APPENDIX 4

MSDS SHEETS FOR DRILLING MUDS/ADDITIVES
PROPOSED FOR USE BY CONTRACTOR, BOART LONGYEAR INC.

(NOTE: PRODUCTS USED SHALL BE ASSUMED TO BE THOSE MOST ENVIRONMENTALLY ACCEPTABLE)

Boart Longyear Inc
Core Drilling Division
403-47th Street East
Saskatoon, Saskatchewan, Canada S7K 5H4
Telephone: (306) 931-4466
Facsimile: (306) 931-1150

Fax message

BOART LONGYEAR

Fax no: 867-873-4532

Page: 1 **of** 44

Date: 01/01/27

Ref no:

From: Hans A. Vanderlinden
Branch Manager

To: Peter Holmes
DeBeers - NWT

Dear Peter,

Subject: MSDS for Mud/Additives and Other In-The-Hole Product

As per our telephone conversation and request, please find attached Material Safety Data Sheets for in-the-hole products anticipated to be utilized on your projects this winter.

I will be out of the office on Monday till Thursday morning, in my absence please direct all inquiries to Peter Dixon, Field Supervisor for Western Canada.

Hoping the information provided is to your satisfaction, we look forward to the opportunity of working with you and DeBeers in the coming months.

Yours sincerely,

H Vanderlinden

Hans A. Vanderlinden

Shell Canada Limited

Material Safety Data Sheet

Effective Date: 20000110

THIS PRODUCT IS NOT A WHMIS CONTROLLED SUBSTANCE.

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT: LINSEED SOAP
SYNONYMS: Lubricating Grease
PRODUCT USE: Lubricating Grease
MSDS Number: 504-991

MANUFACTURER
Shell Canada Limited
P.O. Box 100, Station M
400-4th Ave. S.W.
Calgary, AB Canada
T2P 2H5

TELEPHONE NUMBERS

Shell Emergency Number	1-800-661-7378
CANUTEC 24 HOUR EMERGENCY NUMBER	613-996-6666
For general information:	1-800-661-1600
For MSDS Information:	403-691-3982
(From 7:30 to 4:30 Mountain Time)	403-691-2220

This MSDS was prepared by the Toxicology and Material Safety Section of Shell Canada Limited.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Component Name	CAS Number	% Range	WHMIS Controlled	CBI Claim No. CBI Date

THIS PRODUCT IS NOT A WHMIS CONTROLLED SUBSTANCE.

See Section 8 for Occupational Exposure Guidelines.

3. HAZARDS IDENTIFICATION

Physical Description: Semi-Solid Paste Brown Colour Slight Hydrocarbon Odour

Routes of Exposure: Exposure may occur via inhalation, ingestion, skin absorption and skin or eye contact.

Hazards:

May be slightly irritating to the eyes.

For further information on health effects, see Section 11.

4. FIRST AID

Eyes	Flush eyes with water for at least 15 minutes while holding eyelids open. Obtain medical attention.
Skin	Wipe excess from skin. Wash contaminated skin with mild soap and water for 15 minutes.
Ingestion	If victim is conscious, give two glasses of water and induce vomiting. Obtain medical attention.
Inhalation	Remove victim from further exposure. Additional first aid treatment is not ordinarily required.
Notes to Physician	None identified

5. FIRE FIGHTING MEASURES

Extinguishing Media	Dry Chemical Carbon Dioxide Foam Water Fog
Firefighting Instructions	No special procedures - Avoid inhalation of smoke. Caution, spilled material is slippery. Use water to cool fire exposed containers.
Hazardous Combustion Products	None currently known.

6. ACCIDENTAL RELEASE MEASURES

Spilled material is slippery. Isolate hazard area and restrict access. Wear appropriate breathing apparatus (if applicable) and protective clothing. Stop leak only if safe to do so. Contain a land spill by diking. For large spills remove by mechanical means and place in containers. Clean area with appropriate cleaner. Dispose of recovered material as noted under Disposal Considerations. Notify appropriate environmental agency(ies).

7. HANDLING AND STORAGE

Handling:	Avoid excessive heat, formation of oil mist, breathing of vapours and mist of hot oil and prolonged or repeated contact with skin. Launder contaminated clothing prior to reuse. Properly dispose of contaminated leather articles, including shoes, that cannot be decontaminated.
Storage:	Store in a cool, dry, well ventilated area, away from heat and ignition sources.

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 (1993): North American exposure limits have not been established for the product. Consult local authorities for acceptable provincial values.

Mechanical Ventilation: Mechanical ventilation is recommended for all indoor situations to control fugitive emissions. Local ventilation is recommended if oil mist is present or if exposure limit is exceeded. Make up air should always be supplied to balance air exhausted (either generally or locally).

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: Impervious gloves (viton, nitrile, PVC, neoprene) 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.

Respiratory Protection: Not normally required under intended conditions of use.

9. PHYSICAL DATA

Physical State:	Semi-Solid Paste
Appearance:	Brown Colour
Odour:	Slight Hydrocarbon Odour
Odour Threshold:	Not available
Freezing/Pour Point:	0 degrees C
Boiling Point:	100 degrees C
Density:	Not available
Vapour Density (Air = 1):	Not available
Vapour Pressure:	Not available
Specific Gravity (Water = 1):	1
pH:	9.5 - 11
Flash Point:	Not applicable
Lower Explosion Limit:	Not applicable
Upper Explosion Limit:	Not applicable
Autoignition Temperature:	Not applicable
Viscosity:	Not available
Evaporation Rate (n-BuAc = 1):	Not available
Partition Coefficient (K_{ow}):	Not available
Water Solubility:	Soluble
Other Solvents:	None Identified

10. STABILITY AND REACTIVITY

Chemically Stable:	Yes
Hazardous Polymerization:	No
Sensitive to Mechanical Impact:	No
Sensitive to Static Discharge:	No
Incompatible Materials:	None Identified
Conditions of Reactivity:	Avoid excessive heat, formation of vapours or mists.

11. TOXICOLOGICAL INFORMATION

Ingredient (or Product if not specified) **Toxicological Data**

Routes of Exposure:	Exposure may occur via inhalation, ingestion, skin absorption and skin or eye contact.
Irritancy:	This product is not a primary skin irritant after exposure of short duration, is not a skin sensitizer and is not irritating to the eyes.
Chronic Effects:	Prolonged and repeated contact with skin can cause defatting and drying of the skin resulting in skin irritation and dermatitis.

12. ECOLOGICAL INFORMATION

Environmental Effects	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. Provincial regulations require and federal regulations may require that environmental and/or other agencies be notified of a spill incident. Spill area must be cleaned and restored to original condition or to the satisfaction of authorities.
Biodegradability	Not available.

13. DISPOSAL CONSIDERATIONS

Waste management priorities (depending on volumes and concentration of waste) are: 1. recycle (reprocess), 2. energy recovery (cement kilns, thermal power generation), 3. incineration, 4. disposal at a licenced waste disposal facility. Do not attempt to combust waste on-site.

14. TRANSPORTATION INFORMATION

Canadian Road and Rail Shipping Classification:
This product is not regulated under the Canadian Transportation of Dangerous Goods Regulations for transport by road and rail.

15. REGULATORY INFORMATION

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*.

DSL/NDSL Status:	THIS PRODUCT IS NOT A WHMIS CONTROLLED SUBSTANCE. This product, or all components, are listed on the Domestic Substances List, as required under the Canadian Environmental Protection Act. This product and/or all components are listed on the U.S. EPA TSCA Inventory.
Other Regulatory Status:	No Canadian federal standard; however, for general discharge guidance, federal installations limited to 15 mg/L for total oil and grease. Provincial criteria are likely and should be requested when notifying provincial authorities.

