

# CLEAN LAKES INC.

Aquatic Ecosystem Restoration & Maintenance



March 24, 2016

Jeanine Townsend  
Clerk to the Board  
State Water Resources Control Board  
1001 I Street, 24th Floor  
Sacramento, CA 95814

**RE: Comment Letter – Draft Aquatic Weed Control Permit Amendments, Draft Amendments To Water Quality Order 2013-0002-DWQ**

Ms. Townsend:

Clean Lakes, Inc. would like to provide the following comments on the California State Water Resource Control Board's (SWRCB) proposed amendments to the STATEWIDE GENERAL NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT FOR RESIDUAL AQUATIC PESTICIDE DISCHARGES TO WATERS OF THE UNITED STATES FROM ALGAE AND AQUATIC WEED CONTROL APPLICATIONS.

There are several points and newly added restrictions to peroxide based algaecides (Hydrogen Peroxide, Peroxyacetic Acid (PAA)), and Sodium Carbonate Peroxyhydrate (SCP) that we feel are listed or stated in a manner that could negatively impact the ability to apply these algaecides with optimal efficacy in efforts to control various algae species and improve overall water quality. These proposed changes recommended by the SWRCB will have negative impacts to the water agencies and commercial applicators, users of the site (municipal, recreational, navigation), homeowners (property values) and the environment.

These products have undergone US EPA and California Department of Pesticide Regulation review and approval, and are currently approved for use under the SWRCB NPDES Permit. Sodium carbonate peroxyhydrate has been registered for aquatic use since early 2006, and hydrogen peroxide and peroxyacetic acid since 2002. Upon contact with materials such as algae and organic matter, sodium carbonate peroxyhydrate, hydrogen peroxide and peroxyacetic acid rapidly break down into water, oxygen and acetic acid. Acetic acid breaks down to carbon dioxide and water. None of the moieties resulting from degradation pose any toxicological concern.

Nationally, in the history of peroxide-based algaecide use, there are no documented cases of environmental impacts from these products when applied according to the label directions for use.

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Imposing restrictions on the use of peroxide-based algaecides will result in a reduction in the application of these products, forcing water managers to choose other chemistries which may not provide the required efficacy.

Peroxide based algaecides have become an important water management tool due to the fact that:

1. These products are an alternative to chemistries which can be persistent in the environment.
2. There is no mutational resistance by algae
3. Hydrogen peroxide and PAA rapidly degrades upon contact with organic matter into carbon dioxide, oxygen and water, which are not of toxicological concern.
4. Hydrogen peroxide and PAA are not persistent in the environment and do not bioaccumulate.
5. Rapid degradation allows for a shorter retreatment interval if needed (48 hours).
6. Effective in various water chemistries (variable Alkalinity and pH)
7. Effective on all forms of algae reducing selectivity issues associated with other chemistries
8. Fast acting algaecide
9. Creates beneficial oxygen while controlling algae

**Proposed Restriction 1:** The proposed amendment wording outlined below should not be included in the revised Permit:

Part E (page 72) “Use of these active ingredients in the aquatic environment is limited to contained, non-flowing waters as noted on product labels containing these active ingredients”.

The various label language referring to the application of these products to flowing waters is in regards to injecting product based on flow rates over time (C.F.S.). General application to surface water or spot applications are approved uses in CA. In addition, under field use circumstances, peroxide formulations do not drift outside the general treatment area and degrade rapidly to nearly immeasurable levels within 24 hours, well within time for any triggering of effluent limits. GreenClean® Liquid 2.0 for example is approved for use in CA under the following use sites:

- “Use GreenClean® Liquid 2.0 to suppress, control and prevent algae and cyanobacteria in the following waters: Ponds, Lakes, Lagoons, Water Gardens, Ornamental Pools/Ponds, Ornamental Waterfalls, Fountains, Bird Baths, Irrigation Ponds, Rice/Wild Rice Fields and Paddies, Farm Ponds, Impounded Waters, Bilge Water, Reservoirs, Waterways, Conveyance Ditches, Canals, Laterals, Drainage Systems, Catch Basins, Sewage Lagoons and Pits, Feedlot Run-Off Lagoons, Sewage Systems, Fire Ponds, Watering Tanks, Storage Tanks, Water Collectors”.

