

MSDS List		
MSDS Provided	Product Code	Product Name
Shell Albian Heavy Synthetic Crude	AHS	Albian Synthetic Heavy
Shell Muskeg River Heavy	AMH	Albian Muskeg River Heavy
Shell Albian Resid Blend	ARB	Albian Resid Blend
Shell Seal Heavy Crude Oil	SH	Seal Heavy
Shell Borealis Heavy Blend	BHB	Borealis Heavy Blend
Shell Premium Albian Synthetic Crude	PAS	Premium Albian Synthetic
Shell Synthetic	SPX	Shell Synthetic
Shell Synthetic Crude Blend	SSX	Shell Synthetic Light
Cenovus Heavy Crude Oil/Diluent Mix	BR	Bow River
	CDB	Cenovus Dil-Bit
	WCB	Western Canadian Blend
	WCS	Western Canadian Select
Cenovus Crude Oil (Sour)	F	Fosterton
	M	Midale Blend
Statoil Leismer SE2-079-10-W4M	SCB	Statoil Cheecham Blend
	SCS	Statoil Syn-Bit
Access Western Blend	AWB	Access Heavy Blend
Imperial Oil Dilbit	CL	Cold Lake
Petro Canada Mackay River Blend	MKH	Mackay River Heavy
Enbridge Crude Oil – Heavy	LLB	Lloydminster Hardisty
	LLK	Lloydminster Kerrobert
	SC	Smiley Coleville Heavy
	WH	Wabasca Heavy
	PH	Peace Heavy
Moose Jaw Refinery Moose Jaw Tops	MJT	Moose Jaw Tops
Enbridge Crude Oil – Light	SHE	Sour Heavy Edmonton
	SO	Mixed Blend Sour
	LSB	Light Sour Blend
	SLE	Sour Light Edmonton
	SW	Mixed Sweet Blend
Enbridge US High Sweet Clearbrook Crude Oil	UHC	U.S. Sweet
CNRL Horizon Sweet Light Oil	CNS	CNRL Synthetic Blend
Husky Synthetic Crude Oil	HSB	Husky Synthetic Blend
Suncor OSA	OSA	Suncor - A
Suncor OSC	OSC	Suncor - C
Nexen Diluted Bitumen (Dilbit)	PSH	Long Lake Heavy Blend
Nexen PSC	PSC	Long Lake Synthetic Blend
Syncrude Synthetic Crude Oil	SYN	Syncrude
Conoco Philips Surmont Bitumen Canada	SHB	Surmont Heavy Blend



Shell Canada Limited Material Safety Data Sheet

Effective Date: 2008-12-04

Supersedes: 2008-09-23



Class B2 Flammable Liquid

Class D2A Embryo/Fetotoxicity
Class D2A CarcinogenicityClass D2A Chronic Toxic Effects
Class D2B Skin Irritation

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT: **ALBIAN HEAVY SYNTHETIC CRUDE**

SYNONYMS: AHS

Synthetic crude oil is a mixture of paraffins, naphthenes, aromatics and sulphur compounds

PRODUCT USE: Base product for Petroleum Refining.

PRODUCT CODE: **873-112**

SUPPLIER

Shell Canada Limited (SCL)
P.O. Box 100, Station M
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Calgary, AB Canada
T2P 2H5

TELEPHONE NUMBERS

Shell Emergency Number

CANUTEC 24 HOUR EMERGENCY NUMBER

For general information:

1-800-661-7378

1-613-996-6666

1-800-661-1600

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This MSDS was prepared by the Toxicology and Product Stewardship Section of Shell Canada Limited.

*An asterisk in the product name designates a trade-mark(s) of Shell Canada Limited, used under license by Shell Canada Products.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Component Name	CAS Number	% Range	WHMIS Controlled
Hydrocracked Residues	64741-75-9	30 - 50	Yes
Petroleum - Crude Oil	8002-05-9	25 - 70	Yes
Naphtha (Petroleum), Hydrotreated Light	64742-49-0	0 - 30	Yes
Natural Gas Condensates	68919-39-1	0 - 20	Yes
Natural Gas Condensates (C2 to C20)	64741-47-5	0 - 20	Yes
Residues (Petroleum), Vacuum	64741-56-6	0 - 15	Yes
Distillates (Petroleum), Hydrotreated Middle	64742-46-7	0 - 12.5	Yes
Naphtha (Petroleum), Hydrotreated Heavy	64742-48-9	0 - 12.5	Yes
Naphtha, heavy hydrocracked	64741-78-2	0 - 12	Yes
Clarified Oils (Petroleum), Catalytic Cracked	64741-62-4	2 - 10	Yes

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Naphtha (petroleum), heavy straight-run	64741-41-9	0 - 6	Yes
Naphtha (petroleum), Light Straight-run	64741-46-4	0 - 6	Yes
Distillates (Petroleum), Straight-run Middle	64741-44-2	0 - 5	Yes
Benzene	71-43-2	0.1 - 1	Yes
Xylene (Mixed Isomers)	1330-20-7	0.1 - 0.5 % (wt)	Yes
Ethylbenzene	100-41-4	0.05 - 0.5	Yes

Note: Xylene, ethylbenzene and benzene are not introduced into the product as intentional additives. These chemicals are contained in one or more of the blending components that make up the product.

See Section 8 for Occupational Exposure Guidelines.

3. HAZARDS IDENTIFICATION

Physical Description: Viscous Liquid Dark Brown Hydrocarbon Odour

Routes of Exposure: Exposure will most likely occur through skin contact or inhalation.

Hazards:

Flammable Liquid.

Irritating to skin.

A component in this product has been classified by IARC as carcinogenic to humans (Group 1).

May affect fetal development.

Prolonged exposure may cause serious health effects.

May be irritating to eyes.

Inhalation of oil mist or vapours from hot oil may cause irritation of the upper respiratory tract.

Handling:

Eliminate all ignition sources.

Avoid inhalation of vapours.

Wear suitable gloves and eye protection.

Bond and ground transfer containers and equipment to avoid static accumulation.

Empty containers are hazardous, may contain flammable / explosive dusts, liquid residue or vapours. Keep away from sparks and open flames.

For further information on health effects, see Section 11.

4. FIRST AID MEASURES

Eyes: Flush eyes with water for at least 15 minutes while holding eyelids open. If irritation occurs and persists, obtain medical attention.

Skin: Wash contaminated skin with mild soap and water for at least 15 minutes. If irritation occurs and persists, obtain medical attention.

Ingestion: Do not induce vomiting; get medical help immediately. Guard against aspiration into lungs by having the individual turn on to their left side. If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into the lungs.

Do not give anything by mouth to an unconscious person.

Inhalation: Remove victim from further exposure and restore breathing, if required. Obtain medical attention.

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Notes to Physician: The main hazard following accidental ingestion is aspiration of the liquid into the lungs producing chemical pneumonitis. If symptoms such as loss of gag reflex, convulsions or unconsciousness occur before vomiting, gastric lavage with a cuffed endotracheal tube should be considered.

5. FIRE FIGHTING MEASURES

Extinguishing Media: Dry Chemical
Carbon Dioxide
Foam
Water Fog

Firefighting Instructions: Flammable. Clear area of unprotected personnel. Vapours may travel along ground and flashback along vapour trail may occur. Do not use a direct stream of water as it may spread fire. Containers exposed to intense heat from fires should be cooled with water to prevent vapour pressure buildup, which could result in container rupture. Do not enter confined fire space without adequate protective clothing and an approved positive pressure self-contained breathing apparatus. Delayed lung damage can be experienced after exposure to combustion products, sometimes hours after the exposure. Fight fire from maximum distance.

Hazardous Combustion Products: A complex mixture of airborne solid, liquid, particulates and gases will evolve when this material undergoes pyrolysis or combustion. Carbon monoxide, carbon dioxide, oxides of nitrogen and oxides of sulphur may be formed on combustion.

6. ACCIDENTAL RELEASE MEASURES

Issue warning "Flammable". See Section 8 for advice on personal protective equipment. Eliminate all ignition sources. Isolate hazard area and restrict access. Stop leak only if safe to do so. Notify appropriate environmental agency(ies). Work upwind of spill if it is safe to do so. Dike and contain land spills; contain spills to water by booming. Do not wash spills into sewers or other public water systems. For large spills remove by mechanical means and place in containers. Adsorb residue or small spills with adsorbent material and remove to non-leaking containers for disposal. After area has been cleaned up to the satisfaction of regulatory authorities, flush area with water to remove trace residue. Dispose of recovered material as noted under Disposal Considerations.

7. HANDLING AND STORAGE

Handling: Flammable. Fixed equipment as well as transfer containers and equipment should be grounded to prevent accumulation of static charge. Avoid breathing vapours and prolonged or repeated contact with skin. Do not cut, drill, grind, weld or perform similar operations on or near containers. Empty containers are hazardous, may contain flammable/explosive dusts, residues or vapours. Launder contaminated clothing prior to reuse. Wash with soap and water prior to eating, drinking, smoking, applying cosmetics or using toilet facilities. Use good personal hygiene.

Storage: Tank storage should be done according to NFPA Code 30 for crude oils.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

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The following information, while appropriate for this product, is general in nature. The selection of personal protective equipment will vary depending on the conditions of use.

OCCUPATIONAL EXPOSURE LIMITS (Current ACGIH TLV/TWA unless otherwise noted):

North American exposure limits have not been established for the product. Consult local and provincial authorities for acceptable values.

Xylene: 100 ppm (STEL: 150 ppm)

Naphtha (Carbon range C3 to C11): SCL's internal guideline is 900 mg/m³ total hydrocarbon as an OEL (8-hour TWA).

Petroleum Distillates (Carbon range C9 to C20): SCL's internal guideline is 100 mg/m³ total hydrocarbon as an OEL (8-hour TWA).

Polycyclic Aromatic Hydrocarbons (PAH): SCL's internal guideline is 0.02 mg/m³ as an OEL (8-hour TWA).

Benzene (skin) : 0.5 ppm (STEL: 2.5 ppm)

Ethyl benzene: 100 ppm (STEL: 125 ppm)

Skin Notation: Absorption through skin, eyes and mucous membranes may contribute significantly to the total exposure.

**Mechanical
Ventilation:**

Use explosion-proof ventilation as required to control vapour concentrations. Concentrations in air should be maintained below the occupational exposure limit if unprotected personnel are involved. Make up air should always be supplied to balance air exhausted (either generally or locally). Local ventilation recommended where general ventilation is ineffective in controlling airborne concentrations below the recommended occupational exposure limit. For personnel entry into confined spaces (i.e. bulk storage tanks) a proper confined space entry procedure must be followed including ventilation and testing of tank atmosphere.

PERSONAL PROTECTIVE EQUIPMENT:

Eye Protection: Chemical safety goggles and/or full face shield to protect eyes and face, if product is handled such that it could be splashed into eyes.

Skin Protection: Avoid contact with skin. Impervious gloves (viton, nitrile) should be worn at all times when handling this material. In confined spaces or where the risk of skin exposure is much higher, impervious clothing should be worn. Use protective clothing and gloves manufactured from nitrile.

Respiratory Protection: Avoid breathing vapour or mists. If exposure exceeds occupational exposure limits, use an appropriate NIOSH-approved respirator. Depending on airborne concentration, use either a NIOSH-approved chemical cartridge respirator with organic vapour cartridges in combination with a P95 particulate filter or use a NIOSH-approved supplied-air respirator, either self-contained or airline, operated in positive pressure mode.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Viscous Liquid
Appearance:	Dark Brown
Odour:	Hydrocarbon Odour
Odour Threshold:	Not available
Boiling Point:	0 - 930 °C
Density:	930 - 940 kg/m ³ @ 15 °C
Specific Gravity (Water = 1):	0.93 - 0.94

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pH:	Not available
Flash Point:	< 0 °C
Lower Flammable Limit:	Not available
Upper Flammable Limit:	Not available
Autoignition Temperature:	Not available
Viscosity:	350 cSt @ pipeline reference temperature
Evaporation Rate (n-BuAc = 1):	Not available
Partition Coefficient (log K_{ow}):	Not available
Water Solubility:	Insoluble
Other Solvents:	Hydrocarbon solvents (benzene, ether, chloroform)

10. STABILITY AND REACTIVITY

Chemically Stable:	Yes
Hazardous Polymerization:	No
Sensitive to Mechanical Impact:	No
Sensitive to Static Discharge:	Yes
Hazardous Decomposition Products:	When heated to decomposition, may emit toxic and corrosive fumes of sulphur oxides, as well as CO, CO ₂ , uncombusted hydrocarbons and soot.
Incompatible Materials:	Avoid strong oxidizing agents.
Conditions of Reactivity:	Avoid excessive heat, formation of vapours or mists.

11. TOXICOLOGICAL INFORMATION

Ingredient (or Product if not specified)	Toxicological Data
Hydrocracked Residues	LD50 Oral Rat = 4320 mg/kg LD50 Dermal Rat > 2000 mg/kg LD50 Dermal Rabbit > 2000 mg/kg
Petroleum - Crude Oil	LD50 Oral Rat > 4300 mg/kg LD50 Dermal Rabbit > 2000 mg/kg
Naphtha (Petroleum), Hydrotreated Light	LD50 Oral Rat > 5000 mg/kg LD50 Dermal Rabbit > 2000 mg/kg
Natural Gas Condensates	LD50 Oral Rat > 3000 mg/kg
Natural Gas Condensates (C2 to C20)	LC50 Inhalation Rat > 5200 mg/m ³ for 4hours LD50 Oral Rat = 14000 mg/kg LD50 Dermal Rabbit > 2000 mg/kg
Residues (Petroleum), Vacuum	
Distillates (Petroleum), Hydrotreated Middle	LD50 Dermal Rat > 2000 mg/kg LD50 Oral Rat > 5000 mg/kg
Naphtha (Petroleum), Hydrotreated Heavy	LD50 Oral Rat > 5000 mg/kg LD50 Dermal Rabbit > 3160 mg/kg
Naphtha, heavy hydrocracked	LC50 Inhalation Rat > 5240 mg/m ³ for 4hours LD50 Oral Rat > 5000 mg/kg LD50 Dermal Rabbit > 2000 mg/kg
Clarified Oils (Petroleum), Catalytic Cracked	LD50 Oral Rat 4300 mg/kg
Naphtha (petroleum), heavy straight-run	LC50 Inhalation Rat > 5000 mg/m ³ for 4hours
Naphtha (petroleum), Light Straight-run	
Distillates (Petroleum), Straight-run Middle	LC50 Inhalation Rat 1700 mg/m ³ for 4hours

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Benzene	LD50 Oral Rat 690 - 3400 mg/kg LC50 Inhalation Rat 13700 ppm for 4 hours LD50 Dermal Rabbit > 8260 mg/kg
Xylene (Mixed Isomers)	LD50 Oral Rat = 4300 mg/kg LC50 Inhalation Rat = 6700 ppm for 4 hours LD50 Dermal Rabbit > 2000 mg/kg
Ethylbenzene	LD50 Oral Rat = 3500 mg/kg LC50 Inhalation Rat = 4000 ppm for 4 hours LD50 Dermal Rabbit = 17.8 mL/kg

Routes of Exposure:

Exposure will most likely occur through skin contact or inhalation.

Irritancy:

Based on the ingredients, this product is expected to be irritating to skin.

Chronic Effects:

Prolonged or repeated contact may cause various forms of dermatitis including folliculitis and oil acne. Long term intensive exposure to oil mist may cause benign lung fibrosis. Repeated and/or prolonged exposure to cat-cracked clarified oils may cause liver damage.

Feto/Teratogenicity:

High exposures to xylene in some animal studies, often at levels toxic to the mother, have affected embryo/fetal development. Other animal and human studies have not shown this effect. Oral or dermal exposure of pregnant rats to cat-cracked clarified oils produced embryotoxicity and fetal abnormalities at maternally toxic doses.

Pre-existing Conditions:

Pre-existing skin disorders may be aggravated by exposure to components of this product.

Carcinogenicity and Mutagenicity:

Carcinogenic hazard. Results of Modified Ames tests indicate that this product may have significant carcinogenic properties. This product may contain a variety of polycyclic aromatic hydrocarbons (PAH), some of which are associated with the potential of inducing skin cancer. Increasing amounts of PAH may be released if this product is heated above 200 C. A component of this product has produced mutagenic effects. This product contains benzene. Repeated exposure to benzene concentrations greater than the recommended TLV/TWA may reduce the cellular components of peripheral blood and bone marrow. Epidemiological studies indicate that long term inhalation of benzene vapour can cause leukaemia in man. Benzene has also produced chromosomal aberrations in peripheral blood lymphocytes. IARC has listed Ethylbenzene among those materials for which there is limited evidence for carcinogenicity in animals and inadequate evidence in humans. As a result, Ethylbenzene is classified by IARC as a possible human carcinogen (i.e. IARC 2b)

12. ECOLOGICAL INFORMATION**Environmental Effects:**

The immediate effect of a release is the physical impairment of the environment from the coating of surfaces, resulting in the disruption of oxygen, water and light to flora and fauna. In the event of a release, the light fraction will vaporize and cause exposure via breathing and body contact. May cause physical fouling of aquatic and avian organisms. Prolonged exposure may result in the partitioning of light-end hydrocarbon fractions into the water and gas phases of the subsurface soil environment with potential to adversely affect soil and groundwater quality.

Biodegradability:

Not readily biodegradable.

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13. DISPOSAL CONSIDERATIONS

Waste management priorities (depending on volumes and concentration of waste) are: 1. recycle (reprocess), 2. energy recovery 3. incineration, 4. disposal at a licenced waste disposal facility. Do not attempt to combust waste on-site. Incinerate at a licenced waste disposal site with approval of environmental authority. Landfill adsorbed material in a government approved site.

14. TRANSPORT INFORMATION**Canadian Road and Rail Shipping Classification:**

UN Number	UN1268
Proper Shipping Name	PETROLEUM DISTILLATES, N.O.S.
Hazard Class	Class 3 Flammable Liquids
Packing Group	PG I
Additional Information	Marine Pollutant
Shipping Description	PETROLEUM DISTILLATES, N.O.S. Class 3 UN1268 PG I
	Marine Pollutant

15. REGULATORY INFORMATION

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

WHMIS Class: Class B2 Flammable Liquid
Class D2A Embryo/Fetotoxicity
Class D2A Carcinogenicity
Class D2A Chronic Toxic Effects
Class D2B Skin Irritation

DSL/NDL Status: This product, or all components, are listed on the Domestic Substances List, as required under the Canadian Environmental Protection Act.

Other Regulatory Status: The regulatory information is not intended to be comprehensive. Other regulations may apply to this material. For purposes of TSCA, the product is a mixture of certain blending components, all of which are on the TSCA Inventory. Individual shipments of this product will not necessarily contain all of the blending components listed in Section 2 above.

16. OTHER INFORMATION**LABEL STATEMENTS**

Hazard Statement : Flammable Liquid.
Irritating to skin.
A component in this product has been classified by IARC as carcinogenic to humans (Group 1).
May affect fetal development.
Prolonged exposure may cause serious health effects.

Handling Statement: Eliminate all ignition sources.
Avoid inhalation of vapours.

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First Aid Statement :

Wear suitable gloves and eye protection.
Bond and ground transfer containers and equipment to avoid static accumulation.
Empty containers are hazardous, may contain flammable / explosive dusts, liquid residue or vapours. Keep away from sparks and open flames.
Wash contaminated skin with soap and water.
Flush eyes with water.
If overcome by vapours remove to fresh air.
Do not induce vomiting.
Obtain medical attention.

Revisions:

This MSDS has been reviewed and updated. Changes have been made to: Section 1 Section 2 Section 3 Section 6 Section 8 Section 9 Section 11 Section 12 Section 14 Section 15

**Surmont Bitumen (Canada)****Safety Data Sheet****Section 1: Identification of the substance or mixture and of the supplier**

Product Name:	Surmont Bitumen (Canada)
SDS Number:	778993
MARPOL Annex I Category:	Crude Oils
Intended Use:	Feedstock
Manufacturer:	ConocoPhillips Canada Limited or its Affiliates PO Box 130, 401 9th Ave. SW Calgary, Alberta T2P 2H7 Canada
Emergency Health and Safety Number:	Chemtrec: 800-424-9300 (24 Hours) CANUTEC (613) 996-6666
Customer Service:	403-233-4000
Technical Information:	403-233-4000
SDS Information:	Phone: 855-244-0762 Email: SDS@conocophillips.com URL: www.conocophillips.com

Section 2: Hazard(s) Identification**Classification**

H304 -- Aspiration Hazard -- Category 1
H319 -- Eye damage/irritation -- Category 2
H336 -- Specific target organ toxicity (single exposure) -- Category 3
H373 -- Specific target organ toxicity (repeated exposure) -- Category 2
H350 -- Carcinogenicity -- Category 1B
H411 -- Hazardous to the aquatic environment, chronic toxicity -- Category 2

Label Elements**DANGER**

Causes serious eye irritation. (H319)*

May cause drowsiness or dizziness. (H336)*

May cause damage to organs through prolonged or repeated exposure. (H373)*

May cause cancer. (H350)*

Toxic to aquatic life with long lasting effects. (H411)*

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Precautionary Statement(s):

Obtain special instructions before use. (P201)*
Do not handle until all safety precautions have been read and understood. (P202)*
Do not breathe dust/fume/gas/mist/vapours/spray. (P260)
Wash thoroughly after handling. (P264)*
Use only outdoors or in a well-ventilated area. (P271)*
Avoid release to the environment. (P273)*
Wear protective gloves / protective clothing / eye protection / face protection. (P280)*
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. (P305+P351+P338*)
If eye irritation persists: Get medical advice/attention. (P313)*
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. (P301+P310)*
Do NOT induce vomiting. (P331)*
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. (P340)*
Get medical advice/attention if you feel unwell. (P314)*
Collect spillage. (P391)*
Store locked up. (P405)*
Store in a well-ventilated place. Keep container tightly closed. (P403+P233)*
Dispose of contents/container to approved disposal facility. (P501)*

**(Applicable GHS hazard code.)*

Section 3: Composition / Information on Ingredients

Component	CASRN	Concentration ¹
Crude Oil (Petroleum)	8002-05-9	100
Benzene	71-43-2	<2
Naphthalene	91-20-3	<1

Total Sulfur: < 0.5 wt%

¹ All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Section 4: First Aid Measures

Eye Contact: For direct contact, remove contact lenses if present and easy to do. Immediately hold eyelids apart and flush the affected eye(s) with clean water for at least 20 minutes. Seek immediate medical attention.

Skin Contact: Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops and persists, seek medical attention.

Inhalation (Breathing): If respiratory symptoms develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. If breathing is difficult, oxygen or artificial respiration should be administered by qualified personnel. If symptoms persist, seek medical attention.

Ingestion (Swallowing): First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

Most important symptoms and effects

Acute: Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue.

Delayed: Dry skin and possible irritation with repeated or prolonged exposure.

Notes to Physician: Federal regulations (29 CFR 1910.1028) specify medical surveillance programs for certain exposures to benzene above the action level or PEL (specified in Section (i)(1)(i) of the Standard). In addition, employees exposed in an emergency situation shall, as described in Section (i)(4)(i), provide a urine sample at the end of the shift for measurement of urine phenol.

Section 5: Fire-Fighting Measures



NFPA 704 Hazard Class

Health: 1 **Flammability:** 1 **Instability:** 0 (0-Minimal, 1-Slight, 2-Moderate, 3-Serious, 4-Severe)

Unusual Fire & Explosion Hazards: This material may burn, but will not ignite readily. If container is not properly cooled, it can rupture in the heat of a fire.

Extinguishing Media: Dry chemical, carbon dioxide, foam, or water spray is recommended. Water or foam may cause frothing of materials heated above 212°F / 100°C. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

Fire Fighting Instructions: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Oxides of nitrogen and sulfur may also be formed.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

Section 6: Accidental Release Measures

Personal Precautions: This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

Methods for Containment and Clean-Up: Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken. See Section 13 for information on appropriate disposal.

Section 7: Handling and Storage

Precautions for safe handling: Keep away from flames and hot surfaces. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe vapors or mists. Wear protective gloves/clothing and eye/face protection. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8).

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Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes.

Conditions for safe storage: Keep container(s) tightly closed and properly labeled. This material may contain or release poisonous hydrogen sulfide gas. In a tank, barge, or other closed container, the vapor space above this material may accumulate hazardous concentrations of hydrogen sulfide. Check atmosphere for oxygen content, H₂S, and flammability prior to entry. Use and store this material in cool, dry, well-ventilated area away from heat and all sources of ignition. Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Section 8: Exposure Controls / Personal Protection

Component	ACGIH	OSHA	Other
Crude Oil (Petroleum)	---	---	TWA:100 mg/m ³ - 8 hr (ConocoPhillips Guidelines)
Benzene	STEL: 2.5 ppm TWA: 0.5 ppm Skin	Ceiling: 25 ppm STEL: 5 ppm TWA: 10 ppm TWA: 1 ppm	---
Naphthalene	STEL: 15 ppm TWA: 10 ppm 2 ppm TWA; skin; A3 - confirmed animal carcinogen with unknown relevance to humans; TLV basis: upper respiratory tract irritation Skin	TWA: 10 ppm : 50 mg/m ³	TWA: 0.2 mg/m ³ (as total of 17 PNA"s measured by NIOSH Method 5506) (ConocoPhillips Guidelines)

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye protection (such as splash goggles) that meets or exceeds ANSI Z.87.1 is recommended when there is potential liquid contact to the eye. Depending on conditions of use, a face shield may be necessary.

Skin/Hand Protection: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the breakthrough performance of their products. Suggested protective materials: Nitrile

Respiratory Protection: Where there is potential for airborne exposure above the exposure limit a NIOSH certified air purifying respirator equipped with organic vapor cartridges/canisters may be used.

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use. Air purifying respirators provide limited protection and cannot be used in atmospheres that exceed the maximum use concentration (as directed by regulation or the manufacturer's instructions), in oxygen deficient (less than 19.5 percent oxygen) situations, or under conditions that are immediately dangerous to life and health (IDLH).

If benzene concentrations equal or exceed applicable exposure limits, OSHA requirements for personal protective equipment, exposure monitoring, and training may apply (29CFR1910.1028 - Benzene).

Other Protective Equipment: Eye wash and quick-drench shower facilities should be available in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse.

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

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Section 9: Physical and Chemical Properties

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance:	Dark brown
Physical Form:	Liquid
Odor:	Petroleum
Odor Threshold:	No data
pH:	Not applicable
Vapor Pressure:	<1 mm Hg
Vapor Density (air=1):	>1
Initial Boiling Point/Range:	403 - 1328 °F / 206 - 720 °C
Melting/Freezing Point:	No data
Pour Point:	No data
Solubility in Water:	Insoluble
Partition Coefficient (n-octanol/water) (Kow):	No data
Specific Gravity (water=1):	7.2 °API
Viscosity:	973.5 cSt @ 82°C; 9341.0 cSt @ 54.2°C
Evaporation Rate (nBuAc=1):	No data
Flash Point:	> 284 °F / > 140 °C
Test Method:	Cleveland Open Cup (COC), ASTM D92
Lower Explosive Limits (vol % in air):	No data
Upper Explosive Limits (vol % in air):	No data
Auto-ignition Temperature:	No data

Section 10: Stability and Reactivity

Stability: Stable under normal ambient and anticipated conditions of use.

Conditions to Avoid: Avoid all possible sources of ignition.

Materials to Avoid (Incompatible Materials): Avoid contact with strong oxidizing agents and strong reducing agents.

Hazardous Decomposition Products: Not anticipated under normal conditions of use.

Hazardous Polymerization: Not known to occur.

Section 11: Toxicological Information

Information on Toxicological Effects of Substance/Mixture

<u>Acute Toxicity</u>	<u>Hazard</u>	<u>Additional Information</u>	<u>LC50/LD50 Data</u>
Inhalation	Expected to have a low degree of toxicity by inhalation		> 5 mg/L (vapor)
Skin Absorption	Unlikely to be harmful		> 2 g/kg
Ingestion (Swallowing)	Unlikely to be harmful		> 5 g/kg

Aspiration Hazard: Not expected to be an aspiration hazard.

Skin Corrosion/Irritation: Causes mild skin irritation. Repeated exposure may cause skin dryness or cracking.

Serious Eye Damage/Irritation: Causes serious eye irritation.

Signs and Symptoms: Effects of overexposure may include irritation of the digestive tract, irritation of the respiratory tract, nausea, vomiting, diarrhea and signs of nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue).

Skin Sensitization: Not expected to be a skin sensitizer.

Respiratory Sensitization: No information available.

Specific Target Organ Toxicity (Single Exposure): May cause drowsiness and dizziness.

Specific Target Organ Toxicity (Repeated Exposure): May cause damage to organs through prolonged or repeated exposure. Laboratory animal studies of crude oil by the dermal and inhalation exposure routes have demonstrated toxicity to the liver, blood, spleen and thymus

Carcinogenicity: May cause cancer. Chronic application of crude oil to mouse skin resulted in an increased incidence of skin tumors. IARC concluded in its Crude Oil Monograph that there is limited evidence of carcinogenicity in animals, and that crude oil is not classifiable as to its carcinogenicity in humans (Group 3). It has not been listed as a carcinogen by NTP or OSHA.

Germ Cell Mutagenicity: Inadequate information available.

Reproductive Toxicity: Inadequate information available. Dermal exposure to crude oil during pregnancy resulted in limited evidence of developmental toxicity in laboratory animals. Decreased fetal weight and increased resorptions were noted at maternally toxic doses. No significant effects on pup growth or other developmental landmarks were observed postnatally.

Other Comments: This material may contain varying concentrations of polycyclic aromatic hydrocarbons (PAHs) which have been known to produce a phototoxic reaction when contaminated skin is exposed to sunlight. The effect is similar in appearance to an exaggerated sunburn, and is temporary in duration if exposure is discontinued. Continued exposure to sunlight can result in more serious skin problems including pigmentation (discoloration), skin eruptions (pimples), and possible skin cancers.

Information on Toxicological Effects of Components

Xylenes

Target Organs: Rats exposed to xylenes at 800, 1000 or 1200 ppm 14 hours daily for 6 weeks demonstrated high frequency hearing loss. Another study in rats exposed to 1800 ppm 8 hours daily for 5 days demonstrated middle frequency hearing loss.

Reproductive Toxicity: Both mixed xylenes and the individual isomers produced limited evidence of developmental toxicity in laboratory animals. Inhalation and oral administration of xylene resulted in decreased fetal weight, increased incidences of delayed ossification, skeletal variations and resorptions, but no evidence of teratogenicity.

Toluene

Carcinogenicity: Exposure of rats and mice to toluene at concentrations ranging from 120-1200 ppm for two years did not demonstrate evidence of carcinogenicity. Toluene has not been listed as a carcinogen by IARC.

Target Organs: Epidemiology studies suggest that chronic occupational overexposure to toluene may damage color vision. Subchronic and chronic inhalation studies with toluene produced kidney and liver damage, hearing loss and central nervous system (brain) damage in laboratory animals. Intentional misuse by deliberate inhalation of high concentrations of toluene has been shown to cause liver, kidney, and central nervous system damage, including hearing loss and visual disturbances.

Reproductive Toxicity: Exposure to toluene during pregnancy has demonstrated limited evidence of developmental toxicity in laboratory animals. Decreased fetal body weight and increased skeletal variations in both inhalation and oral studies, but only at doses that were maternally toxic. No fetal toxicity was seen at doses that were not maternally toxic. Decreased sperm counts have been observed in male rats in the absence of a reduction in fertility. Toluene has been reported to cause mental or growth retardation in the children of solvent abusers who directly inhale toluene during pregnancy.

Benzene

Carcinogenicity: Benzene is an animal carcinogen and is known to produce acute myelogenous leukemia (a form of cancer) in humans. Benzene has been identified as a human carcinogen by IARC, the US National Toxicology Program and the US-Occupational Safety and Health Administration.

Target Organs: Prolonged or repeated exposures to benzene vapors can cause damage to the blood and blood forming organs, including disorders like leukopenia, thrombocytopenia, and aplastic anemia.

Reproductive Toxicity: Some studies in occupationally exposed women have suggested benzene exposure increased risk of miscarriage and stillbirth and decreased birth weight and gestational age. The size of the effects detected in these studies was small, and ascertainment of exposure and outcome in some cases relied on self-reports, which may limit the reliability of these results.

Germ Cell Mutagenicity: Benzene exposure has resulted in chromosomal aberrations in human lymphocytes and animal bone marrow cells. Exposure has also been associated with chromosomal aberrations in sperm cells in human and animal studies.

Ethyl Benzene

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Carcinogenicity: Rats and mice exposed to 0, 75, 250, or 750 ppm ethyl benzene in a two year inhalation study demonstrated limited evidence of kidney, liver, and lung cancer. Ethyl benzene has been listed as a possible human carcinogen by IARC.

Target Organs: In rats and mice exposed to 0, 75, 250, or 750 ppm ethyl benzene in a two year inhalation study there was mild damage to the kidney (tubular hyperplasia), liver (eosinophilic foci, hypertrophy, necrosis), lung (alveolar epithelium metaplasia), thyroid (hyperplasia), thyroid (hyperplasia) and pituitary (hyperplasia). In animal models (particularly rats), ethyl benzene affects the auditory function mainly in the cochlear mid-frequency range and ototoxicity was observed after combined exposure to noise and ethyl benzene. There is no evidence of either ethyl benzene-induced hearing losses or ototoxicity with combined exposure to ethyl benzene and noise in workers.

Naphthalene

Carcinogenicity: Naphthalene has been evaluated in two year inhalation studies in both rats and mice. The US National Toxicology Program (NTP) concluded that there is clear evidence of carcinogenicity in male and female rats based on increased incidences of respiratory epithelial adenomas and olfactory epithelial neuroblastomas of the nose. NTP found some evidence of carcinogenicity in female mice (alveolar adenomas) and no evidence of carcinogenicity in male mice. Naphthalene has been identified as a carcinogen by IARC and NTP.

Section 12: Ecological Information

Toxicity: Experimental studies of acute aquatic toxicity show values for crude oil in the range of 2 to over 100 mg/L. These values are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon compositions. Crude oil should be regarded as harmful to aquatic organisms, with the potential to cause long term adverse effects in the aquatic environment. Classification: H411; Chronic Cat 2.

Persistence and Degradability: Most crude oils are not regarded as readily biodegradable. Most of the non-volatile constituents are inherently biodegradable; some of the highest molecular weight components are persistent in water.

Persistence per IOPC Fund definition: Persistent

Bioaccumulative Potential: Log Kow values measured for the hydrocarbon components of this material range from less than 2 to greater than 6, and therefore would be regarded as having the potential to bioaccumulate.

Mobility in Soil: Crude oil spreads as a film on the surface of water, facilitating loss of its lighter components by volatilization. In air, the volatile hydrocarbons undergo photodegradation by reaction with hydroxyl radicals with half-lives varying from 0.5 days for n-dodecane to 6.5 days for benzene. The lower molecular weight aromatic hydrocarbons and some polar compounds have low but significant water solubility. Some higher molecular weight compounds are removed by emulsification and these also slowly biodegrade; others adsorb to sediment and sink. A further removal process from water involving the heavier fraction is agglomeration to form tars, some of which sink.

Other Adverse Effects: None anticipated.

Section 13: Disposal Considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations.

This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste. However, it would likely be identified as a federally regulated RCRA hazardous waste for the following characteristic(s) shown below. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the MSDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste.

Container contents should be completely used and containers should be emptied prior to discard. Container residues and rinseates could be considered to be hazardous wastes.

EPA Waste Number(s)

- D018 - Toxicity characteristic (Benzene)

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Section 14: Transport Information

Canadian (TDG)

Shipping Description: UN3082, Environmentally hazardous substance, liquid, n.o.s. (Petroleum oil), 9, III, Marine Pollutant

Small Means of Containment

Package Marking:

UN3082, Environmentally hazardous substance, liquid, n.o.s., (Petroleum oil), [Marine Pollutant]

Package Labeling:

Class 9

Large Means of Containment

Package Placard/Marking:

Class 9 / 3082

ERAP Index:

None

Emergency Response Guide:

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Note: *If shipping to the United States, see U.S. DOT section for compliance.*

U.S. Department of Transportation (DOT)

Shipping Description: *Aquatic toxicity studies indicate this material may be classified as a Marine Pollutant under IMDG Code. It is not currently regulated as a marine pollutant by the USDOT. If there is not a Shipping Description or other DOT marking, labeling, placarding and packaging references shown in this section, it is not regulated as a hazardous material by the USDOT.*

; Non-Bulk shipments by land are not regulated. ;

Note: *If shipped by land in a packaging having a capacity of 3,500 gallons or more, the provisions of 49 CFR, Part 130 apply. (Contains oil)
This product is regulated by DOT when shipped in bulk packages at temperatures >100° C (212° F). The word HOT must be marked on the bulk package on two opposing sides. [49 CFR 172.325]
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not applicable*

International Maritime Dangerous Goods (IMDG)

Shipping Description: UN3082, Environmentally hazardous substance, liquid, n.o.s., (Petroleum oil), 9, III, Marine Pollutant

Non-Bulk Package Marking: UN3082, Environmentally hazardous substance, liquid, n.o.s., (Petroleum oil), [Marine Pollutant]

Labels:

Class 9

Placards/Marking (Bulk):

Class 9 / 3082

Packaging - Non-Bulk:

P001, LP01

EMS:

F-A, S-F

Note:

***Note: Marine Pollutant Mark not required if container is < 5 L or 5 kg
U.S. DOT compliance requirements may apply. See 49 CFR 171.22, 23 & 25.***

International Civil Aviation Org. / International Air Transport Assoc. (ICAO/IATA)

UN/ID #: UN3082

Proper Shipping Name: Environmentally hazardous substance, liquid, n.o.s. (Petroleum oil)

Hazard Class/Division: 9

Packing Group: III

Non-Bulk Package Marking: UN3082, Environmentally hazardous substance, liquid, n.o.s. (Petroleum oil), [Environmentally Hazardous Substance Mark] (if > 5L container)

Labels:

Class 9

ERG Code:

9L

Note:

***Note: Environmentally Hazardous Substance Mark not required if container is < 5 L or 5 kg
U.S. DOT compliance requirements may apply. See 49 CFR 171.22, 23 & 24.***

	LTD. QTY	Passenger Aircraft	Cargo Aircraft Only
Packaging Instruction #:	Y964	964	964
Max. Net Qty. Per Package:	30 kg	450 L	450 L

Section 15: Regulatory Information

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Status: **FINAL****CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):**

This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

CERCLA/SARA - Section 311/312 (Title III Hazard Categories)

Acute Health: Yes
Chronic Health: Yes
Fire Hazard: No
Pressure Hazard: No
Reactive Hazard: No

CERCLA/SARA - Section 313 and 40 CFR 372:

This material contains the following chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372:

Component	Concentration ¹	de minimis
Xylenes	<6	1.0%
Toluene	<3	1.0%
Benzene	<2	0.1%
Ethyl Benzene	<1	0.1%
Naphthalene	<1	0.1%

EPA (CERCLA) Reportable Quantity (in pounds):

EPA's Petroleum Exclusion applies to this material - (CERCLA 101(14)).

California Proposition 65:

Warning: This material may contain detectable quantities of the following chemicals, known to the State of California to cause cancer, birth defects or other reproductive harm, and which may be subject to the warning requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):

Component	Type of Toxicity
Toluene	Developmental Toxicant Female Reproductive Toxicant
Benzene	Cancer Developmental Toxicant Male Reproductive Toxicant
Ethyl Benzene	Cancer
Naphthalene	Cancer
Various Polycyclic Aromatic Hydrocarbons	Skin Cancer

International Hazard Classification**Canada:**

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

WHMIS Hazard Class:

D2A
D2B

National Chemical Inventories

All components are either listed on the US TSCA Inventory, or are not regulated under TSCA

All components are either on the DSL, or are exempt from DSL listing requirements

U.S. Export Control Classification Number: 1C981

Section 16: Other Information

Date of Issue:

03-Apr-2012

Status:

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Previous Issue Date:

07-Feb-2012

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Revised Sections or Basis for Revision:

Identified Hazards (Section 2)
Precautionary Statement(s) (Section 2)
First Aid (Section 4)
Shipping information (Section 14)
Regulatory information (Section 15)
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SDS Number:**Guide to Abbreviations:**

ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer of Expressed and implied Warranties:

The information presented in this Material Safety Data Sheet is based on data believed to be accurate as of the date this Material Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.



MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

PRODUCT: **Synthetic Crude Oil**
Syncrude Sweet Blend; Syncrude Sweet Premium

SAN 0930

MANUFACTURER:
Syncrude Canada Ltd.
P.O. Bag 4009
Fort McMurray, AB
Canada T9H 3L1
Emergency Telephone No. (780) 790-5094

SYNONYMS: Synthetic Crude Oil; SSB; SSP
Syncrude sample Tag # 200000

PRODUCT USE: Refinery feedstock for petroleum and petrochemical refining.

