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Comments on Draft Diazinon TMDL Problem Statement for the Chollas Creek watershed

Kristin Schwall
San Diego Regional Water Quality Control Board
9771 Clairemont Mesa Blvd., Suite A
San Diego, CA 92124

Dear Kristin,

Following up on the Urban Pesticide Committee Meeting where you presented a discussion of the August 3, 1999 draft TMDL for diazinon caused aquatic life toxicity Problem Statement for the Chollas Creek watershed, in which you asked for comments on this draft, I wish to provide the attached comments.

I find that this Problem Statement makes considerable assumptions about the water quality significance of the diazinon caused *Ceriodaphnia* toxicity. As discussed in the attached finding *Ceriodaphnia* toxicity in urban stormwater runoff that is caused by OP pesticides such as diazinon should not be assumed to represent a significant beneficial use impairment of an urban creek or a marine bay into which the creek discharges. I have been studying these issues in Orange County California, San Diego Creek, and Upper Newport Bay over the past three years. During this time we have conducted over 130 toxicity tests of the creek and bay waters. While there is readily measured toxicity in the stormwater runoff present in the creek which persists for a short distance in the bay, there is considerable uncertainty as to whether this toxicity is significantly adverse to the creek and bay water's beneficial uses.

A summary of the issues that should be considered in evaluating the water quality significance of OP pesticide caused *Ceriodaphnia* toxicity is discussed in a paper that we presented at the ASTM conference that was held in Seattle last April. This paper "Evaluation of the Water Quality Significance of OP Pesticide Toxicity in Tributaries of Upper Newport Bay, Orange County, CA" is available from our website, www.gfredlee.com, in the Pesticide section. Also available at this site are other papers and reports devoted to this issue.

If you or others have questions or comments on these comments, please contact me. If you wish assistance in helping to formulate a proper Problem Statement for the *Ceriodaphnia* toxicity found in stormwater runoff in Chollas Creek, please let me know.

Sincerely yours,

Fred

G. Fred Lee, PhD, DEE

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**Water Quality and Solid & Hazardous Waste Landfills
Evaluation and Management**

<http://www.gfredlee.com>

Dr. G. Fred Lee and Dr. Anne Jones-Lee have prepared professional papers and reports on the various areas in which they are active in research and consulting including domestic water supply water quality, water and wastewater treatment, water pollution control, and the evaluation and management of the impacts of solid and hazardous wastes. Publications are available in the following areas:

- Landfills and Groundwater Quality Protection
- Water Quality Evaluation and Management for Wastewater Discharges, Stormwater Runoff, Ambient Waters and Pesticide Water Quality Management Issues
- State Stormwater Quality Task Force Activities
- Impact of Hazardous Chemicals -- Superfund, LEHR Superfund Site Reports
- Contaminated Sediment -- Aquafund, BPTCP
- Domestic Water Supply Water Quality
- Excessive Fertilization/Eutrophication
- Reuse of Reclaimed Wastewaters
- Watershed Based Water Quality Management Programs:
Sacramento River Watershed Program,
Delta -- CALFED Program, and

Stormwater Runoff Water Quality Science/Engineering Newsletter

**Comments on the California Regional Water Quality Control Board, San Diego Region
“Total Maximum Daily Load for Chollas Creek Watershed” Draft Problem Statement Dated
August 3, 1999**

**Submitted by
G. Fred Lee, PhD, DEE
G. Fred Lee & Associates
El Macero, California**

September, 1999

On August 3, 1999 the San Diego Regional Water Quality Control Board (SDRWQCB) issued for public review a draft problem statement covering the development of total maximum daily loads (TMDL) for diazinon-caused aquatic life toxicity in the Chollas Creek watershed. Presented below are comments on this draft problem statement for the diazinon TMDL.

In the section “What is the problem?” mention is made that stormwater runoff in Chollas Creek has been found to be toxic to *Ceriodaphnia*. This toxicity has been found to be a violation of the SDRWQCB Basin Plan objectives of there being no toxics present in toxic amounts. In the first paragraph under “What is the problem?” in the seventh line, the statement, “...in the storm water indicates adverse affects....,” add the word “potential” before “adverse.” A laboratory measurement of *Ceriodaphnia* toxicity that is related to diazinon as its cause is an indication of potential adverse effects that requires further investigation to assess whether this toxicity is in fact adverse to Chollas Creek and/or the beneficial uses of San Diego Bay, which receives the Chollas Creek stormwater runoff. In that same sentence the word “possibly” should be inserted between “is” and “not.” It should read, “...the Basin Plan for Chollas Creek is possibly not fully protected.” These changes more properly reflect the current understanding of the impacts of diazinon caused aquatic life toxicity.

In the third paragraph under “What is the problem?” the second line uses the word “pollutant. A pollutant, in accord with Porter Cologne’s definition, is a substance that impairs the beneficial use of a waterbody. Diazinon has not been found to impair beneficial uses. In fact, there is considerable justification to question whether diazinon-caused *Ceriodaphnia* toxicity is an impairment of beneficial uses. The word “pollutant” should be changed to “constituent.”

The same problem occurs in “The Chollas Creek Watershed” section, where it is stated on the second line of the third page, “...causing violations of the toxicity water quality objective and adverse affects

to the warm water habitat beneficial use.” The presence of *Ceriodaphnia* toxicity does violate the SDRWQCB Basin Plan objective of no toxic in toxic amounts. The statement, however, that this is adverse to the warm water habitat beneficial uses has not been demonstrated and may not be the case.

