Safety Data Sheet (US)

1. Identification

Product Identifier: Spent Potassium Hydroxide/Sulfide Solution
Other Means of Identification: 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: 9511-17th Street, Edmonton, Alberta T6P 1Y3
MSDS Information: 1-780-449-7910
Emergency Contact: 1-866-377-7110 (24 hours)

2. Hazards Identification

GHS Hazards

Pictogram	Classification	Hazard Statements
	Skin Corrosion/Irritation – Category 1A Serious Eye Damage/Irritation Category 1	H314: Causes severe skin burns and eye damage.
	Acute Toxicity – Category 4 Oral	H302: Harmful if swallowed.
	Hazardous to the Aquatic Environment – Acute Hazard – Category 2 Hazardous to the Aquatic Environment – Long-term Hazard – Category 2	H411: Toxic to aquatic life with long lasting effects.

Hazards Not Otherwise Classified HNOC (US)

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

Signal Word: Danger

Precautionary Statements:

Prevention

- Do not breathe fume/mist/spray.

- Wash hands thoroughly after handling.
- 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. Do not induce vomiting.
- 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	Volume %	CAS No.
Potassium hydroxide	5 - 10	1310-58-3
BTEX (Benzene, Toluene, Ethylbenzene, Xylenes)	0 - 0.1	
Ferrous sulfide	0 - 0.1	1317-37-9
Potassium sulfide	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.

First Aid:	
Inhalation:	Remove person to fresh air and keep comfortable for breathing. Call a doctor/physician if you feel unwell.
Skin:	If on skin (or hair): take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation occurs: get medical advice/attention.
Eyes:	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.
Ingestion:	If swallowed: rinse mouth. Do not induce vomiting. Call a doctor/physician if you feel unwell.

Most Important Effects and Symptoms, Acute or Delayed:		
	Health Effects	**Symptoms of Exposure**
Inhalation:	May reduce pulmonary functions; In severe cases, bronchopneumonia, pulmonary edema (fluid build-up in lungs).	Cough, shortness of breath, difficulty in breathing.
Skin:	It can penetrate to deeper layers of skin. Corrosion will continue until removed.	Burns are not immediately painful; onset of pain may be delayed minutes to hours.
Eyes:	May cause corneal scarring and clouding, leading to glaucoma, cataracts and permanent blindness.	Numbness, burning sensation, blistering, cloudy vision to blindness in severe cases.

5. Fire Fighting Measures

Flammability: No.	**Hazardous Combustion Products:** None.	**Sensitive to Impact/Static Discharge**: No.

Extinguishing Media:	**Unsuitable Extinguishing Media:**
Small Fire: dry chemical, CO_2, or water spray. Large Fire: alcohol-resistant foam or water spray.	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.

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 neutralize this product with acid as Hydrogen Sulfide H_2S 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.
- Wash thoroughly with soap and water after handling.
- Keep containers closed when not in use.

Storage Precautions:

- Store in a cool, dry, well-ventilated location, away from any area of fire-hazard.
- Store in coated-metal, or plastic containers, as the corrosive solution may react with metals.
- 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)	OSHA PEL	None	None
	ACGIH TLV	Ceiling 2 mg/m^3	None
	NIOSH	None	None

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 Family: Alkali Metal Hydroxide/Sulfide	**Chemical Formula:** KOH/K_2S	
Appearance: Dark colored liquid.	**Odor:** Sulfurous mercaptan	**Odor Threshold:** Unknown
pH: 12.50 – 14.00	**Melting/Freezing Point:** ~ 0 °C / 32 °F	**Boiling Point:** ~ 100 °C /212 °F
Flash Point: Non flammable.	**Flammability:** Non flammable.	**Evaporation Rate:** Not available.
Upper & Lower Flammability or Explosion Limits, Autoignition Temperature: Non flammable – not applicable.		
Vapor Pressure: No available.	**Vapor Density:** No available.	**Others:** Soluble in alcohol and glycerin. Not soluble in organic solvents e.g. ether, xylene, chloroform.
Specific Gravity: 1.155 – 1.350	**Soluble in water (@25°C):** 100%	
Viscosity: No available.	**Decomposition Temperature:** No available.	**Partition Coefficient n-octanol/water:** No available.

10. Stability and Reactivity

Reactivity:
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:
No decomposition if stored and applied as directed.

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. Prolonged and repeated contact may lead to dermatitis. It can penetrate to deeper layers of skin. Corrosion will continue until removed.	Prolonged/repeated exposure to dilute solutions may cause irritation, redness, pain, and drying of the skin. Burns are not immediately painful; 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:
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.

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

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: none of this product's components are listed at $\geq$ 0.1%.
IARC: none of this product's components are listed at $\geq$ 0.1%.
OSHA: none of this product's components are listed at $\geq$ 0.1%.

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. See aquatic fate for potassium sulfide.	**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.
- TLm 80 ppm/Mosquito fish, 24 hrs., fresh water.
- Both Taiwan and EU have assigned Potassium Sulfide as “Hazardous to the 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

DOT (U.S.) 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

UNITED STATES

Regulatory List	Chemical
TSCA: Toxic Substance Control Act Inventory List	Potassium sulfide, Potassium hydroxide, Ferrous sulfide
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act (Superfund List)	Potassium hydroxide
CSWHS: Clean Water Act Hazardous Substance list	Potassium hydroxide

16. Other Information

NFPA Hazard Rating:
Health 3, Flammability 0, Instability 0

Prepared for: Keyera Alberta Envirofuels Facility
Revision Date/ Revision No: December 12, 2018/ Revision #6

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:	September 30, 2014	Title change; GHG format
• 6th revision:	December 12, 2018	KOH% changed to 5-10%

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~ End of Safety Data Sheet ~