GW - 014

H_2S CONTINGENCY PLAN

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Tuesday, July 27, 2010 11:26 AM
To: Hill, Larry, EMNRD
Subject: FW: Navajo Refining Company- Lovington Refinery (GW-014) H2S Contingency Plan

Buddy:

FYI.

Carl J. Chavez, CHMM
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(Pollution Prevention Guidance is under "Publications")

From: Chavez, Carl J, EMNRD
Sent: Tuesday, July 27, 2010 11:25 AM
To: 'Lackey, Johnny'
Cc: VonGonten, Glenn, EMNRD
Subject: Navajo Refining Company- Lovington Refinery (GW-014) H2S Contingency Plan

Johnny:

After reviewing the ROEs on Appendix "C" Page C-2 of the "API Recommended Practice for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide" Guidance, it appears that Navajo Refining Company (NRC) assumed a 100% concentration of [H2S] in its API-55 calculation, and the 100 ppm ROE appears to overlap the nearby railroad track. After entering similar flow rate and concentration data into the Pasquil-Gifford Model and verifying NRC's calculated ROEs, the OCD realizes it would be difficult for a continous release to achieve 100% [H2S] due to dispersion processes, etc.

Therefore, the OCD has determined that the Lovington Refinery does not have a 19.15.11.7(H) "Potentially Hazardous Volume" that poses a threat to public areas; thus, no public training is required. If conditions change that indicate otherwise, NRC shall resubmit an H2S CP evaluation for OCD consideration or re-evaluation.

Please contact me if you have questions. Thank you.

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Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Thursday, May 20, 2010 9:02 AM
To: 'Lackey, Johnny'
Cc: 'Schmaltz, Randy'; 'Riege, Ed'; VonGonten, Glenn, EMNRD
Subject: H2S CP & Public Notice

Johnny, et al.:

FYI, you are probably already aware of the Emergency Response Guidebook usually provided during Hazwoper Training Courses. This gives detailed guidance on evacuation radius, etc.

Also, OCD wants the LEPC and Fire Departments to be fully engaged during facility emergencies. The communities are relying on their local Fire Marshals and Fire Departments to step up to plate when they need to stand and deliver during emergencies. We do not want to see the LEPC excluded or turned away from refinery gates during emergencies at refineries in New Mexico. They must become an integral part of the response, solution, provide command and control infrastructure during an emergency, and catastrophies, etc. Please be sure to include them in the emergency process at the refineries in New Mexico.

Thank you.

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Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Tuesday, May 04, 2010 7:06 AM
To: 'Lackey, Johnny'
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; christy.franklyn@schirmereng.com; swati.rao@schirmereng.com; mleighton@lovington.org; hsncpbm@leaco.net; Hill, Larry, EMNRD
Subject: RE: H2S Contingency Plan

Johnny:

The OCD is in receipt of your H2S Contingency Plan (Plan). Please consider your submittal to have satisfied the intent of the OCD regulations.

It is important to note that in a worst case scenario such as this refinery nearby a roadway, there may be an instance where the roadway must be closed due to a catastrophic event. Navajo needs to make sure it has an emergency response plan in place to respond to these events. Similar to the Artesia Refinery, Navajo should consider a public notice to inform the public about H2S and this facility. I recommend that similar to the Artesia Refinery, Navajo submit a draft public notice to the OCD-EB to review to satisfy the public training requirement.

OCD reserves the right to require modifications to the Plan at a future date and will work with Western when, and if necessary.

Thank you.

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From: Lackey, Johnny [mailto:Johnny.Lackey@hollycorp.com]
Sent: Friday, April 30, 2010 6:16 PM
To: Chavez, Carl J, EMNRD
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD; christy.franklyn@schirmereng.com; swati.rao@schirmereng.com; mleighton@lovington.org; hsncpbm@leaco.net
Subject: RE: H2S Contingency Plan

Carl. After calculating the worst case release scenario at the Navajo Lovington Refinery, it was determined that the 500 ppm ROE did not encompass a "public road" (J. "Public road" means a federal, state, municipal or county road or highway) and the 100 ppm ROE does not encompass a "public area". (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). See Appendix C. As you are aware, the Lovington facility is approximately 5 miles south of the city of Lovington and is surrounded by oil and gas production with no businesses or residences in close proximity to the refinery, therefore I don't think an H2S Contingency Plan is required for this facility. However, I am attaching a copy of the Final Plan for your review of the calculations performed in compliance with API RP-55 (see Appendix B) and **will await your concurrence as to the applicability of the H2S Contingency Plan Rule for the Navajo Lovington Refinery.**

Thanks,

Johnny Lackey
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From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Wednesday, April 28, 2010 3:21 PM
To: Lackey, Johnny
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD; christy.franklyn@schirmereng.com; swati.rao@schirmereng.com
Subject: RE: H2S Contingency Plan

Approved. Thank you.

Carl J. Chavez, CHMM
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Sent: Wednesday, April 28, 2010 3:00 PM
To: Chavez, Carl J, EMNRD
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD; christy.franklyn@schirmereng.com; swati.rao@schirmereng.com
Subject: RE: H2S Contingency Plan

Carl. I am working diligently with our consultant to finalize the Lovington H2S Contingency plan. We have the majority of the Plan complete, however due to the consultant's internal review and QA/QC, and our submittal of additional data for the worst case scenario; it appears we may not be ready to submit the Final Plan for your review by end of business today. Will you allow us an extension of 2 days to ensure I have an accurate Plan to submit for review? If you grant the extension I will submit the Plan by EOB on Friday, 4/30/10.

Thanks,

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Johnny.Lackey@hollycorp.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Thursday, April 08, 2010 8:23 AM
To: Lackey, Johnny
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD
Subject: RE: H2S Contingency Plan

Johnny:

Hi. I'm sorry, due to our work load, it is difficult to pin down a date for OCD review and comments. I recommend that Navajo Refining Company (NRC) submit its H2S Contingency Plan for Lovington in its final form in order to satisfy the intent of the OCD H2S Regulations. The OCD will be reviewing them and may have comments at a later date where we can work together to resolve any outstanding issues. NRC should be looking over the OCD regulatory requirements and making sure you address them in you final report. For example, you should have reviewed the API Guidance referenced in the OCD Regulations to ensure you have also complied with the guidance. Thank you.

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From: Lackey, Johnny [mailto:Johnny.Lackey@hollycorp.com]
Sent: Thursday, April 08, 2010 7:54 AM
To: Chavez, Carl J, EMNRD
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD
Subject: RE: H2S Contingency Plan

Carl. We are working on the Lovington Plan and should have it ready for your review by April 28, per your attached email. I was hoping to see comments on Artesia so any changes/comments could be incorporated in the Lovington Plan prior to submittal.

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Sent: Thursday, April 08, 2010 7:24 AM
To: Lackey, Johnny
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD
Subject: RE: H2S Contingency Plan

Johnny, et al.:

Good morning. Where is the Lovington Refinery H2S Contingency Plan? Thank you.

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Sent: Thursday, April 01, 2010 9:03 AM
To: Chavez, Carl J, EMNRD
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD
Subject: RE: H2S Contingency Plan

Attached is Navajo's H2S Contingency Plan (final) for review. Wasn't clear whether you do or do not want to review DRAFT documents???

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From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Wednesday, March 31, 2010 4:48 PM
To: Lackey, Johnny
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD
Subject: RE: H2S Contingency Plan

Johnny:

Please send it as the final contingency plan for OCD review. The OCD does want to review draft documents. Thank you.

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E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

From: Lackey, Johnny [mailto:Johnny.Lackey@hollycorp.com]
Sent: Wednesday, March 31, 2010 4:42 PM
To: Chavez, Carl J, EMNRD
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD
Subject: RE: H2S Contingency Plan
Importance: High

Carl.

Attached is Navajo's DRAFT H2S Contingency Plan for your review/comment/approval. I will be sending via FedEx a hard copy of the plan also. I'm attaching the plot plan separately since the letter size doesn't show up well in the electronic version. The hard copy you will receive will include a color coded "D" sized drawing.

As we discussed, once the plan is approved, Navajo will prepare a "Public Notice" for the local newspaper to publish which will serve as notice to those that may be affected by a release from the refinery. I will send a copy of the proposed release to you for review and approval before sending to the newspaper for publishing.

The previous submittal was not intended to be the Draft Plan but to present our proposed "worst Case" scenario for your OK so we could develop the plan around that scenario.

Let me know if you need additional information or have any questions regarding this submittal.

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From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Friday, March 12, 2010 4:35 PM
To: Lackey, Johnny
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD
Subject: RE: H2S Contingency Plan

Johnny:

The OCD has completed a review of your proposal for the above subject plan for the Artesia Refinery, and I presume would form the basis for the plan for the Lovington Refinery.

In general, the proposal to use the "PHAST" Model to model H2S Gas does not appear to be appropriate (see link http://cfpub.epa.gov/crem/knowledge_base/crem_report.cfm?deid=196448&view=PDF) where the model primary purpose is for simulating multi-component, reactive solute transport in 3-d saturated ground water flow systems, which is clearly not a gas transport model recommended in OCD Hydrogen Sulfide Regulations.

I notice that I don't see maps with detector locations, wind socks, location of "poison gas signs", location of units with flow where ROEs (100 and 500 ppm) would be depicted in public areas surrounding the refinery. Consequently, I am attaching the OCD's Regulations that references API Guidance, which is also not referenced in your proposal. Please take a look at the OCD Regulations and requirements and submit a H2S Contingency Plan that will address the regulations. The OCD provided an example (GW-33) from a Gas Plant that Navajo Refining Company should be using to develop a plan.

See OCD approved H2S Contingency Plan at OCD Online (GW-33) at http://ocdimage.emnrd.state.nm.us/imaging/AEOrderFileView.aspx?appNo=pENV000GW00034.

See attached OCD H2S Regulations to cross-check to make sure your plan addresses OCD Regulations. Also, information on the Pasquil-Gifford Model is attached to help you find another gas dispersion model or you can simply use this user friendly model to complete the plan (ROEs).

Please contact me if you have questions. Thank you.

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Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

From: Lackey, Johnny [mailto:Johnny.Lackey@hollycorp.com]
Sent: Wednesday, March 10, 2010 7:53 AM
To: Chavez, Carl J, EMNRD
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; 'Christy_Franklyn@schirmereng.com'; Whatley, Michael
Subject: RE: H2S Contingency Plan

Carl. Attached is Navajo's proposal for your consideration. Included in the proposal is our worst case release scenario. After your review and comments, Navajo will prepare the H2S Contingency Plan for submittal to the agency and Emergency Response organizations.

Johnny Lackey
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From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Friday, February 05, 2010 1:48 PM
To: Lackey, Johnny
Subject: H2S Contingency Plan

Johnny:

Hi. I have not received Navajo Refining Company's proposal that you indicated during our last meeting related to the above subject.

One recommendation that I have based on our meeting and Navajo Refining Company's concern about the ROE is attempt to provide an illustration of a real worse case scenario based on refinery controls and operations, but explain and reference in appendices the scenario that complies with OCD regulations. In this way, you can present your real worse case and address OCD regulation in the contingency plan.

Thanks.

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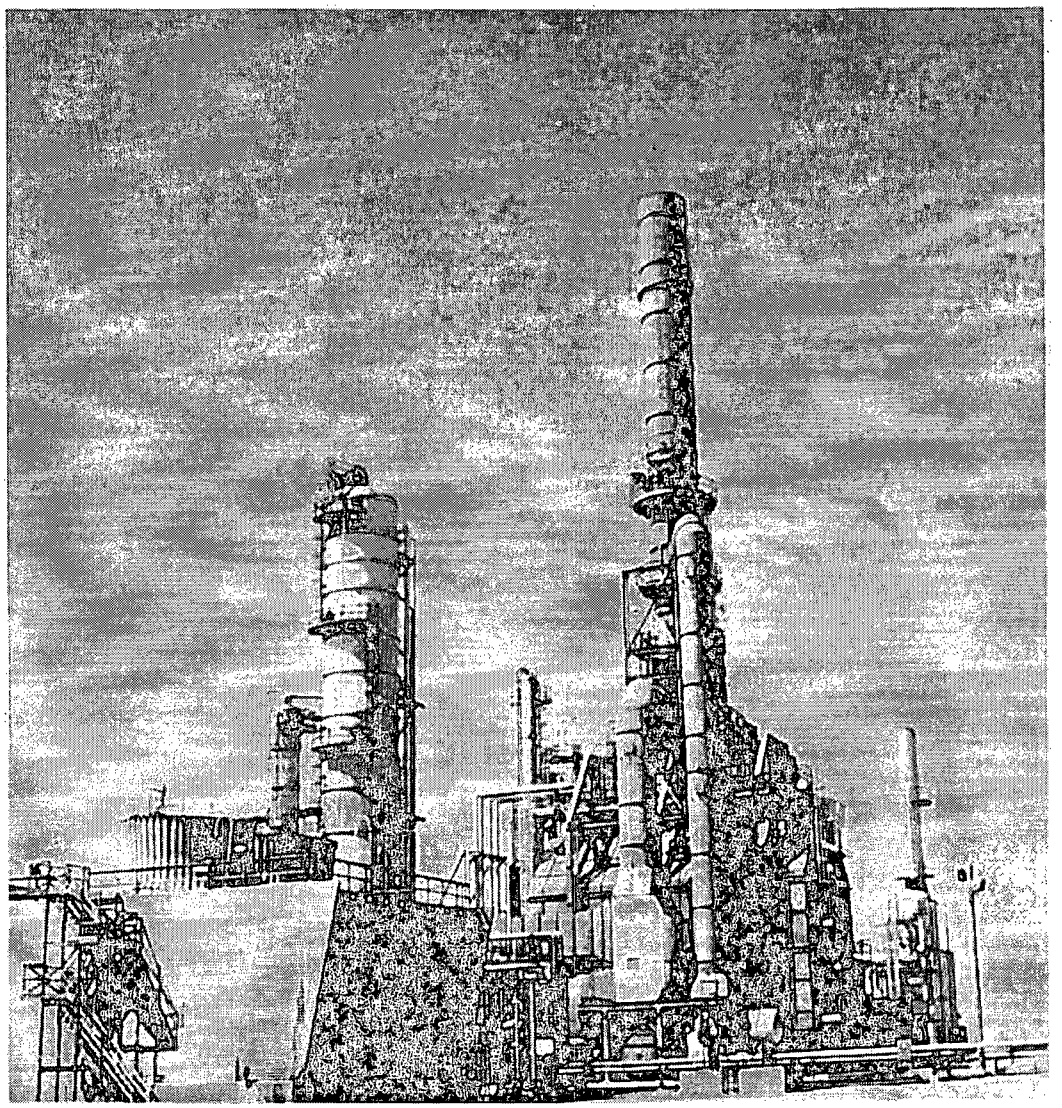
Navajo Refining Company
Lovington, NM



H2S Contingency Plan

Navajo Refining Company
Lea Refinery
Lovington, New Mexico
April 2010

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HYDROGEN SULFIDE CONTINGENCY PLAN
LOVINGTON REFINERY
HOLLY CORPORATION

1.0 INTRODUCTION

Holly Corporation's Lovington Refinery is approximately 65 miles east of Artesia, New Mexico, and operates in conjunction with the Navajo Artesia Refinery. The Refinery also has an additional 1.1 million barrels of feedstock and product tankage. The Lovington Refinery processes crude oil into intermediate products that are transported to Artesia by means of three intermediate pipelines. These products are then upgraded into finished products at the Artesia facility.

The main processes at the Lovington Refinery include the following operations:

- Atmospheric Crude Distillation Unit
- Vacuum Distillation Unit
- Stabilizer

Support operations include:

- Boilers
- Cooling towers
- Loading and unloading racks
- Flare
- Wastewater treatment system
- Volatile organic liquid storage tanks

The Refinery purchases crude oil and a light naphtha intermediate called casinghead. The Refinery receives most of its feed materials via pipeline, although small amounts may occasionally arrive by truck. The feed materials are stored in tanks. The casinghead is blended with the refinery-produced straight-run gasoline.

1.1 Plant Description and Map

The Lovington Refinery is located in Lovington, New Mexico approximately 65 miles east of Artesia. Table 1 provides details on the Holly Corporation Lovington Refinery's location.

Table 1. Lovington Refinery

Lovington Refinery Location	
Physical Address:	3521 South Main Avenue, Lovington, NM 88260-4916
Mailing Address:	PO Box 2110
Latitude:	32° 52' 46"
Longitude:	103° 18' 18"

The location of the Lovington Refinery is illustrated in Figure 1.

Figure 1. Location of Lovington Refinery (Approximate Boundaries)

1.2 Description of Operations

The Lovington Refinery is located approximately five miles south of the City of Lovington, New Mexico. The facility is located on approximately 150 acres of land in the Permian Oil Basin. The facility stores crude oil, gas oil, and diesel fuel. The facility is a petroleum refinery which processes crude oil into asphalt, diesel fuel, naphtha, gasoline and kerosene. The facility has a total storage capacity of 1,196,079 barrels, with an average storage volume of 25,000 to 35,000 barrels and daily throughput averages of approximately 60,000 barrels.

Crude is received through pipelines and trucks with a volume of 60,000 barrels per day and materials are loaded onto tank trucks and are off-loaded from tank trucks at the loading racks to and via pipelines to crude tanks.

All products are transferred to the Artesia Refinery for further processing and/or final sale.

Areas of the facility include:

- Crude Unit
- Vacuum Unit
- Stabilizer
- Off Gas Caustic Scrubber
- Utilities
- Truck Loading/Unloading
- Boilers
- Cooling Tower
- Crude Oil Receiving and Storage
- Flare
- Storage Tanks
- Wastewater Collection and Treatment System

2.0 THE H_2S CONTINGENCY PLAN

2.1 Responsibility for Conformance with the H_2S Contingency Plan

It is the responsibility of all personnel onsite to follow the safety and emergency procedures outlined in this H_2S Contingency Plan, as well as the following documents:

- Navajo Refining Safety and Health Manual
- Navajo Refining Integrated Contingency Plan
- Navajo Refining Environmental Policies and Procedures
- Navajo Refining Operating Procedures

2.2 Revisions to the H_2S Contingency Plan

This H_2S Contingency Plan will be reviewed annually and revised as necessary to address changes to the facility, operations or training requirements, contact information and the public areas including roads, businesses or residents potentially affected, especially those areas within the radii-of-exposure.

2.3 Availability of the H_2S Contingency Plan

This document will be available to all personnel responsible for implementation of the H_2S Contingency Plan. A copy of the H_2S Contingency Plan will be available on the Holly Corporation intranet site (Flashpoint) and hard copies will be available from the Safety Library, Environmental File Room, Plant Manager, Operations Manager, Lovington Operations Foreman, Lovington Safety/Environmental Coordinator, Maintenance Office, PSM Coordinator and each plant control room. See Appendix H for the H_2S Contingency Plan Distribution List.

2.4 Content of the H_2S Contingency Plan

As a minimum, the H_2S Contingency Plan will contain:

- The characteristics of hydrogen sulfide (H_2S)
- A facility description, map and/or drawings
- Emergency procedures to be followed in the event of a release of H_2S
- Information regarding training and drills to be conducted related to the H_2S Contingency Plan

3.0 H_2S Contingency Plan Design Considerations

3.1 Definitions

Immediately Dangerous to Life and Health (IDLH) - The atmospheric concentration of a toxic, corrosive or asphyxiant substance that creates an immediate threat to life or could cause irreversible or delayed adverse health effects, or could interfere with an individual's ability to escape from a dangerous atmosphere.

Parts per million (ppm) - A unit of measure, one equal part of a substance per one million equal parts of air.

Permissible Exposure Limit (PEL) - The employee's 8-hour time weighted average which shall not be exceeded at any time during a work day.

Short Term Exposure Level (STEL) - is the employee's 15-minute time weighted average, which shall not be exceeded at any time during a work day unless another time limit is specified.

Time Weighted Average (TWA) - The employee's average airborne exposure in an 8-hour work shift of a 40-hour work week, which shall not be exceeded.

3.2 General Information

Hydrogen sulfide is a highly toxic, colorless and flammable gas which burns with a blue flame. When burned, it produces sulfur dioxide (SO_2) which is also a poisonous gas. It is slightly heavier than air, and is usually associated with the smell of rotten eggs. This strong and distinctive odor is evident at concentrations as little as 1 ppm. At high concentrations, the olfactory nerves become fatigued and paralyzed; therefore, the sense of smell shall never be used as the sole detector of H_2S. Respiratory protection guidelines must be stringently followed because inhalation is the primary route of exposure.

Generally, H_2S can be found in all plant areas that contain crude oil, refinery fuel gas, sour water or unit areas which remove and process H_2S and/or sulfur. Process piping and equipment containing H_2S may be identified by H_2S warning signs. However, due to the close proximity of operating units and nature of the refining process, warning signs are not intended to indicate every potential H_2S area.

All personnel entering H_2S areas shall visually locate wind socks and note wind direction. In the event of an alarm, workers are not expected to do anything except evacuate immediately. They shall be trained in the use of Self-Contained Breathing Apparatus (SCBA) equipment, and upon entering an H_2S area, they shall locate that SCBA equipment. Fresh air equipment shall be used for initial opening of H_2S-containing process equipment and/or piping. Be aware that there may be additional requirements for work in some areas in the facility, or for special work. Hot Work Permits and Confined Space Entry Permits are examples of such circumstances.

3.3 Hydrogen Sulfide

Hydrogen sulfide properties and characteristics are described in Table 2.

Table 2. H_2S Properties and Characteristics

Property	Characteristic
CAS No.	7783-06-4
Molecular Formula	H_2S
Molecular Weight	34.082
Specific Gravity (air = 1.0)	1.189
Boiling Point	-76.5°F
Freezing Point	-121.8°F
Vapor Pressure	396 psia
Auto ignition Temperature	518°F
Lower Flammability Limit	4.3%
Upper Flammability Limit	46.0%
Stability	Stable
pH in water	3
Corrosivity	Reacts with metals, plastics, tissues and nerves

3.3.1 H_2S Exposure Limits and Effects of Exposure

H_2S exposure limits and effects of exposure are described in Table 3 and Table 4.

Table 3. H_2S Exposure Limits

Toxic Exposure Limit	Concentration
PEL	10 ppm
STEL	15 ppm
IDLH	100 ppm

Table 4. H_2S Affects of Exposure

Concentration	Effect
0.05 ppm	Rotten egg odor, detectable by most people.
0.13 - 30 ppm	Obvious and unpleasant odor.
50 - 150 ppm	Olfactory fatigue (temporary loss of smell) and marked dryness and irritation of the nose, throat and respiratory tract. Prolonged exposure may cause runny nose, cough, hoarseness, headache, nausea, shortness of breath, and severe lung damage (pulmonary edema).
200 - 250 ppm	Worsening and more rapid onset of the above health effects; possible death in 4 to 9 hours.
300 - 500 ppm	Excitement, severe headache and dizziness, staggering, loss of consciousness, respiratory failure likely in 5 minutes to an hour. Possible death in 30 minutes to 4 hours.
500+ ppm	Rapid onset of severe toxicity, respiratory paralysis, and death. If not fatal, may cause long-term effects such as memory loss, paralysis of facial muscles or nerve tissue damage.
800 - 1000 ppm	May be immediately fatal after one or more breaths, resulting in an instant unconsciousness or "knock-down" effect.

3.3.2 Personal Protective Equipment

Approved respiratory protection for H_2S at the Lovington Refinery shall consist of the following:

- 30-minute SCBA (Self-Contained Breathing Apparatus)
- Supplied air-line respirator with 5-minute egress cylinder

3.3.3 Respiratory Protection Protocols

Less than the PEL - In concentrations of H_2S below the PEL (10 ppm), no respiratory protection is required.

More than the PEL but less than IDLH - In concentrations of H_2S above the PEL (10 ppm), and below the IDLH (100 ppm), respiratory protection in the form of a supplied air-line respirator or SCBA shall be used.

More than IDLH - In concentrations of H_2S above the IDLH (100 ppm), respiratory protection in the form of a supplied air-line respirator, or SCBA with at least one standby person per affected person shall be used.

Unknown Concentrations of H_2S - For unknown concentrations of H_2S, respiratory protection in the form of a supplied air-line respirator or SCBA with standby/rescue person(s) shall be required until the concentration can be measured and is found to be below the PEL.

Rescue of Another Person - For rescue purposes, SCBA or supplied air-line respirator shall be the only form of respiratory protection.

As with other chemical hazards, proper care shall be taken to choose proper body, head/face and eye protection as required by the task.

3.4 Radii of Exposure (ROE)

The radius of exposure (ROE) is defined to be the maximum downwind distance that could be exposed to one specific H_2S concentration as a result of a release of a material containing hydrogen sulfide.

