SAFETY DATA SHEET

This Safety Data Sheet (SDS) complies with the requirements of the U.S. Federal Occupational Safety and Health Administration Hazard Communication Standard (29 CFR 1910.1200, as updated in 2012), the American National Standards Institute (Z400.1, 1998), and equivalent state Standards. It has also been developed in accordance with the Canadian Workplace Hazardous Materials Standard and the United Nations Globally Harmonized System of Classification of Chemicals, as well as European Union requirements under REACH (Registration, Evaluation, Authorization and Restriction of Chemical substances, per EC 1907/2006) and Directive 91/155/EC. Refer to Section 16 of this document for the definition of terms and abbreviations.

SECTION 1: IDENTIFICATION of the Substance/Mixture and of the Company/Undertaking

1.1 PRODUCT IDENTIFIER:

- PRODUCT NAME: **JAX GREEN PATINA**
- SYNONYMS: None.
- CHEMICAL NAME/CLASS: Inorganic solution.

1.2 RELEVANT IDENTIFIED USES OF THE MIXTURE OR USES ADVISED AGAINST

- IDENTIFIED USE: Metal Finishing.
- USES ADVISED AGAINST: None Specified.

1.3 DETAILS OF THE SUPPLIER OF THE SAFETY DATA SHEET

- MANUFACTURER/ SUPPLIER: **JAX Chemical Company**
- ADDRESS 640 South Fulton Avenue, Mount Vernon, NY 10550
- BUSINESS PHONE: 914-668-1818
- EMERGENCY PHONE: 1-800-424-9300 (CHEMTREC; 24 hours)
  +1-703-527-3887 **(**CHEMTREC, International and Maritime)

1.4 OTHER PERTINENT INFORMATION

- This product is used as part of metal finishing and polishing processes in relatively small volume. This SDS has been developed to address safety concerns affecting small volume handling situations and those involving warehouses and other workplaces where large numbers of these items are stored or distributed.

SECTION 2: HAZARDS IDENTIFICATION

2.1 CLASSIFICATION OF THE SUBSTANCE OR MIXTURE:

REGULATION	CLASSIFICATION
OSHA HAZARD COMMUNICATION (GHS)	Eye Damage/Irritation – Category 2B.
REACH/CLP (GHS)	Acute Toxicity – Oral -Category 5; Skin Corrosion/Irritation-Category 3; Eye Damage/Irritation – Category 2B; Acute aquatic toxicity (Category 2); Chronic aquatic toxicity (Category 2)
EU DIRECTIVES 67/548/EEC; 1999/45/EC	Xn [Harmful]; Xi [Irritant]; N [Hazard to the Environment]

2.2 LABEL ELEMENTS:

- OSHA/CLP – BASED ON GLOBALLY HARMONIZED SYSTEM

Symbol: See symbol to the right.

Signal Word: WARNING!

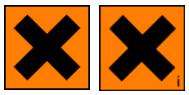
Hazard Statement:

- H303+H315+H320: May be harmful if swallowed. Causes eye and mild skin irritation.
- H401: Toxic to aquatic life.
- H411: Toxic to aquatic life with long-lasting effects.

Precautionary Statements:

- P273: Avoid release into the environment.
- P281: Use personal protective equipment as required.
- P312: Call a POISON CENTER/doctor/physician if you feel unwell.
- P391: Collect spillage.
- P305+P351+P337+P338: IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing. If eye irritation persists, see a physician.
- P332+313: If skin irritation occurs: Get medical advice/attention.
- P501: Dispose of contents/container in accordance with local regulations.

- EC DIRECTIVE SYMBOLS, RISK AND SAFETY PHRASES



Symbol: Xn [Harmful]; [Xi] Irritant; [N] Hazard to the Environment

Risk Phrases: R22 : Harmful if swallowed R36 : Irritating to eyes. 51/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases [S2] Keep out of the reach of children. [S: 16]: Keep container tightly closed. [S20/21] When using do not eat, drink or smoke. [S23] Do not breathe mist, vapors. [S: 24/25]: Avoid contact with skin and eyes. [S: 26]: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. [S28] After contact with skin wash immediately with plenty of water and soap. [S29] Do not empty into drains. [S36/37] Wear suitable protective clothing and gloves. [S45] In case of accident or if you feel unwell, seek medical advice immediately and show container or label. [S51] Use only in well-ventilated area. [S60] This material and its container must be disposed of as hazardous waste.

