



**Section 1: PRODUCT AND COMPANY IDENTIFICATION**

**Product Name:** Claus Tail Gas

**Synonyms:** Not available.

**Product Use:** Intermediate. By-product of claus reaction and feed to scot unit.

**Manufacturer/Supplier:** Husky Lloydminster Upgrader  
HWY 16 East  
Lloydminster, Sask  
S9V 0Z8

**Phone Number:** 306-825-1764

**Emergency Phone:** 877-262-2111

**Date of Preparation:** December 1, 2013

**Section 2: HAZARDS IDENTIFICATION**

**EMERGENCY OVERVIEW**

**DANGER**  
MAY BE FATAL IF INHALED. GAS UNDER PRESSURE. MAY CAUSE FROSTBITE. VERY TOXIC BY INHALATION. IRRITATING TO EYES.

**Colour:** Colourless.  
**Physical State:** Gas.  
**Odour:** Rotten eggs.

WHMIS	Personal Protection Equipment	TDG (Ground)

**Potential Health Effects:** See Section 11 for more information.

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

**Inhalation:** Fatal if inhaled. Hydrogen sulphide may cause symptoms such as digestive upset and loss of appetite, loss of sense of smell and pulmonary edema. At 500-1000 ppm Hydrogen sulphide may cause respiratory paralysis, collapse and death without rescue. Inhalation of Sulphur dioxide at concentrations of approximately 6 ppm will result in eye, nose and throat irritation. Severe overexposure may result in death from systemic acidosis, pulmonary edema or from respiratory arrest. Prolonged or repeated inhalation of sulphur dioxide may cause impaired lung function, bronchitis, cough and fatigue.

**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 H<sub>2</sub>S, 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. Causes skin irritation. Signs/symptoms may include localized redness, swelling, and itching.

**Ingestion:** Not a normal route of exposure.

**Medical Conditions Aggravated By Exposure:** Not available.

**Target Organs:** Skin. Eyes. Respiratory system. Lungs. Blood. Cardiovascular system. Nervous system.

**Potential Environmental Effects:** See Section 12 for more information.

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

**Section 3: COMPOSITION / INFORMATION ON INGREDIENTS**

<b>Hazardous Ingredient(s)</b>	<b>CAS No.</b>	<b>% vol./vol.</b>
Nitrogen	7727-37-9	60 - 100
Hydrogen sulfide (H <sub>2</sub> S)	7783-06-4	0.5 - 1.5
Carbon dioxide	124-38-9	0.5 - 1.5
Sulfur dioxide	7446-09-5	0.5 - 1.5

**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/physician.

**Eye Contact:** 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.

**Skin Contact:** Contact with rapidly expanding or liquefied gas may cause irritation and/or frostbite. If on skin: Wash with plenty of soap and water. Get immediate medical advice/attention. If skin irritation occurs: Get medical advice/attention. Do not rub affected area. Remove non-adhering contaminated clothing. Do not remove adherent material or clothing.

**Ingestion:** 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 MSDS where possible).

**Note to Physicians:** Symptoms may not appear immediately. For inhalation of Hydrogen Sulphide, consider oxygen.



**Section 5: FIRE FIGHTING MEASURES**

**Flammability:** Not flammable or combustible by OSHA/WHMIS criteria. Cylinders exposed to fire may vent and release toxic and/or corrosive gas through pressure relief devices. Containers may explode when heated. Ruptured cylinders may rocket.

If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 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.

**Means of Extinction**

**Suitable Extinguishing Media:** Small Fire: Dry chemical or CO<sub>2</sub>.  
Large Fire: Water spray, fog or regular 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 sulphur.

**Protection of Firefighters:** TOXIC; may be fatal if inhaled or absorbed through skin. Vapors may be irritating. 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.

**Explosion Data**

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

**Sensitivity to Static Discharge:** This material is not sensitive to static discharge.

**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.

**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. If possible, turn leaking containers so that gas escapes rather than liquid. Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material. Do not direct water at spill or source of leak.

**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**

Nitrogen [CAS No. 7727-37-9]

**ACGIH:** Simple asphyxiant (1992)

**OSHA:** No PEL established.

Hydrogen sulfide (H<sub>2</sub>S) [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]



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

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

**OSHA:** 5000 ppm (TWA), 9000 mg/m<sup>3</sup> (TWA);

Sulfur dioxide [CAS No. 7446-09-5]

**ACGIH:** 0.25 ppm (STEL); A4 (2008)

**OSHA:** 5 ppm (TWA), 13 mg/m<sup>3</sup> (TWA);  
2 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 chemical goggles. Ensure that eyewash stations are close to the workstation location. Use equipment for eye protection that meets the standards referenced by 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:** 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 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.

#### Section 9: PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance:</b>	Transparent.
<b>Colour:</b>	Colourless.
<b>Odour:</b>	Rotten eggs.
<b>Odour Threshold:</b>	0.0047 ppm, (Hydrogen sulphide)
<b>Physical State:</b>	Gas.