16. ADDITIONAL INFORMATION

LINSEED SOAP

504-901
Revision Number: 2

Revisions: This MSDS has been reviewed and updated.

PETRO-CANADA

Material Safety Data Sheet

WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing
	Not controlled	

Section 1. Chemical Product and Company Identification

Product Name	DRILL ROD HEAVY GREASE
Supplier	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3
Synonym	None
Chemical Name	Not applicable.
Chemical Family	Petroleum hydrocarbons
Chemical Formula	Not applicable.
Manufacturer	PETRO-CANADA P.O. Box 2844, Petro-Canada Centre Calgary, Alberta T2P 3E3
Material Uses	This product is a multi-purpose grease with a wide range of automotive and industrial lubricant applications.

Code	650-265 File # W218
DSL	On the DSL.
Print Date:	5/25/99.

In case of Emergency

Petro-Canada Emergency Number: (403) 296-3000
Canutec Transportation Emergency: (613) 996-6666
Poison Control Centre Numbers: Consult local telephone directory for emergency number(s).

Section 2. Composition/Information on Ingredients

Name	CAS #	Exposure Limits (ACGIH) TLV-TWA(8 h)	STEL	CEILING	% (V/V)
Mixture of hydrotreated neutral base oil and additives.	Not applicable	5 mg/m³ (oil mist)	Not applicable	Not applicable	100

Section 3. Hazards Identification.

Potential Acute Health Effects

May irritate the eyes. Non irritating to skin but for prolonged use, protective gloves are recommended. This product has a low vapour pressure and is not expected to present an inhalation exposure at ambient conditions. Upon heating to high temperatures, or mechanical actions which may produce vapours, mists or fumes, inhalation of this product may cause irritation of the breathing passages. Low toxicity on ingestion; has laxative effect and rapidly eliminated. For more information, refer to Section 11.

Potential Chronic Health Effects

Prolonged or repeated contact with this product may cause skin irritation or inflammation, characterized by dermatitis, and oil acne. For more information, refer to Section 11.

Section 4. First Aid Measures

Eye Contact

Check for and remove any contact lenses. IMMEDIATELY flush eyes with running water for at lest 15 minutes, keeping eyelids open. Do not use an eye ointment. Seek medical attention if irritation persists.

Skin Contact

Remove contaminated clothing - launder before reuse. Wash gently and thoroughly the contaminated skin with running water and non-abrasive soap. Get medical attention if redness or irritation occurs. High pressure grease gun is capable of injecting grease through the skin. Grease gun injuries require immediate physician assessment.

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Inhalation	Evacuate the victim to a safe area as soon as possible. If the victime is not breathing, perform mouth-to-mouth resuscitation. Administer oxygen if available. Allow the victim to rest in a well ventilated area. Seek medical attention.
Hazardous Inhalation	No additional information.
Ingestion	DO NOT induce vomiting because of danger of aspirating liquid into lungs. Has laxative effect - rapidly eliminated. Physician assessment advised.
Hazardous Ingestion	No additional information.

Section 5. Fire-fighting Measures

The Product is:	Class IIIB - combustible (NFPA).
Auto-Ignition Temperature	316°C (600.8°F)
Flash Points	OPEN CUP: 252°C (485.6°F) (Cleveland, ASTM D92)
Flammable Limits	Not available.
Products of Combustion	Carbon oxides (CO, CO2), nitrogen oxides (NOx), smoke and irritating fumes as products of incomplete combustion.
Fire Hazards in Presence of Various Substances	Low fire hazard. This material must be heated before ignition will occur.
Explosion Hazards in Presence of Various Substances	Do not cut, weld, heat, or drill empty containers.
Fire Fighting Media and Instructions	Cool containing vessels with water spray in order to prevent pressure build-up, autoignition or explosion. Shut off fuel to fire if it is possible to do so without hazard. SMALL FIRE: Use DRY chemicals, foam, or CO2. LARGE FIRE: Use water spray, fog or foam. WATER OR FOAM MAY CAUSE FROTHING. Avoid flushing spilled material into sewers, streams or other bodies of water. For small outdoor fires, portable fire extinguishers may be used, and self contained breathing apparatus (SCBA) may not be required. For all indoor fires and any significant outdoor fires, SCBA is required. Respiratory and eye protection are required for fire fighting personnel.
Special Remarks on Fire Hazards	No additional remark
Special Remarks on Explosion Hazards	No additional remark.

Section 6. Accidental Release Measures

Small Spill	Avoid contact. Contain spill. Use appropriate tools to put the spilled materials in a container for reclaiming or disposal. Check with applicable jurisdictions for specific disposal requirements of material and empty containers. DO NOT FLUSH TO SEWER.
Large Spill	No additional remark.

Section 7. Handling and Storage

Handling	Avoid contact with skin and eyes. Practice good personal hygiene. Wash hands after handling and before eating. Launder work clothes frequently. Discard saturated leather goods.
Storage	Store in tightly closed containers in cool, dry, isolated and well-ventilated area.

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Section 8. Exposure Controls/Personal Protection

Engineering Controls	For normal application, special ventilation is not necessary. If user's operations generate fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make-up air should always be supplied to balance air removed by exhaust ventilation. Ensure that eyewash station and safety shower are close to work-station.
Personal Protection	Wear safety glasses, safety shoes or boots. Wear long sleeved clothing to minimize skin contact. For casual contact, use natural rubber and PVC(polyvinyl chloride). For direct contact for more than 2 hours, NEOPRENE or NITRILE gloves are recommended. Respirator normally not necessary. If mist generated by heating, spraying, etc. wear an organic vapour respirator with a mist filter. All respirators must be NIOSH certified.
Personal Protection in Case of a Large Spill	No additional remarks
Exposure Limits	8-hour TLV-TWA of 5 mg/m³ recommended by Petro-Canada based on ACGIH TLV for oil mists. Consult local authorities for acceptable exposure limits.

Section 9. Physical and Chemical Properties

Physical State and Appearance	Paste of long fibred texture.
Dropping Point	>195°C (>383°F).
Penetration (@ 25°C)	245 (unworked), 220-250 (60 strokes).
Boiling Point	260°C (500°F)
Melting Point	Not available.
Specific Gravity	0.89 kg/L @ 15°C (Water = 1).
Vapor Pressure	0.0010 kPa @ 20°C (0.0075 mmHg @ 68°F).
Vapor Density	Not available.
Volatility	Semivolatile.
Odor Threshold	Not available.
Oil / Water Dist. Coeff.	Not available.
Viscosity (@ 40 °C)	148-163 cSt.
Solubility	Insoluble in cold water, soluble in non-polar hydrocarbon solvents.

Odor	Mild grease like.
Taste	Not available.
Color	Greenish brown.

Section 10. Stability and Reactivity

Stability	The product is stable under normal conditions of storage.		
Instability Temperature	Not available.		
Conditions to Avoid	Avoid excessive heat.		
Incompatibility with Various Substances	Highly reactive with oxidizing agents.	Decomposition products:	COx, NOx, oxides of barium, smoke on combustion.
Corrosivity	Not applicable		
Special Remarks on Reactivity	Peroxides, chlorine, strong acids, etc.		
Special Remarks on Corrosivity	No additional remark.		

