Alum Application Plan for Canyon Lake

Prepared for LESJWA and Canyon Lake POA

AquaTechnex, LLC

Palm Desert, CA
760-272-5842
www.aquatechnex.com

Introduction and Project Objective

Aquatechnex has been contracted by the LESJWA to apply Aluminum Sulfate to the lake to mitigate phosphorus pollution in the system. The dose and amounts ordered were based on specifications in the Request for Proposals to perform this work. This document will lay out the plan for operations on the lake.

The Project Objective is to apply approximately 77,000 gallons of Aluminum Sulfate in chemical composition specified to the surface of Canyon Lake. This objective is to be completed in September, 2013 with follow on applications in February of 2014. This protocol will be repeated in the fall of 2014 and spring of 2015 as well.

Identified Issues to Meeting the Project Objective

Supply and delivery of this volume of material to the lake poses the largest logistical threat. This has been mitigated through the help of General Chemical Performance Products, they are the supplier of the majority of all Aluminum Sulfate that has been used in lake restoration projects nationally. Aquatechnex has established an account with them and arranged for procurement of the necessary gallons of material. They are arranging delivery based on the schedule we provide them. The Canyon Lake Property Owners Association has also provided logistical support and locations around the lake where transfer can take place safely.

Weather is an uncontrollable threat to the project objective. Forecasts will be monitored throughout the mission window as the treatment dates approach. This will be further mitigated by consulting forecasts for the following day during the mission. Delivery of Alum can be cancelled with day prior notification. If conditions change with respect to forecast the day prior to treatment, a decision will be made to terminate and reschedule.

Staging and production are issues that require mitigation. The Canyon Lake Property Owners Association has provided good staging areas and facilities at key locations around the lake . These locations will allow us to stage trucks and transfer Alum to application vessels very near the application sites. Application will be made with 3 to 5 vessels as outlined below to facilitate getting the Alum in the water within a few days time.

Supplier

General Chemical Performance Products of New Jersey will be supplying Aluminum Sulfate that meets the City specifications from production plants in California and potentially Arizona. This material is NSF certified for potable water treatment. The initial schedule will be set to receive 14 trucks over a 3 day period to treat the Large Lake. Five additional trucks will then be scheduled to treat the East Arm of the lake. During each day we will arrange for additional shipments for the following day's needs through their regional manager. Their material data safety sheet is attached to this document.

Equipment mix

General Chemical will be transporting the Alum in tank trailers with a approximately 4,300 gallon capacity. As such, there will be 17-18 trips generated to the lake. These will be staggered so one truck is on site at a time and its cargo can be loaded into the application equipment over a 2-3 hour period. The empty truck will then mobilize from the site and be replaced with the next scheduled delivery.

Aquatechnex will supply transfer hose systems to move the material from the truck parked at either park facility into the holding tanks on the application vessels. These will be manned by the truck driver and an Aquatechnex staff member. A material catch pan will be present under the truck hose connection and on the dock at the nozzle site and monitored at all times. Spill response kits will also be on site and available at each potential discharge location.

We will be transporting and launching one treatment barge and two pontoon boats. These are both equipped with Alum storage tanks, transfer pump system and flat fan application nozzles mounted on the rear of the boat. These fanjets allow for wider broadcast patterns without exposing a boom to potential impact or damage around docks. Back up pumps and booms will also be on site in case a system has a mechanical issue. The boats each have a crew of two and onboard GPS Chartplotter and Integrated Water Depth systems. They also have RAVEN precision application GPS equipment for plotting and recording application lanes and overlap.

Team members

Terry McNabb will be the on-site project manager. His cell phone contact number is 360-201-2612. He will be supported by Ian Cormican (760-272-5842) and Aquatechnex biologists. Each boat will have a support person aboard.

