


1. IDENTIFICATION

Product Identifier	NATURAL GAS (SOUR)
Synonyms	Natural Gas, Methane, CH ₄ , Fuel Gas, Petroleum Gas
Chemical Description	Mixture of light paraffin hydrocarbon gases containing hydrogen sulfide (H ₂ S)
Product Use	Sales Gas, Process stream, Fuel Gas
Manufacturer/ Supplier	CENOVUS ENERGY INC. 500 Centre Street SE, PO Box 766 Calgary, AB T2P 0M5
Prepared By	Cenovus Energy Inc. Health and Safety
Phone Number	1-403-766-2000
Emergency Telephone	Cenovus 1-877-458-8080 CANUTEC 1-613-996-6666 (Canada); 1-888-226-8832 (Toll Free) CHEMTREC 1-800-424-9300 (USA)

2. HAZARDS IDENTIFICATION

Hazard Classifications	Flammable Gases – Category 1 Gases Under Pressure – Compressed Gas Simple Asphyxiants Acute Toxicity – Inhalation – Category 2
Hazard Pictogram(s)	
Signal Word	Danger
Hazard Statement(s)	Fatal if inhaled. Extremely flammable gas. Contains gas under pressure. May explode if heated. May displace oxygen and cause rapid suffocation. <i>Sulfur compounds in this material may decompose to release hydrogen sulfide gas which may accumulate to potentially lethal concentrations in enclosed air spaces.</i>
Prevention	Do not breathe gas or vapour. Use only outdoors or in a well-ventilated area. In case of inadequate ventilation wear respiratory protection. Keep away from heat, sparks, open flames, and hot surfaces. No smoking.
Response	Leaking gas fire: do not extinguish unless leak can be stopped safely. Eliminate all ignition sources if safe to do so. If Inhaled: Remove person to fresh air and keep comfortable for breathing. Immediately call emergency medical service if unwell.
Storage	Protect from sunlight. Store in a well-ventilated place. Keep container tightly closed.
Disposal	Dispose of waste and residues in accordance with local, regional, national, and international regulations.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Ingredients	CAS Number	Approximate Concentration (v/v %)
Methane	74-82-8	70-95
Ethane	74-84-0	0-10
Propane	74-98-6	0-10
Butanes	106-97-8	0-10
Hydrogen Sulfide	7783-06-04	up to 16.5 ppm

4. FIRST AID MEASURES

Inhalation	Be aware of potential hydrogen sulfide – ensure own safety. Don appropriate PPE including SCBA (Self-Contained Breathing Apparatus) or SABA (Supplied Air Breathing Apparatus) before assisting the victim. Remove person to fresh air. If person is not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. If necessary, give additional oxygen once breathing is restored if trained to do so. Get prompt medical attention.
Eye Contact	Flush eyes with large amounts of lukewarm water for 15 minutes, lifting upper and lower lids at intervals. Seek medical attention if irritation persists
Skin Contact	If freezing occurs, gently bathe affected area in luke warm water. Do not rub. Do not try to remove clothing if it is frozen to the skin. If burning occurs, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin. Remove and isolate contaminated clothing and shoes. Get medical attention.
Ingestion	Not a significant route of exposure.
Most Important Symptoms	Fatal at high concentrations due to hydrogen sulfide. Induces unconsciousness at high concentrations. Displaces available oxygen at high concentrations

5. FIRE FIGHTING MEASURES

General Fire Hazards	See Section 9 for Flammability Properties. Extremely flammable. Will be easily ignited by heat, sparks or flames. Will form explosive mixtures with air. Do not extinguish a leaking gas fire unless leak can be stopped.
Hazardous Combustion Products	Carbon monoxide, nitrogen oxides, sulfur oxides, methane.
Extinguishing Media	Foam, CO ₂ , dry chemical.
Firefighting Equipment/ Instructions	Explosive accumulations can build up in areas of poor ventilation. Use water spray to cool fire-exposed containers, and to disperse gas if leak has not ignited. If safe to do so, cut off fuel and allow flame to burn out.

