



June 18, 2014
L-2014-198
10 CFR 50.36

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555-0001

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Wastewater Permit Number FL0001562
Request for Approval for the Use of Copper Sulfate, Hydrogen Peroxide and
A Bio-Stimulant in the Treatment and Control of Blue Green Algae in the Cooling Canal
System (CCS) - NRC Notification

In accordance with Section 3.2.3 of the Turkey Point Units 3 and 4 Environmental Protection Plan (EPP), Appendix B of the Turkey Point Units 3 and 4 Renewed Facility Operating Licenses DPR-31 and DPR-41, enclosed is a copy of the request to revise Wastewater Permit Number FL0001562. Florida Power and Light Company (FPL) is requesting approval from the Florida Department of Environmental Protection of the short term use of copper sulfate, hydrogen peroxide, and a bio-stimulate as part of a mitigating strategy for reducing or eliminating Turkey Point CCS algae growth. This action is requested to be approved as "construction, replacement or repair of components of an industrial site or plant," pursuant to Rule 62-620.200(26)(b), Florida Administrative Code.

Should there be any questions, please contact Mr. John Jones at 561-691-7056.

Very truly yours,

A handwritten signature in black ink, appearing to read 'Michael Kiley', is written over a horizontal line.

Michael Kiley
Vice President
Turkey Point Nuclear Plant

Enclosure

cc: Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point Plant

A001
NRR

ENCLOSURE TO

L-2014-198



June 18, 2014
L-2014-191

Mr. Marc Harris
Industrial Wastewater Section
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

RE: FPL-Turkey Point Units 3 and 4
Wastewater Permit FL0001562
Request for Approval for the Use of Copper Sulfate, Hydrogen Peroxide and a Bio-Stimulant in the Treatment and Control of Blue Green Algae in the Cooling Canal System (CCS)

Florida Power and Light Company (FPL) is herein requesting Florida Department of Environmental Protection (FDEP) to approve the short term use of copper sulfate, hydrogen peroxide, and a bio-stimulate as part of a mitigating strategy for reducing or eliminating Turkey Point Cooling Canal algae growth. We recommend that this action be approved as "construction, replacement or repair of components of an industrial site or plant," pursuant to Rule 62-620.200(26)(b), Florida Administrative Code.

Both Turkey Point Nuclear Operating Units are currently experiencing a high incidence of condenser tube and auxiliary heat exchanger tube biofouling, reduced heat transfer (a viscosity affect), and higher than normal canal temperatures. This is causing MWe reductions, more frequent heat exchanger cleanings and reduced margin to our design conditions. In addition, the intake weir baskets and screens are experiencing a higher than normal loading due to algae buildup. These declining changes in equipment efficiencies and greater than expected maintenance requirements have been recently noted in the power plant operating data, and were initially noticed during the fourth quarter of 2013. The water quality in the cooling canal has appeared to change since late 2013, and through laboratory testing, FPL has determined that the change is attributed to a high concentration of blue-green algae (cyano bacteria) in the water column.

At this time, the factors contributing to the increased algae growth are being evaluated by FPL and our independent contractor.

The Site has formed a team of engineers and environmental specialists to evaluate the water quality concerns and recommend a course of action to improve the canal water quality and to effect an improvement in the plant's operations and maintenance programs. This team has been supplemented with engineers from Enercon Services, Inc. (ENERCON). ENERCON reviewed a number of potential options to control the algae in the CCS, and they have recommended the chemical treatment discussed within this letter. The algae treatment is anticipated to continue for approximately seventy five to ninety days.

While immediate eradication of the algae is possible and highly desirable from a plant operation perspective, there are biological impacts from a sudden algae die off and decay that must be mitigated and/or avoided. An immediate algae kill would likely cause a spike in biological oxygen demand (BOD), as well as, a release of toxins that could result in a fish kill and/or harm

Florida Power & Light Company

9760 SW 344 St Homestead, FL 33035

the crocodiles. While a gradual reduction in algae concentration is preferred due to the concerns mentioned above, FPL has an urgent need to control the algae prior to the peak heat loading conditions anticipated in the summer months. To balance the two, a near-term corrective action has been identified to reduce the algae population in the near term while a more long-term solution is identified, developed and implemented.

The recommended approach is to apply copper sulfate, a bio-stimulant and hydrogen peroxide to the CCS in a staged treatment plan. This recommended approach is outlined below.

