H2S – 064

GENERAL CORRESPONDENCE

2018 - Present

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Tuesday, April 24, 2018 1:52 PM
To: 'Grant McAfee'
Cc: Griswold, Jim, EMNRD
Subject: New Mexico Oil Conservation Division (OCD) H2S Information (H2S-64)
Attachments: H2S CPs CJC 12-20-2017.pdf; H2S RB 12-20-2017.pdf

Grant:

Pleasure meeting with you and Jim Griswold today in Santa Fe about Lucid's plans in New Mexico and Hydrogen Sulfide Gas Contingency Plans.

After you left, Jim explained OCD could simply list any new facilities, etc. with H2S Contingency Plans with amended designations, H2S-64-1, H2S-64-2, H2S-64-3…… Consequently, OCD would recognize Lucid and the amended numbers attached to the main H2S Contingency Plan would track all of Lucid's facilities.

As promised, please find attached OCD's presentation on the H2S Regulations and another presentation as an FYI.

Please contact me if you have questions.

Thank you.

Mr. Carl J. Chavez, CHMM (#13099)
New Mexico Oil Conservation Division
Energy Minerals and Natural Resources Department
1220 South St Francis Drive
Santa Fe, New Mexico 87505
Ph. (505) 476-3490
E-mail: CarlJ.Chavez@state.nm.us
"Why not prevent pollution, minimize waste to reduce operating costs, reuse or recycle, and move forward with the rest of the Nation?" (To see how, go to: http://www.emnrd.state.nm.us/OCD **and see "Publications")**

OCD H2S TRAINING FOLDER

L:\ENVIRONM\WORD\COMMON\OCD Training\OCD REGULATIONS\OCD\Rule 11 H2S

H2S HAZ. VOLUME (PHV)/ H2S CP ACTIVATION

- **1) 100 ppm ROE includes public area;**
- **2) 500 ppm Roe includes public road; or**
- **3) 100 ppm ROE exceeds 3000 ft.**

H2S CP STD PROCESS

- **Field Pipeline and Other H2S Source Gas Related Releases**
  - Was source of H2S concentration > 100 ppm H2S? Ask questions.
    - If yes, ask operator if an H2S CP exists?
    - If yes, was the H2S CP activated? If yes or no, refer H2S related gas releases with copy of the C-141 Form to OCD- SF for compliance with Part 11.
    - Field staff treat H2S gas releases similar to other gas releases under Part 29 with C-141 Forms sent to district office for handling.
- **OCD Requirement: If [H2S] present at 100 ppm or greater, and PHV is present, Operators must submit H2S CP to OCD for review and acceptance for the administrative record, and comply with it henceforth. Not a permit.**
- **OCD H2S CPs tracked as "H2S" ON OCD ONLINE "IMAGING"**
  - UPSTREAM FACILITIES (AT OR NEAR O&G WELL HEAD) District Office
    - Tank Batteries, gas gathering lines,…
  - DOWNSTREAM FACILITIES (FAR AWAY FROM WELL HEAD) Environ. Bureau
    - Refineries, Gas Plants, Compressor Stations, Pipelines…

H2S GAS

- OCD Regulations: 19.15.11.1-16 NMAC (H2S GAS) 2001/2008
  - http://www.emnrd.state.nm.us/OCD/documents/SearchablePDFofOCDTitle19Chapter15-Revised10-5-16.pdf
- **19.15.11.3 STATUTORY AUTHORITY:** 19.15.11 NMAC is adopted pursuant to the O&G Act, NMSA 1978, Section 70-2-6, Section 70-2-11 and Section 70-2-12. [19.15.11.3 NMAC - N, 12/1/08]
- **19.15.11.6 OBJECTIVE:** To require O&G operations be conducted in a manner that protects the public from exposure to H2S gas. [19.15.11.6 NMAC - N, 12/1/08]
- **OCD H2S CP- CP** (not a permit)
  - RBDMS TRACKING: "H2S" ON OCD ONLINE "IMAGING"
    - UPSTREAM (AT OR NEAR O&G WELL HEAD) DO Reviews
    - DOWNSTREAM FACILITIES (FURTHER AWAY FROM WELL HEAD) SF ENV BUREAU

H2S GAS PHYSICAL PROPERTIES

CAS No.	7783-06-4
Molecular Formula	H2S
Molecular Weight	34.082 g/mol
Ceiling Concentration	20 ppm (OSHA)
Ceiling Peak Concentration	50 ppm (OSHA)
Threshold Limit Value (TLV)	15 ppm (ACGIH)
Time Weighted Average (TWA)	10 ppm (NIOSH)
Short Term Exposure Level (STEL)	15 ppm (ACGIH)
Immediately Dangerous to Life or Health (IDLH)	100 ppm
Specific Gravity Relative to Air (Air=1.0)	1.189
Boiling Point	-76.5F
Freezing Point	-121.8F
Vapor Pressure	396 psia
Autoignition Temperature	518F
Lower Flammability Limit	4.3%
Upper Flammability Limit	46.0%
Stability	Stable
pH in water 3	
Corrosivity	Reacts with metals, plastics, tissues and nerves

H2S GAS PHYSICAL EFFECTS

Physical Effects of H2S Concentration

PPM	%	Physical Effects
1	0.00010	Can be smelled (rotten egg odor)
10	0.0010	Obvious & unpleasant odor; Permissible exposure level; safe for 8 hour exposure
20	0.0020	Acceptable ceiling concentration
50	0.0050	Loss of sense of smell in 15 minutes
100	0.0100	Immediately dangerous to life and health(IDLH) loss of sense of smell in 3-15 minutes; stinging in eyes & throat; Altered breathing
200	0.0200	Kills smell rapidly; stinging in eyes & throat
500	0.0500	Dizziness; Unconscious after short exposure; Need artificial respiration
700	0.0700	Unconscious quickly; death will result if not rescued promptly
1000	0.1000	Instant unconsciousness; followed by death within minutes

SOME KEY DEFINITIONS

I. PUBLIC AREA: means a 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 a 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

J. PUBLIC ROAD: means a federal, state, municipal or county road or highway

K. RADIUS OF EXPOSURE: Pasquill-Gifford Algorithmic Air Dispersion Model to determine conservative areas where potentially hazardous vol. of H2S gas may be present based on an acceptable escape rate

THRESHOLD & H2S CP REQUIREMENTS

- **19.15.11.8 REGULATORY THRESHOLD:**
  - **B.** Concentrations determined to be below 100 ppm. If the H2S concentration in a given well, facility or operation is less than 100 ppm, the person is not required to take further actions pursuant to 19.15.11 NMAC.
  - **C.** Concentrations above 100 ppm. The person shall calculate the radius of exposure and comply with applicable requirements of 19.15.11 NMAC. If PHV present, provide H2S ROE to OCD. For a well, facility or operation, the person shall accomplish the determination, calculation and submission 19.15.11.8 NMAC requires before operations begin.
- **19.15.11.9 H2S CP:**
  - **B(2). Plan contents.** Required contents. The H2S CP shall contain information on subjects, as appropriate to the well, facility or operation to which it applies (see OCD Checklist).
  - **C. Plan activation**. The person shall activate the H2S CP when a release creates a H2S concentration greater than the activation level set forth in the H2S CP. At a minimum, the person shall activate the plan whenever a release may create a H2S concentration of more than 100 ppm in a public area, 500 ppm at a public road or 100 ppm 3000 feet from the site of release.