The first paragraph on Page 4 under “Toxicity Identification Evaluation (TIE)” mentions in mid-paragraph that “...(the purple sea urchin *Strongylocentrotus purpuratus*)” has been found to provide a toxic response which is apparently related to zinc in the stormwater runoff in Chollas Creek. Caution should be exercised in using the purple sea urchin fertilization test as a measure of aquatic life toxicity that has any significance to the beneficial uses of a waterbody. This test has been known for many years to provide a significant number of false positives, where “toxicity-impaired reproduction” is found under laboratory conditions. It is not supported by field observations or the characteristics of the waterbody. The purple sea urchin test is a cheap readily conducted test that has limited utility in defining real significant water quality use impairments. Great caution should be exercised in using the results of this test as a basis for requiring that the public be forced to spend a substantial amount of money controlling the input of zinc in stormwater runoff to Chollas Creek based on the fact that there is a “toxic response” in the purple sea urchin fertilization test using Chollas Creek water that has had the salinity adjusted to marine salt conditions.

Appended to the August 3rd statement is a draft Numeric Target statement, in which the Regional Board proposes to use the California Department of Fish and Game diazinon water quality criterion that was developed in 1994. There are several aspects of this criterion that need to be understood. First, while the California Department of Fish and Game staff claims that they followed US EPA protocol for developing these criterion, in fact they did not with respect to the development of an appropriate chronic criterion. The US EPA has been attempting to develop an acute and chronic criterion for diazinon for a number of years. Finally they have concluded that, while they can develop an acute criterion, at this time they cannot follow the procedures that they have developed for developing a chronic criterion because of the high variability that they are finding in the acute chronic ratio. This situation has caused the US EPA to delay the promulgation of a water quality criteria for diazinon.

The second aspect of the Department of Fish and Game diazinon criterion is that the SDRWQCB proposed to use the acute and chronic criterion developed by the Department of Fish and Game where the averaging period for the acute criterion of 80 ng/L is to be one hour with any exceedance of that criterion more than once every three years representing a violation of the NPDES permit. With respect to the chronic water quality criterion, the Regional Board proposed to use a four day average 40 ng/L value where an exceedance of this value more than once every three years represents a violation of the chronic criterion. For the acute they are proposing that if any one sample is collected during the time period associated with the numeric target (one hour average or four day average) a single measurement shall be used to determine attainment of the numeric target for the entire period. The one hour average and the four day average values are used to implement US EPA water quality criteria into state standards, in California, water quality objectives, are highly overly protective of many forms of aquatic life in a number of different situations. The allowing of only one exceedance every three years is also grossly over-protective for aquatic life in many situations. There is no question that this regulatory approach will almost certainly over-

regulate OP pesticide-diazinon-caused aquatic life toxicity.

An equally important issue is that of what does it mean to kill *Ceriodaphnia* in a stormwater runoff event in Chollas Creek to the beneficial uses of the Creek and/or San Diego Bay. With respect to the Bay, there are significant questions about this situation, especially in light of the fact that the Chollas Creek stormwater runoff is non-toxic to *Americamysis bahia* (*Mysidopsis bahia*). In order for the laboratory based toxicity to *Ceriodaphnia* to be a reliable indicator of impaired beneficial uses it is necessary to demonstrate that the killing of *Ceriodaphnia* or other zooplankters with similar sensitivities to OP pesticide toxicity significantly adversely affects higher trophic level organisms, such as fish.

From the information available, *Ceriodaphnia* is among the most sensitive organisms known to diazinon toxicity. Diazinon, at the concentrations being found, is not toxic to fish larvae and to many other forms of zooplankton. It is possible that a toxic response by *Ceriodaphnia* under laboratory test conditions could represent an insignificant impact on the designated beneficial uses of waterbodies of concern to the public. If this TMDL is adopted, it could mean that diazinon would no longer be available to the public to control such pests as termites and ants. This would mean that another pesticide, which could be significantly adverse to the environment, would be substituted. At this time there is no regulatory requirement for screening alternative pest control methods for environmental impact.

Another factor that needs to be considered is the duration of exposure that sensitive zooplankton present in Chollas Creek could receive in a stormwater runoff event compared to the critical diazinon concentration duration of exposure relationships. The toxicity test used often greatly exaggerate the exposure that can occur under environmental conditions compared to the critical exposure that is needed to be adverse to *Ceriodaphnia*.

C. Fox, US EPA Assistant Administrator for Water, in a letter of May 17, 1999, a copy of which is appended to this report, has made it clear that urban and rural stormwater runoff aquatic life toxicity that is due to pesticides will be regulated based on US EPA Office of Pesticide Program requirements of no significant toxicity that effects the beneficial uses of a waterbody, rather than the Clean Water Act requirements of no toxic in toxic amounts. The San Diego Regional Water Quality Control Board should critically examine its proposed approach for regulating diazinon-caused aquatic life toxicity and adopt TMDL goals that range from the California Department of Fish and Game acute water quality criterion for diazinon through no significant toxicity that impairs the beneficial uses of Chollas Creek and San Diego Bay.

If there are questions about these comments, please contact me.