Key telephone numbers

There are a number of telephone numbers that many be required during the course of this mission. They are:

Terry McNabb, Aquatechnex Project Manager: 360-201-2612

Catherine Wilson, Operations Manager of Canyon Lake POA, 951-244-6841, ext. 511

Mark Bercaw, General Chemical: 408-402-2943

City Police and Emergency Services: 911

National Spill Response Center: 1-800-424-8802

Location of emergency services

In the event of a medical emergency with respect to the crew, truck drivers or others, calling emergency services would be initiated at once. All operations will stop and if the emergency is on the water, the boats will return to the shore work site. Communicate with 911 at once stating the location of each park facility and the nature of the emergency. If the emergency is on the water insure that the location of the vessel is communicated to emergency services.

The nearest hospital is Inland Valley Medical Center, 36485 Inland Valley Drive, Wildomar, CA 951-677-1111.

The National Spill Response Center can coordinate response to any spill event that may occur. Their information is presented above.

Delivery of Alum

Delivery of Alum will be scheduled with General Chemical at one truck intervals starting Monday September 23rd in the morning. It is anticipated that each truck can be emptied into application vessels in approximately 2 hours. Trucks will be scheduled so that the flow of materials onto the water is constant. The team will be watching weather forecasts and if wind conditions are expected to be an issue the following day, trucks will be re-scheduled around the wind event. Once a treatment day starts, trucks that are filled will be required to move to the lake and discharge their material. If an unexpected wind event occurs, the applications will be made to the upwind areas of the lake where wave action is low.

Spill Prevention

Responsibility for the Alum loads in transit are with the trucking company. They have requirements they must follow if there is an accident or spill in route.

Prevention is always the best practice. Constant awareness of the potential for spill must be a key part of all operations. Once on the site, the truck will be staged at one of the parks nearest the operations on the water that day. The potential for spill would be greatest during transfer from the truck to the application vessels. A transfer hose has been newly purchased for this project and has no wear on it. That hose has quick couplers that attached to the delivery truck discharge nozzle. This hose will have a shut off valve on each end, the one at the delivery site to the boat will control the flow into the application tank on the vessel. The valve at the truck will be used as a back up if for some reason the hose ruptures to shut off flow. We will have catch devices under both ends of the hose to catch any drips during coupling.

During loading events, there will be the driver and a Aquatechnex employee at the truck controlling that end of the hose system. The boat captain and assistant will receive the transfer hose from the dock at either site and manage delivery of alum. Once the alum is safely onboard the application vessel the tank will be capped and there will be a closed system.

Spill kits will be stationed at each end of the delivery pipeline in the event of a failure. All transfer will stop on indication of release and the remaining alum will be contained in the delivery truck. Spill clean up and notifications will occur in that order. Time is of the essence in stopping the spill and agency response could take hours, so the first steps should be assessment and containment with agencies being notified as soon as possible (within minutes).

