

**SECTION 1 – MATERIAL IDENTIFICATION AND USE****Material Name:** MIXED BUTANE**Use:** Process stream, chemical feedstock, fuel**WHMIS Classification:** Class A; Class B, Div. 1**Fire: 4 Reactivity: 0 Health: 1****TDG:** UN: 1075 **Class:** 2.1 **Packing Group:** N.Av.**Shipping Name:** LIQUEFIED PETROLEUM GASES**Manufacturer/Supplier:** CENOVUS ENERGY INC.

421 - 7 Ave SW PO Box 766

Calgary, AB T2P 0M5

**Emergency Telephone:** 1-877-458-8080**Chemical Family:** Aliphatic paraffinic hydrocarbon mixture**SECTION 2 – HAZARDOUS INGREDIENTS OF MATERIAL**

<b>Hazardous Ingredients</b>	<b>Approximate Concentrations (%)</b>	<b>C.A.S. Nos.</b>	<b>LD50/LC50 Specify Species &amp; Route</b>	<b>Exposure Limits</b>
n-Butane	65 - 80	106-97-8	N.Av./inh rat 4hrs 658 g/m3	1000 ppm (OEL) 1000 ppm (OEL, TLV <sup>1</sup> )
Isobutane	20 - 25	75-28-5	N.Av.	1000 ppm (OEL, TLV <sup>1</sup> )
Propane	0.5 – 1	74-98-6	N.Av.	1000 ppm (OEL, TLV <sup>1</sup> ) (See also Section 6)
Ethane	0.5 - 1	74-84-0	N.Av.	1000 ppm (OEL, TLV <sup>1</sup> )

OEL = 8 hr. Alberta Occupational Exposure Limit TLV = Threshold Limit Value (8 hrs)

<sup>1</sup> As Aliphatic hydrocarbon gases**SECTION 3 – PHYSICAL DATA FOR MATERIAL****Physical State:** Gas**Specific Gravity:** 0.58**Vapour Density (air=1):** 2**Percent Volatiles, by volume:** 100**Odour & Appearance:** colorless, odourless (or may have mercaptan odour)**Freezing Pt. (deg.C):** -146**pH:** N.App.

(N.AV. = not available N.App. = not applicable)

**Vapour Pressure (kPa):** 400 @ 40 degrees C.**Odour Threshold (ppm):** N.Av.**Evaporation Rate:** N.Av.**Boiling Pt. (deg.C):** -4.5**Coefficient of Water/Oil Distribution:** <0.1**SECTION 4 – FIRE AND EXPLOSION****Flammability:** Yes **Conditions:** Material will ignite at normal temperatures.**Means of Extinction:** Foam, CO2, dry chemical. Explosive accumulations can build up in areas of poor ventilation.**Special Procedures:** 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.**Flash Point (deg.C) & Method:** -60**Upper Explosive Limit (% by vol.):** 8.4**Lower Explosive Limit (% by vol.):** 1.8**Auto Ignition Temp. (deg.C):** 405**Hazardous Combustion Products:** Carbon monoxide**Sensitivity to Impact:** No**Sensitivity to Static Discharge:** Yes, may ignite**TDG Flammability Classification:** 2.1

**SECTION 5 – REACTIVITY DATA****Chemical Stability:** Yes**Conditions:** N.App.**Incompatibility:** Yes**Substances:** Chlorine and other strong oxidizing agents.**Reactivity:** Yes**Conditions:** Heat, strong sunlight**Hazardous Decomposition Products:** Carbon dioxide, carbon monoxide**SECTION 6 – TOXICOLOGICAL PROPERTIES OF PRODUCT****Routes of Entry:****Skin Absorption:** N.Av.**Skin Contact:** Yes (liquid)**Eye Contact:** Yes**Inhalation: Acute:** Yes**Chronic:** N.Av.**Ingestion:** No

**Effects of Acute Exposure:** Inhalation can cause headache, disorientation, dizziness, drowsiness and possibly unconsciousness. Evidence exists that butane and propane can cause these effects at concentrations far below those required for oxygen deficiency, for example 10% LEL and above. As concentration increases, oxygen deficiency and asphyxiation may occur.

Rapidly expanding gas or vaporized liquid may cause frostbite to skin and eyes.

**Effects of Chronic Exposure:** N.Av.**Sensitization to Product:** No.**Exposure Limits of Product:** 1000 ppm (8 hour Alberta OEL)**Irritancy:** N.Av.**Synergistic Materials:** None reported**Carcinogenicity:** N.Av.**Reproductive Effects:** N.Av.**Teratogenicity:** N.Av.**Mutagenicity:** N.Av.**SECTION 7 – PREVENTIVE MEASURES**

**Personal Protective Equipment:** Use positive pressure self-contained breathing apparatus or supplied air breathing apparatus when entering areas where high concentrations may be present.

**Gloves:** Insulated gloves**Respiratory Protection:** SCBA or SABA**Eye:** Splash goggles and face shield if SCBA or SABA not worn.**Footwear:** As per safety policy**Clothing:** As per fire protection policy

**Engineering Controls:** Use only in well ventilated areas. Mechanical ventilation recommended in confined areas. Equipment must be explosion proof.

**Leaks & Spills:** If safe to do so, stop gas flow. Remove all ignition sources. Provide clearing ventilation if possible. Prevent from entering confined spaces. Use personal protective equipment.

**Waste Disposal:** Controlled burning or venting in accordance with regulatory requirements.

**Handling Procedures & Equipment:** Avoid contact with liquid or liquid cooled equipment. Avoid inhalation. Bond and ground all transfers. Avoid sparking conditions.

**Storage Requirements:** Store in a cool, dry, well ventilated area away from heat, strong sunlight, and ignition sources.

**Special Shipping Information:** UN 1011, Butane, Class 2.1

**SECTION 8 – FIRST AID MEASURES**

**Skin:** If freeze burn occurs, gently bathe affected area in warm water (38 – 43) deg.C. Do not rub. Get medical attention.

**Eye:** Immediately flush with large amounts of luke warm water for 15 minutes, lifting upper and lower lids at intervals. Seek medical attention if irritation persists.

**Inhalation:** Remove to fresh air. Give oxygen, artificial respiration, or CPR if needed. Seek medical attention.

**Ingestion:** Usually no effect by this route.

**SECTION 9 – PREPARATION DATE OF MSDS**

Prepared By: Cenovus Energy Inc. Environment, Health and Safety (EHS)

Phone Number: 1-877-458-8080

Preparation Date: July 10, 2011 Expiry Date: July 10, 2014