

Section 1: IDENTIFICATION

Product Name: Natural Gas, Sour

Synonyms: Natural Gas; Raw Gas.

Product Use: Feedstock, Fuel.

Restrictions on Use: Not available.

Manufacturer/Supplier: Penn West Petroleum Ltd.
Suite 200, 207-9th Avenue SW
Calgary, Alberta T2P 1K3

Phone Number: (403) 777-2500

Emergency Phone: Emergency Telephone Number: 1-877-792-2990
Emergency Spill Information: (613) 996-6666 Canutec (Canada)
(800) 424-9300 Chemtrec (USA)

Date of Preparation of SDS: October 3, 2014

Section 2: HAZARD(S) IDENTIFICATION**GHS INFORMATION**

Classification: Flammable Gases, Category 1
Gases Under Pressure - Compressed Gas
Acute Toxicity - Inhalation, Category 2
Eye Irritation, Category 2A
Toxic to Reproduction, Category 2

LABEL ELEMENTS**Hazard****Pictogram(s):****Signal Word:** Danger

Hazard Statements: Extremely flammable gas.
Contains gas under pressure; may explode if heated.
Fatal if inhaled.
Causes serious eye irritation.
Suspected of damaging fertility or the unborn child.

Precautionary Statements

Prevention: Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat, sparks, open flames, and hot surfaces. – No smoking.
Do not breathe gas.
Wash thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Wear protective gloves, protective clothing and eye protection.
Wear respiratory protection.

Response: If inhaled: Remove person to fresh air and keep comfortable for breathing.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Immediately call a poison center or doctor.
If eye irritation persists: Get medical advice/attention.
Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
Eliminate all ignition sources if safe to do so.

Storage: Store in a well-ventilated place. Keep container tightly closed.
Store locked up.
Protect from sunlight.

Disposal: Dispose of contents/container in accordance with applicable regional, national and local laws and regulations.

Hazards Not Otherwise Classified: Not applicable.

Ingredients with Unknown Toxicity: None.

This material is considered hazardous by the OSHA Hazard Communication Standard, (29 CFR 1910.1200).

Section 3: COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Ingredient(s)	Common name / Synonyms	CAS No.	% vol./vol.
Natural gas	Not available.	8006-14-2	100
Methane	Not available.	74-82-8	60 - 100
Ethane	Not available.	74-84-0	5 - 10
Propane	Not available.	74-98-6	1 - 5
Carbon dioxide	Not available.	124-38-9	1 - 5
Nitrogen	Not available.	7727-37-9	1 - 5
Hexane	Not available.	110-54-3	0.1 - 1
Hydrogen sulfide (H ₂ S)	Hydrogen sulphide	7783-06-4	0.1 - 1

Section 4: FIRST-AID MEASURES

Inhalation: If inhaled: Remove person to fresh air and keep comfortable for breathing.
Immediately call a poison center or doctor.

Acute and delayed symptoms and effects: Fatal if inhaled. May cause respiratory irritation. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain. Inhalation of Hydrogen sulphide may cause loss of sense of smell, major irritation of the respiratory tract, headache, nausea, vomiting, dizziness, and fluid buildup in the lungs (pulmonary edema), which can be fatal. At 300 ppm unconsciousness may occur after 20 minutes. From 300 to 500 ppm, death can occur within 1 to 4 hours of continuous exposure. At 500 ppm the respiratory system is paralyzed, the victim collapses almost instantaneously, and death can occur after exposure of only 30 to 60 minutes. Above 500 ppm Hydrogen sulphide may cause immediate loss of consciousness; death is rapid, and possibly immediate.

