SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME (GHS Product Identifier): Lime Sludge from water softening treatment
(Other means of Identification): Hydrated lime, slaked lime, lime, calcium hydroxide

PRODUCT INTENDED USE AND RESTRICTION: Soil conditioner

NAME, ADDRESS & TELEPHONE NUMBER OF THE RESPONSIBLE PARTY:

Company
Green Plains Trade Group LLC
1811 Aksarben Drive, Omaha, NE 68106
Phone: 402-884-8700
Email: EHSS@gpreinc.com

CHEMTREC PHONE (24HR Emergency Telephone): 1-800-424-9300 (Within U.S.A)
INTERNATIONAL CHEMTREC CALL: 1-703-527-3887
OTHER CALLS: 1-402-884-8700 (M-F, 8 AM-5 PM, Central time (U.S.A & Canada); within U.S.A)

FAX PHONE: 1-402-884-8776 (M-F, 8 AM-5 PM, Central time (U.S.A & Canada); within U.S.A)

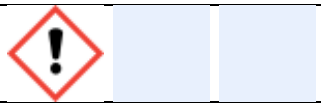
SECTION 1 NOTES: None Available

SECTION 2: HAZARDS IDENTIFICATION

GHS LABELING AND CLASSIFICATION: This product meets the definition of the following hazard classes as defined by the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

GHS CLASSIFICATION ACCORDING TO ANNEX II:

HEALTH	ENVIRONMENTAL	PHYSICAL
Acute Toxicity (Inhalation, dust)-Category 5 Serious eye damage/eye irritation-Irritant 2[i]	Not Classified	Not classified

SIGNAL WORD:		**WARNING**
SYMBOL:		
HAZARD STATEMENT:		May be harmful if inhaled (dust) Causes serious eye irritation
PRECAUTIONARY STATEMENTS:	**PREVENTIVE:**	P261: Avoid breathing dust P264: Wash…thoroughly after handling P280: Wear protective gloves/protective clothing/eye protection/face protection
	RESPONSE:	P304+P312: IF INHALED: Call a POISON CENTER/doctor/…/if you feel unwell P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
	STORAGE:	Not Available
	DISPOSAL:	Dispose of contents/containers in compliance with local, state and federal regulations

Any Regional Considerations: N/A

SECTION 2 NOTES: None Available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL NAME: Calcium hydroxide
COMMON NAME: Lime
CHEMICAL FAMILY: Alkaline Earth Hydroxide
CHEMICAL FORMULA: Complex mixture mostly calcium hydroxide, $Ca(OH)_2$
SYNONYMS: Hydrated lime, slaked lime, lime, calcium hydroxide

Component:

NAME	CAS#	EC#	ICSC#	% WT	% VOL
Calcium Hydroxide	1305-62-0	215-137-3	0408	0-100%	N/A
Total Solids	N/A	N/A	N/A	57.9%	N/A
Moisture (water)	7732-18-5	231-791-2	None	42.1%	N/A
Calcium	7440-70-2	231-179-5	1192	16.0%	N/A
Magnesium Hydroxide	1309-42-8	215-170-3	N/A	0-10%	N/A
Magnesium	7439-95-4	231-104-6	0289	1.26%	N/A
Sulfur	7704-34-9	231-722-6	1166	0.26%	N/A
Phosporus	7723-14-0	231-768-7	N/A	0.01%	N/A
Sodium	7440-23-5	231-132-9	0717	0.02%	N/A
Iron	7439-89-6	231-096-4	N/A	0.0956%	N/A
Manganese	7439-96-5	231-105-1	0174	0.044%	N/A

CARCINOGENICITY

OSHA: NO **ACGIH:** A2, suspected human carcinogen **NTP:** K, known to be human carcinogens
IARC: Classified as carcinogenic to humans (respirable) **OTHER:** N/A

IMPURITIES/STABILIZING ADDITIVES IDENTIFICATION: N/A

IMPURITIES/STABILIZING ADDITIVES CLASSIFICATION (if applicable): N/A

SECTION 3 NOTES: Calcium hydroxide is not listed as a carcinogen by the NTP, IARC, or OSHA. However, the material may contain traces of crystalline silica which is listed by iarc AND ntp BUT NOT BY osha as a carcinogen. OSHA requires products containing >0.1% of a known carcinogen must be labeled. NTP states that “silica, crystalline (respirable)” may reasonably be anticipated to be a carcinogen (1991). Green Plains Renewable Energy Inc. recommends using personal protection when handling this product.

