Safety Data Sheet (Canada)

1. Identification

Product Name: Spent Potassium Hydroxide/Sulfide Solution
Synonym: Sour potassium hydroxide, dipotassium sulfide solution
Product use: Sulfide scrubbing media
Restrictions on use: Do not use for non-industrial purpose
Manufacturer: Keyera Alberta Envirofuels Facility
Address: 9511-17 Street
Edmonton, Alberta T6P 1Y3
Emergency Contact: 1-780-449-7800 (24 hours)
SDS Information: 1-780-449-7910

2. Hazards Identification

GHS Hazards

Pictogram	Classification	Hazard Statements
	Skin Corrosion/Irritation – Category 1A Serious Eye Damage/Irritation Category 1	Causes severe skin burns and eye damage
	Acute Toxicity – Category 4 Oral	Harmful if swallowed

Hazards Not Otherwise Classified HNOC (US)
Physical Hazards Not Otherwise Classified PHNOC (Canada)

- Contact with acid will release Hydrogen Sulphide (H_2S) gas.

Signal Word: Danger

Precautionary Statements:

Prevention

- Wear protective gloves/protective clothing/ eye protection/face protection.
  Gloves: Recommended: neoprene, nitrile, PVC, rubber;
  Not recommended: latex.
  Clothing: Flame-retardant coverall e.g. Nomex, Proban.
  Respirator: A NIOSH/MSHA approved air-purifying respirator equipped with dust, mist, fume cartridges.
  Eye: Safety glasses with side shields, safety goggles or face shields

- Avoid release to the environment.

Response

- If inhaled: remove person to fresh air and keep comfortable for breathing.

- If on skin, (or hair): take off immediately all contaminated clothing. Rinse skin with water/shower.

- If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a doctor/physician.

- If swallowed: rinse mouth.
- If swallowed: call a doctor/physician if you feel unwell.

- Wash contaminated clothing before reuse.
- Collect spillage.

Storage

- Store locked up.

Disposal

- Dispose of contents/container in accordance with applicable local, provincial/state, and federal regulations.

3. Composition/Information on Ingredients

Ingredient Name	Weight %	CAS No.
Potassium hydroxide	5 - 10	1310-58-3
BTEX (Benzene, Toluene, Ethylbenzene, Xylenes)	0 - 0.1	
Ferrous sulphide	0 - 0.1	1317-37-9
Potassium sulphide	0 - 20	1312-73-8
Water	75 - 90	7732-18-5

4. First Aid Measures

Immediate Medical Attention and Special Treatment:
Treat symptomatically and supportively. Refer also to Table below.

Exposure Route	Health Effects	Symptoms of Exposure
Inhalation:	**Acute:**	
	Irritation of the nose, throat and respiratory tract. May reduce pulmonary functions; In severe cases, bronchopneumonia, pulmonary edema (fluid build-up in lungs).	Irritation, cough, running nose, difficulty in breathing.
	Delayed: No known delayed effects. **First Aid**: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/physician.	
Skin:	**Acute:**	
	Skin burns. Prolonged and repeated contact may lead to dermatitis. It can penetrate to deeper layers of skin. Corrosion will continue until removed.	Prolonged and repeated exposure to dilute solutions often cause irritation, redness, pain, and drying of the skin.
	Delayed: Burns are not immediately painful; onset of pain may be delayed minutes to hours. **First Aid**: Take off immediately all contaminated clothing. Rinse skin with water/shower.	
Eye:	**Acute:**	
	May cause corneal scarring and clouding, leading to glaucoma, cataracts and permanent blindness	Numbness, burning sensation, blistering, cloudy vision to blindness in severe cases
	Delayed: No known delayed effects. **First Aid**: Rinse cautiously with water for several minutes. Remove contact lens, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.	
Ingestion:	**Acute:**	
	Burn and damage to mouth, throat and abdomen tissue. Perforation of the esophagus/ stomach lining in severe cases	Pain, vomiting, diarrhea
	Delayed: No known delayed effects. **First Aid**: If swallowed: rinse mouth. Call a POISON CENTER or doctor/physician if you feel unwell.	

