Syncrude
Securing Canada's Energy Future

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

PRODUCT: **Bitumen** **SAN 0469**

MANUFACTURER:

Syncrude Canada Ltd.
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Canada T9H 3L1
Emergency Telephone No. (780) 790-5094

SYNONYMS: Coker Feed, LC-Finer Feed, Vacuum Distillation Unit Feed,
Plant 7 Bitumen Product
Syncrude Sample Tag #'s: 071019, 072019, 221001, 371001

PRODUCT USE: Process stream extracted bitumen, coker feed.

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2. COMPOSITION, INFORMATION ON INGREDIENTS

CAS #: 8052-42-4

Topped heavy oil extracted from oilsand. Black or brownish, tar like texture. A complex combination of high molecular weight organic compounds with carbon numbers greater than C16, with high carbon-to hydrogen ratios. It also contains small amounts of various metals such as nickel, iron, and vanadium.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

A black or dark brown highly viscous liquid. Heated bitumen can cause severe skin burns and eye injury. Eye, skin, gastrointestinal, and respiratory tract irritation can occur. Poisonous hydrogen sulfide gas may accumulate in confined spaces.

ROUTE OF ENTRY: Skin contact, Eye contact, Inhalation, Ingestion

EFFECTS OF ACUTE EXPOSURE:
EYES: Hot bitumen and bitumen fumes may cause severe irritation and burns. Cold bitumen may cause slight irritation. Bitumen dust may cause irritation characterized by burning, redness, swelling and watering.

SKIN: Hot bitumen and bitumen fumes may cause moderate to severe irritation and burns. Cold bitumen may cause moderate irritation. Bitumen dust may cause irritation characterized by redness and occasional drying and peeling.

INGESTION: Irritation of gastrointestinal tract, vomiting and a danger of aspiration. Aspiration can develop into potentially fatal chemical pneumonitis.

INHALATION: Bitumen fumes may cause moderate to severe irritation of the nose, throat and respiratory tract. May cause headache, nausea, sore throat, nasal congestion, dizziness and nervousness. Confined spaces may accumulate hydrogen sulfide gas. Hydrogen sulfide may cause respiratory tract irritation, nausea, headache, dizziness, pulmonary edema, loss of consciousness, brain damage and death.

EFFECTS OF CHRONIC EXPOSURE:
EYES: Effects not reported.

SKIN: Repeated exposure to hot bitumen or bitumen fumes may cause inflammation of the skin, acne like lesions, development of horny growths on the skin, darkening of the skin and sensitization of the skin to light. Bitumen may cause hair loss, dryness, scaling, and dermatitis. May aggravate existing skin conditions. Bitumen contains chemicals that may have a carcinogenic potential.

INGESTION: Effects not reported.

INHALATION: Prolonged exposure to bitumen fumes may cause inflammation of the lungs and mucous membranes of the nose and throat. May cause chronic bronchitis, pulmonary congestion, laryngitis, hoarseness, coughing, fatigue and atrophy and/or death of the epithelium. May aggravate existing respiratory conditions.

4. FIRST AID MEASURES

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

SKIN: Remove contaminated clothing. Use a light mineral oil (e.g. baby oil) to help remove bitumen from the skin. Wash affected area with soap and water. Avoid abrading the skin during washing. 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.

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. Oxygen may be beneficial if administered by a person trained in its use, preferably on a physician's advice.

GENERAL: In all cases, seek medical attention.

5. FIRE FIGHTING MEASURES

FLASH POINT: 166 °C (Cleveland Open Cup)
FLAMMABLE LIMITS (% by volume): Upper - 7.0 Lower - 2.0
AUTO-IGNITION TEMPERATURE: Not available.

FIRE & EXPLOSION HAZARDS:
Flammable in presence of ignition source when heated above flashpoint temperature.

EXTINGUISHING MEDIA:
Foam, Carbon, Dioxide, dry chemical, water fog.
Caution: Hot bitumen will react violently with water.