- Eye Contact:** If in eyes: Rinse cautiously with water for at least 20 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor.
- Acute and delayed symptoms and effects:** Contact with rapidly expanding or liquefied gas may cause irritation and/or frostbite. The pain after contact with liquid can quickly subside. Permanent eye damage or blindness could result. Causes serious eye irritation. Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision. Hydrogen sulphide may cause eye irritation at 1-20 ppm and acute conjunctivitis at higher concentrations. Above 50 ppm H₂S, eye irritation may include symptoms of redness, severe swelling, tearing, sensitivity to light and the appearance of 'Halos' around lights.
- Skin Contact:** Contact with rapidly expanding or liquefied gas may cause irritation and/or frostbite. If on skin: Wash with plenty of water. Get immediate medical advice/attention. Do not rub affected area. Remove non-adhering contaminated clothing. Do not remove adherent material or clothing.
- Acute and delayed symptoms and effects:** Contact with rapidly expanding or liquefied gas may cause irritation and/or frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after contact with liquid can quickly subside. May cause skin irritation. Signs/symptoms may include localized redness, swelling, and itching.
- Ingestion:** Not a normal route of exposure.
- Acute and delayed symptoms and effects:** Not a normal route of exposure.
- General Advice:** In case of accident or if you feel unwell, seek medical advice immediately (show the label or SDS where possible).
- Note to Physicians:** Symptoms may not appear immediately. For inhalation of Hydrogen Sulphide, consider oxygen.

Section 5: FIRE-FIGHTING MEASURES

FLAMMABILITY AND EXPLOSION INFORMATION

Extremely flammable gas. Contains gas under pressure; may explode if heated. Flammable; may be ignited by heat, sparks or flames. May form explosive mixtures with air. Vapors from liquefied gas are initially heavier than air and spread along ground. Vapors may travel to source of ignition and flash back. Cylinders exposed to fire may vent and release toxic and flammable gas through pressure relief devices. Containers may explode when heated. Ruptured cylinders may rocket. Runoff may create fire or explosion hazard. **DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.**

If tank, rail car or tank truck is involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions; also, consider initial evacuation for 1600 meters (1 mile) in all directions.

Fire involving Tanks: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Do not direct water at source of leak or safety devices; icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire.

Sensitivity to Mechanical Impact: This material is not sensitive to mechanical impact.

Sensitivity to Static Discharge: This material is sensitive to static discharge.

MEANS OF EXTINCTION

Suitable Extinguishing Media: Small Fire: Dry chemical, CO₂, water spray or alcohol-resistant foam.

Large Fire: Water spray, fog or alcohol-resistant foam. Move containers from fire area if you can do it without risk. Damaged cylinders should be handled only by specialists.

Unsuitable Extinguishing Media: Not available.

Products of Combustion: Oxides of carbon. Oxides of sulphur.

Protection of Firefighters: Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so. TOXIC; may be fatal if inhaled or absorbed through skin. Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite. Fire will produce irritating, corrosive and/or toxic gases. Runoff from fire control may cause pollution. Hydrogen sulphide is heavier than air and may collect in low lying areas and confined spaces. Wear positive pressure self-contained breathing apparatus (SCBA). Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection. Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

Section 6: ACCIDENTAL RELEASE MEASURES

Emergency Procedures: As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions. Keep unauthorized personnel away. Stay upwind. Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks). Keep out of low areas. Ventilate closed spaces before entering. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). All equipment used when handling the product must be grounded.

Personal Precautions: Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire. Do not touch or walk through spilled material. Use personal protection recommended in Section 8. Don full-face, positive pressure, self-contained breathing apparatus.

Environmental Precautions: Prevent entry into waterways, sewers, basements or confined areas.

Methods for Containment: Stop leak if you can do it without risk. Do not direct water at spill or source of leak. Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material. If possible, turn leaking containers so that gas escapes

rather than liquid.

Methods for Clean-Up: Isolate area until gas has dispersed.

Other Information: See Section 13 for disposal considerations.

Section 7: HANDLING AND STORAGE

Handling:

Do not breathe gas. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat, sparks, open flames, and hot surfaces. – No smoking. Pressurized container: Do not pierce or burn, even after use. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. See Section 8 for information on Personal Protective Equipment.

Storage:

Limit quantity of material in storage. Restrict access to storage area. Post appropriate warning signs. Keep storage area separate from populated work areas. Consider leak detection and alarm systems, as required. Store in a well-ventilated place. Keep container tightly closed. Store locked up. Protect from sunlight. Store away from incompatible materials. See Section 10 for information on Incompatible Materials. Keep out of the reach of children. Head spaces in storage containers may contain toxic hydrogen sulphide gas. Structural materials and lighting and ventilation systems should be corrosion resistant.

Section 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

Component

Natural gas [CAS No. 8006-14-2]

ACGIH: Asphyxia

OSHA: No PEL established.

Methane [CAS No. 74-82-8]

ACGIH: Asphyxia

OSHA: No PEL established.