6. ACCIDENTAL RELEASE MEASURES

Notification Procedures	In the event of a spill or accidental release, notify relevant authorities in accordance with applicable regulations (see Section 15)
Personal precautions and Protective Equipment	Ensure your own safety and use appropriate respiratory protection (see Section 8). Avoid direct contact with material. Stay upwind of release. Isolate the immediate hazard area and keep unnecessary and unprotected people away. Response and clean-up crews must be properly trained and must utilize proper protective equipment. Eliminate all sources of ignition. Provide explosion-proof clearing ventilation, if possible.
Environmental precautions	Use ventilation to prevent material from accumulating in confined areas. Water spray may be useful in minimizing or dispersing vapors.
Cleanup measures	If safe to do so, stop gas flow. Remove all ignition sources. Provide clearing ventilation if possible. Prevent from entering confined spaces. Contact appropriate regulatory authorities for disposal requirements of soil or other media impacted by release (see Section 13).

7. HANDLING AND STORAGE

Handling	Handle under adequate ventilation. Avoid contact with the liquid or liquid-cooled equipment. Avoid inhalation. Bond and ground all transfers. Avoid sparking condition. Never subject a cylinder or piping to severe mechanical shock.
Storage	Store in a dry, well-ventilated place away from heat, strong sunlight, and ignition sources. Keep cool. Use approved containers only. Follow regulatory requirements and best practices for container storage. Empty product containers or vessels may contain explosive vapours. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition. Separate from incompatible material (see Section 10). This material can displace available oxygen for breathing (see Section 11).
Caution	Hydrogen sulfide may accumulate in headspaces of tanks and other equipment, even when concentrations in the liquid product are low. Factors increasing this hazard potential include heating, agitation and contact of the liquid with acid or acid salts. Assess the exposure risk by gas monitoring. Wear air supplying breathing apparatus if necessary. Overexposure to hydrogen sulfide may cause dizziness, headache, nausea and possibly unconsciousness and death.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

Hazardous Ingredients	Alberta	Saskatchewan	OSHA PEL	ACGIH TLV
Methane (C1)	-	1,000 ppm 8-hour TWA (C1-C4)	-	Maintain minimum ambient oxygen partial pressure of 132 torr, or 18% depending on altitude and weather
Ethane (C2)	1,000 ppm 8-hour TWA (C2-C4)		-	
Propane (C3)		1,000 ppm		
Butane (C4)		-		
Hydrogen Sulfide	10 ppm 15 ppm Ceiling	10 ppm 15 ppm (STEL)	20 ppm Ceiling	1 ppm 5 ppm STEL

Engineering Controls	Use only in well-ventilated areas. Local exhaust ventilation required in confined areas. Use explosion-proof equipment and non-sparking tools where conditions may generate an explosive atmosphere.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practices. Do not smoke. Avoid skin exposure. Avoid breathing in the vapour. Wash hands with soap and water before eating, drinking, smoking, or using toilet facilities. Routinely launder PPE to remove contamination. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer.
PPE	Respirator Where concentrations may exceed exposure limits, use full-face, positive pressure self-contained breathing apparatus (SCBA); or supplied-air breathing apparatus (SABA).
	Gloves Wear protective gloves appropriate to the risk of handling the container or material. Cold-insulating gloves may be required.
	Eyewear Wear protective eyewear appropriate to the risk of handling the container or material.
	Footwear As per safety policy.
	Clothing As per fire protection policy.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Gas	Appearance:	Colourless
Odour:	Rotten eggs (Hydrogen Sulfide)	Odour Threshold (ppm):	Not available
Specific Gravity:	Not applicable	pH:	Not applicable
Vapour Pressure (mmHg, 20 °C):	Gaseous >1000	RVP (kPa):	Not applicable
Vapour Density (air=1):	0.5-0.94	Evaporation Rate:	Not available
Boiling Range (°C, D-7169):	Not applicable	Initial Boiling Pt. (°C, D-86):	-161.5 (as methane)
Flash Point (°C) & Method:	-188 (as methane)	Freezing Pt. (°C):	-180
Upper Explosive Limit (% v/v):	15	Lower Explosive Limit (% v/v):	4
Auto-Ignition Temp. (°C):	537 (as methane)		
Sensitivity to Impact:	Not applicable	Sensitivity to Static Discharge:	Yes, will ignite
Octanol/Water Coefficient:	Not available	Solubility in Water	22.7mg/L (as methane)

10. STABILITY AND REACTIVITY

Chemical Stability	Stable under normal, ambient conditions.
Hazardous Reactions	Not known to occur.
Conditions to Avoid	High temperatures, open flames, sparks, welding, smoking and other ignition sources.
Incompatibility	Incompatible with strong oxidizing agents.
Hazardous Decomposition Products	Oxides of carbon, sulfur oxides
Synergistic Materials/Prod	None reported.