2.3 OTHER PERTINENT DATA ON CHEMICAL AND PHYSICAL HAZARDS:

- **EMERGENCY OVERVIEW:**

PHYSICAL DESCRIPTION: This is a blue, odorless solution.

HEALTH HAZARDS: This product may be irritating to the skin, eyes, and respiratory system upon exposure. It may be harmful if swallowed.

FIRE HAZARDS: No known fire hazard.

PHYSICALHAZARDS: Negligible under typical circumstances of use or reasonably anticipated emergency response situations.

EVIRONMENTAL HAZARDS: This product is not anticipated to cause adverse environmental effects.

- **HAZARDOUS MATERIALS IDENTIFICATION SYSTEM**

Health	**1**	HMIS Personal Protective Equipment Rating: Occupational Use situations: B - Safety glasses and gloves; C - Body protection suitable to specific circumstances of use should be considered.
Flammability	**0**	
Physical Hazard	**0**	
Protective Equipment	**B/C**	

SECTION 2: HAZARDS IDENTIFICATION (Continued)

- **CANADIAN REGULATORY STATUS**
  - This product is classified as hazardous under Canadian Controlled Products regulations (SOR-88-66).
  - It is classified as D2B -Materials Causing Immediate and Serious Toxic Effects. See symbol to right.
  - This SDS contains all the information required by the CPR.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

3.1/3.2 SUBSTANCES/MIXTURES

COMPONENT	CAS NUMBER	EINECS #	EC Class/Risk Phrases	% (w/w)
Ammonium Chloride	12125-02-9	235-186-4	Classification: Xn; Xi; **Risk Phrases:** R22 : Harmful if swallowed R36 : Irritating to eyes.	1-10%
Copper Sulfate	7758-98-7	231-847-6	**Classification:** Xi, Xn, N **Risk Phrases:** [R22]: Harmful if swallowed. [R36/38]: Irritating to eyes and skin. [R51/53]: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.	10-15%
Aqueous solution, with components that are below 1.0% in concentration (or below 0.1% in concentration for carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens). All ingredients are listed per the requirements of regulations pertinent to Safety Data Sheet requirements under various regulations.				Balance

SECTION 4: FIRST AID MEASURES

4.1 DESCRIPTION OF FIRST AID MEASURES

Eyes: Flush with copious amounts of water for 15 minutes. “Roll” eyes during flush. Seek medical attention immediately. **Skin:** Flush area with warm, running water for 15 minutes. **Inhalation:** Obtain fresh air. **Ingestion:** Contact a Poison Control Center or physician for instructions.

4.2 MOST IMPORTANT ACUTE AND CHRONIC EXPOSURE SYMPTOMS

- **ACUTE:** Depending on the duration of contact, overexposures may irritate the eyes, skin, mucous membranes, and any other exposed tissue. If swallowed, the product can cause gastrointestinal irritation causing nausea and vomiting. Symptoms of exposure are generally alleviated when overexposure ends. Due to the presence of Copper Sulfate, inhalation of excessive quantities of mists over a prolonged period of time may cause ulceration and perforation of the nasal septum if inhaled in excessive quantities. Also, it should be noted that though unlikely in occupational settings, ingestion of copper compounds may produce systemic toxic effects to the kidney and liver and central nervous excitation followed by depression.
- **CHRONIC:** Prolonged or repeated skin contact may cause dermatitis. Prolonged or repeated eye contact may cause conjunctivitis. May cause liver and kidney damage. May cause anemia and other blood cell abnormalities. Individuals with Wilson's disease are unable to metabolize copper. Thus, copper accumulates in various tissues and may result in liver, kidney, and brain damage.
- **TARGET ORGANS:** Acute: Skin, eyes, gastrointestinal system. Chronic: Blood, kidney, liver.

4.3 INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED

- **RECOMMENDATIONS TO PHYSICIANS:** Treat symptoms and eliminate overexposure.
- **MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:** Individuals with Wilson's disease are more susceptible to chronic copper poisoning.

SECTION 5: FIREFIGHTING MEASURES

5.1 EXTINGUISHING MEDIA

- **RECOMMENDED FIRE EXTINGUISHING MEDIA:** Water Spray, Water Jet, Dry Powder, Foam, Carbon Dioxide, Halon, or any other.
- **UNSUITABLE FIRE EXTINGUISHING MEDIA:** None known.

