

CEDAR LAKE 2026 ALUM TREATMENT

WORKPLAN



JULY 30, 2026

1 Project Contractor (applicator)

SOLitude Lake Management
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402-430-0352

2 Project Owner

Cedar Lake Protection and Rehabilitation District
PO Box 93
Star Prairie, WI 54026

3 Owner's Representative (project contact)

Cheryl Clemens
Harmony Environmental
harmonyenv@amerytel.net
715-225-0690

4 Project Purpose and Scope Summary

Cedar Lake is an 1,118-acre lake located near Star Prairie, WI and has a maximum depth of 34-ft. Liquid aluminum doses have been recommended and successfully used to improve the water quality of Cedar Lake since 2017. The aluminum application produces a “floc” that settles to the bottom of the lake. The floc has sites where phosphorus (P) in the sediments becomes chemically bound as it leaches from the bottom. The floc effectively intercepts and binds the P, which makes it unavailable for the algae to use for growth.

The goals of the project are to continue reduce the internal loading of phosphorus from the sediments, lower the amount of phosphorus in the water column, and reduce the amount of algae and potential toxins. SOLitude understands that the ongoing strategy to realize these goals is to conduct multiple aluminum applications. SOLitude (as HAB Aquatic Solutions) conducted the four applications in 2017, 2019, 2021 and 2023 and will conduct the fifth in 2026. The fifth dose of 112,446 gallons of aluminum sulfate will be applied in August of 2026 (approximate dates = 8/17 – 8/22) to lake depths of 25 feet and greater (370-ac application zone).

The aluminum dose was determined by William James of the University of Wisconsin-Stout. Mr. James conducted studies to determine the amount of available P (i.e. redox-P) in Cedar Lake sediments. This defined the pool of available sediment P. Additional studies were conducted to determine the rate P release under oxic and anoxic conditions. Using a unique aluminum to P binding ratio specific to Cedar Lake, Mr. James calculated the amount of aluminum (in gallons of alum) and the location of the treatment area required to effectively inactive sediment P and suppress P release. See *James, William F. Phosphorus Budget and Management Strategies for Cedar Lake, WI. University of Wisconsin Stout, 2013* for additional details.

5 Alum Application

SOLitude Lake Management (SLM) is the premier alum applicator across the US and Canada. We understand the nuances and challenges associated with large-scale applications, which ensures that our project designs are firmly rooted in reality and take advantage of the latest technology to maximize treatment benefits, effectiveness and reduce costs. With over 200 completed lake applications (including four previous applications at Cedar Lake in 2017, 2019, 2021 & 2023), over fifteen million gallons of alum applied and 40+ years of combined experience, our application expertise and experience are unmatched. Below is the Plan of Work for Cedar Lake.

5.1 Application Overview

SLM furnishes and is responsible for all labor, mobilization, demobilization, materials, equipment and incidentals required to complete alum applications; including chemicals, application equipment, sampling equipment, storage equipment and spill containment equipment. SLM is responsible for transport of the liquid to the staging area and the application to the lake from a custom application vessel. SLM will arrange for portable storage tanks at the staging area and alum will be pumped from the storage tanks to tanks onboard the application vessel. The application vessel uses computerized dosage equipment that maintains a target dose rate by accounting for changes in vessel speed. All application equipment is integrated with GPS tracking to ensure a uniform and verifiable application area and rate. SLM is also responsible for traffic management, restoring the staging areas to pre-project conditions, conducting daily jar test, pH monitoring and submitting daily logs.

5.1.1 Alum Specifications, Delivery and Security

Aluminum Sulfate Specifications:

- Liquid aluminum sulfate supplied shall meet the requirements of AWWA B403-88. The liquid aluminum sulfate shall be of commercial grade appropriate for the application with an aluminum content of 4.0 - 4.4% Al^{+3} (Aluminum) by weight.
- The aluminum sulfate supplied under this standard shall contain no soluble mineral or organic substances in quantities capable of producing deleterious or injurious effects on public health or water quality.
- The aluminum sulfate will be clear, amber, light green, light blue to greenish blue with a faint sharp odor or no odor (See Appendix D: Alum MSDS Sheet).
- Upon mixing with lake water, alum will form a milky-white colloidal aluminum hydroxide precipitant (floc) that has a settling rate of 0.5 ft/min.

