to

b. Exposure Radius Calculation. Within 180 days of the effective date of this rule each facility where testing pursuant to the preceding paragraph demonstrated an H<sub>2</sub>S concentration of 100 ppm or more in the natural gas stream shall calculate the radius of exposure and retain records of the results of the calculation so long as the facility is in operation. If operational or production alterations result in a  $\frac{1}{2}$  or greater increase in the H<sub>2</sub>S concentration or the radius of exposure changes for any reason, the facility shall re-calculate the radius of exposure.

4. Contents of the Public Contingency Plan. The Public Contingency Plan shall, at a minimum, contain the following elements:

a. Division Guidelines; Site-specific Factors. The Public Contingency Plan shall be prepared according to Division Guidelines. The details may vary according to the site-specific conditions. The Division may impose additional requirements based on population density or special circumstances.

b. Actions to be Taken Upon Release. The Public Contingency plan shall detail actions to be taken to alert and protect persons in the event of a release of a Potentially Hazardous Volume of H<sub>2</sub>S.

c. Coordination of Response. At a minimum, the Public Contingency Plan shall stipulate how emergency response actions will be coordinated with the Division and the New Mexico State Police, a Division of the Department of Public Safety, as required pursuant to the New Mexico Emergency Management Act, NMSA 1978, Subsection 74-48-1 through 74-4B-14 and the New Mexico Hazardous Material Emergency Response Plan (HMER Plan). 5. Annual Review. The Public Contingency Plan(s) shall be reviewed on an annual 10cal

basis and a copy of any necessary revisions shall be submitted to the Division, upon request.

6. Retention and On-Site Inspection. The Public Contingency Plan shall be maintained KJPONSE on file at all times and a copy shall be submitted to the Division upon request. The Public Contingency Plan shall be available during a release of a Potentially Hazardous Volume of H<sub>2</sub>S.

D. Drilling Contingency Plan.

1. In General. A Drilling Contingency Plan is a written plan that describes emergency actions which must be taken to alert and protect persons at risk in the event of a release of a Potentially Hazardous Volume of H<sub>2</sub>S, to provide for the safety of any persons at the site of the release, and to maintain control of the well with regard to H<sub>2</sub>S.

2. When Required. Any drilling, completion or workover operation that is conducted in formations that contain or which could reasonably be expected to contain concentrations of H<sub>2</sub>S of 100 ppm or more, must complete and file a Drilling Contingency Plan and, if applicable, a Public Contingency Plan along with the Application for Permit to Drill (APD) on form C-101. Any drilling, completion or workover operations that is conducted in formations that contain or which could reasonably be expected to contain concentrations of H<sub>2</sub>S of 100 ppm or more, both a Drilling Contingency Plan and, if applicable based on the criteria set forth in this Section, a Public Contingency Plan shall be submitted as part of the Application for Permit to Drill (APD) on form C-101.

3. Contents of the Drilling Contingency Plan. The Drilling Contingency Plan shall, at a minimum, contain the following elements:

2

a. Division Guidelines; Site-specific Factors. The Drilling Contingency Plan shall be prepared according to Division Guidelines. The details may vary according to the site-specific conditions or the population potentially at risk. The Division may impose additional safety and engineering control requirements to provide for public safety.

b. Actions to be Taken Upon Release. The Drilling Contingency plan shall detail actions to be taken to alert and protect persons in the event of a release of a Potentially Hazardous Volume of  $H_2S$ .

c. Coordination of Response. At a minimum, the Drilling Contingency Plan shall stipulate how emergency response actions will be coordinated with the Division and

4. Combined Drilling Contingency Plan and Public Contingency Plan. A combined Drilling Contingency Plan and Public Contingency Plan may be submitted where multiple APD's are filed for a lease, communitization agreement, unit or field.

5. Failure to Submit Plan. Failure to submit either the Drilling Contingency Plan or the Public Contingency Plan, or both, when required shall result in an incomplete APD and denial of the Application to Drill.

6. Annual Review. The Drilling Contingency Plan(s) shall be reviewed on an annual basis and a copy of any necessary revisions shall be submitted to the Division, upon request.

7. Retention and On-Site Inspection. The Drilling Contingency Plan shall be maintained on file at all times and a copy shall be submitted to the Division upon request. The Drilling Contingency Plan shall be available during a release of a Potentially Hazardous Volume of  $H_2S$ .

E. Protection from H2S During Drilling, Workover and Servicing Operations

1. Adherence to American Petroleum Institute (API) Standards. At a minimum, all drilling, completion, workover and well servicing operations shall be conducted in accordance with the publications of the American Petroleum Institute (API) entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Safe Drilling of Wells Containing Hydrogen Sulfide," RP-49, most recent edition.

2. Additional Standards. At a minimum, and in addition to the foregoing API standards, all drilling, completion, workover and well servicing operations shall also be conducted in accordance with the following:

a. Before Commencing Operations. The  $H_2S$  Drilling Contingency Plan shall be completed before commencement of operations. In addition, all H2S training shall be completed and all related safety equipment and warning systems shall be operational before to commencing operations.

b. Egress Routes. Egress routes shall be maintained at all times during operations, as follows:

i. Two roads, one at each end of the location or as dictated by prevailing winds and terrain, shall be established as emergency egress routes. If a second road is not practical, a clearly marked footpath to a safe area shall be provided; and

ii. The egress routes shall be kept passable at all times.

c. Detection and Monitoring.  $H_2S$  Detection and Monitoring Equipment shall be provided as follows:

i. Each drilling and completion site shall have an  $H_2S$  detection and monitoring system that automatically activates visible and audible alarms when the ambient air concentration of  $H_2S$  reaches 10 ppm. At a minimum, there shall be a sensing point 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.

ii. The detection system shall be calibrated and periodically tested [according to manufacturer's recommendations]. All tests of the  $H_2S$  monitoring system shall be recorded on the driller's log or it's equivalent.

iii. For workover and well servicing operations, one 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.

d. Wind Indicators and Signs.

i. Equipment to indicate wind direction shall be present and visible at all times during operations. At least two devices to indicate wind direction shall be installed at separate elevations and visible from all principal working areas at all times.

ii. During operations, danger or caution sign(s) shall be displayed along all accesses to the site. 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 approved by the Division. Each sign shall be painted a high visibility red, black and white, or yellow with black lettering. The sign(s) shall be legible and large enough to be read by all persons entering the well site and placed a minimum of 200 feet but no more than 300 feet from the well site and at a location which allows vehicles to turn around at a safe distance prior to reaching the site.

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

e. If H<sub>2</sub>S Encountered During Operations. If H<sub>2</sub>S was not anticipated at the time the APD was approved, but is encountered in excess of 100 ppm in the gas stream, the operator shall immediately ensure control of the well, suspend drilling operations (unless detrimental to well control), and obtain materials and safety equipment to bring the operations into compliance with the following paragraphs of this Rule. The operator shall notify the Division of the event and the mitigating steps that have or are being taken as soon as possible, but no latenthan 24 hours after discovery.
3. Operating Practices in Known H<sub>2</sub>S Areas. General operating procedures and

3. Operating Practices in Known  $H_2S$  Areas. General operating procedures and equipment for operations in  $H_2S$  areas shall be subject to the following minimum requirements.

a.  $H_2S$  Gas Encountered During Drilling Operations With Air, Gas, Mist or Other Non-Mud Circulating Media. If  $H_2S$  gas in excess of 100 ppm is encountered while drilling with air, gas,  $IOO \rho\rho m$ mist or other non-mud circulating mediums for aerated mud, the well shall be killed with a water- or oilbased mud, and mud shall be used thereafter as the circulating medium for continued drilling.

b. Flare System. A flare system shall be designed and installed to safely gather and burn  $H_2S$ -bearing gas. Flare outlets shall be located as far from the well bore as feasible (but not less than 150 feet). Flare lines shall be as straight as practical. The flare system shall be equipped with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall be provided supplemental fuel to maintain ignition.

c. Sulfur Dioxide.

i. Detection Equipment. At any well site where sulfur dioxide (hereinafter referred to as "SO<sub>2</sub>") may be released as a result of flaring of  $H_2S$ , the operator shall make SO<sub>2</sub> portable detection equipment available for checking the SO<sub>2</sub> level in the flare impact area.

ii. Activation of Public Protection Plan. If the flare impact area reaches a sustained ambient threshold level of two ppm or greater of  $SO_2$  in air and includes any occupied residence, school, church. park, or place of business, or area where any person could reasonably be expected to be present, the Public Protection Plan shall be activated.

d. Remote Controlled Choke.

i. When Required. A remote controlled choke shall be installed for all  $H_2S$  drilling and, where feasible, for completion and well servicing operations conducted within 1/4 mile of or contained inside a municipality or within 1/4 mile of an occupied residence, school, church, park, playground, school bus stop, place of business, or any other area where any person could reasonably be expected to be present.

ii. Remote Controlled Valve. A remote controlled valve may be used in lieu of this requirement, but only for completion operations.

iii. Remote Controlled Choke, Requirements. When required, a remote controlled choke or remote controlled valve shall have, at a minimum, a pressure and H<sub>2</sub>S-rated well control choke and kill system including manifold and blowout preventer (hereinafter referred to as "BOP") pursuant to specifications API-16C and API-RP 53. The BOP stack shall have a least one spool for the kill and choke lines, two pipe rams, one blind ram, one annual device and a rotating head. Mud-

gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced or other Division Rules, if more stringent.

e. Mud Program. The mud programs shall adhere to the following minimum requirements:

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

ii. Degassing. Drilling mud containing  $H_2S$  gas shall be degassed in accordance with current industry standards and practices. These gases shall be piped into the flare system.

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

iv. Well Testing. Well Testing in an  $H_2S$  environment shall be performed with a minimum number of personnel in the immediate vicinity to safely and adequately operate the test equipment. Except with prior approval by the Division, 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). An operator shall notify the Division 24 hours in advance of a drill-stem test if a Public Contingency Plan is required pursuant to this Rule.

4. Activation of Drilling Contingency Plan. The Drilling Contingency Plan shall be activated immediately when  $H_2S$  is detected in excess of 10 ppm at any detection point.

F. Protection from H<sub>2</sub>S at Producing Wells, Tank Batteries and Associated Production Facilities.
 1. Adherence to American Petroleum Institute (API) Standards. Operations at producing wells, tank batteries and associated production facilities shall be conducted in accordance with American Petroleum Institute (API) publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

2. Additional Standards. At a minimum, and in addition to the foregoing API standards, production from wells, operation of tank batteries and associated production equipment shall also be conducted in accordance with the following:

a. Gas Streams Containing 100 ppm or more. Producing wells containing 100 ppm or more of  $H_2S$  in the gas stream, and tank batteries at such sites, shall be subject to the following:

i. Public Contingency Plan. A determination must be made of the radius of exposure pursuant to this Rule and, if required based on the calculated radius and exposure, a Public Contingency Plan will also be required.

ii. Signage. A danger sign or signs shall be posted within 50 feet of each facility to alert the public of the potential  $H_2S$  danger. If fenced, a danger sign at the gate(s) shall suffice. Danger signs shall be posted at each flowline and gathering line that

contains  $H_2S$  gas as specified in Subparagraph. A sign shall be placed at each point where such a line crosses a public road or lease road. Each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

iii. Fencing. Fencing and gate(s) shall be required when producing wells, associated tank batteries and associated production facilities are located within a municipality, within 1/4 mile of the outside boundary of a municipality or within 1/4 mile of an occupied residence, school, church, park, playground, school bus stop, place of business, or where any person could reasonably be expected to be present. The Division shall approve the method and type of fencing. Gate(s) shall be locked when unattended by the operator.

iv. Wind Direction Indicators. Wind direction indicator(s) shall be required. In the event the producing well and associated tank battery is located at the same site, one such indicator shall suffice.

v. Secondary Well Control. All wells 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 a potentially hazardous volume of  $H_2S$  is present as set forth in this Rule, well head configuration shall be in accordance with API specifications and at least two entry points provided in the casing/tubing annulus.

vi. Automatic Safety Valve or Shutdown. Where the 100 ppm radius of exposure for  $H_2S$  includes any occupied residence, place of business, school, or other inhabited structure or an area where any person may reasonably be expected to be present, the operator shall install automatic an safety valve or shutdown at the wellhead or other appropriate shut-in control. The automatic safety valve shall be set to activate upon a release of a potentially hazardous volume of  $H_2S$ .

Any tank battery serving a well whose gas stream concentration is 300 ppm of H2S or greater shall be subject to the following additional requirements:

**j** a. Each stair or ladder leading to the top of any storage tank shall be chained and/or marked to restrict entry. For any tank battery that requires fencing pursuant to this Section, a danger sign posted at the gate(s) shall suffice.

storage tank to alert persons of the potential  $H_2S$  danger. For any storage tank for which fencing is required, a danger sign posted at the locked gates shall suffice. Each sign shall read: "DANGER: POISON GAS HYDROGEN SULFIDE."

 $\hat{n}$  At least one permanent wind direction indicator shall be installed so that wind direction can be easily determined at or approaching the storage tank(s).

approved fence to restrict public access when located within a municipality or within 1/4 mile of a municipality or within 1/4 mile of an occupied residence, school, church, park, playground, school bus stop, place of business, or an area where any person could reasonably be expected to be present. Gates shall be locked when unattended.

3. Modification or Repair. The Division may require modification or repair of a producing well, associated tank battery or associated production facilities if the sustained ambient concentration of  $H_2S$  at any occupied residence, school, church, park, playground, school bus stop, place of business, or area where any person could reasonably be expected to present, reaches one ppm.

4. Compliance Schedule. Each existing producing well and associated tank battery not currently meeting the requirements and minimum standards set forth herein shall be brought into compliance within 1 year of the effective date of this Rule. Each producing well and tank battery constructed following the effective date of this Rule shall be designed, constructed and operated to meet the requirements set forth herein.

G. Personnel Protection and Training. All persons working at a facility that must submit a Public Contingency Plan or a Drilling Contingency Plan pursuant to this Section, shall be trained in  $H_2S$  hazards, detection and contingency procedures, and shall be provided with adequate protective equipment. Operators and managers of facilities governed by this Rule shall maintain records of such training activities and make them available to the Division upon request.

H. Standards for Equipment That May Be Exposed to H2S.

1. Metallurgical Equipment. All metallurgical equipment that may be exposed to  $H_2S$  shall be suitable for  $H_2S$  service. The metallurgical properties of the materials used shall conform to the current National Association of Corrosion Engineers (NACE) Standard MR 0175-90, Material Requirement, Sulfide Stress Cracking Resistant Metallic Material for Oil Field Equipment.

2. Other Equipment. 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 Section, or if applicable, adequate protection by chemical inhibition or other such method that controls or limits the corrosive effects of  $H_2S$  shall be used.

I. H2S Injection Prohibited. Injection of fluids containing hydrogen sulfide is prohibited where the injection fluids are a gaseous mixture, or would be a gaseous mixture in the event of a release to the atmosphere, and where the 100 ppm radius of exposure includes any occupied residence, school, church, park, school bus stop, place of business, an area where any person could reasonably be expected to be present, within a municipality or within a 1/4 mile of a municipality.

J. Exemptions. An exemption to the requirements of this Section may be requested by petitioning the Director. Any such petition shall provide specific information as to the circumstances, which warrant approval of the variance requested, and the proposed alternative methods by which the related requirements of this Section are to be satisfied. The Director, after considering all relevant factors, may approve an exemption if it is determined that the proposed alternative meets or exceeds the objectives of this Section and protects the health, safety and welfare of the potentially affected persons.

K. Release. Upon a release of  $H_2S$  of any facility required to submit a Public Contingency Plan or an operator required to submit a Drilling Contingency Plan, the following actions must be taken:

1. Activation of the Public Contingency Plan or the Drilling Contingency Plan, or Both. The Public Contingency Plan or the Drilling Contingency Plan, or both, shall be activated immediately upon detection of release of a Potentially Hazardous Volume of  $H_2S$  or if any person is subjected to an atmosphere exposure exceeding 30 ppm of hydrogen sulfide or 10 ppm of sulfur dioxide.

2. Notification of the Division. Upon release of a Potentially Hazardous Volume of  $H_2S$ , or, alternatively, upon exposure of any person to an atmosphere exposure exceeding 30 ppm of hydrogen sulfide or 2 ppm of sulfur dioxide, the Division shall be notified as soon as practicable, but no later than within one hour of the discovery of the release. A full report of the incident shall be submitted to the OCD on a C-141 form within 15 days of the incident.

L. Minimum Standards. This Section is intended to set forth the minimum acceptable standards with regard to  $H_2S$  operations. The Division may require more stringent standards on a case-by-case basis, or require corrective actions if necessary, to maintain control of a well or any other facility, to prevent waste, provide for public safety, protect public health and the environment.

Hydrogen Sulfide Gas (Hydrogen Sulfide) 19.15.2.

A. In General, Hydrogen Sulfide Q as (known by its chemical abbreviation "  $H_2S$ " or as "sulfurated hydrogen" or "hydrosulfuric acid") is a flammable, poisonous gas that occurs naturally as a component of crude petroleum and natural gas. The gas presents severe threats to human health and can be fatal in high concentrations. The gas has a distinct and characteristic odor of rotten eggs.

B. Applicability. This Section applies to any person, operator or facility subject to the jurisdiction of the Division, including, but not limited to, any person, operator or facility engaged in drilling, stimulating, completing, working over or producing any oil, natural gas or carbon dioxide well, or any person, operator or facility engaged in gathering, transporting, storing, processing, or refining of crude oil, natural gas or carbon dioxide where it is determined pursuant to D.1 helow that H-S concentrations exceed 100 ppm.

C. Definitions (specific to this Rule).

1. API. "API" means the American Petroleum Institute, 300 Corrigan Tower Building, Dallas, Texas, 75201.

2. Dispersion Technique. A "dispersion technique" is a mathematical representation of the physical and chemical transportation characteristics, dilution characteristics, and transformation characteristics of hydrogen sulfide gas in the atmosphere.

3. Escape Rate. The "escape rate" is the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing hydrogen sulfide. The escape rate is calculated using the maximum daily rate of the gaseous mixture produced or the best estimate thereof. For a natural gas well, the escape rate shall be calculated by using the current daily absolute open flow rate against atmospheric pressure. For an oil well, the escape rate shall be calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or best estimate thereof. For an oil or natural gas well drilled in an undeveloped area (a wildcat well), the escape rate may be determined by using offset wells completed in the interval(s) in question, or using some other reasonable means to calculate the escape rate. For facilities or operations not mentioned, the escape rate shall be calculated using the actual flow of gaseous mixture through the facility or operation.

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4. PPM. The abbreviation "ppm" means "parts per million."

5. Potentially Hazardous Volume (hereinafter referred to as a "potentially hazardous volume" or by the acronym "PHV") of Hydrogen Salfide, This means the volume of hydrogen sulfide

gas of such concentration that: (Public a real) a. the 100 ppm radius of exposure includes any residence, school, church, park, school bus stop, or place of business (other than facilities directly involved in oil and gas production, such as producing oil and gas wells, pipelines, tank batteries, production equipment, gas plants, refineries);

b. the 300 ppm radius of exposure includes any public road; or GERA

c. the 100 ppm radius of exposure is in excess of 3,000 feet.
6. Public Area. A dwelling, place of business, church, school, hospital, school bus stop, government building, public road, any portion of a park, city, town, village, or similar area where members of the public can reasonably be expected to be present.

7. Public Road. Any state, municipal or county road or highway, postal route or other public road. A public road is not a private road or a road whose access to members of the general public is limited. restricted.

8. Radius of Exposure. The radius of exposure (hereinafter referred to as "radius of exposure" or "ROE") is an imaginary circle constructed around a point of escape whose radius is calculated using the following Pasquill-Gifford derived equation, or by such other method(s) as may be approved by the Division:

a. For determining the 100 ppm radius of exposure where the hydrogen sulfide concentration in the gaseous mixture is less than 10 percent:

 $X = [(1.589)(hydrogen sulfide concentration)(Q)]^{(0.625)}$ , or

b. For determining the 300 ppm radius of exposure where the hydrogen sulfide concentration in the gaseous mixture is less than 10 percent: X=[(0.7700)(hydrogen sulfide concentration)(O)]<sup> $(0.\overline{6}258)$ </sup>

Where: X= radius of exposure in feet: hydrogen sulfide concentration = decimal equivalent of the mole or volume fractions of hydrogen sulfide in the gaseous mixture; Q= maximum volume of gas determined to be available for escape in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

c. For determining the 100 ppm or the 300 ppm radius of exposure in gaseous mixtures containing hydrogen sulfide concentrations of 10 percent or greater, a dispersion technique that takes into account representative wind speed, direction, atmospheric stability, complex terrain, and 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)."

d. Where multiple sources of hydrogen sulfide are present (e.g. wells, treatment equipment, flow lines, etc.), the radius of exposure may encompass a larger area than would otherwise be calculated using a radius of exposure computation for each component part.

e. For a well being drilled in an area where insufficient data exits to calculate a radius of exposure, but where hydrogen sulfide could reasonably be expected to be present in concentrations in excess of 100 ppm in the gaseous mixture, a 100 ppm radius of exposure equal to 3,000 feet shall be assumed.

D. Determination of Hydrogen Sulfide Risk.

1. Determination of Hydrogen Sulfide Concentration.

a. Each person, operator or facility to which this Section applies shall determine the hydrogen sulfide concentration within the operation or system. A representative sample for each system or operation may be used for testing provided that the person, operator or facility can demonstrate that the concentration derived from a test of the representative sample is reasonably accurate.

b. Tests shall be conducted in accordance with applicable ASTM and GPA standards or by other methods approved by the Division. 2. Calculation of Radius of Exposure.

a. If the testing described in the previous Paragraph determines that the concentration of hydrogen sulfide in a gaseous mixture is 100 ppm or greater, then the person, operator or facility must calculate the radius of exposure pursuant to this Section; otherwise if the concentration of htdrogen sulfide is less, no further calculation is needed.

b. The person, operator or facility shall provide the results of all ROE determinations to the OCD within 180 days of commencing operations or, for existing facilities, within 180 days of the effective date of this Section.

3. Recalculation. If operational or production alterations are made that result in a 25% or greater increase in the hydrogen sulfide concentration in a given operation or facility, a new ROE shall be calculated and the results submitted to the Division and retained. Low tests?

E. H<sub>2</sub>S Contingency Plans.

1. In General. The H<sub>2</sub>S Contingency Plan is a written document that provides an organized and effective plan of action which will be used to alert and protect persons at risk in the event of a potentially significant release of hydrogen sulfide gas. 2. When Required. An H<sub>2</sub>S Contingency Plan is required when any new or existing well,

operation, facility, area or system generates or is capable of generating a potentially hazardous concentration of hydrogen sulfide gas, or generates or is capable of generating a 100 ppm radius of exposure 3,000 feet from the site of a release. any public area, or any public road.

3. Submission. An H<sub>2</sub>S Contingency Plan must be submitted to the Division, and may be submitted separately or along with the Application for Permit to Drill (APD). for a well that is not covered by an existing H<sub>2</sub>S Contingency Plan.

4. Elements. The H<sub>2</sub>S Contingency Plan will consist of different elements depending on the risks encountered. provide a tiered response to the risks present. [THE RULE PROVDES THE

**TIERED RESPONSE, NOT THE PLANS]** The three possible elements of an  $H_2S$  Contingency Plan are the  $H_2S$  Release Plan, the  $H_2S$  Traffic Plan and the  $H_2S$  Public Contingency Plan. The  $H_2S$ Contingency Plan should merge the applicable elements into a single plan, i.e. there should only be one Map or Plat and one Call List.

5. Development. An  $H_2S$  Contingency Plan should be developed according to the requirements for each applicable element of the plan.

6. The H<sub>2</sub>S Release Plan, the H<sub>2</sub>S Traffic Plan and the H<sub>2</sub>S Public Contingency Plan. Contents. The H2S Contingency Plan shall incorporate the <u>following</u> elements based <u>on</u> the level of risk a The U.S. Poloson Plan

a. The H<sub>2</sub>S Release Plan.

1. When Required. <u>An H<sub>2</sub>S Release Plan is</u> required for every  $H_2S$ 

Contingency Plan.

2. Development. An H<sub>2</sub>S Release Plan shall be developed by the operator, with input from the Division, the New Mexico Department of Public Safety, and the Local Emergency Planning Committee.

3. Contents. An H<sub>2</sub>S Release Plan shall, at a minimum, contain the

following provisions:

i. Actions to be taken in the event of a release of a potentially

hazardous volume of hydrogen sulfide.

ii. A call list including the following as applicable:

- 1. local supervisory personnel;
- 2. county sheriff;
- 3 the Department of Public Safety and State Police;
- 4. city (municipal) police;
- 5. the appropriate Division district office; and
- 6. other public agencies as appropriate.

iii. A plat or map detailing the area within the radius of

exposure.

iv A list of the names and telephone numbers of all operator personnel to be contacted when a release is reported or suspected.

b. <u>The H<sub>2</sub>S</u> Traffic Plan.

1. When Required. An  $H_2S$  Traffic Plan is required at any well, operation, facility, area or system where the 300 PPM radius of exposure of  $H_2S$  encompasses any public road.

2. Development. <u>The H<sub>2</sub>S</u> Traffic Plan shall be developed by the

operator with input from the Division, the New Mexico State Police and/or the New Mexico Department of Public Safety, county sheriff, city (municipal) police, and the Local Emergency Planning Committee, as required pursuant to the New Mexico Emergency Management Act, NMSA 1978, Sections 74-48-1 through 744B-14 and the New Mexico Hazardous Materials Emergency Response Plan (HMER Plan). 3. Contents. The H<sub>2</sub>S Traffic Plan shall, at a minimum, contain the

following provisions:

i. Instructions and procedures for alerting and coordinating with emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide that has the potential to affect the public on at any public road.

ii. A call list including the following as applicable:

- 1. local supervisory personnel;
- 2. county sheriff;
- 3 the Department of Public Safety and State Police;
- 4. city (municipal) police;
- 5. the appropriate Division district office; and
- 6. other public agencies as appropriate.

iii. A plat or map detailing the area of exposure, including

the locations of public roads within the radius of exposure.

c. <u>The H<sub>2</sub>S</u> Public Contingency Plan.

1. When Required. A Public Contingency Plan must be prepared and maintained at any well, operation, facility, area or system where the 100 ppm radius of exposure of  $H_2S$  encompasses a public area.

2. Development. A Public Contingency Plan shall be developed <u>with</u> <u>input from the Division and emergency</u> response authorities (including, but not limited to, police and fire departments near the well, operation or facility, the New Mexico State Police and/or the New Mexico Department of Public Safety, and the Local Emergency Planning Committee).

3. Contents. A Public Contingency Plan shall, at a minimum, contain the following provisions:

i. Detailed <u>plans of action to be taken</u> to alert and protect persons in the event of a release of a potentially hazardous volume of hydrogen sulfide. A Public Contingency Plan shall include instructions and procedures for alerting persons at risk and emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide.

ii. A call list including the following as applicable:

- 1. local supervisory personnel;
- 2. county sheriff;

3. the Department of Public Safety and State Police;

4. city (municipal) police;

- 5. ambulance services;
- 6. hospitals;

7. county and city fire departments;

8. doctors;

9. contractors for supplemental or emergency equipment;10. the appropriate Division district office; and

11. other public agencies as appropriate.

iii. A Public Contingency Plan shall stipulate how emergency

response actions will be coordinated with the Division and the New Mexico State Police, <u>consistent with</u> the New Mexico Hazardous Materials Emergency Response Plan (HMER). , a Division of the Department of Public Safety, as required pursuant to the New Mexico Emergency Management Act, NMSA 1978, Sections 74-48-1 through 74-4B-14 and the New Mexico Hazardous Material Emergency Response Plan (HMER Plan).

iv. A plat or map detailing the area of exposure, including the locations of private dwellings or residences, public facilities such as schools, businesses, public roads or other similar areas where the public may be reasonably expected to be present within the radius of exposure.

v. The names and telephone numbers of all persons living within the radius of exposure of 100 ppm hydrogen sulfide and <u>contact persons all responsible parties</u> for each public area, such as churches, schools, and businesses.

vi. Provisions for advance briefing of affected and responsible persons within the radius of exposure. Such advance briefing shall include the hazards and characteristics of hydrogen sulfide, the necessity for an  $H_2S$  Contingency Plan, the possible sources of hydrogen sulfide with the radius of exposure, instructions for reporting a gas leak, the manner in which persons will be notified in the event of an emergency, and steps to be taken in an emergency.

vii. Additional support information, if applicable, such as the location of emergency evacuation routes, the location of safety and life support equipment, the location of hydrogen sulfide containing facilities, the location of nearby telephones and/or other means of communication, and special instructions for conditions at a particular installation such as local terrain and the effect of various weather conditions.

viii. The Division may impose additional requirements or

modify requirements based on site-specific conditions, population density or special circumstances. 6. Submission. Where a Public Contingency Plan is required for a new well or facility,

the H<sub>2</sub>S Contingency Plan shall be submitted to the Division and Local Emergency Planning Committee. All other Hydrogen Sulfide Contingency Plans shall <u>not be submitted</u>, <u>but shall</u> be maintained <del>by the operator</del> and provided to the Division <u>upon request</u> when requested. [conflicts with other language in the rule -- find and make consistent]

7. Failure to Submit Plan. Failure to submit an  $H_2S$  Contingency Plan when required may result in denial of an Application to Drill, cancellation of an allowable or other appropriate enforcement action.

8. Annual Review. An  $H_2S$  Contingency Plan shall be reviewed on an annual basis or <u>earlier sooner</u> if activation of <u>a the plan reveals</u> a deficiency that requires correction. The Division shall be notified of any corrections.

9. Retention and On-Site Inspection. An  $H_2S$  Contingency Plan shall be maintained on file at all times and shall be available for inspection by the Division during normal business hours.

10. Activation Levels for an  $H_2S$  Traffic Plan and the Public Contingency Plan PCP. The Traffic Plan and Public Contingency Plan shall be activated by the operator in the event of that a release of a Potentially Hazardous Volume of  $H_2S$  occurs above the respective thresholds (i.e. 300 ppm radious of exposure for the Traffic Plan, and 100 ppm radious of exposure for the Public Contingency Plan) or if a sustained concentration of  $H_2S$  exceeds 50 ppm at the property line of any facility, well or operation.

F. Protection from Hydrogen Sulfide During Drilling, Workover and Servicing Operations.

1. API Standards. All drilling, completion, workover and well servicing operations shall be conducted with due consideration of the guidelines published by the American Petroleum Institute (API) entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Safe Drilling of Wells Containing Hydrogen Sulfide," RP-49, most recent edition.

2. Minimum Standards. At a minimum, and possibly in addition to the foregoing API standards, each drilling, completion, workover and well servicing operation shall also be conducted in accordance with the following:

a. Before Commencing Operations. An  $H_2S$  Contingency Plan (where required) shall be completed before commencement of operations. In addition, hydrogen sulfide training shall be completed as required in sub-section H.(Personnel Protection and Training) and including all related safety equipment and warning systems shall be operational.

b. Egress Routes. Passable egress routes shall be maintained at all times during operations.

c. Detection and Monitoring. Hydrogen sulfide detection and monitoring equipment shall be provided as follows:

i. Each drilling and completion site shall have hydrogen sulfide detection and monitoring that automatically activates visible and audible alarms when the ambient air concentration of hydrogen sulfide reaches 10 ppm. There shall be a sensing point 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.

ii. The detection system shall be calibrated and tested monthly. Each test of the hydrogen sulfide monitoring system shall be recorded on the driller's log or its equivalent.

iii. For workover and well servicing operations, one operational sensing point shall be located as close to the well bore as practical. Additional sensing points may be necessary for large and/or long-term operations.

iv. Hydrogen sulfide detection and monitoring equipment must be provided during drilling when drilling is within 500 feet of the zone anticipated to contain hydrogen

sulfide and continuously thereafter through all subsequent drilling. Detection and monitoring equipment is not required for drilling from the surface to within 500 feet of the zone anticipated to contain hydrogen sulfide.

d. Wind Indicators and Signs.

i. Equipment to indicate wind direction shall be present and visible at all times. At least two devices to indicate wind direction shall be installed at separate elevations and visible from all principal working areas at all times.

ii. Danger or caution sign(s) shall be displayed along all accesses to the site. 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 approved by the Division. Each sign shall be painted with high visibility red, black and white, or yellow paint with black lettering. The sign(s) shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 300 feet from the well site and at a location which allows vehicles to turn around at a safe distance prior to reaching the site.

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

e. If Hydrogen Sulfide Encountered During Operations. If hydrogen sulfide was not anticipated at the time the APD was approved but is encountered during drilling in excess of 100 ppm in the gaseous mixture, the operator shall immediately ensure control of the well, suspend drilling operations (unless detrimental to well control), and obtain materials and safety equipment to bring the operations into compliance with this <u>Section Rule</u>. The operator shall notify the Division of the event and the mitigating steps that have or are being taken as soon as possible, but no later than 24 hours following discovery.

3. Operating Practices In Hydrogen Sulfide Concentrations of 100 ppm or Greater. Operating practices in areas known to contain a concentration of hydrogen sulfide gas of 100 ppm or greater in the gaseous mixture shall be subject to the following requirements:

a. If Hydrogen Sulfide Is Encountered During Use of Air, Gas, Mist or Other Non-Mud Circulating Media. If hydrogen sulfide gas in excess of 100 ppm is encountered while drilling with air, gas, mist or other non-mud circulating mediums for 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.

b. Flare System. For drilling and completion operations, a flare system shall be installed, unless exempted <u>pursuant to Subsection L. of this Section</u>, to safely gather and burn hydrogen sulfide-bearing gas. Flare outlets shall be located as far from the well bore as feasible (but not less than 150 feet from the well). Flare lines shall be as straight as practical. The flare system shall be equipped with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall be provided supplemental fuel to maintain ignition.

c. Remote Controlled Choke.

i. A remote controlled choke shall be installed during drilling and during completion and well servicing operations when the 100 PPM  $H_2S$  ROE impacts a public area., unless exempted <u>pursuant to Subsection L. of this Section</u>.

ii. A remote controlled valve may be used in lieu of use of a remote controlled choke, but only for completion operations.

iii. A remote controlled choke or remote controlled valve shall have, at a minimum, a pressure and hydrogen sulfide-rated well control choke and kill system including manifold and blowout preventer (hereinafter referred to as "BOP") pursuant to specifications API-16C and API-RP 53. The BOP stack shall have a least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced or other Division Rules, if more stringent. Variations to BOP stack arrangements may be granted by the Division for good cause shown.

d. Mud Program. A mud program, including de-gassing and flaring, capable of handling H<sub>2</sub>S conditions and well control shall be utilized.

e. Well Testing. Except with prior approval by the Division, the drill-stem testing shall be conducted only during daylight hours and formation fluids shall not be permitted to flow to the surface (closed chamber only). An operator shall notify the Division 24 hours in advance of a drill-stem test if an  $H_2S$  Contingency Plan is required pursuant to this Rule.

G. Protection from Hydrogen Sulfide at Producing Wells, Tank Batteries and Associated Production Facilities, Refineries, Gas Plants, and Compressor Stations.

1. American Petroleum Institute (API) Standards. Operations at producing wells, tank batteries and associated production facilities shall considered the guidelines published by the American Petroleum Institute (API) publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

2. Minimum Standards. At a minimum, and possibly in addition to the foregoing API standards, production from wells, operation of tank batteries and associated production equipment shall also be conducted in accordance with the following:

a. Gaseous Mixtures Containing 100 ppm or more. Producing wells containing 100 ppm or more of hydrogen sulfide in the gaseous mixture, tank batteries and associated production facilities at such sites, shall be subject to the following:

i.  $H_2S$  Contingency Plan. A determination must be made of the radius of exposure pursuant to this Rule and, if required based on the calculated radius of exposure, a  $H_2S$  Contingency Plan will also be required.

ii. Signage. A danger sign or signs shall be posted within 50 feet of each facility to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gate(s) shall suffice. Danger signs shall be posted at each flow line and gathering line on the well pad that contains hydrogen sulfide gas as specified in Subparagraph <u>of this Section</u>. A sign shall be placed at each point where such a line crosses a public road. Each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

iii. Fencing. Fencing and gate(s) shall be required when producing wells, associated tank batteries and associated production facilities are located within a 1/4 mile of a residence, school, church, park, playground, school bus stop, or place of business. The fence shall consist of a 5 foot chain link topped by two stands of barbed wire or other methods approved by the Division. Gate(s) shall be locked when unattended by the operator.

iv. Wind Direction Indicators. Wind direction indicator(s) shall be

 $\sim$  at every facility (tank battery, water injection station, production satellite) where H<sub>2</sub>S concentration in a gaseous state exceeds 100 PPM.

v. Secondary Well Control. Wells where the 100 PPM  $H_2S$  ROE incorporates a public area 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.

vi. Automatic Safety Valve or Shutdown. If the 100 PPM ROE involves a public area, an automatic safety valve or shutdown shall be installed at the facility or wellhead or other appropriate shut-in control shall be installed. The automatic safety valve shall be set to activate upon a release of a potentially hazardous volume of hydrogen sulfide.

b. Tanks or vessels containing 300 ppm or more of hydrogen sulfide in the gaseous mixture shall be subject to the following additional requirements:

Each stair or ladder leading to the top of any storage tank shall be chained and/or marked to restrict entry. For any tank battery that requires fencing pursuant to this Section, a danger sign posted at the gate(s) may be substituted for chaining and signage. to alert persons of the potential hydrogen sulfide danger. For any storage tank for which fencing is required, a danger sign posted at the locked gates shall suffice. Each sign shall read: "DANGER: POISON GAS HYDROGEN SULFIDE."

3. Modification or Repair. The Division may require modification or repair of a producing well, associated tank battery or associated production facilities if the sustained ambient concentration of hydrogen sulfide is 1 ppm or greater at any public area.