PREPARED BY: Industrial Hygiene
Kelleigh McCutcheon
(780) 790-5249

DATE OF PREPARATION/REVISION: March 16, 2009

2. COMPOSITION, INFORMATION ON INGREDIENTS

CAS #: 8002-05-9

A low sulfur blend of treated naphtha, light gas oil, and heavy gas oil petroleum fractions derived from bitumen. It consists predominantly of paraffins, cyclic paraffins, and cyclic aromatic hydrocarbons having carbon numbers predominantly in the range of C3 to C50, boiling between -20 and 550 °C. It may also contain small amounts of benzene and oxygenated compounds.

<u>Hazardous Ingredients</u>	<u>Composition</u>	<u>CAS #</u>
Benzene	0.2 Wt.%	CAS # 71-43-2

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

A yellow, translucent, slightly viscous liquid with a hydrocarbon odour. Extremely flammable. Crude oil can cause eye, skin, gastrointestinal, and respiratory tract irritation. May cause serious health effects if inhaled or swallowed. Aspirated crude oil is a threat to life.

ROUTE OF ENTRY: Skin contact, skin absorption, eye contact, inhalation, and ingestion.

EFFECTS OF ACUTE EXPOSURE:

EYES: May cause irritation.

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SKIN: May cause irritation. May cause moderate inflammatory redness, fluid build-up, and slight burning on exposed skin. May damage the liver and kidneys.

INGESTION: May cause irritation and inflammation of the gastrointestinal tract. May cause vomiting, bloating, weight loss, mild mental depression, decreased plasma glucose level, nausea, diarrhea, and abdominal pain. May cause liver and kidney damage. May cause excitement of the central nervous system, as expressed by jerking eye movements, muscle tremors, and short sudden seizures. May affect blood clotting and cellular respiration. May affect reproduction, and cause developmental effects.

Ingestion of crude oil may result in aspiration into the lungs. Symptoms of aspiration may include coughing, choking, shortness of breath, increased respiration, chemical pneumonitis, and pulmonary edema. Liver and kidney damage can occur following aspiration.

INHALATION: Inhalation of crude oil may cause respiratory tract irritation. May cause central nervous system depression, chemical pneumonitis, respiratory arrest, euphoria, and cardiac dysrhythmia. May damage the liver, kidneys, and lungs.

EFFECTS OF CHRONIC EXPOSURE:

EYES: Effects not reported.

SKIN: May cause irritation characterized by inflammation, dryness, pigmentation, and/or lesions of the hair follicles. May aggravate existing skin conditions. May affect the blood, liver, and kidneys. May cause changes to the skin.

INGESTION: Effects not reported.

INHALATION: May cause irritation.

4. FIRST AID MEASURES

INHALATION: Move victim to uncontaminated area. If breathing has stopped, trained personnel should begin artificial respiration, or, if the heart has stopped, cardiopulmonary resuscitation (CPR) immediately. Apply oxygen if available. Obtain medical attention.

EYES: Immediately flush eyes with water for at least 15 minutes. If irritation persists, seek medical attention.

SKIN: Remove contaminated clothing. Wash affected area with soap and water. If irritation persists, seek medical attention.

INGESTION: DO NOT INDUCE VOMITING BECAUSE OF DANGER OF ASPIRATING LIQUID INTO LUNGS. If spontaneous vomiting occurs, monitor for breathing difficulty. Get immediate medical attention.

GENERAL: In all cases seek medical attention.

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**Syncrude Sweet Blend
Crude Oil****SAN 0930****5. FIRE FIGHTING MEASURES****FLASH POINT** (Tag Closed Cup): below -20 °C**FLAMMABLE LIMITS IN AIR:** Not available**AUTO-IGNITION TEMPERATURE:** 245 °C**FIRE & EXPLOSION HAZARDS:**

Flammable near any source of ignition with vapour concentration within explosion limits.

EXTINGUISHING MEDIA:

Class B fire extinguishers: Carbon Dioxide, dry powder, foam, and polymer foam. Water fog can be used by trained fire prevention personnel.

FIRE FIGHTING PROCEDURES:

Evacuate all personnel from danger area. Exposed firefighters must wear full bunker gear, including a NIOSH approved positive pressure self-contained breathing apparatus with full-face mask. Shut off sources of fuel and ignition. Stop flow of material, and contain spill. Cover with extinguishing media. Use water spray to cool fire-exposed containers, and as a protective screen. To avoid spreading fire, do not point solid water stream directly into burning material.

6. ACCIDENTAL RELEASE MEASURES**LEAK AND SPILL PROCEDURE:**

Shut off all sources of ignition and evacuate area. Ventilate area of spill. Dike large spill with non-flammable material. Absorb on inert material and place in closed container for recycling or disposal. Personal Protective Equipment must be worn by clean-up crew.

7. HANDLING AND STORAGE**HANDLING PROCEDURES AND EQUIPMENT:**

Avoid prolonged or repeated exposure to vapours. Avoid skin contact. Wash thoroughly after handling. Contact lens may absorb vapours and cause eye irritation.

STORAGE REQUIREMENTS:

Keep away from direct sunlight, heat, flame, or sources of spark. Do not store near oxidizing material. Provide adequate ventilation. Keep containers tightly closed and grounded.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION**ENGINEERING CONTROLS:**

Ventilate confined space before entry. Provide local exhaust where appropriate to minimize fugitive vapours or mists. Provide adequate general ventilation to dilute vapour concentrations within buildings.

PERSONAL PROTECTIVE EQUIPMENT:

Gloves: Acrylonitrile or neoprene

Respirator: NIOSH approved air purifying organic vapour at low concentrations (< 1000 ppm)

Eye: Monogoggles

Footwear: Not required under normal conditions. Remove and change footwear if contaminated.

Clothing: Coveralls/apron as required.

EXPOSURE LIMITS:

8-hour OEL= 300 ppm (total hydrocarbon)

8-hour OEL = 5 mg/m³ (aerosol)

Benzene 8-hour OEL = 1 ppm

Benzene 15-minute OEL = 5 ppm

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9. PHYSICAL AND CHEMICAL PROPERTIES**APPEARANCE:** Yellow translucent, slightly viscous**ODOUR:** Hydrocarbon odour**PHYSICAL STATE:** Liquid**pH:** Not applicable**VAPOUR PRESSURE:** 3 - 6 psi (Reid Method)**VAPOUR DENSITY (Air = 1):** 2.7**FREEZING POINT:** -45 °C**BOILING RANGE:** -20 to 560 °C**SPECIFIC GRAVITY:** 0.85 to 0.87 at 20 °C**EVAPORATION RATE (n-Butyl Acetate = 1):** 0.28**COEFFICIENT OF WATER/OIL DISTRIBUTION:** Water insoluble, Oil soluble**ODOUR THRESHOLD:** Not available**10. STABILITY AND REACTIVITY****STABILITY:** Stable**CONDITIONS TO AVOID:** Avoid exposure to sources of ignition**MATERIALS TO AVOID:** Strong oxidizing materials. This material might soften or dissolve some plastics.**HAZARDOUS COMBUSTION PRODUCTS:** Carbon dioxide, carbon monoxide, uncombusted hydrocarbons, soot.**11. TOXICOLOGICAL INFORMATION**

LD50: >2 g/kg (dermal) - species not reported
>3.16 g/kg (dermal) - rabbits
>5 g/kg (oral) - mice, rats

LC50: 4 g/m³ (6 hr) - mice

ACUTE:

An acute oral, dermal, ocular and inhalation toxicity study was performed using synthetic crude oil from the Alberta oil sands. No animals (rats and mice) died following a single oral dose of 5 g/kg. No animals (rabbits) died following a single dermal dose of 3.16 g/kg. The rabbits did experience moderate skin irritation (Draize score of 3/8), desquamation, ocular discharge and decreased food consumption. Rabbits experienced slight eye irritation (Draize score of 4/110) with conjunctival redness. Five of 10 mice and no rats died following a 6-hour exposure to 4.0 g/m³. Additional effects following inhalation included extreme hair loss in mice, possible liver and kidney involvement, increased liver weight in mice and female rats and decreased lung weight in female rats. (Reference 1)

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**Syncrude Sweet Blend
Crude Oil****SAN 0930****CHRONIC:**

Observed skin effects among petroleum field workers and crude oil transport workers include dryness, pigmentation, hyperkeratosis, pigmented plane warts, eczematous reaction and follicular lesions.

Two crude oils were dermally applied to rats at doses of 30, 125 and 500 mg/kg (5 day/wk) for 13 weeks. At the 500 mg/kg dose level, observed effects included a reduced weight gain, depressed red blood cell counts, hemoglobin, hematocrit and platelet counts, increased relative and absolute liver weights, decreased absolute and relative thymus weight, changes in the relative kidney, spleen and adrenal weights and atrophy of the thymus. Hyperplasia and an associated dermal inflammatory cell infiltration at the site of application and hypertrophy and hyperplasia of the follicular epithelium in the thyroid gland were observed at all dose levels. (Reference 2)

SENSITIZATION TO PRODUCT:

An acute dermal toxicity study was performed to assess the effect of ultraviolet light on petroleum oil toxicity. Mice were painted with 50 L of oil 5 days per week for 2 weeks. The petroleum oil was found to be non-toxic to the skin of mice, however, the mice that were painted with the oil and then exposed to ultraviolet light for 2 hours experienced some skin damage (distinct erythema). (Reference 3)

CARCINOGENICITY:

Crude oil was applied to the skin of mice (3 times/wk, 6 months followed by 2 times/wk for life) for up to 13 months. Hyperkeratosis was observed at the site of treatment. Many cases of keratotic changes and epithelioma on the exposed skin of workers exposed to crude oil. (Reference 4)

An evaluation of the dermal carcinogenic potential of synthetic crude oil from the Athabasca oil sands was conducted. Mice were dermally applied crude oil three times per week (75 mL/wk) for life. Out of fifty animals 13 developed tumors with a mean latency of 113 weeks. This was significantly different from the controls. The authors concluded that synthetic crude oil from the Athabasca oil sands is a moderately active dermal carcinogen, however, results are consistent with conventional crude oil. (Reference 1)

REPRODUCTIVE TOXICITY:

A single dose (5 mL/kg bw) of crude oil to pregnant rats on gestation days 11, 15 or 17 resulted in induction in both placental and fetal hepatic enzyme systems. (Reference 4)

Oral administration to pregnant rats as a single dose (5 mL/kg bw on gestation days 3, 6, 11, 15 or 17), as a single variable dose (2-10 mL/kg bw on gestation day 6), or as daily doses (1 or 2 mL/kg bw on gestation days 6-17) resulted in significantly increased number of resorptions and decreased fetal weight and length. Daily doses of crude oil also caused a significant reductive in maternal body weight. (Reference 4)

TERATOGENICITY:

Crude oil was dermally applied to pregnant rats on days 0-19 of gestation. Parturition was delayed in the dams at 500 mg/kg. Fetal body weight was decreased at 500 mg/kg and the 4-day viability index was decreased at all dose levels (30, 125 and 500 mg/kg). Also observed were increased in utero death and reduced ossification. (Reference 5)

MUTAGENICITY:

Several studies have reported on the mutagenicity of crude oil to *Salmonella typhimurium*. Crude oil did not induce mutagenicity either in the presence or absence of an exogenous metabolic system, however, some neutral/aromatic fractions were mutagenic. (Reference 4)

A weak positive result was reported for two crude oil samples in the Syrian hamster embryo cell-transformation assay. (Reference 6)

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Crude Oil** Material Safety Data Sheet

No significant differences were noted in the number of spontaneous streptomycin-resistant mutants in *Chlamydomonas reinhardtii*. (Reference 7)

The photomutagenicity of crude oil was assessed using a modification of the *Salmonella* histidine reversion test. Crude oil was non-mutagenic without the added light and was non-mutagenic in the presence of visible light. (Reference 8)

SYNERGISTIC EFFECTS:

May act as a synergist to pesticides. The combination of crude oil and ultraviolet radiation may potentiate the suppressive effect on Langerhans cell density and contact hypersensitivity. (Reference 9)

Ultraviolet light may increase the severity of the effects to the skin. (Reference 10)

12. ECOLOGICAL INFORMATION

Not available.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL: Recover for reuse and recycling. Comply with relevant regulations with regards to disposal, recycling, treatment, transportation and storage.

This material would be considered a hazardous waste in Alberta due to its low flashpoint.

14. TRANSPORT INFORMATION:**CANADIAN TRANSPORTATION OF DANGEROUS GOODS:**

Hazard Class: 3 **Packing Group:** I

PRODUCT IDENTIFICATION NUMBER (PIN): UN1268

PROPER SHIPPING NAME: PETROLEUM DISTILLATES, N.O.S.

15. REGULATORY INFORMATION

WHMIS CLASS: B-2, D-2B

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

All compounds in this product are listed in the Canada Domestic Substances List (DSL) and the United States Toxic Substances Control Act (TSCA) Chemical Substance Inventory (1985).

Material Safety Data Sheet

**Syncrude Sweet Blend
Crude Oil****SAN 0930****16. OTHER INFORMATION****REFERENCES:**

1. McKee, R., W. Stubblefield, S. Lewis, R. Scala, G. Simon and L. DePass. Evaluation of the Dermal Carcinogenic Potential of Tar Sands Bitumen-Derived Liquids. *Fund. and Appl. Toxicol.* 7:228-235. 1986.
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4. World Health Organization. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. World Health Organization. Lyon. 1988.
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6. Frazier, M. E. and T. K. Andrews, Jr., Transformation of Syrian Hamster Embryo Cells by Synfuel Mixtures. *J. Toxicol. Environ. Health.* 11(4-6):591-606. 1983.
7. Vandermeulen, J. H. and R. W. Lee. Lack of Mutagenic Activity of Crude and Refined Oils in the Unicellular Alga *Chlamydomonas Reinhardtii*. *Bull. Environ. Contam. Toxicol.* 36:250-253.
8. Selby, C., J. Calkins and H. Enoch. Detection of Photomutagens in Natural and Synthetic Fuels. *Mutation Research.* 124(1):53-60. 1983.
9. Burnham, K. and M. Rahman. Effects of Petrochemicals and Ultraviolet Radiation on Epidermal IA. Expression in Vitro. *J. Toxicol. Environ. Health.* 35(3):175-185. 1992.
10. Gomer, C. J. and D. M. Smith. Acute Skin Phototoxicity in Hairless Mice Following Exposure to Crude Shale Oil or Natural Petroleum Oil. *Toxicol.* 18:75-85. 1980.

DISCLAIMER

The information and recommendations contained in this MSDS are believed to be accurate as at the date of its preparation. Syncrude Canada Ltd. makes no representations or warranties, express or implied, with respect to the accuracy or completeness of the information contained herein. Syncrude Canada Ltd. assumes no responsibility for incorrect handling or use of the product or the inherent hazards involved in the nature of the product itself.



NEXEN INC.
Long Lake SAGD Operations
Material Safety Data Sheet

SECTION 1 – PRODUCT IDENTIFICATION & USE

Product Identifier: Diluted Bitumen (Dilbit)

Product Use: Gas Plant/Refinery Feed

Manufacturer/Supplier: Nexen Inc.
P.O. Box 6010
Fort McMurray, Alberta
T9H 5R3
Emergency Telephone Number: 780-334-3911

Chemical Name & Synonym: Crude Oil, Hydrocarbon Liquids, Treater Oil Blend

Chemical Name & Formula: C5-C30+ Hydrocarbons

WHMIS Class: Class D2

TDG Description: Class 3, UN 1267, Packing Group III

SECTION 2 COMPOSITION

<u>Ingredients</u>	<u>% W/W</u>	<u>CAS Number</u>	<u>UN Number</u>	<u>Exposure Limits(ppm)</u>
Butane	0.25-0.75	106-97-8	1011	800
Pentane	1.00-1.25	109-66-0	1265	600
Hexanes	1.00-1.50	110-54-3	1208	*
Heptanes	2.00-2.25	142-82-5	1206	400
Octanes	2.00-2.50	111-65-9	1262	300
Benzene	0.05-0.15	71-43-2	1114	1(skin)
Toluene	0.15-0.35	108-88-3	1294	100(skin)
Xylene	0.40-0.75	106-42-3	1307	100
1,2,4 TMBenzene	0.10-0.25	95-63-6	2325	25
MethylCyclopentane	0.25-0.75	96-37-7	2298	n. av.
Cyclohexane	0.10-0.25	110-82-7	1145	300
Methyl Cyclohexane	0.25-0.75	108-87-2	2296	400
Ethylbenzene	0.05-0.15	100-41-4	1175	100

*Note: nHexane 8 hour OEL = 50 ppm Isomers = 500 ppm

SECTION 3 – PHYSICAL DATA

<u>Physical State:</u> Liquid	<u>Odour and Appearance:</u> Viscous liquid Black	<u>Odour Threshold:</u> n. av.
<u>Vapour Pressure:</u> 7 kPa calc.	<u>Vapour Density:</u> (Air = 1) > 3.0	<u>Evaporation Rate:</u> >1
<u>Boiling Point:</u> -12 – 449+ °C	<u>Pour Point:</u> <-35 °C	<u>Critical Temperature</u> n. av.
<u>Specific Gravity:</u> (Water = 1) 0.9026	<u>Solubility in Water:</u> Not Soluble	<u>Coeff. of Water/Oil Dist.:</u> <1

Dilbit



NEXEN INC.
Anzac Pilot Plant
Material Safety Data Sheet

SECTION 4 – REACTIVITY, FIRE AND EXPLOSIVE DATA

Flash Point:
-43 °C (PMCC)

Auto Ignition:
537 est

LEL/UEL%:
n. ap.

Hazardous Combustion
Products:
CO₂, NO_x, CO, SO₂

Sensitivity to Mechanical
Impact:
Not Sensitive

Sensitivity to Static
Electricity:
Static Spark may cause
Ignition

Flammability:
Flammable

Fire Fighting Procedures – Means of Extinguishing:
DRY CHEMICAL, WATER FOG, FOAM, SHUT FUEL SUPPLY OFF

Special Fire Fighting Procedures: n. ap.

Chemical Stability: Stable Mixture

Hazardous Polymerisation:
Will not occur

Sensitivity to Mechanical
Impact: Not sensitive

Incompatibility:
Strong Oxidizing Agents

Reactivity: Chlorine Dioxide

SECTION 5 – TOXICOLOGICAL PROPERTIES

Routes of Entry:

Inhalation: X

Eye Contact: X

Skin Contact: X.

Ingestion: n. ap.

Effects of Acute Exposure:

Inhalation – Primary route of exposure. May cause pulmonary irritation.

Skin/Eye Contact – May cause eye irritation

Ingestion – n. ap.

Irritating: may cause skin irritation



NEXEN INC.
Anzac Pilot Plant
Material Safety Data Sheet

Effects of Chronic Exposure:

Specific Species & Route

<u>Ingredients</u>	<u>LD50 OF INGREDIENT</u>	<u>LC50 OF INGREDIENT</u>
Butane	n. av.	6583 ppm - rats
Pentane	446 ppm IVN mouse	n. av.
Hexanes	28710 mg/kg oral rat	n. av.
Heptanes	n. av.	n. av.
Octanes	n. av.	n. av.
Nonanes	218 mg/kg (IVN mouse)	3200 ppm (4 hr INH rat)
Benzene	930 mg/kg oral rat	13,228 ppm rat
Toluene	7.53 g/kg (oral rat)	n. av.
Xylenes	7.71 mL/kg (oral rat)	n. av.
1,2,4 Trimethylbenzene	n. av.	n. av.
Methyl Cyclopentane	n. av.	n. av.
Cyclohexane	n. av.	n. av.
Methyl Cyclohexane	3.8 mL/kg (oral rat)	41500 mg/m³ (2 hr INH mouse)
Ethylbenzene	3500 mg/kg (oral rat)	n. av.
Benzene	930 mg/kg oral rat	13,228 ppm rat

Exposure Limits:

(8 hours) Occupational Exposure Limit
See above

Carcinogenicity:

Benzene is a known carcinogen

Reproductive Effects:

n. av.

Synergistic Materials:

n. av.

Sensitizing Capabilities:

n. av.

SECTION 6 – PREVENTATIVE MEASURES

Engineering Controls: USE EXPLOSION-PROOF VENTILATION TO CONTROL VAPOUR CONCENTRATION. FOR PERSONNEL ENTRY INTO CONFINED SPACE, ENTRY PROCEDURE MUST INCLUDE VENTILATION AND TESTING OF ATMOSPHERE. MAKE UP AIR MUST BE SUPPLIED TO BALANCE AIR EXHAUSTED.

Personal Protective Equipment:

Respiratory Protection: SCBA should be worn in areas of insufficient oxygen or when H₂S levels exceed 15 ppm.

Body Protection: Flame retardant clothing should be worn,

Eye Protection: Safety glasses with side shields

Leak and Spill Handling: ELIMINATE SOURCE OF IGNITION. PREVENT ADDITIONAL DISCHARGE OF MATERIAL. EVACUATE PERSONNEL NOT EQUIPPED WITH PROTECTIVE CLOTHING AND NIOSH APPROVED RESPIRATORY EQUIPMENT. CONTAIN SPILL WITH NONCOMBUSTABLE ABSORBENTS.

Environmental Effects and Hazards: CONSULT AN EXPERT AND ENSURE DISPOSAL IS IN COMPLIANCE WITH GOVERNMENT REQUIREMENTS.



NEXEN INC.
Anzac Pilot Plant
Material Safety Data Sheet

Handling Procedure and Equipment: KEEP CONTAINERS CLOSED. STORE IN COOL, WELL VENTILATED PLACE AWAY FROM INCOMPATIBLE MATERIALS. DO NOT PRESSURIZE, HEAT, OR WELD EMPTY CONTAINERS. KEEP AWAY FROM OPEN FLAMES AND USE PROPER GROUNDING PROCEDURES.

Storage Requirements: STORE IN COOL, WELL VENTILATED PLACE AWAY FROM INCOMPATIBLE MATERIALS.

Special Shipping Information:

Per Transportation of Dangerous Goods Legislation.

SECTION 7 - FIRST AID MEASURES

Inhalation: IN EMERGENCY SITUATIONS USE PROPER RESPIRATORY PROTECTION AND IMMEDIATELY REMOVE THE VICTIM FROM EXPOSURE. ADMINISTER ARTIFICIAL RESPIRATION IF BREATHING HAS STOPPED. KEEP AT REST AND CALL FOR MEDICAL ATTENTION:

Skin Contact: FLUSH AREA WITH LARGE AMOUNTS OF WATER AND USE SOAP IF AVAILABLE. REMOVE SEVERELY CONTAMINATED CLOTHING AND LAUNDER BEFORE REUSE.

Eye Contact: FLUSH EYES WITH LARGE AMOUNTS OF WATER UNTIL IRRITATION SUBSIDES. CALL FOR MEDICAL ATTENTION IF IRRITATION PERSISTS.

SECTION 8 – PREPARATION INFORMATION

Prepared by: Maxxam Analytics Inc.

Date Prepared 2008-03-10

This MSDS information was developed for employees, customers and agents of Nexen Inc. Long Lake SAGD Operations to provide safety information of the described product or material. The information may not be valid or complete if the product or material is used in combination with other products or materials, or in any process. This information is intended for reasonable normal usage and recommended practices, or does underscore the hazard inherent in the nature of the product or material. Although every effort is made to insure accuracy and completeness of the contained information, it is understood that Nexen Inc. Long Lake SAGD Operations makes no warranty as to the accuracy or completeness of information and assumes no liability or any damage or loss suffered as result of any inaccuracy or incompleteness therein. This information is considered to accurate as of the date of preparation. Updated information will be forwarded to employees, customers or agents, however the reader is invited to contact the Long Lake SAGD Operations at the address shown to insure the most up to date information or obtain information related to an unusual or other use.

n. ap. = not applicable
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est. = estimated
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References 1 CGPA Engineering Data Book



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Long Lake SAGD Operations
Material Safety Data Sheet

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WHMIS Class: Class D2

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Heptanes	2.00-2.25	142-82-5	1206	400
Octanes	2.00-2.50	111-65-9	1262	300
Benzene	0.05-0.15	71-43-2	1114	1(skin)
Toluene	0.15-0.35	108-88-3	1294	100(skin)
Xylene	0.40-0.75	106-42-3	1307	100
1,2,4 TMBenzene	0.10-0.25	95-63-6	2325	25
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*Note: nHexane 8 hour OEL = 50 ppm Isomers = 500 ppm

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<u>Boiling Point:</u> -12 – 449+ °C	<u>Pour Point:</u> <-35 °C	<u>Critical Temperature</u> n. av.
<u>Specific Gravity:</u> (Water = 1) 0.9026	<u>Solubility in Water:</u> Not Soluble	<u>Coeff. of Water/Oil Dist.:</u> <1

Dilbit



NEXEN INC.
Anzac Pilot Plant
Material Safety Data Sheet

SECTION 4 – REACTIVITY, FIRE AND EXPLOSIVE DATA

Flash Point:
-43 °C (PMCC)

Auto Ignition:
537 est

LEL/UEL%:
n. ap.

Hazardous Combustion
Products:
CO₂, NO_x, CO, SO₂

Sensitivity to Mechanical
Impact:
Not Sensitive

Sensitivity to Static
Electricity:
Static Spark may cause
Ignition

Flammability:
Flammable

Fire Fighting Procedures – Means of Extinguishing:
DRY CHEMICAL, WATER FOG, FOAM, SHUT FUEL SUPPLY OFF

Special Fire Fighting Procedures: n. ap.

Chemical Stability: Stable Mixture

Hazardous Polymerisation:
Will not occur

Sensitivity to Mechanical
Impact: Not sensitive

Incompatibility:
Strong Oxidizing Agents

Reactivity: Chlorine Dioxide

SECTION 5 – TOXICOLOGICAL PROPERTIES

Routes of Entry:

Inhalation: X

Eye Contact: X

Skin Contact: X.

Ingestion: n. ap.

Effects of Acute Exposure:

Inhalation – Primary route of exposure. May cause pulmonary irritation.

Skin/Eye Contact – May cause eye irritation

Ingestion – n. ap.

Irritating: may cause skin irritation



NEXEN INC.
Anzac Pilot Plant
Material Safety Data Sheet

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Specific Species & Route

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Ethylbenzene	3500 mg/kg (oral rat)	n. av.
Benzene	930 mg/kg oral rat	13,228 ppm rat

Exposure Limits:

(8 hours) Occupational Exposure Limit
See above

Carcinogenicity:

Benzene is a known carcinogen

Reproductive Effects:

n. av.

Synergistic Materials:

n. av.

Sensitizing Capabilities:

n. av.

SECTION 6 – PREVENTATIVE MEASURES

Engineering Controls: USE EXPLOSION-PROOF VENTILATION TO CONTROL VAPOUR CONCENTRATION. FOR PERSONNEL ENTRY INTO CONFINED SPACE, ENTRY PROCEDURE MUST INCLUDE VENTILATION AND TESTING OF ATMOSPHERE. MAKE UP AIR MUST BE SUPPLIED TO BALANCE AIR EXHAUSTED.

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NEXEN INC.
Anzac Pilot Plant
Material Safety Data Sheet

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Eye Contact: FLUSH EYES WITH LARGE AMOUNTS OF WATER UNTIL IRRITATION SUBSIDES. CALL FOR MEDICAL ATTENTION IF IRRITATION PERSISTS.

SECTION 8 – PREPARATION INFORMATION

Prepared by: Maxxam Analytics Inc.

Date Prepared 2008-03-10

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Material Safety Data Sheet

SUNCOR OSC

WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing
 	B2 - Flammable Liquid D2A - Materials Causing Other Toxic Effects, Very Toxic Material D2B - Materials Causing Other Toxic Effects, Toxic Material	   

NFPA Hazard Class			HMIS Hazard Class	
Health	2	Hazardous	Health	* 2 (chronic health hazard)
Flammability	3	Flashpoint below 100 F	Flammability	3
Reactivity	0	Stable	Physical Hazard	0
Specific hazards			Personal Protective Equipment	Splash Goggles, Gloves, Apron, Vapor Respirator

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : SUNCOR OSC

Product type : Suncor Product

MSDS Number : V00000005743

Synonyms : Sweet Crude Oil, Synthetic Crude Oil, Petroleum Crude

Intended Use : Refinery Feedstock

Manufacturer : Suncor Energy Inc.
P.O. Box 4001
Fort McMurray, Alberta Canada
T9H 3E3

EMERGENCY CONTACT INFORMATION

Suncor Energy Inc., Oil Sands (780) 790-7001 (24-hr)

SECTION 2. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Concentration
Gas oils (oil sand), hydrotreated	128683-29-4	0 - 100 %
Naphtha (oil sand), hydrotreated	128683-33-0	0 - 100 %
FUEL, DIESEL NO.2	68476-34-6	0 - 100 %
BUTANE	106-97-8	0 - 3 %

SECTION 3. HAZARDS IDENTIFICATION

Emergency Overview

Hazard Summary : Highly flammable. Avoid breathing vapors, mist or gas. Vapor accumulation could flash and/or explode if in contact with



Material Safety Data Sheet

SUNCOR OSC

open flame. Exposure to fire can generate highly toxic fumes.

Potential Health Effects

Eyes	: May cause eye irritation.
Skin	: May cause skin irritation. Prolonged or repeated contact may cause dermatitis, reddening of skin and a chapped appearance.
Inhalation	: May cause respiratory tract irritation. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. High concentration of vapours may induce unconsciousness.
Ingestion	: Ingestion may cause irritation to mucous membranes. Aspiration hazard if swallowed - can enter lungs and cause damage.
Chronic Exposure	: May damage the peripheral nervous system. Symptoms include tingling sensations in fingers and toes and muscle weakness.
Primary Routes of Entry	: Inhalation Eye contact Skin Absorption Skin contact Ingestion
Target Organs	: Respiratory system Central nervous system
Carcinogenic Effects	: ACGIH A3 - Confirmed Animal Carcinogen

SECTION 4. FIRST AID MEASURES

General advice	: Consult physician and/or Poison Control Centre for all exposures except minor instances of inhalation or skin contact.
Eye contact	: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Seek medical advice.
Skin contact	: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Seek medical advice. Wash contaminated clothing before reuse. Thoroughly clean shoes before reuse.

**Material Safety Data Sheet****SUNCOR OSC**

- Inhalation : Move to fresh air.
Artificial respiration and/or oxygen may be necessary.
Seek medical advice.
- Ingestion : Do NOT induce vomiting.
If vomiting occurs have victim lean forward to reduce the risk
of aspiration.
Seek medical advice.

SECTION 5. FIRE-FIGHTING MEASURES

- Flash point : Estimated < -35 °C (< -31 °F)
- Flammability in Presence of : Flammable material will readily ignite at normal temperatures.
Vapors can accumulate and travel to distant ignition sources
and flash back.
Risk of fire or explosion exists if static charge accumulates
during transfer or flow of product.
- Explosibility in Presence of : Explosive reaction may occur on heating or burning.
- Products of Combustion : carbon monoxide, Carbon dioxide (CO₂), sulfur dioxide,
nitrogen oxides
- Fire fighting information**
- Suitable extinguishing media : Carbon dioxide (CO₂), Foam, Dry chemical, Water fog.
- Special protective equipment for fire-fighters : Wear self contained breathing apparatus for fire fighting if
necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

- Personal precautions : Wear proper protective equipment as specified in the protective
equipment section.
- Environmental precautions : Do not flush into surface water or sanitary sewer system.
Comply with all applicable Federal and Provincial regulations
or guidelines.
- Methods for cleaning up : Remove all sources of ignition.
Ensure adequate ventilation.
Turn off source, if possible.
Soak up with inert absorbent material.
Keep in suitable, closed containers for disposal.

SECTION 7. HANDLING AND STORAGE



Material Safety Data Sheet

SUNCOR OSC

Handling Precautions

Handling : Keep away from open flames, hot surfaces and sources of ignition.
Prevent the creation of flammable or explosive concentrations of vapour in air and avoid vapour concentration higher than the occupational exposure limits.
When transferring from one container to another apply earthing measures and use conductive hose material.

Storage

Advice on mixed storage : Store in a cool, well ventilated area away from incompatible materials.
Storage tank should be vented to atmosphere.
To avoid ignition of vapours by static electricity discharge, all metal parts of the equipment must be grounded.
A containment dike should be built around tank.
Small quantities should be stored in an approved safety solvent container.
Store container in a fire-resistant grounded cabinet vented to the atmosphere.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering measures : Adequate ventilation to ensure that Occupational Exposure Limits are not exceeded.

Eye protection : Chemical resistant goggles must be worn.

Hand protection : Wear gloves as a standard industrial handling procedure.
The following materials are acceptable:
Neoprene
Nitrile rubber

Skin and body protection : Wear long sleeve clothing or coveralls.
Wear as appropriate:
A neoprene or nitrile rain suit may be needed in certain situations.
(e.g., vessel cleaning).

Respiratory protection : When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.
Half-mask air purifying respirator with organic vapor/dust cartridges is acceptable to 10 times the exposure limit.
Full-face air purifying respirator with organic vapor/dust cartridges is acceptable to 50 times the exposure limit not to exceed the cartridge limit of 1000 ppm.
Use an air-supplied or self-contained breathing apparatus in confined spaces or in emergency or high-exposure situations.



Material Safety Data Sheet

SUNCOR OSC

Hygiene measures : Wash hands and face before breaks and immediately after handling the product.

Legislated occupational threshold limits

FUEL, DIESEL NO.2	68476-34-6	CAD ON OEL	TWA	100 mg/m3
		Expressed as		as total hydrocarbons
		Form of exposure		Vapor and aerosol.
		ACGIH	TWA	100 mg/m3
		Expressed as		as total hydrocarbons
		Form of exposure		Vapor and aerosol.
BUTANE	106-97-8	CAD AB OEL	TWA	800 ppm 1,900 mg/m3
		NIOSH	REL	800 ppm 1,900 mg/m3
		ACGIH	TWA	1,000 ppm
		CAD ON OEL	TWA	800 ppm 1,900 mg/m3
		CAD ON OEL	TWA	1,000 ppm

Note: State/Provincial, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local authorities for further information.

Other information

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Colour	: amber
Odour	: Petroleum Spirits
Physical state	: liquid
Boiling point/boiling range	: Estimated 30 - 550 °C (86 - 1,022 °F)
Vapour pressure	: Note: no data available
Density	: Estimated 0.71 - 0.91 g/cm3
Specific gravity	: Estimated 0.71 - 0.91
Water solubility	: insoluble
Partition coefficient: n-octanol/water	: POW: < 1

SECTION 10. STABILITY AND REACTIVITY

Conditions to avoid	: static charge will ignite rising vapor
Materials to avoid	: Incompatible with oxidizing agents.
Hazardous decomposition products	: Carbon monoxide carbon dioxide Hydrocarbons



Material Safety Data Sheet

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Hazardous reactions : Hazardous polymerisation does not occur.
Note: Stable under normal conditions.

SECTION 11. TOXICOLOGICAL INFORMATION

Further information : There is no data available for this product.

SECTION 12. ECOLOGICAL INFORMATION

Additional ecological information : There is no data available for this product.

SECTION 13. DISPOSAL CONSIDERATIONS

Advice on disposal : Comply with all applicable Federal and Provincial regulations or guidelines.

SECTION 14. TRANSPORT INFORMATION

DOT Proper shipping name : PETROLEUM CRUDE OIL
UN-Number : 1267
Class : 3
Packing group : I

TDG Proper shipping name : PETROLEUM CRUDE OIL
UN-Number : 1267
Class : 3
Packing group : I

IATA UN Number : 1267
Description of the goods : PETROLEUM CRUDE OIL
Class : 3
Packaging group : I
ADR/RID-Labels : 3
Packing instruction (cargo aircraft) : 303
Packing instruction (passenger aircraft) : 302

IMDG Substance No. : UN 1267
Description of the goods : PETROLEUM CRUDE OIL
Class : 3
Packaging group : I
ADR/RID-Labels : 3
EmS Number : F-E

Material Safety Data Sheet**SUNCOR OSC****SECTION 15. REGULATORY INFORMATION****HMIS Hazard Class**

Health	* 2 (chronic health hazard)
Flammability	3
Physical Hazard	0
Personal Protective Equipment	Splash Goggles, Gloves, Apron, Vapor Respirator
NFPA Hazard Rating	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">Flammability</div> <div style="margin-right: 10px;">Health</div> <div style="text-align: center;"> </div> <div style="margin-left: 10px;">Reactivity</div> <div style="margin-left: 10px;">Special</div> </div>

WHMIS Classification

: B2 - Flammable Liquid, D2A - Materials Causing Other Toxic Effects, Very Toxic Material, D2B - Materials Causing Other Toxic Effects, Toxic Material

WHMIS (Pictograms)**DSL Status**

: All components of this product are on the Canadian DSL list.

SECTION 16. OTHER INFORMATION

Date Validated : 06/06/2012

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

Validation date of previous version : 04/16/2009

General contact information : B. Burrell: (519) 383-3657

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SUNCOR OSC

patents. As soon as reasonably practicable after Suncor is aware of any inaccurate information, Suncor will update the MSDS. However, Suncor cannot guarantee the accuracy, currency or completeness of the information at all times.



Material Safety Data Sheet

SUNCOR OSA

WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing
	B2 - Flammable Liquid D2A - Materials Causing Other Toxic Effects, Very Toxic Material D2B - Materials Causing Other Toxic Effects, Toxic Material	

NFPA Hazard Class			HMIS Hazard Class	
Health	2	Hazardous	Health	* 2 (chronic health hazard)
Flammability	3	Flashpoint below 100 F	Flammability	3
Reactivity	0	Stable	Physical Hazard	0
Specific hazards			Personal Protective Equipment	Splash Goggles, Gloves, Apron, Vapor Respirator

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : SUNCOR OSA

Product type : Suncor Product

MSDS Number : V00000000948

Synonyms : Sweet Crude Oil, Blended Synthetic Oil, Petroleum Crude

Intended Use : Refinery Feedstock

Manufacturer : Suncor Energy Inc., Oil Sands
P.O. Box 4001
Fort McMurray, Alberta Canada
T9H 3E3

Telephone : (780)790-7001

EMERGENCY CONTACT INFORMATION

Suncor Energy Inc., Oil Sands (780) 790-7001 (24-hr)

SECTION 2. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Concentration
Gas oils (oil sand), hydrotreated	128683-29-4	60 - 70 %
FUEL, DIESEL NO.2	68476-34-6	10 - 25 %
Naphtha (oil sand), hydrotreated	128683-33-0	10 - 25 %
BUTANE	106-97-8	0 - 3 %

SECTION 3. HAZARDS IDENTIFICATION

Emergency Overview

Hazard Summary : Highly flammable.Avoid breathing vapors, mist or gas.Vapor



Material Safety Data Sheet

SUNCOR OSA

accumulation could flash and/or explode if in contact with open flame. Exposure to fire can generate highly toxic fumes.

Potential Health Effects

Eyes	: May cause eye irritation.
Skin	: May cause skin irritation. Prolonged or repeated contact may cause dermatitis, reddening of skin and a chapped appearance.
Inhalation	: May cause respiratory tract irritation. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. High concentration of vapours may induce unconsciousness.
Ingestion	: Ingestion may cause irritation to mucous membranes. Aspiration hazard if swallowed - can enter lungs and cause damage.
Chronic Exposure	: May damage the peripheral nervous system. Symptoms include tingling sensations in fingers and toes and muscle weakness.
Primary Routes of Entry	: Inhalation Eye contact Skin Absorption Skin contact Ingestion
Target Organs	: Respiratory system Central nervous system
Carcinogenic Effects	: ACGIH A3 - Confirmed Animal Carcinogen

SECTION 4. FIRST AID MEASURES

General advice	: Consult physician and/or Poison Control Centre for all exposures except minor instances of inhalation or skin contact.
Eye contact	: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Seek medical advice.
Skin contact	: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Seek medical advice. Wash clothing before reuse. Thoroughly clean shoes before reuse.



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- Inhalation : Move to fresh air.
Artificial respiration and/or oxygen may be necessary.
Seek medical advice.
- Ingestion : Do NOT induce vomiting.
If vomiting occurs have victim lean forward to reduce the risk of aspiration.
Seek medical advice.

SECTION 5. FIRE-FIGHTING MEASURES

- Flash point : < -35 °C (< -31 °F)
Method: ASTM D 93
- Autoignition temperature : 247 °C (477 °F)
Method: ASTM E659
- Lower explosion limit : 0.41 %(V)
Method: ASTM E681
- Flammability in Presence of : Flammable material will readily ignite at normal temperatures.
Vapors can accumulate and travel to distant ignition sources and flash back.
Risk of fire or explosion exists if static charge accumulates during transfer or flow of product.
- Explosibility in Presence of : Explosive reaction may occur on heating or burning.
- Products of Combustion : carbon monoxide, Carbon dioxide (CO₂), sulfur dioxide, nitrogen oxides

Fire fighting information

- Suitable extinguishing media : Carbon dioxide (CO₂), Foam, Dry chemical, Water fog.
- Special protective equipment for fire-fighters : Wear self contained breathing apparatus for fire fighting if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

- Personal precautions : Wear proper protective equipment as specified in the protective equipment section.
- Environmental precautions : Do not flush into surface water or sanitary sewer system.
Comply with all applicable Federal and Provincial regulations or guidelines.
- Methods for cleaning up : Remove all sources of ignition.



