PACIFIC STATES
CAST IRON PIPE COMPANY
DIVISION OF McWANE INC
P.O. BOX 1219, PROVO, UTAH 84603
TELEPHONE (AREA CODE 801) 373-6910
FAX (801) 377-0338

PSCIPCO

March 4, 2013

Daniel Griffin
Division of Water Quality
Utah Department of Environmental Quality
P.O. Box 144870
Salt Lake City, Utah 84114-4870

Re: **Pacific States Cast Iron Pipe Company Cooling Tower Blowdown**

Dear Mr. Griffin:

This letter is a follow-up from a phone conversation on about December 12, 2012, and emails sent during late December 2012 regarding the potential modification of our Utah Pollutant Discharge Elimination System (UPDES) permit to accommodate cooling tower blow down. The existing casting machines at PSCIPCO use non-contact cooling water that is discharged to the Ironton Canal at UPDES permitted outfall 001Discharge. PSCIPCO is anticipating the replacement of two of its casting machines with a single new casting machine. The new casting machine will use a closed loop cooling water system in conjunction with a cooling tower. Details regarding this project and the cooling tower blow down, as far as it can be determined at this stage in the project development, are provided below.

Project Overview

Pacific States is in the process of replacing two existing casting machines with one high-efficiency, state-of-the art, casting machine. The new casting machine will lower the labor costs associated with casting and will provide better control of pipe quality. Foundation work for this machine is expected to begin in the summer of 2013 with installation of the new machine sometime that fall. The new casting machine will be equipped with a closed-loop, non-contact cooling water system that will maintain the water temperature using a cooling tower (see attached figure). It is anticipated that the cooling tower will be installed in a vacated concrete secondary containment area directly north of the casting area and adjacent to the Ironton Canal (see attached figure).

There are preliminary plans to replace the remaining five existing casting machines with two to three new casting machines at some future date. The timeline for the complete replacement of the existing casting machines is not clear at this point, but there is a tentative schedule to install a second machine in 2015. It is anticipated that subsequent installations will also likely be equipped with a similar closed-loop, non-contact cooling water system. Additional cells would then be added to the proposed cooling tower to accommodate the additional flow.

Proposed Management

It is proposed that blow down from the cooling tower be diverted to the existing Million Gallon Reservoir where it will commingle with the permitted non-contact cooling water from the remaining casting machines, the shell, and the tuyeres. The combined effluent will ultimately be discharged to the Ironton Canal at outfall 001 Discharge, as shown in the attached water balance for the pump water system. The

flows to and from the Million Gallon Reservoir as it exists today (see attached drawing) and as it is anticipated to exist at the completion of the project, are provided in the following table. Two of the older cast machines will be removed during the installation of the new cast machine. However, the pump that supplies cooling water to the older casting machines is not variable. Therefore, the return water from the remaining two older casting machines will continue to discharge approximately 1,520 gpm to the Million Gallon Reservoir. It is anticipated that makeup water to the cooling tower will be drawn from the Million Gallon Reservoir cooling water supply line, resulting in a net decrease in flow from 001 Discharge.

	Typical Flow Rate (gpm)	
Source	Pre-Project[1]	Post-Project
Casting Machine Return Water	1,520	1,520
Combined Tuyere/Shell Return Water[2]	1,880	1,880
Groundwater Well	6	6
Boardman Springs	920	920
MGR Cooling Water Supply	1,820	1,790
Cooling Tower Evaporative Loss[3]	-	30
Cooling Tower Blowdown	-	30
Cooling Tower Makeup	-	60
001 Discharge	1,570	1,540

1. Water balance of pump water system using four cast machines completed March of 2012.
2. Two of the older cast machines will be removed during the installation of the new cast machine. However, the pump that supplies cooling water to the older cast machines is not variable. Unless the pump is downsized, the casting machine return water will continue to discharge approximately 1,520 gpm to the Million Gallon Reservoir.
3. Evaporative loss from cooling tower is assumed to be similar to that observed from the cupola and tuyeres during a water balance completed in March of 2012.

The quality of water being discharged to the Ironton Canal will also be affected by the proposed casting machine modifications. Water to the cooling tower must be chemically conditioned to maintain proper operating conditions, as shown below. A material safety data sheet (MSDS) for each chemical is provided along with this letter.

- Scale buildup treatment (most likely ISI 511 or ISI 586)
- Biocide treatment (most likely 0.3 ppm dose rate of 12.5% sodium hypochlorite)
- Passivator treatment (most likely hexametaphosphate)
- pH treatment (most likely sulfuric acid).

	001 Discharge Pre-Project[1]	Cooling Tower Blow down	001 Discharge Post-Project
Flow (gpm)	1570	30	1540
pH	7.9	8.5	8.2
Temperature (C)	25	65	< 25[3]
Total Suspended Solids (mg/L)	4.9	0	5.0
Total Dissolved Solids (mg/L)	549	1500	589
Residual Chlorine (ppm)	0[2]	0.2[4]	0[4]

1. Average of 2011 - 2012 monitored data.
2. Completed in-house using informal non-EPA approved analytical test methods (Hach titration kit).
3. The temperature of the return cooling water from the casting machines will remain at a constant flow rate, but will cool half the number of casting machines. Temperature is anticipated to decrease, but is not quantifiable at this point in the project.
4. Anticipated total residual chlorine concentration. Actual concentration will be based upon operating conditions.

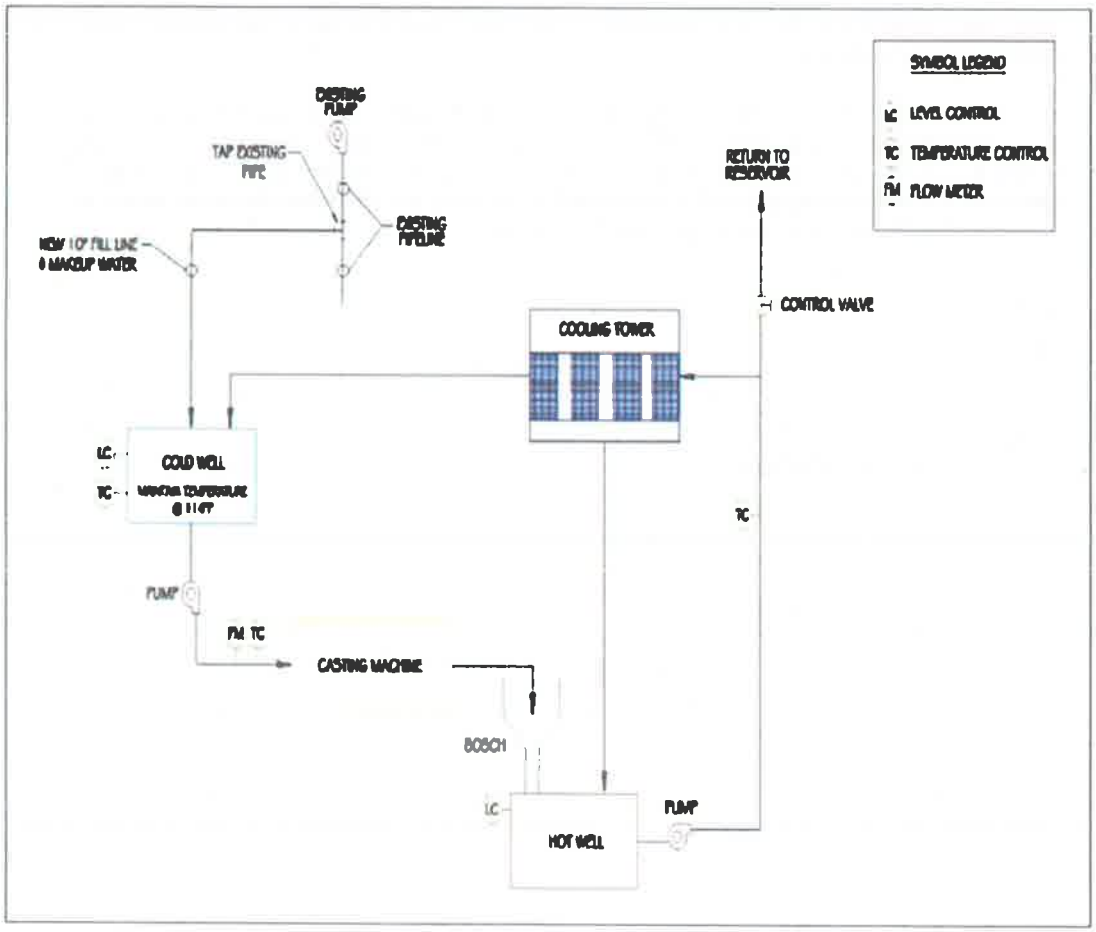
As shown in the table above, the Million Gallon Reservoir will serve as a treatment unit for the cooling tower blow down by providing sufficient residence time for the water to cool and for the total residual chlorine to be consumed prior to discharge at outfall 001 Discharge. Cooling tower blow down addition to the Million Gallon Reservoir will likely result in a significant decrease in the temperature of the water being discharged to the Ironton Canal. Although the pH and total suspended solids concentration of the water may increase slightly, these parameters are not anticipated to be above the permitted limit of 9.0 and 25 mg/L, respectively.

