1. Identification

Product Name: Hydrogen Sulfide

MSDS Number: A0020.sds
Synonyms: Sulfurreted Hydrogen, H_2S, Stink Damp, Sulfur Hydride, Sewer Gas
Product Use: Naturally occurring in crude petroleum and encountered during petroleum/natural gas exploration and production

EP Energy
1001 Louisiana Street
Houston, Texas 77002

Information: (713) 997-1000 or 855-269-0826
CHEMTREC: (800) 424-9300

2. Hazard(s) Identification

Note: This product has not been tested by EP Energy to determine its specific health hazards. Therefore, the information provided in this section includes health hazard information on the product components.

Potential Health Effects from Overexposure:

***Acute Effects*:**

Eyes: Highly irritating. May cause eye pain and an increased production of tears.

Skin: None expected from contact with gas. Liquid may cause frostbite, but this exposure not expected.

Inhalation: CNS injury can be immediate and significant . Mucous membrane and respiratory tract irritant. High concentrations, even briefly, may cause dizziness, drowsiness, tremors, pulmonary edema, and death. Acts as a chemical asphyxiant by paralyzing the respiratory center. Lower concentrations will produce symptoms such as headache, dizziness, excitement, staggering gait, diarrhea and dysuria. Fibrogenic to the lungs following acute exposures complicated by bronchitis obliterans.

Ingestion: Route of exposure unlikely to occur.

Chronic Effects:
Chronic low exposures may cause conjunctivitis, photophobia, bronchitis and headaches.

***Additional Medical and Toxicological Information*:**
May aggravate pre-existing lung ailments, gastrointestinal, cardiovascular and nervous disorders.

3. Composition/Information

Components	CAS No.	Wt%
Hydrogen Sulfide	7783-06-4	100

Dangerous levels of H_2S may be present during handling and storage of oil and gas products.

4. First-aid measures

Eye Contact: Flush thoroughly with water for at least 15 minutes. If pain or redness persists, seek medical attention.

Skin Contact: Skin contact unlikely to occur.

Inhalation: If respiratory symptoms develop, move victim to fresh air. Seek immediate medical attention if symptoms persist. If breathing has stopped and airway is clear, provide artificial respiration. Seek immediate medical attention.

Ingestion: Not applicable

Medical Providers: Medical providers are urged to contact a Regional Poison Center at 800-222-1222. At high concentrations, hydrogen sulfide may produce pulmonary edema, respiratory depression, and/or respiratory paralysis.

5. Fire-Fighting Measures

Flammable Properties:
Flash Point: Not applicable (gas)
Flammable Limits in Air % by Vol.:
Lower (LFL): 4 % Upper (UFL): 44 %
Auto-ignition Temperature: 500 ºF

NFPA Ratings: Health: 4 Flammability: 4 Reactivity: 0

General Fire Hazards:
Highly flammable, toxic gas. Gas/air mixtures can be explosive. Ignited by heat, sparks or flames or other sources of ignition. May travel to sources of ignition and flashback. Static discharge may cause explosive ignition.

Hazardous combustion/decomposition products may include sulfur dioxide.

Extinguishing Media:
Suitable extinguishing media: dry chemical, foam, carbon dioxide or water spray for small fires. Water spray or foam should be used for large fires.

Unsuitable extinguishing media: none.

Fire Fighting Instructions:
Isolate area for at least 100 meters in all directions as an initial precaution. Stay upwind. Keep out of low areas. Move containers from fire area if you can do it without risk. Use a water spray to cool fire-exposed containers until well after fire is out. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Do not direct water at source of leak or safety devices as icing may occur. Dike fire-control water for later disposal; do not scatter the material. Firefighters should wear self-contained breathing apparatus. Refer to Section 8 for proper PPE selection. Maintain isolation of area until gas has dispersed.

6. Accidental Release Measures

As an immediate precautionary measure, isolate spill or leak area for at least 1600 meters in all directions. Keep unauthorized personnel away. Stay upwind. Keep out of low areas. Ventilate closed spaces before re-entering.

Stop gas and/or material flow. Eliminate sources of heat or ignition, including internal combustion engines and power tools. If indoors, ventilate the affected area. All equipment must be grounded. Isolate area until gas has dispersed.

Prevent spreading of vapors through sewers, ventilation systems and confined areas. For emergency information and procedures to follow in the case of an accidental release, call the Emergency Telephone Number(s) listed in Section 1.