RRS/Schirmer calculated a 100-ppm radius of exposure and a 500-ppm radius of exposure associated with a "worst case release scenario" (as described in Appendix A) involving a vessel at the Lovington facility filled with a mixture containing some H_2S. The 100-ppm and 500-ppm ROE calculations were performed in compliance with API RP-55, and they are summarized in Table 5.

Table 5. Radius of Exposure

Concentration of H_2S (ppm)	Distance (feet)
100	834
500	304

The detailed calculations, equations, and other variables used to evaluate the ROE are discussed in Appendix B, Calculation of Radius of Exposure. Appendix C shows the 100-ppm and 500-ppm radii superimposed on a Land View map of the area surrounding the Refinery. Appendix C also contains a satellite photograph of the Refinery illustrating the same two radii.

4.0 EMERGENCY ACTION PROCEDURES

4.1 Emergency Response Organization

Holly Corporation's Lovington Refinery utilizes the Incident Command System (ICS) to manage emergency response activities. The ICS is a management tool which is readily adaptable to very small incidents as well as those of considerable significance. The ICS shall be implemented for all discharge incidents with staffing levels adjusted as required to meet the specific needs (size and severity of the incident). Response to a discharge originating from the facility will be provided by the Emergency Response Team.

4.1.1 Qualified Individual

Vital duties of the Qualified Individual (QI) include:

- Activate internal alarms and hazard communication systems to notify all facility personnel.
- Notify all response personnel, as needed.
- Identify the character, exact source, amount, and extent of the release, as well as the other items needed for notification.
- Notify and provide necessary information to the appropriate Federal, State, and Local authorities with designated response roles, including the National Response Center (NRC), State Emergency Response Commission (SERC), and local response agencies.
- Assess the interaction of the spilled substance with water and/or other substances stored at the facility and notify response personnel at the scene of that assessment.
- Assess the possible hazards to human health and the environment due to the release. This assessment must consider both the direct and indirect effects of the release (i.e., the effects of any toxic, irritating, or asphyxiating gases that may be generated or the effects of any hazardous surface water runoffs from water or chemical agents used to control fire and heat-induced explosion).
- Assess and implement prompt removal actions to contain and remove the substance released.
- Coordinate rescue and response actions as previously arranged with all response personnel. Use authority to immediately access company funding to initiate clean-up activities.
- Direct clean-up activities until properly relieved of this responsibility.

The Refinery Vice President/Manager serves as Qualified Individual (QI) and the Lovington Safety/Environmental Coordinator serves as the Alternate Qualified Individual (AQI). Arrangements are made to ensure that either one or the other is available on a 24-hour basis and is able to arrive at the facility in a reasonable time. The AQI shall replace the QI in the event of his absence and have the same responsibilities and authority.

4.1.2 Emergency Response Team

The first Lovington person on scene will function as the person-in-charge until relieved by an authorized supervisor who will assume the position of Incident Commander (IC). Transfer of command will take place as more senior management respond to the incident. For response operations within the control of the Emergency Response Team, the role of IC will typically be assumed and retained by qualified management personnel.

The number of positions/personnel required to staff the Emergency Response Team will depend on the size and complexity of the incident. The duties of each position may be performed by the IC directly or delegated as the situation demands.

The IC is always responsible for directing the response activities and will assume the duties of all the primary positions until the duties can be delegated to other qualified personnel.

The Emergency Response Team is shown on the organization chart in Figure 2.

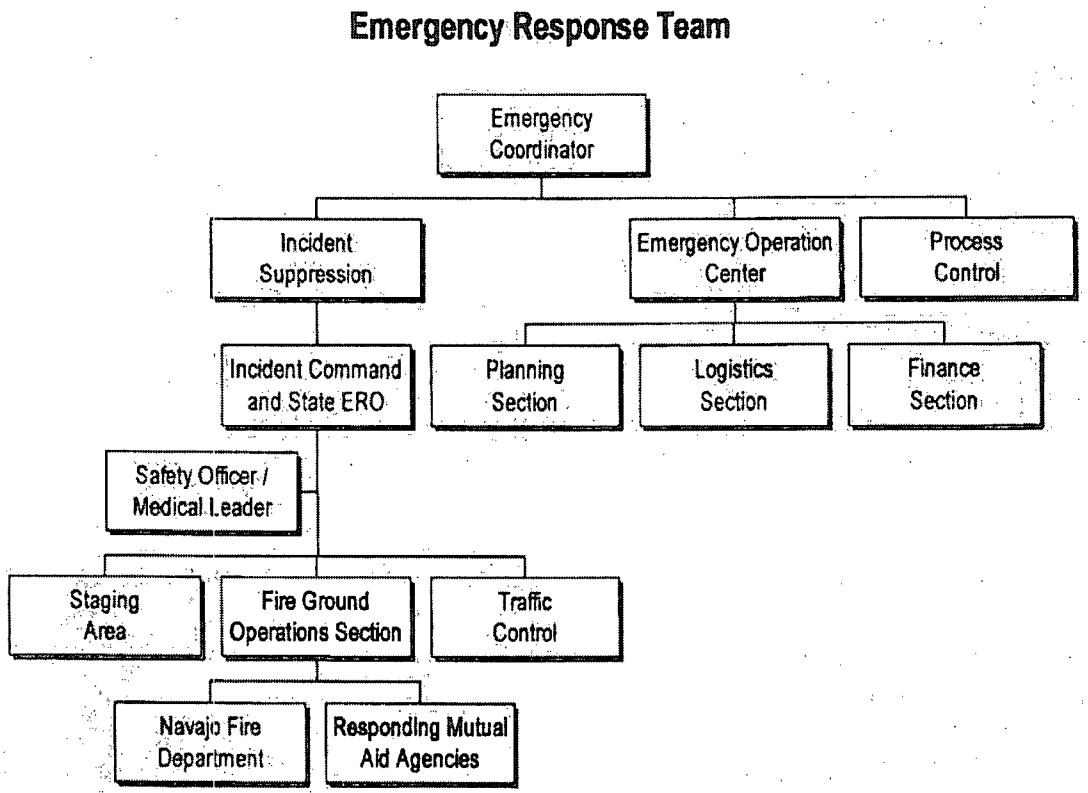


Figure 2. Emergency Response Team

4.2 Emergency Response

4.2.1 Objective

This section explains the procedures and decision process to be used in the event of an H_2S release; much of which has been pre-determined to ensure a coordinated, efficient and immediate action plan for alerting and protecting operating personnel and the public as well as to prevent or minimize environmental hazards and damage to property.

4.2.2 Plant Evacuation and Emergency Assembly Areas

Appendix D contains a plot plan illustrating the Plant Evacuation and Emergency Assembly Areas.

4.2.3 Immediate Action Plan

Refinery employees, contractors, and visitors are expected to attend the facility's training program. During this program, potential hazardous areas are identified to the trainee and proper procedures to follow are discussed if an incident were to occur. All onsite personnel including employees, contractors, and visitors are expected to report any emergency situation, including a release of H_2S, by the following actions:

- When an employee discovers an Emergency or potential Emergency Condition, the Control Room should be notified (radio or telephone) to sound the alarm. IF ANY DOUBT EXISTS ABOUT WHETHER OR NOT AN EMERGENCY EXISTS, NOTIFY THE CONTROL ROOM.

- After notifying the Control Room, the employee should announce twice over the operating channel for that location (Type of Emergency) at (Location). Example: "Naphtha spill at 1202" or "Fire at H-502 in the Vacuum Unit".

- The Boardman will immediately:
  - Sound the emergency signal (SIREN – WAIL TONE)
  - Start the fire water pump if a fire, spill or vapor release is involved
  - Page all plant personnel and advise them of the situation
  - If a fire, hydrocarbon spill or vapor release is involved contact the Lovington Fire Department and request assistance

4.2.3.1 Initial Response Actions

Initial response actions are those taken by local personnel immediately upon becoming aware of a discharge or emergency incident, before the Emergency Response Team is formed and functioning. Timely implementation of these initial steps is of the utmost importance because they can greatly affect the overall response operation. Response actions are contained in Appendix F.

It is important to note that these actions are intended only as guidelines. The appropriate response to a particular incident may vary depending on the nature and severity of the incident. **Without exception, personnel and public safety is first priority.**

The first Lovington person on scene will function as the person-in-charge until relieved by an authorized supervisor who will assume the position of Incident Commander (IC). Transfer of command will take place as more senior management respond to the incident. For response operations within the control of the Emergency Response Team, the role of IC will typically be assumed and retained by the Lovington Safety/Environmental Coordinator.

The person functioning as IC during the initial response period has the authority to take the steps necessary to control the situation and must not be constrained by these general guidelines.

For the purpose of implementation, a distinction is made between spills or vapor releases that are contained on refinery property as opposed to spills or vapor releases that leave or have the potential to leave refinery property. In the latter case, the threat of environmental harm to the public and the waters of the United States are much greater. In addition, the agency reporting requirements, the response personnel and equipment requirements vary depending on the scenario.

The potential for a spill or vapor release to migrate out from refinery property is reduced since the Lovington refinery provides emergency shutdowns, flare, mitigation (fire water, foam systems, etc.) secondary containment protection through a process wastewater collection system from the process area, and secondary containment dikes around the bulk storage tanks. Based on the site topography, spills or releases from the site flow southeast and the refinery has an earthen berm surrounding the entire facility. However, in the unlikely event that discharges escape the confines of the facility, emergency procedures have been established. Vapor releases are minimized by flaring, reducing charge rates, water application, foam application to control vapors and emergency shutdown of the affected process.

The following are response actions for plant personnel:

- **OPERATIONS (PROCESS CONTROL)** – On-duty operations personnel that detect an emergency shall immediately indicate an emergency response plan and if the emergency is in their unit, take immediate action within the scope of their training to minimize the escalation of the emergency by use of first aid emergency control equipment (i.e. fixed monitors, portable/wheeled fire extinguishers, or process control measures). At no time should such action be taken if the situation has escalated beyond your capability, training or level of protective equipment. If an emergency exists that is not in your unit, but you are in near proximity to the problem and can take action without endangering the operation of your assigned unit, do so but only to the extent that you are trained and able to do so safely. Otherwise, operations personnel should continue to operate their unit with a heightened sense of awareness that the emergency condition may affect their unit.

- **MAINTENANCE** - Maintenance personnel that detect an emergency shall immediately initiate an emergency response plan and if in the immediate area take action within the scope of their training to minimize the escalation of the emergency by use of first aid emergency control equipment (i.e. fixed monitors or portable/wheeled fire extinguishers). At no time should such action be taken if the situation has escalated beyond your capability, training or level of protective equipment. Otherwise, maintenance personnel should secure their area and report to the Incident Base (fire station) for assignments.
- **EMERGENCY RESPONSE TEAM**
  - The Lea Refinery Emergency Response Team is the primary response group for fires, material spills, vapor releases, rescues or similar plant emergencies. Other emergencies outside the training of the Response Team will utilize the ICS to provide a structured response to such emergencies.
  - RESPONSE TEAM PERSONNEL SHOULD BE IN FULL BUNKER GEAR WITH SCBA AVAILABLE BEFORE APPROACHING ANY EMERGENCY SCENE UNTIL THE FIRE GROUND OPERATIONS SECTION CHIEF ADVISES OTHERWISE.
- **OFF DUTY PERSONNEL** - Operations and Maintenance personnel on vacation, days off or otherwise off duty should report to the fire house, bunker out and report to staging area. Personal vehicles should be positioned so they are not endangered by the foreseeable magnitude of the incident and do not interfere with emergency response activities.

4.2.3.2 Initial Response Documentation

It is difficult, particularly during the first few minutes of an initial response operation, to think about the importance of documentation. A log should be maintained which documents the history of the events and communications that occur during the response.

When recording this information, it is important to remember that the log may become instrumental in legal proceedings, therefore:

- Record only facts, do not speculate.
- Do not criticize the efforts and/or methods of other people/operations.
- Do not speculate on the cause of the spill or release.
- Do not skip lines between entries or make erasures. If an error is made, draw a line through it, add the correct entry above or below it, and initial the change.
- Record the recommendations, instructions, and actions taken by government/regulatory officials.
- Document conversations (telephone or in person) with government/regulatory officials.
- Request that government/regulatory officials document and sign their recommendations or orders (especially if company personnel does not agree with the suggestions, instructions, or actions).

4.2.4 Emergency Shutdown System

An Emergency Shutdown Procedure should be followed if the unit has reached conditions that are unsafe to continue operation. The A-Operator and the Board Operator have the authority to initiate an Emergency Shutdown if they feel the conditions of the unit require it. If unsure, do not hesitate to consult with a supervisor. Circumstances that could require an emergency shutdown are:

- Control Failure
- Mechanical Failure
- Utility Failure
- Fire

In the event of an emergency shutdown, an "All Call" should be initiated. An emergency shutdown will require multiple personnel, not only to help in the unit, but also standby with emergency equipment if necessary.

4.2.5 Relief Systems and Sour Gas Flaring Procedure

The Lovington Refinery strategy is to minimize sour gas flaring under all operating scenarios. However, in the event of power failures, instrument failures, or the inability to treat all the sour gas, the sour gas will be flared.

4.2.6 Fixed H_2S Detection Systems

Local H_2S detectors are installed at all locations where H_2S levels were determined during HAZOP studies to be high. These alarms are set to alarm at concentrations higher than 20 ppm. A remote alarm is initiated in the control room along with local beacons and alarms located in the unit.

4.2.7 PSM - Mechanical Integrity

The refinery maintains a staff of 4 inspectors and contract inspectors when necessary to ensure the mechanical integrity of the plant remains up to code. Controls and emergency shutdown systems are periodically tested to ensure proper operation. Operating procedures are maintained and updated as necessary in operating manuals for the unit.

4.2.7.1 Operations Field Monitoring of the Unit

The refinery has unit operators who walk-down the unit on an hourly basis. Their duty is to visually inspect the unit for any problems that can not be monitored from the control room.

4.2.7.2 Notifications and Reports

The Lovington Refinery has various notification and reporting obligations. Some are related to its state air quality permit, as well as well as state and federal spill reporting obligations. In addition to the regulatory obligations noted above, refinery personnel also have internal and external notification and reporting obligations associated with the activation of this H_2S Contingency Plan. Internal notifications should be made for each emergency incident to the extent that the incident demands as described on the checklists provided as Table 4.

4.2.7.3 Discovery and Internal Reporting

All refinery personnel who perform maintenance and/or repair work within the refinery wear H_2S monitoring devices to assist them in detecting the presence of unsafe levels of H_2S. When any plant personnel while performing such work discovers a leak or emission release they are to attempt to resolve the issue as long as H_2S levels remain below 10 ppm. The personal monitoring devices they wear will give off an audible alarm at 10 ppm. These devices are to be worn within the breathing zone. If the response action needed to resolve the issue is more than simply closing a value or stopping a small leak, the refinery personnel shall notify the Operations Foreman, or his designee and convey, at a minimum, the following information:

- Name, telephone number, and location of person reporting the situation.
- Type and severity of the emergency.
- Location of the emergency (process unit, storage tank number, loading rack location or building), and the distance to surrounding equipment and/or structures.
- The cause of the vapor release, spill or leak, name and quantity of material released, and extent of the affected area including the degree of environmental hazard.
- Description of injuries and report of damage to property and structures.
- Initiate and maintain a chronological record of events log. This record should record the time, date, and a summary of the event.
- If the Plant personnel detects H_2S levels greater than 10 ppm either as a result of his/her personal monitoring device or the Plant intermittent alarm and/or red flashing beacon, Plant operators are to contact their immediate supervisor for assistance and put on the 30-min SCBA so they can attempt to resolve the issue. All non essential persons shall be notified of the release and evacuated from the area. Operators wearing the SCBAs are to first assist any persons requiring assistance during the evacuation, then attempt to resolve the issue. The immediate supervisor is then responsible for notifying the Safety/Environmental Coordinator, Operations Foreman or their designee so that the IC system can be implemented and H_2S Plan activated if necessary.
- Once the Safety/Environmental Coordinator is contacted, he or his designee is to notify the appropriate refinery management, EHS personnel, Plant emergency response personnel, and advise them of the existing emergency situation. Refinery management will then conduct further reporting that is necessary, based on the situation.
- Plant personnel are to advise any contractor, service company, and all others on-site or attempting to enter the plant that the H_2S Plan has been activated.

4.2.7.4 External Notification

The following guidelines should be remembered when reporting spills or vapor releases:

- Never include information that has not been verified.
- Never speculate as to the cause of an incident or make any acknowledgement of liability.
- Document:
  - Agency Notified.
  - Date/Time of Notification.
  - Person Notified.
  - Content of Message Given.
- DO NOT DELAY reporting due to incomplete information.

Appendix G contains the Emergency Call List.

4.2.7.5 Site Security

The security measures in place for the facility perimeter include fences and gates as follows:

- The refinery property is fully fenced and monitored by contract security guards 24 hours per day, 7 days per week.
- All plant entrances have automatic gates or are staffed with guards 24 hours per day.
- The facility is manned by operating personnel 24 hours per day, 7 days per week.

4.2.7.6 Sign and Markers

The refinery has warning signs indicating the presence of H_2S at the entrance to the refinery. Signs are located at the plant entrances indicating that all visitors are to proceed to the main office to sign-in.

4.2.7.7 First-Aid Station

The first aid station will be located at the Emergency Assembly Area. First aid kits are located at the:

- Main office building
- Fire Station
- Warehouses
- Control Rooms

4.2.7.8 Media Site

If the H_2S Contingency Plan is activated, the media site will be located at the Lovington City Hall, Commissioner's Conference Room.

At no time shall any unescorted representative from the media be allowed any closer to the plant than the media site location, unless approved by the Incident Commander, the Safety Officer, and the Media Relations Officer.

4.2.7.9 Emergency and Safety Equipment

There is one emergency response trailer at the Lovington Refinery. The trailer is maintained inside the refinery boundary fence. A complete listing of the emergency response equipment is provided in Appendix E.

5.0 TRAINING AND DRILLS

5.1 All Employees

All Lovington employees and contractor employees shall receive H_2S training upon initial orientation into the facility. Refresher training shall be administered on an annual basis, or when changes are made to this program.

Initial training for short-term contract employees and visitors may be waived under the following conditions:

- These person(s) are accompanied by H_2S trained personnel when working in high H_2S areas.
- The person(s) are given site and job specific instructional training that cover possible H_2S hazards in low H_2S areas.
- The person(s) are working in a plant area which contains no possible H_2S exposures.

Training information and documentation will be maintained by the Safety Department.

5.2 Response Team Training

Lovington has designated a Safety Training Coordinator (Safety/Environmental Coordinator) in light of the significant training and record keeping requirements by the many different government agencies (i.e., DOT, OSHA, EPA and various state and local agencies). The training coordinator's duties include conducting, training and maintaining records for all employees which documents the content of and the applicable regulatory requirement for the training. In addition to training records, the coordinator also maintains records of safety meetings and other meetings related to environmental regulations.

All employees who work in operating areas of the refinery or have the potential to be exposed to the operating areas receive an initial 40 hours of comprehensive training emphasizing occupational safety, environmental compliance and process safety management. Employees receive 40-hour training at their initial employment and annual computer based training (CBT) refresher training thereafter to comply with requirements found in:

- 40 CFR 112.7(e) - SPCC Plan
- 40 CFR 112.21 - Facility Response Plan
- 40 CFR 262 - Hazardous Waste Contingency Plan

Common elements of all three of these programs include prevention, detection, and response to releases of oils and other hazardous materials. Training common to all three also includes emphasis on good housekeeping practices (Best Management Practices), secondary containment, and prompt initial notification of an incident.

5.2.1 Response Team Exercises

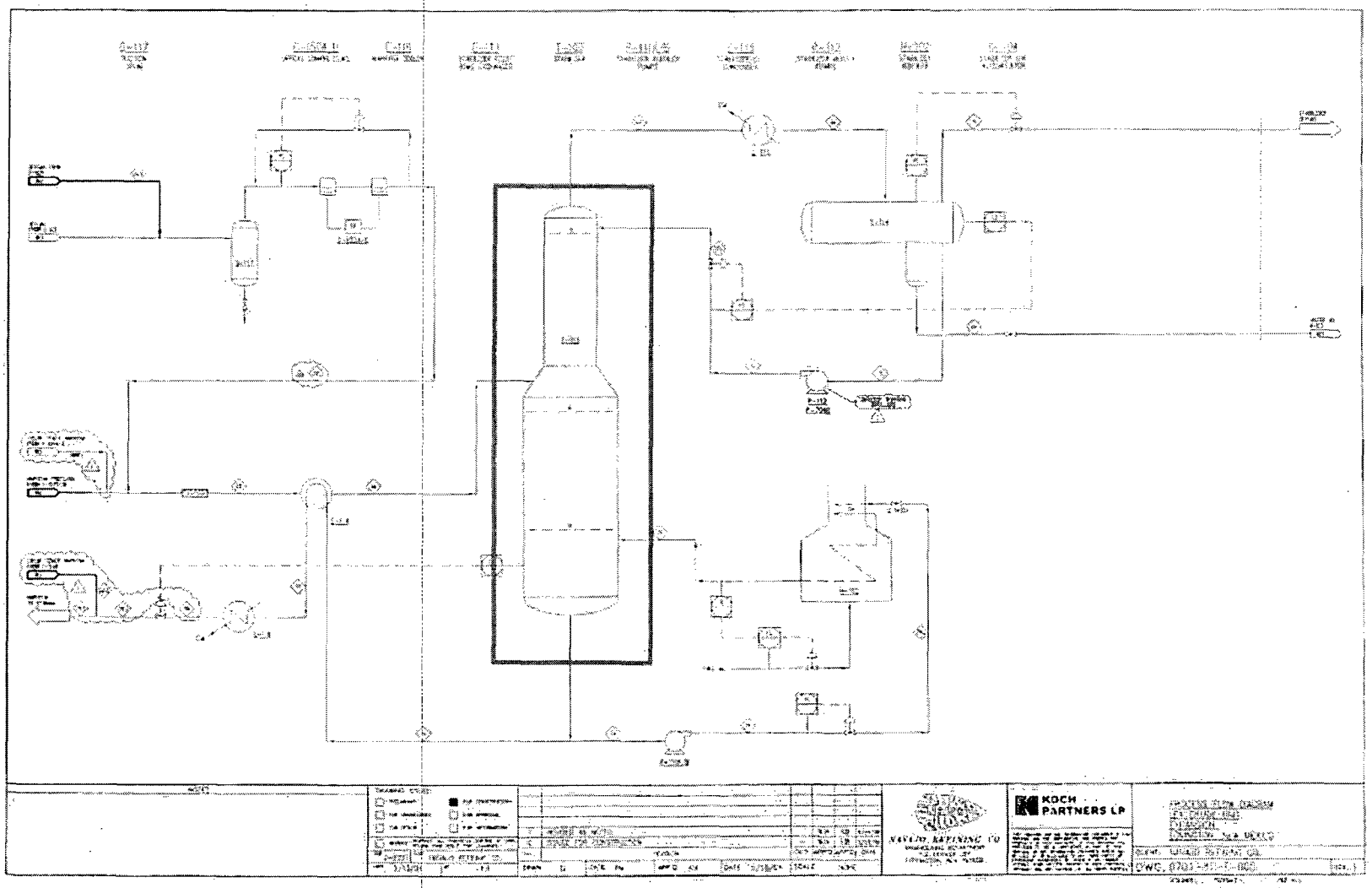
Emergency Response team members, various agencies, contractors and other response resources will participate in emergency response exercises as required by federal, state, and local regulations and as detailed in the "National Preparedness for Response Exercise Program" (PREP). Lovington Refinery will utilize announced and unannounced notification exercises, equipment deployment exercises, tabletop exercises, and/or various combinations to ensure that each component of the plan is exercised as required. Exercises include:

- Annual Qualified Individual Notification Exercises
- Annual Equipment Deployment Exercise
- Annual Response Team Tabletop Exercise

APPENDIX A

WORST CASE SCENARIO FOR H_2S RELEASE

The "worst case" release scenario of H_2S gas selected by Lovington Refinery personnel to be a release of the contents of the stabilizer (T-103) over a period of ten minutes. The T-103 stabilizer is shown in a red box in the PFD below.



APPENDIX B

CALCULATION FOR RADIUS OF EXPOSURE

The "worst case" scenario for a release of H_2S involves a release of the contents of stabilizer T-103 over a period of ten minutes. That scenario is based on a suggestion found in the *Risk Management Program Guidance for Offsite Consequence Analysis* document published by the United States Environmental Protection Agency (EPA). According to that document, one can describe a "worst case release scenario" as a release of the total quantity of material in a storage or process vessel over a duration of ten minutes.