Ethane [CAS No. 74-84-0]

ACGIH: Asphyxia

OSHA: No PEL established.

Propane [CAS No. 74-98-6]

ACGIH: Asphyxia

OSHA: 1000 ppm (TWA), 1800 mg/m³ (TWA)

Carbon dioxide [CAS No. 124-38-9]

ACGIH: 5000 ppm (TWA); 30000 ppm (STEL); (1983)

OSHA: 5000 ppm (TWA), 9000 mg/m³ (TWA);

Nitrogen [CAS No. 7727-37-9]

ACGIH: Simple asphyxiant

OSHA: No PEL established.

Hexane [CAS No. 110-54-3]

ACGIH: 50 ppm (TWA); Skin, BEI (1996)

OSHA: 500 ppm (TWA), 1800 mg/m³ (TWA); Skin.
50 ppm (TWA) [Vacated];

Hydrogen sulphide [CAS No. 7783-06-4]

ACGIH: 1 ppm (TWA); 5 ppm (STEL); (2009);

OSHA: 20 ppm (C); 50 ppm (Peak) (Maximum duration: 10 mins. once only if no other meas. exp. occurs.)

10 ppm (TWA); 15 ppm (STEL) [Vacated];

PEL: Permissible Exposure Limit

TWA: Time-Weighted Average

STEL: Short-Term Exposure Limit

C: Ceiling

Engineering Controls:

Use ventilation adequate to keep exposures (airborne levels of dust, fume, vapour, gas, etc.) below recommended exposure limits.

PERSONAL PROTECTIVE EQUIPMENT (PPE)



Eye/Face Protection:

Wear safety glasses. Ensure that eyewash stations are close to the workstation location. Use equipment for eye protection that meets the standards referenced by CSA Standard CAN/CSA-Z94.3-92 and OSHA regulations in 29 CFR 1910.133 for Personal Protective Equipment.

Hand Protection:

Wear protective gloves. Wear cold insulating gloves. Consult manufacturer specifications for further information.

Skin and Body Protection:

Wear protective clothing.

Respiratory Protection:

Wear respiratory protection. If engineering controls and ventilation are not sufficient to control exposure to below the allowable limits then an appropriate NIOSH/MSHA approved air-purifying respirator that meets the requirements of CSA Standard CAN/CSA-Z94.4-11, or self-contained breathing apparatus must be used. Supplied air breathing apparatus must be used when oxygen concentrations are low or if airborne concentrations exceed the limits of the air-purifying respirators.

General Hygiene Considerations:

Handle according to established industrial hygiene and safety practices. Consult a competent industrial hygienist to determine hazard potential and/or the PPE manufacturers to ensure adequate protection.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Colourless gas.
Colour:	Colourless.
Odour:	Slight hydrocarbon. Rotten eggs.
Odour Threshold:	0.0047 ppm, (Hydrogen sulphide)
Physical State:	Gas.
pH:	Not available.
Melting Point / Freezing Point:	-182.6 °C (-296.7 °F)
Initial Boiling Point:	Not available.
Boiling Range:	-161.4 °C (-258.5 °F)
Flash Point:	-156 °C (-248.8 °F) (TCC)
Evaporation Rate:	Not available.
Flammability (solid, gas):	Extremely flammable gas.
Lower Flammability Limit:	5 % (Methane)
Upper Flammability Limit:	15 % (Methane)
Vapor Pressure:	1207 kPa at 15 °C (59 °F)
Vapor Density:	0.554 (Air = 1)
Relative Density:	0.6818 (Water = 1) at 15 °C (59 °F) (calculated)
Solubilities:	Slightly soluble in water.
Partition Coefficient: n-Octanol/Water:	log Kow = 1.09
Auto-ignition Temperature:	537 °C (998.6 °F) (Methane)
Decomposition Temperature:	Not available.
Viscosity:	Not available.
Percent Volatile, wt. %:	100
VOC content, wt. %:	Not available.
Density:	0.835 kg/m ³ at 15°C (59 °F) (calculated)
Coefficient of Water/Oil Distribution:	Not available.

Section 10: STABILITY AND REACTIVITY

Reactivity:	Contact with incompatible materials. Sources of ignition. Exposure to heat.
Chemical Stability:	Stable under normal storage conditions.

Possibility of Hazardous Reactions: Not available.