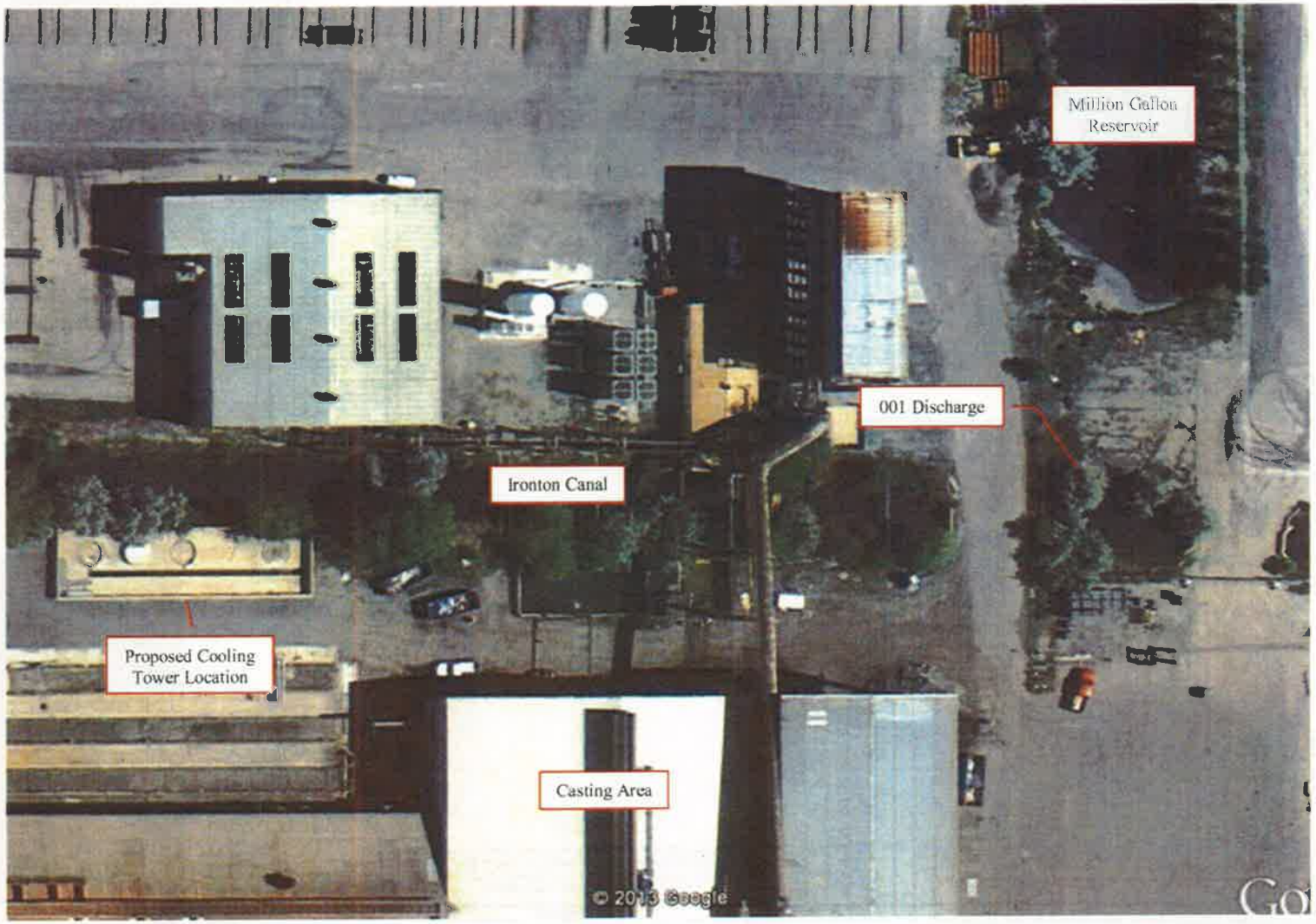
As noted previously, this project is still under development. Additional details regarding the cooling tower operation and characterization of the blow down from the system will be provided as they become available. Contact David Georgeson (801-623-4212, david.georgeson@pscipco.om) if you have any questions or comments regarding this project and/or the proposed modifications to our permit to accommodate the addition of cooling tower blow down.

