

HINKLE SHANOR LLP

ATTORNEYS AT LAW
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WRITER:

Dana S. Hardy, Partner dhardy@hinklelawfirm.com

December 10, 2021

VIA CERTIFIED MAIL RETURN RECEIPT REQUESTED

TO ALL INTERESTED PARTIES SUBJECT TO NOTICE

Re: Case No. 22458 - Application of Manzano LLC for Approval of a Pressure Maintenance Project and Authorization to Inject, Lea County, New Mexico.

To whom it may concern:

This letter is to advise you that the enclosed application was filed with the New Mexico Oil Conservation Division. The hearing will be conducted on **January 6**, **2022** beginning at 8:15 a.m.

Manzano LLC ("Manzano" or "Applicant") seeks an order: (1) approving a pressure maintenance project for the injection of produced gas through the Vince BGH #1 well into the San Andres formation in a project area ("Project Area") comprised of the SE/4 and E/2NE/4 of Section 30, and the E/2SE/4 of Section 19, Township 9 South, Range 35 East, NMPM, Lea County, New Mexico; and (2) authorizing Manzano to convert the Vince BGH #1 well from a producing well to an injector. Applicant operates the following described wells within or near the Project Area:

- the Sodbuster 21 Fee #4H (API 30-025-43704) with a surface hole location at 200 FSL, 1650 FWL of Section 21 and a bottom hole location at 330 FNL, 1650 FWL of Section 21;
- the Rag Mama 30-19 Fee #1 (API 30-025-44067) with a surface hole location at 25 FSL, 528 FEL of Section 30 and a bottom hole location at 2303 FSL, 394 FEL of Section 19; and
- The Vince BGH No. 1H (API No. 30-025-37104) located at 1980 FSL, 1750 FEL (Unit J) of Section 30.

The wells are currently producing from the Jenkins San Andres Pool (Pool No. 33950). Applicant proposes to convert its Vince BGH No. 1H well from a producer into an injection well for pressure maintenance operations. Applicant plans to inject produced gas from the Sodbuster 21 Fee #4 and Rag Mama 30-19 Fee #1 into the San Andres formation through a closed system using the Vince BGH No. 1H. Applicant does not anticipate compatibility issues. The injection interval of the Vince BGH No. 1H is 4840 feet to 4850 feet. Injection will provide pressure maintenance support for the Rag Mama 30 19 Fee #1 well and will also reduce flaring. The expected average injection rate of produced gas into the Vince BGH No. 1H is 150 MCFGPD. The expected maximum injection rate is 1,000 MCFGPD to provide Manzano the option to inject more gas as the GOR increases or if Manzano drills additional wells in the Jenkins San Andres Pool. The expected average injection pressure of produced gas into the Vince BGH No. 1H is 500 psi and the proposed maximum injection pressure is 950 psi. Applicant's proposed pressure maintenance project can be conducted in a safe and responsible manner without causing waste, impairing correlative rights or

PO BOX 10 ROSWELL, NEW MEXICO 88202 575-622-6510 (FAX) 575-623-9332

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MANZANO LLC

Case No. 22458

Exhibit A-4

December 10, 2021 Page 2

endangering fresh water, public health or the environment. The wells are located approximately 18.1 miles north of Tatum, New Mexico.

During the COVID-19 Public Health Emergency, state buildings are closed to the public and hearings will be conducted remotely. To participate in the electronic hearing, see the instructions posted on the OCD Hearings website: https://www.emnrd.nm.gov/ocd/hearing-info/. You are not required to attend this hearing, but as an owner of an interest that may be affected by this application, you may appear and present testimony. Failure to appear at that time and become a party of record will preclude you from challenging the matter at a later date.

Pursuant to Division Rule 19.15.4.13.B, a party who intends to present evidence at the hearing shall file a pre-hearing statement and serve copies on other parties, or the attorneys of parties who are represented by counsel, at least four business days in advance of a scheduled hearing, but in no event later than 5:00 p.m. mountain time, on the Thursday preceding the scheduled hearing date. The statement must be filed at the Division's Santa Fe office or submitted through the OCD E-Permitting system (https://www.apps.emnrd.state.nm.us/ocd/ocdpermitting/) and should include: the names of the parties and their attorneys, a concise statement of the case, the names of all witnesses the party will call to testify at the hearing, the approximate time the party will need to present its case, and identification of any procedural matters that are to be resolved prior to the hearing.

A copy of Manzano's Application to Inject (Form C-108) in this matter will be provided upon request. Please do not hesitate to contact me if you have any questions about this matter.

Sincerely,

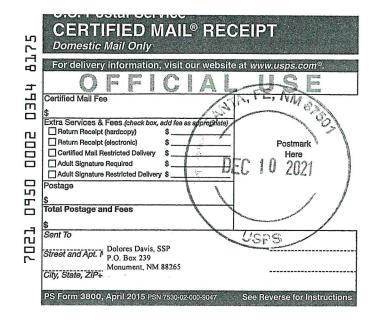
/s/ Dana S. Hardy

Dana S. Hardy

Enclosure

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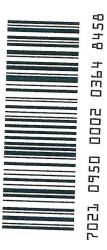
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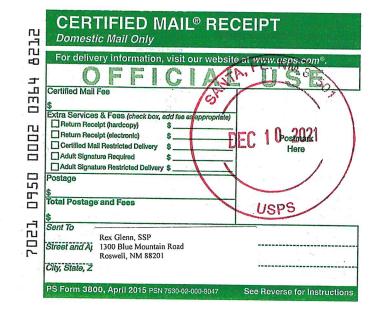


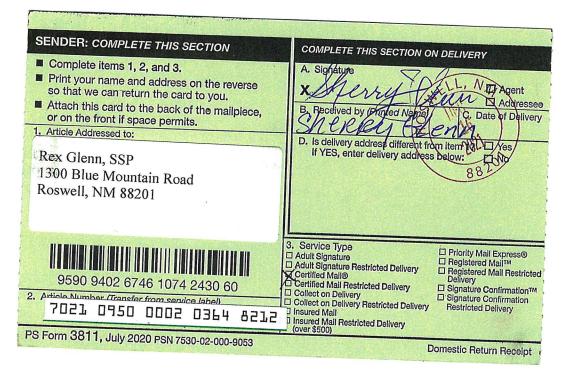


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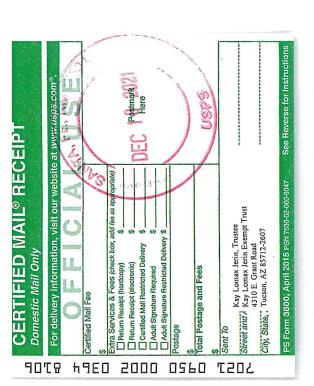
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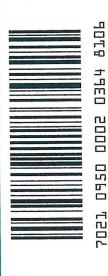