Use water spray to reduce vapors or divert vapor cloud drift. Provide sufficient ventilation in the affected area(s) and wear appropriate personal protective equipment as indicated in Section 8 when handling spill material. Wear self-contained breathing apparatus if conditions warrant. Clean up according to all applicable regulations.

7. Handling and Storage

Dangerous levels of H_2S may be present during handling and storage of oil and gas products. Odor is not a good warning signal.

Handling: Keep away from heat, sparks and open flame. No smoking. Use only with adequate ventilation. Use only with adequate ventilation. Wear appropriate personal protective equipment and use exposure controls as indicated in Section 8. Vent slowly to the atmosphere when opening. Avoid all contact with skin and eyes and avoid breathing gas. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Non-sparking tools should be used. Ground and bond all transfer and storage equipment. Use appropriate mitigating procedures. Do not enter confined spaces without following proper entry procedures.

Storage: Keep away from flame, sparks, excessive temperatures and open flame. No smoking. Maintain vessels closed and clearly labeled. Empty vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose these vessels to sources of ignition. In a tank or other closed container, the vapor space may accumulate hazardous concentrations of H_2S. Do not enter confined spaces without following proper entry procedures.

Incompatibilities: Keep away from strong oxidizers, strong nitric acid, metals, ignition sources and heat.

8. Exposure Controls/Personal Protection

Components	CAS No.	Occupational Exposure Limits			Units
		OSHA[(1)]	ACGIH[(1)]	NIOSH[(2)]	
Hydrogen Sulfide	7783-06-4	20 Ceiling	15 STEL	10 Ceiling	ppm

[(1)]8-hour TWA unless otherwise specified.
[(2)]10-hour TWA unless otherwise specified.
STEL: 15-minute Short Term Exposure Limit
Ceiling: Concentration not to be exceeded at any time

Eye Protection: Safety glasses are required standard PPE.

Skin Protection: Fire Resistant Clothing (FRC) is required standard PPE.

Inhalation: A NIOSH-approved respirator must be worn where controls do not maintain airborne concentrations below occupational exposure limits. Use approved positive-pressure supplied-air respirator or positive-pressure, full-face self-contained breathing apparatus (SCBA) protective equipment for entry into areas of unknown concentrations and to contain leaks, entry into tanks, vessels or other confined spaces or in situations where airborne concentrations may exceed occupational exposure levels.

Engineering Controls: Provide adequate general and local ventilation to: (1) Maintain airborne chemical concentrations below applicable exposure limits, (2) Prevent accumulation of flammable vapors and formation of explosive atmospheres, and (3) Prevent formation of oxygen deficient atmospheres, especially in confined spaces.

9. Physical and chemical properties

Appearance:	Colorless gas	**% Volatile by Volume:**	100
Odor:	Rotten eggs	**Viscosity:**	Not available
Boiling Point:	-77 ºF	**Melting Point:**	-122 °F
Freezing Point:	-122 ºF	**Vapor Density (Air = 1):**	1.2
Vapor Pressure:	17.6 @ 77 °F	**pH:**	Not available
Solubility in H_2O:	0.4 %	**Evaporation Rate:**	13.9
Specific Gravity @ 60º F & 1 atm:	1.2	**Molecular Wt.:**	34.1

10. Stability and Reactivity

Stability: Stable under normal conditions of use and normal temperature conditions.
Hazardous Polymerization: Will not occur.
Conditions to Avoid/Incompatibilities: Strong oxidizing agents, strong nitric acid and metals, heat, sparks, flame and build-up of static electricity.
Hazardous Decomposition Products: Sulfur dioxide.

11. Toxicological Information

Hydrogen sulfide may be fatal if inhaled. Greater than 15-20 ppm continuous exposure can cause mucous membrane and respiratory tract irritation. 50-500 ppm can cause headache, nausea, dizziness, loss of reasoning and balance, difficulty breathing, fluid in the lungs and possible loss of consciousness. Greater than 500 ppm can cause rapid or immediate unconsciousness due to respiratory paralysis and death by suffocation unless removed from exposure and successfully resuscitated. Inhalation of a single breath at a concentration of 1000 ppm (0.1%) can cause immediate unconsciousness and death. Hydrogen sulfide is corrosive when moist. Skin contact may cause burns. There is a rapid loss of sense of smell on exposure to gas concentrations above 50 ppm. At high concentrations, individuals may not even recognize the odor before becoming unconscious.

