Response to USEPA Questions
Commonwealth of Massachusetts
October 24, 2012
New Bedford Marine Commerce Terminal (NBMCT)

Introduction

Thank you for this opportunity to provide USEPA additional information related to the development of the NBMCT. Development of this facility represents an important opportunity to deliver lasting environmental benefits to the New Bedford region, as well as accelerate economic development throughout the region.

This document provides responses to some of the USEPA's questions and comments submitted via e-mail dated October 17, 2012.

The format of the document will follow a comment–and-response outline, where each of the USEPA Comments will be listed in the order in which they were presented in the USEPA's Memoranda with the Commonwealth's Response to each Comment presented immediately thereafter.

Question 1 (Item 1 from EPA's October 17th, 2012 e-mail): We need final design and locations for placement of silt curtains and bubble curtains. In addition, we need to know what amendments, if any, the Commonwealth will be making to the performance standards listed in Appendix J (Attachment 5 of the TSCA Determination) and Appendix C of EPA's Draft Determination to reflect this new mitigation measure.

Response: The Commonwealth previously submitted its Fish Deterrent Plan within its October 17, 2012 submission to EPA, which included the design and locations for placement of silt curtains and bubble curtains. The Commonwealth will be making no changes to the Performance Standards listed in Appendix J (Attachment 5 of the TSCA Determination) and/or Appendix C of EPA's Draft Determination in association with the silt curtains and bubble curtains associated with the Fish Deterrent Plan.

QUESTION 2 (item 3 from EPA's October 17th, 2012 e-mail): We need more detail on the potential aquatic toxicity of expandable grout as described in the "Non-blasting Alternatives" document in order to justify the conclusion that there would be no toxic effects on aquatic life due to the use of this grout.

Response: The Commonwealth has attached to this document Material Safety Data Sheets for several expansive grouts (CRACKAMITE, Da-mite, and RockFrac, **Appendix 1**) which are marketed for use as non-blasting rock fracturing alternatives. The expansive grouts used for fracturing rock are safe for the environment, and for the products to be effective, they must be relatively isolated from the surrounding waterbody. As a result the products are restricted in their interaction with the water column and what little interaction may occur is minimized in its effect by both the relatively small surface area that will be exposed to the water column and the buffered state of the seawater.

Similar to other concrete and lime products, the primary component within these materials is quicklime (which is a basic compound). In concentrated form these materials are caustic and must be handled with care. To aid in the comparison of the relative safety of the expansive grouts, the Commonwealth has included MSDSs for Portland cement (**Appendix 2**) as well as hydrated lime (aka quicklime, **Appendix 3**). Please note the similarities of the expansive grouts and Portland cement/quicklime. Also please note that Portland cement is often utilized in construction projects in a marine environment without further regulations by EPA and that hydrated lime (aka quicklime) is used in mortar, cement, water softening equipment and pH adjustments associated with wastewater treatment.

It should be noted that the major threat from these products is direct contact with the concentrated caustic slurry (a similar issue with Portland Cement), and that dilution renders the product safe. The attached MSDSs report that although personal protective equipment and good hygienic practices are required for the safe handling of these products, once they have been mixed and placed properly, the products are generally safe for the environment. Please also note that one of the uses of quicklime (the major component in expansive grouts) is to correct the pH of saltwater aquarium water, indicating that, when used in the proper proportions, it is not toxic to marine life.

In practice, the material, although caustic, has to be carefully handled due to the impact of seawater on the grout, more than the impact of the grout on the seawater. The high salt and dissolved mineral content of seawater acts to buffer the effect of introduced acids and bases (especially when the quantity of basic material is small, as in this case), and also reduces the hydrating ability of water in the lime curing process. Therefore, the grout needs to be carefully placed into the drilled hole to ensure that the material is properly hydrated and not inadvertently deactivated by the seawater (the buffering capacity of the seawater may render the material inert prior to its effective use).

The possible interference of seawater in the lime curing process requires the drill hole to be isolated from the surrounding seawater through the use of a drill pipe, “tremie” sleeve or similar method through which the grout is poured. The tremie sleeve or pipe is removed after the grout has been placed to be reused at the next drill hole location. This separation of the grout from the seawater is required for the proper curing and expansion of the grout, but it also minimizes the contact area and reaction of the grout with the water column. The drill holes into which the grout is placed are typically around 2.5 inches in diameter, which leaves a relatively small surface area through which the buffered seawater may interact with the product once the tremie sleeve or pipe is removed.

APPENDIX 1

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MATERIAL SAFETY DATA SHEET

SECTION I

Material Name & Description	CRACKAMITE (Non-Explosive Demolition Agent)
Manufacturer's name	Hydraulics & Pneumatics
Address	B-85, Bais Godam Industrial Estate, Jaipur - 302 006 Rajasthan, INDIA
Telephone Number	+91-141-3220774

SECTION II - HAZARDOUS INGREDIENTS / IDENTITY INFORMATION

1. HAZARDOUS COMPONENTS:	NONE
2. NON-HAZARDOUS CHEMICAL COMPOUNDS: (% by Weight)	
2.1 Silicon Dioxide (SiO2)	5.1%
2.2 Aluminum Oxide (Al2O3)	1.6%
2.3 Ferric Oxide (Fe2O3)	2.5%
2.4 Calcium Oxide (CaO)	89.6%
TOTAL:	98.8%

- CRACKAMITE works without any vibration, noise, flying rock, dust and toxic gases by providing silent cracking.
- CRACKAMITE is environmentally safe.
- Proper application of CRACKAMITE is not harmful to fresh water sources (lake, river), plants (trees, grass), animals (fish, birds or other wildlife).