4. Compliance Schedule. Each existing producing well and associated tank battery not currently meeting the requirements and minimum standards set forth herein shall be brought into compliance within one (1) year of the effective date of this Rule. Each producing well and tank battery constructed following the effective date of this Rule shall be designed, constructed and operated to meet the requirements set forth herein.

H. Personnel Protection and Training. All persons responsible for the implementation of any  $H_2S$  Contingency Plan shall be provided training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.

I. Standards for Equipment That May Be Exposed to Hydrogen Sulfide. Proper materials and/or appropriate protective measures for equipment exposed to hydrogen sulfide shall be utilized. Records shall be retained and shall be made available to the Division upon request. The Division may require additional requirements on any facility that may pose a threat to public health and/or the environment.

J. Hydrogen Sulfide Injection. Injection of fluids containing hydrogen sulfide where the injection fluids are a gaseous mixture, or would be a gaseous mixture in the event of a release to the atmosphere, and where the 100 ppm radius of exposure includes any public area, excluding public roads, shall not be allowed unless first approved by the division after public hearing.

K. Exemptions. An exemption to the requirements of this Section may be granted by petitioning the Director. Any such petition shall provide specific information as to the circumstances that warrant approval of the variance requested and the proposed alternative methods by which the related requirements of this Section are to be satisfied. The Director, after considering all relevant factors, may approve an exemption if it is determined that the proposed alternative meets or exceeds the requirements of this Section and otherwise protects the health, safety and welfare of potentially affected persons.

L. Release. Upon a release of hydrogen sulfide the following actions must be taken:

1. Activation of the H<sub>2</sub>S Contingency Plan. The H<sub>2</sub>S Contingency Plan shall be activated immediately upon a H<sub>2</sub>S release where the if there is potential exists to expose any public area to a concentration of H<sub>2</sub>S greater than 100 ppm or a concentration of H<sub>2</sub>S greater than 300 ppm H<sub>2</sub>S at any public road, a concentration of H<sub>2</sub>S greater than 100 ppm at three thousand (3000) feet from the well, facility or operation, or a concentration of H<sub>2</sub>S greater than 50 ppm at the property line of any well, facility or operation.

2. Notification of the Division. Upon release of a hydrogen sulfide requiring activation of the  $H_2S$  Contingency Plan, the Division shall be notified as soon as practicable, preferably within one hour of the discovery of the release or as soon as possible in cases where recognizing that prompt response should supercede notification. A full report of the incident shall be submitted to the OCD on a C-141 form no later than fifteen (15) days following the incident.

M. Additional Standards. The Division may require more stringent standards on a case-by-case basis than those set forth in this Section, or require corrective actions if necessary, to maintain control of a well or any other facility, or to safeguard public health or safety.

19.15.2.\_\_\_ Hydrogen Sulfide Gas (Hydrogen Sulfide)

A. In General. Hydrogen Sulfide Gas (known by its chemical abbreviation " $H_2S$ " or as "sulfurated hydrogen" or "hydrosulfuric acid") is a flammable, poisonous gas that occurs naturally as a component of crude petroleum and natural gas. The gas presents severe threats to human health and can be fatal in high concentrations. The gas has a distinct and characteristic odor of rotten eggs.

B. Applicability. This Section applies to any person, operator or facility subject to the jurisdiction of the Division, including, but not limited to, any person, operator or facility engaged in drilling, stimulating, completing, working over or producing any oil, natural gas or carbon dioxide well, or any person, operator or facility engaged in gathering, transporting, storing, processing, or refining of crude oil, natural gas or carbon dioxide where it is determined pursuant to D.1 below that H<sub>2</sub>S concentrations exceed 100 ppm.

C. Definitions (specific to this Rule).

1. API. "API" means the American Petroleum Institute, 300 Corrigan Tower Building, Dallas, Texas, 75201.

2. Dispersion Technique. A "dispersion technique" is a mathematical representation of the physical and chemical transportation characteristics, dilution characteristics, and transformation characteristics of hydrogen sulfide gas in the atmosphere.

3. Escape Rate. The "escape rate" is the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing hydrogen sulfide. The escape rate is calculated using the maximum daily rate of the gaseous mixture produced or the best estimate thereof. For a natural gas well, the escape rate shall be calculated by using the current daily absolute open flow rate against atmospheric pressure. For an oil well, the escape rate shall be calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or best estimate thereof. For an oil or natural gas well drilled in an undeveloped area (a wildcat well), the escape rate may be determined by using offset wells completed in the interval(s) in question, or using some other reasonable means to calculate the escape rate. For facilities or operations not mentioned, the escape rate shall be calculated using the actual flow of gaseous mixture through the facility or operation.

4. PPM. The abbreviation "ppm" means "parts per million."

5. Potentially Hazardous Volume (PHV) of Hydrogen Sulfide. This means the volume of hydrogen sulfide gas of such concentration that: a. the 100 ppm radius of exposure (ROE) includes any residence, school, church,

park, school bus stop, or place of business other than oil and gas production (i.e. SIC 1311) b. the 300 ppm radius of exposure (ROE) includes any public road. (Steve to check

definition of public road); 1 = 100 and 1 = 100 (ROE) in includes any public road. (Sieve to check

c. the 100 ppm radius of exposure (ROE) is in excess of 3,000 feet.

6. Public Area. A dwelling, place of business, church, school, hospital, school bus stop, government building, public road, all or any portion of a park, city, town, village, or other similar area that can expect to be populated.

7. Public Road. Any road or highway that is under the jurisdiction of federal, slate, county, or municipality for maintenance and public use (Steve to check)

8. Radius of Exposure, The radius of exposure is an imaginary circle constructed around a point of escape whose radius is calculated using the following Pasquill-Gifford derived equation, or by such other method(s) as may be approved by the Division:

a. For determining the 100 ppm radius of exposure where the hydrogen sulfide concentration in the gaseous mixture is less than 10 percent:  $X = [(1.589)(hydrogen sulfide concentration)(Q)]^{(0.625)}$ , or

b. For determining the 300 ppm radius of exposure where the hydrogen sulfide concentration in the gaseous mixture is less than 10 percent:  $X=[(0.5683)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ 

Where: X= radius of exposure in feet: hydrogen sulfide concentration = decimal equivalent of the mole or volume fractions of hydrogen sulfide in the gaseous mixture; Q= maximum volume of gas determined to be available for escape in cubic feet per day (corrected for standard conditions of 14.73 psia and  $60^{\circ}$ F).

c. For determining the 100 ppm or the 300 ppm radius of exposure in gaseous mixtures containing hydrogen sulfide concentrations of 10 percent or greater, a dispersion technique that takes into account representative wind speed, direction, atmospheric stability, complex terrain, and 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-450/278-027R)."

d. Where multiple sources of hydrogen sulfide are present (e.g. wells, treatment equipment, flow lines, etc.), the radius of exposure may encompass a larger area than would otherwise be calculated using a radius of exposure computation for each component part.

e. For a well being drilled in an area where insufficient data exits to calculate a radius of exposure, but where hydrogen sulfide could reasonably be expected to be present in concentrations in excess of 100 ppm in the gaseous mixture, a 100 ppm radius of exposure equal to 3,000 feet shall be assumed.

D. Determination of Hydrogen Sulfide Risk 1. Determination of Hydrogen Sulfide Concentration. a. Each well, facility, or pipeline operator shall determine the hydrogen sulfide concentration within their operator or system. A representative sample for each system or operation shall suffice provided that the operator can show that the concentration derived is reasonably accurate. there what is a first shall be conducted in accordance with applicable ASTM supervised to the system of the second state of the second state

or by other methods approved by the Division.

2. Calculation of Radius of Exposure (ROE)  $\checkmark$ 

If testing described in 1. above determines that the concentration of hydrogen sulfide in a gaseous mixture is 100 ppm or greater, then the operator must calculate the radius of exposures as defined in the definition.

- the operator shall provide the results of all ROE determinations to the OCD within 180 days of commencing operations or, for existing facilities, within 180 days of the effective date of this rule. 3. Recalculation  $\checkmark$ 

If operational or production alterations are made that result in a 25% or greater increase in the hydrogen sulfide concentration, a new ROE shall be calculated and the results submitted to the Division and similarly retained.

E. H<sub>2</sub>S Contingency Plans.

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1. General. The H<sub>2</sub>S Contingency Plan is a written document which provides an organized and effective plan of action to alert and protect persons at risk in the event of a potentially significant release of hydrogen sulfide gas.

2. When Required. An H<sub>2</sub>S Contingency Plan is required when any new or existing well, operation, facility, area or system generates an H<sub>2</sub>S 100 ppm ROE of 3,000 feet from the site of release, or an H<sub>2</sub>S 100 ppm ROE encompasses any public area; or an H<sub>2</sub>S 300 ppm ROE encompasses any public road. An H<sub>2</sub>S Contingency Plan shall be submitted along with the Application for Permit to Drill (APD) (form 2) What about we

C-101) for a well that is not covered by an existing H<sub>2</sub>S Contingency Plan.
3. Elements. The H<sub>2</sub>S Contingency Plan is a document that provide a tiered response to the risks present. The three possible elements of an H2S Contingency Plan are the H2S Release Plan, the Traffic Plan and the Public Contingency Plan.

4. Development. An H<sub>2</sub>S Contingency Plan should be developed according to the requirements for each applicable element of the plan. The single  $H_2S$  contingency plan should merge the applicable provisions of the requisite elements into a single plan, i.e. there should only be one Map or Plat and one Call List.

5. Contents. The H<sub>2</sub>S Contingency Plan shall incorporate the required elements below based on a tiered level of risk:

a. H<sub>2</sub>S Release Plan $\chi$ 

1. When Required. Required for every H<sub>2</sub>S Contingency Plan,

2. Development. An H<sub>2</sub>S Release Plan shall be developed by the operator, and made available for inspection by the Division, the New Mexico Department of Public Safety, and the LEPC when requested.) - on the not Jucks point 3. Contents. An H<sub>2</sub>S Release Plan shall, at a minimum, contain the following provisions: i. Actions to be taken in the event of a release of a potentially hazardous volume of hydrogen sulfide. ii. A call list including the following as applicable; ? 1. local supervisory personnel; 2. county sheriff; 3 the Department of Public Safety and State Police; 4. city (municipal) police; 5. the appropriate Division district office; and 6. other public agencies as appropriate. iii. A plat or map detailing the area within the radius of exposure. iv A list of the names and telephone numbers of all operator personnel to be contacted when a release is reported or suspected. b. Traffic Plan. 1. When Required. A Traffic Plan is required where the  $H_2S_{-}300$  PPM ROE encompasses any public road. 2 Development. A Traffic Plan shall be developed by the operator with due\_ consideration of the relevant issues provided by the Division, the New Mexico State Police and/or the New Mexico Department of Public Safety, county sheriff, city (municipal) police, and the Local Emergency Planning Committee, as required pursuant to the New Mexico Emergency Management Act, NMSA 1978, Sections 74-48-1 through 744B-14 and the New Mexico Hazardous Materials Emergency Response Plan 3. Contents. A Traffic Plan shall, at a minimum, contain the following (HMER Plan). provisions: i. Instructions and procedures for alerting and coordination with emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide that has the potential to affect the public on a public road. New requirement I through it ii. A call list including the following as applicable: 1. local supervisory personnel; 2. county sheriff; 3 the Department of Public Safety and State Police; 445 100 ppm 4. *p*ity (municipal) police; RDE 5, the appropriate Division district office; and 6. other public agencies as appropriate. iii. Aplat or map detailing the grea of exposure including the locations of public roads within the radius of exposure. c. Public Contingency Plan (PCP). 1. When Required. A Public Contingency Plan must be prepared and maintained at any well, operation, facility, area or system where the 100 PPM H<sub>2</sub>S ROE encompasses a public area. 2. Development. A Public Contingency Plan shall be developed with due consideration of the relevant issues presented by the Division and emergency response authorities (including, but not limited to, police and fire departments near the well, operation or facility, the New Mexico State Police and/or the New Mexico Department of Public Safety, and the Local Emergency Planning Committee).

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following provisions:

3. Contents. A Public Contingency Plan shall, at a minimum, contain the plans of
i. Detailed actions to be taken to alert and protect persons in the event

i. Detailed action to be taken to alert and protect persons in the event of a release of a potentially hazardous volume of hydrogen sulfide. A Public Contingency Plan shall include instructions and procedures for alerting persons at risk and emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide.

ii. A call list including the following as applicable:

- 1. local supervisory personnel;
- 2. county sheriff;
- 3. the Department of Public Safety and State Police;
- 4. city (municipal) police;
- 5. ambulance services;
- 6. hospitals;
- 7. county and city fire departments;
- 8. doctors;
- 9. contractors for supplemental or emergency equipment;
- 10. the appropriate Division district office; and
- 11. other public agencies as appropriate.

iii. A public contingency plan shall stipulate how emergency response actions will be coordinated with the Division and the New Mexico State Police, a Division of the Department of Public Safety, as required pursuant to the New Mexico Emergency Management Act, NMSA 1978, Sections 74-48-1 through 74-4B-14 and the New Mexico Hazardous Material Emergency Response Plan (HMER Plan).

iv. A plat or map detailing the area of exposure, including the locations of private dwellings or residences, public facilities such as schools, businesses, public roads or other similar areas where the public may be reasonably expected to be present within the radius of exposure.

v. The names and telephone numbers of all persons living within the radius of exposure of 100 ppm hydrogen sulfide and all responsible parties for each public area, such as churches, schools, and businesses.

vi.. Provisions for advance briefing of affected and responsible persons within the radius of exposure. Such advance briefing shall include the hazards and characteristics of hydrogen sulfide, the necessity for an  $H_2S$  Contingency Plan, the possible sources of hydrogen sulfide with the radius of exposure, instructions for reporting a gas leak, the manner in which persons will be notified in the event of an emergency, and steps to be taken in an emergency.

vii. Additional support information, if applicable, such as the location of emergency evacuation routes, the location of safety and life support equipment, the location of hydrogen sulfide containing facilities, the location of nearby telephones and/or other means of communication, and special instructions for conditions at a particular installation such as local terrain and the effect of various weather conditions.

viii. The Division may impose additional requirements or modify requirements based on site-specific conditions, population density or special circumstances.

6. Submission. Where a Public Contingency Plan is required for a new well or facility, the  $H_2S$  Contingency Plan shall be submitted to the Division and LEPC All other Hydrogen Sulfide Contingency Plans shall be maintained by the operator and provided to the Division when requested.

7. Failure to Submit Plan. Failure to submit an  $H_2S$  Contingency Plan when required may result in denial of an Application to Drill, cancellation of an allowable or other appropriate enforcement action.

8. Annual Review: H<sub>2</sub>S Contingency Plan shall be reviewed on an annual basis or sooner if activation of the plan reveals deficiencies that require correction. The Division shall be notified of any corrections.

9. Retention and On-Site Inspection. All  $H_2S$  Contingency Plan shall be

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maintained on file at all times and shall be available?

10. Activation Level for Traffic Plan and PCP. The Traffic Plan and Public Plan shall be activated by the operator in the event that a release of a Potentially Hazardous Volume occurs above their respective thresholds (i.e., 300 ppm ROE for Traffic Plan and 100 ppm ROE for PCP) or if a sustained concentration of  $H_2S$  exceeds 50 ppm at the site property line.

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F. Protection from Hydrogen Sulfide During Drilling, Workover and Servicing Operations.

1. API Standards. All drilling, completion, workover and well servicing operations shall be conducted with due consideration of the guidelines published by the American Petroleum Institute (API) entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Safe Drilling of Wells Containing Hydrogen Sulfide," RP-49, most recent edition.

2. Minimum Standards. At a minimum, and possibly in addition to the foregoing API standards, each drilling, completion, workover and well servicing operation shall also be conducted in accordance with the following:

a. Before Commencing Operations. An  $H_2S$  Contingency Plan (where required) shall be completed before commencement of operations. In addition, hydrogen sulfide training shall be completed as required in sub-section H.(Personnel Protection and Training) including all related safety equipment and warning systems shall be operational.

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b. Egress Routes. Passable egress routes shall be maintained at all times during operations.

c. Detection and Monitoring. Hydrogen sulfide detection and monitoring equipment shall be provided (for drilling this can be provided when drilling has reached 500 feet of the zone anticipated to contain hydrogen sulfide) at follows:

i. Each drilling and completion site shall have a hydrogen sulfide detection and monitoring system that automatically activates visible and audible alarms when the ambient air concentration of hydrogen sulfide reaches 10 ppm. There shall be a sensing point 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.

ii. The detection system shall be calibrated and tested monthly. Each test of the hydrogen sulfide monitoring system shall be recorded on the driller's log or its equivalent.

iii. For workover and well servicing operations, one operational sensing point shall be located as close to the well bore as practical. Additional sensing points may be necessary for large and/or long-term operations.

d. Wind Indicators and Signs.

i. Equipment to indicate wind direction shall be present and visible at all times. At least two devices to indicate wind direction shall be installed at separate elevations and visible from all principal working areas at all times.

ii. Danger or caution sign(s) shall be displayed along all accesses to the site. 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 approved by the Division. Each sign shall be painted with high visibility red, black and white, or yellow paint with black lettering. The sign(s) shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 300 feet from the well site and at a location which allows vehicles to turn around at a safe distance prior to reaching the site.

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

e. If Hydrogen Sulfide Encountered During Operations. If hydrogen sulfide was not anticipated at the time the APD was approved but is encountered during drilling in excess of 100 ppm in the gaseous mixture, the operator shall immediately ensure control of the well, suspend drilling operations (unless detrimental to well control), and obtain materials and safety equipment to bring the operations into compliance

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Rule The operator shall notify the Division of the event and the mitigating steps that have or are with this being taken as soon as possible, but no later than 24 hours after discovery.

3. Operating Practices In Hydrogen Sulfide Concentrations of 100 ppm or Greater. Operating practices in areas known to contain a concentration of hydrogen sulfide gas of 100 ppm or greater in the gaseous mixture shall be subject to the following requirements:

a. If Hydrogen Sulfide Is Encountered During Use of Air, Gas, Mist or Other Non-Mud Circulating Media. If hydrogen sulfide gas in excess of 100 ppm is encountered while drilling with air, gas, mist or other non-mud circulating mediums for aerated mud, the well shall be killed with a water- or oilbased mud, and mud shall be used thereafter as the circulating medium for continued drilling.

b. Flare System. For drilling and completion operations, a flare system shall be installed unless exempted by the Division) to safely gather and burn hydrogen sulfide-bearing gas. Flare outlets shall be located as far from the well bore as feasible (but not less than 150 feet from the well). Flare lines shall be as straight as practical. The flare system shall be equipped with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall be provided supplemental fuel to maintain ignition.  $\mu_{c}$  Remote Controlled Choke.

i. A remote controlled choke shall be installed during drilling and during completion and well servicing operations when the 100 PPM H<sub>2</sub>S ROE impacts a public area funless exempted ii. A remote controlled valve may be used in lieu of use of a remote expended by the division

controlled choke, but only for completion operations.

iii. A remote controlled choke or remote controlled valve shall have, at a minimum, a pressure and hydrogen sulfide-rated well control choke and kill system including manifold and blowout preventer (hereinafter referred to as "BOP") pursuant to specifications API-16C and APIRP 53. The BOP stack shall have a least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced or other Division Rules, if more stringent. Variations to BOP stack arrangements may be granted by the Division for good cause shown.

d. Mud Program. A mud program, including de-gassing and flaring, capable of handling H<sub>2</sub>S conditions and well control shall be utilized.

e. Well Testing. Except with prior approval by the Division, the drill-stem testing shall be conducted only during daylight hours and formation fluids shall not be permitted to flow to the surface (closed chamber only). An operator shall notify the Division 24 hours in advance of a drill-stem test if an  $H_2S$ Contingency Plan is required pursuant to this Rule.

G Protection from Hydrogen Sulfide at Producing Wells, Tank Batteries and Associated Production Facilities, Refineries, Gas Plants, and Compressor Stations.

1 American Petroleum Institute (API) Standards. Operations at producing wells, tank batteries and associated production facilities shall considered the guidelines published by the American Petroleum Institute (API) publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

2. Minimum Standards. At a minimum, and possibly in addition to the foregoing API standards, production from wells, operation of tank batteries and associated production equipment shall also be conducted in accordance with the following:

a. Gaseous Mixtures Containing 100 ppm or more. Producing wells containing 100 ppm or more of hydrogen sulfide in the gaseous mixture, tank batteries and associated production facilities at such sites, shall be subject to the following:

i. H<sub>2</sub>S Contingency Plan. A determination must be made of the radius of exposure pursuant to this Rule and, if required based on the calculated radius of exposure, a H<sub>2</sub>S Contingency Plan will also be required.

ii. Signage. A danger sign or signs shall be posted within 50 feet of each facility to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gate(s) shall suffice. Danger signs shall be posted at each flow line and gathering line on the well pad that contains hydrogen sulfide gas as specified in Subparagraph. A sign shall be placed at each point where such a line crosses a public road. Each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

iii. Fencing. Fencing and gate(s) shall be required when producing wells, associated tank batteries and associated production facilities are located within a 1/4 mile of a residence, school, church, park, playground, school bus stop, or place of business. The fence shall consist of a 5 foot chain link topped by two stands of barbed wire or other methods approved by the Division. Gate(s) shall be locked when unattended by the operated.

iv. Wind Direction Indicators. Wind direction indicator(s) shall be required at every facility (tank battery, water injection station, production satellite) where H<sub>2</sub>S concentration in a gaseous state exceeds 100 PPM. v. Secondary Well Control. Wells where the 100 PPM H<sub>2</sub>S ROE

v. Secondary Well Control. Wells where the 100 PPM H<sub>2</sub>S ROE incorporates a public area 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.

vi. Automatic Safety Valve or Shutdown. If the 100 PPM ROE involves a public area an automatic safety valve or shutdown shall be installed at the facility or wellhead or other appropriate shut-in control shall be installed. The automatic safety valve shall be set to activate upon a release of a potentially hazardous volume of hydrogen sulfide.

b. Tanks or vessels containing 300 ppm or more of hydrogen sulfide in the gaseous mixture shall be subject to the following additional requirements:

1. Each stair or ladder leading to the top of any storage tank shall be chained and/or marked to restrict entry. For any tank battery that requires fencing pursuant to this Section, a danger sign posted at the gate(s) may be substituted for chaining and signage.

A danger sign shall be posted on or within 50 feet of any storage tank to alert persons of the potential hydrogen sulfide danger. For any storage tank for which fencing is required, a danger sign posted at the locked gates shall suffice. Each sign shall read: "DANGER: POISON GAS HYDROGEN SULFIDE."

30 Modification or Repair. The Division may require modification or repair of a producing well, associated tank battery or associated production facilities if the sustained ambient concentration of hydrogen sulfide is 1 ppm or greater at any public area.

40 Compliance Schedule. Each existing producing well and associated tank battery not currently meeting the requirements and minimum standards set forth herein shall be brought into compliance within one (1) year of the effective date of this Rule. Each producing well and tank battery constructed following the effective date of this Rule shall be designed, constructed and operated to meet the requirements set forth herein.

H. Personnel Protection and Training.

All persons responsible for the implementation of any H<sub>2</sub>S Contingency Plan shall be provided training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.

I. Standards for Equipment That May Be Exposed to Hydrogen Sulfide. Proper materials and/or appropriate protective measures for equipment exposed to hydrogen sulfide shall be utilized. Records shall be retained and shall be made available to the Division upon request. The Division may require additional requirements on any facility that may pose a threat to public health and/or the environment.

J. Hydrogen Sulfide Injection. Injection of fluids containing hydrogen sulfide where the injection fluids are a gaseous mixture, or would be a gaseous mixture in the event of a release to the atmosphere, and

where the 100 ppm radius of exposure includes any public area, excluding public roads, shall not be allowed unless first approved by the division after public hearing.

K. Exemptions. An exemption to the requirements of this Section may be granted by petitioning the Director. Any such petition shall provide specific information as to the circumstances that warrant approval of the variance requested and the proposed alternative methods by which the related requirements of this Section are to be satisfied. The Director, after considering all relevant factors, may approve an exemption if it is determined that the proposed alternative meets or exceeds the requirements of this Section and otherwise protects the health, safety and welfare of potentially affected persons.

L. Release. Upon a release of hydrogen sulfide the following actions must be taken:

1. Activation of the  $H_2S$  Contingency Plan. The  $H_2S$  Contingency Plan shall be activated immediately upon a  $H_2S$  release if there is potential to expose any public area to 100 PPM  $H_2S$  or a potential to expose a public road to a 300 PPM  $H_2S$  or a potential exposure of  $H_2S$  100 PPM ROE of 3000 or greater, or if a sustained concentration of  $H_2S$  exceeds 50 ppm at the site property line.

2. Notification of the Division. Upon release of a hydrogen sulfide requiring activation of the  $H_2S$  Contingency Plan, required above, othe Division shall be notified as soon as practicable, preferably within one hour of the discovery of the release of as soon as possible recognizing that prompt response should supercede notification. A full report of the incident shall be submitted to the OCD on a C-141 form no later than fifteen (15) days following the incident.

M. Additional Standards. The Division may require more stringent standards on a case-by-case basis than those set forth in this Section, or require corrective actions if necessary, to maintain control of a well or any other facility, or to safegyard public health or safety.

## 19.15. \_\_\_\_ Hydrogen Sulfide Gas (Hydrogen Sulfide)

A. In General. Hydrogen sulfide gas (known by its chemical abbreviation " $H_2S$ " or as "sulfurated hydrogen" or "hydrosulfuric acid") is a flammable, poisonous gas that <u>may</u> occurs naturally as a component of crude petroleum and natural gas. The gas has a distinct and characteristic odor of rotten eggs but due to olfactory fatigue may not be sensed by the human sense of smell.

B. Scope. This Section <u>provides for public safety in areas where hydrogen sulfide gas  $(H_2S)$  exists in a potentially hazardous volume. This Section applies to any person, operator or facility subject to the jurisdiction of the Division, including, but not limited to, any person, operator or facility engaged in drilling, stimulating, injection into, completing, working over or producing any oil <u>or</u> natural gas or carbon dioxide well or any person, operator or facility engaged in gathering, transporting, storing, processing or refining of crude oil, natural gas or carbon dioxide.</u>

C. Definitions (specific to this Section).

- 1. ANSI. The acronym "ANSI" means the american national standard institute.
- 2. API. The acronym "API" means the american petroleum institute.
- 3. ASTM. The acronym "ASTM" means the american society for testing and materials.

4. Dispersion Technique. A "dispersion technique" is a mathematical representation of the physical and chemical transportation characteristics, dilution characteristics and transformation characteristics of  $H_2S$  gas in the atmosphere.

5. Escape Rate. The "escape rate" is the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing  $H_2S$ . The escape rate is calculated using the maximum daily rate of the gaseous mixture produced or the best estimate thereof. For a natural gas well, the escape rate shall be calculated by using the current daily absolute open flow rate against atmospheric pressure. For an oil well, the escape rate shall be calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or best estimate thereof. For an oil or natural gas well drilled in an undeveloped area, a wildcat well, the escape rate may be determined by using offset wells completed in the interval in question, or using some other reasonable means to calculate the escape rate. For facilities or operations not mentioned, the escape rate shall be calculated using the actual flow of gaseous mixture through the facility or operation.

6. GPA. The acronym "GPA" means the gas processors association.

7. LEPC. The acronym "LEPC" means the local emergency planning committee established pursuant to the emergency planning and community right-to-know act, 42 U.S. C. § 11001.

8. NACE. The acronym "NACE" refers to the national association of corrosion

engineers.

9. PPM. The acronym "ppm" means "parts per million" by volume.

10. Potentially Hazardous Volume (hereinafter referred to as a "potentially hazardous volume" or by the acronym "PHV") means the volume of hydrogen sulfide gas of such concentration that:

- a. the 100 ppm radius of exposure includes any public area as defined herein;
- b. the 300 ppm radius of exposure includes any public road as defined herein; or
- c. the 100 ppm radius of exposure is in excess of 3,000 feet.

11. Public Area. A "public area" is any dwelling, office, place of business, church, school, hospital, school bus stop, government building, or any portion of a park, city, town, village or other similar populated area where members of the public may reasonably be expected to be present, but does not include facilities directly involved in oil and gas production, such as producing oil and gas wells, pipelines, tank batteries, production equipment, gas plants, refineries [THIS LAST PART] WAS LEFT OUT OF THE LATEST DRAFT, BUT I DON'T KNOW WHY].

12. Public Road. A "public road" is any <u>maintained federal</u> state, municipal or county road or highway <u>or</u> postal route <del>or other public road.</del> A public road is not a private road or a road to which access to members of the general public is restricted.

13. Radius of Exposure. The radius of exposure (hereinafter referred to as "radius of exposure" or "ROE") is an imaginary circle constructed around a point of escape the radius of which is calculated using the following Pasquill-Gifford derived equation, or by such other method as may be approved by the division:

a. For determining the 100-ppm radius of exposure where the hydrogen sulfide concentration in the gaseous mixture is less than 10 percent:  $X = [(1.589)(hydrogen sulfide concentration)(Q)]^{(0.625)}$ , or

b. For determining the 300-ppm radius of exposure where the hydrogen sulfide concentration in the gaseous mixture is less than 10 percent:  $X=[(0.77)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ 

Where: X= radius of exposure in feet: hydrogen sulfide concentration = decimal equivalent of the mole or volume fractions of hydrogen sulfide in the gaseous mixture; Q= maximum volume of gas determined to be available for escape in cubic feet per day (corrected for standard conditions of 14.73 psia and  $60^{\circ}$ F).

c. For determining the 100 ppm or the 300 ppm radius of exposure in gaseous mixtures containing hydrogen sulfide concentrations of 10 percent or greater, a dispersion technique that takes into account representative wind speed, direction, atmospheric stability, complex terrain and 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)."

d. Where multiple sources of hydrogen sulfide are present (e.g. wells, treatment equipment, flow lines, etc.), the radius of exposure may encompass a larger area than would otherwise be calculated using a radius of exposure computation for each component part.

e. For a well being drilled in an area where insufficient data exits to calculate a radius of exposure, but where hydrogen sulfide could reasonably be expected to be present in concentrations in excess of 100 ppm in the gaseous mixture, a 100 ppm radius of exposure equal to 3,000 feet shall be assumed.

D. Determination of Hydrogen Sulfide Risk.

1. Determination of Hydrogen Sulfide Concentration.

a. Each person, operator or facility to which this Section applies shall determine the hydrogen sulfide concentration within each of its operations or systems. A representative sample for each system or operation may be used for testing provided that the person, operator or facility can demonstrate that the concentration derived from a test of the representative sample is reasonably representative of the hydrogen sulfide concentration within the operation or system.

b. The tests referred to in the previous Subparagraph shall be conducted in accordance with applicable ASTM or GPA standards or by other methods approved by the division.

c. If a representative sample from a system or operation was tested within one (1) year of the effective date of this Section, new testing shall not be required. [WAYNE: HOW LONG WILL YOU ACCEPT PREVIOUS TEST RESULTS? I GUESSED ONE YEAR BUT IT'S JUST A GUESS.]

2. Tested Concentrations Below 100 ppm. If the testing described in the previous Paragraph determines that the hydrogen sulfide concentration in a given operation or system is less than 100 ppm, no further actions are required pursuant to this Section.

3. Tested Concentrations Above 100 ppm; Calculation of the Radius of Exposure.

a. If the testing described in Paragraph 1 of this Subsection determines that the concentration of hydrogen sulfide in a gaseous mixture is 100 ppm or greater, then the person, operator or facility must calculate the radius of exposure pursuant to this Section.

b. If calculation of the radius of exposure reveals that a potentially hazardous volume may be present, the person, operator or facility shall provide the results of the radius of exposure determinations to the division electronically in a generally accepted electronic format form that is compatible with the division's systems within 180 days of commencing operations or, for existing facilities, within 180 days of the effective date of this Section. An Operator may petition the Division for an extension of the 180-day reporting period pursuant to subsection K of this Section. The Division may disapprove the test methodology and require additional testing if the testing methodology did not conform to the requirements of this Section. [I PUT THIS BACK IN - IT WAS IN EARLIER DRAFTS - WHY WAS IT TAKEN OUT?]

4. Recalculation. If operational or production alterations are made that, through application of generally accepted engineering principles and generally accepted operating practices, indicate that a 25% or greater increase in the hydrogen sulfide concentration may occur in a given operation or facility, the person, operator or facility shall recalculate the radius of exposure and submit the results to the division electronically in a form that is compatible with the division's systems.

E. H<sub>2</sub>S Contingency Plan.

1. In General. An  $H_2S$  contingency plan is a written document that provides a plan of action that will be used to alert and protect persons at risk in the event of a potentially significant release of hydrogen sulfide gas. The Plan must be developed in accordance with the following paragraphs. [eliminated from NMOGA draft - why?]

2. When Required. An  $H_2S$  contingency plan must be prepared whenever a potentially hazardous volume of hydrogen sulfide may be present.

3. Input <u>of</u> -From Emergency Response Authorities and the Division. The person, operator or facility <u>may receive input on the proposed H<sub>2</sub>S contingency plan from shall develop the H<sub>2</sub>S</u> contingency plan with input from the division, the New Mexico department of public safety (and as appropriate the New Mexico state police) and the local emergency planning committee, except that where the 300 ppm radius of exposure encompasses any public road, input shall also be sought from the county sheriff, <u>and/or</u>, as applicable, the city or municipal police, and/<u>or</u> where the 100 ppm radius of exposure encompasses a public area, input shall also be sought from police and fire departments near the well, operation or facility. If input is received, the H<sub>2</sub>S contingency plan shall identify the agency from which input was received pursuant to this paragraph, identify the person at the agency contacted (with telephone number) and briefly describe the nature of the input provided. [WASN'T THERE SOME DIFFICULTY WITH THIS PROVISION?]

4. Elements. The  $H_2S$  contingency plan shall consist of different elements depending on the risks present.

a. Elements Required for Each Plan:

i. A detailed description of each action to be taken in the event of a release of a potentially hazardous volume of hydrogen sulfide, including an immediate action plan that substantially conforms to paragraph 7.6 of guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, most recent edition;

ii. A call list including the following as applicable:

- aa. local supervisory personnel;
- bb. county sheriff;
- cc. the department of public safety and state police;
- dd. city or municipal police;
- ee. the appropriate division district office; and
- ff. other public agencies as appropriate.

iii. A plat or map detailing the area within the radius of exposure of a potentially hazardous volume; and

iv. A list of the names and telephone numbers of all personnel to be contacted when a release is reported or suspected.

b. Where the 300-ppm radius of exposure encompasses any public road, the person, operator or facility shall include the following additional elements in the H<sub>2</sub>S contingency plan: i. Instructions and procedures for alerting and coordinating with

emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide at any public road;

ii. A plat or map detailing the area of exposure, including the locations of public roads within the radius of exposure of a potentially hazardous volume;

iii. A plan to divert traffic and safely get existing traffic off the road and out of danger.

c. Where the 100-ppm radius of exposure encompasses any public area, the following additional elements shall be included in the  $H_2S$  contingency plan:

i. detailed plans of action to alert and protect persons in the event of a release of a potentially hazardous volume of hydrogen sulfide, including instructions and procedures for alerting persons at risk and emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide;

ii. a call list including all the persons set forth in Sub subparagraph E(4)(a)(ii), above, and the following:

- aa. ambulance services;
- bb. hospitals;
- cc. county and city fire departments;
- dd. doctors;
- ee. contractors for supplemental or emergency equipment; and
- ff. other public agencies as appropriate.

iii. a statement describing how emergency response actions will be coordinated with the division and the New Mexico state police, consistent with the New Mexico hazardous materials emergency response plan (HMER);

iv. a plat or map detailing the area of exposure, including the locations of private dwellings or residences, public facilities such as schools, businesses, public roads or other similar areas where the public may be reasonably expected to be present within the radius of exposure;

v. the names and telephone numbers of all persons living within the radius of exposure of 100 ppm hydrogen sulfide and contact persons for each public area, such as churches, schools and businesses;

vi. provisions for advance briefing of affected and responsible persons within the radius of exposure. Such advance briefing shall include the hazards and characteristics of hydrogen sulfide, the necessity for an  $H_2S$  contingency plan, the possible sources of hydrogen sulfide within the radius of exposure, instructions for reporting a gas leak, the manner in which persons will be notified in the event of an emergency and steps to be taken in an emergency; and

vii. in lieu of the previous subparagraph, a reaction-type plan may be prepared and submitted that provides for mass notification of a hydrogen sulfide leak and for an evacuation of affected areas;

<u>viii</u>. additional support information, if applicable, such as the location of emergency evacuation routes, the location of safety and life support equipment, the location of hydrogen sulfide containing facilities, the location of nearby telephones or other means of communication and special instructions for conditions at a particular installation such as local terrain and the effect of various weather conditions.

d. Additional Requirements. The division may impose additional requirements or modify requirements based on site-specific conditions, population density or special circumstances.

5. Submission. The  $H_2S$  contingency plan shall be submitted to the division electronically in a form that is compatible with the division's systems and to the local emergency planning committee no later than 180 days following submission of the radius of exposure required in Subsection D of this Section. The  $H_2S$  contingency plan may be submitted separately or along with the application for permit to drill (APD) and may be submitted to the division electronically in a generally accepted format.

6. Failure to Submit Plan. Failure to submit an  $H_2S$  contingency plan when required may result in denial of an application for permit to drill <u>that well</u>, cancellation of an allowable or other appropriate enforcement action. [CHECK WITH LORI ON THIS]

7. Annual Review, Amendment. The person, operator or facility shall review the  $H_2S$  contingency plan on an annual basis or earlier if activation of a plan reveals a deficiency. The person, operator or facility shall submit any amendments to the division electronically in a form that is compatible with the division's systems and to the local emergency planning committee. Reasonable efforts shall be taken to update on an annual basis the names and telephone numbers of persons living within the 100

## ppm radius of exposure. [I MOVED THIS FROM SOMEPLACE ELSE WHERE IT DIDN'T MAKE SENSE]

8. Retention and On-Site Inspection. An  $H_2S$  contingency plan shall be reasonably accessible in the event of a release and maintained on file at all times and shall be available for inspection by the Division.