The alum will be delivered to the site on the day of application or one day prior to application. The chemicals will be delivered to the site in 5,000 gallon tankers and transferred to temporary lakeshore chemical storage tanks from air-pressurized delivery tankers through enforcer suction discharge hose. Chemical transfer pumps will also be on-site if needed. The lakeshore chemical storage tanks will be secured (locked) when chemicals are stored overnight at the project staging area (Fig. 1). SLM will be responsible for scheduling the delivery of the alum and maintaining a secure staging area.

This project entails applying a total of 112,446 gallons of alum to a 370-acre portion of Cedar Lake (Fig. 2). The application will take approximately five days to complete. SOLitude understands that lake pH water temperature and weather conditions will ultimately control the speed of application.

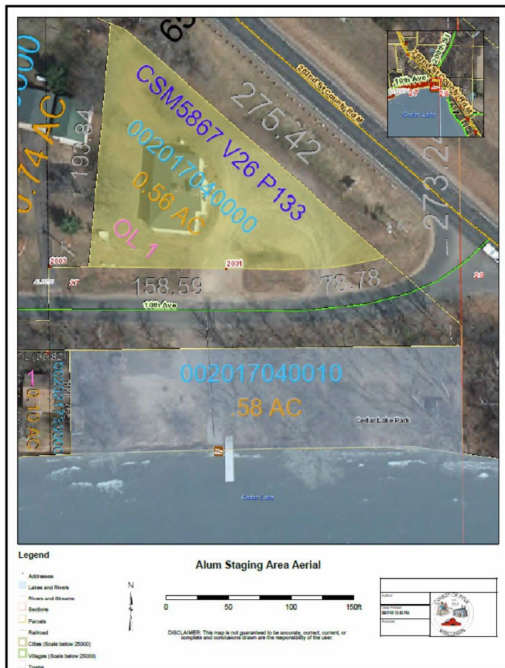


Figure 1. Cedar Lake Staging Area

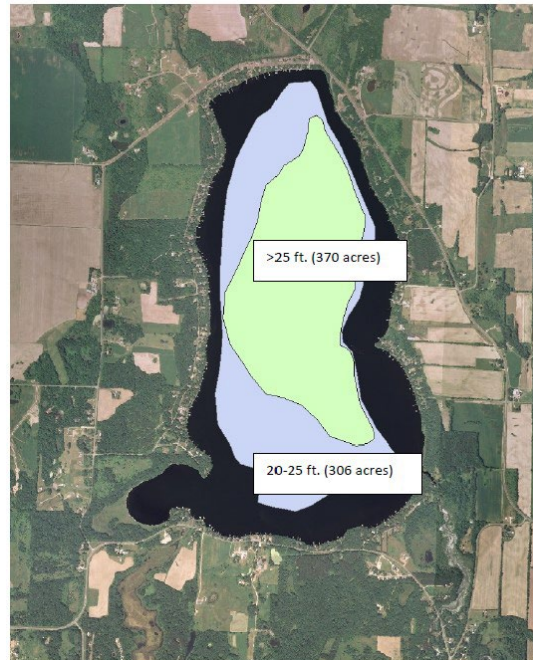


Figure 2. Cedar Lake Application Zone (>25 ft; 370-ac)

5.1.2 Alum Transfer

Alum is transferred to temporary lakeshore chemical storage tanks from air-pressurized delivery tankers through heavy-duty HDPE hoses. Type 316 stainless-steel fittings are used in areas where contact with liquid alum is anticipated. All hoses, couplings and connectors meet corrosion resistance standards for alum. Alum will be transferred from the onshore storage tanks to the application vessel tanks with centrifugal chemical transfer pumps rated for safe handling of alum.

5.1.3 On-Shore Storage Tanks



Figure 2. Staging Area and Tanks at Bald Eagle Lake, MN

On-shore chemical storage tanks are an important component of all successful applications. Onshore storage allows SLM to precisely manage that delivery of the alum. The tanks provide a “buffer” to unfavorable application conditions. Deliveries can still be accepted and stored during a suspension of operations. Stored chemicals can be used to apply at a rate that exceeds the delivered supply when conditions are optimal. This results in a seamless, consistent and efficient application.

Storage will consist of three 6,900-gallon polyethylene tanks. A one-foot-high chemical spill containment guard will surround the tanks. The onshore storage tanks will be located at the staging area (North Boat Landing) and are secured (locked) when chemicals are stored overnight.

5.1.4 Application Protocol

Alum is applied from a single 8' x 32' customized pontoon boat. This vessel is powered with twin 60 horsepower outboard motors, is equipped with a 39' application boom, and has two thrust balanced, sealless, mag-drive pumps. The vessel has an application rate of 30,000 gallons per day. The minimum application water depth for this vessel is two feet.



