




ATTACHMENT 3 – *MSDS CRUDE OIL*

WHMIS	Personal Protection	TDG Road/Rail
		

Section 1. Product Identification and Uses

Common/Trade name	Western Canadian Select (WCS)		
Synonyms	Not available.	CAS #	8002-05-09
Chemical family	Blend of Heavy Petroleum Crude, Medium Sweet Crude and Synthetic Crude.	DSL	On the DSL list.
Supplier	Husky Oil Operations Limited PO Box 6525 Station 'D' Calgary, Alberta T2P 3G7 403-298-6111	Manufacturer	Husky Oil Operations Limited PO Box 6525 Station 'D' Calgary, Alberta T2P 3G7 403-298-6111
Material uses	Chemical feedstock		

Section 2. First Aid Measures

Eye contact	Flush eyes for at least 15 minutes with clean water. Patch lightly, allowing drainage. Seek medical attention.
Skin contact	Remove contaminated clothing. Wash skin thoroughly with soap and water. Seek medical attention if irritation develops.
Inhalation	Protect rescuer. Move exposed person to fresh air. If breathing has stopped apply artificial respiration. Seek medical attention.
Ingestion	If swallowed, do not induce vomiting or give liquids. Seek immediate medical attention.

Section 3. Hazardous Ingredients

Name	CAS #	Exposure Limits						% by Weight
		TWA (ppm)	TWA (Mg/M3)	STEL (ppm)	STEL (Mg/M3)	CEIL (ppm)	CEIL (Mg/M3)	
Crude Oil (Hydrocarbons C5 and C6 Rich)	8002-05-09	100	n/av	n/av	n/av	n/av	n/av	100
Hydrogen Sulphide	7783-06-4	10	14	15	21	n/av	n/av	<0.5
Benzene	71-43-2	0.5	n/av	2.5	n/av			0.1-1
Toluene	108-88-3	20	n/av					1-5
Xylene	1330-20-7	100	n/av	150	n/av			1-30
Toxicity values of the hazardous ingredients	Crude oil (Hydrocarbons C5 and C6 Rich) LD50:4,300 mg/Kg (Rat). LC50: Not available. Hydrogen Sulphide (H2S) LC50 Inhalation Mouse = 673 ppm 1 hour. LC50 Inhalation Rat = 444 ppm for 4 hours Benzene. LD50 Oral rat= 930-5600 mg/Kg. LC50 Inhalation rat = 13,700 ppm for 4 hrs. Xylene. LD50 Oral rat= 4300 mg/Kg. LC50 Inhalation rat= 6700 ppm for 4 hrs. LD50 Dermal rabbit >2000 mg/Kg. Toluene. LD50 Oral rat= 5000 mg/Kg. LC50 Inhalation rat= 8000 ppm for n4 hrs. LD50 Dermal rabbit= 14000 mg/Kg.							

Section 4. Physical Data

Physical state and appearance	Liquid. Black/Brown.
Odor	Petroleum Odour
pH (1% soln/water)	Not applicable.
Odor threshold	0.13 ppm H ₂ S
Evaporation rate	Not available.
Freezing point	Not available.
Boiling point	10°C - 1000°C
Specific gravity	0.92 - 0.94 (Water = 1)
Volatility	100 (%vol)
Vapor density	Not available.
Vapor pressure	Not available.
Water/oil dist. coeff.	Not available.
Solubility	Not available.
Molecular Weight	Not applicable.
Melting Point	Not available.
Density	Not available.

Section 5. Fire and Explosion Data

Auto-ignition temperature	Not available.
Flash points	CLOSED CUP: -40°C (-40°F)
Flammable limits	Not available.
Extinguishing Media	Use DRY chemicals, CO ₂ , or foam to extinguish fire. Water may not be an effective medium to extinguish fire. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.
Special fire fighting procedures	Use supplied air or self contained breathing apparatus (SCBA) for large fires or for fires in enclosed areas.
Flammability	Highly flammable liquid. Released vapours may form flammable/explosive mixtures at or above the flash point. Vapours may travel considerable distances to ignition sources and cause a flash fire. All storage containers and pumping equipment must be grounded. Remark No additional remark.
Risks of explosion	This material is sensitive to static discharge. This product is not sensitive to mechanical impact. Remark No additional remark.