5.2 SPECIAL HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE

NFPA RATING

NFPA FLAMMABILITY CLASSIFICATION: Not flammable.

UNUSUAL HAZARDS IN FIRE SITUATIONS: This product is a corrosive solution. When involved in a fire, this material may produce irritating vapors and toxic gases (e.g., oxides of carbon, nitrogen, chlorine, sulfur, and copper).

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

5.3 ADVICE FOR FIREFIGHTERS

Wear Self Contained Breathing Apparatus and full protective equipment for fire response. Move containers from fire area if it can be done without risk to personnel. Otherwise, use water spray to keep fire-exposed containers cool. Contaminated equipment should be rinsed thoroughly with water before returning to service.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT, AND EMERGENCY PROCEDURES

- **RESPONSE TO INCIDENTAL RELEASES:** Personnel who have received basic chemical safety training can generally handle small-scale releases. Wear gloves and safety glasses when cleaning-up spills. Use caution during clean-up; contaminated floors and items may be slippery.
- **RESPONSE TO NON-INCIDENTAL RELEASES:** Generally, releases of this product will be no larger than the loss of one shipment of material (therefore, 1 gallon or less). Subsequently, personnel can follow the instructions for incidental releases. As needed, respond to non-incidental chemical releases of this product (such as the simultaneous destruction of several pallets of this product) by clearing the impacted area and contacting appropriate emergency personnel. Respiratory protection (i.e., air-purifying respirator with particulate filter) is recommended if excessive mists could be generated during clean-up).
- **RESPONSE PROCEDURES FOR ANY RELEASE**: Absorb spilled liquid with polypads or other suitable absorbent materials.

6.2 ENVIRONMENTAL PRECAUTIONS

- Avoid response actions that can cause a release of a significant amount of the substance (1 liter or more) into the environment.

6.3 METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP

- **SPILL RESPONSE EQUIPMENT:** Polypad or other absorbent material.

6.4 REFERENCES TO OTHER SECTIONS

- **SECTION 8:** For exposure levels and detailed personal protective equipment recommendations.
- **SECTION 13:** For waste handling guidelines.

SECTION 7: HANDLING AND STORAGE

7.1 PRECAUTIONS FOR SAFE HANDLING

- **HYGIENE PRACTICES:** Keep out of reach of children**.** Follow good chemical hygiene practices. Do not smoke, drink, eat, or apply cosmetics in the chemical use area. Avoid inhalation of vapors, mists and sprays. Use in well-ventilated area. Avoid contact with skin or eyes. Remove contaminated clothing promptly. Clean up spilled product immediately.
- **HANDLING RECOMMENDATIONS:** Employees must be appropriately trained to use this product safely as needed. **Keep containers closed when not in use.**

7.2 CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES

- **STORAGE RECOMMENDATIONS:** Ensure all containers are correctly labeled. Store containers away from direct sunlight, sources of intense heat, or where freezing is possible. Store this product away from incompatible chemicals (See Section 10, Stability and Reactivity). Empty containers may contain residual liquid; therefore, empty containers should be handled with care. Material should be stored in secondary containers, or in a diked area, as appropriate. Storage and use areas should be covered with impervious materials. Storage areas should be made of fire-resistant materials. If appropriate, post warning signs in storage and use areas. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged.

7.3 SPECIFIC END USES

- **RECOMMENDATIONS:** Place product away from children and animals.
- **INDUSTRIAL-SECTOR SPECIFIC SOLUTIONS:** PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT -- Follow practices indicated in Section 6 (Accidental Release Measures).

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 CONTROL PARAMETERS

- **U.S. NATIONAL EXPOSURE LIMITS:**

COMPONENT	ACGIH TLV	OSHA PEL (ppm)	NIOSH REL (ppm)	OTHER
AMMONIUM CHLORIDE	10 mg/m^3 (TWA); 20 mg/m^3 (STEL)	10 mg/m^3 (TWA); 20 mg/m^3 (STEL)	10 mg/m^3 (TWA); 20 mg/m^3 (STEL)	NE
COPPER SULFATE (as Copper and its inorganic compounds)	NE	NE	NE	Sigma Aldrich: TWA = 1 mg/m^3