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point	Not Applicable	**Specific Gravity (H20 = 1)**	3.20
Density	3.2 gm/cm3	**Bulk Density**	1150 Kg/m3
PH Value (at 10g/ 1 H2O)	13	**Melting Point**	1000°C
Solubility in Water	Slight		
Appearance and Odor	Gray Powder, No Odor		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used)	Not Applicable	**Flammable Limits**	Not Applicable
Extinguishing Media	Not Applicable	**Special Fire Fighting Procedures**	Not Applicable
Unusual Fire and Explosion Hazards	When mixed with water, the product expands under high temperature development.		

SECTION V - REACTIVITY DATA

Stability	Unstable		Conditions to Avoid - Not Applicable
	Stable	YES	
Incompatibility *(Materials to Avoid)*	Water (Only Storage)		
Hazardous Decomposition or Byproducts	None		
Hazardous Polymerization	May Occur		Conditions to Avoid - Not Applicable
	Will Not Occur	YES	

SECTION VI - HEALTH HAZARD DATA

Route(s) of Entry Inhalation? Avoid Skin? Avoid Ingestion? Avoid Eye Contact? Avoid

Health Hazards *(Acute and Chronic)*

1. **Skin and eye contact:** Irritation, Burn
2. **Inhalation and Ingestion:** The same symptoms as getting cement or quicklime will appear.

Carcinogencity	NTP?	IARC Monographs?	OSHA Regulated?
	Not Applicable	Not Applicable	Not Applicable

Signs and Symptoms of Exposure
• Since the product is an alkali material, skin etc. may be irritated.
Medical Conditions

- Generally Aggravated by Exposure.
- Skin and eyes may be irritated and burn unless immediately rinsed off.

Emergency and First Aid Procedures

- If the skin comes in contact with the product, rinse it off with clean water immediately.
- If eyes come in contact with it, rinse it off with clean water immediately,and consult with a doctor as soon as possible.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to Be Taken in Case Material Is Released or Spilled

1. Gather the released or spilled product with a broom or a shovel.
2. Mix it with a large amount of water.
3. Sprinkle it onto open ground.

Waste Disposal Method

1. Mix it with a large amount of water
2. Sprinkle it onto open ground.

Precautions to Be Taken in Handling and Storing

1. Store the product under dry condition
2. Always wear safety goggles for eye protection, dust-proof mask and rubber gloves.

Other Precautions

- When mixing the product with water, do not get close to holes filled with the mixture of the product and water to avoid any accident to be caused by blow-out.

SECTION VII - CONTROL MEASURES

Respiratory Protection	It is recommended to wear ordinary dust-proof mask.		
Ventilation	Local Exhaust - *Not Applicable*	Special - *Not Applicable*	
	Mechanical - *Not Applicable*	Other - *Not Applicable*	
Protective Gloves	Ordinary Rubber Gloves	**Eye Protection**	Safety Goggles
Other Protective Clothing or Equipment		Not Applicable	
Work/Hygienic Practices		Not Applicable	

MATERIAL SAFETY DATA SHEET

(Conforms to the ANSI Z400.5.2004 Standard)

SECTION 1 – CHEMICAL PRODUCT & COMPANY IDENTIFICATION

Product Identifier:	Dā-mite® Rock Splitting Mortar (Dā-mite). Non Explosive Demolition Mortar
Product Use:	For controlled, silent, non-vibration demolition of stone, rock, and concrete.
Manufacturer's/Supplier's Name:	Daigh Company Inc.
Address:	2393 Canton Hwy, Suite 400, Cumming, GA 30040
Emergency Telephone #:	770-886-4711
Date MSDS Prepared	September 24, 2010

SECTION 2 – COMPOSITION

Hazardous Ingredients *(specific)*	%	CAS Number
Calcium Oxide (CaO)	85-95	1305–78-8
Silicon Dioxide (SiO2)	4-9	60676-0
Iron Oxide (Fe3O4)	1.5-3	1309-37-1
Aluminum Oxide (Al2O3)	1-5	1344-28-1
Sulfur Trioxide (So3)	0.5-3	7704-34-9

Toxicological Data on Calcium Oxide LD50: Not Available	LC50: Not Available
OSHA PEL for calcium oxide - 5 mg/m^3	
ACGIH TLV for calcium oxide - 2 mg/m^3	

SECTION 3 – HAZARDS IDENTIFICATION

Emergency Overview:	Danger! Harmful if swallowed or inhaled. Causes burns to skin and eyes. Causes severe irritation to the respiratory tract, characterized by burning, sneezing and coughing. Inflammation of the eyes is characterized by redness, watering and itching.

SECTION 4 – FIRST AID MEASURES

Eyes:	Immediately flush eyes with water for a period of 15 minutes. Pull back the eyelid to make sure all the dust has been washed out. Seek medical attention immediately.
Skin:	Flush exposed area with large amounts of water. Seek medical attention immediately.
Inhalation:	Remove to fresh air. Seek medical attention if necessary.
Ingestion:	Give large quantities of water or fruit juice. Do not induce vomiting. Seek medical attention immediately.
Note to physicians:	Provide general supportive measures and treat symptomatically.