Section 6. Reactivity Data

Stability	The product is stable.
Hazardous decomp. products	Carbon monoxide, carbon dioxide and irritant fumes and gases including sulphur oxides, nitrogen oxides and aldehydes.
Reactivity	Incompatible material: Strong acids, strong oxidizers, chlorine. Hazardous polymerization: Will not occur. Remark No additional remark.

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Section 7. Toxicological Properties

Routes of entry	Ingestion. Inhalation. Eye contact. Skin contact.
TLV	TLV-TWA 100 PPM (525 mg/m ³) for standard solvent from ACGIH. Hydrogen Sulfide: TWA: 10 ppm, STEL: 15 ppm, from ACGIH Benzene TWA: 0.5 ppm, STEL: 2.5 ppm, from ACGIH, SKIN Toluene TWA: 20 ppm, from ACGIH Consult local authorities for acceptable exposure limits.
Toxicity to animals	Hydrocarbons C5 and C6 Rich LD50: Not available. LC50: Not available. Hydrogen Sulphide (H₂S) LC50 Inhalation Mouse = 673 ppm 1 hour LC50 Inhalation Rat = 444 ppm for 4 hours
	Remark No additional remark.
Chronic effects	This product may contain benzene. Benzene has been classified by the international agency for research on cancer as a group 1 product indicating sufficient evidence of carcinogenicity. Studies exist which report a link to crude oil and reproductive effects including fetal tumors and menstrual disorders. This product contains small quantities of xylene. High exposure to xylene has produced fetotoxic effects in animal studies. This product contains small quantities of polycyclic aromatic hydrocarbons. Prolonged contact with these compounds has been associated with the induction of skin and lung tumours. This product may contain toluene which is known to cause visual impairment, narcosis, anxiety, muscle fatigue, insomnia, dermatitis, parathesis, liver and kidney damage and to affect reproduction.
	Remark No additional remark.
Acute effects	Sensitizing Capability: No effects known. Irritancy: Skin, eye and upper respiratory tract irritant.
Ingestion	Pulmonary aspiration hazard if swallowed and vomiting occurs.
Skin	Prolonged skin contact can cause defatting of the skin resulting in dry cracked skin and dermatitis.
Eyes	Eye contact with product or product vapours may result in eye irritation.
Inhalation	May cause headache, dizziness, loss of appetite and loss of consciousness. Product vapours are irritating to the respiratory tract.
	Remark This product contains small quantities of hydrogen sulphide (H ₂ S) gas which may collect in confined spaces. Acute effects vary with concentration of H ₂ S released from mild eye, nose and throat irritation at approximately 100 ppm to sudden unconsciousness or death at 500 ppm.
Synergistic materials	Not available.

Section 8. Preventive Measures

Waste disposal	Dispose of in accordance with all federal, provincial and local regulations.
Storage	Keep away from all ignition sources. Maintain temperature below the flash point. Head spaces in storage containers may contain hydrocarbon vapours and toxic hydrogen sulphide gas.
Ventilation	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
Spill and leak	Evacuate unnecessary personnel. Eliminate all ignition sources. Be alert to the potential for the presence of hydrogen sulphide gas and don appropriate protective equipment. Stop leak if safe to do so. Contain spill and absorb with inert absorbent. Large spills should be removed with explosion proof vacuum equipment. Large pools may be covered with foam to prevent vapour evolution. Comply with federal, provincial, and local requirements for spill notification.

Section 9. Classification/Regulatory Information

TDG road / rail TDG CLASS 3: Flammable liquid with a flash point less than or equal to 60.5 C (140.9 F). Closed cup test method.



PIN: 1267 - PETROLEUM CRUDE OIL

Remark

No additional remark.

WHMIS WHMIS CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
WHMIS CLASS D-2A: Material causing other toxic effects (VERY TOXIC).
WHMIS CLASS D-2B: Material causing other toxic effects (TOXIC).

**Remark**

No additional remark.

Other This product is on the Domestic Substances List (DSL). TSCA (Toxic Substance Control Act): This product is listed on the TSCA Inventory.
Refer to federal, provincial, and local legislation for further requirements.