Chemical Treatment Approach

Light applications of copper sulfate and a bio-stimulant will work synergistically to reduce the algae population. The bio-stimulant will enhance the respiration rate of the existing bacteria to initiate degradation of accumulated sludge materials in the bottom of the CCS. An initial shock dosage of the bio-stimulant will significantly aid in "jump starting" the degradation process. To prevent the dead algae from causing water quality issues, as well as to facilitate the biological digestion of the sludge in the bottom of the CCS, the copper sulfate/bio-stimulant application will be preceded and followed by applications of hydrogen peroxide added directly into the CCS. ENERCON recommends that the algae populations be reduced in stages throughout the CCS in an effort to prevent adverse impacts from a quick algae kill within the entire canal system. The CCS will be divided into either two or three zones (See Attachment 1). Zone one will be treated weekly with copper sulfate, bio-stimulator, and hydrogen peroxide. FPL will assess the effectiveness of treatment in Zone 1, and determine whether or not to also move treatment into Zones 2 and 3.

Temperature, total nitrogen, total phosphorus, and pH data will be monitored at one or more surface water monitoring locations within the canal, and the results will be reviewed weekly during the chemical treatment period. This initial weekly application will continue until such time as a long-term solution is implemented or weather conditions allow the curtailment of these efforts. When applied at label rates, copper sulfate is safe and not toxic to fish, crocodiles and other wildlife found in and around the CCS; however, to be conservative, ENERCON recommends applying copper sulfate below label rates to build in a safety buffer.

Attachment 2 provides the Material Safety Data Sheets for the three chemicals scheduled for use in the canal.

Chemical Information

Copper sulfate: Copper sulfate is available in powder, crystal or liquid form, and must be dissolved in water before it is applied to the CCS. Plating or metal replacement issues are not anticipated from the copper sulfate on the heat exchange units. The copper sulfate will be applied at relatively low rates; therefore, the concentration of free copper will be limited in the CCS. The canal pH is slightly alkaline, approximately 8.5, which means that once applied, the free availability of copper is nearly nonexistent. As a result, the free copper will be attenuated to soil particles in the bottom of the CCS. The pH would have to drop below approximately 4.0 (which is unlikely), before the copper will go into solution and potentially impact the heat exchange units.

Copper sulfate is widely used in the control of algae, and when used at manufacturer label recommended doses, it has been demonstrated to not harm aquatic animals. The U.S. EPA completed registration of copper sulfate as an algaecide in 2009 (Boone, et al., 2012).

Bio-stimulant: The bio-stimulant is a combination of bacteria, enzymes and polymers that increases microorganism activity and will accelerate the digestion of sludge in the bottom of the CCS. It is not expected that these organisms will have any adverse effects on the heat exchange units. As the sludge in the CCS is digested, the nutrient levels will be lowered which will reduce the algae population. An additional benefit is that the digestion of the organic material in the bottom of the CCS may increase the total volume of water, which may improve the CCS heat exchange properties.

Hydrogen peroxide: To mitigate the oxygen depleting effects of the copper sulfate and to facilitate the biological digestion of the sludge at the bottom of the CCS, hydrogen peroxide will be applied along with the copper sulfate.

Hydrogen peroxide is a standard oxidizer that is often used in the aquaculture industry as an oxidizer for fish populations. In simple terms, it is a water molecule with an extra loosely bonded oxygen atom attached, which will be released to the water column upon application. The hydrogen peroxide will be applied in a liquid stream to maximize the amount of oxygen that is released and available to the organisms in the CCS. Because the hydrogen peroxide is applied directly to the canal water, the loosely bonded oxygen atom is expected to release quickly with no direct or indirect negative impacts to the heat exchange units.

The recommended application rates for each treatment option have not been finalized; however, approximate dosages are provided below for planning purposes. A summary of the recommended near-term option chemicals, application rate, and notes on corrosive potential to the plant equipment is provided in Table 1.

If you have any questions on this matter, or need any additional information, please contact Mr. John Jones at (561) 691-7056.

Sincerely,



Michael Kiley
Vice President
Turkey Point Nuclear Plant

Attachments

- Attachment 1- Proposed Zone Definition for Introduction of Chemicals
- Attachment 2- Material Safety Data Sheets