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11. TOXICOLOGICAL INFORMATION

Acute Exposure Initial detection of hydrogen sulfide odour at about 0.1 ppm. Irritation of eyes, nose and throat occurs.
 Hydrogen sulfide may cause loss of sense of smell at 100 ppm. At higher concentrations lung irritation, drowsiness, unconsciousness, respiratory failure, and possible death can occur. Eye contact may cause irritation and swelling. Rapidly expanding gas or vaporized liquid may cause frostbite to exposed skin and eyes. Evidence exists that propane and butane may cause drowsiness and even unconsciousness at concentrations far below those required for oxygen deficiency, for example 10% LEL and above.

Hazardous Ingredients	Result	Species	Dose	Exposure
Methane	Not Available	-	-	-
Ethane	LC50	Mouse	410,000 ppm	2 hr
Propane	LC50 EC50 (CNS)	Rat	>800,000 ppm 280,000 ppm	15 min 10 min
Butane	LC50	Mouse	520,400 ppm	2 hr
Hydrogen sulfide	LC50	Rate	444 ppm	4 hr

Chronic Exposure Hydrogen sulfide may cause fatigue, headache, dizziness, and bronchitis.

Health Effects **Irritant:** Not available **Reproductive Toxicity:** Not available
Skin Sensitization: No **Teratogenicity:** Not available
Respiratory Sensitization: No **Mutagenicity:** Not available
Carcinogenicity: Not available

Carcinogenicity Not available

12. ECOLOGICAL INFORMATION

Ecotoxicity Petroleum gases will readily evaporate from the surface and would not be expected to have significant adverse effects in the aquatic environment.

Biodegradation Degraded in atmosphere by reaction with photochemically-produced hydroxyl radicals with a half-life of 4 years. Readily biodegradable in water. May be an environmental fate process in soil.

Bioaccumulation Not regarded as having the potential to bioaccumulate.

Atmospheric Oxidation More volatile component expected to degrade rapidly in air.

Photolysis Not expected to be susceptible to direct photolysis by sunlight.

Mobility Highly mobile in air as well as air spaces within soil porosity .

13. DISPOSAL CONSIDERATIONS

Disposal This material is a gas and would not typically be managed as a waste. Dispose of contents/container in accordance with local, regional, national, and/or international regulations. Empty containers or liners may retain a residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions.

14. TRANSPORT INFORMATION

Regulatory Information	UN Number	Proper Shipping Name	Class	PG	Label	Additional Information
TDG	UN1953	Compressed gas, toxic, flammable, n.o.s. (hydrogen sulfide, methane)	2.3 (2.1)		Flammable Gas Inhalation Hazard	
DOT	UN1953	Compressed gas, toxic, flammable, n.o.s. (hydrogen sulfide, methane)	2.3 (2.1)		Inhalation Hazard, Flammable Gas	49 CFR 173.302, 305, 314, 315; 172.203;172.322
IMDG	UN1953	Compressed gas, toxic, flammable, n.o.s. (hydrogen sulfide, methane)	2.3 (2.1)		Inhalation Hazard, Flammable Gas	EMS:F-D, S-U Marine Pollutant MARPOL Annex II
ICAO/IATA	UN1953	Compressed gas, toxic, flammable, n.o.s. (hydrogen sulfide, methane)	2.3 (2.1)		Inhalation Hazard, Flammable Gas	Forbidden, Cargo Aircraft Only ERG Code: 10L

North American Emergency Response Guide Number: 119

Emergency Response Assistance Plan (ERAP) Number: ERP2-0010-302; 1-800-265-0212

15. REGULATORY INFORMATION

Canadian Classification This product has been classified in accordance with the hazard criteria of the Hazardous Products Regulation (HPR) and the SDS contains all of the information required by the HPR.

WHMIS 1988 Classification: A, B1, D1A

CEPA Domestic Substance List: All components are either listed or exempt.

US Federal and State Regulations The contents of this SDS comply with the OSHA Hazard Communication Standard 29 CFR 1910.1200.