SECTION 5 – FIREFIGHTING MEASURES

Fire Hazards:	Dā-mite is not combustible or flammable. However Dā-mite reacts with water releasing sufficient heat to ignite highly combustible materials in certain instances. Dā-mite is not an explosion hazard. However' reaction with water or other combustible material causes the material to swell and may rupture containers.
Hazardous Combustion Products:	None identified.
Extinguishing Media:	Use dry chemical fire extinguisher. Do not use water or halogenated compounds, except that water may be used to deluge small amounts of Dā-mite.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Spill/Leak Procedures:	Do not use water on bulk material spills.
Small Spills:	Use dry methods to collect spilled materials. Do not clean up with compressed air. Store spilled materials in dry, sealed, plastic or metal containers. Do not store clean up residuals in aluminum containers. Surfaces contaminated with residual amounts may be washed down with water.
Large Spills:	Use dry methods to collect spilled materials. Evacuate area downwind of clean-up operations to avoid dust exposure. Store spilled materials in dry, sealed, plastic or metal containers. Do not store clean up residuals in aluminum containers.
Containment:	For large spills avoid the generation of dust. Do not release into sewers or waterways.
Clean-up:	Residual amounts can be flushed with large amounts of water. Equipment can be decontaminated by washing either in mild vinegar and water solution, or detergent and water solution.

SECTION 7 – HANDLING AND STORAGE

Handling:	Keep in tightly closed containers. Protect from physical damage. Avoid direct contact with material.
Storage:	Store in a cool, dry and well ventilated location. Keep stored Dā-mite away from moisture. Do not store or ship in aluminum containers.

SECTION 8 – EXPOSURE CONTROLS/PERSONAL PROTECTION EQUIPMENT

Airborne Exposure Limits:	
OSHA Permissible Exposure Limits (PEL)	5 mg/m^3 (TWA)
ACGIH Threshold Limit Value (TLV)	2 mg/m^3

Ventilation System:	A system of local and/or general exhaust is recommended to keep employee exposures below the airborne exposure limits.
Personal Respirators (NIOSH Approved):	If the exposure limit is exceeded and engineering controls are not feasible a full-face piece particulate respirator (NIOSH Type N100 Filters) may be worn.
Skin Protection:	Use an approved water resistant barrier cream. Wear impervious protective clothing, including boots, gloves, head protection and approved eye protection, long-sleeves, apron or coveralls to prevent skin contact.
Eye Protection:	Use chemical safety glasses/goggles and/or full-face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick drench facilities in the work area.
Footwear:	Resistant to caustic solutions.

SECTION 9 – PHYSICAL & CHEMICAL PROPERTIES

Appearance:	Light gray powder
Odor:	Odorless
Solubility:	Slightly soluble in water with the release of heat and formation of calcium hydroxide
Specific Gravity:	3.2 – 3.4
pH:	10 (1% solution of Dā-mite in water)
% Volatiles by volume at 21C (70F):	0

SECTION 10 – STABILITY & REACTIVITY

Stability:	Chemically stable. Unlike normal Calcium Oxide which reacts quickly with water, Dā-mite is specially kilned to provide a hard outer coating which allows slow penetration of water resulting in a controlled reaction, expansion and heat evolution to take place. This process generates the highest tensile forces necessary to split rock.
Hazardous Decomposition Products:	No hazardous decomposition products
Incompatibilities:	Dā-mite should not be mixed or stored with the following materials due to the potential for violent reaction and heat: Acids, reactive fluorinated compounds, reactive brominated compounds, reactive powdered metals, organic acid anhydrides, nitro organic compounds and reactive phosphorous compounds.
Conditions to Avoid:	Air, moisture and incompatibles.

SECTION 11 – TOXICOLOGICAL INFORMATION

No LD50/LC50 has been identified for the components of Dā-mite. The main component is calcium oxide which is not listed by MSHA, OSHA, or IARC as a carcinogen.

SECTION 12 – ECOLOGICAL INFORMATION

Ecotoxicity:	Calcium Oxide is not listed as a hazardous substance or marine pollutant. As such it would not produce significant ecotoxicity upon exposure to aquatic organisms and aquatic systems.
Environmental Fate:	This material shows no bioaccumulation or food chain toxicity potential.

SECTION 13 – DISPOSAL CONSIDERATIONS

Dispose of in accordance with all applicable Federal, State and Local environmental regulations.

SECTION 14 – TRANSPORTATION INFORMATION

Calcium oxide is included in the DOT Hazardous Materials Table (49CFR172 Table 172-101) and is listed as Class 8 UN1910 Packing Group III. It is listed as non-hazardous for ground and rail car transportation as per CFR172.101.

SECTION 15 – REGULATORY INFORMATION

State Regulations:	
New Jersey Hazardous Substances:	The following components are listed: Calcium oxide, calcium hydroxide, silica, di-iron trioxide and aluminum oxide.
New York Acutely Hazardous Substances:	None of the components are listed.
New York Toxic Chemical Release Reporting:	None of the components are listed.

Hazardous Materials Information System:	Rating
Health	2
Flammability	0
Reactivity	2
Contact	3

SECTION 16 – OTHER INFORMATION

Packaging: Dā-mite is packaged in 5 kg (11 lb) sealed plastic bags which in turn are placed inside a larger plastic bag. Four such bags 20 kgs (44 lbs) are placed inside a strapped cardboard box.