Table 1: Near-Term Option Application Rate and Corrosive Potential

Algaecide	Dosage	Treatments Quantities	Notes for Corrosive Potential
Copper Sulfate	1 mg/L for the top 2 feet of the water surface	7 treatments 3,000 gal per treatment	PTN's FSAR identifies the heat exchangers as being carbon steel (shell side) and aluminum brass (tube side). A preliminary review was conducted to identify the corrosive potential of each algaecide. The corrosive potential was researched for aluminum brass, aluminum bronze, carbon steel, copper nickel, monel, Buna-N, stainless steel (304 & 316), Teflon and titanium.
Hydrogen Peroxide	1 to 5 pounds per pound of sulfate	7 treatments 4,000 gal per treatment Will need stainless steel (SS) storage/pumping equipment with SS piping for injection.	Aluminum brass, aluminum bronze, copper nickel, stainless steel and titanium have good corrosion resistance. The algaecides are potentially corrosive to carbon steel and monel. Most rubbers and polymers like Teflon are typically non-reactive.
Bio-stimulant	Application rate per manufacturer recommendation	1 gal/million gal or as per manufacturer recommendation 1 semi-truck load	The bio-stimulation process utilizes a combination of bacteria, enzymes and polymers that increases the microorganism activity to digest organics in the bottom sludge. The water quality treatment application will be for finite periods of time at low concentrations. Low concentrations in minimal doses will render the algaecide to be non- corrosive.

Reference

Boone, C.; Jervais, G.; Luukinen, B.; Buhl, K.; Stone, D. 2012. *Copper Sulfate Technical Fact Sheet*; National Pesticide Information Center, Oregon State University Extension Services.
<http://npic.orst.edu/factsheets/cuso4tech.html>.

Attachment 1

Proposed Zone Definition for Introduction of Chemicals

Near-Term Option Application Zones



L-2014-191

Attachment 2

Material Safety Data Sheets

**HYDROGEN PEROXIDE 50% (ALL GRADES)****1. PRODUCT AND COMPANY IDENTIFICATION****Company**

Arkema Inc.
2000 Market Street
Philadelphia, Pennsylvania 19103

Oxygenated and Derivatives

Customer Service Telephone Number: (800) 346-7575
(Monday through Friday, 8:30 AM to 5:30 PM EST)

Emergency Information

Transportation: CHEMTREC: (800) 424-9300
(24 hrs., 7 days a week)
Medical: Rocky Mountain Poison Center: (303) 623-5716
(24 hrs., 7 days a week)

Product Information

Product name: HYDROGEN PEROXIDE 50% (ALL GRADES)
Synonyms: Not available
Molecular formula: H₂O₂
Chemical family: peroxides
Molecular weight: 34.01 g/mol
Product use: Bleaching agent, Oxidizing agent, Cosmetics, Water treatment

2. HAZARDS IDENTIFICATION**Emergency Overview**

Color: colourless
Physical state: liquid
Odor: pungent

DANGER!
STRONG OXIDIZER.
CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE OR EXPLOSIVE DECOMPOSITION.
CAUSES EYE AND SKIN BURNS.
MAY CAUSE BLINDNESS.
MAY CAUSE RESPIRATORY TRACT IRRITATION.
HARMFUL IF SWALLOWED.

Potential Health Effects

Primary routes of exposure:
Inhalation and skin contact.

Signs and symptoms of acute exposure:
Corrosive to skin and eyes. May cause irritation of respiratory tract. Effects due to ingestion may include: gastrointestinal symptoms ulceration, burns, accumulation of fluid in the lungs which may be delayed for several hours.

**HYDROGEN PEROXIDE 50% (ALL GRADES)****Skin:**

Slightly toxic. Corrosive. (based on animal studies)

Inhalation:

Slightly toxic. (based on animal studies)

Eyes:

Corrosive. (based on animal studies)

Ingestion:

No more than moderately toxic. (based on animal studies)

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No.	Wt/Wt	OSHA Hazardous
Hydrogen peroxide (H ₂ O ₂)	7722-84-1	50 %	Y
Water	7732-18-5	50 %	N

The substance(s) marked with a "Y" in the Hazard column above, are those identified as hazardous chemicals under the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

This material is classified as hazardous under Federal OSHA regulation.

4. FIRST AID MEASURES**Inhalation:**

If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If inhaled, remove to fresh air. Get medical attention.

Skin:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Destroy contaminated shoes.

Eyes:

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

Ingestion:

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

Notes to physician:

Exposure to material may cause delayed lung injury resulting in pulmonary edema and pneumonitis. Exposed individuals should be monitored for 72 hours after exposure for the onset of delayed respiratory symptoms.

5. FIRE-FIGHTING MEASURES

Flash point None.

**HYDROGEN PEROXIDE 50% (ALL GRADES)**

Auto-ignition temperature: not applicable

Lower flammable limit (LFL): not applicable

Upper flammable limit (UFL): not applicable

Extinguishing media (suitable):
water spray, water fog

Protective equipment:

Fire fighters and others who may be exposed to products of combustion should wear full fire fighting turn out gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand / NIOSH approved or equivalent).