Material Safety Data Sheet

SUNCOR OSA

Ensure adequate ventilation.
Turn off source, if possible.
Soak up with inert absorbent material.
Keep in suitable, closed containers for disposal.

SECTION 7. HANDLING AND STORAGE

Handling Precautions

Handling : Keep away from open flames, hot surfaces and sources of ignition.
Prevent the creation of flammable or explosive concentrations of vapour in air and avoid vapour concentration higher than the occupational exposure limits.
When transferring from one container to another apply earthing measures and use conductive hose material.

Storage

Advice on mixed storage : Store in a cool, well ventilated area away from incompatible materials.
Storage tank should be vented to atmosphere.
To avoid ignition of vapours by static electricity discharge, all metal parts of the equipment must be grounded.
A containment dike should be built around tank.
Small quantities should be stored in an approved safety solvent container.
Store container in a fire-resistant grounded cabinet vented to the atmosphere.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering measures : Adequate ventilation to ensure that Occupational Exposure Limits are not exceeded.

Eye protection : Chemical resistant goggles must be worn.

Hand protection : Wear gloves as a standard industrial handling procedure.
The following materials are acceptable:
Neoprene
Nitrile rubber

Skin and body protection : Wear long sleeve clothing or coveralls.
Wear as appropriate:
A neoprene or nitrile rain suit may be needed in certain situations.
(e.g., vessel cleaning).

Respiratory protection : When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.



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Half-mask air purifying respirator with organic vapor/dust cartridges is acceptable to 10 times the exposure limit.
Full-face air purifying respirator with organic vapor/dust cartridges is acceptable to 50 times the exposure limit not to exceed the cartridge limit of 1000 ppm.
Use an air-supplied or self-contained breathing apparatus in confined spaces or in emergency or high-exposure situations.

Hygiene measures : Wash hands and face before breaks and immediately after handling the product.

Legislated occupational threshold limits

FUEL, DIESEL NO.2	68476-34-6	CAD ON OEL	TWA	100 mg/m3
		Expressed as		as total hydrocarbons
		Form of exposure		Vapor and aerosol.
		ACGIH	TWA	100 mg/m3
		Expressed as		as total hydrocarbons
		Form of exposure		Vapor and aerosol.
BUTANE	106-97-8	CAD AB OEL	TWA	800 ppm 1,900 mg/m3
		NIOSH	REL	800 ppm 1,900 mg/m3
		ACGIH	TWA	1,000 ppm
		CAD ON OEL	TWA	800 ppm 1,900 mg/m3
		CAD ON OEL	TWA	1,000 ppm

Note: State/Provincial, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local authorities for further information.

Other information

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Colour	: amber
Odour	: Petroleum Spirits
Physical state	: liquid
Boiling point/boiling range	: 30 - 550 °C (86 - 1,022 °F) Method: ASTM D6352
Evaporation rate	: 1.1 compared to Butyl Acetate
Density	: 0.86 - 0.87 g/cm3
Specific gravity	: 0.86 - 0.87
Water solubility	: insoluble
Partition coefficient: n-octanol/water	: POW: < 1
Viscosity, kinematic	: 4.4 mm2/s at 30 °C (86 °F)



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3.5 mm²/s at 40 °C (104 °F)

2.9 mm²/s at 50 °C (122 °F)

Method: ASTM D 445

SECTION 10. STABILITY AND REACTIVITY

- Conditions to avoid : static charge will ignite rising vapor
- Materials to avoid : Incompatible with oxidizing agents.
- Hazardous decomposition products : Carbon monoxide
carbon dioxide
Hydrocarbons
- Hazardous reactions : Hazardous polymerisation does not occur.
Note: Stable under normal conditions.

SECTION 11. TOXICOLOGICAL INFORMATION

- Further information : There is no data available for this product.

SECTION 12. ECOLOGICAL INFORMATION

- Additional ecological information : There is no data available for this product.

SECTION 13. DISPOSAL CONSIDERATIONS

- Advice on disposal : Comply with all applicable Federal and Provincial regulations or guidelines.

SECTION 14. TRANSPORT INFORMATION

- DOT** Proper shipping name : PETROLEUM CRUDE OIL
UN-Number : 1267
Class : 3
Packing group : I
- TDG** Proper shipping name : PETROLEUM CRUDE OIL
UN-Number : 1267
Class : 3
Packing group : I
- IATA** UN Number : 1267
Description of the goods : PETROLEUM CRUDE OIL
Class : 3



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	Packaging group	: I
	ADR/RID-Labels	: 3
	Packing instruction (cargo aircraft)	: 303
	Packing instruction (passenger aircraft)	: 302
IMDG	Substance No.	: UN 1267
	Description of the goods	: PETROLEUM CRUDE OIL
	Class	: 3
	Packaging group	: I
	ADR/RID-Labels	: 3
	EmS Number	: F-E

SECTION 15. REGULATORY INFORMATION

HMIS Hazard Class	
Health	* 2 (chronic health hazard)
Flammability	3
Physical Hazard	0
Personal Protective Equipment	Splash Goggles, Gloves, Apron, Vapor Respirator
NFPA Hazard Rating	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">Flammability</div> <div style="text-align: center;"> </div> <div style="margin-left: 10px;">Reactivity</div> </div> <div style="display: flex; align-items: center; margin-top: 10px;"> <div style="margin-right: 10px;">Health</div> <div style="text-align: center;"> </div> <div style="margin-left: 10px;">Special</div> </div>

WHMIS Classification : B2 - Flammable Liquid, D2A - Materials Causing Other Toxic Effects, Very Toxic Material, D2B - Materials Causing Other Toxic Effects, Toxic Material

WHMIS (Pictograms)



DSL Status

: All components of this product are on the Canadian DSL list.

SECTION 16. OTHER INFORMATION

Date Validated : 05/31/2012

References : This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the

**Material Safety Data Sheet****SUNCOR OSA**

CPR.

Validation date of previous version : 06/16/2009

General contact information : B. Burrell: (519) 383-3657

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Husky Energy
MATERIAL SAFETY DATA SHEET

Synthetic Crude Oil
Date of Preparation: January 5, 2011

Section 1: PRODUCT AND COMPANY IDENTIFICATION

Product Name: Synthetic Crude Oil
Synonyms: Not available.
Product Use: Refinery feedstock.
Supplier: Husky Oil Operations Ltd.
 PO Box 6525 Station 'D'
 Calgary, Alberta
 T2P 3G7
Phone Number: 403-298-6111
Emergency Phone: 877-262-2111
Date of Preparation: January 5, 2011

Section 2: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

DANGER
 FLAMMABLE LIQUID AND VAPOR. IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN. HARMFUL OR FATAL IF SWALLOWED. CAN ENTER LUNGS AND CAUSE DAMAGE.

Colour: Straw coloured.
Physical State: Liquid.
Odour: Petroleum. Rotten eggs. May be odourless (due to high H₂S concentrations present).

WHMIS	Personal Protection Equipment	TDG (Ground)

Potential Health Effects: See Section 11 for more information.

Likely Routes of Exposure: Eye contact, skin contact, inhalation, and ingestion.

Eye: Irritating to eyes. Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision. Above 50 ppm Hydrogen sulphide, eye irritation may include symptoms of redness, severe swelling, tearing, sensitivity to light and the appearance of 'Halos' around lights.

Skin: Irritating to skin. Signs/symptoms may include localized redness, swelling, and itching.

Ingestion: Harmful or fatal: may cause lung damage if swallowed. Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. May cause gastrointestinal irritation. Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.

Inhalation: Irritating to respiratory system. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain. May cause headache, dizziness, confusion, loss of appetite and loss of consciousness. This product contains hydrogen sulphide (H₂S) gas which may collect in confined spaces. Acute effects vary with


Husky Energy
MATERIAL SAFETY DATA SHEET
Synthetic Crude Oil

Date of Preparation: January 5, 2011

concentration of H₂S released from mild eye, nose and throat irritation at approximately 100 ppm to sudden unconsciousness or death at 500 ppm.

Chronic Effects: See Section 11 for more information.

Medical Conditions Aggravated By Exposure: Not available.

Target Organs: Skin, eyes, gastrointestinal tract, and respiratory system. Central 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

Ingredient	CAS No.	Wt. %
Gas oils (petroleum), hydrodesulfurized	64742-79-6	60 - 100
Naphtha (petroleum), hydrotreated heavy	64742-48-9	10 - 30
Naphtha (petroleum), hydrotreated light	64742-49-0	3 - 7
Butane	106-97-8	1 - 5
Hydrogen sulfide (H ₂ S)	7783-06-4	0.001 - 0.01

Section 4: FIRST AID MEASURES

Eye Contact:	Flush eyes with plenty of water for at least 15 minutes. If signs/symptoms persist, get medical attention.
Skin Contact:	Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. If signs/symptoms develop, get medical attention.
Inhalation:	Remove person to fresh air. If breathing has stopped apply artificial respiration. If signs/symptoms develop, get medical attention.
Ingestion:	Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
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.

Section 5: FIRE FIGHTING MEASURES

Flammability:	Flammable liquid by WHMIS criteria. Flammable liquid by OSHA criteria. 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. Cool containing vessels with water jet in order to prevent pressure build-up, auto-ignition or explosion.
Means of Extinction	
Suitable Extinguishing Media:	Dry chemical, foam, or carbon dioxide.
Unsuitable Extinguishing Media:	Water may not be an effective medium to extinguish fire.
Products of Combustion:	Oxides of carbon. Oxides of nitrogen. Aldehydes. Hazardous


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Synthetic Crude Oil

Date of Preparation: January 5, 2011

sulphur dioxide, and related oxides of sulphur may be generated upon combustion.

Protection of Firefighters:

Keep upwind of fire. Wear full fire fighting turn-out gear (full Bunker gear) and respiratory protection (SCBA).

Explosion Data
Sensitivity to Mechanical Impact:

This material is not sensitive to mechanical impact.

Sensitivity to Static Discharge:

This material is sensitive to static discharge at temperatures above the flash point.

Section 6: ACCIDENTAL RELEASE MEASURES
Personal Precautions:

Evacuate all unnecessary personnel. Stay upwind. Eliminate all ignition sources. Use personal protection recommended in Section 8. Isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Environmental Precautions:

Keep out of drains, sewers, ditches, and waterways.

Methods for Containment:

Stop leak if without risk. Contain spill and absorb with inert absorbent. Large pools may be covered with foam to prevent vapour evolution. Do not flush to sewer or allow to enter waterways.

Methods for Clean-Up:

Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Use clean non-sparking tools to collect absorbed material. Large spills should be removed with explosion proof vacuum equipment.

Other Information:

Dispose of in accordance with all federal, provincial and local regulations. Comply with federal, provincial, and local requirements for spill and/or release notification.

Section 7: HANDLING AND STORAGE
Handling:

Do not breathe vapours. Do not swallow. Do not get in eyes, or on skin. All equipment used when handling the product must be grounded. Handle and open container with care. When using do not eat or drink. Wash hands before eating, drinking, or smoking. See Section 8 for information on Personal Protective Equipment.

Storage:

Head spaces in storage containers may contain toxic hydrogen sulphide gas. Store in cool, dry, well-ventilated area away from incompatible materials, heat, and sources of ignition. All storage containers and pumping equipment should be grounded. Structural materials and lighting and ventilation systems should be corrosion resistant. Keep out of the reach of children.

Section 8: EXPOSURE CONTROLS / PERSONAL PROTECTION
Exposure Guidelines
Ingredient

Gas oils
(petroleum),
hydrodesulfurized

ACGIH

TWA
5 mg/m³ *
STEL
10 mg/m³ *
Ceiling

Not available.

Notes

* Oil mist, mineral.



Husky Energy

MATERIAL SAFETY DATA SHEET

Synthetic Crude Oil

Date of Preparation: January 5, 2011

Gas oils (petroleum), hydrodesulfurized	OSHA	5 mg/m ³ *	Not available.	Not available.	* Oil mist, mineral.
Naphtha (petroleum), hydrotreated heavy	ACGIH	100 ppm (400 mg/m ³) *	Not available.	Not available.	* For Naphtha.
Naphtha (petroleum), hydrotreated heavy	OSHA	100 ppm (400 mg/m ³) *	Not available.	Not available.	* For Naphtha.
Naphtha (petroleum), hydrotreated light	ACGIH	100 ppm (400 mg/m ³) *	Not available.	Not available.	* For Naphtha.
Naphtha (petroleum), hydrotreated light	OSHA	100 ppm (400 mg/m ³) *	Not available.	Not available.	* For Naphtha.
Butane	ACGIH	1000 ppm	Not available.	Not available.	Not available.
Butane	OSHA	800 ppm (1900 mg/m ³) *	Not available.	Not available.	* Vacated.
Hydrogen sulfide (H ₂ S)	ACGIH	1 ppm	5 ppm	Not available.	Not available.
Hydrogen sulfide (H ₂ S)	OSHA	Not available.	Not available.	20 ppm	50 ppm (10 mins. once only if no other meas. exp. occurs.)
Benzene	ACGIH	0.5 ppm	2.5 ppm	Not available.	Skin.
Benzene	OSHA	1 ppm	5 ppm	Not available.	Not available.
Polycyclic Aromatic Hydrocarbons	ACGIH	0.2 mg/m ³ *	Not available.	Not available.	* For benzene- soluble fraction.
Polycyclic Aromatic Hydrocarbons	OSHA	0.2 mg/m ³ *	Not available.	Not available.	* For benzene- soluble fraction.
Benzene, dimethyl-	ACGIH	100 ppm	150 ppm	Not available.	Not available.
Benzene, dimethyl-	OSHA	100 ppm (435 mg/m ³)	Not available.	Not available.	Not available.

Engineering Controls:

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

Personal Protective Equipment

Eye/Face Protection:

Wear chemical goggles.

Hand Protection:

Wear impervious gloves. Neoprene or nitrile gloves are recommended. Consult manufacturer specifications for further information.

Skin and Body Protection:

Wear suitable protective clothing. Flame resistant clothing such as Nomex ® is recommended in areas where material is stored or handled.

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 (SCBA) should be used. Supplied air breathing apparatus must be used when oxygen concentrations are low or if airborne concentrations exceed the limits of the air-


Husky Energy
MATERIAL SAFETY DATA SHEET
Synthetic Crude Oil

Date of Preparation: January 5, 2011

purifying respirators. Where hydrogen sulfide is present or possibly present in confined spaces at hazardous levels a NIOSH-approved supplied air respirator or self-contained breathing apparatus (SCBA) is necessary.

General Hygiene Considerations: Handle according to established industrial hygiene and safety practices.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear liquid.
Colour:	Straw coloured.
Odour:	Petroleum.
Odour Threshold:	0.00047 ppm, (Hydrogen sulphide)
Physical State:	Liquid.
pH:	Not available.
Viscosity:	Not available.
Melting Point:	Not available.
Boiling Point:	Not available.
Flash Point:	20 °C (PMCC)
Evaporation Rate:	(Ether, anhydrous = 1)
Lower Flammability Limit:	Not available.
Upper Flammability Limit:	Not available.
Vapor Pressure:	15 to 35 kPa (20 °C)
Vapor Density:	Not available.
Specific Gravity:	0.86 (Water = 1)
Density:	Not available.
Solubility in Water:	Insoluble in cold water.
Coefficient of Water/Oil Distribution:	Not available.
Auto-ignition Temperature:	Not available.
Percent Volatile, wt. %:	Not available.
VOC content, wt. %:	Not available.

Section 10: STABILITY AND REACTIVITY

Stability:	Stable under normal storage conditions.
Conditions of Reactivity:	Contact with incompatible materials. Sources of ignition.
Incompatible Materials:	Strong acids. Strong oxidizers. Chlorine.

**Husky Energy****MATERIAL SAFETY DATA SHEET****Synthetic Crude Oil**

Date of Preparation: January 5, 2011

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

Possibility of Hazardous Reactions: Explosion hazard in contact with strong nitric acid.

Section 11: TOXICOLOGICAL INFORMATION
--

EFFECTS OF ACUTE EXPOSURE**Component Toxicity**

Ingredient	CAS No.	LD₅₀ oral	LD₅₀ dermal	LC₅₀
Gas oils (petroleum), hydrotreated heavy	64742-79-6	Not available.	Not available.	Not available.
Naphtha (petroleum), hydrotreated light	64742-48-9	Not available.	Not available.	Not available.
Naphtha (petroleum), hydrotreated heavy	64742-49-0	Not available.	Not available.	Not available.
Butane	106-97-8	Not available.	Not available.	658000 mg/m ³ , (rat)
Hydrogen sulfide (H ₂ S)	7783-06-4	Not available.	Not available.	444 ppm, (rat)
Benzene	71-43-2	930 mg/kg, (rat)	>9400 µl/kg, (rabbit)	10000 ppm, (rat)
Polycyclic Aromatic Hydrocarbons	130498-29-2	Not available.	Not available.	Not available.
Benzene, dimethyl-	1330-20-7	>1700 mg/kg, (rat)	4300 mg/kg, (rabbit)	5000 ppm, (rat)

Eye: Irritating to eyes. Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision. Above 50 ppm Hydrogen sulphide, eye irritation may include symptoms of redness, severe swelling, tearing, sensitivity to light and the appearance of 'Halos' around lights.

Skin: Irritating to skin. Signs/symptoms may include localized redness, swelling, and itching.

Ingestion: Harmful or fatal: may cause lung damage if swallowed. Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. May cause gastrointestinal irritation. Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.

Inhalation: Irritating to respiratory system. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain. May cause headache, dizziness, confusion, loss of appetite and loss of consciousness. This product contains hydrogen sulphide (H₂S) gas which may collect in confined spaces. Acute effects vary with concentration of H₂S released from mild eye, nose and throat irritation at approximately 100 ppm to sudden unconsciousness or death at 500 ppm. Memory loss, paralysis of facial muscles, and nerve tissue damage may occur after severe exposures near 500 ppm.

Skin Sensitization: Not hazardous by OSHA/WHMIS criteria.

Respiratory Sensitization: Not hazardous by OSHA/WHMIS criteria.


Husky Energy
MATERIAL SAFETY DATA SHEET
Synthetic Crude Oil

Date of Preparation: January 5, 2011

EFFECTS OF CHRONIC EXPOSURE

Target Organs: Respiratory system. Skin. Liver. Kidney. Blood. Central nervous system. Cardiovascular system.

Chronic Effects: Not hazardous by OSHA/WHMIS criteria. Prolonged or repeated contact may dry skin and cause irritation. Similar products have shown the potential to produce skin tumors in laboratory animals as indicated following direct skin application over the lifetime of the test animal. High vapour concentrations, generally greater than 10% by volume, may sensitize the heart and lead to lethal cardiac arrhythmias. Repeated or prolonged exposure to H₂S at 50 ppm or greater include respiratory illnesses such as bronchitis and pulmonary edema. This product may contain small quantities of benzene. Epidemiological studies indicate that long term inhalation of benzene vapours can result in leukemia. This product contains small quantities of xylene. Xylene can damage bone marrow thus causing anemia, and can also damage the liver and kidneys, as well as the central and peripheral nervous systems. This product contains small quantities of polycyclic aromatic hydrocarbons. 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.

Carcinogenicity: Hazardous by OSHA/WHMIS criteria. May cause cancer. Benzene has been classified by the International Agency for Research on Cancer as carcinogenic to humans (IARC Group 1).

Component Carcinogenicity

Ingredient	ACGIH	IARC	OSHA	NTP	Prop 65
Gas oils (petroleum), hydrosulfurized	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.
Naphtha (petroleum), hydrotreated heavy	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.
Naphtha (petroleum), hydrotreated light	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.
Butane	Not listed.	Not listed.	Not listed.	Not listed.	Not listed.
Hydrogen sulfide (H ₂ S)	Not listed.	Not listed.	Listed.	Not listed.	Not listed.
Benzene	A1	Group 1	Listed.	List 1	Listed.
Polycyclic Aromatic Hydrocarbons	A2	Group 2A	Listed.	List 2	Listed.
Benzene, dimethyl-	A4	Group 3	Listed.	Not listed.	Not listed.

Mutagenicity: Not hazardous by OSHA/WHMIS criteria.

Reproductive Effects: Not hazardous by OSHA/WHMIS criteria.

Developmental Effects

Teratogenicity: Not hazardous by OSHA/WHMIS criteria.

Embryotoxicity: Not hazardous by OSHA/WHMIS criteria. Exposure to xylene has produced fetotoxic effects in animal studies.

Toxicologically Synergistic Materials: Not available.

**Husky Energy**
MATERIAL SAFETY DATA SHEET**Synthetic Crude Oil**
Date of Preparation: January 5, 2011**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: TRANSPORTATION INFORMATION**CFR**

Proper Shipping Name: PETROLEUM CRUDE OIL, 3, UN 1267, II
Class: 3
UN Number: 1267
Packing Group: II
Label Code:

**TDG**

Proper Shipping Name: PETROLEUM CRUDE OIL, 3, UN 1267, II
Class: 3
UN Number: 1267
Packing Group: II
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.


Husky Energy
MATERIAL SAFETY DATA SHEET
Synthetic Crude Oil

Date of Preparation: January 5, 2011

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 B2 - Flammable Liquids.
 Class D2A - Carcinogenicity.
 Class D2B - Skin irritant.
 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.

State Regulations
Massachusetts

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

Ingredient	CAS No.	RTK List
Gas oils (petroleum), hydrodesulfurized	64742-79-6	Not listed.
Naphtha (petroleum), hydrotreated heavy	64742-48-9	Not listed.
Naphtha (petroleum), hydrotreated light	64742-49-0	Not listed.
Butane	106-97-8	Listed.
Hydrogen sulfide (H ₂ S)	7783-06-4	Not listed.
Benzene	71-43-2	Listed.
Polycyclic Aromatic Hydrocarbons	130498-29-2	Not listed.
Benzene, dimethyl-	1330-20-7	Not listed.

New Jersey

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

Ingredient	CAS No.	RTK List
Gas oils (petroleum), hydrodesulfurized	64742-79-6	Not listed.
Naphtha (petroleum), hydrotreated heavy	64742-48-9	Not listed.
Naphtha (petroleum), hydrotreated light	64742-49-0	Not listed.
Butane	106-97-8	Listed.
Hydrogen sulfide (H ₂ S)	7783-06-4	Listed.
Benzene	71-43-2	Listed.
Polycyclic Aromatic Hydrocarbons	130498-29-2	Not listed.
Benzene, dimethyl-	1330-20-7	Listed.

Pennsylvania

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

Ingredient	CAS No.	RTK List
Gas oils (petroleum), hydrodesulfurized	64742-79-6	Not listed.
Naphtha (petroleum), hydrotreated heavy	64742-48-9	Not listed.
Naphtha (petroleum), hydrotreated light	64742-49-0	Not listed.

**Husky Energy****MATERIAL SAFETY DATA SHEET****Synthetic Crude Oil**

Date of Preparation: January 5, 2011

Butane	106-97-8	Listed.
Hydrogen sulfide (H ₂ S)	7783-06-4	Listed.
Benzene	71-43-2	Listed.
Polycyclic Aromatic Hydrocarbons	130498-29-2	Not listed.
Benzene, dimethyl-	1330-20-7	Listed.

California

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

Ingredient

Benzene
Benzene
Polycyclic Aromatic Hydrocarbons

Type of Toxicity

developmental, male
cancer
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.

Expiry Date: January 4, 2014

Version: 1.0

MSDS Prepared by: Deerfoot Consulting Inc.

Phone: (403) 720-3700

**Canadian Natural**

Manufacturer/Supplier:



**Canadian Natural
Resources Ltd.**
2500, 855 2nd Street S.W.
Calgary, Alberta, Canada
T2P 4J8

MATERIAL SAFETY DATA SHEET

24 Hour Emergency Telephone Number:

1-780-828-3000

1. PRODUCT IDENTIFICATION

HORIZON SWEET LIGHT OIL

SYNONYMS: 1. Synthetic Crude Oil 3. Horizon Sweet Oil
2. Sweet Light Oil 4. Horizon Light Oil

WHMIS

Class B: Division 2
Flammable Liquid

Class D Division 2:
Poisonous and
Infectious Material
(Material Causing Other Toxic
Effects)



TDG

FLAMMABLE LIQUID: 3

SHIPPING NAME: Synthetic Crude Oil

UN NUMBER: UN1267
Class 3, PG II or III



DESCRIPTION: Complex mixture of hydrocarbons derived from Upgrading processing of Extra Heavy Crude Oil.

PRODUCT USE: Refinery feedstock.

2. HAZARDOUS INGREDIENTS

The following components are defined in accordance with sub-paragraph 13(a)(i) to (iv) or paragraph 14(a) of the Hazardous Product Act:

NAME	%	CAS#
Hydrocarbons(aromatic and paraffinic)	100	8002-05-9
Benzene	0.05 (LV%)	71-43-2

LD50: not available

LC50: not available

All components of this material are either on the Domestic Substances List (DSL) or exempt.

3. TYPICAL PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE:	Liquid
ODOUR AND APPEARANCE:	Aromatic or petroleum odour. Usually

	light brown or light green liquid
ODOUR THRESHOLD:	Not available
SPECIFIC GRAVITY:	0.838 (water = 1)
VAPOUR PRESSURE (RVP):	35 kPa(ab) @ 37.8 °C
VAPOUR DENSITY:	Not available
EVAPORATION RATE:	Variable
BOILING POINT/RANGE:	-18 °C to 538 °C
FREEZING / MELTING POINT:	Not available
pH IN WATER	Not available
SOLUBILITY IN WATER:	0%
MOLECULAR FORMULA:	Not applicable - mixture
MOLECULAR WEIGHT:	Not applicable - mixture

4. HEALTH HAZARD INFORMATION

RELEVANT ROUTES OF ENTRY:

Inhalation, skin contact, eye contact, ingestion

ACUTE AND CHRONIC EFFECTS OF EXPOSURE:

INHALATION:

Inhalation of vapours can lead to irritation upper respiratory system and depression of the central nervous system.

EYE CONTACT:

Contact with vapours and/or mists can lead to irritation.

SKIN CONTACT:

Can cause defatting of the skin as well as skin irritation.

INGESTION:

Ingestion may lead to irritation of mucous membranes as well as nausea and vomiting.

IRRITANCY OF PRODUCT:

See acute and chronic effects of exposure; inhalation, eye contact, ingestion and skin contact.

SENZITATION OF PRODUCT: Not available

CARCINOGENICITY: Benzene: IARC Group 1: Carcinogenic to humans

REPRODUCTIVE TOXICITY: Not available

TERATOGENICITY: Not available

MUTAGENICITY: Not available

NAME OF TOXICOLOGICALLY SYNERGISTIC PRODUCTS: Not available

OCCUPATIONAL EXPOSURE LIMITS (OELs) RECOMMENDED:

Alberta (Stoddard Solvent)	100 ppm
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THRESHOLD LIMIT VALUES:

ACGIH (Stoddard Solvent)	100 ppm
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**Canadian Natural****Manufacturer/Supplier:**

**Canadian Natural
Resources Ltd.**
2500, 855 2nd Street S.W.
Calgary, Alberta, Canada
T2P 4J8

MATERIAL SAFETY DATA SHEET

24 Hour Emergency Telephone Number:**1-780-828-3000**

5. FIRST AID MEASURES

INHALATION:

If inhalation causes adverse effects remove victim to fresh air and seek medical attention immediately.

EYE CONTACT:

Flush immediately with water for at least 15 min. Seek medical attention immediately.

SKIN CONTACT:

Flush with water and soap. Remove contaminated clothing and shoes. Seek medical attention if necessary.

INGESTION:

Do not induce vomiting, seek medical attention immediately.

6. PREVENTATIVE AND CORRECTIVE MEASURES

PERSONAL PROTECTION:

SKIN PROTECTION: Wear long sleeves, chemical resistant gloves, chemical safety goggles and CSA approved work boots.

RESPIRATORY PROTECTION: If OEL are likely to be exceeded wear NIOSH approved respiratory protection.

EYE PROTECTION: Wear CSA or ANSI approved eye protection where required.

ENGINEERING CONTROL:

Ensure adequate ventilation.

HANDLING, STORAGE:

Always use personal protective equipment as specified above. Avoid sources of ignition where LEL limits have been reached. Store only in approved containers.

LAND SPILL:

Ensure clean up and disposal in compliance with government requirements and ensure conformity to local disposal regulations. Follow proper notification requirements.

WATER SPILL:

Ensure clean up and disposal in compliance with government requirements and ensure conformity to local disposal regulations. Follow proper notification requirements.

WASTE DISPOSAL:

Dispose of as per local and federal regulations.

7. FIRE AND EXPLOSION HAZARD

CONDITIONS OF FLAMMABILITY	Temperature above flash point, open flame or sources of ignition
MEANS OF EXTINCTION	Foam, water and/or dry chemical
FLASH-POINT (Test Method):	Below -18 °C (Tag Closed Cup)
FLAMMABLE LIMITS (% Volume):	Not available
AUTO-IGNITION:	245 °C

HAZARDOUS COMBUSTION PRODUCTS	Carbon monoxide and dioxide, oxides of sulphur and acid fumes
SENSITIVITY TO MECHANICAL IMPACT	Stable (do not expose to sparks - highly flammable)
SENSITIVITY TO STATIC DISCHARGE	Low. Highly flammable

8. REACTIVITY DATA

CONDITIONS UNDER WHICH PRODUCT IS CHEMICALLY UNSTABLE:

Chemical is stable under normal conditions. Hazardous polymerization is not known to occur.

INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID:

Strong oxidizing agents, heat

CONDITIONS OF REACTIVITY:

Heat, sparks, flames, sources of ignition

9. PREPARATION

Prepared by:	CNRL Horizon Industrial Hygiene
Phone:	780-828-2555
Preparation date:	MAY 2008

CAUTION

The information contained herein is provided free of charge and is offered to the user in good faith as accurate. Certain information has been obtained from sources outside of the supplier and while the supplier believes such information to be correct, it cannot guarantee its accuracy or completeness.

The information contained herein relates only to the product or material set forth in Section 1 and may not be applicable or complete if such product material is used in combination with any other product or material or in any process. The information may not be applicable or complete for all individuals or if the products or material is used for a purpose or under conditions which are abnormal or not reasonable foreseeable. For greater certainty, uses other than those described in Section 1 must be reviewed with the supplier.

It is the user's obligation to consider, investigate and verify the information, to use the product safely and to comply with all applicable laws and regulations. The supplier makes no warranties, guarantees or conditions express or implied in respect of the information contained herein.

Material Safety Data Sheet



1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

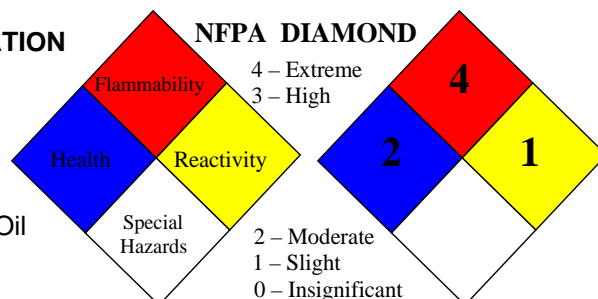
Manufacturer/Supplier: Enbridge Pipelines Inc.
10201- Jasper Avenue
Edmonton, Alberta T5J 3N7
CANADA

Product Name: US. High Sweet Clearbrook (UHC) Crude Oil
Synonyms: Hydrocarbons of Petroleum

General Information: 780-420-5306

Emergency Telephone Number (24 hrs): CHEMTREC 800-424-9300 USA
CANUTEC 613-996-6666 Canada

Date Prepared: 06/17/2011



2 – PRODUCT COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS Number	Normal % * by Wt./Vol.	Occupational Exposure Limits (ppm)		
			OSHA	ACGIH	NIOSH
Petroleum Hydrocarbons	68919-39-1	100	N/A	N/A	N/A
1t,2-dimethylcyclopentane	28729-52-4	1.8	None	None	None
2-methylhexane	591-76-4	1.0	None	None	None
2-methylpentane	107-83-5	1.8	None	500	100
3-methylhexane	589-34-4	1.6	None	None	None
3-methylpentane	96-14-0	1.3	None	500	100
2-methylheptane	592-27-8	1.4	None	300	None
Benzene	71-43-2	0.4	1	0.5	0.1
cyclohexane	110-82-7	1.0	300	100	300
i-pentane	109-66-0	1.8	1000	600	120
methylcyclohexane	108-87-2	2.3	500	400	400
methylcyclopentane	96-37-7	2.2	None	None	None
n-butane	106-97-8	1.9	800	1000	800
n-heptane	142-82-5	3.4	500	400	85
n-Hexane	110-54-3	3.4	50	50	50
n-Pentane	109-66-0	3.4	600	600	120
n-octane	111-65-9	3.0	500	300	75

n-nonane	111-84-2	2.2	None	200	200
n-decane	124-18-5	2.0	None	None	None
n-undecane	1120-21-4	1.7	None	None	None
n-dodecane	112-40-3	1.5	None	None	None
n-tridecane	629-50-5	1.3	None	None	None
Toluene	108-88-3	0.9	100	20	100
Hydrogen sulfide	7783-06-4	<0.00001	20 ^{Ceiling}	1	10 ^{Ceiling}
Ethylbenzene	100-41-4	0.6	100	20	100
Xylenes	1330-20-7	0-5	100	100	100

* Values do not reflect absolute minimums and maximums; those values may vary from time to time.

N/A - Not Available

3 – HAZARDS IDENTIFICATION

Flammability: Flammable liquid and vapor. Keep away from heat, sparks, flames or other sources of ignition (such as static electricity, pilot lights, mechanical/electrical equipment).
HMIS Classification for Flammability: 4

Stability: Stable under normal conditions. Avoid all sources of ignition.
HMIS Classification for Reactivity: 1

Potential Health Effects from Overexposure

Acute Effects:

Ingestion: Ingestion may result in nausea, vomiting, diarrhea and central nervous system depression. Aspiration of liquid into the lungs must be avoided as even small quantities in the lungs can produce chemical pneumonitis, pulmonary edema/hemorrhage and even death.

Skin Contact: Prolonged and repeated contact may cause defatting and drying of the skin and can lead to irritation and/or dermatitis.

Eye Contact: Liquid or vapor contact may cause mild eye irritation, including stinging, watering, redness and swelling. Hydrogen sulfide (H₂S) may cause burning or tearing and visual disturbances at repeated exposures above the TLV.

Inhalation: Prolonged or excessive exposure may cause irritation to the nose, throat, lungs and respiratory tract and may lead to headache, nausea, drowsiness, fatigue, pneumonitis, pulmonary edema, CNS depression, coma and respiratory arrest.

Chronic Health Effects from Overexposures:

Skin and eye irritation. May affect the respiratory and central nervous systems.

Special Toxic Effects:

n-Hexane (CAS 110-54-3)

Target Organs – Excess exposure to n-hexane can result in peripheral neuropathies. The initial symptoms are symmetrical sensory numbness and paresthesia of distal portions of the extremities. Motor weakness is typically observed in muscles of the toes and fingers but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. The neurotoxic properties of n-hexane are potentiated by exposure to methyl ethyl ketone and methyl isobutyl ketone. Prolonged exposure to high concentrations of n-hexane (>1,000 ppm) has resulted in decreased sperm count and degenerative changes in the testes of rats but not those of mice.

Benzene (CAS 71-43-2)

Carcinogenicity: Benzene is a known animal carcinogen and is known to produce leukemia in humans. Benzene has been identified as a human carcinogen by NTP, IARC and OSHA.

4 – FIRST AID MEASURES

- Ingestion:** Aspiration hazard. Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe damage. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration.
- Skin Contact:** Wipe material from skin and remove contaminated clothing. Cleanse affected areas thoroughly by washing with mild soap and water and, if necessary, a waterless skin cleanser. If irritation or redness develops, seek medical attention.
- Eye Contact:** If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water for 15 minutes, with eyelids held open. If symptoms persist, seek medical attention.
- Inhalation:** If respiratory symptoms or other symptoms of exposure develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, qualified personnel should administer oxygen. Seek immediate medical attention.

Notes to Physician: Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of this material (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for development of cardiac arrhythmias.

5 – Exposure Controls/ Personal Protection

- Eye Protection:** Safety glasses or goggles are recommended when there is a possibility of splashing or spraying.
- Skin Protection:** The use of gloves (nitrile or neoprene) is advised to prevent skin contact and possible irritation. Depending on conditions, the use of an apron or chemical protective clothing may be necessary.
- Respiratory Protection:** A NIOSH certified air purifying respirator with an organic vapor cartridge may be used under conditions where airborne concentrations of hydrocarbons are expected to exceed exposure limits. Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is a potential for an uncontrolled release, exposure levels are not known or any other circumstances where air purifying respirators

may not provide adequate protection. A respiratory protection program that meets US OSHA's 29 CFR 1910.134, Canadian Labour Code Part II and ANSI Z88.2 requirements must be followed when workplace conditions warrant a respirator's use.

Engineering Controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used (see appropriate electrical codes).

6 – FIRE FIGHTING MEASURES

Flash Point:	< 40 °C	Lower Explosive Limit:	Not Established
Auto Ignition Temperature:	Not data available	Upper Explosive Limit:	Not Established

Basic Fire Fighting Procedures: Long-duration fires involving diluent stored in tanks may result in a boilover. The contents of the tank may be expelled beyond the containment dikes or ditches. All personnel should be kept back a safe distance when a boilover is anticipated (reference NFPA 11). For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces or when explicitly required by DOT, a self-contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant. Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk. Water spray may be useful in minimizing or dispersing vapors. Cool equipment exposed to fire with water, if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

Extinguishing Media: Any extinguisher capable of handling Class B fires is recommended, including extinguishing media such as CO₂, dry chemical or foam. Water spray is recommended to cool or protect exposed materials or structures. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Firefighting should be attempted only by those who are adequately trained and equipped with proper personal protective equipment.

Unusual Fire and Explosion Hazards: This material is flammable and may be ignited by heat, sparks, flames or other sources of ignition (such as static electricity, pilot lights, or mechanical/electrical equipment). Vapors may travel considerable distances to a source of ignition where they can ignite, flashback or explode. May create vapor/air explosion hazard indoors, outdoors or in sewers. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire.

7 – ACCIDENTAL RELEASE MEASURES

Personal precautions: Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources.

Spill management: Wear appropriate breathing apparatus (if applicable) and protective clothing. A vapor suppressing foam may be used to reduce vapors. Try to work upwind of spill. Dike and contain land spills; contain water spills by booming. For large spills remove by mechanical means such as vacuuming or pumping and place in containers. All equipment used when

handling the product must be grounded. Recover and return free product to proper containers. Use suitable absorbent materials such as vermiculite, sands, soil, or clay to clean up residual liquids. Do not wash spills into sewers or other public water systems.

Reporting: Report spills to local or federal authorities as appropriate or required.

8 – HANDLING AND STORAGE

The use of explosion-proof equipment is recommended and may be required (see appropriate fire codes). Do not enter confined spaces such as tanks or pits without following proper entry procedures. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits.

Use appropriate grounding and bonding practices. Stores in properly closed containers that are appropriately labeled and in a cool well-ventilated area. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Do not cut, drill, grind or weld on empty containers since they may contain explosive residues.

Harmful concentrations of hydrogen sulfide (H₂S) gas can accumulate in excavations and low-lying areas as well as the vapor space of storage and bulk transport compartments. Stay upwind and vent open hatches before uploading.

Avoid skin contact. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water.

9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear to brown liquid
Physical Form:	Liquid
Substance type (Pure/Mixture):	Mixture
Boiling Temperature:	94 to 1330 °F
Melting Temperature:	Not determined
Vapor Pressure:	about 7.47 psi
Vapor Density:	1.0 - 3.9
Evaporation Rate:	(Ethyl ether =1) >1
Specific Gravity:	0.82
Water Solubility:	Negligible
pH:	Not determined
Viscosity:	5.43 mm ² /s
Color:	Clear to brown
Odor:	Rotten egg, petroleum like odor

10 – STABILITY AND REACTIVITY

CONDITIONS TO AVOID:	Excessive heat, sources of ignition, sparks, open flames, and buildup of static electricity.
CHEMICAL STABILITY:	Stable at 70 °F, 760 mmHg pressure.
HAZARDOUS DECOMPOSITION PRODUCTS:	Combustion produces carbon monoxide, aldehydes, aromatic and other hydrocarbons.
HAZARDOUS POLYMERIZATION:	Will not occur
INCOMPATIBILITY:	Strong oxidizers such as nitrates, chlorates, peroxides.

11 – TOXICOLOGICAL INFORMATION– CHRONIC AND ACUTE HEALTH HAZARDS

This product contains aliphatic naphthas at a level of >0.1%. Lifetime skin painting studies in mice with similar naphthas have shown wither negative or very weak dermal carcinogenic activity following prolonged and repeated skin contact. Some other petroleum fractions that show carcinogenic activity when tested at nonirritating dose levels did not show any significant carcinogenic activity indicating that this tumorigenic response is likely related to chronic irritation and not dose. Some components of aliphatic naphthas, i.e., paraffins and olefins, have been shown to produce a species specific, sex hormonal dependent kidney damage develops via the formation of alpha-2u-globulin, a mechanism unique to the male rat. Humans do not for alpha-2u-globulin; therefore, the kidney effects resulting from this mechanism are not relevant in humans.