NOTIFICATION OF THE DIVISION

- **19.15.11.16 NOTIFICATION OF THE DIVISION:**
  - The person shall notify the division upon a release of H2S requiring activation of the H2S CP as soon as possible, but no more than 4 hours after plan activation, recognizing that a prompt response should supersede notification. The person shall submit a full report of the incident to the division on form C-141 no later than 15 days following the release.

CP REQUIREMENTS

- **19.15.11.9(E) FAILURE TO SUBMIT A PLAN:**
  - A person's failure to submit a H2S CP 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 well, facility or operation.

H2S CP REVIEW CHECKLIST (COMMUNICATION TOOL)

OIL CONSERVATION DIVISION

H2S CONTINGENCY PLAN
REQUIRED BY OCD RULE
19.15.11 NMAC

DCP Zia II Gas Processing Plant w/ Two AGI Wells
(H2S-063)
DCP Zia II Gas Processing Plant
5/5/2015

Contingency Plan Requirements Checklist					
19.15.11.9.B NMAC Requirement	**Included?**	**Page in Document?**		**OCD Notes**	**Geolex Comments/Actions**
Emergency Procedures					
Responsibilities & duties of personnel during emergency	Y	Pg. 2 - 3; Figure 7; Appdx. A & B			
Immediate action plan	Y	Pg. 3 & 16; Appdx. A & B			
Evacuation and shelter in place plans	Y	Pgs. 5 - 8; Figs. 2e & 4 & Appdx. A			
Telephone numbers of emergency responders	Y	Pg. 4 & Appdx. C			
Telephone numbers of public agencies	Y	Appdx. C		Should the NM Office of Public Safety phone number be included under the COUNTY AND LOCAL LAW ENFORCEMENT AND PUBLIC AGENCIES in Appdx. C? BLM appears to be needed on the list(s).	The number for the New Mexico Office of Public Safety and the number for the BLM Field Office in Carlsbad, NM have been added to **Appendix C** under **COUNTY AND LOCAL LAW ENFOREMENT AND PUBLIC AGENCIES**.
Telephone numbers of local government	Y	Appdx. C			
Telephone numbers of appropriate public authorities	Y	Appdx. C			
Location of potentially affected public areas Also see 19.15.11.12.B & D	Y	Fig. 4		Plant appears isolated with 4 roadways potentially affected by a 3 mile ROE_{100}.	
Location of potentially affected public roads	Y	Pg. 4; Figs. 1 & 4			
Proposed evacuation routes, with locations of road blocks	Y	Pgs. 5 - 6; Figs. 2e & 4			
Procedures for notifying the public	Y	Pg. 14 &16; Appdx. C			
Availability and location of safety equipment and supplies Also see 19.15.11.12.C	Y	Pg. 6 - 8; Figs. 2, 2a, 2b, 2c & 2d			
Characteristics of hydrogen sulfide and sulfur dioxide					
Discussion of characteristics	Y	Pgs. 9 - 10			
Maps and Drawings					
Area of exposure	Y	Pg. 12, Fig. 4 & Appdx. D		Verified radii of exposure w/ OCD's PG Calc. ROE_{100} over 2 miles, but in isolated area w/ exception of Hwy 248/128 ~0.22 mi. due N of AGI Well No.1.	
Public areas within area of exposure	Y	Pg. 4 - 5		No population in area (isolated).	
Public roads within area of exposure	Y	Fig. 4		Four county roads intersect ROE_{500}	
Training and Drills					
Training of personnel to include responsibilities, duties, hazards, detection, personal protection and contingency procedure	Y	Pgs. 8, 14 - 15; Figs. 2b, 2c, 2d, 2e & 3; and Appdx A & B			
Periodic drills or exercises that simulate a release	Y	Pgs. 14 - 15			
Documentation of training, drills, & attendance	Y	Pgs. 15 - 16			
Training of residents on protective measures	Y	Pg. 15		No residents within ROE, but O & G Producers are present. **OCD will require monitoring for residential building within ROE100 to identify any new residents to include in plan.**	Language to this effect has been added on **Pg. 15** of the plan.
Briefing of public officials on evacuation or shelter-in-place plans	Y	Pgs. 1, 4, 5, 14, & 15 - 16; Figs. 4 - ; Appdx. A Level II & III		BLM needs to be included in training, etc., since facility is located on Federal lands.	BLM has beed added to all sections of text which refer to notification, location and training, including pgs. **iv, 1, 3, 4, 5, 15, 16 & 17,** as well as **Appendix A (Levels 2 & 3)**, and **Appendix B (Levels 2 & 3).** The BLM Field Office in Carlsbad, NM has been added on **p. 15** under the section "**Training for Public Officials and Response Agencies"**.
Coordination with state emergency plans					

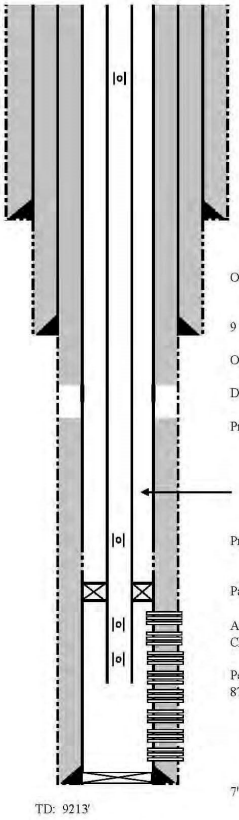
GAS PLANTS W/ AGI WELLS

Figure 7

DCP Midstream
API # 30-025-38576

DCP LINAM AGI #1
WELLBORE SCHEMATIC

Location: 1980' FSL, 1980' FWL
STR 30-T18S-R37E
County, St.: LEA, NEW MEXICO



SURFACE CASING:
13 3/8", 48.00#/ft, H40, STC at 530'

INTERMEDIATE CASING:
9 5/8", 40.00#/ft, J55, LTC at 4212'

PRODUCTION CASING:
7", 26.00#/ft, L80, STC at 9200'
PBTD = 9137'

TUBING:
Subsurface Safety Valve at 250 ft
3 1/2", 9.2#/ft, L80, Hunting SLF at 8650'

PACKER:
Permanent Production Packer
Adjustable Choke
Check valve

PACKER FLUID (CORROSION INHIBITED):
Diesel w/ Cortron R-2525 (Corrosion inhibitor and oxygen scavenger)

PERFORATIONS:

Primary Target	Secondary Target
Lower Bone Springs	Brushy Canyon
8710' - 8730'	5000' to 5300'
8755' - 8765'	(Not perforated)
8780' - 8795'	
8780' - 8890'	
8925' - 8930'	
8945' - 8975'	
8985' - 9000'	
9045' - 9085'	

DEFINITIONS

- **19.15.11.7 DEFINITIONS:**
  - A. ANSI (American National Stds. Institute)
  - B. AREA OF EXPOSURE
  - C. DISPERSION TECHNIQUE
  - D. ESCAPE RATE
  - E. GPA (Gas Processors Association)
  - F. LEPC (Local Emergency Planning Committee)
  - G. NACE (National Assoc. of Corrosion Engineers)
  - H. POTENTIALLY HAZARDOUS VOLUME
    - 1) 100 PPM ROE INCLUDES PUBLIC AREA;
    - 2) 500 PPM ROE INCLUDES PUBLIC ROAD; OR
    - 3) 100 PPM ROE EXCEEDS 3000 FT.
  - I. PUBLIC AREA
  - J. PUBLIC ROAD
  - K. RADIUS OF EXPOSURE (100 & 500 PPM ALGORITHMS)

REGULATORY THRESHOLD

- **19.15.11.8 REGULATORY THRESHOLD:**
  - A. Determination of H2S concentration
  - B. Concentrations determined to be below 100 ppm
  - C. Concentrations determined to be above 100 ppm
    - 1. > 100 ppm: calc. ROE & comply with 19.15.11 NMAC
    - 2. ROE shows PHV eval., provide [H2S] & calc. to OCD. For well, facility or oper., complete determin., calc., and submission before Oper. begins.
  - D. Recalculation. Provide change results to OCD within 60 days.