- **INTERNATIONAL EXPOSURE LIMITS:**

COMPONENT	Federal Republic of Germany (DFG) Maximum Concentration Values in the Workplace (MAKs)	OTHER
AMMONIUM CHLORIDE	NE	**United Kingdom:** 10 mg/m^3 (TWA); 20 mg/m^3 (STEL)
COPPER SULFATE (as Copper and its inorganic compounds)	1 mg/m3	**United Kingdom Workplace Exposure limits:** TWA = 1 ppm; STEL = 5 ppm

- **BIOLOGICAL OCCUPATIONAL EXPOSURE LIMITS:** Not established.
- **DERIVED NO EFFECT LEVEL (DNEL):** Not established.
- **PREDICTED NO EFFECT CONCENTRATION (PNEC):** Not established.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION (Continued)

8.2 EXPOSURE CONTROLS

- **ENGINEERING CONTROLS:** Use this product in well-ventilated environment. Safety showers, eye wash stations, and hand-washing equipment should be available.
- **RESPIRATORY PROTECTION:** None needed under normal conditions of use.
- **HAND PROTECTION:** Rubber, nitrile, or neoprene gloves should be used when prolonged contact is anticipated.
- **EYE PROTECTION:** Splash goggles or safety glasses. If more than 1 gallon of this product is to be used, a face shield should be considered. If necessary, refer to U.S. OSHA 29 CFR 1910.133, Canadian Standards, or the European Standard EN166.
- **BODY PROTECTION:** Use a body protection appropriate to task (e.g., lab coat, coveralls, or apron).

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES

(a) APPEARANCE: Blue liquid.
(b) ODOR: None.
(c) ODOR THRESHOLD: Not determined.
(d) pH: 3.3
(e) MELTING POINT/FREEZING POINT: Approx. 0°C (32 °F).
(f) INITIAL BOILING POINT AND BOILING RANGE: Approximately100°C (212°F).
(g) FLASH POINT: Not applicable.
(h) EVAPORATION RATE (water=1): Approx. 1.
(i) FLAMMABILITY: Not flammable.
(j) UPPER/LOWER FLAMMABILITY OR EXPLOSIVE LIMITS: Not applicable.
(k) VAPOR PRESSURE (mmHg @ 20˚C): Not determined.
(l) VAPOR DENSITY: Not determined.
(m) RELATIVE DENSITY (water=1): 1.05
(n) SOLUBILITY: Soluble.
(o) PARTITION COEFFICIENT: N-OCTANOL/WATER: Not determined.
(p) AUTO-IGNITION TEMPERATURE: Not determined.
(q) DECOMPOSITION TEMPERATURE: Not determined.
(r) VISCOSITY: Not determined.
(s) EXPLOSIVE PROPERTIES: Not applicable.
(t) OXIDIZING PROPERTIES: Not an oxidizer.

9.2 OTHER INFORMATION

- **VOC (less water & exempt):** Not applicable.
- **WEIGHT% VOC:** Not applicable.

SECTION 10: STABILITY AND REACTIVITY

10.1 REACTIVITY

- Not reactive under typical conditions of use or handling.

10.2 CHEMICAL STABILITY

- Normally stable under standard temperatures and pressures.

10.3 POSSIBILITY OF HAZARDOUS REACTIONS

- This product is not self-reactive, water-reactive, or air-reactive.
- This product will not undergo hazardous polymerization**.**

10.4 CONDITIONS TO AVOID

- Avoid contact with incompatible chemicals.

10.5 INCOMPATIBLE MATERIALS

- Strong oxidizing agents, strong acids, strong bases, water reactive materials.

10.6 HAZARDOUS DECOMPOSITION PRODUCTS

- Products of thermal decomposition of this product can include carbon monoxide and carbon dioxide.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 INFORMATION ON TOXICOLOGICAL EFFECTS

- **ACUTE TOXICITY:**
  - **TOXICOLOGY DATA:** The following data are available for the hazardous components in this product listed in Section 3 (Composition/Information on Ingredients).

    AMMONIUM CHLORIDE
    LD50 (Oral, Rat) = 1650 mg/kg

    COPPER SULFATE
    LD50 (Oral, mouse) = 369 mg/kg
    LD50 (Oral, mouse) = 87 mg/kg
    LD50 (Oral, rat) = 300 mg/kg
    LD50 (Oral, rat) = 960 mg/kg

  - **DEGREE OF IRRITATION:** Mild to moderate after prolonged exposure.
  - **SENSITIZATION:** Due to the presence of Copper Sulfate, this solution may cause allergic skin reactions in sensitive individuals.
  - **REVIEW OF ACUTE SYMPTOMS AND EFFECTS:** See Section 2 (Hazards Information) and Section 4 (First-Aid Measures) for details.
    - **EYES:** May cause mild to moderate eye irritation.
    - **SKIN**: May cause mild to moderate skin irritation.
    - **INHALATION:** May cause mild to moderate irritation of membranes of nose, mouth, throat.
    - **INGESTION:** May cause mild irritation and of gastrointestinal system. Ingestion of excessive amounts can cause adverse health effects.