SECTION 4: FIRST AID MEASURES

Contaminated individuals of chemical exposure must be taken for medical attention if any adverse effect occurs. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to health professional with contaminated individual.

EMERGENCY OVERVIEW: Corrosive to eyes and skin. Causes burns. Irritating to respiratory system. Do not breathe vapor or mist. Do not get in eyes or on skin or clothing. Contains material that may cause target organ damage, based on animal data. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

ROUTES OF ENTRY/FIRST AID: Skin contact, eye contact, ingestion and inhalation

EYES CONTACT: If this chemical contacts the eyes, immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately. Contact lenses should not be worn when working with this chemical.

SKIN CONTACT: If this chemical contacts the skin, immediately flush the contaminated skin with soap and water. If this chemical penetrates the clothing, immediately remove the clothing and flush the skin with water. If irritation persists after washing, get medical attention.

INHALATION: If a person breathes large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform mouth-to-mouth resuscitation. Keep the affected person warm and at rest. Get medical attention as soon as possible.

INGESTION: If victim is conscious, give 300 ml (10 oz) of water, followed by diluted vinegar (1 part vinegar, 2 parts water) or fruit juice to neutralize the alkali. Do not induce vomiting. Contact a physician immediately.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Respiratory disease, dermatitis (skin disorders)

NOTES TO PHYSICIANS OR FIRST AID PROVIDERS: N/A

SECTION 4 NOTES: None Available

SECTION 5: FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA: Calcium hydroxide is not flammable. Use extinguishing media appropriate to the surrounding fire conditions.

PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIRE FIGHTERS: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
(*Define specific hazards arising from the chemical e.g., nature of any hazardous combustion products*)
Chemical reaction with incompatibles has potential to produce high pressure/explosion in confined spaces. The nitroparaffins, nitromethane, nitropropane, etc. form salts with inorganic bases such as calcium hydroxide. The dry salts are explosive.

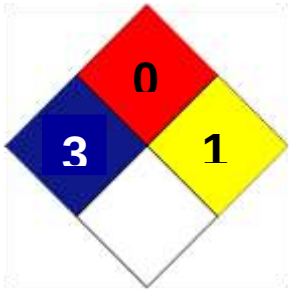
HAZARDOUS DECOMPOSITION PRODUCTS: Decomposition products may include the following materials—metal oxide/oxides.

FLAMMABLE LIMITS IN AIR (% by volume): N/A
UPPER LIMIT:
LOWER LIMIT:

FLASH POINT: N/A
F:
C:
METHOD USED:

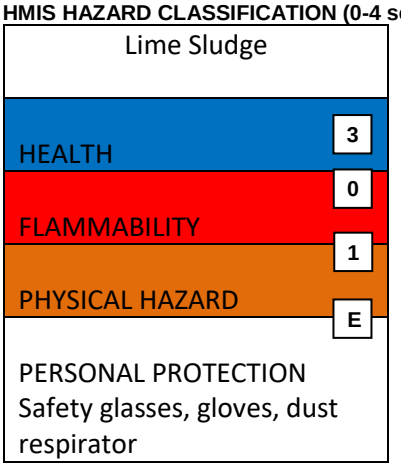
AUTOIGNITION TEMPERATURE: N/A
F:
C:

NFPA HAZARD CLASSIFICATION:



HEALTH=3
FLAMMABILITY=0
REACTIVITY=1
OTHER=N/A

HMIS HAZARD CLASSIFICATION (0-4 scale):



SECTION 5 NOTES: None Available

SECTION 6: ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

ENVIRONMENTAL PRECAUTIONS: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP: Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material such as sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product.

SECTION 6 NOTES: None Available

SECTION 7: HANDLING AND STORAGE

PRECAUTION FOR SAFE HANDLING: Avoid contact with skin and eyes. Wear protective equipment. Keep dust levels to a minimum, Minimize dust generation. Enclose dust sources, use exhaust ventilation (dust collector at handling points). Handling systems should preferably be enclosed. When handling bags usual precautions should be paid to the risks.

CONDITIONS FOR SAFE STORAGE (any incompatibilities): Store under dry conditions. Minimize contact with air and moisture. Bulk storage should be in purpose-designed silos. Keep away from acids, significant quantities of paper, straw, and nitro compounds. Keep out of reach of children. Do not use aluminium for transport or storage if there is a risk of contact with water.

