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**UCD Report on Low Level Mercury Analysis of LEHR Superfund Site Stormwater Runoff**

Julie Roth, Executive Director
DSCSOC

Julie,

I have reviewed the belated report dated April 15, 2004, provided by UCD (Brian Oatman) on the low-level mercury analysis. Based on this review, I have several comments on issues that need to be more adequately addressed.

In the letter, page 1, item 1, mention is made of the California Toxics Rule standard of 50 ng/L for mercury. As I indicated in previous correspondence on this matter,

> Lee, G. F., "Regulating Mercury in the Water Column and Sediments," Report to Dredge Tailings Workgroup, by G. Fred Lee & Associates, El Macero, CA (2003). http://www.gfredlee.com/TotalMercuryandDissolvedMercuryStandards-rev.pdf

which was forwarded by you to the RPMs, the CTR 50 ng/L mercury standard is not recognized as a protective standard that will prevent bioaccumulation of mercury in edible fish above US EPA recommended hazardous levels. Excerpts from this report is attached.

As discussed in the materials I previously provided on this situation, the US EPA, in adopting the 50 ng/L CTR mercury standard, made it clear that this was based on changing the approach that was being used to develop a mercury criterion, and not based on a risk assessment. It was further noted (see my note from Phil Woods of the US EPA Region 9) that in order to be protective against excessive bioaccumulation of mercury in edible fish, the concentrations of mercury in the water column need to be less than about 5 ng/L. From a Superfund site investigation and remediation perspective, the 5 ng/L value is more appropriate than the 50 ng/L value. If the 50 ng/L value is used, UCD/DOE could find themselves, in a few years when the US EPA finally promulgates the updated mercury criterion, having to find that much of the data that they have collected which had detection limits greater than about 5 ng/L is not appropriate to evaluate the potential for LEHR site stormwater runoff to contain mercury at hazardous levels.

With respect to item 2 in Mr. Oatman's letter regarding the concentrations of mercury found in stormwater runoff and other areas, what is found in other areas is not relevant to the situation. The other areas are not Superfund sites and therefore are not under regulatory investigation and remediation. While UCD states that the problem of high mercury in LEHR site stormwater runoff is a problem of the area – and it may be – this in no way relieves UCD and DOE of

responsibility for controlling mercury in runoff from the LEHR Superfund site at concentrations that are a threat to lead to excessive bioaccumulation in Putah Creek fish. Putah Creek is a water quality limited waterbody with respect to mercury. Clean Water Act implementation requires that any NPDES-permitted discharge above the existing (or what will become the US EPA proposed) water quality criterion be controlled.

Mr. Oatman makes the statement in the last paragraph on page 1,

> *"As discussed in previous meetings with the RPMs, the objective of this work was to evaluate the usefulness of the low-level mercury method and determine if low concentrations of mercury were present, but not detected by the standard method. UC Davis believes that the data satisfies this objective."*

Mr. Oatman's interpretation of the adequacy of this issue is inappropriate. He states on page 2 of his letter that the conventional analytical methods have detection limits between 39 and 64 ng/L. Obviously 64 ng/L is inadequate for current CTR criteria, and 39 ng/L is inadequate for eventual US EPA water quality criteria of a few ng/L.

Further, I find Mr. Oatman's statement about the detection limits for the conventional analytical methods for mercury in disagreement with Appendix D "Metals – Surface Waters" and "Metals – Stormwater" of the April 2004 draft Brown and Caldwell LEHR SCDS Annual Report 2003 – Metals. In this appendix, the CRDL for mercury is listed as 200 ng/L. It was this type of value that caused me to originally point out that UCD is using grossly inadequate analytical methods for mercury.

Mr. Oatman states that UCD plans to collect additional samples and "*… will make a recommendation for the method to be used for future stormwater sampling."* While collection of additional samples is appropriate, the recommendation that the current method is adequate is unacceptable. It does not have an adequate detection limit to detect mercury in stormwater runoff at concentrations that are contributing to the excessive mercury concentrations in Putah Creek that have caused Putah Creek to be listed as a 303(d) waterbody for excessive mercury in edible fish tissue.

With respect to the data presented for Low Level Mercury Sampling Results 2000-2003 in Mr. Oatman's letter, I have difficulty reconciling the mercury results presented in the December 2003 final annual monitoring report for the 2002 data, where in Appendix B mercury is listed as a CRDL of 0.2 µg/L and the LF-01 sample collected on 11-9-2002 had 549 µg/L. The Low Level mercury analysis for Nov/Dec 2002 was 58.2 ng/L.