9. Activation Levels. The  $H_2S$  contingency plan shall be activated in the event of a release of a potentially hazardous volume of  $H_2S$  above the respective thresholds (i.e. 300 ppm radius at any public road, 100 ppm radius at any public area, etc.) or if a sustained concentration of  $H_2S$  exceeds 50 ppm at the property line of any facility, well or operation.

F. Protection from Hydrogen Sulfide During Drilling, Workover and Servicing Operations.

1. API Standards. All drilling, completion, workover and well servicing operations shall be conducted with due consideration to the guidelines published by the API entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Safe Drilling of Wells Containing Hydrogen Sulfide," RP-49, most recent edition.

2. Minimum Standards. At a minimum, and possibly in addition to the foregoing API standards, each drilling, completion, workover and well servicing operation shall also be conducted in accordance with the following:

a. Before Commencing Operations. The person, operator or facility shall complete an  $H_2S$  contingency plan, where required, before commencement of operations. In addition, hydrogen sulfide training shall be completed and all related safety equipment and warning systems shall be operational before commencement of operations.

b. Egress Routes. The person, operator or facility shall maintain passable egress routes at all times during operations.

c. <u>Safety</u>, Detection and Monitoring <u>Equipment</u>. The person, operator or facility shall provide hydrogen sulfide detection and monitoring equipment as follows:

i. Each drilling and completion site shall have <u>a</u> hydrogen sulfide detection and monitoring <u>system</u> that automatically activates visible and audible alarms when the ambient air concentration of hydrogen sulfide reaches <u>20</u> 10 ppm. There shall be a sensing point 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.

ii. The detection system shall be calibrated, and tested and the results recorded monthly. Each test of the hydrogen sulfide monitoring system shall be recorded on the driller's log or its equivalent.

iii. For workover and well servicing operations, one operational sensing point shall be located as close to the well bore as practical. Additional sensing points may be necessary for large or long-term operations.

iv. Hydrogen sulfide detection, <u>safety</u> and monitoring equipment must be provided <u>and the prescribed safety equipment must be made operational</u> during drilling when drilling is within 500 feet of the zone anticipated to contain hydrogen sulfide and continuously thereafter through all subsequent drilling. Detection and monitoring equipment is not required for drilling from the surface to within 500 feet of the zone anticipated to contain hydrogen sulfide.

d. Wind Indicators and Signs.

i. Equipment to indicate wind direction shall be present and visible at all times. At least two devices to indicate wind direction shall be installed at separate elevations and visible from all principal working areas at all times.

ii. Danger or caution signs shall be displayed along all accesses to the site. The signs shall read "DANGER - POISON GAS, HYDROGEN SULFIDE PRESENT" or, as appropriate, "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or equivalent language approved by the division, and in smaller lettering: "Do Not Approach If Red Flag is Flying" or equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration.

The signs shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 300 feet from the well site and at a location which allows vehicles to turn around at a safe distance prior to reaching the site.

iii. When hydrogen sulfide is detected in excess of <u>20</u>-10-ppm at any detection point, red flags shall be displayed.

e. If Hydrogen Sulfide Encountered During Operations. If hydrogen sulfide was not anticipated at the time the division approved the APD but is encountered during drilling in excess of 100 ppm in the gaseous mixture, the operator shall immediately ensure control of the well, suspend drilling operations unless detrimental to well control, and obtain materials and safety equipment to bring the operations into compliance with this Section. The operator shall notify the division of the event and the mitigating steps that have or are being taken as soon as possible, but no later than 24 hours following discovery.

3. Operating Practices In Hydrogen Sulfide Concentrations of 100 ppm or Greater. Operating practices in areas known to contain a concentration of hydrogen sulfide gas of 100 ppm or greater in the gaseous mixture shall be subject to the following requirements:

a. If Hydrogen Sulfide Is Encountered During Use of Air, Gas, Mist or Other Non-Mud Circulating Media. If hydrogen sulfide gas in excess of 100 ppm is encountered while drilling with air, gas, mist or other non-mud circulating mediums for 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. <u>An alternate drilling method may be used after encountering hydrogen sulfide in excess of 100</u> ppm, but only if the alternative method is specifically approved by the Division.

b. Flare System. For drilling and completion operations, the person, operator or facility shall install a flare system to safely gather and burn hydrogen sulfide-bearing gas, unless exempted pursuant to Subsection K. Flare outlets shall be located as far from the well bore as feasible but not less than 150 feet from the well. Flare lines shall be as straight as practical. The flare system shall be equipped with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall be provided supplemental fuel to maintain ignition.

c. Remote Controlled Choke.

i. The person, operator or facility shall install a remote controlled choke during drilling and during completion and well servicing operations when the 100-ppm  $H_2S$  radius of exposure includes a public area, unless exempted pursuant to Subsection K.

ii. A remote controlled valve may be used in lieu of use of a remote controlled choke, but only for completion operations. [BRUCE WAS GOING TO PROVIDE A SUBSTITUTE FOR THIS PARAGRAPH]

iii. For drilling operations, a remote controlled choke or remote controlled valve shall have, at a minimum, a pressure and hydrogen sulfide-rated well control choke and kill system including manifold and blowout preventer pursuant to specifications API-16C and API-RP 53. The blowout preventer stack shall have at least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced or other division rules, if more stringent. Variations to blowout preventer stack arrangements may be granted by the division for good cause shown.

d. Mud Program. A mud program, including de-gassing and flaring, capable of handling  $H_2S$  conditions and well control shall be used.

e. Well Testing. Except with prior approval by the division, the drill-stem testing shall be conducted only during daylight hours and formation fluids shall not be permitted to flow to the surface (closed chamber only). An operator shall notify the division 24 hours in advance of a drill-stem test if an  $H_2S$  contingency plan is required pursuant to this Section.

G. Protection from Hydrogen Sulfide at Crude Oil Pump Stations, Producing Wells, Tank Batteries and Associated Production Facilities, Refineries, Gas Plants and Compressor Stations.

1. API Standards. Operations at crude oil pump stations and producing wells, tank batteries and associated production facilities shall be conducted <u>according to</u> the guidelines published by

the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

2. Minimum Standards. At a minimum, production from crude oil pump stations and producing wells, tank batteries and associated production facilities shall also be conducted in accordance with the following Subparagraphs and Sub subparagraphs. Where API standards referred to in the previous paragraph are less stringent than the following, the more stringent standards shall apply.

a. Gaseous Mixtures Containing 100 ppm or more. Producing wells containing 100 ppm or more of hydrogen sulfide in the gaseous mixture, crude oil pump stations, tank batteries and associated production facilities, refineries, gas plants and compressor stations, shall be subject to the following:

i.  $H_2S$  Contingency Plan. If <u>a potentially hazardous volume of  $H_2S$  exists, required based on the radius of exposure calculated pursuant to Subsection D</u>, an  $H_2S$  contingency plan shall be required.

ii. Signage. A danger sign or signs shall be posted within 50 feet of each facility to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gates shall suffice. Danger signs shall be posted at each flow line and gathering line on the well pad that contains hydrogen sulfide gas. The signs shall read "DANGER - POISON GAS - HYDROGEN SULFIDE PRESENT", or, as appropriate "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration. The signs shall be legible and large enough to be read by all persons entering the well site and shall be placed on or within 50 feet of the site. A sign shall be placed at each point where a flow line or gathering line crosses a public road. Each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

iii. Fencing. Fencing and gates shall be required when crude oil pump stations and producing wells, tank batteries and associated production facilities are located <u>in a public</u> <u>area or</u> within a 1/4-mile of a residence, school, church, park, playground, school bus stop or place of business. The fence shall consist of a 5-foot chain link topped by two stands of barbed wire or other designs approved by the division. Gates shall be locked when unattended.

iv. Wind Direction Indicators. Wind direction indicators shall be required at every crude oil pump station, producing well, tank battery and associated production facility where the  $H_2S$  concentration in a gaseous state exceeds 100 PPM.

v. Secondary Well Control. Wells where the 100-ppm  $H_2S$  radius of exposure incorporates a public area shall possess a secondary means of immediate well control through the use of appropriate christmas tree or downhole completion equipment. Such equipment shall allow downhole accessibility (reentry) under pressure for permanent well control operations.

vi. Automatic Safety Valve or Shutdown. If the 100-ppm radius of exposure involves a public area, the person, operator or facility shall install an automatic safety valve or shutdown at the facility or wellhead or shall install other appropriate shut-in control. The automatic safety valve shall be set to activate upon a release of a potentially hazardous volume of hydrogen sulfide. b. Tanks or vessels containing 300 ppm or more of hydrogen sulfide in the

gaseous mixture shall be subject to the following additional requirements: 1. Each stair or ladder leading to the top of any storage tank shall

be chained or marked to restrict entry. For any tank battery that requires fencing pursuant to this Section, a danger sign posted at the gates may be substituted for chaining and signs.

2. The person, operator or facility shall post a danger sign on or within 50 feet of any storage tank to alert persons of the potential hydrogen sulfide danger. For any storage tank for which fencing is required, a danger sign posted at the locked gates shall suffice. The signs shall read "DANGER - POISON GAS - HYDROGEN SULFIDE PRESENT", or, as appropriate "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration. The sign(s) shall be legible and large enough to be read by all persons entering the site and shall be placed on or within 50 feet of the site.

3. Modification or Repair. The division may require modification or repair of a crude oil pump station, producing well, tank battery or associated production facilities, refinery, gas plant or compressor station if the sustained ambient concentration of hydrogen sulfide is 1 ppm or greater within a public area and the crude oil pump station, producing well, tank battery or associated production facility, refinery, gas plant or compressor station is the source of the hydrogen sulfide detected.

<u>3</u>. Compliance Schedule. Each existing crude oil pump station and producing well, tank battery and associated production facility not currently meeting the requirements and minimum standards set forth herein shall be brought into compliance within one year of the effective date of this Section. Each crude oil pump station and producing well, tank battery and associated production facility constructed following the effective date of this Section shall be designed, constructed and operated to meet the requirements set forth herein.

H. Personnel Protection and Training. All persons responsible for the implementation of any  $H_2S$  contingency plan shall be provided training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.

I. Standards for Equipment That May Be Exposed to Hydrogen Sulfide. Persons, operators and facilities shall chose equipment with consideration for both the  $H_2S$  working environment and anticipated stresses. NACE Standard MR0175 (latest edition) shall be used for <u>selection of</u> metallic equipment <del>selection</del> or, if applicable, adequate protection by chemical inhibition or other methods that controls or limits the corrosive effects of  $H_2S$  shall be used.

J. Hydrogen Sulfide Injection. Injection of fluids containing hydrogen sulfide where the injection fluids are a gaseous mixture, or would be a gaseous mixture in the event of a release to the atmosphere, and where the 100-ppm radius of exposure from the injection point includes any public area, shall not be permitted unless first approved by the division <u>as set forth in 19.15.9.701</u> <u>NMAC through 19.15.9.708 NMAC.</u> <u>after public hearing. Injection facilities and projects that are permitted as of the effective date of this Section are exempt from the provisions of this subsection. Expansion of a previously-permitted projects do not need a public hearing. [I'M LEANING TO ELIMINATING THIS SUBSECTION ENTIRELY. IT DOESN'T ADD ANYTHING]</u>

K. Exemptions. An exemption to the requirements of this Section may be granted by petitioning the director. Any such petition shall provide specific information as to the circumstances that warrant approval of the exemption requested and how the public safety will be protected. The director, after considering all relevant factors, may approve an exemption if the circumstances warrant an exemption, if the requirements of this Section are met, and public safety will be protected.

L. Release. Upon a release of hydrogen sulfide the following actions must be taken:

1. Activation of the  $H_2S$  Contingency Plan. The person, operator or facility shall activate the  $H_2S$  contingency plan immediately upon an  $H_2S$  release where the potential exists for exposure to a potentially hazardous volume of  $H_2S$ , or where a concentration of  $H_2S$  greater than 50 ppm exists at the property line of any well, facility or operation.

2. Notification of the Division. The person, operator or facility shall notify the division upon a release of hydrogen sulfide requiring activation of the  $H_2S$  contingency plan as soon as practicable, preferably within one hour of discovery of the release or as soon as possible in cases where prompt response should supercede notification. The person, operator or facility shall submit a full report of the incident to the division on Form C-141 no later than fifteen (15) days following the release.

M. <u>Corrective Actions</u>. <u>Additional Standards</u>. The division may require more stringent standards on a case by case basis than those set forth in this Section, or require corrective actions if necessary to maintain control of a well or any other facility or to safeguard public safety.

#### 19.15.2.52 Hydrogen Sulfide Gas (Hydrogen Sulfide)

[wells, facilities, operations ...]

A. Applicability. This section applies to any person, operator or facility subject to the jurisdiction of the Division, including, but not limited to, any person, operator or facility engaged in drilling, stimulating, injecting into, completing, working over or producing any oil, natural gas or carbon i person " operator 11 00 r facility" AC or, if tor, if referming to specify ials. Subjects dioxide well or any person, operator, system or facility engaged in gathering, transporting, storing, processing or refining of crude oil, natural gas or carbon dioxide (hereinafter referred to collectively as / "wells, facilities or operations"  $\leq$  as  $\leq >>$ ). This section shall not act to exempt or otherwise excuse surface waste management facilities permitted by the division pursuant to 19 NMAC 15.I.711 from more stringent conditions on the handling of hydrogen sulfide required of such facilities by 19 NMAC 15.I.711 or more stringent conditions existing in permits issued thereunder, nor shall such facilities be exempt or otherwise excused from the requirements set forth in this section by virtue of permitting under 19 NMAC 15.I.711.

B. Definitions (specific to this section).

1. ANSI. The acronym "ANSI" means the american national standards institute.

2. API. The acronym "API" means the american petroleum institute.

3. Area of Exposure. The phrase "area of exposure" means the area within a circle constructed with the point of escape at its center and the radius of exposure as its radius.

4. ASTM. The acronym "ASTM" means the american society for testing and materials.  $\mathbf{S}_{\mathbf{A}}$ 

5. Dispersion Technique. A "dispersion technique" is a mathematical representation of the physical and chemical transportation characteristics, dilution characteristics and transformation characteristics of hydrogen sulfide gas in the atmosphere.

6. Escape Rate. The "escape rate" is the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing hydrogen sulfide, as set forth herein.

a. For existing natural gas facilities or operations, the escape rate shall be is calculated using the maximum daily rate of the gaseous mixture produced or handled or the best estimate thereof. For an existing natural gas well, the escape rate shall be calculated by using the current daily absolute open flow rate against atmospheric pressure or the best estimate of that rate.

b. For new natural gas operations or facilities, the escape rate shall be calculated as the maximum anticipated flow rate through the system. For a new natural gas well, the escape rate shall be calculated using the maximum open-flow rate of offset wells in the pool, or the pool average of maximum open-flow rates.

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

d. For new oil wells, the escape rate shall be calculated by multiplying the producing gas/oil ration by the maximum daily production rate of offset wells in the pool, or the pool average of the product of the producing gas/oil ration by the maximum daily production rate.

 $f_{e.}$  For facilities or operations not mentioned, the escape rate shall be calculated using the actual flow of the gaseous mixture through the operation or system.

7. GPA. The acronym "GPA" means the gas processors association.

8. LEPC. The acronym "LEPC" means the local emergency planning committee established pursuant to the emergency planning and community right-to-know act, 42 U.S. C. § 11001.

9. NACE. The acronym "NACE" refers to the national association of corrosion engineers.

10. PPM. The acronym "ppm" means "parts per million" by volume.

11. Potentially Hazardous Volume (hereinafter referred to as a "potentially hazardous volume") means the volume of hydrogen sulfide gas of such concentration that:

a. the 100-ppm radius of exposure includes any public area as defined herein;

b. the 500-ppm radius of exposure includes any public road

as defined herein; or

c. the 100-ppm radius of exposure exceeds 3,000 feet.

12. Public Area. A "public area" is any building or structure that is not associated with the well, operation or system for which the radius of exposure is being calculated and that is used as a dwelling, office, place of business, church, school, hospital, or government building, or any portion of a park, city, town, village or designated school bus stop or other similar area where members of the public may reasonably be expected to be present.

13. Public Road. A "public road" is any federal, state, municipal or county road or highway or postal route.

14. Radius of Exposure. The radius of exposure is that radius constructed with the point of escape as its starting point and its length calculated using the following Pasquill-Gifford derived equation, or by such other method as may be approved by the division:

a. For determining the 100-ppm radius of exposure: X = [(1.589)(hydrogensulfide concentration)(Q)]  $^{(0.6258)}$ , where "X" is the radius of exposure in feet, the "hydrogen sulfide concentration" is the decimal equivalent of the mole or volume fraction of hydrogen sulfide in the gaseous mixture, and "Q" is the escape rate expressed in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F). <del>O</del>F

b. For determining the 500-ppm radius of exposure: X=[(0.4546)(hydrogensulfide concentration)(Q)] $^{(0.6258)}$ , where "X" is the radius of exposure in feet, the "hydrogen sulfide concentration" is the decimal equivalent of the mole or volume fraction of hydrogen sulfide in the gaseous mixture, and "Q" is the escape rate expressed in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

c. For a well being drilled, completed, recompleted, worked over or serviced in an area where insufficient data exists to calculate a radius of exposure but where hydrogen sulfide could reasonably be expected to be present in concentrations in excess of 100 ppm in the gaseous mixture, a 100-ppm radius of exposure equal to 3,000 feet shall be assumed.

C. D. Required Testing and Calculation. 1. Testing.

d Testing and Calculation. a. Each well, facility or operation shall determine the hydrogen sulfide first well, facility or operation. A representative contraction of the hydrogen sulfideconcentration within each of its well, facility or operation. A representative sample or process knowledge may be used in lieu of individual testing of wells, operations or facilities provided that the concentration derived from the representative sample or process knowledge is reasonably representative of the hydrogen by terhus sulfide concentration within the well, facility or operation.

b. The tests used to make the determination referred to in the previous subparagraph shall be conducted in accordance with applicable ASTM or GPA standards or by other methods approved by the division.

c. If a representative sample from a well, facility or operation was tested prior to the effective date of this section and otherwise meets the requirements of the previous subparagraphs, new -referring shall be required in a cord testing shall not be required.

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d. If any change or alteration may materially increase the concentration of hydrogen sulfide in a well, facility or operation, the operator must make a new determination of the hydrogen sulfide concentration in the well, facility or operation in accordance with this subsection

2. Concentrations Determined to be Below 100 ppm. If the concentration of hydrogen sulfide in a given well, facility or operation is less than 100 ppm, no further actions shall be required pursuant to this section.

3. Concentrations Determined to be Above 100 ppm.

a. If the concentration of hydrogen sulfide in a given well, facility or operation is determined to be 100 ppm or greater, then the person, facility or operation must calculate the radius of exposure and comply with applicable requirements of this section.

b. If calculation of the radius of exposure reveals that a potentially hazardous volume is present, the results of the determination of the hydrogen sulfide concentration and the calculation of the radius of exposure shall be provided to the division. For a well, facility or operation existing on the effective date of this section, the determination, calculation and submission required herein shall be accomplished within 180 days of the effective date of this section; for any well, <u>facility or</u> operation that commences operations after the effective date of this section, the determination, calculation and submission required herein shall be accomplished before operations begin.

4. Recalculation. The person, operator or facility shall calculate or recalculate the radius of exposure if the hydrogen sulfide concentration in a well, <u>facility or</u> operation increases to 100 ppm or greater or, if the hydrogen sulfide concentration in a well, <u>facility or</u> operation <del>or system</del> was already 100 ppm or greater, <u>there is a 25%</u> or greater increase in the actual volume fraction of hydrogen sulfide. If calculation or recalculation of the radius of exposure reveals that a potentially hazardous volume is present, the results <u>shall be provided</u> to the division within <u>sixty (60)</u> days.

E. Hydrogen Sulfide Contingency Plan.

1. In General. A hydrogen sulfide contingency plan is a written document that provides a plan of action that will be used to alert and protect persons at risk in the event of a potentially significant release of hydrogen sulfide gas. The hydrogen sulfide contingency plan must be developed in accordance with the following paragraphs.

2. When Required. A hydrogen sulfide contingency plan must be prepared whenever a potentially hazardous volume of hydrogen sulfide is present or may reasonably <u>be</u> expected to be encountered.

3. Plan Contents.

a. API Guidelines. The hydrogen sulfide contingency plan shall be developed with due consideration of the guidelines in paragraph 7.6 of the guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, most recent edition.

b. Required Contents, The hydrogen sulfide contingency plan shall contain, but shall not be limited to, information on the following subjects, as appropriate to the well, operation or system to which it applies [delete, weakens and provides loophole]:

i. Emergency procedures. The hydrogen sulfide contingency plan shall contain information on emergency procedures to be taken in the event of a release, and shall include, at a minimum, information concerning the responsibilities of personnel during the emergency, an immediate action plan as described in the API document referenced in the previous subsubparagraph, telephone numbers of public agencies, emergency responders, local government and other appropriate public authorities. The hydrogen sulfide contingency plan shall also include the locations of nearby residences, bit is businesses, parks, schools, churches, roads, medical facilities etc. The public business business business of public actions of the previous subsubparagraph.

ii. Characteristics of hydrogen sulfide and sulfur dioxide. The hydrogen sulfide contingency plan shall include a discussion of the characteristics of hydrogen sulfide and hydrogen sulfide.

iii. Maps and drawings. The hydrogen sulfide contingency plan shall include maps and drawings that depict the radius of exposure, areas potentially affected thereby, public areas, public roads and any areas potentially affected by a release of a potentially hazardous volume.

iv. Trainings and Drills. The hydrogen sulfide contingency plan shall include a description of the responsibilities and duties of essential personnel, provide for periodic on-site or classroom drills or exercises that simulate a release, and shall describe how that training, and attendance at the training, will be documented. The hydrogen sulfide contingency plan shall also provide for training of residents on the proper protective measures to be taken in the event of a release, and shall include provisions for briefing public officials on issues such as evacuations or shelter-in-place plans.

Location and availabeility of necessary safety equipment and supplies.

v. Coordination with State Emergency Plans. The hydrogen sulfide contingency plan shall describe how emergency response actions proposed in the plan will be coordinated with the division and with the New Mexico state police consistent with the New Mexico hazardous materials emergency response plan (HMER). vi. Activation Levels. The hydrogen sulfide contingency plan shall

include the activation threshold and a description of events that could lead to such a release

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b. When Submited. A hydrogen sulfide contingency plan for a well, facility or operation existing on the effective date of this section shall be submitted within 180 days from the effective date of this section. A hydrogen sulfide contingency plan for a new well, system or operation shall be submitted before operations commence. A hydrogen sulfide contingency plan shall be submitted within 180 days after the person, operator or facility becomes aware or should have become aware that if a public area or public road is established that creates a potentially hazardous volume where none previously existed. The hydrogen sulfide contingency plan for a drilling, completion, workover or well servicing operation must be on file with the division before operations commence and may be submitted separately or along with the application for permit to drill (APD) or may be on file from a previous submission.

c. Annual Inventory of Contingency Plans. On an annual basis, each person, operator or facility required to prepare one or more hydrogen sulfide contingency plans pursuant to this section shall file with the appropriate local emergency planning committee and the state emergency response commission an inventory of the wells, facilities or operations for which plans are on file with the division and the name, address and telephone number of a point of contact.

( . <u>d. Electronic Submission</u>. The hydrogen sulfide contingency plan shall be submitted electronically in a generally accepted format that is compatible with the division's systems.

5.6. Failure to Submit Plan. Failure to submit a hydrogen sulfide contingency plan when required may result in denial of an application for permit to drill, cancellation of an allowable for the subject well or other appropriate enforcement action.

 $\sqrt{7}$ . Review, Amendment. The person, operator or facility shall review the hydrogen sulfide contingency plan any time a subject addressed in the plan changes and make appropriate amendments. If the division determines that a hydrogen sulfide contingency plan is inadequate b protect public safety, the division may require the person, operator or facility to add provisions to the plan or amend the plan as necessary to protect public safety.

3. Retention and Inspection. The hydrogen sulfide contingency plan shall be reasonably accessible in the event of a release, maintained on file at all times, and available for inspection by the

W. Plan Activation. The hydrogen sulfide contingency plan shall be activated in the event of a release that may create a concentration of hydrogen sulfide of 100 ppm in any public area, 500 ppm at any public road or 100 ppm 3,000 feet from the site of release. Las set for the method. F. Signage. Each well, facility or operation containing a concentration of hydrogen sulfide of (

100 ppm or greater shall provide and maintain signage. The sign or marker shall conform with the current ANSI standard Z53.1 and shall provide other information sufficient to warn the public that a potential danger exists. Signs markers shall be prominently posted at locations like entrance points and road crossings and shall be sufficient to alert the public that a potential danger exists.

G. Protection from Hydrogen Sulfide During Drilling, Completion, Workover, and Well Servicing Operations.

1. API Standards. All drilling, completion, workover and well servicing operations shall be conducted with due consideration to the guidelines published by the API entitled "Recommended" Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RF-68.

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and "Recommended Practices for Drilling and Well Servicing Operations Involving of Wells Containing

Hydrogen Sulfide," RP-49, most recent editions. 2. Detection and Monitoring Equipment. The person, operator or facility shall provide hydrogen sulfide detection and monitoring equipment as follows:

a. Each drilling and completion site shall have an accurate and precise hydrogen sulfide detection and monitoring system that will automatically activate visible and audible alarms when the ambient air concentration of hydrogen sulfide reaches a predetermined value set by the operator, not to exceed 20 ppm. There shall be a sensing point 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.

b. For workover and well servicing operations, one operational sensing point shall be located as close to the well bore as practical. Additional sensing points may be necessary for large or long-term operations.

c. Hydrogen sulfide detection and monitoring equipment must be provided and must be made operational during drilling when drilling is within 500 feet of a zone anticipated to contain hydrogen sulfide and continuously thereafter through all subsequent drilling.

3. Wind Indicators. Threshold 100 ppm?? a. Equipment to indicate wind direction shall be present and visible at all times. At least two devices to indicate wind direction shall be installed at separate elevations and visible from all principal working areas at all times.

b. When a sustained concentration of hydrogen sulfide is detected in excess of 20 ppm at any detection point, red flags shall be displayed.

4.\_Flare System. For drilling and completion operations in an area where it is reasonably expected that a potentially hazardous volume of hydrogen sulfide will be encountered, the person, operator or facility shall install a flare system to safely gather and burn hydrogen sulfide-bearing gas. Flare outlets shall be located at least 150 feet from the well bore. Flare lines shall be as straight as practical. The flare system shall be equipped with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall be provided supplemental fuel to maintain ignition.

5. Well Control Equipment. When the 100 ppm radius of exposure includes a public area, the following additional measures shall be required:

a. Drilling. A remote controlled well control system shall be installed and operational at all times beginning when drilling is within 500 feet of the formation believed to contain hydrogen sulfide and continuously thereafter during drilling. The well control system must include, at a minimum, a pressure and hydrogen sulfide-rated well control choke and kill system including manifold and blowout preventer that meets or exceeds the specifications API-16C and API-RP 53 or other specifications approved by the division. Mud-gas separators shall be used. These systems shall be tested and maintained pursuant to the specifications referenced, according to the requirements of this part, or otherwise as approved by the division.

b. Completion, Workover and Well Servicing. A remote controlled pressure and hydrogen sulfide rated well control system that meets or exceeds API specifications or other specifications approved by the division shall be installed and operationsla at all times during completion, workover and servicing of a well. An Thres wild 100 ppn? 6. Mud Program. A mud program, including de-gassing and flaring, capable of handling

hydrogen sulfide conditions and well control shall be used. 7. Well Testing. Except with prior approval of the division, drill-stem testing of a zone

that contains hydrogen sulfide shall be conducted only during daylight hours and formation fluids shall not be permitted to flow to the surface (closed chamber only).

8. If Hydrogen Sulfide Encountered During Operations. If hydrogen sulfide was not anticipated at the time the division issued a permit to drill but is encountered during drilling in a concentration of 100 ppm or greater in the gaseous mixture, the operator must sate sate is fy the requirements of this section before continuing drilling operations. The operator shall notify the division of the event and the mitigating steps that have or are being taken as soon as possible, but no later than 24 hours

following discovery. The division may grant verbal approval to continue drilling operations pending preparation of any required hydrogen sulfide contingency plan.

H. Protection from Hydrogen Sulfide at Crude Oil Pump Stations, Producing Wells, Tank Batteries and Associated Production Facilities, <u>Pipelines</u>, Refineries, Gas Plants and Compressor Stations.

1. API Standards. Operations at crude oil pump stations and producing wells, tank batteries and associated production facilities, refineries, gas plants and compressor stations containing a potentially hazardous volume of hydrogen sulfide shall be conducted with due consideration to the guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

2. Security. Well sites and other unattended, fixed surface facilities shall be protected from public access by fencing with locking gates when the location is within 1/4 mile of a public area. A surface pipeline shall not be considered a fixed surface facility for purposes of this paragraph.

3. Wind Direction Indicators. Equipment to indicate wind direction shall be installed 200 ppm, and visible from all principal working areas at all times.

<u>4.</u> Well Control Equipment. Any well shall possess a secondary means of immediate well control through the use of appropriate christmas tree or downhole completion equipment. Such equipment shall allow downhole accessibility (reentry) under pressure for permanent well control. <u>d. Special Requirements. In addition, safety devices such as automtic shut-down devices shall be installed and maintained in good opertal ing vcondition. Alternatively, safety procedures shall be established designed to prevent the undetected release of hydrogen sulfide. Any well shall possess a secondary means of immediate well control through the use of an appropriate christas tree or downhole completion equipment. Such equipment shall permit the downhole accessibility (re-entry) under pressure for immediate well control.</u>

5%. Tanks or vessels. Each stair or ladder leading to the top of any tank or vessel containing 300 ppm or more of hydrogen sulfide in the gaseous mixture shall be chained or marked to restrict entry.

 $\oint A$ . Compliance Schedule. Each existing crude oil pump station and producing well, tank battery and associated production facility, <u>pipeline</u>, refinery, gas plant and compressor station not currently meeting the requirements <u>of this subsection</u> shall be brought into compliance within one year of the effective date of this section.

I. Personnel Protection and Training. All persons responsible for the implementation of any hydrogen sulfide contingency plan shall be provided training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.

J. Standards for Equipment That May Be Exposed to Hydrogen Sulfide. Whenever a potential  $1\gamma$  hazardous volume of hydrogen sulfide is present or may reasonably be expected to be encountered, persons, operators and facilities shall select equipment with consideration for both the hydrogen sulfide working environment and anticipated stresses and use NACE Standard MR0175 (latest edition) or some other standard approved by the division for selection of metallic equipment or, if applicable, provide adequate protection by chemical inhibition or other methods that control or limit the corrosive effects of hydrogen sulfide.

K. Exemptions. Any person, operator or facility may petition the director, or the director's <u>designee</u>, for an exemption to any requirements of this section. Any such petition shall provide specific information as to the circumstances that warrant approval of the exemption requested and how the public safety will be protected. The director, or the director's deisgnee, after considering all relevant factors, may approve an exemption if the circumstances warrant an exemption.

L. Notification of the Division. The person, operator or facility shall notify the division upon a release of hydrogen sulfide requiring activation of the hydrogen sulfide contingency plan as soon as possible, but no more than four hours after plan activation, recognizing that a prompt response should supercede notification. The person, operator or facility shall submit a full report of the incident to the division on Form C-141 no later than fifteen (15) days following the release.

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M. Corrective Actions. The division may require corrective actions if necessary to maintain control of a well or any other facility or to safeguard public safety. [RE<MINDER OF DIVISION'S STATUTORY AUHTHORITY]

### 19.15.2.52 Hydrogen Sulfide Gas (Hydrogen Sulfide)

A. In General. Hydrogen sulfide gas (known by its chemical abbreviation " $H_2S$ " or as "sulfurated hydrogen" or "hydrosulfuric acid") is a flammable, poisonous gas that may occur naturally as a component of crude petroleum and natural gas. The gas has a distinct and characteristic odor of rotten eggs but due to olfactory fatigue may not be sensed by the human sense of smell.

B. <u>Applicability</u> Scope. This Section provides for public safety in areas where hydrogen sulfide gas (H<sub>2</sub>S) may exists in concentrations greater than 100 ppm or in a potentially hazardous volume. This section applies to any person, operator or facility subject to the jurisdiction of the Division, including, but not limited to, any person, operator or facility engaged in drilling, stimulating, injecting into, completing, working over or producing any oil, natural gas or carbon dioxide well or any person, operator or facility engaged in gathering, transporting, storing, processing or refining of crude oil, natural gas or carbon dioxide. This section shall not act to exempt or otherwise excuse Exempt from this rule are surface waste management facilities permitted by the division pursuant to 19 NMAC 15.I.711 from more stringent conditions on the handling of hydrogen sulfide required of such facilities by 19 NMAC 15.I.711 or more stringent conditions existing in permits issued thereunder, nor shall such facilities be exempt from the requirements set forth in this section by virtue of permitting under 19 NMAC 15.I.711.

C. Definitions (specific to this section).

- 1. ANSI. The acronym "ANSI" means the american national standards institute.
- 2. API. The acronym "API" means the american petroleum institute.
- 3. ASTM. The acronym "ASTM" means the american society for testing and materials.

4. Dispersion Technique. A "dispersion technique" is a mathematical representation of the physical and chemical transportation characteristics, dilution characteristics and transformation characteristics of hydrogen sulfide gas in the atmosphere.

5. Escape Rate. The "escape rate" is the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing hydrogen sulfide. The escape rate is calculated using the maximum daily rate of the gaseous mixture produced or the best estimate thereof. For a natural gas well, the escape rate shall be calculated by using the current daily absolute open flow rate against atmospheric pressure or best estimate thereof. For an oil well, the escape rate shall be calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or best estimate thereof. For an oil or natural gas well drilled in a previously undeveloped area (a "wildcat" well), the escape rate may be determined by using data from offset wells completed in the interval in question, or using some other reasonable means to calculate the escape rate. For wildcat wells, subparagraph C.13.d shall apply. For facilities or operations not mentioned, the escape rate shall be calculated using the actual flow of gaseous mixture through the facility or operation.

6. GPA. The acronym "GPA" means the gas processors association.

7. LEPC. The acronym "LEPC" means the local emergency planning committee established pursuant to the emergency planning and community right-to-know act, 42 U.S. C. § 11001.

8. NACE. The acronym "NACE" refers to the national association of corrosion

engineers.

9. PPM. The acronym "ppm" means "parts per million" by volume.

10. Potentially Hazardous Volume (hereinafter referred to as a "potentially hazardous volume" or by the acronym "PHV") means the volume of hydrogen sulfide gas of such concentration that:

a. the 100 ppm radius of exposure includes any public area as defined herein;

b. the 500 ppm radius of exposure includes any public road

as defined herein; or

c. the 100 ppm radius of exposure is in excess of 3,000 feet.

11. Public Area. A "public area" is any <u>area where members of the public may</u> reasonably be expected to be present such as a dwelling, office, place of business, church, school, hospital, school bus stop, government building, <u>any portion of a park, city, town, village or other similar</u> <u>area, or any portion of a park, city, town, village or other similar area where members of the public may</u> reasonably be expected to be present. 12. Public Road. A "public road" is any federal, state, municipal or county road or highway or postal route.

13. Radius of Exposure. The radius of exposure (hereinafter referred to as "radius of exposure" or "ROE") is an imaginary circle constructed around a point of escape the radius of which is calculated using the following Pasquill-Gifford derived equation, or by such other method as may be approved by the division:

a. For determining the 100-ppm radius of exposure:  $X = [(1.589)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ , where "X" is the radius of exposure in feet, the "hydrogen sulfide concentration" is the decimal equivalent of the mole or volume fraction of hydrogen sulfide in the gaseous mixture, and "Q" is the escape rate expressed in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

b. For determining the 500-ppm radius of exposure:  $X=[(0.4546)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ , where "X" is the radius of exposure in feet, the "hydrogen sulfide concentration" is the decimal equivalent of the mole or volume fraction of hydrogen sulfide in the gaseous mixture, and "Q" is the escape rate expressed in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

c. Where multiple sources of hydrogen sulfide are present (e.g. wells, treatment equipment, flow lines, etc.), the radius of exposure may encompass a larger area than would otherwise be calculated using a radius of exposure computation for each component part.

<u>c. d.</u> For a well being drilled in an area where insufficient data <u>exists</u> to calculate a radius of exposure but where hydrogen sulfide could reasonably be expected to be present in concentrations in excess of 100 ppm in the gaseous mixture, a 100 ppm radius of exposure equal to 3,000 feet shall be assumed.

D. Determination of Hydrogen Sulfide Risk.

1. Determination of Hydrogen Sulfide Concentration.

a. Each person, operator or facility to which this section applies shall determine the hydrogen sulfide concentration within each of its <u>wells</u>, operations or systems. A representative sample or <del>previous</del> process knowledge for each system or operation may be used <u>in lieu of individual for</u> testing <u>of wells</u>, <u>operations or systems</u> provided that the person, operator or facility can demonstrate that the concentration derived from a test or process knowledge of the representative sample is reasonably representative of the hydrogen sulfide concentration <del>within the operation, pool or system</del>.

b. The tests referred to in the previous subparagraph shall be conducted in accordance with applicable ASTM or GPA standards or by other methods approved by the division.

c. If a representative sample from a system or operation was tested within one (1) year of the effective date of this section, new testing shall not be required; provided, however, new testing shall not be required for a producing well that was tested at any time prior to the effective date of this section.

d. The Division may disapprove the test methodology and require additional testing if the testing methodology did not conform to the requirements of this Section.