Figure 3. Custom Application Barge

The alum is stored onboard in polyethylene tanks. Onboard pumps are used to pump the alum through hoses that supply the chemical to application ports on the spray bars. All piping is stainless steel or heavy-duty HDPE tubing. Type 316 stainless-steel fittings are used in areas where contact with liquid alum is anticipated. All couplings and connectors for distribution lines, storage tanks, pump and injector units meet corrosion resistance standards for alum. Injection lines with jet nozzles penetrate the water surface and are suspended from the application boom.

SLM's subsurface injection technology utilizes injection lines with jet nozzles that are suspended from the application boom and penetrate the water surface. The alum is injected under pressure to flash mix with lake water. This method bypasses the lake water's surface tension and allows the floc to form and begin to settle quickly out of the photic zone (documented settling rates of 1 ft every 2 min). Thus, floc contact with algae and potential wind redistribution of floc is minimized. SLM has successfully applied alum to lakes with high algal concentrations (e.g., Grand Lake St. Mary's, OH; Spring Lake, MN) and wind concerns (e.g., Bald Eagle Lake, MN; Cedar Lake, WI).

The pumping system on the application vessel is automatically controlled by a computerized GPS system that varies the flow rate with boat speed and bathymetric measurements to ensure the target dose rate of aluminum is achieved. Water depth is measured from the vessel by sonar. pH is monitored in real time on the vessel with a YSI Model 100M meter (calibrated daily) and the application stops if pH drops below a pre-determined threshold (6.3). The computer-controlled pumping system has a manual backup system and replacements for all major parts (including pumps) exist on-site.

Duplicate back-up copies of the daily application data are downloaded from the onboard computer at the end of each day. The two storage devices are kept in separate locations overnight. A third copy of the data remains on the hard drive of the on-board computer.

5.1.5 Equipment & Personnel Redundancy

SLM provides complete redundancy for equipment and personnel during all applications to ensure that the project is not only completed, but completed on time. In fact, SLM has finished every project to date well before the contracted project end date. Downtime is minimized or eliminated by having replacement equipment and parts onsite for all components of the application process (e.g., pumps, hoses, fittings, valves, computerized flow control system components, etc.). The application barge is equipped with two outboard motors and the application could continue with one motor in the event one fails. SLM also has a backup barge that could be transported the project site within 2-3 days. We also have trained on-call personnel that could also be to the project site within 1-2 days to replace onsite staff if needed. In sum, this complete redundancy in equipment and personnel eliminates our clients concerns that SLM will not complete the application.

5.1.6 Water Testing & pH Monitoring

Jar tests will be conducted every morning prior to the application of alum to evaluate the effects of the application to the lake water at the time of application. Tests will be conducted on 20 gallons of water, which will be dosed with planned rates of application. The effects of the dose on lake water pH will be monitored (YSI Model 100A meter, calibrated daily).

The lake pH will be monitored in surface water samples at hourly intervals during the application. A YSI Model 100A will be calibrated daily and used to measure pH. Application will be suspended if pH falls below 6.3 S.U. or increases above 9.0 S.U.

5.1.7 Daily Application Log & Permit Records

A daily application log will be kept electronically by SLM and stored at two separate locations. The log will be emailed daily to the owner's representative (Cheryl Clemens of Harmony Environmental). The log will contain the following information:

- Date of work
- Hours of application
- Quantity of alum applied
- Approximate acreage covered
- Summary of deliveries
- Explanation of any downtime, problems, violations, or noncompliance
- pH monitoring & jar test records
- Explanation of any unintended discharges, spills, or leaks
- Facility Inspection Log
- Discharge Inspection Log

Permit records will be stored at the Alden Town Hall, 183 155th Street, Star Prairie, WI 54026. Cheryl Clemens (owner's representative) will provide reporting to DNR. The notice of intent, equipment preventative maintenance records, employee training records, SLM's SPCC Plan, SLM's Safety Policy &

Plan and any other project records will also be provided to the owner's representative and stored at Alden Town Hall.

5.1.8 Public Notification

The Cedar Lake Protection and Rehabilitation District will notify all property owners of the upcoming buffered alum treatment via the District's email notification system. Notification of the beginning and completion of the application will also be made through email notification system. An 11"X11" sign notifying lake users of the alum treatment will be posted at the north boat landing.

5.1.9 Spill Prevention, Control and Contingency Plan (SPCC Plan)

See Appendix A. Includes Facility & Discharge Inspection Logs.

5.1.10 Safety Plan & Procedures (OSHA Compliant)

See Appendix B.