Acute Inhalation LC50 Mouse: > 0.024 mg/L 960 minutes
Acute Inhalation LC50 Rat: > 0.38 mg/L 960 minutes
Acute Inhalation LC50 Monkey: 0.7 mg/L 35 minutes
Inhalation LC50 Rat: 712 ppm (1-hour exposure)
Inhalation LC50 Mouse: 634 ppm (1-hour exposure)

11. Toxicological Information (cont'd)

Carcinogenicity:

Component (CAS No.)	*ACGIH[1]*	*IARC Monographs[2]*	*US NTP*	*OSHA Regulated*
None listed	None listed	None listed	None listed	None listed

[1]ACGIH Carcinogens: A1 = Confirmed human carcinogen, A2 = Suspected human carcinogen, A3 = Confirmed animal carcinogen with unknown relevance to humans, A4 = Not classifiable as a human carcinogen, A5 = Not suspected as a human carcinogen
[2]IARC Monographs: 1 = Carcinogenic to humans, 2A = Probably carcinogenic to humans, 2B = Possibly carcinogenic to humans, 3 = Not classifiable as to carcinogenicity to humans, 4 = Probably not carcinogenic to humans

12. Ecological Information

Very toxic to aquatic organisms.

Keep out of sewers, drainage areas, and waterways. Report spills and releases, as applicable, under Federal and State regulations.

13. Disposal Information

Hydrogen sulfide may be present in oil and gas production fluids and wastes. If hydrogen sulfide is present in the waste, the waste may be considered a hazardous U-listed waste. If discarded, this material may meet the criteria of being an "ignitable" waste. Under RCRA, it is the responsibility of the user to determine, at the time of disposal, if the material meets federal, state, or local criteria to be defined as a hazardous waste.

14. Transport Information

Proper Shipping Name: Hydrogen sulfide
UN/Identification Number: UN 1053
Hazard Class: 2.3 (Poisonous gas)
Packing Group: Not assigned
ERG#: 117

15. Regulatory Information

EPA SARA TITLE III

Section 302 EPCRA Extremely Hazardous Substances (EHS)

Product Component	*CAS No.*	*Wt%*	*RQ, lb*	*TPQ, lb*
Hydrogen Sulfide	7783-06-4	100	100	500

Section 304 CERCLA Hazardous Substances

Product Component	*CAS No.*	*Wt%*	*RQ, lb*
Hydrogen Sulfide	7783-06-4	100	100

Section 311/312 Hazard Categorization

Acute:	*Chronic:*	*Fire:*	*Pressure:*	*Reactive:*
Yes	Yes	Yes	Yes	Yes

Section 313 EPCRA Toxic Substances

Product Component	*CAS No.*	*Wt.%*
Hydrogen Sulfide	7783-06-4	100

EPA TSCA
All components are on the U.S. EPA TSCA Inventory List.

Key:
RQ = Reportable Quantity

16. Other Information

Last Revision: 08/01/2012, Date Prepared: 10/27/1985

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Key/Legend:
ACGIH - American Conference of Governmental Industrial Hygienists
ADR - Agreement on Dangerous Goods by Road
CAA - Clean Air Act
CAS - Chemical Abstracts Service Registry Number
CDG - Carriage of Dangerous Goods By Road and Rail Manual
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
CFR - Code of Federal Regulations
CNS - Central Nervous System
EINECS - European Inventory of Existing Chemical Substances Registry Number
ERG - Emergency Response Guidebook
EPCRA - Emergency Planning and Community Right-to-Know Act
GHS - Globally Harmonized System of Classification and Labeling of Chemicals
IARC - International Agency for Research on Cancer
IATA - International Air Transport Association
ICAO - International Civil Aviation Organization
IMDG - International Maritime Dangerous Goods Code
IMO - International Maritime Organization
MSDS - Material Safety Data Sheet
N/E - Not Established
NTP - National Toxicology Program
OSHA - Occupational Safety and Health Administration
PEL - Permissible Exposure Limit
PPE - Personal Protective Equipment
RCRA - Resource Conversation and Recovery Act
RID - Regulations Concerning the International Transport of Dangerous Goods by Rail
RQ - Reportable Quantities
SARA - Superfund Amendments and Reauthorization Act of 1986
SDS - Safety Data Sheet
TCC - Tag Closed Cup
TDG - Transportation of Dangerous Goods
TLV - Threshold Limit Value
TSCA - Toxic Substance Control Act
UN/NA - United Nations / North American Number
UNECE - United Nations Economic Commission for Europe
US DOT - United States Department of Transportation
US EPA - United States Environmental Protection Agency
Vol. - Volume
WHMIS - Workplace Hazardous Materials Information System

This is the end of MSDS A0020.sds