SAFETY DATA SHEET

1. Identification

Product identifier **Natural Gas Sour**

Other means of identification Not available.

Recommended use Fuel

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Company name Noble Energy, Inc.

Address 1001 Noble Energy Way
Houston, TX 77070 US
US

Telephone Non-emergency Telephone: 720-587-2085

E-mail SDSGLOBAL@nobleenergyinc.com

Emergency phone number 24 Hour Emergency: 1-760-476-3962
Access code 333053

2. Hazard(s) identification

Physical hazards Flammable gases — Category 1
Gases under pressure — Compressed gas

Health hazards Acute toxicity, inhalation — Category 2

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement Extremely flammable gas. Fatal if inhaled. Contains gas under pressure; may explode if heated.

Precautionary statement

Prevention Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Do not breathe gas. Use only outdoors or in a well-ventilated area. In case of inadequate ventilation wear respiratory protection.

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 a poison center/doctor.

Storage Store in a well-ventilated place. Keep container tightly closed. Store locked up.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Methane	74-82-8	> 99
Hydrogen sulfide	7783-06-4	100 ppm - 3

Composition comments	All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume. Note: Natural gas can contain minor amounts of sulfur, nitrogen and oxygen containing organic compounds as well as trace amounts of heavy metals like mercury, arsenic, nickel, and vanadium. Composition can vary depending on the source and formation.

4. First-aid measures

Inhalation	Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Skin contact	Frostbite: Do not remove clothes, but flush with copious amounts of lukewarm water. Call an ambulance and continue to flush during transportation to hospital.
Eye contact	If frostbite occurs, immediately flush eyes with plenty of warm water (not exceeding 105°F/41°C) for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention if irritation develops or persists.
Ingestion	This material is a gas under normal atmospheric conditions and ingestion is unlikely.
Most important symptoms/effects, acute and delayed	Fatal if inhaled. Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite ("cold burn"). May contain poisonous and flammable hydrogen sulfide vapor in container headspace. Odor does not provide a reliable indicator of the presence of hazardous levels in the atmosphere. In high concentrations (500-1000 ppm), H2S acts as a systemic poison causing unconsciousness and death.
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Foam. Dry chemical powder. Carbon dioxide (CO2). Water fog.
Unsuitable extinguishing media	None known.
Specific hazards arising from the chemical	Containers may explode when heated. Thermal decomposition or combustion may liberate toxic gases or fumes. May contain poisonous and flammable hydrogen sulfide vapor in container headspace.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Specific methods	Move container from fire area if it can be done without risk. Use water spray to keep fire-exposed containers cool.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Eliminate sources of ignition. Wear appropriate personal protective equipment (See Section 8). Before entering storage tanks and commencing any operation in a confined area, check the atmosphere for oxygen content, hydrogen sulfide (H2S) and flammability.
Methods and materials for containment and cleaning up	Eliminate sources of ignition. Remove gas with fine water spray. Prevent runoff from entering drains, sewers, or streams. Dike for later disposal.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Keep away from heat, sparks and open flame. Do not breathe gas. Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling. Use only with adequate ventilation. May contain poisonous and flammable hydrogen sulfide vapor in container headspace.
Conditions for safe storage, including any incompatibilities	Keep container tightly closed and in a well-ventilated place. Store away from incompatible materials. Before entering storage tanks and commencing any operation in a confined area, check the atmosphere for oxygen content, hydrogen sulfide (H2S) and flammability.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-2 (29 CFR 1910.1000)

Components	Type	Value
Hydrogen sulfide (CAS 7783-06-4)	Ceiling	20 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
Hydrogen sulfide (CAS 7783-06-4)	STEL	5 ppm
	TWA	1 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Hydrogen sulfide (CAS 7783-06-4)	Ceiling	15 mg/m3
		10 ppm

Biological limit values No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls Ensure adequate ventilation, especially in confined areas. Provide easy access to water supply and eye wash facilities.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection Chemical resistant gloves are recommended.

Other Wear chemical-resistant gloves, footwear, and protective clothing appropriate for the risk of exposure. Contact health and safety professional or manufacturer for specific information.

Respiratory protection Hydrogen sulfide impairs olfactory nerve function above 20 ppm, odor warning property (rotten egg smell) lost at higher concentrations.
If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Respirator type: Air-purifying respirator with an appropriate, government approved (where applicable), air-purifying filter, cartridge or canister.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance Colorless gas.

Physical state Gas.

Form Gas.

Color Colorless.

Odor Rotten egg or sulfur smell.

Odor threshold 0.02 ppm

pH Not relevant.

Melting point/freezing point -296.45 °F (-182.47 °C)

Initial boiling point and boiling range -161.5 °F (-107.5 °C)

Flash point -127.5 °F (-88.6 °C) Pensky-Martens Closed Cup

Evaporation rate Not relevant.

Flammability (solid, gas) Flammable gas.

Upper/lower flammability or explosive limits

Flammability limit - lower (%) 5

Flammability limit - upper (%) 15

Vapor pressure Not relevant.