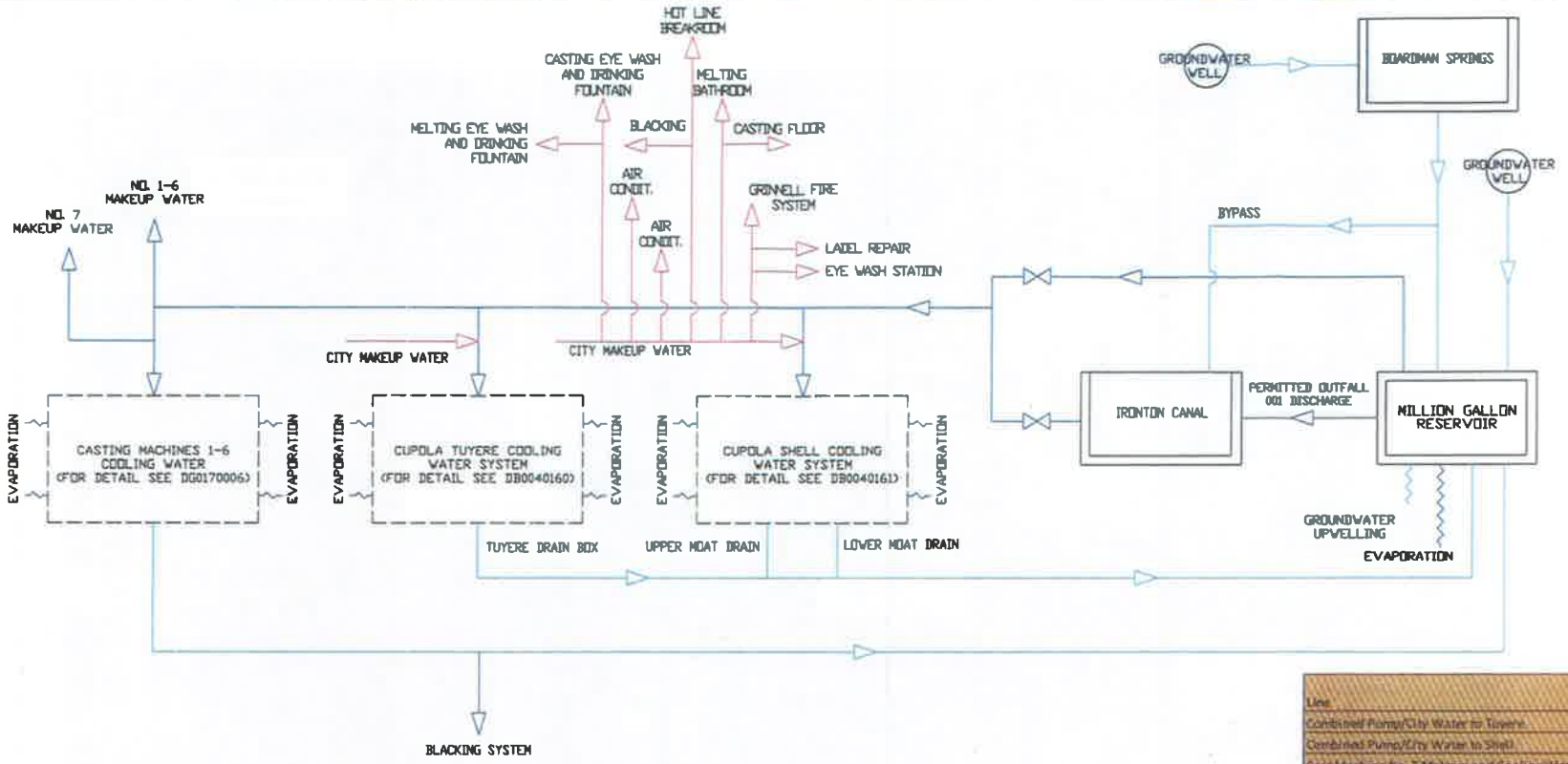
Respectfully,

Kent Brown

Kent Brown
Vice President/General Manager


SYMBOL LEGEND
LC LEVEL CONTROL
TC TEMPERATURE CONTROL
FM FLOW METER
EXISTING PUMP
TAP EXISTING PIPE
EXISTING PIPELINE
NEW 10" FILL LINE & MAKEUP WATER
RETURN TO RESERVOIR
CONTROL VALVE
COOLING TOWER
LC
COLD WELL
TC
TC
PUMP
FM TC
CASTING MACHINE
BOSCH
LC
HOT WELL
PUMP


Million Gallon Reservoir
001 Discharge
Ironton Canal
Proposed Cooling Tower Location
Casting Area
© 2013 Google



PROCESS WATER TO MILLION GALLON RESERVOIR

PROCESS WATER FROM MILLION GALLON RESERVOIR

CITY WATER

Line	Measured Usage (gpm)
Combined Pump/City Water to Tuyere	831
Combined Pump/City Water to Shell	1,216
Cast Machine No. 7 Makeup and Cooling Water	75
Cast Machine No. 1-6 Makeup Water	8
Cast Machine No. 1-6 Cooling Water	1,602
Cast Machine Return Water	1,522
Total Pump Water	3,477
Combined Tuyere/Shell Return Water	1,880
Ironton Cooling Water Supply	2,695
MGR Cooling Water Supply	1,810
Casting Pump Water to Blacking System	0
Combined Tuyere/Shell Evaporative Loss	32
001 Discharge to Ironton	1,589
Boardman Springs Discharge to MGR	919
Groundwater Well Discharge to MGR	6
Net Infiltration from MGR	1,119

NOTE

WATER FLOW ANALYSIS WAS COMPLETED FROM JUNE 2011 TO MARCH 2012. FLOW RATES SHOWN HERE ARE AN APPROXIMATION OF THE SYSTEM AT THE TIME OF MEASUREMENT. THE 2012 COMPLETE WATER BALANCE STUDY IS MAINTAINED BY THE ENVIRONMENTAL DEPARTMENT

REFERENCE DRAWINGS			
DRAWING NO.	TITLE	REV	REV DATE
DB0040160	MELTING, CUPOLA, TUYERE WATER SCHEMATIC	0	10/07/2004
DB0040161	MELTING, CUPOLA, SHELL WATER SCHEMATIC	1	NO DATE
DG0170006	GENERAL PLANT, CASTING AND MELTING, CASTING MACHINES 1-6 COOLING WATER SCHEMATIC	0	12/20/2005
PA-CD-1127	COOLING WATER SYSTEM, DELAVAUD CASTING MACHINE	0	08/04/1948
PA-CD-1128	COOLING WATER SECTIONS AND DETAILS	1	08/04/1948

REVISIONS

A		1	
B		2	
C		3	

Pacific States Cast Iron Pipe Co.

GENERAL PLANT ENVIRONMENTAL COOLING WATER SYSTEM

DRAWN H.GUER | CHECKED | DATE 03/30/2012

PROJECT NUMBER | SCALE NONE | BG0340013

Fisher Scientific
Part of Thermo Fisher Scientific

Material Safety Data Sheet

Potassium Phosphate Dibasic Anhydrous

ACC# 19542

Section 1 - Chemical Product and Company Identification

MSDS Name: Potassium Phosphate Dibasic Anhydrous
Product Grade : SQ, ExcelaR, HPLC
Catalog Numbers: 26735, 15665, 15675
Synonyms: Di-Potassium Hydrogen Orthophosphate.
Company Identification:

Fisher Scientific
Part of Thermo Fisher Scientific
THERMO ELECTRON LLS INDIA PVT.LTD.
Godrej Coliseum, 101A-101B, Somaiya Hospital Road,
Off Eastern Express Highway, Sion (East), Mumbai-400 022, India

For information, call: 022 – 6680 3001/2, **Call India Toll Free** – 1 800 209 7001
Emergency Number: 022-66803004/14
For CHEMTREC assistance, call: 800-424-9300 [International]
For International CHEMTREC assistance, call: 703-527-3887 [International]

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7758-11-4	Dipotassium Phosphate	ca.100	231-834-5

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white crystalline powder.
Caution! May cause eye, skin, and respiratory tract irritation. The toxicological properties of this material have not been fully investigated.
Target Organs: No data found.

Potential Health Effects
Eye: May cause eye irritation. Dust may cause mechanical irritation.

Skin: May cause skin irritation. Low hazard for usual industrial handling.
Ingestion: May cause irritation of the digestive tract. Low hazard for usual industrial handling.
Inhalation: May cause respiratory tract irritation. Low hazard for usual industrial handling.
Chronic: No information found.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: Get medical aid. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. This material in sufficient quantity and reduced particle size is capable of creating a dust explosion.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or appropriate foam.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 1; Flammability: 0; Instability: 1

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in

Section 8.

Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation. Do not let this chemical enter the environment.

Section 7 - Handling and Storage

Handling: Minimize dust generation and accumulation. Avoid prolonged or repeated contact with skin. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation. Use with adequate ventilation. Avoid breathing dust.

Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Store protected from moisture.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Dipotassium Phosphate	none listed	none listed	none listed

OSHA Vacated PELs: Dipotassium Phosphate: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Crystalline powder
Appearance: white
Odor: odorless
pH: 8.5-9.6 (5% aq.sol.)
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: Not available.
Freezing/Melting Point:340 deg C
Decomposition Temperature:340 deg C
Solubility: 1600 g/l (20°C)
Specific Gravity/Density:2.3
Molecular Formula:K2HPO4
Molecular Weight:174.18

Section 10 - Stability and Reactivity

Chemical Stability: Hygroscopic: absorbs moisture or water from the air.
Conditions to Avoid: Incompatible materials, dust generation, exposure to moist air or water.
Incompatibilities with Other Materials: Strong oxidizing agents, strong acids.
Hazardous Decomposition Products: Carbon monoxide, oxides of phosphorus, carbon dioxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 7758-11-4 unlisted.
LD50/LC50:
Not available.

Carcinogenicity:
CAS# 7758-11-4: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: No information found

Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. No information available.
Environmental: No information available.
Physical: No information available.
Other: Do not empty into drains.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not Regulated.	Not Regulated.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 7758-11-4 is listed on the TSCA inventory.

Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
Section 313 No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 7758-11-4 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
Not available.
Risk Phrases:

Safety Phrases:
S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)
CAS# 7758-11-4: 1
Canada - DSL/NDSL
CAS# 7758-11-4 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of D2B.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.
Canadian Ingredient Disclosure List

Fisher Scientific
Part of Thermo Fisher Scientific

Section 16 - Additional Information

MSDS Creation Date: 7/15/1999
Revision #8 Date: 2/15/2008

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 Fisher 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 Fisher has been advised of the possibility of such damages.

ISI
Industrial Solutions, Inc

Emergency Phone
1-866-301-1004

Material Safety Data Sheet

Section 1 Product Identification

Trade Name: **ISI 511** Product Type: Scale & Corrosion Inhibitor

DOT Shipping Name Industrial Process Water Treatment, liquid

Section 2 Hazardous Ingredients

	CAS Number	%	Exposure Criteria
Sodium organophosphates	67953-76-8	<10	N.D.
Sodium Hydroxide	1310-73-2	<10	500 mg/Kg (LD_{50})

Section 3 Physical Data

Boiling Point, 760 mm Hg	>212°F (>100°C)	Melting Point	N.A.
Freezing Point	27°F (-3°C)	Vapor Pressure	N.D.
Specific Gravity	1.18	Solubility in Water	Complete
Vapor Density	N.D.	Evaporation Rate	1
% Volatiles	N.D.	pH	12.0 - 13.0
Appearance and Odor	Pale Yellow Liquid, Sweet Odor		

Section 4 Fire & Explosion Hazard Data

Flash Point (& Method Used)	Flammable Limits in Air % by Volume Lower	Upper	Auto Ignition Temperature
>95°F (>200°C) TCC	N.D.	N.D.	N.D.

Extinguishing Media Dry Chemical; Foam; CO_2, Water

Special Firefighting Instructions

Use extinguishing techniques appropriate to the primary cause of the fire.

Unusual Fire and Explosion Hazard
None Known

ISI
Industrial Solutions, Inc

Section 5 Reactivity Data

Stability	-	Stable
Conditions to Avoid	-	None
Incompatibility	-	Strong Oxidizing Agents and Acids
Hazardous Decomposition Products	-	Oxides of phosphorous and CO
Hazardous Polymerization	-	Will not occur
Conditions to Avoid	-	Not Applicable

Section 6 Health Hazard Information

Toxicity Information - Exposure level not established for this product. See section 2.

Effects of Overexposure:	Inhalation:	inhaling vapors may irritate respiratory passages.
	Ingestion:	may cause gastrointestinal problems if swallowed.
	Skin Contact:	prolonged or frequent skin contact may cause irritation.
	Eye Contact:	will cause severe irritation.

Emergency & First Aid Procedures

Inhalation:	remove affected person to fresh air and treat symptomatically.
Ingestion:	if conscious, give water to dilute and contact a physician immediately.
Skin Contact:	wash with soap and water. Remove contaminated clothing and wash before reuse.
Eye Contact:	flush with water for 15 minutes and seek medical attention.

Section 7 Special Protection Information

Ventilation Requirements	-	use sufficient ventilation.
Respiratory Protection	-	none normally required.
Eye Protection	-	wear chemical goggles or safety glasses.
Gloves	-	PVA recommended.
Other Protective Items	-	long sleeve shirt and pants; rubber apron and gloves.

ISI
Industrial Solutions, Inc

Section 8 Spill or Leak Procedures

Action if material is released or spilled

Small spills can be absorbed on an inert material and disposed of in a landfill according to local regulations. Any residual can be flushed to drain with excess water.

Waste Disposal Method

Dispose according to federal, state and local regulations.

This product contains no materials that are subject to reporting requirements under CERCLA and it is however, classified as a corrosive waste unless neutralized.

Section 9 Special Precautions

Precautions to be taken in Handling and Storage

Store Container closed when not in use.

Other Precautions

For Industrial Use Only. Keep out of Reach of Children

PREPARED & REVISED BY: Lee R. Jenkins DATE: 12-12-12

ISI
Industrial Solutions, Inc

Emergency Phone
1-866-301-1004

Material Safety Data Sheet

Section 1 Product Identification

Trade Name: **ISI 586** Product Type: Scale Inhibitor

DOT Shipping Name Industrial Process Water Treatment, liquid

Section 2 Hazardous Ingredients

	CAS Number	%	Exposure Criteria
Sodium Organophosphonates	67953-76-8	<15	N.D.
Sodium Hydroxide	1310-73-2	<8	500 mg/Kg (LD_{50})

Section 3 Physical Data

Boiling Point, 760 mm Hg	>212°F (>100°C)	Melting Point	N.A.
Freezing Point	23°F (-5°C)	Vapor Pressure	N.D.
Specific Gravity	1.18	Solubility in Water	Complete
Vapor Density	N.D.	Evaporation Rate	1
% Volatiles	N.D.	pH	9.0 – 10.5
Appearance and Odor	Pale Amber Liquid, sweet Odor		

Section 4 Fire & Explosion Hazard Data

Flash Point (& Method Used)	Flammable Limits in Air % by Volume Lower	Upper	Auto Ignition Temperature
>95°F (>200°C) TCC	N.D.	N.D.	N.D.

Extinguishing Media: Dry Chemical; Foam; CO_2, Water

Special Firefighting Instructions

Use extinguishing techniques appropriate to the primary cause of the fire. Firefighters should wear self-contained breathing apparatus.

Unusual Fire and Explosion Hazard
None Known

Section 5 Reactivity Data

Stability	-	Stable
Conditions to Avoid	-	None
Incompatibility	-	Strong Oxidizing Agents and Acids
Hazardous Decomposition Products	-	CO
Hazardous Polymerization	-	Will not occur
Conditions to Avoid	-	Not Applicable

Section 6 Health Hazard Information

Toxicity Information - Exposure level not established for this product. See section 2.

Effects of Overexposure:	Inhalation:	inhaling vapors may irritate respiratory passages.
	Ingestion:	may cause gastrointestinal problems if swallowed.
	Skin Contact:	prolonged or frequent skin contact may cause irritation.
	Eye Contact:	may cause irritation.

Emergency & First Aid Procedures

Inhalation:	remove affected person to fresh air and treat symptomatically.
Ingestion:	if conscious, give water to dilute and contact a physician immediately.
Skin Contact:	wash with soap and water. Remove contaminated clothing and wash before reuse.
Eye Contact:	flush with water for 15 minutes and seek medical attention.

Section 7 Special Protection Information

Ventilation Requirements	-	use sufficient ventilation.
Respiratory Protection	-	none normally required.
Eye Protection	-	wear chemical goggles or safety glasses.
Gloves	-	PVA recommended.
Other Protective Items	-	long sleeve shirt and pants; rubber apron and gloves.

Section 8 Spill or Leak Procedures

Action if Material is Released or Spilled

Small spills can be absorbed on an inert material and disposed of in a landfill according to local regulations. Any residual can be flushed to drain with excess water.

Waste Disposal Method

Dispose according to federal, state and local regulations.

This product contains no materials that are subject to reporting requirements under CERCLA.

Section 9 Special Precautions

Precautions to be taken in Handling and Storage

Store Container closed when not in use.

Other Precautions

For Industrial Use Only. Keep out of Reach of Children

PREPARED & REVISED BY: Lee R. Jenkins DATE: 12-12-12

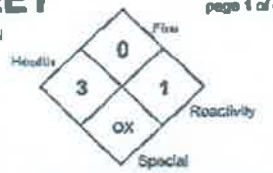
MATERIAL SAFETY DATA SHEET

BRENNTAG [redacted]

Brenntag MSDS #:	BPI-00233
MSDS Revision/Issue Date:	01/28/08
Supercedes Revision Date:	New

NFPA 704 DESIGNATION
HAZARD RATING

4=Extreme
3=High
2=Moderate
1=Slight
0=Insignificant



1. CHEMICAL PRODUCT IDENTIFICATION & COMPANY IDENTIFICATION

PRODUCT IDENTIFIER: 12.5% Sodium Hypochlorite

GENERAL USE: This product is to be used as an industrial sanitizing solution. This product is registered with the EPA for use as a disinfectant or sanitizer and can be used for those purposes.