2. Tested Concentrations Below 100 ppm. If the testing described in the previous paragraph determines that the hydrogen sulfide concentration in a given <u>well</u>, operation or system is less than 100 ppm, no further actions <u>shall be are</u> required pursuant to this section.

3. Tested Concentrations Above 100 ppm; Calculation of the Radius of Exposure.

a. If the testing described in paragraph 1 of this subsection determines that the concentration of hydrogen sulfide in a gaseous mixture is 100 ppm or greater, then the person, operator or facility must calculate the radius of exposure pursuant to this section.

b. If calculation of the radius of exposure reveals that a potentially hazardous volume <u>is may be</u> present, the person, operator or facility shall provide the results of the testing and the resulting radius of exposure determinations to the division <del>electronically in a generally accepted</del> <del>electronic format that is compatible with the division's systems.</del> For a well, facility or operation existing on the effective date of this section, the calculation and submission required herein shall be accomplished

before commencing operations or, for existing facilities, within 180 days of the effective date of this section; any well, facility or operation that commences operations after the effective date of this section shall calculate the radius of exposure and submit the results prior to beginning operations. Operators may petition the Division for an extension of the submission date, or for an exception to the electronic submission requirement pursuant to subsection J of this Section.

4. Recalculation. <u>The person, operator or facility shall recalculate the radius of exposure</u> <u>if any of the following occurs: an operational</u> change or production alterations are made then recalculations may be made causes the hydrogen sulfide concentration to increase to 100 ppm or greater; application of generally accepted engineering principles and generally accepted operating practices <u>indicate</u> If recalculations indicate that the a hydrogen sulfide H2S concentration has <u>increased to become</u> greater than 100 ppm or greater; a 25% or greater increase in the actual volume fraction of hydrogen sulfide has occurred; in a given operation or facility, the person, operator or facility shall recalculate the radius of exposure or, and, changed circumstances result in a the ROE reveals that a potentially hazardous volume where one was not previously present PHV may be present. If recalculation is performed, the results shall be submitted submit the results to the division electronically in a generally accepted electronic format that is compatible with the division's systems.

E. <u>Hydrogen Sulfide H<sub>2</sub>S</u> Contingency Plan.

1. In General. A <u>hydrogen sulfide</u>  $n H_2S$  contingency plan is a written document that provides a plan of action that will be used to alert and protect persons at risk in the event of a potentially significant release of hydrogen sulfide gas. The <u>hydrogen sulfide contingency plan</u> must be developed in accordance with the following paragraphs.

2. When Required. A <u>hydrogen sulfide  $n H_2S$  contingency plan must be prepared</u> whenever a potentially hazardous volume of hydrogen sulfide <u>is may</u> be present.

3. Input of Emergency Response Authorities and the Division. The person, operator or facility shall develop a proposed hydrogen sulfide contingency plan and provide a copy to coordinate the proposed H<sub>2</sub>S contingency plan with the division, the New Mexico department of public safety (i.e. the New Mexico state police), and the local emergency planning committee. If the potential source of release is within a municipality, a copy shall be provided to the municipal police and fire department. If the potential source of the release is within a county, a copy shall also be provided to as appropriate, the county sheriff and the city or municipal police, and/or police and fire departments. Input on the proposed plan shall be sought from each of the foregoing; if an emergency response authority provided with a copy of the proposed plan fails to provide input or fails to respond at all, that fact shall be stated in the proposed hydrogen sulfide contingency plan submitted to the division. The input provided by the emergency response authorities shall be considered when preparing the final plan for submission to the division but failure to include any specific suggestion shall not affect the validity of the plan or cause disapproval of the plan by the division. A statement in the contingency plan indicating which agencies have been notified shall suffice as proof of coordination.

4. Elements.

a. Elements Required for Each Plan:

i. A detailed description of each action to be taken in the event of a release of a potentially hazardous volume of hydrogen sulfide shall be included in each hydrogen sulfide contingency plan, including an immediate action plan that provisions for alerting and accounting for personnel, controlling any release of hydrogen sulfide gas, eliminating possible ignition sources, alerting the public (directly or through appropriate government agencies), evacuating persons in the affected area, use of the call list to alert company officials and assure coordination with emergency response authorities, making recommendations to public officials to block access to affected areas and evacuations and coordination of emergency response with emergency response authorities. Alternatively, a plan that addresses the items described in paragraph 7.6 of guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, most recent edition shall be adequate for this purpose;

ii. A call list including the following as applicable:

aa. local supervisory personnel;

bb. county sheriff;

cc. the department of public safety and state police;

dd. city or municipal police;

ee. the appropriate division district office; and

ff. other public agencies as appropriate.

iii. A plat or map detailing the area within the radius of exposure of a potentially hazardous volume; and

iv. A list of the names and telephone numbers of all personnel to be contacted when a release is reported or suspected.

b. Where the 500-ppm radius of exposure encompasses any public road, the person, operator or facility shall include the following additional elements in the <u>hydrogen sulfide  $H_2S$ </u> contingency plan:

i. Instructions and procedures for alerting and coordinating <u>emergency</u> <u>response to a release</u> with emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide at any public road;

ii. A plat or map detailing the area of exposure, including the locations of public roads within the radius of exposure of a potentially hazardous volume; and

iii. A plan to divert traffic and safely get existing traffic off the road and out of danger.

c. Where the 100-ppm radius of exposure encompasses any public area, the following additional elements shall be included in the <u>hydrogen sulfide  $H_2S$  contingency plan</u>:

i. Detailed plans of action to alert and protect persons in the event of a release of a potentially hazardous volume of hydrogen sulfide, including instructions and procedures for alerting persons at risk and emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide;

ii. A call list including all the persons set forth in Sub subparagraph E(4)(a)(ii), above, and the following:

- aa. ambulance services;
- bb. hospitals;
- cc. county and city fire departments;
- dd. doctors;
- ee. contractors for supplemental or emergency equipment; and
- ff. other public agencies as appropriate.

iii. A statement describing how emergency response actions will be

coordinated with the division and the New Mexico state police, consistent with the New Mexico hazardous materials emergency response plan (HMER);

iv. A plat or map detailing the area of exposure, including the locations of private dwellings or residences, public facilities such as schools, businesses, public roads or other similar areas where the public may be reasonably expected to be present within the radius of exposure;

v. The names and telephone numbers of all persons <u>within a public area</u> <u>subject to a potentially hazardous volume living within the radius of exposure of 100 ppm hydrogen</u> <del>sulfide</del> and contact persons for <u>areas of public concentration each public area</u>, such as churches, schools and businesses;

vi. Provision for advance briefing of affected and responsible persons

within the radius of exposure. Such advance briefing shall include the hazards and characteristics of hydrogen sulfide, the necessity for a <u>hydrogen sulfide</u>  $n H_2S$  contingency plan, the possible sources of hydrogen sulfide within the radius of exposure, instructions for reporting a gas leak, the manner in which persons will be notified in the event of an emergency and steps to be taken in an emergency; and

vii. In lieu of provision for advance briefing or persons within the radius of exposure described in the previous subsubparagraph, a reaction-type plan may be prepared and submitted that provides for mass notification of a release of hydrogen sulfide and for evacuation of affected areas where the operator can demonstrate that the risk to public safety is minimal such as in remote locations, a simplified a reaction-type plan may be prepared and submitted that provides for mass notification of a hydrogen sulfide leak and for an evacuation of affected areas;

viii. additional support information, if applicable, such as the location of emergency evacuation routes, the location of safety and life support equipment, the location of <u>facilities</u> <u>containing</u> hydrogen sulfide <del>containing facilities</del>, the location of nearby telephones or other means of communication and special instructions for conditions at a particular installation such as local terrain and the effect of various weather conditions.

d. Additional Requirements. The division may impose additional requirements or modify requirements based on site-specific conditions, population density or special circumstances.

5. Submission, When Submitted. The hydrogen sulfide contingency plan shall be submitted to the division and a copy shall be submitted to the local emergency planning committee, if one exists. Existing For crude oil pump stations, producing wells, tank batteries and associated production facilities, refineries, gas plants and compressor stations shall submit existing subsection G facilities. the hydrogen sulfide  $H_2S$  contingency plan shall be submitted no later than 180 days from the effective date of this section. Existing drilling, workover and servicing operations shall submit the hydrogen sulfide contingency plan for the relevant well no later than 180 days after the effective date of this section. New crude oil pump stations, producing wells, tank batteries and associated production facilities, refineries, gas plants and compressor stations shall submit the H<sub>2</sub>S contingency plan prior to beginning operations. New wells and workover and servicing operations that commence after the effective date of this section shall submit the hydrogen sulfide contingency plan prior to commencing work. the division electronically in a form that is compatible with the division's systems and to the local emergency planning committee. no later than 180 days following submission of the radius of exposure required in Subsection D of this Section For subsection F operations and shall be submitted to the division electronically in a generally accepted electronic format that is compatible with the division's systems before commencement of operations. The hydrogen sulfide  $H_{2S}$  contingency plan for a drilling, workover or servicing operation may be submitted separately or along with the application for permit to drill (APD).

6. Failure to Submit Plan. Failure to submit an  $H_2S$  contingency plan when required may result in denial of an application for permit to drill that well, cancellation of an allowable or other appropriate enforcement action.

7. Annual Review, Amendment. The person, operator or facility shall review the hydrogen sulfide  $H_2S$  contingency plan on an annual basis, or more frequently if activation of a plan reveals a deficiency or, if changes to processes, concentrations of hydrogen sulfide or other circumstances occur. The person, operator or facility shall submit any amendments to the division electronically in a form that is compatible with the division's systems and to the local emergency planning committee. Reasonable efforts shall be taken to update on an annual basis the names and telephone numbers of persons within a public area subject to a potentially hazardous volume designated in E.4.c.v. within the 100 ppm radius of exposure.

8. Retention and Inspection. A <u>The hydrogen sulfide  $n H_2S$ </u> contingency plan shall be reasonably accessible in the event of a release and maintained on file at all times and shall be available for inspection by the Division.

9. Activation Levels. The <u>hydrogen sulfide</u>  $H_2S$  contingency plan shall be activated in the event of a release <u>that may create a concentration of hydrogen sulfide of 100 ppm in any public area</u>, 500 ppm at any public road or if a concentration of 100 ppm hydrogen sulfide may be present 3,000 feet from the site of release of a potentially hazardous volume of  $H_2S$  above the respective thresholds (i.e. 500 ppm radius at any public road, 100 ppm radius at any public area, etc.) or if a sustained concentration of  $H_2S$  exceeds 50 ppm at the facility boundary of any facility, well or operation.

F. Protection from Hydrogen Sulfide During Drilling, Workover and Servicing Operations.

1. API Standards. All drilling, completion, workover and well servicing operations where it is reasonably expected that a concentration of hydrogen sulfide in a gaseous mixture of 100 ppm or greater will be encountered shall be conducted with due consideration to the guidelines published by the API entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Safe Drilling and Well Servicing Operations Involving of Wells Containing Hydrogen Sulfide," RP-49, most recent edition.

2. Minimum Standards. At a minimum, and possibly in addition to the foregoing API standards, each drilling, completion, workover and well servicing operation shall also be conducted in accordance with the following:

a. Before Commencing Operations. The person, operator or facility shall complete a the hydrogen sulfide  $n H_2S$  contingency plan, where required, before commencement of operations. In addition, hydrogen sulfide training shall be completed and all related safety equipment and warning systems shall be operational before commencement of operations. Detection and monitoring equipment is not required for drilling from the surface to within 500 feet of the zone anticipated to contain hydrogen sulfide.

b. Egress Routes. The person, operator or facility shall maintain passable egress routes at all times during operations.

c. Safety, Detection and Monitoring Equipment. The person, operator or facility shall provide hydrogen sulfide detection and monitoring equipment as follows:

i. Each drilling and completion site shall have a hydrogen sulfide detection and monitoring system that automatically activates visible and audible alarms when the ambient air concentration of hydrogen sulfide reaches 20 ppm. There shall be a sensing point 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.

ii. The detection system shall be calibrated, tested and the results recorded monthly. Each test of the hydrogen sulfide monitoring system shall be recorded on the driller's log or its equivalent.

iii. For workover and well servicing operations, one operational sensing point shall be located as close to the well bore as practical. Additional sensing points may be necessary for large or long-term operations.

iv. Hydrogen sulfide detection, safety and monitoring equipment must be provided and the prescribed safety equipment must be made operational during drilling when drilling is within 500 feet of <u>a the</u> zone anticipated to contain hydrogen sulfide and continuously thereafter through all subsequent drilling.

d. Wind Indicators and Signs.

i. Equipment to indicate wind direction shall be present and visible at all times. At least two devices to indicate wind direction shall be installed at separate elevations and visible from all principal working areas at all times.

ii. Danger or caution signs shall be displayed along all accesses to the site. The signs shall read "DANGER - POISON GAS, HYDROGEN SULFIDE PRESENT" or, as appropriate, "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or equivalent language approved by the division, and in smaller lettering: "Do Not Approach If Red Flag is Flying" or equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967,  $\Theta$  regulations of the federal occupational safety and health administration  $\underline{Or}$  in another color approved by the division. The signs shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 500 feet from the well site and at a location which allows vehicles to turn around at a safe distance prior to reaching the site.

iii. When a sustained concentration of hydrogen sulfide is detected in excess of 20 ppm at any detection point, red flags shall be displayed.

e. If Hydrogen Sulfide Encountered During Operations. If hydrogen sulfide was not anticipated at the time the division <u>issued a permit to drill approved the APD</u> but is encountered during drilling in <u>a concentration excess</u> of 100 ppm <u>or greater</u> in the gaseous mixture, the operator shall immediately ensure control of the well, suspend drilling operations unless detrimental to well control, <u>takes whatever measures are necessary under the circumstances to assure public safety</u>, and obtain materials and safety equipment to bring the operations into compliance with this section, <u>calculate the</u> <u>radius of exposure and prepare a hydrogen sulfide contingency plan if a potentially hazardous volume is</u> <u>present</u>. The operator shall notify the division of the event and the mitigating steps that have or are being taken as soon as possible, but no later than 24 hours following discovery.

3. Operating Practices In Hydrogen Sulfide Concentrations of 100 ppm or Greater. Operating practices in areas known to contain a concentration of hydrogen sulfide gas of 100 ppm or greater in the gaseous mixture shall be subject to the following requirements:

a. If Hydrogen Sulfide Is Encountered During Use of Air, Gas, Mist or Other Non-Mud Circulating Media. If hydrogen sulfide gas in excess of 100 ppm is encountered while drilling with air, gas, mist or other non-mud circulating mediums for 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. An alternate drilling method may be used after <u>encountering hydrogen sulfide in excess of 100</u> ppm but only if the alternate method is specifically approved by the Division. <u>the Division specifically</u> approves encountering hydrogen sulfide in excess of 100 ppm, but only if the alternative method.

b. Flare System. For drilling and completion operations, the person, operator or facility shall install a flare system to safely gather and burn hydrogen sulfide-bearing gas, unless exempted pursuant to Subsection J. Flare outlets shall be located at least 150 feet from as far from the well bore, if as feasible given terrain at the site but not less than 150 feet from the well. Flare lines shall be as straight as practical. The flare system shall be equipped with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall be provided supplemental fuel to maintain ignition.

c. Use of Well Control Equipment. Remote Controlled Choke. When a potentially hazardous volume of  $H_2S$  may be present in any public area, the following measures shall be taken:

i. <u>Drilling.</u> The person, operator or facility shall install A remote controlled choke and accumulator shall be installed and operational at all times beginning within five hundred feet of the formation believed to contain hydrogen sulfide and continuously thereafter during drilling and during completion and well servicing operations when the 100-ppm H<sub>2</sub>S radius of exposure includes a public area.., unless exempted pursuant to Subsection J; The remote controlled choke or remote controlled valve that must include, at a minimum, a pressure and hydrogen sulfide-rated well control choke and kill system including manifold and blowout preventer that meets or exceeds the pursuant to specifications API-16C and API-RP 53 or other specifications approved by the division. The blowout preventer stack shall have at least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced, otherwise according to the requirements of this part, or otherwise as approved by the division. or other division rules, if more stringent. Variations to blowout preventer stack arrangements may be granted by the division for good eause shown.

ii. <u>Completion, Service and Workover. If feasible, the equipment</u> <u>described in the previous subsubparagraph shall be installed and operational at all times during</u> <u>completion, service and workover of a well containing a potentially hazardous volume or when</u> <u>recompleting an existing well into a formation reasonably believed to contain a concentration of hydrogen</u> <u>sulfide in the gaseous mixture equal to or greater than 100 ppm. and during completion and well servicing</u> <u>operations when the 100 ppm H<sub>2</sub>S radius of exposure includes a public area.</u> <u>If not feasible, unless</u> <u>exempted pursuant to Subsection J</u>; For completion or workover operations, the person, operator or <u>facility may install</u> a suitable alternative to a remote choke <u>such as (i.e.</u> a remote controlled valve <u>or</u> blow out preventer with remote accumulator <u>may be used</u>, so long as the alternative equipment will be <u>protective of public safety as set forth in this section.</u>, etc. may be used); and

iii. For drilling operations, the person, operator or facility shall install a remote controlled choke or remote controlled valve that includes, at a minimum, a pressure and hydrogen sulfide-rated well control choke and kill system including manifold and blowout preventer pursuant to specifications API-16C and API-RP 53. The blowout preventer stack shall have at least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications

referenced or other division rules; if more stringent. Variations to blowout preventer stack arrangements may be granted by the division for good cause shown.

d. Mud Program. A mud program, including de-gassing and flaring, capable of handling H<sub>2</sub>S conditions and well control shall be used.

e. Well Testing. Except with prior approval by the division, the drill-stem testing shall be <u>closed chamber only</u>, in that <u>conducted only during daylight hours and</u> formation fluids shall not be permitted to flow to the surface. (closed chamber only). An operator shall notify the division <u>twenty-four (24)</u> hours in advance of a drill-stem test if a <u>hydrogen sulfide  $n H_2S$  contingency</u> plan is required pursuant to this section.

G. Protection from Hydrogen Sulfide at Crude Oil Pump Stations, Producing Wells, Tank Batteries and Associated Production Facilities, Refineries, Gas Plants and Compressor Stations.

1. API Standards. Operations at crude oil pump stations and producing wells, tank batteries and associated production facilities <u>containing a potentially hazardous volume of hydrogen</u> <u>sulfide</u> shall be conducted <u>with due consideration according</u> to the guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

2. Minimum Standards. At a minimum, production from crude oil pump stations and producing wells, tank batteries and associated production facilities shall also be conducted in accordance with the following subparagraphs and subsubparagraphs. Where API standards referred to in the previous paragraph are less stringent than the following, the more stringent standards shall apply.

a. Gaseous Mixtures Containing 100 ppm or more. Producing wells containing 100 ppm or more of hydrogen sulfide in the gaseous mixture, crude oil pump stations, tank batteries and associated production facilities, refineries, gas plants and compressor stations, shall be subject to the following:

i.  $H_2S$  Contingency Plan. If a potentially hazardous volume of  $H_2S$  exists, an  $H_2S$  contingency plan shall be required.

ii. Signage. A danger sign or signs shall be posted within 50 feet of each facility to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gates shall suffice. The signs shall read "DANGER - POISON GAS - HYDROGEN SULFIDE PRESENT", or, as appropriate "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967, or regulations of the federal occupational safety and health administration or in another color approved by the division. The signs shall be legible and large enough to be read by all persons entering the well site. A sign shall be placed at each point where a flow line or gathering line crosses a public road. Each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

iii. Fencing. Fencing and gates shall be required when crude oil pump stations and producing wells, tank batteries and associated production facilities are located in a public area or within a 1/4-mile of a residence, school, church, park, playground, school bus stop or place of business. The fence shall consist of a 5-foot chain link topped by two stands of barbed wire or other designs approved by the division. Gates shall be locked when unattended.

iv. Wind Direction Indicators. Wind direction indicators shall be required at every crude oil pump station, producing well, tank battery and associated production facility where the  $H_2S$  concentration in a gaseous state exceeds 100 PPM.

v. Secondary Well Control. Any well where the 100 ppm  $H_2S$  radius of exposure incorporates a public area shall possess a secondary means of immediate well control through the use of appropriate christmas tree or downhole completion equipment <u>if a potentially hazardous</u> volume exists at any public area. Such equipment shall allow downhole accessibility (reentry) under pressure for permanent well control operations.

vi. Automatic Safety Valve or Shutdown. <u>Any well If the 100-ppm</u> radius of exposure involves a public area, the person, operator or facility shall <u>possess</u> install an automatic safety valve or shutdown at the facility or wellhead or shall install other appropriate shut-in control <u>if a</u> potentially hazardous volume exists at any public area. The automatic safety valve shall be set to activate upon a release of a potentially hazardous volume of hydrogen sulfide.

b. Tanks or vessels containing 300 ppm or more of hydrogen sulfide. <u>Tanks or</u> vessels containing 300 ppm or more of hydrogen sulfide in the gaseous mixture shall be subject to the following additional requirements:

i. Each stair or ladder leading to the top of any storage tank shall be chained or marked to restrict entry. For Any tank <u>or tank</u> battery that requires fencing pursuant to this section <u>may substitute</u> a danger sign posted at the gates <del>may be substituted</del> for chaining and signs.

ii. The person, operator or facility shall post a danger sign on or within 50 feet of any storage tank to alert persons of the potential hydrogen sulfide danger. For any storage tank for which fencing is required, a danger sign posted at the locked gates shall suffice. The signs shall read "DANGER - POISON GAS - HYDROGEN SULFIDE PRESENT", or, as appropriate "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967, regulations of the federal occupational safety and health administration or another color approved by the division. The sign(s) shall be legible and large enough to be read by all persons entering the site.

3. Compliance Schedule. Each existing crude oil pump station and producing well, tank battery and associated production facility not currently meeting the requirements and minimum standards set forth herein shall be brought into compliance within one year of the effective date of this section except that contingency plans shall be submitted within 180 days. Each crude oil pump station and producing well, tank battery and associated production facility constructed following the effective date of this section shall be designed, constructed and operated to meet the requirements set forth herein.

H. Personnel Protection and Training. All persons responsible for the implementation of any <u>hydrogen sulfide  $H_2S$  contingency plan shall be provided training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.</u>

I. Standards for Equipment That May Be Exposed to Hydrogen Sulfide. Persons, operators and facilities shall choose equipment with consideration for both the <u>hydrogen sulfide H<sub>2</sub>S</u> working environment and anticipated stresses. NACE Standard MR0175 (latest edition) or some other standard <u>approved by the division</u> shall be used for selection of metallic equipment or, if applicable, adequate protection by chemical inhibition or other methods that control or limits the corrosive effects of <u>hydrogen sulfide H<sub>2</sub>S</u> shall be used.

J. Exemptions. An exemption to <u>any certain</u> requirements of this section may be granted by petitioning the director. Any such petition shall provide specific information as to the circumstances that warrant approval of the exemption requested and how the public safety will be protected. Submission of a safety plan required by other governmental agencies may accompany the petition for exemption. The director, after considering all relevant factors, may approve an exemption if the circumstances warrant an exemption.

K. Release. Upon a release of hydrogen sulfide the following actions must be taken:

1. Activation of the <u>Hydrogen Sulfide H<sub>2</sub>S</u> Contingency Plan. The person, operator or facility shall activate the H<sub>2</sub>S contingency plan immediately upon an H<sub>2</sub>S release where the potential exists for exposure to The <u>hydrogen sulfide H<sub>2</sub>S</u> contingency plan shall be activated in the event of a release that may create a concentration of hydrogen sulfide of 100 ppm in any public area, 500 ppm at any public road or 100 ppm 3,000 feet from the site of release.

2. Notification of the Division. The person, operator or facility shall notify the division upon a release of hydrogen sulfide requiring activation of the <u>hydrogen sulfide H<sub>2</sub>S</u>-contingency plan as soon as practicable, preferably within one hour of discovery of the release or as soon as possible in cases where prompt response should supercede notification. The person, operator or facility shall submit a full report of the incident to the division on Form C-141 no later than fifteen (15) days following the release.

L. Electronic Submission. Any submission to the division required by this section shall be made electronically in a generally accepted format that is compatible with the division's systems.

 $\underline{M}$ .  $\underline{L}$ . Corrective Actions. The division may require corrective actions if necessary to maintain control of a well or any other facility or to safeguard public safety.

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### 19.15.2.52 Hydrogen Sulfide Gas (Hydrogen Sulfide)

<u>A.</u> In General. Hydrogen sulfide gas (known by its chemical abbreviation " $H_2S$ " or as "sulfurated hydrogen" or "hydrosulfuric acid") is a flammable, poisonous gas that may occur naturally as a component of crude petroleum and natural gas. The gas has a distinct and characteristic odor of rotten eggs but due to olfactory fatigue may not be sensed by the human sense of smell.

B. <u>Applicability Scope</u>. This Section provides for public safety in areas where hydrogen sulfide gas (H<sub>2</sub>S) may exists in concentrations greater than 100 ppm or in a potentially hazardous volume. This section applies to any person, operator or facility subject to the jurisdiction of the Division, including, but not limited to, any person, operator or facility engaged in drilling, stimulating, injecting into, completing, working over or producing any oil, natural gas or carbon dioxide well or any person, operator or facility engaged in gathering, transporting, storing, processing or refining of crude oil, natural gas or carbon dioxide. This section shall not act to exempt or otherwise excuse Exempt from this rule are surface waste management facilities permitted by the division pursuant to 19 NMAC 15.I.711 from more stringent conditions existing in permits issued thereunder, nor shall such facilities be exempt or otherwise excuse from the requirements set forth in this section by virtue of permitting under 19 NMAC 15.I.711.

C. Definitions (specific to this section).

1. ANSI. The acronym "ANSI" means the american national standards institute.

2. API. The acronym "API" means the american petroleum institute.

<u>3. Area of Exposure. The phrase "area of exposure" means the area within a circle constructed with the point of escape at its center and the radius of exposure as its radius.</u>

<u>4.</u> <u>3.</u> ASTM. The acronym "ASTM" means the american society for testing and materials.

5.4. Dispersion Technique. A "dispersion technique" is a mathematical representation of the physical and chemical transportation characteristics, dilution characteristics and transformation characteristics of hydrogen sulfide gas in the atmosphere.

<u>6.</u> 5. Escape Rate. The "escape rate" is the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing hydrogen sulfide. The escape rate is calculated using the maximum daily rate of the gaseous mixture produced or the best estimate thereof. For a natural gas well, the escape rate shall be calculated by using the current daily absolute open flow rate against atmospheric pressure or the best estimate of that rate. For an oil well, the escape rate shall be calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or the best estimate thereof. For an oil or natural gas well drilled in a developed area, the escape rate may be determined by using data from offset wells completed in the interval in question, or using some other reasonable means to calculate the escape rate. For wildcat wells, subparagraph C.13.d shall apply. For facilities or operations not mentioned, the escape rate shall be calculated using the actual flow of the gaseous mixture through the facility or operation.

7. 6. GPA. The acronym "GPA" means the gas processors association.

<u>8.</u> 7. LEPC. The acronym "LEPC" means the local emergency planning committee established pursuant to the emergency planning and community right-to-know act, 42 U.S. C. § 11001.

<u>9.</u> 8. NACE. The acronym "NACE" refers to the national association of corrosion engineers.

<u>10.</u> 9. PPM. The acronym "ppm" means "parts per million" by volume.

<u>11.</u> 10. Potentially Hazardous Volume (hereinafter referred to as a "potentially hazardous volume" or by the acronym "PHV") means the volume of hydrogen sulfide gas of such concentration that:

a. the 100-ppm radius of exposure includes any public area as defined herein;

b. the 500-ppm radius of exposure includes any public road

as defined herein; or

c. the 100-ppm radius of exposure is equal to or in excess of 3,000 feet.

<u>12.</u> 11. Public Area. A "public area" is any <u>building or structure that is not associated</u> with the well, operation or system for which the radius of exposure is being calculated and that is used as <u>a</u> dwelling, office, place of business, church, school, hospital, school bus stop, <u>or</u> government building, or any portion of a park, city, town, village <u>or school bus stop</u> or other similar area where members of the public may reasonably be expected to be present.

<u>13.</u> <u>12.</u> Public Road. A "public road" is any federal, state, municipal or county road or highway or postal route.

<u>14.</u> 13. Radius of Exposure. The radius of exposure (hereinafter referred to as "radius of exposure" or "ROE") is <u>that radius constructed with the an imaginary circle constructed around a</u> point of escape <u>as its starting point and its length the radius of which is calculated using the following Pasquill-Gifford derived equation, or by such other method as may be approved by the division:</u>

a. For determining the 100-ppm radius of exposure:  $X = [(1.589)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ , where "X" is the radius of exposure in feet, the "hydrogen sulfide concentration" is the decimal equivalent of the mole or volume fraction of hydrogen sulfide in the gaseous mixture, and "Q" is the escape rate expressed in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

b. For determining the 500-ppm radius of exposure:  $X=[(0.4546)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ , where "X" is the radius of exposure in feet, the "hydrogen sulfide concentration" is the decimal equivalent of the mole or volume fraction of hydrogen sulfide in the gaseous mixture, and "Q" is the escape rate expressed in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

c. Where multiple sources of hydrogen sulfide are present (e.g. wells, treatment equipment, flow lines, etc.), the radius of exposure may encompass a larger area than would otherwise be calculated using a radius of exposure computation for each component part.

<u>c. d.</u> For a well being drilled, <u>completed</u>, <u>recompleted</u>, <u>worked over or serviced</u> in an area where insufficient data <u>exists</u> to calculate a radius of exposure but where hydrogen sulfide could reasonably be expected to be present in concentrations in excess of 100 ppm in the gaseous mixture, a 100-ppm radius of exposure equal to 3,000 feet shall be assumed.

D. Determination of Hydrogen Sulfide Risk.

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1. Determination of Hydrogen Sulfide Concentration.

a. Each person, operator or facility to which this section applies shall determine the hydrogen sulfide concentration within each of its <u>wells</u>, operations or systems. A representative sample or <del>previous</del> process knowledge <del>for each system or operation</del> may be used <u>in lieu of individual for</u> testing <u>of wells</u>, <u>operations or systems</u> provided that the person, operator or facility can demonstrate that the concentration derived from <del>a test or process</del> knowledge of the representative sample <u>or process</u> <u>knowledge</u> is reasonably representative of the hydrogen sulfide concentration within the <u>well</u>, operation<del>,</del> <del>pool</del> or system.

b. The tests <u>used to make the determination</u> referred to in the previous subparagraph shall be conducted in accordance with applicable ASTM or GPA standards or by other methods approved by the division.

c. If a representative sample from a <u>well</u>, <u>operation or</u> system was tested within one (1) year of the effective date of this section, new testing shall not be required; provided, however, new testing shall not be required for a producing well that was tested at any time prior to the effective date of this section.

d. The Division may disapprove the test methodology and require additional testing if the testing methodology did not conform to the requirements of this Section.

2. Tested Concentrations Below 100 ppm. If the testing described in the previous paragraph determines that the concentration of hydrogen sulfide concentration in a given well, operation or system is less than 100 ppm, no further actions shall be are required pursuant to this section.

3. Tested Concentrations Above 100 ppm; Calculation of the Radius of Exposure.

a. If the testing described in paragraph 1 of this subsection determines that the concentration of hydrogen sulfide in a given well, operation or system gaseous mixture is 100 ppm or greater, then the person, operator or facility must calculate the radius of exposure pursuant to this section. b. If calculation of the radius of exposure reveals that a potentially hazardous

volume <u>is may be</u>-present, the person, operator or facility shall provide the results of the <u>determination of</u> the hydrogen sulfide concentration and the calculation of the testing and the resulting radius of exposure determinations to the division <u>electronically in a generally accepted electronic format that is compatible</u> with the division's systems. For a well, operation or system existing on the effective date of this section, the determination, calculation and submission required herein shall be accomplished before commencing operations or, for existing facilities, within 180 days of the effective date of this section; for any well, operation or system that commences operations after the effective date of this section, the determination, calculation and submission required herein shall be accomplished before operators may petition the Division for an extension of the submission date, or for an exception to the electronic submission requirement pursuant to subsection J of this Section.

4. Recalculation. <u>The person, operator or facility shall calculate or recalculate the radius of exposure if an operational</u> change or production alterations are made then recalculations may be made causes the hydrogen sulfide concentration in a well, operation or system to increase to 100 ppm or greater or, if the hydrogen sulfide concentration in a well, operation or system was already 100 ppm or greater, causes a 25% or greater increase in the actual volume fraction of hydrogen sulfide. If calculation or recalculation of the radius of exposure reveals that a potentially hazardous volume is present, the person, operator or facility shall provide the results to the division within thirty (30) days. application of generally accepted engineering principles and generally accepted operating practices. If recalculations indicate that a hydrogen sulfide H2S concentration has become greater than 100 ppm a 25% or greater increase in the actual volume fraction of hydrogen sulfide has occurred; in a given operation or facility, the person, operator or facility shall recalculate the radius of exposure and, the ROE reveals that a PHV may be present submit the results to the division electronically in a generally accepted electronic format that is compatible with the division's systems.

E. <u>Hydrogen Sulfide</u> H<sub>2</sub>S Contingency Plan.

1. In General. A <u>hydrogen sulfide  $n H_2S$ </u> contingency plan is a written document that provides a plan of action that will be used to alert and protect persons at risk in the event of a potentially significant release of hydrogen sulfide gas. The <u>hydrogen sulfide contingency plan</u> must be developed in accordance with the following paragraphs.

2. When Required. A <u>hydrogen sulfide</u>  $n H_2S$  contingency plan must be prepared whenever a potentially hazardous volume of hydrogen sulfide <u>is may be</u> present <u>or may reasonably</u> <u>expected to be encountered</u>.

3. Input of Emergency Response Authorities and the Division. The person, operator or facility shall develop a proposed hydrogen sulfide contingency plan and provide a copy to coordinate the proposed H<sub>2</sub>S contingency plan with the division, the New Mexico department of public safety (*i.e.*, the New Mexico state police), and the local emergency planning committee. If the potential source of release is within a municipality, a copy shall be provided to the municipal police and fire department. If the potential source of the release is outside the boundaries of a municipality, a copy shall instead be provided to as appropriate, the county sheriff and the city or municipal police, and/or police and county fire department or departments. Input on the proposed plan shall be sought from each of the foregoing; if an emergency response authority provided with a copy of the proposed plan fails to provide input or fails to respond at all, that fact shall be stated in the final hydrogen sulfide contingency plan submitted to the division. The input provided by the emergency response authorities shall be considered when preparing the final plan for submission to the division but failure to include any specific suggestion shall not affect the validity of the plan or cause disapproval of the plan by the division. A statement in the contingency plan indicating which agencies have been notified shall suffice as proof of coordination.

4. Elements.

a. Elements Required for Each Plan:

i. A detailed description of each action to be taken in the event of a release of a potentially hazardous volume of hydrogen sulfide requiring activation shall be included in each hydrogen sulfide contingency plan, including an immediate action plan that provisions for alerting and accounting for personnel, controlling any release of hydrogen sulfide gas, eliminating possible ignition sources, alerting the public (directly or through appropriate government agencies), evacuating persons in the affected area, using the call list to alert company officials and emergency response authorities, making recommendations to public officials to block access to affected areas and conducting evacuations and coordinating emergency response with emergency response authorities. A plan that addresses the items described in paragraph 7.6 of the guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, most recent edition, shall be adequate for this purpose;

ii. A call list including the following as applicable:

- aa. local supervisory personnel;
- bb. county sheriff;
- cc. the department of public safety and state police;
- dd. city or municipal police;
- ee. the appropriate division district office; and
- ff. other public agencies as appropriate;

iii. A plat or map detailing the area within the radius of exposure of a potentially hazardous volume; and

iv. A list of the names and telephone numbers of all personnel to be contacted when a release is reported or suspected.

b. Where the 500-ppm radius of exposure encompasses any public road, the person, operator or facility shall include the following additional elements in the <u>hydrogen sulfide  $H_2S$ </u> contingency plan:

i. Instructions and procedures for alerting and coordinating <u>emergency</u> <u>response to a release</u> with emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide at any public road;

ii. A plat or map detailing the area of exposure, including the locations of public roads within the radius of exposure of a potentially hazardous volume; and

<u>ii.</u> iii. A plan to divert traffic and safely get existing traffic off the road and out of danger.

c. Where the 100-ppm radius of exposure encompasses any public area, the following additional elements shall be included in the <u>hydrogen sulfide  $H_2S$  contingency plan:</u>

i. Detailed plans of action to alert and protect persons in the event of a release of a potentially hazardous volume of hydrogen sulfide, including instructions and procedures for alerting persons at risk and emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide;

E(4)(a)(ii), above, and the following:

- aa. ambulance services;
- bb. hospitals;
- cc. county and city fire departments;
- dd. doctors;
  - ee. contractors for supplemental or emergency equipment; and
  - ff. other public agencies as appropriate;

<u>ii.</u><u>iii</u>. A statement describing how emergency response actions will be coordinated with the division and the New Mexico state police, consistent with the New Mexico hazardous materials emergency response plan (HMER);

<u>iii.</u> iv. A plat or map detailing the area of exposure, including the locations of <u>public areas and private dwellings or residences</u>, <u>public facilities such as schools</u>, <u>businesses</u>,

public roads or other similar areas where the public may be reasonably expected to be present within the radius of exposure;

iv.  $\mathbf{v}_{\tau}$  The names and telephone numbers of all persons living within the area of exposure radius of exposure of 100 ppm hydrogen sulfide and contact persons for areas of public concentration each public area, such as churches, schools, hospitals, offices and places of businesses;

v. vi. Provision for advance briefing of affected and responsible persons within the radius of exposure. Such advance briefing shall include the hazards and characteristics of hydrogen sulfide, the necessity for a hydrogen sulfide  $n H_2S$  contingency plan, the possible sources of hydrogen sulfide within the radius of exposure, instructions for reporting a gas leak, the manner in which persons will be notified in the event of an emergency and steps to be taken in an emergency; and

vi. vii. In lieu of the provision for advance briefing of persons within the radius of exposure described in the previous subsubparagraph, a reaction-type plan may be prepared and submitted that provides for mass notification of a release of hydrogen sulfide and for evacuation of affected areas where the operator can demonstrate that the risk to public safety is minimal such as in remote locations, a simplified a reaction type plan may be prepared and submitted that provides for mass notification of a hydrogen sulfide leak and for an evacuation of affected areas; and

vii. viii. Additional support information, if applicable, such as the location of emergency evacuation routes, the location of safety and life-support equipment, the location of facilities containing hydrogen sulfide, the location of nearby telephones or other means of communication and special instructions for conditions at a particular installation such as local terrain and the effect of various weather conditions.

d. Additional Requirements. The division may impose additional requirements or modify requirements based on site-specific conditions, population density or special circumstances.