This product contains benzene at a level of 0.1%. Repeated or prolonged exposure to benzene at concentrations in excess of the TLV may cause serious injury to blood-forming organs. Significant chronic exposure to benzene vapor has been reported to produce various blood disorders ranging from anemia to certain forms of leukemia (cancer) in man. Benzene produced tumors in rats and mice in lifetime chronic toxicity studies, but the response has not been consistent across species, strain, sex or route of exposure. Animal studies on benzene have demonstrated immune toxicity, chromosomal aberrations, testicular effects and alterations in reproductive cycles and embryo/fetotoxicity, but not teratogenicity.

Hydrogen sulfide gas (H_2S) is toxic by inhalation. Prolonged breathing of 50-100 ppm H_2S vapors can produce eye and respiratory tract irritation. Higher concentration (250-600 ppm) for 15-30 minutes can produce headache, dizziness, nervousness, nausea and pulmonary edema or bronchial pneumonia. Concentrations of >1000 ppm will cause immediate unconsciousness and death through respiratory paralysis. Rats and mice exposed to 80 ppm H_2S , 6 hrs/day, 5 days/week for 10 weeks, did not produce any toxicity except for irritation of nasal passages. H_2S did not affect reproduction and development (birth defects or neurotoxicity) in rats exposed to concentrations of 75-80 ppm or 150 ppm H_2S , respectively. Over the years a number of acute cases of H_2S poisoning have been reported. Complete and rapid recovery is the general rule. However, if the exposure was sufficiently intense and sustained causing cerebral hypoxia (lack of oxygen to the brain), neurologic effects such as amnesia, intention tremors or brain damage are possible.

This product may contain hexane at a level of >1.0%. Studies in laboratory animals have produced systemic toxicity in blood, spleen and lungs. Fetotoxicity has been observed at hexane concentrations that produced maternal toxicity. Long term exposure to high concentrations of hexane has been shown to cause testicular effects and nervous system damage.

This product may contain xylenes at a level of >1.0%. Gross overexposure or severe poisoning incidents in humans to xylenes has been reported to cause lung, liver, kidney, heart and brain damage as well as neurologic disturbances. Laboratory animals exposed to high dose of xylenes showed evidence of effects in the liver, kidneys, lungs, spleen, heart and adrenals. Exposure of pregnant rats, mice and rabbits during gestation to significant concentrations of xylenes produced maternal, fetal and developmental toxicity (skeletal retardation, cleft palate, and wavy ribs) generally at maternally toxic doses. These types of fetotoxic effects have been associated with maternal toxicity. Repeated inhalation of high xylene concentrations has shown impairment of performance abilities (behavioral tests) in animals and man. Xylenes produced a mild frequency hearing loss in rats subchronically exposed to high concentrations of xylenes.

12 – DISPOSAL INFORMATION

Container contents should be completely used and containers should be emptied prior to discard. Container could be considered a RCRA hazardous waste and must be disposed of with care and in full compliance with federal, state and local regulations. Larger empty containers, such as drums, should be returned to the distributor or to a drum re-conditioner. To assure proper disposal of smaller empty containers, consult with state and local regulations and disposal authorities. This product, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA RCRA (40 CFR 261), Environment Canada, or other State, Provincial, and local regulations. If this product is classified as a hazardous waste, federal law

requires disposal at a licensed hazardous waste disposal facility. This product could also contain benzene at >0.5 ppm and could exhibit the characteristic of "toxicity" (D018) as determined by the toxicity characteristic leaching procedure (TCLP). This material could become a hazardous waste if mixed or contaminated with a hazardous waste or other substance(s). It is the responsibility of the user to consult federal, state and local waste regulations to determine appropriate disposal options.

13 – ENVIRONMENTAL INFORMATION

Spill or Release to the Environment: Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof equipment is recommended. Stay upwind and away from spill/release. Notify persons downwind of spill/release, isolate immediate hazard area and keep unauthorized personnel out. Product may release large amounts of flammable vapors (e.g., methane, ethane and propane) at or below ambient temperature depending on source and process conditions. Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment including respiratory equipment as conditions warrant. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment drainage systems and natural waterways. Dike far ahead of spill for later recovery or disposal. Use foam on spills to minimize vapors. Spilled material may be absorbed into an appropriate absorbent material.

Notify fire authorities and appropriate federal, state (provincial) and local agencies. Immediate cleanup of any spill is recommended. If spill of any amount into navigable waters, notify appropriate federal, state (provincial) and local agencies.

Sara Title III Information: This material contains the following chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372:

Toluene	CAS – 108-88-3	Weight % - 0 – 2%
n-Hexane	CAS – 110-54-3	Weight % - up to 11%
Benzene	CAS – 71-43-2	Weight % - 0 – 2%

14 – REGULATORY INFORMATION

USA: All of the components of this product are on the Toxic Substances Control Act (TSCA) Chemical Inventory.

Canada: All the components of this product are on the Canadian Domestic Substances List (DSL), or have been notified under the New Substances Notification Regulations, but have not yet been published in the Canada Gazette.

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

WHMIS Classification: Class B2 Flammable Liquids
 Class D2B Other Toxic Effects - Skin Irritant
 Class D2A Other Toxic Effects – Embryotoxic/Fetotoxic

US EPA Reportable Quantity: The estimated reportable quantity (RQ) for this material is based on the weight % shown below:

RQ based on benzene – The RQ for benzene is 10 pounds, which equals 3,333 pounds of natural gas condensate (556 gallons). The RQ is based on 0.3 wt. % benzene.

RQ based on n-Hexane – The RQ for n-Hexane is 5000 pounds, which equals 50,000 pounds of natural gas condensate (8,333 gallons). The RQ is based on 10 wt. % n-Hexane.

RQ based on toluene – The RQ for toluene is 1000 pounds, which equals 50,000 pounds of natural gas condensate (8,333 gallons). The RQ is based on 2 wt. % toluene.

15 – SPECIAL PRECAUTIONS / SUPPLEMENTAL INFORMATION

Keep containers tightly closed. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces and all sources of ignition. Post area “No Smoking or Open Flame”. Store only in approved containers. Keep away from any incompatible material. Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet US OSHA standards, Canadian Labour Codes and other appropriate fire codes.

Depending on the source of natural gas condensate, there could be some amount of NORM (naturally occurring radioactive materials) in the scale, deposit and sludge associated with this material. Proper measurements should be taken prior to handling this material or any equipment contaminated with this material. If NORM is indicated, refer to API Bulletin E2, “Bulletin on Management of Naturally Occurring Radioactive Materials in Oil and Gas Production,” for additional information.

Empty Containers: “Empty” containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks or other sources of ignition. They may explode and cause injury or death. “Empty” drums should be completely drained, properly bunged and promptly shipped to the supplier or a drum re-conditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1 and other governmental and industrial references pertaining to cleaning, repairing, welding or other contemplated operations.

16 – TRANSPORTATION REQUIREMENTS

General Transportation Information:

DOT Proper Shipping Name (49 CFR 172.101):	Petroleum Crude Oil
DOT Hazard Classes (49 CFR 172.101):	3
UN/NA Code (49 CFR 172.101):	UN1267
Packing Group (49 CFR 172.101):	II
Bill of Lading Description (49 CFR 172.202):	Petroleum Crude Oil
DOT Labels Required (49 CFR 172.101):	Flammable Liquid

Please note that the actual shipping name and associated data can vary due to the properties of the product. Other acceptable shipping names may include Petroleum Distillate n.o.s. 1268, Gasoline UN1203, Flammable liquids, n.o.s. (pentane) UN1993 or Hydrocarbons, Liquid n.o.s. (condensate) UN3295.

PREPARED BY: Enbridge Pipelines Inc.

Disclaimer

The information presented herein is based on data considered to be accurate as of the date of preparation of this Material Safety Data Sheet (MSDS). However, MSDS's may not be used as a commercial specification sheet of manufacturer or seller, and no warranty or representation, express or implied, is made as to the accuracy or completeness of the foregoing data and safety information, nor is any authorization given or implied to practice any patented invention without a license. In addition, no responsibility can be assumed by vendor for any damage or injury resulting from abnormal use, from any failure to adhere to recommended practices or from any hazards inherent in the nature of the product.

ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
ASTM	American Society for Testing and Materials
CAS	Chemical Abstract Service
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
HMIS	Hazardous Materials Identification System
IARC	International Agency for Research on Cancer
m ³	Cubic meter
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
n.o.s.	Not Otherwise Specified
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
REL	Recommended Exposure Limit
SARA	Superfund Amendments and Reauthorization Act
TLV	Threshold Limit Value
TSCA	Toxic Substance Control Act
TWA	Time Weighted Average

Material Safety Data Sheet



1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Manufacturer/Supplier: Enbridge Pipelines Inc.
10201- Jasper Avenue
Edmonton, Alberta T5J 3N7
CANADA

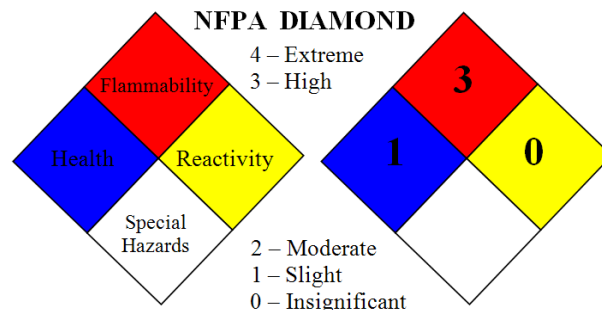
Product Name: Crude Oil - Light

Synonyms: Petroleum Crude Oil, bitumen blend - light

General Information: 1-780-420-5210 715-398-4500

Emergency Telephone Number (24 hrs): CHEMTREC 800-424-9300 USA
CANUTEC 613-996-6666 Canada

Date Prepared: 11/28/2012 Last updated: 4/18/2013



2 – PRODUCT COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS Number	Normal % * by Weight	Occupational Exposure Limits (ppm)		
			OSHA	ACGIH	NIOSH
Crude Oil	8002-05-09	100	N/A	N/A N/A	
Methane	74-82-8	<0.1	N/A	1000	N/A
Ethane	74-84-0	<0.1	N/A	1000	N/A
Propane	74-98-6	<0.3	1000	1000	1000
Iso-Butane	75-28-5	<1	800	1000	800
n-Butane	106-97-8	1-3	800	1000	800
Hexane	110-54-3	1-10	50	50	50
n-Pentane	109-66-0	1-10	600	600	120
Iso-Pentane	92046-46-3	0.7-10	600	600	120
Heptane	142-82-5	0.8-10	400	400	85
Octane	111-65-9	0.5-10	300	300	75
Nonane	111-84-2	0.5-10	N/A	200	200
Decane	124-18-5	0.5-5	N/A	N/A	N/A
neoHexane	75-83-2	<0.5	N/A	N/A	N/A
Benzene	71-43-2	0-3	1	0.5	0.1
Toluene	108-88-3	0-3	100	20	100
Methylcyclohexane	108-87-2	0.5-5	500	400	400

Hydrogen sulfide	7783-06-4	<1	20 ^{Ceiling}	1 10	Ceiling
Ethylbenzene	100-41-4	<1	100	100	100
Xylenes	1330-20-7	1-3	100	100	100
Trimethylbenzene	2551-13-7	<1	25	25	25
C11 – C62 Hydrocarbons	N/A	10-70	N/A	N/A	N/A

* Values do not reflect absolute minimums and maximums; those values may vary from time to time.

N/A - Not Available

3 – HAZARDS IDENTIFICATION

Flammability: Flammable liquid and vapor. Keep away from heat, sparks, flames or other sources of ignition (such as static electricity, pilot lights, mechanical/electrical equipment).
HMIS Classification for Flammability: 3

Stability: Stable under normal conditions. Avoid all sources of ignition.
HMIS Classification for Reactivity: 0

Potential Health Effects from Overexposure

Acute Effects:

Ingestion: Ingestion may result in nausea, vomiting, diarrhea and central nervous system depression. Aspiration of liquid into the lungs must be avoided as even small quantities in the lungs can produce chemical pneumonitis, pulmonary edema/hemorrhage and even death.

Skin Contact: Prolonged and repeated contact may cause defecating and drying of the skin and can lead to irritation and/or dermatitis.

Eye Contact: Liquid or vapor contact may cause mild eye irritation, including stinging, watering, redness, and swelling. Hydrogen sulfide (H₂S) may cause burning or tearing and visual disturbances at repeated exposures above the TLV.

Inhalation: Prolonged or excessive exposure may cause irritation to the nose, throat, lungs, and respiratory tract and may lead to headache, nausea, drowsiness, fatigue, pneumonitis, pulmonary edema, CNS depression, coma and respiratory arrest.

Chronic Health Effects from Overexposures:

Skin and eye irritation. May affect the respiratory and central nervous systems.

Special Toxic Effects:

Hydrogen sulfide (CAS 7783-06-40)

Target organs - Hydrogen sulfide is both an irritant and a chemical asphyxiant with effects on both oxygen utilization and the central nervous system.

Low concentrations- can irritate the eyes, nose, throat and respiratory system.

Moderate concentrations- can cause severe eye and respiratory irritation (including coughing, difficulty breathing, and accumulation of fluid in the lungs), headache, dizziness, nausea, vomiting, staggering and excitability.

High concentrations- can cause shock, convulsions, inability to breathe, rapid unconsciousness, coma, and death. Effects can occur within in one or a few breaths.

n-Hexane (CAS 110-54-3)

Target Organs – Excess exposure to n-hexane can result in peripheral neuropathies. The initial symptoms are symmetrical sensory numbness and paresthesia of distal portions of the extremities. Motor weakness is typically observed in muscles of the toes and fingers but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. The neurotoxic properties of n-hexane are potentiated by exposure to methyl ethyl ketone and methyl isobutyl ketone. Prolonged exposure to high concentrations of n-hexane (>1,000 ppm) has resulted in decreased sperm count and degenerative changes in the testes of rats but not those of mice.

Toluene (CAS 108-88-3)

Target Organs – Epidemiology studies suggest that chronic occupational overexposure to toluene may damage color vision. Sub-chronic and chronic inhalation studies with toluene produced kidney and liver damage, hearing loss and central nervous system damage in lab animals.

Developmental – Exposure to toluene during pregnancy has demonstrated limited evidence of developmental toxicity in lab animals.

Benzene (CAS 71-43-2)

Carcinogenicity: Benzene is a known animal carcinogen and is known to produce leukemia in humans. Benzene has been identified as a human carcinogen by NTP, IARC and OSHA.

4 – FIRST AID MEASURES

- Ingestion: Aspiration hazard. Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe damage. Obtain immediate medical attention. If spontaneous vomiting occurs lean victim forward to reduce the risk of aspiration.
- Skin Contact: Wipe material from skin and remove contaminated clothing. Cleanse affected areas thoroughly by washing with mild soap and water and, if necessary, a waterless skin cleanser. If irritation or redness develops, seek medical attention.
- Eye Contact: If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water for 15 minutes, with eyelids held open. If symptoms persist, seek medical attention.
- Inhalation: If respiratory symptoms or other symptoms of exposure develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, qualified personnel should administer oxygen. Seek immediate medical attention.
- Notes to Physician: Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of this material (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for development of cardiac arrhythmias.

5 – Exposure Controls/ Personal Protection

Eye Protection: Safety glasses or goggles are recommended when there is a possibility of splashing or spraying.

Skin Protection: The use of gloves (nitrile or neoprene) is advised to prevent skin contact and possible irritation. Depending on conditions, the use of an apron or chemical protective clothing may be necessary.

Respiratory Protection: A NIOSH certified air purifying respirator with an organic vapor cartridge may be used under conditions where airborne concentrations of hydrocarbons are expected to exceed exposure limits. Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is a potential for an uncontrolled release, exposure levels are not known or any other circumstances where air purifying respirators may not provide adequate protection. A respiratory protection program that meets US OSHA's 29 CFR 1910.134, Canadian Labour Code Part II and ANSI Z88.2 requirements must be followed when workplace conditions warrant a respirator's use.

Engineering Controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used (see appropriate electrical codes).

6 – FIRE FIGHTING MEASURES

Flash Point:	< 50 °F	Lower Explosive Limit:	Varies, est. 1%
Auto Ignition Temperature:	Not data available	Upper Explosive Limit:	Varies, est. 13%

Basic Fire Fighting Procedures: Long-duration fires involving crude oil stored in tanks may result in a boil over. The contents of the tank may be expelled beyond the containment dikes or ditches. All personnel should be kept back a safe distance when a boil over is anticipated (reference NFPA 11). For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces or when explicitly required by DOT, a self-contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant. Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk. Water spray may be useful in minimizing or dispersing vapors. Cool equipment exposed to fire with water, if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

Extinguishing Media: Any extinguisher capable of handling Class B fires is recommended, including extinguishing media such as CO₂, dry chemical or foam. Water spray is recommended to cool or protect exposed materials or structures. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Firefighting should be attempted only by those who are adequately trained and equipped with proper personal protective equipment.

Unusual Fire and Explosion Hazards: This material is flammable and may be ignited by heat, sparks, flames or other sources of ignition (such as static electricity, pilot lights, or mechanical/electrical equipment). Vapors may travel considerable distances to a source of ignition where they can ignite, flashback or explode. May create vapor/air explosion hazard indoors, outdoors or in sewers. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire.

7 – ACCIDENTAL RELEASE MEASURES

Personal precautions: Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources.

Spill management: Wear appropriate breathing apparatus (if applicable) and protective clothing. A vapor suppressing foam may be used to reduce vapors. Try to work upwind of spill. Dikes and ditches contain land spills and water spills by booming. For large spills remove by mechanical means such as vacuuming or pumping and place in containers. All equipment used when handling the product must be grounded. Recover and return free product to proper containers. Use suitable absorbent materials such as vermiculite, sands, soil, or clay to clean up residual liquids. Do not wash spills into sewers or other public water systems.

Reporting: Report spills to local or federal authorities as appropriate or required.

8 – HANDLING AND STORAGE

The use of explosion-proof equipment is recommended and may be required (see appropriate fire codes). Do not enter confined spaces such as tanks or pits without following proper entry procedures. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits.

Use appropriate grounding and bonding practices. Store in properly closed containers that are appropriately labeled and in a cool well-ventilated area. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Do not cut, drill, grind or weld on empty containers since they may contain explosive residues.

Harmful concentrations of hydrogen sulfide (H₂S) gas can accumulate in excavations and low-lying areas as well as the vapor space of storage and bulk transport compartments. Stay upwind and vent open hatches before uploading.

Avoid skin contact. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water.

9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear to brown liquid
Physical Form:	Liquid
Substance type (Pure/Mixture):	Mixture
Boiling Temperature:	<95 - to 1100 °F
Melting Temperature:	Not determined
Vapor Pressure:	Not determined
Vapor Density:	1.0 - 3.9

Evaporation Rate: (Ethyl ether =1) >1
Specific Gravity: 0.3 - 0.75
Water Solubility: Negligible
pH: Not determined
Viscosity: Not determined
Color: Clear to brown
Odor: Rotten egg, petroleum like odor

10 – STABILITY AND REACTIVITY

CONDITIONS TO AVOID: Excessive heat, sources of ignition, sparks, open flames, and buildup of static electricity.
CHEMICAL STABILITY: Stable at 70 °F, 760 mmHg pressure.
HAZARDOUS DECOMPOSITION PRODUCTS: Combustion produces carbon monoxide, aldehydes, aromatic and other hydrocarbons.
HAZARDOUS POLYMERIZATION: Will not occur
INCOMPATIBILITY: Strong oxidizers such as nitrates, chlorates, peroxides.

11 – TOXICOLOGICAL INFORMATION– CHRONIC AND ACUTE HEALTH HAZARDS

This product contains aliphatic naphthas at a level of >0.1%. Lifetime skin painting studies in mice with similar naphthas have shown wither negative or very weak dermal carcinogenic activity following prolonged and repeated skin contact. Some other petroleum fractions that show carcinogenic activity when tested at nonirritating dose levels did not show any significant carcinogenic activity indicating that this tumorigenic response is likely related to chronic irritation and not dose. Some components of aliphatic naphthas, i.e., paraffins and olefins, have been shown to produce a species specific sex hormonal dependent kidney damage develops via the formation of alpha-2u-globulin, a mechanism unique to the male rat. Humans do not for alpha-2u-globulin; therefore, the kidney effects resulting from this mechanism are not relevant in humans.

This product contains benzene at a level of 0.1%. Repeated or prolonged exposure to benzene at concentrations in excess of the TLV may cause serious injury to blood-forming organs. Significant chronic exposure to benzene vapor has been reported to produce various blood disorders ranging from anemia to certain forms of leukemia (cancer) in man. Benzene produced tumors in rats and mice in lifetime chronic toxicity studies, but the response has not been consistent across species, strain, sex or route of exposure. Animal studies on benzene have demonstrated immune toxicity, chromosomal aberrations, testicular effects and alterations in reproductive cycles and embryo/fetotoxicity, but not teratogenicity.

Hydrogen sulfide gas (H₂S) is toxic by inhalation. Prolonged breathing of 50-100 ppm H₂S vapors can produce eye and respiratory tract irritation. Higher concentration (250-600 ppm) for 15-30 minutes can produce headache, dizziness, nervousness, nausea and pulmonary edema or bronchial pneumonia. Concentrations of >1000 ppm will cause immediate unconsciousness and death through respiratory paralysis. Rats and mice exposed to 80 ppm H₂S, 6 hrs/day, 5 days/week for 10 weeks, did not produce any toxicity except for irritation of nasal passages. H₂S did not affect reproduction and development (birth defects or neurotoxicity) in rats exposed to concentrations of 75-80 ppm or 150 ppm H₂S, respectively. Over the years a number of acute cases of H₂S poisoning have been reported. Complete and rapid recovery is the general rule. However, if the exposure was sufficiently intense and sustained causing cerebral hypoxia (lack of oxygen to the brain), neurologic effects such as amnesia, intention tremors or brain damage are possible.

This product may contain hexane at a level of >1.0%. Studies in laboratory animals have produced systemic toxicity in blood, spleen and lungs. Fetotoxicity has been observed at hexane concentrations that produced maternal toxicity. Long term exposure to high concentrations of hexane has been shown to cause testicular effects and nervous system damage.

This product may contain xylenes at a level of >1.0%. Gross overexposure or severe poisoning incidents in humans to xylenes has been reported to cause lung, liver, kidney, heart and brain damage as well as neurologic disturbances. Laboratory animals exposed to high dose of xylenes showed evidence of effects in the liver, kidneys, lungs, spleen, heart and adrenals. Exposure of pregnant rats, mice and rabbits during gestation to significant concentrations of xylenes produced maternal, fetal and developmental toxicity (skeletal retardation, cleft palate, and wavy ribs) generally at maternally toxic doses. These types of fetotoxic effects have been associated with maternal toxicity. Repeated inhalation of high xylene concentrations has shown impairment of performance abilities (behavioral tests) in animals and man. Xylenes produced a mild frequency hearing loss in rats sub-chronically exposed to high concentrations of xylenes.

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Container contents should be completely used and containers should be emptied prior to discard. Container could be considered a RCRA hazardous waste and must be disposed of with care and in full compliance with federal, state and local regulations. Larger empty containers, such as drums, should be returned to the distributor or to a drum re-conditioner. To assure proper disposal of smaller empty containers, consult with state and local regulations and disposal authorities. This product, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA RCRA (40 CFR 261), Environment Canada, or other State, Provincial, and local regulations. If this product is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility. This product could also contain benzene at >0.5 ppm and could exhibit the characteristic of “toxicity” (D018) as determined by the toxicity characteristic leaching procedure (TCLP). This material could become a hazardous waste if mixed or contaminated with a hazardous waste or other substance(s). It is the responsibility of the user to consult federal, state and local waste regulations to determine appropriate disposal options.

13 – ENVIRONMENTAL INFORMATION

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Notify fire authorities and appropriate federal, state (provincial) and local agencies. Immediate cleanup of any spill is recommended. If spill of any amount into navigable waters, notify appropriate federal, state (provincial) and local agencies.

Sara Title III Information: This material contains the following chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372:

Toluene	CAS – 108-88-3	Weight % - 0 -3%
Hexane	CAS – 110-54-3	Weight % - 1-20%
Benzene	CAS – 71-43-2	Weight % - 0-3%

14 – REGULATORY INFORMATION

USA: All of the components of this product are on the Toxic Substances Control Act (TSCA) Chemical Inventory.

Canada: All the components of this product are on the Canadian Domestic Substances List (DSL), or have been notified under the New Substances Notification Regulations, but have not yet been published in the Canada Gazette.

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

WHMIS Classification: Class B2 Flammable Liquids
Class D2B Other Toxic Effects - Skin Irritant
Class D2A Other Toxic Effects – Embryotoxic/Fetotoxic

US EPA Reportable Quantity: The estimated reportable quantity (RQ) for this material is based on the weight % shown below:

RQ based on benzene – The RQ for benzene is 10 pounds, which equals 3,333 pounds of crude oil (556 gallons). The RQ is based on 0.3 wt. % benzene.

RQ based on n-Hexane – The RQ for n-Hexane is 5000 pounds, which equals 50,000 pounds of crude oil (8,333 gallons). The RQ is based on 10 wt. % n-Hexane.

RQ based on toluene – The RQ for toluene is 1000 pounds, which equals 50,000 pounds of crude oil (8,333 gallons). The RQ is based on 2 wt. % toluene.

15 – SPECIAL PRECAUTIONS / SUPPLEMENTAL INFORMATION

Keep containers tightly closed. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces and all sources of ignition. Post area “No Smoking or Open Flame”. Store only in approved containers. Keep away from any incompatible material. Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet US OSHA standards, Canadian Labour Codes and other appropriate fire codes.

Depending on the source of crude oil, there could be some amount of NORM (naturally occurring radioactive materials) in the scale, deposit and sludge associated with this material. Proper measurements should be taken prior to handling this material or any equipment contaminated with this material. If NORM is indicated, refer to API Bulletin E2, “Bulletin on Management of Naturally Occurring Radioactive Materials in Oil and Gas Production,” for additional information.

Empty Containers: “Empty” containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks or other sources of ignition. They may explode and cause injury or death. “Empty” drums should be completely drained, properly bunged and promptly shipped to the supplier or a drum re-conditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

Before working on or in tanks which contain or have contained this material refer to OSHA regulations, ANSI Z49.1, and other governmental and industrial references pertaining to cleaning, repairing, welding or other contemplated operations.

16 – TRANSPORTATION REQUIREMENTS

General Transportation Information:

DOT Proper Shipping Name (49 CFR 172.101): Petroleum Crude Oil
DOT Hazard Classes (49 CFR 172.101): 3
UN/NA Code (49 CFR 172.101): UN1267
Packing Group (49 CFR 172.101): I
Bill of Lading Description (49 CFR 172.202): Petroleum Crude Oil
DOT Labels Required (49 CFR 172.101): Flammable Liquid

Please note that the actual shipping name and associated data can vary due to the properties of the product. Other acceptable shipping names may include Petroleum Distillate n.o.s. 1268, Flammable liquids, n.o.s. (pentane) UN1993 or Hydrocarbons, Liquid n.o.s. UN3295.

PREPARED BY: Enbridge Pipelines Inc.

Disclaimer

The information presented herein is based on data considered to be accurate as of the date of preparation of this Material Safety Data Sheet (MSDS). However, MSDS's may not be used as a commercial specification sheet of manufacturer or seller, and no warranty or representation, express or implied, is made as to the accuracy or completeness of the foregoing data and safety information, nor is any authorization given or implied to practice any patented invention without a license. In addition, no responsibility can be assumed by vendor for any damage or injury resulting from abnormal use, from any failure to adhere to recommended practices or from any hazards inherent in the nature of the product.

ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
ASTM	American Society for Testing and Materials
CAS	Chemical Abstract Service
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
HMIS	Hazardous Materials Identification System
IARC	International Agency for Research on Cancer
m ³	Cubic meter
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
n.o.s.	Not Otherwise Specified
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
REL	Recommended Exposure Limit
SARA	Superfund Amendments and Reauthorization Act
TLV	Threshold Limit Value
TSCA	Toxic Substance Control Act
TWA	Time Weighted Average



MATERIAL SAFETY DATA SHEET

WHMIS CLASSIFICATION			
Combustible Liquid (Class B2) Poisonous Material (Class D1)		PRODUCT CODE: N/A CHEMICAL CODE: 9371-01 DATE: June, 2011	
SECTION 1 – MATERIAL IDENTIFICATION			
Trade Name:		MOOSE JAW TOPS	
Other Names:		Hydrocarbon Mixture	
Chemical Synonyms and Family:		Petroleum Hydrocarbon	
Name of Manufacturer/Supplier Address & Phone #:		MOOSE JAW REFINERY PARTNERSHIP P.O. Box 2000 Moose Jaw, Sask. S6H 6E3 (306) 691-7800	
Poison Control Centre Numbers:		Consult local telephone directory for emergency numbers.	
Application:		Tops is a raw material of the petroleum refining industry. Tops contains traces of dissolved hydrogen sulphide.	
SECTION 2 – TRANSPORTATION			
Shipping Name: Petroleum Distillate, N.O.S.		Primary Classification: 3	
UN Number: 1268		Compatibility Groups: N/A	
Subsidiary Classification: N/A		(613) 996-6666 FLAMMABLE LIQUID	
CANUTEC Transport Emergency Number:			
SECTION 3 – COMPOSITION			
Components	Allowable Limits (8 hr.)	% (Volume)	CAS #
Complex mixture of paraffinic and aromatic hydrocarbons (C ₁ -C ₃₅)*	not established	98-100	147880-08-8*
Hydrogen sulphide (dissolved and free)	10 ppm	trace	7783-06-4
* Contains small amounts of benzene and combined sulphur compounds.			
SECTION 4 – PHYSICAL DATA			
Density (at 15°C): 0.70-0.90 kg/L Vapor Pressure(at 15°C): 10-40 kPa Vapor Density (at 20°C): >1 (approximate) Solubility in Water: Insoluble Viscosity (Kinematic): 1-4 cSt (at 40°C)		Boiling point/range(at 1 atm): 0-550°C (wide range) Percent Volatile (at 20°C): Variable Evaporation Rate: Unknown Appearance and Odour: Light brown to dark brown liquid with mercaptan type odour.	

SECTION 5 – FIRE and EXPLOSION DATA

Flash Point (method used = TCC):	<4°C
Flammable limits in air (% by volume):	Unknown, similar to gasoline.
Auto-Ignition Temperature:	Unknown, similar to gasoline.
Fire and Explosion Hazards:	Easily ignitable by flame or spark. Vapors are heavier than air and may travel considerable distance to sources of ignition and flash back. Do not cut, drill or weld empty containers.
Extinguishing Media:	Foam, dry chemical, water spray, carbon dioxide for small fires.
Firefighting Procedures:	Use full protective equipment and self-contained breathing apparatus. Stop flow. Contain spill. Cover with extinguishing agent. Use water spray to cool fire-exposed containers and as a protective screen.
EXTREME FIRE HAZARD	Isolate all ignition sources in area of spill. Use gas detector in confined spaces. To avoid spreading fire, do not point solid water stream directly into burning product.

SECTION 6 – HEALTH HAZARD INFORMATION

<u>Toxicity Data</u>	*Estimated acute LD ₅₀ > 3000 mg/kg (rat, oral): slightly toxic. For H ₂ S: LC ₅₀ = 600 ppm/30 min. (inhalation, human): extremely toxic.
	Tops contains polycyclic aromatic hydrocarbons several of which have been identified as carcinogenic to experimental animals.
<u>Effects of Overexposure</u>	
Inhalation:	Exposures to high concentrations of hydrogen sulphide (1000 ppm or more, i.e. 0.1% or more) will cause respiratory paralysis resulting in coma and death. At 600 ppm, H ₂ S will cause dizziness, nausea, vomiting, fatigue, light headedness, reduced coordination and unconsciousness; central nervous system depressant; kidney and liver damage from long term exposure. May be narcotic in high concentrations.
Skin and Eyes:	Drying, cracking or inflammation of skin. Prolonged exposure to skin may cause dermatitis. Eye contact may cause irritation, but not permanent damage. Exposures to 20-50 ppm. H ₂ S may cause inflammation of the eye tissues (conjunctivitis).
Ingestion:	Overexposure due to ingestion is unlikely for adults since taste and smell limit the amount swallowed. Harmful or fatal if swallowed.
	NOTE 1: AVOID BREATHING VAPOR. AVOID CONTACT WITH SKIN AND EYES. AVOID ASPIRATION.
	NOTE 2: Tops may contain a small amount of benzene which is a suspect human carcinogen.

Emergency and First Aid Procedures Information

Skin:	Remove contaminated clothing - launder before reuse. Soap and water wash. Discard saturated leather articles.
Eyes:	Copious warm water flush - 15 minutes. Physician assessment necessary if irritation persists.
Inhalation:	Evacuate to fresh air. Apply cardio-pulmonary resuscitation if required. Administer oxygen if available. If resuscitation is required, physician assessment mandatory.
Ingestion:	DO NOT INDUCE VOMITING. If vomiting - take care to prevent aspiration. Give 250 ml (1/2 pint) of milk to drink. Liquid paraffin may slow gastric absorption. Mandatory physician assessment.
NOTE TO PHYSICIAN:	Gastric lavage should only be done after endotracheal intubation in view of the risk of aspiration which can cause serious chemical pneumonitis for which antibiotic and corticosteroid therapy may be indicated.

SECTION 7 – REACTIVITY DATA

Stability:	Stable under normal storage and use.
Conditions to avoid:	Sources of ignition; excessive formation of oil mist; heating greatly increases fire and explosion hazards.
Materials to avoid:	Strong oxidizing agents (nitric acid, sulphuric acid, chlorine, ozones, peroxides, etc.) which cause detonation on contact.
Hazardous decomposition products:	CO _x , SO _x , NO _x , black smoke on combustion; H ₂ S may be present.
Can hazardous polymerization occur?	NO

SECTION 8 – SPILL OR LEAK PROCEDURES

Steps to be taken if material is released or spilled:	Evacuate personnel. Avoid contact. Use full protective equipment and breathing apparatus. Eliminate ignition sources. Shut off source of spill. Absorb with inert absorbent, such as dry clay, sand or diatomaceous earth, commercial sorbents, or recover using electrically grounded explosion proof pumps. Place absorbent in closed metal containers. DO NOT FLUSH TO SEWER. Large spills may be pumped from upwind locations using vacuum trucks and extended hoses. Large pools may be covered with foam to prevent vapor evolution. Immediate shutdown and evacuation if wind shifts. Constant monitoring is required.
Waste Disposal Method:	Dispose in approved landfill site or licensed waste reclaimer facility.

SECTION 9 – SPECIAL PROTECTION INFORMATION

Ventilation:	General ventilation. Use explosion proof mechanical ventilation suitable for group D atmospheres. Local exhaust, if necessary, to control vapors.
Respiratory Protection:	Use an approved full-face organic vapor cartridge respirator in areas with adequate oxygen. For H ₂ S concentrations above 10 ppm, use full-face air-supplied or self-contained breathing apparatus.
Protective Gloves:	Nitrile, Viton
Eye Protection:	Chemical goggles.
Other Protective Clothing:	Tyvek protective clothing to prevent all contact. DO NOT USE NATURAL RUBBER, NEOPRENE, BUTYL RUBBER or PVC (polyvinyl chloride).

SECTION 10 – SPECIAL PRECAUTIONS

HANDLE AS EXTREMELY FLAMMABLE LIQUID. Store in a cool, well ventilated area. Electrically ground/bond during pumping or transfer to avoid static accumulation. PRECAUTIONS SHOULD BE TAKEN TO MINIMIZE SKIN AND EYE CONTACT AND INHALATION OF HYDROGEN SULPHIDE GAS. High standards of personal hygiene are necessary. Wash skin thoroughly with soap and water after contact and before eating. Launder work clothes frequently. Moose Jaw Refinery Inc. recommends an allowable exposure of 10 ppm H₂S when handling SOUR CRUDE.

SECTION 11 - REFERENCES

ACGIH, Threshold Limit Values and Biological Exposure Indices for 1987-88.

CONCAWE, First Aid Measures, Medical Toxicology Data and Professional Advice to Clinicians on Petroleum Products, Feb. 1983.

API, Petroleum Process Stream Terms Included in the Chemical Substances Inventory Under the Toxic Substances Control Act (TSCA), 1983.

ITI, Toxic and Hazardous Industrial Chemicals Safety Manual, 1982.

CONCAWE, Health Aspects of Petroleum Fuels - General Principles, April 1985.

Transportation of Dangerous Goods Act & Regulations.

Moose Jaw Refinery Partnership assumes no responsibility for injury to anyone caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, Moose Jaw Refinery Partnership assumes no responsibility for injury to anyone caused by abnormal use of the material even if reasonable safety procedures are followed. Furthermore, vendee and third persons assume the risk in their use of the material.

Moose Jaw Refinery

Prepared by Health, Safety and Security

Material Safety Data Sheet



1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Manufacturer/Supplier: Enbridge Pipelines Inc.
10201- Jasper Avenue
Edmonton, Alberta T5J 3N7
CANADA

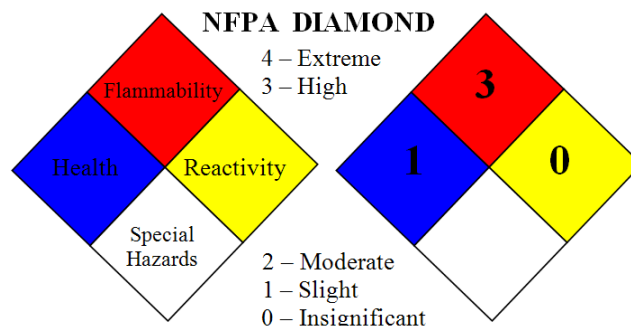
Product Name: Crude Oil - Heavy

Synonyms: Heavy petroleum crude, heavy crude

General Information: 780-420-5210 (Canada) 715-398-4500 (US)

Emergency Telephone Number (24 hrs): CHEMTREC 800-424-9300 USA
CANUTEC 613-996-6666 Canada

Date Prepared: 09/22/2009 Last Updated: 04/18/2013



2 – PRODUCT COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS Number	Normal % * by Weight	Occupational Exposure Limits (ppm)		
			OSHA	ACGIH	NIOSH
Crude Oil	8002-05-09	100	N/A	N/A N/A	
Methane	74-82-8	<0.1	N/A	1000	N/A
Ethane	74-84-0	<0.1	N/A	1000	N/A
Propane	74-98-6	<0.1	1000	1000	1000
Iso-Butane	75-28-5	<1	800	1000	800
n-Butane	106-97-8	<1	800	1000	800
Hexane	110-54-3	1-3	50	50	50
n-Pentane	109-66-0	<1	600	600	120
Iso-Pentane	92046-46-3	<1	600	600	120
Heptane	142-82-5	1-3	400	400	85
Octane	111-65-9	1-3	300	300	75
Nonane	111-84-2	1-3	N/A	200	200
Decane	124-18-5	1-3	N/A	N/A	N/A
neoHexane	75-83-2	<0.1	N/A	N/A	N/A
Benzene	71-43-2	<5	1	0.5	0.1
Toluene	108-88-3	<1	100	20	100

Methylcyclohexane	108-87-2	<1	500	400	400
Hydrogen sulfide	7783-06-4	<1	20 ^{Ceiling}	10	10 ^{Ceiling}
Ethylbenzene	100-41-4	<1	100	100	100
Xylenes	1330-20-7	<1	100	100	100
Trimethylbenzene	2551-13-7	<1	25	25	25
C11 – C62 Hydrocarbons	N/A	70 – 90	N/A	N/A	N/A

* Values do not reflect absolute minimums and maximums; those values may vary from time to time.
N/A - Not Available

3 – HAZARDS IDENTIFICATION

Flammability: Flammable liquid and vapor. Keep away from heat, sparks, flames or other sources of ignition (such as; static electricity, pilot lights, mechanical/electrical equipment).
HMIS Classification for Flammability: 3

Stability: Stable under normal conditions. Avoid all sources of ignition.
HMIS Classification for Reactivity: 0

Potential Health Effects from Overexposure

Acute Effects:

- Ingestion:** Ingestion may result in nausea, vomiting, diarrhea and central nervous system, and depression. Aspiration of liquid into the lungs must be avoided as even small quantities in the lungs can produce chemical pneumonitis, pulmonary edema/hemorrhage and even death.
- Skin Contact:** Prolonged and repeated contact may cause deflating and drying of the skin, and can lead to irritation and/or dermatitis.
- Eye Contact:** Liquid or vapor contact may cause mild eye irritation, including stinging, watering, redness and swelling. Hydrogen sulfide (H₂S) may cause burning or tearing and visual disturbances at repeated exposures above the TLV.
- Inhalation:** Prolonged or excessive exposure may cause irritation to the nose, throat, lungs and respiratory tract which may lead to headache, nausea, drowsiness, fatigue, pneumonitis, pulmonary edema, CNS depression, coma and respiratory arrest.