To estimate the radius of exposure (ROE) associated with the worst-case release scenario, a calculation procedure was adopted from API RP-55, *Recommended Practice for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide.* The equation for predicting ROE for H_2S releases was taken from pg. 36 of Appendix C of API RP 55:

$$ROE = 10^{\left[A \times \log[H_2S] + B\right]}$$

where ROE is the H_2S radius of exposure, A and B are coefficients contained in Table C-1 of API RP 55 (reprinted below), and $[H_2S]$ is the amount of H_2S released. For a continuous release, the $[H_2S]$ must be specified in standard cubic feet per hour (SCFH); for a puff (instantaneous) release, $[H_2S]$ must be specified in standard cubic feet (SCF). Table C-1 provides values for A and B for continuous and puff releases, under both day and night weather conditions.

Table C-1—Linear Regression Coefficients for Mathematical Predictions of ROE as a Function of Downwind Hydrogen Sulfide Concentration and Release Quantity/Rate

Time*	Type of Release	Concentration, ppm	Coefficients A	Coefficients B
Day	Continuous	10	0.61	0.84
Day	Continuous	30	0.62	0.59
Day	Continuous	100	0.58	0.45
Day	Continuous	300	0.64	-0.08
Day	Continuous	500	0.64	-0.23
Night	Continuous	10	0.68	1.22
Night	Continuous	30	0.67	1.02
Night	Continuous	100	0.66	0.69
Night	Continuous	300	0.65	0.46
Night	Continuous	500	0.64	0.32
Day	Puff	10	0.39	2.23
Day	Puff	30	0.39	2.10
Day	Puff	100	0.39	1.91
Day	Puff	300	0.39	1.70
Day	Puff	500	0.40	1.61
Night	Puff	10	0.39	2.77
Night	Puff	30	0.39	2.60
Night	Puff	100	0.40	2.40
Night	Puff	300	0.40	2.20
Night	Puff	500	0.41	2.09

*Day Meteorological Conditions: Stability Class PG D (Neutral)—5 mph Wind Speed.
*Night Meteorological Conditions: Stability Class PG F (Stable)—2.2 mph Wind Speed.

According to the information supplied by the Lovington Refinery personnel, the stabilizer contains a total volume of 2,600 cubic feet. The average pressure in the stabilizer is 109.7 psia and the average temperature is 247.5 degrees Fahrenheit. Upon release of contents of the T-103 stabilizer to the atmosphere, the escaping stream would have an H_2S composition of 2.6 mole%. Therefore, the maximum escaping gaseous volume of H_2S would be 2.6 mole% of 2,600 cubic feet, which is 68 cubic feet. At standard conditions of 14.73 psia and 60 degrees Fahrenheit, 68 cubic feet of H_2S (at 109.7 psia and 247.5 deg Fahrenheit) would be roughly equivalent to 400 standard cubic feet (or 400 SCF) of H_2S. Assuming a ten minute release (based on the suggestion found in the EPA's RMP regulation), this results in a release rate of 400 SCF / 10 minute × (60 minute / hour) = 2,400 SCFH.

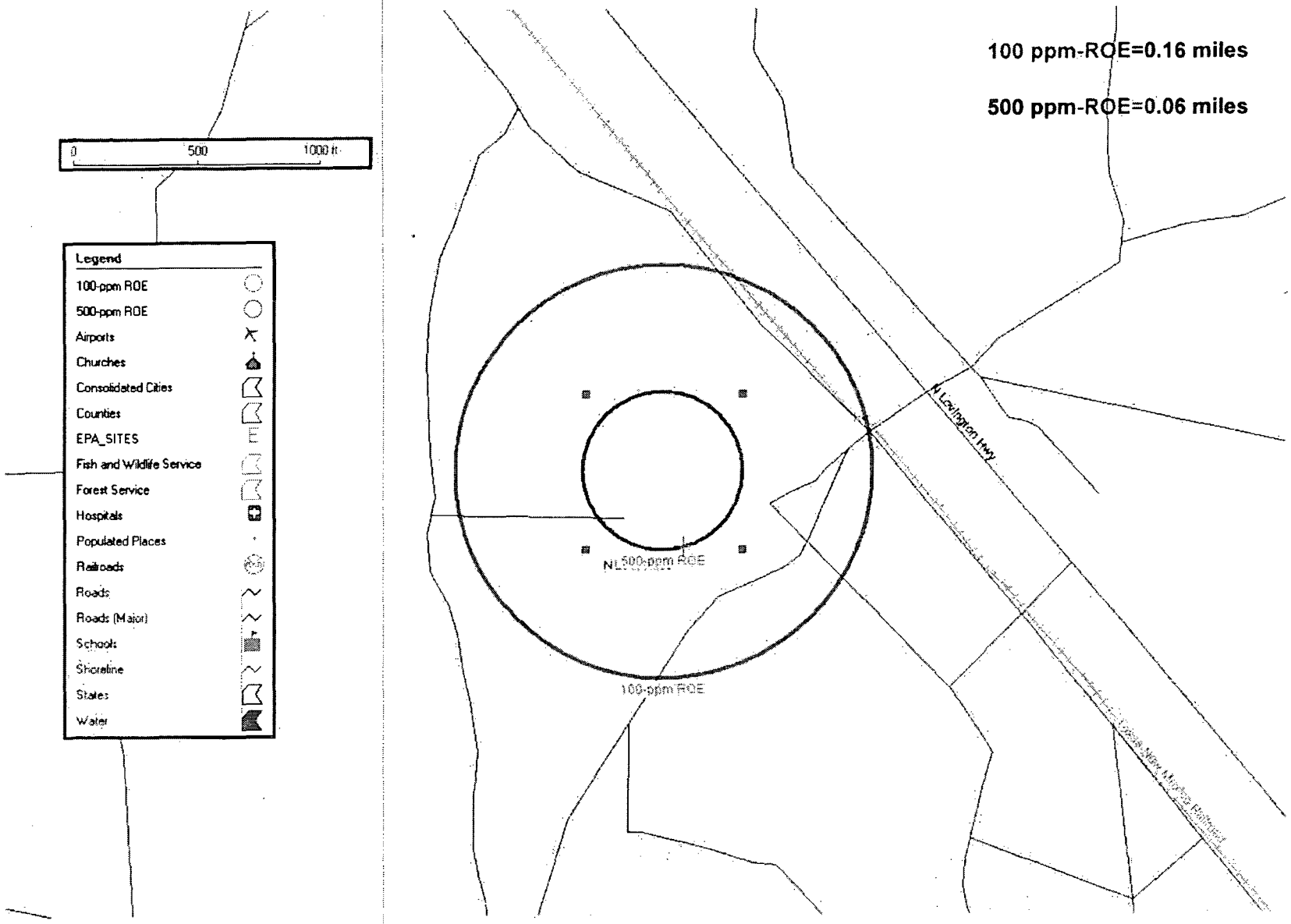
To calculate ROE distances, the values for coefficients A and B were taken from Table C-1, assuming night-time conditions (to ensure the most conservative results) and a continuous release. Radii of exposure for those two concentrations were calculated as follows:

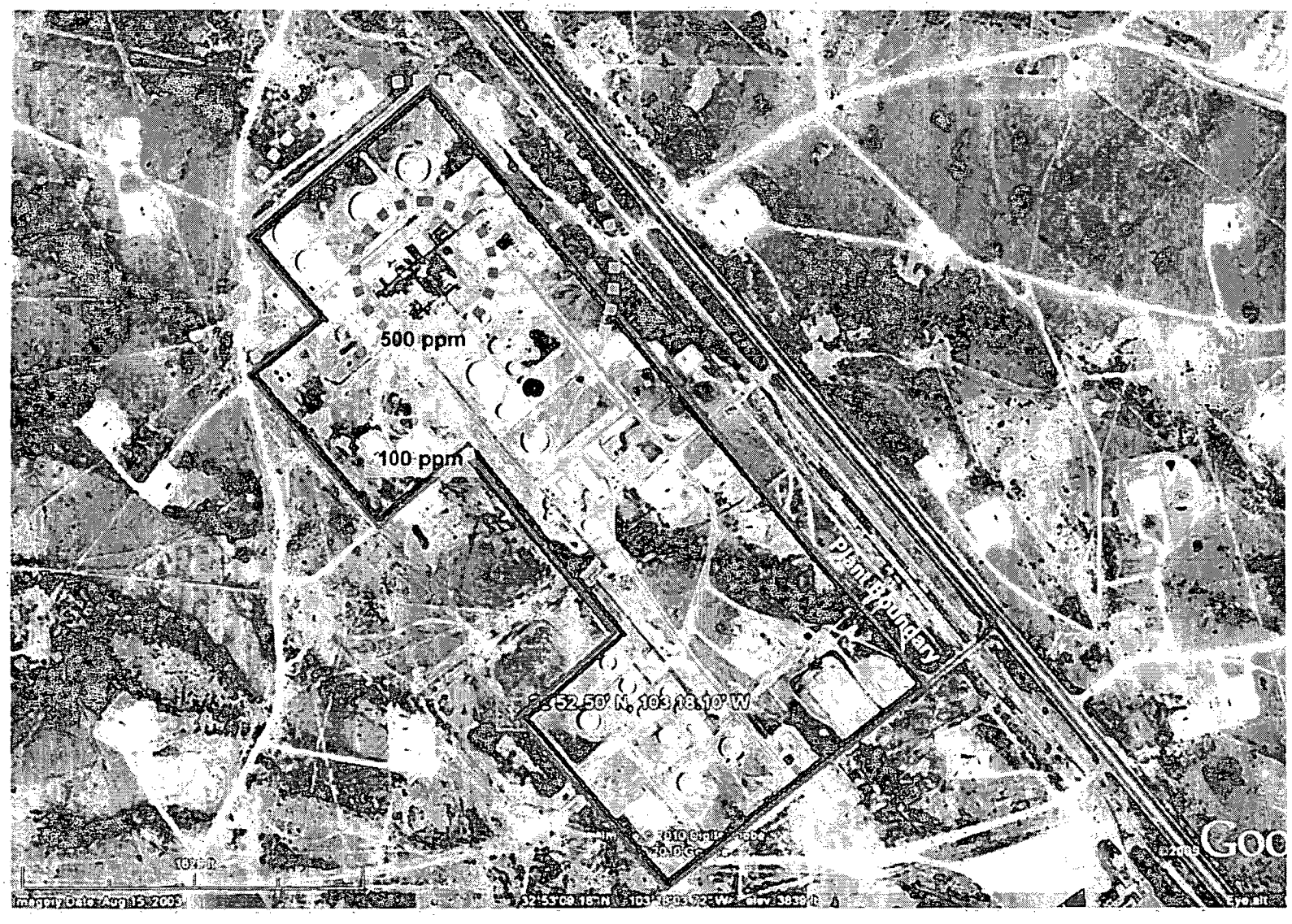
$$\text{ROE to 100 ppm} = 10^{[0.66 \times \log(2{,}400) + 0.69]} = 834 \text{ feet}$$

$$\text{ROE to 500 ppm} = 10^{[0.64 \times \log(2{,}400) + 0.32]} = 304 \text{ feet}$$

APPENDIX C

RADIUS OF EXPOSURE (ROE) MAP


100 ppm-ROE=0.16 miles
500 ppm-ROE=0.06 miles
0
500
1000 ft
Legend
100-ppm ROE
500-ppm ROE
Airports
Churches
Consolidated Cities
Counties
EPA_SITES
Fish and Wildlife Service
Forest Service
Hospitals
Populated Places
Railroads
Roads
Roads (Major)
Schools
Shoreline
States
Water
N Lovington Hwy
500-ppm ROE
100-ppm ROE


500 ppm
100 ppm
Pierce Boulevard
32 52.50' N, 103 18.10' W

APPENDIX D

PLANT DIAGRAM - EVACUATION ROUTES, H_2S MONITORING AND ALARM LOCATIONS

APPENDIX E

DESCRIPTION OF EMERGENCY RESPONSE EQUIPMENT

Lovington Refinery

- 25 BBL Vacuum Truck
- 8'X20' spill response trailer
- 5 sacks Bio-Sorb absorbent
- 10 sacks Peat
- 2- Wheel barrows
- 20 misc. rakes, shovels, hoes, etc.
- One 55 gallon over pack drum
- Approximately 50' of 4" boom
- One lot of absorbent pads
- Several sets of complete PPE for oil spill response (rubber boots, tyvek suits, gloves, goggles, face shields etc)
- One skid steer loader
- One all terrain forklift
- One 4-wheel drive Pickup for pulling trailer

Communication Equipment - Operational Status: Good

Description	Quantity	Location
Telephones	30	Throughout Refinery
Base Radios	5	Throughout Refinery
Portable Radios	30	Throughout Refinery
Mobile Radios	8	Throughout Refinery
Remote Radios	0	Throughout Refinery
Pagers	30	Throughout Refinery
Cellular Phones	7	Throughout Refinery

Cellular Phones

Cellular Phones Assigned To	Phone No.
Safety & Risk Manager (Bill Jones)	575-748-6779
Sr. Engineer Mgr (Jimmy Meeks)	575-308-8718
Maintenance Superintendent (Charles Hutchings)	575-441-7374
Sr. Operations Mgr (Ricky Swafford)	575-308-9865
Operations Foreman (Eloy Hernandez)	575-631-2551
Refinery Mgr (Michael Whatley)	575-513-2276
Safety/Environmental Coordinator (Steve Terry)	575-631-2553
Sr. Environmental Mgr (Johnny Lackey)	972-261-8075

APPENDIX F

H_2S CONTINGENCY PLAN - RESPONSE

H_2S Protection Protocols

Less than the PEL - In concentrations of H_2S below the PEL (10 ppm), no respiratory protection is required.

More than the PEL but less than IDLH - In concentrations of H_2S above the PEL (10 ppm), and below the IDLH (100 ppm), respiratory protection in the form of a supplied air-line respirator or SCBA shall be used.

More than IDLH - In concentrations of H_2S above the IDLH (100 ppm), respiratory protection in the form of a supplied air-line respirator, or SCBA with at least one standby person per affected person shall be used.

Unknown Concentrations of H_2S - For unknown concentration of H_2S, respiratory protection in the form of a supplied air-line respirator or SCBA with standby/rescue person(s) shall be required until the concentration can be measured and is found to be below the PEL.

Rescue of Another Person - For rescue purposes, SCBA or supplied air-line respirator shall be the only form of respiratory protection.

As with other chemical hazards, proper care shall taken to choose proper body, head/face and eye protection as required by the task.

Detection - Personal Monitoring Equipment

Personal H_2S monitors used in the facility should alarm at the PEL (10 ppm) and STEL (15 ppm). Monitors may or may not have direct reading capabilities. Employees should wear a personal H_2S monitor at all times when working in the process units and Blender/Tank Farm locations. The monitors should be worn within the "breathing zone", unobstructed by clothing or equipment and such that the employee can readily perceive the alarms. The breathing zone is a 1.5-foot radius in all directions centered at the nose and mouth.

Alarm Protocol

If a personal monitor alarms at the low alarm (PEL), personnel must leave the area and obtain fresh air equipment to complete the work task.

Detection - Fixed Monitoring Equipment

Fixed H_2S monitors are located in the refinery in the North Plant and the CCR. The fixed H_2S monitors have two alarm set points. The alarm set points and responses are as follows:

- First set point: 20 ppm
  - Response: Activates alarm in the control rooms
- Second set point: 50 ppm
  - Response: Activates alarm in the control room. Activates strobe lights and an audible alarm in affected unit area(s).

Alarm Protocol:

In the event a fixed monitor alarms at the first set point of 20 ppm:

- Operations personnel shall contact and remove any personnel that are not protected with respiratory protection in the affected area(s) under alarm.
- Operations personnel shall contact personnel with proper respiratory protection in the affected area(s) and to ensure that they are aware of the alarm situation.
- Operations personnel may remove any personnel using proper respiratory protection at their discretion.
- Non-operations personnel shall remove themselves from the affected unit area(s). Non-operations personnel can only re-enter an area under alarm with Operations' permission and with proper respiratory protection.

In the event a fixed monitor alarms at the second set point of 50 ppm:

- Operations personnel shall contact and remove all personnel in the affected area(s).
- Non-operations personnel shall remove themselves from the affected unit area(s). **IF FRESH AIR EQUIPMENT IS BEING UTILIZED AT THE TIME OF REMOVAL, IT MUST BE WORN TO EXIT THE AFFECTED AREA(S).**
- Non-operations personnel shall contact operations after they have exited the affected area(s) under alarm.

Emergency Procedures

All emergency procedures for fire, facility evacuation, earthquake, etc shall be followed as outlined in the **Emergency Response Plan**.

In the event of an H_2S release:

- Wear appropriate respiratory protection if available.
- Make note of wind direction and evacuate upwind or cross wind from the affected area(s).
- Check in with operations once outside the affected area(s).

First Aid/Rescue Procedures:

- Activate the alarm.
- Never attempt to rescue a downed victim without proper respiratory protection. Proper respiratory protection for rescue purposes is fresh air in the form of a 30-minute SCBA.
- Remove victim to fresh air.
- Check victim for breathing and pulse. If qualified, administer CPR as needed until help arrives.

Information and Training

All employees and contractor employees shall receive H_2S training upon initial orientation into the facility. Refresher training shall be administered on an annual basis, or when changes are made to this program.

Initial training for short-term contract employees and visitors may be waived under the following conditions:

- These person(s) are accompanied by H_2S trained personnel when working in high H_2S areas, or
- The person(s) are given site and job specific instructional training that cover possible H_2S hazards in low H_2S areas, or
- The person(s) are working in a plant area which contains no possible H_2S exposures.

Training information and documentation will be maintained by the Safety Department.

APPENDIX G

EMERGENCY CALL LIST

Navajo Refining Internal Notifications

Internal Notifications				
Organization	**Name**	**Office**	**Home**	**Other**
Emergency Coordinator Refinery VP/Manager (Qualified Individual):	Michael Whatley	(575) 748-3311 ext. 743	(575) 746-2096	(575) 513-2276
Alternate Qualified Individual Operations Supervisor	Eloy Hernandez	(575) 396-9403	(575) 396-3590	(575) 631-2551
Incident Commander Safety & Risk Manager:	Bill Jones	(575) 748-3311 ext. 779	(281) 217-0897	(575) 308-9503
Fire Chief	Steve Terry	(575) 396-9404	(575) 396-7245	(575) 631-2553
Safety Officer/Medical Officer Safety Department	Kent Bratcher	(575) 748-3311 ext. 407	(575) 746-3268	(575) 365-7995
Manager of Environmental for Water and Waste	Darrell Moore	(575) 748-3311 ext. 281	(575) 703-5058	(575) 703-5058
Logistics Section Relief Maintenance Supervisor	Chuck Lunsford	(575) 396-9418		(575) 631-4699
Maintenance Supervisor	Charles Hutchins	(575) 396-9401	(575) 393-2587	(575) 441-7374
Planning Section Maintenance Director	David Bolding	(575) 738-3311 ext. 444	(575) 365-2694	(575) 746-7646
Logistics Section Maintenance Department Coordinator	David Rowland	(575) 748-3311 ext. 327	(575) 746-4828	(575) 365-7895
Finance Section Purchasing Department	Mark Sanderson	(575) 748-3311 ext. 327	(575) 746-4828	(575) 365-7895
Finance Section – Expediter Purchasing Department	Jon Ross	(575) 748-3311 ext. 325	(575) 746-6452	(575) 365-4244

Navajo Refining External Notifications

Required External Notifications			
Agency	**Location**	**Office**	**Alternate**
National Response Center (NRC)	Washington, D.C.	(800) 424-8802	(202) 267-2675
Roswell State Police (SERC)	Roswell, NM	(575) 827-9223	(575) 622-7200
NM Energy, Minerals, and Natural Resources Department (OCD)	Hobbs,NM (District 1)	(575) 393-6161	
Local Emergency Planning Committee (LEPC)	Hobbs, NM	(575) 397-2870	(575) 392-3019
Assistance/Advisory Notifications (outside resources)			
Agency	**Location**	**Office**	**Alternate**
New Mexico Department of Game and Fish	Roswell, NM	(575) 624-6135	(575) 748-3036
New Mexico OSHA Bureau	Santa Fe, NM	(575) 827-2888	
OSHA (For Reportable Injury or Death)	Washington, D.C.	(800) 321-6724	
U.S. Environmental Protection Agency (EPA) Region IV	Dallas, TX	(800) 887-6063	(214) 665-2200
U.S. Fish and Wildlife Services (USFWS)	Albuquerque, NM	(505) 346-2525	
Bureau of Land Management (BLM)	Santa Fe, NM	(505) 438-7501	
New Mexico Health and Environmental Department	Santa Fe, NM	(505) 827-3723	
New Mexico Fire Marshal	Roswell, NM	(575) 347-5700	
National Weather Service (Recorded Forecasts) (NOAA)	Roswell, NM	(575) 347-5700	
Local Water Supply System	Lovington, NM	(575) 396-2884	
Local Emergency Services			
Agency	**Location**	**Office**	**Alternate**
Lovington Fire Department	Lovington, NM	911	(575) 396-2359
Lea County Sheriff	Lovington, NM	911	(575) 396-3611
Lovington City Police	Lovington, NM	911	(575) 396-2811
Lovington Ambulance	Lovington, NM	911	
Lea Regional Hospital	Lovington, NM	(575) 748-3333	
Eastern New Mexico Medical Center	Roswell, NM	(575) 622-1110	
Norlea Hospital	Lovington, NM	(575) 396-6611	

Other Emergency Resources

Oil Spill Removal Organizations (OSRO)			
Company	**Location**	**Office**	**Alternate**
TAS Environmental Services, Inc.	Fort Worth, TX	(888) 654-0111	(800) 442-7637
Additional Response Recourses			
Company	**Location**	**Office**	**Alternate**
Indian Fire & Safety	Artesia, NM	(575) 393-3093	(800) 530-8693
I/W Hot Oil - Transports Service	Lovington, NM	(575) 396-3311	
Gandy Corporation - Transports Service	Lovington, NM	(575) 396-4948	
AA Oil Field	Hobbs, NM	(575) 746-6233	
Swett Construction - Dirt Equipment	Artesia, NM	(575) 748-1238	
T&C Tank Rental - Temporary Storage	Artesia, NM	(575) 746-9788	
International Bird Rescue Center	Fairfield, CA	(707) 207-0380	
Tri-State Bird Rescue	Newark, NJ	(302) 737-9543	
KBIM - TV	Roswell, NM	(575) 622-2120	
KLEA - AM Radio	Lovington, NM	(575) 396-3355	

APPENDIX H

H_2S PLAN DISTRIBUTION LIST

DISTRIBUTION

Copy #	Location
1	Safety Library
2	Environmental File Room
3	Safety/Environmental Coordinator
4	Plant Manager
5	Operations Manager
6	Lovington Operations Foreman
7	Maintenance Office
8	PSM Coordinator
9	Lovington Control Room
10	Corporate EH&S

Chavez, Carl J, EMNRD

From: Lackey, Johnny [Johnny.Lackey@hollycorp.com]
Sent: Monday, May 03, 2010 9:08 AM
To: Chavez, Carl J, EMNRD
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD; christy.franklyn@schirmereng.com; swati.rao@schirmereng.com; mleighton@lovington.org; hsncpbm@leaco.net
Subject: RE: H2S Contingency Plan
Attachments: Lovington H2S CP Plot Plan.pdf

Carl. Attached is Appendix D (Plant Diagram-Evacuation Routes, H2S Monitoring and Alarm Locations) for the Lovington H2S Contingency Plan. I just discovered that this drawing was not inserted in the Plan submitted on Friday.