The information contained herein is believed to be accurate and reliable as of the date hereof. However, Daigh Company, Inc. makes no representation, warranty or guarantee as to results or as to the information's accuracy, reliability or completeness. Daigh Company has no liability for any loss or damage that may result from use of the information. Each user is responsible to review this information, satisfy itself as to the information's suitability and completeness, and circulate the information to its employees, customers and other appropriate third parties.

SECTION 1: PRODUCT AND Supplier IDENTIFICATION

1.1 PRODUCT Identification

Trade Name: *RockFrac* (Rock Splitting Mortar on Carton) Customs Code 2522.10.00

1.2 Supplier Identification

Supplier : Enterprising Europa, Inc

Address: 439 Route 17 N Mahwah, NJ 07430

1.3 EMERGENCY PHONE: 201 236-0969

FAX: 201 584-0229 E-Mail: info@ee-us.com

2. Product composition, Ingredient information

CHEMICAL Name: Calcium Oxide (quicklime)

CHEMICAL FORMULA: CaO & $CaCO^3$ (varying percentages)

Form	**: powder**
Color	**: grayish**
Odor	**: odorless**
CAS	**nº 1305-78-8**
EINECS	**nº 215-138-9**
ONU	**nº 1910**

3. Hazard Statement

- **Reacts with water with low exothermal effect and dangerous squirts**
- **It does not have particular toxicological effects**
- **Prolonged or repeated short time overexposure may be irritant by inhalation or by contact with wet skin and eyes**

4. First Aid Measures

• wet skin	**: wash with soap and cold water repeatedly**
• eyes	**: do not rub, flush with large amounts of cold water for at least 10 minutes and then consult a physician**
• Ingestion	**: rinse repeatedly the oral and nasal cavities with plenty of cold water and drink as much cold water as possible and consult a physician**
• Inhalation	**: remove to fresh air and if breathing is difficult call for a physician.**

5. Anti-fire Measures

• Flash Point	**: not flammable- product will not burn**
• Auto ignition	**: not applicable**
• LEL	**: not applicable**
• UEL	**: not applicable**

Unusual fire and explosion hazards: the product is not a fire or explosion hazard

6. Steps to be taken for accidental releasing or spilling of the product

Use mask, safety glasses and gloves. Contain spillage and scoop up the product.

Do not use cleaning methods that will generate air dust pollution.

Wash out residuals with large quantities of cold water.

7. Precautions in handling and storage

7.1 handle the product avoiding air dusting pollution and by using mask, safety glasses and gloves

7.2 the product shall be stored in covered and dry area to avoid contact with water during storage

8. Exposition control and individual protection

- **TVL/TWA: 2 mg/m³ (PEL 5 mg/m³),(MAK 5 mg/m³)**
- **Avoid dust breathing by using a anti-dust mask**
- **Avoid contact with eyes by using safety glasses**

9. Physical and chemical properties

- **Avoid contact with skin by using safety gloves and wears**
- **Form : Powder**
- **Color : Gray –may have blue, green, orange or yellow coloring**
- **Odor : Odorless**
- **pH value (2g/l aqueous solution) : 12-13**
- **melting point : none**
- **explosion property : not applicable**
- **boiling point : not applicable**
- **flash point : not applicable**
- **water solubility at 20ºC : about 1.4g/l as calcium hydroxide**
- **stability : yes (in dry condition)**
- **specific gravity : about 3.4 g/cm³**

10. Stability and reactivity

- **Stable in dry condition**
- **High hygroscopic**
- **Hydrates in wet condition to form calcium hydroxides**
- **Reacts with high exothermal effect with cold water**
- **Reacts with low exothermal effect with cold water**
- **Soluble in glycerin and in aqueous sugar solution**

11. Toxicological information

The product does not have toxicological effect if properly handled

12. Ecological information

Ecologically indifferent product, ecotoxical level is possible only after accidental spilling of a large quantity of the product in water presence

13. Waste disposal consideration

Waste product is a hydrated lime that is acceptable in landfills

14. Transport information

No particular information about transport hazard, the product does not contain toxic chemicals

15. Information on regulation:

Symbols:

- **Xi : irritant**
- **R:41 : causes serious damages for eyes**
- **S:26 : in case of eye contact do not rub flush eyes with plenty cold water immediately and contact a physician**
- **S:39 : use safety glasses**

16. Other information

The data reported in this safety data sheet are based on known information at time of this MSDS.

The company declines all responsibility arising from any inappropriate use of the information from this data sheet.

APPENDIX 2

MATERIAL SAFETY DATA SHEET (MSDS) FOR PORTLAND CEMENT

(Complies with OSHA and MSHA Hazard Communication Standards,
29 CFR 1910.1200and 30 CFR Part 47)

CEMEX, INC.
CEMEX CALIFORNIA CEMENT LLC
VICTORVILLE CEMENT PLANT
16888 NORTH "E" STREET
VICTORVILLE, CALIFORNIA 92394-2999

Section 1 - IDENTIFICATION

Supplier/Manufacturer

CEMEX, Inc.
CEMEX California Cement LLC
Victorville Cement Plant
16888 North "E" Street
Victorville, California 92394-2999

Emergency Contact Information

(619) 381-7600

Chemical name and synonyms

Portland Cement (CAS #65997-15-1)

Product name

"CEMEX Type I/II"
"CEMEX Type III"
“CEMEX Type II/V”
"CEMEX Type V"
"CEMEX Block"
"CEMEX Class G"

Chemical family

Calcium salts.