H2S CP

- **19.15.11.9 H2S CP:**
  - A. When required
  - B. Plan contents
    - API Guidelines
    - Required contents
    - Emergency procedures
    - Characteristics of H2S and SO2
    - Maps & Drawings
    - Training & Drills
    - Coordination w/ state emergency plans
    - Activation levels
    - Plan activation
  - C. Plan Activation
  - D. Submission
  - E. Failure to submit plan
  - F. Review, amendment
  - G. Retention & inspection
  - H. Annual Inventory of CPs
  - I. Plans required by other jurisdictions

H2S CP SUBMISSION

- **19.15.11.9 H2S CP:**
  - **D.** Submission.
    - **(2)** When submitted. The person shall submit a H2S CP for a new well, facility or operation before operations commence. The plan for a drilling, completion, workover or well servicing operation shall be on file with the division before operations commence and may be submitted separately or along with the APD or may be on file from a previous submission. A person shall submit a plan within 180 days after the person 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.

FAILURE TO SUBMIT H2S CP

- **19.15.11.9 H2S CP:**
  - **E.** Failure to submit plan.
    - A person's failure to submit a H2S CP 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 well, facility or operation.

REVIEW, AMENDMENT OF H2S CP

- **19.15.11.9 H2S CP:**
  - **F.** Review, amendment. The person shall review the H2S CP any time a subject addressed in the plan materially changes and make appropriate amendments. If the division determines that a H2S CP is inadequate to protect public safety, the division may require the person to add provisions to the plan or amend the plan as necessary to protect public safety.

REVIEW, AMENDMENT OF H2S CP

- **19.15.11.9 H2S CP:**
  - **F.** Review, amendment. The person shall review the H2S CP any time a subject addressed in the plan materially changes and make appropriate amendments. If the division determines that a H2S CP is inadequate to protect public safety, the division may require the person to add provisions to the plan or amend the plan as necessary to protect public safety.

REVIEW, AMENDMENT OF H2S CP

- **19.15.11.10 SIGNS, MARKERS:**
- For each well, facility or operation involving a H2S concentration of 100 ppm or greater, the person shall install and maintain signs or markers that conform with the current ANSI standard Z535.1-2002 (Safety Color Code), or some other division-approved standard. The sign or marker shall be readily readable, and shall contain the words "poison gas" and other information sufficient to warn the public that a potential danger exists. The person shall prominently post signs or markers at locations, including entrance points and road crossings, sufficient to alert the public that a potential danger exists.

FIGURE 4
PHOTO OF FLASHING SIGN

PROTECTION DURING DRILLING, COMPLETION, WORKOVER AND WELL SERVICING OPERATIONS

- **19.15.11.11 PROTECTION FROM H2S DURING DRILLING, COMPLETION, WORKOVER AND WELL SERVICING OPERATIONS**
  - A. API standards
  - B. Detection & monitoring equipment
  - C. Wind indicators
  - D. Flare systems
  - E. Well control equipment
  - F. Mud program
  - G. Well testing
  - H. If H2S encountered during operations

REFERENCED API PUBS

RP49 Recommended Practice for Drilling and Well Service Operations Involving H2S

- Recommendations set forth in this publication apply to oil and gas well drilling and servicing operations involving H2S. These operations include well drilling, completion, servicing, workover, downhole maintenance, and plug and abandonment procedures conducted with H2S present in the fluids being handled. Coverage of this publication is applicable to operations confined to the original wellbore or original total depth and applies to the selection of materials for installation or use in the well and in the well drilling or servicing operation(s). The presence of H2S in these operations also presents the possibility of exposure to sulfur dioxide from the combustion of H2S. Pages: 29
- 2nd Edition I May 2001 I Reaffirmed: March 2007 Product Number: G049003 I Price: $88.00 You may access RP 49 in a read-only platform: publications.api.org

REFERENCED API PUBS

RP54 Recommended Practice for Occupational Safety for Oil and Gas Well Drilling and Servicing Operations

- Includes procedures for promotion and maintenance of safe working conditions for employees engaged in rotary drilling operations and well servicing operations, including special services. Applies to rotary drilling rigs, well servicing rigs, and special services as they relate to operations on locations. Pages: 35
- 3rd Edition I August 1999 I Reaffirmed: March 2007 Product Number: G54003 I Price: $125.00 You may access RP 54 in a read-only platform: publications.api.org

REFERENCED API PUBS

RP55 Conducting Oil and Gas Producing and Gas Processing Plant Operations Involving H2S

- Covers recommendations for protection of employees and the public, as well as conducting oil and gas producing and gas processing plant operations where H2S is present in the fluids being produced. Pages: 40
- 2nd Edition I February 1995 I Reaffirmed: March 2007 Product Number: G55002 I Price: $115.00 You may access RP 55 in a read-only platform: publications.api.org

PROTECTION AT OIL PUMP STATIONS, PRODUCING WELLS, TANK BATTERIES AND ASSOC. PROD. FACILITIES, PIPELINES, REFINERIES, GAS PLANT, AND COMPRESSOR STATIONS

- **19.15.11.12 PROTECTION FROM H2S AT OIL PUMP STATIONS, PRODUCING WELLS, TANK BATTERIES AND ASSOCIATED PRODUCTION FACILITIES, PIPELINES, REFINERIES, GAS PLANTS AND COMPRESSOR STATIONS:**
  - **A. API STDs**
  - **B. Security**
  - **C. Wind direction indicators**
  - **D. Control equipment**

PERSONNEL PROTECTION & TRAINING

- **19.15.11.13 PERSONNEL PROTECTION AND TRAINING:**
  - The person shall provide persons responsible for implementing a H2S CP training in H2S hazards, detection, personal protection and contingency procedures.

STANDARDS FOR EQUIPMENT EXPOSED TO H2S

- **19.15.11.14 STANDARDS FOR EQUIPMENT THAT MAY BE EXPOSED TO H2S:**
  - Whenever a well, facility or operation involves a potentially hazardous H2S volume, the person shall select equipment with consideration for both the H2S working environment and anticipated stresses and shall use NACE Standard MR0175 (latest edition) or some other division approved standard for selection of metallic equipment or, if applicable, use adequate protection by chemical inhibition or other methods that control or limit H2S's corrosive effects.

NACE REFERENCE

NACE

What is NACE?
NACE International, formerly known as National Association of Corrosion Engineers, is a worldwide corrosion society. NACE International provides and publishes standards such as the MR0175 and the MR0103. In these standards, NACE International provides guidance on which corrosion resistant alloys and materials should be used for preventing sulfide stress cracking. These guidelines are determined from the collection of laboratory experimental data and field experience related to cracking resistance of metallic materials in a hydrogen sulfide (H2S) containing environment. In the NACE International standards, a H2S containing environment may also be recognized as a "sour gas environment."