- **CHRONIC TOXICITY:**
  - **CARCINOGENICITY STATUS:** The following table summarizes the carcinogenicity listing for the components of this product. "NO" indicates that the substance is not considered to be, or suspected to be, a carcinogen by the listed agency.

CHEMICAL	IARC	NTP	NIOSH	OSHA	OTHER
AMMONIUM CHLORIDE	NO	NO	NO	NO	NO
COPPER SULFATE	NO	NO	NO	NO	For "Copper and its Inorganic Compounds" = EPA-D: Not classifiable as to human carcinogenicity.

  - **REPRODUCTIVE TOXICITY INFORMATION:** The components of this product are not reported to cause reproductive effects under typical circumstances of exposure. The following data are available for components of this product, obtained in laboratory studies.

    COPPER SULFATE: TDLo (Oral-Pig) 140 mg/kg: female 1-15 week(s) after conception lactating female 4 week(s) post-birth: Reproductive: Effects on Newborn: biochemical and metabolic; TDLo (Intraperitoneal-Rat) 791 mg/kg/18 weeks-intermittent: Nutritional and Gross Metabolic: weight loss or decreased weight gain; TDLo (Intraperitoneal-Rat) 7500 μg/kg: female 3 day(s) after conception: Reproductive: Fertility: other measures of fertility; TDLo (Subcutaneous-Rat) 12,768 μg/kg: male 1 day(s) pre-mating: Reproductive: Paternal Effects: testes, epididymis, sperm duct; TDLo (Subcutaneous-Mouse) 12,768 μg/kg: male 30 day(s) pre-mating: Reproductive: Paternal Effects: testes, epididymis, sperm duct; TDLo (Intratesticular-Rat) 3192 μg/kg: male 1 day(s) pre-mating: Reproductive: Paternal Effects: spermatogenesis (incl. genetic material, sperm morphology, motility, and count), testes, epididymis, sperm duct; TDLo (Intravenous-Mouse) 3200 μg/kg: female 8 day(s) after conception: Reproductive: Effects on Embryo or Fetus: fetotoxicity (except death, e.g., stunted fetus); Specific Developmental Abnormalities: Central Nervous System, cardiovascular (circulatory) system
  - **MUTAGENIC EFFECTS** The components of this product are not reported to cause mutagenic effects under typical circumstances of exposure. The following data are available for components of this product, obtained in laboratory studies.

    COPPER SULFATE: Mutation Test Systems-not otherwise (Bacteria-Bacillus subtilis) 400 μmol/L; Sex Chromosome Loss and Nondisjunction (Parenteral-*Drosophila melanogaster*) 1000 ppm; Sex Chromosome Loss and Nondisjunction (Unreported-*Drosophila melanogaster*) 7100 ppm; DNA Damage (Rat-*Ascites tumor*) 500 μmol/L; DNA Damage (Rat-Liver) 1 mmol/L; DNA Inhibition (Intraperitoneal-Mouse) 20 gm/kg; Morphological Transformation (Hamster-Embryo) 80 μmol/L Unscheduled DNA Synthesis (Hamster-Embryo) 200 μmol/L
  - **SPECIFIC TARGET ORGAN TOXICITY – SINGLE EXPOSURE:** Not applicable.
  - **SPECIFIC TARGET ORGAN TOXICITY – REPEATED EXPOSURE:** Not applicable

SECTION 11: TOXICOLOGICAL INFORMATION (Continued)

- **OTHER INFORMATION**
  - **TOXICOLOGICALLY SYNERGISTIC PRODUCTS:** None known.
  - **ADDITIONAL TOXICOLOGY:** Not applicable.