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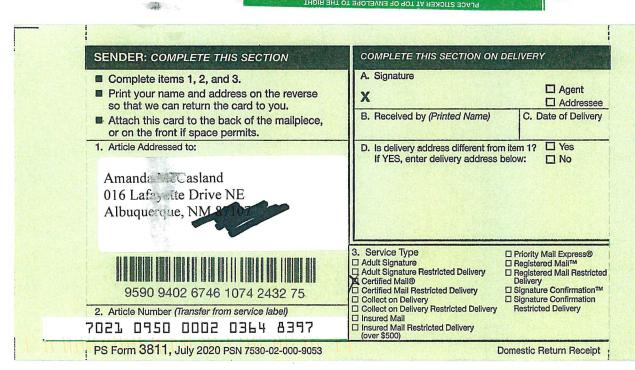
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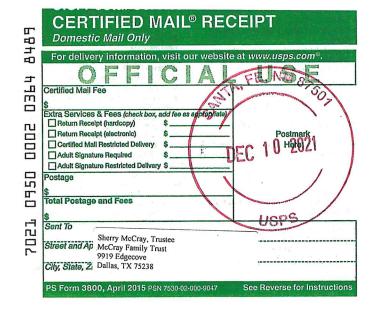


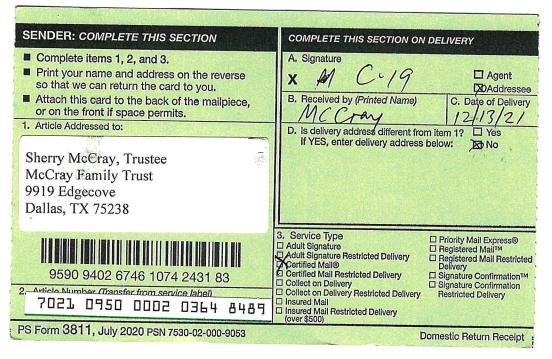
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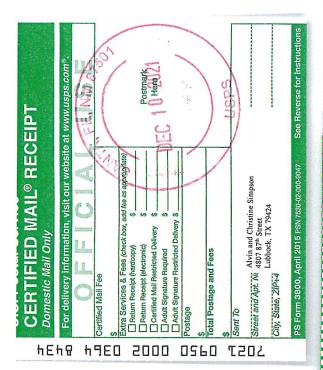
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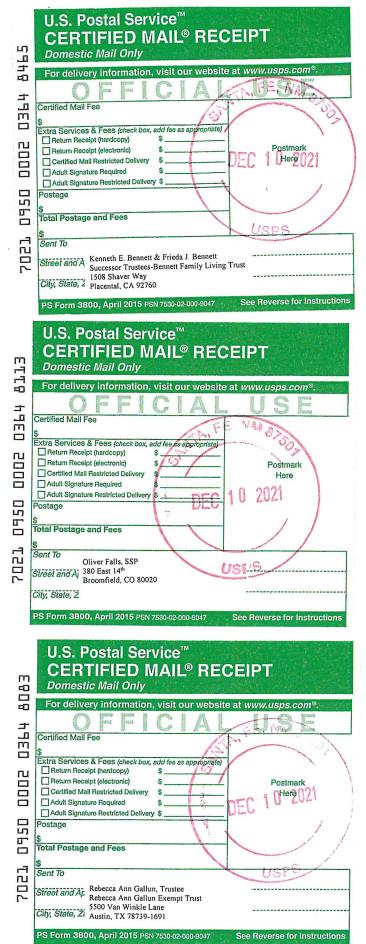
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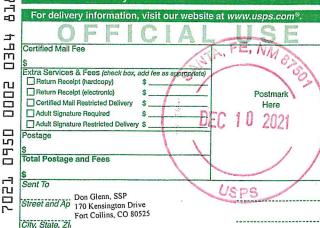
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Affidavit of Publication

STATE OF NEW MEXICO COUNTY OF LEA

I, Daniel Russell, Publisher of the Hobbs News-Sun, a newspaper published at Hobbs, New Mexico, solemnly swear that the clipping attached hereto was published in the regular and entire issue of said newspaper, and not a supplement thereof for a period of 1 issue(s).

> Beginning with the issue dated December 15, 2021 and ending with the issue dated December 15, 2021.

Publisher

Sworn and subscribed to before me this 15th day of December 2021.

Business Manager

My commission expires OFFICIAL SEAL **GUSSIE BLACK** 4-23-22 Notary Public

State of New Mexico My Commission Expires

tige van teen van de voor en de verde van de his newspaper is duly qualified to publish degal notices or advertisements within the meaning of Section 3, Chapter 167, Laws of ₹937 and payment of fees for said

LEGAL NOTICE December 15, 2021

This is to notify all interested parties, including Donivan D. Crockett; Hayden G. Crockett; William Harrel Delaffield, Jr.; Mary Ann Delafield Frazier; Gleason Wildcats, LLC; Donald Joseph Marozeski; Dorothy Ann Middaugh; Margaret Ann Morgan Lilly, Edward R. Lilly; Patricia Ann Morgan McNally; Leo Patrick Morgan, Jr.; Mary Carol Morgan; Sharon Y. Weisler; Crayton Weisler; William Marvin Zahn, Jr.; Stephanie Zahn; Darwin D. Crockett; Dorothy Fitzgerald; Walta Neuner Ocker; Keith Z. Neuner; Robert Franklin White, Sr., Rebecca Ann Gallun, Trustee of the Rebecca Ann Gallun Exempt Trust; Everett Bruce Lomax, Trustee of the Everett Bruce Lomax Exempt Trust; Everett Bruce Lomax, Trustee of the Kay Lomax Jerin Exempt Trust; Kathryn Ann Barwick Fox; Maxine E. Barber; Tom Barber; Rozella M. Jones; Arville O. Glenn, Jr.; Arlis E. Schleiger; Worth Fullingim; Bena F. Kerr; Rodean Gleason; Beal Gleason; Cleo Dickinson; James Don Dickinson; Barbara S. Dickinson; Grace G. Glenn; Prosperity State Bank, Successor to American State Bank, Trustee of the Willa Ruth Simmons Trust; Kenneth Edward Bennett and Frieda Johanna Bennett, Successors Trustes of the Bennett Family Living Trust; Lawrence A. Wangler, Trustee of the Wangler Trust; Sherry McCray, Trustee, McCray Family Trust; Cliver Falls; Melissa Glenn; Gerald Glenn; Bonnie Downing; Michael Goolsby; Cindy Corkins; Phillip Corkins; Melanie Caywood; Patsy Jean Howard Guinn; Doug Guinn; Dolores Davis; Don Glenn; Clark A. Glenn; Carolyn Taylor; Rex Glenn; Brenda Sue Ehlert Hayden; Marilyn K. Glenn; Toni Martin; Laura Oglesby; Claudia Moyers; Jennifer Glenn; Cliff Glenn; Scott Alan Frost; Glenda King; Laura Haad; Alice Beed; Gary McCray; Janetle-MeCray; William-E. Glenn, Jr.; Patricia Horton; Lance Jackson; Tiffany Latner; Amanda McCasland; Amelia Jackson; Kathryn Ann Barwick Fox; Alvin Simpson; Christine Simpson; Worth Fullingim; Lawrence A. Wangler, Truste of the Wangler Trust; Cindy Corkins; Phillip Corkins; Melanie Caywood, the Bureau of Land Management; the New Mexico State Lan

• the Rag Mama 30-19 Fee #1 (API 30-025-44067) with a surface hole location at 25 FSL, 528 FEL of Section 30 and a bottom hole location at 2303 FSL, 394 FEL of Section 19; and

• The Vince BGH No. 1H (API No. 30-025-37104) located at 1980 FSL, 1750 FEL (Unit J) of Section 30.