5. Fire Fighting Measures

Flammability: No.	**Hazardous Combustion Products:** None.
Explosion: Sensitive to Impact: No.	**Sensitive to static discharge:** No.
Extinguishing Media: Small Fire: dry chemical, CO_2, or water spray. Large Fire: alcohol-resistant foam or water spray.	**Unsuitable Extinguishing Media:** High-pressure water jet.

Special Protective Equipment for Firefighters:

- Wear full protective clothing and NIOSH-approved SCBA with full face-piece.

Precautions for Firefighters:

- Avoid skin contact with the corrosive liquid.
- Move container from fire area if it can be done without risk.
- Stay away from tanks engulfed in fire.
- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (½ mile) in all directions; also, consider initial evacuation for 800 meters (½ mile) in all directions.
- Cool fire-exposed containers with flooding quantities of water from a far distance .
- Apply cooling water to containers that are exposed to flames until well after fire is out.

Unusual Fire and Explosion Hazards:

- None.

6. Accidental Release Measures

Protective Equipment:

Gloves:	Recommended: neoprene, nitrile, PVC, rubber; Not recommended: latex.
Clothing:	Flame-retardant coverall e.g. Nomex, Proban.
Respirator:	Air-purifying respirator equipped with dust, mist, fume cartridges.
Eye:	Safety glasses with side shields, safety goggles or face shields.

Precautions:

- **DO NOT attempt to neutralize with acid as Hydrogen Sulfide will be generated.**

Emergency Procedures:

- Shut off leak/release source, if possible.
- Isolate hazard area. Evacuate area of all unnecessary personnel.
  Large spill: consider downwind evacuation of at least 200 meters (600 ft.).
  If tank, rail car or tank truck is involved in a fire, ISOLATE and consider initial evacuation in all directions for 800 meters (½ mile).
- Ventilate area of leak or spill.
- Absorb with dry earth, sand or other non-combustible material. Transfer to containers.
- See Guide 154, Emergency Response Guidebook (Transp. Can/US Dept. of Transp.).

Containment and Clean-up:

- Use booms/pillows to prevent runoff into storm sewers and ditches that lead to waterways.
- Collect spillage.
- Store recovered materials including used sorbents in coated-metal or plastic containers. Liquid may corrode metal drums causing leaks.

7. Handling and Storage

Handling Precautions:

- Avoid contact with eyes, skin, and clothing and avoid breathing vapor.
- Wear protective gloves/clothing and eye/face protection:

Gloves:	Recommended: neoprene, nitrile, PVC, rubber; Not recommended: latex. Prior to use, user should confirm impermeability.
Clothing:	Flame-retardant coverall e.g. Nomex, Proban.
Respirator:	A NIOSH/MSHA approved air-purifying respirator equipped with dust, mist fume cartridges.
Eye:	Safety glasses with side shields, safety goggles or face shields.

- Use only in a well ventilated area.
- When diluting: add potassium hydroxide solution to water in small amounts to avoid splattering.
- Wash thoroughly with soap and water after handling.
- Keep containers closed when not in use.

Storage Precautions:

Locations

- Store in a cool, dry, well-ventilated location, away from any area of fire-hazard.

Containers

- Store in coated-metal, or plastic containers, as the corrosive solution may react with metals.

Other precautions

- Store locked-up.
- Keep separate from the following incompatibles

  Acids: may react violently, with the release of Hydrogen Sulfide (H_2S) gas.
  Metals: reaction may produce flammable and explosive hydrogen gas.
  Organohalogen compounds: may react to form spontaneously combustible compounds.
  Nitro and Chloro organic compounds: may react explosively.

8. Exposure Controls / Personal Protection

EXPOSURE LIMITS

	Authority	15 MINS STEL or Ceiling	8-HOURS
Potassium hydroxide (CAS 1310-58-3)	Alberta, Ontario, BC	Ceiling 2 mg/m^3 skin irritation Ceiling 2 mg/m^3	-

ENGINEERING CONTROLS

- Engineering control methods to reduce hazardous exposures are preferred. Methods include mechanical ventilation, process or personal enclosure, control or process conditions, and process modification.
- Ventilate area where product is used, stored and/or handled.
- Ventilation system should be separate from other exhaust ventilation systems. Adequate make-up air must be provided.

PERSONAL PROTECTIVE EQUIPMENT

Gloves: Recommended: neoprene, nitrile, PVC, rubber;
Not recommended: latex.
Prior to use, user should confirm impermeability.