SECTION 12: ECOLOGICAL INFORMATION

12.1 TOXICITY

- Based on available data, this product is not anticipated to be harmful or fatal to contaminated terrestrial plants or animals.
- Based on available data, this product is not anticipated to be harmful or fatal to contaminated aquatic plants or animals.
- The following aquatic toxicity data are available for components of this product:

AMMONIUM CHLORIDE
LC_{50} - *Cyprinus carpio* (Carp) - 209.00 mg/l - 96 hours; LC_{50} - *Oncorhynchus mykiss* (rainbow trout) - 3.98 mg/l - 96 hours
NOEC - *Oncorhynchus mykiss* (rainbow trout) - 57 mg/l - 96 hours; LC_{50} - *Daphnia magna* (Water flea) - 161 mg/l - 48 hours

COPPER SULFATE:
Fish: Rainbow trout: LC50 = 0.1- 2.5 mg/L; 96 Hr; Unspecified
Fish: Bluegill/Sunfish: LC50 = 0.6 mg/L; 48 Hr; 15 mg/L $CaCO_3$
Fish: Bluegill/Sunfish: LC50 = 8.0 mg/L; 48 Hr; 68 mg/L $CaCO_3$
Fish: Bluegill/Sunfish: LC50 = 10.0 mg/L; 48 Hr; 100 mg/L $CaCO_3$
Fish: Bluegill/Sunfish: LC50 = 45.0 mg/L; 48 Hr; 132 mg/L $CaCO_3$

12.2 PERSISTENCE AND DEGRADABILITY

- When released into the soil, the components of this product are expected to biodegrade, dissipate in soils via oxidation, or otherwise chemically degrade or photo-decompose via solar radiation. Specific environmental fate data for components of this product are as follows:

COPPER SULFATE: Persistence: May persist at toxic levels indefinitely. Biodegradation: No evidence was found to indicate that there is any biotransformation process for copper compounds which would have a significant bearing on the fate of copper in aquatic environments (soluble copper salts). Terrestrial Fate: In soil, Copper Sulfate is partly washed down to lower levels, partly bound by soil components, and partly oxidatively transformed. Aquatic Fate: Several processes determine the fate of copper in the aquatic environment: complex formation, especially with humic substances; sorption to hydrous metal oxides, clays, and organic materials; and bioaccumulation. The formation of complexes with organic ligands modifies the solubility and precipitation behavior of copper such that solid copper species probably do not precipitate under normal circumstances. Furthermore, complexed copper is more easily adsorbed by clay and other surfaces than the free (hydrated) cation. The aquatic fate of copper is highly dependent on such variables as pH, Eh /oxidation-reduction potential in millivolts/, concentrations of organic materials and adsorbents, availability of precipitating iron and manganese oxides, biological activity, and competition with other heavy metals

12.3 BIOACCUMULATIVE POTENTIAL

- This product is not anticipated to bioaccumulate significantly.

12.4 MOBILITY IN SOIL

- It is to be expected this product will have small mobility in soil. Some of the components may get into the soil and, ultimately, the ground water. Product spreads on the water surface.

12.5 RESULTS OF PBTand vPvB ASSESSMENT

- No data are available.

12.6 OTHER ADVERSE EFFECTS

- ENDROCRINE DISRUPTOR INFORMATION: No component is reported to be an endocrine disruptor.

SECTION 13: DISPOSAL CONSIDERATION

13.1 WASTE TREATMENT METHODS

- **WASTE HANDLING RECOMMENDATIONS:** Prepare, transport, treat, store, and dispose of waste product according to all applicable local, U.S. State and U.S. Federal regulations, the applicable Canadian standards, or the appropriate standards of the nations of the European Community.

13.2 DISPOSAL CONSIDERATIONS

- **EPA RCRA WASTE CODE:** Not applicable. **EUROPEAN WASTE CODE:** 11 01 99

SECTION 14: TRANSPORT INFORMATION

14.1,2,3,4: DANGEROUS GOODS BASIC DESCRIPTION AND OTHER TRANSPORT INFORMATION

- **DEPARTMENT OF TRANSPORTATION HAZARDOUS MATERIALS SHIPPING REGULATIONS:**

UN/NA Number	Proper Shipping Name	Packing Group	Hazard Class	Label	North American Emergency Response Guide #	Marine Pollutant Status
NOT APPLICABLE						Cupric Sulfate (i.e., Copper Sulfate) is designated as a severe Marine Pollutant.

