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May 16, 2011

Danny McClure
Water Resources Control Engineer
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive #200
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Via: Email to dmccclure@waterboards.ca.gov

SUBJECT: Draft Cypermethrin Criteria Derivation

Dear Mr. McClure:

The Sacramento Regional County Sanitation District (SRCS D) appreciates the opportunity to comment on the Cypermethrin Criteria Derivation (draft criteria) developed by the University of California, Davis (UCD). SRCS D owns and operates the Sacramento Regional Wastewater Treatment Plant (SRWTP), and provides wastewater collection, conveyance and treatment services to over 1.3 million residents and thousands of commercial and industrial customers in the Sacramento region. Our mission is to protect human health and the environment by keeping the Sacramento River clean and safe. We take our mission very seriously and work on a daily basis to meet our obligations to protect water quality and beneficial uses in the River and Delta. Our excellent compliance record with our National Pollutant Discharge Elimination System (NPDES) permit speaks to this commitment and performance.

SRCS D has technical and regulatory concerns with the draft acute/chronic criteria. Our primary concern with the exceedingly overly protective draft criteria directly relates to our ability to maintain our excellent compliance record should the Central Valley Regional Water Quality Control Board (Regional Board) staff use these draft criteria to interpret narrative objectives in the Sacramento-San Joaquin Basin Plan. Additionally, SRCS D has technical concerns with how the draft acute/chronic criteria were derived. Following are SRCS D's concerns regarding use of draft criteria to interpret narrative water quality objectives based on technical issues with the derivation of the draft criteria.

Concerns with Use of Draft Criteria to Interpret Narrative Water Quality Objectives

SRCS D is concerned with the Regional Board's proposed use of the draft criteria to interpret narrative water quality objectives. The specific concern is the Regional Board's potential use of the criteria to set water quality based effluent limitations in NPDES permits, as it will create liability for SRCS D.

Considering the liability associated with complying with such effluent limitations, the Regional Board should take care in using only criteria that are well-developed and well-founded. As indicated above, the draft criteria for cypermethrin are likely overly-protective, thereby creating unnecessary liability for wastewater dischargers. Effluent limitation violations may subject dischargers to the Regional Board's discretionary administrative civil liability authority, mandatory minimum penalties, or to third party lawsuits brought under the Clean Water Act's citizen suit enforcement provisions. (See 33 U.S.C. § 505.)

SRCSD is concerned with the use of the draft criteria to interpret narrative objectives as it creates de facto water quality objectives that have not been adopted in accordance with the law. Under Porter-Cologne Water Quality Control Act (Porter-Cologne), the Regional Board is required to regulate water quality in a manner that attains the highest level of water quality which is reasonable, considering all demands being made and to be made on those waters. (See Wat. Code, § 13000.)

Further, water quality objectives are supposed to be established to ensure reasonable protection of beneficial uses, considering a number of different factors. The factors that must be considered include: past, present and probable future beneficial uses; environmental characteristics of the hydrographic unit under consideration, including the quality of water; water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area; economic considerations; the need for developing housing; and the need to develop and use recycled water. (Wat. Code, § 13241.)

Also, the Regional Board is required to adopt a program of implementation for achieving water quality objectives at the time of adoption. (See Wat. Code, § 13242.) In other words, when adopting water quality objectives, the Regional Board must determine if the objective is necessary to provide for reasonable protection of the beneficial uses, and the Regional Board must balance all of the competing demands on the water and consider the economic implications associated with adoption of water quality objectives. SRCSD respectfully requests that the Regional Board refrain from using the draft criteria for cypermethrin until the criteria are properly adopted as water quality objectives pursuant to all requirements in Porter-Cologne.

Concerns with Derivation of the Draft Criteria

As confirmed by UCD, the main problems with cypermethrin criteria development are the lack of good toxicity data. Because the necessary toxicity studies are insufficient to use standard EPA methodology to develop the criteria, the draft criteria were developed based on unique criteria derivation techniques.

Draft chronic water quality criteria (WQC) derived for the Regional Board were typically calculated by dividing the median 5th percentile of the acute toxicity data by an acute-to-chronic ratio (ACR) developed from paired acute and chronic toxicity values in the dataset when a species sensitivity distribution was unavailable. In the case of cypermethrin, the median 1st percentile (50% confidence limit) of the acute toxicity data was divided by the ACR of 949. This ACR is significantly greater than ACR values developed for five other pyrethroids which ranged from 4.73 to 12.4 (the default value). Thus, the criteria developed for cypermethrin is 10 times overly-protective than the ones developed for other pyrethroids. The draft WQC authors recognized this outlier when stating that the high ACR "*made us suspicious of the extremely large cypermethrin SMACR for Daphnia magna...*" The cypermethrin ACR of 949 is suspect for several reasons. The cypermethrin ACR for *Daphnia* is

much greater than the ACRs for two other species, one copepod and one fish, were 2.1 and 2.3, respectively. It is also based on a single study (Kim et al. 2008) where there is uncertainty in the reported concentrations from this study that were based on nominal concentrations rather than measured values, the lack of reporting control data, and the failure to report the statistical methods upon which significant differences were based. Data presented by Kim et al. (2008) also show interrupted dose responses for several endpoints, which are an indication that the data should be interpreted with caution (USEPA 2000). The environmental relevance of the reproductive endpoint (young per female over 21 days for <24-hour neonates) for *Daphnia* is also questionable when Kim et al. (2008) noted that the population would not decrease at any of the tested concentrations (up to 200 ng/L) due to positive rates of intrinsic growth.