<b>pH:</b>	Not available.
<b>Viscosity:</b>	Not available.
<b>Melting Point:</b>	Not available.
<b>Boiling Point:</b>	Not available.
<b>Flash Point:</b>	Not available.
<b>Evaporation Rate:</b>	Not available.
<b>Lower Flammability Limit:</b>	Not available.
<b>Upper Flammability Limit:</b>	Not available.
<b>Vapor Pressure:</b>	Not available.
<b>Vapor Density:</b>	Not available.
<b>Specific Gravity:</b>	Not available.
<b>Density:</b>	Not available.
<b>Solubility in Water:</b>	Not available.
<b>Coefficient of Water/Oil Distribution:</b>	Not available.
<b>Auto-ignition Temperature:</b>	Not available.
<b>Percent Volatile, wt. %:</b>	Not available.
<b>VOC content, wt. %:</b>	Not available.

**Section 10: STABILITY AND REACTIVITY**

<b>Stability:</b>	Stable under normal storage conditions.
<b>Conditions of Reactivity:</b>	Contact with incompatible materials. Exposure to heat.
<b>Incompatible Materials:</b>	Bases. Oxidizers. Reducers. Metals. Zinc. Halogens. Peroxides. Metal oxides. Metal salts.
<b>Hazardous Decomposition Products:</b>	Hazardous sulphur dioxide, and related oxides of sulphur may be generated upon combustion.
<b>Possibility of Hazardous Reactions:</b>	Dusts of various metals, such as magnesium, zirconium, titanium, aluminum, chromium & manganese are ignitable and explosive when suspended in Carbon dioxide. Forms carbonic acid in water.

**Section 11: TOXICOLOGICAL INFORMATION**

**EFFECTS OF ACUTE EXPOSURE**

**Component Toxicity**

<b>Component</b>	<b>CAS No.</b>	<b>LD<sub>50</sub> oral</b>	<b>LD<sub>50</sub> dermal</b>	<b>LC<sub>50</sub></b>
Nitrogen	7727-37-9	Not available.	Not available.	Not available.
Hydrogen sulfide	7783-06-4	Not available.	Not available.	444 ppm (rat); 4H
Carbon dioxide	124-38-9	Not available.	Not available.	Not available.
Sulfur dioxide	7446-09-5	Not available.	Not available.	2520 ppm (rat); 1H



**Inhalation:** Fatal if inhaled. Hydrogen sulphide may cause symptoms such as digestive upset and loss of appetite, loss of sense of smell and pulmonary edema. At 500-1000 ppm Hydrogen sulphide may cause respiratory paralysis, collapse and death without rescue. Inhalation of Sulphur dioxide at concentrations of approximately 6 ppm will result in eye, nose and throat irritation. Severe overexposure may result in death from systemic acidosis, pulmonary edema or from respiratory arrest. Prolonged or repeated inhalation of sulphur dioxide may cause impaired lung function, bronchitis, cough and fatigue.

**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 H<sub>2</sub>S, 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. Causes 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.

**EFFECTS OF CHRONIC EXPOSURE**

**Target Organs:** Skin. Eyes. Respiratory system. Lungs. Blood. Cardiovascular system. Nervous system.

**Chronic 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. Several human studies have shown that repeated exposure to Sulphur dioxide at levels exceeding the exposure limit has caused permanent pulmonary impairment.

**Carcinogenicity:** Product is not classified as a carcinogen. See Component Carcinogenicity table below for information on individual components.

**Component Carcinogenicity**

Component	ACGIH	IARC	NTP	OSHA	Prop 65
Sulfur dioxide	A4	Group 3	Not listed.	Not listed.	Not listed.

**Mutagenicity:** May cause genetic damage.

**Reproductive Effects:** Not available.



**Husky Energy**

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**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.

**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:** UN1955, COMPRESSED GAS, TOXIC, N.O.S. (Hydrogen sulphide, Sulfur dioxide), 2.3

**Class:** 2.3

**UN Number:** UN1955

**Packing Group:** Not applicable.

**Label Code:**



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

**Proper Shipping Name:** UN1955, COMPRESSED GAS, TOXIC, N.O.S. (Hydrogen sulphide, Sulfur dioxide), 2.3

**Class:** 2.3

**UN Number:** UN1955

**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.

**WHMIS Classification:** Class A - Compressed Gas.  
Class D1A - Very Toxic Material.  
Class D2B - Mutagenicity.  
Class D2B - Eye irritant.

**Hazard Symbols:**



**United States**

This MSDS 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.)
Hydrogen sulfide	500	100	100	313s	U135	10000
Sulfur dioxide	500	500	Not listed.	Not listed.	Not listed.	5000

**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
Nitrogen	7727-37-9	Listed.
Hydrogen sulfide (H2S)	7783-06-4	E
Carbon dioxide	124-38-9	Listed.
Sulfur dioxide	7446-09-5	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
Nitrogen	7727-37-9	Listed.
Hydrogen sulfide (H2S)	7783-06-4	SHHS
Carbon dioxide	124-38-9	Listed.
Sulfur dioxide	7446-09-5	Listed.



**Husky Energy**

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**Note:** SHHS = Special Health Hazard Substance

**Pennsylvania**

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

<b>Component</b>	<b>CAS No.</b>	<b>RTK List</b>
Nitrogen	7727-37-9	Listed.
Hydrogen sulfide (H <sub>2</sub> S)	7783-06-4	E
Carbon dioxide	124-38-9	Listed.
Sulfur dioxide	7446-09-5	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.

<b>Component</b>	<b>Type of Toxicity</b>
Sulfur dioxide	developmental

**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 their own particular use.

**MSDS Expiry Date (Canada):** October 27, 2016

**Version:** 2.0

**MSDS Prepared by:** **Deerfoot Consulting Inc.**

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