NACE MR0175 and MR0103 Standards
The NACE MR0175 standard, also known as ISO15156 (International Standard), was developed for the prevention of sulfide stress cracking due to H2S in oil and gas production systems. Historically, for the refining process, the MR0175 standard was used as a guideline for choosing suitable materials. However, the refining process environment is outside of the scope of the MR0175 standard. The NACE MR0103 standard was developed to be a refinery-specific sour service materials standard. Like the MR0175 standard, the MR0103 standard provides recommendations on which alloys and materials to use to prevent sulfide stress cracking in an H2S containing environment.

WIKA Factory Approved Pressure Gauges for NACE
For prevention of sulfide stress cracking in H2S containing oil and gas production systems and refinery process environments, WIKA offers several pressure gauges that meet NACE recommendations. These pressure gauges are separated into two main NACE recommended materials listed below.

EXEMPTIONS

- **19.15.11.15 EXEMPTIONS:**
  - A person may petition the director or the director's designee for an exemption to a requirement of 19.15.11 NMAC. A petition shall provide specific information as to the circumstances that warrant approval of the exemption requested and how the person will protect public safety. 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 person protects public safety.

NOTIFICATION OF THE DIVISION

- **19.15.11.16 NOTIFICATION OF THE DIVISION:**
  - The person shall notify the division upon a release of H2S requiring activation of the H2S CP as soon as possible, but no more than four hours after plan activation, recognizing that a prompt response should supersede notification. The person shall submit a full report of the incident to the division on form C-141 no later than 15 days following the release.

OCD ACCEPTANCE FOR RECORD LETTER

State of New Mexico
Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

David Martin
Cabinet Secretary

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

David R. Catanach, Division Director
Oil Conservation Division

NOVEMBER 5, 2015

Julie W. Gutiérrez
Geolex, Inc®
500 Marquette Avenue, NW Suite 1350
Albuquerque, NM 87102

RE: Frontier Field Services, LLC Maljamar Gas Processing Plant and Maljamar AGI Facility (H2S-044): H2S Contingency Plan (Revised October 28, 2015) Section 21, Township 17 South, Range 32 East in Lea County, New Mexico

Dear Mrs. Gutiérrez:

The Oil Conservation Division (OCD) is in receipt of Frontier Field Services, LLC's "Maljamar Gas Processing Plant and Maljamar AGI Facility" H2S Contingency Plan".

OCD has completed its review of the revised plan and finds that it appears to meet the intent of the OCD Hydrogen Sulfide Gas Regulations (19.15.11 NMAC). Therefore, OCD hereby **accepts** the plan for record.

Please be advised that OCD approval of this plan does not relieve Frontier Field Services, LLC of responsibility should its operations fail to adequately detect, investigate, and/or undertake corrective actions to prevent or stop a hydrogen sulfide release(s) that may pose a threat to groundwater, surface water, human health, public safety or the environment. In addition, OCD approval does not relieve Frontier Field Services, LLC of responsibility for compliance with any other federal, state, or local laws and/or regulations.

If you have any questions, please contact Carl Chavez of my staff at (505) 476-3490, mail at the address below, or email at CarlJ.Chavez@state.nm.us. Thank you.

Sincerely,

Jim Griswold
Environmental Bureau Chief

JG/cjc

cc: OCD Hobbs District Office

1220 South St. Francis Drive - Santa Fe, New Mexico 87505
Phone (505) 476-3460 - Fax (505) 476-3462 - www.emnrd.state.nm.us/ocd

LETTER ACCEPTANCE LANGUAGE

- "OCD has completed its review of the revised plan and finds that it appears to meet the intent of the OCD H2S Gas Regulations (19.15.l I NMAC). Therefore, OCD hereby accepts the plan for record."
- OCD continues "check list" comments iterative review process until it can accept H2S CP. OCD doesn't place any document into admin. record in RBDMS "H2S" until "accepted for record."

LETTER DISCLAIMER

"Please be advised that OCD approval of this plan does not relieve (Operator Name) of responsibility should its operations fail to adequately detect, investigate, and/or undertake corrective actions to prevent or stop a H2S release(s) that may pose a threat to groundwater, surface water, human health, public safety or the environment. In addition, OCD approval does not relieve (Operator Name) of responsibility for compliance with any other federal, state, or local laws and/or regulations."

SOME KEY OBSERVATIONS

1. OCD HAS ACCEPTED H2S CP UNDER OLD REGULATIONS ON FILE AND AS LONG AS THE ESCAPE RATE HAS NOT CHANGED, OCD HAS NOT REQUESTED AN UPDATED H2S CP
2. NO PENALTIES OR FINES EXIST IN THE REGULATIONS FOR COMPLIANCE & ENFORCEMENT UNDER REGS. EXCEPT FOR WELL, FACILITY OR OPERATION IN 19.15.9(E) NMAC FAILURE TO SUBMIT PLAN DENIAL OF APD, CANCELLATION, OR OTHER ENFORCEMENT ACTION.
3. OTHER AIR DISPERSION MODELS ARE GENERALLY LESS CONSERVATIVE THAN THE PASQUILL-GIFFORD MODEL
4. OCD REVIEWERS MAY MISTAKENLY CONFUSE 19.15.11.9(C) BELOW AS THE PRE-REQUISITE FOR RECEIPT OF AN H2S CP WHEN ANY CONCENTRATION ABOVE 100 PPM PRECIPITATES AN AOE SUBIMITTAL TO OCD AT MINIMUM TO ASSESS POTENTIAL HAZ VOL. FOR H2S CP REQUIREMENT.
5. THERE ARE ~ 63 "H2S" CP RECORDS ON FILE. IT APPEARS MOST CPS ARE NOT ACCEPTED FOR RECORD UNLESS NO. 6 BELOW IS OBSERVED AT A FACILITY REQUIRING AN OCD H2S CP FULL REVIEW PROCESS.
6. AT A MINIMUM, THE PERSON SHALL ACTIVATE THE PLAN WHENEVER A RELEASE MAY CREATE A H2S CONCENTRATION OF MORE THAN 100 PPM IN A PUBLIC AREA, 500 PPM AT A PUBLIC ROAD OR 100 PPM 3000 FEET FROM THE SITE OF RELEASE. OPERATORS WHO SPECIFY LOWER ACTIVATION LIMITS MUST IMPLEMENT THEIR PLANS AT THEIR PRESCRIBED H2S ACTIVATION LIMITS.