Further firefighting advice:

Fire fighting equipment should be thoroughly decontaminated after use.

Fire and explosion hazards:

Oxidizing Material

Solutions above 65% are especially hazardous as they do not contain enough water to remove the heat of decomposition by evaporation.

Explosive when mixed with combustible material.

Avoid breathing fumes from fire exposed material.

6. ACCIDENTAL RELEASE MEASURES

In case of spill or leak:

Stop the leak if you can do so without risk. Ventilate the area. Flush with plenty of water. Avoid contact with cellulose, paper, sawdust or similar substances. Risk of self-ignition or promotion of fires. Combustible materials exposed to hydrogen peroxide should be rinsed immediately with large amounts of water to ensure that all the hydrogen peroxide is removed. Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits.

7. HANDLING AND STORAGE

Handling

General information on handling:

Do not get in eyes, on skin, or on clothing.

Avoid breathing vapor or mist.

Do not taste or swallow.

Wash thoroughly after handling.

Use only with adequate ventilation.

Avoid contamination.

Keep from contact with clothing and other combustible materials.

Store in tightly closed container.

Emptied container retains vapor and product residue.

Observe all labeled safeguards until container is cleaned, reconditioned or destroyed.

DO NOT CUT, DRILL, GRIND, OR WELD ON OR NEAR THIS CONTAINER.

Storage

**HYDROGEN PEROXIDE 50% (ALL GRADES)****General information on storage conditions:**

Store away from combustibles and incompatible materials. Store in cool, dry, well ventilated area away from sources of ignition such as flame, sparks and static electricity. Refer to National Fire Protection Association (NFPA) 43A, Code for the Storage of Solid and Liquid Oxidizers.

Storage incompatibility – General:

Store separate from acids, alkalis, reducing agents, and combustibles. Store separate from: Metallic oxides

Organic materials

Metallic oxides

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Airborne Exposure Guidelines:****Engineering controls:**

Investigate engineering techniques to reduce exposures below airborne exposure limits. Provide ventilation if necessary to control exposure levels below airborne exposure limits (see above). If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment. Consult ACGIH ventilation manual or NFPA Standard 91 for design of exhaust systems.

Respiratory protection:

Avoid breathing vapor or mist. When airborne exposure limits are exceeded, use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. Full facepiece equipment is recommended and, if used, replaces need for face shield and/or chemical goggles. Consult respirator manufacturer to determine appropriate type equipment for a given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where exposure limits may be significantly exceeded, use an approved full face positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. Respiratory protection programs must comply with 29 CFR § 1910.134.

Skin protection:

Wear appropriate chemical resistant protective clothing and chemical resistant gloves to prevent skin contact.

When handling this material, gloves of the following type(s) should be worn:

Neoprene

Polyvinylchloride

Impervious butyl rubber gloves

Wear chemical goggles, a face shield, and chemical resistant clothing such as a rubber apron when splashing may occur. Rinse immediately if skin is contaminated. Remove contaminated clothing immediately and wash before reuse. Clean protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash thoroughly after handling.

Eye protection:

Where there is potential for eye contact, wear a face shield, chemical goggles, and have eye flushing equipment immediately available.

Body protection:

Rubber boots with neoprene or pvc soles., Note: As the water content of hydrogen peroxide evaporates, cotton,

**HYDROGEN PEROXIDE 50% (ALL GRADES)**

rayon, and wool fibers are particularly subject to spontaneous combustion., Where there is significant risk of sudden splash or spray, it is advised that an apron or rubber suit be worn.

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	colourless
Physical state:	liquid
Odor:	pungent
pH:	no data available
Density:	1.196 g/cm ³ (68 °F (20 °C))
Vapor pressure:	18 mmHg (68 °F (20 °C))
Relative vapor density:	1.0
Vapor density:	not determined
Boiling point/boiling range:	237 °F (114 °C)
Freezing point:	-62 °F (-52 °C)
Evaporation rate:	no data available
Solubility in water:	completely soluble
% Volatiles:	100 %
Molecular weight:	34.01 g/mol
Henry's constant:	(Concentration: 50%) 10.0E-03

10. STABILITY AND REACTIVITY**Stability:**

This material is chemically stable under normal and anticipated storage, handling and processing conditions.

Materials to avoid:

Metals
Organic materials
Reducing agents
Metallic oxides
Dusts
Combustible materials (e.g., wood, sawdust)
Alkaline materials

Conditions / hazards to avoid:

Material decomposes with the potential to produce a rupture of unvented closed containers.