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Section 11. Toxicological Information

Routes of Entry	Skin contact, eye contact, inhalation, and ingestion.
Toxicity to Animals	Acute oral toxicity (LD50): 5000 mg/kg (rat).
Chronic Effects on Humans	Prolonged or repeated contact with this product may cause skin irritation or inflammation, characterized by dermatitis, and oil acne. For more information, refer to Section 11.
Other Toxic Effects on Humans	May irritate the eyes. Non irritating to skin but for prolonged use, protective gloves are recommended. This product has a low vapour pressure and is not expected to present an inhalation exposure at ambient conditions. Upon heating to high temperatures, or mechanical actions which may produce vapours, mists or fumes, inhalation of this product may cause irritation of the breathing passages. Low toxicity on ingestion; has laxative effect and rapidly eliminated. For more information, refer to Section 11.
Special Remarks on Toxicity to Animals	Based on toxicity of severely hydrotreated paraffinic oil only. Severely hydrotreated base oils are negative when tested by the modified Ames test. Propane-deasphalted residual oils are also negative in the sister chromatid exchange in chinese hamster ovary cells and in the mouse lymphoma forward mutation assay.
Special Remarks on Chronic Effects on Humans	Based on toxicity of hydrotreated paraffinic based oils only. Hydrotreated based oils give negative results when tested for: (a) In vitro cytogenetic assay measuring sister chromated exchange frequencies in Chinese hamster ovary cells; (b) determination of the mutagenic activity towards Salmonella Typhimurium TA 98 using the Modified Ames Assay.
Special Remarks on Other Toxic Effects on Humans	No additional remark.

Section 12. Ecological Information

Ecotoxicity	No studies were found.
BOD5 and COD	No studies were found.
Products of Biodegradation	No studies were found.
Toxicity of the Products of Biodegradation	No studies were found.
Special Remarks on the Products of Biodegradation	No additional remark.

Section 13. Disposal Considerations

Waste Disposal	Preferred waste management priorities are: (1) recycle or reprocess; (2) incineration with energy recovery; (3) disposal at licensed waste disposal facility. Ensure that disposal or reprocessing is in compliance with government requirements and local disposal regulations.

Section 14. Transport Information

TDG Classification	Not controlled under TDG (Canada).
Special Provisions for Transport	No additional remark.

Section 15. Regulatory Information and Pictograms

Other Regulations	All components of this formulation are listed in the Domestic Substances List (DSL-Canadian) and in the Toxic Substances Control Act Inventory (TSCA-U.S.). This product is not known to contain any of the carcinogens required to be listed under OSHA hazard communication standard, 29 CFR 1910.1200 (U.S.). Not listed in EPCRA or SARA Title III, Section 313, Toxic Chemicals (40 CFR 355). Not listed in CERCLA (40 CFR 302.40). Please note that the chemical identity of some or all of the ingredients that may be listed herein is confidential business information and is being withheld as permitted by 29 CFR 1910.1200 and various State Right to Know Laws.
Other Classifications	WHMIS (Canada) Not controlled

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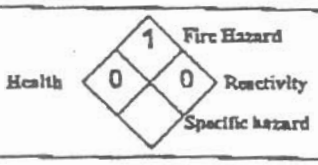
DSD/DPD (EEC)	Not classified under the Dangerous Substances or Dangerous Preparations Directives.

WHMIS (Canada)
(Pictograms)

HMIS (U.S.A.)

Health Hazard	0
Fire Hazard	1
Reactivity	0
Personal Protection	a

NFPA (U.S.A.)



DSD/DPD (Europe)
(Pictograms)

TDG (Canada)
(pictograms)

DOT (U.S.A)
(Pictograms)

Protective Clothing
(Pictograms)

Section 16. Other Information

References	Available upon request.
Other Special Considerations	No additional remark.
Prepared by May on 5/7/96.	Data entry by May Chau.
	Print Date: 5/25/99.

Information Contact
Petro-Canada
Product Safety Coordinator
(403) 296-4410

PETRO-CANADA

Material Safety Data Sheet

WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing
	D-2A	

Section 1. Chemical Product and Company Identification

Product Name	**API MODIFIED THREAD COMPOUND**
Code	650-775 File # W236
DSL	Ingredient(s) are listed.
Print Date:	5/25/99.
Supplier	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3
Synonym	None
Chemical Name	Not applicable.
Chemical Family	Petroleum hydrocarbons
Chemical Formula	Not applicable.
In case of Emergency	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3
Material Uses	API Modified Thread Compound is used in drilling operations for the lubrication of casing, tubing, and line pipe, as protection for threads and as a sealant against drilling fluids.

Section 2. Composition/Information on Ingredients

Name	CAS #	Exposure Limits (ACGIH) TLV-TWA(8 h)	STEL	CEILING	% (V/V)
Severely hydrotreated paraffinic oil.	72623-85-9	5 mg/m³ (oil mist)	Not applicable	Not applicable	20-30
Lead (powder)	7439-92-1	0.05 mg/m³	Not applicable	Not applicable	30-40
Zinc (dust)	7440-66-6	10 mg/m³	Not applicable	Not applicable	10-15
Graphite (powder)	7782-42-5	None	Not applicable	Not applicable	15-20
Copper (powder)	7440-50-8	0.2 mg/m³ (fume); 1 mg/m³ (dust/mist)	Not applicable	Not applicable	1-5
Aluminum sterate thickener, inhibitor	7429-90-5	None	Not applicable	Not applicable	5-10

Section 3. Hazards Identification.

Potential Acute Health Effects	Mildly irritating to eyes and skin. This product has a low vapour pressure and is not expected to present an inhalation exposure at ambient conditions. Upon heating to high temperatures, or mechanical actions which may produce vapours, mists or fumes, inhalation of this product may cause irritation of the breathing passages. For more information, refer to Section 11.
Potential Chronic Health Effects	Prolonged or repeated contact with skin may cause irritation and possibly dermatitis. Prolonged exposure to leaded grease may cause neurotoxic, embryotoxic and/or reproductive effects. For more information, refer to Section 11.

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Section 4. First Aid Measures

Eye Contact	Check for and remove any contact lenses. IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. DO NOT use an eye ointment. Seek medical attention if irritation persists
Skin Contact	Remove contaminated clothing - launder before reuse. Wash gently and thoroughly the contaminated skin with running water and non-abrasive soap. Get medical attention if redness or irritation occurs. High pressure grease gun is capable of injecting grease through the skin. Grease gun injuries require immediate physician assessment.
Inhalation	Evacuate the victim to a safe area as soon as possible. If the victime is not breathing, perform mouth-to-mouth resuscitation. Administer oxygen if available. Allow the victim to rest in a well ventilated area. Seek medical attention.
Hazardous Inhalation	No additional information.
Ingestion	DO NOT induce vomiting because of danger of aspirating liquid into lungs. Physician assessment advised.
Hazardous Ingestion	No additional information.

Section 5. Fire-fighting Measures

The Product is:	Nonflammable, but will burn on prolonged exposure to flame or high temperature.
Auto-Ignition Temperature	365°C (689°F)
Flash Points	OPEN CUP: 221°C (430°F) (Cleveland, ASTM D92)
Flammable Limits	Not applicable.
Products of Combustion	Carbon oxides (CO, CO2), smoke and irritating fumes as products of incomplete combustion.
Fire Hazards in Presence of Various Substances	Low fire hazard. Must be moderately heated before ignition will occur. Avoid contact with strong oxidizing agents.
Explosion Hazards in Presence of Various Substances	Do not cut, drill or weld empty containers.
Fire Fighting Media and Instructions	NAERG96, GUIDE 171, Substances (low to moderate hazard): If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (0.5 mile) in all directions; also, consider initial evacuation for 800 meters (0.5 mile) in all directions. DO NOT extinguish a leaking gas flame unless leak can be stopped. Shut off fuel to fire if it is possible to do so without hazard. If this is impossible, withdraw from area and let fire burn out under controlled conditions. Withdraw immediately in case of rising sound from venting safety device or any discolouration of tank due to fire. Cool containing vessels with water spray in order to prevent pressure build-up, autoignition or explosion. SMALL FIRE: use DRY chemicals, foam, or CO2. LARGE FIRE: use water spray, fog or foam. For small outdoor fires, portable fire extinguishers may be used, and self contained breathing apparatus (SCBA) may not be required. For all indoor fires and any significant outdoor fires, SCBA is required. Respiratory and eye protection are required for fire fighting personnel.
Special Remarks on Fire Hazards	Flash point is typical mineral oil component.
Special Remarks on Explosion Hazards	No additional remark.