Treatment Plan and Schedule

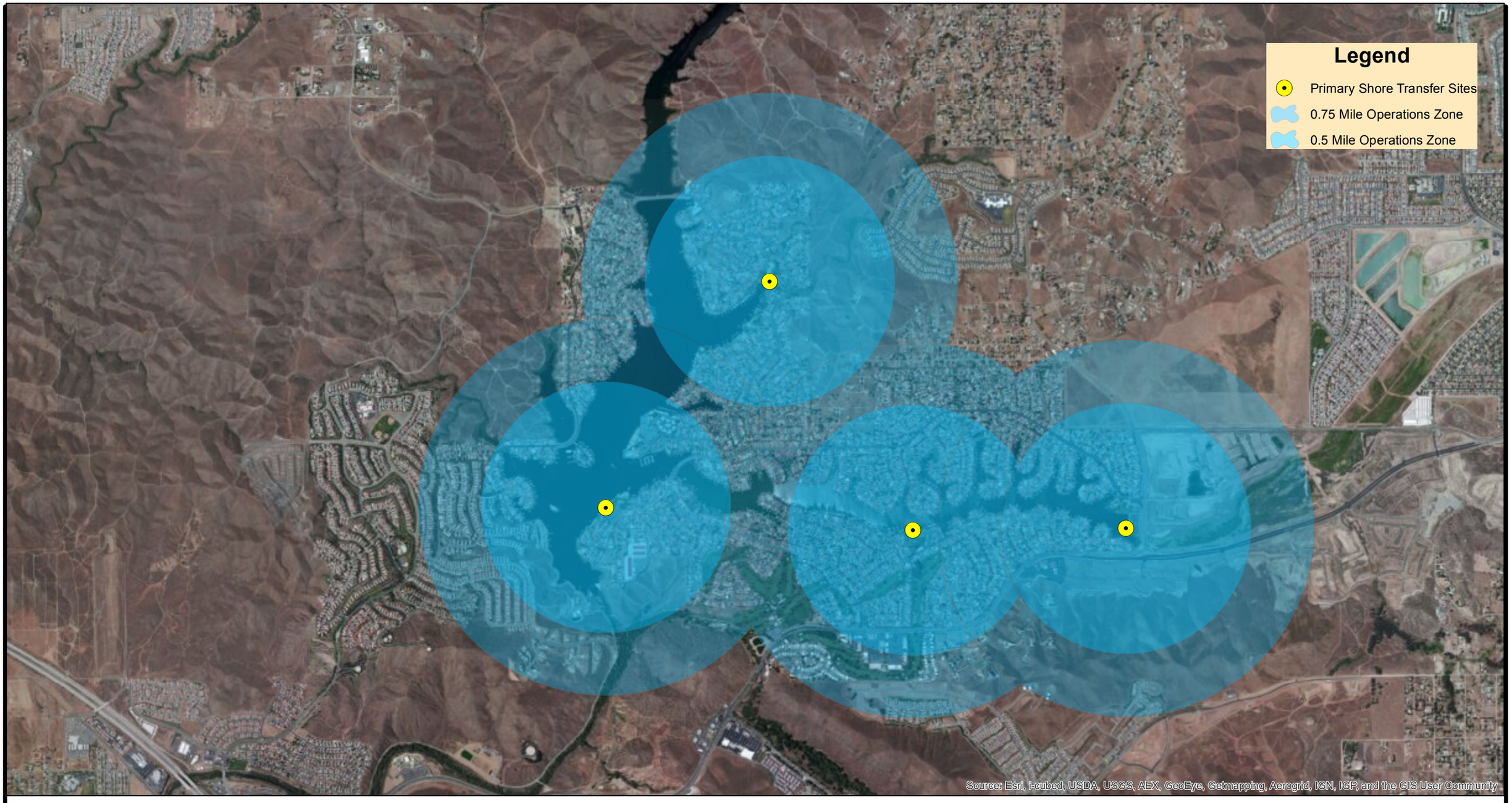
The treatment plan should proceed as follows.

- Tuesday, September 10th, attend the public meeting and present an overview of Alum application procedures that will take place on the water and participate in the panel discussion to answer questions that the public may have.
- Sunday, September 22nd, mobilize boats to Canyon Lake, participate in the POA's boat inspection program for invasive aquatic species, launch application crews, calibrate systems and finalize application maps, upload treatment polygons to GPS systems on vessels, secure the areas provided by the POA for staging Alum transfer at first site at the boat ramp in Holiday Harbor Park , meet with POA Staff, brief application team on all aspects of project and hold safety meeting
- Monday, September 23rd. Receive four trucks at staggered intervals of 7 am, 10 am 1 pm and 3 pm and commence operations. The treatment maps and tracks will be designed so that the application vessels accept alum at the dock at the park, travel to the closes edge of treatment track and commence traveling an application transect. The application vessels are going to travel straight lines away from the closest access point between the loading area and the treatment zone. They will be traveling at approximately 5 miles per hour during application and will be empty at the furthers point from the loading zone. They can then transition to high speed and travel back to the loading zone at 25-30 mph (observing no wake zones as necessary in their transit). It is estimated that the best case operational flow will be such that the vessels can collect and apply 1,000 gallons per half hour.
- Tuesday September 24th. We would anticipate scheduling five trucks at staggered intervals from the Holiday Harbor Site and making application throughout the day to the remaining southern main lake zones. Tuesday evening we will relocate shoreline operations to the North end of the main lake and stage for the following day from Indian Beach.
- Wednesday September 25th. We would receive the final 5 trucks scheduled for the main lake application from this location at Indian Beach and make applications to the northern portion of the lake completing the treatment on the main lake. We would then stage to the East Arm and stage from the park beach on the East Arm.
- Thursday September 26th. We would receive 3 of the 4 trucks scheduled for the East Arm at the park location noted on the attached map and make applications in both directions from this site. Speed limits on the east arm to protect moored vessels and shorelines from excessive wake will slow the application process and the team will likely add additional 1-2 boats. One boat will be