FEL (Unit J) of Section 30.

The wells are currently producing from the Jenkins San Andres Pool (Pool No. 33950). Applicant proposes to convert its Vince BGH No. 1H well from a producer into an injection well for pressure maintenance operations. Applicant plans to inject produced gas from the Sodbuster 21 Fee #4 and Rag Mama 30-19 Fee #1 into the San Andres formation through a closed system using the Vince BGH No. 1H. Applicant does not anticipate compatibility issues. The injection interval of the Vince BGH No. 1H is 4840-feet to 4850 feet. Injection will provide pressure maintenance support for the Rag Mama 30 19 Fee #1 well and will also reduce flaring. The expected average injection rate of produced gas into the Vince BGH No. 1H is 150 MCFGPD. The expected maximum injection rate is 1,000 MCFGPD to provide Manzano the option to inject more gas as the GOR increases or if Manzano drills additional wells in the Jenkins San Andres Pool. The expected average injection pressure of produced gas into the Vince BGH No. 1H is 500 psi and the proposed maximum injection pressure is 950 psi. Applicant's proposed pressure maintenance project can be pressure is 950 psi. Applicant's proposed pressure maintenance project can be conducted in a safe and responsible manner without causing waste, impairing correlative rights or endangering fresh water, public health or the environment. The wells are located approximately 18.1 miles north of Tatum, New Mexico.

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GILBERT HINKLE, SHANOR LLP PO BOX 2068 SANTA FE, NM 87504

MANZANO LLC

Case No. 22458

Exhibit A-5

STATE OF NEW MEXICO DEPARTMENT OF ENERGY, MINERALS AND NATURAL RESOURCES OIL CONSERVATION DIVISION

APPLICATION OF MANZANO LLC FOR APPROVAL OF A PRESSURE MAINTENANCE PROJECT AND AUTHORIZATION TO INJECT, LEA COUNTY, NEW MEXICO.

CASE NO. 22458

SELF-AFFIRMED STATEMENT OF JOHN WORRALL

- 1. I am employed by Manzano LLC ("Manzano") as a geologist. I am over 18 years of age and competent to provide this Self-Affirmed Statement. I have personal knowledge of the matters addressed herein. I am familiar with the Application in this case and with the geology matters pertaining to this Application. I have previously testified before the New Mexico Oil Conservation Division ("Division"), and my credentials as an expert in petroleum geology matters were accepted and made a matter of record.
- 2. Manzano's Application seeks an order: (1) approving a pressure maintenance project for the injection of produced gas through the Vince BGH #1 well into the Jenkins San Andres pool (Pool Code 33950) within the San Andres formation in a project area ("Project Area") comprised of the SE/4 and E/2NE/4 of Section 30, and the E/2SE/4 of Section 19, Township 9 South, Range 35 East, NMPM, Lea County, New Mexico; and (2) authorizing Manzano to convert the Vince BGH #1 well from a producing well to an injector.
- 3. Manzano operates the following described wells within or near the Project Area currently producing from the Jenkins San Andres Pool:

MANZANO LLC

- a. Sodbuster 21 Fee #4H (API 30-025-43704) horizontally drilled from a surface hole location at 200 FSL, 1650 FWL in Section 21 to a bottom hole location at 330 FNL, 1650 FWL in Section 21;
- b. Rag Mama 30-19 Fee #1 (API 30-025-44067) horizontally drilled from a surface hole location at 25 FSL, 528 FEL in Section 30 to a bottom hole location at 2303 FSL, 394 FEL in Section 19; and
- c. Vince BGH No. 1H (API No. 30-025-37104) ("Vince") vertically drilled at 1980 FSL, 1750 FEL (Unit J) of Section 30.
- 4. The perforated interval of the Rag Mama 30-19 Fee #1 is from 5,250' to 12,123'; the perforated interval of the Sodbuster 21 Fee #4H is from 5150 to 9,330; and the perforated interval of the Vince BGH No. 1H is 4840' to 4850'.
- 5. The Vince well currently produces 2 BOPD and 31 BWPD and is deemed uneconomic. Therefore, Manzano proposes to convert the well from a producer into an injection well to provide pressure maintenance support for the Rag Mama 30 19 Fee #1 well. Conversion of the well will also allow Manzano to attempt to eliminate flaring.
- 6. Manzano plans to inject produced gas from the Sodbuster 21 Fee #4 and Rag Mama 30-19 Fee #1 into the San Andres formation through a closed system using the Vince BGH No. 1H at depths of 4840' to 4850' within the San Andres formation.
- 7. Accordingly, Manzano proposes the unitized interval be defined as the Jenkins San Andres pool (Pool Code 33950) within the San Andres formation at depths of 4840' to 4850' as defined on the Manzano Vince BGH #1 well log provided on page 24 of Form C-108.
 - 8. The injection interval of the Vince BGH No. 1H well ("Vince") is 4840' to 4850'.

- 9. The productive zone immediately overlying the proposed injection interval is the San Andres formation with its top being at an approximate depth of 4000' TVD.
- 10. Page 22 of Form C-108 contains a structure map of the Project Area. The map shows the structural contours near the top of the P-1 dolomite within the San Andres formation. The map demonstrates the reservoir is relatively flat with a 40 feet of east dip per mile (a half degree slope).
- 11. Page 23 of Form C-108 contains an isopach map of the P-1 Dolomite interval within the San Andres formation. The San Andres formation is present from 4000 to 5460' within the Vince well. The interval from 4810 to 4900' is known as the P-1 dolomite which is a fine crystalline dolomite with 4% to 12% porosity and 20 to 100 ohm-m of resistivity. The interval has up to 100' of porosity greater than 6%. Oil and gas is stratigraphically trapped where this reservoir pinches out northward into anhydrite. The zone is also overlain by anhydrite and underlain by a tight limestone.
- 12. Page 21 of Form C-108 contains a cross-section of the target injection interval. The cross-sections demonstrate the injection interval is consistent and continuous across the formation underlying the Project Area. The cross-section also shows all lands within the proposed unit contain porous reservoir rock, and therefore, all lands within the proposed unit appear capable of contributing additional secondary recovery reserves.
- 13. From geologic studies performed over this area, the Project Area is well suited for pressure maintenance operations and the entire Project Area should continue to contribute enhanced recovery reserves.
- 14. There are no faults or other geologic impediments that would impede the efficiency of the Project.