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Section 6. Accidental Release Measures

Small Spill	Avoid contact. ELIMINATE ALL IGNITION SOURCES; no flares, smoking or flames in hazard area. Stop leak if without risk. Contain spill. Absorb with inert absorbent such as dry clay, diatomaceous earth, or commercial sorbents. Place used absorbent and rags in closed metal containers. DO NOT FLUSH TO SEWER. Check with applicable jurisdictions for specific disposal requirements of material and empty containers.
Large Spill	No additional remark.

Section 7. Handling and Storage

Handling	Keep away from sources of ignition. Avoid inhalation of fumes, oil mist and volatile decompostion products if heated excessively such as with a welding torch. Avoid contact with skin and eyes. Practice good personal hygiene. Wash hands after handling and before eating. Launder work clothes frequently. Discard saturated leather goods.
Storage	Store in tightly closed containers in cool, dry, isolated, well-ventilated area, and away from strong oxidizing agents.

Section 8. Exposure Controls/Personal Protection

Engineering Controls	For normal application, special ventilation is not necessary. If user's operations generate fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make-up air should always be supplied to balance air removed by exhaust ventilation. Ensure that eyewash station and safety shower are close to work-station.
Personal Protection	Wear safety glasses, safety shoes or boots. Wear long sleeved clothing to minimize skin contact. For casual contact, use natural rubber and PVC(polyvinyl chloride). For direct contact for more than 2 hours, NEOPRENE or NITRILE gloves are recommended. Respirator normally not necessary. If mist generated by heating, spraying, etc. wear an organic vapour respirator with a mist filter. All respirators must be NIOSH certified.
Personal Protection in Case of a Large Spill	No additional remarks
Exposure Limits	8-hour TLV-TWA of 0.05 mg/m³ recommended by Manufacturers based on ACGIH TLV for lead component. Consult local authorities for acceptable exposure limits.

Section 9. Physical and Chemical Properties

Physical State and Appearance	Buttery smooth semi-solid.
Dropping Point	99°C (typical).
Penetration (@ 25°C)	310-340 (60 strokes); 200 (min.) unworked.
Boiling Point	>274°C (>525°F)
Melting Point	Not available.
Specific Gravity	1.97 kg/L (Water = 1)
Vapor Pressure	<0.1 kPa @ 20°C (<0.1 mmHg @ 68°F).
Vapor Density	>5
Volatility	Non-volatile
Odor Threshold	Not available.
Oil / Water Dist. Coeff.	Not available.
Viscosity (@ 40 °C)	Not available.
Solubility	Insoluble in cold water, soluble in non-polar hydrocarbon solvents.

Odor	Mild grease like.
Taste	Not available.
Color	Dark grey.

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Section 10. Stability and Reactivity

Stability	The product is stable under normal conditions of use and storage.		
Instability Temperature	Not available.		
Conditions to Avoid	Avoid excessive heat. Sources of ignition.		
Incompatibility with Various Substances	Can react with strong organic oxidizing agents.	Decomposition products:	COx, oxides of lead, zinc, copper, and aluminum; smoke on combustion.
Corrosivity	Non corrosive.		
Special Remarks on Reactivity	Peroxides, chlorine, strong acids, etc.		
Special Remarks on Corrosivity	No additional remark.		

Section 11. Toxicological Information

Routes of Entry	Skin contact, eye contact, and ingestion.
Toxicity to Animals	Acute oral toxicity (LD50): 5000 mg/kg (rat).
Chronic Effects on Humans	Prolonged or repeated contact with skin may cause irritation and possibly dermatitis. Prolonged exposure to leaded grease may cause neurotoxic, embryotoxic and/or reproductive effects. For more information, refer to Section 11.
Other Toxic Effects on Humans	Mildly irritating to eyes and skin. This product has a low vapour pressure and is not expected to present an inhalation exposure at ambient conditions. Upon heating to high temperatures, or mechanical actions which may produce vapours, mists or fumes, inhalation of this product may cause irritation of the breathing passages. For more information, refer to Section 11.
Special Remarks on Toxicity to Animals	No additional remark.
Special Remarks on Chronic Effects on Humans	Toxicity of lead is CUMULATIVE AND IRREVERSIBLE. The major targets for its toxic effects are the peripheral nervous system, the central nervous system (more commonly in children), blood formation, gastrointestinal effects, kidney damage, and reproductive effects in men, women and children.
Special Remarks on Other Toxic Effects on Humans	No additional remark.

Section 12. Ecological Information

Ecotoxicity	Not available
BOD5 and COD	Not available.
Products of Biodegradation	Not available.
Toxicity of the Products of Biodegradation	No studies were found.
Special Remarks on the Products of Biodegradation	No additional remark.

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API MODIFIED THREAD COMPOUND

Section 13. Disposal Considerations

Waste Disposal	Consult your local or regional authorities. Preferred waste management priorities are: (1) recycle or reprocess; (2) disposal at licensed waste disposal facility. Ensure that disposal or reprocessing is in compliance with government requirements and local disposal regulations.

Section 14. Transport Information

TDG Classification	Shipping name: Environmentally hazardous substances, liquid, n.o.s. (lead); Class 9.2 ; UN3082; Packing Group: III.
Special Provisions for Transport	109 The consignor must determine legal limit.

Section 15. Regulatory Information and Pictograms

Other Regulations	All components of this formulation are listed in the Domestic Substances List (DSL-Canadian) and in the Toxic Substances Control Act Inventory (TSCA-U.S.). Please note that the chemical identity of some or all of the ingredients that may be listed herein is confidential business information and is being withheld as permitted by 29 CFR 1910.1200 and various State Right to Know Laws.	
Other Classifications	WHMIS (Canada)	D-2A
	DSD/DPD (EEC)	36/38- Irritating to eyes and skin. 23/25- Toxic by inhalation and if swallowed.

WHMIS (Canada) (Pictograms)

HMIS (U.S.A.)

Health Hazard	2
Fire Hazard	1
Reactivity	0
Personal Protection	b

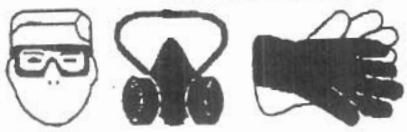
NFPA (U.S.A.)