Formula

$3CaO.SiO_2$	(CAS #12168-85-3)
$2CaO.SiO_2$	(CAS #10034-77-2)
$3CaO.Al_2O_2$	(CAS #12042-78-3)
$4CaO..Al_2O_3Fe_2O_3$	(CAS #12068-35-8)
$CaSO_2.2H_2O$	(CAS #13397-24-5)

Other salts: Small amounts of MgO, and trace amounts of K_2SO_4 and Na_2SO_4 may also be present.

Section 2 - COMPONENTS

Hazardous Ingredients

Portland cement clinker (CAS# 65997-15- 1) - approximately - 93.5-96.0 % by weight
ACGIH TLV-TWA (2000) = 10 mg total dust/m^3
OSHA PEL (8-hour TWA) = 50 million particles/ft^3

Gypsum (CAS# 7778-18-9) - approximately - 4.0-6.5 % by weight
ACGIH TLV-TWA (2000) = 10 mg total dust/m^3
OSHA PEL (8-hour TWA) = 15 mg total dust/m^3
OSHA PEL (8-hour TWA) = 5 mg respirable dust/m^3

Respirable quartz (CAS# 14808-60-7) – greater than 0.1% by weight
ACGIH TLV-TWA (2000) = 0.05 mg respirable quartz dust/m^3
OSHA PEL (8-hour TWA) = (10 mg respirable dust/$m^{3)}$/(percent silica + 2)

Trace Ingredients

Trace amounts of naturally occurring chemicals might be detected during chemical analysis. Trace constituents may include up to 0.75% insoluble residue, some of which may be free crystalline silica, calcium oxide (Also known as lime or quick lime), magnesium oxide, potassium sulfate, sodium sulfate, chromium compounds, and nickel compounds.

Section 3 - HAZARD IDENTIFICATION

Emergency Overview

Portland cement is a light gray powder that poses little immediate hazard. A single short-term exposure to the dry powder is not likely to cause serious harm. However, exposure of sufficient duration to wet portland cement can cause serious, potentially irreversible tissue (skin or eye) destruction in the form of chemical (caustic) burns. The same type of tissue destruction can occur if wet or moist areas of the body are exposed for sufficient duration to dry portland cement.

Potential Health Effects

Relevant Routes of Exposure:

Eye contact, skin contact, inhalation, and ingestion.

Effects Resulting from Eye Contact:

Exposure to airborne dust may cause immediate or delayed irritation or inflammation. Eye contact by large amounts of dry powder or splashes of wet portland cement may cause effects ranging from moderate eye irritation to chemical burns or blindness. Such exposures require immediate first aid (see Section 4) and medical attention to prevent significant damage to the eye.

Effects Resulting from Skin Contact:

Discomfort or pain cannot be relied upon to alert a person to hazardous skin exposure. Consequently, the only effective means of avoiding skin injury or illness involves minimizing skin contact, particularly with wet cement. Exposed persons may not feel discomfort until hours after the exposure has ended and significant injury has occurred.

Dry portland cement contacting wet skin or exposure to moist or wet portland cement may cause more severe skin effects including thickening, cracking or fissuring of the skin. Prolonged exposure can cause severe skin damage in the form of (alkali) chemical burns.

Some individuals may exhibit an allergic response upon exposure to portland cement, possibly due to trace elements of chromium. The response may appear in a variety of forms ranging from a mild rash to severe skin ulcers. Persons already sensitized may react to their first contact with the product. Other persons may first experience this effect after years of contact with portland cement products.

Effects Resulting from Inhalation:

Portland cement may contain trace amounts of free crystalline silica. Prolonged exposure to respirable free silica can aggravate other lung conditions and cause silicosis, a disabling and potentially fatal lung disease.

Exposure to portland cement may cause irritation to the moist mucous membranes of the nose, throat, and upper respiratory system. It may also leave unpleasant deposits in the nose.

Effects Resulting from Ingestion:

Although small quantities of dust are not known to be harmful, ill effects are possible if larger quantities are consumed. Portland cement should not be eaten.

Carcinogenic potential:

Portland cement is **not** listed as a carcinogen by NTP, OSHA, or IARC. It may however, contain trace amounts of substances listed as carcinogens by these organizations.

Crystalline silica, a potential trace level contaminate in Portland cement, is now classified by IARC as known human carcinogen (Group I). NTP has characterized respirable silica as "reasonably anticipated to be [a] carcinogen".

Medical conditions which may be aggravated be, inhalation or dermal exposure:

Pre-existing upper respiratory and lung diseases.
Unusual (hyper) sensitivity to hexavalent chromium (chromium^{+6}) salts.

Section 4 - FIRST AID

Eyes

Immediately flush eyes thoroughly with water. Continue flushing eye for at least 15 minutes, including under lids, to remove all particles. Call physician immediately.

Skin

Wash skin with cool water and pH-neutral soap or a mild detergent. Seek medical treatment in all cases of prolonged exposure to wet cement, cement mixtures, liquids from fresh cement products, or prolonged wet skin exposure to dry cement.