Johnny Lackey
Environmental Manager
Navajo Refining Company, L.L.C.
Office - 575-746-5490
Cell - 972-261-8075
Fax - 575-746-5451
Johnny.Lackey@hollycorp.com

From: Lackey, Johnny
Sent: Friday, April 30, 2010 6:16 PM
To: 'Chavez, Carl J, EMNRD'
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD; christy.franklyn@schirmereng.com; swati.rao@schirmereng.com; mleighton@lovington.org; 'hsncpbm@leaco.net'
Subject: RE: H2S Contingency Plan

Carl. After calculating the worst case release scenario at the Navajo Lovington Refinery, it was determined that the 500 ppm ROE did not encompass a "public road" (J. "Public road" means a federal, state, municipal or county road or highway) and the 100 ppm ROE does not encompass a "public area". (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). See Appendix C. As you are aware, the Lovington facility is approximately 5 miles south of the city of Lovington and is surrounded by oil and gas production with no businesses or residences in close proximity to the refinery, therefore I don't think an H2S Contingency Plan is required for this facility. However, I am attaching a copy of the Final Plan for your review of the calculations performed in compliance with API RP-55 (see Appendix B) and **will await your concurrence as to the applicability of the H2S Contingency Plan Rule for the Navajo Lovington Refinery.**

Thanks,

Johnny Lackey
Environmental Manager
Navajo Refining Company, L.L.C.
Office - 575-746-5490
Cell - 972-261-8075

Fax - 575-746-5451
Johnny.Lackey@hollycorp.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Wednesday, April 28, 2010 3:21 PM
To: Lackey, Johnny
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD; christy.franklyn@schirmereng.com; swati.rao@schirmereng.com
Subject: RE: H2S Contingency Plan

Approved. Thank you.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3490
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

From: Lackey, Johnny [mailto:Johnny.Lackey@hollycorp.com]
Sent: Wednesday, April 28, 2010 3:00 PM
To: Chavez, Carl J, EMNRD
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD; christy.franklyn@schirmereng.com; swati.rao@schirmereng.com
Subject: RE: H2S Contingency Plan

Carl. I am working diligently with our consultant to finalize the Lovington H2S Contingency plan. We have the majority of the Plan complete, however due to the consultant's internal review and QA/QC, and our submittal of additional data for the worst case scenario; it appears we may not be ready to submit the Final Plan for your review by end of business today. Will you allow us an extension of 2 days to ensure I have an accurate Plan to submit for review? If you grant the extension I will submit the Plan by EOB on Friday, 4/30/10.

Thanks,

Johnny Lackey
Environmental Manager
Navajo Refining Company, L.L.C.
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Fax - 575-746-5451
Johnny.Lackey@hollycorp.com

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From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Thursday, April 08, 2010 8:23 AM
To: Lackey, Johnny
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD
Subject: RE: H2S Contingency Plan

Johnny:

Hi. I'm sorry, due to our work load, it is difficult to pin down a date for OCD review and comments. I recommend that Navajo Refining Company (NRC) submit its H2S Contingency Plan for Lovington in its final form in order to satisfy the intent of the OCD H2S Regulations. The OCD will be reviewing them and may have comments at a later date where we can work together to resolve any outstanding issues. NRC should be looking over the OCD regulatory requirements and making sure you address them in you final report. For example, you should have reviewed the API Guidance referenced in the OCD Regulations to ensure you have also complied with the guidance. Thank you.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3490
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

From: Lackey, Johnny [mailto:Johnny.Lackey@hollycorp.com]
Sent: Thursday, April 08, 2010 7:54 AM
To: Chavez, Carl J, EMNRD
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD
Subject: RE: H2S Contingency Plan

Carl. We are working on the Lovington Plan and should have it ready for your review by April 28, per your attached email. I was hoping to see comments on Artesia so any changes/comments could be incorporated in the Lovington Plan prior to submittal.

Johnny Lackey
Environmental Manager
Navajo Refining Company, L.L.C.
Office - 575-746-5490
Cell - 972-261-8075
Fax - 575-746-5451
Johnny.Lackey@hollycorp.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Thursday, April 08, 2010 7:24 AM
To: Lackey, Johnny

Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD
Subject: RE: H2S Contingency Plan

Johnny, et al.:

Good morning. Where is the Lovington Refinery H2S Contingency Plan? Thank you.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
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Office: (505) 476-3490
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

From: Lackey, Johnny [mailto:Johnny.Lackey@hollycorp.com]
Sent: Thursday, April 01, 2010 9:03 AM
To: Chavez, Carl J, EMNRD
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD
Subject: RE: H2S Contingency Plan

Attached is Navajo's H2S Contingency Plan (final) for review. Wasn't clear whether you do or do not want to review DRAFT documents???

Johnny Lackey
Environmental Manager
Navajo Refining Company, L.L.C.
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Fax - 575-746-5451
Johnny.Lackey@hollycorp.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Wednesday, March 31, 2010 4:48 PM
To: Lackey, Johnny
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD
Subject: RE: H2S Contingency Plan

Johnny:

Please send it as the final contingency plan for OCD review. The OCD does want to review draft documents. Thank you.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505

Office: (505) 476-3490
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

From: Lackey, Johnny [mailto:Johnny.Lackey@hollycorp.com]
Sent: Wednesday, March 31, 2010 4:42 PM
To: Chavez, Carl J, EMNRD
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD
Subject: RE: H2S Contingency Plan
Importance: High

Carl.

Attached is Navajo's DRAFT H2S Contingency Plan for your review/comment/approval. I will be sending via FedEx a hard copy of the plan also. I'm attaching the plot plan separately since the letter size doesn't show up well in the electronic version. The hard copy you will receive will include a color coded "D" sized drawing.

As we discussed, once the plan is approved, Navajo will prepare a "Public Notice" for the local newspaper to publish which will serve as notice to those that may be affected by a release from the refinery. I will send a copy of the proposed release to you for review and approval before sending to the newspaper for publishing.

The previous submittal was not intended to be the Draft Plan but to present our proposed "worst Case" scenario for your OK so we could develop the plan around that scenario.

Let me know if you need additional information or have any questions regarding this submittal.

Johnny Lackey
Environmental Manager
Navajo Refining Company, L.L.C.
Office - 575-746-5490
Cell - 972-261-8075
Fax - 575-746-5451
Johnny.Lackey@hollycorp.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Friday, March 12, 2010 4:35 PM
To: Lackey, Johnny
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD
Subject: RE: H2S Contingency Plan

Johnny:

The OCD has completed a review of your proposal for the above subject plan for the Artesia Refinery, and I presume would form the basis for the plan for the Lovington Refinery.

In general, the proposal to use the "PHAST" Model to model H2S Gas does not appear to be appropriate (see link http://cfpub.epa.gov/crem/knowledge_base/crem_report.cfm?deid=196448&view=PDF) where the model primary purpose

is for simulating multi-component, reactive solute transport in 3-d saturated ground water flow systems, which is clearly not a gas transport model recommended in OCD Hydrogen Sulfide Regulations.

I notice that I don't see maps with detector locations, wind socks, location of "poison gas signs", location of units with flow where ROEs (100 and 500 ppm) would be depicted in public areas surrounding the refinery. Consequently, I am attaching the OCD's Regulations that references API Guidance, which is also not referenced in your proposal. Please take a look at the OCD Regulations and requirements and submit a H2S Contingency Plan that will address the regulations. The OCD provided an example (GW-33) from a Gas Plant that Navajo Refining Company should be using to develop a plan.

See OCD approved H2S Contingency Plan at OCD Online (GW-33) at http://ocdimage.emnrd.state.nm.us/imaging/AEOrderFileView.aspx?appNo=pENV000GW00034.

See attached OCD H2S Regulations to cross-check to make sure your plan addresses OCD Regulations. Also, information on the Pasquil-Gifford Model is attached to help you find another gas dispersion model or you can simply use this user friendly model to complete the plan (ROEs).

Please contact me if you have questions. Thank you.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3490
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

From: Lackey, Johnny [mailto:Johnny.Lackey@hollycorp.com]
Sent: Wednesday, March 10, 2010 7:53 AM
To: Chavez, Carl J, EMNRD
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; 'Christy_Franklyn@schirmereng.com'; Whatley, Michael
Subject: RE: H2S Contingency Plan

Carl. Attached is Navajo's proposal for your consideration. Included in the proposal is our worst case release scenario. After your review and comments, Navajo will prepare the H2S Contingency Plan for submittal to the agency and Emergency Response organizations.

Johnny Lackey
Environmental Manager
Navajo Refining Company, L.L.C.
Office - 575-746-5490
Cell - 972-261-8075
Fax - 575-746-5451
Johnny.Lackey@hollycorp.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Friday, February 05, 2010 1:48 PM

To: Lackey, Johnny
Subject: H2S Contingency Plan

Johnny:

Hi. I have not received Navajo Refining Company's proposal that you indicated during our last meeting related to the above subject.

One recommendation that I have based on our meeting and Navajo Refining Company's concern about the ROE is attempt to provide an illustration of a real worse case scenario based on refinery controls and operations, but explain and reference in appendices the scenario that complies with OCD regulations. In this way, you can present your real worse case and address OCD regulation in the contingency plan.

Thanks.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3490
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

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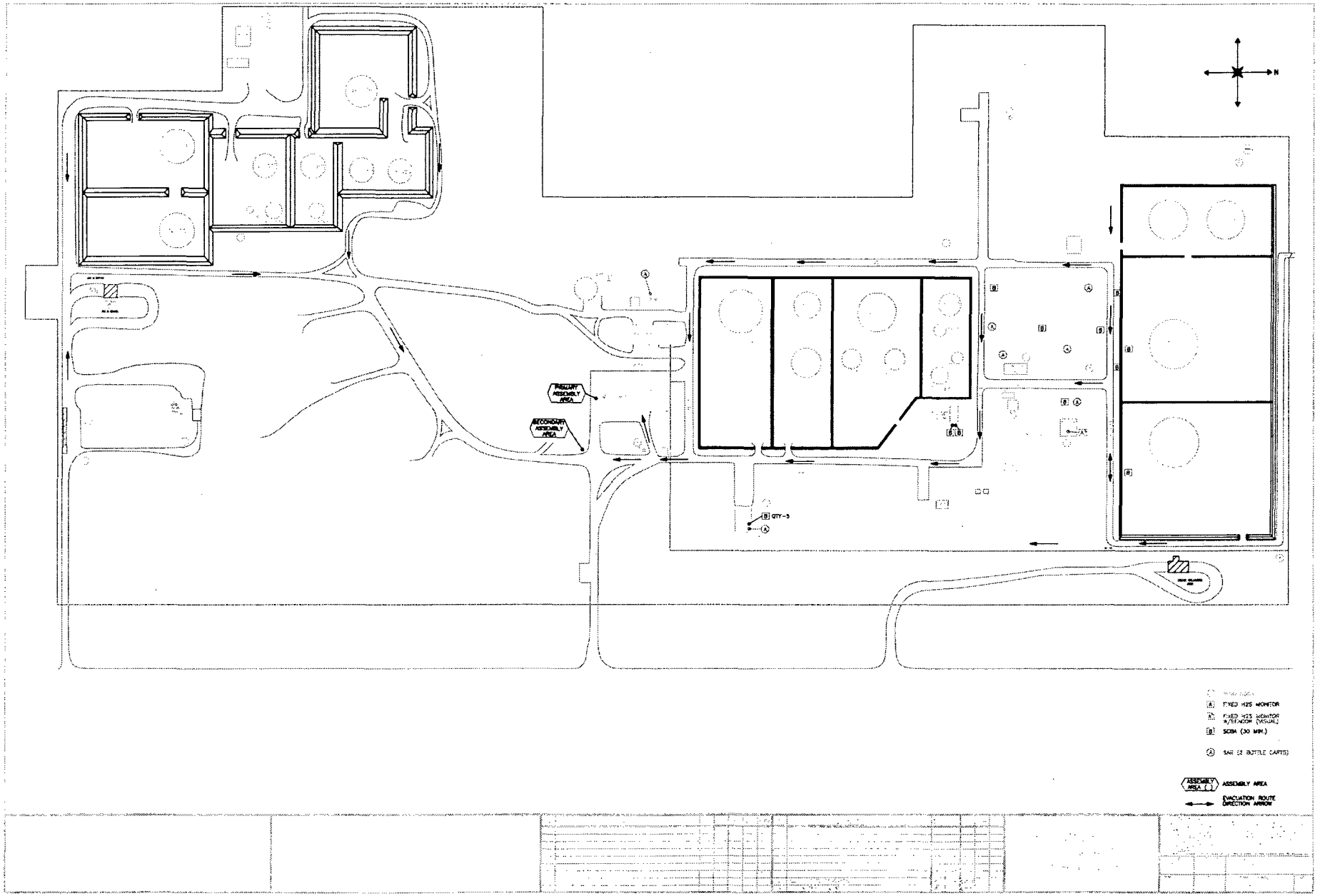
N
PRIMARY ASSEMBLY AREA
SECONDARY ASSEMBLY AREA
QTY-5
FIXED H2S MONITOR
FIXED H2S MONITOR W/BEACON (VISUAL)
SCBA (30 MIN.)
SAR (2 BOTTLE CARTS)
ASSEMBLY AREA
EVACUATION ROUTE DIRECTION ARROW

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Friday, April 30, 2010 8:02 AM
To: 'Lackey, Johnny'
Cc: Dade, Randy, EMNRD; VonGonten, Glenn, EMNRD; Sanchez, Daniel J., EMNRD; Hill, Larry, EMNRD
Subject: FW: H2S Contingency Plan (Plan) (GW-028)

Johnny:

Re: As we discussed, once the plan is approved, Navajo Refining Company (Navajo) will prepare a "Public Notice" for the local newspaper to publish which will serve as notice to those that may be affected by a release from the refinery. I will send a copy of the proposed release to you for review and approval before sending to the newspaper for publishing.

Good morning. The H2S Contingency Plan has been scanned into OCD Online at "GW-028" under the "H2S Contingency Plan" thumbnail.

The most immediate concern to OCD based on the Plan is the ROEs (100 & 500 ppm) overlapping the nearby community and public health concerns. Fortunately, Navajo has maintained good communication throughout the Plan preparation and we discussed a plan for educating the public on what Navajo will do in the event of an H2S release that threatens public safety. Navajo is also working on Lovington Refinery Plan, which OCD expects to receive soon.

OCD's recommendation and in consideration of any recommendation(s) by OCD District Office Supervisor, Randy Dade, is: Navajo shall submit a draft of its public notice for the local newspaper(s) for OCD review and comment. We want the map to be shown, an explanation of what H2S and SO2 are and why they are dangerous, and the emergency action steps that Navajo will undertake to protect the community with a mail address and phone number for all incoming calls on the matter and letters to be logged and shared with the OCD. The OCD's position is that if there is significant interest voiced and/or documented by letter to Navajo, OCD feels it is in the best interest to hold a "Safety Meeting" open to the community where any questions, issues, etc. may be discussed with the community with the local Fire Marshal in attendance along with the OCD.

Please let me know your thoughts by next Friday COB with proposed date to submit your draft to Randy and I so we can proceed to address the H2S Public Safety issues together for the Artesia Refinery. Thank you.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3490
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
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Sent: Wednesday, March 31, 2010 4:48 PM
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Subject: RE: H2S Contingency Plan
Importance: High

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Let me know if you need additional information or have any questions regarding this submittal.

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To: Lackey, Johnny
Subject: H2S Contingency Plan

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Chavez, Carl J, EMNRD

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Sent: Thursday, April 08, 2010 8:23 AM
To: 'Lackey, Johnny'
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD
Subject: RE: H2S Contingency Plan

Johnny:

Hi. I'm sorry, due to our work load, it is difficult to pin down a date for OCD review and comments. I recommend that Navajo Refining Company (NRC) submit its H2S Contingency Plan for Lovington in its final form in order to satisfy the intent of the OCD H2S Regulations. The OCD will be reviewing them and may have comments at a later date where we can work together to resolve any outstanding issues. NRC should be looking over the OCD regulatory requirements and making sure you address them in you final report. For example, you should have reviewed the API Guidance referenced in the OCD Regulations to ensure you have also complied with the guidance. Thank you.

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Subject: RE: H2S Contingency Plan

Carl. We are working on the Lovington Plan and should have it ready for your review by April 28, per your attached email. I was hoping to see comments on Artesia so any changes/comments could be incorporated in the Lovington Plan prior to submittal.

Johnny Lackey
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Subject: RE: H2S Contingency Plan

Johnny, et al.:

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Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3490
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E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

From: Lackey, Johnny [mailto:Johnny.Lackey@hollycorp.com]
Sent: Wednesday, March 10, 2010 7:53 AM
To: Chavez, Carl J, EMNRD
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; 'Christy_Franklyn@schirmereng.com'; Whatley, Michael
Subject: RE: H2S Contingency Plan

Carl. Attached is Navajo's proposal for your consideration. Included in the proposal is our worst case release scenario. After your review and comments, Navajo will prepare the H2S Contingency Plan for submittal to the agency and Emergency Response organizations.

Johnny Lackey
Environmental Manager
Navajo Refining Company, L.L.C.
Office - 575-746-5490
Cell - 972-261-8075
Fax - 575-746-5451
Johnny.Lackey@hollycorp.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Friday, February 05, 2010 1:48 PM
To: Lackey, Johnny
Subject: H2S Contingency Plan

Johnny:

Hi. I have not received Navajo Refining Company's proposal that you indicated during our last meeting related to the above subject.

One recommendation that I have based on our meeting and Navajo Refining Company's concern about the ROE is attempt to provide an illustration of a real worse case scenario based on refinery controls and operations, but explain and reference in appendices the scenario that complies with OCD regulations. In this way, you can present your real worse case and address OCD regulation in the contingency plan.

Thanks.

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Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Wednesday, March 31, 2010 4:48 PM
To: 'Lackey, Johnny'
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD
Subject: RE: H2S Contingency Plan

Johnny:

Please send it as the final contingency plan for OCD review. The OCD does want to review draft documents. Thank you.

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Sent: Wednesday, March 31, 2010 4:42 PM
To: Chavez, Carl J, EMNRD
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD
Subject: RE: H2S Contingency Plan
Importance: High

Carl.

Attached is Navajo's DRAFT H2S Contingency Plan for your review/comment/approval. I will be sending via FedEx a hard copy of the plan also. I'm attaching the plot plan separately since the letter size doesn't show up well in the electronic version. The hard copy you will receive will include a color coded "D" sized drawing.

As we discussed, once the plan is approved, Navajo will prepare a "Public Notice" for the local newspaper to publish which will serve as notice to those that may be affected by a release from the refinery. I will send a copy of the proposed release to you for review and approval before sending to the newspaper for publishing.

The previous submittal was not intended to be the Draft Plan but to present our proposed "worst Case" scenario for your OK so we could develop the plan around that scenario.

Let me know if you need additional information or have any questions regarding this submittal.

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From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Friday, March 12, 2010 4:35 PM
To: Lackey, Johnny
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; Christy_Franklyn@schirmereng.com; Whatley, Michael; Dade, Randy, EMNRD
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The OCD has completed a review of your proposal for the above subject plan for the Artesia Refinery, and I presume would form the basis for the plan for the Lovington Refinery.

In general, the proposal to use the "PHAST" Model to model H2S Gas does not appear to be appropriate (see link http://cfpub.epa.gov/crem/knowledge_base/crem_report.cfm?deid=196448&view=PDF) where the model primary purpose is for simulating multi-component, reactive solute transport in 3-d saturated ground water flow systems, which is clearly not a gas transport model recommended in OCD Hydrogen Sulfide Regulations.

I notice that I don't see maps with detector locations, wind socks, location of "poison gas signs", location of units with flow where ROEs (100 and 500 ppm) would be depicted in public areas surrounding the refinery. Consequently, I am attaching the OCD's Regulations that references API Guidance, which is also not referenced in your proposal. Please take a look at the OCD Regulations and requirements and submit a H2S Contingency Plan that will address the regulations. The OCD provided an example (GW-33) from a Gas Plant that Navajo Refining Company should be using to develop a plan.

See OCD approved H2S Contingency Plan at OCD Online (GW-33) at http://ocdimage.emnrd.state.nm.us/imaging/AEOrderFileView.aspx?appNo=pENV000GW00034.

See attached OCD H2S Regulations to cross-check to make sure your plan addresses OCD Regulations. Also, information on the Pasquil-Gifford Model is attached to help you find another gas dispersion model or you can simply use this user friendly model to complete the plan (ROEs).

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Attachments: 19.15.11 NMAC.pdf; Pasquil-Gifford Model.pdf

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Toxic Release and Dispersion Models

Gausian Dispersion Models

Dispersion Models

- Practical and Potential Releases
- Pasquil-Gifford Models
  - Stability classes
  - Dispersion coefficients
- Plume Model
- Puff
  - Integrated dose
- Isopleths
- Release Mitigation
- Example

Practical and Potential Releases

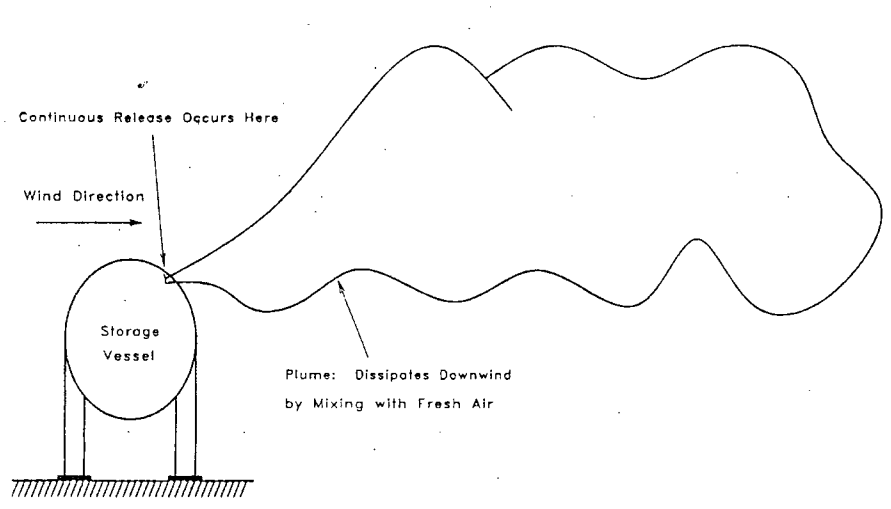
- During an accident process equipment can release toxic materials very quickly.
  - Explosive rupture of a process vessel due to excess pressure
  - Rupture of a pipeline with material under high pressure
  - Rupture of tank with material above boiling point
  - Rupture of a train or truck following an accident.

Practical and Potential Releases

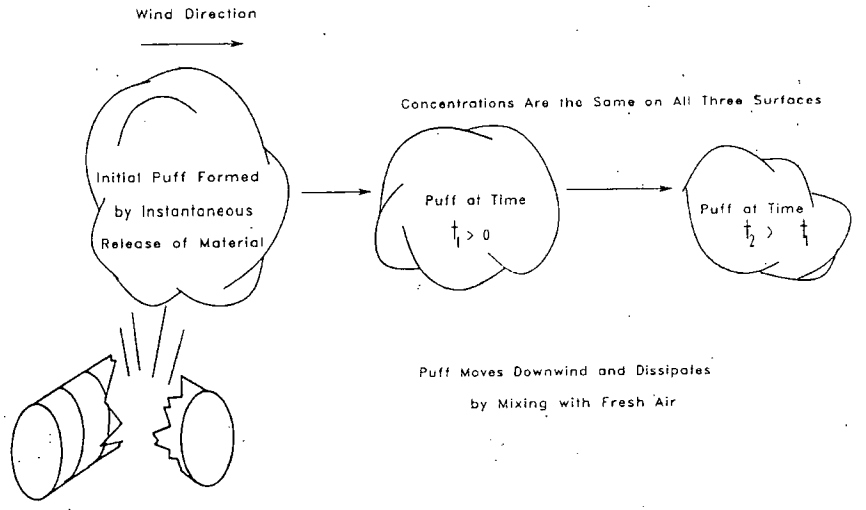
- Identify the Design basis
  - What process situations can lead to a release, and which are the worst situations
- Source Model
  - What are the process conditions and hence what will the state of the release and rate of release
- Dispersion Model
  - Using prevailing conditions (or worst case) determine how far the materials could spread

Types of Dispersion Models

- Plume models were originally developed for dispersion from a smoke stack.
- In an emergency if there is a leak in a large tank then a plume can develop.



Types of Dispersion Models



- Puff models are used when you have essentially an instantaneous release and the cloud is swept downwind.
- No significant plume develops

Dispersion Models

- Practical and Potential Releases
- Pasquil-Gifford Models
  - Stability classes
  - Dispersion coefficients
- Plume Model
- Puff
  - Integrated dose
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- Example

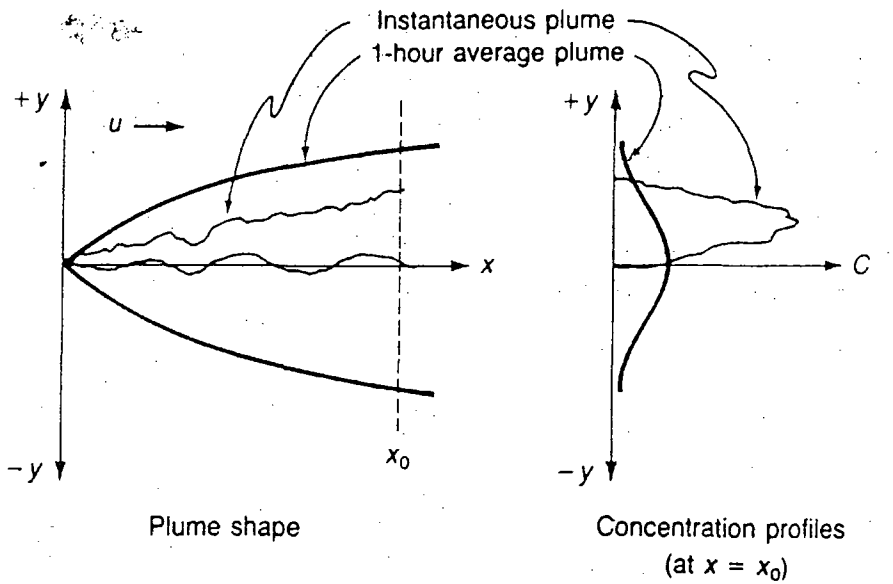
Pasquil-Gifford Dispersion Models

- Because of fluctuations and turbulence the eddy diffusivity is constantly changing and traditional transport phenomena equations don't do a good job of predicting dispersion.