The peroxyacetic acid component of GreenClean Liquid algaecides, when applied to the water body to control algae, quickly dissociates into hydrogen peroxide and acetic acid upon introduction to water. The peroxide rapidly breaks down in the presence of the algae and other organic material, releasing oxygen. The concentrations and exposure times (often referred to in lab eco-toxicity trials) found to cause harm to aquatic life is not sustainable in the actual in-field use. There are many other factors that contribute to the breakdown of the product in the field. Additionally, the product is generally applied to water margins and surface treatments, so entire water volume treatments are not a common practice, therefore the impact on aquatic life is minimal.

The rate of degradation of hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>; Active Ingredient in GreenClean PRO and GreenClean Liquid 2.0) and Peracetic Acid (PAA; Second Active Ingredient in GreenClean Liquid 2.0) in the environment was shown to be rapid based on data from multiple studies discussed below (Boulos et al. undated; Kay, et al. 1984; Ma DEP, 2010; Quimby and Kay, 1984, BioSafe Systems, 2015).

- A. Study by Boulos et al (unpublished) with a product similar in composition to GreenCleanPRO has shown a 93-100% degradation of H<sub>2</sub>O<sub>2</sub> by 24 hrs after treatment.
- B. Similarly, results from the study by Kay et al (1984) has shown that 94% of initial 0.137 mM H<sub>2</sub>O<sub>2</sub> had disappeared by 4 hours after treatment of a Raphidiopsis culture.
- C. A water column degradation study (OPP, 2004; as cited in Ma. DEP, 2010) conducted using a granular product similar in composition to GreenCleanPRO at different rates (2.5-20 lbs./acre-ft.) and time increments (0-50 hrs), demonstrated rapid dissipation of residual H<sub>2</sub>O<sub>2</sub> levels over time and mostly undetectable by 24 hrs after treatment
- D. Studies conducted by Quimby and Kay (Quimby and Kay, 1984) show that an application of 3 ppm H<sub>2</sub>O<sub>2</sub> declined to background levels (0.2 ppm) by 24 hours after treatment in the presence of a blue green algae suspension.
- E. In another study conducted at the Bill Evers Reservoir in Florida, the water was treated with a dose of 2 ppm H<sub>2</sub>O<sub>2</sub> (equivalent to 40.29 lbs. GreenCleanPRO Granular/acre-foot). Hydrogen peroxide levels were reduced to 0.75 ppm after eight hours and were completely decomposed after 24 hours (Quimby and Kay 1984).

The above referenced studies demonstrate the recommended treatment dosages of hydrogen peroxide algaecides (See Table 1) from products like GreenCleanPRO and GreenClean Liquid are not likely to persist in the water column long enough to pose any adverse effect on non-target species. The rapid degradation of H<sub>2</sub>O<sub>2</sub> in the presence of algae and organic matter supports the fact that the exposure of non-target species to toxic levels of H<sub>2</sub>O<sub>2</sub> is highly unlikely.

**Proposed Restrictions 2 & 3:** The proposed amendment wording outlined below should not be included in the revised Permit:

“These active ingredients can be highly toxic to fish and aquatic invertebrates at the higher application rates indicated on labels for products containing these active ingredients.”

- do not apply products containing these active ingredients during prime fish feeding times (i.e., at dawn or dusk and when flying insects are visible over water surface) to protect resident fish species.
- do not apply products containing these active ingredients when juvenile fish and amphibians are present.