5. Submission. The hydrogen sulfide contingency plan shall be submitted to the division and a copy shall be submitted to the local emergency planning committee, if one exists. A hydrogen sulfide contingency plan for a well, system or operation existing on the effective date of this section shall be submitted within 180 days from the effective date of this section. A hydrogen sulfide contingency plan for a new well, system or operation shall be submitted before operations commence. A hydrogen sulfide contingency plan shall be submitted within 180 days if a public area or public road is established that creates a potentially hazardous volume where none previously existed. For subsection G facilities. H<sub>2</sub>S shall be submitted to the division electronically in a form that is compatible with the division's systems and to the local emergency planning committee. no later than 180 days following submission of the radiu of exposure required in Subsection D of this Section For subsection F operations and shall be submitted the division's systems before commencement of operations. The hydrogen sulfide H<sub>2</sub>S contingency plan for a drilling, completion, workover or well servicing operation may be submitted separately or along with the application for permit to drill (APD).
 6. Failure to Submit Plan. Failure to submit a hydrogen sulfide n H<sub>2</sub>S contingency plan for a mathematical of an application for permit to drill that well, cancellation of an allowable or other appropriate enforcement action. sulfide contingency plan for a well, system or operation existing on the effective date of this section shall be submitted within 180 days from the effective date of this section. A hydrogen sulfide contingency plan for a new well, system or operation shall be submitted before operations commence. A hydrogen sulfide Add Max's and to the local emergency planning committee. no later than 180 days following submission of the radius 1.74 of exposure required in Subsection D of this Section For subsection F operations and shall be submitted to the division electronically in a generally accepted electronic format that is compatible with the division's systems before commencement of operations. The hydrogen sulfide  $H_2S$  contingency plan for a drilling.

6. Failure to Submit Plan. Failure to submit a hydrogen sulfide  $n H_2S$  contingency plan allowable or other appropriate enforcement action.

7. Annual Review, Amendment. The person, operator or facility shall review the <u>hydrogen sulfide  $H_2S$  contingency plan on an annual basis, or more frequently if activation of a plan</u> reveals a deficiency or, if changes to processes, concentrations of hydrogen sulfide or other circumstances occur, or if a new public area and/or a new public road is established that creates a potentially hazardous volume. The person, operator or facility shall submit any amendments to the division electronically in a form that is compatible with the division's systems and to the local emergency planning committee. Reasonable efforts shall be taken to update on an annual basis the lists of names and telephone numbers in the hydrogen sulfide contingency plan designated in E.4.c.v. within the 100 ppm radius of exposure.

8. Retention and Inspection. A The hydrogen sulfide  $n H_2S$  contingency plan shall be reasonably accessible in the event of a release and maintained on file at all times and shall be available for inspection by the division.

9. Activation Levels. The  $H_2S$  contingency plan shall be activated in the event of a release a potentially hazardous volume of  $H_2S$  above the respective thresholds (i.e. 500 ppm radius at any public road, 100 ppm radius at any public area, etc.) or if a sustained concentration of  $H_2S$  exceeds 50 ppm at the facility boundary of any facility, well or operation.

F. Signage at Wells, Facilities or Operations. For every well, operation or system to which this section applies that contains a concentration of hydrogen sulfide of 100 ppm or greater, the person, operator or facility must provide signage as set forth herein.

1. Drilling, Completion, Workover, and Well Servicing Operations. A danger or caution sign shall be displayed at each drilling, completion, workover and well servicing operation along each point of access to the site. The signs shall read "DANGER - POISON GAS, HYDROGEN SULFIDE PRESENT" or, as appropriate, "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or use equivalent language approved by the division, and shall state in smaller lettering: "Do Not Approach If Red Flag is Flying" or use equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration, or in another color approved by the division. The signs shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 500 feet from the well site and at a location that allows vehicles to turn around at a safe distance prior to reaching the site.

2. Crude Oil Pump Stations, Producing Wells, Tank Batteries and Associated Production Facilities, Refineries, Gas Plants and Compressor Stations. A danger sign or signs shall be posted within 50 feet of each crude oil pump station, producing well, tank battery and associated production facility, refinery, gas plant and compressor station to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gates shall suffice. The signs shall read "DANGER - POISON GAS -HYDROGEN SULFIDE PRESENT," or, as appropriate, "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or use equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration, or in another color approved by the division. The signs shall be legible and large enough to be read by all persons entering the site. A sign shall be placed at each point where a flow line or gathering line crosses a public road; each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

3. Tanks or Vessels. A danger sign or signs shall be posted on or within 50 feet of any storage tank to alert persons of the potential hydrogen sulfide danger. For any storage tank for which fencing is required, a danger sign posted at the locked gates shall suffice. The signs shall read "DANGER - POISON GAS - HYDROGEN SULFIDE PRESENT," or, as appropriate "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT," or equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration or another color approved by the division. The sign(s) shall be legible and large enough to be read by all persons entering the site.

<u>G.</u> F. Protection from Hydrogen Sulfide During Drilling, <u>Completion</u>, Workover, and <u>Well</u> Servicing Operations.

1. API Standards. All drilling, completion, workover and well servicing operations where it is reasonably expected that a potentially hazardous volume of hydrogen sulfide will be encountered shall be conducted with due consideration to the guidelines published by the API entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Safe Drilling and Well Servicing Operations Involving of Wells Containing Hydrogen Sulfide," RP-49, most recent edition.

2. Minimum Standards. At a minimum, and possibly in addition to the foregoing API standards, each drilling, completion, workover and well servicing operation where a potentially hazardous volume of hydrogen sulfide may reasonably be expected to be encountered shall also be conducted in accordance with the following:

a. Before Commencing Operations. The person, operator or facility shall complete an H<sub>2</sub>S contingency plan, where required, before commencement of operations. In addition,

Hydrogen sulfide training shall be completed and all related safety equipment and warning systems shall be operational before commencement of operations. Detection and monitoring equipment is not required for drilling from the surface to within 500 feet of the zone anticipated to contain hydrogen sulfide.

b. Egress Routes. The person, operator or facility shall maintain passable egress routes at all times during operations.

c. Safety, Detection and Monitoring Equipment. The person, operator or facility shall provide hydrogen sulfide detection and monitoring equipment as follows:

i. Each drilling and completion site shall have a hydrogen sulfide detection and monitoring system that automatically activates visible and audible alarms when the ambient air concentration of hydrogen sulfide reaches 20 ppm. There shall be a sensing point 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.

ii. The detection system shall be calibrated <u>and</u> tested and the results recorded monthly. Each test of the hydrogen sulfide monitoring system shall be recorded on the driller's log or its equivalent.

iii. For workover and well servicing operations, one operational sensing point shall be located as close to the well bore as practical. Additional sensing points may be necessary for large or long-term operations.

iv. Hydrogen sulfide detection<del>, safety</del> and monitoring equipment must be provided and the prescribed safety equipment must be made operational during drilling when drilling is within 500 feet of <u>a the</u> zone anticipated to contain hydrogen sulfide and continuously thereafter through all subsequent drilling.

d. Wind Indicators and Signs.

i. Equipment to indicate wind direction shall be present and visible at all times. At least two devices to indicate wind direction shall be installed at separate elevations and visible from all principal working areas at all times.

ii.—Danger or caution signs shall be displayed along all accesses to the site. The signs shall read "DANGER—POISON GAS, HYDROGEN SULFIDE PRESENT" or, as appropriate, "CAUTION—POISON GAS—HYDROGEN SULFIDE MAY BE PRESENT" or <u>use</u> equivalent language approved by the division, and <u>shall state</u> in smaller lettering: "Do Not Approach If Red Flag is Flying" or <u>use</u> equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration, or in another color approved by the division. The signs shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 500 feet from the well site and at a location <u>that</u> which allows vehicles to turn around at a safe distance prior to reaching the site.

iii. When a sustained concentration of hydrogen sulfide is detected in excess of 20 ppm at any detection point, red flags shall be displayed.

e. b. Flare System. For drilling and completion operations, the person, operator or facility shall install a flare system to safely gather and burn hydrogen sulfide-bearing gas, unless exempted pursuant to Subsection J. Flare outlets shall be located at least 150 feet from as far from the well bore as feasible but not less than 150 feet from the well. Flare lines shall be as straight as practical. The flare system shall be equipped with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall be provided supplemental fuel to maintain ignition.

<u>f.</u> e. <u>Use of Well Control Equipment</u>. Remote Controlled Choke. When a potentially hazardous volume of  $H_2S$  may be present in any public area, the following measures shall be taken:

i. <u>Drilling</u>. The person, operator or facility shall install A remote controlled choke and accumulator shall be installed and operational at all times beginning when drilling is within 500 feet of the formation believed to contain hydrogen sulfide and continuously thereafter during drilling and during completion, workover and well servicing operations when the 100-ppm H<sub>2</sub>S radius of exposure includes a public area.., unless exempted pursuant to Subsection J; <u>The</u> remote controlled

choke or remote controlled valve that <u>must</u> include, at a minimum, a pressure and hydrogen sulfide-rated well control choke and kill system including manifold and blowout preventer <u>that meets or exceeds the</u> <u>pursuant to</u> specifications API-16C and API-RP 53 or other specifications approved by the division. The blowout preventer stack shall have at least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced, according to the requirements of this part, or otherwise as approved by the division. or other division rules, if more stringent. Variations to blowout preventer stack arrangements may be granted by the division for good cause shown.

ii. <u>Completion, Workover and Well Servicing</u>. If feasible, the equipment described in the previous subsubparagraph shall be installed and operational at all times during completion, workover and well servicing of a well and during completion and well servicing operations when the 100 ppm H<sub>2</sub>S radius of exposure includes a public area. If not feasible, unless exempted pursuant to Subsection J; For completion or workover operations, the person, operator or facility may install a suitable alternative to a remote choke <u>such as (i.e.</u> a remote-controlled valve <u>or</u> blow out preventer with remote accumulator <u>may be used</u>, so long as the alternative equipment will be protective of public safety. , etc. may be used); and

iii. For drilling operations, the person, operator or facility shall install a remote controlled choke or remote controlled valve that includes, at a minimum, a pressure and hydrogen sulfide-rated well control choke and kill system including manifold and blowout preventer pursuant to specifications API-16C and API-RP 53. The blowout preventer stack shall have at least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced or other division rules, if more stringent. Variations to blowout preventer stack arrangements may be granted by the division for good cause shown.

<u>g. d.</u> Mud Program. A mud program, including de-gassing and flaring, capable of handling <u>hydrogen sulfide  $H_2S$ -conditions and well control shall be used.</u>

<u>h. e.</u> Well Testing. Except with prior approval by the division, the drill-stem testing of a zone that contains hydrogen sulfide shall be closed chamber only, in that conducted only during daylight hours and formation fluids shall not be permitted to flow to the surface. (closed chamber only). An operator shall notify the division (24) hours in advance of a drill-stem test if an  $H_2S$  contingency plan is required pursuant to this section.

<u>3.</u> e. If Hydrogen Sulfide Encountered During Operations.

a. If hydrogen sulfide was not anticipated at the time the division issued a permit to drill approved the APD but is encountered during drilling in a concentration excess of 100 ppm or greater in the gaseous mixture, the operator shall immediately ensure control of the well, suspend drilling operations unless detrimental to well control, take whatever measures are necessary under the circumstances to assure public safety, and obtain materials and safety equipment to bring the operations into compliance with this section, calculate the radius of exposure and, if a potentially hazardous volume is present, prepare a hydrogen sulfide contingency plan and obtain materials and equipment to bring operations into compliance with this section. The operator shall notify the division of the event and the mitigating steps that have or are being taken as soon as possible, but no later than 24 hours following discovery.

<u>— 3. Operating Practices In Hydrogen Sulfide Concentrations of 100 ppm or Greater.</u> Operating practices in areas known to contain a concentration of hydrogen sulfide gas of 100 ppm or greater in the gaseous mixture shall be subject to the following requirements:

<u>b.</u> a. If Hydrogen Sulfide Is Encountered During Use of Air, Gas, Mist or Other Non-Mud Circulating Media. If hydrogen sulfide gas in excess of 100 ppm is encountered while drilling with air, gas, mist or other non-mud circulating mediums for 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. An alternate drilling method may be used <u>if specifically approved by the division after the</u> Division specifically approves encountering hydrogen sulfide in excess of 100 ppm, but only if the alternative method. <u>H.</u> G. Protection from Hydrogen Sulfide at Crude Oil Pump Stations, Producing Wells, Tank Batteries and Associated Production Facilities, Refineries, Gas Plants and Compressor Stations.

1. API Standards. Operations at crude oil pump stations and producing wells, tank batteries and associated production facilities, refineries, gas plants and compressor stations containing a potentially hazardous volume of hydrogen sulfide shall be conducted with due consideration according to the guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

2. Minimum Standards. At a minimum, <u>operations at production from</u> crude oil pump stations and producing wells, tank batteries and associated production facilities, <u>refineries</u>, <u>gas plants and</u> <u>compressor stations containing a potentially hazardous volume of hydrogen sulfide</u> shall also be conducted in accordance with the following subparagraphs and subsubparagraphs. Where API standards referred to in the previous paragraph are less stringent than the following, the more stringent standards shall apply.

a. Gaseous Mixtures Containing 100 ppm or more. Producing wells containing 100 ppm or more of hydrogen sulfide in the gaseous mixture, crude oil pump stations, tank batteries and associated production facilities, refineries, gas plants and compressor stations, shall be subject to the following:

i.  $H_2S$  Contingency Plan. If a potentially hazardous volume of  $H_2S$  exists, an  $H_2S$  contingency plan shall be required.

a. ii. Signage. A danger sign or signs shall be posted within 50 feet of each facility to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gates shall suffice. The signs shall read "DANGER – POISON GAS – HYDROGEN SULFIDE PRESENT," or, as appropriate, "CAUTION – POISON GAS – HYDROGEN SULFIDE MAY BE PRESENT" or use equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1–1967 or regulations of the federal occupational safety and health administration, or in another color approved by the division. The signs shall be legible and large enough to be read by all persons entering the well site. A sign shall be placed at each point where a flow line or gathering line crosses a public road within the area of exposure. Each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

iii. Fencing. Fencing and gates shall be required when crude oil pump stations and producing wells, tank batteries and associated production facilities are located in a public area or within a-1/4 mile of a <u>building or structure used as a dwelling, office, place of business, church, school, hospital or government building or within 1/4 mile of a residence, school, church, park, playground or school bus stop or place of business. The fence shall consist of a 5-foot chain link topped by two stands of barbed wire or other design approved by the division. Gates shall be locked when unattended.</u>

<u>b.</u> iv. Wind Direction Indicators. Wind direction indicators shall be required where the  $H_2S$  concentration in a gaseous state exceeds 100 PPM.

<u>c.</u> v. Secondary Well Control. <u>Any well where the 100 ppm H<sub>2</sub>S radius of</u> exposure incorporates a public area shall possess a secondary means of immediate well control through the use of appropriate christmas tree or downhole completion equipment. Such equipment shall allow downhole accessibility (reentry) under pressure for permanent well control operations.

<u>d. vi.</u> Automatic Safety Valve or Shutdown. <u>Any well If the 100-ppm radius of</u> <u>exposure involves a public area, the person, operator or facility shall possess install an automatic safety</u> valve or shutdown at the facility or wellhead or <del>shall install</del> other appropriate shut-in control. The automatic safety valve shall be set to activate upon a release of a <del>potentially hazardous</del> volume of hydrogen sulfide <u>that may create a concentration of hydrogen sulfide of 100 ppm in any public area, 500</u> ppm at any public road or 100 ppm 3,000 feet from the site of release.

<u>3. b.</u> Tanks or vessels containing 300 ppm or more of hydrogen sulfide. Each stair or ladder leading to the top of any tank or vessel containing 300 ppm or more of hydrogen sulfide in the gaseous mixture shall be subject to the following additional requirements:

<u>a. i. Each stair or ladder leading to the top of any storage tank shall</u> be chained or marked to restrict entry. For Any tank <u>or tank</u> battery that requires fencing pursuant to this section <u>may</u> substitute a danger sign posted at the gates may be substituted for chaining and signs.

ii. The person, operator or facility shall post a danger sign on or within 50 feet of any storage tank to alert persons of the potential hydrogen sulfide danger. For any storage tank for which fencing is required, a danger sign posted at the locked gates shall suffice. The signs shall read "DANGER -POISON GAS – HYDROGEN SULFIDE PRESENT," or, as appropriate "CAUTION - POISON GAS – HYDROGEN SULFIDE MAY BE PRESENT," or equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration <u>or another color approved by the division</u>. The sign(s) shall be legible and large enough to be read by all persons entering the site.

<u>4.</u> Compliance Schedule. Each existing crude oil pump station and producing well, tank battery and associated production facility, refinery, gas plant and compressor station not currently meeting the requirements and minimum standards set forth herein shall be brought into compliance within one year of the effective date of this section except that contingency plans shall be submitted within 180 days. Each crude oil pump station and producing well, tank battery and associated production facility constructed following the effective date of this section shall be designed, constructed and operated to meet the requirements set forth herein.

<u>I. H.</u> Personnel Protection and Training. All persons responsible for the implementation of any <u>hydrogen sulfide  $H_2S$  contingency plan shall be provided training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.</u>

<u>J. I.</u> Standards for Equipment That May Be Exposed to Hydrogen Sulfide. Persons, operators and facilities shall choose equipment with consideration for both the <u>hydrogen sulfide  $H_2S$ </u> working environment and anticipated stresses. NACE Standard MR0175 (latest edition) or some other standard <u>approved by the division</u> shall be used for selection of metallic equipment or, if applicable, adequate protection by chemical inhibition or other methods that control or limits the corrosive effects of <u>hydrogen sulfide  $H_2S$ </u> shall be used.

<u>K.</u> J. Exemptions. <u>Any person, operator or facility may petition the director for an exemption</u> to <u>any certain</u> requirements of this section may be granted by petitioning the director. Any such petition shall provide specific information as to the circumstances that warrant approval of the exemption requested and how the public safety will be protected. <u>Submission of</u> A safety plan required by other governmental agencies may accompany the petition for exemption. The director, after considering all relevant factors, may approve an exemption if the circumstances warrant an exemption.

L. K. Release. Upon a release of hydrogen sulfide the following actions must be taken:

1. Activation of the <u>Hydrogen Sulfide H<sub>2</sub>S</u> Contingency Plan. The person, operator or facility shall activate the H<sub>2</sub>S contingency plan immediately upon an H<sub>2</sub>S release where the potential exists for exposure to The <u>hydrogen sulfide H<sub>2</sub>S</u> contingency plan shall be activated in the event of a release that may create a concentration of hydrogen sulfide of 100 ppm in any public area, 500 ppm at any public road or 100 ppm 3,000 feet from the site of release.

2. Notification of the Division. The person, operator or facility shall notify the division upon a release of hydrogen sulfide requiring activation of the <u>hydrogen sulfide H<sub>2</sub>S</u>-contingency plan, as soon as practicable, preferably within one hour of discovery of the release, <u>but or</u> as soon as possible in cases where prompt response should supercede notification. The person, operator or facility shall submit a full report of the incident to the division on Form C-141 no later than fifteen (15) days following the release.

<u>M. Electronic Submission. Any submission to the division required by this section shall be made</u> electronically in a generally accepted format that is compatible with the division's systems.

<u>N. L.</u> Corrective Actions. The division may require corrective actions if necessary to maintain control of a well or any other facility or to safeguard public safety.

#### 19.15.2.52 Hydrogen Sulfide Gas (Hydrogen Sulfide)

A. In General. Hydrogen sulfide gas (known by its chemical abbreviation " $H_2S$ " or as "sulfurated hydrogen" or "hydrosulfuric acid") is a flammable, poisonous gas that may occur naturally as a component of crude petroleum and natural gas. The gas has a distinct and characteristic odor of rotten eggs but due to olfactory fatigue may not be sensed by the human sense of smell.

B. <u>Applicability Scope</u>. This Section provides for public safety in areas where hydrogen sulfide gas (H<sub>2</sub>S) may exists in concentrations greater than 100 ppm or in a potentially hazardous volume. This section applies to any person, operator or facility subject to the jurisdiction of the Division, including, but not limited to, any person, operator or facility engaged in drilling, stimulating, injecting into, completing, working over or producing any oil, natural gas or carbon dioxide well or any person, operator or facility engaged in gathering, transporting, storing, processing or refining of crude oil, natural gas or carbon dioxide. This section shall not act to exempt or otherwise excuse Exempt from this rule are surface waste management facilities permitted by the division pursuant to 19 NMAC 15.I.711 from more stringent conditions existing in permits issued thereunder, nor shall such facilities be exempt or otherwise excused from the requirements set forth in this section by virtue of permitting under 19 NMAC 15.I.711.

C. Definitions (specific to this section).

1. ANSI. The acronym "ANSI" means the american national standards institute.

2. API. The acronym "API" means the american petroleum institute.

<u>3. Area of Exposure. The phrase "area of exposure" means the area within a circle</u> constructed with the point of escape at its center and the radius of exposure as its radius.

<u>4.</u> <u>3.</u> ASTM. The acronym "ASTM" means the american society for testing and materials.

5.4. Dispersion Technique. A "dispersion technique" is a mathematical representation of the physical and chemical transportation characteristics, dilution characteristics and transformation characteristics of hydrogen sulfide gas in the atmosphere.

<u>6.</u> 5. Escape Rate. The "escape rate" is the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing hydrogen sulfide. The escape rate is calculated using the maximum daily rate of the gaseous mixture produced or the best estimate thereof. For a natural gas well, the escape rate shall be calculated by using the current daily absolute open flow rate against atmospheric pressure or the best estimate of that rate. For an oil well, the escape rate shall be calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or <u>the</u> best estimate thereof. For an oil or natural gas well drilled in a developed area, the escape rate may be determined by using <u>data from</u> offset wells completed in the interval in question, or using some other reasonable means to calculate the escape rate. For wildcat wells, subparagraph C.13.d shall apply. For facilities or operations not mentioned, the escape rate shall be calculated using the actual flow of <u>the</u> gaseous mixture through the facility or operation.

7. 6. GPA. The acronym "GPA" means the gas processors association.

<u>8.</u> <del>7.</del> LEPC. The acronym "LEPC" means the local emergency planning committee established pursuant to the emergency planning and community right-to-know act, 42 U.S. C. § 11001.

<u>9.</u> 8. NACE. The acronym "NACE" refers to the national association of corrosion

10. 9. PPM. The acronym "ppm" means "parts per million" by volume.

<u>11.</u> 10. Potentially Hazardous Volume (hereinafter referred to as a "potentially hazardous volume" or by the acronym "PHV") means the volume of hydrogen sulfide gas of such concentration that:

a. the 100-ppm radius of exposure includes any public area as defined herein;

b. the 500-ppm radius of exposure includes any public road

as defined herein; or

engineers.

c. the 100-ppm radius of exposure is equal to or in excess of 3,000 feet.

<u>12.</u> 11. Public Area. A "public area" is any <u>building or structure that is not associated</u> with the well, operation or system for which the radius of exposure is being calculated and that is used as <u>a</u> dwelling, office, place of business, church, school, hospital, school bus stop, or government building, or any portion of a park, city, town, village or school bus stop or other similar area where members of the public may reasonably be expected to be present.

<u>13.</u> <u>12.</u> Public Road. A "public road" is any federal, state, municipal or county road or highway or postal route.

<u>14.</u> 13. Radius of Exposure. The radius of exposure (hereinafter referred to as "radius of exposure" or "ROE") is <u>that radius constructed with the an-imaginary circle constructed around a</u> point of escape <u>as its starting point and its length the radius of which is</u> calculated using the following Pasquill-Gifford derived equation, or by such other method as may be approved by the division:

a. For determining the 100-ppm radius of exposure:  $X = [(1.589)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ , where "X" is the radius of exposure in feet, the "hydrogen sulfide concentration" is the decimal equivalent of the mole or volume fraction of hydrogen sulfide in the gaseous mixture, and "Q" is the escape rate expressed in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

b. For determining the 500-ppm radius of exposure:  $X=[(0.4546)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ , where "X" is the radius of exposure in feet, the "hydrogen sulfide concentration" is the decimal equivalent of the mole or volume fraction of hydrogen sulfide in the gaseous mixture, and "Q" is the escape rate expressed in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

c. Where multiple sources of hydrogen sulfide are present (e.g. wells, treatment equipment, flow lines, etc.), the radius of exposure may encompass a larger area than would otherwise be calculated using a radius of exposure computation for each component part.

<u>c. d.</u> For a well being drilled, <u>completed</u>, <u>recompleted</u>, <u>worked over or serviced</u> in an area where insufficient data <u>exists</u> to calculate a radius of exposure but where hydrogen sulfide could reasonably be expected to be present in concentrations in excess of 100 ppm in the gaseous mixture, a 100-ppm radius of exposure equal to 3,000 feet shall be assumed.

D. Determination of Hydrogen Sulfide Risk.

<del>or</del>

1. Determination of Hydrogen Sulfide Concentration.

a. Each person, operator or facility to which this section applies shall determine the hydrogen sulfide concentration within each of its <u>wells</u>, operations or systems. A representative sample or <del>previous</del> process knowledge <del>for each system or operation</del> may be used <u>in lieu of individual for</u> testing <u>of wells</u>, <u>operations or systems</u> provided that the person, operator or facility can demonstrate that the concentration derived from <u>a test or process knowledge of</u> the representative sample <u>or process</u> <u>knowledge</u> is reasonably representative of the hydrogen sulfide concentration within the <u>well</u>, operation<sub>3</sub> <del>pool</del> or system.

b. The tests <u>used to make the determination</u> referred to in the previous subparagraph shall be conducted in accordance with applicable ASTM or GPA standards or by other methods approved by the division.

c. If a representative sample from a <u>well</u>, <u>operation or</u> system was tested within one (1) year of the effective date of this section, new testing shall not be required; provided, however, new testing shall not be required for a producing well that was tested at any time prior to the effective date of this section.

d. The Division may disapprove the test methodology and require additional testing if the testing methodology did not conform to the requirements of this Section.

2. Tested Concentrations Below 100 ppm. If the testing described in the previous paragraph determines that the concentration of hydrogen sulfide concentration in a given well, operation or system is less than 100 ppm, no further actions shall be are required pursuant to this section.

3. Tested Concentrations Above 100 ppm; Calculation of the Radius of Exposure.

a. If the testing described in paragraph 1 of this subsection determines that the concentration of hydrogen sulfide in a given well, operation or system gaseous mixture is 100 ppm or greater, then the person, operator or facility must calculate the radius of exposure pursuant to this section.

b. If calculation of the radius of exposure reveals that a potentially hazardous volume <u>is may be</u> present, the person, operator or facility shall provide the results of the <u>determination of</u> <u>the hydrogen sulfide concentration and the calculation of the testing and the resulting</u> radius of exposure determinations to the division <u>electronically</u> in a generally accepted electronic format that is compatible with the division's systems. For a well, operation or system existing on the effective date of this section, the determination, calculation and submission required herein shall be accomplished before commencing operations or, for existing facilities, within 180 days of the effective date of this section; for any well, <u>operation or system</u> that commences operations after the effective date of this section, the determination, <u>calculation and submission required herein shall be accomplished before operations</u>. Operators may petition the Division for an extension of the submission date, or for an exception to the electronic submission requirement pursuant to subsection.

4. Recalculation. The person, operator or facility shall calculate or recalculate the radius of exposure if an operational change or production alterations are made then recalculations may be made causes the hydrogen sulfide concentration in a well, operation or system to increase to 100 ppm or greater or, if the hydrogen sulfide concentration in a well, operation or system was already 100 ppm or greater, causes a 25% or greater increase in the actual volume fraction of hydrogen sulfide. If calculation or recalculation of the radius of exposure reveals that a potentially hazardous volume is present, the person, operator or facility shall provide the results to the division within thirty (30) days, application of generally accepted engineering principles and generally accepted operating practices. If recalculations indicate that a hydrogen sulfide H2S concentration has become greater than 100 ppm a 25% or greater increase in the actual volume fraction of hydrogen sulfide has occurred; in a given operation or facility, the person, operator or facility shall recalculate the radius of exposure and, the ROE reveals that a PHV may be present submit the results to the division electronically in a generally accepted electronic format that is compatible with the division's systems.

E. <u>Hydrogen Sulfide H<sub>2</sub>S</u> Contingency Plan.

1. In General. A <u>hydrogen sulfide  $n H_2S$ </u> contingency plan is a written document that provides a plan of action that will be used to alert and protect persons at risk in the event of a potentially significant release of hydrogen sulfide gas. The <u>hydrogen sulfide contingency plan</u> must be developed in accordance with the following paragraphs.

2. When Required. A <u>hydrogen sulfide  $n H_2S$  contingency plan must be prepared</u> whenever a potentially hazardous volume of hydrogen sulfide <u>is may be</u> present <u>or may reasonably</u> <u>expected to be encountered</u>.

3. Input of Emergency Response Authorities and the Division. The person, operator or facility shall develop a proposed hydrogen sulfide contingency plan and provide a copy to coordinate the proposed H<sub>2</sub>S contingency plan with the division, the New Mexico department of public safety (*i.e.*, the New Mexico state police), and the local emergency planning committee. If the potential source of release is within a municipality, a copy shall be provided to the municipal police and fire department. If the potential source of the release is outside the boundaries of a municipality, a copy shall instead be provided to as appropriate, the county sheriff and the city or municipal police, and/or police and county fire department or departments. Input on the proposed plan shall be sought from each of the foregoing; if an emergency response authority provided with a copy of the proposed plan fails to provide input or fails to respond at all, that fact shall be stated in the final hydrogen sulfide contingency plan submitted to the division. The input provided by the emergency response authorities shall be considered when preparing the final plan for submission to the division but failure to include any specific suggestion shall not affect the validity of the plan or cause disapproval of the plan by the division. A statement in the contingency plan indicating which agencies have been notified shall suffice as proof of coordination.

4. Elements.

a. Elements Required for Each Plan:

i. A detailed description of each action to be taken in the event of a release of a potentially hazardous volume of hydrogen sulfide requiring activation shall be included in each hydrogen sulfide contingency plan, including an immediate action plan that provisions for alerting and accounting for personnel, controlling any release of hydrogen sulfide gas, eliminating possible ignition sources, alerting the public (directly or through appropriate government agencies), evacuating persons in the affected area, using the call list to alert company officials and emergency response authorities, making recommendations to public officials to block access to affected areas and conducting evacuations and coordinating emergency response with emergency response authorities. A plan that addresses the items described in paragraph 7.6 of the guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, most recent edition, shall be adequate for this purpose;

ii. A call list including the following as applicable:

- aa. local supervisory personnel;
- bb. county sheriff;

cc. the department of public safety and state police;

dd. city or municipal police;

ee. the appropriate division district office; and

ff. other public agencies as appropriate;

iii. A plat or map detailing the area within the radius of exposure of a potentially hazardous volume; and

iv. A list of the names and telephone numbers of all personnel to be contacted when a release is reported or suspected.

b. Where the 500-ppm radius of exposure encompasses any public road, the person, operator or facility shall include the following additional elements in the <u>hydrogen sulfide</u>  $H_2S$  contingency plan:

i. Instructions and procedures for alerting and coordinating <u>emergency</u> <u>response to a release with emergency response authorities in the event of a release of a potentially</u> hazardous volume of hydrogen sulfide at any public road;

ii. A plat or map detailing the area of exposure, including the locations of public roads within the radius of exposure of a potentially hazardous volume; and

<u>ii.</u> <u>iii.</u> A plan to divert traffic and safely get existing traffic off the road and out of danger.

c. Where the 100-ppm radius of exposure encompasses any public area, the following additional elements shall be included in the hydrogen sulfide  $H_{2S}$  contingency plan:

i. Detailed plans of action to alert and protect persons in the event of a release of a potentially hazardous volume of hydrogen sulfide, including instructions and procedures for alerting persons at risk and emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide;

ii. A call list including all the persons set forth in Sub subparagraph E(4)(a)(ii), above, and the following:

- aa. ambulance services;
- bb. hospitals;
- cc. county and city fire departments;
- dd. doctors;

ee. contractors for supplemental or emergency equipment; and

ff. other public agencies as appropriate;

<u>ii.</u> <u>iii.</u> A statement describing how emergency response actions will be coordinated with the division and the New Mexico state police, consistent with the New Mexico hazardous materials emergency response plan (HMER);

<u>iii.</u> iv. A plat or map detailing the area of exposure, including the locations of <u>public areas and private dwellings or residences</u>, <u>public facilities such as schools</u>, <u>businesses</u>,

public roads or other similar areas where the public may be reasonably expected to be present within the radius of exposure;

<u>iv.</u>  $\mathbf{v}$ . The names and telephone numbers of all persons living within the <u>area of exposure radius of exposure of 100 ppm hydrogen sulfide</u> and contact persons for <u>areas of public</u> <u>concentration each public area</u>, such as churches, schools, <u>hospitals</u>, <u>offices</u> and <u>places of</u> businesses;

v. vi. Provision for advance briefing of affected and responsible persons within the radius of exposure. Such advance briefing shall include the hazards and characteristics of hydrogen sulfide, the necessity for a hydrogen sulfide n H<sub>2</sub>S contingency plan, the possible sources of hydrogen sulfide within the radius of exposure, instructions for reporting a gas leak, the manner in which persons will be notified in the event of an emergency and steps to be taken in an emergency; and vi. vii. In lieu of the provision for advance briefing of persons within the

radius of exposure described in the previous subsubparagraph, a reaction-type plan may be prepared and submitted that provides for mass notification of a release of hydrogen sulfide and for evacuation of a affected areas where the operator can demonstrate that the risk to public safety is minimal such as in remote locations, a simplified a reaction-type plan may be prepared and submitted that provides for mass notification of a hydrogen sulfide leak and for an evacuation of affected areas; and

<u>vii.</u> viii. Additional support information, if applicable, such as the location of emergency evacuation routes, the location of safety and life-support equipment, the location of facilities <u>containing hydrogen sulfide</u>, the location of nearby telephones or other means of communication and special instructions for conditions at a particular installation such as local terrain and the effect of various weather conditions.

d. Additional Requirements. The division may impose additional requirements or modify requirements based on site-specific conditions, population density or special circumstances.

5. Submission. The hydrogen sulfide contingency plan shall be submitted to the division and a copy shall be submitted to the local emergency planning committee, if one exists. A hydrogen sulfide contingency plan for a well, system or operation existing on the effective date of this section shall be submitted within 180 days from the effective date of this section. A hydrogen sulfide contingency plan for a new well, system or operation shall be submitted before operations commence. A hydrogen sulfide contingency plan shall be submitted within 180 days if a public area or public road is established that creates a potentially hazardous volume where none previously existed. For subsection G facilities. H<sub>2</sub>S shall be submitted to the division electronically in a form that is compatible with the division's systems and to the local emergency planning committee, no later than 180 days following submission of the radius of exposure required in Subsection D of this Section For subsection F operations and shall be submitted to the division electronically accepted electronic format that is compatible with the division's systems before commencement of operations. The hydrogen sulfide H<sub>2</sub>S contingency plan for a drilling, completion, workover or well servicing operation may be submitted separately or along with the application for permit to drill (APD).

6. Failure to Submit Plan. Failure to submit a <u>hydrogen sulfide  $n H_2S$ </u> contingency plan when required may result in denial of an application for permit to drill that well, cancellation of an allowable or other appropriate enforcement action.

7. Annual Review, Amendment. The person, operator or facility shall review the hydrogen sulfide  $H_2S$  contingency plan on an annual basis, or more frequently if activation of a plan reveals a deficiency  $\sigma_{r_3}$  if changes to processes, concentrations of hydrogen sulfide or other circumstances occur, or if a new public area and/or a new public road is established that creates a potentially hazardous volume. The person, operator or facility shall submit any amendments to the division electronically in a form that is compatible with the division's systems and to the local emergency planning committee. Reasonable efforts shall be taken to update on an annual basis the lists of names and telephone numbers in the hydrogen sulfide contingency plan designated in E.4.c.v.within the 100 ppm radius of exposure.

8. Retention and Inspection. A <u>The hydrogen sulfide  $n H_2S$ </u> contingency plan shall be reasonably accessible in the event of a release and maintained on file at all times and shall be available for inspection by the division.

9. Activation Levels. The  $H_2S$  contingency plan shall be activated in the event of a release a potentially hazardous volume of  $H_2S$  above the respective thresholds (i.e. 500 ppm radius at any public road, 100 ppm radius at any public area, etc.) or if a sustained concentration of  $H_2S$  exceeds 50 ppm at the facility boundary of any facility, well or operation.

F. Signage at Wells, Facilities or Operations. For every well, operation or system to which this section applies that contains a concentration of hydrogen sulfide of 100 ppm or greater, the person, operator or facility must provide signage as set forth herein.