PRODUCT DESCRIPTION: An aqueous solution of Sodium Hypochlorite. Synonyms for Sodium Hypochlorite include: Dakins solution; hychlorite; sodium chloride oxide; and sodium oxychloride.

INFORMATION PROVIDED BY:
Brenntag Pacific, Inc.
6700 N.W. Front Avenue
Portland, OR 97210

For MSDS call: PHONE: 503-242-0200

EMERGENCY PHONE NUMBERS

BRENNTAG:	503-690-7055
CHEMTREC:	800-424-9300
CANUTEC:	613-996-6666

2. COMPOSITION & INFORMATION ON INGREDIENTS

COMPONENT	CAS #	OSHA HAZARD	WT %	ACGIH TLV/TWA	ACGIH STEL	OSHA PEL/TWA	OSHA STEL
Sodium Hypochlorite	7681-52-9	Corrosive; Oxidizer; Lung toxin	12.5 Minimum	None	None AIHA WEEL: 2 mg/m³ (for 15 minutes)	None	None
Sodium Hydroxide	1310-73-2	Corrosive; Lung toxin	2.0 Maximum	None Ceiling: 2 mg/m³	None	2 mg/m³	None

NDA = No Data Available NA = Not Applicable

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: A clear, light yellow-green liquid having a chlorine-like odor. The liquid and mists may be corrosive to the eyes, skin and respiratory tract. Inhalation of high mist concentrations can cause permanent lung damage. The NIOSH I.D.L.H. for Sodium Hydroxide is: 10 mg/m³.

POTENTIAL HEALTH EFFECTS

INHALATION: Inhalation of mists may be severely irritating or corrosive to the nose, mouth, throat, mucous membranes and lungs. Symptoms of exposure may include shortness of breath, sneezing, coughing, choking, chest pain, impairment of lung function and burns to the respiratory tract with the production of lung edema. Inhalation of high mist concentrations may result in permanent lung damage.

EYE CONTACT: Exposure to the liquid or mists may cause severe eye irritation or burns. Symptoms of exposure may include tearing, redness, swelling and pain. Corneal damage with impairment of vision may result from direct contact with the liquid, unless treated promptly.

SKIN CONTACT: Exposure to the liquid or mists may cause severe skin irritation or burns. Symptoms of exposure may include redness, swelling, discomfort or pain and possible scab formation. Prolonged skin exposure to the liquid may cause destruction of the dermis with impairment of the skin, at site of contact, to regenerate. No published data indicates this product is absorbed through the skin.

INGESTION: Ingestion may cause severe irritation or burns to the entire gastrointestinal tract, including the stomach and intestines. Symptoms of exposure may include nausea, vomiting, diarrhea, abdominal pain, bleeding and/or tissue ulceration.

CHRONIC: The chronic health effects of exposure to the liquid or mists are expected to be the same as for acute exposure.

4. FIRST AID MEASURES

INHALATION: If inhaled, immediately move to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; use the Holger Nielsen method (back pressure – arm lift) or proper respiratory medical device. If breathing is difficult, give oxygen. Call a physician.

EYE CONTACT: In case of contact, immediately flush eyes with plenty of clean running water for at least 15 minutes, lifting the upper and lower lids occasionally. Remove contact lenses, if worn. Get medical attention immediately.

SKIN CONTACT: In case of contact, immediately flush skin with plenty of clean running water for at least 15 minutes, while removing contaminated clothing and shoes. If burn or irritation occurs, call a physician.

INGESTION: If swallowed, DO NOT induce vomiting. Get medical attention immediately. If victim is fully conscious, give plenty of water to drink. Never give anything by mouth to an unconscious person.

NOTE TO PHYSICIANS: Sodium hypochlorite solutions have a relatively low oral toxicity, but may be corrosive to the eyes, skin and mucous membranes. If ingested, consideration should be given to careful endoscopy as stomach or esophageal burns, perforations or strictures may occur. Careful gastric lavage with an endotracheal tube in place should be considered. Treat exposure symptomatically.

5. FIRE FIGHTING MEASURES

Flashpoint and Method: This product does not flash.

Flammable Limits (in air, % by volume) **Lower:** Not applicable **Upper:** Not applicable

Autoignition Temperature: Not applicable

GENERAL HAZARD: This product is a non-combustible, aqueous solution. The Uniform Fire Code health hazard rating for this product is: **Corrosive (Alkaline).** Dilute solutions of this product may be corrosive. This product can release Oxygen and / or Chlorine gases. Any contamination or heat will accelerate this product's break down.

FIRE FIGHTING INSTRUCTIONS: **EXTINGUISHING MEDIA:** Flood with water or CO_2.
Use a water spray or fog to cool the containers exposed to the heat of a fire.

FIRE FIGHTING EQUIPMENT: Fire fighters should wear full protective equipment, including self-contained breathing apparatus.

HAZARDOUS COMBUSTION PRODUCTS: When heated to dryness and decomposition, this product emits toxic chloride fumes plus toxic sodium oxide. This solution will slowly liberate Oxygen.

6. ACCIDENTAL RELEASE MEASURES

LAND SPILL: Wearing recommended protective equipment and clothing, dike the spill and pick up the bulk of liquid using pumps or a vacuum truck, or absorb the liquid in sand or a commercial absorbent. Place in approved containers for recovery, disposal, or satellite accumulation. Neutralize the hypochlorite or available chlorine with a dilute solution of Sodium Sulfite or Sodium Thiosulfate. Neutralize the alkalinity, of the remaining liquid, using a dilute acid solution that is appropriate for neutralizing alkaline liquids. Liberally cover the spill area with Sodium Bicarbonate. Flush the spill area with water; collect the rinsates for disposal or sewer, as appropriate.

WATER SPILL: Wear recommended protective equipment and clothing if contact with hazardous material can occur. Stop or divert water flow. Dike contaminated water and remove for disposal and/or treatment. As appropriate, notify all downstream users of possible contamination.

7. HANDLING AND STORAGE

STORAGE TEMPERATURE: Below 21° C. (70° F.) **STORAGE PRESSURE:** Ambient

GENERAL: Store in a cool, dry, well-ventilated area away from incompatible materials and products. Protect this product from direct sunlight and heat to avoid deterioration. Do not allow this product to freeze. Open containers slowly to relieve any possible pressure. Do not store in metallic containers. Do not allow this solution to dry out.

Do not get this product in eyes, on skin or on clothing. Wear recommended personal protective equipment when handling this product. Avoid breathing vapors, mists or aerosols. Use with adequate ventilation. Keep the containers tightly closed when not in use. Wash thoroughly after handling this product.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

CONTROL MEASURES: Use a local or general, mechanical exhaust ventilation system capable of maintaining emissions, in the work area, below the OSHA-PEL, ACGIH Ceiling level, AIHA WEEL or levels that may cause irritation.

RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

RESPIRATOR: For exposure above the OSHA-PEL, ACGIH Ceiling level, AIHA WEEL or levels that may cause irritation, wear a NIOSH-approved full facepiece or half mask air-purifying cartridge respirator equipped with a good mist / particulate and acid gas cartridges or supplied air.

EYES: Wear chemical goggles (recommended by ANSI Z87.1-1979), unless a full facepiece respirator is worn.

GLOVES: Wear Butyl Rubber, Neoprene, Nitrile or Natural Rubber gloves.

CLOTHING & EQUIPMENT: Wear a Butyl Rubber, Neoprene, Nitrile or Natural Rubber apron or full protective clothing when handling this product. An eye wash station and safety shower should be available in the work area.