5.1.11 OSHA Compliant Endorsement for Safety Plan

See Appendix C.

5.1.12 Alum Product Data

See Appendix D.

Appendix A: Spill Prevention, Control and Contingency Plan (SPCC Plan)

SOLitude Lake Management SPILL PREVENTION, CONTROL AND CONTINGENCY PLAN for Cedar Lake Alum Treatment 2026

Federal Water Pollution Control Act (33 U.S.C. Secs. 1251 et. Seq as amended to date) require implementation of a spill response and prevention plan. Preventing spills of materials is a significant component of complying with these regulations. However, even with the best prevention efforts, spills may still occur. When they do, it is up to contracted personnel to respond quickly and effectively to cleanup the spilled material or notify someone who can. The plan should be kept in a central location that is easily accessible for employees.

Plan Implementation Date: January 1, 2026

Facility's Responsible Person(s) in charge of spill response planning, implementation and maintenance of this Plan:

Name Phone #'s

Tadd Barrow (SLM) 402-430-6813

RESPONSIBILITIES

- The **Job Site Responsible Person** has primary responsibility for coordinating the response to emergencies, including chemical spills.
- **Supervisors** should ensure that employees are familiar with these procedures and receive any necessary training.
- **All employees** should follow these procedures in the event of a chemical spill.

EMERGENCY CONTACT NUMBERS

- Outside emergency services (police, fire department, ambulance service): 911
- Hospital: [Westfields Hospital and Clinic, New Richmond, WI]: 715-242-2600
- Facility Responsible Person: Tadd Barrow Phone #: 402-430-6813

CHEMICAL STORAGE AND APPLICATION

Lakeshore storage tanks will consist of three 6,900-gallon capacity polyethylene tanks. Alum will be applied from a single 8' x 32' modified pontoon boat. This vessel is powered with twin 60 horsepower outboard motors, is equipped with a 32' application boom, and has two thrust balanced, sealless, mag-drive pumps.

The alum will be stored onboard in polyethylene tanks. Onboard pumps are used to pump alum through hoses that supply the alum to application ports on the spray bars. All piping is stainless steel or heavy-duty HDPE tubing. Type 316 stainless-steel fittings are used in areas where contact with liquid alum is anticipated. All couplings and connectors for distribution lines, storage tanks, pump and injector units meet corrosion resistance standards for alum. All application and spill control and prevention equipment are inspected at least daily and maintained as needed.

All Wisconsin State boater safety regulations will be followed and SLM will assess site conditions and identify potential obstructions such as docks, logs, debris and shallow water. Obstructions will be marked as a waypoint on the application vessel's GPS to ensure that they are avoided during application.

CHEMICAL TRANSFER

Alum will be transferred to the onshore storage tanks from air-pressurized delivery tankers through enforcer suction discharge hose. The chemical will be transferred from the onshore storage tanks to the application vessel tanks with separate centrifugal chemical transfer pumps and enforcer suction discharge hose and fittings rated for safe handling of alum.

SECURITY

The lakeshore chemical storage tanks will be secured (locked) when alum is stored overnight. SLM is responsible for placing security fencing around the staging area, including the storage tanks and pumps, and maintaining a safe and secure staging area.

CLEAN-UP PROCEDURES

Spilled chemicals should be effectively and quickly contained and cleaned up. Employees should clean up spills themselves ***only if properly trained and protected***. Employees who are not trained in spill cleanup procedures should report the spill to the Responsible Person(s) listed above, warn other employees, and leave the area.

The following general guidelines should be followed for evacuation, spill control, notification of proper authorities, and general emergency procedures in the event of a chemical incident in which there is potential for a significant release of hazardous materials.

1. Evacuation

Persons in the immediate vicinity of a spill (including the public) will be *immediately evacuated* from the area by trained SLM employees (except for employees with training in spill response in circumstances described below).

2. Spill Control Techniques

Once a spill has occurred, the employee needs to decide whether the spill is small enough to handle without outside assistance. Only employees with training in spill response should attempt to contain or clean up a spill.

NOTE: If you are cleaning up a spill yourself, make sure you are aware of the hazards associated with the materials spilled, have adequate ventilation, and proper personal protective equipment. Treat all residual chemical and cleanup materials as hazardous waste.

Spill control equipment should be located wherever significant quantities of hazardous materials are received or stored.

3. Spill Response and Cleanup

Response and cleanup procedures will vary depending on the size of the spill.

Training: Employees will be trained to respond to an incidental spill by use of the personal protective procedures in place. Training will focus on stopping and minimization of the spill to protect the environment. Training also includes safely conducting the procedures and tasks involved in the alum application workplan.