focused and equipped to treat tight areas with heavy dock concentrations in the narrow fingers of this section of the lake. We will them stage the last truck out of the East Port Boat Ramp

- Friday September 27th. We will receive and apply the last truck of Alum from the East Port Boat Ramp and demobilize from the site, meet with POA Operations Management to confirm we have met their expectations in terms of clearing the staging areas and remove our equipment from the location.

This schedule is based on smooth operations and weather, if delivery problems or weather impact operations an additional day or so may be required. If there are delays we will submit a new schedule to the POA and LESJWA at once.



0 90 180 360 540 720
Meters

Canyon Lake Alum Planning Project

Overview

AquaTechnex

Sheet No.
1

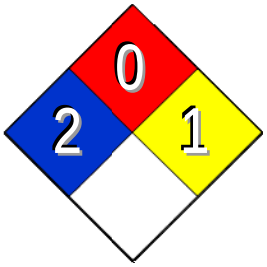
AquaTechnex, LLC

Drawn By: T. McNabb

Checked by: T. McNabb

Date: 8/27/2013

MATERIAL SAFETY DATA SHEET

NFPA	HMIS	PPE	Symbol(s)
			 Regulated

Current Issue Date: November 1, 2011	Revision Number: 0

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Liquid Alum
Other/Generic Names:	Aluminum Sulfate Aqueous Mixture
Recommended Use:	Water treatment. Various industrial uses.
Manufacturer:	General Chemical, LLC 90 East Halsey Road Parsippany, NJ 07054 General Chemical Performance Products Ltd. 90 East Halsey Road Parsippany, NJ 07054
For More Information:	Customer Service US ONLY: 800-631-8050 (Monday – Friday 9:00AM – 4:30PM) Customer Service CANADA ONLY: 866-543-3896 (Monday – Friday 9:00AM – 4:30PM)
Emergency Telephone Number:	US ONLY - CALL CHEMTREC: 800-424-9300 (24 Hours/Day, 7 Days/Week) CANADA ONLY - CALL CANUTEC: 613-996-6666 (24 Hours/Day, 7 Days/Week)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: A clear, light green or amber liquid with a negligible odor. Can irritate the skin and eyes. May be harmful if swallowed. Not flammable, but may release toxic vapors if decomposed in a fire.

OSHA Status:	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)
Potential Health Affects	
Skin:	May cause skin irritation.
Eyes:	May strongly irritate or burn the eyes.
Inhalation:	Product mists may cause irritation to the respiratory tract.
Ingestion:	May irritate the gastrointestinal tract. Concentrated solutions may cause burns to the digestive tract.
Delayed Effects:	None known.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS No	Weight %
Aluminum sulfate	10043-01-3	~48.5 (dry basis)
Water	7732-18-5	Balance)

4. FIRST AID MEASURES

Eye Contact	Immediately flush eyes with water for at least 15 minutes. Get medical attention if irritation persists.
Skin Contact	Flush with plenty of water, removing contaminated clothing. If irritation develops, get medical attention.
Inhalation	Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get prompt medical attention.
Ingestion	Do not induce vomiting. Immediately give large quantities of water. Get medical attention immediately.
Notes to Physician	Treat symptomatically