DSD/DPD (Europe) (Pictograms)

TDG (Canada) (pictograms)

DOT (U.S.A) (Pictograms)

Protective Clothing (Pictograms)



Continued on Next Page

Section 16. Other Information

References	Available upon request.
Other Special Considerations	No additional remark.
Prepared by May Chau on 8/24/98.	Date entry by May Chau. Print Date: 5/25/99.
Information Contact	Western Canada, telephone: 1-800-661-1199; fax: 1-800-378-4518 Ontario & Central Canada, telephone: 1-800-268-5850; fax: 1-800-201-6285 Quebec & Eastern Canada, telephone: 1-800-787-5682; fax: 905-403-5528 For Product Safety Information: (905) 896-6720

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

QUIK-GEL®

00029 1.00 US EA 07.01.1999 MSDS_US

1. PRODUCT AND COMPANY IDENTIFICATION

Product Code	00029
Trade Name	QUIK-GEL®
Generic Description	BENTONITE, SODIUM MONTMORILLONITE (CAS# 1302-78-9)
Manufacturer/Supplier	Baroid
Address	P.O. Box 1675 Houston, TX 77251
Phone Number	(281) 871-5900
Emergency Phone Number	(281) 871-5900
Chemtrec Number	(800)424-9300
MSDS first issued	7 January 1999
MSDS data revised	

2. COMPOSITION/INFORMATION ON THE COMPONENTS

Hazardous Components in Preparation for US

Component Name	Codes	Concentration
SILICA, CRYSTALLINE AS QUARTZ	14808-60-7	2.00 - 6.00

3. HAZARD IDENTIFICATION

Routes of Entry	- Inhalation of dusts - Eye contact - Skin contact
Carcinogenic Status	An ingredient is: - Listed as carcinogenic by: - IARC
Target Organs	- Eye - Skin - Lung
Health Effects - Eyes	Dust may cause slight transient irritation.
Health Effects - Skin	Material may cause slight irritation on prolonged or repeated contact.
Health Effects - Ingestion	Swallowing may have the following effects: - irritation of mouth, throat and digestive tract
Health Effects - Inhalation	Exposure to dust may have the following effects: - Irritation of nose, throat and respiratory tract Prolonged inhalation of dust may result in cancerous and noncancerous lung disease. Crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans.

MATERIAL SAFETY DATA SHEET

QUIK-GEL®

00029 1.00 US EA 07.01.1999 MSDS_US

4. FIRST AID MEASURES

First Aid - Eyes	Immediately flood the eye with plenty of water for at least 15 minutes, holding the eye open. Obtain medical attention if soreness or redness persists.
First Aid - Skin	Wash skin thoroughly with soap and water.
First Aid - Ingestion	Wash out mouth with water.
First Aid - Inhalation	Remove from exposure. If there is difficulty in breathing, give oxygen. Seek medical attention if symptoms persist.
Advice to Physicians	Treat symptomatically.

5. FIRE FIGHTING MEASURES

Extinguishing Media	Not combustible. Select extinguishing agent appropriate to other materials involved.
Special Hazards of Product	Avoid the formation of dust clouds.
Protective Equipment for Fire-Fighting	No specific measures necessary.

6. ACCIDENTAL RELEASE MEASURES

Spill Procedures	Avoid creating a dust. Sweep or preferably vacuum up and collect in suitable containers for recovery or disposal. Avoid accumulation of dust.
Personal Precautions	Wear appropriate protective clothing. Wear respiratory protection. Material can create slippery conditions underfoot.
Environmental Precautions	No specific measures necessary.

7. HANDLING AND STORAGE

Handling	Avoid creating a dust. Use in well ventilated area. Avoid inhaling dust.
Storage	Store in original containers. Storage area should be: - cool - dry - well ventilated - under cover

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Standards

SILICA, CRYSTALLINE AS QUARTZ	OSHA (respirable): 10 mg/m3 / %SiO2 + 2 OSHA (Total Dust): 30 mg/m3 / %SiO2 + 2 Dust, respirable:

MATERIAL SAFETY DATA SHEET

QUIK-GEL®

00029 1.00 US EA 07.01.1999 MSDS_US

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

	ACGIH: TLV 0.1mg/m3 8h TWA UK EH40: MEL 0.4mg/m3 8h TWA
Engineering Control Measures	Engineering methods to prevent or control exposure are preferred. Methods include process or personnel enclosure, mechanical ventilation (dilution and local exhaust), and control of process conditions. If engineering controls and work practices are not effective in preventing or controlling exposure, then suitable personal protective equipment, which is known to perform satisfactorily, should be used. Use of the basic principles of Industrial Hygiene will enable this material to be used safely.
Respiratory Protection	The specific respirator selected must be based on the airborne concentration found in the workplace and must not exceed the working limits of the respirator.
Hand Protection	Work gloves
Eye Protection	Dust tight goggles.
Body Protection	Normal work wear. - overall or apron

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Powder
Color	Light Brown - Grey
Odor	Odorless
pH	Not applicable.
Specific Gravity	2.5
Boiling Range/Point (°C/F)	Not determined.
Flash Point (PMCC) (°C/F)	None.
Explosion Limits (%)	None.
Vapor Pressure	Not applicable.
Density	47.6 lb/ft3 at 20 °C. (loose)
Solubility in Water	Not applicable.
Vapor Density (Air = 1)	Not applicable.
Evaporation Rate	Not applicable.
VOC (g/l)	0

10. STABILITY AND REACTIVITY

Stability	Stable under normal conditions.
Materials to Avoid	None known.

MATERIAL SAFETY DATA SHEET

QUIK-GEL®

00029 1.00 US EA 07.01.1999 MSDS_US

10. STABILITY AND REACTIVITY

Hazardous Polymerization	Will not occur.
Hazardous Decomposition Products	None known.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity	Low order of acute toxicity predicted.
Chronic Toxicity/Carcinogenicity	IARC assessment: one of the components of this product is carcinogenic to humans (Group 1).
Genotoxicity	No relevant studies identified.
Reproductive/Developmental Toxicity	No relevant studies identified.

12. ECOLOGICAL INFORMATION

Mobility	The product is insoluble in water.
Persistance/Degradability	No relevant studies identified.
Bio-accumulation	No relevant studies identified.
Ecotoxicity	No relevant studies identified.

13. DISPOSAL

Product Disposal	Dispose of in accordance with all applicable local and national regulations.
Container Disposal	Dispose of containers with care.

14. TRANSPORT INFORMATION

DOT CFR 172.101 Data	Proper Shipping Name: Not Regulated
UN Proper Shipping Name	Not Regulated
UN Class	None.
UN Number	None.

15. REGULATORY INFORMATION

TSCA Listed	Yes.
MA Right To Know Law	Listed.

MATERIAL SAFETY DATA SHEET

QUIK-GEL®

00029 1.00 US EA 07.01.1999 MSDS_US

15. REGULATORY INFORMATION

PA Right To Know Law	Listed
NJ Right to Know Law	Listed
California Proposition 65	This product contains the following chemicals that have been found by the State of California to cause cancer, birth defects or other reproductive harm: - Silica, crystalline
SARA Title III Sect. 302 (EHS)	Not listed.
SARA Title III Sect. 311/312 Categorization	Delayed (Chronic) Health Hazard
SARA Title III Sect. 313	This product does not contain a chemical which is listed in Section 313 at or above de deminis concentrations.

16. OTHER INFORMATION

NFPA Ratings	NFPA Code for Health 1 NFPA Code for Flammability 0 NFPA Code for Reactivity 0
Abbreviations	® Registered trademark of Baroid Technology (TM) Trademark of Halliburton Energy Services N/A. Denotes no applicable information found or available CAS#: Chemical Abstracts Service Number ACGIH: American Conference of Governmental Industrial Hygienists OSHA: Occupational Safety and Health Administration TLV: Threshold Limit Value PEL: Permissible Exposure Limit STEL: Short Term Exposure Limit NTP: National Toxicology Program IARC: International Agency for Research on Cancer R: Risk S: Safety LC50: Lethal Concentration 50% LD50: Lethal Dose 50% BOD: Biological Oxygen Demand KoC: Soil Organic Carbon Partition Coefficient
Prepared By:	Environmental Services

All information recommendations and suggestions herein concerning our product are based on tests and data believed to be reliable, however, it is the user's responsibility to determine the safety, toxicity and suitability for his own use of the product described herein. Since the actual use by others is beyond our control, no guarantees, expressed or implied, is made by Baroid as to the effects of such use, the results to be obtained, or the safety and toxicity of the product nor does Baroid assume any liability arising from the use, by others, of the product referred to herein. Nor is the information herein to be construed as absolutely complete since additional information may be necessary or desirable