When used according to the approved labeled directions for use, no adverse effects to aquatic organisms are expected. The various labels contain use statements, of which states;

“Begin treatment along the shore and proceed outward in bands to allow fish to move into untreated areas.” in order to further mitigate any potential risk to aquatic life. Furthermore, the concentration of hydrogen peroxide and PAA when diluted and applied as an algaecide is extremely low, and once applied to water degrades on contact with organics, the non-toxic metabolites of oxygen, carbon dioxide and water. Hydrogen peroxide and PAA are not persistent in the environment so there is low potential for exposure to aquatic organisms following application.

Hydrogen peroxide is a reactive substance, and undergoes degradation by both biotic and abiotic reactions (EU, 2003). This ready degradability of hydrogen peroxide is expected to minimize the potential exposure of aquatic invertebrates to hydrogen peroxide.

**Proposed Restriction 4:** “apply products containing these active ingredients from the shallow margins of the water body out to deeper waters to allow mobile aquatic life to escape the treatment area.”

This statement is a Best Management Practice, and a general treatment note as found on many aquatic herbicides and algaecides. This should not be considered a restriction, it is a common practice utilized by professional aquatic applicators to further mitigate any risk to aquatic life.

**Proposed Restriction 5:** “only treat one-half of the contained water body at a time to minimize impacts to the aquatic system and, do not make subsequent treatments of the untreated area in the same water body within 48 hours of the initial water body treatment.”

This is a general treatment note or recommendation on various aquatic herbicide and algaecide labels for use by the professional applicator, who has the expertise and experience to determine how they will apply the product in each unique situation. This

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should not be a restriction. These algaecides add dissolved oxygen to the water column as they work. With peroxide chemistries this is merely a recommendation to the applicator- to be cognizant of dissolved oxygen levels when treating shallow ponds (less than 4 feet) with extreme bloom conditions. Treating ½ the body of water and then waiting 2 days to treat the other half would, in most circumstances, exacerbate the problem and create more work, and algae. Algae growth is exponent, and will outpace the treatments if not taken care of properly. This restriction limits applicators ability to treat algae and is a potential health hazard when dealing with cyanobacteria blooms. Many professional applicators specifically use peroxide based algaecides to treat entire water bodies to effectively control algae, confident that treatments will be not only efficacious, but safe.

In conclusion, the increased restrictions outlined will negatively impact the ability of licensed applicators in multiple facets of the aquatic industry to apply these algaecides with optimal efficacy in efforts to improve overall water quality.

Thanks you in advance for taking these comments into consideration for the proposed changes to the current CA NPDES Permit changes in reference to the use of products containing the actives hydrogen peroxide, peroxyacetic acid, and Sodium Carbonate Peroxyhydrate. It is recommended that the US-EPA and CA-DPR approved label application practices not be changed or be additionally restricted.

Sincerely,

**CLEAN LAKES, INC.**



Thomas J. McNabb  
President, CA-DPR Licensed Pest Control Adviser  
[tmcnabb@cleanlake.com](mailto:tmcnabb@cleanlake.com)

References:

1. Boulos, Noel and Samuel Moore. "The Use of PAKTM27 for Algae Control in Surface Waters: A Literature Review and Case Study." Unpublished study. Undated.
2. Kay, S.H., P.C. Quimby, Jr., and J.D. Ouzts, 1984. Photo-enhancement of hydrogen peroxide toxicity to submersed vascular plants and algae. *Journal of Aquatic Plant Management* 22: 25-34.
3. MA DEP, 2010. GreenClean Product Evaluation and Recommendation. Massachusetts Department of Environmental Protection, October 2010
4. Quimby, P.C. Jr., and S.H. Kay. Sodium Carbonate Peroxyhydrate as a new algaecide. Abstract of the Meeting of the Weed Science Society of America. 1984.
5. BioSafe Systems. 2015. Rate of Decomposition of Active Ingredients of GreenClean Liquid 2.0 on Algae Solutions.

**P. O. Box 3186, Martinez, California 94553-Phone: 925-957-1905 Fax: 925-957-1906**

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