Inhalation of Airborne Dust

Remove to fresh air. Seek medical help if coughing and other symptoms do not subside.

Ingestion

Do not induce vomiting. If conscious, have the victim drink plenty of water and call a physician immediately.

Section 5 - FIRE AND EXPLOSION DATA

Flash point .....None	Lower Explosive Limit.....None
Upper Explosive Limit.....None	Auto ignition temperature.....Not Combustible
Extinguishing media.....Not Combustible	Special fire fighting Procedures.....None
Hazardous combustion products.....None	Unusual fire and explosion hazards...None

Section 6 - ACCIDENTAL RELEASE MEASURES

Collect dry material using a scoop. Avoid actions that cause dust to become airborne. Avoid inhalation of dust and contact with skin. Wear appropriate personal protective equipment as described in Section 8.

Scrape up wet material and place in an appropriate container. Allow the material to "dry" before disposal. Do not attempt to wash portland cement down drains.

Dispose of waste material according to local, state and federal regulations.

Section 7 - HANDLING AND STORAGE

Keep portland cement dry until used. Normal temperatures and pressures do not affect the material.

Promptly remove dusty clothing or clothing which is wet with cement fluids and launder before reuse. Wash thoroughly after exposure to dust or wet cement mixtures or fluids.

Section 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Skin Protection

Prevention is essential to avoiding potentially severe skin injury. Avoid contact with unhardened portland cement. If contact occurs, promptly wash affected area with soap and water. Where prolonged exposure to unhardened portland cement products might occur, wear impervious clothing and gloves to eliminate skin contact. Wear sturdy boots that are impervious to water to eliminate foot and ankle exposure.

Do not rely on barrier creams: barrier creams should not be used in place of gloves.

Periodically wash areas contacted by dry portland cement or by wet cement or concrete fluids with a pH neutral soap. Wash again at the end of work. If irritation occurs, immediately wash the affected area and seek treatment. If clothing becomes saturated with wet concrete, it should be removed and replaced with clean dry clothing.

Respiratory Protection

Avoid actions that cause dust to become airborne. Use local or general exhaust ventilation to control exposures below applicable exposure limits.

Use NIOSH/MSHA approved (under 30 CFR 11) or NIOSH approved (under 42 CFR 84) respirators in poorly ventilated areas, if an applicable exposure limit is exceeded, or when dust causes discomfort or irritation. (Advisory: Respirators and filters purchased after June 10, 1998 must be certified under 42 CFR 84.)

Ventilation

Use local exhaust or general dilution ventilation to control exposure within applicable limits.

Eye Protection

Where potentially subject to splashes or puffs of cement, wear safety glasses with side shields or goggles. In extremely dusty environments and unpredictable environments wear unvented or indirectly vented goggles to avoid eye irritation or injury. Contact lenses should not be worn when working with portland cement or fresh cement products.

Section 9 - PHYSICAL AND CHEMICAL, PROPERTIES

Appearance.....Gray Powder
Physical state.....Solid (powder)
Solubility in water...Slightly soluble (0.1 to 1.0%)
Vapor density.....Not applicable
Melting point.....Not applicable
Evaporation rate.....Not applicable
Odor.....No distinct odor
pH (in water).....12 to 13
Vapor pressure.....Not applicable
Boiling point.....Not applicable (i.e., > 1000 C)
Specific gravity (H20 = 1.0).....3.15

Section 10 - STABILITY AND REACTIVITY

Stability

Stable.

Conditions to avoid

Unintentional contact with water.

Incompatibility

Wet Portland cement is alkaline. As such it is incompatible with acids, ammonium salts and phosphorous.

Hazardous decomposition

Will not spontaneously occur. Adding water produces (caustic) calcium hydroxide

Hazardous Polymerization

Will not occur.

Section 11 - TOXICOLOGICAL INFORMATION

For a description of available, more detailed toxicological information contact the supplier or manufacturer.

Section 12 - ECOLOGICAL INFORMATION

Ecotoxicity

No recognized unusual toxicity to plants or animals

Relevant physical and chemical properties

(See Sections 9 and 10.)

Section 13 - DISPOSAL

Dispose of waste material according to local, state and federal regulations. (Since portland cement is stable, uncontaminated material may be saved for future use.

Dispose of bags in an approved landfill or incinerator.

Section 14 - TRANSPORTATION DATA

Hazardous materials description/proper shipping name

Portland is cement is not hazardous under U.S. Department of Transportation (DOT) regulations.

Hazard class

Not applicable

Identification number

Not applicable.

Required label text

Not applicable.

Hazardous substances/reportable quantities (RQ)

Not applicable.

Section 15 - OTHER REGULATORY INFORMATION

Status under USDOL-OSHA Hazard Communication Rule, 29 CFR 1910.1200

Portland cement is considered a "hazardous chemical" under this regulation, and should be part of any hazard communication program.

Status under CERCLA/SUPERFUND 40 CFR 117 and 302

Not listed.

Hazard Category under SARA(Title III), Sections 311 and 312

Portland cement qualifies as a "hazardous substance" with delayed health effects.

Status under SARA (Title III), Section 313

Not subject to reporting requirements under Section 313.

Status under TSCA (as of May 1997)

Some substances in portland cement are on the TSCA inventory list.

Status under the Federal Hazardous Substances Act

Portland cement is a "hazardous substance" subject to statutes promulgated under the subject act.