Clothing: Flame-retardant coverall e.g. Nomex, Proban.

Respirator: A NIOSH/MSHA approved air-purifying respirator equipped with dust, mist, fume cartridges.

Eye: Safety glasses with side shields, safety goggles or face shields.

9. Physical and Chemical Properties

Chemical Formula: KOH/K_2S	**Molecular Weight:** Not available	**Chemical Family:** Alkali Metal Hydroxide/Sulfide
Appearance: Dark colored liquid	**Odor:** Sulphurous mercaptan	**Odor Threshold:** Not available
pH: 12.50 – 14.00	**Melting/Freezing Point:** ~ 0 °C / 32 °F	**Boiling Point:** ~ 100 °C /212 °F
Boiling Range: Not available	**Vapor Density:** Not available	**Specific Gravity:** 1.155 – 1.350
Flash Point: None	**Flammability:** Non flammable	**Evaporation Rate:** Not available
Upper-Lower Explosive Limit: Not applicable – non-flammable	**Vapor Pressure:** Not available	**Percent Volatile:** ~0
Soluble in water (@20°C): 100%	**Others:** Soluble in alcohol and glycerin. Not soluble in organic solvents e.g. ether, xylene, chloroform.	
Partition Coefficient n-octanol/water: Not available	**Auto-Ignition Temperature:** None	**Decomposition Temp.:** Not available
Viscosity: Not available	**Henry's Law Constant:** Not available	**Isobaric Heat Capacity:** Not available

10. Stability and Reactivity

Reactivity:
- Stable under normal temperatures and pressures.
- Corrosive to aluminum, tin, and zinc. Corrosive to steel at elevated temperatures.

Chemical Stability:
Stable under normal temperatures and pressures.

Possibility of Hazardous Reactions:
Polymerization has not been reported to occur under normal temperature and pressure conditions.

Conditions to Avoid:
Extreme temperatures and incompatible materials.

Incompatible Materials:
- Acids: may react violently, with the release of Hydrogen Sulfide (H_2S) gas.
- Metals: reaction may produce flammable and explosive hydrogen gas.
- Organohalogen compounds: may react to form spontaneously combustible compounds.
- Nitro and Chloro organic compounds: may react explosively.

Hazardous Decomposition Products:
Not known to be generated.

11. Toxicological Information

Exposure Route	Acute Health Effects	Symptoms of Exposure
Inhalation:	Irritation of the nose, throat and respiratory tract. May reduce pulmonary functions; In severe cases, bronchopneumonia, pulmonary edema (fluid build-up in lungs).	Irritation, cough, running nose, difficulty in breathing.
Skin:	Skin burns. Burns are not immediately painful; onset of pain may be delayed minutes to hours.	Irritation, redness, pain, and drying of the skin. Onset of pain may be delayed minutes to hours.
Eye:	May cause corneal scarring and clouding, leading to glaucoma, cataracts and permanent blindness.	numbness, burning sensation, blistering, cloudy vision to blindness in severe cases.
Ingestion:	May cause burn and damage to mouth, throat and abdomen tissue. Perforation of the esophagus and stomach lining in severe cases.	pain, vomiting, diarrhea.

Chronic Exposure:

Inhalation:
Repeated and/or prolonged exposures may cause productive cough, running nose, bronchopneumonia, pulmonary edema (fluid build-up in lungs), and reduction of pulmonary functions.

Skin: Not known to be a skin-sensitizer. Prolonged and repeated exposure to dilute solutions often cause irritation, redness, pain & drying of the skin. Prolonged/repeated contact may lead to dermatitis. May penetrate to deeper layers of skin. Corrosion will continue until removed.

Medical Conditions Aggravated by Exposure:
Possibly dermatitis.

Carcinogenicity:
Has been implicated in cases of cancer of the esophagus in individuals who have ingested it. The cancer may develop 12 to 42 years after ingestion. Similar cancers have been observed at the sites of severe thermal burns. However, these cancers may be due to tissue destruction and scar formation rather than the potassium hydroxide.

NTP, IARC, OSHA: none of this product's components are listed at ≥ 0.1%.

Target organs:	**Irritancy:**
Single exposure: eye, skin. Repeated exposure: skin	Not classified as a skin irritant.