**HYDROGEN PEROXIDE 50% (ALL GRADES)****Hazardous decomposition products:**

This material decomposes if contaminated, causing fire and possible explosions. Oxygen can be liberated at temperatures above ambient.

11. TOXICOLOGICAL INFORMATION

Data on this material and/or its components are summarized below.

Data for HYDROGEN PEROXIDE 50% (ALL GRADES)**Acute toxicity****Oral:**

No more than moderately toxic. (rat) LD50 = 225-1200 mg/kg (50%) .

Moderately toxic. (rat) LD50 = 75 mg/kg (70%) .

Dermal:

Practically nontoxic. (rat) LD50 >6500 mg/kg (70%) .

Inhalation:

Slightly toxic. (rat) LC0 > 0.17 mg/l. (50 %)

Skin Irritation:

Corrosive. (rabbit) (50 %)

Corrosive. (rabbit) (70 %)

Eye Irritation:

Corrosive. (rabbit) (70 %)

Repeated dose toxicity

Repeated drinking water administration to rat and mouse / affected organ(s): GI tract / signs: irritation

Repeated inhalation administration to rat and mouse / affected organ(s): nose / signs: irritation

Repeated inhalation administration to dog / affected organ(s): upper respiratory tract, lung / signs: irritation, emphysema

Chronic oral administration to laboratory animal / affected organ(s): stomach / signs: ulceration

Carcinogenicity

Chronic drinking water administration to rat and mouse / affected organ(s): GI tract / Increased incidence of tumors was reported.

Classified by the International Agency for Research on Cancer as: Group 3: Unclassifiable as to carcinogenicity in humans.

Genotoxicity**Assessment in Vitro:**

Genetic changes were observed in laboratory tests using: bacteria, animal cells



HYDROGEN PEROXIDE 50% (ALL GRADES)

Assessment in Vivo:

No genetic changes were observed in laboratory tests using: animals

Human experience

Inhalation:

Throat: irritation. (based on reports of occupational exposure to workers)

Skin contact:

Skin: bleaching of hair. (based on reports of occupational exposure to workers)

Eye contact:

Eye: irritating. (based on reports of occupational exposure to workers)

Ingestion:

GI tract: bloating, ulceration, burns. (accidental exposure to concentrated solutions)

Lung: accumulation of fluid in the lungs, death.

12. ECOLOGICAL INFORMATION

Chemical Fate and Pathway

No data are available.

Ecotoxicology

Data for HYDROGEN PEROXIDE 50% (ALL GRADES)

Aquatic toxicity data:

Slightly toxic. Fish 96 h LC50 between 10 - 37 mg/l

Aquatic invertebrates:

Moderately toxic. Daphnia magna (Water flea) EC50 = 7.7 mg/l

Moderately toxic. Daphnia pulex (Water flea) EC50 = 2.4 mg/l

Algae:

Highly toxic. EC50 = 0.85 mg/l

Microorganisms:

Slightly toxic. Bacteria EC50 = 30 mg/l

13. DISPOSAL CONSIDERATIONS

Waste disposal:

Dilution with water is the preferred method of disposal. Dispose of in accordance with federal, state and local regulations. Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits. Note: Chemical additions to, processing of, or otherwise altering this material may make this waste management information incomplete, inaccurate, or otherwise inappropriate. Furthermore, state and local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.

**HYDROGEN PEROXIDE 50% (ALL GRADES)****14. TRANSPORT INFORMATION****US Department of Transportation (DOT)**

UN Number : 2014
Proper shipping name : Hydrogen peroxide, aqueous solutions
Class : 5.1
Subsidiary hazard class : (8)
Packaging group : II
Marine pollutant : no

International Maritime Dangerous Goods Code (IMDG)

UN Number : 2014
Proper shipping name : HYDROGEN PEROXIDE, AQUEOUS SOLUTION
Class : 5.1
Subsidiary hazard class : (8)
Packaging group : II
Marine pollutant : no

15. REGULATORY INFORMATION**Chemical Inventory Status**

EU. EINECS	EINECS	Conforms to
US. Toxic Substances Control Act	TSCA	The components of this product are all on the TSCA Inventory.
Australia. Industrial Chemical (Notification and Assessment) Act	AICS	Conforms to
Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL). (Can. Gaz. Part II, Vol. 133)	DSL	All components of this product are on the Canadian DSL list.
Japan. Kashin-Hou Law List	ENCS (JP)	Does not conform
Korea. Toxic Chemical Control Law (TCCL) List	KECI (KR)	Conforms to
Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act	PICCS (PH)	Does not conform
China. Inventory of Existing Chemical Substances	INV (CN)	Does not conform
New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand	NZIOC	Conforms to