- **CANADIAN TRANSPORTATION INFORMATION**: This product is not regulated by Transport Canada as dangerous goods under Canadian transportation standards. Refer to above information.
- **IATA DESIGNATION**: This product is not regulated as dangerous goods by the International Air Transport Association.
- **IMO DESIGNATION**: Based on the presence of Copper Sulfate, this product is regulated as dangerous goods by the International Maritime Organization. Use the following information:

Basic Description	Limited and Excepted Quantity Provisions		Packing		EmS
	Limited Quantities	Excepted Quantities	Instructions	Provisions	
UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID (copper sulfate), 9, PGIII	5L	E1	P001 LP01	PP1	FA-SF

- **EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR):** This product is not considered to be dangerous goods. Use the above information for transport classification.

14.5: ENVIRONMENTAL HAZARDS

- None described, as related to transportation.

14.6: SPECIAL PRECAUTIONS FOR USERS

- Not applicable.

14.7: TRANSPORT IN BULK

- Not applicable.

SECTION 15: REGULATORY INFORMATION

15.1: SAFETY, HEALTH, AND ENVIRONMENTAL REGULATIONS SPECIFIC FOR THE SUBSTANCE OR MIXTURE.

- **OTHER IMPORTANT U.S. REGULATIONS**
  - **U .S. SARA THRESHOLD PLANNING QUANTITY**: Not applicable.
  - **U.S. SARA HAZARD CATEGORIES (SECTION 311/312, 40 CFR 370-21):** ACUTE: Yes; CHRONIC: No; FIRE: No; REACTIVE: No; SUDDEN RELEASE: No
  - **U.S. CERCLA REPORTABLE QUANTITY (RQ):** Copper Sulfate = 4.54 kg (10 lb).
  - **U.S. TSCA INVENTORY STATUS:** All components of this product are listed on the TSCA Inventory.
  - **U.S. SARA 313:** Copper Sulfate (as a copper compound) is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
  - **CALIFORNIA SAFE DRINKING WATER ACT (PROPOSITION 65) STATUS:** Not applicable.

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SECTION 15: REGULATORY INFORMATION (Continued)

- **INTERNATIONAL REGULATIONS**
  - **CANADIAN DSL/NDSL INVENTORY STATUS:** The listed components of this product are on the DSL/NDSL Inventory.
  - **CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS:** The components of this product are not on the CEPA Priorities Substances Lists.
  - **GERMAN WATER HAZARD CLASSIFICATION:** 2 (hazard to waters).

15.2: CHEMICAL SAFETY ASSESSMENT.

- No information available.

SECTION 16: OTHER INFORMATION

16.1: INDICATION OF CHANGE.

- **CHANGE INDICATED:** Full compliance with new Globally Harmonized System requirements under OSHA Hazard Communication Standard.
- **ORIGINAL DATE OF ISSUE:** October 18, 1989
- **DATES OF UPDATES:** April 18, 2014

16.2: CLASSIFICATION AND PROCEDURE USED TO DERIVE THE CLASSIFICATIONS FOR MIXTURES

- **CLASSIFICATION**: Section 2 (Hazards Information) provides all relevant classification information used for this product. The assignments were based on data available for the component products, calculations, expert judgment, and weight of evidence.

16.3: KEY LITERATURE REFERENCES AND SOURCES FOR DATA

- SAFETY DATA SHEETS FOR COMPONENT PRODUCTS and Southern BioTech formulation.
- Regulations (EC) No 1907/2006, 1272/2008 & 453/2010 of the European Parliament and of the Council.
- Federal OSHA Hazard Communication Standard: 29 CFR 1910.1200.
- SAX – Dangerous Properties of Industrial Materials.
- RTECS – Registry of Effects of Toxic Chemicals.
- ESIS -European chemical Substances Information System http://esis.jrc.ec.europa.eu/.

16.4: ABBREVIATIONS AND ACRONYMS.

ALL SECTIONS: OSHA: U.S. Federal Occupational Safety and Health Administration. WHMIS: Canadian Workplace Hazardous Materials Standard. GHS: Globally Harmonized System of Classification of Chemical Substances. REACH: European Union regulation, Registration, Evaluation, Authorization and Restriction of Chemical substances.

SECTION 2: CAS Number: Chemical Abstract Service Number, which is used by the American chemical Society to uniquely identify a chemical. EINECS: European Inventory of Existing Commercial Substances.

SECTION 3: HAZARDOUS MATERIALS IDENTIFICATION SYSTEM RATING: This is a rating system used by industry to summarize physical and health hazards to chemical users and was originally developed by the National Paint and Coating Association. 0 = No Significant Hazard. 1 = Slight Hazard. 2 = Moderate Hazard. 3 = Severe Hazard. 4 = Extreme Hazard.