Chronic Health Effects from Overexposures:

Skin and eye irritation. May affect the respiratory and central nervous systems.

Special Toxic Effects:

Hydrogen sulfide (CAS 7783-06-40)

Target organs - Hydrogen sulfide is both an irritant and a chemical asphyxiant with effects on both oxygen utilization and the central nervous system.

Low concentrations- can irritate the eyes, nose, throat and respiratory system.

Moderate concentrations- can cause severe eye and respiratory irritation (including coughing, difficulty breathing, and accumulation of fluid in the lungs), headache, dizziness, nausea, vomiting, staggering and excitability.

High concentrations- can cause shock, convulsions, inability to breathe, rapid unconsciousness, coma, and death. Effects can occur within in one or a few breaths.

n-Hexane (CAS 110-54-3)

Target Organs – Excess exposure to n-hexane can result in peripheral neuropathies. The initial symptoms are symmetrical sensory numbness and paresthesia of distal portions of the extremities. Motor weakness is typically observed in muscles of the toes and fingers but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. The neurotoxic properties of n-hexane are potentiated by exposure to methyl ethyl ketone and methyl isobutyl ketone. Prolonged exposure to high concentrations of n-hexane (>1,000 ppm) has resulted in decreased sperm count and degenerative changes in the testes of rats but not those of mice.

Toluene (CAS 108-88-3)

Target Organs – Epidemiology studies suggest that chronic occupational overexposure to toluene may damage color vision. Sub-chronic and chronic inhalation studies with toluene produced kidney and liver damage, hearing loss and central nervous system damage in lab animals.

Developmental – Exposure to toluene during pregnancy has demonstrated limited evidence of developmental toxicity in lab animals.

Benzene (CAS 71-43-2)

Carcinogenicity: Benzene is a known animal carcinogen and is known to produce leukemia in humans. Benzene has been identified as a human carcinogen by NTP, IARC and OSHA.

4 – FIRST AID MEASURES

- Ingestion:** Aspiration hazard. Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe damage. Obtain immediate medical attention. If spontaneous vomiting occurs lean victim forward to reduce the risk of aspiration.
- Skin Contact:** Wipe material from skin and remove contaminated clothing. Cleanse affected areas thoroughly by washing with mild soap and water and, if necessary, a waterless skin cleanser. If irritation or redness develops, seek medical attention.
- Eye Contact:** If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water for 15 minutes with eyelids held open. If symptoms persist, seek medical attention.
- Inhalation:** If respiratory symptoms or other symptoms of exposure develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, qualified personnel should administer oxygen. Seek immediate medical attention.

Notes to Physician: Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of this material (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for development of cardiac arrhythmias.

5 – Exposure Controls/ Personal Protection

Eye Protection: Safety glasses or goggles are recommended when there is a possibility of splashing or spraying.

Skin Protection: The use of gloves (nitrile or neoprene) is advised to prevent skin contact and possible irritation. Depending on conditions, the use of an apron or chemical protective clothing may be necessary.

Respiratory Protection: A NIOSH certified air purifying respirator with an organic vapor cartridge may be used under conditions where airborne concentrations of hydrocarbons are expected to exceed exposure limits. Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is a potential for an uncontrolled release, exposure levels are not known or any other circumstances where air purifying respirators may not provide adequate protection. A respiratory protection program should be used that meets US OSHA's 29 CFR 1910.134, Canadian Labour Code Part II and ANSI Z88 standards. 2 requirements must be followed when workplace conditions warrant a respirator's use.

Engineering Controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used (see appropriate electrical codes).

6 – FIRE FIGHTING MEASURES

Flash Point:	< 100 °F	Lower Explosive Limit:	Varies, est. 1%
Auto Ignition Temperature:	Not data available	Upper Explosive Limit:	Varies, est. 13%

Basic Fire Fighting Procedures: Long-duration fires involving crude oil stored in tanks may result in a boil over. The contents of the tank may be expelled beyond the containment dikes or ditches. All personnel should be kept back a safe distance when a boil over is anticipated (reference NFPA 11). For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces or when explicitly required by DOT, a self-contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant. Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk. Water spray may be useful in minimizing or dispersing vapors. Cool equipment exposed to fire with water, if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

Extinguishing Media: Any extinguisher capable of handling Class B fires is recommended including extinguishing media such as CO₂, dry chemical or foam. Water spray is recommended to cool or protect exposed materials or structures. Water may be ineffective for extinguishment,

unless used under favorable conditions by experienced fire fighters. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Firefighting should be attempted only by those who are adequately trained and equipped with proper personal protective equipment.

Unusual Fire and Explosion Hazards: This material is flammable and may be ignited by heat, sparks, flames or other sources of ignition (such as static electricity, pilot lights, or mechanical/electrical equipment). Vapors may travel considerable distances to a source of ignition where they can ignite, flashback or explode. May create vapor/air explosion hazard indoors, outdoors, or in sewers. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire.

7 – ACCIDENTAL RELEASE MEASURES

Personal precautions: Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources.

Spill management: Wear appropriate breathing apparatus (if applicable) and protective clothing. A vapor suppressing foam may be used to reduce vapors. Try to work upwind of spill. Dikes and ditches contain land spills and water spills by booming. For large spills remove by mechanical means such as vacuuming or pumping and place in containers. All equipment used when handling the product must be grounded. Recover and return free product to proper containers. Use suitable absorbent materials such as vermiculite, sands, soil, or clay to clean up residual liquids. Do not wash spills into sewers or other public water systems.

Reporting: Report spills to local or federal authorities as appropriate or required.

8 – HANDLING AND STORAGE

The use of explosion-proof equipment is recommended and may be required (see appropriate fire codes). Do not enter confined spaces such as tanks or pits without following proper entry procedures. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits.

Use appropriate grounding and bonding practices. Store in properly closed containers that are appropriately labeled and in a cool well-ventilated area. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Do not cut, drill, grind or weld on empty containers since they may contain explosive residues.

Harmful concentrations of hydrogen sulfide (H₂S) gas can accumulate in excavations and low-lying areas as well as the vapor space of storage and bulk transport compartments. Stay upwind and vent open hatches before unloading.

Avoid skin contact. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water.

9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear to brown thick liquid
Physical Form:	Liquid

Substance type (Pure/Mixture):		Mixture
Boiling Temperature:		-4 to 2012 °F
Melting Temperature:	Not	determined
Vapor Pressure:		Not determined
Vapor Density:		1.0 - 3.9
Evaporation Rate:		(Ethyl ether =1) >1
Specific Gravity:		0.3 - 0.75
Water Solubility:	Negli	gible
pH:	Not	determined
Viscosity:	Not	determined
Color:	Clea	r to brown
Odor:	Rotten	egg, petroleum like odor

10 – STABILITY AND REACTIVITY

CONDITIONS TO AVOID:		Excessive heat, sources of ignition, sparks, open flames, and buildup of static electricity.
CHEMICAL STABILITY:		Stable at 70 °F, 760 mmHg pressure.
HAZARDOUS DECOMPOSITION PRODUCTS:		Combustion produces carbon monoxide, aldehydes, aromatics and other hydrocarbons.
HAZARDOUS POLYMERIZATION:		Will not occur
INCOMPATIBILITY:	Strong	oxidizers such as nitrates, chlorates, peroxides.

11 – TOXICOLOGICAL INFORMATION– CHRONIC AND ACUTE HEALTH HAZARDS

This product contains aliphatic naphthas at a level of >0.1%. Lifetime skin painting studies in mice with similar naphthas have shown wither negative or very weak dermal carcinogenic activity following prolonged and repeated skin contact. Some other petroleum fractions that show carcinogenic activity when tested at nonirritating dose levels did not show any significant carcinogenic activity indicating that this tumorigenic response is likely related to chromic irritation and not dose. Some components of aliphatic naphthas, i.e., paraffins and olefins, have been shown to produce a species specific sex hormonal dependent kidney damage develops via the formation of alpha-2u-globulin, a mechanism unique to the male rat. Humans do not have a mechanism for alpha-2u-globulin; therefore, the kidney effects resulting from this mechanism are not relevant in humans.

This product contains benzene at a level of 0.1%. Repeated or prolonged exposure to benzene at concentrations in excess of the TLV may cause serious injury to blood-forming organs. Significant chronic exposure to benzene vapor has been reported to produce various blood disorders ranging from anemia to certain forms of leukemia (cancer) in man. Benzene produced tumors in rats and mice in lifetime chronic toxicity studies, but the response has not been consistent across species, strain, sex or route of exposure. Animal studies on benzene have demonstrated immune toxicity, chromosomal aberrations, testicular effects and alterations in reproductive cycles and embryo/fetotoxicity, but not teratogenicity.

Hydrogen sulfide gas (H₂S) is toxic by inhalation. Prolonged breathing of 50-100 ppm H₂S vapors can produce eye and respiratory tract irritation. Higher concentration (250-600 ppm) for 15-30 minutes can produce headache, dizziness, nervousness, nausea and pulmonary edema or bronchial pneumonia. Concentrations of >1000 ppm will cause immediate unconsciousness and death through respiratory paralysis. Rats and mice exposed to 80 ppm H₂S, 6 hrs/day, 5 days/week for 10 weeks, did not produce any toxicity except for irritation of nasal passages. H₂S did not affect reproduction and development (birth defects or neurotoxicity) in rats exposed to concentrations of 75-80 ppm or 150 ppm H₂S, respectively. Over the years a number of acute cases of H₂S poisoning have been reported. Complete and rapid recovery is the general rule. However, if the exposure was sufficiently intense and sustained causing cerebral hypoxia (lack of oxygen to the brain), neurologic effects such as amnesia, intention tremors or brain damage are possible.

This product may contain hexane at a level of >1.0%. Studies in laboratory animals have produced systemic toxicity in blood, spleen and lungs. Fetotoxicity has been observed at hexane concentrations that produced maternal toxicity. Long term exposure to high concentrations of hexane has been shown to cause testicular effects and nervous system damage.

This product may contain xylenes at a level of >1.0%. Gross overexposure or severe poisoning incidents in humans to xylenes has been reported to cause lung, liver, kidney, heart and brain damage as well as neurologic disturbances. Laboratory animals exposed to high dose of xylenes showed evidence of effects in the liver, kidneys, lungs, spleen, heart and adrenals. Exposure of pregnant rats, mice and rabbits during gestation to significant concentrations of xylenes produced maternal, fetal and developmental toxicity (skeletal retardation, cleft palate, and wavy ribs) generally at maternally toxic doses. These types of fetotoxic effects have been associated with maternal toxicity. Repeated inhalation of high xylene concentrations has shown impairment of performance abilities (behavioral tests) in animals and man. Xylenes produced a mild frequency hearing loss in rats sub-chronically exposed to high concentrations of xylenes.

12 – DISPOSAL INFORMATION

Container contents should be completely used and containers should be emptied prior to discard. Container could be considered a RCRA hazardous waste and must be disposed of with care and in full compliance with federal, state and local regulations. Larger empty containers, such as drums, should be returned to the distributor or to a drum re-conditioner. To assure proper disposal of smaller empty containers, consult with state and local regulations and disposal authorities. This product, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA RCRA (40 CFR 261), Environment Canada, or other State, Provincial, and local regulations. If this product is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility. This product could also contain benzene at >0.5 ppm and could exhibit the characteristic of "toxicity" (D018) as determined by the toxicity characteristic leaching procedure (TCLP). This material could become a hazardous waste if mixed or contaminated with a hazardous waste or other substance(s). It is the responsibility of the user to consult federal, state and local waste regulations to determine appropriate disposal options.

13 – ENVIRONMENTAL INFORMATION

Spill or Release to the Environment: Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof equipment is recommended. Stay upwind and away from spill/release. Notify persons downwind of spill/release, isolate immediate hazard area and keep unauthorized personnel out. Product may release large amounts of flammable vapors (e.g., methane, ethane and propane) at or below ambient temperature depending on source and process conditions. Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment including respiratory equipment as conditions warrant. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment drainage systems and natural waterways. Place a dike far ahead of spill for later recovery or disposal. Use foam on spills to minimize vapors. Spilled material may be absorbed into an appropriate absorbent material.

Notify fire authorities and appropriate federal, state (provincial) and local agencies. Immediate cleanup of any spill is recommended. If spill of any amount into navigable waters, notify appropriate federal, state (provincial) and local agencies.

Sara Title III Information: This material contains the following chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372:

Toluene	CAS – 108-88-3	Weight % - 0-1%
n-Hexane	CAS – 110-54-3	Weight % - 0-3%
Benzene	CAS – 71-43-2	Weight % - 0-1%

14 – REGULATORY INFORMATION

USA: All of the components of this product are on the Toxic Substances Control Act (TSCA) Chemical Inventory.

Canada: All the components of this product are on the Canadian Domestic Substances List (DSL), or have been notified under the New Substances Notification Regulations, but have not yet been published in the Canada Gazette.

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

WHMIS Classification: Class B2 Flammable Liquids
 Class D2B Other Toxic Effects - Skin Irritant
 Class D2A Other Toxic Effects – Embryotoxic/Fetotoxic

US EPA Reportable Quantity: The estimated reportable quantity (RQ) for this material is based on the weight % shown below:

RQ based on benzene – The RQ for benzene is 10 pounds, which equals 3,333 pounds of crude oil (556 gallons). The RQ is based on 0.3 wt. % benzene.

RQ based on n-Hexane – The RQ for n-Hexane is 5000 pounds, which equals 50,000 pounds of crude oil (8,333 gallons). The RQ is based on 10 wt. % n-Hexane.

RQ based on toluene – The RQ for toluene is 1000 pounds, which equals 50,000 pounds of crude oil (8,333 gallons). The RQ is based on 2 wt. % toluene.

15 – SPECIAL PRECAUTIONS / SUPPLEMENTAL INFORMATION

Keep containers tightly closed. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces and all sources of ignition. Post area “No Smoking or Open Flame”. Store only in approved containers. Keep away from any incompatible material. Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet US OSHA standards, Canadian Labour Codes and other appropriate fire codes.

Depending on the source of crude oil, there could be some amount of NORM (naturally occurring radioactive materials) in the scale, deposit and sludge associated with this material. Proper measurements should be taken prior to handling this material or any equipment contaminated with this material. If NORM is indicated, refer to API Bulletin E2, “Bulletin on Management of Naturally Occurring Radioactive Materials in Oil and Gas Production,” for additional information.

Empty Containers: “Empty” containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks or other sources of ignition. They may explode and cause injury or death. “Empty” drums should be completely drained, properly bunged and promptly shipped to the supplier or a drum re-conditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

Before working on or in tanks which contain or have contained this material refer to OSHA regulations, ANSI Z49.1 and other governmental and industrial references pertaining to cleaning, repairing, welding or other contemplated operations.

16 – TRANSPORTATION REQUIREMENTS

General Transportation Information:

DOT Proper Shipping Name (49 CFR 172.101): Petroleum Crude Oil
DOT Hazard Classes (49 CFR 172.101): 3

UN/NA Code (49 CFR 172.101):	UN1267
Packing Group (49 CFR 172.101):	II
Bill of Lading Description (49 CFR 172.202):	Petroleum Crude Oil
DOT Labels Required (49 CFR 172.101):	Flammable Liquid

Please note that the actual shipping name and associated data can vary due to the properties of the product. Other acceptable shipping names may include Petroleum Distillate n.o.s. 1268.

PREPARED BY: Enbridge Pipelines Inc.

Disclaimer

The information presented herein is based on data considered to be accurate as of the date of preparation of this Material Safety Data Sheet (MSDS). However, MSDS's may not be used as a commercial specification sheet of manufacturer or seller, and no warranty or representation, express or implied, is made as to the accuracy or completeness of the foregoing data and safety information, nor is any authorization given or implied to practice any patented invention without a license. In addition, no responsibility can be assumed by vendor for any damage or injury resulting from abnormal use, from any failure to adhere to recommended practices or from any hazards inherent in the nature of the product.

ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
ASTM	American Society for Testing and Materials
CAS	Chemical Abstract Service
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
HMIS	Hazardous Materials Identification System
IARC	International Agency for Research on Cancer
m ³	Cubic meter
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
n.o.s.	Not Otherwise Specified
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
REL	Recommended Exposure Limit
SARA	Superfund Amendments and Reauthorization Act
TLV	Threshold Limit Value
TSCA	Toxic Substance Control Act
TWA	Time Weighted Average

Material Safety Data Sheet



MACKAY RIVER BLEND



1. Product and company identification

Product name	: MACKAY RIVER BLEND
Synonym	: MacKay River Bitumen/Synthetic Crude Oil Blend, Synbit Blend
Code	: 90000125
Material uses	: Used as refinery feedstock.
Manufacturer	: PETRO-CANADA P.O. Box 2844 150 – 6th Avenue South-West Calgary, Alberta T2P 3E3
<u>In case of emergency</u>	: Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).

2. Hazards identification

Physical state	: Viscous liquid.
Odour	: Pungent.
WHMIS (Canada)	:   Class B-2: Flammable liquid Class D-2A: Material causing other toxic effects (Very toxic). Class D-2B: Material causing other toxic effects (Toxic).
OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Emergency overview	: WARNING! FLAMMABLE LIQUID AND VAPOUR. CAUSES EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. Flammable liquid. Irritating to eyes and skin. May cause sensitisation by skin contact. Keep away from heat, sparks and flame. Avoid exposure - obtain special instructions before use. Do not breathe vapour or mist. Do not get on skin or clothing. Avoid contact with eyes. Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
Routes of entry	: Dermal contact. Eye contact. Inhalation. Ingestion.
<u>Potential acute health effects</u>	
Inhalation	: Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.
Ingestion	: Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract.
Skin	: Irritating to skin. May cause sensitisation by skin contact.
Eyes	: Irritating to eyes.
<u>Potential chronic health effects</u>	
Chronic effects	: Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
Carcinogenicity	: Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.
Mutagenicity	: Contains material which may cause heritable genetic effects.
Teratogenicity	: Contains material which may cause birth defects, based on animal data.

2. Hazards identification

- Developmental effects** : No known significant effects or critical hazards.
- Fertility effects** : Contains material which may impair male fertility, based on animal data. Contains material which may impair female fertility, based on animal data.
- Medical conditions aggravated by over-exposure** : Pre-existing skin disorders may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

3. Composition/information on ingredients

<u>Name</u>	<u>CAS number</u>	<u>%</u>
Synthetic crude oil*	64742-59-2	45 - 55
Bitumen	128683-24-9	45 - 55
Sulphur	7704-34-9	1-5

*A complex combination of hydrocarbons extracted from oil sands. Contains small amounts of benzene, polynuclear aromatic hydrocarbons (PNAs), sulphur compounds and oxygenated compounds.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First-aid measures

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognised skin cleanser. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.
- Notes to physician** : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

- Flammability of the product** : May be combustible at high temperature.
- Extinguishing media**
- Suitable** : Use dry chemical, CO₂, water spray (fog) or foam.
- Not suitable** : Do not use water jet.
- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

5 . Fire-fighting measures

- Products of combustion** : Carbon oxides (CO, CO₂), nitrogen oxides (NO_x), sulphur oxides (SO_x), sulphur compounds (H₂S), hydrocarbons, smoke and irritating vapours as products of incomplete combustion.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
- Special remarks on fire hazards** : Easily ignites under almost all normal temperature conditions. Extremely flammable in presence of open flames, sparks, shocks, heat, oxidizing materials. Vapours are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks), and may travel considerable distance to sources of ignition and flash back. Hydrogen sulphide may be released if the product is overheated.
- Special remarks on explosion hazards** : Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Container explosion may occur under fire conditions or when heated. Vapours may form explosive mixtures with air. Runoff to sewer may create fire or explosion hazard. This product can accumulate static charge and ignite.

6 . Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up**
- Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.
- Large spill** : Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7 . Handling and storage

- Handling** : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Avoid exposure during pregnancy. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapour or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by earthing and bonding containers and equipment before transferring material. Empty containers retain

7 . Handling and storage

product residue and can be hazardous. Do not reuse container.

Storage

- : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination.

8 . Exposure controls/personal protection

Ingredient	Exposure limits
Benzene	ACGIH TLV (United States). Absorbed through skin. TWA: 0.5 ppm 8 hour(s). STEL: 2.5 ppm 15 minute(s).

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures

- : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures

- : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapour or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Hygiene measures

- : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Respiratory

- : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: organic vapour cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.

Hands

- : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Recommended: neoprene, nitrile, polyvinyl alcohol (PVA), Viton®.

Eyes

- : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin

- : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls

- : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state	: Viscous liquid.
Flash point	: Closed cup: <0°C (<32°F) [Closed cup]
Auto-ignition temperature	: Not available.
Flammable limits	: Not available.
Colour	: Black.
Odour	: Pungent.
Odour threshold	: Not available.
pH	: Not available.
Boiling/condensation point	: Initial boiling point: 25°C (77°F)
Melting/freezing point	: Not available.
Relative density	: 940 kg/m ³ @ 15°C (59°F)
Vapour pressure	: Not available.
Vapour density	: Heavier than air.
Volatility	: Not available.
Evaporation rate	: Not available.
Viscosity	: 90 cSt @ 40°C (104°F)
Pour point	: <-27°C (-17°F)
Solubility	: Insoluble in water.

10 . Stability and reactivity

Chemical stability	: The product is stable.
Hazardous polymerisation	: Under normal conditions of storage and use, hazardous polymerisation will not occur.
Materials to avoid	: Reactive with oxidising agents.
Hazardous decomposition products	: May release CO _x , NO _x , SO _x , H ₂ S, hydrocarbons, smoke and irritating vapours when heated to decomposition.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Benzene	LD50 Dermal	Rabbit	>8240 mg/kg	-
	LD50 Oral	Rat	930 mg/kg	-
	LC50 Inhalation	Rat	13700 ppm	4 hours
	Vapour			

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitiser

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Gas oils, petroleum, hydrotreated vacuum	-	2A	-	-	-	-
Benzene	A1	1	A	+	Proven.	+
Polycyclic aromatic hydrocarbons	A2	1	-	-	Possible	-

11 . Toxicological information

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.



13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimised wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	UN1267	Petroleum crude oil	3	I		Special provisions IATA Class: Petroleum crude oil, Class 3, UN1267, Packing group I
DOT Classification	UN1267	Petroleum crude oil	3	-		Remarks As limited quantity: inner packages not to exceed 0.5 L and the package not to exceed 30 kg, marking to be UN1267 within a diamond.

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Flammable liquid
Irritating material
Sensitising material
Carcinogen

Canada

WHMIS (Canada) : Class B-2: Flammable liquid
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

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.

International regulations

Canada inventory : All components are listed or exempted.

United States inventory (TSCA 8b) : All components are listed or exempted.

Europe inventory : Not determined.

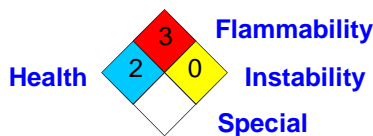
16 . Other information

Label requirements : FLAMMABLE LIQUID AND VAPOUR. CAUSES EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.

Hazardous Material Information System (U.S.A.) :

Health	2
Flammability	3
Physical hazards	0
Personal protection	H

National Fire Protection Association (U.S.A.) :



References : Available upon request.
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Date of printing : 5/25/2012.

Date of issue : 25 May 2012

Date of previous issue : 11/19/2009.

Responsible name : Product Safety - DSR

Indicates information that has changed from previously issued version.

For Copy of (M)SDS : Internet: www.petro-canada.ca/msds

Western Canada, telephone: 403-296-7672; fax: 403-296-5147

For Product Safety Information: (905) 804-4752

Notice to reader

16 . Other information

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

**MATERIAL SAFETY DATA SHEET**

Date Prepared: April 6, 2011
Supersedes: February 5, 2008
M.S.D.S Number: 11174
Reference: ERC

1. PRODUCT INFORMATION

NAME: DILBIT

SYNONYMS: 01.COLD LAKE BLEND
02.DILUTED BITUMEN
03.DILBIT COLD LAKE BLEND

DESCRIPTION AND APPLICATION:

A naturally occurring bitumen (high molecular weight hydrocarbon) blended with a diluent (Natural Gas Condensate or Diluent). Mixture is "sour" with approximately 3.5% sulphur by weight.

CAS# Not applicable

REGULATORY CLASSIFICATION:

WHMIS: Class B, Division 2: Flammable Liquids
Class D, Division 2, Subdivision A: Very Toxic Material

Canadian Environmental Protection Act (CEPA):
All components of this material are either on the Domestic Substances List (DSL) or exempt

TDG Information (Land Only)
TDG SHIPPING NAME: Petroluem Crude Oil

Primary TDG: 3 P.I.N.: UN1267
Secondary TDG: Packing Group: II
Tertiary TDG:
Marine Pollutant:

EMERGENCY TELEPHONE NUMBERS: Name of MFG/SUPPLIER:
IMPERIAL OIL
CRUDE OIL SUPPLY & MKTG.

ADDRESS & PHONE NUMBER:

Box 2480 Station M
Calgary, Alberta
T2P 3M9
(403) 237 - 3383

HEALTH: (866) 232 - 9563
TRANSPORTATION: (866) 232 - 9563

2. REGULATED COMPONENTS

The following components are defined in accordance with subparagraph 13 (a). (I) to (IV) or paragraph 14(a) of the hazardous product act.

COMPONENT	%	CAS#
BITUMEN	40-70	8052-42-4
LIGHT NAPHTHA	15-40	v/v 64741-46-4
NATURAL GAS CONDENSATE	15-40	v/v 64741-47-5

3. TYPICAL PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid
SPECIFIC GRAVITY: 0.9 to 1.2
ODOUR/APPEARANCE:
"Tarry" odour and associated smell of "rotten eggs" due to hydrogen sulphide presence; black liquid
ODOUR THRESHOLD: Not Available
VAPOR PRESSURE: 12 to 21 kPa @ 24 deg C
VAPOUR DENSITY: Not Available
EVAPORATION RATE: Not Available
BOILING POINT: 35 deg C IBP
FREEZING/MELTING POINT: -35 deg C
VISCOSITY: 52 to 96 centistokes @ 38 deg C
PH: Not Applicable
SOLUBILITY: insoluble
CO-EFFICIENT OF
WATER/OIL DISTRIBUTION: Not Available
PERCENT VOLATILE: 10 - 30%
MOLECULAR FORMULA: Not Applicable
MOLECULAR WEIGHT: Not Applicable

4. HEALTH HAZARD INFORMATION

NATURE OF HAZARD

INHALATION:

High vapour concentrations are irritating to the eyes, nose,

throat and lungs; may cause headaches and dizziness; may be anesthetic and may cause other central nervous system effects, including death.

Hydrogen sulphide gas may be released. Hydrogen sulphide may cause irritation, breathing failure, coma and death, without necessarily any warning odour being sensed.

Avoid breathing vapours or mists.

EYE CONTACT:

Irritating, but will not injure eye tissue.

Hot splashes will cause eye burns and permanent eye damage.

SKIN CONTACT:

Low toxicity. Will enter the body through the skin and produce one or more toxic effects on the body.

Frequent or prolonged contact may irritate the skin and cause a skin rash (dermatitis).

Exposure to hot material may cause thermal burns.

Benzene may be absorbed through damaged skin and may cause blood or blood producing system disorder and/or damage.

INGESTION:

Low toxicity.

Small amounts of this liquid drawn into the lungs from swallowing or vomiting may cause severe health effects (e.g. bronchopneumonia or pulmonary edema).

CHRONIC:

Contains polynuclear aromatic hydrocarbons (PNAs). Prolonged and/or repeated skin contact with certain PNAs has been shown to cause skin cancer. Prolonged and/or repeated exposures by inhalation of certain PNAs may also cause cancer of the lung and of other parts of the body.

Contains benzene. Human health studies (epidemiological) indicate that prolonged and/or repeated overexposures to benzene may cause damage to the blood producing system (particularly the bone marrow) and serious blood disorders including leukemia. Animal tests indicate that benzene does not cause malformations but may be toxic to the embryo/fetus. The relationship of the results to humans has not been established. Studies indicate that benzene is a known human carcinogen.

Contains n-hexane. Prolonged and/or repeated exposures may cause damage to the peripheral nervous system (e.g. fingers, feet, arms etc.).

High exposures to xylenes in some animal studies have been reported to cause health effects on the developing embryo/fetus. These effects were often at levels toxic to the mother. The significance of these findings to humans has not been determined.

TOXICITY DATA:

Not available for product

OCCUPATIONAL EXPOSURE LIMITS

ACGIH RECOMMENDS:

For Hydrogen Sulphide a TWA of 1ppm and a STEL of 5 ppm.
For Benzene, the ACGIH recommends a TLV of 0.5 ppm (1.6 mg/m³), and describes it as a confirmed human carcinogen.
For Xylene, 100 ppm (434 mg/m³).
For Pentane, 600 ppm (1700 mg/m³); for n-Heptane, 400 ppm (1640 mg/m³); for n-Hexane, 50 ppm (176 mg/m³); and for other hexane isomers 500 ppm (1760 mg/m³).

MANUFACTURER RECOMMENDS:

Although no specific hygiene standard exists, the workplace exposures to total particulates should be controlled well below a TWA value of 0.1 mg/m³ (skin) polynuclear aromatic hydrocarbon particulates measured as benzene solubles.
For Hydrogen Sulphide, 5 ppm TWA for 8 hr/day, 10 ppm STEL for 15 minutes.

Local regulated limits may vary

5. FIRST AID MEASURES

INHALATION:

In emergency situations use proper respiratory protection to immediately remove the affected victim from exposure.
Administer artificial respiration if breathing has stopped.
Keep at rest. Call for prompt medical attention.

EYE CONTACT:

Immediately flush eyes with large amounts of water for at least 15 minutes. Get prompt medical attention.

SKIN CONTACT:

Immediately flush with large amounts of water. Use soap if available. Remove contaminated clothing, including shoes, after flushing has begun.
Get prompt medical attention.
For hot material, immediately immerse in or flush affected area with large amounts of cold water to dissipate heat. Cover with clean cotton sheeting or gauze and get prompt medical attention.
For hot material, no attempt should be made to remove material from skin or to remove contaminated clothing as the damaged flesh may easily be torn. Transport individual to a medical facility for treatment.

INGESTION:

If swallowed, DO NOT induce vomiting. Keep at rest. Get prompt medical attention.

6. PREVENTIVE AND CORRECTIVE MEASURES

PERSONAL PROTECTION:

The selection of personal protective equipment varies, depending upon conditions of use.

Where skin and eye contact is unlikely, but may occur as a result of short and/or periodic exposures, wear long sleeves, chemical resistant gloves, chemical safety goggles, plus a face shield.

Where prolonged and/or repeated skin and eye contact is likely to occur, wear chemical resistant gloves, rubber boots, a chemical jacket, chemical safety goggles, and a face shield.

Where skin and eye contact with hot material is unlikely, but may occur as a result of short and/or periodic exposures, wear thermal resistant gloves, arm protection and a face shield.

Where concentrations in air may exceed the occupational exposure limits given in Section 4 and where engineering, work practices or other means of exposure reduction are not adequate, approved respirators may be necessary to prevent overexposure by inhalation.

ENGINEERING CONTROL:

The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fumehood. Provide mechanical ventilation of confined spaces. Use explosion-proof ventilation equipment.

HANDLING, STORAGE AND SHIPPING:

Keep containers closed. Handle and open containers with care. Store in a cool, well ventilated place away from incompatible materials.

Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse empty containers without commercial cleaning or reconditioning.

Do not handle or store near an open flame, sources of heat, or sources of ignition.

Material will accumulate static charges which may cause a spark. Static charge build-up could become an ignition source. Use proper grounding and bonding procedures.

SPILL CONTROL AND DISPOSAL:

Consult an expert on disposal of recovered material. Ensure disposal is in compliance with government requirements and ensure conformity to local disposal regulations. Notify the appropriate authorities immediately. Take all additional action necessary to prevent and remedy the adverse effects of the spill.

LAND SPILLS:

Eliminate sources of ignition. Keep public away. Prevent additional discharge of material, if possible to do so without hazard.

Vapours or dust may be harmful or fatal. Warn occupants of downwind areas.

Prevent spills from entering sewers, watercourses or low areas. Contain spilled liquid with sand or earth. Do not use combustible materials such as sawdust.

Recover by pumping (use an explosion proof motor or hand pump) or by using a suitable absorbent.

WATER SPILLS:

Keep public and other shipping traffic away. Prevent

additional discharge of material, if possible to do so without hazard.

Eliminate all sources of ignition. Vapours or dust may be harmful or fatal. Warn occupants and shipping in downwind areas.

Remove from surface by skimming or with suitable absorbents.

If allowed by local authorities and environmental agencies, sinking and/or suitable dispersants may be used in unconfined waters.

Product will submerge after a few days of weathering.

7. FIRE & EXPLOSION HAZARD

Flashpoint and Method: < -18 deg C (CC)

Autoignition: Not Available

Flammable Limits (% volume): LEL: unknown UEL: unknown

GENERAL HAZARDS:

Extremely flammable; material will readily ignite at normal temperatures.

Flammable Liquid; may release vapours that form flammable mixtures at or above the flash point.

Decomposes; flammable/toxic gases will form at elevated temperatures (thermal decomposition).

Toxic gases will form upon combustion.

FIREFIGHTING:

Use water spray to cool fire exposed surfaces and to protect personnel. Shut off fuel to fire if possible to do so without hazard. If a leak or spill has not ignited use water spray to disperse the vapours.

Either allow fire to burn out under controlled conditions or extinguish with foam or dry chemical. Try to cover liquid spills with foam.

Respiratory and eye protection required for fire fighting personnel.

A self-contained breathing apparatus (SCBA) should be used for all indoor fires and any significant outdoor fires. For small outdoor fires, which may easily be extinguished with a portable fire extinguisher, use of an SCBA may not be required.

HAZARDOUS COMBUSTION PRODUCTS:

Oxides of carbon; hydrogen sulphide; oxides of sulphur

8. REACTIVITY DATA

This material is stable.

Hazardous Polymerization will not occur.

INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID:

Heat; ignition sources; oxidizing agents

HAZARDOUS DECOMPOSITION:

Oxides of carbon; hydrogen sulphide

9. NOTES

Equipment handling hydrogen sulphide rich materials can accumulate black deposits of iron sulphide which, if dry, burn on exposure to air.

Hazardous concentrations of Hydrogen Sulphide (H₂S) gas may build-up in the vapour space of storage tanks or vessels. Appropriate precautions must be taken when opening or entering vessels or other containers to avoid inhalation of H₂S.

SECTION(S) 4, HAVE BEEN CHANGED SINCE THE LAST REVISION TO MSDS

10. PREPARATION

Prepared by: Imperial Oil Limited
Industrial Hygiene
(416) - 968 - 4940

Date Prepared: April 6, 2011
Supersedes Date: February 5, 2008

CAUTION: The information contained herein relates only to this product or material and may not be valid when used in combination with any other product or material or in any process. If the product is not to be used for a purpose or under conditions which are normal or reasonably foreseeable, this information cannot be relied upon as complete or applicable. For greater certainty, uses other than those described in section 1 must be reviewed with the supplier. The information contained herein is based on the information available at the indicated date of preparation. This MSDS is for the use of IMPERIAL OIL customers and their employees and agents. Further distribution of this MSDS is prohibited without the written consent by IMPERIAL OIL customers, suppliers or transporters.

FOR FURTHER INFORMATION CONTACT TEL. NO. (416) 968-4940, IMPERIAL OIL, INDUSTRIAL HYGIENE AND PRODUCT SAFETY

MSDS11174MC



Material Safety Data Sheet

1. Product and Company Identification

Product Name: Access Western Blend
 Synonym: AWB
 Product Use: Access Western Blend is a diluted bitumen product that is used as refinery feedstock.
 Manufacturer: Access Pipeline Inc.
 Address: Suite 1510, 540 – 5th Avenue S.W., Calgary, AB T2P 0M2
 Emergency Contact: **1-866-987-3899**
 Canutec: (613) 996-6666 or Cellular *666

2. Hazards Identification

Emergency Overview

This product is **highly flammable!** May contain benzene, a proven human carcinogen. May contain toluene known to cause birth defects. Vapours are heavier than air and may travel considerable distances to a source of ignition and flash back. Vapours may spread along the ground and may enter sewers, basements and other confined spaces.

Potential Health Effects/Routes of Exposure

Eye: This product is a moderate eye irritant.
Skin: This product is a moderate skin irritant; repeated or prolonged contact may defat the skin.
Ingestion: If ingested, abdominal cramping, vomiting and diarrhea may occur. Aspiration of liquid into the lungs may cause chemical pneumonia, severe lung damage and respiratory failure.
Inhalation: Potential effects target the Central Nervous System, liver and kidneys. The benzene component is a known human carcinogen that may result in aplastic anemia and leukemia (cancer of the bone marrow).

3. Composition/Information on Ingredients

Ingredient Name	%	CAS No.	Exposure Limits
n-Butane	0-3	106-97-8	ACGIH TLV-TWA =1000ppm
iso-Pentane	4-12	78-78-4	ACGIH TLV-TWA =600ppm
n-Pentane	4-12	109-66-0	ACGIH TLV-TWA =600ppm
n-Hexane	5-15	110-54-3	ACGIH TLV-TWA =50ppm (skin)
Heptane	5-15	142-82-5	ACGIH TLV-TWA =400ppm ACGIH TLV-STEL =500ppm
Octane	4-9	111-65-9	ACGIH TLV-TWA =300ppm
Nonane	1-5	111-84-2	ACGIH TLV-TWA =200ppm
Decane	1-5	124-18-5	Not applicable
Methylcyclopentane	0-3	96-37-7	Not applicable
Benzene	0.1-1.5	71-43-2	ACGIH TLV-TWA =0.5ppm (skin) ACGIH TLV-STEL =2.5ppm
Cyclohexane	1-3	110-82-7	ACGIH TLV-TWA =100ppm
Methylcyclohexane	1-3	108-87-2	ACGIH TLV-TWA =400ppm
Toluene	0.1-1.5	108-88-3	ACGIH TLV-TWA =20ppm
Ethylbenzene	0.1-1	100-41-4	ACGIH TLV-TWA =20ppm
Xylene	0-3	1330-20-7	ACGIH TLV-TWA =100ppm ACGIH TLV-STEL =150ppm
1, 2, 4 Trimethylbenzene	0.1-1	25551-13-7	ACGIH TLV-TWA= 25 ppm

Access Western Blend (AWB) – Material Data Sheet

appropriate for non-fire emergency situations. Clean-up crews must be properly trained and must utilize proper protective equipment.

Evacuation: Fire: 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.

7. Handling and Storage

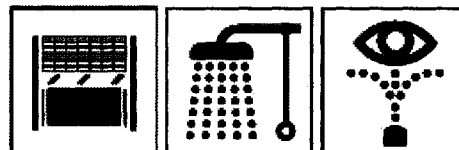
Handling Precautions: Ensure your own safety and use the appropriate respiratory protection. Handle as a flammable liquid. Keep away from all sources of heat, sparks, open flame or any sources of ignition as well as flammable materials or oxidizers. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition. Use only with adequate ventilation and avoid breathing vapours. Ground and bond all lines and equipment. Use intrinsically safe electrical equipment. DO NOT siphon by mouth.

Storage Precautions: Store in a cool, dry and well ventilated area out of sunlight and away from all sources of ignition. Avoid storage in low, confined locations or near incompatible materials such as other flammable materials, oxidizers or materials that support combustion.

Work/Hygienic Practices: An emergency eye wash station should be available in the vicinity of any potential splash exposure. Use good personal hygiene practices. Avoid skin exposure and wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapours which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves. Work areas should be assessed for airborne benzene concentrations.

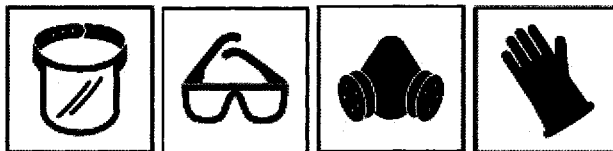
8. Exposure Controls / Personal Protection**Engineering Controls**

Ensure adequate ventilation to keep vapour and gas concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces. Ventilation system and other equipment must be intrinsically safe. Showers and/or eyewash fountains should be provided within the immediate work area for emergency use if there is any possibility of exposure to liquids.

**Personal Protective Equipment**

Eye/Face Protection: Wear chemical goggles or a full-face shield during handling.

Skin Protection: Avoid skin contact. Wear fire retardant clothing and chemical resistant gloves when handling this product.



Respiratory Protection: Ensure your own safety and use the appropriate respiratory protection. An approved self-contained breathing apparatus (SCBA) with full-face piece must be worn if the concentration exceeds the OEL (Occupational Exposure Limit) of benzene or LELs. When assessing the proper type of respiratory protection, also consider the occupational exposure limits of individual ingredients. Refer to CSA Standard "Selection, Use and Care of Respirators" (Z94.4-11) and NIOSH Respirator Decision Logic for additional guidance.

