



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Washington, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

December 22, 2008

Gary R. Orr, Ph.D.
Rivendell Consulting USA, LLC
Agent for Phoenix Environmental Care
400 E. Jane St.
Valdosta, GA 31601

Subject: Product Name: Symmetry Algaecide
EPA Registration Number: 81943-2

Dear Dr. Orr:

Based on the Antimicrobials Division Product Science Branch acute toxicity review dated June 27, 2007, the acute inhalation toxicity study (MRID #470450-01) is acceptable and assigned Tox Category III. Therefore, the signal word change from "warning" to "caution" is acceptable.

The labeling amendment, submitted in connection with registration under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as amended, is acceptable with the following comment(s).

Revise the first Aid statements to read as follows:

IF INHALED:

- Move person to fresh air.
- If person is not breathing, call 911 or an ambulance, and then give artificial respiration, preferably mouth-to-mouth, if possible.
- Call a Poison Control Center or doctor for further treatment advice.

IF IN EYES:

- Hold eye open and rinse slowly and gently with water for 15-20 minutes.
- Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.
- Call a Poison Control Center or doctor for treatment advice.

IF ON SKIN OR CLOTHING:

- Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15-20 minutes.
- Call a Poison Control Center or doctor for treatment advice.

IF SWALLOWED:

- Call a Poison Control Center or doctor immediately for treatment advice.
- Have person sip a glass of water if able to swallow.
- Do not induce vomiting unless told to do so by the Poison Control Center or doctor. Do not give anything by mouth to an unconscious person.

Submit three (3) copies of the revised label bearing the revisions stated above. A stamped copy of the label is enclosed for your records.

If you have further questions or concerns concerning this letter, please contact me by telephone at (703) 308-6422 or by e-mail at heyward.adam@epa.gov or Lisa Mckelvin by telephone at (703) 308-7496 or by email at mckelvin.lisa@epa.gov during the hours of 8:00 am to 4:00 pm EST. When submitting information or data in response to this letter, a copy of this letter should accompany the submission to facilitate processing.

Sincerely,



Adam Heyward
Product Manager 34
Regulatory Management Branch II
Antimicrobials Division (7510P)

Enclosure: Stamped label

SYMMETRY™ ALGAECIDE

For use in Fresh Water Lakes, Potable Water Reservoirs, Ponds (including Golf Course Ponds), Fish Hatcheries, Irrigation Ditches, and Other Such Slow Moving or Quiescent Bodies of Water

Water treated with Symmetry may be used immediately for recreational activities, for drinking, for watering livestock, and for irrigation of crops, golf courses, ornamental plantings, and turf areas.

ACTIVE INGREDIENT

*Copper as elemental..... 8%

INERT INGREDIENTS..... 92%

TOTAL..... 100%

(*Derived from Copper-Triethanolamine Complex and Copper Hydroxide) – Contains 0.8 Pounds of Elemental Copper Per Gallon

KEEP OUT OF REACH OF CHILDREN CAUTION

FIRST AID	
IF INHALED	<ul style="list-style-type: none"> • Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. • Call a poison control center or doctor for further treatment advice.
IF SWALLOWED	<ul style="list-style-type: none"> • Call a poison control center or doctor immediately for treatment advice. • Have 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 by mouth to an unconscious person.
IF IN EYES	<ul style="list-style-type: none"> • Hold eye open and rinse slowly and gently with water for 15 to 20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
IF ON SKIN OR CLOTHING	<ul style="list-style-type: none"> • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15 to 20 minutes. • Call a poison control center or doctor for treatment advice.
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. For medical emergencies involving this product, call toll free 1-888-875-1724.	
See Label for Additional Precautions and Directions for Use	

Phoenix Environmental Care, LLC
Valdosta, GA 31601

EPA Reg. No. 81943-2
EPA Est. No. _____

Net Contents: _____

ACCEPTED
with COMMENTS
in EPA Letter Dated:
DEC 22 2008

**Under the Federal Insecticide,
Fungicide, and Rodenticide Act as
amended, for the pesticide,
registered under EPA Reg. No.**

81943-2

**PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS
CAUTION**

Harmful if inhaled. Causes eye irritation. Harmful if swallowed or absorbed through the skin. Avoid breathing vapor or spray mist. Avoid contact with skin, eyes or clothing. Prolonged or frequently repeated skin contact may cause allergic reaction in some individuals. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, or using tobacco. Remove and wash contaminated clothing before reuse.