SECTION 7 NOTES: None Available

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS/GUIDELINES:

INGREDIENTS	ACGIH	NIOSH	OSHA-FINAL PELs
Calcium hydroxide	8-hr TLV 5 mg/m3	10-hr TWA 5 mg/cu m	8-hr TWA 5 mg/cu m

ENGINEERING CONTROLS: Handle with mechanical equipment to avoid or minimize contact with skin and breathing dust. This material (lime sludge, spent) is normally moist.

VENTILATION: Stored outside, avoid dust

PERSONAL PROTECTIVE EQUIPMENT (PPE):

EYE PROTECTION: wear protective goggles to avoid dust. In event of dusty material, an eyewash station and safety shower should be readily available.

SKIN PROTECTION: Wear clean, dry gloves; full length pants over boots, long sleeved shirt buttoned at the neck, head protection and approved eye protection selected for the working conditions.

RESPIRATORY PROTECTION: In cases of insufficient ventilation, use a NIOSH-approved dust respirator.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

SECTION 8 NOTES: None Available

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: White to buff/tan colored, fine or clay textured, powder or paste

PHYSICAL STATE: Solid

COLOR: Colorless or white powder

ODOR: Slightly earthy odor

pH AS SUPPLIED: 9.3 (for lime sludge, spent)
pH (Other):

FREEZING POINT: N/A
F:
C:

BOILING POINT:
F: 5162˚F
C: 2850˚C

MELTING POINT:
F: 1076 ˚F
C: 580˚C

FLASH POINT: N/A
F:
C:

EVAPORATION RATE (BASIS=1): N/A

FLAMMABILITY (by %volume): N/A
UPPER FLAMMABILITY LIMIT:

LOWER FLAMMABILITY LIMIT:

VAPOR PRESSURE (mmHg): N/A
@
F:
C:

VAPOR DENSITY (AIR = 1): N/A
@
F:
C:

SOLUBILITY IN WATER: Varies, 0.165 g/100 g solution

PARTITION COEFFICIENT n-octanol/water: N/A

AUTO-IGNITION TEMPERATURE: N/A
F:
C:

DECOMPOSITION TEMPERATURE: Decompose at boiling temperature
F: 5162˚F
C: 2850˚C

SPECIFIC GRAVITY (H2O = 1): 2.2-2.4
@
F:
C:

PERCENT SOLIDS BY WEIGHT: ~60%

PERCENT VOLATILE: N/A
BY WT/BY VOL @
F:
C:

VOLATILE ORGANIC COMPOUNDS (VOC): N/A
WITH WATER: LBS/GAL
WITHOUT WATER: LBS/GAL

MOLECULAR WEIGHT: 74.093 g/mole (as Calcium hydroxide)

VISCOSITY: N/A
@
F:
C:

SECTION 9 NOTES: None Available

SECTION 10: STABILITY AND REACTIVITY

REACTIVITY: The nitroparaffins, nitromethane, nitropropane, etc. form salts with inorganic bases such as calcium hydroxide. The dry salts are explosive.

STABILITY: Stable under normal conditions.

CONDITIONS TO AVOID (STABILITY): Acids

POSSIBILITY OF HAZARDOUS REACTIONS: The nitroparaffins, nitromethane, nitropropane, etc. form salts with inorganic bases such as calcium hydroxide. The dry salts are explosive.

INCOMPATIBILITY MATERIAL: Acids (violent reaction generating heat and gasses, possible explosion in confined area, Boron tri-flouride, chlorine tri-flouride, ethanol, fluorine, hydrogen fluoride phonsporus pentoxide.

HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition at 540^{o} C will produce calcium oxide and water**.**

SECTION 10 NOTES: None Available

SECTION 11: TOXICOLOGICAL INFORMATION

TOXICOLOGICAL INFORMATION: There is very little data available on the toxicity of calcium hydroxide. There is very little existing animal data, but it has been shown that chronic exposure to calcium hydroxide in drinking water can cause aggression, restlessness, and reduced food intake and blood changes in rats. In animal tests there was no reported skin irritation in rabbits exposed to calcium hydroxide, and eye irritation studies reported a high possibility of corrosiveness and permanent eye damage when exposed to thick, pasty compounds containing calcium hydroxide.