FOOTWEAR: Wear Butyl Rubber, Neoprene, Nitrile or Natural Rubber boots.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear, light yellow-green	**Bulk Density (pounds/ft³):**	Not applicable
Physical State:	Liquid	**Vapor Pressure:**	No data available
Odor:	Chlorine-like	**Vapor Density (air=1):**	No data available
Odor Threshold:	0.3 ppm in air (Chlorine)	**Evaporation Rate (n-butyl Acetate=1):**	No data available
Molecular Formula:	Mixture	**VOC Content:**	Nil
Molecular Weight:	Not applicable	**% Volatile:**	Approximately 74
Boiling Point:	Decomposes at 110° C. (230° F.)	**Solubility in H_2O:**	Complete
Freezing/Melting Point:	-28.1° C. (-15° F.)	**Octanol/Water Partition Coefficient:**	No data available
Specific Gravity:	Approximately 1.22 @ 20° C.	**pH (as is):**	12.5 – 13.5
Density (pounds/gallon):	Approximately 10.17	**pH (1% solution):**	11.0 – 12.0

10. STABILITY AND REACTIVITY

GENERAL: This product is stable and hazardous polymerization will not occur.

CONDITIONS TO AVOID: Avoid heat, sunlight, decrease in pH, and contamination with heavy metals.

INCOMPATIBLE MATERIAL: Acids & acidic materials or products, alcohols, amines, Ammonia, chlorinated isocyanurates, flammable or combustible materials, metals & metallic salts, cyanides, detergents, ethers, oxidizable materials, reducing agents and other oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS: When heated to dryness and decomposition, it emits toxic chloride fumes plus toxic sodium oxide. This solution will slowly liberate Oxygen.

SENSITIVITY TO MECHANICAL IMPACT: This product is not sensitive to mechanical impact.

SENSITIVITY TO STATIC DISCHARGE: This product is not sensitive to static discharge.

11. TOXICOLOGICAL INFORMATION

Components:	Sodium Hypochlorite	Sodium Hydroxide
Eye Contact:	Rabbit: 10 mg; Moderate	Rabbit: 1 mg/24 hours; Severe
Skin Contact:	No data available	Rabbit: 500 mg/24 hours; Severe
Oral Rat LD_{50}:	690 mg/kg (sodium)	No data available (Oral Rabbit LD_{Lo}: 500 mg/kg)
Dermal Rabbit LD_{50}:	Greater than 10 gm/kg	1,350 mg/kg
Inhalation Rat LC_{50}:	Greater than 10.5 mg/Liter/1 hour	No data available
Human Data:	Oral Woman TD_{Lo}: 1 gm/kg; Behavioral effects	No data available
Other Toxicological Data:	Oral Mouse LD_{50}: 5,800 mg/kg	Intraperitoneal Mouse LD_{50}: 40 mg/kg
Carcinogenicity:	No data available	No data available
Teratogenicity:	No data available	No data available
Mutagenicity:	Human Cytogenetic Analysis; Lymphocyte: 100 ppm/24 hours	Hamster Cytogenetic Analysis; Lung: 10 mmol/Liter
Synergistic Products:	None reported	None reported
Target Organs:	Eyes, Skin, Mucous membranes & Lungs	Eyes, Skin, Mucous membranes & Lungs
Medical Conditions Aggravated By Exposure:	Skin or Respiratory disorders	Skin or Respiratory disorders

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE:

This product is completely soluble in water. No specific environmental fate information is available. This product will effect the pH of water.

ENVIRONMENTAL CONSIDERATIONS:

The aquatic toxicity for this product has not been determined. The EPA has determined that Sodium Hypochlorite is toxic to marine organisms.

13. DISPOSAL CONSIDERATIONS

RCRA 40 CFR 261 CLASSIFICATON: Corrosive Waste

U.S. EPA WASTE NUMBER/DESCRIPTION: D002

If this product is disposed of as shipped, it meets the criteria of a hazardous waste as defined under 40 CFR 261 due to its corrosivity. If this product becomes a waste, it will be a hazardous waste, which is subject to the Land Disposal Restrictions under 40 CFR 268 and must be managed accordingly. As a hazardous liquid waste, it must be disposed of in accordance with local, state, and federal regulations in a permitted hazardous waste treatment, storage, and disposal facility.

14. TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME: Hypochlorite solutions
Hazard Class: 8 UN Number: UN1791 Packing Group: III
Primary Label: Corrosive Subsidiary Label(s): None Required
Primary/Subsidiary Placards: Corrosive

DOT Reportable Quantity (RQ): 100 pounds (NaOCl) **RQ for Product:** 800 pounds (78.6 gallons)

Marine Pollutant: NA

2004 North American Emergency Response Guidebook No.: 154

TDG PROPER SHIPPING NAME: HYPOCHLORITE SOLUTIONS
Hazard Class: 8 UN Number: UN1791 Packing Group: III
Primary Label: Corrosive Subsidiary Label(s): None Required
Primary/Subsidiary Placards: Corrosive

TDG Reportable Quantity (RQ): # At least 5 kg or 5 liters.

TDG Schedule XII: Not listed

Regulated Limit (RL): ## 5 kg (NaOCl) **RL for Product:** 40 kg (32.8 liters)

Other Shipping Information: None

Canadian Transportation of Dangerous Goods Regulations (TDGR), Part IX, Table I, Quantities or levels for Immediate Reporting: releases of reportable quantities, RQ, that meet the definition of a "dangerous occurrence" (a threat to life, health, property, or the environment) must be reported to the appropriate authorities as outlined in TDGR 9.13(1) and 9.14(1).

Reporting to Environment Canada is required for any releases exceeding the regulated limits, RL, of 0.2 materials (primary or secondary). The regulated limits are found in Schedule XII of the TDGR.

15. REGULATORY INFORMATION

COMPONENTS:	Sodium Hypochlorite	Sodium Hydroxide
OSHA Target Organs:	Eyes, Skin, Mucous membranes & Lungs	Eyes, Skin, Mucous membranes & Lungs
Carcinogenic Potential:		
Regulated by OSHA:	No	No
Listed on NTP Report:	No	No
Listed by IARC:	Yes	No
IARC Group:	Group 3	Not applicable
ACGIH Appendix A:	Not listed	Not listed
A1 Confirmed Human:	Not applicable	Not applicable
A2 Suspected Human:	Not applicable	Not applicable
U.S. EPA Requirements		
Release Reporting		
CERCLA (40 CFR 302)		
Listed Substance:	Yes	Yes
Reportable Quantity:	100 pounds	1,000 pounds
Category:	B	C
RCRA Waste No.:	None listed	None listed
Unlisted Substance:	Not applicable	Not applicable
Reportable Quantity:	Not applicable	Not applicable
Characteristic:	Not applicable	Not applicable
RCRA Waste No.:	Not applicable	Not applicable
SARA TITLE III		
Section 302 & 303 (40 CFR 355):		
Listed Substance:	Not listed	Not listed
Reportable Quantity:	Not applicable	Not applicable
Planning Threshold:	Not applicable	Not applicable
Section 311 & 312 (40 CFR 370):		
Hazard Categories (product):	Fire: N Sudden Release of Pressure: N Reactive: N Acute Health: Y Chronic Health: N	
Planning threshold:	10,000 pounds	10,000 pounds
Section 313 (40 CFR 372):		
Listed Toxic Chemical:	Not listed	Not listed
Reporting Threshold:	Not applicable	Not applicable
U.S. TSCA Status		
Listed (40 CFR 710):	Yes	Yes
State Regulations		
State of California: Safe Drinking Water and Toxics Enforcement Act, 1986 (Proposition 65):		
Carcinogen:	No	No
Reproductive Toxin:	No	No
Other Regulations		
State Right To Know Laws:	MA, NJ, PA, CA	
Canadian Regulations		
Product Information:		
Controlled Product:	Yes	
WHMIS Hazard Symbols:	Material Causing Other Toxic Effects; Corrosive Material	
WHMIS Class & Division:	D.2B; E	
Ingredient Information:		
IDL Substance:	Yes	Yes
DSL or NDSL Lists:	DSL	DSL

16. OTHER INFORMATION

EPA Registration number: 66887 - 20001

Approved Product Uses: This product is registered for the following uses: Swimming Pool Water Disinfection; Spas, Hot Tubs, Immersion Tanks, Etc.; Sanitization of Nonporous Food Contact Surfaces; Sanitization of Porous Food Contact Surfaces; Sanitization of Nonporous Non-Food Contact Surfaces; Disinfection of Nonporous Non-Food Contact Surfaces; Sanitization of Porous Non-Food Contact Surfaces; Sewage & Wastewater Effluent Treatment; Sewage and Wastewater Treatment; Public Water Systems; Emergency Disinfection After Fires; Emergency Disinfection After Drought; Emergency Disinfection After Main Breaks; Cooling Tower/Evaporative Condenser Water; Household Laundry Sanitizers; Commercial Laundry Sanitizers; Farm Premises; Pulp and Paper Mill Process Water Systems; Aquacultural Uses; Asphalt or Wood Roofs and Sidings; Boat Bottoms; and Artificial Sand Beaches.