EPCRA (SARA Title III) Section 302 Extremely Hazardous Substance (EHS) (40 CFR 355, Appendix A)

CAS RN: 7783-06-4

Name: HYDROGEN SULFIDE

The EHS Reportable Quantity (RQ) is 100 lbs.

Threshold Planning Quantity is 500 lbs.

EPCRA (SARA Title III) Section 313 Toxic Chemical Release Inventory (TRI) Reporting for RY 2015 (as amended December 2015)

CAS RN: 7783-06-4

Name: HYDROGEN SULFIDE

De Minimis Concentration for Section 313 is 1.0 %.

Reporting threshold for manufacturing and processing: 25000 lbs

Reporting threshold for other uses: 10000 lbs

CERCLA Hazardous Substances [other than radionuclides] (40 CFR 302.4) (as amended by 75 FR 78918, Dec. 17, 2010)

CAS RN: 74-82-8 regulated as a member of the Generics group for RN: D001

Generics group name: RCRA HAZARDOUS WASTE NO. D001

The Reportable Quantity (RQ) is 100 lbs.

CAS RN: 74-82-8 regulated as a member of the Generics group for RN: D001

Generics group name: UNLISTED HAZARDOUS WASTES CHARACTERISTIC OF IGNITABILITY

The Reportable Quantity (RQ) is 100 lbs.

CAS RN: 7783-06-4

Name: HYDROGEN SULFIDE

The Reportable Quantity (RQ) is 100 lbs.

Clean Air Act Section 112(r) Accidental Release Prevention (40 CFR 68.130)

CAS RN: 74-82-8

Name: METHANE

Regulated Flammable Substance (excludes fuel used or held for sale at a retail facility)

Threshold Quantity is 10000 lbs.

CAS RN: 7783-06-4

Name: HYDROGEN SULFIDE

Regulated Toxic Substance

Threshold Quantity is 10000 lbs.

Toxic Endpoint is 0.042 mg/L.

USA. Toxic Substances Control Act (TSCA) Chemical Substances Inventory (July 2016)

CAS RN: 74-82-8

Name: Methane

Molecular formula: CH₄

CAS RN: 74-82-8 regulated as a member of the Generics group for RN: 68410639

Generics group name: Natural gas, dried

Molecular formula: Unspecified

Substance definition: A complex combination of hydrocarbons separated from natural gas. It consists of saturated aliphatic hydrocarbons having carbon numbers in the range of C1 through C4, predominantly methane and ethane.

CAS RN: 74-82-8 regulated as a member of the Generics group for RN: 68475570

Generics group name: Alkanes, C1-2

Molecular formula: Unspecified

CAS RN: 74-82-8 regulated as a member of the Generics group for RN: 8006142

Generics group name: Natural gas

Molecular formula: Unspecified

Substance definition: Raw natural gas, as found in nature, or a gaseous combination of hydrocarbons having carbon numbers predominantly in the range of C1 through C4 separated from raw natural gas by the removal of natural gas condensate, natural gas liquid, and natural gas condensate/natural gas.

CAS RN: 7783-06-4

Name: Hydrogen sulfide (H₂S)

Molecular formula: H₂S

NFPA 704 Rating:

Flammability:4, Instability/Reactivity:0, Health:4

16. OTHER INFORMATION

Guide to Abbreviations: 15min = 15 minutes; ACGIH = American Conference of Governmental Hygienists; C = Ceiling; CAS = Chemical Abstracts Service Registry; CEPA = Canadian Environmental Protection Act; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act; DOT = Department of Transport; EMS = Environmental Management System; ERG = Emergency Response Guide IARC = International Agency for Research on Cancer; ICAO/IATA = International Civil Aviation Organization/International Air Transport Association; IMDG = International Marine Dangerous Goods; GHS = Globally Harmonized System of Classification and Labeling of Chemicals; lbs = pounds; mg/L = milligrams per litre; OEL = Occupational Exposure Limit; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit; PG = Packing Group; PPE = Personal protective equipment; SDS = Safety Data Sheet; Skin = danger of skin absorption; SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit; TDG = Transportation of Dangerous Goods; TLV = Threshold Limit Value; TSCA = Toxic Substances Control Act; TWA = Time-Weighted Average; TPQ = Threshold Planning Quantity; v/v = volume per volume; WHMIS = Workplace Hazardous Materials Information System

Date of preparation is noted in the footer of this document.