MATERIAL SAFETY DATA SHEET

QUIK-GEL®

00029 1.00 US EA 07.01.1999 MSDS_US

16. OTHER INFORMATION

when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

Baroid Drilling Fluids
MATERIAL SAFETY DATA SHEET
EZ-MUD®
00177 1.00 US EA 06.01.1999 MSDS_US

1. PRODUCT AND COMPANY IDENTIFICATION

Product Code	00177
Trade Name	EZ-MUD®
Generic Description	PARTIALLY HYDROLYZED POLYACRYLAMIDE
Manufacturer/Supplier	Baroid
Address	P.O. Box 1675 Houston, TX 77251
Phone Number	(281) 871-5900
Emergency Phone Number	(281) 871-5900
Chemtrec Number	(800)424-9300
MSDS first issued	6 January 1999
MSDS data revised	

2. COMPOSITION/INFORMATION ON THE COMPONENTS

Hazardous Components in Preparation for US

Component Name	Codes	Concentration
PETROLEUM DISTILLATE HYDROTREATED LIGHT	64742-47-8	24.00

3. HAZARD IDENTIFICATION

Routes of Entry	- Eye contact - Skin contact - Inhalation - Ingestion
Carcinogenic Status	Not considered carcinogenic by NTP, IARC, and OSHA.
Target Organs	- Eye - Skin - Lung - Central Nervous System - Blood - Heart
Health Effects - Eyes	Liquid, mist or vapor may cause slight transient irritation.
Health Effects - Skin	Material may cause slight irritation on prolonged or repeated contact.
Health Effects - Ingestion	Swallowing may have the

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Health Effects - Inhalation	following effects: - irritation of mouth, throat and digestive tract Exposure to vapor may have the following effects: - irritation of nose, throat and respiratory tract Prolonged or repeated exposure will have the following effects: - dizziness - drowsiness - headache - damage to the central nervous system - damage to heart muscle - blood disorders

4. FIRST AID MEASURES

First Aid - Eyes	Immediately flood the eye with plenty of water for at least 15 minutes, holding the eye open. Obtain medical attention if soreness or redness persists.
First Aid - Skin	Wash skin thoroughly with soap and water. Contaminated clothing should be washed or dry-cleaned before re-use.
First Aid - Ingestion	Wash out mouth with water.
First Aid - Inhalation	Remove from exposure. If there is difficulty in breathing, give oxygen. Seek medical attention if symptoms persist.
Advice to Physicians	Treat symptomatically.

5. FIRE FIGHTING MEASURES

Extinguishing Media	Use water spray, foam, dry chemical or carbon dioxide. Keep containers and surroundings cool with water spray.
Special Hazards of Product	None known.
Protective Equipment for Fire-Fighting	Wear full protective clothing and self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

Spill Procedures	Contain and absorb using earth, sand or other inert material. Transfer into suitable containers for recovery or disposal.
Personal Precautions	Wear appropriate protective clothing. Wear respiratory protection. Material can create slippery conditions underfoot.
Environmental Precautions	None known.

7. HANDLING AND STORAGE

Handling

Use in well ventilated area. Use local exhaust ventilation. Avoid inhaling vapor Avoid contact with eyes, skin and clothing.

Storage

Store away from sources of heat or ignition. Storage area should be: - away from incompatible materials - cool - dry - well ventilated
Do not store in: - aluminium and its alloys - copper and its alloys - iron

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Control Measures

If engineering controls and work practices are not effective in preventing or controlling exposure, then suitable personal protective equipment, which is known to perform satisfactorily, should be used.

Respiratory Protection

Respiratory protection if there is a risk of uncontrolled exposure to vapor The specific respirator selected must be based on the airborne concentration found in the workplace and must not exceed the working limits of the respirator.

Hand Protection

Chemical resistant gloves

Eye Protection

Chemical goggles.

Body Protection

Normal work wear.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Viscous liquid
Color	Off-white
Odor	Faint Hydrocarbon
pH	Not applicable.
Specific Gravity	1.0
Boiling Range/Point (°C/F)	175/347
Flash Point (PMCC) (°C/F)	>95/>203
Explosion Limits (%)	None.
Vapor Pressure	Negligible vapor pressure at ambient conditions.
Density	8.5 lb/gal
Solubility in Water	Appreciable
Vapor Density (Air = 1)	Not determined..
Evaporation Rate	(referenced as n-butyl acetate = 1) <1

VOC (g/l)	Data not available.

10. STABILITY AND REACTIVITY

Stability	Stable under normal conditions.
Conditions to Avoid	None known.
Materials to Avoid	- Strong oxidizers - reacts slowly with iron, copper and aluminum
Hazardous Polymerization	Will not occur.
Hazardous Decomposition Products	- carbon monoxide - ammonia - oxides of nitrogen

11. TOXICOLOGICAL INFORMATION

Acute Toxicity	Oral LD50 (rat) 4.5-25ml/kg. Inhalation LC50 (rat) 15000ppm.
Chronic Toxicity/Carcinogenicity	No relevant studies identified.
Genotoxicity	No relevant studies identified.
Reproductive/Developmental Toxicity	No relevant studies identified.

12. ECOLOGICAL INFORMATION

Mobility	No relevant studies identified.
Persistence/Degradability	No relevant studies identified.
Bio-accumulation	No relevant studies identified.
Ecotoxicity	No relevant studies identified.

13. DISPOSAL

Product Disposal	Dispose of in accordance with all applicable local and national regulations.
Container Disposal	Empty containers may contain hazardous residues. Dispose of containers with care.

14. TRANSPORT INFORMATION

DOT CFR 172.101 Data	Proper Shipping Name: Not Regulated
UN Proper Shipping Name	Not Regulated
UN Class	None.
UN Number	None.

15. REGULATORY INFORMATION

TSCA Listed	Yes.
MA Right To Know Law	Not listed.
PA Right To Know Law	Not listed.
NJ Right to Know Law	Not listed.
California Proposition 65	This product contains the

SARA Title III Sect. 302 (EHS)	following chemicals that have been found by the State of California to cause cancer, birth defects or other reproductive harm: - Acrylamide (trace)
SARA Title III Sect. 311/312 Categorization	Not listed.
SARA Title III Sect. 313	Immediate (Acute) Health Hazard Delayed (Chronic) Health Hazard This product does not contain a chemical which is listed in Section 313 at or above de deminis concentrations.

16. OTHER INFORMATION

NFPA Ratings	NFPA Code for Health 2 NFPA Code for Flammability 1 NFPA Code for Reactivity 0
Abbreviations	® Registered trademark of Baroid Technology (TM) Trademark of Halliburton Energy Services N/A: Denotes no applicable information found or available CAS#: Chemical Abstracts Service Number ACGIH: American Conference of Governmental Industrial Hygienists OSHA: Occupational Safety and Health Administration TLV: Threshold Limit Value PEL: Permissible Exposure Limit STEL: Short Term Exposure Limit NTP: National Toxicology Program IARC: International Agency for Research on Cancer R: Risk S: Safety LC50: Lethal Concentration 50% LD50: Lethal Dose 50%

BOD: Biological Oxygen Demand
KoC: Soil Organic Carbon Partition Coefficient
Environmental Services

Prepared By:

All information recommendations and suggestions herein concerning our product are based on tests and data believed to be reliable, however, it is the user's responsibility to determine the safety, toxicity and suitability for his own use of the product described herein. Since the actual use by others is beyond our control, no guarantees, expressed or implied, is made by Baroid as to the effects of such use, the results to be obtained, or the safety and toxicity of the product nor does Baroid assume any liability arising from the use, by others, of the product referred to herein. Nor is the information herein to be construed as absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

March 31, 2000

CANADIAN
Material Safety Data Sheet

LIQUID DRISPAC® POLYMER

DRILLING SPECIALTIES COMPANY
Bartlesville, Oklahoma 74004

PHONE NUMBERS
Emergency: (918) 661-8118
Technical Services: (800) 221-1956
For Additional MSDSs: (918) 661-7354

A. Product Identification

Synonyms: Drilling mud additive
Chemical Name: Mixture
Chemical Family: Mixture
Chemical Formula: Mixture
CAS Reg. No.: Mixture
Product No.: Not Established

Canadian Inventory Listing Status: DSL

All ingredients are listed in the Domestic Substances List (DSL) Impurities are exempt in accordance with Section 3 of the Canadian of Environmental Protection Act (CEPA).