Status under California Proposition 65

This product contains up to 0.05 percent of chemicals (trace elements) known to the State of California to cause cancer, birth defects or other reproductive harm. California law requires the manufacturer to give the above warning in the absence of definitive testing to prove that the defined risks do not exist.

Section 16 - OTHER INFORMATION

Prepared by

Kevin Keegan
Director - Health and Safety
CEMEX, Inc.
Houston, Texas

Approval date or Revision date

Approved: August, 1997
Revised: March, 2001

Other important information

Portland cement should only be used by knowledgeable persons. A key to using the product safely requires the user to recognize that portland cement chemically reacts with water, and that some of the intermediate products of this reaction (that is those present while a portland cement product is "setting") pose a more severe hazard than does dry portland cement itself.

While the information provided in this material safety data sheet is believed to provide a useful summary of the hazards of portland cement as it is commonly used, the sheet cannot anticipate and provide the all of the information that might be needed in every situation. Inexperienced product users should obtain proper training before using this product.

SELLER MAKES NO WARRANTY, EXPRESSED OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY CEMEX, Inc. except that the product shall conform to contracted specifications. The information provided herein was believed by CEMEX, Inc. to be accurate at the time of preparation or prepared from sources believed to be reliable, but it is the responsibility of the user to investigate and understand other pertinent sources of information to comply with all laws and procedures applicable to the safe handling and use of product and to determine the suitability of the product for its intended use. Buyer's exclusive remedy shall be for damages and no claim of any kind, whether as to product delivered or for non-delivery of product, and whether based on contract, breach of warranty, negligence, or otherwise shall be greater in amount than the purchase price of the quantity of product in respect of which damages are claimed. In no event shall Seller be liable for incidental or consequential damages, whether Buyer's claim is based on contract, breach of warranty, negligence or otherwise.

In particular, the data furnished in this sheet do not address hazards that may be posed by other materials mixed with portland cement to produce portland cement products. Users should review other relevant material safety data sheets before working with this portland cement or working on portland cement products, for example, portland cement concrete.

APPENDIX 3

MATERIAL SAFETY DATA SHEET (MSDS) FOR QUICK LIME

(Complies with OSHA's Hazard Communication Standard, 29 CFR 1910.1200)

OLDCASTLE INDUSTRIAL MINERALS
110 MARBLE STREET
LEE, MA 01238

Section 1 - IDENTIFICATION

Supplier/Manufacturer

OLDCASTLE INDUSTRIAL MINERALS
110 Marble Street
Lee, MA 01238

Emergency Contact Information

(413) 243-0053

Product name

Quick Lime

Chemical family

Autoclave Lime - (CAS #1317-65-3)

Formula

CaO – 57%
MgO – 33%

Section 2 - COMPONENTS

Hazardous Ingredients

Respirable quartz (CAS# 14808-60-7) – greater than - 0.1% by weight
ACGIH TLV-TWA (1997) = 0.10 mg respirable quartz dust/m^3
OSHA PEL (8-hour TWA) = (10 mg respirable dust/$m^{3)}$/(percent silica + 2)
NIOSH REL (8-hour TWA) = 0.05 mg respirable dust/m^3

Section 3 - HAZARD IDENTIFICATION

Emergency Overview

Exposure of sufficient duration to wet quick lime can cause serious, potentially irreversible tissue (skin or eye) destruction in the form of chemical (caustic) burns. The same type of tissue destruction can occur if wet or moist areas of the body are exposed for sufficient duration to dry quick lime.

Potential Health Effects

Relevant Routes of Exposure:
Eye contact, skin contact, inhalation, and ingestion.

Effects Resulting from Eye Contact:
Exposure to airborne dust may cause immediate or delayed irritation or inflammation. Eye contact by large amounts of dry powder or splashes of wet quick lime may cause effects ranging from moderate eye irritation to chemical burns or blindness. Such exposures require immediate first aid (see Section 4) and medical attention to prevent significant damage to the eye.

Effects Resulting from Skin Contact:
Discomfort or pain cannot be relied upon to alert a person to hazardous skin exposure. Consequently, the only effective means of avoiding skin injury or illness involves minimizing skin contact, particularly with wet quick lime. Exposed persons may not feel discomfort until hours after the exposure has ended and significant injury has occurred.

Dry quick lime contacting wet skin or exposure to moist or wet quick lime may cause more severe skin effects including thickening, cracking or fissuring of the skin. Prolonged exposure can cause severe skin damage in the form of (alkali) chemical burns.

Effects Resulting from Inhalation:
Exposure to quick lime may cause irritation or caustic burns to the moist mucous membranes of the nose, throat, and upper respiratory system. It may also leave unpleasant deposits in the nose.

Effects Resulting from Ingestion:

Although small quantities of dust are not known to be harmful, ill effects are possible if larger quantities are consumed.

Carcinogenic potential:

Quick lime is **not** listed as a carcinogen by NTP, OSHA, or IARC. It may however, contain trace amounts of substances listed as carcinogens by these organizations.

Crystalline silica, a contaminate in quick lime, is now classified by IARC as known human carcinogen (Group I). NTP has characterized respirable silica as "reasonably anticipated to be [a] carcinogen".

Medical conditions which may be aggravated be, inhalation or dermal exposure:

Pre-existing upper respiratory and lung diseases.