Hydrogen Sulfide

Contingency Plans

19.15.11 NMAC

Table of Contents

Terms and Definitions

Dispersion and Math Model

Radius of Exposure

Requirements for Contingency Plan

Rules for H_2S > 100 ppm

CPlan Status

Questions for H_2S Program

Terms

Radius of Exposure (ROE)

Potentially Hazardous Volume (PHV) ~ public impact

Mole fraction – same as volume fraction

if volume = 5 %, mole fraction = 0.05

if volume = 5 ppm, mole fraction = 0.000005

RP means operator (Responsible Party)

CPlan means Contingency Plan

More Terms

Texas Railroad Commission (TX RRC)

RRC Rule 36 means the Texas H_2S rules, similar to NM

MMscfd means million standard cubic feet/day of gas

M^2cf/d flow rate, Q, same as above

(note: M^2cf/d doesn't imply that an entire day's gas flow will be lost, it's an instantaneous rate)

LEPC Local Emergency Planning Committee

Contingency Plan (CPlan)

CPlans required when H_2S could impact PHVs:

- 100 ppm in any public area,
- 500 ppm on any public road, or
- 100 ppm at 3,000 feet from release site

  (as calculated by a dispersion math model)

Requirements for H_2S

1. All operators (RPs) must test for H_2S
2. If gas contains more than 100 ppm H_2S, RPs must calculate ROEs and see if PHVs exist.
3. If PHVs exist, RPs notify OCD and must prepare CPlans

Dispersion
Radius of Exposure

Inversion, the Worst Case for Dispersion

Dispersion -- Weather

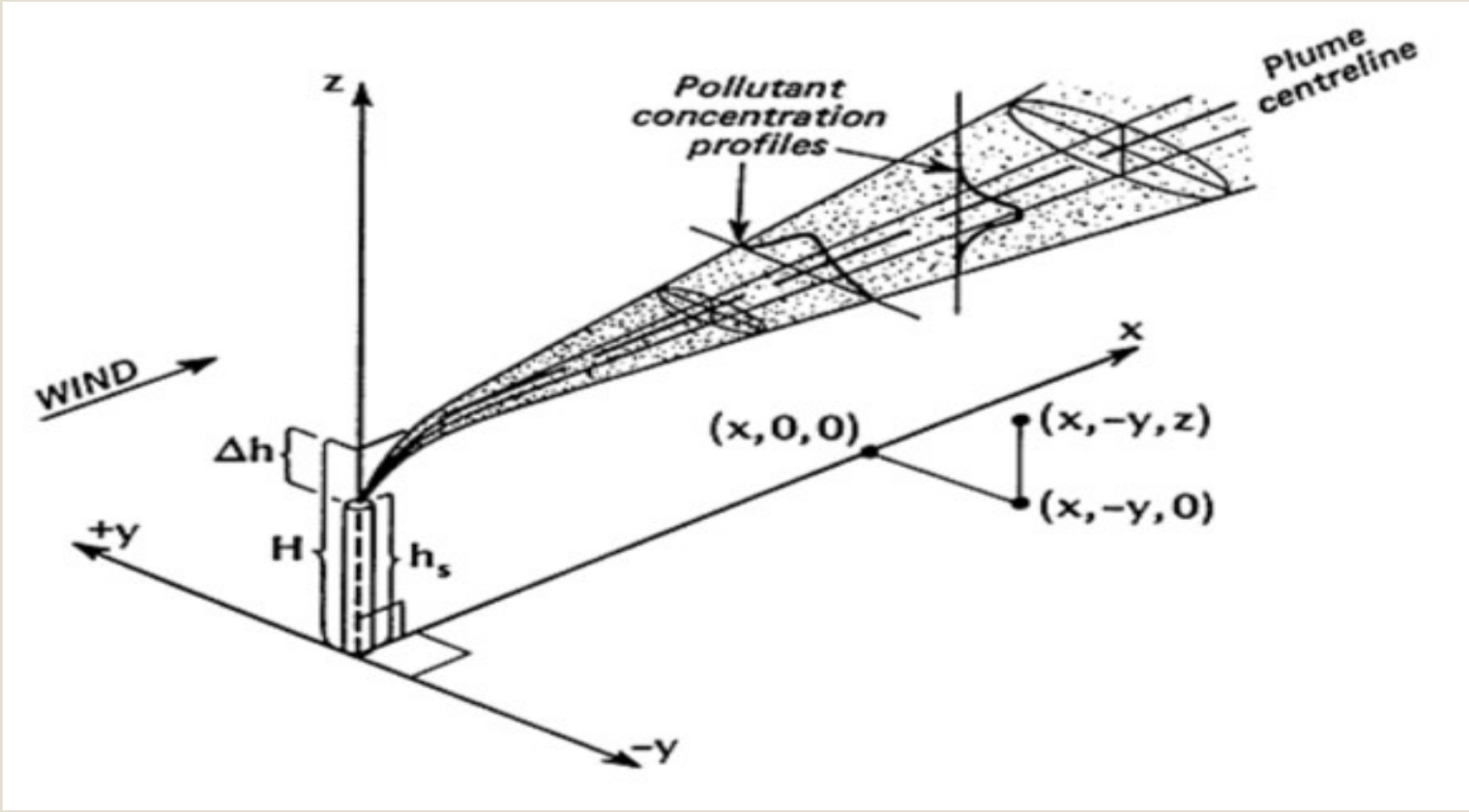
Worst Case Weather (high ROE) means

- **Low wind speed < 1mph, calm**
- **Night time, early morning, cool**
- **Clear skies**

Best Case Weather (low ROE) means

- **High wind speed**
- **Intense sunlight**

Dispersion – Fanning Plume



Dispersion – Radius of Exposure

Radius of Exposure (ROE)

- **Amount H_2S released (MMscfd * concentration)**
- **Any wind direction, max wind speed = 1 mph**
- **Stable WX (worst case: clear night, cool, calm)**
- **For 100 ppm and 500 ppm:**

$$ROE_{(100\ ppm)} = [1.589*Conc*Flow]^{0.6258}$$

$$ROE_{(500\ ppm)} = [0.4546*Conc*Flow]^{0.6258}$$

Dispersion – Radius of Exposure

Example Calculation

Gas flow = 4,000,000 $scft^3$/day (1 atm, 60°F)

Concentration = 3,000 ppm H_2S

Convert ppm to "mole fraction" (= volume fraction)

volume fraction = 3,000/1,000,000 = 0.003

Substitute in formula

$ROE\ (500\ ppm) = [0.4546*Conc*Flow]^{0.6258}$

$ROE\ (500\ ppm) = [0.4546*0.003*4{,}000{,}000]^{0.6258}$

ROE (500 ppm) = 218 feet

Dispersion – ROE in Texas

Example Calculation (as before)

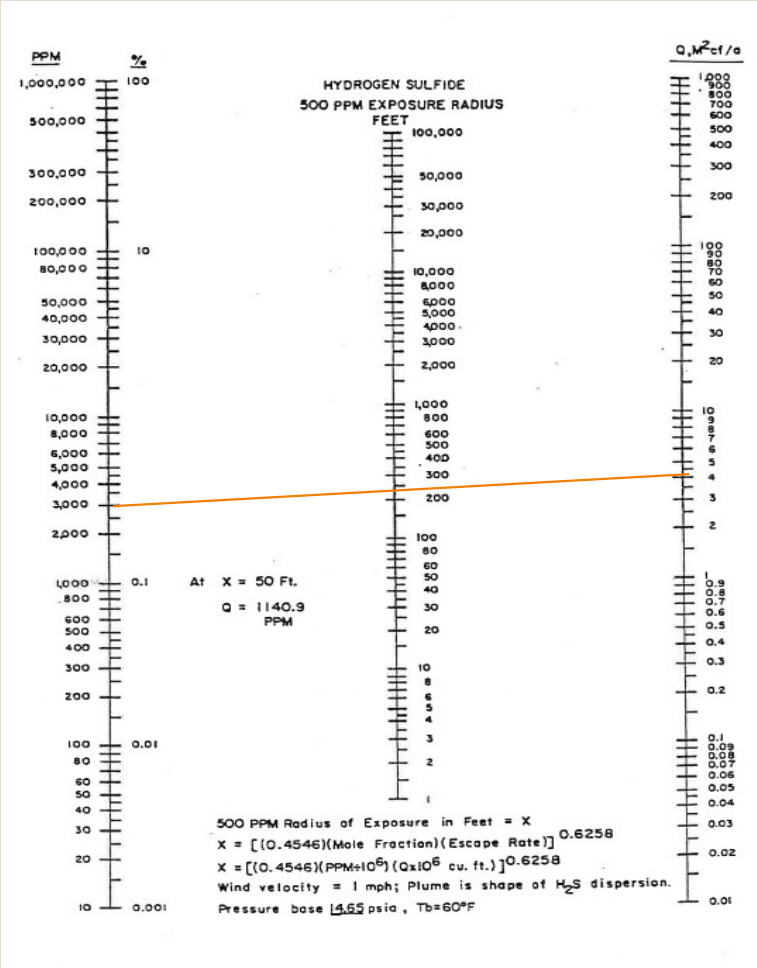
Gas flow = 4,000,000 scft^3/day

Concentration = 3,000 ppm H_2S

Using Nomograph from TX RRC Rule 36:

ROE 220 ft

Q = million standard cubic feet per day



Math Model by Pasquill & Gifford

1961 EPAs first, most used, field tested, and verified

Straight line on log-log graph paper, the power curve

$$Y = A * B^{x}$$

"All Models Are Wrong, but Some Are Useful"

Models must be verified before they can used to predict actual conditions

Assumptions for math models must be understood

P-G Dispersion Power Curve

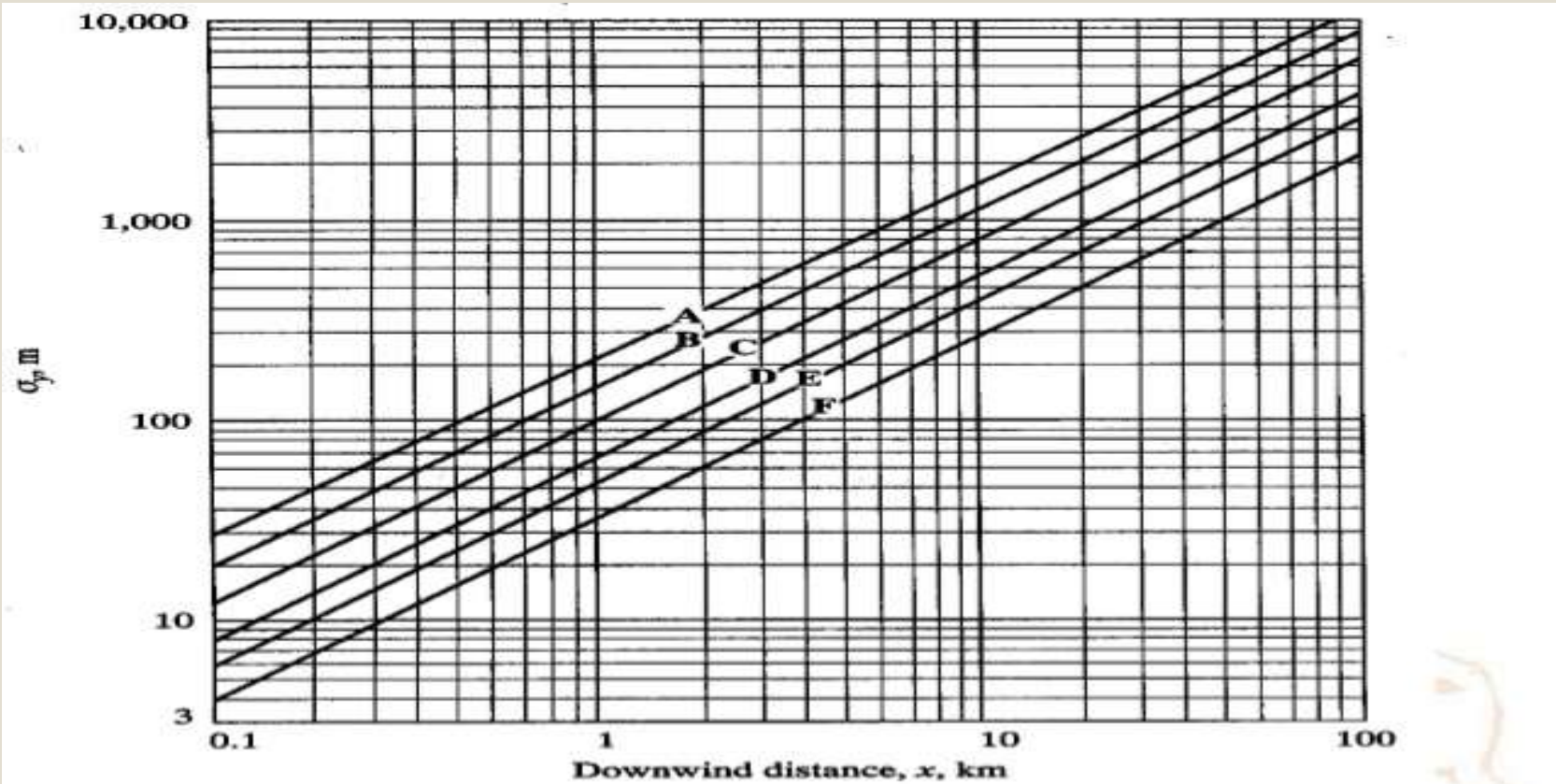


FIGURE 6.7
Horizontal dispersion coefficient σ_y as a function of downwind distance from the source for various stability categories. See Problem 6.16. (From Turner [6].)

Dispersion – Radius of Exposure

Downwind concentration inversely proportional to wind speed

If you double the wind speed, you halve the downwind concentration

If your ROE is 500 ft at 1 mph, then at 2 mph the ROE is 250 ft

Assumptions for P-G Math Model

Constant wind speed (1 mph) & constant direction

No change in air temperature, especially with altitude

No solar radiation or cloud cover

No terrain changes (draws, gullies, hills), must be flat land

No rain or fog

No reaction of H_2S in air or upon contact with land

Ground level emission, same release temp as ambient temp

No vertical or horizontal velocity at release site

Constant gas escape rate and constant H_2S concentration

Maximum downwind distance ~ 1,600 feet

Contingency Plans

What's in a CPlan: Emergency Procedures

- List responders and phone numbers
- List public agencies, govt, LEPC
- Areas of public impact
- Evacuation routes
- Road blocks
- Public notification procedures
- Location of safety equipment

What's in a CPlan: Characteristics

H_2S and SO_2

- Odor detection levels
- Exposure limits, TWA, IDLH
- NFPA, DOT hazard classifications
- Toxicity levels, acute and chronic
- Flammability
- Respiratory protection

What's in a CPlan: Maps and Drawings

- Showing areas of exposure
- Public roads, road block sites
- Dwellings and occupied buildings
- Site layout, alarms, monitors, detectors
- H_2S source locations

What's in a CPlan: Training and Drills

- Content and schedule of training
- Recordkeeping
- Nearby residents and public officials
- Drills for simulating and testing the response

Annual Inventory

CPlan holders must provide LEPC and state emergency response commission with an inventory of wells and facilities for which a CPlan is on file with OCD each year, with name, address, and phone number for point of contact

CPlans – Activations Levels

- Usually 10 ppm or 20 ppm (alarms go off)
- Maximum 100 ppm in public area or 3000 ft from source, 500 ppm at public road

Must notify OCD in 4 hrs if CPlan Activated

Rules if H2S > 100 ppm

(but not a CPlan)

If > 100 ppm, Signs, Markers

"Poison Gas" at entrances, road crossings

If > 100 ppm, Security

For well sites and unattended surface facilities:

If ¼ mile from public area, fencing with locked gates required.