- 15. Manzano's pressure maintenance project can be conducted in a safe and responsible manner without causing waste, impairing correlative rights or endangering fresh water, public health or the environment.
- 16. There are no water wells within one (1) mile of the proposed injection well. Page 26 of Form C-108 shows the nearest water wells are located 2.5 to 3.0 miles from the Vince well.
- 17. The water aquifer in the Project Area is the Ogalalla Red Beds. Page 25 of Form C-108 contains a map from Atkins Engineering of Roswell indicating the top of water is present at 4025' above sea level below the Vince well. This well has a drill floor elevation of 4183' where water is found at 158'. The map indicates there is approximately 25' of water in this area.
- 18. With respect to compatibility, the source of the gas to be injected will be produced gas from the Sodbuster 21 Fee #4H and Rag Mama 30-19 Fee #1 wells drilled within or near the Project area. Gas analyses for the Sodbuster 21 Fee #4 and Rag Mama 30-19 Fee #1 are provided on pages 19 and 20 of Form C-108 and show the two source wells produce a typical San Andres formation gas the BTU content is 1059 to 1138 with nitrogen (4.4 to 8.1 Mole %), CO2 (13.1to15.3mole%) and H2S (2.1 to 2.4 mole %).
- 19. I do not expect any compatibility issues to arise from the proposed injection operations.
- 20. I have examined the available geological and engineering data and have found no evidence of open faults or hydrological connection between the proposed injection interval and any underground sources of drinking water.
- 21. **Exhibit B-1** is an Injection Model for the proposed injection of gas into the Vince BGH #1 Well over 5-year, 10-year, and 20-year periods. At an average rate of 150 MCFGPD, the model shows we will displace an area of 12.1, 24.2 and 48.4 acres over 5, 10 and 20 years,

respectively. As shown on the Plat of Injection, the radius of injection for the 20-year period is 580 feet.

- 22. Based on my professional training and experience, it is my opinion that the proposed injection operations will not impair any hydrocarbon-bearing zones. It is also my opinion that injection fluids will be confined to the injection interval as a result of the stratigraphic confining layers above and below the injection zone.
- 23. In my opinion, the granting of Manzano's application would serve the interests of conservation, the prevention of waste, and the protection of correlative rights.
- 24. The exhibits referenced above were either prepared by me or under my supervision or were compiled from company business records.
- 25. I understand this Self-Affirmed Statement will be used as written testimony in this case. I affirm that my testimony in paragraphs 1 through 24 above is true and correct and is made under penalty of perjury under the laws of the State of New Mexico. My testimony is made as of the date handwritten next to my signature below.

John Worrall

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Date

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Reservoir Parameters:

Thickness: 100 feet of P-1 Dolomite

Average Porosity = 6%

Initial Reservoir Pressure = 1700 psi

Initial Reservoir Temperature = 99 Fahrenheit

Gas Compressibility .9955

INJECTION MODEL

Our proposal is to inject an average of 150,000 cubic feet today at the surface conditions. What volume is that at reservoir conditions? And how much area would it cover?

<u>Part A. You can convert the volume of gas at the surface to the volume of gas at initial reservoir conditions as follows:</u>

CFG@FmPressure = CFG@ Surface / ((FmPressure/14.7) x (520/460+Temp Fm) x (1 / Z))

 $CFG@FmPressure = 150,000 / ((1700/14.7) \times (520/460+99) \times (1/.9955)) = 1388.117712$ cubic feet/day

Part B. You can determine the Acreage of Injection by the Formula:

Acres = CFG@FmPressure / (43560 x Porosity x (1 – Swirr) x Thickness)

Daily Acres = 1388.117712 CFG / (43560 x .06 x 100 x .8) = .006638916 acres/day

TABLE OF INJECTION Assuming a continuous 150 MCFGPD average rate

Term,Years	Total CFG, Surface	CFG, In Situ	Total Acres, Area	Radius of Injection
5	273750000	2533315	12.11602208	183 feet
10	547500000	5066629	24.23204416	410 Feet
20	1095000000	10133529	48.46408833	580 Feet

MANZANO LLC

Case No. 22458

Exhibit B-1

STATE OF NEW MEXICO DEPARTMENT OF ENERGY, MINERALS AND NATURAL RESOURCES OIL CONSERVATION DIVISION

APPLICATION OF MANZANO LLC FOR APPROVAL OF A PRESSURE MAINTENANCE PROJECT AND AUTHORIZATION TO INJECT, LEA COUNTY, NEW MEXICO.

CASE NO. 22458

SELF-AFFIRMED STATEMENT OF MIKE HANAGAN

- 1. I am the Operations Manager for Manzano LLC ("Manzano"). I am over 18 years of age and competent to provide this Self-Affirmed Statement. I have personal knowledge of the matters addressed herein. I am familiar with the Application in this case and with the engineering matters pertaining to this Application. I have previously testified before the New Mexico Oil Conservation Division ("Division"), and my credentials as an expert in petroleum engineering were accepted and made a matter of record.
- 2. Manzano's Application seeks an order: (1) approving a pressure maintenance project for the injection of produced gas through the Vince BGH #1 well into the Jenkins San Andres pool (Pool Code 33950) within the San Andres formation in a project area ("Project Area") comprised of the SE/4 and E/2NE/4 of Section 30, and the E/2SE/4 of Section 19, Township 9 South, Range 35 East, NMPM, Lea County, New Mexico; and (2) authorizing Manzano to convert the Vince BGH #1 well from a producing well to an injector.
- 3. Manzano operates the following described wells within or near the Project Area currently producing from the Jenkins San Andres Pool:
 - a. **Sodbuster 21 Fee** #**4H** (API 30-025-43704) horizontally drilled from a surface hole location at 200 FSL, 1650 FWL in Section 21 to a bottom hole location at 330 FNL, 1650 FWL in Section 21;

- b. Rag Mama 30-19 Fee #1 (API 30-025-44067) horizontally drilled from a surface hole location at 25 FSL, 528 FEL in Section 30 to a bottom hole location at 2303 FSL, 394 FEL in Section 19; and
- c. Vince BGH No. 1H (API No. 30-025-37104) vertically drilled at 1980 FSL, 1750 FEL (Unit J) of Section 30.
- 4. The injection interval of the Vince BGH No. 1H well ("Vince") is 4840' to 4850'.
- 5. Manzano proposes to convert its Vince well from a producer into an injection well for pressure maintenance operations for the purpose of mitigating the flaring of off-spec methane from the Rag Mama and Sod Buster wells and increasing the ultimate recovery of oil within the interval underlying the Project area.
- 6. Manzano proposes to inject produced gas from the Sodbuster 21 Fee #4 and Rag Mama 30-19 Fee #1 into the San Andres formation through a closed system using the Vince well at depths of 4840' to 4850' within the San Andres formation.
- 7. Specifications and a wellbore schematic for the Vince well is provided at pages 8-11 of Form C-108. The Vince well will be adequately equipped for injection and the construction of the Well will protect fresh water and other hydrocarbon-bearing zones.
- 8. The expected average injection rate of produced gas into the Vince well is 150 MCFGPD. The expected maximum injection rate is 1,000 MCFGPD to provide Manzano the option to inject more gas as the GOR increases or if Manzano drills additional wells in the Jenkins San Andres pool.
- 9. The expected average injection pressure of produced gas into the Vince well is 500 psi and the proposed maximum injection pressure is 950 psi.
- 10. No additional stimulation is planned. The zone has already been acidized with 41,000 gallons of 15% NEFE acid.