ENVIRONMENTAL HAZARDS

This product may be toxic to fish. Some species of fish may be killed at application rates on this label—trout and channel catfish are especially sensitive. Immature fish are more susceptible to injury than mature. Generally, fish toxicity is reduced as water hardness increases. Consult State Fish and Game Agency or other responsible agency before applying this product to public waters.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage and disposal.

PESTICIDE STORAGE: Store in a cool, dry place.

PESTICIDE DISPOSAL: Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray 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.

CONTAINER DISPOSAL: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by incineration, or if allowed by state and local authorities, by burning. If burned, stay out of smoke.

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

GENERAL INFORMATION

Symmetry may be applied to fresh water lakes, potable water reservoirs, ponds (including golf course ponds), fish hatcheries, irrigation canals, laterals, and ditches and other such slow moving or quiescent bodies of water. Symmetry successfully controls diverse algal types including branched, filamentous, and planktonic species. To obtain optimal control, apply Symmetry in accordance with label directions at the first appearance of algae bloom. Water treated with Symmetry may be used immediately to irrigate crops, golf courses, ornamental plants, and turf areas.

Surface applications of Symmetry may be made using a land-based sprayer, or spray boat. Weighted trailing hoses are recommended for subsurface applications. Where appropriate, Symmetry can be applied as an invert emulsion, or as an admixture with a suitable polymer, (see specific instructions, and select only adjuvants approved for application in food crop production).

Decomposition of dead plant material can result in dissolved oxygen depletion and subsequent fish kill. High water temperatures and dense weed infestation are exacerbating factors. To avoid excessive oxygen depletion and fish kill, treat no more than 1/2 of the water body at one time. Do not apply more Symmetry than required for the treatment area, and allow 10 to 14 days before making application to the remaining portion of the water body. Avoid trapping fish between the shoreline and treatment areas by treating from the shore outward toward deeper, untreated water.

Algae in the water column or on the weed surfaces can reduce the effectiveness of aquatic herbicides against *Hydrilla verticillata* and other vascular weeds. Unless specifically prohibited by the mix partner label, Symmetry may be tank mixed with products containing the active ingredients, copper, fluridone, diquat and endothall; to improve aquatic weed control. If a product is tank mixed with Symmetry, the more stringent requirements of the Symmetry and mix partner labels must be met.

NOTE: Symmetry and solutions of Symmetry with cupric ion concentrations in excess of 1.0 ppm may cause non target plant injury. Do not allow sprays to drift over crops, ornamentals, grass or other desirable plants. Observe all label restrictions.

ALGAE CONTROL

See Table 1 for a listing of indigenous algae, diatom, and protozoa genera controlled by Symmetry. Control of free floating genera is obtained at rates equivalent to 0.2 to 0.5 ppm metallic copper. Control of mat forming genera requires rates equivalent to 0.5 to 1.0 ppm metallic copper. Hard to control genera such as *Chara* and *Phormidium* require a rate of 0.5 to 1.0 ppm metallic copper to be applied at the first signs of algal growth. The lower ends of the recommended ranges can be used in soft water and low growth situations. Higher rates within the recommended ranges should be used in situations of hard water or high algal growth. Always consult your State Fish and Game Agency or other responsible agency before applying this product to public waters.