B. Hazardous Components

Ingredients	CAS Number	% By Wt.	OSHA PEL	ACGIH TLV
Petroleum distillates	64742-47-8	55	xx	xx

xx See Section F, for Recommended Exposure Limits.

NA - Not Applicable NE - Not Established

C. Personal Protection Information

Ventilation: Use adequate ventilation to control exposures below recommended exposure limits.

Respiratory Protection: None generally required unless needed to prevent respiratory irritation. Use NIOSH approved air purifying respirator with organic vapor cartridge. In case of spill or leak resulting in unknown concentration, use NIOSH approved supplied air respirator.

Eye Protection: Use safety glasses with side sheilds. Use chemical goggles if splashes could occur.

Skin Protection: Use rubber or neoprene gloves.

NOTE: Personal protection information shown in Section C is based upon general information as to normal uses and conditions. Where special or unusual uses or conditions exist, it is suggested that the expert assistance of an industrial hygienist or other qualified professional be sought.

D. Handling and Storage Precautions

Wash thoroughly after handling. Avoid contact with eyes, skin or clothing. Avoid breathing vapors, mist, fume or dust. Wear protective equipment and/or garments described in Material Safety Data Sheet if exposure conditions warrant. Launder contaminated clothing before reuse. Use with adequate ventilation.

Keep away from heat, sparks, and flame. Store in well-ventilated area. Bond and ground during liquid transfer. Store in closed container.

E. Reactivity Data

Stability: Stable
Conditions to Avoid: Not Applicable
Incompatibility (Materials to Avoid): Strong oxidizing materials

Hazardous Polymerization: Will Not Occur
Conditions to Avoid: Not Applicable
Hazardous Decomposition Products: Carbon oxides formed when burned.

F. Health Hazard Data

Recommended Exposure Limits:

The Company recommends an exposure limit of 400 ppm (total hydrocarbons in air).

Acute Effects of Overexposu

Eye: May cause mild irritation.

Skin: Repeated or prolonged contact may result in defatting of skin, irritation and dermatitis.

Inhalation: High vapor concentrations may cause headache, dizziness, nausea, and unconsciousness. May cause mild mucous membrane irritation of nose and throat.

Ingestion: Low toxicity; may produce diarrhea.

Subchronic and Chronic Effects of Overexposure:

A component has caused kidney injury in male rats only. No comparable health hazard for kidney injury is known to occur in humans.

Other Health Effects:

No known applicable information.

Health Hazard Categories:

CLASS D: POISONOUS AND INFECTIOUS MATERIAL CATEGORIES

1. Materials Causing Immediate and Serious Toxic Effects

   A. Very Toxic ____
   B. Toxic ____

2. Materials Causing Other Toxic Effects

   A. Very Toxic

      1. Chronic Toxic Effects ____
      2. Teratogen/Embryo Toxin ____
      3. Carcinogen ____
      4. Reproductive Toxin ____
      5. Respiratory Tract Sensitizer ____
      6. Mutagen ____

   B. Toxic

      1. Chronic Toxic Effects ____
      2. Skin or Eye Irritant ____
      3. Skin Sensitizer ____
      4. Mutagen ____

   Specify: Does not meet the criteria for any of the above categories.

   Other: _____

NA - Not Applicable NE - Not Established

First Aid and Emergency Procedures:

Eye: Flush eyes with running water for at least fifteen minutes. If irritation or adverse symptoms develop, seek medical attention.

Skin: Wash with soap and water for at least fifteen minutes. If irritation or adverse symptoms develop, seek medical attention.

Inhalation: Remove from exposure. If breathing is difficult, give oxygen. If breathing ceases, administer artificial respiration followed by oxygen. Seek immediate medical attention.

Ingestion: Give two glasses of water and induce vomiting, only if subject is conscious. Seek medical attention.

G. Physical Data

Appearance:	Off-white Viscous Liquid
Odor:	Mild Odor
Boiling Point:	424-460F (217-237C)
Vapor Pressure:	Not Established
Vapor Density (Air = 1):	Not Established
Solubility in Water:	Not Established
Specific Gravity (H2O = 1):	0.97
Percent Volatile by Volume:	Not Established
Evaporation Rate (Butyl Acetate = 1):	<1
Viscosity:	Not Established

H. Fire and Explosion Data

Flash Point (Method Used):	185F (85C) (TCC, ASTM D56)
Flammable Limits (% by Volume in Air):	LEL - Not Established UEL - Not Established
Fire Extinguishing Media:	Dry chemical, foam or carbon dioxide (CO2)
Special Fire Fighting Procedures:	Evacuate area of all unnecessary personnel. Shut off source, if possible. Wear protective equipment and/or garments described in Section C if conditions warrant. Water fog or spray may be used to cool exposed equipment and containers. Use of water may create slick surfaces.
Fire and Explosion Hazards:	Carbon oxides formed when burned.

I. Spill, Leak and Disposal Procedures

Precautions Required if Material is Released or Spilled:
Evacuate area of all unnecessary personnel. Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Shut off source, if possible and contain spill. Protect from ignition. Keep out of water sources and sewers. Absorb in dry, inert material (sand, clay, sawdust, etc.) and transfer to disposal container using non-sparking equipment.

Waste Disposal (Insure Conformity with all Applicable Disposal Regulations):
Incinerate or place in permitted waste management facility.

J. DOT Transportation

Shipping Name:	Petroleum products, n.o.s.
Hazard Class:	Combustible liquid
ID Number:	UN 1268
Packing Group:	III
Marking:	1268 (Bulk packages only)
Label:	None
Placard:	Combustible/1268
Hazardous Substance/RQ:	Not applicable
Shipping Description:	Petroleum products, n.o.s., Combustible liquid, UN 1268, PG III
Packaging References:	49 CFR 173.150, 173.203, 173.241

Note: This product is not regulated by DOT when shipped domestically by highway or rail in non-bulk packagings.

K. RCRA Classification - Unadulterated Product as a Waste

Prior to disposal, consult your environmental contact to determine if TCLP (Toxicity Characteristic Leaching Procedure, EPA Test Method 1311) is required. Reference 40 CFR Part 261.

L. Protection Required for Work on Contaminated Equipment

Contact immediate supervisor for specific instructions before work is initiated. Wear protective equipment and/or garments described in Section C if exposure conditions warrant.