SECTION 5: NFPA: National Fire Protection Association. NFPA FLAMMABILITY CLASSIFICATION: The NFPA uses the flash point (Fl.P.) and boiling point (BP) to classify flammable or combustible liquids. Class IA: Fl.P. below 73°F and BP below 100°F. Class IB: Fl.P. below 73°F and BP at or above 100°F. Class IC: :Fl.P. at or above 73°F and BP at or above 100°F. Class II: : Fl.P. at or above 100°F and below 140°F. Class IIIA: Fl.P. at or above 140°F and below 200°F. Class IIIB: Fl.P. at or above 200°F. NFPA HAZARDOUS MATERIALS RATING: This is a rating system used to summarize physical and health hazards to firefighters. 0 = No Significant Hazard. 1 = Slight Hazard. 2 = Moderate Hazard. 3 = Severe Hazard. 4 = Extreme Hazard.

SECTION 8: NE:Not established.ACGIH: American Conference of Government Industrial Hygienists; TWA: Time-Weighted Average (over an 8-hour work day); STEL: Short-Term Exposure Limit (15 minute average, no more than 4-times daily and each exposure separated by one-hour minimally); C: Ceiling Limit (concentration not to be exceeded in a work environment). PEL: Permissible Exposure Limit. NIOSH: National Institute of Occupational Safety and Health; REL: Recommended Exposure Limit; IDLH: Immediately Dangerous to Life and Health Concentrations. *Note*: In July 1992, a court ruling vacated the more protective PELs set by OSHA in 1989. Because OSHA may enforce the more protective levels under the "general duty clause", both the current and vacated levels are presented in this document. ppm: Parts per Million. mg/m^3: Milligrams per cubic meter. mppcf: Millions of Particles per Cubic Foot. BEI: Biological Exposure Limit. EL: Exposure Limit (United Kingdom). Federal Republic of Germany (DFG) Maximum Concentration Values in the Workplace (MAKs)

SECTION 9: pH: Scale (0 to 14) used to rate the acidity or alkalinity of aqueous solutions. For example, a pH value of 0 indicates a strongly acidic solution, pH of 7 indicates a neutral solution, and a pH value of 14 indicates an extremely basic solution. FLASH POINT: Temperature at which a liquid generates enough flammable vapors so that ignition may occur. AUTOIGNITION TEMPERATURE: Temperature at which spontaneous ignition occurs. LOWER EXPLOSIVE LIMIT (LEL): The minimal concentration of flammable vapors in air which will sustain ignition. UPPER EXPLOSIVE LIMIT (UEL): The maximum concentration of flammable vapors in air which will sustain ignition.≈: Approximately symbol.

SECTION 11: CARCINOGENICITY STATUS: NTP: National Toxicology Program. IARC: International Agency for Research on Cancer. REPRODUCTIVE TOXICITY INFORMATION: Mutagen: Substance capable of causing chromosomal damage to cells. Embryotoxin: Substance capable of damaging the developing embryo in an overexposed female. Teratogen: Substance capable of damaging the developing fetus in an overexposed female. Reproductive toxin: Substance capable of adversely affecting male or female reproductive organs or functions. TOXICOLOGY DATA: LD*xx*or LC*xx*: The Lethal Dose or Lethal Concentration of a substance which will be fatal to a given percentage (*xx*) of exposed test animals by the designate route of administration. This value is used to access the toxicity of chemical substances to humans. TD*xx*or TC*xx*: The Toxic Dose or Toxic Concentration of a substance which will cause an adverse effect to a given percentage (*xx*) of exposed test animals by the designate route of administration.

SECTION 13: RCRA: Resource Conservation and Recovery Act. The regulations promulgated under this act under Act are found in 40 CFR, Sections 260 ff, and define the requirements of hazardous waste generation, transport, treatment, storage, and disposal. EPA RCRA Waste Codes: Defined in 40 CFR Section 261.

SECTION 15: CERCLA: Comprehensive Environmental Response Compensation and Liability Act (a.k.a. "Superfund") and SARA: (Superfund Amendment and Reauthorization Act). The regulations promulgated under this Act are located under 40 CFR 300 ff. and provide "community right-to-know" requirements. DSL/NDSL: Canadian Domestic Substances and Non-Domestic Substances Lists.