Best results are obtained when Symmetry is applied at the first appearance of algae and when water temperatures are above 60°F. Apply under calm conditions in a manner that uniformly distributes Symmetry throughout the treated area. Symmetry can be applied directly, but a 10 to 20 fold dilution of Symmetry with water facilitates uniform application. Large mats of floating algae should be removed prior to treatment, and a second application 1 to 2 weeks following the initial treatment may be required in areas of dense algae growth.

Table 1. Copper Levels Required for Control of Different Genera of Algae

ORGANISM	0.2 – 0.5 ppm COPPER		0.5 – 1.0 ppm COPPER	
Cyanophyceae (Blue-green algae)	<i>Anabaena</i>	<i>Microcystis</i>	<i>Calothrix</i>	<i>Phormidium</i>
	<i>Aphanizomenon</i>	<i>Oscillatoria</i>	<i>Nostoc</i>	<i>Symploca</i>
	<i>Cylindrospermum</i>	<i>Plectonema</i>		
	<i>Gloeotrichia</i>	<i>Polycystis</i>		
	<i>Gomphosphaeria</i>			
Chlorophyceae (Green algae)	<i>Botryococcus</i>	<i>Hydrodictyon</i>	<i>Ankistrodesmus</i>	<i>Nitella</i>
	<i>Closterium</i>	<i>Microspora</i>	<i>Chara</i>	<i>Oocystis</i>
	<i>Coelastrum</i>	<i>Spirogyra</i>	<i>Chlorella</i>	<i>Palmella</i>
	<i>Draparnaldia</i>	<i>Tribonema</i>	<i>Cladophora</i>	<i>Pithophora</i>
	<i>Enteromorpha</i>	<i>Ulothrix</i>	<i>Crucigenia</i>	<i>Scenedesmus</i>
	<i>Gloecystis</i>	<i>Zygnema</i>	<i>Desmidium</i>	<i>Staurastrum</i>
			<i>Golenkinia</i>	<i>Tetraedron</i>
Diatomaceae (Diatoms)	<i>Asterionella</i>	<i>Nitzschia</i>	<i>Achnanthes</i>	
	<i>Fragilaria</i>	<i>Stephanodiscus</i>	<i>Cymbella</i>	
	<i>Gomphonema</i>	<i>Synedra</i>	<i>Neidium</i>	
	<i>Melosira</i>	<i>Tabellaria</i>		
	<i>Navicula</i>			
Protozoa (Flagellates)	<i>Ceratium</i>	<i>Mallomonas</i>	<i>Chlamydomonas</i>	<i>Pandorina</i>
	<i>Cryptomonas</i>	<i>Synura</i>	<i>Eudorina</i>	<i>Peridinium</i>
	<i>Dinobryon</i>	<i>Uroglera</i>	<i>Hawmatococcus</i>	
	<i>Euglena</i>	<i>Volvox</i>		
	<i>Glenodinium</i>			

Table 2 gives the amount of Symmetry required to achieve a desired copper concentration in quiescent or slow moving waters as a function of water depth. This target concentration must be maintained for a minimum of 3 hours to achieve optimal algae control. In moving water, where flow will result in significant reduction of copper ion within 3 hours of treatment, application of Symmetry through a metering system is recommended (See instructions for Trip System Application below).

Table 2. Application Rates for Quiescent or Slow Moving Water

Average Depth of Water of Treatment Site (Feet)	Gallons of Symmetry per Surface Acre to Achieve the Desired Copper Concentration		
	0.2 ppm Cu	0.5 ppm Cu	1.0 ppm Cu
1	0.7	1.7	3.4
2	1.4	3.4	6.8
3	2.0	5.1	10.2
4	2.7	6.8	13.6

STRATIFIED LAKES (Summer Application) – Lakes known to be stratified require treatment of the upper 6 feet of water only.

NON-STRATIFIED LAKES (Spring/Fall Application) – Non-stratified lakes require treatments based on the total water depth. To avoid adverse effects on fish population, treat no more than 1/2 of the water body at a time.