5. FIRE-FIGHTING MEASURES

Flammable Properties

FLASH POINT:	Not Flammable
FLASH POINT METHOD:	Not Applicable
AUTOIGNITION TEMPERATURE:	Not Applicable
UPPER FLAME LIMIT (VOLUME % IN AIR):	Not Applicable
LOWER FLAME LIMIT (VOLUME % IN AIR):	Not Applicable
FLAME PROPAGATION RATE (SOLIDS):	Not Applicable
OSHA FLAMMABILITY CLASS:	Not Applicable
SUITABLE EXTINGUISHING MEDIA:	Water spray, foam, carbon dioxide or dry chemical
UNSUITABLE EXTINGUISHING MEDIA:	No information available

Explosion Limits

Hazardous Combustion Products	No information available
Impact sensitivity	No information available
Sensitivity to static discharge	No information available
Specific Hazards Arising from the Chemical	Keep product and empty container away from heat and sources of ignition.
Protective Equipment and Precautions for Firefighters	Wear self-contained breathing apparatus (SCBA) and full protective equipment. Use water spray to keep containers cool.

6. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE	Dilute small spills or leaks cautiously with plenty of water. Neutralize any further residue with alkali such as soda ash, lime or limestone. Adequate ventilation is required if soda ash or limestone is used, because of the consequent release of carbon dioxide gas. Large spills should be diked up with soda ash and neutralized as above. Collect liquid and/or residue and dispose of in accordance with applicable regulations.

7. ACCIDENTAL RELEASE MEASURES

Handling	Keep container tightly closed when not in use. Avoid contact with skin, eyes, and clothing. Avoid breathing vapors or mists. Remove contaminated clothing and wash thoroughly after handling.
Storage	Keep storage container tightly closed. Sore in a cool, dry, well-ventilated area or cabinet. Isolate from incompatible substances. Store and ship in plastic or rubber-lined containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Component	ACGIH TLV	OSHA PEL	Ontario TWAEV	Mexico OEL (TWA)	NIOSH IDLH
Aluminum sulfate	2 mg/m^3	2 mg/m^3		TWA: 2 mg/m^3	

Engineering Measures Use local exhuast to keep airborne concentrations below the permissible exposure limits.

Personal Protective Equipment

Eye/Face Protection Wear hard hard (or other head covering) and chemical safety goggles. Do not wear contact lenses.

Skin Protection Wear appropriate personal protective clothing to prevent skin contact. If prolonged or repeated contact is anticipated, all clothing should be impervious to liquid.

Respiratory Protection A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 or applicable federal/provincial requirements must be followed whenever workplace conditions warrant respirator use. NIOSH's "Respirator Decision Logic" may be useful in determining the suitability of various types of respirators.

General Hygiene Considerations To identify additional Personal Protective Equipment (PPE) requirements, it is recommended that a hazard assessment in accordance with the OSHA PPE Standard (29CFR 1910.132) be conducted before using this product. Eyewash and safety showers are recommended.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Clear, light green or amber liquid
Color	Clear, light green or amber
Chemical Formula	~48.5% $Al_2(SO_4)_3$ $14H_2O$ in water
Odor	None
Odor Threshold	No information available
Physical State	Liquid
pH	2.0-2.4
Flash Point	Not flammable
Autoignition Temperature	Not applicable
Boiling Point/Range	101 ^{o}C / 214 ^{o}F
Melting Point/Range	-16^{o}C /4^{o}F
Flammability Limits in Air	No information available
Explosive Properties	No information available
Oxidizing Properties	No information available
Evaporation Rate	Not determined
Vapor Pressure	Not applicable
Vapor Density	Not applicable
Specific Gravity	1.335
Partition Coefficient (n-octano/water)	No information available
Viscosity	No information available
Molecular Weight	594 for $Al_2(SO_4)_3$ $14H_2O$
Water Solubility	100%
VOC Content (%)	0

10. STABILITY AND REACTIVITY

Chemical Stability Normally stable. If evaporated to dryness, residue should not be exposed to elevated temperatures (above 760°C), as this will yield toxic and corrosive gases.