- 11. When Manzano drilled and completed the Rag Mama 30 19 #1H well, which at its nearest point is over 1,200' east of the Vince, with a frac that included 5,155,137 lbs. of sand, Manzano did not see any effect on the production in the adjacent Vince well. Therefore, the proposed Project Area is appropriate because the reservoir has low permeability and we do not believe the injected gas will affect reservoir pressure in a larger area. It will take time for the injected gas to affect the Rag Mama well, but it should help to arrest decline of the production of the well.
- 12. **Exhibit C-1** is a decline curve of the Rag Mama 30 19 #1H. Based on my professional training and experience, it is my opinion that production will further decline in the absence of pressure maintenance support.
- 13. Without approval of this application, Manzano will likely have to plug and abandon the Rag Mama 30 19 #IH, Vince BGH #1, and Sodbuster 21 #IH wells because there are no alternatives to comply with the NMOCD Flare Rule in this area. This will result in a permanent waste of the oil and gas in these wells. Injection of the gas will allow for the gas that is currently flared to be safely stored in the reservoir while potentially providing the added benefit of pressure support.
- 14. It is my opinion that injection operations within the Project Area are economically and technically feasible and that it is prudent to utilize pressure maintenance operations to maximize oil recovery. It is also my opinion that the proposed conversion of Manzano's Vince BGH No. 1H producer to injector for pressure maintenance operations is not premature.
- 15. Injection of produced gas into the Vince BGH No. 1H well will attempt to eliminate flaring.
- 16. Manzano has run an MIT test prior to commencing injection and will monitor pressure during injection.

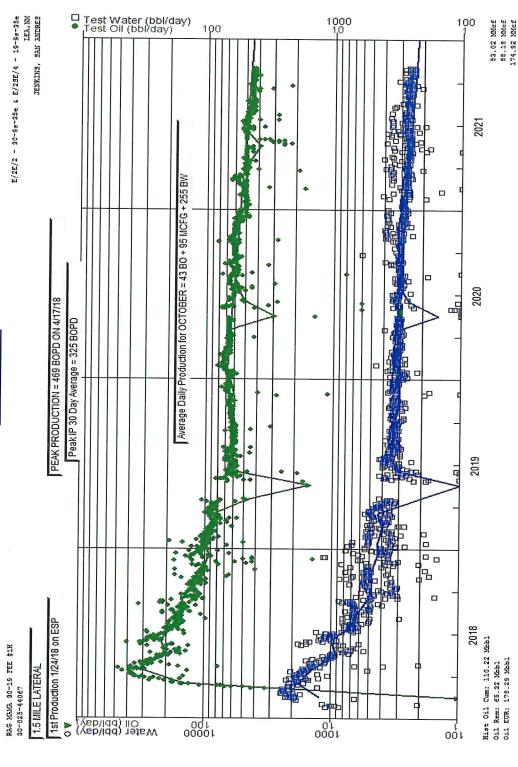
- 17. A copy of Manzano's H2S contingency plan is attached as Exhibit C-2.
- 18. The exhibits referenced above were either prepared by me or under my supervision or were compiled from company business records.
- 19. In my opinion, the granting of Manzano's application would serve the interests of conservation, the prevention of waste, and the protection of correlative rights.
- 20. I understand this Self-Affirmed Statement will be used as written testimony in this case. I affirm that my testimony in paragraphs 1 through 19 above is true and correct and is made under penalty of perjury under the laws of the State of New Mexico. My testimony is made as of the date handwritten next to my signature below.

Mike Hanagan

1/3/2

Date





MANZANO LLC

Case No. 22458

Exhibit C-1

H₂S Contingency Plan For Manzano, LLC Vince BGH #1 Injection Well

MANZANO LLC

Case No. 22458

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I. <u>EMERGENCY ASSISTANCE TELEPHONE LIST</u>

PUBLIC SAFETY: 911 or

Sheriff's Department:

Lea County Sherriff's Office 575-396-3611

New Mexico State Police: 575-392-5588

Hospitals:

Nor-Lea Hospital 575-396-6661

NMOCD:

Main Line 575-476-3441

NM Department of Transportation 505-795-1401

OSHA 24 Hr. Reporting (800) 321-6742

(8 hrs. after death or 24 hrs. after in-patient, amputation, loss of an eye)

OPERATOR CONTACTS

Manzano, LLC:

Mike Hanagan 575-623-1996 extension 310

575-420-8821 (cell)

John Thompson 575-623-1996 extension 304

575-840-5797 (cell)

II. <u>H₂S CONTINGENCY PLAN SECTION</u>

Scope:

This contingency plan provides an organized plan of action for alerting and protecting the public within an area of exposure prior to an intentional release or following the accidental release of a potentially hazardous volume of hydrogen sulfide. The plan establishes guidelines for personnel whose work activity may involve exposure to Hydrogen Sulfide Gas (H_2S).

Objective:

Prevent the uncontrolled release of H_2S into the atmosphere. Provide proper evacuation procedures to cope with emergencies. Provide immediate and adequate medical attention should an injury occur.

Purpose, Distribution and Updating of Contingency Plan:

The Purpose of this contingency plan is to protect the general public from the harmful effects of H_2S accidentally escaping from the subject injection well. This plan is designed to accomplish its purpose by assuring the preparedness necessary to:

- 1. Minimize the possibility of releasing H₂S into the atmosphere during related operations.
- 2. Provide for the logical, efficient, and safe emergency actions required to protect the general public in the event of an accidental release of a potentially hazardous quantity of H₂S.

Supplemental information is included with this plan and is intended as reference material for anyone needing a more detailed understanding of the many factors pertinent to H₂S drilling operations safety. Due to the ability to turn off the source of the H2S, the release of a potentially hazardous quantity of H₂S from this low pressure, low volume injection well is highly unlikely. If such a release should occur however, obviously the exact time, rate, duration, and other pertinent facts will not be known in advance thus, this contingency plan must necessarily be somewhat general. The plan does review in detail, as is reasonably possible, the type of accidental release that could possibly endanger the general public, the probable extent of such danger, and the emergency actions generally appropriate. In the event of such an accidental release, the specific actions to be taken will have to be determined at the time of release by the responsible personnel at the drilling location. Complete familiarity with this plan will help such personnel make the proper decisions rapidly. Familiarity with this plan is required of all production personnel, Operators employees and contractor personnel who could possibly be at the location at the time of an H2S emergency.

As this contingency plan was prepared considerably in advance of the anticipated H_2S operation, the plan must be kept current if it is to effectively serve its purpose. The operators will be responsible for seeing that all copies are updated. Updating the plan is required when any changes to the personnel Call List (Section I) including telephone numbers occur or when any pertinent data or plans for the well are altered. The plan must also be updated when any changes in the general public likely to be within the exposure area in the event of an accidental release from the well bore of a potentially hazardous quantity of H_2S . Two copies of this plan shall be retained at the office of Manzano, LLC.