1. Drilling, Completion, Workover, and Well Servicing Operations. A danger or caution sign shall be displayed at each drilling, completion, workover and well servicing operation along each point of access to the site. The signs shall read "DANGER - POISON GAS, HYDROGEN SULFIDE PRESENT" or, as appropriate, "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or use equivalent language approved by the division, and shall state in smaller lettering: "Do Not Approach If Red Flag is Flying" or use equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53,1-1967 or regulations of the federal occupational safety and health administration, or in another color approved by the division. The signs shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 500 feet from the well site and at a location that allows vehicles to turn around at a safe distance prior to reaching the site.

2. Crude Oil Pump Stations, Producing Wells, Tank Batteries and Associated Production Facilities, Refineries, Gas Plants and Compressor Stations. A danger sign or signs shall be posted within 50 feet of each crude oil pump station, producing well, tank battery and associated production facility, refinery, gas plant and compressor station to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gates shall suffice. The signs shall read "DANGER - POISON GAS -HYDROGEN SULFIDE PRESENT," or, as appropriate, "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or use equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration, or in another color approved by the division. The signs shall be legible and large enough to be read by all persons entering the site. A sign shall be placed at each point where a flow line or gathering line crosses a public road; each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

3. Tanks or Vessels. A danger sign or signs shall be posted on or within 50 feet of any storage tank to alert persons of the potential hydrogen sulfide danger. For any storage tank for which fencing is required, a danger sign posted at the locked gates shall suffice. The signs shall read "DANGER - POISON GAS - HYDROGEN SULFIDE PRESENT," or, as appropriate "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT," or equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration or another color approved by the division. The sign(s) shall be legible and large enough to be read by all persons entering the site.

<u>G.</u> F. Protection from Hydrogen Sulfide During Drilling, <u>Completion</u>, Workover, and <u>Well</u> Servicing Operations.

1. API Standards. All drilling, completion, workover and well servicing operations where it is reasonably expected that a potentially hazardous volume of hydrogen sulfide will be encountered shall be conducted with due consideration to the guidelines published by the API entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Safe Drilling and Well Servicing Operations Involving of Wells Containing Hydrogen Sulfide," RP-49, most recent edition.

2. Minimum Standards. At a minimum, and possibly in addition to the foregoing API standards, each drilling, completion, workover and well servicing operation where a potentially hazardous volume of hydrogen sulfide may reasonably be expected to be encountered shall also be conducted in accordance with the following:

a. Before Commencing Operations. The person, operator or facility shall complete an H<sub>2</sub>S contingency plan, where required, before commencement of operations. In addition,

Hydrogen sulfide training shall be completed and all related safety equipment and warning systems shall be operational before commencement of operations. Detection and monitoring equipment is not required for drilling from the surface to within 500 feet of the zone anticipated to contain hydrogen sulfide.

b. Egress Routes. The person, operator or facility shall maintain passable egress routes at all times during operations.

c. Safety, Detection and Monitoring Equipment. The person, operator or facility shall provide hydrogen sulfide detection and monitoring equipment as follows:

i. Each drilling and completion site shall have a hydrogen sulfide detection and monitoring system that automatically activates visible and audible alarms when the ambient air concentration of hydrogen sulfide reaches 20 ppm. There shall be a sensing point 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.

ii. The detection system shall be calibrated <u>and</u> tested and the results recorded monthly. Each test of the hydrogen sulfide monitoring system shall be recorded on the driller's log or its equivalent.

iii. For workover and well servicing operations, one operational sensing point shall be located as close to the well bore as practical. Additional sensing points may be necessary for large or long-term operations.

iv. Hydrogen sulfide detection, safety and monitoring equipment must be provided and the prescribed safety equipment must be made operational during drilling when drilling is within 500 feet of <u>a the</u> zone anticipated to contain hydrogen sulfide and continuously thereafter through all subsequent drilling.

d. Wind Indicators and Signs.

i. Equipment to indicate wind direction shall be present and visible at all times. At least two devices to indicate wind direction shall be installed at separate elevations and visible from all principal working areas at all times.

ii.— Danger or caution signs shall be displayed along all accesses to the site. The signs shall read "DANGER - POISON GAS, HYDROGEN SULFIDE PRESENT" or, as appropriate, "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or use equivalent language approved by the division, and shall state in smaller lettering: "Do Not Approach If Red Flag is Flying" or use equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration, or in another color approved by the division. The signs shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 500 feet from the well site and at a location that which allows vehicles to turn around at a safe distance prior to reaching the site.

iii. When a sustained concentration of hydrogen sulfide is detected in excess of 20 ppm at any detection point, red flags shall be displayed.

<u>e. b.</u> Flare System. For drilling and completion operations, the person, operator or facility shall install a flare system to safely gather and burn hydrogen sulfide-bearing gas, unless exempted pursuant to Subsection J. Flare outlets shall be located at least 150 feet from as far from the well bore as feasible but not less than 150 feet from the well. Flare lines shall be as straight as practical. The flare system shall be equipped with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall be provided supplemental fuel to maintain ignition.

<u>f. c.</u> <u>Use of Well Control Equipment</u>. Remote Controlled Choke: When a potentially hazardous volume of  $H_2S$  may be present in any public area, the following measures shall be taken:

i. <u>Drilling</u>. The person, operator or facility shall install A remote

controlled choke and accumulator shall be installed and operational at all times beginning when drilling is within 500 feet of the formation believed to contain hydrogen sulfide and continuously thereafter during drilling and during completion, workover and well servicing operations when the 100-ppm H<sub>2</sub>S radius of exposure includes a public area.., unless exempted pursuant to Subsection J; The remote controlled choke ør remote controlled valve that <u>must</u> include, at a minimum, a pressure and hydrogen sulfide-rated well control choke and kill system including manifold and blowout preventer <u>that meets or exceeds the</u> <del>pursuant to</del> specifications API-16C and API-RP 53 or other specifications approved by the division. The blowout preventer stack shall have at least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced, <u>according to the requirements of this</u> <u>part, or otherwise as approved by the division</u>. <del>or other division rules, if more stringent</del>. Variations to blowout preventer stack arrangements may be granted by the division for good cause shown.

ii. <u>Completion, Workover and Well Servicing</u>. If feasible, the equipment described in the previous subsubparagraph shall be installed and operational at all times during completion, workover and well servicing of a well and during completion and well servicing operations when the 100 ppm H<sub>2</sub>S radius of exposure includes a public area. If not feasible, unless exempted pursuant to Subsection J; For completion or workover operations, the person, operator or facility may install a suitable alternative to a remote choke such as (i.e. a remote-controlled valve or blow out preventer with remote accumulator may be used, so long as the alternative equipment will be protective of public safety.</u>, etc. may be used); and

iii. For drilling operations, the person, operator or facility shall install a remote controlled choke or remote controlled valve that includes, at a minimum, a pressure and hydrogen sulfide-rated well-control choke and kill system including manifold and blowout preventer pursuant to specifications API-16C and API-RP 53. The blowout preventer stack shall have at least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced or other division rules, if more stringent. Variations to blowout preventer stack arrangements may be granted by the division for good cause shown.

<u>g. d.</u> Mud Program. A mud program, including de-gassing and flaring, capable of handling <u>hydrogen sulfide</u>  $H_2S$ -conditions and well control shall be used.

<u>h. e.</u> Well Testing. Except with prior approval by the division, the drill-stem testing of a zone that contains hydrogen sulfide shall be <u>closed chamber only</u>, in that <u>conducted only</u> during daylight hours and formation fluids shall not be permitted to flow to the surface. (closed chamber only). An operator shall notify the division (24) hours in advance of a drill stem test if an H<sub>2</sub>S contingency plan is required pursuant to this section.

<u>3.</u> e. If Hydrogen Sulfide Encountered During Operations.

a. If hydrogen sulfide was not anticipated at the time the division issued a permit to drill approved the APD but is encountered during drilling in a concentration excess of 100 ppm or greater in the gaseous mixture, the operator shall immediately ensure control of the well, suspend drilling operations unless detrimental to well control, take whatever measures are necessary under the circumstances to assure public safety, and obtain materials and safety equipment to bring the operations into compliance with this section, calculate the radius of exposure and, if a potentially hazardous volume is present, prepare a hydrogen sulfide contingency plan and obtain materials and equipment to bring operations into compliance with this section. The operator shall notify the division of the event and the mitigating steps that have or are being taken as soon as possible, but no later than 24 hours following discovery.

<u>— 3. Operating Practices In Hydrogen Sulfide Concentrations of 100 ppm or Greater.</u> Operating practices in areas known to contain a concentration of hydrogen sulfide gas of 100 ppm or greater in the gaseous mixture shall be subject to the following requirements:

<u>b.</u> a. If Hydrogen Sulfide Is Encountered During Use of Air, Gas, Mist or Other Non-Mud Circulating Media. If hydrogen sulfide gas in excess of 100 ppm is encountered while drilling with air, gas, mist or other non-mud circulating mediums for 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. An alternate drilling method may be used <u>if specifically approved by the division</u> after the Division specifically approves encountering hydrogen sulfide in excess of 100 ppm, but only if the alternative method. <u>H. G.</u> Protection from Hydrogen Sulfide at Crude Oil Pump Stations, Producing Wells, Tank Batteries and Associated Production Facilities, Refineries, Gas Plants and Compressor Stations.

1. API Standards. Operations at crude oil pump stations and producing wells, tank batteries and associated production facilities, refineries, gas plants and compressor stations containing a potentially hazardous volume of hydrogen sulfide shall be conducted with due consideration according to the guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

2. Minimum Standards. At a minimum, <u>operations at production from</u> crude oil pump stations and producing wells, tank batteries and associated production facilities, <u>refineries</u>, <u>gas plants and</u> <u>compressor stations containing a potentially hazardous volume of hydrogen sulfide</u> shall also be conducted in accordance with the following subparagraphs and subsubparagraphs. Where API standards referred to in the previous paragraph are less stringent than the following, the more stringent standards shall apply.

a. Gaseous Mixtures Containing 100 ppm or more. Producing wells containing 100 ppm or more of hydrogen sulfide in the gaseous mixture, crude oil pump stations, tank batteries and associated production facilities, refineries, gas plants and compressor stations, shall be subject to the following:

i.  $H_2S$  Contingency Plan. If a potentially hazardous volume of  $H_2S$  exists, an  $H_2S$  contingency plan shall be required.

<u>a. ii. Signage. A danger sign or signs shall be posted within 50 feet of each</u> facility to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gates shall suffice. The signs shall read "DANGER – POISON GAS – HYDROGEN SULFIDE PRESENT," or, as appropriate, "CAUTION – POISON GAS – HYDROGEN SULFIDE MAY BE PRESENT" or <u>use</u> equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1–1967 or regulations of the federal occupational safety and health administration, <u>or</u> <u>in another color approved by the division</u>. The signs shall be legible and large enough to be read by all persons entering the well site. A sign shall be placed at each point where a flow line or gathering line erosses a public road within the area of exposure. Each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

iii. Fencing. Fencing and gates shall be required when crude oil pump stations and producing wells, tank batteries and associated production facilities are located in a public area or within a-1/4 mile of a <u>building or structure used as a dwelling, office, place of business, church, school, hospital or government building or within 1/4 mile of a residence, school, church, park, playground or school bus stop or place of business. The fence shall consist of a 5-foot chain link topped by two stands of barbed wire or other design approved by the division. Gates shall be locked when unattended.</u>

<u>b.</u> iv. Wind Direction Indicators. Wind direction indicators shall be required where the H<sub>2</sub>S concentration in a gaseous state exceeds 100 PPM.

<u>c.</u> v. Secondary Well Control. <u>Any well where the 100 ppm H<sub>2</sub>S radius of</u> exposure incorporates a public area shall possess a secondary means of immediate well control through the use of appropriate christmas tree or downhole completion equipment. Such equipment shall allow downhole accessibility (reentry) under pressure for permanent well control operations.

<u>d. vi.</u> Automatic Safety Valve or Shutdown. <u>Any well If the 100 ppm radius of</u> <u>exposure involves a public area, the person, operator or facility shall possess install an automatic safety</u> valve or shutdown at the facility or wellhead or <del>shall install</del> other appropriate shut-in control. The automatic safety valve shall be set to activate upon a release of a <del>potentially hazardous</del> volume of hydrogen sulfide <u>that may create a concentration of hydrogen sulfide of 100 ppm in any public area, 500</u> <u>ppm at any public road or 100 ppm 3,000 feet from the site of release</u>.

<u>3. b.</u> Tanks or vessels containing 300 ppm or more of hydrogen sulfide. Each stair or ladder leading to the top of any tank or vessel containing 300 ppm or more of hydrogen sulfide in the gaseous mixture shall be subject to the following additional requirements:

<u>a. i. Each stair or ladder leading to the top of any storage tank shall be chained or</u> marked to restrict entry. For Any tank <u>or tank</u> battery that requires fencing pursuant to this section <u>may</u> <u>substitute</u> a danger sign posted at the gates <del>may be substituted</del> for chaining and signs.

ii. The person, operator or facility shall post a danger sign on or within 50 feet of any storage tank to alert persons of the potential hydrogen sulfide danger. For any storage tank for which fencing is required, a danger sign posted at the locked gates shall suffice. The signs shall read "DANGER -POISON GAS - HYDROGEN SULFIDE PRESENT," or, as appropriate "CAUTION - POISON GAS -HYDROGEN SULFIDE MAY BE PRESENT," or equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration <u>or another color approved by the division</u>. The sign(s) shall be legible and large enough to be read by all persons entering the site.

<u>4.</u> Compliance Schedule. Each existing crude oil pump station and producing well, tank battery and associated production facility, refinery, gas plant and compressor station not currently meeting the requirements and minimum standards set forth herein shall be brought into compliance within one year of the effective date of this section except that contingency plans shall be submitted within 180 days. Each crude oil pump station and producing well, tank battery and associated production facility constructed following the effective date of this section shall be designed, constructed and operated to meet the requirements set forth herein.

<u>I. H.</u> Personnel Protection and Training. All persons responsible for the implementation of any <u>hydrogen sulfide  $H_2S$  contingency plan shall be provided training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.</u>

<u>J. I.</u> Standards for Equipment That May Be Exposed to Hydrogen Sulfide. Persons, operators and facilities shall choose equipment with consideration for both the <u>hydrogen sulfide  $H_2S$ </u> working environment and anticipated stresses. NACE Standard MR0175 (latest edition) or some other standard <u>approved by the division</u> shall be used for selection of metallic equipment or, if applicable, adequate protection by chemical inhibition or other methods that control or limits the corrosive effects of <u>hydrogen sulfide H<sub>2</sub>S</u> shall be used.

<u>K.</u> J. Exemptions. <u>Any person, operator or facility may petition the director for an exemption</u> to <u>any certain</u> requirements of this section may be granted by petitioning the director. Any such petition shall provide specific information as to the circumstances that warrant approval of the exemption requested and how the public safety will be protected. <u>Submission of</u> A safety plan required by other governmental agencies may accompany the petition for exemption. The director, after considering all relevant factors, may approve an exemption if the circumstances warrant an exemption.

L. K. Release. Upon a release of hydrogen sulfide the following actions must be taken:

1. Activation of the <u>Hydrogen Sulfide H<sub>2</sub>S</u> Contingency Plan. The person, operator or facility shall activate the H<sub>2</sub>S contingency plan immediately upon an H<sub>2</sub>S release where the potential exists for exposure to The <u>hydrogen sulfide H<sub>2</sub>S</u> contingency plan shall be activated in the event of a release that may create a concentration of hydrogen sulfide of 100 ppm in any public area, 500 ppm at any public road or 100 ppm 3,000 feet from the site of release.

2. Notification of the Division. The person, operator or facility shall notify the division upon a release of hydrogen sulfide requiring activation of the <u>hydrogen sulfide H<sub>2</sub>S</u>-contingency plan, as soon as practicable, preferably within one hour of discovery of the release, <u>but or</u> as soon as possible in cases where prompt response should supercede notification. The person, operator or facility shall submit a full report of the incident to the division on Form C-141 no later than fifteen (15) days following the release.

M. Electronic Submission. Any submission to the division required by this section shall be made electronically in a generally accepted format that is compatible with the division's systems.

<u>N. L.</u> Corrective Actions. The division may require corrective actions if necessary to maintain control of a well or any other facility or to safeguard public safety.

## 19.15.2.52 Hydrogen Sulfide Gas (Hydrogen Sulfide)

A. In General. Hydrogen sulfide gas (known by its chemical abbreviation " $H_2S$ " or as "sulfurated hydrogen" or "hydrosulfuric acid") is a flammable, poisonous gas that may occur naturally as a component of crude petroleum and natural gas. The gas has a distinct and characteristic odor of rotten eggs but due to olfactory fatigue may not be sensed by the human sense of smell.

B. <u>Applicability Scope</u>. This Section provides for public safety in areas where hydrogen sulfide gas (H<sub>2</sub>S) may exists in concentrations greater than 100 ppm or in a potentially hazardous volume. This section applies to any person, operator or facility subject to the jurisdiction of the Division, including, but not limited to, any person, operator or facility engaged in drilling, stimulating, injecting into, completing, working over or producing any oil, natural gas or carbon dioxide well or any person, operator or facility engaged in gathering, transporting, storing, processing or refining of crude oil, natural gas or carbon dioxide. This section shall not act to exempt or otherwise excuse Exempt from this rule are surface waste management facilities permitted by the division pursuant to 19 NMAC 15.I.711 from more stringent conditions existing in permits issued thereunder, nor shall such facilities be exempt or otherwise excuse from the requirements set forth in this section by virtue of permitting under 19 NMAC 15.I.711.

C. Definitions (specific to this section).

1. ANSI. The acronym "ANSI" means the american national standards institute.

2. API. The acronym "API" means the american petroleum institute.

3. Area of Exposure. The phrase "area of exposure" means the area within a circle constructed with the point of escape at its center and the radius of exposure as its radius.

<u>4.</u> 3. ASTM. The acronym "ASTM" means the american society for testing and

5.4. Dispersion Technique. A "dispersion technique" is a mathematical representation of the physical and chemical transportation characteristics, dilution characteristics and transformation characteristics of hydrogen sulfide gas in the atmosphere.

<u>6.</u> 5. Escape Rate. The "escape rate" is the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing hydrogen sulfide. The escape rate is calculated using the maximum daily rate of the gaseous mixture produced or the best estimate thereof. For a natural gas well, the escape rate shall be calculated by using the current daily absolute open flow rate against atmospheric pressure or the best estimate of that rate. For an oil well, the escape rate shall be calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or the best estimate thereof. For an oil or natural gas well drilled in a developed area, the escape rate may be determined by using data from offset wells completed in the interval in question, or using some other reasonable means to calculate the escape rate. For wildcat wells, subparagraph C.13.d shall apply. For facilities or operations not mentioned, the escape rate shall be calculated using the actual flow of the gaseous mixture through the facility or operation.

7. 6. GPA. The acronym "GPA" means the gas processors association.

<u>8.</u> <del>7.</del> LEPC. The acronym "LEPC" means the local emergency planning committee established pursuant to the emergency planning and community right-to-know act, 42 U.S. C. § 11001.

<u>9.</u> 8. NACE. The acronym "NACE" refers to the national association of corrosion engineers.

10. 9. PPM. The acronym "ppm" means "parts per million" by volume.

<u>11.</u> 10. Potentially Hazardous Volume (hereinafter referred to as a "potentially hazardous volume" or by the acronym "PHV") means the volume of hydrogen sulfide gas of such concentration that:

a. the 100-ppm radius of exposure includes any public area as defined herein;

b. the 500-ppm radius of exposure includes any public road

as defined herein; or

materials.

c. the 100-ppm radius of exposure is equal to or in excess of 3,000 feet.

12. 11. Public Area. A "public area" is any <u>building or structure that is not associated</u> with the well, operation or system for which the radius of exposure is being calculated and that is used as a\_dwelling, office, place of business, church, school, hospital, school bus stop, or government building, or any portion of a park, city, town, village or school bus stop or other similar area where members of the public may reasonably be expected to be present.

<u>13.</u> 12. Public Road. A "public road" is any federal, state, municipal or county road or highway or postal route.

<u>14.</u> 13. Radius of Exposure. The radius of exposure (hereinafter referred to as "radius of exposure" or "ROE") is <u>that radius constructed with the an imaginary circle constructed around a</u> point of escape <u>as its starting point and its length the radius of which is calculated using the following Pasquill-Gifford derived equation, or by such other method as may be approved by the division:</u>

a. For determining the 100-ppm radius of exposure:  $X = [(1.589)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ , where "X" is the radius of exposure in feet, the "hydrogen sulfide concentration" is the decimal equivalent of the mole or volume fraction of hydrogen sulfide in the gaseous mixture, and "Q" is the escape rate expressed in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

or b. For determining the 500-ppm radius of exposure:  $X=[(0.4546)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ , where "X" is the radius of exposure in feet, the "hydrogen sulfide concentration" is the decimal equivalent of the mole or volume fraction of hydrogen sulfide in the gaseous mixture, and "Q" is the escape rate expressed in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

c. Where multiple sources of hydrogen sulfide are present (e.g. wells, treatment equipment, flow lines, etc.), the radius of exposure may encompass a larger area than would otherwise be calculated using a radius of exposure computation for each component part.

<u>c. d.</u> For a well being drilled, <u>completed</u>, <u>recompleted</u>, <u>worked</u> over or <u>serviced</u> in an area where insufficient data <u>exists</u> to calculate a radius of exposure but where hydrogen sulfide could reasonably be expected to be present in concentrations in excess of 100 ppm in the gaseous mixture, a 100-ppm radius of exposure equal to 3,000 feet shall be assumed.

D. Determination of Hydrogen Sulfide Risk.

1. Determination of Hydrogen Sulfide Concentration.

a. Each person, operator or facility to which this section applies shall determine the hydrogen sulfide concentration within each of its <u>wells</u>, operations or systems. A representative sample or <del>previous</del> process knowledge for each system or operation may be used <u>in lieu of individual for</u> testing <u>of wells</u>, <u>operations or systems</u> provided that the person, operator or facility can demonstrate that the concentration derived from a test or process knowledge of the representative sample <u>or process</u> <u>knowledge</u> is reasonably representative of the hydrogen sulfide concentration within the <u>well</u>, operation<del>,</del> <del>pool</del> or system.

b. The tests <u>used to make the determination</u> referred to in the previous subparagraph shall be conducted in accordance with applicable ASTM or GPA standards or by other methods approved by the division.

c. If a representative sample from a <u>well</u>, <u>operation or</u> system was tested within one (1) year of the effective date of this section, new testing shall not be required; provided, however, new testing shall not be required for a producing well that was tested at any time prior to the effective date of this section.

d. The Division may disapprove the test methodology and require additional testing if the testing methodology did not conform to the requirements of this Section.

2. Tested Concentrations Below 100 ppm. If the testing described in the previous paragraph determines that the concentration of hydrogen sulfide concentration in a given well, operation or system is less than 100 ppm, no further actions shall be are required pursuant to this section.

3. Tested Concentrations Above 100 ppm; Calculation of the Radius of Exposure.

a. If the testing described in paragraph 1 of this subsection determines that the concentration of hydrogen sulfide in a given well, operation or system gaseous mixture is 100 ppm or greater, then the person, operator or facility must calculate the radius of exposure pursuant to this section.

b. If calculation of the radius of exposure reveals that a potentially hazardous volume <u>is may be</u> present, the person, operator or facility shall provide the results of the <u>determination of</u> the hydrogen sulfide concentration and the calculation of the testing and the resulting radius of exposure determinations to the division electronically in a generally accepted electronic format that is compatible with the division's systems. For a well, operation or system existing on the effective date of this section, the determination, calculation and submission required herein shall be accomplished before commencing operations or, for existing facilities, within 180 days of the effective date of this section, the determination, calculation and submission after the effective date of this section, the determination, calculation and submission required herein shall be accomplished before operations, the determination, calculation and submission required herein shall be accomplished before operations, calculation and submission required herein shall be accomplished before operations, calculation and submission required herein shall be accomplished before operations, calculation and submission required herein shall be accomplished before operations begin. Operators may petition the Division for an extension of the submission date, or for an exception to the electronic submission requirement pursuant to subsection.

4. Recalculation. The person, operator or facility shall calculate or recalculate the radius of exposure if an operational change or production alterations are made then recalculations may be made causes the hydrogen sulfide concentration in a well, operation or system to increase to 100 ppm or greater or, if the hydrogen sulfide concentration in a well, operation or system was already 100 ppm or greater, causes a 25% or greater increase in the actual volume fraction of hydrogen sulfide. If calculation or recalculation of the radius of exposure reveals that a potentially hazardous volume is present, the person, operator or facility shall provide the results to the division within thirty (30) days. application of generally accepted engineering principles and generally accepted operating practices. If recalculations indicate that a hydrogen sulfide H2S concentration has become greater than 100 ppm a 25% or greater increase in the actual volume fraction of hydrogen sulfide has occurred; in a given operation or facility, the person, operator or facility shall recalculate the radius of exposure and, the ROE reveals that a PHV may be present submit the results to the division electronically in a generally accepted electronic format that is compatible with the division's systems.

E. <u>Hydrogen Sulfide H<sub>2</sub>S</u> Contingency Plan.

1. In General. A <u>hydrogen sulfide  $n H_2S$ </u> contingency plan is a written document that provides a plan of action that will be used to alert and protect persons at risk in the event of a potentially significant release of hydrogen sulfide gas. The <u>hydrogen sulfide contingency plan</u> must be developed in accordance with the following paragraphs.

2. When Required. A <u>hydrogen sulfide</u>  $n H_2S$  contingency plan must be prepared whenever a potentially hazardous volume of hydrogen sulfide <u>is may be</u> present <u>or may reasonably</u> <u>expected to be encountered</u>.

3. Input of Emergency Response Authorities and the Division. The person, operator or facility shall develop a proposed hydrogen sulfide contingency plan and provide a copy to coordinate the proposed H<sub>2</sub>S contingency plan with the division, the New Mexico department of public safety (*i.e.*, the New Mexico state police), and the local emergency planning committee. If the potential source of release is within a municipality, a copy shall be provided to the municipal police and fire department. If the potential source of the release is outside the boundaries of a municipality, a copy shall instead be provided to as appropriate, the county sheriff and the city or municipal police, and/or police and <u>county</u> fire department or departments. Input on the proposed plan shall be sought from each of the foregoing; if an emergency response authority provided with a copy of the proposed plan fails to provide input or fails to respond at all, that fact shall be stated in the final hydrogen sulfide contingency plan submitted to the division. The input provided by the emergency response authorities shall be considered when preparing the final plan for submission to the division but failure to include any specific suggestion shall not affect the validity of the plan or cause disapproval of the plan by the division. A statement in the contingency plan indicating which agencies have been notified shall suffice as proof of coordination.

4. Elements.

a. Elements Required for Each Plan:

i. A detailed description of each action to be taken in the event of a release of a potentially hazardous volume of hydrogen sulfide requiring activation shall be included in each hydrogen sulfide contingency plan, including an immediate action plan that provisions for alerting and accounting for personnel, controlling any release of hydrogen sulfide gas, eliminating possible ignition sources, alerting the public (directly or through appropriate government agencies), evacuating persons in the affected area, using the call list to alert company officials and emergency response authorities, making recommendations to public officials to block access to affected areas and conducting evacuations and coordinating emergency response with emergency response authorities. A plan that addresses the items described in paragraph 7.6 of the guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, most recent edition, shall be adequate for this purpose;

ii. A call list including the following as applicable:

- aa. local supervisory personnel;
- bb. county sheriff;

cc. the department of public safety and state police;

dd. city or municipal police;

ee. the appropriate division district office; and

ff. other public agencies as appropriate;

iii. A plat or map detailing the area within the radius of exposure of a potentially hazardous volume; and

iv. A list of the names and telephone numbers of all personnel to be contacted when a release is reported or suspected.

b. Where the 500-ppm radius of exposure encompasses any public road, the person, operator or facility shall include the following additional elements in the <u>hydrogen sulfide  $H_2S$ </u> contingency plan:

i. <u>Instructions and procedures for alerting and coordinating emergency</u> <u>response to a release with emergency response authorities in the event of a release of a potentially</u> hazardous volume of hydrogen sulfide at any public road;

ii. A plat or map detailing the area of exposure, including the locations of public roads within the radius of exposure of a potentially hazardous volume; and

<u>ii.</u> <u>iii.</u> A plan to divert traffic and safely get existing traffic off the road and out of danger.

c. Where the 100-ppm radius of exposure encompasses any public area, the following additional elements shall be included in the <u>hydrogen sulfide H<sub>2</sub>S</u> contingency plan:

i. Detailed plans of action to alert and protect persons in the event of a release of a potentially hazardous volume of hydrogen sulfide, including instructions and procedures for alerting persons at risk and emergency response authorities in the event of a release of a potentially hazardous volume of hydrogen sulfide;

- aa. ambulance services;
- bb. hospitals;
- cc. county and city fire departments;
- dd. doctors;

ee. contractors for supplemental or emergency equipment; and

ff. other public agencies as appropriate;

<u>ii.</u><u>iii.</u> A statement describing how emergency response actions will be coordinated with the division and the New Mexico state police, consistent with the New Mexico hazardous materials emergency response plan (HMER);

<u>iii.</u> iv. A plat or map detailing the area of exposure, including the locations of <u>public areas and private dwellings or residences</u>, <u>public facilities such as schools</u>, <u>businesses</u>,

public roads or other similar areas where the public may be reasonably expected to be present within the radius of exposure;

<u>iv.</u> <del>v.</del> The names and telephone numbers of all persons living within the <u>area of exposure radius of exposure of 100 ppm hydrogen sulfide</u> and contact persons for <u>areas of public</u> <u>concentration</u> each public area, such as churches, schools, <u>hospitals</u>, <u>offices</u> and <u>places of</u> businesses; v. <del>vi.</del> Provision for advance briefing of affected <del>and responsible</del> persons

within the radius of exposure. Such advance briefing shall include the hazards and characteristics of hydrogen sulfide, the necessity for a <u>hydrogen sulfide</u>  $n H_2S$  contingency plan, the possible sources of hydrogen sulfide within the radius of exposure, instructions for reporting a gas leak, the manner in which persons will be notified in the event of an emergency and steps to be taken in an emergency; and

vi. vii. In lieu of the provision for advance briefing of persons within the radius of exposure described in the previous subsubparagraph, a reaction-type plan may be prepared and submitted that provides for mass notification of a release of hydrogen sulfide and for evacuation of affected areas where the operator can demonstrate that the risk to public safety is minimal such as in remote locations, a simplified a reaction type plan may be prepared and submitted that provides for mass notification of a hydrogen sulfide leak and for an evacuation of affected areas; and

<u>vii.</u> viii. Additional support information, if applicable, such as the location of emergency evacuation routes, the location of safety and life-support equipment, the location of facilities <u>containing hydrogen sulfide</u>, the location of nearby telephones or other means of communication and special instructions for conditions at a particular installation such as local terrain and the effect of various weather conditions.

d. Additional Requirements. The division may impose additional requirements or modify requirements based on site-specific conditions, population density or special circumstances.

5. Submission. The hydrogen sulfide contingency plan shall be submitted to the division and a copy shall be submitted to the local emergency planning committee, if one exists. A hydrogen sulfide contingency plan for a well, system or operation existing on the effective date of this section shall be submitted within 180 days from the effective date of this section. A hydrogen sulfide contingency plan for a new well, system or operation shall be submitted before operations commence. A hydrogen sulfide contingency plan shall be submitted within 180 days if a public area or public road is established that creates a potentially hazardous volume where none previously existed. For subsection G facilities.  $H_2S$ shall be submitted to the division electronically in a form that is compatible with the division's systems and to the local emergency planning committee, no later than 180 days following submission of the radius of exposure required in Subsection D of this Section For subsection F operations and shall be submitted to the division electronically accepted electronic format that is compatible with the division's systems before commencement of operations. The hydrogen sulfide  $H_2S$  contingency plan for a drilling, completion, workover or well servicing operation may be submitted separately or along with the application for permit to drill (APD).

6. Failure to Submit Plan. Failure to submit a <u>hydrogen sulfide</u>  $n H_2S$  contingency plan when required may result in denial of an application for permit to drill that well, cancellation of an allowable or other appropriate enforcement action.

7. Annual Review, Amendment. The person, operator or facility shall review the hydrogen sulfide  $H_2S$  contingency plan on an annual basis, or more frequently if activation of a plan reveals a deficiency or, if changes to processes, concentrations of hydrogen sulfide or other circumstances occur, or if a new public area and/or a new public road is established that creates a potentially hazardous volume. The person, operator or facility shall submit any amendments to the division electronically in a form that is compatible with the division's systems and to the local emergency planning committee. Reasonable efforts shall be taken to update on an annual basis the lists of names and telephone numbers in the hydrogen sulfide contingency plan designated in E.4.c.v. within the 100 ppm radius of exposure.

8. Retention and Inspection. A <u>The hydrogen sulfide  $n H_2S$ </u> contingency plan shall be reasonably accessible in the event of a release and maintained on file at all times and shall be available for inspection by the division.

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9. Activation Levels. The  $H_2S$  contingency plan shall be activated in the event of a release a potentially hazardous volume of  $H_2S$  above the respective thresholds (i.e. 500 ppm radius at any public road, 100 ppm radius at any public area, etc.) or if a sustained concentration of  $H_2S$  exceeds 50 ppm at the facility boundary of any facility, well or operation.

<u>F.</u> Signage at Wells, Facilities or Operations. For every well, operation or system to which this section applies that contains a concentration of hydrogen sulfide of 100 ppm or greater, the person, operator or facility must provide signage as set forth herein.

1. Drilling, Completion, Workover, and Well Servicing Operations. A danger or caution sign shall be displayed at each drilling, completion, workover and well servicing operation along each point of access to the site. The signs shall read "DANGER - POISON GAS, HYDROGEN SULFIDE PRESENT" or, as appropriate, "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or use equivalent language approved by the division, and shall state in smaller lettering: "Do Not Approach If Red Flag is Flying" or use equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration, or in another color approved by the division. The signs shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 500 feet from the well site and at a location that allows vehicles to turn around at a safe distance prior to reaching the site.

2. Crude Oil Pump Stations, Producing Wells, Tank Batteries and Associated Production Facilities, Refineries, Gas Plants and Compressor Stations. A danger sign or signs shall be posted within 50 feet of each crude oil pump station, producing well, tank battery and associated production facility, refinery, gas plant and compressor station to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gates shall suffice. The signs shall read "DANGER - POISON GAS -HYDROGEN SULFIDE PRESENT," or, as appropriate, "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or use equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration, or in another color approved by the division. The signs shall be legible and large enough to be read by all persons entering the site. A sign shall be placed at each point where a flow line or gathering line crosses a public road; each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

3. Tanks or Vessels. A danger sign or signs shall be posted on or within 50 feet of any storage tank to alert persons of the potential hydrogen sulfide danger. For any storage tank for which fencing is required, a danger sign posted at the locked gates shall suffice. The signs shall read "DANGER - POISON GAS - HYDROGEN SULFIDE PRESENT," or, as appropriate "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT," or equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration or another color approved by the division. The sign(s) shall be legible and large enough to be read by all persons entering the site.

<u>G. F.</u> Protection from Hydrogen Sulfide During Drilling, <u>Completion</u>, Workover, and <u>Well</u> Servicing Operations.

1. API Standards. All drilling, completion, workover and well servicing operations where it is reasonably expected that a potentially hazardous volume of hydrogen sulfide will be encountered shall be conducted with due consideration to the guidelines published by the API entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Safe Drilling and Well Servicing Operations Involving of Wells Containing Hydrogen Sulfide," RP-49, most recent edition.

2. Minimum Standards. At a minimum, and possibly in addition to the foregoing API standards, each drilling, completion, workover and well servicing operation where a potentially hazardous volume of hydrogen sulfide may reasonably be expected to be encountered shall also be conducted in accordance with the following:

a. Before Commencing Operations. The person, operator or facility shall complete an H<sub>2</sub>S contingency plan, where required, before commencement of operations. In addition,

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Hydrogen sulfide training shall be completed and all related safety equipment and warning systems shall be operational before commencement of operations. Detection and monitoring equipment is not required for drilling from the surface to within 500 feet of the zone anticipated to contain hydrogen sulfide.

b. Egress Routes. The person, operator or facility shall maintain passable egress routes at all times during operations.

c. Safety, Detection and Monitoring Equipment. The person, operator or facility shall provide hydrogen sulfide detection and monitoring equipment as follows:

i. Each drilling and completion site shall have a hydrogen sulfide detection and monitoring system that automatically activates visible and audible alarms when the ambient air concentration of hydrogen sulfide reaches 20 ppm. There shall be a sensing point 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.

ii. The detection system shall be calibrated <u>and</u> tested and the results recorded monthly. Each test of the hydrogen sulfide monitoring system shall be recorded on the driller's log or its equivalent.

iii. For workover and well servicing operations, one operational sensing point shall be located as close to the well bore as practical. Additional sensing points may be necessary for large or long-term operations.

iv. Hydrogen sulfide detection, safety and monitoring equipment must be provided and the prescribed safety equipment must be made operational during drilling when drilling is within 500 feet of <u>a the</u> zone anticipated to contain hydrogen sulfide and continuously thereafter through all subsequent drilling.

d. Wind Indicators and Signs.

i. Equipment to indicate wind direction shall be present and visible at all times. At least two devices to indicate wind direction shall be installed at separate elevations and visible from all principal working areas at all times.

ii.— Danger or caution signs shall be displayed along all accesses to the site. The signs shall read "DANGER - POISON GAS, HYDROGEN SULFIDE PRESENT" or, as appropriate, "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or use equivalent language approved by the division, and shall state in smaller lettering: "Do Not Approach If Red Flag is Flying" or use equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration, or in another color approved by the division. The signs shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 500 feet from the well site and at a location that which allows vehicles to turn around at a safe distance prior to reaching the site.

iii. When a sustained concentration of hydrogen sulfide is detected in excess of 20 ppm at any detection point, red flags shall be displayed.

e. b. Flare System. For drilling and completion operations, the person, operator or facility shall install a flare system to safely gather and burn hydrogen sulfide-bearing gas, unless exempted pursuant to Subsection J. Flare outlets shall be located at least 150 feet from as far from the well bore as feasible but not less than 150 feet from the well. Flare lines shall be as straight as practical. The flare system shall be equipped with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall be provided supplemental fuel to maintain ignition.