Special Notes:

This product does not contain any material, which the State of California has found to cause cancer and/or birth defects or other reproductive harm.

Special Instructions:

Store 12.5% Sodium Hypochlorite in a cool, dry, well ventilated area, away from heat, direct sunlight and incompatible materials or products.

When making solutions, always add this product to water with adequate mixing to ensure a uniform solution.

Do not add 12.5% Sodium Hypochlorite to acids, or acidic sanitizers and cleaners as this liberates toxic, corrosive Chlorine gas.

MSDS Revision Information: Information Revised This Issue Date: Revised MSDS format.

Form Revision made 2/03/06

MSDS Distributed by: Brenntag Pacific, Inc.
NW Environmental Department
Phone: 503-242-0200 FAX: 503-412-3390

Prepared By:	Edward Doheny	Date Prepared:	January 28, 2008

Material Safety Data Sheet
J. R. Simplot Company
AgriBusiness

Trade Name: Sulfuric Acid 93%
Registration No: None

M16020

SECTION 1 CHEMICAL PRODUCT AND COMPANY INFORMATION

Manufacturer or Formulator: J.R. Simplot Company
P.O. Box 70013
Boise, ID 83707
Emergency Phone - Chemtrec: 1-800-424-9300

Product Name: Sulfuric Acid 93%
Common Name: Sulfuric Acid, Oil of Vitriol
Chemical Type: Inorganic Acid

SECTION 2 COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name and Synonyms	C.A.S. No.	Chemical Formula	WT%	TLV	PEL
			Hazardous		
Sulfuric Acid	7664-93-9	H_2SO_4	93%	0.2 mg/m^3	1 mg/m^3 8Hr TWA
			Non-hazardous		
Water	7732-18-5	H_2O	7%	Not listed	Not listed

SECTION 3 HAZARDS IDENTIFICATION

Ingestion: Ingestion may cause severe injury or death.
Inhalation: Not normal route of entry.
Eye Contact: May be slight to severe. Irritation, burns, corneal necrosis (loss of sight).
Skin Absorption: May destroy the epidermis and penetrate some distance into the skin and subcutaneous tissues and cause necrosis. Ulceration of the skin.
Skin Contact: May cause irritation or burns on skin. Prolonged contact may cause severe, deep burns to tissue; very corrosive effects. May cause dermatitis, ulceration.
Effects of Overdose: LOCAL: Conjunctivitis, corneal necrosis, dermatitis, skin burns, ulceration. RESPIRATORY: Irritation of the nose and throat, laryngeal edema, bronchitis, pneumonia, pulmonary edema. GASTROINTESTINAL: Dental erosion, shock, anuria, burning in mouth, throat and abdomen; nausea, vomiting of blood and eroded tissue, perforation of gastrointestinal tract, albumin, blood and casts in urine.

SECTION 4 FIRST AID MEASURES

Emergency and First Aid Procedures: Treatment is symptomatic and no specific antidotes are known.
Ingestion: Rinse mouth with large amounts of water, DO NOT INDUCE VOMITING. If patient is conscious give milk mixed with egg whites or as much water as possible.
Inhalation: Remove person from exposure area to fresh air and support breathing.
Eyes: IMMEDIATELY flush eyes with fresh running water for 15-20 minutes.
Skin: Give continuous flow of water to wash material off body. Remove contaminated clothing (under a shower if possible) and subject patient to deluge-type shower, if possible. Treat for shock. Prompt medical consultation is essential.

SECTION 5 FIRE FIGHTING MEASURES

Extinguishing Media: Fires involving small amounts of combustibles may be smothered with suitable dry chemicals. Use water on combustibles in vicinity of this material but use care, as water applied directly to their acid results in evolution of heat, causes splattering, and can further disperse aerosols.

Special Fire Fighting Procedures: Avoid any contact with acid. Wear full protective rubber clothing, gloves, boots, wear self-contained breathing apparatus.

Unusual Fire and Explosion Hazards: Not flammable but highly reactive and can cause ignition by contact with combustible materials. Reacts violently with water and organics. May release explosive hydrogen gas inside storage tanks, drums, tank cars, and tank trucks. This is a very powerful acidic oxidizer which can ignite or even explode on contact with many materials; i.e., acetic acid, acetone cyanhydrin, (acetone + HNO_3), (acetone + $K_2Cr_2O_7$), acetonitrile, acrolein, acrylonitrile, (acrylonitrile + H_2O), (alcohols + H_2O_2), allyl alcohol, allyl chloride, NH_4OH, 2-amino ethanol, NH_4triperchromate, aniline, (bromates + metals, BrF_3, n-butyraldehyde, carbides, $CoHC_2$, chlorates, (metals + chlorates), ClF_3, chlorosulfonic acid, Cu_3N, diisobutylene, (dimethyl benzylcarbinol + H_2O_2), epichlorohydrin, ethylene cyanhydrin, ethylene diamine, ethylene glycol, ethylene imine, fulminates, HCl, H_2, IF_7 (indene + HNO_3 + glycerides, p-nitroluene, perchlorates, $HClO_4$, (C_6H_6 + permanganates), pentasilver trihydroxydiamino phosphate, (l-phenyl-2-methyl propyl alcohol + H_2O_2), P, $P(OCN)_3$, picrates, potassium-tert-butoxide, $KClO_3$, $KMnO_4$, ($KMnO_4$ + KCl), $KMnO_4$ + H_2O) beta-propiolactone, $RbHC_2$, propylene oxide, pyridine, NA, Na_2CO_3, NaOH, steel, styrene monomer, water, vinyl acetate, (HNO_3 + toluene).

SECTION 6 ACCIDENTAL RELEASE MEASURES

Environmental Precautions: No information available; however, Sulfuric Acid has a reportable quantity of 1000 lbs. and, in the event of an accidental release, should be kept out of all watercourses and bodies of water. Do not contaminate any watercourse or body of water by direct application, cleaning of equipment or disposal.

Steps to be taken in case material is released or spilled:
Treat with extreme caution. Zone off contaminated area. Dike area with sand or earth. Acid may be neutralized with soda ash or lime. Neutralization or dilution of strong Sulfuric Acid will **ALWAYS** be accompanied by a very strong

chemical reaction with release of heat and possible splattering of the acid. Organic or combustible materials such as sawdust or rags should never be used to soak up spills. Wear full protective clothing (acid protective slicker suit).