FIRE FIGHTING PROCEDURES:
DO NOT USE WATER on a bitumen tank fire; it may cause violent eruption and spreading of burning bitumen. Hot material may ignite flammable mixtures (liquids) on contact. Material will not burn unless preheated. Exposed firefighters must wear full bunker gear, including a NIOSH approved positive pressure self-contained breathing apparatus with full-face mask. Containers exposed to intense heat from fires should be cooled with water to prevent vapour pressure build-up, which could result in container rupture. Container areas exposed to direct flame contact should be cooled with large quantities of water as needed to prevent weakening of container structure.

6. ACCIDENTAL RELEASE MEASURES

LEAK AND SPILL PROCEDURE:
Shut off fuel source and ventilate spill area. Dike large spills with non-flammable material. Absorb on inert material and place in closed container for recycling or disposal.

7. HANDLING AND STORAGE

HANDLING PROCEDURES AND EQUIPMENT:
Avoid excessive heating and oxidizing materials. Wash hands thoroughly after handling.

STORAGE REQUIREMENTS:
Keep away from heat and flame. Ventilate. Keep containers tightly closed. Hot bitumen reacts violently with water. Keep away from oxidizing materials.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

ENGINEERING CONTROLS:
Mechanical ventilation necessary to maintain concentrations below appropriate OEL's. Ventilate confined spaces before entry.

PERSONAL PROTECTIVE EQUIPMENT:
Gloves: Acrylonitrile latex. Change if contaminated.
Respirator: NIOSH approved air purifying organic vapour.
Eyes: Safety glasses, monogoggles, or faceshield.
Clothing: Coveralls, apron as required.
Footwear:

EXPOSURE LIMITS:
Bitumen 8-hour OEL = mg/m^3

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Black or brownish, tarry texture.

ODOUR: Solvent-like odour

PHYSICAL STATE: Viscous liquid

pH: Not applicable

VAPOUR PRESSURE: Not available

VAPOUR DENSITY (Air = 1): Not available

FREEZING/MELTING POINT: Not applicable

BOILING RANGE (deg C): IBP 290 °C; 40-45 % boiling at 524 °C

SPECIFIC GRAVITY: 1.02 @ 20 °C

EVAPORATION RATE (n-Butyl Acetate = 1): Essentially non-volatile at ambient temperatures

COEFFICIENT OF WATER/OIL DISTRIBUTION: Not miscible with water

ODOUR THRESHOLD: Not available

10. STABILITY AND REACTIVITY

STABILITY: Stable

CONDITIONS TO AVOID: Not applicable

MATERIALS TO AVOID: Strong oxidizing materials. This product may dissolve or soften some plastics.

HAZARDOUS COMBUSTION PRODUCTS: Carbon monoxide, Carbon dioxide, oxides of nitrogen and sulphur, soot, uncombusted hydrocarbons.

11. TOXICOLOGICAL INFORMATION

LD50:	5 to 15 g/kg (oral), 3-8 g/kg (rat-intragastric),	>5 g/kg (oral) - mice, rats >3.16 g/kg (dermal) - rabbits

LC50: No data found.

ACUTE:

An acute oral, dermal, ocular and inhalation toxicity study was performed using bitumen (bitumen diluted with naphtha) 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) and desquamation. Rabbits experienced slight eye irritation (Draize score of 4/110) with conjunctival redness. No mortalities (rats) occurred following a 6-hour inhalation exposure to 1.46 g/m3, however, lung discolouration and decreased lung weight was observed. (Reference 1)

CHRONIC:
Several epidemiological studies have been performed and results indicate that there are no differences in the general health of bitumen workers as compared to the general public. In a mouse skin painting study (twice/day for life), hair loss, dryness and scaling of the skin and papiloma formation was reported. (Reference 2)

Mice were exposed to heated asphalt fumes for 6 - 7.5 hours per day, five days a week for 21 months. Peribronchial round cell infiltration, bronchitis, pneumonitis, abscess formation, loss of cilia, epithelial atrophy and necrosis were common in the mice. Squamous cell hyperplasia was also observed. (Reference 3)

CARCINOGENICITY:
There is inadequate evidence of carcinogenicity in humans and limited to sufficient evidence in animals. Bitumen is not considered to be carcinogenic to humans, but does contain carcinogenic components. (Reference 4)

Results from several epidemiological studies indicate that there is no difference in the number of skin and/or lung cancers attributed to working with bitumen. (Reference 2)