METHODS OF APPLICATION

SURFACE APPLICATION: Surface applications are appropriate for shallow depths of 4 feet or less. Use a diluted spray mixture and apply evenly across the surface of the water from a boat or from shore.

SUBSURFACE APPLICATION: Subsurface applications of Symmetry are recommended for water depths exceeding 4 feet. Weighted trailing hoses should be set to deliver the recommended rate of Symmetry to zones containing dense algae populations. Subsurface application can be used for direct or invert applications of Symmetry. Avoid dragging the hoses on the bottom.

POLYMER APPLICATION: Spray sinking, deposition, and retention may be improved by addition of a polymer to Symmetry itself or to a dilution of Symmetry in water. Follow the recommendations on the polymer product label governing the use of that product in algae control.

INVERT EMULSIONS: Symmetry can be applied alone or in combination with aquatic herbicides (see below) in an invert emulsion. Inverts are not suited for surface application and should only be applied subsurface through submerged, weighted trailing hoses. Do not drag hoses on the bottom.

DRIP SYSTEM APPLICATION

FOR USE IN IRRIGATION CONVEYANCE SYSTEMS AND OTHER MOVING WATER

In irrigation systems, application should be made prior to appearance of algae. Delayed treatment may allow growth of algae mats that can impede the flow and delivery of water through obstruction of system components including lateral headgates, pumps, pumping systems, screens, and siphon tubes. It may be necessary to increase water flow rates during treatment to achieve good chemical distribution and effective algae control.

Application rates are calculated based on water flow rate in cubic feet per second. Prior to application of Symmetry, determine the system flow rate using devices which give accurate water flow measurements (e.g., weirs, or orifices). Lacking these devices, the rate of flow may be estimated by the following formula:

$$\text{Average Width (feet)} \times \text{Average Depth (feet)} \times \text{Average Velocity (feet/second)} \times 0.9 = \text{Cubic Feet per Second (C.F.S.)}$$

Velocity can be estimated by measuring the time it takes a floating object to travel a predetermined distance down the middle of the canal. Velocity (feet/second) is then the distance traveled (feet) divided by the time (seconds) required. The average velocity is the arithmetic mean of the results obtained from a minimum of three individual velocity measurements. Use this average velocity (feet/second) in the formula above to determine the flow rate (C.F.S.).

Once the flow rate is known, the appropriate Symmetry drip rate can be read from Table 3.

Table 3. Application Rates for Moving Water

WATER FLOW RATE		SYMMETRY DRIP RATE (to give 1.0 ppm Cu)		
C.F.S.	GAL./MIN.	QTS./HR.	mL/MIN.	FL. OZ./MIN.
1	500	1.25	20	0.7
2	1000	2.50	40	1.3
3	1500	3.75	60	2.0
4	2000	5.00	80	2.3
5	2500	6.25	100	3.3

Determining Amount of Symmetry: The rates shown in Table 3 will produce a concentration of 1.0 ppm Cu^{**} in treated water. The target copper concentration is obtained by multiplying the rate value read from the table by the target concentration in ppm. As it is necessary to maintain the target application rate for a minimum of 3 hours (180 minutes), the minimum amount of Symmetry needed to achieve effective control is calculated multiplying the adjusted Qts./Hr. rate by 3, the adjusted mL/Min. rate by 180; or adjusted Fl. Oz./Min. rate by 180. Apply Symmetry in the channel at weirs or other turbulence creating structures or at several injection points across the flow to ensure thorough mixing and uniform dispersion.

Calibrating For Drip Application (Gravity Feed): Add the amount of Symmetry required for 3 hours treatment (as calculated above) to a drum or tank equipped with an adjustable constant flow valve. Adjust the flow rate to the target value by dripping the Symmetry into a clean graduated container while measuring the time required to reach a given volume. Several iterations may be necessary to achieve the target flow. Symmetry captured during the valve calibration can be returned to the tank. **NOTE:** it may be necessary to readjust the constant flow valve if the drip rate changes during the 3 hour treatment period. If electricity is available, a small adjustable metering pump can be used as a more accurate means of introducing Symmetry into the water.