Discussion of Plan:

Suspected Problem Zones: This well is a low pressure, low volume injection well that injects low pressure casinghead gas collected from nearby producers into the wellbore at low pressure in a closed-loop system. In

the unlikely event of a gas release of sufficient volume for the H2S detection equipment to set off an alarm, the incoming gas supply would be immediately turn off at the wells which would result in the elimination of any additional H2S and any residual H2S @ the location would quickly dissipate into the atmosphere.

Implementation: This plan, with all details, is to be implemented prior to injection into the well.

Emergency Response Procedure: This section outlines the conditions and denotes steps to be taken in the event of an emergency.

Emergency Equipment and Procedure: This section outlines the safety and emergency equipment that will be located at the injection facility.

Training Provisions: This section outlines the training provisions for production personnel, Operator's employees and contractor personnel normally present at the injection facility.

Emergency call list: Included are the telephone numbers of all persons that would need to be contacted, should an H₂S emergency occur.

Briefing: This section deals with the briefing of persons involved with the production and injection operations of this well.

Public Safety: It is not necessary for Public Safety Personnel to be made aware of this injection well.

Check Lists: Status check lists and procedural check lists have been included to ensure adherence to the plan.

General Information: A general information section has been included to supply support information.

III. OPERATING PROCEDURES

A. Outside Service Personnel

All service people such as pulling unit crews, truck drivers, etc will furnish their own safety equipment. The Company Man/ or designee will be sure that they have been briefed regarding safety procedures. He will also be sure each of these people know about what to do in case of an emergency alert. Visitors will be restricted when H_2S has been detected.

B. Safety Meetings

Persons involved in the operations of this injection well will be informed of the characteristics of H_2S , its danger and safety procedures to be used when it is encountered, and recommended first-aid procedure for regular production operations personnel.

C. Area Residences/ Occupied Locations/ Public Roads

There are no occupied residences/ businesses that are within a reasonable perimeter of the location (attached map will identify a 3000' radius around location).

IV. OPERATING CONDITIONS

A. Windsocks

Windsocks will be located at the entrance to the location and at the production tanks on the location

B. Air Packs

1. Production personnel, such as pumpers and company production supervisors will be required to have a personal air pack and H2S detector while on location.

V. <u>EMERGENCY PROCEDURES</u>

- I. In the event of any evidence of H₂S level above 10ppm, take the following steps immediately:
 - a. Secure breathing apparatus.
 - b. Order non-essential personnel out of the danger zone.
 - c. Shut off gas supply from off-site wells.
 - d. Take additional steps to determine if the H_2S level can be corrected or suppressed, and if so, proceed with normal operations.
- II. If uncontrollable conditions occur, proceed with the following:
 - a. Take steps to protect and/or remove any public downwind of the injection well. Notify necessary public safety personnel.
 - b. Remove all personnel to the Safe Briefing Area.
 - c. Determine and proceed with the best possible plan to regain control of the well. Maintain tight security and safety measures.

III. Responsibility

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a. The Company Approved Supervisor shall be responsible for the total implementation of the plan.

- b. The Company Approved Supervisor shall be in complete command during any emergency.
- c. The Company Approved Supervisor shall designate a backup Supervisor if he/she is not available.

IV. Actions to be taken

- a. Stop the dispersion of H₂S
- b. Assign specific tasks to personnel
- c. Cordon off the exposure area to prevent entry by unauthorized persons
- d. Request assistance as needed and initiate emergency notifications
- e. Complete emergency notifications as required
- f. Return the situation to normal

EMERGENCY PROCEDURE IMPLEMENTATION

I. Production &/or Injection Operations

a. All Personnel

- i. When alarm sounds, stop what you are doing & proceed to the egress area or upwind if the egress area is down wind.
- ii. Check status of other personnel.
- iii. Do not go back on location until securing a breathing apparatus.
- iv. Go to gas supply wells and shut in gas to the gas injection line.
- v. Notify Manzano and wait for orders from supervisor.

VI. POST EMERGENCY ACTIONS

In the event this plan is activated, the following post emergency actions shall be taken in an effort to reduce the possibility of a reoccurrence of the type of problem that required its activation, and/or assure that any future activation of a similar plan will be as effective as possible.

- A. Review the factors that caused or permitted the emergency occur, and if the need is indicated, modify operating, maintance and/or surveillance procedures.
- B. If the need is indicated, retrain employees in blowout prevention, H₂S emergency procedures and etc.
- C. Clean up, recharge, restock, reapair, and/ or repalce H₂S emergency equipment as necessary , and return it to its proper place.

VII. IGNITION PROCEDURES

Responsibilities:

Due to the ability to isolate and eliminate the supply of gas associated with any H2S release at this injection well, there is not a foreseeable situation that would require the ignition of the well. However, the decision to ignite the well is the responsibility of Manzano, LLC in concurrence with the STATE POLICE. This decision should be made only as a last resort and in a situation where it is clear that:

- 1. Human life and property are endangered.
- 2. There is no hope of controlling the blowout under the prevailing conditions.

If time permits, notify the main office, but do not delay if human life is in danger. Initiate the first phase of the evacuation plan.

Instructions for Igniting the Well:

- 1. Two people are required for the actual igniting operation. Both men must wear self-contained breathing apparatus and must use a full body harness and attach a retrievable safety line to the D-Ring in the back. One man must monitor the atmosphere for explosive gases with the LEL monitor, while the Manzano Company Supervisor is responsible for igniting the well.
- 2. The primary method to ignite is a 25mm flare gun with a range of approximately 500 feet.
- 3. Ignite from upwind and do not approach any closer than is warranted.
- 4. Select the ignition site best suited for protection and which offers an easy escape route.
- 5. Before igniting, check for the presence of combustible gases.
- 6. After igniting, continue emergency actions and procedures as before.
- 7. All unassigned personnel will limit their actions to those directed by the Manzano Company Supervisor.

Note: After the well is ignited, burning Hydrogen Sulfide will convert to Sulfur Dioxide, which is also highly toxic. Also, both are heavier than air. Do not assume the area is safe even after the well is ignited.

VIII. TRAINING PROGRAM

When working in an area where Hydrogen Sulfide (H_2S) might be encountered, training requirements must be carried out. The Manzano Company Supervisor will ensure that all personnel, at the well site, have had adequate training in the following:

- 1. Hazards and characteristics of Hydrogen Sulfide (H₂S).
- 2. Physicals effects of Hydrogen Sulfide on the human body.
- 3. Toxicity of Hydrogen Sulfide and Sulfur Dioxide.
- 4. H₂S detection, Emergency alarm and sensor location.
- **5.** Don and Doff of SCBA and be clean shaven.
- **6.** Emergency rescue.
- **7.** Resuscitators.

- 8. First aid and artificial resuscitation.
- 9. The effects of Hydrogen Sulfide on metals.
- Location safety.