<u>f.</u> e. <u>Use of Well Control Equipment</u>. Remote Controlled Choke. When a potentially hazardous volume of  $H_2S$ -may be present in any public area, the following measures shall be taken:

i. <u>Drilling</u>. The person, operator or facility shall install A remote controlled choke and accumulator shall be installed and operational at all times beginning when drilling is within 500 feet of the formation believed to contain hydrogen sulfide and continuously thereafter during drilling and during completion, workover and well servicing operations when the 100 ppm H<sub>2</sub>S radius of exposure includes a public area.., unless exempted pursuant to Subsection J; The remote controlled

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choke or remote controlled valve that <u>must</u> include, at a minimum, a pressure and hydrogen sulfide-rated well control choke and kill system including manifold and blowout preventer <u>that meets or exceeds the</u> <u>pursuant to</u> specifications API-16C and API-RP 53<u>or other specifications approved by the division</u>. The blowout preventer stack shall have at least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced, <u>according to the requirements of this</u> <u>part, or otherwise as approved by the division</u>. <del>or other division rules, if more stringent</del>. Variations to <del>blowout preventer stack arrangements may be granted by the division for good cause shown</del>.

ii. <u>Completion, Workover and Well Servicing</u>. If feasible, the equipment described in the previous subsubparagraph shall be installed and operational at all times during completion, workover and well servicing of a well and during completion and well servicing operations when the 100 ppm  $H_2S$  radius of exposure includes a public area. If not feasible, unless exempted pursuant to Subsection J; For completion or workover operations, the person, operator or facility may install a suitable alternative to a remote choke such as (i.e. a remote-controlled valve or blow out preventer with remote accumulator may be used, so long as the alternative equipment will be protective of public safety., etc. may be used); and

iii. For drilling operations, the person, operator or facility shall install a remote controlled choke or remote controlled valve that includes, at a minimum, a pressure and hydrogen sulfide-rated well control choke and kill system including manifold and blowout preventer pursuant to specifications API-16C and API-RP 53. The blowout preventer stack shall have at least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced or other division rules, if more stringent. Variations to blowout preventer stack arrangements may be granted by the division for good cause shown.

<u>g. d.</u> Mud Program. A mud program, including de-gassing and flaring, capable of handling <u>hydrogen sulfide</u>  $H_2S$ -conditions and well control shall be used.

<u>h. e.</u> Well Testing. Except with prior approval by the division, the drill-stem testing of a zone that contains hydrogen sulfide shall be <u>closed chamber only</u>, in that <u>conducted only</u> during daylight hours and formation fluids shall not be permitted to flow to the surface. (closed chamber only). An operator shall notify the division (24) hours in advance of a drill-stem test if an H<sub>2</sub>S contingency plan is required pursuant to this section.

<u>3.\_e.</u> If Hydrogen Sulfide Encountered During Operations.

<u>a.</u> If hydrogen sulfide was not anticipated at the time the division <u>issued a permit</u> to drill approved the APD but is encountered during drilling in <u>a concentration excess</u> of 100 ppm or <u>greater</u> in the gaseous mixture, the operator shall immediately ensure control of the well, suspend drilling operations unless detrimental to well control, <u>take whatever measures are necessary under the</u> <u>circumstances to assure public safety</u>, and obtain materials and safety equipment to bring the operations into compliance with this section, <u>calculate the radius of exposure and</u>, if a potentially hazardous volume is present, prepare a hydrogen sulfide contingency plan and obtain materials and equipment to bring operations into compliance with this section. The operator shall notify the division of the event and the mitigating steps that have or are being taken as soon as possible, but no later than 24 hours following discovery.

<u>b.</u> a. If Hydrogen Sulfide Is Encountered During Use of Air, Gas, Mist or Other Non-Mud Circulating Media. If hydrogen sulfide gas in excess of 100 ppm is encountered while drilling with air, gas, mist or other non-mud circulating mediums for 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. An alternate drilling method may be used <u>if specifically approved by the division</u> after the Division specifically approves encountering hydrogen sulfide in excess of 100 ppm, but only if the alternative method.

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<u>H. G.</u> Protection from Hydrogen Sulfide at Crude Oil Pump Stations, Producing Wells, Tank Batteries and Associated Production Facilities, Refineries, Gas Plants and Compressor Stations.

1. API Standards. Operations at crude oil pump stations and producing wells, tank batteries and associated production facilities, refineries, gas plants and compressor stations containing a potentially hazardous volume of hydrogen sulfide shall be conducted with due consideration according to the guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

2. Minimum Standards. At a minimum, <u>operations at production from</u> crude oil pump stations and producing wells, tank batteries and associated production facilities, <u>refineries</u>, <u>gas plants and</u> <u>compressor stations containing a potentially hazardous volume of hydrogen sulfide</u> shall also be conducted in accordance with the following subparagraphs and subsubparagraphs. <del>Where API standards</del> <del>referred to in the previous paragraph are less stringent than the following, the more stringent standards</del> <del>shall apply.</del>

a. Gaseous Mixtures Containing-100 ppm or more. Producing wells containing 100 ppm or more of hydrogen sulfide in the gaseous mixture, crude oil pump stations, tank batteries and associated production facilities, refineries, gas plants and compressor stations, shall be subject to the following:

i.  $H_2S$  Contingency Plan. If a potentially hazardous volume of  $H_2S$  exists, an  $H_2S$  contingency plan shall be required.

<u>a.</u> ii. Signage. A danger sign or signs shall be posted within 50 feet of each facility to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gates shall suffice. The signs shall read "DANGER - POISON GAS - HYDROGEN SULFIDE PRESENT," or, as appropriate, "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or use equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration, or in another color approved by the division. The signs shall be legible and large enough to be read by all persons entering the well site. A sign shall be placed at each point where a flow line or gathering line crosses a public road within the area of exposure. Each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

iii. Fencing. Fencing and gates shall be required when crude oil pump stations and producing wells, tank batteries and associated production facilities are located in a public area or within a-1/4 mile of a <u>building or structure used as a dwelling, office, place of business, church, school, hospital or government building or within 1/4 mile of a residence, school, church, park, playground or school bus stop or place of business. The fence shall consist of a 5-foot chain link topped by two stands of barbed wire or other design approved by the division. Gates shall be locked when unattended.</u>

<u>b.</u> iv. Wind Direction Indicators. Wind direction indicators shall be required where the  $H_2S$  concentration in a gaseous state exceeds 100 PPM.

<u>c. v.</u> Secondary Well Control. <u>Any well where the 100-ppm H<sub>2</sub>S radius of</u> exposure incorporates a public area shall possess a secondary means of immediate well control through the use of appropriate christmas tree or downhole completion equipment. Such equipment shall allow downhole accessibility (reentry) under pressure for permanent well control operations.

<u>d.</u> vi. Automatic Safety Valve or Shutdown. <u>Any well If the 100-ppm radius of exposure involves a public area, the person, operator or facility shall possess install an automatic safety valve or shutdown at the facility or wellhead or shall install other appropriate shut-in control. The automatic safety valve shall be set to activate upon a release of a potentially hazardous volume of hydrogen sulfide that may create a concentration of hydrogen sulfide of 100 ppm in any public area, 500 ppm at any public road or 100 ppm 3,000 feet from the site of release.</u>

<u>3.</u> b. Tanks or vessels containing 300 ppm or more of hydrogen sulfide. Each stair or ladder leading to the top of any tank or vessel containing 300 ppm or more of hydrogen sulfide in the gaseous mixture shall be subject to the following additional requirements:

<u>a.</u> i. Each stair or ladder leading to the top of any storage tank shall be chained or marked to restrict entry. For Any tank <u>or tank</u> battery that requires fencing pursuant to this section <u>may</u> substitute a danger sign posted at the gates may be substituted for chaining and signs.

ii. The person, operator or facility shall post a danger sign on or within 50 feet of any storage tank to alert persons of the potential hydrogen sulfide danger. For any storage tank for which fencing is required, a danger sign posted at the locked gates shall suffice. The signs shall read "DANGER - POISON GAS- - HYDROGEN SULFIDE PRESENT," or, as appropriate "CAUTION - POISON GAS -HYDROGEN SULFIDE MAY BE PRESENT," or equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration <u>or another color approved by the division</u>. The sign(s) shall be legible and large enough to be read by all persons entering the site.

<u>4.</u> Compliance Schedule. Each existing crude oil pump station and producing well, tank battery and associated production facility, refinery, gas plant and compressor station not currently meeting the requirements and minimum standards set forth herein shall be brought into compliance within one year of the effective date of this section except that contingency plans shall be submitted within 180 days. Each crude oil pump station and producing well, tank battery and associated production facility constructed following the effective date of this section shall be designed, constructed and operated to meet the requirements set forth herein.

<u>I. H.</u> Personnel Protection and Training. All persons responsible for the implementation of any <u>hydrogen sulfide  $H_2S$  contingency plan shall be provided training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.</u>

<u>J. I.</u> Standards for Equipment That May Be Exposed to Hydrogen Sulfide. Persons, operators and facilities shall choose equipment with consideration for both the <u>hydrogen sulfide H<sub>2</sub>S</u> working environment and anticipated stresses. NACE Standard MR0175 (latest edition) or some other standard approved by the division shall be used for selection of metallic equipment or, if applicable, adequate protection by chemical inhibition or other methods that control or limits the corrosive effects of <u>hydrogen sulfide H<sub>2</sub>S</u> shall be used.

<u>K.</u> J. Exemptions. <u>Any person, operator or facility may petition the director for an exemption</u> to <u>any certain</u> requirements of this section may be granted by petitioning the director. Any such petition shall provide specific information as to the circumstances that warrant approval of the exemption requested and how the public safety will be protected. Submission of A safety plan required by other governmental agencies may accompany the petition for exemption. The director, after considering all relevant factors, may approve an exemption if the circumstances warrant an exemption.

L. K. Release. Upon a release of hydrogen sulfide the following actions must be taken:

1. Activation of the <u>Hydrogen Sulfide H<sub>2</sub>S</u> Contingency Plan. The person, operator or facility shall activate the H<sub>2</sub>S contingency plan immediately upon an H<sub>2</sub>S release where the potential exists for exposure to The <u>hydrogen sulfide H<sub>2</sub>S</u> contingency plan shall be activated in the event of a release that may create a concentration of hydrogen sulfide of 100 ppm in any public area, 500 ppm at any public road or 100 ppm 3,000 feet from the site of release.

2. Notification of the Division. The person, operator or facility shall notify the division upon a release of hydrogen sulfide requiring activation of the <u>hydrogen sulfide H<sub>2</sub>S</u>-contingency plan<u></u>, as soon as practicable, preferably within one hour of discovery of the release, but or as soon as possible in cases where prompt response should supercede notification. The person, operator or facility shall submit a full report of the incident to the division on Form C-141 no later than fifteen (15) days following the release.

M. Electronic Submission. Any submission to the division required by this section shall be made electronically in a generally accepted format that is compatible with the division's systems.

<u>N. L.</u> Corrective Actions. The division may require corrective actions if necessary to maintain control of a well or any other facility or to safeguard public safety.



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## 19.15.2.52 Hydrogen Sulfide Gas (Hydrogen Sulfide)

A. In General. Hydrogen sulfide gas is a flammable, poisonous gas that may occur naturally as a component of crude petroleum and natural gas. The gas has a distinct and characteristic odor of rotten eggs but due to olfactory fatigue may not be sensed by the human sense of smell.

B. Applicability. This section applies to any person, operator or facility subject to the jurisdiction of the Division, including, but not limited to, any person, operator or facility engaged in drilling, stimulating, injecting into, completing, working over or producing any oil, natural gas or carbon dioxide well or any person, operator or facility engaged in gathering, transporting, storing, processing or refining of crude oil, natural gas or carbon dioxide (referred to herein se "person, operator or facility" or "well, facility or operation"). This section shall not act to exempt or otherwise excuse surface waste management facilities permitted by the division pursuant to 19.15.9.711 NMAC 15.1.711 from more stringent conditions existing in permits issued thereunder, nor shall such facilities be exempt or otherwise excused from the requirements set forth in this section by virtue of permitting under 19.15.9.711 NMAC 15.1.711.

<u>B.</u> C. Definitions (specific to this section).

1. ANSI. The acronym "ANSI" means the american national standards institute.

2. API. The acronym "API" means the american petroleum institute.

3. Area of Exposure. The phrase "area of exposure" means the area within a circle constructed with <u>a the</u> point of escape at its center and the radius of exposure as its radius.

4. ASTM. The acronym "ASTM" means the american society for testing and materials.

5. Dispersion Technique. A "dispersion technique" is a mathematical representation of the physical and chemical transportation characteristics, dilution characteristics and transformation characteristics of hydrogen sulfide gas in the atmosphere.

6. Escape Rate. The "escape rate" is the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing hydrogen sulfide, as set forth herein.

<u>a.</u> For <u>existing gas facilities or operations, the escape rate shall be is</u> calculated using the maximum daily rate of the gaseous mixture produced or <u>handled or</u> the best estimate thereof. <u>For an existing natural</u> gas well, the escape rate shall be calculated by using the current daily absolute open flow rate against atmospheric pressure or the best estimate of that rate.

b. For new gas operations or facilities, the escape rate shall be calculated as the maximum anticipated flow rate through the system. For a new gas well, the escape rate shall be calculated using the maximum open-flow rate of offset wells in the pool or reservoir, or the pool or reservoir average of maximum open-flow rates.

<u>c. For existing oil wells</u>, the escape rate shall be calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or the best estimate thereof.

<u>d.</u> For new oil wells, the escape rate <u>shall be calculated by multiplying the</u> producing gas/oil ratio by the maximum daily production rate of offset wells in the pool or reservoir, or the pool or reservoir average of the producing gas/oil ratio multiplied by the maximum daily production rate.

e. For facilities or operations not mentioned, the escape rate shall be calculated using the actual flow of the gaseous mixture through the operation or system or the best estimate thereof.

7. GPA. The acronym "GPA" means the gas processors association.

 LEPC. The acronym "LEPC" means the local emergency planning committee established pursuant to the emergency planning and community right-to-know act, 42 U.S. C. § 11001.
 9. NACE. The acronym "NACE" refers to the national association of corrosion

engineers.

10. PPM. The acronym "ppm" means "parts per million" by volume.

11. Potentially Hazardous Volume (hereinafter referred to as a "potentially hazardous--volume") means the volume of hydrogen sulfide gas of such concentration that: a. the 100-ppm radius of exposure includes any public area as defined herein;

b. the 500-ppm radius of exposure includes any public road

as defined herein: or

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c. the 100-ppm radius of exposure exceeds is equal to or in excess of 3,000 feet.

12. Public Area. A "public area" is any building or structure that is not associated with the well, facility or operation or system for which the radius of exposure is being calculated and that is used as a dwelling, office, place of business, church, school, hospital, or government building, or any portion of a park, city, town, village or designated school bus stop or other similar area where members of the public may reasonably be expected to be present.

13. Public Road. A "public road" is any federal, state, municipal or county road or highway or postal route.

14. Radius of Exposure. The radius of exposure (hereinafter referred to as "radius of exposure" or "ROE") is that radius constructed with the point of escape as its starting point and its length calculated using the following Pasquill-Gifford derived equation, or by such other method as may be approved by the division:

a. For determining the 100-ppm radius of exposure:  $X = [(1.589)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ , where "X" is the radius of exposure in feet, the "hydrogen sulfide concentration" is the decimal equivalent of the mole or volume fraction of hydrogen sulfide in the gaseous mixture, and "Q" is the escape rate expressed in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F). <del>of</del>

b. For determining the 500-ppm radius of exposure: X=[(0.4546)(hvdrogensulfide concentration)(Q)]<sup>(0.6258)</sup>, where "X" is the radius of exposure in feet, the "hydrogen sulfide concentration" is the decimal equivalent of the mole or volume fraction of hydrogen sulfide in the gaseous mixture, and "Q" is the escape rate expressed in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

c. For a well being drilled, completed, recompleted, worked over or serviced in an area where insufficient data exists to calculate a radius of exposure but where hydrogen sulfide could reasonably be expected to be present in concentrations in excess of 100 ppm in the gaseous mixture, a 100-ppm radius of exposure equal to 3,000 feet shall be assumed.

stet-C. D. Regulatory Threshold. Determination of Hydrogen Sulfide Risk. 1. Determination of Hydrogen Sulfide Concentration-

a. Each person, operator or facility to which this section applies shall determine the hydrogen sulfide concentration within each of its well, <u>facility or</u> operation <u>either by testing</u> <u>using a</u> <u>sample from each well</u>, facility or operation, testing a representative sample, or using process knowledge in lieu of testing or systems. If a representative sample or process knowledge is used, may be used in lieu +ture of individual testing of wells, operations or systems provided that the person, operator or facility can demonstrate that the concentration derived from the representative sample or process knowledge must be is reasonably representative of the hydrogen sulfide concentration within the well, facility or operation or facility system.

b. The tests used to make the determination referred to in the previous subparagraph shall be conducted in accordance with applicable ASTM or GPA standards or by another e division. test was conducted. c. If a representative sample from <u>from</u> a well, <u>facility or</u> operation or system. methods approved by the division.

was tested prior to within one (1) year of the effective date of this section and otherwise meets the requirements of the previous subparagraphs, new testing shall not be required; provided, however, new testing shall not be required for a producing well that was tested at any time prior to the effective date of this section.

d. If any change or alteration may materially increase the concentration of hydrogen sulfide in a well, facility or operation, a new determination shall be required in accordance with this section.

2. Tested Concentrations <u>Determined to be</u> Below 100 ppm. If the concentration of hydrogen sulfidgin a given well, <u>facility or</u> operation <del>or system</del> is less than 100 ppm, no further actions shall be required pursuant to this section.

3. Tested-Concentrations Determined to be Above 100 ppm; Calculation of the Radius of Exposure.

a. If the concentration of hydrogen sulfide in a given well, facility or operation is determined to be 100 ppm or greater, then the person, <u>operator or facility or operation</u> must calculate the radius of exposure and comply with applicable requirements of this section.

b. If calculation of the radius of exposure reveals that a potentially hazardous volume is present, the person, operator or facility shall provide the results of the determination of the hydrogen sulfide concentration and the calculation of the radius of exposure shall be provided to the division. For a well, facility or operation or system existing on the effective date of this section, the determination, calculation and submission required herein shall be accomplished within 180 days of the effective date of this section; for any well, facility or operation or system that commences operations after the effective date of this section, the determination, calculation and submission required herein shall be accomplished before operations begin.

4. Recalculation. The person, operator or facility shall calculate or recalculate the radius of exposure if an operational change or production alteration causes the hydrogen sulfide concentration in a well, facility or operation or system to increases to 100 ppm or greater. The person, operator or facility shall also recalculate the radius of exposure if the actual volume fraction of hydrogen sulfide increases by a factor of eauses a twenty-five percent in a well, facility or operation or system that was previously had a already 100 ppm or greater and 25% or greater increase. If calculation or recalculation of the radius of exposure reveals that a potentially hazardous volume is present, the person, operator or facility shall provide the results shall be provided to the division within sixty thirty (60) days.

D. Hydrogen Sulfide Contingency Plan.

1. When Required In General. A hydrogen sulfide contingency plan is a written document that provides a plan of action that will be used to alert and protect persons at risk in the event of a potentially significant release of hydrogen sulfide gas. If a well, facility or operation involves <u>a</u> potentially hazardous volume of hydrogen sulfide, a The hydrogen sulfide contingency plan that will be used to alert and protect the public must be developed in accordance with the following paragraphs.

2. When Required. A hydrogen sulfide contingency plan must be prepared whenever a potentially hazardous volume of hydrogen sulfide is present or may reasonably <u>be</u> expected to be encountered.

3. Input of Emergency Response Authorities and the Division. The person, operator or facility shall develop a proposed hydrogen sulfide contingency plan and provide a copy to the division, the New Mexico department of public safety (*i.e.*, the New Mexico state police), and the local emergency planning committee. If the potential source of release is within a municipality, a copy shall be provided to the municipal police and fire department. If the potential source of the release is outside the boundaries of a municipality, a copy shall instead be provided to the county sheriff and the county fire department or departments. Input on the proposed plan shall be sought from each of the foregoing; if an emergency response authority provided with a copy of the proposed plan fails to provide input or fails to respond at all, that fact shall be stated in the final hydrogen sulfide contingency plan submitted to the division. The input provided by the emergency response authorities shall be considered when preparing the final plan for submission to the division but failure to include any specific suggestion shall not affect the validity of the plan or cause disapproval of the plan by the division.

4. Plan Contents Elements.

a. Elements Required for Each Plan:

i. A detailed description of each action to be taken in the event of a release of hydrogen sulfide requiring activation shall be included in each hydrogen sulfide contingency plan, including provisions for alerting and accounting for personnel, controlling any release of hydrogen sulfide gas, eliminating possible ignition sources, alerting the public (directly or through appropriate government agencies), evacuating persons in the affected area, using the call list to alert company

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officials and emergency response authorities, making recommendations to public officials to block access to affected areas and conducting evacuations and coordinating emergency response with emergency response authorities.

<u>a. API Guidelines. The hydrogen sulfide contingency plan shall be developed</u> with due consideration of plan that addresses the items described in paragraph 7.6 of the guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, most recent edition, or with due consideration to another standard approved by the division. , shall be adequate for this purpose

b. Required Contents. The hydrogen sulfide contingency plan shall contain, but shall not be limited to, information on the following subjects, as appropriate to the well, facility or operation to which it applies:

i. Emergency procedures. The hydrogen sulfide contingency plan shall contain information on emergency procedures to be followed in the event of a release and shall include, at a minimum, information concerning the responsibilities and duties of personnel during the emergency, an immediate action plan as described in the API document referenced in the previous subsubparagraph, and telephone numbers of emergency responders, public agencies, local government and other appropriate public authorities. The plan shall also include the locations of potentially affected public areas and public roads and shall describe proposed evacuation routes, location of road blocks and procedures for notifying the public, either through direct telephone notification using telephone number lists or by means of mass notification and reaction plans. The plan shall include information on the availability and location of necessary safety equipment and supplies.

ii. Characteristics of hydrogen sulfide and sulfur dioxide. The hydrogen sulfide contingency plan shall include a discussion of the characteristics of hydrogen sulfide and sulfur dioxide.

iii. Maps and drawings. The hydrogen sulfide contingency plan shall include maps and drawings that depict the <u>area</u> radius of exposure <u>and</u>, areas potentially affected thereby, public areas <u>and</u> public roads <u>within the area of exposure</u> and any areas potentially affected by a release of a potentially hazardous volume.

iv. Training and Drills. The hydrogen sulfide contingency plan shall provide for training and drills, including training in the responsibilities and duties of essential personnels, and provide for training and drills or exercises that simulate a release, and a description how the training, drills and attendance will be documented. The hydrogen sulfide contingency plan shall also provide for training of residents as appropriate on the proper protective measures to be taken in the event of a release, and shall provide for briefing of public officials on issues such as evacuation or shelter-inplace plans.

v. Coordination with State Emergency Plans. The hydrogen sulfide contingency plan shall describe how emergency response actions under the plan will be coordinated with the division and with the New Mexico state police consistent with the New Mexico hazardous materials emergency response plan (HMER).

vi. Activation Levels. The hydrogen sulfide contingency plan shall include the activation level and a description of events that could lead to a release of hydrogen sulfide sufficient to create a concentration in excess of the activation level.

<u>create</u> <u>3. Plan Activation. The hydrogen sulfide contingency plan shall be activated when a release causes a concentration of hydrogen sulfide greater than the activation level set forth in the hydrogen sulfide contingency plan. At a minimum, the plan must be activated whenever a release may create a concentration of hydrogen sulfide of more than 100 ppm in any public area, 500 ppm at any public road or 100 ppm 3,000 feet from the site of release.</u>

ii. A call list including the following as applicable:

bb. county sheriff;

shall describe

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cc. department of public safety and state police; dd. city or municipal police; ee. appropriate division district office; and ff. other public agencies as appropriate; iii. A plat or map detailing the area within the radius of exposure of a potentially hazardous volume; and iv. A list of the names and telephone numbers of all personnel to be contacted when a release is reported or suspected. -b. Where the 500-ppm radius of exposure encompasses any public road, the person, operator or facility shall include the following additional elements in the hydrogen sulfide contingency plan: i. A plat or map detailing the area of exposure, including the locations of public roads; and ii. A plan to divert traffic and safely get existing traffic off the road and out of danger. c. Where the 100-ppm radius of exposure encompasses any public area, the following additional elements shall be included in the hydrogen sulfide contingency plan: i. A call list including all the persons set forth in Sub-subparagraph E(4)(a)(ii), above, and the following: aa. ambulance services; bb. hospitals; cc. county and city fire departments; dd. doctors; ee. contractors for supplemental or emergency equipment; and ff. other public agencies as appropriate; ii. A statement describing how emergency response actions will be coordinated with the division and the New Mexico state police, consistent with the New Mexico hazardous-materials emergency response plan (HMER); iii. A plat or map detailing the area of exposure, including the locations of public areas and public roads; iv. The names and telephone numbers of all persons living within the area of exposure and contact persons for areas of public concentration such as churches, schools, hospitals, offices and places of business; v. Provision for advance briefing of affected persons within the radius of exposure. Such advance briefing shall include the hazards and characteristics of hydrogen sulfide, the necessity for a hydrogen sulfide contingency plan, the possible sources of hydrogen sulfide within the radius of exposure, instructions for reporting a gas leak, the manner in which persons will be notified in the event of an emergency and steps to be taken in an emergency; vi. In lieu of the provision for advance briefing of persons within the radius of exposure described in the previous subsubparagraph, a reaction-type plan may be prepared and submitted that provides for mass notification of a release of hydrogen sulfide and for evacuation of affected areas: and vii. Additional support information, if applicable, such as the location of emergency evacuation routes, the location of safety and life-support equipment, the location of facilities

containing hydrogen sulfide, the location of nearby telephones or other means of communication and special instructions for conditions at a particular installation such as local terrain and the effect of various weather conditions.

 d. Additional Requirements. The division may impose additional requirements or modify requirements based on site-specific conditions, population density or special circumstances.
 4. Submission.

<u>a. Where Submitted.</u> The hydrogen sulfide contingency plan shall be submitted to the division and a copy shall be submitted to the local emergency planning committee, if one exists.

effective of this section

b. When Submitted. A hydrogen sulfide contingency plan for a well, facility or system or operation existing on the effective date of this section shall be submitted within one year of 180 days from the effective date a determination is made that a potentially hazardous volume exists Lould alternatively require that it be submitted within one year of the effective date of this

∠ section of this section. A hydrogen sulfide contingency plan for a new well, facility system or operation shall be submitted before operations commence. The hydrogen sulfide contingency plan for a drilling. completion, workover or well servicing operation must be on file with the division before operations commence and may be submitted separately or along with the application for permit to drill (APD) or may be on file from a previous submission. A hydrogen sulfide contingency plan shall be also submitted within 180 days after the person, operator or facility becomes aware or should have become aware that if a public area or public road is established that creates a potentially hazardous volume where none previously existed.

c. Electronic Submission. Any filer who operates more than one hundred wells or who operates a crude oil pump station, compressor station, refinery or gas plant must submit each hydrogen sulfide contingency plan in electronic format. The hydrogen sulfide contingency plan may be submitted through electronic mail, through an Internet filing or by delivering electronic media to the division, so long as the electronic submission is compatible with the division's systems.

5. Failure to Submit rian. Failure to required may result in denial of an application for permit to drill, that well, cancellation or an anomaly for the subject well or other appropriate enforcement action appropriate to the operation or facility. Well, taulity, 6 Annual Review, Amendment. The person, operator or facility shall review the in the plan materially changes and make

appropriate amendments. on an annual basis, or more frequently if activation of a plan reveals a deficiency or, if changes to processes, concentrations of hydrogen sulfide or other circumstances occur, or if a new public area and/or a new public road is established that creates a potentially hazardous volume. The person, operator or facility shall submit any amendments to the division and to the local emergency planning committee. Reasonable efforts shall be taken to update on an annual basis the lists of names and telephone numbers in the hydrogen sulfide contingency plan. If the division determines that a hydrogen sulfide contingency plan is inadequate to protect public safety, the division may require the person, operator or facility to add provisions to the plan or amend the plan as necessary to protect public safety. H'd delete the bolded reference -- it will make it difficult to enforce

7. Retention and Inspection. The hydrogen sulfide contingency plan shall be reasonably accessible in the event of a release, and maintained on file at all times, and shall be available for inspection by the division.

8. Annual Inventory of Contingency Plans. On an annual basis, each person, operator or facility required to prepare one or more hydrogen sulfide contingency plans pursuant to this section shall file with the appropriate local emergency planning committee and the state emergency response commission an inventory of the wells, facilities and operations for which plans are on file with the division and the name, address and telephone number of a point of contact.

9. Plans Required by Other Jurisdictions. A hydrogen sulfide contingency plan required by the Bureau of Land Management or other jurisdiction that meets the requirements of this subsection may be submitted to the division in satisfaction of this subsection.

E. Signage, Markers. For each well, facility or operation involving a concentration of hydrogen sulfide of 100 ppm or greater, signs and/or markers shall be installed and maintained. Each sign or marker shall conform with the current ANSI standard Z53.1 or some other standard approved by the division {this additional phrase will make this reference consistent with the rest of the rule. climinate due process concerns related to the reference, and hopefully eliminate the requirement that we attach the material to the rule and shall provide information sufficient to warn the public that a potential danger exists. Signs or markers shall be prominently posted at locations, including but not limited to entrance points and road crossings, sufficient to alert the public that a potential danger exists. Signs and/or markers that conform with this subsection on the shall be installed or replaced

Signage at Wells, Facilities or Operations. For every well, operation or system to which this section applies that contains a concentration of hydrogen sulfide of 100 ppm or greater, the person, operator or facility must provide signage as set forth herein.

1. Drilling, Completion, Workover, and Well Servicing Operations. A danger or caution sign shall be displayed at each drilling, completion, workover and well servicing operation along each point of access to the site. The signs shall read "DANGER - POISON GAS, HYDROGEN SULFIDE PRESENT" or, as appropriate, "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or use equivalent language approved by the division, and shall state in smaller lettering: "Do Not Approach If Red Flag is Flying" or use equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration, or in another color approved by the division. The signs shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 500 feet from the well site and at a location that allows vehicles to turn around at a safe distance prior to reaching the site.

2. Crude Oil Pump Stations, Producing Wells, Tank Batteries and Associated Production Facilities, Refineries, Gas Plants and Compressor Stations. A danger sign or signs shall be posted within 50 feet of each crude oil pump station, producing well, tank battery and associated production facility, refinery, gas plant and compressor station to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gates shall suffice. The signs shall read "DANGER - POISON GAS -HYDROGEN SULFIDE PRESENT," or, as appropriate, "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT" or use equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration, or in another color approved by the division. The signs shall be legible and large enough to be read by all persons entering the site. A sign shall be placed at each point where a flow line or gathering line crosses a public road; each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

3. Tanks or Vessels. A danger sign or signs shall be posted on or within 50 feet of any storage tank to alert persons of the potential hydrogen sulfide danger. For any storage tank for which fencing is required, a danger sign posted at the locked gates shall suffice. The signs shall read "DANGER - POISON GAS - HYDROGEN SULFIDE PRESENT," or, as appropriate "CAUTION - POISON GAS - HYDROGEN SULFIDE MAY BE PRESENT," or equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration or another color approved by the division. The sign(s) shall be legible and large enough to be read by all persons entering the site.

<u>F.</u> Protection from Hydrogen Sulfide During Drilling, Completion, Workover, and Well Servicing Operations.

1. API Standards. All drilling, completion, workover and well servicing operations involving a hydrogen sulfide concentration of 100 ppm or greater where it is reasonably expected that a potentially hazardous volume of hydrogen sulfide will be encountered shall be conducted with due consideration to the guidelines published by the API entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Drilling and Well Servicing Operations Involving of Wells Containing Hydrogen Sulfide," RP-49, most recent editions.

2. Minimum Standards. At a minimum, each drilling, completion, workover and well servicing operation where a potentially hazardous volume of hydrogen sulfide may reasonably be expected to be encountered shall be conducted in accordance with the following:

a. Before Commencing Operations. Hydrogen sulfide training shall be completed and warning systems shall be operational before commencement of operations. Detection and monitoring equipment is not required for drilling from the surface to within 500 feet of the zone anticipated to contain hydrogen sulfide.

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b. Egress Routes. The person, operator or facility shall maintain passable egress routes at all times during operations.

 Detection and Monitoring Equipment. <u>Drilling, completion, workover and well</u> servicing operations involving a hydrogen sulfide concentration of 100 ppm or greater The person, operator or facility shall include provide hydrogen sulfide detection and monitoring equipment as follows:

 a. Each drilling and completion site shall have an accurate and precise hydrogen

sulfide detection and monitoring system that will automatically activate visible and audible alarms when the ambient air concentration of hydrogen sulfide reaches <u>a predetermined value set by the operator</u>, not to exceed 20 ppm. There shall be a sensing point 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.

ii. The detection system shall be calibrated and tested and the results recorded monthly. Each test of the hydrogen sulfide monitoring system shall be recorded on the driller's log or its equivalent.

b. For workover and well servicing operations, one operational sensing point shall be located as close to the well bore as practical. Additional sensing points may be necessary for large or long-term operations.

c. Hydrogen sulfide detection and monitoring equipment must be provided and must be made operational during drilling when drilling is within 500 feet of a zone anticipated to contain hydrogen sulfide and continuously thereafter through all subsequent drilling.

<u>3.</u> Wind Indicators. <u>All drilling, completion, workover and well servicing operations</u> involving a hydrogen sulfide concentration of 100 ppm or greater shall include wind indicators.

a. Equipment to indicate wind direction shall be present and visible at all times. At least two devices to indicate wind direction shall be installed at separate elevations and visible from all principal working areas at all times.

b. When a sustained concentration of hydrogen sulfide is detected in excess of 20 ppm at any detection point, red flags shall be displayed.

<u>4.</u> Flare System. For drilling and completion operations in an area where it is reasonably expected that a potentially hazardous volume of hydrogen sulfide will be encountered, the person, operator or facility shall install a flare system to safely gather and burn hydrogen-sulfide-bearing gas. Flare outlets shall be located at least 150 feet from the well bore. Flare lines shall be as straight as practical. The flare system shall be equipped with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall be provided supplemental fuel to maintain ignition.

<u>5. Use of Well Control Equipment.</u> When the 100 ppm radius of exposure includes a public area, the following well control equipment shall be required:

a. Drilling. A remote-controlled <u>well control system choke and accumulator</u> shall be installed and operational at all times beginning when drilling is within 500 feet of the formation believed to contain hydrogen sulfide and continuously thereafter during drilling. The <u>well control system</u> remote controlled choke must include, at a minimum, a pressure and hydrogen-sulfide-rated well control choke and kill system including manifold and blowout preventer that meets or exceeds the specifications API-16C and API-RP 53 or other specifications approved by the division. The blowout preventer stack shall have at least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced, according to the requirements of this part, or otherwise as approved by the division.

b. Completion, Workover and Well Servicing. <u>A remote controlled pressure and</u> <u>hydrogen-sulfide-rated well control system that meets or exceeds API specifications or other</u> <u>specifications approved by the division shall be installed and shall be operational at all times during</u> <u>completion, workover and servicing of a well.</u> If feasible, the equipment described in the previous <del>subsubparagraph shall be installed and operational at all times during completion, workover and well</del> <del>servicing of a well.</del> If not feasible, a suitable alternative to a remote choke such as a remote controlled valve or blow out preventer with remote accumulator may be used, so long as the alternative equipment will be protective of public safety.

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6. Mud Program. All drilling, completion, workover and well servicing operations involving a hydrogen sulfide concentration of 100 ppm or greater shall provide a hydrogen sulfide mud program capable of handling hydrogen sulfide conditions and well control, including de-gassing and flaring, shall be used. [LORI'S QUERY: DO ALL WORKOVERS AND WELL SERVICES USE A MUD PROGRAM?]

7. Well Testing. Except with prior approval <u>of by</u> the division, drill-stem testing of a zone that contains hydrogen sulfide <u>concentration of 100 ppm or greater</u> shall be <u>conducted only during</u> <u>daylight hours and closed chamber only, in that</u> formation fluids shall not be permitted to flow to the surface.

8. If Hydrogen Sulfide Encountered During Operations.

a. If hydrogen sulfide was not anticipated at the time the division issued a permit to drill but is encountered during drilling in a concentration of 100 ppm or greater in the gaseous in the the operator must satisfy the requirements of this section before continuing drilling operations. shall immediately ensure control of the well, suspend drilling operations unless detrimental to well control, take whatever measures are necessary under the circumstances to assure public safety, calculate the radius of exposure and, if a potentially hazardous volume is present, prepare a hydrogen sulfide contingency plan and obtain materials and equipment to bring operations into compliance with this section. The operator shall notify the division of the event and the mitigating steps that have or are being taken as soon as possible, but no later than 24 hours following discovery. The division may grant verbal approval to continue drilling operations pending preparation of any required hydrogen sulfide contingency plan.

b. If Hydrogen Sulfide Is Encountered During Use of Air, Gas, Mist or Other Non-Mud Circulating Media. If hydrogen sulfide gas in excess of 100 ppm is encountered while drilling with air, gas, mist or other non-mud circulating mediums, the well shall be killed with a water-or oilbased mud, and mud shall be used thereafter as the circulating medium for continued drilling. An alternate drilling method may be used if specifically approved by the division.