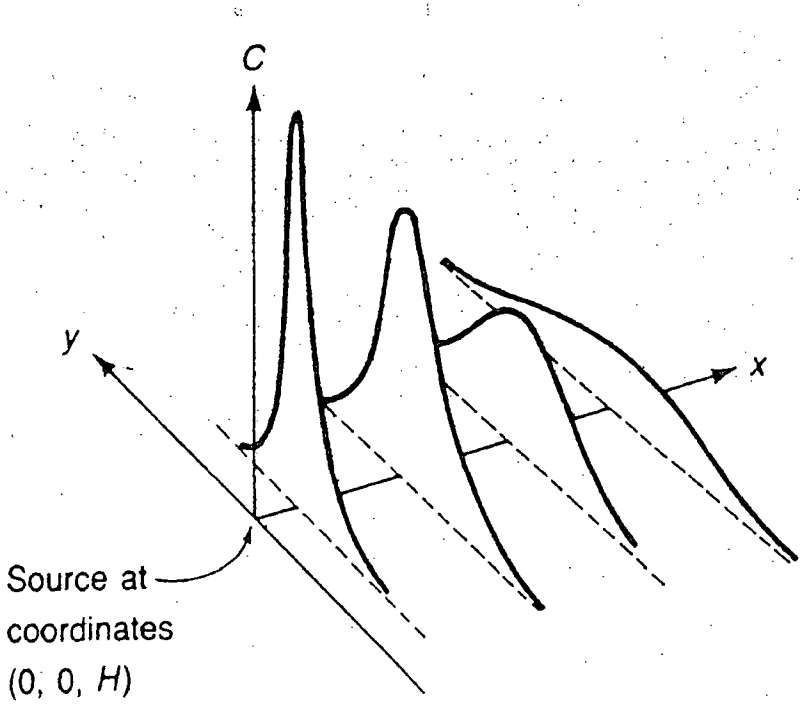
- Solution is to assume that the materials spread out in a normal Gausian-type distribution.

Pasquil-Gifford Dispersion Models

- For a plume the instantaneous value is different then the average.
- Develop correlations to predict the average concentration profile



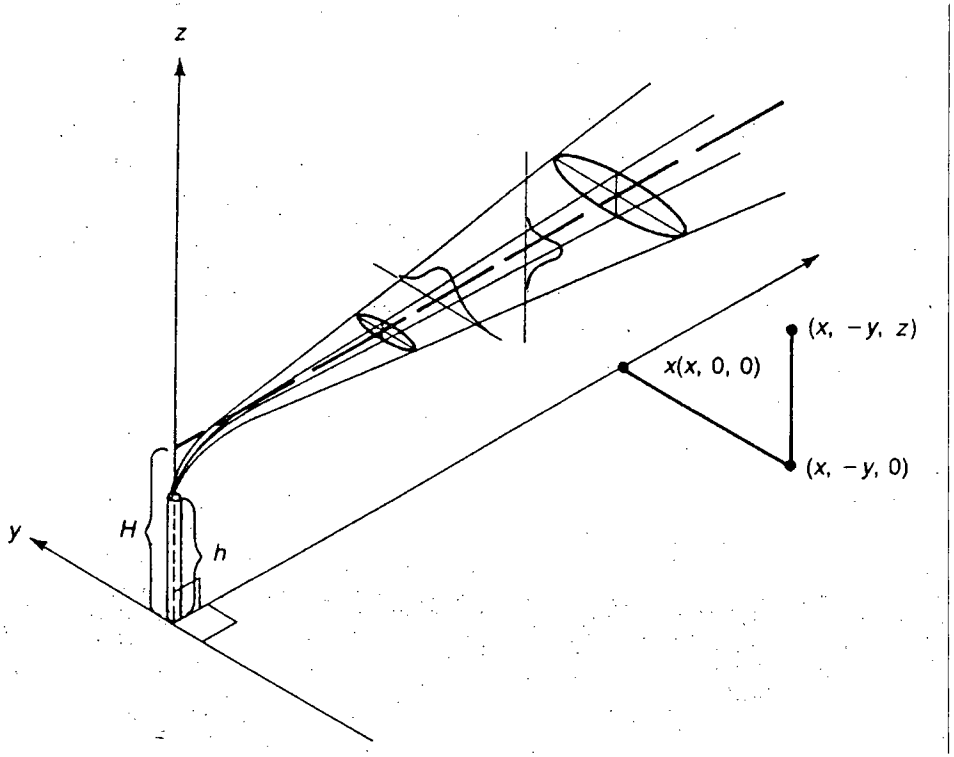
Pasquil-Gifford Dispersion Models



- As the plume is swept downwind, the concentration profile spreads out and decreases

Pasquil-Gifford Dispersion Models

- Have "dispersion coefficients" defined in the direction of the wind, in a cross wind direction and with elevation.
- These coefficients are correlated for six different stability classes.



Pasquil-Gifford Dispersion Models

- Table 5-2 gives the six stability classes to be used in the Pasquil-Gifford models.
  - For a given set of conditions, you can determine which stability class to use.
- Figure 5-10 and Figure 5-11 give the dispersion coefficients for as a function of distance downwind from release for Plume Models

Plume Model Dispersion Coefficients

TABLE 5-3 EQUATIONS AND DATA FOR PASQUILL-GIFFORD DISPERSION COEFFICIENTS[1]

Equations for continuous plumes

Stability class	σ_y (m)
A	$\sigma_y = 0.493x^{0.88}$
B	$\sigma_y = 0.337x^{0.88}$
C	$\sigma_y = 0.195x^{0.90}$
D	$\sigma_y = 0.128x^{0.90}$
E	$\sigma_y = 0.091x^{0.91}$
F	$\sigma_y = 0.067x^{0.90}$

Stability class	x (m)	σ_z (m)
A	100 - 300	$\sigma_z = 0.087x^{1.10}$
	300 - 3000	$\log_{10}\sigma_z = -1.67 + 0.902 \log_{10}x + 0.181(\log_{10}x)^2$
B	100 - 500	$\sigma_z = 0.135x^{0.95}$
	500 - 2×10^4	$\log_{10}\sigma_z = -1.25 + 1.09 \log_{10}x + 0.0018(\log_{10}x)^2$
C	100 - 10^5	$\sigma_z = 0.112x^{0.91}$
D	100 - 500	$\sigma_z = 0.093x^{0.85}$
	500 - 10^5	$\log_{10}\sigma_z = -1.22 + 1.08 \log_{10}x - 0.061(\log_{10}x)^2$
E	100 - 500	$\sigma_z = 0.082x^{0.82}$
	500 - 10^5	$\log_{10}\sigma_z = -1.19 + 1.04 \log_{10}x - 0.070(\log_{10}x)^2$
F	100 - 500	$\sigma_z = 0.057x^{0.80}$
	500 - 10^5	$\log_{10}\sigma_z = -1.91 + 1.37 \log_{10}x - 0.119(\log_{10}x)^2$

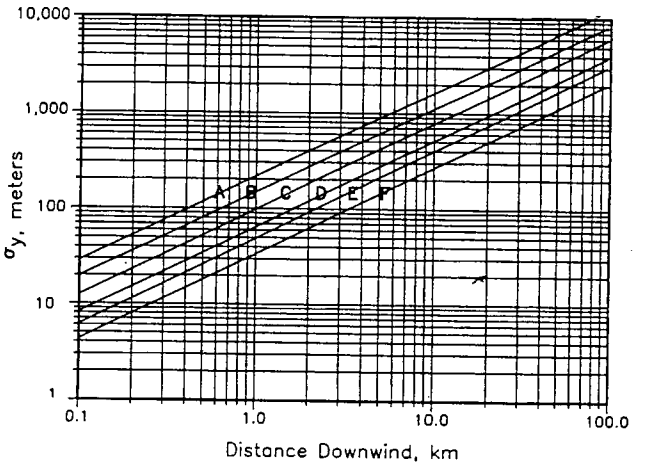


Figure 5-10 Horizontal dispersion coefficient for Pasquill-Gifford plume model. The dispersion coefficient is a function of distance downwind and the atmospheric stability class.

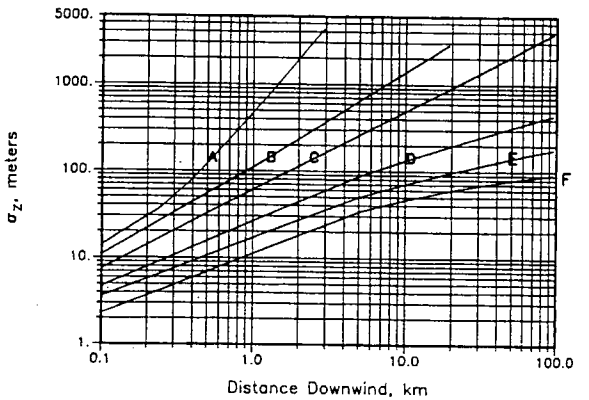


Figure 5-11 Vertical dispersion coefficient for Pasquill-Gifford plume model. The dispersion coefficient is a function of distance downwind and the atmospheric stability class.

Puff Model Dispersion Coefficients

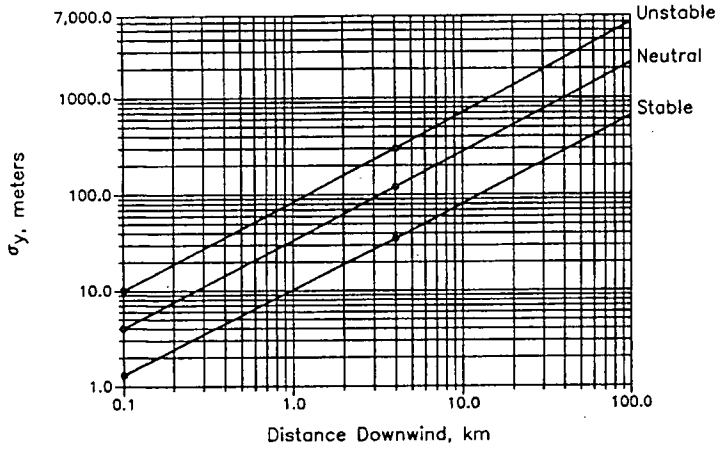


Figure 5-12 Horizontal dispersion coefficient for puff model. This data is based only on the data points shown and should not be considered reliable at other distances.

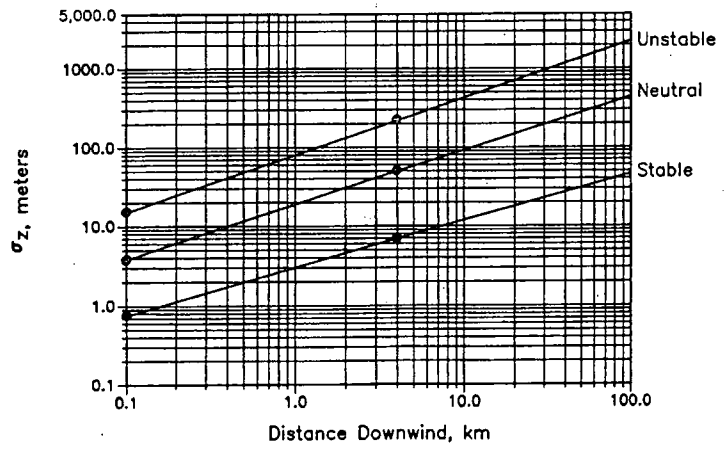


Figure 5-13 Vertical dispersion coefficient for puff model. This data is based only on the data points shown and should not be considered reliable at other distances.

$$\sigma_x = \sigma_y$$

$$Unstable -> \log_{10}\sigma_y = -0.84403 + 0.992014\log_{10}(x)$$

$$Neutral -> \log_{10}\sigma_y = 0.006425 + 0.297817\log_{10}(x)$$

$$Stable -> \log_{10}\sigma_y = -1.67141 + 0.892679\log_{10}(x)$$

$$Unstable -> \log_{10}\sigma_z = -0.27995 + 0.72802\log_{10}(x)$$

$$Neutral -> \log_{10}\sigma_z = -0.8174 + 0.698592\log_{10}(x)$$

$$Stable -> \log_{10}\sigma_z = -1.33593 + 0.605493\log_{10}(x)$$

Dispersion Models

- Practical and Potential Releases
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- Release Mitigation
- Example

Plume Model

- Assumes plume has developed, hence it is continuous. Thus there is no "dispersion coefficient", σ_x, in the direction of flow (direction of the wind)

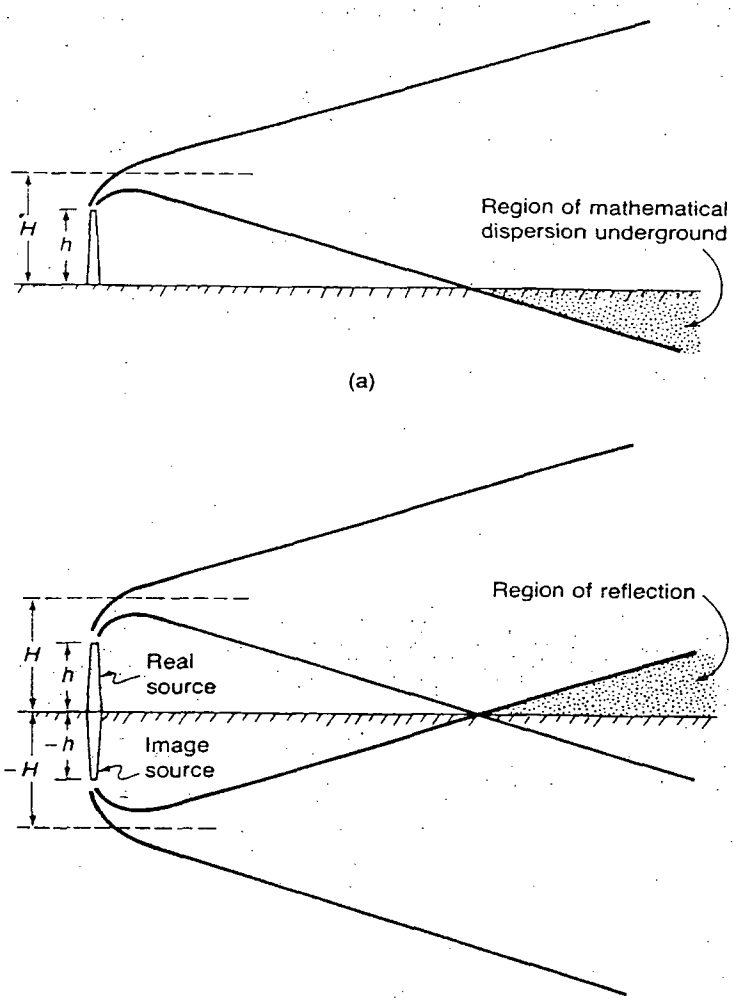
Plume Model

$$< C > (x, y, z) = \frac{\dot{Q}_m}{2\pi\sigma_y\sigma_z u} \exp\left[-\frac{1}{2}\left(\frac{y}{\sigma_y} \right)^2 \right]$$

$$\times \left\{ \exp\left[-\frac{1}{2}\left(\frac{z - Hr}{\sigma_z} \right)^2 \right] + \exp\left[-\frac{1}{2}\left(\frac{z + Hr}{\sigma_z} \right)^2 \right] \right\}$$

- Equation 5-49 is complete plume model
- Can simplify as needed

Plume Model



- Reason for last term in the expression is that as the gaseous plume is dispersed eventually you get reflection back off of the ground

Plume Model - Simplifications

- If you a particulate or something that will react with the ground, then you remove "reflection" term

$$< C > (x, y, z) = \frac{\dot{Q}_m}{2\pi\sigma_y\sigma_z u} \exp\left[-\frac{1}{2}\left(\frac{y}{\sigma_y} \right)^2 \right]$$

$$\times \left\{ \exp\left[-\frac{1}{2}\left(\frac{z - Hr}{\sigma_z} \right)^2 \right] \right\}$$

Plume Model - Simplifications

- If your source is at ground level Hr is zero. Note the two terms add to two. Results in Eq. 5-46

$$< C > (x, y, z) = \frac{\dot{Q}_m}{\pi \sigma_y \sigma_z u} \exp\left[-\frac{1}{2}\left(\frac{y^2}{\sigma_y^{\,2}} + \frac{z^2}{\sigma_z^{\,2}} \right) \right]$$

Dispersion Models

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Puff Models

- Often in accidents, the releases are essentially instantaneous and no plume develops. Need to use a different dispersion model that is based on a puff.
- Now need to have "dispersion coefficient" in the wind direction. However, assume it is the same as in the cross wind (y) direction.
- Dispersion coefficients only defined for three stability classes (Unstable, Neutral, Stable). See bottom of Table 5-2.

Puff Model – Puff at height Hr

- Eq. 5-58 describes dispersion

$$< C > (x, y, z) = \frac{Q_m}{(2\pi)^{3/2}\sigma_x\sigma_y\sigma_z} \exp\left[-\frac{1}{2}\left(\frac{y}{\sigma_y}\right)^2\right]$$

$$\times\left\{\exp\left[-\frac{1}{2}\left(\frac{z-Hr}{\sigma_z}\right)^2\right] + \exp\left[-\frac{1}{2}\left(\frac{z+Hr}{\sigma_z}\right)^2\right]\right\}$$

$$\times\exp\left[-\frac{1}{2}\left(\frac{x-ut}{\sigma_x}\right)^2\right]$$

Puff Model - Simplification

- Ground level source. Eq. 5-38

$$< C > (x, y, z) = \frac{Q_m}{\sqrt{2}\pi^{3/2}\sigma_x\sigma_y\sigma_z} \exp\left[-\frac{1}{2}\left[\left(\frac{x-ut}{\sigma_x}\right)^2 + \left(\frac{y}{\sigma_y}\right)^2 + \left(\frac{z}{\sigma_z}\right)^2\right]\right]$$

Puff Model-Simplification

- Coordinate system moves along with puff. Eq. 5-54

$$< C > (x, y, z) = \frac{Q_m}{(2\pi)^{3/2}\sigma_x\sigma_y\sigma_z} \exp\left[-\frac{1}{2}\left(\frac{y}{\sigma_y}\right)^2\right]$$

$$\times\left\{\exp\left[-\frac{1}{2}\left(\frac{z-Hr}{\sigma_z}\right)^2\right] + \exp\left[-\frac{1}{2}\left(\frac{z+Hr}{\sigma_z}\right)^2\right]\right\}$$

Dispersion Models

- Practical and Potential Releases
- Pasquil-Gifford Models
  - Stability classes
  - Dispersion coefficients
- Plume Model
- Puff
  - Integrated dose
- Isopleths
- Release Mitigation
- Example

Integrated Dose

- When a person is standing in a fixed location and a puff passes over, he/she receives a dose that is the time integral of the concentration.

$$D_{tid}(x,y,z) = \int_0^\infty < C > (x,y,z,t)dt$$

Integrated Dose

- For person on ground at distance y cross wind, Eq. 5-43

$$D_{tid}(x,y,0) = \frac{Q_m}{\pi\sigma_y\sigma_z u}\exp\left(-\frac{1}{2}\frac{y^2}{\sigma_y{}^2}\right)$$

- For person on ground at centerline of flow, Eq. 5-44

$$D_{tid}(x,0,0) = \frac{Q_m}{\pi\sigma_y\sigma_z u}$$

Dispersion Models

- Practical and Potential Releases
- Pasquil-Gifford Models
  - Stability classes
  - Dispersion coefficients
- Plume Model
- Puff
  - Integrated dose
- Isopleths
- Release Mitigation
- Example

Isopleths

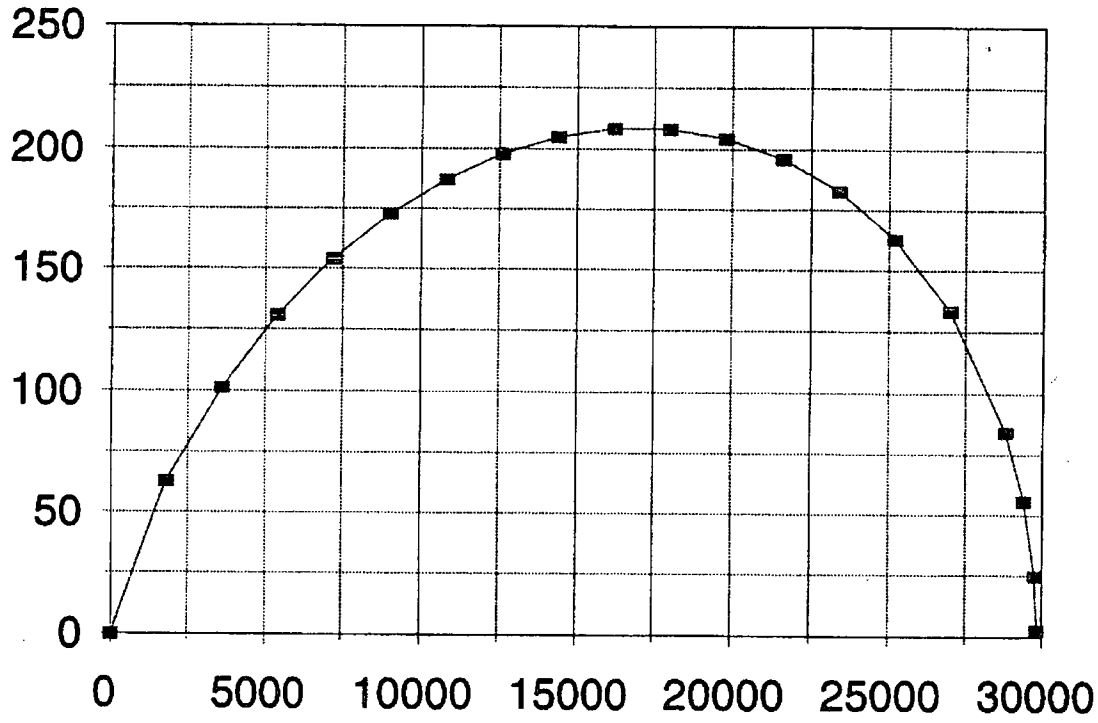
- An isopleth is a three dimensional surface of constant concentration.
- Calculated by
  - Specify desired $\langle C \rangle_{desired}$, u and t
  - Find concentration along x axis at that t $\langle C \rangle(x,0,0,t)$ to define boundaries and points along centerline
  - At each point to be evaluated find y using equation 5-45.

Isopleths

- Equation 5-45 makes more sense if you write it as follows

$$y = \sigma_y \sqrt{2 \ln \left(\frac{< C > (x,0,0,t)_{centerline}}{< C > (x,y,0,t)_{desired}} \right)}$$

Isopleths



Comparison of Plume & Puff Models

Puff model can used for continuous calculations by representing a plume as a succession of puffs.

