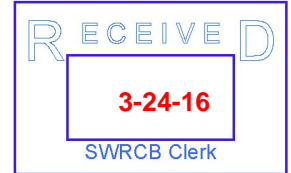




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March 24, 2016

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:

On behalf of BioSafe Systems, LLC, I would like to comment 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 of users in many industries to apply these algaecides with optimal efficacy in efforts to improve the overall water quality. These proposed changes recommended by the SWRCB will have negative impacts to the applicators (water agencies or commercial applicators), users of the site (municipal, recreational, navigation), homeowners (property values) and the environment.

These products have undergone US EPA review and approval, and they are currently approved for use by SWRCB. Sodium carbonate peroxyhydrate has been registered for aquatic use since early 2006, and hydrogen peroxide and peroxyacetic acid since 2002. These products are a softer option to other chemistries used in the industry. 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. The proposed restrictions will undoubtedly have a negative impact on the applicators ultimate goal of using good integrated pest management (IPM) and having multiple "tools" to address their ever-changing needs. Imposing restrictions on the use of peroxide-based algaecides will result in a reduction in the application of these products, forcing applicators to choose chemistries which bioaccumulate in the environment or have mutational resistance issues.

The rate of degradation of hydrogen peroxide (H₂O₂; 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 H₂O₂ 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 H₂O₂ 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) has demonstrated rapid dissipation of residual H₂O₂ levels over time and mostly undetectable by 24 hrs after treatment
- D. Studies conducted by Quimby and Kay (Quimby and Kay, 1984) has shown that an application of 3 ppm H₂O₂ 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 H₂O₂ (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).
- F. In-house bench scale study conducted by BioSafe Systems with GreenClean Liquid 2.0 show that the half-life of active ingredients (Hydrogen Peroxide and Peroxyacetic Acid) was < 24 hrs when added to algae infested water (BioSafe Systems, 2015).

These 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 H₂O₂ in the presence of algae and organic matter supports the fact that the exposure of non-target species to toxic levels of H₂O₂ is highly unlikely.

Restrictions (2 & 3) – In regards to the new permit language which is recommended to be withdrawn – *“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.”*

(2) - 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.

(3) - do not apply products containing these active ingredients when juvenile fish and amphibians are present.

When used according to the labeled directions for use, no adverse effects to aquatic organisms are expected. The label contains the statement “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 organic l 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.

efforts to improve the overall water quality. These proposed changes recommended by the SWRCB will indirectly have undesirable impacts to the environment by the way of forcing applicators to use less of these effective peroxide based algaecides, that leave no residue, and using more of other algaecides that are not only known toxicants to aquatic life, but also have a persistent residual left after they are finished with their given algaecidal purpose.

Please take 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. Due to the comments in this document it is strongly urged that the currently allowed label application practices not be changed or be additionally restricted.

References:

1. Boulos, Noel and Samuel Moore. "The Use of PAK™27 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.

Sincerely,



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