The severity of algae infestation will dictate the distance that algae control will extend from the application point. Any subsequent applications should be made at points 3 hours downstream from the prior point of application. This step can be repeated as necessary until the entire infested area has been treated. Season long control may require periodic retreatment.

HYDRILLA VERTICILLATA CONTROL

Unless specifically prohibited by the mix partner label, Symmetry may be tank mixed with Current, or with aquatic herbicide products containing diquat as the active ingredient. In these mixtures Symmetry kills algae covering *Hydrilla* and thereby interfering with herbicide absorption. If a product is tank mixed with Symmetry, the more stringent requirements of the Symmetry and mix partner labels must be met. Table 4 gives example directions for tank mixes of Symmetry with diquat based products. The complete effect of these treatments will take 8-12 weeks to develop. In cases of dense weed growth, a second application may be necessary after 12 weeks:

Table 4. Example Tank Mixes of Symmetry Algaecide

Mix Partner	Amount of Mix Partner	Amount of Symmetry	Amount of Water	Additive	Rate	Application Method
1. Diquat (35.3%) ^{1,2}	1-2 gal. ³	1.7 - 3.4 gal. ⁴	100 gal.	Invert emulsion carrier ⁵	Per A-foot	Surface Spray or subsurface injection, or bottom placement ⁶
2. Current (8% Cu)	3.34 gal.	1.7 - 3.4 gal. ⁵	10-20 gal.		Per A-foot	Surface spray or subsurface injection ⁷

¹Make applications in bright sunlight when water is above 60°F.

²In heavily infested areas, a second application after 12 weeks may be necessary.

³See the diquat product label for actual diquat application rate

⁴Use the low rate of Symmetry for light infestations of easy-to-control algae species in soft water. The high rate of Symmetry is indicated when any of the following conditions exist: heavy algae infestations, difficult-to-control species, or hard water.

⁵An invert emulsion carrier is indicated in slowly moving, or muddy water

⁶Bottom placement is recommended where *Hydrilla* growth has reached the surface

⁷Choose an application method which provides uniform coverage of the treated area and delivers the spray solution to the plant surface.

8/8/9

Surface Application: Apply using a hand held low pressure nozzle, or other method of application which provides uniform coverage of the treated area.

Subsurface Application: Use Delavan or Spraying System 80-degree nozzle tips fitted with 06 orifices on boom mounted trailing hoses 18 to 24 inches long. Such hoses will release the spray mixture 3 to 6 inches below the water surface. Booms can be mounted on the boat's bow or stern. Make applications in swaths no more than 20 feet apart.

Bottom Placement: Using weighted, trailing hoses and water as the carrier, inject the diluted Symmetry plus diquat mixture 1 to 2 feet above the bottom.

FISH NOTE

Symmetry may be toxic to trout and other species of fish. The risk of fish toxicity generally decreases as the hardness of the water increases.

IRRIGATION WITH TREATED WATER

Water treated with Symmetry in accordance with label directions may be used for irrigation immediately after treatment.

WARRANTY STATEMENT

PHOENIX warrants that this product conforms to the chemical description on the label thereof and is reasonably fit for purposes stated on such label only when used in accordance with directions under normal use conditions. It is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials or the manner of use or application, all of which are beyond the control of PHOENIX. In no case shall PHOENIX be liable for consequential, special or indirect damages resulting from the use or handling of this product. All such risks shall be assumed by the Buyer. The exclusive remedy of any buyer or user of this product for any and all losses, injuries, or damages resulting from or in any way arising from the use, handling, or application of this product, whether in contract, warranty, tort, negligence, strict liability, or otherwise, shall not exceed the purchase price paid for this product or at PHOENIX'S election, the replacement of this product. PHOENIX MAKES NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS STATED ABOVE.

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