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February 18, 2010

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SUBJECT: Draft Lambda-Cyhalothrin Criteria Derivation

Dear Mr. McClure:

The Sacramento Regional County Sanitation District (SRCS D) appreciates the opportunity to comment on the *Lambda-Cyhalothrin 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.

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SRCS D has technical and regulatory concerns with the draft acute/chronic criterion. Our primary concern with the overly protective draft criteria directly relates to our ability to maintain our excellent compliance record should the Central Valley Regional Water Quality Control (Regional Board) staff use this draft criterion 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.

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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 in our comments below, the draft criteria for lambda-cyhalothrin are most 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 CWA's citizen suit enforcement provisions. (See 33 U.S.C. § 505.)

SRCSO 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. SRCSO respectfully requests that the Regional Board refrain from using the draft criteria for lambda-cyhalothrin until the criteria are properly adopted as water quality objectives pursuant to all requirements in Porter-Cologne and the following technical issues are addressed.

Concerns with Draft Criteria as Derived

As confirmed by UCD, the main problems with lambda-cyhalothrin 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. Minimal acute toxicity data were used to develop an acute criterion of 1 ng/L. A factor of 2 was applied to the 5th percentile LC50 to achieve this draft acute criterion because of the sparse data set, including the few taxa in the species-sensitivity distribution.

The suggested chronic criterion (1 ng/L) was derived using the paired acute-to-chronic (ACR) toxicity data from three species, yielding a low ACR of 4.73. The chronic value is documented as being somewhat conservative. It is a factor of 2.6 below the lowest acceptable chronic toxicity value in the dataset (waterborne exposure) and one to two orders of magnitude below any of the estimated NOEC values based on bioaccumulation to wildlife or humans (oral exposure route). The resulting draft criteria (1 ng/L for acute and chronic) create a number of problematic analytical issues for SRCSO. Both criteria are below or at the reporting limits and detection limits for most, if not all, labs (in clean matrix such as deionized water). Although not recognized in the draft criteria document, analytical quantitation limits have an impact on the ability of SRCSO achieving

lambda-cyhalothrin are most 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 CWA's citizen suit enforcement provisions. (See 33 U.S.C. § 505.)

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compliance with effluent limitations and receiving water limits derived from the draft criteria. 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 (University of Southern Illinois) claims one of the lowest reporting limits (3 ng/L) for pyrethroids, yet it is still 3 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 have an unknown effect on analytical precision and accuracy.

Below are bulleted specific concerns and suggestions with the Draft Criteria as derived:

- The draft criteria were based on limited data and the authors recommend that the criteria be based on measurements in whole water, even though the literature suggests strong and highly variable interactions with suspended particulates and lambda-cyhalothrin concentrations in the dissolved phase. As a result, the authors recognize that the suggested criteria are likely to be overprotective and that the criteria should be revised when more, and appropriate, toxicity data become available. Several factors that reduce the toxicity of lambda-cyhalothrin were determined to be important for understanding the bioavailable fraction, and should be included in site specific lambda-cyhalothrin criteria.
 - Dietary exposures produced higher NOEC values (reduced toxicity) than a direct, topical exposure route, and were one to two orders of magnitude higher than the chronic exposure criterion. This could be due lambda-cyhalothrin stuck to organic matter in contaminated food is not bioavailable. Nevertheless, the authors concluded that while dietary exposure is important in estimating true toxicity of lambda-cyhalothrin, it was not possible to incorporate dietary exposure into the criteria derivations.
 - Suspended solids and sediments in the tests greatly reduced toxicity and data indicate that toxicity is from the freely-dissolved fraction. The authors concluded that bioavailability has to be estimated based on dissolved phase measurements or from calculations and that detailed site-specific data on suspended sediments and organic fractions is essential for estimating lambda-cyhalothrin toxicity in natural waters. However, this site-specific requirement for water quality factors affecting toxicity is not considered by adopting fixed values for acute and chronic criteria.
 - Turbidity, TSS, DOC, and chlorophyll-a (another measure of particulate organic matter) are recognized as factors that reduce the bioavailability and toxicity of lambda-cyhalothrin in surface water. In fact, the best way to determine compliance with criteria would be to measure the dissolved phase (bioavailable) concentration. However, it is concluded that these known factors cannot be used in the application of criteria because they are not available for to