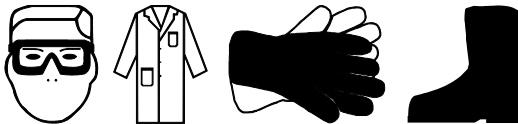
Section 10. Protective Clothing

Eye Non-vented chemical goggles to prevent eye irritation from the solvent vapours.

Skin Impervious gloves and clothing should be worn as appropriate to protect against skin contact. Neoprene or nitrile material is suggested.

Respiratory Respiratory protection may be required in poorly ventilated areas. Properly fitted air purifying masks equipped with organic vapour filters will provide protection at low concentrations. Air supplied respirators or positive pressure self contained breathing apparatus is required when atmospheric concentrations of hydrocarbon vapours are likely to exceed 10X the occupational exposure limit or when high concentrations of H₂S may be present.

Other As required by the situation according to your companies policies and procedures. Contact your supervisor for direction.

**Section 11. Preparation Information**

References -Provisional Domestic Substances List, Canadian Environmental Protection Act, Volume 1-Registry Number Index, April 1990; Environment Canada. -SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. CCOHS (Chem advi)
CCOHS(Cheminfo) Documentation of the Threshold Limit Values and Biological Exposure Indices (ACGIH)
Pocket Guide to Chemical Hazards (NIOSH)
Transportation of Dangerous Goods Schedule II List II

MSDS Status

Acronyms: TLV = Threshold Limit Value N/AP = Not applicable N/AV = Not Available COC = Cleveland Open Cup PMCC = Pinsky Martens Closed Cup

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Emergency Phone # 403-262-2111

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SECTION 1 – MATERIAL IDENTIFICATION AND USE**Material Name:** HEAVY CRUDE OIL/DILUENT MIX (CHRISTINA LAKE/FOSTER CREEK)**Use:** Process stream, fuels and lubricants production**WHMIS Classification:** Class B, Div. 2, Class D, Div. 2, Sub-Div. A and B**NFPA: Fire:** 2 **Reactivity:** 0 **Health:** 3**TDG Shipping Name:** Petroleum Crude Oil**TDG Class:** 3**UN:** 1267**TDG Packing Group:** II (boiling point 35 deg. C or above, and flash point less than 23 deg. C)**Manufacturer/Supplier:** CENOVUS ENERGY INC.

421 - 7 Ave SW PO Box 766

Calgary, AB T2P 0M5

Emergency Telephone: IOD – 780-573-7321 Plains – 1-877-458-8080**Chemical Family:** Crude oil/condensate mix**SECTION 2 – HAZARDOUS INGREDIENTS OF MATERIAL**

Hazardous Ingredients	Approximate Concentrations (%)	C.A.S. Nos.	LD50/LC50 Specify Species & Route	Exposure Limits
Crude oil	50 - 70	8002-05-9	LD50, rat, skin, >2 g/kg	5 mg/m ³ (OEL, TLV)
Hydrocarbon Diluent	30 - 50	N.Av.	N.Av.	900 mg/m ³ (OEL)*
Benzene	0.03 - 0.3	71-43-2	LD50, rat, oral, 930 mg/kg LC50, rat, 4 hr, 13200 ppm	1 ppm (OEL), 0.5 ppm (TLV)
Hydrogen Sulphide	<0.5	7783-06-04	LC50, rat, 4 hrs, 444 ppm	10 ppm (OEL, TLV)

OEL = 8 hr. Alberta Occupational Exposure Limit; TLV = Threshold Limit Value (8 hrs) *OEL for gasoline

SECTION 3 – PHYSICAL DATA FOR MATERIAL**Physical State:** Liquid**Specific Gravity:** 0.65 – 0.75**Vapour Density (air=1):** 2.5 -5.0**Percent Volatiles, by volume:** 20 - 30 (estimated)**pH:** N.Av.**Coefficient of Water/Oil Distribution:** <0.1**Odour & Appearance:** Brown/black liquid, hydrocarbon odour