United States – Federal Regulations**SARA Title III – Section 302 Extremely Hazardous Chemicals:**

**HYDROGEN PEROXIDE 50% (ALL GRADES)****SARA Title III - Section 311/312 Hazard Categories:**

Acute Health Hazard, Fire Hazard, Reactivity Hazard

SARA Title III – Section 313 Toxic Chemicals:

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) - Reportable Quantity (RQ):**OSHA Regulated Carcinogens (NTP, IARC, OSHA Listed):****NTP:**

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

IARC:

No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA:

No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

United States – State Regulations**Massachusetts Right to Know**

<u>Chemical Name</u>	<u>CAS-No.</u>
Hydrogen peroxide (H2O2)	7722-84-1
Chlorides	Proprietary

New Jersey Right to Know

<u>Chemical Name</u>	<u>CAS-No.</u>
Hydrogen peroxide (H2O2)	7722-84-1

Pennsylvania Right to Know

<u>Chemical Name</u>	<u>CAS-No.</u>
Water	7732-18-5
Hydrogen peroxide (H2O2)	7722-84-1

California Prop. 65

This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive defects.

16. OTHER INFORMATION**Miscellaneous:**



Material Safety Data Sheet

HYDROGEN PEROXIDE 50% (ALL GRADES)

Other information: This MSDS covers the following grades of 50% H₂O₂: Albone; Peroxal; Valsterane; A; Alb, BIO; CG; CG-HP; CGHP; CLG; DS; FG; M; MS.

Latest Revision(s):

Reference number: 000000033382
Date of Revision: 05/04/2009
Date Printed: 05/04/2009

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MATERIAL SAFETY DATA SHEET

EARTH SCIENCE LABORATORIES, INC.

113 SE 22nd Street, Suite 1
Bentonville, AR 72712
earthsciencelabs.com

Emergency Phone Number:
Information Phone Number:

1-800-535-5053 (Infotrac)
1-479-271-7381

Material Name: *EarthTec®*

Page: 1 of 2
Issue Date: 12/93
Revision Date: 1/14

Section 1 – IDENTIFICATION

Product Name: EarthTec®

Certified to: NSF/ANSI Standard 60. Do not exceed 19 mg/L.

EPA Reg. No. 64962-1

Section 2 – HAZARDS IDENTIFICATION

Primary Routes of Entry: *Absorption and ingestion.*

Eyes: Causes substantial but temporary eye injury. Do not get in eyes.

Skin: Harmful if absorbed through skin. Avoid contact with skin.

Ingestion: Harmful if swallowed.

Section 3 – COMPOSITION/INFORMATION ON INGREDIENT

Components	CAS#	OSHA PEL	ACGIH TLV	%
Copper sulfate pentahydrate	7758-99-8	1mg/m ³	1mg/m ³	18.25-21.75%

Section 4 – FIRST AID MEASURES

If in Eyes: Hold eye open and rinse slowly and gently with water for 20 minutes. Remove contact lenses, if present, after first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for advice.

If on Skin or Clothing: Take off contaminated clothing. Rinse skin immediately with plenty of soap and water for 15 to 20 minutes. Call a poison control center or doctor for treatment.

If Swallowed: Call a poison control center or doctor immediately for treatment advice. Have a person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give anything to an unconscious person.

Note to Physician: Probable mucosal damage may contraindicate the use of gastric lavage.

Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact INFOTRAC 1-800-535-5053 for emergency treatment.

Section 5 – FIRE FIGHTING MEASURES

Flash Point: N/E

UFL: N/E

LFL: N/E

Hazardous Combustion Products: May react with high carbon metals to produce hydrogen gas, which can form an explosive mixture.

Fire Fighting Equipment/Instructions: Firefighters must wear MSHA/NIOSH approved positive pressure breathing apparatus (SCBA) with full face mask and full protective equipment.

NFPA Ratings:

Fire: 0

Health: 2

Reactivity: 1

Other: X

HMIS III Ratings:

Fire: 0

Health: 2

Reactivity: 1

Personal Protection: X

Section 6 – ACCIDENTAL RELEASE MEASURES

Containment Procedures: Flush with water into retaining area or container. Caution should be exercised regarding personal safety and exposure to released product.

Clean-Up Procedures: Neutralize solution with bicarbonate of soda.

Evacuation Procedures: Keep unnecessary people away; isolate hazard area and deny entry.