Number of Puffs, n

$$n = \frac{t}{t_p}$$

Time to form Puff, t_p

$$t_p = \frac{H_{eff}}{u}$$

Effective Height, H_{eff}

$$H_{eff} = (\text{Leak Height}) \times 1.5$$

Continuous Leak

$$Q_m = \dot{Q}_m t_p$$

Instantaneous Leak Into Smaller Puffs

$$Q_m = \frac{(Q_m)_{total}}{n}$$

Effective Release Height

- Both the Plume and Puff model utilizes an effective release height, Hr.
- This is caused the momentum and buoyancy
- For release from a stack

$$\Delta H_r = \frac{\overline{u}_s d}{\overline{u}}\left[1.5 + 2.68\times10^{-3} Pd\left(\frac{T_s - T_a}{T_s}\right)\right]$$

ΔH_r = additional effective height, m

$\overline{u}_s$ = stack velocity, m/s

d = release (stack) diameter, m

$\overline{u}$ = wind speed, m/s

P = atmospheric pressure, mbar

T_a = air temperature, K

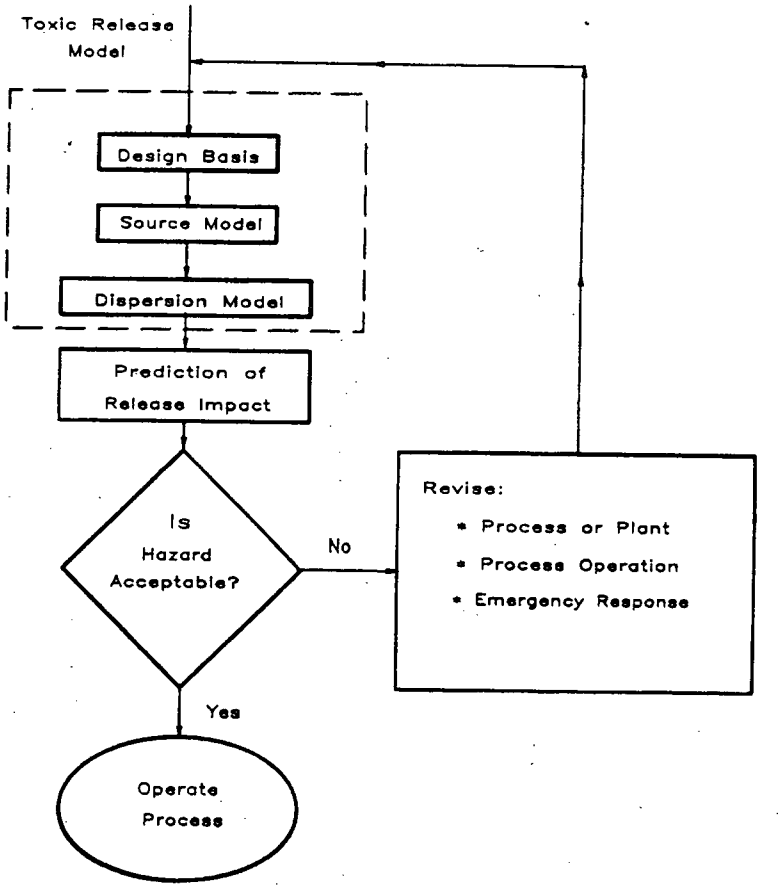
T_s = release gas temperature, K

Dispersion Models

- Practical and Potential Releases
- Pasquil-Gifford Models
  - Stability classes
  - Dispersion coefficients
- Plume Model
- Puff
  - Integrated dose
- Isopleths
- Release Mitigation
- Example

Release Mitigation

- Utilize toxic release models as a tool for release mitigation.
- Make changes in process, operations or emergency response scenarios according to results.



Release Mitigation

- Inherent Safety
  - Inventory reduction
  - Chemical substitution
  - Process attentuation
- Engineering Design
  - Physical integrity of seals and construction
  - Process integrity
  - Emergency control
  - Spill containment
- Management
  - Policies and procedures
  - Training for vapor release
  - Audits & inspections
  - Equipment testing
  - Routine maintenance
  - Management of change
  - Security

Release Mitigation

- Early Vapor Detection
  - Sensors
  - Personnel
- Countermeasures
  - Water sprays and curtains
  - Steam or air curtains
  - Deliberate ignition
  - Foams
- Emergency Response
  - On-site communications
  - Emergency shutdown
  - Site evacuation
  - Safe havens
  - PPE
  - Medical treatment
  - On-site emergency plans, procedures, training & drills

ChE 258
Chemical Process Safety

In Class Problem

A burning dump emits an estimated 3 g/s of oxides of nitrogen. What is the average concentration of oxides of nitrogen from this source directly downwind at a distance of 3 km on an overcast night with a wind speed of 7 m/s? Assume the dump to be a point ground-level source.

Solution

- Assume point source –plum develops
- x = 3 km
- Overcast night
- u=7 m/s
- Table 5.2 -> Stability class D

$$< C > (x, y, z) = \frac{\dot{Q}_m}{\pi \sigma_y \sigma_z u} \exp\left[-\frac{1}{2}\left(\frac{y^2}{\sigma_y^{\,2}} + \frac{z^2}{\sigma_z^{\,2}} \right) \right]$$

Solution

- Ground level concentration, z=0
- Centerline, y=0

$$< C > (x,0,0) = \frac{\dot{Q}_m}{\pi \sigma_y \sigma_z u}$$

$$\sigma_y = 0.128x^{.90} = 0.128(3000)^{.9} = 172m$$

$$\log_{10}\sigma_z = -1.22 + 1.08\log_{10} x - 0.061(\log_{10} x)^2$$

$$\log_{10}\sigma_z = -1.22 + 1.08\log_{10}(3000) - 0.061(\log_{10} 3000)^2$$

$$\log_{10}\sigma_z = 1.80$$

$$\sigma_z = 63m$$

Solution

$$< C > (3000,0,0) = \frac{\left(3\,{}^{g}/_{s}\right)}{\pi(172m)(63m)\left(7\,{}^{m}/_{s}\right)} = 1.26\times10^{-5}\ {}^{g}/_{m^3}$$

TITLE 19 NATURAL RESOURCES AND WILDLIFE
CHAPTER 15 OIL AND GAS
PART 11 HYDROGEN SULFIDE GAS

19.15.11.1 ISSUING AGENCY: Energy, Minerals and Natural Resources Department, Oil Conservation Division.
[19.15.11.1 NMAC - N, 12/1/08]

19.15.11.2 SCOPE: 19.15.11 NMAC applies to a person subject to the division's jurisdiction, including a person engaged in drilling, stimulating, injecting into, completing, working over or producing an oil, gas or carbon dioxide well or a person engaged in gathering, transporting, storing, processing or refining of oil, gas or carbon dioxide. 19.15.11 NMAC does not exempt or otherwise excuse surface waste management facilities the division permits pursuant to 19.15.36 NMAC from more stringent conditions on the handling of hydrogen sulfide required of such facilities by 19.15.36 NMAC or more stringent conditions in permits issued pursuant to 19.15.36 NMAC, nor shall the facilities be exempt or otherwise excused from the requirements set forth in 19.15.11 NMAC by virtue of permitting under 19.15.36 NMAC.
[19.15.11.2 NMAC - Rp, 19.15.3.118 NMAC, 12/1/08]

19.15.11.3 STATUTORY AUTHORITY: 19.15.11 NMAC is adopted pursuant to the Oil and Gas 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]

19.15.11.4 DURATION: Permanent.
[19.15.11.4 NMAC - N, 12/1/08]

19.15.11.5 EFFECTIVE DATE: December 1, 2008, unless a later date is cited at the end of a section.
[19.15.11.5 NMAC - N, 12/1/08]

19.15.11.6 OBJECTIVE: To require oil and gas operations be conducted in a manner that protects the public from exposure to hydrogen sulfide gas.
[19.15.11.6 NMAC - N, 12/1/08]

19.15.11.7 DEFINITIONS:

A. "ANSI" means the American national standards institute.

B. "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.

C. "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.

D. "Escape rate" means the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing hydrogen sulfide, as set forth in 19.15.11 NMAC.

(1) For existing gas facilities or operations, the escape rate is 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 is calculated using the current daily absolute open flow rate against atmospheric pressure or the best estimate of that rate.

(2) For new gas operations or facilities, the escape rate is calculated as the maximum anticipated flow rate through the system. For a new gas well, the escape rate is 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.

(3) For existing oil wells, the escape rate is calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or the best estimate of the maximum daily production rate.

(4) For new oil wells, the escape rate is 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 or reservoir average of the producing gas/oil ratio multiplied by the maximum daily production rate.

(5) For facilities or operations not mentioned, the escape rate is calculated using the actual flow of the gaseous mixture through the system or the best estimate of the actual flow of the gaseous mixture through the system.

E. "GPA" means the gas processors association.

F. "LEPC" means the local emergency planning committee established pursuant to the Emergency Planning and Community Right-To-Know Act, 42 U.S.C. section 11001.

G. "NACE" means the national association of corrosion engineers.

H. "Potentially hazardous volume" means the volume of hydrogen sulfide gas of such concentration that:

(1) the 100-ppm radius of exposure includes a public area;

(2) the 500-ppm radius of exposure includes a public road; or

(3) the 100-ppm radius of exposure exceeds 3000 feet.

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 19.15.11 NMAC
http://www.nmcpr.state.nm.us/nmac/parts/title19/19.015.0011.htm[1/16/2009 4:18:08 PM] present.

J. "Public road" means a federal, state, municipal or county road or highway.

K. "Radius of exposure" means the 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 the division may approve:

(1) 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 psi absolute and 60 degrees fahrenheit);

(2) 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 psi absolute and 60 degrees fahrenheit);

(3) 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 3000 feet is assumed.
[19.15.11.7 NMAC - Rp, 19.15.3.118 NMAC, 12/1/08]

19.15.11.8 REGULATORY THRESHOLD:
A. Determination of hydrogen sulfide concentration.

(1) Each person shall determine the hydrogen sulfide concentration in the gaseous mixture within wells, facilities or operations 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 the person uses a representative sample or process knowledge, the concentration derived from the representative sample or process knowledge shall be reasonably representative of the hydrogen sulfide concentration within the well, facility or operation.

(2) The person shall conduct the tests used to make the determination referred to in Paragraph (1) of Subsection A of 19.15.11.8 NMAC in accordance with applicable ASTM or GPA standards or by another division-approved method.

(3) If the person conducted a test prior to January 31, 2003 that otherwise meets the requirements of Paragraphs (1) and (2) of Subsection A of 19.15.11.8 NMAC, new testing is not required.

(4) If a change or alteration may materially increase the hydrogen sulfide concentration in a well, facility or operation, the person shall make a new determination in accordance with 19.15.11 NMAC.

B. Concentrations determined to be below 100 ppm. If the hydrogen sulfide 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 determined to be above 100 ppm.

(1) If the person determines the hydrogen sulfide concentration in a given well, facility or operation is 100 ppm or greater, then the person shall calculate the radius of exposure and comply with applicable requirements of 19.15.11 NMAC.

(2) If calculation of the radius of exposure reveals that a potentially hazardous volume is present, the person shall provide results of the hydrogen sulfide concentration determination and the calculation of the radius of exposure to the division. For a well, facility or operation, the person shall accomplish the determination, calculation and submission 19.15.11.8 NMAC requires before operations begin.

D. Recalculation. The person shall calculate the radius of exposure if the hydrogen sulfide concentration in a well, facility or operation increases to 100 ppm or greater. The person shall also recalculate the radius of exposure if the actual volume fraction of hydrogen sulfide increases by a factor of 25 percent in a well, facility or operation that previously had a hydrogen sulfide concentration of 100 ppm or greater. If calculation or recalculation of the radius of exposure reveals that a potentially hazardous volume is present, the person shall provide the results to the division within 60 days.
[19.15.11.8 NMAC - Rp, 19.15.3.118 NMAC, 12/1/08]

19.15.11.9 HYDROGEN SULFIDE CONTINGENCY PLAN:

A. When required. If a well, facility or operation involves a potentially hazardous volume of hydrogen sulfide, the person shall develop a hydrogen sulfide contingency plan that the person will use to alert and protect the public in accordance with the Subsections B through I of 19.15.11.9 NMAC.

B. Plan contents.

(1) API guidelines. The person shall develop the hydrogen sulfide contingency plan with due consideration of paragraph 7.6 of the guidelines in the API publication 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 division-approved standard.

(2) Required contents. The hydrogen sulfide contingency plan shall contain information on the following subjects, as appropriate to the well, facility or operation to which it applies.

(a) Emergency procedures. The hydrogen sulfide contingency plan shall contain information on emergency procedures the person will follow 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 Paragraph (1) of Subsection B of 19.15.11.9 NMAC, 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, locations of road blocks and procedures for notifying the public, either through direct telephone notification using telephone number lists or by means of mass 19.15.11 NMAC http://www.nmcpr.state.nm.us/nmac/parts/title19/19.015.0011.htm[1/16/2009 4:18:08 PM] notification and reaction plans. The plan shall include information on the availability and location of necessary safety equipment and supplies.

(b) 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.

(c) 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.

(d) Training and drills. The hydrogen sulfide contingency plan shall provide for training and drills, including training in the responsibilities and duties of essential personnel and periodic on-site or classroom drills or exercises that simulate a release, and shall describe how the person will document the training, drills and attendance. 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-in-place plans.

(e) Coordination with state emergency plans. The hydrogen sulfide contingency plan shall describe how the person will coordinate emergency response actions under the plan with the division and the New Mexico state police consistent with the New Mexico hazardous materials emergency response plan.

(f) 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. Plan activation. The person shall activate the hydrogen sulfide contingency plan when a release creates a hydrogen sulfide concentration greater than the activation level set forth in the hydrogen sulfide contingency plan. At a minimum, the person shall activate the plan whenever a release may create a hydrogen sulfide 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.

D. Submission.

(1) Where submitted. The person shall submit the hydrogen sulfide contingency plan to the division.

(2) When submitted. The person shall submit a hydrogen sulfide contingency plan for a new well, facility or operation before operations commence. The hydrogen sulfide contingency 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 hydrogen sulfide contingency 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.

(3) Electronic submission. A filer who operates more than 100 wells or who operates an oil pump station, compressor station, refinery or gas plant shall submit each hydrogen sulfide contingency plan in electronic format. The file may submit the hydrogen sulfide contingency plan 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.

E. Failure to submit plan. A person's 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 well, facility or operation.

F. Review, amendment. The person 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 to add provisions to the plan or amend the plan as necessary to protect public safety.

G. 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 division inspection.

H. Annual inventory of contingency plans. On an annual basis, each person required to prepare one or more hydrogen sulfide contingency plans pursuant to 19.15.11 NMAC 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.

I. Plans required by other jurisdictions. The person may submit a hydrogen sulfide contingency plan to the BLM or other jurisdiction require that meets the requirements of 19.15.11.9 NMAC to the division in satisfaction of 19.15.11.9 NMAC.
[19.15.11.9 NMAC - Rp, 19.15.3.118 NMAC, 12/1/08]

19.15.11.10 SIGNS, MARKERS: For each well, facility or operation involving a hydrogen sulfide 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.
[19.15.11.10 NMAC - Rp, 19.15.3.118 NMAC, 12/1/08]

19.15.11.11 PROTECTION FROM HYDROGEN SULFIDE DURING DRILLING, COMPLETION, WORKOVER AND WELL SERVICING OPERATIONS:

A. API standards. The person shall conduct drilling, completion, workover and well servicing operations involving a hydrogen sulfide concentration of 100 ppm or greater with due consideration to the guidelines in the API publications 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 Hydrogen Sulfide, RP-49, most recent editions, or some other division-approved standard.

B. Detection and monitoring equipment. Drilling, completion, workover and well servicing operations involving a hydrogen sulfide 19.15.11 NMAC http://www.nmcpr.state.nm.us/nmac/parts/title19/19.015.0011.htm[1/16/2009 4:18:08 PM] concentration of 100 ppm or greater shall include hydrogen sulfide detection and monitoring equipment as follows.

(1) Each drilling and completion site shall have an accurate and precise hydrogen sulfide detection and monitoring system that automatically activates visible and audible alarms when the hydrogen sulfide's ambient air concentration reaches a predetermined value the operator sets, not to exceed 20 ppm. The operator shall locate a sensing point 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.

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

(3) The operator shall provide and maintain as operational hydrogen sulfide detection and monitoring equipment during drilling when

drilling is within 500 feet of a zone anticipated to contain hydrogen sulfide and continuously thereafter through all subsequent drilling.

C. Wind indicators. Drilling, completion, workover and well servicing operations involving a hydrogen sulfide concentration of 100 ppm or greater shall include wind indicators. The person shall have equipment to indicate wind direction present and visible at all times. The person shall install at least two devices to indicate wind direction at separate elevations that visible from all principal working areas at all times. When a sustained hydrogen sulfide concentration is detected in excess of 20 ppm at a detection point, the person shall display red flags.

D. Flare system. For drilling and completion operations in an area where it is reasonably expected that a potentially hazardous hydrogen sulfide volume will be encountered, the person shall install a flare system to safely gather and burn hydrogen-sulfide-bearing gas. The person shall locate flare outlets at least 150 feet from the well bore. Flare lines shall be as straight as practical. The person shall equip the flare system with a suitable and safe means of ignition. Where oncombustible gas is to be flared, the system shall provide supplemental fuel to maintain ignition.

E. Well control equipment. When the 100 ppm radius of exposure includes a public area, the following well control equipment is required.

(1) Drilling. The person shall install a remote-controlled well control system that is operational at all times beginning when drilling is within 500 vertical feet of the formation believed to contain hydrogen sulfide and continuously thereafter during drilling. The well control system shall 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 in API publications Choke and Kill Systems, 16C and Blowout Prevention Equipment Systems for Drilling Wells, RP 53 or other division-approved specifications. The person shall use mud-gas separators. The person

shall test and maintain these systems pursuant to the specifications referenced, according to the requirements of 19.15.11 NMAC, or as the division otherwise approves.

(2) Completion, workover and well servicing. The person shall install a remote controlled pressure and hydrogen-sulfide-rated well control system that meets or exceeds API specifications or other division-approved specifications that is operational at all times during a well's completion, workover and servicing.

F. Mud program. Drilling, completion, workover and well servicing operations involving a hydrogen sulfide concentration of 100 ppm or greater shall use a hydrogen sulfide mud program capable of handling hydrogen sulfide conditions and well control, including de-gassing.

G. Well testing. except with prior division approval, a person shall conduct drill-stem testing of a zone that contains hydrogen sulfide in a concentration of 100 ppm or greater only during daylight hours and not permit formation fluids to flow to the surface.

H. 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, the operator shall satisfy the requirements of 19.15.11 NMAC before continuing drilling operations. The operator shall notify the division of the event and the mitigating steps that the operator has or is taking 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 a required hydrogen sulfide contingency plan. [19.15.11.11 NMAC - Rp, 19.15.3.118 NMAC, 12/1/08]

19.15.11.12 PROTECTION FROM HYDROGEN SULFIDE AT OIL PUMP STATIONS, PRODUCING WELLS, TANK

BATTERIES AND ASSOCIATED PRODUCTION FACILITIES, PIPELINES, REFINERIES, GAS PLANTS AND COMPRESSOR STATIONS:

A. API standards. A person shall conduct operations at oil pump stations and producing wells, tank batteries and associated production facilities, refineries, gas plants and compressor stations involving a hydrogen sulfide concentration of 100 ppm or greater with due consideration to the guidelines in the API publication Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide, RP-55, latest edition or some other division-approved standard.

B. Security. A person shall protect well sites and other unattended, fixed surface facilities involving a hydrogen sulfide concentration of 100 ppm or greater from public access by fencing with locking gates when the location is within 1/4 mile of a public area. For the purposes of Subsection B of 19.15.11.12 NMAC, a surface pipeline is not considered a fixed surface facility.

C. Wind direction indicators. Oil pump stations, producing wells, tank batteries and associated production facilities, pipelines, refineries, gas plants and compressor stations involving a hydrogen sulfide concentration of 100 ppm or greater shall have equipment to indicate wind direction. The person shall install wind direction equipment that is visible from all principal working areas at all times.

D. Control equipment. When the 100 ppm radius of exposure includes a public area, the following additional measures are required.

(1) The person shall install and maintain in good operating condition safety devices, such as automatic shut-down devices, to prevent hydrogen sulfide's escape. Alternatively, the person shall establish safety procedures to achieve the same purpose.

(2) A well shall possess a secondary means of immediate well control through the use of an appropriate christmas tree or downhole completion equipment. The equipment shall allow downhole accessibility (reentry) under pressure for permanent well control.

E. Tanks or vessels. The person shall chain each stair or ladder leading to the top of a tank or vessel containing 300 ppm or more 19.15.11 NMAC http://www.nmcpr.state.nm.us/nmac/parts/title19/19.015.0011.htm[1/16/2009 4:18:08 PM] of hydrogen sulfide in the gaseous mixture or mark it to restrict entry. [19.15.11.12 NMAC - Rp, 19.15.3.118 NMAC, 12/1/08]

19.15.11.13 PERSONNEL PROTECTION AND TRAINING: The person shall provide persons responsible for implementing a hydrogen sulfide contingency plan training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.
[19.15.11.13 NMAC - Rp, 19.15.3.118 NMAC, 12/1/08]

19.15.11.14 STANDARDS FOR EQUIPMENT THAT MAY BE EXPOSED TO HYDROGEN SULFIDE: Whenever a well, facility or operation involves a potentially hazardous hydrogen sulfide volume, the person shall select equipment with consideration for both the hydrogen sulfide 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 hydrogen sulfide's corrosive effects.
[19.15.11.14 NMAC - Rp, 19.15.3.118 NMAC, 12/1/08]

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.
[19.15.11.15 NMAC - Rp, 19.15.3.118 NMAC, 12/1/08]

19.15.11.16 NOTIFICATION OF THE DIVISION: The person 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 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.
[19.15.11.16 NMAC - Rp, 19.15.3.118 NMAC, 12/1/08]

HISTORY of 19.15.11 NMAC:
History of Repealed Material: 19.15.3 NMAC, Drilling (filed 10/29/2001) repealed 12/1/08.
NMAC History:
That applicable portion of 19.15.3 NMAC, Drilling (Section 118) (filed 10/29/2001) was replaced by 19.15.11 NMAC, Hydrogen Sulfide Gas, effective 12/1/08.

Chavez, Carl J, EMNRD

From: Lackey, Johnny [Johnny.Lackey@hollycorp.com]
Sent: Wednesday, March 10, 2010 7:53 AM
To: Chavez, Carl J, EMNRD
Cc: VonGonten, Glenn, EMNRD; Moore, Darrell; Meeks, Jimmy; 'Christy_Franklyn@schirmereng.com'; Whatley, Michael
Subject: RE: H2S Contingency Plan
Attachments: Navajo Refining H2S Contingency Proposal.pdf

Carl. Attached is Navajo's proposal for your consideration. Included in the proposal is our worst case release scenario. After your review and comments, Navajo will prepare the H2S Contingency Plan for submittal to the agency and Emergency Response organizations.

Johnny Lackey
Environmental Manager
Navajo Refining Company, L.L.C.
Office - 575-746-5490
Cell - 972-261-8075
Fax - 575-746-5451
Johnny.Lackey@hollycorp.com

From: Chavez, Carl J, EMNRD [mailto:CarlJ.Chavez@state.nm.us]
Sent: Friday, February 05, 2010 1:48 PM
To: Lackey, Johnny
Subject: H2S Contingency Plan

Johnny:

Hi. I have not received Navajo Refining Company's proposal that you indicated during our last meeting related to the above subject.

One recommendation that I have based on our meeting and Navajo Refining Company's concern about the ROE is attempt to provide an illustration of a real worse case scenario based on refinery controls and operations, but explain and reference in appendices the scenario that complies with OCD regulations. In this way, you can present your real worse case and address OCD regulation in the contingency plan.

Thanks.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
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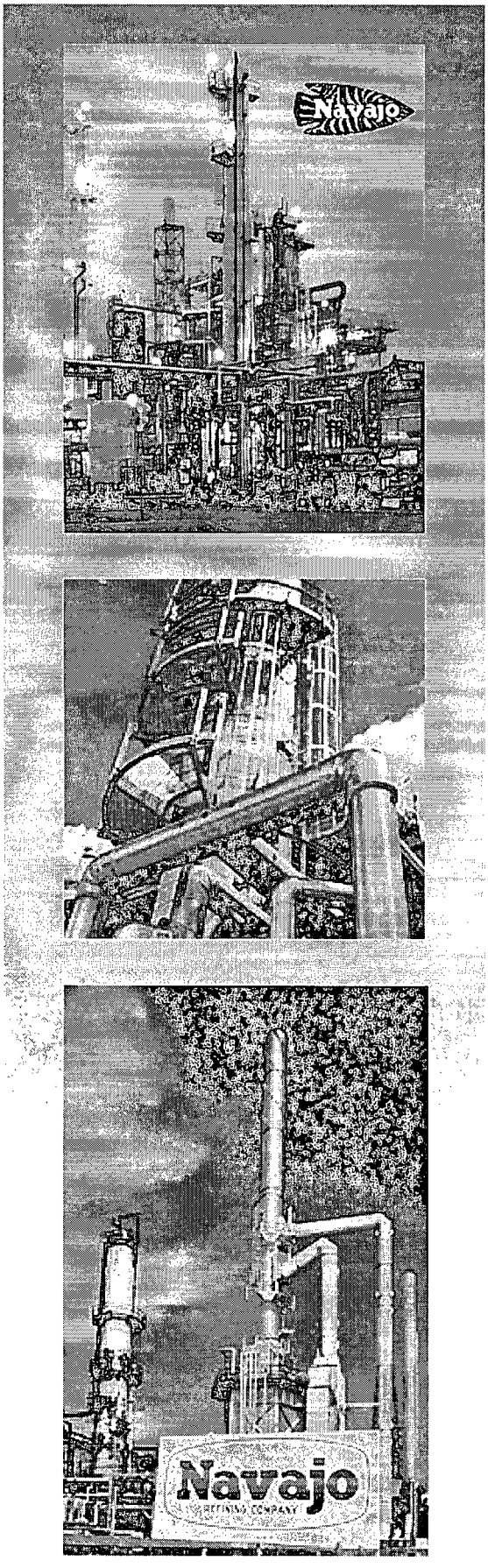
Office: (505) 476-3490
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")



Hydrogen Sulfide Contingency Plan Proposal

Navajo Artesia Refinery
Holly Corporation

February 2010

Navajo Refining Company ◆
501 E. Main Street, Artesia NM ◆ 88211

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H2S CONTINGENCY PLAN PROPOSAL
NAVAJO ARTESIA REFINERY

1.0 REFINERY DESCRIPTION

The Navajo Artesia refinery processes crude oil as well as intermediates received from outside sources, such as Navajo's Lovington, NM refinery and other third-party sources. Crude oil and intermediates are purchased as needed or as justified on an economic basis. The crude oil and other intermediates enter the Artesia refinery via pipeline, truck, or rail. The Artesia refinery produces butane, propane, liquefied petroleum gas (LPG), jet fuels, kerosenes, diesel fuels, various grades of gasoline, carbon black oil (CBO), gas oils, fuel oils, asphalt, pitch, and molten sulfur. For its own use, the Navajo Artesia refinery produces refinery fuel gas, hydrogen, nitrogen, and steam. The combined facility charge capacity is approximately 100,000 bbl/ day.