ROUTES OF EXPOSURE: Skin contact, eye contact, ingestion and inhalation

SYMPTOMS RELATED TO THE PHYSICAL, CHEMICAL AND TOXICOLOGICAL CHARACTERISTICS:

CONTACT WITH EYES: Eye contact with dust may cause immediate or delayed irritation or inflammation. Eye contact with large amounts of dry powder or with wet hydrated lime can cause moderate eye irritation, chemical burns and blindness.

CONTACT WITH SKIN: Dermal contact may cause dry skin, discomfort, irritation, and severe burns.

INHALATION: Irritant; breathing dust may cause nose, throat or lung irritation, including choking, depending on the degree of exposure. Inhalation of high levels of dust can cause chemical burns to the nose, throat and lungs.

INGESTION: Ingestion of small quantities of hydrated lime is not known to be harmful. Large quantities can cause chemical burns in the mouth, throat, stomach, and digestive tract.

DELAYED AND IMMEDIATE EFFECTS AND ALSO CHRONIC EFFECTS FROM SHORT- AND LONG-TERM EXPOSURE:

ACUTE HEALTH HAZARDS: Prolonged contact may irritate or burn skin, especially in the presence of moisture. Inhalation of dust may irritate mucous membranes or respiratory passages. Direct eye contact may cause permanent damage.

CHRONIC HEALTH HAZARDS: Contact dermatitis

NUMERICAL MEASURES OF TOXICITY:

LD50/LC50: LD50 (LIME) is 7340 mg/kg (Rat, Oral), 7300 mg/kg (Mouse, Oral)

IRRITATION DATA: Not available

CARCINOGENICITY: Not available

EPIDEMILOGY: Not available

TERATOGENICITY: Not available

REPRODUCTIVE EFFECTS: Not available

NEUROTOXICITY: Not available

MUTAGENICITY: Not available

OTHER: N/A

SECTION 11 NOTES: when consumers are not exposed to calcium hydroxide, hydroxide nor calcium carbonate should cause any permanent or lasting physical effects. Calcium carbonate should precipitate out, and hydroxide will combine with available oxides to form water, which would also be flushed from the system. In regards to genotoxicity, carcinogenicity, and developmental toxicity, calcium is already present in the body and essential to bone density and production. It can be concluded that there is concern for humans with regard to possible genotoxicity, carcinogenicity or developmental toxicity of calcium hydroxide. The only critical endpoint for calcium hydroxide exposure seems to be the potential for eye irritation.

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICITY (AQUATIC AND TERRESTRIAL, WHERE AVAILABLE): Acute LC50 356 mg/L marine water, Fish-Guppy-Poecilia reticulate-Young-3 weeks, 96 hrs; Acute LC50 160000 ug/L fresh water, Fish-Western mosquitofish-Gambusia affinis-Adult, 96 hrs; Acute LC50 33884.4 ug/L fresh water, Fish-Zambezi barbell-Clarias gariepinus-Fingerling, 96 hrs; Chronic NOEC 56 mg/L marine water, Fish-Guppy-Poecilia reticulate-Young-3 weeks, 96 hrs.

PERSISTENCE AND DEGRADABILITY: Calcium hydroxide does not degrade oxidatively; it is neutralized by absorption of atmospheric carbon dioxide.

BIOACCUMULATIVE POTENTIAL: This compound shows no bioaccumulation or food chain concentration toxicity potential.

MOBILITY IN SOIL: Calcium hydroxide reacts with water and/or carbon dioxide to form calcium carbonate, which is sparingly soluble, and so presents a low mobility in most ground. Moreover this product is used as fertilizers.

OTHER ADVERSE EFFECTS: N/A

SECTION 12 NOTES: Hydrated lime has been withdrawn from the Clean Water Act list of hazardous substances (11/13/79, 44FR65400). It is concluded that the use of calcium hydroxide in the treatment of wastewater has no adverse effect on the aquatic ecosystem in "Draft human and environmental risk assessment of calcium hydroxide" report prepared by the Washington State Department of Ecology in March 2005.

SECTION 13: DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Disposal waste calcium oxide or hydroxide must never be discharged directly into sewers or surface waters. Following neutralization either at the spill site or at a waste management facility, the resultant sludge can be disposed of to a secure landfill. Or consult with environmental regulatory agencies for guidance on acceptable disposal practices.

RCRA HAZARD CLASS: Not a hazardous waste either by listing or characteristic.