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

Vapour Pressure (kPa): 2.5 – 36.5 @ 20C**Odour Threshold (ppm):** N.Av.**Evaporation Rate:** N.Av.**Boiling Pt. (deg.C):** 40 - 180**Freezing Pt. (deg.C):** <0**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 vapors if spill has not ignited. Cut off fuel and allow flame to burn out.**Flash Point (deg.C) & Method:** <-35 (PMCC)**Upper Explosive Limit (% by vol.):** 8 (estimated)**Lower Explosive Limit (% by vol.):** 0.8 (estimated)**Auto-Ignition Temp. (deg.C):** 250 (estimated)**Hazardous Combustion Products:** Carbon monoxide, carbon dioxide, sulphur oxides**Sensitivity to Impact:** No**Sensitivity to Static Discharge:** Yes, at normal temperatures**TDG Flammability Classification:** 3**SECTION 5 – REACTIVITY DATA****Chemical Stability:** Stable**Conditions:** Heat**Incompatibility:** Yes**Substances:** Oxidizing agents (e.g. chlorine)**Reactivity:** Yes**Conditions:** Heat, strong sunlight**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide, sulphur oxides

SECTION 6 – TOXICOLOGICAL PROPERTIES OF PRODUCT

Routes of Entry:**Skin Absorption:** Yes**Skin Contact:** Yes**Eye Contact:** Yes**Inhalation: Acute:** Yes**Chronic:** Yes**Ingestion:** Yes**Effects of Acute Exposure:** Vapour may cause irritation of eyes, nose and throat, dizziness and drowsiness. Contact with skin may cause irritation and possibly dermatitis. Contact of liquid with eyes may cause severe irritation/burns.**Effects of Chronic Exposure:** Due to presence of benzene, long term exposure may increase the risk of anaemia and leukemia. Repeated skin contact may increase the risk of skin cancer.**Sensitization to Product:** No.**Exposure Limits of Product:** 1 ppm (Alberta 8 hr OEL for benzene)**Irritancy:** Yes**Synergistic Materials:** None reported**Carcinogenicity:** Yes **Reproductive Effects:** Possibly **Teratogenicity:** Possibly **Mutagenicity:** Possibly

SECTION 7 – PREVENTIVE MEASURES

Personal Protective Equipment: Use positive pressure self-contained breathing apparatus, supplied air breathing apparatus or cartridge air purifying respirator approved for organic vapours where concentrations may exceed exposure limits (note: cartridge respirator not suitable for hydrogen sulphide, oxygen deficiency or IDLH situations) – see also Storage below).**Gloves:** Viton (nitrile adequate for short exposure to liquid)**Eye:** Chemical splash goggles. **Footwear:** As per safety policy **Clothing:** As per fire protection policy**Engineering Controls:** Use only in well ventilated areas. Mechanical ventilation required in confined areas. Equipment must be explosion proof.**Leaks & Spills:** Stop leak if safe to do so. Use personal protective equipment. Use water spray to cool containers.

Remove all ignition sources. Provide explosion-proof clearing ventilation, if possible. Prevent from entering confined spaces. Dyke and pump into containers for recycling or disposal. Notify appropriate regulatory authorities.

Waste Disposal: Contact appropriate regulatory authorities for disposal requirements.**Handling Procedures & Equipment:** Avoid contact with liquid. 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.**Caution:** hydrogen sulphide may accumulate in headspaces of tanks and other equipment, even when concentrations in the liquid product are low. Overexposure to hydrogen sulphide may cause dizziness, headache, nausea and possibly knock-down and death. Factors increasing this risk include heating, agitation and contact of the liquid with acids or acid salts.

Assess the exposure risk by gas monitoring. Wear air supplying breathing apparatus if necessary.

Special Shipping Provisions: N.App.

SECTION 8 – FIRST AID MEASURES

Skin: Flush skin with water, removing contaminated clothing. Get medical attention if irritation persists or large area of contact. Decontaminate clothing before re-use.**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:** Ensure own safety. Remove victim to fresh air. Give oxygen, artificial respiration, or CPR if needed. Seek medical attention immediately.**Ingestion:** Give 2-3 glasses of milk or water to drink. DO NOT INDUCE VOMITING. Keep warm and at rest. Get immediate medical attention.

SECTION 9 – PREPARATION DATE OF MSDS

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

Phone Number: IOD – 780-573-7321 Plains – 1-877-458-8080

Preparation Date: October 15, 2008 Expiry Date: October 15, 2011