M. Hazard Classification

Class B-Flammable and Combustible Material

N. Additional Comments

SARA 313

As of the preparation date, this product did not contain a chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

NFPA 704 Hazard Codes - - - - - - - - Signals

Health	: 1	Least - 0
Flammability	: 2	Slight - 1
Reactivity	: 0	Moderate - 2
Special Haz.	: -	High - 3
		Extreme - 4

REFERENCES

ACGIH	American Conference of Government Industrial Hygienists
ASTM	American Society of Testing and Materials
CFR	Code of Federal Regulations, U.S.
DOT	Department of Transportation, U.S.
EPA	Environmental Protection Agency, U.S.
IARC	International Agency for Research on Cancer
MSHA	Mine Safety and Health Administration, U.S.
NFPA	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health, U.S.
NTP	National Toxicology Program, U.S.
OSHA	Occupational Safety and Health Administration, U.S.
RCRA	Resource Conservation and Recovery Act, U.S.
SARA	Superfund Amendments and Reauthorization Act, U.S.
TSCA	Toxic Substances Control Act, U.S.

LA2876 MATERIAL SAFETY DATA SHEET PAGE 1

VAN WATERS & ROGERS LTD. 9800 VAN HORNE WAY RICHMOND, B.C. V6X 1W5

SALES ORDER: 17215500

VAN WATERS & ROGERS PRODUCT: 62186SKT

MSDS NUMBER: LA2876 VERSION: 2

DATE PRINTED: 24/02/00

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THIESSEN EQUIPMENT LTD.
1638 ALBERTA AVENUE
SASKATOON SASK. S7K 1R6

WHMIS CODES: D.2B

For Emergency Assistance
Involving Chemicals Call
CHEMTREC (800) 424-9300

WHMIS (Classification)
WHMIS CLASS D-2B: Material causing other toxic effects (TOXIC).

Section I. Chemical Product Identification

Product Name Soda Ash 58% Light

Code	LA2876
CAS#	Not available.
DSL	On the DSL list.
	Not available.

Synonym	Sodium Carbonate
Chemical Name	Sodium Carbonate
Chemical Family	Not available.
Chemical Formula	Not available.
Material Uses	Soda salts; glass; soap, cleaners and water softners; pulp and paper; photographical agent.

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Section II. Composition and Information on Ingredients

Name	CAS #	% by Weight	Exposure Limits TLV/PEL	LC50/LD50
Sodium carbonate	000497198	60-100	Not available.	ORAL (LD50): Acute: 4090 mg/kg [Rat]. 2050 mg/kg [Mouse].

Section III. Hazards Identification

Potential Acute Health Effects	Very hazardous in case of eye contact (irritant). Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Inflammation of the eye is characterized by redness, watering, and itching.
Potential Chronic Health Effects	CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. There is no known effect from chronic exposure to this product. Repeated or prolonged exposure is not known to aggravate medical condition.

Section IV. First Aid Measures

Eye Contact	Check for and remove any contact lenses. IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. COLD water may be used. DO NOT use an eye ointment. Seek medical attention.
Skin Contact	After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. COLD water may be used. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.
Hazardous Skin Contact	Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation	Allow the victim to rest in a well-ventilated area. Seek immediate medical attention.
Hazardous Inhalation	No additional information.
Ingestion	Have conscious person drink several glasses of water. DO NOT induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.
Hazardous Ingestion	No additional information.

Section V. Fire and Explosion Data

The Product is:	May be combustible at high temperature.
Auto-Ignition Temperature	Not available.
Flash Points	Not available.
Flammable Limits	Not available.
Products of Combustion	Not available.
Fire Hazards in Presence of Various Substances	No specific information is available in our database regarding the flammability of this product in presence of various materials.
Explosion Hazards in Presence of Various Substances	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. No specific information is available in our database regarding the product's risks of explosion in the presence of various materials.
Fire Fighting Media and Instructions	SMALL FIRE: Use DRY chemicals, CO2, water spray or foam. LARGE FIRE: Use water spray, fog or foam. DO NOT use water jet.

Special Remarks on Fire Hazards: No additional remark.

Special Remarks on Explosion Hazards: No additional remark.

Section VI. Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container. If necessary: Neutralize the residue with a dilute solution of acetic acid. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill: Our database contains no additional information in case of a spill and/or a leak of the product. Use a shovel to put the material into a convenient waste disposal container. Neutralize the residue with a dilute solution of acetic acid. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section VII. Handling and Storage

Precautions: Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. DO NOT breathe dust. In case of insufficient ventilation, wear suitable respiratory equipment. If you feel unwell, seek medical attention and show the label when possible. Avoid contact with skin and eyes.

Storage: Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool and well-ventilated area. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

Section VIII. Exposure Controls/Personal Protection

Engineering Controls: Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate

	dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
Personal Protection	Splash goggles. Lab coat. Dust respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent. Gloves.
Personal Protection in Case of a Large Spill	Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.
Exposure Limits	Not available.

Section IX. Physical and Chemical Properties

Physical State and Appearance	Solid. (Powdered solid.)	Odor	Odorless.
Molecular Weight	105.99 g/mole	Taste	Not available.
		Color	White.
pH (1% soln/water)	11.3 [Basic.]		
Boiling Point	Not available.		
Melting Point	854.C (1569.2.F)		
Critical Temperature	Not available.		
Specific Gravity	2.533 (Water = 1)		
Vapor Pressure	Not available.		
Vapor Density	Not available.		
Volatility	Not available.		
Odor Threshold	Not available.		
Evaporation rate	Not available.		
Viscosity	Not available.		
Water/Oil Dist.	Not available.		

Coeff.	
Ionicity (in Water)	Not available.
Dispersion Properties	See solubility in water.
Solubility	Partially soluble in cold water.

Section X. Stability and Reactivity Data

Stability	The product is stable.
Instability Temperature	Not available.
Conditions of Instability	Simultaneous exposure to soda ash and lime dusts (CaO). In the presence of moisture (ie. perspiration) the two materials combine to form corrosive caustic soda (NaOH) which may cause burns. Contact with acids will release carbon dioxide gas.
Incompatibility with various substances	Can react violently with red hot aluminum metal; fluorine gas; lithium; and 2,4,6- trinitrotoluene.
Corrosivity	No specific information is available in our database regarding the corrosivity of this product in presence of various materials.
Special Remarks on Reactivity	Hazardous Decomposition Products: Heating soda ash liberates CO2.
Special Remarks on Corrosivity	No additional remark.
Hazerdous Polymerization	No.

Section XI. Toxicological Information

Routes of Entry	Eye contact. Inhalation. Ingestion.
Toxicity to Animals	LD50: Not available. LC50: Not available.

Chronic Effects on Humans	CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. There is no known effect from chronic exposure to this product. Repeated or prolonged exposure is not known to aggravate medical condition.
Other Toxic Effects on Humans	Very hazardous in case of eye contact (irritant). Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Inflammation of the eye is characterized by redness, watering, and itching.
Special Remarks on Toxicity to Animals	No additional remark.
Special Remarks on Chronic Effects on Humans	Excessive contact may produce "soda ulcers" on hands and perforation of the nasal septum. Sensitivity reactions may occur from prolonged and repeated exposure.
Special Remarks on Other Toxic Effects on Humans	No additional remark.

Section XII. Ecological Information

Ecotoxicity	Not available.
BOD5 and COD	Not available.
Products of Biodegradation	Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.
Toxicity of the Products of Biodegradation	Not available.
Special Remarks on the Products of Biodegradation	No additional remark.

Section XIII. Disposal Considerations

Waste Disposal Recycle, if possible. Consult your local or regional authorities.

Section XIV. Transport Information

TDG Classification	Not controlled under TDG (Canada).
Shipping name	Not applicable.
PIN	Not applicable.
Packing Group	Not applicable.
Special Provisions for Transport	No additional remark.

Section XV. Other Regulatory Information

Other Regulations	OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Section XVI. Other Information

References	Not available.
Other Special Considerations	No additional remark.

Verified by Hardev Bendick.

Validated by Hardev Bendick on 1/12/1999.

Information Contact
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Vancouver, B.C.
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