Safety: Safety procedures vary with the material spilled, the location of the spill and the amount spilled. In general, stay out of the spill zone and avoid contact with all chemicals. People involved in containment and clean up must wear proper safety apparel as required by area safety rules for the material spilled. While it is important to stop and contain spills, it is more important to prevent injuries.

Equipment Available to Contain Spills: Most potential spills would be contained in the 1,750 gallon spill guards. Any spills outside of the spill guards will be hosed down with lake water immediately. SLM will maintain pumps and hoses dedicated to wash down on site at all times. Spills are generally handled by internal personnel and usually do not require an emergency response by police or fire department HAZMAT teams.

- Quickly control the spill by stopping or securing the spill source. This could be as simple as uprighting a container or isolating the leak by closing a shut-off valve. Wear gloves and protective clothing, if necessary.

REPORTING SPILLS

All chemical spills, regardless of size, should be reported as soon as possible to the Job Site Responsible Person. The Responsible Person will determine whether the spill has the potential to affect the environment outside of the job site and must be reported to 911 or the National Response Center at 800-424-8802. Examples of spills that could affect the outside environment include spills that are accompanied by fire or explosion and spills that could reach nearby water bodies. In addition, any spills greater than 5 gallons will be reported to the Owner's Representative via phone and email, who will then communicate the spill information to the WI DNR staff contact for the project.

SPILLS (MATERIALS) THAT REQUIRE SPECIAL CLEANUP

Describe any materials used your facility that in require special materials and procedures for cleanup procedures beyond those listed above. Provide details regarding hazards associated with these.

<u>Material Amount</u>	<u>(max)</u>	<u>Location(s)</u>
Aluminum Sulfate	6,900 gallons	Onshore storage tanks

<u>Material</u>	<u>Maximum Volume to be cleaned</u>	<u>Disposal Method/Location</u>
Aluminum Sulfate	5 gallons	Neutralize and absorb with chemical absorbent

Note: Each storage tank is surrounded by a one-foot-high spill guard that contains 1,750 gallons. In the unlikely event of a spill, the alum is pumped to from spill guard back to a secure storage tank(s) and/or pumped to the application vessel and applied to the lake. There is also a chance of very small spills or drips (<5 gallons) where the discharge hose is connected to the delivery truck. These potential drips are contained in buckets placed under the hose connectors. In the event of an uncontained drip, the chemical is absorbed and neutralized with chemical absorbent (floor dry) and then properly disposed of by SLM.

EMPLOYEE TRAINING LOG

Identify the spill response training provided to each employee or contractor who is charged with responsibility for spill response:

<u>EMPLOYEE NAME</u>	<u>INSTRUCTORS NAME</u>	<u>DATE OF TRAINING</u>
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Facility Inspection Log (Onshore Equipment & Staging Area)

Cedar Lake Alum Application – 2026

Indicate completed inspection task by marking box with a “X”

Task	Morning Inspection	Afternoon Inspection
	Date: Time: Inspector:	Date: Time: Inspector:
Spill containment kit onsite & complete		
Truck hook-up coupler & shut off valve secure, operational & leak-free		
Storage tanks leak-free		
Spill containment secure		
Storage tank inflow couplers & valves secure, operational & leak-free		
Storage tank discharge couplers & valve secure, operational & leak-free		
Transfer pump inflow couplers secure & leak-free		
Transfer pump discharge couplers secure & leak-free		
Transfer pumps operational, leak-free & properly maintained		
Onshore barge fill couplers & valves secure, operational & leak-free		
Discharge hoses leak-free		
Discharge hose couplers secure & leak-free		
Safety center onsite & complete		
Safety fence & signage in place		
Worksite free from obstacles		
PPE onsite, operational, complete & in use		

Discharge Inspection Log (On Application Barge)

Cedar Lake Alum Application – 2026

Indicate completed inspection task by marking box with a “X”

Task	Morning Inspection	Afternoon Inspection
	Date: Time: Inspector:	Date: Time: Inspector:
Spill containment kit onboard & complete		
Storage tanks leak-free		
Storage tank inflow couplers & valves secure, operational & leak-free		
Storage tank discharge couplers & valve secure, operational & leak-free		
Transfer pump inflow couplers secure & leak-free		
Transfer pump discharge couplers secure & leak-free		
Transfer pumps operational, leak-free & properly maintained		
Barge fill couplers & valves secure, operational & leak-free		
Boom drop hoses leak-free		
Boom drop hose couplers secure & leak-free		
Hand valves operational & leak-free		
Boating & personal safety equipment onboard, accessible & operational		
Walkway free from obstacles		
PPE onboard, operational, complete & in use		

Appendix B: Safety Policy & Procedures

Safety Policy

SOLitude Lake Management, LLC is committed to providing a safe work environment for all employees and contractors and conducting all operations in a safe and healthful manner.