Process units at the refinery include:

- Alkylation Unit
- Amine Unit
- Atmospheric Crude Distillation Units
- Boilers
- CCR Reformer
- Cooling Towers
- Crude Oil Receiving and Storage
- Diesel Hydrotreating Unit
- Flares
- Flasher/Vacuum Distillation Unit
- Fluid Catalytic Cracking Unit
- Gas Oil Hydrotreating Unit
- Hydrocracking Unit
- Hydrogen Production Units
- Isomerization (or Penex) Unit
- Kerosene Hydrotreating Unit
- LPG Pressure Tanks
- MEROX®/Merichem Treaters
- Naphtha Hydrotreating Units
- PBC Butane Splitter Unit
- Saturates Gas Plants
- Solvent De-Asphalting Unit (ROSE Unit)
- Sour Water Strippers
- Storage Tanks
- Sulfur Recovery Units
- Utility and Vessels
- Wastewater Collection and Treatment System

H2S is produced by processing, primarily by hydrogen de-sulphurization, products distilled from crude oil, naphtha, kerosene, diesel, and gas oils at the Artesia Refinery. Small amounts of H2S are present in crude oil and are recovered during distillation into fuel gas. Sour gas streams produced by processing and sour fuel gas from the crude unit are contacted with amine to recover H2S from sour gas streams. The amine solution that absorbs the H2S is circulated to a steam re-boiled Stripping Tower to regenerate the amine for re-use in contacting sour gas. The off-gas from the Amine Stripping Tower is sent to a Sulfur Recovery Unit (SRU) to convert the H2S into elemental sulfur.

The Sulfur Recover Units have the highest concentration of H2S.

1.1 Sulfur Recovery Units (SRUs)

The Artesia Refinery currently uses two, three-stage Claus sulfur recovery units (SRU1 and SRU2), a common tail gas treatment unit (TGTU), and a common tail gas incinerator (TGI). Navajo also has an additional sulfur recovery unit (SRU3). The new SRU has its own TGTU (TGTU3) and its own TGI (TGI3).

The sulfur recovery process significantly reduces air pollution and generates steam for refinery consumption.

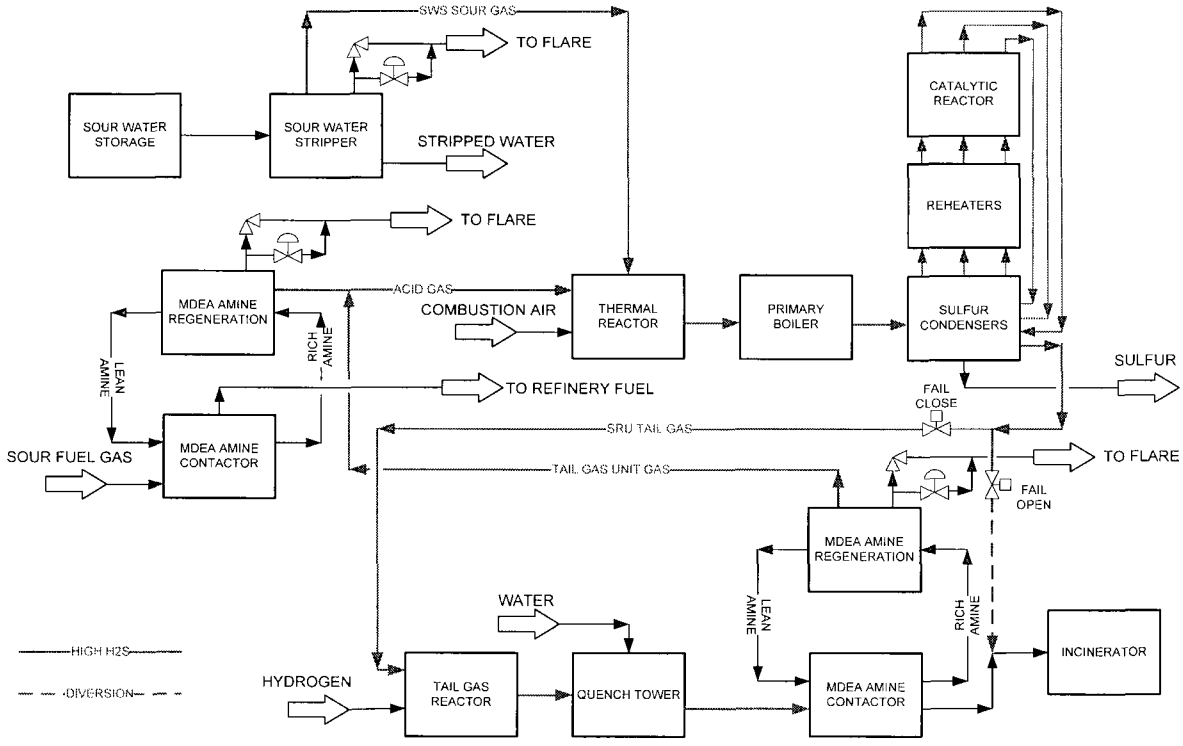
A Claus sulfur recovery unit converts H_2S to elemental sulfur by first oxidizing one-third of the H_2S to SO_2 to form elemental sulfur.

The acid gas first passes through knockout drums designed to remove entrained sour water and condensed hydrocarbons from the amine acid gas and the sour water stripper gas. The gases are then fed to a thermal reactor. Heat for the reactor is provided by the combustion of the acid gas.

Tail gas containing unrecovered sulfur compounds flows from the SRU to the TGTU where the sulfur compounds pass through a reactor converting the sulfur compounds into the H_2S. The reactor effluent then flows into a vessel for contact with lean (low sulfur) amine solution. The H_2S is absorbed by the amine while the treated tail gas flows to the TGI for combustion. The rich (high sulfur) amine solution then flows from the contactor to a stripper column, which regenerates, lean amine from rich amine by removing the H_2S. The concentrated H_2S gas stream produced by the stripper is recycled to the SRU. The regenerated lean amine is pumped back to the contactor for reuse.

The TGI will receive any remaining gases from the TGTU, as well as the vent stream from the sulfur pit. The TGI will further reduce H_2S emissions by combusting the H_2S to SO_2. Continuous emissions monitor systems (CEMS) will continuously measure and record sulfur dioxide (SO_2) concentrations in each TGI stack.

The sulfur recovery process is illustrated in Figure 1.



ARTESIA SULFUR RECOVERY

Figure 1. Navajo Artesia Refinery Sulfur Recovery Flow Diagram

2.0 REGULATORY COMPLIANCE

In addition to New Mexico's Energy, Minerals and Natural Resources Department, Oil Conservation Division's H2S Contingency Plan requirements (Title 19, Chapter 15, Oil and Gas, Part 11, Hydrogen Sulfide Gas), the Navajo Artesia Refinery is in compliance with other regulations that govern facilities with threshold quantities of H2S.

2.1 Process Safety Management

The Occupational Safety and Health Administration's (OSHA) Process Safety Management Regulation requires facilities with threshold quantities of listed flammable and toxic materials to comply with 29 CFR 1910.119, *Process Safety Management of Highly Hazardous Chemicals*. Hydrogen sulfide is included in OSHA's List of Highly Hazardous Chemicals, Toxics and Reactives and the Navajo Refinery exceeds the threshold planning quantity of 1,500 lbs.

This comprehensive safety and risk reduction regulation requires facilities to establish management systems to manage the hazards associated with the materials they use and process. These management systems include:

- Process Safety Information
- Process Hazard Analysis
- Operating Procedures
- Employee Participation
- Training
- Contractors
- Pre-Startup Safety Review
- Mechanical Integrity
- Hot Work Permit
- Management of Change
- Incident Investigation
- Emergency Planning and Response
- Compliance audits
- Trade Secrets

These management systems are robust and work together to prevent the release of hydrogen sulfide and other materials.

2.2 Risk Management Program

The Environmental Protection Agency's Risk Management Program (RMP) rule requires facilities with threshold quantities of toxic and flammable materials to comply with the requirements of 40 CFR Part 68, Accidental Release Prevention, Risk Management Plan. This regulation contains these key parts:

- Prevention Program (which mirrors the requirements in OSHA's PSM regulation discussed above).
- Hazard Assessment, including worst-case and alternative case release modeling
- Emergency Response

Although the Navajo Refinery does not meet the 10,000 lb threshold quantity of H2S onsite, the refinery has other materials that meet the threshold requirements and therefore, is in compliance with these regulatory requirements.

Of particular interest are the EPA's requirements for defining the worst-case release scenarios. For toxic materials, the worst-case scenario is defined as a 10 minute release of the entire contents of the vessel with the largest quantity of the material:

§ 68.25 Worst-case release scenario analysis.

(b) Determination of worst-case release quantity. The worst-case release quantity shall be the greater of the following:

(1) For substances in a vessel, the greatest amount held in a single vessel, taking into account administrative controls that limit the maximum quantity; or

(2) For substances in pipes, the greatest amount in a pipe, taking into account administrative controls that limit the maximum quantity.

(c) Worst-case release scenario - toxic gases. (1) For regulated toxic substances that are normally gases at ambient temperature and handled as a gas or as a liquid under pressure, the owner or operator shall assume that the quantity in the vessel or pipe, as determined under paragraph (b) of this section, is released as a gas over 10 minutes. The release rate shall be assumed to be the total quantity divided by 10 unless passive mitigation systems are in place.

This definition of worst-case release scenario is also consistent with the following state requirements for facilities that handle above threshold quantities of hydrogen sulfide:

- **California:** *California Code of Regulations, Title 19. Public Safety, Division 2. Office Of Emergency Services, Chapter 4.5 California Accidental Release Prevention (CalARP) Program*
- **New Jersey:** *Toxic Catastrophe Prevention Act (TCPA) Program*
- **Louisiana:** *Chemical Accident Prevention Regulations (LAC 33:III.Chapter 59)*
- **Nevada:** *Chemical Accident Prevention Program (CAPP)*

3.0 SAFETY SYSTEMS

3.1 Emergency Shutdown Systems

The SRU is equipped with an emergency shutdown (ESD) that can be initiated at the unit or remotely from the control room. The ESD will cause the following actions:

- Trip SRU Burner Management System (BMS)
- Trip Incinerator BMS
- Trip Oil Heater Furnace BMS
- Block sour gas flow to the Sulfur Plant

In addition to the operator initiated shutdowns, the unit will automatically shutdown due to:

- High catalytic bed temperatures (excess air) in either the SRU or the Tail Gas Unit
- Loss of flame in the Thermal Reactor
- Low combustion air flow
- High level in feed knock-out drums
- Low Boiler water level

In the event of an SRU trip and the redundant SRU(s) can not handle the required capacity, the acid gas will be diverted to flare and the refinery will immediately begin sulfur shedding to minimize acid gas flaring.

3.2 Relief Systems and Sour Gas Flaring Procedure

The Artesia refinery strategy is to minimize acid gas flaring under all operating scenarios. However, in the event of power failures, instrument failures, or the inability to treat all the acid gas, the acid gas will be flared. Under NSR Permit No. PSD-NM-0195-M26R2 the refinery will add supplemental fuel gas while flaring acid gas to comply with NAAQS for SO2.

Acid gas flaring will be initiated when the SRUs are unable to treat acid gas. The Amine Regeneration (Steam Reboiled Strippers) is equipped with a pressure control valve with a set-

point higher than normal operating pressure of the stripper. With the acid gas blocked during a SRU trip, the pressure on the Stripper will increase until the pressure control valve set-point to flare is exceeded. The Stripper will then begin to send acid gas to the flare to maintain the pressure of the Stripper. Sulfur Shedding procedures are initiated immediately when problems with the SRU are determined.

3.3 Sulfur Shedding to Minimize Acid Gas Flaring

Roughly 99% of all the H2S in the refinery is produced by processes at the refinery, .i.e. hydrotreating, cracking, etc. Sour gas from theses processes are contacted with amine to absorb the H2S and sweeten the gas streams prior to being sent to the refinery fuel system. In conjunction with the sour gas streams, sour water is produced and must be stripped. Sour water is stripped in a sour water stripper to produce a stripped water low enough in H2S for refinery re-use and a sour gas stream that is treated in the SRUs. Depending on which SRU goes down, different shedding scenarios are followed. In general the following steps are followed:

- Shutdown sour water strippers and inventory sour water in storage tanks
- Cut steam to amine strippers and increase H2S loading in rich amine
- Reduce charge to hydrotreating units and cut reactor temperature

3.4 Fixed H2S Detection Systems

Local H2S detectors are installed at all locations where H2S levels were determined during HAZOP studies to be high. These alarms are set to alarm at concentrations higher than 10 ppm. A remote alarm is initiated in the control room along with local beacons and alarms located in the unit.

3.5 PSM - Mechanical Integrity

The refinery maintains a staff of 4 inspectors and contract inspectors when necessary to ensure the mechanical integrity of the plant remains up to code. Controls and emergency shutdown systems are periodically tested to ensure proper operation. Operating procedures are maintained and updated as necessary in operating manuals for the unit.

3.6 Operations Field Monitoring of the Unit

The refinery has unit operators who walk-down the unit on an hourly basis. Their duty is to visually inspect the unit for any problems that can not be monitored from the control room.

4.0 PROPOSED H2S SCENARIO DESCRIPTION

Based on the regulatory requirements in Title 19, Chapter 15, Part 11, Section 19.15.11.7 D. (5):

> *For facilities or operations not mentioned, the escape rate is calculated using the actual flow of the gaseous mixture through the system or the best estimate of the actual flow of the gaseous mixture through the system.*

and Section 19.15.11.7 K.:

> *"Radius of exposure" means the 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 the division may approve: . . .*

Navajo Refining proposes to identify the vessel with the largest inventory and highest concentration of H2S and model a release of the entire contents over a 10-minute period. This scenario will most likely originate in Unit 31, Sulfur Recovery Unit, and will be modeled using conservative operating and weather conditions.

Based on the safety systems discussed above, this worst-case scenario is highly unlikely and truly represents a worst-case impact on the community.

This worst-case definition is consistent with other state and federal requirements.

4.1 Consequence Model

To conservatively estimate the consequences to employees and the community, Navajo Refining proposes to use the PHAST computer model to calculate the distance to 100 ppm and 500 ppm H2S. PHAST (Process Hazard Analysis Software Tool), by DNV Software, is used to assess situations which present potential hazards to life, property and the environment, and to quantify their severity. PHAST examines the progress of a potential incident from the initial release to far-field dispersion including modeling of pool spreading and evaporation, and flammable and toxic effects. PHAST uses proprietary techniques to model heavier than air gases and Pasquill-Gifford (Gaussian) equations for all other vapor clouds. In this case, H2S will be heavier than air for a short period of time, but it will quickly become Gaussian in nature.

The results from the analysis can be displayed in tabular & graphical form, so the extent of the impact can be seen, and the effect of the release on the population and environment assessed.

PHAST is designed to comply with the regulatory requirements of many countries. For example, specific modules have been included to ensure compliance with the The Netherlands, US EPA and UK HSE regulations.

4.2 Community Impact

Navajo Refining proposes to use the Landview computer model to identify the areas of the community impacted by 100 ppm and 500 ppm.

LandView has its roots in the CAMEO (Computer-Aided Management of Emergency Operations). CAMEO was developed by the EPA and the NOAA to facilitate the implementation of the Emergency Planning and Community Right-to-Know Act. This far-reaching law requires communities to develop emergency response plans addressing chemical hazards and to make available to the public information on chemical hazards in the community. Released January 20, 2004, LandView 6 updates the Census 2000 statistical data as well as the Environmental Protection Agency (EPA) and U.S. Geological Survey (USGS) databases contained in LandView 5 that was released in November, 2002.

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Thursday, January 28, 2010 6:25 AM
To: 'Ed.Riege@wnr.com'; 'Schmaltz, Randy'
Cc: VonGonten, Glenn, EMNRD; 'Lackey, Johnny'
Subject: FW: H2S Contingency Plan Checklist.docx
Attachments: 19.15.11 NMAC.doc; H2S Plan Checklist.docx

Gentlemen:

You may recall that the OCD had alerted you to the New Mexico Oil Conservation Division hydrogen sulfide gas regulations and the requirement to have a H2S Contingency Plan if there is a potential for a release of 100 ppm or greater of H2S at your facilities.

Please find attached a document that was shared with the Navajo Refining Company in preparation of their H2S Contingency Plan. Please find attached the H2S Regulations to review the requirements for your facilities. Also, a sample of an H2S Contingency Plan approved by the OCD that may be similar to that required at a refinery and may be found on OCD Online at http://ocdimage.emnrd.state.nm.us/imaging/AEOrderCriteria.aspx (GW-33).

Please submit your H2S Contingency Plan(s) to the OCD within 90 days of today's date (April 28, 2010). Please contact me if you wish to meet to discuss the contingency plan for your facilities. If you feel your facility does not meet the requirements of the regulations, please provide an explanation for our records.

Please contact me if you have questions or need further assistance. Thank you.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3490
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

From: Chavez, Carl J, EMNRD
Sent: Thursday, January 28, 2010 6:15 AM
To: 'Lackey, Johnny'
Subject: FW: H2S Contingency Plan Checklist.docx

Johnny:

Re: Refinery Hydrogen Sulfide Contingency Plan Requirements

It was a pleasure meeting with Navajo Refining Company Representatives yesterday to discuss the hydrogen sulfide contingency plan for your refineries. The OCD is working to ensure all facilities (including refineries) that may discharge H2S at concentrations greater than 100 ppm meet the NMOCD H2S Regulations. As you realized yesterday, the public training, meetings, etc. component of the H2S contingency plan is an extremely important component of a refinery contingency plan. As you indicated, refineries are a little different than a gas plant with raw gas containing H2S because a refinery produces H2S and can shut down or flare gas under emergency conditions. A Gas Plant handles raw gas that inherently contains a volume fraction of H2S with fewer controls than a refinery that produces it in its refining process.

Here is the checklist that Glen von Gonten was glad to provide and that you requested yesterday.

Disclaimer: Please be advised that the attached document is not an official guidance document from the OCD, but is provided to assist you with your evaluation of the New Mexico Hydrogen Sulfide Regulations Title 19 (Natural Resources and Wildlife), Chapter 15 [(Oil and Gas), and Part 11 (Hydrogen Sulfide Gas- 19.15.11 NMAC)].

Please contact me if you have questions. Thank you.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3490
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

From: VonGonten, Glenn, EMNRD
Sent: Wednesday, January 27, 2010 4:00 PM
To: Chavez, Carl J, EMNRD
Subject: H2S Plan Checklist.docx

Carl,

For Navajo.

Glenn

TITLE 19 NATURAL RESOURCES AND WILDLIFE
CHAPTER 15 OIL AND GAS
PART 11 HYDROGEN SULFIDE GAS

19.15.11.1 ISSUING AGENCY: Energy, Minerals and Natural Resources Department, Oil Conservation Division.
[19.15.11.1 NMAC - N, 12/1/08]

19.15.11.2 SCOPE: 19.15.11 NMAC applies to a person subject to the division's jurisdiction, including a person engaged in drilling, stimulating, injecting into, completing, working over or producing an oil, gas or carbon dioxide well or a person engaged in gathering, transporting, storing, processing or refining of oil, gas or carbon dioxide. 19.15.11 NMAC does not exempt or otherwise excuse surface waste management facilities the division permits pursuant to 19.15.36 NMAC from more stringent conditions on the handling of hydrogen sulfide required of such facilities by 19.15.36 NMAC or more stringent conditions in permits issued pursuant to 19.15.36 NMAC, nor shall the facilities be exempt or otherwise excused from the requirements set forth in 19.15.11 NMAC by virtue of permitting under 19.15.36 NMAC.
[19.15.11.2 NMAC - Rp, 19.15.3.118 NMAC, 12/1/08]

19.15.11.3 STATUTORY AUTHORITY: 19.15.11 NMAC is adopted pursuant to the Oil and Gas 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]

19.15.11.4 DURATION: Permanent.
[19.15.11.4 NMAC - N, 12/1/08]

19.15.11.5 EFFECTIVE DATE: December 1, 2008, unless a later date is cited at the end of a section.
[19.15.11.5 NMAC - N, 12/1/08]

19.15.11.6 OBJECTIVE: To require oil and gas operations be conducted in a manner that protects the public from exposure to hydrogen sulfide gas.
[19.15.11.6 NMAC - N, 12/1/08]

19.15.11.7 DEFINITIONS:

A. "ANSI" means the American national standards institute.

B. "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.

C. "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.

D. "Escape rate" means the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing hydrogen sulfide, as set forth in 19.15.11 NMAC.

(1) For existing gas facilities or operations, the escape rate is 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 is calculated using the current daily absolute open flow rate against atmospheric pressure or the best estimate of that rate.

(2) For new gas operations or facilities, the escape rate is calculated as the maximum anticipated flow rate through the system. For a new gas well, the escape rate is 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.

(3) For existing oil wells, the escape rate is calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or the best estimate of the maximum daily production rate.

(4) For new oil wells, the escape rate is 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 or reservoir average of the producing gas/oil ratio multiplied by the maximum daily production rate.

(5) For facilities or operations not mentioned, the escape rate is calculated using the actual flow of the gaseous mixture through the system or the best estimate of the actual flow of the gaseous mixture through the system.

E. "GPA" means the gas processors association.

F. "LEPC" means the local emergency planning committee established pursuant to the Emergency Planning and Community Right-To-Know Act, 42 U.S.C. section 11001.

G. "NACE" means the national association of corrosion engineers.

H. "Potentially hazardous volume" means the volume of hydrogen sulfide gas of such concentration that:

(1) the 100-ppm radius of exposure includes a public area;

(2) the 500-ppm radius of exposure includes a public road; or

(3) the 100-ppm radius of exposure exceeds 3000 feet.

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 19.15.11 NMAC http://www.nmcpr.state.nm.us/nmac/parts/title19/19.015.0011.htm[1/16/2009 4:18:08 PM] present.

J. "Public road" means a federal, state, municipal or county road or highway.

K. "Radius of exposure" means the 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 the division may approve:

(1) 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 psi absolute and 60 degrees fahrenheit);

(2) 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 psi absolute and 60 degrees fahrenheit);

(3) 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 3000 feet is assumed.
[19.15.11.7 NMAC - Rp, 19.15.3.118 NMAC, 12/1/08]

19.15.11.8 REGULATORY THRESHOLD:
A. Determination of hydrogen sulfide concentration.

(1) Each person shall determine the hydrogen sulfide concentration in the gaseous mixture within wells, facilities or operations 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 the person uses a representative sample or process knowledge, the concentration derived from the representative sample or process knowledge shall be reasonably representative of the hydrogen sulfide concentration within the well, facility or operation.

(2) The person shall conduct the tests used to make the determination referred to in Paragraph (1) of Subsection A of 19.15.11.8 NMAC in accordance with applicable ASTM or GPA standards or by another division-approved method.

(3) If the person conducted a test prior to January 31, 2003 that otherwise meets the requirements of Paragraphs (1) and (2) of Subsection A of 19.15.11.8 NMAC, new testing is not required.

(4) If a change or alteration may materially increase the hydrogen sulfide concentration in a well, facility or operation, the person shall make a new determination in accordance with 19.15.11 NMAC.

B. Concentrations determined to be below 100 ppm. If the hydrogen sulfide 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 determined to be above 100 ppm.

