



Department of Pesticide Regulation



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MEMORANDUM

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Environmental
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TO: Susan McCarthy, Registration Specialist
Pesticide Registration Branch **HSM 00012**

FROM: Michael H. Dong, Ph.D., CNS, DABT, Staff Toxicologist
Worker Health and Safety Branch **[original signed by M Dong]**
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DATE: March 1, 2000

SUBJECT: CALCULATION OF SODIUM TETRABORATE PENTAHYDRATE (STP)
CONCENTRATION IN POOL WATER

Super Puck (EPA Reg. No. 5185-460) and Synergy Tabs (EPA Reg. No. 5185-435) are both borate products manufactured by Bio-Lab, Inc. Both products are for use in floaters, automatic type feeders, or skimmers to provide pool water sanitation. The borate active ingredient in Super Puck consists of 6.8% (by weight) boron sodium oxide pentahydrate (BSOP) whereas that in Synergy Tabs, of 5.0% disodium baborate pentahydrate (DBP). The DBP and BSOP active ingredients are actually the same material and synonymous for sodium tetraborate pentahydrate (STP). Below is the clarification as well as the justification for the pool water levels of STP calculated for using the two borate sanitation products.

According to the review by Formoli (1997a), the refilling of the Synergy Tabs tablets, each weighing 14 grams, was assumed to occur *once every week*. Thus based on the label rate of 11 tablets per 10,000 gallons of pool water per week, the STP concentration would be 21.1 mg/L [= (11 tablets/week) x (14 grams/tablet) x (104 weeks) x (5.0% STP by weight) x (1000 mg/gram) x (10,000 gallons)⁻¹ x (1 gallon/3.79 liters)] for two years (i.e., 104 weeks) with no significant removal of STP through filtration. Using the swimmer exposure assessment model developed by the U.S. Environmental Protection Agency, as illustrated in the review, Formoli calculated the boron equivalent absorbed daily dosage (ADD) to be 0.58 mg/day for a competitive child swimmer. In that review, Formoli also used available literature data to support an interim default *total* boron tolerance level of 1 to 1.5 mg/day for children. The literature data included a tolerance level of 1 mg/L used by the U.S. Department of Interior for boron in drinking water, and a 1973 report by the World Health Organization showing that a typical school lunch would provide approximately 0.5 mg boron. The ADD of 0.58 mg/day calculated above was hence considered to be marginally acceptable, in that a six-year old child (who on average consumes less than 1 liter of drinking water per day) could take in additional boron present in food, hand soaps, pharmaceuticals, and other sources (other than from swimming in a treated pool).

The STP concentration in pool water treated with Super Puck (as well as with Prolong Service Tablets, the same product under a different trade name) was also calculated in a subsequent review by Formoli (1997b). Based on the maximum label rate of 2 oz of the product per 10,000 gallons of pool water, which can be applied *daily*, the STP concentration would be 74.1 mg/L = [(2 oz/day) x (28.3 grams/oz per net contents specified on the label) x (730 days) x (6.8% STP by weight) x (10,000 gallons)⁻¹] for two years (i.e., 730 days) with no significant removal of STP through filtration. This STP (synonymous with DBP or BSOP) concentration of 74.1 mg/L is 3.5-fold greater than that (21.1 mg/L) calculated above for using Synergy Tabs.



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Accordingly, the ADD of boron would increase 3.5-fold to 2.0 mg/day for a competitive child swimming in a pool that has been treated with Super Puck daily for two years. As state above, the interim default *total* boron tolerance level was less than 1.5 mg/day for children. It is important to note that by *total* boron tolerance level, it means for intakes of boron from all exposure sources, not just from swimming in a treated pool. Even when the pool has been treated with Super Puck daily for just *one* year, the ADD for the child would be 1.0 mg/day from this exposure path alone.

References

Formoli TA, 1997a. *Document Review Memo: Review for Insignificant Human Exposure (for Synergy Tabs)*. Worker Health and Safety Branch, Cal/EPA Department of Pesticide Regulation, dated May 19.

Formoli TA, 1997b. *Document Review Memo: Review for Insignificant Human Exposure (for Super Puck and Prolong Service Tablets)*. Worker Health and Safety Branch, Cal/EPA Department of Pesticide Regulation, dated November 18.

cc: Charles M. Andrews
Tareq A. Formoli