Special Instructions: Notify local authorities and the National Response Center, if required.

Section 7 – HANDLING AND STORAGE

Application and Handling Equipment: Application, handling or storage equipment MUST consist of fiberglass, PVC, polypropylene, viton, corrosion resistant plastics or stainless steel. Never use mild steel, nylon, brass or copper around product. Always rinse and clean equipment thoroughly each night with plenty of fresh, clean water.

Storage: Store in a safe place away from pets and keep out of the reach of children. Store away from excessive heat. Product will freeze. Always store product above 32 degrees F (Do Not Freeze). Freezing may cause product separation. Always keep container closed. Store product in its original container only. Keep away from galvanized pipe, and any nylon storage or handling equipment.

Section 8 – EXPOSURE CONTROLS/PERSONAL PROTECTION**Personal Protective Equipment (PPE)**

Mixers, loaders, applicators and other handlers must wear the following: long-sleeved shirt, long pants, shoes plus socks, chemical-resistant gloves made of any water proof material (Chemical Resistance Category A), and protective eyewear.

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry. Discard clothing and other absorbent material that have been drenched or heavily contaminated with the product's concentrate. Do not reuse them.

Section 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Clear blue liquid

Physical State: Liquid

pH: 0.5

Vapor Pressure: 0.1mm 68° F

Boiling Point: 220° F

Melting Point: N/A

Odor: Minimal odor

Vapor Density (Air=1): 1.0

Evaporation Rate: N/A

Solubility in Water: Complete

Specific Gravity (H₂O=1): 1.188 +/- 0.05

Section 10 – STABILITY AND REACTIVITY

Chemical Stability: Stable.

Conditions to Avoid: Avoid mixing with strong bases and strong reducing agents.

Incompatibility: Incompatible with strong bases and strong reducing agents.

Hazardous Decomposition Products: Sulfur dioxide and sulfur trioxide may be produced with decomposition.

Hazardous Polymerization: Will not occur.

Section 11 - TOXICOLOGICAL INFORMATION

Acute Toxicity / Chronic Toxicity: Continued overexposure to this solution may cause systemic toxicity.

Carcinogenicity: N/A

Signs and Symptoms of Exposure: Overexposure may cause the following specific symptoms, depending on the concentration and duration of exposure: vomiting, shallow respiration and lung function changes.

Section 12 - ECOLOGICAL INFORMATION

Waters treated with this product may be hazardous to aquatic organisms.

Section 13 – DISPOSAL CONSIDERATIONS

Pesticide wastes are acutely hazardous. Improper disposal of excess product mixture or rinsate is a violation of federal law. If these wastes cannot be disposed of by use according to label instructions, contact your state pesticide or environmental control agency, or the hazardous waste representative at the nearest EPA regional office for guidance. In the event of spill, neutralize with limestone or baking soda before disposal. May deteriorate concrete.

Section 14 – TRANSPORT INFORMATION**DOT Information**

Proper Shipping Name: Corrosive liquid, acidic, inorganic, n.o.s., (contains cupric sulfate)

Hazard Class: 8

UN/NA #: UN3264

Packing Group: III

- Packages that contain more than 5.1 US gallons are **RQ** (reportable quantity)
- Packages that contain less than 4.0 liters could be **ORM-D**
- The proper shipping information is the responsibility of the shipper and this information is only guidelines.

Section 15 - REGULATORY INFORMATION

This chemical is a pesticide product registered by the Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for Safety Data Sheets, and for workplace labels of non-pesticide chemicals. Following is the hazard information as required on the pesticide label:

WARNING

Causes substantial but temporary eye injury.

Harmful if swallowed.

Harmful if absorbed through skin.

Section 16 - OTHER INFORMATION

Date of Last Revision: January 14, 2014.

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MATERIAL SAFETY DATA SHEET

Bio-Regen PWT-1000

Section 1 – Chemical Product & Company Identification

Trade Name: Bio-Regen PWT-1000
Chemical Family: Mixture
Product Description: A concentrated blend of organic biopolymers and L-amino acids that is non-hazardous.

Manufacturer: 3 Tier Technologies, LLC
250 National Place, Suite 142, Longwood, FL 32750

Technical Support: 877-226-7498
Chemical Emergency: 407-808-4653

Issue Date: 01/24/14 **Supersedes Date:** None

Section 2 – Hazards Identification

Emergency overview: Avoid contact with eyes. Mild skin irritation.