Section 4 - FIRST AID

Eyes

Immediately flush eyes thoroughly with water. Continue flushing eye for at least 15 minutes, including under lids, to remove all particles. Call physician immediately.

Skin

Wash skin with cool water and pH-neutral soap or a mild detergent. Seek medical treatment in all cases of prolonged exposure to quick lime/lime mixtures, liquids from fresh lime products, or prolonged wet skin exposure to dry quick lime.

Inhalation of Airborne Dust

Remove to fresh air. Seek medical help if coughing and other symptoms do not subside.

Ingestion

Do not induce vomiting. If conscious, have the victim drink plenty of water and call a physician immediately.

Section 5 - FIRE AND EXPLOSION DATA

Flash point .....None	Lower Explosive Limit.....None
Upper Explosive Limit.....None	Auto ignition temperature.....….....Not Combustible
Extinguishing media.....Not Combustible	Special fire fighting Procedures.....None
Hazardous combustion products.....None	Unusual fire and explosion hazards…None

Section 6 - ACCIDENTAL RELEASE MEASURES

Collect dry material using a scoop. Avoid actions that cause dust to become airborne. Avoid inhalation of dust and contact with skin.

Wear appropriate personal protective equipment as described in Section 8.

Scrape up wet material and place in an appropriate container. Allow the material to "dry" before disposal. Do not attempt to wash quick lime down drains.

Dispose of waste material according to local, state and federal regulations.

Section 7 - HANDLING AND STORAGE

Keep quick lime dry until used. Normal temperatures and pressures do not affect the material.

Promptly remove dusty clothing or clothing which is wet with cement fluids and launder before reuse. Wash thoroughly after exposure to dust or quick lime mixtures or fluids.

Section 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Skin Protection

Prevention is essential to avoiding potentially severe skin injury. Avoid contact with quick lime cement. If contact occurs, promptly wash affected area with soap and water. Where prolonged exposure to quick lime products might occur, wear

impervious clothing and gloves to eliminate skin contact. Wear sturdy boots that are impervious to water to eliminate foot and ankle exposure.

Do not rely on barrier creams: barrier creams should not be used in place of gloves.

Periodically wash areas contacted by quick lime or by hydrated lime based fluids with a pH neutral soap. Wash again at the end of work. If irritation occurs, immediately wash the affected area and seek treatment. If clothing becomes saturated with quick lime, it should be removed and replaced with clean dry clothing.

Respiratory Protection

Avoid actions that cause dust to become airborne. Use local or general exhaust ventilation to control exposures below applicable exposure limits.

Use NIOSH/MSHA approved (under 30 CFR 11) or NIOSH approved (under 42 CFR 84) respirators in poorly ventilated areas, if an applicable exposure limit is exceeded, or when dust causes discomfort or irritation. (Advisory: Respirators and filters purchased after June 10, 1998 must be certified under 42 CFR 84.)

Ventilation

Use local exhaust or general dilution ventilation to control exposure within applicable limits.

Eye Protection

Where potentially subject to splashes or puffs of quick lime, wear safety glasses with side shields or goggles. In extremely dusty environments and unpredictable environments wear unvented or indirectly vented goggles to avoid eye irritation or injury. Contact lenses should not be worn when working with quick lime.

Section 9 - PHYSICAL AND CHEMICAL, PROPERTIES

Appearance.....Light colored Powder
Physical state.....Solid (powder)
Solubility in water...(0.16%)
Vapor density.....Not applicable
Melting point.....Not applicable
Evaporation rate.....Not applicable

Odor.....No distinct odor
pH (in water).....12 to 13
Vapor pressure.....Not applicable
Boiling point.....….....Not applicable (i.e., > 1000 C)
Specific gravity (H20 = 1.0).....2.7-3.1

Section 10 - STABILITY AND REACTIVITY

Stability

Stable.

Conditions to avoid

Avoid contact with incompatible materials (see below).

Incompatibility

Maleic Abhydride, Phosphorus, Nitroethane, Nitromethane, Nitroparaffins, Nitropropane
Note: Attacks some metals.

Hazardous decomposition

Will not spontaneously occur. Silica-containing respirable dust particles may be generated by handling.

Hazardous Polymerization

Will not occur.

Section 11 - TOXICOLOGICAL INFORMATION

For a description of available, more detailed toxicological information contact the supplier or manufacturer.

Section 12 - ECOLOGICAL INFORMATION

Ecotoxicity

No recognized unusual toxicity to plants or animals

Relevant physical and chemical properties
(See Sections 9 and 10.)

Section 13 - DISPOSAL

Dispose of waste material according to local, state and federal regulations. (Since quick lime is stable, uncontaminated material may be saved for future use).

Dispose of bags in an approved landfill or incinerator.

Section 14 - TRANSPORTATION DATA

Hazardous materials description/proper shipping name
Quick lime is not hazardous under U.S. Department of Transportation (DOT) regulations.

Hazard class
Not applicable

Identification number
Not applicable.

Required label text
Not applicable.

Hazardous substances/reportable quantities (RQ)
Not applicable.

Section 15 - OTHER REGULATORY INFORMATION

Status under USDOL-OSHA Hazard Communication Rule, 29 CFR 1910.1200
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Section 16 - OTHER INFORMATION

Revision date

April 2007

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In particular, the data furnished in this sheet do not address hazards that may be posed by other materials mixed with quick lime. Users should review other relevant material safety data sheets before working with quick lime.