DESCRIPTION OF WASTE RESIDUES AND INFORMATION ON THEIR SAFE HANDLING AND METHODS OF DISPOSAL, INCLUDING ANY CONTAMINATED PACKAGING: Dispose of waste and containers in compliance with applicable Federal, State, Provincial and Local regulations.

SECTION 13 NOTES: None Available

SECTION 14: TRANSPORT INFORMATION

U.N. GHS TRANSPORT REQUIREMENT

UN NUMBER: N/A
PROPER SHIPPING NAME: N/A
TRANSPORT HAZARD CLASS: N/A
PACKING GROUP: N/A
LABEL STATEMENT: N/A
MARINE POLLUTANT: NO

SPECIAL PRECAUTIONS FOR USER: Corrosive material; avoid any release of dust during transportation, by using tight tanks for powders and covered trucks for pebbles.

SECTION 14 NOTES: None Available

SECTION 15: REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS

TOXIC SUBSTANCE CONTROL ACT (TSCA): All naturally occurring components of this product are automatically included in the USEPA TSCA Inventory List per 40 CFR 710.4(b). All other components are listed on the USEPA TSCA Chemical Substances Inventory. Calcium Hydroxide is subject to inventory update reporting (IUR).

OCCUPATIONAL, SAFETY AND HEALTH ADMINISTRATION (OSHA): N/A

COMPREHENSIVE RESPONSE COMPENSATION, AND LIABILITY ACT (CERCLA): Not listed in Table 302.4

CLEAN WATER ACT (CWA): N/A

CLEAN AIR ACT (CAA): N/A

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) TITLE III INFORMATION:

SARA SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES: Not listed

SARA SECTION 311/312 (40 CFR 370) HAZARD CATEGORIES: This product is regulated under 29 CFR 1919.1200 (OSHA Hazard Communication) as Immediated (Acute) Health Hazards – Irritant.

SARA 313 REPORTABLE INGREDIENTS: Not listed.

STATE REGULATIONS: Massachusetts Substances: The following components are listed: Calcium Hydroxide; New Jersey Hazardous Substances: The following components are listed: Calcium hydroxide, hydrated lime. Pennsylvania RTK Hazardous Substances: The following components are listed: Calcium Hydroxide.

INTERNATIONAL REGULATIONS: Canada WHMIS: Class E: Corrosive material

SECTION 15 NOTES: Hydrated Lime has been investigated with respect to elements identified by EPA as toxic and it has been classified for use in direct contact with drinking water (in accordance with Standard ANSI/NSF 60).

SECTION 16: OTHER INFORMATION

DISCLAIMER: The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall the company be liable for any claims, losses or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.

REFERENCES:

GHS Annex II
GHS SDS Instruction

ACRONYMS/ABBREVIATIONS:

ACGIH-American Conference of Governmental Industrial Hygienists
CAA-Clean Air Act
CAS-Chemical Abstracts Service
CERCLA-Comprehensive Response Compensation and Liability Act
CHEMTREC-It serves as a round-the-clock resource for obtaining immediate response information for incidents involving hazardous material and dangerous goods.
CWA-Clean Water Act
EC-European Commission
GHS-Globally Harmonized System of Classification and Labeling of Chemicals
IARC-International Agency for the Research on Cancer
ICSC-International Chemical Safety Cards
LC50-The concentration of a chemical in air or of a chemical in water which causes the death of 50% of a group of test animals.
LD50-The amount of a chemical, given all at once, which causes the death of 50% of a group of test animals.
NIOSH-The National Institute for Occupational Safety and Health
NTP-National Toxicology Program
OSHA-Occupational Safety and Health Administration
RCRA-Resource Conservation and Recovery Act
RQ-Reportable Quantity
SARA-Superfund Amendments and Reauthorization Act
STOST-SE-Specific Target Organ Toxicity Single Exposure
TPQ-Threshold Planning Quantity
TSCA-Toxic Substance Control Act
U.N.-United Nation
UNCED-United Nations Conference on Environment and Development
VOL-Volume
WT-Weight

[i] There is very limited animal testing data on eye irritation by calcium hydroxide. According to Pierce JO., rabbits exposed for 1 minute to a paste of calcium hydroxide in the eyes displayed a gradual decrease in mucopolysaccharides of the cornea, reaching a maximum at 24 hours, which did not return to normal levels within 3 months. (Pierce JO. Alkaline materials. In: Clayton GD, Clayton FE, eds. Toxicology. 4th ed. New York: John Wiley&Sons, 1993:762-4.)