Incompatible Products Alkalis and water reactive materials such as oleum: causes exothermic reactions.

Hazardous Decomposition Products At elevated temperatures, sulfur oxides may be formed. These are toxic and corrosive and are oxidizers. Sulfur trioxide is also a fire hazard. The loss of these gases leaves a caustic residue.

Possibility of Hazardous Reactions Will not occur.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Aluminum sulfate	1930 mg/kg (rat) 6207 mg/kg (mouse		

Irritation No information available

Corrosivity No information available

Sensitization No information available

Chronic Toxicity

Carcinogenicity There are no known carcinogenic chemicals in this product.

Mutagenic Effects No information available

Reproductive Effects No information available

Developmental Effects No information available

Teratogenicty No information available

Target Organ Effects No information available

Other Adverse Effects No information available

Endocrine Disruptor Information No information available

12. ECOLOGICAL INFORMATION

Ecotoxicity

Contains no substances known to be hazardous to the environment or not degradable in waste water treatment plants.

Component	Freshwater Algae	Freshwater Fish	Microtex	Water Flea
Aluminum sulfate		LC50 = 100 mg/L Carassius auratus 96 h LC50 = 37 mg/L Gambusia affinis 96 h		EC50 = 136 mg/L 15 min

Persistence and Degradability No information available

Bioaccumulation No information available

Mobility in Environmental Media No information available

Other adverse affects

Aluminum sulfate component:

14 ppm/36 hr/fundulus/fatal/fresh water; 240 ppm/48 hr/mosquito fish/TLm/water type not specified; TLm Mosquito fish, 235 ppm, 96 hours; LC50 Largemouth bass, 250 ppm, 96 hours

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods Dispose of waste in accordance with all federal, state, and local regulations.

Contaminated Packaging Empty containers should be taken for local recycling, recovery or waste disposal.

14. TRANSPORT INFORMATION

DOT	Regulated
Proper Shipping Name	Corrosive liquid, acidic, inorganic, n.o.s. (contains aluminum sulfate)
Hazard Class	8
UN-No	UN3264
Packing Group	PGIII
TDG	Regulated
Hazard Class	8
UN-No	UN3264
Packing Group	PGIII

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL	Complies
NDSL	Does not comply
ELINCS	Does not comply
EINECS	Complies
ENCS	Complies
CHIINA	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

U.S. Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains the following chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372: None

SARA 311/312 Hazardous Categorization

Chronic Health Hazard	No
Acute Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA – Reportable Quantities	CWA – Toxic Pollutants	CWA – Priority Pollutants	CWA – Hazardous Substances
Aluminum sulfate	5000 lb			X

CERCLA

Component	CERCLA RQ (lb)	SARA TPQ (lb)
Aluminum sulfate	5000 lb	

U.S. State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals.

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Aluminum sulfate	X	X	X		

Other International Regulations

Mexico — No information available

Canada — This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class	
E Corrosive material	
D2B Toxic materials	

16. OTHER INFORMATION

Current Issue Date:	November 1, 2011
Previous Issue Date:	February 4, 2011
Revision Summary:	Convert to GC Template

Disclaimer:

All information, statements, data, service and/or recommendations, including, without limitation, those relating to storage, loading/unloading, piping and transportation (collectively referred to herein as "information") are believed to be accurate and reliable. However, no representation or warranty, express or implied, is made as to its completeness, accuracy, fitness or a particular purpose or any other matter, including, without limitation, that the practice or application of any such information is free of patent infringement or other intellectual property misappropriation. General Chemical, LLC is not engaged in the business of providing technical, operational, engineering or safety information for a fee, and therefore; any such information provided herein has been furnished as an accommodation and without charge. All information provided herein is intended for use by persons having requisite knowledge, skill, and experience in the chemical industry. General Chemical, LLC shall not be responsible or liable for the use, application or implementation of the information, provided herein, and all such information is to be used at the risk, and in the sole judgment and discretion, of such persons, their employees, advisors and agents.

End of MSDS