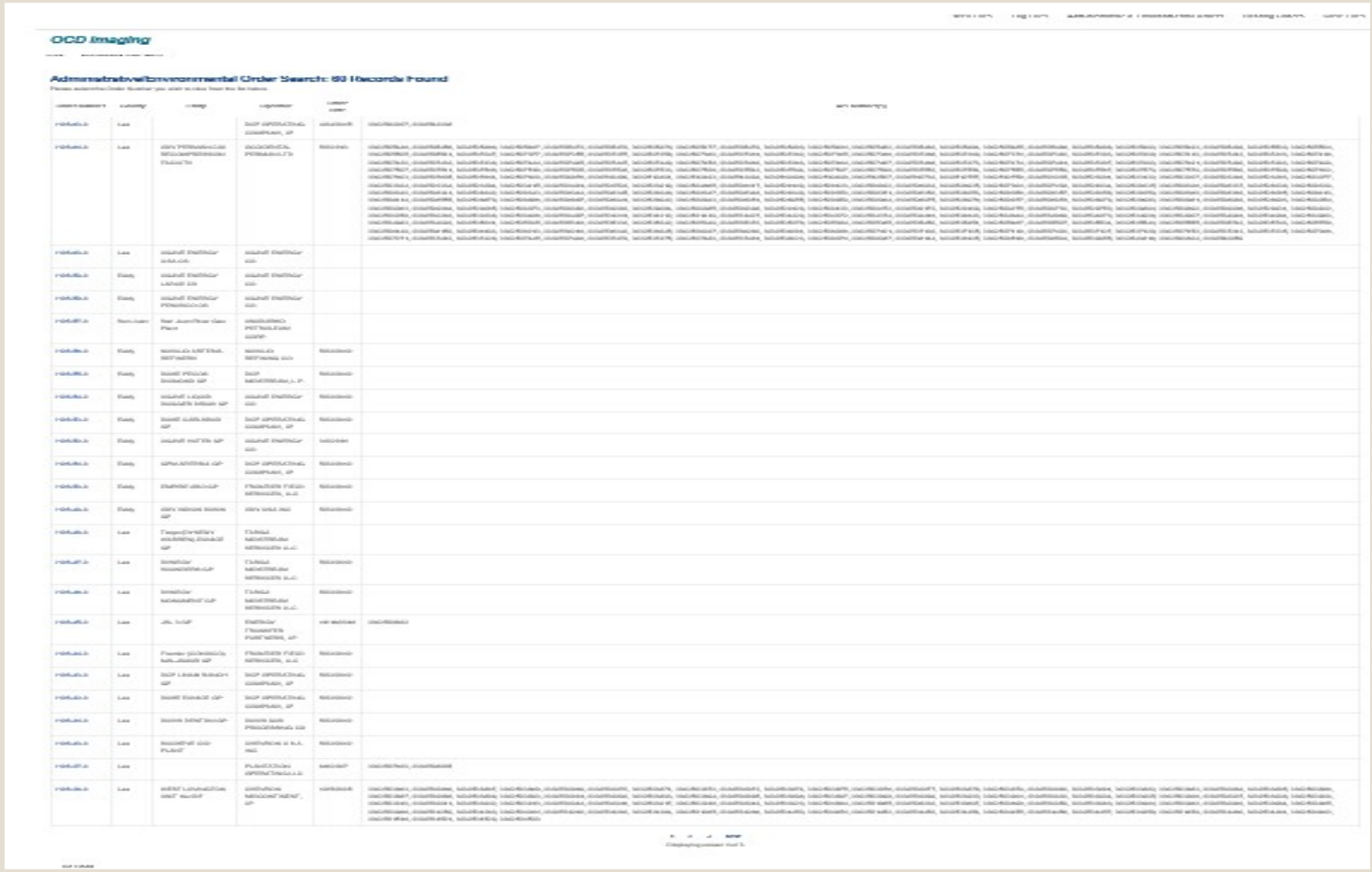
If > 100 ppm, Wind Indicators

For wells, batteries, refineries, gas plants, compressor stations

Must be visible from all working areas

CPlan Status

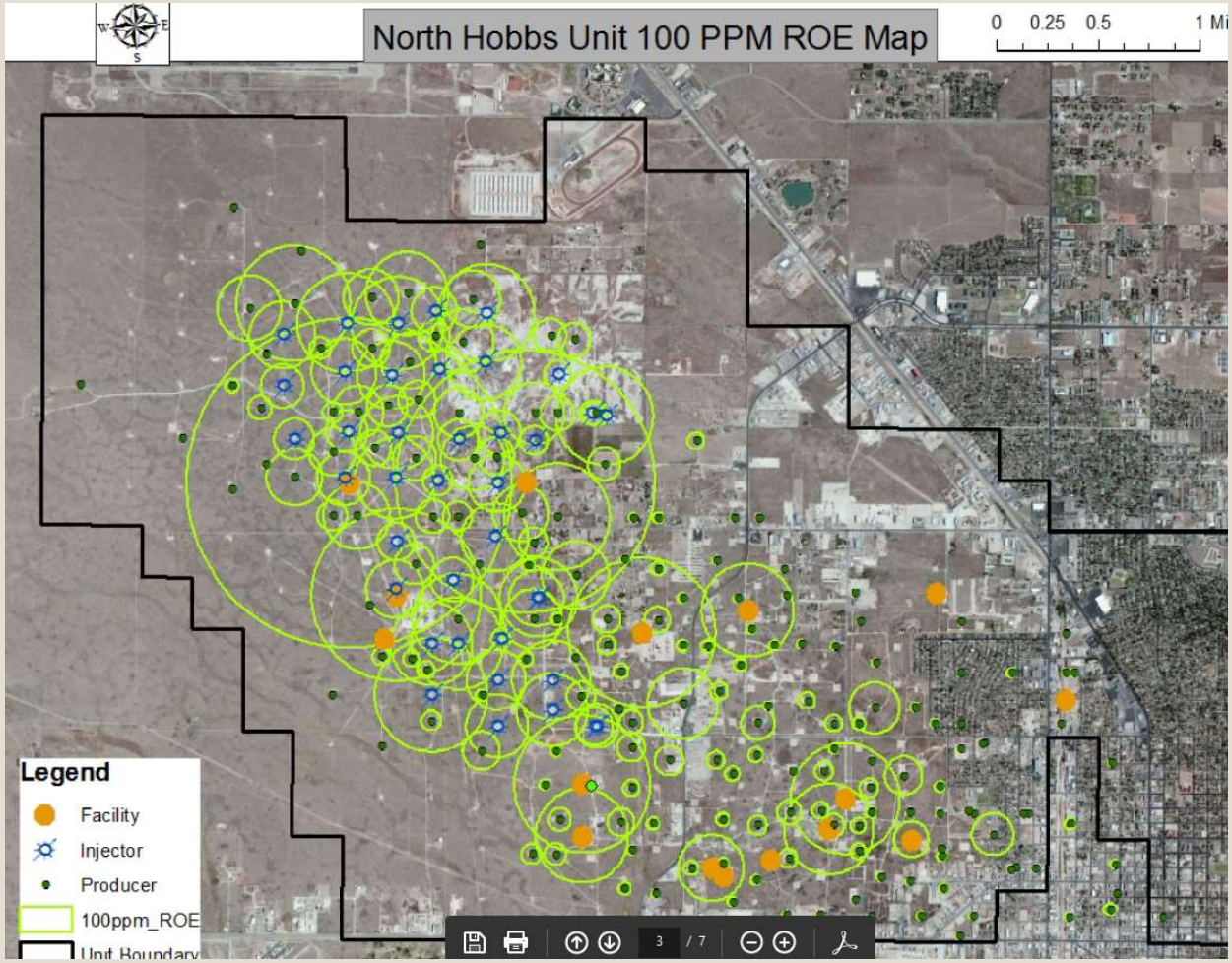
Sixty CPlans in eDocs



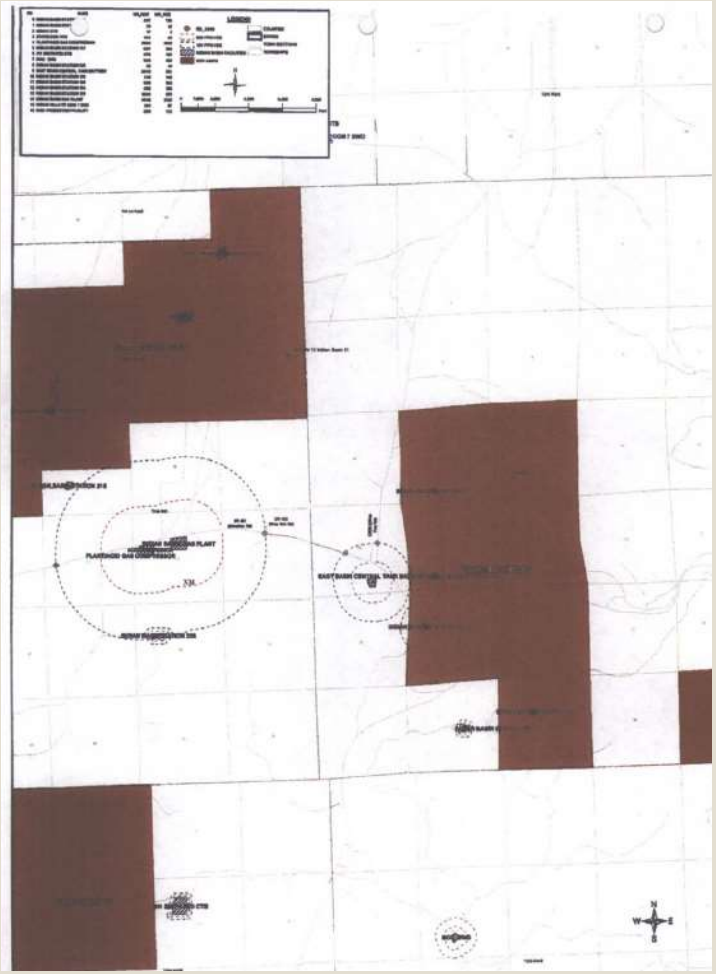
CPlans in eDocs

	CPlans	With 0 Wells	With <12 Wells	With >100 Wells
DI	49	18	18	7
DII	10	10		