multiple-species and would not meet the criteria for toxicity data. The number of species-test combinations this document assumes is required to develop criteria that include a model parameter for particulate matter and/or DOC should not be the sole basis for excluding this important variable. Draft criteria should be developed with and without these modeled factors, based on available data, so that the CVRWQCB and regulated community may evaluate the options and determine the best possible criteria to meet all objectives. Alternatively, this information should be added to Section 17: Assumptions, Limitations, and Uncertainties.

- Temperature is an important factor in determining pyrethroid toxicity and should be included in a model for determining the lambda-cyhalothrin criteria. Pyrethroid toxicity increases at lower temperatures when enzymes break down these chemicals more slowly.
- The draft criteria should include the sediment organic carbon to water partitioning coefficient (K_{oc}), which is of interest for the fraction sorbed to sediments, and in addition to the K_{ow}, accounts for the partitioning to sediments and suspended solids.
- It would be helpful understanding the degradation of lambda-cyhalothrin in sediments by including half-life for degradation rates in sediments in Table 2. This is relevant since much of the surface water pyrethroid will partition to sediments due to the high K_{ow} (7.0 at 20 degrees C), and be degraded there.
- Figure 3 shows one interpretation of acute toxicity data for lambda-cyhalothrin (the Burr III-type), but the regression is extrapolated over an order of magnitude less than the lowest data point. There is great uncertainty when extrapolating beyond the ranges of data. It would be very helpful to add confidence intervals onto Figure 3 to more accurately describe these extrapolations.
- The regression estimate for concentrations below 0.01 ug/L (10 ppb) may not accurately describe these data, which appear to have a dose response that drops more steeply than the Burr III-type regression estimate depicts (Figure 3). Alternative regression models, such as those used by the USEPA method for estimating the 5th percentile, should be evaluated and the one that best fits the data should be recommended for use. The USEPA method recognizes that results for insensitive species have little relevance on estimating criteria to protect sensitive species, has the added advantages of making fewer assumptions about the underlying distribution, and thus avoids potential problems of multimodality and outliers. Either changing the curve shape or limiting the data to the most sensitive species without assumptions about distribution of the data would probably raise the 5th percentile LC50 value to more closely approximate the available data.
- The statement that "...equilibrium partitioning would suggest that as organisms take up lambda-cyhalothrin, more lambda-cyhalothrin will desorb from particles, so the fraction absorbed to solids is likely not completely unavailable." [page 9] is misleading. If the dissolved and particulate bound fractions of lambda-cyhalothrin are in a steady state, then the surface water concentrations would remain constant for reasons stated in the draft criteria. Because dissolved concentrations would be constant there is added confidence that they indicate the true bioavailable fraction, even though the bound fraction may decrease to maintain equilibrium. It is suggested that this sentence is removed from the document.
- Estimated acute toxicity values for species similar to local, listed species of fish yielded toxicity values of several orders of magnitude higher than the suggested chronic criterion. Therefore, these criteria are overly protective of fish.

In general, the selected chronic criterion and supportive information were either lacking or over-protective. Further supportive data were inconclusive or unavailable on the effects of pesticide mixtures, temperature effects for freshwater organisms, and the effects on the most sensitive species. Epibenthic invertebrates (e.g., *H. azteca*) are the most sensitive model species for toxicity tests with pyrethroids but chronic tests with this sensitive species were lacking.

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 lambda-cyhalothrin 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 if you have any questions.

Sincerely,



Linda Dorn
Environmental Program Manager

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