Conditions to Avoid: Contact with incompatible materials. Sources of ignition. Exposure to heat.

Incompatible Materials: Oxidizers.

Hazardous Decomposition Products: Hazardous sulphur dioxide, and related oxides of sulphur may be generated upon combustion.

Section 11: TOXICOLOGICAL INFORMATION

EFFECTS OF ACUTE EXPOSURE

Product Toxicity

Oral: Not available.

Dermal: Not available.

Inhalation: Not available.

Component Toxicity

Component	CAS No.	LD ₅₀ oral	LD ₅₀ dermal	LC ₅₀
Natural gas	8006-14-2	Not available.	Not available.	Not available.
Methane	74-82-8	Not available.	Not available.	Not available.
Ethane	74-84-0	Not available.	Not available.	Not available.
Propane	74-98-6	Not available.	Not available.	Not available.
Carbon dioxide	124-38-9	Not available.	Not available.	Not available.
Nitrogen	7727-37-9	Not available.	Not available.	Not available.
Hexane	110-54-3	25000 mg/kg (rat)	Not available.	48000 ppm (rat); 4H
Hydrogen sulphide	7783-06-4	Not available.	Not available.	444 ppm (rat); 4H

Likely Routes of Exposure: Eye contact. Skin contact. Inhalation.

Target Organs: Skin. Eyes. Respiratory system. Lungs. Blood. Cardiovascular system. Central nervous system. Peripheral nervous system.

Symptoms (including delayed and immediate effects)

Inhalation: Fatal if inhaled. May cause respiratory irritation. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain. Inhalation of Hydrogen sulphide may cause loss of sense of smell, major irritation of the respiratory tract, headache, nausea, vomiting, dizziness, and fluid buildup in the lungs (pulmonary edema), which can be fatal. At 300 ppm unconsciousness may occur after 20 minutes. From 300 to 500 ppm, death can occur within 1 to 4 hours of continuous exposure. At 500 ppm the respiratory system is paralyzed, the victim collapses almost instantaneously, and death can occur after exposure of only 30 to 60 minutes. Above 500 ppm Hydrogen sulphide may cause immediate loss of consciousness; death is rapid, and possibly immediate.

Eye: Contact with rapidly expanding or liquefied gas may cause irritation and/or frostbite. The pain after contact with liquid can quickly subside. Permanent eye damage or blindness could result. Causes serious eye irritation. Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision. Hydrogen sulphide may cause eye irritation at 1-20 ppm and acute conjunctivitis at higher concentrations.

Above 50 ppm H₂S, eye irritation may include symptoms of redness, severe swelling, tearing, sensitivity to light and the appearance of 'Halos' around lights.

Skin: Contact with rapidly expanding or liquefied gas may cause irritation and/or frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after contact with liquid can quickly subside. May cause skin irritation. Signs/symptoms may include localized redness, swelling, and itching.

Ingestion: Not a normal route of exposure.

Skin Sensitization: Not available.

Respiratory Sensitization: Not available.

Medical Conditions Aggravated By Exposure: Not available.

EFFECTS OF CHRONIC EXPOSURE (from short and long-term exposure)

Target Organs: Skin. Eyes. Respiratory system. Lungs. Blood. Cardiovascular system. Central nervous system. Peripheral nervous system.

Chronic Effects: Prolonged exposure to Natural gas can lead to hypoxia, bluish colouration to the skin, numbness, damage to the nervous system, heart sensitization, reduced consciousness and death. Chronic inhalation of n-Hexane may cause peripheral nerve disorders and central nervous system effects. Hydrogen sulphide may reduce lung function; cause neurological effects such as headaches, nausea, depression and personality changes; eye and mucous membrane irritation: damage to cardiovascular system.

Carcinogenicity: This product does not contain any carcinogens or potential carcinogens as listed by ACGIH, IARC, OSHA, or NTP.

Mutagenicity: Not available.

Reproductive Effects: Suspected of damaging fertility or the unborn child.

Developmental Effects

Teratogenicity: Not available.

Embryotoxicity: Not available.

Toxicologically Synergistic Materials: Not available.

Section 12: ECOLOGICAL INFORMATION

Ecotoxicity: Not available.

Persistence / Degradability: Not available.

Bioaccumulation / Accumulation: Not available.