DIII	1	1		

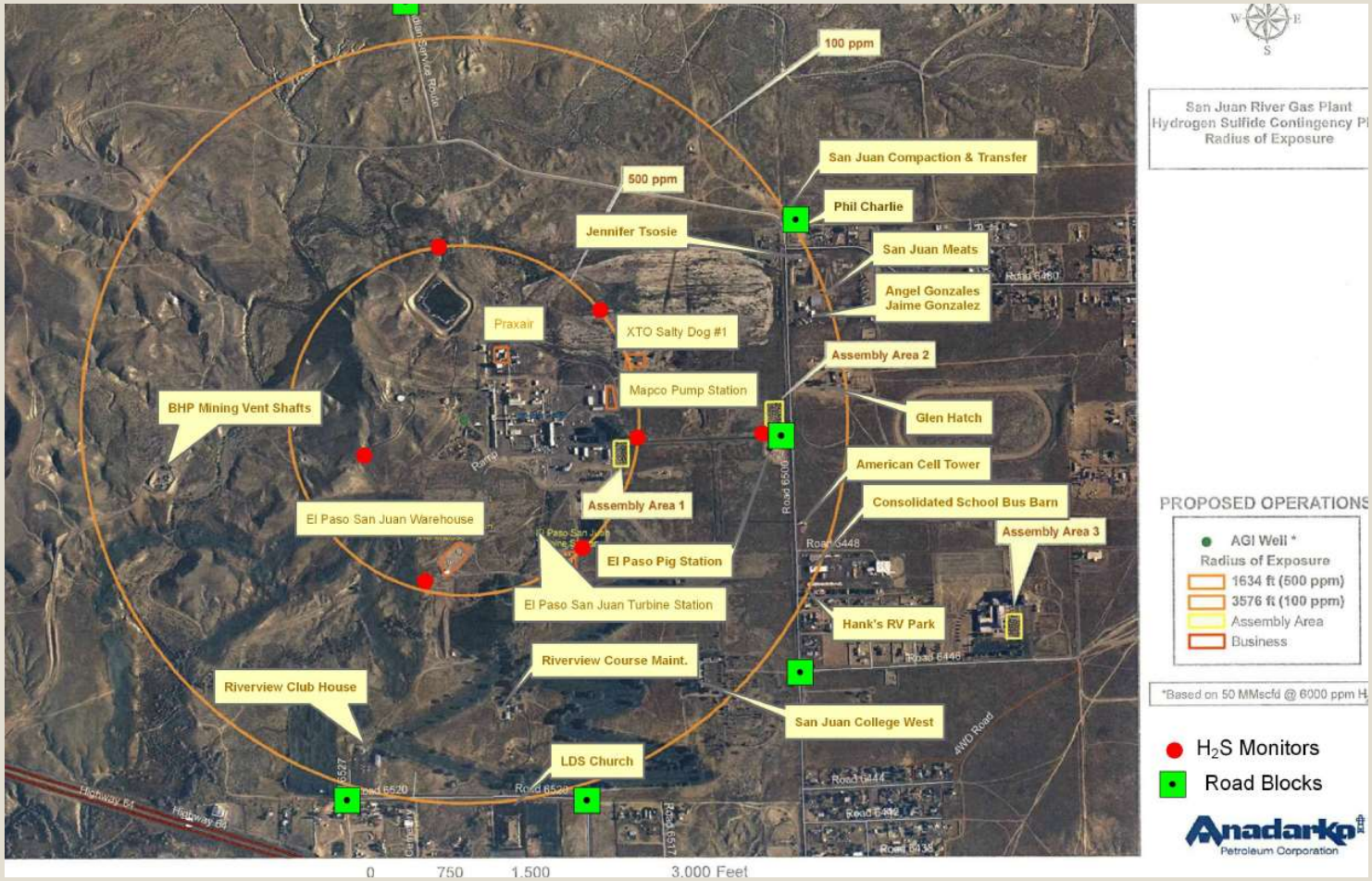
ROE Calculations/ Locations



ROE Calculations/ Locations



ROE Calculations/ Locations



Questions

- More emphasis on H_2S?
- Audit the H_2S CPlan program?
  - Check for reports of CPlan activation?
  - Annual inventory to LEPC
  - Update for new operators, facilities
- Inspect H_2S facilities?
- Participate in H_2S training and drills?