Furthermore, it is not clear why the acute data from Kim et al. (2008) were determined to be unusable for calculating an acute toxicity criteria based on the lack of a control response description and low reliability score (Table 5) when one of these same acute data (0.0006 ug/L) was used in the calculation of the *Daphnia* ACR of 949 (Table 8).

Given the highly conservative and uncertain nature of the draft cypermethrin chronic WQC, the usefulness of the chronic criteria is extremely questionable and should not be used for compliance purposes. SRCSD agrees that future criteria updates should be done as soon as additional information, such as enough data for a species sensitivity distribution or updated ACR for an aquatic invertebrate, becomes available that can reduce this uncertainty.

SRCSD support the authors' recommendation that "*the freely dissolved fraction of cypermethrin be directly measured or calculated based on site specific information for compliance assessment.*" This conclusion was based on multiple study findings "*that the freely dissolved concentration will be the most accurate predictor of toxicity and that bound cypermethrin was unavailable to the organisms that were studied.*" SRCSD does not find it scientifically defensible to use whole water concentrations for criteria compliance assessment and does not agree with the recommendation to use whole water concentrations for criteria compliance assessment at the discretion of the environmental managers; however, total concentrations could be an indicator of where additional information is needed to determine if there is a potential risk to the aquatic community from cypermethrin.

Because of the lack of confidence in these draft WQC (based on chronic data without measured concentrations, lack of a species sensitivity distribution, based on whole water concentrations when the dissolved phase determines toxicity, fewer species data than recommended by both the EPA [1985] and Tenbrook et al. [2009] methods), and over-protectiveness of the proposed values, SRCSD does not support their use by the Regional Board as a water quality objective (WQO) until there is a better understanding of fate and transport, chronic toxicity, and affects of dissolved solids and suspended particles that can be accounted for in an empirical model. The suggested WQC may be useful as risk screening values and concentrations above them could be evaluated further for possible environmental relevance, but the proposed water quality criteria are insufficiently supported to support the regulatory weight associated with WQO.

On page 10, the text notes "*Bondarenko & Gan (2009) report a method detection limits of 2.0 ng/L for cypermethrin, which is below the acute criterion and identical to the chronic criterion, although method detection limits vary between laboratories.*" The statement is incorrect as the chronic criterion for cypermethrin was calculated at 0.003 ng/L, not 2.0 ng/L. Additionally, the acute criterion is 1.0 ng/L. Both of these are below the referenced method detection limit of 2.0 ng/L. Please revise the

text relative to the correct criteria developed for cypermethrin and indicate the implications of draft WQC below available detection limits, as discussed below.

The resulting draft criteria (0.003 and 1 ng/L acute and chronic, respectively) create a number of problematic analytical issues. Both criteria are below reporting limits and detection limits for most, if not all, labs (in clean matrices such as deionized water). Although not recognized in the draft criteria document, analytical quantitation limits have an impact on the ability of dischargers to achieve compliance with effluent limitations and receiving water limits. Moreover, the ability to detect concentrations below one ppt (less than one ng/L) in a complex matrix such as effluent is even more challenging than detecting these low concentrations in a clean matrix. In fact, because of the challenges, detections below one ppt have yet to be demonstrated. Currently, one ppt detection limits are the goal of California organizations evaluating pyrethroids (i.e., DPR, TriTAC, and the Pyrethroid Working Group [PWG]).

Further, the lack of a standard EPA methodology for analyzing pyrethroids may also pose a problem for pyrethroid analyses. For example, the academic lab of Dr. Mike Lydy (Southern Illinois University) claims one of the lowest reporting limits (3 ng/L) for pyrethroids, yet it is still 1000 times higher than the suggested chronic criterion in the draft criteria. Questions have been raised about the possibility of interferences or false positive identifications without confirmation by other methods. To achieve such low reporting limits, Dr. Lydy must perform multiple clean-up steps that are not available or commonly performed by commercial labs, and samples are concentrated 20,000 times (1,000x is normal). These extreme steps in non-standard methods can have an unknown effect on analytical precision and accuracy.

Authors of the draft criteria note that the dietary pathway for chronic exposure from cypermethrin may be an important exposure route but that it is not currently possible to incorporate this exposure route into criteria compliance assessment. SRCSD agrees that future criteria updates should consider this pathway and be done as soon as additional information becomes available.

Because of the lack of confidence in the chronic criterion, and over-protectiveness of the proposed value, SRCSD cannot support their use by the Regional Board until there is a better understanding of fate and transport, chronic toxicity, and affects of dissolved solids and suspended particles that can be accounted for in an empirical model. Therefore, SRCSD requests that the Regional Board refrain from using the draft criteria for cypermethrin until more research is completed and the criteria are properly adopted as water quality objectives.

Thank you for your considerations. Please contact me at (916) 876-6030 or dornl@sacsewer.com if you have any questions.

Sincerely,



Linda Dorn
Environmental Program Manager

cc: Stan Dean, District Engineer,
Prabhakar Somavarapu, Director of Policy and Planning
Terrie Mitchell, Legislative and Regulatory Affairs, Manager
Debbie Webster, CVCWA, Executive Officer