Potential health effects:

Eyes: Contact with eyes may cause severe irritation.
Skin: May cause irritation upon prolonged contact.
Inhalation: None known
Ingestion: May cause irritation/nausea if ingested in large quantities

Section 3 – Composition / Information on Ingredients

<u>Components</u>	<u>CAS #</u>	<u>Percent</u>
Bio-Regen PWT-1000 is a blended composition "not considered hazardous" under the OSHA Hazard Communication Standard CFR Title 29 1910.1200. All ingredients appear on the EPA TSCA Inventory.		
Organic Biopolymer from Brown Coal	1415-93-6	60%
L-Amino Acids	Various	35%
RO Water	7732-18-5	5%

Ingredients of >1% have been added to a non-hazardous liquid organic substrate.
Active components <15% are identified above

Section 4 – First Aid Measures

First aid procedures

Eye contact: Immediately flush eyes with plenty of water for at least 15 minutes. Seek medical attention if irritation persists.

Skin Contact: Flush skin with large amounts of water. Remove any contaminated clothing and wash before reuse. Seek medical attention if irritation occurs.

Inhalation: If symptoms are experienced, remove source of contamination and/or move victim to fresh air. If breathing is difficult, have trained personnel administer oxygen. If respiration stops, have trained personnel administer artificial respiration. Get medical attention immediately.

Ingestion: Give large amounts of water. Do not induce vomiting. If vomiting occurs prevent aspiration by keeping victim's head below the knees. Get immediate medical attention.

Section 5 – Fire Fighting Measures

Flash Point: None

Extinguishing

Media: Water fog or fine spray, carbon dioxide, dry chemical or foam. No special requirements

Fire fighting

Protection: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

Section 6 – Accidental Release Measures

Personal

Precautions: Isolate area. Keep unnecessary personnel away. Keep out of low areas. Ventilate closed spaces before entering. Use of safety glasses and impervious gloves recommended.

Environmental

Precautions: Prevent further leakage or spillage if safe to do so.

Methods for

Containment: Prevent entry into waterways, sewers, basements or confined areas.

Methods for

Clean-up: Wear appropriate protective equipment and clothing during clean-up.

Large spill: Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Dispose in accordance with all local, state and federal regulations.

Small spill: Follow same procedure as above.

Section 7 – Handling and Storage

Handling: Avoid contact with skin and eyes. Wash hands thoroughly after handling.

Storage: Store this product below 120°F (49°C), preferably below 75°F (24°C), in a cool, dry, well ventilated area away from heat, sparks, flame, oxidizers and out of direct sunlight. For best results, use within 24 months.

Section 8 – Exposure Controls, Personal Protection

Personal Protection

General: Eye wash fountain is recommended. Minimize exposure in accordance with good hygiene practices. Keep out of reach of children.

Eyes: Wear chemical goggles.

Skin: Suitable protective clothing is recommended but not required. Use impervious gloves.

Respiratory: None required for recommended use. Avoid creating aerosols in poorly ventilated areas.

Section 9 – Physical & Chemical Properties

Vapor Pressure: Equivalent to Water
Vapor Density (air = 1): Equivalent to Water
Specific Gravity: 1.0 approx.
Solubility in water: 99%
VOC: Negligible
Appearance: Brown/Black Liquid
pH: 6.0 to 8.5
Boiling Point: > 212° F (100° C)
Flash Point: None
Freezing Point: < 32° F (0° C)
Evaporation Rate: Not Determined
Weight: 8.7 – 9.2 lbs. /gallon
Odor: Mild earthy odor

Section 10 – Stability & Reactivity

Chemical Stability: Stable at normal conditions.

Incompatible Materials: Strong oxidizing agents, alkalis

Hazardous Decomposition Products: None known.

Conditions to avoid: See Section 7.

Hazardous Polymerization: Will not occur.

Section 11 – Toxicology Information

Toxicology data: Not available.

Section 12 – Ecological Information

Ecotoxicity: Readily biodegradable.

Section 13 – Disposal Considerations

Disposal instructions: Dispose in accordance with all applicable regulations. All wastes must be handled in accordance with local, state and federal regulations. Regulations vary.

Section 14 – Transportation Information

General information: Non-hazardous.

US DOT: Not regulated.

Proper Shipping Description: Class 55

Section 15 – Regulatory Information

TSCA Inventory Status: This product and/or all of its components are either included on or exempt from the TSCA Inventory of Chemical Substances.

DSL (Canada): This product and/or all of its components are either included on or exempt from the Domestic Substances List.

Section 16 – Other Information

HMIS ratings: Health: 1
Flammability: 0
Physical hazard: 0

NFPA ratings: Health: 1
Flammability: 0
Reactivity: 0

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