Service company personnel and visiting personnel must be notified if the zone contains H₂S, and each service company must provide adequate training and equipment for their employees before they arrive at the well site.

IX. <u>EMERGENCY EQUIPMENT</u>

Lease Entrance Sign:

Should be located at the lease entrance with the following information:

CAUTION – POTENTIAL POISON GAS
HYDROGEN SULFIDE
NO ADMITTANCE WITHOUT AUTHORIZATION

Respiratory Equipment:

• Production operation personnel will be required to have personal breathing packs in their vehicle whenever entering onto the location.

Windsocks or Wind Streamers:

• A minimum of two 10" windsocks will be located at entrance to the location and near the tank battery and so that they may be seen from any point on location.

Hydrogen Sulfide Detector and Alarms:

- 1 Four channel H₂S monitor with alarms.
- Production operations personnel will be required to have Personal H2S detector on their person while on the location.

Fire Extinguishers:

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Adequate fire extinguishers shall be located at strategic locations.

Confined Space Monitor:

For any work in confined space, there should be a portable multi-gas monitor with at least 3 sensors (O_2 , LEL H_2S), preferably 4 (O_2 , LEL, H_2S , CO). This instrument should be used to test the atmosphere of any confined space before entering. It should also be used for atmospheric testing for LEL gas before beginning any type of Hot Work. Proper calibration documentation will need to be provided.

• Evacuation route shall be out the existing lease road. If lease road is down wind of release proceed up wind out of the affected area

X. CHECKLISTS

Rig-up & Equipment Status Check List

Note: Install Date for each item as they are implemented.

	Date Installed		T
Sign at location entrance.			
Two (2) windsocks in required locations.			
Hydrogen Sulfide detection/ alarm system hooked-up & tested.			
All outside service contractors advised of potential H_2S on the well.		9	
Two (2) Fire Extinguishers in required locations			

Procedural Check List

- 1. Check fire extinguishers to see that they have the proper charge.
- 2. Check breathing equipment to ensure that they have not been tampered with.
- 3. Check pressure on the supply air bottles to make sure they are capable of recharging.
- 4. Make sure all the Hydrogen Sulfide detection systems are operative.

Perform the following each week:

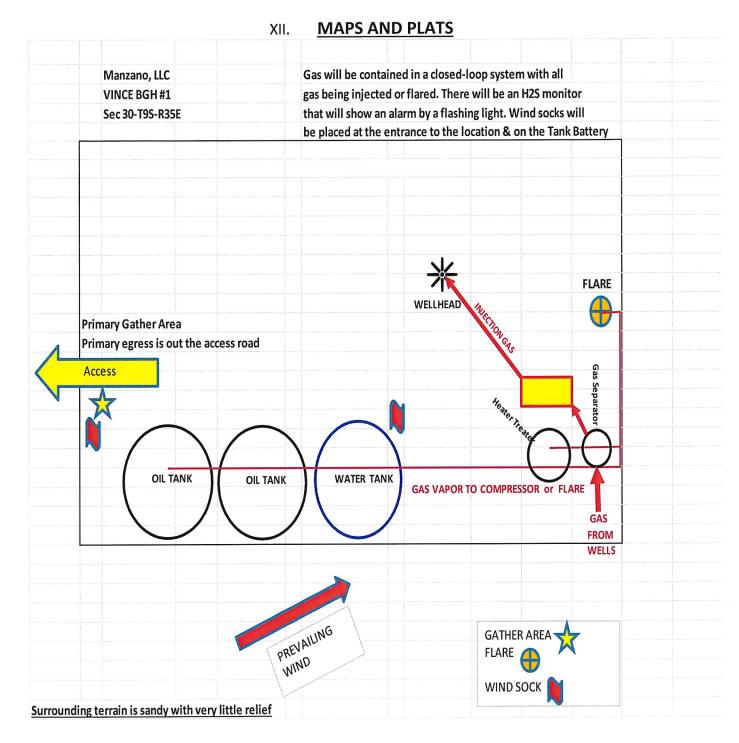
- Check each piece of personal breathing equipment to make sure that they are fully charged and
 operational. This requires that the air cylinder be opened, and the mask assembly be put on and tested
 to make sure that the regulators and masks are properly working. Negative and Positive pressure should
 be conducted on all masks.
- 2. Check all breathing air mask assemblies to see that straps are loosened and turned back, ready for use.
- 3. Perform breathing drills periodically.

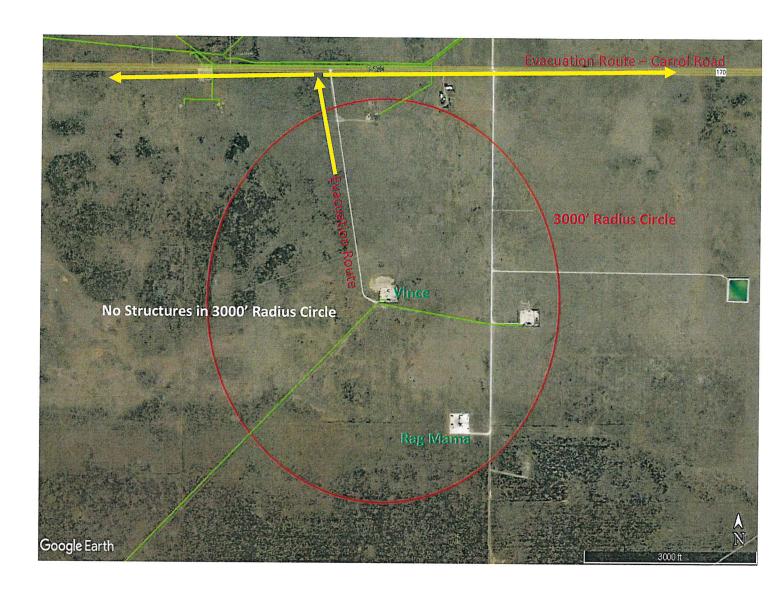
XI. EVACUATION PLAN

General Plan

There are homes, businesses or public located in the vicinity of the injection well so there is no one that would need to be evacuated. However, in the unlikely event of the need to evacuate the area, Manzano, LLC has prepared the following direct lines of action to protect the public from hazardous gas situations are as follows:

- 1. When the Manzano Company Supervisor determines that Hydrogen Sulfide gas cannot be limited to the well location, and the public will be involved, the Supervisor will activate the evacuation plan. Escape routes are noted on the area map.
- 2. Company safety personnel or designee will notify the appropriate local government agency that a hazardous condition exists, and evacuation needs to be implemented.
- 3. Law enforcement personnel (State Police, Local Police Department, Fire Department, and the Sheriff's Department) will be called to aid in setting up and maintaining roadblocks. Also, they will aid in evacuation of the public if necessary. NOTE: Law enforcement personnel will not be asked to come into a contaminated area. Their assistance will be limited to uncontaminated areas. Constant radio contact will be maintained with them.
- 4. After the discharge of gas has been controlled, "Company" personnel will determine when the area is safe for re-entry.
- 5. If a major release is secured, all exposed housing, vehicles, rig buildings, and low-lying areas and other structures downwind must be tested and clear with SCBAs donned to ensure that all residual H2S is cleared. Fans, or opening of doors is recommended to ensure that areas are cleared out as part of this process.