Access Western Blend (AWB) – Material Data Sheet

	Benzene exposure has been linked to menstrual changes, spontaneous abortion and stillbirth. Toluene and Xylene may be toxic to the fetus.
Carcinogenicity:	Benzene carcinogenic listings are as follows: Known Carcinogen NTP, Known human carcinogen IARC Group 1 proven and Confirmed human carcinogen ACGIH A1. Ethylbenzene is classified as a possible carcinogen IARC 2B.
Target organs:	Central nervous system (CNS), heart, blood forming systems, liver and kidneys, gastrointestinal tract and respiratory system.

12. Ecological Information

If released into soil, this product will absorb and may biodegrade in anaerobic conditions. In water, it may volatilize. Photo-oxidation products include phenol, nitrophenols, nitrobenzene, formic acid and peroxyacetyl nitrate.

13. Disposal Considerations

Maximize product recovery for reuse or recycling. Contaminated materials may be classified as a hazardous waste due to the low flash point and benzene. Empty containers can have residues that are subject to hazardous waste disposal requirements. Dispose of waste in accordance with all applicable federal, provincial, and/or local regulations.

14. Transport Information

Proper Shipping Name:	Petroleum Crude Oil
TDG Class:	3
TDG Identification Number:	UN1267
TDG Shipping Label:	Flammable liquid
Packing Group:	I

15. Regulatory Information**Workplace Hazardous Materials Information System (WHMIS)**

Workplace Hazardous Materials Information Systems (WHMIS): This product has been classified in accordance with the hazard criteria of the CPR (Controlled Product Regulations), and the MSDS contains all of the information required by the CPR.



Class B3 Flammable Liquid
Class D2A Materials Causing Serious and Other Toxic Effects

Canadian Environmental Protection Act (CEPA)

All components of this product are listed on the Canadian DSL Inventory.

16. Other Information

Prepared for:	Access Pipeline Inc.
Preparation information:	403-264-6514
Issue date:	May 8, 2012
Prepared by:	Deerfoot Consulting Inc.

Disclaimer of Expressed and Implied Warranties

The information presented in the Material Safety Data Sheet is based on data believed to be accurate as of the date this Material Safety Data Sheet was prepared. However, neither Access Pipeline Inc, Deerfoot Consulting Inc. nor any of their subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use.

STATOIL
LEISMER SE2-079-10-W4M
Material Safety Data Sheet

SECTION 1 – PRODUCT IDENTIFICATION & USE

Product Identifier: Sales Oil

Product Use: Refinery Feed

Manufacturer/Supplier: Statoil
 Leismer SE2-079-10-W4M
 Conklin, Alberta
 T0A 2C0
 Emergency Telephone Number: 1-403-268-7461

Chemical Name & Synonym: Crude Oil, Hydrocarbon Liquids, Treater Oil

Chemical Name & Formula: C5-C30+ Hydrocarbons

WHMIS Class: Class B, Division 2, Flammable Liquid

TDG Description: Class 3, UN 1267, Packing Group 3

SECTION 2 COMPOSITION

<u>Ingredients</u>	<u>% W/W</u>	<u>CAS Number</u>	<u>UN Number</u>	<u>Exposure Limits(ppm)</u>
Butane	0.15-0.40	106-97-8	1011	800
Pentane	3.50-4.00	109-66-0	1265	600
Hexanes	2.50-3.00	110-54-3	1208	*
Heptanes	2.00-2.50	142-82-5	1206	400
Octanes	2.25-2.75	111-65-9	1262	300
Benzene	0.20-0.40	71-43-2	1114	1(skin)
Toluene	0.75-1.25	108-88-3	1294	100(skin)
Xylenes	0.75-1.00	106-42-3	1307	100
1,2,4 TMBenzene	0.15-0.25	95-63-6	2325	25
MethylCyclopentane	0.50-0.75	96-37-7	2298	n. av.
Cyclohexane	0.75-1.00	110-82-7	1145	300
Methyl Cyclohexane	1.25-1.75	108-87-2	2296	400
Ethylbenzene	0.05-0.15	100-41-4	1175	100

*Note: nHexane 8 hour OEL = 50 ppm Isomers = 500 ppm

SECTION 3 – PHYSICAL DATA

<u>Physical State:</u> Liquid	<u>Odour and Appearance:</u> Viscous liquid Black	<u>Odour Threshold:</u> n. av.
<u>Vapour Pressure:</u> 12 kPa calc.	<u>Vapour Density:</u> (Air = 1) >3.0	<u>Evaporation Rate:</u> <1
<u>Boiling Point:</u> 35 ->716 °C	<u>Pour Point:</u> -45 C	<u>Critical Temperature</u> n. av.
<u>Specific Gravity:</u> (Water = 1) 0.914	<u>Solubility in Water:</u> Not Soluble	<u>Coeff. of Water/Oil Dist.:</u> <1

STATOIL
LEISMER SE2-079-10-W4M
Material Safety Data Sheet

SECTION 4 – REACTIVITY, FIRE AND EXPLOSIVE DATA

Flash Point:
<-35 °C (est)

Auto Ignition:
537 est

LEL/UEL%:
n. ap.

Hazardous Combustion
Products:
CO₂, NO_x, CO, SO₂

Sensitivity to Mechanical
Impact:
Not Sensitive

Sensitivity to Static
Electricity:
Static Spark may cause
Ignition

Flammability:
Flammable

Fire Fighting Procedures – Means of Extinguishing:
DRY CHEMICAL, WATER FOG, FOAM, SHUT FUEL SUPPLY OFF

Special Fire Fighting Procedures: n. ap.

Chemical Stability: Stable Mixture

Hazardous Polymerisation:
Will not occur

Sensitivity to Mechanical
Impact: Not sensitive

Incompatibility:
Strong Oxidizing Agents

Reactivity: Chlorine Dioxide

SECTION 5 – TOXICOLOGICAL PROPERTIES

Routes of Entry:

Inhalation: X

Eye Contact: X

Skin Contact: X.

Ingestion: n. ap.

Effects of Acute Exposure:

Inhalation – Primary route of exposure. High vapour concentrations are irritating to the eyes, nose, throat and lungs. May cause headaches, and dizziness. May be anesthetic and may cause other central nervous system effects.

Skin/Eye Contact – May cause eye and/or skin irritation

Ingestion – n. ap.

STATOIL
LEISMER SE2-079-10-W4M
Material Safety Data Sheet

Effects of Chronic Exposure:**Specific Species & Route**

<u>Ingredients</u>	<u>LD50 OF INGREDIENT</u>	<u>LC50 OF INGREDIENT</u>
Butane	n. av.	6583 ppm - rats
Pentane	446 ppm IVN mouse	n. av.
Hexanes	28710 mg/kg oral rat	n. av.
Heptanes	n. av.	n. av.
Octanes	n. av.	n. av.
Nonanes	218 mg/kg (IVN mouse)	3200 ppm (4 hr INH rat)
Benzene	930 mg/kg oral rat	13,228 ppm rat
Toluene	7.53 g/kg (oral rat)	n. av.
Xylenes	7.71 mL/kg (oral rat)	n. av.
1,2,4 Trimethylbenzene	n. av.	n. av.
Methyl Cyclopentane	n. av.	n. av.
Cyclohexane	n. av.	n. av.
Methyl Cyclohexane	3.8 mL/kg (oral rat)	41500 mg/m ³ (2 hr INH mouse)
Ethylbenzene	3500 mg/kg (oral rat)	n. av.
Benzene	930 mg/kg oral rat	13,228 ppm rat

Exposure Limits:

(8 hours) Occupational Exposure Limit
See list

Carcinogenicity:

Contains small amount of Benzene, a
known carcinogen

Reproductive Effects:

n. av.

Synergistic Materials:

n. av.

Sensitizing Capabilities:

n. av.

SECTION 6 – PREVENTATIVE MEASURES

Engineering Controls: USE EXPLOSION-PROOF VENTILATION TO CONTROL VAPOUR CONCENTRATION, FOR PERSONNEL ENTRY INTO CONFINED SPACE, ENTRY PROCEDURE MUST INCLUDE VENTILATION AND TESTING OF ATMOSPHERE. MAKE UP AIR MUST BE SUPPLIED TO BALANCE AIR EXHAUSTED.

Personal Protective Equipment:

Respiratory Protection: SCBA should be worn in areas of insufficient oxygen or when H₂S levels exceed 15 ppm.

Body Protection: Flame retardant clothing should be worn,

Eye Protection: Safety glasses with side shields

Leak and Spill Handling: ELIMINATE SOURCE OF IGNITION. PREVENT ADDITIONAL DISCHARGE OF MATERIAL. EVACUATE PERSONNEL NOT EQUIPPED WITH PROTECTIVE CLOTHING AND NIOSH APPROVED RESPIRATORY EQUIPMENT. CONTAIN SPILL WITH NONCOMBUSTABLE ABSORBENTS.

Environmental Effects and Hazards: CONSULT AN EXPERT AND ENSURE DISPOSAL IS IN COMPLIANCE WITH GOVERNMENT REQUIREMENTS.

STATOIL
LEISMER SE2-079-10-W4M
Material Safety Data Sheet

Handling Procedure and Equipment: KEEP CONTAINERS CLOSED. STORE IN COOL, WELL VENTILATED PLACE AWAY FROM INCOMPATIBLE MATERIALS. DO NOT PRESSURIZE, HEAT, OR WELD EMPTY CONTAINERS. KEEP AWAY FROM OPEN FLAMES AND USE PROPER GROUNDING PROCEDURES.

Storage Requirements: STORE IN COOL, WELL VENTILATED PLACE AWAY FROM INCOMPATIBLE MATERIALS.

Special Shipping Information:

Per Transportation of Dangerous Goods Legislation.

SECTION 7 - FIRST AID MEASURES

Inhalation: IN EMERGENCY SITUATIONS USE PROPER RESPIRATORY PROTECTION AND IMMEDIATELY REMOVE THE VICTIM FROM EXPOSURE. ADMINISTER ARTIFICIAL RESPIRATION IF BREATHING HAS STOPPED. KEEP AT REST AND CALL FOR MEDICAL ATTENTION:

Skin Contact: FLUSH AREA WITH LARGE AMOUNTS OF WATER AND USE SOAP IF AVAILABLE. REMOVE SEVERELY CONTAMINATED CLOTHING AND LAUNDRY BEFORE REUSE.

Eye Contact: FLUSH EYES WITH LARGE AMOUNTS OF WATER UNTIL IRRITATION SUBSIDES. CALL FOR MEDICAL ATTENTION IF IRRITATION PERSISTS.

SECTION 8 – PREPARATION INFORMATION

Prepared by: Maxxam Analytics Inc.

Reference: GPSA SI Engineering Data Book

Date Prepared 2010-11-09

This MSDS information was developed for employees, customers and agents of Statoil Canada Ltd. to provide safety information of the described product or material. The information may not be valid or complete if the product or material is used in combination with other products or materials, or in any process. This information is intended for reasonable normal usage and recommended practices, or does underscore the hazard inherent in the nature of the product or material. Although every effort is made to insure accuracy and completeness of the contained information, it is understood that Statoil Canada Ltd. makes no warranty as to the accuracy or completeness of information and assumes no liability or any damage or loss suffered as result of any inaccuracy or incompleteness therein. This information is considered to accurate as of the date of preparation. Updated information will be forwarded to employees, customers or agents, however the reader is invited to contact Statoil Canada Ltd. at the address shown to insure the most up to date information or obtain information related to an unusual or other use.

n. ap. = not applicable

n. av. = not available

calc. = calculated

est. = estimated

Cenovus Energy Inc.
Crude Oil (Sour)**Material Safety Data Sheet**

Page 1 of 2

SECTION 1 – MATERIAL IDENTIFICATION AND USE

Material Name: CRUDE OIL (SOUR)
Synonyms: Midale Blend (M or MID); Fosterton (F); Central Alberta Crude (CAL)
Use: Process stream, fuel and lubricants production
WHMIS Classification: Class B, Div. 2; Class D, Div. 1, Sub-Div. A; Div. 2, Sub-Div. A and B
NFPA: **Fire:** 4 **Reactivity:** 0 **Health:** 4
TDG Shipping Name: Petroleum Crude Oil (contains Hydrogen Sulphide)
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: 1-877-458-8080
Chemical Family: Complex mixture of aliphatic and aromatic hydrocarbons, with dissolved hydrogen sulphide

SECTION 2 – HAZARDOUS INGREDIENTS OF MATERIAL

Hazardous Ingredients	Approximate Concentrations (%)	C.A.S. Nos.	LD50/LC50 (Incl. Species & Route)	Exposure Limits
Crude oil	100	8002-05-9	LD50, rat, skin, >2 g/kg	5 mg/m ³ (OEL, TLV)
Benzene	0.1	71-43-2	LD50, rat, oral, 930 mg/kg LC50, rat, 4 hr, 13200 ppm	0.5 ppm (OEL, TLV)
Hydrogen sulphide [§]	>20 ppm	7783-06-04	LC50, rat, 4 hrs, 444 ppm	10 ppm (OEL) 1 ppm (TLV)

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

[§]Hydrogen Sulfide in liquid, vapour phase may contain higher concentrations**SECTION 3 – PHYSICAL DATA FOR MATERIAL**

Physical State: Liquid **Vapour Pressure (mmHg):** 0.5-14000 @ 20 deg. C.
Specific Gravity: 0.7- 0.95 **Odour Threshold (ppm):** 0.13
Vapour Density (air=1): 2.5 - 5.0 **Evaporation Rate:** N.Av.
Percent Volatiles: N.Av. **Boiling Pt. (deg.C):** 38-500+
pH: N.Av. **Freezing Pt. (deg.C):** <-40
Coefficient of Water/Oil Distribution: <0.1
Odour & Appearance: brown/black/green viscous liquid, rotten eggs odour
 (N.AV. = not available)

SECTION 4 – FIRE AND EXPLOSION

Flammability: Yes **Conditions:** Material will ignite at normal temperatures.
Means of Extinction: Foam, CO₂, dry chemical. Explosive and toxic vapours can build up in poorly ventilated areas.
Special Procedures: Use water spray to cool fire-exposed containers, and to disperse vapors if spill has not ignited. If safe to do so, cut off fuel and allow flame to burn out.
Flash Point (deg.C) & Method: <-40 (TCC)
Upper Explosive Limit (% by vol.): 44 **Sensitivity to Impact:** No
Lower Explosive Limit (% by vol.): 0.8 **Sensitivity to Static Discharge:** Yes, may ignite
Auto-Ignition Temp. (deg.C): 260 **TDG Flammability Classification:** 3
Hazardous Combustion Products: Carbon monoxide, carbon dioxide, sulphur oxides

SECTION 5 – REACTIVITY DATA

Chemical Stability: Yes **Conditions:** Heat
Incompatibility: Yes **Substances:** Oxidizing agents (eg chlorine); metals (e.g. iron, copper, lead).
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 (liquid)**Eye Contact:** Yes**Inhalation: Acute:** Yes**Chronic:** Yes**Ingestion:** Yes

Effects of Acute Exposure: Initial odour of H₂S detected as low as about 0.1 ppm. Gas/vapour may cause irritation of eyes, nose and throat, dizziness and drowsiness. Hydrogen sulphide may cause a loss of sense of smell at 100 ppm. At higher concentrations, severe irritation of eyes, nose, throat and lungs, dizziness, headache, nausea, unconsciousness and respiratory failure may occur. Death may result if not revived promptly. Repeated contact with skin may cause irritation and possibly dermatitis. Absorbed through intact skin. Contact of liquid with eyes may cause severe irritation.

Effects of Chronic Exposure: Due to presence of benzene and n-hexane, long term exposure may increase the risk of anaemia, leukaemia and nervous system damage.

Sensitization to Product: No.**Exposure Limits of Product:** 0.5 ppm OEL for benzene; 10 ppm OEL for H₂S**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 or supplied air breathing apparatus where concentrations may exceed exposure limits.

Gloves: Viton (nitrile adequate for short exposure to liquid) **Respiratory:** SCBA or SABA

Eye: SCBA with full facepiece

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 appropriate 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 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.

Special Shipping Information: N.Av.

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 lukewarm 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: 1-877-458-8080

Preparation Date: March 29, 2011

Expiry Date: March 29, 2014

Cenovus Energy Inc.
Heavy Crude Oil/Diluent Mix

Material Safety Data Sheet

Page 1 of 2

SECTION 1 – MATERIAL IDENTIFICATION

Material Name: HEAVY CRUDE OIL/DILUENT MIX
Synonyms: Bow River (BR); Cold Lake Blend (CLB); Christina Lake Dil-bit Blend (CDB), Christina Lake Blend (CSB); Western Canadian Blend (WCB); Western Canadian Select (WCS); Wabasca Heavy (WH)
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.
 500 Centre Street SE, PO Box 766
 Calgary, AB T2P 0M5
Emergency Telephone: 1-877-458-8080, CANUTEC 1-613-996-6666 (Canada)
Chemical Description: A naturally occurring mixture of paraffins, naphthalenes, aromatic hydrocarbons and small amounts of sulphur and nitrogen compounds mixed with condensate

SECTION 2 – HAZARDOUS INGREDIENTS OF MATERIAL

Hazardous Ingredients	Approximate Concentrations (%)	C.A.S. Nos.	LD50/LC50 Specify Species & Route	Exposure Limits
Crude oil	50 – 90	8002-05-9	LD50, rat, skin, >2 g/kg	5 mg/m ³ (OEL, PEL oil mist)
Hydrocarbon Diluent	10 – 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	0.5 ppm (OEL, TLV) 10 ppm (PEL)
Hydrogen Sulphide [§]	<0.1	7783-06-04	LC50, rat, 4 hrs, 444 ppm	10 ppm (OEL), 1 ppm (TLV), 20 ppm (PEL-C)

OEL = AB Occupational Exposure Limit; TLV = ACGIH Threshold Limit Value; PEL = OSHA Permissible Exposure Limit; C = Ceiling; *OEL for gasoline; [§]Hydrogen Sulfide in liquid, vapour phase may contain higher concentrations

SECTION 3 – PHYSICAL DATA FOR MATERIAL

Physical State: Liquid **Vapour Pressure, Reid (kPa):** 76 @ 38°C
Specific Gravity: 0.91 – 0.94 **Odour Threshold (ppm):** N.Av.
Vapour Density (air=1): 2.5 -5.0 (estimated) **Evaporation Rate:** N.Av.
Percent Volatiles, (v/v): 15 - 30 (estimated) **Boiling Pt. (deg.C):** 35 – 180°C
pH: N.Av. **Freezing Pt. (deg.C):** <20
Coefficient of Water/Oil Distribution: <0.1
Odour & Appearance: Brown/black liquid, hydrocarbon odour
 (N.Av. = not available N.App. = not applicable)

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) **Sensitivity to Impact:** No
Lower Explosive Limit (% by vol.): 0.8 (estimated) **Sensitivity to Static Discharge:** Yes, at normal temperatures
Auto-Ignition Temp. (deg.C): 250 (estimated) **TDG Flammability Classification:** 3
Hazardous Combustion Products: Carbon monoxide, carbon dioxide, sulphur oxides

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

Cenovus Energy Inc.
Heavy Crude Oil/Diluent Mix

Material Safety Data Sheet

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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 anemia and leukemia. Repeated skin contact may increase the risk of skin cancer.

Sensitization to Product: No.

Exposure Limits of Product: 0.5 ppm (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 sulfide, 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.

Special Shipping Provisions: N.App.

Caution: Hydrogen sulfide 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 unconsciousness 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.

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 lukewarm 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. Health and Safety

Phone Number: 1-403-766-2000

Preparation Date: November 6, 2012

**Shell Canada Limited**
Material Safety Data Sheet

Effective Date: 2010-02-15

Supersedes: 2007-02-23



Class B2 Flammable Liquid



Class D2B Skin Irritation

Class D2A Embryo/Fetotoxicity
Class D2A Carcinogenicity**1. PRODUCT AND COMPANY IDENTIFICATION****PRODUCT: SHELL SYNTHETIC CRUDE BLEND****SYNONYMS: SSX**

Synthetic crude oil is a mixture of paraffins, naphthenes, aromatics and sulphur compounds

PRODUCT USE: Base product for Petroleum Refining.**PRODUCT CODE: 873-100****SUPPLIER****Shell Canada Limited (SCL)**

P.O. Box 100, Station M

400-4th Ave. S.W.

Calgary, AB Canada

T2P 2H5

TELEPHONE NUMBERS**Shell Emergency Number****CANUTEC 24 HOUR EMERGENCY NUMBER**

For general information:

1-800-661-7378

1-613-996-6666

1-800-661-1600

www.shell.ca

This MSDS was prepared by the Toxicology and Product Stewardship Section of Shell Canada Limited.

*An asterisk in the product name designates a trade-mark of Shell Brands International AG. Used under license.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Component Name	CAS Number	% Range	WHMIS Controlled
Hydrocracked Residues	64741-75-9	0 - 100	Yes
Gas Oils (Petroleum), Heavy Atmospheric	68783-08-4	0 - 100	Yes
Distillates (Petroleum), Hydrotreated Middle	64742-46-7	0 - 30	Yes
Naphtha (Petroleum), Hydrotreated Heavy	64742-48-9	0 - 30	Yes
Naphtha (Petroleum), Hydrotreated Light	64742-49-0	0 - 10	Yes
Xylene (Mixed Isomers)	1330-20-7	1 - 2	Yes
n-Hexane	110-54-3	< 1	Yes
Toluene	108-88-3	< 1	Yes
Naphtha (petroleum), heavy straight-run	64741-41-9	0 - 5	Yes

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Naphtha, heavy hydrocracked	64741-78-2	0 - 5	Yes
Benzene	71-43-2	< 0.1	Yes
Ethylbenzene	100-41-4	< 0.1	Yes

Note: N-hexane, toluene, xylene, ethylbenzene and benzene are not introduced into the product as intentional additives. These chemicals may be contained in one or more of the blending components that make up the product.

See Section 8 for Occupational Exposure Guidelines.

3. HAZARDS IDENTIFICATION

Physical Description: Viscous Liquid Dark Brown Hydrocarbon Odour

Routes of Exposure: Exposure will most likely occur through skin contact or inhalation.

Hazards:

- Flammable Liquid.
- Irritating to skin.
- May cause cancer.
- Contains xylene, which may affect fetal development.
- Exposure to vapours may cause irritation of the eyes.
- Inhalation of oil mist or vapours from hot oil may cause irritation of the upper respiratory tract.

Handling:

- Eliminate all ignition sources.
- Wear suitable gloves and eye protection.
- Bond and ground transfer containers and equipment to avoid static accumulation.
- Empty containers are hazardous, may contain flammable / explosive dusts, liquid residue or vapours. Keep away from sparks and open flames.
- Avoid inhalation of vapours.

For further information on health effects, see Section 11.

4. FIRST AID MEASURES

Eyes: Flush eyes with water for at least 15 minutes while holding eyelids open. If irritation occurs and persists, obtain medical attention.

Skin: Wash contaminated skin with mild soap and water for at least 15 minutes. If irritation occurs and persists, obtain medical attention.

Ingestion: Do not induce vomiting; get medical help immediately.

Inhalation: Remove victim from further exposure and restore breathing, if required. Obtain medical attention.

Notes to Physician: Treatment of exposure should be directed at the control of symptoms and the clinical condition.

5. FIRE FIGHTING MEASURES

Extinguishing Media:

- Dry Chemical
- Carbon Dioxide
- Foam
- Water Fog

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- Firefighting Instructions:** Flammable. Clear area of unprotected personnel. Do not use a direct stream of water as it may spread fire. Vapours may travel along ground and flashback along vapour trail may occur. Containers exposed to intense heat from fires should be cooled with water to prevent vapour pressure buildup, which could result in container rupture. Do not enter confined fire space without adequate protective clothing and an approved positive pressure self-contained breathing apparatus. Delayed lung damage can be experienced after exposure to combustion products, sometimes hours after the exposure. Fight fire from maximum distance.
- Hazardous Combustion Products:** A complex mixture of airborne solid, liquid, particulates and gases will evolve when this material undergoes pyrolysis or combustion. Carbon monoxide, carbon dioxide, oxides of nitrogen and oxides of sulphur may be formed on combustion.

6. ACCIDENTAL RELEASE MEASURES

Issue warning "Flammable". See Section 8 for advice on personal protective equipment. Eliminate all ignition sources. Isolate hazard area and restrict access. Stop leak only if safe to do so. Notify appropriate environmental agency(ies). Work upwind of spill if it is safe to do so. Dike and contain land spills; contain spills to water by booming. Do not wash spills into sewers or other public water systems. For large spills remove by mechanical means and place in containers. Adsorb residue or small spills with adsorbent material and remove to non-leaking containers for disposal. After area has been cleaned up to the satisfaction of regulatory authorities, flush area with water to remove trace residue. Dispose of recovered material as noted under Disposal Considerations.

7. HANDLING AND STORAGE

- Handling:** Flammable. Fixed equipment as well as transfer containers and equipment should be grounded to prevent accumulation of static charge. Avoid breathing vapours and prolonged or repeated contact with skin. Empty containers are hazardous, may contain flammable/explosive dusts, residues or vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers. Launder contaminated clothing prior to reuse. Wash with soap and water prior to eating, drinking, smoking, applying cosmetics or using toilet facilities. Use good personal hygiene.
- Storage:** Tank storage should be done according to NFPA Code 30 for crude oils.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

The following information, while appropriate for this product, is general in nature. The selection of personal protective equipment will vary depending on the conditions of use.

OCCUPATIONAL EXPOSURE LIMITS (Current ACGIH TLV/TWA unless otherwise noted):

North American exposure limits have not been established for the product. Consult local and provincial authorities for acceptable values.

Xylene: 100 ppm (STEL: 150 ppm)

Petroleum Distillates (Carbon range C9 to C20): Shell Canada's internal guideline is 100 mg/m³ total hydrocarbon as an OEL (8-hour TWA).

Naphtha (Carbon range C3 to C11): Shell Canada's internal guideline is 900 mg/m³ total hydrocarbon as an OEL (8-hour TWA).

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Polycyclic Aromatic Hydrocarbons (PAH): Shell Canada's internal guideline is 0.02 mg/m³ as an OEL (8-hour TWA).

Mechanical Ventilation: Use explosion-proof ventilation as required to control vapour concentrations. Concentrations in air should be maintained below the occupational exposure limit if unprotected personnel are involved. Make up air should always be supplied to balance air exhausted (either generally or locally). Local ventilation recommended where general ventilation is ineffective in controlling airborne concentrations below the recommended occupational exposure limit. For personnel entry into confined spaces (i.e. bulk storage tanks) a proper confined space entry procedure must be followed including ventilation and testing of tank atmosphere.

PERSONAL PROTECTIVE EQUIPMENT:

Eye Protection: Chemical safety goggles and/or full face shield to protect eyes and face, if product is handled such that it could be splashed into eyes.

Skin Protection: Avoid contact with skin. Impervious gloves should be worn at all times when handling this product. In confined spaces or where the risk of skin exposure is much higher, impervious clothing should be worn. Use protective clothing and gloves manufactured from nitrile.

Respiratory Protection: Avoid breathing vapour or mists. If exposure exceeds occupational exposure limits, use an appropriate NIOSH-approved respirator. Depending on airborne concentration, use either a NIOSH-approved chemical cartridge respirator with organic vapour cartridges in combination with a P95 particulate filter or use a NIOSH-approved supplied-air respirator, either self-contained or airline, operated in positive pressure mode.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Viscous Liquid
Appearance:	Dark Brown
Odour:	Hydrocarbon Odour
Odour Threshold:	Not available
Boiling Point:	-15 - 590 °C
Density:	860 - 900 kg/m ³ @ 15 °C
Specific Gravity (Water = 1):	0.86 - 0.9
pH:	Not available
Flash Point:	< 0 °C
Lower Flammable Limit:	Not available
Upper Flammable Limit:	Not available
Autoignition Temperature:	Not available
Viscosity:	16 cSt @ 30 °C
Evaporation Rate (n-BuAc = 1):	Not available
Partition Coefficient (log K_{ow}):	Not available
Water Solubility:	Insoluble
Other Solvents:	Hydrocarbon Solvents

10. STABILITY AND REACTIVITY

Chemically Stable: Yes

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Hazardous Polymerization:	No
Sensitive to Mechanical Impact:	No
Sensitive to Static Discharge:	Yes
Hazardous Decomposition Products:	When heated to decomposition, may emit toxic and corrosive fumes of sulphur oxides, as well as CO, CO ₂ , uncombusted hydrocarbons and soot.
Incompatible Materials:	Avoid strong oxidizing agents.
Conditions of Reactivity:	Avoid excessive heat, formation of vapours or mists.

11. TOXICOLOGICAL INFORMATION

Ingredient (or Product if not specified)	Toxicological Data
Hydrocracked Residues	LD50 Oral Rat = 4320 mg/kg LD50 Dermal Rat > 2000 mg/kg LD50 Dermal Rabbit > 2000 mg/kg
Gas Oils (Petroleum), Heavy Atmospheric Distillates (Petroleum), Hydrotreated Middle	LD50 Dermal Rat > 2000 mg/kg LD50 Oral Rat > 5000 mg/kg
Naphtha (Petroleum), Hydrotreated Heavy	LD50 Oral Rat > 5000 mg/kg LD50 Dermal Rabbit > 3160 mg/kg
Naphtha (Petroleum), Hydrotreated Light	LD50 Oral Rat > 5000 mg/kg LD50 Dermal Rabbit > 2000 mg/kg
Xylene (Mixed Isomers)	LD50 Oral Rat = 4300 mg/kg LC50 Inhalation Rat = 6700 ppm for 4 hours LD50 Dermal Rabbit > 2000 mg/kg
n-Hexane	LD50 Oral Rat > 8 mL/kg LD50 Dermal Rat > 4 mL/kg LC50 Inhalation Rat = 54090 - 57000 ppm for 4 hours
Toluene	LD50 Oral Rat 5580 mg/kg LC50 Inhalation Rat 26700 ppm for 1 hour LD50 Dermal Rabbit 12400 mg/kg
Naphtha (petroleum), heavy straight-run	LC50 Inhalation Rat > 5000 mg/m ³ for 4hours
Naphtha, heavy hydrocracked	LC50 Inhalation Rat > 5240 mg/m ³ for 4hours LD50 Oral Rat > 5000 mg/kg LD50 Dermal Rabbit > 2000 mg/kg
Benzene	LD50 Oral Rat 690 - 3400 mg/kg LC50 Inhalation Rat 13700 ppm for 4 hours LD50 Dermal Rabbit > 8260 mg/kg
Ethylbenzene	LD50 Oral Rat = 3500 mg/kg LC50 Inhalation Rat = 4000 ppm for 4 hours LD50 Dermal Rabbit = 17.8 mL/kg

Routes of Exposure:	Exposure will most likely occur through skin contact or inhalation.
Irritancy:	Based on the ingredients, this product is expected to be irritating to skin.
Chronic Effects:	Prolonged or repeated contact may cause various forms of dermatitis including folliculitis and oil acne. Prolonged exposure to high vapour concentration can cause headache, dizziness, nausea, blurred vision and central nervous system depression. Long term intensive exposure to oil mist may cause benign lung fibrosis.

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- Feto/Teratogenicity:** High exposures to xylene in some animal studies, often at levels toxic to the mother, have affected embryo/fetal development. Other animal and human studies have not shown this effect.
- Pre-existing Conditions:** Pre-existing skin disorders may be aggravated by exposure to components of this product.
- Carcinogenicity and Mutagenicity:** Carcinogenic hazard. This product may contain a variety of polycyclic aromatic hydrocarbons (PAH), some of which are associated with the potential of inducing skin cancer. Increasing amounts of PAH may be released if this product is heated above 200 C.

12. ECOLOGICAL INFORMATION

- Environmental Effects:** The immediate effect of a release is the physical impairment of the environment from the coating of surfaces, resulting in the disruption of oxygen, water and light to flora and fauna. May cause physical fouling of aquatic and avian organisms. Prolonged exposure may result in the partitioning of light-end hydrocarbon fractions into the water and gas phases of the subsurface soil environment with potential to adversely affect soil and groundwater quality.
- Biodegradability:** Not readily biodegradable.

13. DISPOSAL CONSIDERATIONS

Waste management priorities (depending on volumes and concentration of waste) are: 1. recycle (reprocess), 2. energy recovery 3. incineration, 4. disposal at a licenced waste disposal facility. Do not attempt to combust waste on-site. Incinerate at a licenced waste disposal site with approval of environmental authority. Landfill adsorbed material in a government approved site.

14. TRANSPORT INFORMATION**Canadian Road and Rail Shipping Classification:**

UN Number	UN1268
Proper Shipping Name	PETROLEUM DISTILLATES, N.O.S.
Hazard Class	Class 3 Flammable Liquids
Packing Group	PG I
Shipping Description	PETROLEUM DISTILLATES, N.O.S. Class 3 UN1268 PG I

15. REGULATORY INFORMATION

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

- WHMIS Class:** Class B2 Flammable Liquid
Class D2B Skin Irritation
Class D2A Embryo/Fetotoxicity
Class D2A Carcinogenicity
- DSL/NDSL Status:** This product, or all components, are listed on the Domestic Substances List, as required under the Canadian Environmental Protection Act.

SHELL SYNTHETIC CRUDE BLEND

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Other Regulatory Status: The regulatory information is not intended to be comprehensive. Other regulations may apply to this material. For purposes of TSCA, the product is a mixture of certain blending components, all of which are on the TSCA Inventory. Individual shipments of this product will not necessarily contain all of the blending components listed in Section 2 above.

16. OTHER INFORMATION

LABEL STATEMENTS

Hazard Statement : Flammable Liquid.
Irritating to skin.
May cause cancer.
Contains xylene, which may affect fetal development.

Handling Statement: Eliminate all ignition sources.
Wear suitable gloves and eye protection.
Bond and ground transfer containers and equipment to avoid static accumulation.
Empty containers are hazardous, may contain flammable / explosive dusts, liquid residue or vapours. Keep away from sparks and open flames.
Avoid inhalation of vapours.

First Aid Statement : Wash contaminated skin with soap and water.
Flush eyes with water.
If overcome by vapours remove to fresh air.
Do not induce vomiting.
Obtain medical attention.

Revisions: This MSDS has been reviewed and updated. Changes have been made to: Section 2 Section 15



Shell Canada Limited Material Safety Data Sheet

Effective Date: 2010-08-18

Supersedes: 2007-08-09



Class B2 Flammable Liquid



Class D2B Skin Irritation

Class D2A Carcinogenicity
Class D2A Embryo/Fetotoxicity

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT: **SHELL PREMIUM SYNTHETIC (SPX)**
 SYNONYMS: SPX
 Synthetic crude oil is a mixture of paraffins, naphthenes, aromatics and sulphur compounds
 PRODUCT USE: Base product for Petroleum Refining.
 PRODUCT CODE: **873-114**

SUPPLIER

Shell Canada Limited (SCL)
 P.O. Box 100, Station M
 400-4th Ave. S.W.
 Calgary, AB Canada
 T2P 2H5

TELEPHONE NUMBERS

Shell Emergency Number
CANUTEC 24 HOUR EMERGENCY NUMBER
 For general information:

1-800-661-7378
 1-613-996-6666
 1-800-661-1600
www.shell.ca

This MSDS was prepared by the Toxicology and Product Stewardship Section of Shell Canada Limited.

*An asterisk in the product name designates a trade-mark of Shell Brands International AG. Used under license.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Component Name	CAS Number	% Range	WHMIS Controlled
Hydrocracked Residues	64741-75-9	10 - 50	Yes
Distillates (Petroleum), Hydrotreated Middle	64742-46-7	10 - 50	Yes
Gas Oils (Petroleum), Heavy Atmospheric	68783-08-4	10 - 50	Yes
Naphtha (Petroleum), Hydrotreated Heavy	64742-48-9	10 - 50	Yes
Distillates (Petroleum), Straight-run Middle	64741-44-2	0 - 15	Yes
Naphtha (Petroleum), Hydrotreated Light	64742-49-0	0 - 10	Yes
Naphtha (petroleum), Light Straight-run	64741-46-4	0 - 10	Yes
n-Hexane	110-54-3	< 1	Yes
Toluene	108-88-3	< 1	Yes

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Xylene (Mixed Isomers)	1330-20-7	0.1 - 1	Yes
Benzene	71-43-2	0.1 - 1	Yes
Ethylbenzene	100-41-4	< 0.1	Yes

Note: N-hexane, toluene, xylene, ethylbenzene and benzene are not introduced into the product as intentional additives. These chemicals may be contained in one or more of the blending components that make up the product.

See Section 8 for Occupational Exposure Guidelines.

3. HAZARDS IDENTIFICATION

Physical Description: Liquid Brown Colour Hydrocarbon Odour

Routes of Exposure: Exposure will most likely occur through skin contact or inhalation.

Hazards:

Flammable Liquid.
May cause cancer.
Contains xylene, which may affect fetal development.
Irritating to skin.
Exposure to vapours may cause irritation of the eyes.
Inhalation of oil mist or vapours from hot oil may cause irritation of the upper respiratory tract.

Handling:

Eliminate all ignition sources.
Wear suitable gloves and eye protection.
Bond and ground transfer containers and equipment to avoid static accumulation.
Empty containers are hazardous, may contain flammable / explosive dusts, liquid residue or vapours. Keep away from sparks and open flames.
Avoid inhalation of vapours.

For further information on health effects, see Section 11.

4. FIRST AID MEASURES

Eyes: Flush eyes with water for at least 15 minutes while holding eyelids open. If irritation occurs and persists, obtain medical attention.

Skin: Remove contaminated clothing, shoes and jewellery. Wash contaminated skin with mild soap and water for at least 15 minutes. If irritation occurs and persists, obtain medical attention.

Ingestion: Do not induce vomiting; get medical help immediately. Guard against aspiration into lungs by having the individual turn on to their left side. If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into the lungs.

Inhalation: Remove victim from further exposure and restore breathing, if required. Obtain medical attention.

Notes to Physician: The main hazard following accidental ingestion is aspiration of the liquid into the lungs producing chemical pneumonitis.

5. FIRE FIGHTING MEASURES

Extinguishing Media: Dry Chemical

SHELL PREMIUM SYNTHETIC (SPX)

873-114

Revision Number: 2

	Carbon Dioxide
	Foam
	Water Fog
Firefighting Instructions:	Flammable. Clear area of unprotected personnel. Firewater and cooling water streams/nozzles should be adjusted to fogging/small droplets, as full streams may spread fire. Do not enter confined fire space without adequate protective clothing and an approved positive pressure self-contained breathing apparatus. Containers exposed to intense heat from fires should be cooled with water to prevent vapour pressure buildup, which could result in container rupture. Vapours may travel along ground and flashback along vapour trail may occur. Delayed lung damage can be experienced after exposure to combustion products, sometimes hours after the exposure. Fight fire from maximum distance.
Hazardous Combustion Products:	A complex mixture of airborne solid, liquid, particulates and gases will evolve when this material undergoes pyrolysis or combustion. Carbon monoxide, carbon dioxide, oxides of nitrogen and oxides of sulphur may be formed on combustion.

6. ACCIDENTAL RELEASE MEASURES

Issue warning "Flammable". See Section 8 for advice on personal protective equipment. Eliminate all ignition sources. Isolate hazard area and restrict access. Stop leak only if safe to do so. Notify appropriate environmental agency(ies). Work upwind of spill if it is safe to do so. Dike and contain land spills; contain spills to water by booming. Do not wash spills into sewers or other public water systems. For large spills remove by mechanical means and place in containers. Adsorb residue or small spills with adsorbent material and remove to non-leaking containers for disposal. After area has been cleaned up to the satisfaction of regulatory authorities, flush area with water to remove trace residue. Dispose of recovered material as noted under Disposal Considerations.

7. HANDLING AND STORAGE

- Handling:** Flammable. Fixed equipment as well as transfer containers and equipment should be grounded to prevent accumulation of static charge. Avoid breathing vapours and prolonged or repeated contact with skin. Empty containers are hazardous, may contain flammable/explosive dusts, residues or vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers. Launder contaminated clothing prior to reuse. Wash with soap and water prior to eating, drinking, smoking, applying cosmetics or using toilet facilities. Use good personal hygiene.
- Storage:** Tank storage should be done according to NFPA Code 30 for crude oils.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

The following information, while appropriate for this product, is general in nature. The selection of personal protective equipment will vary depending on the conditions of use.

OCCUPATIONAL EXPOSURE LIMITS (Current ACGIH TLV/TWA unless otherwise noted):

The exposure limits listed here are provided for guidance only. Consult local, provincial and territorial authorities for specific values.

Benzene (skin) : 0.5 ppm (STEL: 2.5 ppm)

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Benzene: Shell internal standard is 0.5 ppm or 1.6 mg/m³ (8-12 hour time-weighted average limit), 2.5 ppm or 8 mg/m³ (15-minute short term limit)

Xylene: 100 ppm (STEL: 150 ppm)

Petroleum Distillates (Carbon range C9 to C20): Shell Canada's internal guideline is 100 mg/m³ total hydrocarbon as an OEL (8-hour TWA).

Naphtha (Carbon range C3 to C11): Shell Canada's internal guideline is 900 mg/m³ total hydrocarbon as an OEL (8-hour TWA).

Skin Notation: Absorption through skin, eyes and mucous membranes may contribute significantly to the total exposure.