(1) If the person determines the hydrogen sulfide concentration in a given well, facility or operation is 100 ppm or greater, then the person shall calculate the radius of exposure and comply with applicable requirements of 19.15.11 NMAC.

(2) If calculation of the radius of exposure reveals that a potentially hazardous volume is present, the person shall provide results of the hydrogen sulfide concentration determination and the calculation of the radius of exposure to the division. For a well, facility or operation, the person shall accomplish the determination, calculation and submission 19.15.11.8 NMAC requires before operations begin.

D. Recalculation. The person shall calculate the radius of exposure if the hydrogen sulfide concentration in a well, facility or operation increases to 100 ppm or greater. The person shall also recalculate the radius of exposure if the actual volume fraction of hydrogen sulfide increases by a factor of 25 percent in a well, facility or operation that previously had a hydrogen sulfide concentration of 100 ppm or greater. If calculation or recalculation of the radius of exposure reveals that a potentially hazardous volume is present, the person shall provide the results to the division within 60 days.
[19.15.11.8 NMAC - Rp, 19.15.3.118 NMAC, 12/1/08]

19.15.11.9 HYDROGEN SULFIDE CONTINGENCY PLAN:

A. When required. If a well, facility or operation involves a potentially hazardous volume of hydrogen sulfide, the person shall develop a hydrogen sulfide contingency plan that the person will use to alert and protect the public in accordance with the Subsections B through I of 19.15.11.9 NMAC.

B. Plan contents.

(1) API guidelines. The person shall develop the hydrogen sulfide contingency plan with due consideration of paragraph 7.6 of the guidelines in the API publication 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 division-approved standard.

(2) Required contents. The hydrogen sulfide contingency plan shall contain information on the following subjects, as appropriate to the well, facility or operation to which it applies.

(a) Emergency procedures. The hydrogen sulfide contingency plan shall contain information on emergency procedures the person will follow 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 Paragraph (1) of Subsection B of 19.15.11.9 NMAC, 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, locations of road blocks and procedures for notifying the public, either through direct telephone notification using telephone number lists or by means of mass 19.15.11 NMAC http://www.nmcpr.state.nm.us/nmac/parts/title19/19.015.0011.htm[1/16/2009 4:18:08 PM] notification and reaction plans. The plan shall include information on the availability and location of necessary safety equipment and supplies.

(b) 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.

(c) 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.

(d) Training and drills. The hydrogen sulfide contingency plan shall provide for training and drills, including training in the responsibilities and duties of essential personnel and periodic on-site or classroom drills or exercises that simulate a release, and shall describe how the person will document the training, drills and attendance. 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-in-place plans.

(e) Coordination with state emergency plans. The hydrogen sulfide contingency plan shall describe how the person will coordinate emergency response actions under the plan with the division and the New Mexico state police consistent with the New Mexico hazardous materials emergency response plan.

(f) 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. Plan activation. The person shall activate the hydrogen sulfide contingency plan when a release creates a hydrogen sulfide concentration greater than the activation level set forth in the hydrogen sulfide contingency plan. At a minimum, the person shall activate the plan whenever a release may create a hydrogen sulfide 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.

D. Submission.

(1) Where submitted. The person shall submit the hydrogen sulfide contingency plan to the division.

(2) When submitted. The person shall submit a hydrogen sulfide contingency plan for a new well, facility or operation before operations commence. The hydrogen sulfide contingency 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 hydrogen sulfide contingency 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.

(3) Electronic submission. A filer who operates more than 100 wells or who operates an oil pump station, compressor station, refinery or gas plant shall submit each hydrogen sulfide contingency plan in electronic format. The file may submit the hydrogen sulfide contingency plan 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.

E. Failure to submit plan. A person's 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 well, facility or operation.

F. Review, amendment. The person 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 to add provisions to the plan or amend the plan as necessary to protect public safety.

G. 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 division inspection.

H. Annual inventory of contingency plans. On an annual basis, each person required to prepare one or more hydrogen sulfide contingency plans pursuant to 19.15.11 NMAC 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.

I. Plans required by other jurisdictions. The person may submit a hydrogen sulfide contingency plan to the BLM or other jurisdiction require that meets the requirements of 19.15.11.9 NMAC to the division in satisfaction of 19.15.11.9 NMAC.
[19.15.11.9 NMAC - Rp, 19.15.3.118 NMAC, 12/1/08]

19.15.11.10 SIGNS, MARKERS: For each well, facility or operation involving a hydrogen sulfide 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.
[19.15.11.10 NMAC - Rp, 19.15.3.118 NMAC, 12/1/08]

19.15.11.11 PROTECTION FROM HYDROGEN SULFIDE DURING DRILLING, COMPLETION, WORKOVER AND WELL SERVICING OPERATIONS:

A. API standards. The person shall conduct drilling, completion, workover and well servicing operations involving a hydrogen sulfide concentration of 100 ppm or greater with due consideration to the guidelines in the API publications 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 Hydrogen Sulfide, RP-49, most recent editions, or some other division-approved standard.

B. Detection and monitoring equipment. Drilling, completion, workover and well servicing operations involving a hydrogen sulfide 19.15.11 NMAC http://www.nmcpr.state.nm.us/nmac/parts/title19/19.015.0011.htm[1/16/2009 4:18:08 PM] concentration of 100 ppm or greater shall include hydrogen sulfide detection and monitoring equipment as follows.

(1) Each drilling and completion site shall have an accurate and precise hydrogen sulfide detection and monitoring system that automatically activates visible and audible alarms when the hydrogen sulfide's ambient air concentration reaches a predetermined value the operator sets, not to exceed 20 ppm. The operator shall locate a sensing point 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.

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

(3) The operator shall provide and maintain as operational hydrogen sulfide detection and monitoring equipment during drilling when

drilling is within 500 feet of a zone anticipated to contain hydrogen sulfide and continuously thereafter through all subsequent drilling.

C. Wind indicators. Drilling, completion, workover and well servicing operations involving a hydrogen sulfide concentration of 100 ppm or greater shall include wind indicators. The person shall have equipment to indicate wind direction present and visible at all times. The person shall install at least two devices to indicate wind direction at separate elevations that visible from all principal working areas at all times. When a sustained hydrogen sulfide concentration is detected in excess of 20 ppm at a detection point, the person shall display red flags.

D. Flare system. For drilling and completion operations in an area where it is reasonably expected that a potentially hazardous hydrogen sulfide volume will be encountered, the person shall install a flare system to safely gather and burn hydrogen-sulfide-bearing gas. The person shall locate flare outlets at least 150 feet from the well bore. Flare lines shall be as straight as practical. The person shall equip the flare system with a suitable and safe means of ignition. Where oncombustible gas is to be flared, the system shall provide supplemental fuel to maintain ignition.

E. Well control equipment. When the 100 ppm radius of exposure includes a public area, the following well control equipment is required.

(1) Drilling. The person shall install a remote-controlled well control system that is operational at all times beginning when drilling is within 500 vertical feet of the formation believed to contain hydrogen sulfide and continuously thereafter during drilling. The well control system shall 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 in API publications Choke and Kill Systems, 16C and Blowout Prevention Equipment Systems for Drilling Wells, RP 53 or other division-approved specifications. The person shall use mud-gas separators. The person

shall test and maintain these systems pursuant to the specifications referenced, according to the requirements of 19.15.11 NMAC, or as the division otherwise approves.

(2) Completion, workover and well servicing. The person shall install a remote controlled pressure and hydrogen-sulfide-rated well control system that meets or exceeds API specifications or other division-approved specifications that is operational at all times during a well's completion, workover and servicing.

F. Mud program. Drilling, completion, workover and well servicing operations involving a hydrogen sulfide concentration of 100 ppm or greater shall use a hydrogen sulfide mud program capable of handling hydrogen sulfide conditions and well control, including de-gassing.

G. Well testing. except with prior division approval, a person shall conduct drill-stem testing of a zone that contains hydrogen sulfide in a concentration of 100 ppm or greater only during daylight hours and not permit formation fluids to flow to the surface.

H. 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, the operator shall satisfy the requirements of 19.15.11 NMAC before continuing drilling operations. The operator shall notify the division of the event and the mitigating steps that the operator has or is taking 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 a required hydrogen sulfide contingency plan. [19.15.11.11 NMAC - Rp, 19.15.3.118 NMAC, 12/1/08]

19.15.11.12 PROTECTION FROM HYDROGEN SULFIDE AT OIL PUMP STATIONS, PRODUCING WELLS, TANK

BATTERIES AND ASSOCIATED PRODUCTION FACILITIES, PIPELINES, REFINERIES, GAS PLANTS AND COMPRESSOR STATIONS:

A. API standards. A person shall conduct operations at oil pump stations and producing wells, tank batteries and associated production facilities, refineries, gas plants and compressor stations involving a hydrogen sulfide concentration of 100 ppm or greater with due consideration to the guidelines in the API publication Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide, RP-55, latest edition or some other division-approved standard.

B. Security. A person shall protect well sites and other unattended, fixed surface facilities involving a hydrogen sulfide concentration of 100 ppm or greater from public access by fencing with locking gates when the location is within 1/4 mile of a public area. For the purposes of Subsection B of 19.15.11.12 NMAC, a surface pipeline is not considered a fixed surface facility.

C. Wind direction indicators. Oil pump stations, producing wells, tank batteries and associated production facilities, pipelines, refineries, gas plants and compressor stations involving a hydrogen sulfide concentration of 100 ppm or greater shall have equipment to indicate wind direction. The person shall install wind direction equipment that is visible from all principal working areas at all times.

D. Control equipment. When the 100 ppm radius of exposure includes a public area, the following additional measures are required.

(1) The person shall install and maintain in good operating condition safety devices, such as automatic shut-down devices, to prevent hydrogen sulfide's escape. Alternatively, the person shall establish safety procedures to achieve the same purpose.

(2) A well shall possess a secondary means of immediate well control through the use of an appropriate christmas tree or downhole completion equipment. The equipment shall allow downhole accessibility (reentry) under pressure for permanent well control.

E. Tanks or vessels. The person shall chain each stair or ladder leading to the top of a tank or vessel containing 300 ppm or more 19.15.11 NMAC
http://www.nmcpr.state.nm.us/nmac/parts/title19/19.015.0011.htm[1/16/2009 4:18:08 PM] of hydrogen sulfide in the gaseous mixture or mark it to restrict entry. [19.15.11.12 NMAC - Rp, 19.15.3.118 NMAC, 12/1/08]

19.15.11.13 PERSONNEL PROTECTION AND TRAINING: The person shall provide persons responsible for implementing a hydrogen sulfide contingency plan training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.
[19.15.11.13 NMAC - Rp, 19.15.3.118 NMAC, 12/1/08]

19.15.11.14 STANDARDS FOR EQUIPMENT THAT MAY BE EXPOSED TO HYDROGEN SULFIDE: Whenever a well, facility or operation involves a potentially hazardous hydrogen sulfide volume, the person shall select equipment with consideration for both the hydrogen sulfide 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 hydrogen sulfide's corrosive effects.
[19.15.11.14 NMAC - Rp, 19.15.3.118 NMAC, 12/1/08]

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.
[19.15.11.15 NMAC - Rp, 19.15.3.118 NMAC, 12/1/08]

19.15.11.16 NOTIFICATION OF THE DIVISION: The person 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 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.
[19.15.11.16 NMAC - Rp, 19.15.3.118 NMAC, 12/1/08]

HISTORY of 19.15.11 NMAC:
History of Repealed Material: 19.15.3 NMAC, Drilling (filed 10/29/2001) repealed 12/1/08.
NMAC History:
That applicable portion of 19.15.3 NMAC, Drilling (Section 118) (filed 10/29/2001) was replaced by 19.15.11 NMAC, Hydrogen Sulfide Gas, effective 12/1/08.

TITLE 19 NATURAL RESOURCES AND WILDLIFE CHAPTER 15 OIL& GAS **PART 11 HYDROGEN SULFIDE GAS** **19.15.11.7 DEFINITIONS:**	
A. "ANSI" means the American national standards institute.	
B. "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.	
C. "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.	
D. "Escape rate" means the maximum volume (Q) that is used to designate the possible rate of escape of a gaseous mixture containing hydrogen sulfide, as set forth in 19.15.11 NMAC.	
(1) For existing gas facilities or operations, the escape rate is 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 is calculated using the current daily absolute open flow rate against atmospheric pressure or the best estimate of that rate.	
(2) For new gas operations or facilities, the escape rate is calculated as the maximum anticipated flow rate through the system. For a new gas well, the escape rate is 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.	
(3) For existing oil wells, the escape rate is calculated by multiplying the producing gas/oil ratio by the maximum daily production rate or the best estimate of the maximum daily production rate.	
(4) For new oil wells, the escape rate is 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 or reservoir average of the producing gas/oil ratio multiplied by the maximum daily production rate.	
(5) For facilities or operations not mentioned, the escape rate is calculated using the actual flow of the gaseous mixture through the system or the best estimate of the actual flow of the gaseous mixture through the system.	
E. "GPA" means the gas processors association.	
F. "LEPC" means the local emergency planning committee established pursuant to the Emergency Planning and Community Right-To-Know Act, 42 U.S.C. section 11001.	
G. "NACE" means the national association of corrosion engineers.	
H. "Potentially hazardous volume" means the volume of hydrogen sulfide gas of such concentration that:	
(1) the 100-ppm radius of exposure includes a public area;	
(2) the 500-ppm radius of exposure includes a public road; or	
(3) the 100-ppm radius of exposure exceeds 3000 feet.	
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" means the 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 the division may approve:	
(1) 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 psi absolute and 60 degrees fahrenheit);	
(2) 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 psi absolute and 60 degrees fahrenheit);	
(3) 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 3000 feet is assumed.	
19.15.11.8 REGULATORY THRESHOLD:	
A. Determination of hydrogen sulfide concentration.	
(1) Each person shall determine the hydrogen sulfide concentration in the gaseous mixture by testing a sample from each well, facility or operation; testing a representative sample; or using process knowledge in lieu of testing.	
(2) The person shall conduct the tests in accordance with applicable ASTM or GPA standards or by another division-approved method.	
(3) If the person conducted a test prior to January 31, 2003 that otherwise meets the requirements of Paragraphs (1) and (2) of Subsection A of 19.15.11.8 NMAC, new testing is not required.	
(4) If a change or alteration occurs operators shall make a new determination	
B. Concentrations determined to be below 100 ppm. If less than 100 ppm, the person is not required to take further actions pursuant to 19.15.11 NMAC.	
C. Concentrations determined to be above 100 ppm.	
(1) If the person determines the hydrogen sulfide concentration in a given well, facility or operation is 100 ppm or greater, then the person shall calculate the radius of exposure and comply with applicable requirements of 19.15.11 NMAC.	
(2) If calculation of the radius of exposure reveals that a potentially hazardous volume is present, the person shall provide results of the hydrogen sulfide concentration determination and the calculation of	

the radius of exposure to the division. For a well, facility or operation, the person shall accomplish the determination, calculation and submission 19.15.11.8 NMAC requires before operations begin.	
D. Recalculation. The person shall calculate the radius of exposure if the hydrogen sulfide concentration in a well, facility or operation increases to 100 ppm or greater. The person shall also recalculate the radius of exposure if the actual volume fraction of hydrogen sulfide increases by a factor of 25 percent in a well, facility or operation that previously had a hydrogen sulfide concentration of 100 ppm or greater. If calculation or recalculation of the radius of exposure reveals that a potentially hazardous volume is present, the person shall provide the results to the division within 60 days.	
19.15.11.9 HYDROGEN SULFIDE CONTINGENCY PLAN:	
A. When required. If a well, facility or operation involves a potentially hazardous volume of hydrogen sulfide, the person shall develop a hydrogen sulfide contingency plan that the person will use to alert and protect the public in accordance with the Subsections B through I of 19.15.11.9 NMAC. B. Plan contents.	
(1) API guidelines. The person shall develop the hydrogen sulfide contingency plan with due consideration of paragraph 7.6 of the guidelines in the API publication 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 division-approved standard.	
(2) Required contents. The hydrogen sulfide contingency plan shall contain information on the following subjects, as appropriate to the well, facility or operation to which it applies.	
(a) Emergency procedures. The hydrogen sulfide contingency plan shall contain information on emergency procedures the person will follow 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 Paragraph (1) of Subsection B of 19.15.11.9 NMAC, 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, 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.	
(b) 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.	
(c) 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.	
(d) Training and drills. The hydrogen sulfide contingency plan shall provide for training and drills, including training in the responsibilities and duties of essential personnel and periodic on-site or classroom drills or exercises that simulate a release, and shall describe how the person will document the training, drills and attendance. 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-in-place plans.	

(e) Coordination with state emergency plans. The hydrogen sulfide contingency plan shall describe how the person will coordinate emergency response actions under the plan with the division and the New Mexico state police consistent with the New Mexico hazardous materials emergency response plan.	
(f) 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. Plan activation. The person shall activate the hydrogen sulfide contingency plan when a release creates a hydrogen sulfide concentration greater than the activation level set forth in the hydrogen sulfide contingency plan. At a minimum, the person shall activate the plan whenever a release may create a hydrogen sulfide 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.	
D. Submission.	
(1) Where submitted. The person shall submit the hydrogen sulfide contingency plan to the division.	
(2) When submitted. The person shall submit a hydrogen sulfide contingency plan for a new well, facility or operation before operations commence. The hydrogen sulfide contingency 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 hydrogen sulfide contingency 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.	
(3) Electronic submission. A filer who operates more than 100 wells or who operates an oil pump station, compressor station, refinery or gas plant shall submit each hydrogen sulfide contingency plan in electronic format. The file may submit the hydrogen sulfide contingency plan 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.	
E. Failure to submit plan. A person's 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 well, facility or operation.	
F. Review, amendment. The person 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 to add provisions to the plan or amend the plan as necessary to protect public safety.	
G. 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 division inspection.	
H. Annual inventory of contingency plans. On an annual basis, each person required to prepare one or more hydrogen sulfide contingency plans pursuant to 19.15.11 NMAC 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.	
I. Plans required by other jurisdictions. The person may submit a hydrogen sulfide contingency plan the BLM or other jurisdiction require that meets the requirements of 19.15.11.9 NMAC to the division in satisfaction of 19.15.11.9 NMAC.	
19.15.11.10 SIGNS, MARKERS:	
For each well, facility or operation involving a hydrogen sulfide 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.	
19.15.11.11 PROTECTION FROM HYDROGEN SULFIDE DURING DRILLING; COMPLETION, WORKOVER AND WELL SERVICING OPERATIONS:	
A. API standards. The person shall conduct drilling, completion, workover and well servicing operations involving a hydrogen sulfide concentration of 100 ppm or greater with due consideration to the guidelines in the API publications 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 Hydrogen Sulfide, RP-49, most recent editions, or some other division-approved standard.	
B. 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.	
(1) Each drilling and completion site shall have an accurate and precise hydrogen sulfide detection and monitoring system that automatically activates visible and audible alarms when the hydrogen sulfide's ambient air concentration reaches a predetermined value the operator sets, not to exceed 20 ppm. The operator shall locate a sensing point 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.	
(2) For workover and well servicing operations, the person shall locate one operational sensing point as close to the well bore as practical. Additional sensing points may be necessary for large or long-term operations.	
(3) The operator shall provide and maintain as operational hydrogen sulfide detection and monitoring equipment during drilling when drilling is within 500 feet of a zone anticipated to contain hydrogen sulfide and continuously thereafter through all subsequent drilling.	
C. Wind indicators. Drilling, completion, workover and well servicing operations involving a hydrogen sulfide concentration of 100 ppm or greater shall include wind indicators. The person shall have equipment to indicate wind direction present and visible at all times. The person shall install at least two devices to indicate wind direction at separate elevations that visible from all principal working areas at all times. When a sustained hydrogen sulfide concentration is detected in excess of 20 ppm at a	

detection point, the person shall display red flags.	
D. Flare system. For drilling and completion operations in an area where it is reasonably expected that a potentially hazardous hydrogen sulfide volume will be encountered, the person shall install a flare system to safely gather and burn hydrogen-sulfide-bearing gas. The person shall locate flare outlets at least 150 feet from the well bore. Flare lines shall be as straight as practical. The person shall equip the flare system with a suitable and safe means of ignition. Where noncombustible gas is to be flared, the system shall provide supplemental fuel to maintain ignition.	
E. Well control equipment. When the 100 ppm radius of exposure includes a public area, the following well control equipment is required.	
(1) Drilling. The person shall install a remote-controlled well control system that is operational at all times beginning when drilling is within 500 vertical feet of the formation believed to contain hydrogen sulfide and continuously thereafter during drilling. The well control system shall 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 in API publications Choke and Kill Systems, 16C and Blowout Prevention Equipment Systems for Drilling Wells, RP 53 or other division-approved specifications. The person shall use mud-gas separators. The person shall test and maintain these systems pursuant to the specifications referenced, according to the requirements of 19.15.11 NMAC, or as the division otherwise approves.	
(2) Completion, workover and well servicing. The person shall install a remote controlled pressure and hydrogen-sulfide-rated well control system that meets or exceeds API specifications or other division-approved specifications that is operational at all times during a well's completion, workover and servicing.	
F. Mud program. Drilling, completion, workover and well servicing operations involving a hydrogen sulfide concentration of 100 ppm or greater shall use a hydrogen sulfide mud program capable of handling hydrogen sulfide conditions and well control, including de-gassing.	
G. Well testing. Except with prior division approval, a person shall conduct drill-stem testing of a zone that contains hydrogen sulfide in a concentration of 100 ppm or greater only during daylight hours and not permit formation fluids to flow to the surface.	
H. 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, the operator shall satisfy the requirements of 19.15.11 NMAC before continuing drilling operations. The operator shall notify the division of the event and the mitigating steps that the operator has or is taking 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 a required hydrogen sulfide contingency plan.	
19.15.11.12 PROTECTION FROM HYDROGEN SULFIDE AT OIL PUMP STATIONS, PRODUCING WELLS, TANK BATTERIES AND ASSOCIATED PRODUCTION FACILITIES, PIPELINES, REFINERIES, GAS PLANTS AND COMPRESSOR STATIONS:	
A. API standards. A person shall conduct operations at oil pump stations and producing wells, tank	

batteries and associated production facilities, refineries, gas plants and compressor stations involving a hydrogen sulfide concentration of 100 ppm or greater with due consideration to the guidelines in the API publication Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide, RP-55, latest edition or some other division-approved standard.	
B. Security. A person shall protect well sites and other unattended, fixed surface facilities involving a hydrogen sulfide concentration of 100 ppm or greater from public access by fencing with locking gates when the location is within 1/4 mile of a public area. For the purposes of Subsection B of 19.15.11.12 NMAC, a surface pipeline is not considered a fixed surface facility.	
C. Wind direction indicators. Oil pump stations, producing wells, tank batteries and associated production facilities, pipelines, refineries, gas plants and compressor stations involving a hydrogen sulfide concentration of 100 ppm or greater shall have equipment to indicate wind direction. The person shall install wind direction equipment that is visible from all principal working areas at all times.	
D. Control equipment. When the 100 ppm radius of exposure includes a public area, the following additional measures are required.	
(1) The person shall install and maintain in good operating condition safety devices, such as automatic shut-down devices, to prevent hydrogen sulfide's escape. Alternatively, the person shall establish safety procedures to achieve the same purpose.	
(2) A well shall possess a secondary means of immediate well control through the use of an appropriate Christmas tree or down hole completion equipment. The equipment shall allow downhole accessibility (reentry) under pressure for permanent well control. E. Tanks or vessels. The person shall chain each stair or ladder leading to the top of a tank or vessel containing 300 ppm or more of hydrogen sulfide in the gaseous mixture or mark it to restrict entry.	
19.15.11.13 PERSONNEL PROTECTION AND TRAINING:	
The person shall provide persons responsible for implementing a hydrogen sulfide contingency plan training in hydrogen sulfide hazards, detection, personal protection and contingency procedures.	
19.15.11.14 STANDARDS FOR EQUIPMENT THAT MAY BE EXPOSED TO HYDROGEN SULFIDE:	
Whenever a well, facility or operation involves a potentially hazardous hydrogen sulfide volume, the person shall select equipment with consideration for both the hydrogen sulfide 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 hydrogen sulfide's corrosive effects.	
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.	
19.15.11.16 NOTIFICATION OF THE DIVISION:	
The person 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 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.	
C-108 REQUIREMENTS	
XIV. PROOF OF NOTICE All applicants must furnish proof that a copy of the application has been furnished, by certified or registered mail, to the owner of the surface of the land on which the well is to be located and to each leasehold operator within one-half mile of the well location. Where an application is subject to administrative approval, a proof of publication must be submitted. Such proof shall consist of a copy of the legal advertisement which was published in the county in which the well is located.	
OTHER ISSUES - GW033	
OTHER ISSUES - BHP COAL MINE	