The health and safety of every employee and contractor is a fundamental consideration in every business decision and plan. SLM is committed to protect the public, company property, and our customers from incidents that could cause harm or economic loss due to our operations.

Our goal is to prevent the occurrence of all work-related injuries, illnesses, and property losses. The SLM health and safety program contains specific requirements which are based on the following principles in providing an effective safety program:

- Managers and Supervisors are responsible for the safety of operations under their control and will be evaluated accordingly.
- SLM strives to provide a safe work environment by eliminating or controlling hazards with appropriately designed equipment and facilities, safe operating procedures, and necessary personal protective equipment.
- All applicable safety regulations, codes and accepted work practices will be followed. Specific rules and procedures will be established and followed at every location.
- Each employee and contractor will be informed of hazards associated with his or her job and trained in safe work procedures, the use of personal protective equipment, and other means intended to provide personal protection.
- All employees and contractors are responsible for performing their job activities in a safe and reasonable manner and in accordance with safety related instructions given to them, and the training they have received. Failure to comply with these rules will result in disciplinary actions up to and including termination.
- All unsafe acts, conditions and incidents must be reported to the site manager for investigation and prompt correction.

All employees and contractors are expected to support and participate in the SLM Health and Safety Program.

Personal Protective Equipment Procedure

Purpose

Personal protective equipment, commonly referred to as "PPE", is equipment worn to minimize exposure to hazards that cause serious workplace injuries and illnesses. These injuries and illnesses may result from contact with chemical, radiological, physical, electrical, mechanical, or other workplace hazards.

When engineering, work practice, and administrative controls are not feasible or do not provide adequate protection, the company will provide personal protective equipment to their workers and ensure its proper use. The company will also train each worker required to use personal protective equipment to know:

- When it is necessary
- What kind is necessary
- How to properly put it on, adjust, wear and take it off
- The limitations of the equipment
- Proper care, maintenance, useful life, and disposal of the equipment

The company has evaluated all our work activities and determined that the following Personal Protective Equipment must be worn when the hazard is present in order to protect our employees and comply with OSHA Standards:

Standard PPE

- Protective Footwear: Closed hard toe boots or shoes that meet ANSI Z41 standards.
- Protective Headgear: Non-conductive hardhats that meet ANSI Z89 standards.
- Safety Eyewear: Safety glasses with side shields that meet ANSI Z87 standards.
- Hand Protection: Gloves appropriate for the task; for cuts, chemicals, burns, etc.
- Hearing Protection Devices: Adequate to reduce the 8-hour TWA noise level to below 85 dB.
- Safety Vest: High visibility material.

Specialty PPE

- USCG Approved Floatation Vest/Jacket

Additional PPE

If an employee finds they need an additional or alternative PPE, their Supervisor will provide the PPE as needed.

Work Site Visitors

Work site visitors (defined as non-SLM employees or contractors) are restricted from entering the storage tank area, transfer pump area, barge filling area and from boarding the barge. These restricted areas will be clearly designated. Visitors to the site outside of the restricted areas are required to wear high visibility clothing (e.g., vests). SLM typically has a few hi-vis vests for visitors.

Work Site Safety Center

SLM establishes a Work Site Safety Center at the staging area of each project. The center contains:

- SLM's Safety & Visitor Policies
- OSHA Workplace Poster
- First Aid Kit
- Eyewash Solution
- Base Neutralizing Solution
- Fire Extinguisher
- Hearing Protection

Appendix C: OSHA Compliant Endorsement for Safety Plan



December 2, 2020

Mr. Tadd Barrow
HAB Aquatic Solutions
Via Email

Dear Mr. Barrow,

This letter is to confirm that your company is currently within compliance with the OSHA General Industry Standard as it applies to your written programs and annual training.

I have included with this letter copies of the written program list as well as your annual training list.

Feel free to contact me if you have any questions regarding this letter or if additional information is required.

Sincerely,


Douglas S. Carlson, SSH



4180 Providence Rd.
Suite 310
Marietta, GA 30062

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Aluminum Sulfate, Liquid
SYNONYMS: Liquid Alum, Papermakers Alum
CAS No. 010043-01-3
CHEMICAL FAMILY: Inorganic Salt
MOLECULAR FORMULA: $Al_2(SO_4)_3 \cdot (14H_2O)$
MOLECULAR WEIGHT: ~590
EMERGENCY PHONE: For emergency involving spill, leak, fire, exposure, or accident call CHEMTREC: 1-800-424-9300.