Mechanical Ventilation: Use explosion-proof ventilation as required to control vapour concentrations. Concentrations in air should be maintained below the occupational exposure limit if unprotected personnel are involved. Make up air should always be supplied to balance air exhausted (either generally or locally). Local ventilation recommended where general ventilation is ineffective in controlling airborne concentrations below the recommended occupational exposure limit. For personnel entry into confined spaces (i.e. bulk storage tanks) a proper confined space entry procedure must be followed including ventilation and testing of tank atmosphere.

PERSONAL PROTECTIVE EQUIPMENT:

Eye Protection: Chemical safety goggles and/or full face shield to protect eyes and face, if product is handled such that it could be splashed into eyes.

Skin Protection: Avoid contact with skin. Impervious gloves should be worn at all times when handling this product. In confined spaces or where the risk of skin exposure is much higher, impervious clothing should be worn. Use protective clothing and gloves manufactured from nitrile.

Respiratory Protection: Avoid breathing vapour or mists. If exposure exceeds occupational exposure limits, use an appropriate NIOSH-approved respirator. Depending on airborne concentration, use either a NIOSH-approved chemical cartridge respirator with organic vapour cartridges in combination with a P95 particulate filter or use a NIOSH-approved supplied-air respirator, either self-contained or airline, operated in positive pressure mode.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Appearance:	Brown Colour
Odour:	Hydrocarbon Odour
Odour Threshold:	Not available
Boiling Point:	-20 - 600 °C
Density:	860 - 900 kg/m ³ @ 15 °C
Specific Gravity (Water = 1):	0.86 - 0.9
pH:	Not available
Flash Point:	< 0 °C
Lower Flammable Limit:	Not available
Upper Flammable Limit:	Not available
Autoignition Temperature:	Not available
Viscosity:	5.2 mm ² /s @ 40 °C
Evaporation Rate (n-BuAc = 1):	Not available
Partition Coefficient (log K_{ow}):	Not available

SHELL PREMIUM SYNTHETIC (SPX)

873-114

Revision Number: 2

Water Solubility: Insoluble
Other Solvents: Hydrocarbon Solvents

10. STABILITY AND REACTIVITY

Chemically Stable: Yes
Hazardous Polymerization: No
Sensitive to Mechanical Impact: No
Sensitive to Static Discharge: Yes
Hazardous Decomposition Products: When heated to decomposition, may emit toxic and corrosive fumes of sulphur oxides, as well as CO, CO₂, uncombusted hydrocarbons and soot.
Incompatible Materials: Avoid strong oxidizing agents.
Conditions of Reactivity: Avoid excessive heat, formation of vapours or mists.

11. TOXICOLOGICAL INFORMATION

Ingredient (or Product if not specified)	Toxicological Data
Hydrocracked Residues	LD50 Oral Rat = 4320 mg/kg LD50 Dermal Rat > 2000 mg/kg LD50 Dermal Rabbit > 2000 mg/kg
Distillates (Petroleum), Hydrotreated Middle	LD50 Dermal Rat > 2000 mg/kg LD50 Oral Rat > 5000 mg/kg
Gas Oils (Petroleum), Heavy Atmospheric	
Naphtha (Petroleum), Hydrotreated Heavy	LD50 Oral Rat > 5000 mg/kg LD50 Dermal Rabbit > 3160 mg/kg
Distillates (Petroleum), Straight-run Middle	LC50 Inhalation Rat 1700 mg/m ³ for 4hours
Naphtha (Petroleum), Hydrotreated Light	LD50 Oral Rat > 5000 mg/kg LD50 Dermal Rabbit > 2000 mg/kg
Naphtha (petroleum), Light Straight-run	
n-Hexane	LD50 Oral Rat > 8 mL/kg LD50 Dermal Rat > 4 mL/kg LC50 Inhalation Rat = 54090 - 57000 ppm for 4 hours
Toluene	LD50 Oral Rat 5580 mg/kg LC50 Inhalation Rat 26700 ppm for 1 hour LD50 Dermal Rabbit 12400 mg/kg
Xylene (Mixed Isomers)	LD50 Oral Rat = 4300 mg/kg LC50 Inhalation Rat = 6700 ppm for 4 hours LD50 Dermal Rabbit > 2000 mg/kg
Benzene	LD50 Oral Rat 690 - 3400 mg/kg LC50 Inhalation Rat 13700 ppm for 4 hours LD50 Dermal Rabbit > 8260 mg/kg
Ethylbenzene	LD50 Oral Rat = 3500 mg/kg LC50 Inhalation Rat = 4000 ppm for 4 hours LD50 Dermal Rabbit = 17.8 mL/kg

Routes of Exposure: Exposure will most likely occur through skin contact or inhalation.
Irritancy: Based on the ingredients, this product is expected to be irritating to skin.
Chronic Effects: Prolonged or repeated contact may cause various forms of dermatitis including

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	folliculitis and oil acne. Prolonged exposure to high vapour concentration can cause headache, dizziness, nausea, blurred vision and central nervous system depression. Long term intensive exposure to oil mist may cause benign lung fibrosis. Prolonged and repeated exposure may cause serious injury to blood forming organs, resulting in anemia and similar conditions. Myelodysplastic syndrome (MDS) has been observed in people exposed to very high levels (50 to 300 ppm) of benzene over a long period of time in the workplace. The relevance of these results to lower levels of exposure is not known.
Feto/Teratogenicity:	High exposures to xylene in some animal studies, often at levels toxic to the mother, have affected embryo/fetal development. Other animal and human studies have not shown this effect.
Pre-existing Conditions:	Pre-existing skin disorders may be aggravated by exposure to components of this product.
Carcinogenicity and Mutagenicity:	Middle distillates have caused skin cancers in laboratory animals when applied repeatedly and left in place between applications. This effect is believed to be caused by the continuous irritation of the skin. Good personal hygiene should be maintained to avoid this risk. Carcinogenic hazard. This product contains benzene. Repeated exposure to benzene concentrations greater than the recommended TLV/TWA may reduce the cellular components of peripheral blood and bone marrow. Epidemiological studies indicate that long term inhalation of benzene vapour can cause leukaemia in man. Benzene has also produced chromosomal aberrations in peripheral blood lymphocytes. This product may contain a variety of polycyclic aromatic hydrocarbons (PAH), some of which are associated with the potential of inducing skin cancer. Increasing amounts of PAH may be released if this product is heated above 200 C.

12. ECOLOGICAL INFORMATION

Environmental Effects:	The immediate effect of a release is the physical impairment of the environment from the coating of surfaces, resulting in the disruption of oxygen, water and light to flora and fauna. May cause physical fouling of aquatic and avian organisms. Prolonged exposure may result in the partitioning of light-end hydrocarbon fractions into the water and gas phases of the subsurface soil environment with potential to adversely affect soil and groundwater quality.
Biodegradability:	Not readily biodegradable.

13. DISPOSAL CONSIDERATIONS

Waste management priorities (depending on volumes and concentration of waste) are: 1. recycle (reprocess), 2. energy recovery 3. incineration, 4. disposal at a licenced waste disposal facility. Do not attempt to combust waste on-site. Incinerate at a licenced waste disposal site with approval of environmental authority. Landfill adsorbed material in a government approved site.

14. TRANSPORT INFORMATION

Canadian Road and Rail Shipping Classification:	
UN Number	UN1268
Proper Shipping Name	PETROLEUM DISTILLATES, N.O.S.
Hazard Class	Class 3 Flammable Liquids

SHELL PREMIUM SYNTHETIC (SPX)

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Packing Group
Shipping DescriptionPG I
PETROLEUM DISTILLATES, N.O.S. Class 3 UN1268 PG I**15. REGULATORY INFORMATION**

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

WHMIS Class:Class B2 Flammable Liquid
Class D2B Skin Irritation
Class D2A Carcinogenicity
Class D2A Embryo/Fetotoxicity**DSL/NDSL Status:**

This product, or all components, are listed on the Domestic Substances List, as required under the Canadian Environmental Protection Act.

Other Regulatory Status:

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material. For purposes of TSCA, the product is a mixture of certain blending components, all of which are on the TSCA Inventory. Individual shipments of this product will not necessarily contain all of the blending components listed in Section 2 above.

16. OTHER INFORMATION**LABEL STATEMENTS****Hazard Statement :**Flammable Liquid.
May cause cancer.
Contains xylene, which may affect fetal development.
Irritating to skin.**Handling Statement:**Eliminate all ignition sources.
Wear suitable gloves and eye protection.
Bond and ground transfer containers and equipment to avoid static accumulation.
Empty containers are hazardous, may contain flammable / explosive dusts, liquid residue or vapours. Keep away from sparks and open flames.
Avoid inhalation of vapours.**First Aid Statement :**Wash contaminated skin with soap and water.
Flush eyes with water.
If overcome by vapours remove to fresh air.
Do not induce vomiting.
Obtain medical attention.**Revisions:**

This MSDS has been reviewed and updated. Changes have been made to: Section 4 Section 8 Section 15



Shell Canada Limited Material Safety Data Sheet

Effective Date: 2010-02-26

Supersedes: 2007-02-23



Class B2 Flammable Liquid



Class D2B Skin Irritation



Class D2A Embryo/Fetotoxicity

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT: **PREMIUM ALBIAN SYNTHETIC CRUDE**

SYNONYMS: PAS

Synthetic crude oil is a mixture of paraffins, naphthenes, aromatics and sulphur compounds

PRODUCT USE: Base product for Petroleum Refining.

PRODUCT CODE: **873-111**

SUPPLIER

Shell Canada Limited (SCL)

P.O. Box 100, Station M

400-4th Ave. S.W.

Calgary, AB Canada

T2P 2H5

TELEPHONE NUMBERS

Shell Emergency Number**CANUTEC 24 HOUR EMERGENCY NUMBER**

For general information:

1-800-661-7378

1-613-996-6666

1-800-661-1600

www.shell.ca

This MSDS was prepared by the Toxicology and Product Stewardship Section of Shell Canada Limited.

*An asterisk in the product name designates a trade-mark of Shell Brands International AG. Used under license.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Component Name	CAS Number	% Range	WHMIS Controlled
Distillates (Petroleum), Hydrotreated Middle	64742-46-7	45 - 50	Yes
Naphtha (Petroleum), Hydrotreated Heavy	64742-48-9	45 - 50	Yes
Naphtha (Petroleum), Hydrotreated Light	64742-49-0	0 - 6	Yes
n-Hexane	110-54-3	< 1	Yes
Toluene	108-88-3	< 1	Yes
Butane (n-Butane)	106-97-8	0.1 - 1	Yes
Xylene (Mixed Isomers)	1330-20-7	0.5 - 1	Yes
Benzene	71-43-2	< 0.1	Yes
Ethylbenzene	100-41-4	< 0.1	Yes

Note: N-hexane, toluene, xylene, ethylbenzene and benzene are not introduced into the product as intentional additives. These chemicals may be contained in one or more of the blending components that make up the product.

PREMIUM ALBIAN SYNTHETIC CRUDE

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See Section 8 for Occupational Exposure Guidelines.

3. HAZARDS IDENTIFICATION

Physical Description:	Liquid Brown Colour Hydrocarbon Odour
Routes of Exposure:	Exposure will most likely occur through skin contact or inhalation.
Hazards:	Flammable Liquid. Irritating to skin. Contains xylene, which may affect fetal development. Exposure to vapours may cause irritation of the eyes. Inhalation of oil mist or vapours from hot oil may cause irritation of the upper respiratory tract.
Handling:	Eliminate all ignition sources. Wear suitable gloves and eye protection. Bond and ground transfer containers and equipment to avoid static accumulation. Empty containers are hazardous, may contain flammable / explosive dusts, liquid residue or vapours. Keep away from sparks and open flames. Avoid inhalation of vapours.

For further information on health effects, see Section 11.

4. FIRST AID MEASURES

Eyes:	Flush eyes with water for at least 15 minutes while holding eyelids open. If irritation occurs and persists, obtain medical attention.
Skin:	Wash contaminated skin with mild soap and water for at least 15 minutes. If irritation occurs and persists, obtain medical attention.
Ingestion:	Do not induce vomiting; get medical help immediately. Guard against aspiration into lungs by having the individual turn on to their left side. If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into the lungs.
Inhalation:	Remove victim from further exposure and restore breathing, if required. Obtain medical attention.
Notes to Physician:	The main hazard following accidental ingestion is aspiration of the liquid into the lungs producing chemical pneumonitis.

5. FIRE FIGHTING MEASURES

Extinguishing Media:	Dry Chemical Carbon Dioxide Foam Water Fog
Firefighting Instructions:	Flammable. Clear area of unprotected personnel. Do not use a direct stream of water as it may spread fire. Do not enter confined fire space without adequate protective clothing and an approved positive pressure self-contained breathing apparatus. Containers exposed to intense heat from fires should be cooled with water to prevent vapour pressure buildup, which could result in container

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rupture. Vapours may travel along ground and flashback along vapour trail may occur. Delayed lung damage can be experienced after exposure to combustion products, sometimes hours after the exposure. Fight fire from maximum distance.

Hazardous Combustion Products: A complex mixture of airborne solid, liquid, particulates and gases will evolve when this material undergoes pyrolysis or combustion. Carbon monoxide, carbon dioxide, oxides of nitrogen and oxides of sulphur may be formed on combustion.

6. ACCIDENTAL RELEASE MEASURES

Issue warning "Flammable". See Section 8 for advice on personal protective equipment. Eliminate all ignition sources. Isolate hazard area and restrict access. Stop leak only if safe to do so. Notify appropriate environmental agency(ies). Work upwind of spill if it is safe to do so. Dike and contain land spills; contain spills to water by booming. Do not wash spills into sewers or other public water systems. For large spills remove by mechanical means and place in containers. Adsorb residue or small spills with adsorbent material and remove to non-leaking containers for disposal. After area has been cleaned up to the satisfaction of regulatory authorities, flush area with water to remove trace residue. Dispose of recovered material as noted under Disposal Considerations.

7. HANDLING AND STORAGE

Handling: Flammable. Fixed equipment as well as transfer containers and equipment should be grounded to prevent accumulation of static charge. Avoid breathing vapours and prolonged or repeated contact with skin. Empty containers are hazardous, may contain flammable/explosive dusts, residues or vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers. Launder contaminated clothing prior to reuse. Wash with soap and water prior to eating, drinking, smoking, applying cosmetics or using toilet facilities. Use good personal hygiene.

Storage: Tank storage should be done according to NFPA Code 30 for crude oils.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

The following information, while appropriate for this product, is general in nature. The selection of personal protective equipment will vary depending on the conditions of use.

OCCUPATIONAL EXPOSURE LIMITS (Current ACGIH TLV/TWA unless otherwise noted):

North American exposure limits have not been established for the product. Consult local and provincial authorities for acceptable values.

Xylene: 100 ppm (STEL: 150 ppm)

Diesel fuel, as total hydrocarbons (skin): 100 mg/m³

Gasoline: 300 ppm (STEL: 500 ppm)

Mechanical Ventilation: Use explosion-proof ventilation as required to control vapour concentrations. Concentrations in air should be maintained below the occupational exposure limit if unprotected personnel are involved. Make up air should always be supplied to balance air exhausted (either generally or locally). Local ventilation recommended where general ventilation is ineffective in controlling airborne concentrations below the recommended occupational exposure limit. For personnel entry into confined spaces

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(i.e. bulk storage tanks) a proper confined space entry procedure must be followed including ventilation and testing of tank atmosphere.

PERSONAL PROTECTIVE EQUIPMENT:

Eye Protection:	Chemical safety goggles and/or full face shield to protect eyes and face, if product is handled such that it could be splashed into eyes.
Skin Protection:	Avoid contact with skin. Impervious gloves should be worn at all times when handling this product. In confined spaces or where the risk of skin exposure is much higher, impervious clothing should be worn. Use protective clothing and gloves manufactured from nitrile.
Respiratory Protection:	Avoid breathing vapour or mists. If exposure exceeds occupational exposure limits, use an appropriate NIOSH-approved respirator. Depending on airborne concentration, use either a NIOSH-approved chemical cartridge respirator with organic vapour cartridges in combination with a P95 particulate filter or use a NIOSH-approved supplied-air respirator, either self-contained or airline, operated in positive pressure mode.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Appearance:	Brown Colour
Odour:	Hydrocarbon Odour
Odour Threshold:	Not available
Boiling Point:	-42 - 500 °C
Density:	845 - 860 kg/m ³ @ 15 °C
Specific Gravity (Water = 1):	0.845 - 0.86
pH:	Not available
Flash Point:	< 0 °C
Lower Flammable Limit:	Not available
Upper Flammable Limit:	Not available
Autoignition Temperature:	Not available
Viscosity:	4 cSt @ 30 °C
Evaporation Rate (n-BuAc = 1):	Not available
Partition Coefficient (log K_{OW}):	Not available
Water Solubility:	Insoluble
Other Solvents:	Hydrocarbon Solvents

10. STABILITY AND REACTIVITY

Chemically Stable:	Yes
Hazardous Polymerization:	No
Sensitive to Mechanical Impact:	No
Sensitive to Static Discharge:	Yes
Hazardous Decomposition Products:	When heated to decomposition, may emit toxic and corrosive fumes of sulphur oxides, as well as CO, CO ₂ , uncombusted hydrocarbons and soot.
Incompatible Materials:	Avoid strong oxidizing agents.
Conditions of Reactivity:	Avoid excessive heat, formation of vapours or mists.

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11. TOXICOLOGICAL INFORMATION

Ingredient (or Product if not specified)	Toxicological Data
Distillates (Petroleum), Hydrotreated Middle	LD50 Dermal Rat > 2000 mg/kg LD50 Oral Rat > 5000 mg/kg
Naphtha (Petroleum), Hydrotreated Heavy	LD50 Oral Rat > 5000 mg/kg LD50 Dermal Rabbit > 3160 mg/kg
Naphtha (Petroleum), Hydrotreated Light	LD50 Oral Rat > 5000 mg/kg LD50 Dermal Rabbit > 2000 mg/kg
n-Hexane	LD50 Oral Rat > 8 mL/kg LD50 Dermal Rat > 4 mL/kg LC50 Inhalation Rat = 54090 - 57000 ppm for 4 hours
Toluene	LD50 Oral Rat 5580 mg/kg LC50 Inhalation Rat 26700 ppm for 1 hour LD50 Dermal Rabbit 12400 mg/kg
Butane (n-Butane)	LC50 Inhalation Mouse = 680000 mg/m ³ for 2 hours LC50 Inhalation Rat = 658000 mg/m ³ for 4 hours
Xylene (Mixed Isomers)	LD50 Oral Rat = 4300 mg/kg LC50 Inhalation Rat = 6700 ppm for 4 hours LD50 Dermal Rabbit > 2000 mg/kg
Benzene	LD50 Oral Rat 690 - 3400 mg/kg LC50 Inhalation Rat 13700 ppm for 4 hours LD50 Dermal Rabbit > 8260 mg/kg
Ethylbenzene	LD50 Oral Rat = 3500 mg/kg LC50 Inhalation Rat = 4000 ppm for 4 hours LD50 Dermal Rabbit = 17.8 mL/kg

Routes of Exposure:	Exposure will most likely occur through skin contact or inhalation.
Irritancy:	Based on the ingredients, this product is expected to be irritating to skin.
Chronic Effects:	Prolonged or repeated contact may cause various forms of dermatitis including folliculitis and oil acne. Prolonged exposure to high vapour concentration can cause headache, dizziness, nausea, blurred vision and central nervous system depression. Long term intensive exposure to oil mist may cause benign lung fibrosis.
Feto/Teratogenicity:	High exposures to xylene in some animal studies, often at levels toxic to the mother, have affected embryo/fetal development. Other animal and human studies have not shown this effect.
Pre-existing Conditions:	Pre-existing skin disorders may be aggravated by exposure to components of this product.
Carcinogenicity and Mutagenicity:	Middle distillates have caused skin cancers in laboratory animals when applied repeatedly and left in place between applications. This effect is believed to be caused by the continuous irritation of the skin. Good personal hygiene should be maintained to avoid this risk. Based on an Ames mutagenicity assay, this product would not be predicted to produce tumours via skin contact.

12. ECOLOGICAL INFORMATION

Environmental Effects:	The immediate effect of a release is the physical impairment of the environment from the coating of surfaces, resulting in the disruption of oxygen, water and
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light to flora and fauna. May cause physical fouling of aquatic and avian organisms. Prolonged exposure may result in the partitioning of light-end hydrocarbon fractions into the water and gas phases of the subsurface soil environment with potential to adversely affect soil and groundwater quality.

Biodegradability:

Not readily biodegradable.

13. DISPOSAL CONSIDERATIONS

Waste management priorities (depending on volumes and concentration of waste) are: 1. recycle (reprocess), 2. energy recovery 3. incineration, 4. disposal at a licenced waste disposal facility. Do not attempt to combust waste on-site. Incinerate at a licenced waste disposal site with approval of environmental authority. Landfill adsorbed material in a government approved site.

14. TRANSPORT INFORMATION**Canadian Road and Rail Shipping Classification:**

UN Number	UN1268
Proper Shipping Name	PETROLEUM DISTILLATES, N.O.S.
Hazard Class	Class 3 Flammable Liquids
Packing Group	PG I
Shipping Description	PETROLEUM DISTILLATES, N.O.S. Class 3 UN1268 PG I

15. REGULATORY INFORMATION

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

WHMIS Class: Class B2 Flammable Liquid
Class D2B Skin Irritation
Class D2A Embryo/Fetotoxicity

DSL/NDL Status: This product, or all components, are listed on the Domestic Substances List, as required under the Canadian Environmental Protection Act.

Other Regulatory Status: No Canadian federal standards. Provincial criteria are likely and should be requested when notifying provincial authorities. For purposes of TSCA, the product is a mixture of certain blending components, all of which are on the TSCA Inventory. Individual shipments of this product will not necessarily contain all of the blending components listed in Section 2 above.

16. OTHER INFORMATION**LABEL STATEMENTS**

Hazard Statement : Flammable Liquid.
Irritating to skin.
Contains xylene, which may affect fetal development.

Handling Statement: Eliminate all ignition sources.
Wear suitable gloves and eye protection.
Bond and ground transfer containers and equipment to avoid static accumulation.

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First Aid Statement : Empty containers are hazardous, may contain flammable / explosive dusts, liquid residue or vapours. Keep away from sparks and open flames.
Avoid inhalation of vapours.
Wash contaminated skin with soap and water.
Flush eyes with water.
If overcome by vapours remove to fresh air.
Do not induce vomiting.
Obtain medical attention.

Revisions: This MSDS has been reviewed and updated. Changes have been made to: Section 2 Section 4 Section 8 Section 11



Material Safety Data Sheet

Suncor BHB

WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing
  	B2 - Flammable Liquid D1A - Materials causing immediate and serious toxic effects, Very Toxic Material D2A - Materials Causing Other Toxic Effects, Very Toxic Material D2B - Materials Causing Other Toxic Effects, Toxic Material	  

NFPA Hazard Class			HMIS Hazard Class	
Health	2	Hazardous	Health	2
Flammability	3	Flashpoint below 100 F	Flammability	3
Reactivity	0	Stable	Physical Hazard	0
Specific hazards			Personal Protective Equipment	Splash Goggles, Gloves, Apron, Dust and Vapor Respirator

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Suncor BHB
 Product type : Suncor Product
 MSDS Number : OS0000000006
 Intended Use : Refinery Feedstock
 Manufacturer : Suncor Energy Inc.
 P.O. Box 4001
 Fort McMurray, Alberta Canada
 T9H 3E3

EMERGENCY CONTACT INFORMATION

Suncor Energy Inc., Oil Sands (780) 790-7001 (24-hr)

SECTION 2. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Concentration
BITUMEN	128683-24-9	60 - 80 %
Naphtha (oil sand), hydrotreated	128683-33-0	20 - 40 %
HYDROGEN SULPHIDE	7783-06-4	0 - 40 PPM
Sulphur based on mass/mass	7704-34-9	>= 3.0 %
BENZENE	71-43-2	0.04 - 0.12 %
XYLENE	1330-20-7	0.40 - 0.80 %

Comment on components : Contains trace amounts of Polycyclic aromatic hydrocarbons, some of which are suspected carcinogens.



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Suncor BHB

SECTION 3. HAZARDS IDENTIFICATION

Emergency Overview

Hazard Summary : Highly flammable. Product may contain Hydrogen Sulfide.

Potential Health Effects

Eyes : May cause eye irritation.
Liquid may cause severe irritation, reddening and swelling.

Skin : Prolonged or repeated contact may cause dermatitis, reddening of skin and a chapped appearance.
May cause irritation, drying and blistering.

Inhalation : Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
High concentration of vapours may induce unconsciousness.
May cause respiratory tract irritation.
Symptoms of hydrogen sulfide overexposure include respiratory tract irritation and shortness of breath.
In high doses hydrogen sulfide may produce pulmonary edema and respiratory depression or paralysis.
Exposure to very high levels of hydrogen sulfide (> 500 ppm) will result in unconsciousness and death.

Ingestion : May cause burning sensation in mouth, throat and stomach; vomiting and diarrhea, drowsiness.
Small amounts of liquid drawn into the lungs from swallowing or vomiting may cause fluid build up in the lungs or inflammation of the bronchi.

Chronic Exposure : Chronic exposure causes drying effect on the skin and eczema.
May damage the nervous system characterized by chronic headache, dizziness, fatigue, impaired sense of balance, and loss of memory.
May cause kidney damage and enlargement of the liver.
Chronic exposure to benzene may result in increased risk of leukemia and other blood disorders.

Primary Routes of Entry : Inhalation
Eye contact
Skin Absorption
Skin contact
Ingestion

Target Organs : Respiratory system
Central nervous system

Carcinogenic Effects : Benzene is an animal carcinogen and is known to produce

**Material Safety Data Sheet****Suncor BHB**

acute myelogenous leukemia in humans.

SECTION 4. FIRST AID MEASURES

- General advice : Consult physician and/or Poison Control Centre for all exposures except minor instances of inhalation or skin contact.
- Eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Seek medical advice.
- Skin contact : Take off all contaminated clothing immediately.
Wash off with soap and water.
For large exposures use a deluge shower.
- Inhalation : Move to fresh air.
Artificial respiration and/or oxygen may be necessary.
Seek medical advice.
- Ingestion : Do NOT induce vomiting.
If vomiting occurs have victim lean forward to reduce the risk of aspiration.
Seek medical advice.

SECTION 5. FIRE-FIGHTING MEASURES

- Flash point : Estimated-30 - -20 °C (-22 - -4 °F)
Test type: closed cup
Method: ASTM D 93
- Lower explosion limit : Note: no data available
- Flammability in Presence of : Flammable material will readily ignite at normal temperatures.
Risk of fire or explosion exists if static charge accumulates during transfer or flow of product.
Increased risk of flammable or explosive concentrations if hydrogen sulfide builds up in unventilated spaces.
- Explosibility in Presence of : Explosive in the form of a vapor when exposed to heat or flame.
- Products of Combustion : carbon monoxide, Carbon dioxide (CO₂), sulfur dioxide, Polycyclic Aromatic Hydrocarbons

Fire fighting information

- Suitable extinguishing media : Carbon dioxide (CO₂), Foam, Dry chemical
- Special protective equipment for fire-fighters : Wear a positive-pressure supplied-air respirator with full facepiece.
Wear structural fire fighters protective clothing.

**Material Safety Data Sheet****Suncor BHB****SECTION 6. ACCIDENTAL RELEASE MEASURES**

- Personal precautions : Wear proper protective equipment as specified in the protective equipment section.
- Environmental precautions : Do not flush into surface water or sanitary sewer system. Comply with all applicable Federal and Provincial regulations or guidelines.
- Methods for cleaning up : Ensure adequate ventilation.
Wear proper protective equipment as specified in the protective equipment section.
Remove all sources of ignition.
Turn off source, if possible.
Soak up with inert absorbent material.
Keep in suitable, closed containers for disposal.

SECTION 7. HANDLING AND STORAGE**Handling Precautions**

- Handling : Keep away from open flames, hot surfaces and sources of ignition.
Prevent the creation of flammable or explosive concentrations of vapour in air and avoid vapour concentration higher than the occupational exposure limits.
When transferring from one container to another apply earthing measures and use conductive hose material.
Dangerous concentrations of hydrogen sulfide may be present in the headspaces of storage tanks, vessels and bulk transport tanks which contain or may have contained sour product.

Storage

- Advice on mixed storage : Store in a cool, well ventilated area away from incompatible materials.
Storage tank should be vented to atmosphere.
To avoid ignition of vapours by static electricity discharge, all metal parts of the equipment must be grounded.
A containment dike should be built around tank.
Small quantities should be stored in an approved safety solvent container.
Store container in a fire-resistant grounded cabinet vented to the atmosphere.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

- Engineering measures : Adequate ventilation to ensure that Occupational Exposure Limits are not exceeded.



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Suncor BHB

Eye protection	:	Chemical resistant goggles must be worn. Wear face-shield if splashing hazard is likely.
Hand protection	:	Wear suitable gloves. The following materials are acceptable: Nitrile rubber Neoprene
Skin and body protection	:	Wear as appropriate: Long sleeved clothing A neoprene or nitrile rain suit may be needed in certain situations. (e.g., vessel cleaning).
Respiratory protection	:	Concentration in air determines protection needed. Half-mask air purifying respirator with organic vapor/dust cartridges is acceptable to 10 times the exposure limit. Full-face air purifying respirator with organic vapor cartridges is acceptable to 50 times the exposure limit. A positive pressure self-contained or air supplied breathing apparatus should be worn in areas with insufficient oxygen or if the presence or release of H ₂ S is possible.
Hygiene measures	:	Wash hands and face before breaks and immediately after handling the product.

Legislated occupational threshold limits

HYDROGEN SULPHIDE	7783-06-4	CAD AB OEL	TWA	10 ppm	14 mg/m ³
		CAD AB OEL	CEILING	15 ppm	21 mg/m ³
		CAD ON OEL	TWA	10 ppm	14 mg/m ³
		CAD ON OEL	STEL	15 ppm	21 mg/m ³
		ACGIH	TWA	10 ppm	
		ACGIH	STEL	15 ppm	
		ACGIH NIC	TWA	1 ppm	
		ACGIH NIC	STEL	5 ppm	
		NIOSH	Ceil_Time	10 ppm	15 mg/m ³
		OSHA Z2	Ceiling	20 ppm	
		OSHA Z2	MAX. CONC	50 ppm	
		CAD AB OEL	TWA	10 mg/m ³	
		CAD AB OEL	TWA	1 ppm	3.2 mg/m ³
		CAD AB OEL	STEL	5 ppm	16 mg/m ³
		CAD ON OEL	TWA	0.5 ppm	
		CAD ON OEL	STEL	2.5 ppm	
Sulphur based on mass/mass BENZENE	7704-34-9 71-43-2	ACGIH	TWA	0.5 ppm	
		ACGIH	STEL	2.5 ppm	
		NIOSH	REL	0.1 ppm	
		NIOSH	STEL	1 ppm	
		OSHA Z2	TWA	10 ppm	
		OSHA Z2	Ceiling	25 ppm	
		OSHA Z2	MAX. CONC	50 ppm	
		OSHA	TWA	1 ppm	
		OSHA	STEL	5 ppm	
		OSHA	OSHA_ACT	0.5 ppm	
		OEL (QUE)	TWA	1 ppm	3 mg/m ³



Material Safety Data Sheet

Suncor BHB

		Remarks	Exposure must be minimized.	
		OEL (QUE) Remarks	STEL	5 ppm 15.5 mg/m3
XYLENE	1330-20-7	CAD AB OEL	TWA	100 ppm 434 mg/m3
		CAD AB OEL	STEL	150 ppm 651 mg/m3
		CAD ON OEL	TWA	100 ppm 435 mg/m3
		CAD ON OEL	STEL	150 ppm 650 mg/m3
		ACGIH	TWA	100 ppm
		ACGIH	STEL	150 ppm
		OSHA Z1	PEL	100 ppm 435 mg/m3
		NIOSH	REL	100 ppm 435 mg/m3
		NIOSH	STEL	150 ppm 655 mg/m3
		NIOSH	REL	100 ppm 435 mg/m3
		NIOSH	STEL	150 ppm 655 mg/m3
		NIOSH	REL	100 ppm 435 mg/m3
		NIOSH	STEL	150 ppm 655 mg/m3

Note: State/Provincial, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local authorities for further information.

Other information

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Colour	: black
Odour	: hydrocarbon-like
Physical state	: liquid
Vapour pressure	: Estimated 11.8 kPa Method: ASTM D 323A
Density	: 0.915 - 0.925 g/cm3
Specific gravity	: 0.915 - 0.925
Water solubility	: insoluble
Partition coefficient: n-octanol/water	: POW: Estimated < 1
Viscosity, kinematic	: Estimated 63.5 mm2/s at 40 °C (104 °F) Estimated 268.5 mm2/s at 15.5 °C (59.9 °F) Method: ASTM D 445

SECTION 10. STABILITY AND REACTIVITY

Conditions to avoid	: Heat, flames and sparks.
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Material Safety Data Sheet

Suncor BHB

- Materials to avoid : Incompatible with oxidizing agents.
- Hazardous decomposition products : Carbon monoxide
carbon dioxide
polycyclic aromatic hydrocarbons
hydrogen sulfide
sulfur dioxide
- Hazardous reactions : Hazardous polymerization does not occur.
Note: Stable under normal conditions.

SECTION 11. TOXICOLOGICAL INFORMATION

- Acute oral toxicity : LD 50 Rat(Female)
Dose: > 2,000 mg/kg
Method: OECD Test Guideline 425
Test substance: naphtha
- Acute dermal toxicity : LD 50 Rabbit (Female, Male)
Dose: > 2,000 mg/kg
Method: OECD Test Guideline 402
Test substance: naphtha
- Acute inhalation toxicity : LC 50 Rat (Female, Male)
Exposure time: 4 h
Dose: Approximate 5.1 mg/l
Method: OECD Test Guideline 403
Test substance: naphtha
- Skin irritation : rabbit
Result: Mild skin irritation
Method: OECD Test Guideline 404
Exposure time: 4 h
Test substance: Bitumen
- Eye irritation : rabbit
Result: slight irritation
Method: OECD Test Guideline 405
Test substance: Bitumen

SECTION 12. ECOLOGICAL INFORMATION

- Acute and prolonged toxicity to fish : No Observed Effect Concentration NOEC
Species: Oncorhynchus mykiss (rainbow trout)
Dose: 1.24 mg/l
Test substance: naphtha
Method: OECD Test Guideline 203
Remarks: Not toxic to rainbow trout
- LC 50
Species: Oncorhynchus mykiss (rainbow trout)



Material Safety Data Sheet

Suncor BHB

Dose: 1.24 mg/l
 Exposure time: 96 h
 Test substance: naphtha
 Method: OECD Test Guideline 203
 Remarks: Not toxic to rainbow trout

Acute toxicity to aquatic invertebrates

: Immobilization EC 50
 Species: Water flea (Daphnia magna)
 Dose: Estimated 2.89 mg/l
 Exposure time: 48 h
 Test substance: naphtha
 Method: OECD Test Guideline 202
 Remarks:
 Based on mean measured concentration

Lowest Observed Effect Concentration LOEC
 Species: Water flea (Daphnia magna)
 Dose: Estimated 7.95 mg/l
 Test substance: naphtha
 Method: OECD Test Guideline 202
 Remarks:
 Based on mean measured concentration

No Observed Effect Concentration NOEC
 Species: Water flea (Daphnia magna)
 Dose: Estimated 0.69 mg/l
 Test substance: naphtha
 Method: OECD Test Guideline 202
 Remarks:
 Based on mean measured concentration

Additional ecological information

: no data available

SECTION 13. DISPOSAL CONSIDERATIONS

Advice on disposal

: Comply with all applicable Federal and Provincial regulations or guidelines.

SECTION 14. TRANSPORT INFORMATION

DOT	Proper shipping name	: <u>Flammable liquid, n.o.s.</u>
	UN-Number	: 1993
	Class	: 3
	Packing group	: II
TDG	Proper shipping name	: Flammable liquid, n.o.s.
	UN-Number	: 1993
	Class	: 3
	Packing group	: II



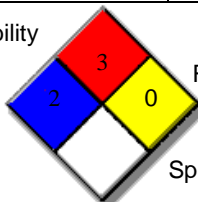
Material Safety Data Sheet

Suncor BHB

IATA UN Number : 1993
 Description of the goods : Flammable liquid, n.o.s.
 Class : 3
 Packaging group : II
 ADR/RID-Labels : 3
 Packing instruction (cargo aircraft) : 307
 Packing instruction (passenger aircraft) : 305
 Packing instruction (passenger aircraft) : Y305

IMDG Substance No. : UN 1993
 Description of the goods : Flammable liquid, n.o.s.
 Class : 3
 Packaging group : II
 ADR/RID-Labels : 3
 EmS Number : F-E

SECTION 15. REGULATORY INFORMATION

HMIS Hazard Class	
Health	2
Flammability	3
Physical Hazard	0
Personal Protective Equipment	Splash Goggles, Gloves, Apron, Dust and Vapor Respirator
NFPA Hazard Rating	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> Flammability Health </div>  <div style="margin-left: 10px;"> Reactivity Special </div> </div>

WHMIS Classification : B2 - Flammable Liquid, D1A - Materials causing immediate and serious toxic effects, Very Toxic Material, D2A - Materials Causing Other Toxic Effects, Very Toxic Material, D2B - Materials Causing Other Toxic Effects, Toxic Material

WHMIS (Pictograms)



TSCA Status

: Listed on TSCA
 HYDROGEN SULPHIDE 7783-06-4
 sec-Butyl Mercaptan 513-53-1
 1-Propanethiol 107-03-9

**Material Safety Data Sheet****Suncor BHB**

ETHANETHIOL	75-08-1
Isopropyl Mercaptan	75-33-2
Butyl Mercaptan	109-79-5
METHANETHIOL	74-93-1
Sulphur based on mass/mass	7704-34-9

DSL Status : All components of this product are on the Canadian DSL list.

SECTION 16. OTHER INFORMATION

Date Validated : 05/27/2010

References : Maxxam Analytics Inc. analysis, 2002
Hazelton Wisconsin, Primary Dermal Irritation/Corrosion Study of Bitumen in Rabbits (OECD Guidelines), January 22, 1991
Hazelton Wisconsin, Primary Eye Irritation/Corrosion Study of Bitumen in Rabbits (OECD Guidelines), January 22, 1991

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**Shell Canada Limited**
Material Safety Data Sheet

Effective Date: 2010-07-29

Supersedes: 2007-07-09



Class B2 Flammable Liquid



Class D2B Skin Irritation



Class D2A Embryo/Fetotoxicity

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT: **SEAL HEAVY CRUDE OIL**

SYNONYMS: Crude oil is a naturally occurring mixture of paraffins, naphthenes, aromatic hydrocarbons, small amounts of sulphur and nitrogen compounds.

PRODUCT USE: Base product for Petroleum Refining.

PRODUCT CODE: **9500-145**

SUPPLIER

Shell Canada Limited (SCL)
P.O. Box 100, Station M
400-4th Ave. S.W.
Calgary, AB Canada
T2P 2H5

TELEPHONE NUMBERS

Shell Emergency Number
CANUTEC 24 HOUR EMERGENCY NUMBER
For general information:

1-800-661-7378
1-613-996-6666
1-800-661-1600
www.shell.ca

This MSDS was prepared by the Toxicology and Product Stewardship Section of Shell Canada Limited.

*An asterisk in the product name designates a trade-mark of Shell Brands International AG. Used under license.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Component Name	CAS Number	% Range	WHMIS Controlled
Petroleum - Crude Oil	8002-05-9	100	Yes
Xylene (Mixed Isomers)	1330-20-7	0.1 - 1.0	Yes
Hydrogen Sulfide (H ₂ S)	7783-06-4	< 10 ppm	Yes

See Section 8 for Occupational Exposure Guidelines.

3. HAZARDS IDENTIFICATION

Physical Description: Viscous Liquid Dark Brown Mild Hydrocarbon Odour

Routes of Exposure: Exposure may occur via inhalation, ingestion, skin absorption and skin or eye contact.

Hazards:

Flammable Liquid.
Irritating to skin.
Contains xylene, which may affect fetal development.

SEAL HEAVY CRUDE OIL

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Handling: Eliminate all ignition sources.
Bond and ground transfer containers and equipment to avoid static accumulation.
Empty containers are hazardous, may contain flammable / explosive dusts, liquid residue or vapours. Keep away from sparks and open flames.
Avoid prolonged exposure to vapours.
Wear suitable gloves and eye protection.

For further information on health effects, see Section 11.

4. FIRST AID MEASURES

Eyes: Flush eyes with water for at least 15 minutes while holding eyelids open. If irritation occurs and persists, obtain medical attention.

Skin: Wipe excess from skin. Wash contaminated skin with mild soap and water for at least 15 minutes. If irritation occurs and persists, obtain medical attention.

Ingestion: Do not induce vomiting; get medical help immediately. Guard against aspiration into lungs by having the individual turn on to their left side. If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into the lungs. Do not give anything by mouth to an unconscious person.