<u>G.</u> Protection from Hydrogen Sulfide at Crude Oil Pump Stations, Producing Wells, Tank Batteries and Associated Production Facilities, <u>Pipelines</u>, Refineries, Gas Plants and Compressor Stations.

1. API Standards. Operations at crude oil pump stations and producing wells, tank batteries and associated production facilities, refineries, gas plants and compressor stations eontaining a potentially hazardous volume of hydrogen sulfide involving a concentration of hydrogen sulfide of 100 ppm or greater shall be conducted with due consideration to the guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

2. Minimum Standards. At a minimum, operations at crude oil pump stations and producing wells, tank batteries and associated production facilities, refineries, gas plants and compressor stations containing a potentially hazardous volume of hydrogen sulfide shall also be conducted in accordance with the following subparagraphs and subsubparagraphs.

2. Security Fencing. Well sites and other unattended, fixed surface facilities shall be protected from public access by fencing with locking gates when the location is within 1/4 mile of a public area. A surface pipeline shall not be considered a fixed surface facility for purposes of this paragraph. Fencing and gates shall be required when crude oil pump stations and producing wells, tank batteries and associated production facilities are located in a public area or within a 1/4 mile of a building or structure used as a dwelling, office, place of business, church, school, hospital or government building or within 1/4 mile of a park, playground or school bus stop. The fence shall consist of a 5-foot chain link topped by two stands of barbed wire or other design approved by the division. Gates shall be locked when unattended.

3. Wind Direction Indicators. All crude oil pump stations, producing wells, tank batteries and associated production facilities, pipelines, refineries, gas plants and compressor stations where a concentration of hydrogen sulfide of 100 ppm or greater is present shall provide equipment to indicate wind direction. The wind direction equipment shall be installed and visible from all principal working areas at all times. Wind direction indicators shall be required.



<u>4. Secondary Well Control Equipment</u>. <u>When the 100 ppm radius of exposure includes</u> a public area, the following additional measures are required:

a. Safety devices, such as automatic shut-down devices, shall be installed and maintained in good operating condition to prevent the continuing escape of hydrogen sulfide. Alternatively, safety procedures shall be established to achieve the same purpose. If can't remember why the word "continuing" appears; it could be interpreted as requiring safety devices that protectonly against continuing releases and not one-time releases, no matter what the concentration or volume of the release

<u>b.</u> Any well shall possess a secondary means of immediate well control through the use of <u>an</u> appropriate christmas tree or downhole completion equipment. Such equipment shall allow downhole accessibility (reentry) under pressure for permanent well control <del>operations</del>.

d. Automatic Safety Valve or Shutdown. Any well shall possess an automatic safety valve or shutdown at the facility or wellhead or other appropriate shut-in control. The automatic safety valve shall be set to activate upon a release of a volume of hydrogen sulfide that may create a concentration of hydrogen sulfide of 100 ppm in any public area, 500 ppm at any public road or 100 ppm 3,000 feet from the site of release.

<u>5.</u> Tanks or vessels. Each stair or ladder leading to the top of any tank or vessel containing 300 ppm or more of hydrogen sulfide in the gaseous mixture shall be chained or marked to restrict entry. Any tank or tank battery that requires fencing pursuant to this section may substitute a danger sign posted at the gates for chaining and signs.

<u>6.</u> Compliance Schedule. Each existing crude oil pump station, and producing well, tank battery and associated production facility, <u>pipeline</u>, refinery, gas plant and compressor station not currently meeting the requirements <u>of this subsection and minimum standards set forth herein</u> shall be brought into compliance within one year of the effective date of this section. Each erude oil pump station and producing well, tank battery and associated production facility constructed following the effective date of this section shall be designed, constructed and operated to meet the requirements set forth herein.

<u>H.</u> Personnel Protection and Training. All persons responsible for the implementation of any hydrogen sulfide contingency plan shall be provided training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.

I. Standards for Equipment That May Be Exposed to Hydrogen Sulfide. Whenever a well, facility or operation involves a potentially hazardous volume of hydrogen sulfide, persons, operators and facilities shall choose equipment shall be selected with consideration for both the hydrogen sulfide working environment and anticipated stresses and sector NACE Standard MR0175 (latest edition) or some other standard approved by the division shall be used for selection of metallic equipment or, if applicable, shall use adequate protection by chemical inhibition or other methods that control or limit the corrosive effects of hydrogen sulfide shall be used.

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<u>J.</u> Exemptions. Any person, operator or facility may petition the director <u>or the director's</u> <u>designee</u> for an exemption to any requirements of this section. Any such petition shall provide specific information as to the circumstances that warrant approval of the exemption requested and how the public safety will be protected. A safety plan required by other governmental agencies may accompany the petition for exemption. The director <u>or the director's designee</u>, after considering all relevant factors, may approve an exemption if the circumstances warrant <u>and so long as the public safety will be protected an</u> exemption.

K. - Release - Upon a release of hydrogen sulfide the following actions must be taken:

1. Activation of the Hydrogen Sulfide Contingency Plan. The hydrogen sulfide contingency plan shall be activated in the event of a release that may create a concentration of hydrogen sulfide of 100 ppm in any public area, 500 ppm at any public road or 100 ppm 3,000 feet from the site of release.

2. Notification of the Division. The person, operator or facility shall notify the division upon a release of hydrogen sulfide requiring activation of the hydrogen sulfide contingency plan preferably within one hour of discovery of the release, but as soon as possible, but no more than four hours after plan activation, recognizing that a in cases where prompt response should supercede

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notification. The person, operator or facility shall submit a full report of the incident to the division on Form C-141 no later than fifteen (15) days following the release.

M. Electronic Submission. Any submission to the division required by this section shall be made electronically in a generally accepted format that is compatible with the division's systems. [moved to contingency plan section]

N. Corrective Actions. The division may require corrective actions if necessary to maintain control of a well or any other facility or to safeguard public safety.

## 19.15.2.52 Hydrogen Sulfide Gas (Hydrogen Sulfide)

A. In General. Hydrogen sulfide gas is a flammable, poisonous gas that may occur naturally as a component of crude petroleum and natural gas. The gas has a distinct and characteristic odor of rotten eggs but due to olfactory fatigue may not be sensed by the human sense of smell.

B- Applicability. This section applies to any person, operator or facility subject to the jurisdiction of the Division, including, but not limited to, any person, operator or facility engaged in drilling, stimulating, injecting into, completing, working over or producing any oil, natural gas or carbon dioxide well or any person, operator or facility engaged in gathering, transporting, storing, processing or refining of crude oil, natural gas or carbon dioxide (hereinafter referred to as "person, operator or facility" when referring to a personal obligation and "wells, facilities or operations" when referring to regulated operations). This section shall not act to exempt or otherwise excuse surface waste management facilities permitted by the division pursuant to 19.15.9.711 NMAC 15.1.714 from more stringent conditions on the handling of hydrogen sulfide required of such facilities by 19.15.9.711 NMAC 15.1.711 or more stringent conditions existing in permits issued thereunder, nor shall such facilities be exempt or otherwise excused from the requirements set forth in this section by virtue of permitting under 19.15.9.711 NMAC 15.1.711.

<u>B.</u> C. Definitions (specific to this section).

1. ANSI. The acronym "ANSI" means the american national standards institute.

2. API. The acronym "API" means the american petroleum institute.

3. Area of Exposure. The phrase "area of exposure" means the area within a circle constructed with <u>a the</u> point of escape at its center and the radius of exposure as its radius.

4. ASTM. The acronym "ASTM" means the american society for testing and materials.

5. Dispersion Technique. A "dispersion technique" is a mathematical representation of the physical and chemical transportation characteristics, dilution characteristics and transformation characteristics of hydrogen sulfide gas in the atmosphere.

6. Escape Rate. The "escape rate" is the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing hydrogen sulfide, as set forth herein.

a. For existing natural gas facilities or operations, the escape rate shall be is calculated using the maximum daily rate of the gaseous mixture produced or <u>handled or</u> the best estimate thereof. For an existing natural gas well, the escape rate shall be calculated by using the current daily absolute open flow rate against atmospheric pressure or the best estimate of that rate.

b. For new natural gas operations or facilities, the escape rate shall be calculated as the maximum anticipated flow rate through the system. For a new natural gas well, the escape rate shall be calculated using the maximum open-flow rate of offset wells in the pool, or the pool average of maximum open-flow rates.

<u>c. For existing oil wells</u> the escape rate shall be calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or the best estimate thereof.

<u>d.</u> For new oil wells, the escape rate <u>shall be calculated by multiplying the</u> producing gas/oil ration by the maximum daily production rate of offset wells in the pool, or the pool average of the product of the producing gas/oil ration by the maximum daily production rate.

<u>e.</u> For facilities or operations not mentioned, the escape rate shall be calculated using the actual flow of the gaseous mixture through the operation or system.

7. GPA. The acronym "GPA" means the gas processors association.

8. LEPC. The acronym "LEPC" means the local emergency planning committee established pursuant to the emergency planning and community right-to-know act, 42 U.S. C. § 11001.

9. NACE. The acronym "NACE" refers to the national association of corrosion engineers.

10 PPM The acronym "r

10. PPM. The acronym "ppm" means "parts per million" by volume.

11. Potentially Hazardous Volume (hereinafter referred to as a "potentially hazardous volume") means the volume of hydrogen sulfide gas of such concentration that:

a. the 100-ppm radius of exposure includes any public area as defined herein;

b. the 500-ppm radius of exposure includes any public road

as defined herein; or

c. the 100-ppm radius of exposure <u>exceeds</u> is equal to or in excess of 3,000 feet.

12. Public Area. A "public area" is any building or structure that is not associated with the well, operation or system for which the radius of exposure is being calculated and that is used as a dwelling, office, place of business, church, school, hospital, or government building, or any portion of a park, city, town, village or <u>designated</u> school bus stop or other similar area where members of the public may reasonably be expected to be present.

13. Public Road. A "public road" is any federal, state, municipal or county road or highway or postal route.

14. Radius of Exposure. The radius of exposure (hereinafter referred to as "radius of exposure" or "ROE") is that radius constructed with the point of escape as its starting point and its length calculated using the following Pasquill-Gifford derived equation, or by such other method as may be approved by the division:

a. For determining the 100-ppm radius of exposure:  $X = [(1.589)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ , where "X" is the radius of exposure in feet, the "hydrogen sulfide concentration" is the decimal equivalent of the mole or volume fraction of hydrogen sulfide in the gaseous mixture, and "Q" is the escape rate expressed in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

b. For determining the 500-ppm radius of exposure:  $X=[(0.4546)(hydrogen sulfide concentration)(Q)]^{(0.6258)}$ , where "X" is the radius of exposure in feet, the "hydrogen sulfide concentration" is the decimal equivalent of the mole or volume fraction of hydrogen sulfide in the gaseous mixture, and "Q" is the escape rate expressed in cubic feet per day (corrected for standard conditions of 14.73 psia and 60°F).

c. For a well being drilled, completed, recompleted, worked over or serviced in an area where insufficient data exists to calculate a radius of exposure but where hydrogen sulfide could reasonably be expected to be present in concentrations in excess of 100 ppm in the gaseous mixture, a 100-ppm radius of exposure equal to 3,000 feet shall be assumed.

C. D. Required Testing and Calculations. Determination of Hydrogen Sulfide Risk.

1. Testing Determination of Hydrogen Sulfide Concentration.

a. Each <u>well</u>, <u>facility or operation person</u>, <u>operator or facility to which this</u> section applies shall determine <u>by testing</u> the hydrogen sulfide concentration within each <del>of</del> its well, <u>facility or</u> operation <del>or systems</del>. A representative sample or process knowledge may be used in lieu of individual testing of wells, operations or <u>facilities systems</u> provided that <del>the person, operator or facility</del> <del>can demonstrate that</del> the concentration derived from the representative sample or process knowledge is reasonably representative of the hydrogen sulfide concentration within the well, <u>facility or</u> operation <del>or</del> <u>facility</u> system.

b. The tests used to make the determination referred to in the previous subparagraph shall be conducted in accordance with applicable ASTM or GPA standards or by other methods approved by the division.

c. If a representative sample from a well, <u>facility or</u> operation or system was tested <u>prior to</u> within one (1) year of the effective date of this section <u>and otherwise meets the</u> requirements of the previous subparagraphs, new testing shall not be required; provided, however, new testing shall not be required for a producing well that was tested at any time prior to the effective date of this section.

d. If any change or alteration may materially increase the concentration of hydrogen sulfide in a well, facility or operation, retesting shall be required in accordance wit this section.

2. Tested Concentrations <u>Determined to be</u> Below 100 ppm. If the concentration of hydrogen sulfide in a given well, <u>facility or operation or system</u> is less than 100 ppm, no further actions shall be required pursuant to this section.

3. Tested Concentrations <u>Determined to be</u> Above 100 ppm; <u>Calculation of the Radius of</u> Exposure.

a. If the concentration of hydrogen sulfide in a given well, facility or operation or system is determined to be 100 ppm or greater, then the person, facility or operation or facility must calculate the radius of exposure and comply with applicable requirements of <del>pursuant to</del> this section.

b. If calculation of the radius of exposure reveals that a potentially hazardous volume is present, the person, operator or facility shall provide the results of the determination of the hydrogen sulfide concentration and the calculation of the radius of exposure shall be provided to the division. For a well, facility or operation or system existing on the effective date of this section, the determination, calculation and submission required herein shall be accomplished within 180 days of the effective date of this section; for any well, facility or operation or system that commences operations after the effective date of this section, the determination, calculation and submission required herein shall be accomplished before operations begin.

4. Recalculation. The person, operator or facility shall calculate or recalculate the radius of exposure if an operational change or production alteration causes the hydrogen sulfide concentration in a well, facility or operation or system to increases to 100 ppm or greater or, if the hydrogen sulfide concentration in a well, facility or operation or system was already 100 ppm or greater, there is causes a 25% or greater increase in the actual volume fraction of hydrogen sulfide. If calculation or recalculation of the radius of exposure reveals that a potentially hazardous volume is present, the person, operator or facility shall provide the results shall be provided to the division within sixty thirty (60) days.

E. Hydrogen Sulfide Contingency Plan.

lash of PHV a plan of action that will be used to alert and protect persons at risk in the event of a potentially significant release of hydrogen sulfide gas. The hydrogen sulfide contingency plan must be developed in accordance with the following paragraphs. 2. When Required. A hydrogen sulfide contingency plan must be prepared whenever a potentially hazardous volume of hydrogen sulfide is present or may reasonably <u>be</u> expected to be encountered. 3. Input of Emergency Response Authorities and the Division. The person, operator or facility shall develop a proposed hydrogen sulfide contingency plan and provide a copy to the division, the New Mexico department of public safety (*i.e.*, the New Mexico state police) and the local planning convertion.

planning committee. If the potential source of release is within a municipality, a copy shall be provided to the municipal police and fire department. If the potential source of the release is outside the boundaries of a municipality, a copy shall instead be provided to the county sheriff and the county fire department or departments. Input on the proposed plan shall be sought from each of the foregoing; if an emergency response authority provided with a copy of the proposed plan fails to provide input or fails to respond at all, that fact shall be stated in the final hydrogen sulfide contingency plan submitted to the division. The input provided by the emergency response authorities shall be considered when preparing the final plan for submission to the division but failure to include any specific suggestion shall not affect the validity of the plan or cause disapproval of the plan by the division.

4. Plan Contents Elements.

a. Elements Required for Each Plan:

i. A detailed description of each action to be taken in the event of a release of hydrogen sulfide requiring activation shall be included in each hydrogen sulfide contingency plan, including provisions for alerting and accounting for personnel, controlling any release of hydrogen sulfide gas, eliminating possible ignition sources, alerting the public (directly or through appropriate government agencies), evacuating persons in the affected area, using the call list to alert company officials and emergency response authorities, making recommendations to public officials to block access to affected areas and conducting evacuations and coordinating emergency response with emergency response authorities.

a. API Guidelines. The hydrogen sulfide contingency plan shall be developed with due consideration of the guidelines plan that addresses the items described in paragraph 7.6 of the guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas

Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, most recent edition. - shall be adequate for this purpose

b. Required Contents, The hydrogen sulfide contingency plan shall contain, but shall not be limited to, information on the following subjects, as appropriate to the well, operation or system to which it applies:

i. Emergency procedures. The hydrogen sulfide contingency plan shall contain information on emergency procedures to be taken in the event of a release, and shall include, at a minimum, information concerning the responsibilities of personnel during the emergency, an immediate action plan as described in the API document referenced in the previous subsubparagraph, and telephone numbers of public agencies, emergency responders, local government and other appropriate public authorities. The plan shall also include the locations of nearby residences, businesses, parks, schools, churches, roads, medical facilities etc., shall describe proposed evacuation routes and locations of road blocks and procedures for notifying the public, either through direct telephone notification using telephone number lists or by means of mass notification and reaction plans. The plan shall include information on the location and availability of necessary safety equipment and supplies.

ii. Characteristics of hydrogen sulfide and sulfur dioxide. The hydrogen sulfide contingency plan shall include a discussion of the characteristics of hydrogen sulfide and hydrogen sulfide.

iii. Maps and drawings. The hydrogen sulfide contingency plan shall include maps and drawings that depict the radius of exposure, areas potentially affected thereby, public areas, public roads and any areas potentially affected by a release of a potentially hazardous volume.

iv. Trainings and Drills. The hydrogen sulfide contingency plan shall include a description of the responsibilities and duties of essential personnel, provide for periodic on-site or classroom drills or exercises that simulate a release, and shall describe how that training, and attendance at the training, will be documented. The hydrogen sulfide contingency plan shall also provide for training of residents as appropriate on the proper protective measures to be taken in the event of a release, and shall include provisions for briefing public officials on issues such as evacuations or shelterin-place plans.

v. Coordination with State Emergency Plans. The hydrogen sulfide contingency plan shall describe how emergency response actions proposed in the plan will be coordinated with the division and with the New Mexico state police consistent with the New Mexico hazardous materials emergency response plan (HMER). vi. Activation Levels. The hydrogen sulfide contingency plan shall include the activation threshold and a description of events that could lead to a release of hydrogen sulfide

-sufficient to create a concentration in excess of the activation level.

c. Plans Required by Other Jurisdictions. A plan required by the Bureau of Land Management or other jurisdiction that meets the requirements of this subsection may be submitted to the conflict division in satisfaction of this subsection.

ii. A call list including the following as applicable:

aa. local supervisory personnel;

- bb. county sheriff;
- cc. department of public safety and state police;

dd.-city or municipal police;

ee. appropriate division district office; and

ff. other public agencies as appropriate;

iii. A plat or map detailing the area within the radius of exposure of a potentially hazardous volume; and

iv. A list of the names and telephone numbers of all personnel to be contacted when a release is reported or suspected.

b. Where the 500-ppm radius of exposure encompasses any public road, the person, operator or facility shall include the following additional elements in the hydrogen sulfide contingency plan:

i. A plat or map detailing the area of exposure, including the locations of public roads; and ii. A plan to divert traffic and safely get existing traffic off the road and out of danger. c. Where the 100-ppm radius of exposure encompasses any public area, the following additional elements shall be included in the hydrogen sulfide contingency plan: i. A call list including all the persons set forth in Sub subparagraph E(4)(a)(ii), above, and the following: -aa. ambulance services; bb. hospitals; cc. county and city fire departments; dd. doctors; ee. contractors for supplemental or emergency equipment; and -ff. other public agencies as appropriate; ii. A statement describing how emergency response actions will be

coordinated with the division and the New Mexico state police, consistent with the New Mexico hazardous materials emergency response plan (HMER);

iii. A plat or map detailing the area of exposure, including the locations of public areas and public roads;

iv. The names and telephone numbers of all persons living within the area of exposure and contact persons for areas of public concentration such as churches, schools, hospitals, offices and places of business;

v. Provision for advance-briefing of affected persons within the radius of exposure. Such advance briefing shall include the hazards and characteristics of hydrogen sulfide, the necessity for a hydrogen sulfide contingency plan, the possible sources of hydrogen sulfide within the radius of exposure, instructions for reporting a gas leak, the manner in which persons will be notified in the event of an emergency and steps to be taken in an emergency;

vi. In lieu of the provision for advance briefing of persons within the radius of exposure described in the previous subsubparagraph, a reaction type plan may be prepared and submitted that provides for mass notification of a release of hydrogen sulfide and for evacuation of affected areas; and

vii. Additional support information, if applicable, such as the location of emergency evacuation routes, the location of safety and life-support equipment, the location of facilities containing hydrogen sulfide, the location of nearby telephones or other means of communication and special instructions for conditions at a particular installation such as local terrain and the effect of various weather conditions.

d. Additional Requirements. The division may impose additional requirements or modify requirements based on site specific conditions, population density or special circumstances.

4. Submission.

a. Where Submitted. The hydrogen sulfide contingency plan shall be submitted to the division and a copy shall be submitted to the local emergency planning committee, if one exists.

b. When Submitted. A hydrogen sulfide contingency plan for a well, facility or system or operation existing on the effective date of this section shall be submitted within 180 days from Submit the effective date a determination is made that a potentially hazardous volume exists of this section. A hydrogen sulfide contingency plan for a new well, system or operation shall be submitted before operations commence. A hydrogen sulfide contingency plan shall be submitted within 180 days after the person, operator or facility becomes aware or should have become aware that if a public area or public road is established that creates a potentially hazardous volume where none previously existed. The hydrogen sulfide contingency plan for a drilling, completion, workover or well servicing operation must be on file with the division before operations commence and may be submitted separately or along with the application for permit to drill (APD) or may be on file from a previous submission.



c. Electronic Submission. The hydrogen sulfide contingency plan shall be submitted electronically in a generally accepted format that is compatible with the division's systems.

5. Failure to Submit Plan. Failure to submit a hydrogen sulfide contingency plan when required may result in denial of an application for permit to drill that well, cancellation of an allowable for the subject well or other appropriate enforcement action.

<u>6.</u> <u>Annual</u> Review, Amendment. The person, operator or facility shall review the hydrogen sulfide contingency plan <u>any time a subject addressed in the plan changes and make appropriate amendments</u><u>on an annual basis, or more frequently if activation of a plan reveals a deficiency or, if changes to processes, concentrations of hydrogen sulfide or other circumstances occur, or if a new public area and/or a new public road is established that creates a potentially hazardous volume. The person, operator or facility shall submit any amendments to the division and to the local emergency planning committee. Reasonable efforts shall be taken to update on an annual basis the lists of names and telephone numbers in the hydrogen sulfide contingency plan. If the division determines that a hydrogen sulfide contingency plan is inadequate to protect public safety, the division may require the person, operator or facility to add provisions to the plan or amend the plan as necessary to protect public safety.</u>

<u>7.</u> Retention and Inspection. The hydrogen sulfide contingency plan shall be reasonably accessible in the event of a release, and maintained on file at all times, and shall be available for inspection by the division.

8. Annual Inventory of Contingency Plans. On an annual basis, each person, operator or facility required to prepare one or more hydrogen sulfide contingency plans pursuant to this section shall file with the appropriate local emergency planning committee and the state emergency response commission an inventory of the wells, facilities or operations for which plans are on file with the division and the name, address and telephone number of a point of contact.

event of a release that may create a concentration of hydrogen sulfide as set forth in the hydrogen sulfide contingency plan, but at a minimum the plan provide for activation when a concentration of hydrogen sulfide exists more than 100 ppm in any public area, 500 ppm at any public road or 100 ppm 3,000 feet from the site of release.

F. Signage. Each well, facility or operation containing a concentration of hydrogen sulfide of 100 ppm or greater shall provide and maintain signage. Each sign or marker shall conform with the current ANSI standard Z53.1 and shall provide other information sufficient to warn the public that a potential danger exists. Signs markers shall be prominently posted at locations like entrance points and road crossings, and shall be sufficient to alert the public that a potential danger exists. Signage at Wells, Facilities or Operations. For every well, operation or system to which this section applies that contains a concentration of hydrogen sulfide of 100 ppm or greater, the person, operator or facility must provide signage as set forth herein.

1. Drilling, Completion, Workover, and Well Servicing Operations. A danger or caution sign shall be displayed at each drilling, completion, workover and well servicing operation along each point of access to the site. The signs shall read "DANGER – POISON GAS, HYDROGEN SULFIDE PRESENT" or, as appropriate, "CAUTION – POISON GAS – HYDROGEN SULFIDE MAY BE PRESENT" or use equivalent language approved by the division, and shall state in smaller lettering: "Do Not Approach If Red Flag is Flying" or use equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1-1967 or regulations of the federal occupational safety and health administration, or in another color approved by the division. The signs shall be legible and large enough to be read by all persons entering the well site and shall be placed a minimum of 200 feet but no more than 500 feet from the well site and at a location that allows vehicles to turn around at a safe distance prior to reaching the site.

2. Crude Oil Pump Stations, Producing Wells, Tank Batteries and Associated Production Facilities, Refineries, Gas Plants and Compressor Stations. A danger sign or signs shall be posted within 50 feet of each crude oil pump station, producing well, tank battery and associated production facility, refinery, gas plant and compressor station to alert the public of the potential hydrogen sulfide danger. If fenced, a danger sign at the gates shall suffice. The signs shall read "DANGER – POISON GAS –

HYDROGEN SULFIDE PRESENT," or, as appropriate, "CAUTION – POISON GAS – HYDROGEN SULFIDE MAY BE PRESENT" or use equivalent language approved by the division. Each sign shall be painted in colors that satisfy Table 1 of ANSI standard Z53.1–1967 or regulations of the federal occupational safety and health administration, or in another color approved by the division. The signs shall be legible and large enough to be read by all persons entering the site. A sign shall be placed at each point where a flow line or gathering line crosses a public road; each sign shall be legible and shall contain the name of the owner or operator and an emergency telephone number.

G. Protection from Hydrogen Sulfide During Drilling, Completion, Workover, and Well Servicing Operations.

1. API Standards. All drilling, completion, workover and well servicing operations where a concentration of above 100 ppm is present where it is reasonably expected that a potentially hazardous volume of hydrogen sulfide will be encountered shall be conducted with due consideration to the guidelines published by the API entitled "Recommended Practice for Oil and Gas Well Servicing and Workover Operations Involving Hydrogen Sulfide," RP-68, and "Recommended Practices for Drilling and Well Servicing Operations Involving of Wells Containing Hydrogen Sulfide," RP-49, most recent editions.

2. Minimum Standards. At a minimum, each drilling, completion, workover and well servicing operation where a potentially hazardous volume of hydrogen sulfide may reasonably be expected to be encountered shall be conducted in accordance with the following:

a. Before Commencing Operations. Hydrogen sulfide training shall be completed and warning systems shall be operational before commencement of operations. Detection and monitoring equipment is not required for drilling from the surface to within 500 feet of the zone anticipated to contain hydrogen sulfide.

b. Egress Routes. The person, operator or facility shall maintain passable egress routes at all times during operations.

2. Detection and Monitoring Equipment. <u>All drilling, completion, workover and well</u> servicing operations where a concentration of above 100 ppm is present. The person, operator or facility shall provide hydrogen sulfide detection and monitoring equipment as follows:

a. Each drilling and completion site shall have an accurate and precise hydrogen sulfide detection and monitoring system that will automatically activate visible and audible alarms when the ambient air concentration of hydrogen sulfide reaches a predetermined value set by the operator, not to exceed 20 ppm. There shall be a sensing point 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.

ii. The detection system shall be calibrated and tested and the results recorded monthly. Each test of the hydrogen sulfide monitoring system shall be recorded on the driller's log or its equivalent.

b. For workover and well servicing operations, one operational sensing point shall be located as close to the well bore as practical. Additional sensing points may be necessary for large or long-term operations.

c. Hydrogen sulfide detection and monitoring equipment must be provided and must be made operational during drilling when drilling is within 500 feet of a zone anticipated to contain hydrogen sulfide and continuously thereafter through all subsequent drilling.

<u>3.</u> Wind Indicators. <u>All drilling, completion, workover and well servicing operations</u> where a concentration of above 100 ppm is present shall provide wind indicators.

a. Equipment to indicate wind direction shall be present and visible at all times. At least two devices to indicate wind direction shall be installed at separate elevations and visible from all principal working areas at all times.

b. When a sustained concentration of hydrogen sulfide is detected in excess of 20 ppm at any detection point, red flags shall be displayed.

<u>4. Flare System.</u> For drilling and completion operations <u>in an area where it is reasonably</u> <u>expected that a potentially hazardous volume of hydrogen sulfide will be encountered</u>, the person, operator or facility shall install a flare system to safely gather and burn hydrogen sulfide-bearing gas. Flare outlets shall be located at least 150 feet from the well bore. Flare lines shall be as straight as practical. The flare system shall be equipped with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall be provided supplemental fuel to maintain ignition.

5. Use of Well Control Equipment. When the 100 ppm radius of exposure includes a public area, the following additional measures shall be required:

a. Drilling. A remote controlled <u>well control system choke and accumulator</u> shall be installed and operational at all times beginning when drilling is within 500 feet of the formation believed to contain hydrogen sulfide and continuously thereafter during drilling. The <u>well control system</u> remote controlled choke must include, at a minimum, a pressure and hydrogen sulfide-rated well control choke and kill system including manifold and blowout preventer that meets or exceeds the specifications API-16C and API-RP 53 or other specifications approved by the division. The blowout preventer stack shall have at least one spool for the kill and choke lines, two pipe rams, one blind ram, one annular device and a rotating head. Mud-gas separators shall also be used. These systems shall be tested and maintained pursuant to the specifications referenced, according to the requirements of this part, or otherwise as approved by the division.

b. Completion, Workover and Well Servicing. <u>A remote controlled pressure and</u> <u>hydrogen sulfide rated well control system that meets or exceeds API specifications or other</u> <u>specifications approved by the division shall be installed and operationsla at all times during completion,</u> <u>workover and servicing of a well.</u> If feasible, the equipment described in the previous subsubparagraph <u>shall be installed and operational at all times during completion, workover and well servicing of a well.</u> If <u>not feasible, a suitable alternative to a remote choke such as a remote controlled valve or blow out</u> <u>preventer with remote accumulator may be used, so long as the alternative equipment will be protective of</u> <u>public safety.</u>

<u>6.</u> Mud Program. <u>All drilling, completion, workover and well servicing operations</u> where a concentration of above 100 ppm is present shall provide a hydrogen sulfide mud program capable of handling hydrogen sulfide conditions and well control, including de-gassing and flaring, shall be used.

<u>7.</u> Well Testing. Except with prior approval <u>of by</u> the division, drill-stem testing of a zone that contains hydrogen sulfide shall be <u>conducted only during daylight hours and elosed chamber</u> only, in that formation fluids shall not be permitted to flow to the surface (closed chamber only).

<u>8.</u> If Hydrogen Sulfide Encountered During Operations.

a. If hydrogen sulfide was not anticipated at the time the division issued a permit to drill but is encountered during drilling in a concentration of 100 ppm or greater in the gaseous mixture, the operator <u>must satisfy the requirements of this section before continuing drilling operations</u>. <u>shall</u> <u>immediately ensure control of the well, suspend drilling operations unless detrimental to well control,</u> take whatever measures are necessary under the circumstances to assure public safety, calculate the radius of exposure and, if a potentially hazardous volume is present, prepare a hydrogen sulfide contingency plan and obtain materials and equipment to bring operations into compliance with this section. The operator shall notify the division of the event and the mitigating steps that have or are being taken as soon as possible, but no later than 24 hours following discovery. The division may grant verbal approval to continue drilling operations pending preparation of any required hydrogen sulfide contingency plan.</u>

b. If Hydrogen Sulfide Is Encountered During Use of Air, Gas, Mist or Other Non-Mud Circulating Media. If hydrogen sulfide gas in excess of 100 ppm is encountered while drilling with air, gas, mist or other non-mud circulating mediums, the well shall be killed with a water- or oilbased mud, and mud shall be used thereafter as the circulating medium for continued drilling. An alternate drilling method may be used if specifically approved by the division.

H. Protection from Hydrogen Sulfide at Crude Oil Pump Stations, Producing Wells, Tank Batteries and Associated Production Facilities, <u>Pipelines</u>, Refineries, Gas Plants and Compressor Stations.

1. API Standards. Operations at crude oil pump stations and producing wells, tank batteries and associated production facilities, refineries, gas plants and compressor stations containing a potentially hazardous volume of hydrogen sulfide where a concentration of hydrogen sulfide above 100 ppm is present shall be conducted with due consideration to the guidelines published by the API in its publication entitled "Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide," RP-55, latest edition.

2. Minimum Standards. At a minimum, operations at crude oil pump stations and producing wells, tank batteries and associated production facilities, refineries, gas plants and compressor stations containing a potentially hazardous volume of hydrogen sulfide shall also be conducted in accordance with the following subparagraphs and subsubparagraphs.

2. Security Fencing. Well sites and other unattended, fixed surface facilities shall be protected from public access by fencing with locking gates when the location is within 1/4 mile of a public area. A surface pipeline shall not be considered a fixed surface facility for purposes of this paragraph. Fencing and gates shall be required when crude oil pump stations and producing wells, tank batteries and associated production facilities are located in a public area or within a 1/4 mile of a building or structure used as a dwelling, office, place of business, church, school, hospital or government building or within 1/4 mile of a park, playground or school bus stop. The fence shall consist of a 5-foot chain link topped by two stands of barbed wire or other design approved by the division. Gates shall be locked when unattended.

<u>3.</u> Wind Direction Indicators. <u>All crude oil pump stations, producing wells, tank</u> <u>batteries and associated production facilities, pipelines, refineries, gas plants and compressor stations</u> <u>where a concentration of hydrogen sulfide of above 100 ppm is present shall provide equipment to</u> <u>indicate wind direction.</u> The wind direction equipment shall be installed and visible from all principal <u>working areas at all times.</u> Wind direction indicators shall be required.

<u>4. Secondary Well Control Equipment</u>. <u>All crude oil pump stations, producing wells, tank batteries and associated production facilities, pipelines, refineries, gas plants and compressor stations where a concentration of hydrogen sulfide of above 100 ppm is present shall provide well control equipment as provided herein. Any well shall possess a secondary means of immediate well control through the use of appropriate christmas tree or downhole completion equipment. Such equipment shall allow downhole accessibility (reentry) under pressure for permanent well control <del>operations</del>. In addition, safety devices such as automatic shut-down devices shall be installed and maintained in good operating condition. Alternatively, safety procedures shall be established designed to prevent the undetected release of hydrogen sulfide. Any well shall possess a secondary means of immediate well control through the use of an appropriate christmas tree or downhole completion equipment. Such equipment shall permit the downhole accessibility (re-entry) under pressure for immediate well control through the use of an appropriate christmas tree or downhole completion equipment. Such equipment shall permit the downhole accessibility (re-entry) under pressure for immediate well control.</u>

d. Automatic Safety Valve or Shutdown. Any well shall possess an automatic safety valve or shutdown at the facility or wellhead or other appropriate shut in control. The automatic safety valve shall be set to activate upon a release of a volume of hydrogen sulfide that may create a concentration of hydrogen sulfide of 100 ppm in any public area, 500 ppm at any public road or 100 ppm 3,000 feet from the site of release.

5. Tanks or vessels. Each stair or ladder leading to the top of any tank or vessel containing 300 ppm or more of hydrogen sulfide in the gaseous mixture shall be chained or marked to restrict entry. Any tank or tank battery that requires fencing pursuant to this section may substitute a danger sign posted at the gates for chaining and signs.

<u>6.</u> Compliance Schedule. Each existing crude oil pump station and producing well, tank battery and associated production facility, <u>pipeline</u>, refinery, gas plant and compressor station not currently meeting the requirements <u>of this subsection and minimum standards set forth herein</u> shall be brought into compliance within one year of the effective date of this section. Each crude oil pump station

and producing well, tank battery and associated production facility constructed following the effective date of this section shall be designed, constructed and operated to meet the requirements set forth herein.

I. Personnel Protection and Training. All persons responsible for the implementation of any hydrogen sulfide contingency plan shall be provided training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.

J. Standards for Equipment That May Be Exposed to Hydrogen Sulfide. <u>Whenever a potentially</u> <u>hazardous volume of hydrogen sulfide is present or may reasonably be expected to be encountered</u>, persons, operators and facilities shall <u>select choose</u> equipment with consideration for both the hydrogen sulfide working environment and anticipated stresses <u>and use</u> NACE Standard MR0175 (latest edition) or some other standard approved by the division shall be used for selection of metallic equipment or, if applicable, <u>provide</u> adequate protection by chemical inhibition or other methods that control or limit the corrosive effects of hydrogen sulfide shall be used.

K. Exemptions. Any person, operator or facility may petition the director<u>or the director's</u> <u>designee</u> for an exemption to any requirements of this section. Any such petition shall provide specific information as to the circumstances that warrant approval of the exemption requested and how the public safety will be protected. A safety plan required by other governmental agencies may accompany the <u>petition for exemption</u>. The director, <u>or the director's deisgnee</u>, after considering all relevant factors, may approve an exemption if the circumstances warrant an exemption.

L. Release. Upon a release of hydrogen sulfide the following actions must be taken:

1. Activation of the Hydrogen Sulfide Contingency Plan. The hydrogen sulfide contingency plan shall be activated in the event of a release that may create a concentration of hydrogen sulfide of 100 ppm in any public area, 500 ppm at any public road or 100 ppm 3,000 feet from the site of release. [moved to contingency plans]

2. Notification of the Division. The person, operator or facility shall notify the division upon a release of hydrogen sulfide requiring activation of the hydrogen sulfide contingency plan, preferably within one hour of discovery of the release, but as soon as possible, but no more than four hours after plan activation, recognizing that a in cases where prompt response should supercede notification. The person, operator or facility shall submit a full report of the incident to the division on Form C-141 no later than fifteen (15) days following the release.

M. Electronic Submission. Any submission to the division required by this section shall be made electronically in a generally accepted format that is compatible with the division's systems. [moved to contingency plan section]

N. Corrective Actions. The division may require corrective actions if necessary to maintain control of a well or any other facility or to safeguard public safety.