2. COMPOSITION/INFORMATION ON INGREDIENTS:

OSHA REGULATED COMPONENTS

COMPONENT	CAS No.	%	TWA/CEILING	REFERENCE
Aluminum Sulfate	010043-01-3	>50	2 mg/M ³	OSHA/ACGIH

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: APPEARANCE AND ODOR: Clear, amber, light green, light Blue to greenish blue liquid with a faint sharp odor or no odor.
STATEMENTS OF HAZARD: CAUTION! MAY CAUSE EYE AND SKIN IRRITATION
POTENTIAL HEALTH EFFECTS:
INHALATION: Inhalation of alum mist may irritate respiratory tract.
INGESTION: May irritate gastrointestinal tract. Concentrated solutions may cause burns to the digestive tract.
EYES: May cause strong irritation or burning of the eyes
SKIN: May cause mild skin irritation

4. FIRST AID MEASURES

In case of skin contact, wash affected areas of skin with plenty of soap and water. In case of eye contact, immediately irrigate with plenty of water for 15 minutes.

EYES: Flush immediately with plenty of water for no less than 15 minutes. If irritation persists, seek medical attention.
SKIN: Flush with plenty of water, remove contaminated clothing, wash skin with soap and water. If irritation persists, seek medical attention.
INHALATION: Promptly remove to fresh air.
INGESTION: Never give anything by mouth to an unconscious person. Immediately give to a conscious person large quantities of milk or water. Induce vomiting by touching finger to back of throat. Get immediate medical attention.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT:	>200 DEGREES F (>93.3 DEG. C)
METHOD:	Setaflash Closed Cup
FLAMMABLE LIMITS (% BY VOL.):	Not Applicable
AUTO IGNITION TEMP:	Not Applicable
DECOMPOSITION TEMP:	Not Applicable

EXTINGUISHING MEDIA AND FIRE FIGHTING INSTRUCTIONS

Use water spray, carbon dioxide, or dry chemical to extinguish fire. Use water to keep containers cool. Wear self-contained, positive pressure breathing apparatus.

6. ACCIDENTAL RELEASE MEASURE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Where exposure level is not known, wear NIOSH approved, positive pressure, self-contained respirator. Where exposure level is known, wear NIOSH approved respirator suitable for level of exposure. In addition to the protective clothing/equipment in Exposure Control (Exposure Controls/Personal Protection), wear rain suit. Cover spills with some inert absorbent material; sweep up and place in a waste disposal container. Flush area with water. Another option would be to 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. (See Section 13 for disposal methods). Large spills: dike up with soda ash, and neutralize and so forth as above.

7. HANDLING AND STORAGE

Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling. Prevent material from coming in contact with common metals.

8. EXPOSURE CONTROL/PERSONAL PROTECTION

ENGINEERING CONTROLS AND PERSONAL PROTECTIVE EQUIPMENT (PPE)

Engineering controls are not usually necessary if good hygiene practices are followed. Before eating, drinking, or smoking, wash face and hands thoroughly with soap and water. Avoid unnecessary skin contact. Impervious gloves and aprons are recommended to prevent skin contact. For operations where eye or face contact can occur, wear eye protection such as chemical splash-proof goggles or face shield. Where exposures are below the Permissible Exposure Limit (PEL), no respiratory protection is required. Where exposures exceed the PEL, use respirator approved by NIOSH for the material and level of exposure. See GUIDE TO INDUSTRIAL RESPIRATORY PROTECTION (NIOSH).

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AND ODOR: Clear, amber, light green, light blue to greenish blue liquid with a faint sharp odor or no odor.

BOILING POINT:	214 DEG. F (101 DEG C)
MELTING POINT:	Not Available
VAPOR PRESSURE:	Similar to water
SPECIFIC GRAVITY:	1.32-1.35
VAPOR DENSITY:	Similar to water
% VOLATILE (BY WT.):	66-69
SATURATION IN AIR (BY VOL.):	Similar to water
EVAPORATION RATE:	Similar to water
SOLUBILITY IN WATER:	Complete

10. STABILITY AND REACTIVITY

STABILITY:	Stable
CONDITIONS TO AVOID:	If evaporated to dryness, residue should not be exposed to temperatures above 760 degrees C (1400 deg. F) these yield toxic and corrosive gases.
POLYMERIZATION:	Will Not Occur
CONDITIONS TO AVOID:	None Known
INCOMPATIBLE MATERIALS:	Alum corrodes iron and aluminum. This product is incompatible with alkalis.
HAZARDOUS DECOMPOSITION PRODUCTS:	Thermal decomposition may produce sulfur dioxide or sulfur trioxide.