Inhalation: Remove victim from further exposure and restore breathing, if required. Obtain medical attention.

Notes to Physician: The main hazard following accidental ingestion is aspiration of the liquid into the lungs producing chemical pneumonitis.

5. FIRE FIGHTING MEASURES

Extinguishing Media: Dry Chemical
Carbon Dioxide
Foam
Water Fog

Firefighting Instructions: Flammable. Avoid inhalation of smoke. Do not enter confined fire space without adequate protective clothing and an approved positive pressure self-contained breathing apparatus. Vapour forms a flammable/explosive mixture with air between upper and lower flammable limits. Vapours may travel along ground and flashback along vapour trail may occur. Product will float and can be reignited on surface of water. Do not use a direct stream of water as it may spread fire. Containers exposed to intense heat may rupture. Use water to cool fire exposed containers. Delayed lung damage can be experienced after exposure to combustion products, sometimes hours after the exposure.

Hazardous Combustion Products: A complex mixture of airborne solid, liquid, particulates and gases will evolve when this material undergoes pyrolysis or combustion. Carbon dioxide, carbon monoxide and unidentified organic compounds may be formed upon combustion.

6. ACCIDENTAL RELEASE MEASURES

Issue warning "Flammable". Isolate hazard area and restrict access. Wear appropriate breathing apparatus (if applicable) and protective clothing. Eliminate all ignition sources. Handling equipment must be grounded. Avoid direct contact with material. Stop leak only if safe to do so. Dike and contain land spills; contain spills

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to water by booming. Work upwind of spill if it is safe to do so. Adsorb residue or small spills with adsorbent material and remove to non-leaking containers for disposal. Use water fog to knock down vapours; contain runoff. Notify appropriate environmental agency(ies). After area has been cleaned up to the satisfaction of regulatory authorities, flush area with water to remove trace residue. Dispose of recovered material as noted under Disposal Considerations.

7. HANDLING AND STORAGE

- Handling:** Flammable. Avoid excessive heat, sparks, open flames and all other sources of ignition. Fixed equipment as well as transfer containers and equipment should be grounded to prevent accumulation of static charge. Vapours may accumulate and travel to distant ignition sources and flashback. Vapours are heavier than air and will settle and collect in low areas and pits, displacing breathing air. Empty containers are hazardous, may contain flammable/explosive dusts, residues or vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers. Do not pressurize drum containers to empty them. Wash with soap and water prior to eating, drinking, smoking, applying cosmetics or using toilet facilities. Launder contaminated clothing prior to reuse. Use good personal hygiene.
- Storage:** Store in a cool, dry, well ventilated area, away from heat and ignition sources. Keep container tightly closed.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

The following information, while appropriate for this product, is general in nature. The selection of personal protective equipment will vary depending on the conditions of use.

OCCUPATIONAL EXPOSURE LIMITS (Current ACGIH TLV/TWA unless otherwise noted):

The exposure limits listed here are provided for guidance only. Consult local, provincial and territorial authorities for specific values.

Hydrogen Sulfide: 1 ppm (STEL: 5 ppm)

Xylene: 100 ppm (STEL: 150 ppm)

- Mechanical Ventilation:** Use explosion-proof ventilation as required to control vapour concentrations. Concentrations in air should be maintained below the occupational exposure limit if unprotected personnel are involved. Make up air should always be supplied to balance air exhausted (either generally or locally). For personnel entry into confined spaces (i.e. bulk storage tanks) a proper confined space entry procedure must be followed including ventilation and testing of tank atmosphere. Local ventilation recommended where general ventilation is ineffective in controlling airborne concentrations below the recommended occupational exposure limit.

PERSONAL PROTECTIVE EQUIPMENT:

- Eye Protection:** Chemical safety goggles and/or full face shield to protect eyes and face, if product is handled such that it could be splashed into eyes. Provide an eyewash station in the area.
- Skin Protection:** Impervious gloves (viton, nitrile) should be worn at all times when handling this material. In confined spaces or where the risk of skin exposure is much higher, impervious clothing should be worn. Safety showers should be available for emergency use.
- Respiratory Protection:** If exposure exceeds occupational exposure limits, use an appropriate NIOSH-approved respirator. Use a NIOSH-approved chemical cartridge respirator with organic vapour

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cartridges or use a NIOSH-approved supplied-air respirator. For high airborne concentrations, use a NIOSH-approved supplied-air respirator, either self-contained or airline breathing apparatus, operated in positive pressure mode.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Viscous Liquid
Appearance:	Dark Brown
Odour:	Mild Hydrocarbon Odour
Boiling Point:	> 25 - 600 °C
Density:	932 kg/m ³ @ 15 °C
Vapour Density (Air = 1):	Not available
Vapour Pressure (absolute):	Not available
pH:	Not available
Flash Point:	Not available
Lower Flammable Limit:	Not available
Upper Flammable Limit:	Not available
Autoignition Temperature:	Not available
Viscosity:	251 mm ² /s @ 15 °C
Evaporation Rate (n-BuAc = 1):	Not available
Partition Coefficient (log K_{OW}):	Not available
Water Solubility:	Insoluble
Other Solvents:	Hydrocarbon solvents (benzene, ether, chloroform)

10. STABILITY AND REACTIVITY

Chemically Stable:	Yes
Hazardous Polymerization:	No
Sensitive to Mechanical Impact:	No
Sensitive to Static Discharge:	Yes
Hazardous Decomposition Products:	Thermal decomposition products are highly dependent on combustion conditions.
Incompatible Materials:	Avoid strong oxidizing agents.
Conditions of Reactivity:	Avoid excessive heat, open flames and all ignition sources.

11. TOXICOLOGICAL INFORMATION

Ingredient (or Product if not specified)	Toxicological Data
Petroleum - Crude Oil	LD50 Oral Rat > 4300 mg/kg LD50 Dermal Rabbit > 2000 mg/kg
Xylene (Mixed Isomers)	LD50 Oral Rat = 4300 mg/kg LC50 Inhalation Rat = 6700 ppm for 4 hours LD50 Dermal Rabbit > 2000 mg/kg
Hydrogen Sulfide (H ₂ S)	LC50 Inhalation Mouse = 673 ppm for 1 hour LC50 Inhalation Rat = 444 ppm for 4 hours

Routes of Exposure: Exposure may occur via inhalation, ingestion, skin absorption and skin or eye contact.

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Irritancy:	Based on the ingredients, this product is expected to be irritating to skin.
Feto/Teratogenicity:	High exposures to xylene in some animal studies, often at levels toxic to the mother, have affected embryo/fetal development. Other animal and human studies have not shown this effect.
Pre-existing Conditions:	Pre-existing eye, skin and respiratory disorders may be aggravated by exposure to this product.
Carcinogenicity and Mutagenicity:	The International Agency for Research on Cancer (IARC) indicates that there is little evidence for the carcinogenicity in humans of crude oil. Various components of crude oil have been tested independently and have been shown to cause serious long-term effects.

12. ECOLOGICAL INFORMATION

Do not allow product or runoff from fire control to enter storm or sanitary sewers, lakes, rivers, streams, or public waterways. Block off drains and ditches. May cause physical fouling of aquatic and avian organisms.

Biodegradability: Not available.

Bioaccumulation: Not available.

Partition Coefficient (log K_{OW}): Not available

Ingredient:	Toxicological Data
Petroleum - Crude Oil	
Xylene (Mixed Isomers)	LL50 Rainbow Trout (96hr) 1 - 10 mg/L. EL50 Daphnia Magna (48hr) 1 - 10 mg/L.
Hydrogen Sulfide (H₂S)	LL50 Rainbow Trout (96hr) < 1 mg/L. EL50 Daphnia Magna (48hr) < 1 mg/L. EL50 - growth rate Algae (72hr) < 1 mg/L.

Definition(s): LL and EL are the lethal loading concentration and effective loading concentration respectively. The concentration represents the amount of substance added to the system to obtain a toxic concentration. They replace the traditional LC and EC for low solubility substances.

13. DISPOSAL CONSIDERATIONS

Waste management priorities (depending on volumes and concentration of waste) are: 1. recycle (reprocess), 2. energy recovery 3. incineration, 4. disposal at a licenced waste disposal facility. Do not attempt to combust waste on-site. Incinerate at a licenced waste disposal site with approval of environmental authority. Landfill adsorbed material in a government approved site.

14. TRANSPORT INFORMATION**Canadian Road and Rail Shipping Classification:**

UN Number	UN1267
Proper Shipping Name	PETROLEUM CRUDE OIL
Hazard Class	Class 3 Flammable Liquids
Packing Group	PG II
Additional Information	Classification as PG II determined in accordance with TDGR 2.19 (2) (b).
Shipping Description	PETROLEUM CRUDE OIL Class 3 UN1267 PG II

SEAL HEAVY CRUDE OIL

9500-145

Revision Number: 2

Classification as PG II determined in accordance with TDGR 2.19 (2) (b).

15. REGULATORY INFORMATION

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

WHMIS Class: Class B2 Flammable Liquid
Class D2B Skin Irritation
Class D2A Embryo/Fetotoxicity

DSL/NDSL Status: This product, or all components, are listed on the Domestic Substances List, as required under the Canadian Environmental Protection Act.

Other Regulatory Status: The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

16. OTHER INFORMATION**LABEL STATEMENTS**

Hazard Statement : Flammable Liquid.
Irritating to skin.
Contains xylene, which may affect fetal development.

Handling Statement: Eliminate all ignition sources.
Bond and ground transfer containers and equipment to avoid static accumulation.
Empty containers are hazardous, may contain flammable / explosive dusts, liquid residue or vapours. Keep away from sparks and open flames.
Avoid prolonged exposure to vapours.
Wear suitable gloves and eye protection.

First Aid Statement : Wash contaminated skin with soap and water.
Flush eyes with water.
If overcome by vapours remove to fresh air.
Do not induce vomiting.
Obtain medical attention.

Revisions: This MSDS has been reviewed and updated. Changes have been made to: Section 1 Section 3 Section 4 Section 5 Section 6 Section 7 Section 8 Section 10 Section 11 Section 15



Shell Canada Limited Material Safety Data Sheet

Effective Date: 2010-02-19

Supersedes: 2007-02-23



Class B2 Flammable Liquid

Class D2A Embryo/Fetotoxicity
Class D2A Carcinogenicity

Class D2B Skin Irritation

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT: **ALBIAN RESID BLEND**

SYNONYMS: ARB

Synthetic crude oil is a mixture of paraffins, naphthenes, aromatics and sulphur compounds

PRODUCT USE: Base product for Petroleum Refining.

PRODUCT CODE: **873-332**

SUPPLIER

Shell Canada Limited (SCL)

P.O. Box 100, Station M

400-4th Ave. S.W.

Calgary, AB Canada

T2P 2H5

TELEPHONE NUMBERS

Shell Emergency Number**CANUTEC 24 HOUR EMERGENCY NUMBER**

For general information:

1-800-661-7378

1-613-996-6666

1-800-661-1600

www.shell.ca

This MSDS was prepared by the Toxicology and Product Stewardship Section of Shell Canada Limited.

*An asterisk in the product name designates a trade-mark of Shell Brands International AG. Used under license.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Component Name	CAS Number	% Range	WHMIS Controlled
Residues (Petroleum), Vacuum	64741-56-6	35 - 45	Yes
Distillates (Petroleum), Hydrotreated Middle	64742-46-7	0 - 59	Yes
Naphtha (Petroleum), Hydrotreated Heavy	64742-48-9	0 - 33	Yes
Gas Oils (Petroleum), Hydrotreated Vacuum	64742-59-2	0 - 26	Yes
Naphtha (Petroleum), Hydrotreated Light	64742-49-0	0 - 19	Yes
Natural Gas Condensates	68919-39-1	0 - 10	Yes
n-Hexane	110-54-3	1 - 2	Yes
Toluene	108-88-3	< 1	Yes
Benzene	71-43-2	0.1 - 1	Yes
Xylene (Mixed Isomers)	1330-20-7	0.1 - 0.5 % (wt)	Yes

ALBIAN RESID BLEND

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Ethylbenzene	100-41-4	0.05 - 0.2	Yes
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Note: N-hexane, toluene, xylene, ethylbenzene and benzene are not introduced into the product as intentional additives. These chemicals may be contained in one or more of the blending components that make up the product.

See Section 8 for Occupational Exposure Guidelines.

3. HAZARDS IDENTIFICATION

Physical Description:	Viscous Liquid Dark Brown Hydrocarbon Odour
Routes of Exposure:	Exposure will most likely occur through skin contact or inhalation.
Hazards:	<p>Flammable Liquid.</p> <p>Contains xylene, which may affect fetal development.</p> <p>May cause cancer.</p> <p>Irritating to skin.</p> <p>Exposure to vapours may cause irritation of the eyes.</p> <p>Inhalation of oil mist or vapours from hot oil may cause irritation of the upper respiratory tract.</p>
Handling:	<p>Eliminate all ignition sources.</p> <p>Avoid inhalation of vapours.</p> <p>Wear suitable gloves and eye protection.</p> <p>Bond and ground transfer containers and equipment to avoid static accumulation.</p> <p>Empty containers are hazardous, may contain flammable / explosive dusts, liquid residue or vapours. Keep away from sparks and open flames.</p>

For further information on health effects, see Section 11.

4. FIRST AID MEASURES

Eyes:	Flush eyes with water for at least 15 minutes while holding eyelids open. If irritation occurs and persists, obtain medical attention.
Skin:	Wash contaminated skin with mild soap and water for at least 15 minutes. If irritation occurs and persists, obtain medical attention.
Ingestion:	Do not induce vomiting; get medical help immediately.
Inhalation:	Remove victim from further exposure and restore breathing, if required. Obtain medical attention.
Notes to Physician:	Treatment of exposure should be directed at the control of symptoms and the clinical condition.

5. FIRE FIGHTING MEASURES

Extinguishing Media:	<p>Dry Chemical</p> <p>Carbon Dioxide</p> <p>Foam</p> <p>Water Fog</p>
Firefighting Instructions:	Flammable. Clear area of unprotected personnel. Vapours may travel along ground and flashback along vapour trail may occur. Do not use a direct stream

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Hazardous Combustion Products:

of water as it may spread fire. Containers exposed to intense heat from fires should be cooled with water to prevent vapour pressure buildup, which could result in container rupture. Do not enter confined fire space without adequate protective clothing and an approved positive pressure self-contained breathing apparatus. Delayed lung damage can be experienced after exposure to combustion products, sometimes hours after the exposure. Fight fire from maximum distance.

A complex mixture of airborne solid, liquid, particulates and gases will evolve when this material undergoes pyrolysis or combustion. Carbon monoxide, carbon dioxide, oxides of nitrogen and oxides of sulphur may be formed on combustion.

6. ACCIDENTAL RELEASE MEASURES

Issue warning "Flammable". See Section 8 for advice on personal protective equipment. Eliminate all ignition sources. Isolate hazard area and restrict access. Stop leak only if safe to do so. Notify appropriate environmental agency(ies). Work upwind of spill if it is safe to do so. Dike and contain land spills; contain spills to water by booming. Do not wash spills into sewers or other public water systems. For large spills remove by mechanical means and place in containers. Adsorb residue or small spills with adsorbent material and remove to non-leaking containers for disposal. After area has been cleaned up to the satisfaction of regulatory authorities, flush area with water to remove trace residue. Dispose of recovered material as noted under Disposal Considerations.

7. HANDLING AND STORAGE

Handling: Flammable. Fixed equipment as well as transfer containers and equipment should be grounded to prevent accumulation of static charge. Avoid breathing vapours and prolonged or repeated contact with skin. Do not cut, drill, grind, weld or perform similar operations on or near containers. Empty containers are hazardous, may contain flammable/explosive dusts, residues or vapours. Launder contaminated clothing prior to reuse. Wash with soap and water prior to eating, drinking, smoking, applying cosmetics or using toilet facilities. Use good personal hygiene.

Storage: Tank storage should be done according to NFPA Code 30 for crude oils.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

The following information, while appropriate for this product, is general in nature. The selection of personal protective equipment will vary depending on the conditions of use.

OCCUPATIONAL EXPOSURE LIMITS (Current ACGIH TLV/TWA unless otherwise noted):

North American exposure limits have not been established for the product. Consult local and provincial authorities for acceptable values.

Xylene: 100 ppm (STEL: 150 ppm)

Polycyclic Aromatic Hydrocarbons (PAH): Shell Canada's internal guideline is 0.02 mg/m³ as an OEL (8-hour TWA).

Naphtha (Carbon range C3 to C11): Shell Canada's internal guideline is 900 mg/m³ total hydrocarbon as an OEL (8-hour TWA).

Petroleum Distillates (Carbon range C9 to C20): Shell Canada's internal guideline is 100 mg/m³ total hydrocarbon as an OEL (8-hour TWA).

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Benzene (skin) : 0.5 ppm (STEL: 2.5 ppm)

Benzene: Shell internal standard is 0.5 ppm or 1.6 mg/m³ (8-12 hour time-weighted average limit), 2.5 ppm or 8 mg/m³ (15-minute short term limit)

n-Hexane (skin): 50 ppm

Ethyl benzene: 100 ppm (STEL: 125 ppm)

Skin Notation: Absorption through skin, eyes and mucous membranes may contribute significantly to the total exposure.

Mechanical Ventilation: Use explosion-proof ventilation as required to control vapour concentrations. Concentrations in air should be maintained below the occupational exposure limit if unprotected personnel are involved. Make up air should always be supplied to balance air exhausted (either generally or locally). Local ventilation recommended where general ventilation is ineffective in controlling airborne concentrations below the recommended occupational exposure limit. For personnel entry into confined spaces (i.e. bulk storage tanks) a proper confined space entry procedure must be followed including ventilation and testing of tank atmosphere.

PERSONAL PROTECTIVE EQUIPMENT:

Eye Protection: Chemical safety goggles and/or full face shield to protect eyes and face, if product is handled such that it could be splashed into eyes.

Skin Protection: Avoid contact with skin. Impervious gloves should be worn at all times when handling this product. Impervious clothing (apron, coveralls) should also be worn in confined workspaces or where the risk of skin exposure is much higher. Use protective clothing and gloves manufactured from nitrile.

Respiratory Protection: Avoid breathing vapour or mists. If exposure exceeds occupational exposure limits, use an appropriate NIOSH-approved respirator. Depending on airborne concentration, use either a NIOSH-approved chemical cartridge respirator with organic vapour cartridges in combination with a P95 particulate filter or use a NIOSH-approved supplied-air respirator, either self-contained or airline, operated in positive pressure mode.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Viscous Liquid
Appearance:	Dark Brown
Odour:	Hydrocarbon Odour
Odour Threshold:	Not available
Boiling Point:	0 - 930 °C
Density:	930 - 940 kg/m ³ @ 15 °C
Specific Gravity (Water = 1):	0.93 - 0.94
pH:	Not available
Flash Point:	< 0 °C
Lower Flammable Limit:	Not available
Upper Flammable Limit:	Not available
Autoignition Temperature:	Not available
Viscosity:	350 cSt @ pipeline reference temperature
Evaporation Rate (n-BuAc = 1):	Not available
Partition Coefficient (log K_{OW}):	Not available
Water Solubility:	Insoluble

ALBIAN RESID BLEND

873-332

Revision Number: 4

10. STABILITY AND REACTIVITY

Chemically Stable:	Yes
Hazardous Polymerization:	No
Sensitive to Mechanical Impact:	No
Sensitive to Static Discharge:	Yes
Hazardous Decomposition Products:	When heated to decomposition, may emit toxic and corrosive fumes of sulphur oxides, as well as CO, CO ₂ , uncombusted hydrocarbons and soot.
Incompatible Materials:	Avoid strong oxidizing agents.
Conditions of Reactivity:	Avoid excessive heat, formation of vapours or mists.

11. TOXICOLOGICAL INFORMATION

Ingredient (or Product if not specified)	Toxicological Data
Residues (Petroleum), Vacuum	
Distillates (Petroleum), Hydrotreated Middle	LD50 Dermal Rat > 2000 mg/kg LD50 Oral Rat > 5000 mg/kg
Naphtha (Petroleum), Hydrotreated Heavy	LD50 Oral Rat > 5000 mg/kg LD50 Dermal Rabbit > 3160 mg/kg
Gas Oils (Petroleum), Hydrotreated Vacuum	
Naphtha (Petroleum), Hydrotreated Light	LD50 Oral Rat > 5000 mg/kg LD50 Dermal Rabbit > 2000 mg/kg
Natural Gas Condensates	LD50 Oral Rat > 3000 mg/kg
n-Hexane	LD50 Oral Rat > 8 mL/kg LD50 Dermal Rat > 4 mL/kg LC50 Inhalation Rat = 54090 - 57000 ppm for 4 hours
Toluene	LD50 Oral Rat 5580 mg/kg LC50 Inhalation Rat 26700 ppm for 1 hour LD50 Dermal Rabbit 12400 mg/kg
Benzene	LD50 Oral Rat 690 - 3400 mg/kg LC50 Inhalation Rat 13700 ppm for 4 hours LD50 Dermal Rabbit > 8260 mg/kg
Xylene (Mixed Isomers)	LD50 Oral Rat = 4300 mg/kg LC50 Inhalation Rat = 6700 ppm for 4 hours LD50 Dermal Rabbit > 2000 mg/kg
Ethylbenzene	LD50 Oral Rat = 3500 mg/kg LC50 Inhalation Rat = 4000 ppm for 4 hours LD50 Dermal Rabbit = 17.8 mL/kg

Routes of Exposure:	Exposure will most likely occur through skin contact or inhalation.
Irritancy:	Based on the ingredients, this product is expected to be irritating to skin.
Chronic Effects:	Prolonged or repeated contact may cause various forms of dermatitis including folliculitis and oil acne. Long term intensive exposure to oil mist may cause benign lung fibrosis. Prolonged exposure to high vapour concentration can cause headache, dizziness, nausea, blurred vision and central nervous system depression. Peripheral neurotoxicity has been reported in connection with over exposure to n-hexane. Prolonged exposure over a period of weeks or months to levels well above the TLV may cause neurotoxic disease, with symptoms including

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	weakness and lack of sensation in hands and feet.
Feto/Teratogenicity:	High exposures to xylene in some animal studies, often at levels toxic to the mother, have affected embryo/fetal development. Other animal and human studies have not shown this effect.
Pre-existing Conditions:	Pre-existing skin disorders may be aggravated by exposure to components of this product.
Carcinogenicity and Mutagenicity:	Carcinogenic hazard. This product may contain a variety of polycyclic aromatic hydrocarbons (PAH), some of which are associated with the potential of inducing skin cancer. Increasing amounts of PAH may be released if this product is heated above 200 C. This product contains benzene. Repeated exposure to benzene concentrations greater than the recommended TLV/TWA may reduce the cellular components of peripheral blood and bone marrow. Epidemiological studies indicate that long term inhalation of benzene vapour can cause leukaemia in man. Benzene has also produced chromosomal aberrations in peripheral blood lymphocytes.

12. ECOLOGICAL INFORMATION

Environmental Effects:	The immediate effect of a release is the physical impairment of the environment from the coating of surfaces, resulting in the disruption of oxygen, water and light to flora and fauna. May cause physical fouling of aquatic and avian organisms. Prolonged exposure may result in the partitioning of light-end hydrocarbon fractions into the water and gas phases of the subsurface soil environment with potential to adversely affect soil and groundwater quality.
Biodegradability:	Not readily biodegradable.

13. DISPOSAL CONSIDERATIONS

Waste management priorities (depending on volumes and concentration of waste) are: 1. recycle (reprocess), 2. energy recovery 3. incineration, 4. disposal at a licenced waste disposal facility. Do not attempt to combust waste on-site. Incinerate at a licenced waste disposal site with approval of environmental authority. Landfill adsorbed material in a government approved site.

14. TRANSPORT INFORMATION**Canadian Road and Rail Shipping Classification:**

UN Number	UN1268
Proper Shipping Name	PETROLEUM DISTILLATES, N.O.S.
Hazard Class	Class 3 Flammable Liquids
Packing Group	PG I
Shipping Description	PETROLEUM DISTILLATES, N.O.S. Class 3 UN1268 PG I

15. REGULATORY INFORMATION

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

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WHMIS Class:	Class B2 Flammable Liquid Class D2A Embryo/Fetotoxicity Class D2A Carcinogenicity Class D2B Skin Irritation
DSL/NDL Status:	This product, or all components, are listed on the Domestic Substances List, as required under the Canadian Environmental Protection Act.
Other Regulatory Status:	No Canadian federal standards. Provincial criteria are likely and should be requested when notifying provincial authorities. For purposes of TSCA, the product is a mixture of certain blending components, all of which are on the TSCA Inventory. Individual shipments of this product will not necessarily contain all of the blending components listed in Section 2 above.

16. OTHER INFORMATION

LABEL STATEMENTS

Hazard Statement :	Flammable Liquid. Contains xylene, which may affect fetal development. May cause cancer. Irritating to skin.
Handling Statement:	Eliminate all ignition sources. Avoid inhalation of vapours. Wear suitable gloves and eye protection. Bond and ground transfer containers and equipment to avoid static accumulation. Empty containers are hazardous, may contain flammable / explosive dusts, liquid residue or vapours. Keep away from sparks and open flames.
First Aid Statement :	Wash contaminated skin with soap and water. Flush eyes with water. If overcome by vapours remove to fresh air. Do not induce vomiting. Obtain medical attention.
Revisions:	This MSDS has been reviewed and updated. Changes have been made to: Section 2 Section 8 Section 9 Section 11 Section 12 Section 14



Shell Canada Limited Material Safety Data Sheet

Effective Date: 2011-02-16

Supersedes: None



Class B2 Flammable Liquid

Class D2A Embryo/Fetotoxicity
Class D2A CarcinogenicityClass D2A Mutagenicity
Class D2B Skin Irritation

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT: **ALBIAN MUSKEG RIVER HEAVY (AMH)**
SYNONYMS: AMH
 Synthetic crude oil is a mixture of paraffins, naphthenes, aromatics and sulphur compounds
PRODUCT USE: Base product for Petroleum Refining.
PRODUCT CODE: **9700-140**

SUPPLIER

Shell Canada Limited (SCL)
 P.O. Box 100, Station M
 400-4th Ave. S.W.
 Calgary, AB Canada
 T2P 2H5

TELEPHONE NUMBERS

Shell Emergency Number

CANUTEC 24 HOUR EMERGENCY NUMBER

For general information:

1-800-661-7378

1-613-996-6666

1-800-661-1600

www.shell.ca

This MSDS was prepared by the Toxicology and Product Stewardship Section of Shell Canada Limited.

*An asterisk in the product name designates a trade-mark of Shell Brands International AG. Used under license.

2. HAZARDS IDENTIFICATION

Physical Description: Viscous Liquid Dark Brown Hydrocarbon Odour

Routes of Exposure: Exposure will most likely occur through skin contact or inhalation.

Hazards:

Flammable Liquid.

Irritating to skin.

A component in this product has been classified by IARC as carcinogenic to humans (Group 1).

May affect fetal development.

This product contains a component that has produced mutagenic effects.

May be irritating to eyes.

Inhalation of oil mist or vapours from hot oil may cause irritation of the upper respiratory tract.

Handling:

Eliminate all ignition sources.

Avoid inhalation of vapours.

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Wear suitable gloves and eye protection.
Bond and ground transfer containers and equipment to avoid static accumulation.
Empty containers are hazardous, may contain flammable / explosive dusts, liquid residue or vapours. Keep away from sparks and open flames.

For further information on health effects, see Section 11.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component Name	CAS Number	% Range	WHMIS Controlled
Residues (Petroleum), Vacuum	64741-56-6	35 - 50	Yes
Distillates (petroleum), petroleum residues vacuum	68955-27-1	10 - 30	Yes
Natural Gas Condensates (C2 to C20)	64741-47-5	0 - 30	Yes
Naphtha (Petroleum), Hydrotreated Light	64742-49-0	0 - 30	Yes
Distillates (Petroleum), Straight-run Middle	64741-44-2	7 - 15	Yes
Naphtha (petroleum), heavy straight-run	64741-41-9	0 - 5	Yes
Naphtha, heavy hydrocracked	64741-78-2	0 - 5	Yes
Toluene	108-88-3	0 - 3	Yes
n-Hexane	110-54-3	< 1	Yes
Benzene	71-43-2	0.1 - 1	Yes
Xylene (Mixed Isomers)	1330-20-7	0.1 - 0.5 % (wt)	Yes
Ethylbenzene	100-41-4	0.05 - 0.5	Yes

Note: N-hexane, toluene, xylene, ethylbenzene and benzene are not introduced into the product as intentional additives. These chemicals may be contained in one or more of the blending components that make up the product.

See Section 8 for Occupational Exposure Guidelines.

4. FIRST AID MEASURES

Eyes:	Flush eyes with water for at least 15 minutes while holding eyelids open. If irritation occurs and persists, obtain medical attention.
Skin:	Wash contaminated skin with mild soap and water for at least 15 minutes. If irritation occurs and persists, obtain medical attention.
Ingestion:	Do not induce vomiting; get medical help immediately. Guard against aspiration into lungs by having the individual turn on to their left side. If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into the lungs. Do not give anything by mouth to an unconscious person.
Inhalation:	Remove victim from further exposure and restore breathing, if required. Obtain medical attention.
Notes to Physician:	The main hazard following accidental ingestion is aspiration of the liquid into the lungs producing chemical pneumonitis.

5. FIRE FIGHTING MEASURES

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Extinguishing Media:	Dry Chemical Carbon Dioxide Foam Water Fog
Firefighting Instructions:	Flammable. Clear area of unprotected personnel. Vapours may travel along ground and flashback along vapour trail may occur. Do not use a direct stream of water as it may spread fire. Containers exposed to intense heat from fires should be cooled with water to prevent vapour pressure buildup, which could result in container rupture. Do not enter confined fire space without adequate protective clothing and an approved positive pressure self-contained breathing apparatus. Delayed lung damage can be experienced after exposure to combustion products, sometimes hours after the exposure. Fight fire from maximum distance.
Hazardous Combustion Products:	A complex mixture of airborne solid, liquid, particulates and gases will evolve when this material undergoes pyrolysis or combustion. Carbon monoxide, carbon dioxide, oxides of nitrogen and oxides of sulphur may be formed on combustion.

6. ACCIDENTAL RELEASE MEASURES

Issue warning "Flammable". See Section 8 for advice on personal protective equipment. Eliminate all ignition sources. Isolate hazard area and restrict access. Stop leak only if safe to do so. Notify appropriate environmental agency(ies). Work upwind of spill if it is safe to do so. Dike and contain land spills; contain spills to water by booming. Do not wash spills into sewers or other public water systems. For large spills remove by mechanical means and place in containers. Adsorb residue or small spills with adsorbent material and remove to non-leaking containers for disposal. After area has been cleaned up to the satisfaction of regulatory authorities, flush area with water to remove trace residue. Dispose of recovered material as noted under Disposal Considerations.

7. HANDLING AND STORAGE

Handling: Flammable. Fixed equipment as well as transfer containers and equipment should be grounded to prevent accumulation of static charge. Avoid breathing vapours and prolonged or repeated contact with skin. Do not cut, drill, grind, weld or perform similar operations on or near containers. Empty containers are hazardous, may contain flammable/explosive dusts, residues or vapours. Launder contaminated clothing prior to reuse. Wash with soap and water prior to eating, drinking, smoking, applying cosmetics or using toilet facilities. Use good personal hygiene.

Storage: Tank storage should be done according to NFPA Code 30 for crude oils.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

The following information, while appropriate for this product, is general in nature. The selection of personal protective equipment will vary depending on the conditions of use.

OCCUPATIONAL EXPOSURE LIMITS (Current ACGIH TLV/TWA unless otherwise noted):

The exposure limits listed here are provided for guidance only. Consult local, provincial and territorial authorities for specific values.

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Xylene: 100 ppm (STEL: 150 ppm)

Gasoline: 300 ppm (STEL: 500 ppm)

Diesel fuel, as total hydrocarbons (skin): 100 mg/m³

Benzene (skin) : 0.5 ppm (STEL: 2.5 ppm)

Benzene: Shell internal standard is 0.5 ppm or 1.6 mg/m³ (8-12 hour time-weighted average limit), 2.5 ppm or 8 mg/m³ (15-minute short term limit)

Ethyl benzene: 100 ppm (STEL: 125 ppm)

Skin Notation: Absorption through skin, eyes and mucous membranes may contribute significantly to the total exposure.

Mechanical

Use explosion-proof ventilation as required to control vapour concentrations.

Ventilation:

Concentrations in air should be maintained below the occupational exposure limit if unprotected personnel are involved. Make up air should always be supplied to balance air exhausted (either generally or locally). Local ventilation recommended where general ventilation is ineffective in controlling airborne concentrations below the recommended occupational exposure limit. For personnel entry into confined spaces (i.e. bulk storage tanks) a proper confined space entry procedure must be followed including ventilation and testing of tank atmosphere.

PERSONAL PROTECTIVE EQUIPMENT:**Eye Protection:**

Chemical safety goggles and/or full face shield to protect eyes and face, if product is handled such that it could be splashed into eyes.

Skin Protection:

Avoid contact with skin. Impervious gloves (viton, nitrile) should be worn at all times when handling this material. In confined spaces or where the risk of skin exposure is much higher, impervious clothing should be worn. Use protective clothing and gloves manufactured from nitrile.

Respiratory Protection:

Avoid breathing vapour or mists. If exposure exceeds occupational exposure limits, use an appropriate NIOSH-approved respirator. Depending on airborne concentration, use either a NIOSH-approved chemical cartridge respirator with organic vapour cartridges in combination with a P95 particulate filter or use a NIOSH-approved supplied-air respirator, either self-contained or airline, operated in positive pressure mode.

9. PHYSICAL AND CHEMICAL PROPERTIES**Physical State:**

Viscous Liquid

Appearance:

Dark Brown

Odour:

Hydrocarbon Odour

Odour Threshold:

Not available

Boiling Point:

35 - 930 °C

Density:910 - 930 kg/m³ @ 15 °C**Specific Gravity (Water = 1):**

0.91 - 0.93

pH:

Not available

Flash Point:

PMCC 26 °C

Lower Flammable Limit:

Not available

Upper Flammable Limit:

Not available

Autoignition Temperature:

Not available

Viscosity:350 mm²/s @ pipeline reference temperature**Evaporation Rate (n-BuAc = 1):**

Not available

Partition Coefficient (log K_{OW}):

Not available

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Water Solubility: Insoluble**10. STABILITY AND REACTIVITY**

Chemically Stable:	Yes
Hazardous Polymerization:	No
Sensitive to Mechanical Impact:	No
Sensitive to Static Discharge:	Yes
Hazardous Decomposition Products:	When heated to decomposition, may emit toxic and corrosive fumes of sulphur oxides, as well as CO, CO ₂ , uncombusted hydrocarbons and soot.
Incompatible Materials:	Avoid strong oxidizing agents.
Conditions of Reactivity:	Avoid excessive heat, formation of vapours or mists.

11. TOXICOLOGICAL INFORMATION

Ingredient (or Product if not specified)	Toxicological Data
Residues (Petroleum), Vacuum	
Distillates (petroleum), petroleum residues vacuum	LD50 Oral Rat = 4320 mg/kg LD50 Dermal Rat > 2000 mg/kg LD50 Dermal Rabbit > 2000 mg/kg
Natural Gas Condensates (C2 to C20)	LC50 Inhalation Rat > 5200 mg/m ³ for 4hours LD50 Oral Rat = 14000 mg/kg LD50 Dermal Rabbit > 2000 mg/kg
Naphtha (Petroleum), Hydrotreated Light	LD50 Oral Rat > 5000 mg/kg LD50 Dermal Rabbit > 2000 mg/kg
Distillates (Petroleum), Straight-run Middle	LC50 Inhalation Rat 1700 mg/m ³ for 4hours
Naphtha (petroleum), heavy straight-run	LC50 Inhalation Rat > 5000 mg/m ³ for 4hours
Naphtha, heavy hydrocracked	LC50 Inhalation Rat > 5240 mg/m ³ for 4hours LD50 Oral Rat > 5000 mg/kg LD50 Dermal Rabbit > 2000 mg/kg
Toluene	LD50 Oral Rat 5580 mg/kg LC50 Inhalation Rat 26700 ppm for 1 hour LD50 Dermal Rabbit 12400 mg/kg
n-Hexane	LD50 Oral Rat > 8 mL/kg LD50 Dermal Rat > 4 mL/kg LC50 Inhalation Rat = 54090 - 57000 ppm for 4 hours
Benzene	LD50 Oral Rat 690 - 3400 mg/kg LC50 Inhalation Rat 13700 ppm for 4 hours LD50 Dermal Rabbit > 8260 mg/kg
Xylene (Mixed Isomers)	LD50 Oral Rat = 4300 mg/kg LC50 Inhalation Rat = 6700 ppm for 4 hours LD50 Dermal Rabbit > 2000 mg/kg
Ethylbenzene	LD50 Oral Rat = 3500 mg/kg LC50 Inhalation Rat = 4000 ppm for 4 hours LD50 Dermal Rabbit = 17.8 mL/kg

Routes of Exposure: Exposure will most likely occur through skin contact or inhalation.
Irritancy: Based on the ingredients, this product is expected to be irritating to skin.

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Chronic Effects:	Prolonged or repeated contact may cause various forms of dermatitis including folliculitis and oil acne.
Feto/Teratogenicity:	High exposures to xylene in some animal studies, often at levels toxic to the mother, have affected embryo/fetal development. Other animal and human studies have not shown this effect.
Pre-existing Conditions:	Pre-existing skin disorders may be aggravated by exposure to components of this product.
Carcinogenicity and Mutagenicity:	Carcinogenic hazard. This product may contain a variety of polycyclic aromatic hydrocarbons (PAH), some of which are associated with the potential of inducing skin cancer. Increasing amounts of PAH may be released if this product is heated above 200 C. A component of this product has produced mutagenic effects. This product contains benzene. Repeated exposure to benzene concentrations greater than the recommended TLV/TWA may reduce the cellular components of peripheral blood and bone marrow. Epidemiological studies indicate that long term inhalation of benzene vapour can cause leukaemia in man. Benzene has also produced chromosomal aberrations in peripheral blood lymphocytes. IARC has listed Ethylbenzene among those materials for which there is limited evidence for carcinogenicity in animals and inadequate evidence in humans. As a result, Ethylbenzene is classified by IARC as a possible human carcinogen (i.e. IARC 2b)

12. ECOLOGICAL INFORMATION

Environmental Effects:	The immediate effect of a release is the physical impairment of the environment from the coating of surfaces, resulting in the disruption of oxygen, water and light to flora and fauna. In the event of a release, the light fraction will vaporize and cause exposure via breathing and body contact. May cause physical fouling of aquatic and avian organisms. Prolonged exposure may result in the partitioning of light-end hydrocarbon fractions into the water and gas phases of the subsurface soil environment with potential to adversely affect soil and groundwater quality.
Biodegradability:	Not readily biodegradable.

13. DISPOSAL CONSIDERATIONS

Waste management priorities (depending on volumes and concentration of waste) are: 1. recycle (reprocess), 2. energy recovery 3. incineration, 4. disposal at a licenced waste disposal facility. Do not attempt to combust waste on-site. Incinerate at a licenced waste disposal site with approval of environmental authority. Landfill adsorbed material in a government approved site.

14. TRANSPORT INFORMATION**Canadian Road and Rail Shipping Classification:**

UN Number	UN1268
Proper Shipping Name	PETROLEUM DISTILLATES, N.O.S.
Hazard Class	Class 3 Flammable Liquids
Packing Group	PG II
Shipping Description	PETROLEUM DISTILLATES, N.O.S. Class 3 UN1268 PG II

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Revision Number: 1

15. REGULATORY INFORMATION

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

WHMIS Class:	Class B2 Flammable Liquid Class D2A Embryo/Fetotoxicity Class D2A Carcinogenicity Class D2A Mutagenicity Class D2B Skin Irritation
DSL/NDSL Status:	This product, or all components, are listed on the Domestic Substances List, as required under the Canadian Environmental Protection Act.
Other Regulatory Status:	The regulatory information is not intended to be comprehensive. Other regulations may apply to this material. For purposes of TSCA, the product is a mixture of certain blending components, all of which are on the TSCA inventory. Individual shipments of this product will not necessarily contain all of the blending components listed in Section 2 above.

16. OTHER INFORMATION**LABEL STATEMENTS**

Hazard Statement :	Flammable Liquid. Irritating to skin. A component in this product has been classified by IARC as carcinogenic to humans (Group 1). May affect fetal development.
Handling Statement:	This product contains a component that has produced mutagenic effects. Eliminate all ignition sources. Avoid inhalation of vapours. Wear suitable gloves and eye protection. Bond and ground transfer containers and equipment to avoid static accumulation. Empty containers are hazardous, may contain flammable / explosive dusts, liquid residue or vapours. Keep away from sparks and open flames.
First Aid Statement :	Wash contaminated skin with soap and water. Flush eyes with water. If overcome by vapours remove to fresh air. Do not induce vomiting. Obtain medical attention.
Revisions:	This is a new MSDS.