Sensitization:	**Reproductive Toxicology:**	**Teratogenicity:**	**Mutagenicity:**
No	No	No	No

Lethality Tests:

Chemical Name	CAS No.	LD50	LC50
Potassium Hydroxide	1310-58-3	Rat, oral: 284 mg/Kg	Not available
Potassium Sulfide	16721-80-5	Not available	Not available

12. Ecological Information

Ecotoxicity: Toxic to aquatic life.	**Persistence & Degradability:** No data available for the mixture.	**Bioaccumulative Potential:** No data available for the mixture.
	Mobility: No data available for the mixture.	**Other Adverse Effects:** No data available for the mixture.

Terrestrial Fate:

- Potassium hydroxide will stay in the soil and if not recovered, potentially contaminate the groundwater.

Aquatic Fate:

- Potassium hydroxide KOH may be hazardous to the aquatic environment (NIOSH).
- KOH is not listed as acutely toxic to fish.
- Environmental toxicity: TLm 80 ppm/Mosquito fish, 24 hrs., fresh water.
- Taiwan and EU have assigned Potassium Sulfide as “Hazardous to Aquatic Environment”.

Atmospheric Fate:

- Potassium hydroxide itself is non-volatile and will not participate in atmospheric reaction

13. Disposal Considerations

Waste Disposal:

- Dispose of waste material at an approved (hazardous) waste treatment/disposal facility in accordance with applicable local, provincial/state, and federal regulations.
- Do not dispose of waste with normal garbage, or to sewer systems.

14. Transport Information

TDG (Canada) CLASSIFICATION

PROPER SHIPPING NAME:
Corrosive Liquid, Basic, Inorganic, N.O.S. (Potassium Hydroxide, Potassium Sulfide Solution)
UN NUMBER: UN3266
CLASS: 8
PACKING GROUP: II **LABEL/PLACARD:**

Or

PROPER SHIPPING NAME:
Corrosive Liquid, N.O.S. (Potassium Hydroxide, Potassium Sulfide Solution)
UN NUMBER: UN1760
CLASS: 8
PACKING GROUP: II **LABEL/PLACARD:**

STANDARD TRANSPORTATION COMMODITY CODE STCC

Product Code	2812410
Product Group	Chemical or Allied Products
Hazmat Code	4935230
Product Description	Potassium Hydroxide (Caustic Potassium)
Harmonized Codes	2815.20.0000

15. Regulatory Information

CANADA

	Chemical		
	Potassium hydroxide	Potassium sulphide	Ferrous sulphide
CAS No.	1310-58-3	1312-73-8	1317-37-9
DSL (Domestic Substance List)	yes	yes	yes
NPRI (National Pollutant Release Inventory)	no	no	no
E2 (Environmental Emergencies)	no	no	no
Ingredient Disclosure List	yes	no	no

16. Other Information

Prepared for: Keyera Alberta Envirofuels Facility
Revision Date/ Revision No: July 15, 2015/ Revision #5

Revisions:	Dates:	Main Changes
• Original:	July 19, 2005	
• 1st revision:	Oct 1, 2006	Contact info
• 2nd revision:	August 27, 2009	No change
• 3rd revision:	May 23, 2012	Company name change
• 4th revision:	April 3, 2014	Composition updated
• 5th revision:	July 15, 2015	GHG format
• 6th revision	December 12,2018	KOH changed to 5-10%

Glossary

ACGIH – American Conference of Governmental Industrial Hygiene
DOT – US Department of Transportation
E2 – Environmental Emergencies (Canada)
IARC – International Agency for Research on Cancer
IDLH – Immediately Dangerous to Life and Health
NIOSH – National Institute for Occupational Safety & Health
NPRI – National Pollutant Release Inventory (Canada)
NTP – National Toxicology Program
OSHA – Occupational Safety & Health Administration of the US Depart of Labour
PEL – Permissible Exposure Limit
SARA – Superfund Amendments and Reauthorization Act of 1986
SCBA – Self-Contained Breathing Apparatus
STEL – Short Term Exposure Limit
TDG – Canada Transportation of Dangerous Goods
TRI – US Toxic Release Inventory
TSCA – Toxic Substance Control Act
TWA – Time Weighed Average

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~ End of Safety Data Sheet ~