Vapor density 0.68 @ 59°F (15°C) (air=1)

Relative density 0.554 @ 68°F (20°C)

Solubility(ies)

Solubility (water) 22.7 mg/l (Slightly soluble)

Partition coefficient (n-octanol/water)	1.1
Auto-ignition temperature	1076 °F (580 °C)
Decomposition temperature	Not relevant.
Viscosity	0.01 mPa·s
Viscosity temperature	80.6 °F (27 °C)
Other information	Gas density at boiling point is 1.816 kg/m3.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Keep away from heat, sparks, and flame.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Ingestion	This material is a gas under normal atmospheric conditions and ingestion is unlikely.
Inhalation	Fatal if inhaled. In high concentrations, vapors are narcotic and may cause headache, fatigue, dizziness and nausea.
Skin contact	Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.
Eye contact	Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.
Symptoms related to the physical, chemical and toxicological characteristics	Fatal if inhaled. Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite ("cold burn"). May contain poisonous and flammable hydrogen sulfide vapor in container headspace. Odor does not provide a reliable indicator of the presence of hazardous levels in the atmosphere. In high concentrations (500-1000 ppm), H2S acts as a systemic poison causing unconsciousness and death.

Information on toxicological effects

Acute toxicity	Fatal if inhaled. Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite ("cold burn").

Components	Species	Test Results
Hydrogen sulfide (CAS 7783-06-4)		
Acute		
Inhalation		
LC100	Rat	2317 mg/m3, 3 Minutes
		780 - 800 ppm, 10 Minutes
LC50	Mouse	940 mg/m3
		634 ppm, 1 Hours
	Rat	950 mg/m3
		712 ppm, 1 Hours
		444 ppm, 4 Hours
		335 ppm
		> 0.38 mg/l, 960 Minutes

Skin corrosion/irritation	Not classified.
Serious eye damage/eye irritation	Not classified.
Respiratory or skin sensitization	
Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	Not a skin sensitizer.
Germ cell mutagenicity	Not classified.

Carcinogenicity This product is not considered to be a carcinogen by NTP, IARC, or OSHA.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity Not classified.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Not applicable.

12. Ecological information

Ecotoxicity The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Components		Species	Test Results
Hydrogen sulfide (CAS 7783-06-4)			
Aquatic			
Fish	LC50	Lake whitefish (Coregonus clupeaformis)	0.002 mg/l, 96 hours
		Rainbow trout,donaldson trout (Oncorhynchus mykiss)	0.007 mg/l, 96 hours

Persistence and degradability Not established.

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)

Natural Gas Sour (CAS Mixture)	1.09

Mobility in soil Not available.

Other adverse effects Not established.

13. Disposal considerations

Disposal instructions Do not discharge into drains, water courses or onto the ground. Discharge, treatment, or disposal may be subject to national, state, or local laws.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

US RCRA Hazardous Waste U List: Reference

Hydrogen sulfide (CAS 7783-06-4)	U135

Waste from residues / unused products Dispose of in accordance with local regulations.

Contaminated packaging Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

UN number UN1971
UN proper shipping name Methane, compressed
Transport hazard class(es)
Class 2.1
Subsidiary risk 6.1
Packing group Not applicable.
Environmental hazards
Marine pollutant No
Special precautions for user Not available.
Packaging exceptions 306
Packaging non bulk 302
Packaging bulk 302

IATA

UN number UN1971
UN proper shipping name Methane, compressed

Transport hazard class(es)

Class	2.1
Subsidiary risk	6.1
Label(s)	2.1
Packing group	Not applicable.
Environmental hazards	No.
Special precautions for user	Not available.

IMDG

UN number	UN1971
UN proper shipping name	Methane, compressed
Transport hazard class(es)	
Class	2.1
Subsidiary risk	6.1
Label(s)	2.1
Packing group	Not applicable.
Environmental hazards	
Marine pollutant	No.
EmS	Not available.
Special precautions for user	Not available.

15. Regulatory information

US federal regulations This product is hazardous according to OSHA 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

CERCLA Hazardous Substance List (40 CFR 302.4)

Hydrogen sulfide (CAS 7783-06-4)	LISTED
Methane (CAS 74-82-8)	LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - Yes
Delayed Hazard - No
Fire Hazard - Yes
Pressure Hazard - Yes
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Chemical name	CAS number	Reportable quantity	Threshold planning quantity	Threshold planning quantity, lower value	Threshold planning quantity, upper value
Hydrogen sulfide	7783-06-4	100	500 lbs		

SARA 311/312 Hazardous chemical Yes

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

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

Hydrogen sulfide (CAS 7783-06-4)
Methane (CAS 74-82-8)

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

US. Massachusetts RTK - Substance List

Hydrogen sulfide (CAS 7783-06-4)

Methane (CAS 74-82-8)

US. New Jersey Worker and Community Right-to-Know Act

Hydrogen sulfide (CAS 7783-06-4)
Methane (CAS 74-82-8)

US. Pennsylvania Worker and Community Right-to-Know Law

Hydrogen sulfide (CAS 7783-06-4)
Methane (CAS 74-82-8)

US. Rhode Island RTK

Hydrogen sulfide (CAS 7783-06-4)
Methane (CAS 74-82-8)

US. California Proposition 65

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Not listed.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 03-July-2014

Revision date 03-July-2014

Version # 03

NFPA ratings

References

ECHA registered substances database
HSDB® - Hazardous Substances Data Bank
IARC Monographs. Overall Evaluation of Carcinogenicity
National Toxicology Program (NTP) Report on Carcinogens
Registry of Toxic Effects of Chemical Substances (RTECS)

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