11. TOXICOLOGICAL INFORMATION

Toxicological information on the OSHA regulated components of this product is as follows: The acute oral (rat) LD50 value for aluminum sulfate is 1,900 mg/kg. Acute overexposure to aluminum sulfate may produce skin and eye irritation. Inhalation overexposure to aluminum sulfate dust may cause irritation to respiratory tract.

12. ECOLOGICAL INFORMATION

No aquatic LC50, BOD, or COD data available
OCTANOL/H2O PARTITION COEF: Not Available

13. DISPOSAL CONSIDERATIONS

Disposal must be made in accordance with applicable governmental regulations.

14. TRANSPORT INFORMATION

D.O.T. SHIPPING INFORMATION

SHIPPING NAME:	Other Regulated Substances
HAZARD CLASS:	9
PACKING GROUP:	III
UN NUMBER:	3082
IMDG PAGE:	Not Applicable
D.O.T	(PRODUCT REPORTABLE QUANTITY)
HAZARDOUS SUBSTANCES:	Aluminum Sulfate (5,000 lbs)
TRANSPORT LABEL REQUIRED:	3082 on white square or 3082 on point panels or orange panels
EXAMPLES:	Environmentally Hazardous Substances, Liquid, NOS, 9, UN 3082, PG III (Aluminum Sulfate, Solution) or Other Regulated Substances, Liquid, NOS, NA 3082, PG III (Aluminum Sulfate, Solution)

15. REGULATORY INFORMATION

INVENTORY INFORMATION

US TSCA

This product is manufactured in compliance with all provisions of the Toxic Substances Control Act, 15 U.S.C.

OTHER ENVIRONMENTAL

INFORMATION

The following components are defined as toxic chemicals subject to reporting requirements of Section 313 of Title III and of 40 CFR 372 or subject to other EPA regulations.

COMPONENT	CAS. NO.	%	TPQ (LBS)	RQ(LBS)	S313	RCRA	TSCA	12B
Aluminum Sulfate	010043-01-3	>50	NONE	5000	NO	NONE		

PRODUCT CLASSIFICATION UNDER SECTION 311 OF SARA

16. OTHER INFORMATION

Meets American Water Works Association standards AWWA B403-88

NSF Certified

Standard 60 Health Effects

Maximum Use For Potable Water 150Mg/L

NFPA HAZARD RATING (National Fire Protection Association)

Fire

FIRE: Materials that will not burn.

Health 1

HEALTH: Materials on which exposure would cause irritation but only minor residual injury even if no treatment is given.

Reactivity 0

REACTIVITY: Materials which in themselves are normally stable even under fire exposure conditions, and which are not reactive with water.

Special

Not for food or drug use unless marked as such

REASON FOR REISSUE:

Condensed Format 2/22/99

This information is given without any warranty or representation. We do not assume any legal responsibility for same, nor do we give permission, inducement, or recommendation to practice any patented invention without a license. It is offered solely for your consideration, investigation, and verification. Before using any product, read its label.



4180 Providence Rd.
Suite 310
Marietta, GA 30062

PRODUCT SPECIFICATIONS
Standard Grade Alum

Aluminum Sulfate- $\text{Al}_2(\text{SO}_4)_3 \cdot (14\text{H}_2\text{O})$

<u>CHARACTERISTIC</u>	<u>LIMITS</u>	<u>TYPICAL VALUES</u>
1) Appearance	Clear, water white to pale green, yellow green, or red	Clear, water white to pale green, yellow green or red
2) Specific Gravity @ 60 deg. F	1.3182-1.3364	1.333
3) Total Al_2O_3 % From S.G. Chart	7.92-8.32	8.24
4) Percent Alum @ 17%	46.6%-49.0%	48.5
5) Total Fe as Fe_2O_3 (As Is Basis)	<2500 ppm Max	<2000 ppm
6) Turbidity, NTU	Reasonably clear and will permit the reading of flow measuring devices without difficulty	Reasonably clear and will permit the reading of flow measuring devices without difficulty
7) Lbs Alum per Gallon	5.12-5.45	5.39

Product is NSF Certified and meets AWWA requirements.

Approved: R. L. Chandler, Vice President
November 06, 2000