A review of epidemiological publications regarding the carcinogenic potential of bitumen was conducted. The authors concluded that although many of the studies show an increased risk of cancer, they do not show a casual relationship between exposure to bitumen and development of cancer. Nearly all the studies suffer from a lack of data on exposure and/or potential confounders. (Reference 5)

An evaluation of the dermal carcinogenic potential of bitumen from the Athabasca oil sands was conducted. Mice were dermally applied three times per week (52.50 mg/wk) for life. Out of 50 animals, two developed tumours with a mean latency of 145 weeks. This was not significantly different form the controls. The authors concluded that the bitumen from the Athabasca oil sands produced weak evidence of carcinogenic potential, but was consistent with conventional petroleum - derived bitumen. (Reference 6)

An evaluation of the dermal carcinogenic potential of bitumen from the Cold Lake oil sands was conducted. Mice were dermally applied three times per week (56.25 mg/wk) for life. Out of 50 animals, 13 developed tumours with a mean latency of 106 weeks. This was significantly different from the controls. The authors concluded that this result is consistent with conventional petroleum-derived bitumen. (Reference 7)

REPRODUCTION:
No data.

TERATOLOGY:
No data.

MUTAGENICITY:
Bitumen has given negative or marginally position findings in most mutagenicity assays conducted. (Reference 8)

Adult and foetal human skin were treated with bitumen and analysed for the presence of DNA-adducts. Levels of 3 and 15 g of bitumen significantly increased the number of DNA-adducts. (Reference 9)

The genotoxic activity of bitumen was tested using Salmonella typhimurium and DNA damage in rats. No mutagenic activity was noted in the absence or presence of metabolic activation with Salmonella typhimurium. Bitumen gave negative results for in vivo DNA damage. (Reference 10)

TOXICOLOGICALLY SYNERGISTIC PRODUCTS:
No data.

12. ECOLOGICAL INFORMATION

Not available

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL: Recycle and reuse material if possible. Off-site spills should be dealt with according to relevant legislation. Bury in approved landfill if acceptable.

14. TRANSPORT INFORMATION:

CANADIAN TDG: Not Regulated

HAZARD CLASS: Not applicable.

PROPER SHIPPING NAME: Not applicable.

15. REGULATORY INFORMATION

WHMIS CLASS: 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).

16. OTHER INFORMATION

REFERENCES:

1. Stubblefield, W. A., R. H. McKee, R. W. Kapp Jr and J. P. Hinz. An Evaluation of the Acute Toxic Properties of Liquids Derived from Oil Sands. J. Appl. Toxicol. 9(1):59-65. 1989.

2. World Health Organization. Environmental Health Criteria 20 Selected Petroleum Products. World Health Organization. Geneva. 1982.

3. Simmers, M. H. Petroleum Asphalt Inhalation by Mice. Arch. Environ. Health. 9:727-734. 1964.

4. Royal Society of Chemistry. The Dictionary of Substances and Their Effects. Ed. M. L. Richardson and S. Gangolli. The Royal Society of Chemistry. 1992.

5. Chiazze Jr. L., D. K. Watkins and J. Amsel. Asphalt and Risk of Cancer in Man. Brit. J. of Ind. Med. 48:538-542. 1991.

6. McKee, R. H., 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.

7. McKee, R. H. and S. C. Lewis. Evaluation of the Dermal Carcinogenic Potential of Liquids Produced From the Cold Lake Heavy Oil Deposits of Northeast Alberta. Can. J. Physiol. Pharmacol. 65:1793-1797. 1987.

8. CONCAWE. Bitumens and Bitumen Derivatives. CONCAWE's Petroleum Products and Health Management Groups. Brussels. 1992.

9. Schoket, B., A. Hewer, P. L. Grover and D. H. Phillips. Formation of DNA Adducts in Human Skin Maintained in Short-Term Organ Culture and Treated with Coal-Tar, Creosote or Bitumen. Int. J. Cancer. 42:622-626. 1988.

10. Pasquini, R., M. Taningher, S. Monarca, M. Pala, and G. Angeli. Chemical Composition and Genotoxic Activity of Petroleum Derivatives Collected in Two Working Environments. J. Toxicol. Environ. Health. 27(2):225-238. 1989.

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