XIII. APPENDICES AND XIV. GENERAL INFORMATION

Radius of Exposure Affected Notification List

(within a 65' radius of exposure @100ppm)

The accompanying map illustrates the affected areas of the community (<u>NONE</u>). The residents within this radius (<u>none</u>) will be notified via a hand delivered written notice describing the activities, potential hazards, conditions of evacuation, evacuation drill siren alarms and other precautionary measures.

Toxic Effects of H₂S Poisoning

Hydrogen Sulfide is extremely toxic. The acceptable ceiling concentration for eight-hour exposure is 10 PPM, which is .001% by volume. Hydrogen Sulfide is heavier than air (specific gravity -1.192) and is colorless and transparent. Hydrogen Sulfide is almost as toxic as Hydrogen Cyanide and is 5-6 times more toxic than Carbon Monoxide. Occupational exposure limits for Hydrogen Sulfide and other gases are compared below in Table 1. Toxicity table for H_2S and physical effects are shown in Table 2.

Table 1
Permissible Exposure Limits of Various Gases

Common Name	Symbol	Sp. Gravity	TLV	<u>STEL</u>	<u>IDLH</u>
Hydrogen Cyanide	HCN	.94	4.7 ppm	4.7 ppm	50 ppm
Hydrogen Sulfide	H ₂ S	1.192	10 ppm	15 ppm	100 ppm
Sulfide Dioxide	SO ₂	2.21	2 ppm	5 ppm	100 ppm
Chlorine	CL	2.45	.5 ppm	1 ppm	10 ppm
Carbon Monoxide	СО	.97	25 ppm	200 ppm	1200 ppm
Carbon Dioxide	CO ₂	1.52	5000 ppm	30,000 ppm	40,000 ppm
Methane	CH ₄	.55	5% LEL	15% UEL	

Definitions

A. TLV – Threshold Limit Value is the concentration employees may be exposed based on a TWA (time weighted average) for eight (8) hours in one day for 40 hours in one (1) week. This is set by ACGIH (American Conference of Governmental Hygienists) and regulated by OSHA.

- B. STEL Short Term Exposure Limit is the 15-minute average concentration an employee may be exposed to providing that the highest exposure never exceeds the OEL (Occupational Exposure Limit). The OEL for H₂S is 20 PPM.
- C. IDLH Immediately Dangerous to Life and Health is the concentration that has been determined by the ACGIH to cause serious health problems or death if exposed to this level. The IDLH for H₂S is 100 PPM.
- D. TWA Time Weighted Average is the average concentration of any chemical or gas for an eight (8) hour period. This is the concentration that any employee may be exposed based on a TWA.

Toxicity Table of H₂S

Percent % .0001	<u>PPM</u> 1	Physical Effects Can smell less than 1 ppm.
.001 .0015	10 15	TLV for 8 hours of exposure. STEL for 15 minutes of exposure.
.01	100	Immediately Dangerous to Life & Health. Kills sense of smell in 3 to 5 minutes.
.02	200	Kills sense of smell quickly, may burn eyes and throat.
.05	500	Dizziness, cessation of breathing begins in a few minutes.
.07	700	Unconscious quickly, death will result if not rescued promptly.
.10	1000	Death will result unless rescued promptly. Artificial resuscitation may be necessary.

PHYSICAL PROPERTIES OF H₂S

The properties of all gases are usually described in the context of seven major categories:

COLOR

ODOR

VAPOR DENSITY

EXPLOSIVE LIMITS

FLAMMABILITY

SOLUBILITY (IN WATER)

BOILING POINT

Hydrogen Sulfide is no exception. Information from these categories should be considered in order to provide a fairly complete picture of the properties of the gas.

COLOR – TRANSPARENT

Hydrogen Sulfide is colorless, so it is invisible. This fact simply means that you can't rely on your eyes to detect its presence. In fact, that makes this gas extremely dangerous to be around.

ODOR - ROTTEN EGGS

Hydrogen Sulfide has a distinctive offensive smell, like "rotten eggs". For this reason, it earned its common name "sour gas". However, H₂S, even in low concentrations, is so toxic that it attacks and quickly impairs a victim's sense of smell, so it could be fatal to rely on your nose as a detection device.

VAPOR DENSITY – SPECIFIC GRAVITY OF 1.192

Hydrogen Sulfide is heavier than air, so it tends to settle in low-lying areas like pits, cellars or tanks. If you find yourself in a location where H_2S is known to exist, protect yourself. Whenever possible, work in an area upwind and keep to higher ground.

EXPLOSIVE LIMITS – 4.0% TO 44%

Mixed with the right proportion of air or oxygen, H_2S will ignite and burn or explode, producing another alarming element of danger besides poisoning.

FLAMMABILITY

Hydrogen Sulfide will burn readily with a distinctive clear blue flame, producing Sulfur Dioxide (SO₂), another hazardous gas that irritates the eyes and lungs.

SOLUBILITY - 4 TO 1 RATIO WITH WATER

Hydrogen Sulfide can be dissolved in liquids, which means that it can be present in any container or vessel used to carry or hold well fluids including oil, water, emulsion and sludge. The solubility of H2S is dependent on temperature and pressure, but if conditions are right, simply agitating a fluid containing H2S may release the gas into the air.

BOILING POINT – (-77° Fahrenheit)

Liquefied Hydrogen Sulfide boils at a very low temperature, so it is usually found as a gas

Respirators shall be worn during the following conditions:

- A. Any employee who works near the top or on the top of any tank unless tests reveal less than 20 ppm of H_2S .
- B. When breaking out any line where H₂S can reasonably be expected.
- C. When sampling air in areas where H₂S may be present.
- D. When working in areas where the concentration of H₂S exceeds the Threshold Limit Value for H₂S (10 ppm).
- E. At any time where there is a doubt as to the H₂S level in the area to be entered.

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EMERGENCY RESCUE PROCEDURES

DO NOT PANIC!!!

Remain Calm - Think

- 1. Before attempting any rescue, you must first get out of the hazardous area yourself. Go to a safe briefing area.
- 2. Sound alarm and activate the 911 system.
- 3. Put on breathing apparatus. At least two persons should do this, when available use the buddy system.
- 4. Rescue the victim and return them to a safe briefing area.
- 5. Perform an initial assessment and begin proper First Aid/CPR procedures.
- 6. Keep victim lying down with a blanket or coat, etc.., under the shoulders to keep airway open. Conserve body heat and do not leave unattended.
- 7. If the eyes are affected by H_2S , wash them thoroughly with potable water. For slight irritation, cold compresses are helpful.
- 8. In case a person has only minor exposure and does not lose consciousness totally, it's best if he doesn't return to work until the following day.
- 9. Any personnel overcome by H₂S should always be examined by medical personnel. They should always be transported to a hospital or doctor.

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