SECTION 7 HANDLING AND STORAGE

Precautions to be taken in handling and storing:
When diluting always add acid to water slowly, never the reverse. Protect against physical damage and water. Wear full protective rubber clothing and rubber gloves and boots, acid hood, and full face shield when loading or unloading tank trucks or railway cars. If exposure is low, acid gas canister may be satisfactory or a self-contained breathing apparatus in the pressure demand mode or a supplied air respirator. Consult the respirator manufacturer to determine the appropriate type of equipment for a given application. In any event always wear eye protection.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Ventilation Protection:	Maintain adequate ventilation at all locations where acid is handled. Store in the open or in well ventilated buildings or sheds.
Respiratory Protection:	Depends on type of exposure, can range from nose to full protection. Self-contained breathing apparatus, or positive pressure hose mask, or air-line supplied with clean compressed air. Check with respirator manufacturer to determine the appropriate type of equipment for a given application.
Protective Clothing:	When loading or unloading trucks or cleaning out tanks or towers, wear acid resistant slicker suit, rubber clothing with rubber hood or broad soft hat, rubber apron, rubber gloves, rubber boots, and full face shield.
Suit Material Performance:	(suggested by E.P.A.--user should determine by specific use) Butyl ..... Poor Butyl/Neoprene ..... Good CPE ..... Excellent Chlorobutyl ..... Good Neoprene ..... Good
Eye Protection:	Chemical splash-proof goggles and/or full face shield.
Other:	Safety shower and eyewash fountain checked daily in area.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point:	530°F	Solubility in Water:	Complete (Exothermic)
Specific Gravity:	1.84 @ 60°F	% Volatiles (by volume):	100% @ 644°F
Flashpoint:	Non-flammable. It may cause ignition on contact with combustible liquids or solids.	Vapor Pressure, mm Hg:	1 @ 294°F
		Melting Point:	-31° to 51°F
pH:	Less than 1.0	Reaction with Water:	VIOLENT
Appearance:	Clear, colorless to cloudy.	Extinguishing Media:	Dry chemicals or carbon dioxide

SECTION 10 HANDLING AND STORAGE PRECAUTIONS

Stability (Normal Conditions):	Stable
Conditions to Avoid:	High temperature, organic materials, powdered metals, and other combustible materials.
Incompatibility (Material to Avoid):	Water and most common metals, organic materials, carbides, chlorates, fulminates, nitrates, picrates, powdered metals, other combustible materials and strong oxidizing agents. Attacks many metals, releasing hydrogen. Acetic acid, acetone cyanohydrin, acetone and nitric acid and styrene monomer, vinyl acetate, nitric acid and toluene.
Hazardous Decomposition Products:	Hydrogen gas and hazardous fumes of SO_x.
Hazardous Polymerization:	Will not occur.

SECTION 11 TOXICOLOGY INFORMATION

Acute Oral Toxicity:	LD_{50} (rat) is greater than 5,000 mg/kg (ppm); not acutely toxic by oral exposure. (TFI Product Testing Results, OECD Guideline 425)
Acute Inhalation Toxicity:	LC_{50} (rat, guinea pig) is 18-420 mg/m^3, highly toxic by inhalation. (TFI Product Testing Results)
Acute Aquatic Toxicity:	Fish 96-hour LC_{50} is 42-500 mg/L (ppm); daphnia 24-hour EC_{50} 29-88 mg/L; algae 10 mg/L. Slightly toxic to aquatic organisms. (TFI Product Testing Results)

SECTION 12 ECOLOGICAL INFORMATION

None listed.

SECTION 13 DISPOSAL CONSIDERATIONS

Waste Disposal Procedures: If possible, avoid pouring or spraying water directly onto strong Sulfuric Acid. This **ALWAYS** results in a violent chemical reaction. It is always best to slowly pour the acid into water during disposal operations to avoid the violent reaction and splattering of acid. If water must be sprayed into the acid for dilution, flushing, etc., it should always be done from a distance with proper protective gear.

SECTION 14 TRANSPORT INFORMATION

Proper shipping name:	RQ Sulfuric Acid (with more than 51 percent acid), 8, UN1830 P.G. II		
Hazard Class:	8	D.O.T. Number:	UN1830
Reportable Quantity (RQ):	1000 lbs. - Sulfuric Acid	Haz Waste No:	D002
Labels Required:	Corrosive	EPA Regist No:	None

Trade Name: Sulfuric Acid 93% **M16020**
Registration No: None
Placard: Corrosive **Packaging Group:** II
C.A.S. Number: 7664-93-9
Refer to 49 CFR 172.101 Hazardous Materials Table for further provisions, packaging authorizations and quantity limitations.

SECTION 15 REGULATORY INFORMATION

Carcinogenicity: by IARC?: Yes ( ) No (X) by NTP?: Yes ( ) No (X)
IARC evaluates occupational exposures to strong, inorganic-acid mists containing Sulfuric Acid in "Group 1", as having carcinogenic potential. However, SULFURIC ACID ITSELF WAS NOT CLASSIFIED AS A GROUP I CARCINOGEN.

This product contains sulfuric acid, CAS No. 7664-93-9, which is subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

SECTION 16 OTHER INFORMATION

Flash Point (Test Method):	Not applicable	**Flammable Limits**	**LOWER**	**UPPER**
Autoignition Temperature:	Not applicable	(% BY VOLUME)	N/A	N/A

Hazard Rating (N.F.P.A.): **Health:** 3 **Fire:** 0 **Reactivity:** 2 **Specific:** Use no water
This N.F.P.A. rating is a recommendation by the manufacturer using the guidelines or published evaluations prepared by the National Fire Protection Association (N.F.P.A.).

FIREFIGHTING TECHNIQUE
Concentrated vapors of Sulfuric Acid are extremely irritating to the respiratory tract and may cause breathing difficulty. Prevent human exposure to fire, smoke, fumes, or products of combustion. Evacuate nonessential personnel from the fire area. Maintain a safe distance from the fire and storage area because excessive heat may cause tank to rupture. Wear full face, self-contained breathing apparatus and impervious clothing (such as gloves, hood, suits, and rubber boots). Use water spray, dry chemical, foam, carbon dioxide, or halogenated extinguishing agents. If the tank is not leaking, keep cooled using a fog spray nozzle to minimize the reactivity of the water and acid. Under no circumstance should water or other liquid be introduced into acid tanks. Take care not to ignite hydrogen gas which can accumulate inside metal tanks containing acid.

SPECIAL HANDLING
Make sure all personnel involved in the spill cleanup follow good industrial hygiene practices.

A small spill can be handled routinely. Use adequate ventilation or wear an air-supplied respirator to prevent inhalation contact. Wear suitable protective clothing to prevent skin and eye contact. Use the following procedures:

- Any leak occurring in pipelines or equipment should be considered an acid leak and treated with extreme caution until the leak is proven not to be an acid leak.
- All contaminated areas should be immediately zoned off to avoid personnel exposure to the acid spray or stream.
- Adjust all appropriate valves to isolate the system and stop further leakage.
- Soda ash or lime should be spread around to neutralize any remaining acidity on the surface of the ground or concrete pad. The contaminated area should be covered with sand or gravel, and acidity neutralized with soda ash or lime.
- Sulfuric Acid leaks, spills or drainings must not come in contact with any acid soluble sulfide wastes (such as in sewers), because of danger of evolving hydrogen sulfide gas.
- Large spills should be handled according to the predetermined plan. Part of this plan should include Section V, FIRE FIGHTING MEASURES.

CORROSIVITY TO MATERIALS OF CONSTRUCTION
Weaker strengths of Sulfuric Acid, particularly concentrations below 60° Baume, are highly corrosive to most metals with evolution of hydrogen gas.

STORAGE REQUIREMENTS
The following safety facilities should be readily accessible in all areas where Sulfuric Acid is handled or stored.

SAFETY SHOWERS--with quick opening valves which stay open. Water should be supplied through insulated lines to prevent freeze-ups in cold weather.
EYEWASH FOUNTAIN--or other means of washing the eyes with a gentle flow of tap water.

Sulfuric Acid may be safely stored in properly designed bulk storage tanks.

DISPOSAL OF UNUSED MATERIAL
Sulfuric Acid that cannot be used or chemically reprocessed should be disposed of in such a manner that will not adversely affect the environment.

MSDS Version Number: 6 (revision to Sections 2 & 5)

Reviewed by: The Environmental Health and Safety Department
July 2006 (208) 389-7394