Mobility in Environment: Not available.

Other Adverse Effects: Not available.

Section 13: DISPOSAL CONSIDERATIONS

Disposal Instructions: Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

Section 14: TRANSPORT INFORMATION**U.S. Department of Transportation (DOT)**

Proper Shipping Name: UN1953, COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S. (Methane, Hydrogen sulphide), 2.3 (2.1)

Class: 2.3 (2.1)

UN Number: UN1953

Packing Group: Not applicable.

Label Code:

**Canada Transportation of Dangerous Goods (TDG)**

Proper Shipping Name: UN1953, COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S. (Methane, Hydrogen sulphide), 2.3 (2.1)

Class: 2.3 (2.1)

UN Number: UN1953

Packing Group: Not applicable.

Label Code:

**Section 15: REGULATORY INFORMATION****Chemical Inventories****US (TSCA)**

The components of this product are in compliance with the chemical notification requirements of TSCA.

Canada (DSL)

The components of this product are in compliance with the chemical notification requirements of the NSN Regulations under CEPA, 1999.

Federal Regulations**Canada**

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

PennWest

Natural Gas, Sour

SAFETY DATA SHEET / MATERIAL SAFETY DATA SHEET

Date of Preparation: October 3, 2014

WHMIS Classification: Class A - Compressed Gas.
Class B1 - Flammable Gases.
Class D1A - Very Toxic Material.
Class D2B - Eye irritant.

Hazard Symbols:



United States

This SDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SARA Title III

Component	Section 302 (EHS) TPQ (lbs.)	Section 304 EHS RQ (lbs.)	CERCLA RQ (lbs.)	Section 313	RCRA CODE	CAA 112(r) TQ (lbs.)
Methane	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.	10000
Ethane	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.	10000
Propane	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.	10000
Hexane	Not listed.	Not listed.	5000	313	Not listed.	Not listed.
Hydrogen sulphide	500	100	100	313s	U135	10000

State Regulations

Massachusetts

US Massachusetts Commonwealth's Right-to-Know Law (Appendix A to 105 Code of Massachusetts Regulations Section 670.000)

Component	CAS No.	RTK List
Natural gas	8006-14-2	Listed.
Methane	74-82-8	Listed.
Ethane	74-84-0	Listed.
Propane	74-98-6	Listed.
Carbon dioxide	124-38-9	Listed.
Nitrogen	7727-37-9	Listed.
Hexane	110-54-3	Listed.
Hydrogen sulphide	7783-06-4	E
Benzene	71-43-2	E

Note: E = Extraordinarily Hazardous Substance

New Jersey

US New Jersey Worker and Community Right-to-Know Act (New Jersey Statute Annotated Section 34:5A-5)

Component	CAS No.	RTK List
Methane	74-82-8	SHHS
Ethane	74-84-0	SHHS
Propane	74-98-6	SHHS
Carbon dioxide	124-38-9	Listed.
Nitrogen	7727-37-9	Listed.
Hexane	110-54-3	SHHS
Hydrogen sulphide	7783-06-4	SHHS

Note: SHHS = Special Health Hazard Substance

Pennsylvania

US Pennsylvania Worker and Community Right-to-Know Law (34 Pa. Code Chap. 301-323)

Component	CAS No.	RTK List
Natural gas	8006-14-2	Listed.
Methane	74-82-8	Listed.
Ethane	74-84-0	Listed.
Propane	74-98-6	Listed.
Carbon dioxide	124-38-9	Listed.
Nitrogen	7727-37-9	Listed.
Hexane	110-54-3	Listed.
Hydrogen sulphide	7783-06-4	E

Note: E = Environmental Hazard**California****California Prop 65:** WARNING: This product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

Component	Type of Toxicity
Benzene	cancer; developmental, male
Toluene	developmental; female
Ethylbenzene	cancer

Section 16: OTHER INFORMATION**Disclaimer:**

The information contained in this document applies to this specific material as supplied. It may not be valid for this material if it is used in combination with any other materials. It is the user's responsibility to satisfy oneself as to the suitability and completeness of this information for his own particular use.

Date of Preparation of SDS: October 3, 2014**SDS Expiry Date (Canada):** October 2, 2017**Version:** 1.0**GHS SDS Prepared by:** Deerfoot Consulting Inc.**Phone: (403) 720-3700**