Overall, UCD's handling of this matter has been inappropriate. This issue was originally pointed out by me when I saw the inadequacy of the stormwater monitoring work that UCD and DOE have been conducting since 1995. There is still need for the RPMs to require that UCD develop and conduct a credible stormwater runoff monitoring program from the LEHR site. If there are questions on these comments, please contact me.

Fred

Excerpts from

# Regulating Mercury in the Water Column and Sediments

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At the March 27, 2003, and July 9, 2003, meetings of the Dredge Tailings Workgroup, questions were raised regarding the regulation of mercury in the water column and sediments. With respect to the water quality standard (objective) for regulating mercury in the water column, about a year ago Dr. Anne Jones-Lee and I were subcontractors to a firm developing an SEIR for Cache Creek in-channel projects. In connection with this effort we developed the Water Quality chapter of the Yolo County Department of Public Works SEIR. This effort involved reviewing the water quality data that are available on Cache Creek that had been collected from the mid-1990s to date for the Cache Creek Improvement Project area – i.e., Capay Dam to I-5. Our review included a presentation and discussion of all of the data that the County and others had collected in this area during this period. Further, we reviewed the regulatory requirements governing water quality in Cache Creek that are applicable to the project area. Our chapter was included in the SEIR which was certified by the County Board of Supervisors.

In order to make this information available to others(i.e., to not have it buried in an SEIR which has limited availability), we developed a separate report on the Cache Creek water quality issues that we covered, which does not include the SEIR issues, but does include the water quality data and regulatory limits. This report,

> Lee, G. F. and Jones-Lee, A., "Review of Yolo County Lower Cache Creek Water Quality," Report of G. Fred Lee & Associates, El Macero, CA, September (2002),

is available from our website at www.gfredlee.com/CacheCreekwatqualrpt.pdf. Presented below are excerpts from this report that cover the mercury water quality criteria/standards/objectives issues that were discussed at Dredge Tailings Workgroup meetings.

## Excerpts from G. Fred Lee and Anne Jones-Lee, "Review of Yolo County Lower Cache Creek Water Quality," Report of G. Fred Lee & Associates, El Macero, CA, September (2002)

***Total Mercury and Dissolved Mercury:*** Mercury is one of the most important water quality parameters for Cache Creek. This importance arises from the fact that mercury can convert to methylmercury, which then bioaccumulates in fish tissue. Methylmercury is highly toxic to fetuses and young children, causing neurological damage. The CA DHS has established a mercury drinking water MCL of 0.002 mg/L.

The CVRWQCB does not have a water quality objective for mercury; however, the US EPA (1987) developed a water quality criterion for total recoverable mercury of 12 ng/L. The US EPA (2000c), as part of developing the California Toxics Rule, subsequently raised this criterion to 50 ng/L. The US EPA (Woods, 2000) has indicated, however, that this change does not represent a change in the level of significance of mercury in water, but a change related to how the Agency determines critical concentrations of mercury. Woods (2000) has indicated that the mercury criterion could be lowered to about 5 ng/L total recoverable mercury within a few years. This concentration represents a "worst case" situation for bioaccumulation of mercury in fish tissue. By "worst case" it is meant that the mercury in the water column is in a bioavailable form that can be bioaccumulated by the trophic food web in the area that could lead to excessive mercury in edible fish tissue.

***Mercury Special Studies***

To date, the US EPA has been regulating mercury in water based on water concentrations of total recoverable mercury. This approach has proven to be unreliable, since there are a wide variety of factors that influence the conversion of total mercury in water and/or sediments to methylmercury in water and fish tissue. The US EPA (1999c,d; 2001b,c) is recommending a change in the approach for regulating mercury, which would be based on fish tissue residues. The US EPA (2001c) states,

> *"To assess health risks, EPA developed a reference dose that is a scientifically justifiable maximum level of exposure to protect public health from all toxic effects. EPA based the methylmercury criterion on a new reference dose that protects all exposed populations. EPA also updated the exposure assessment and relative source contribution following the recently published 2000 Human Health Methodology. The resulting criterion of 0.3 mg methylmercury/kg in fish tissue should not be exceeded to protect the health of consumers of noncommercial freshwater/estuarine fish."*

This is a much more reliable approach for regulating mercury. It will require that a Cache Creek-specific translation factor between methylmercury in water and methylmercury in fish tissue, be established. Slotton (pers. comm., 2001) has indicated that he is developing such a relationship for Cache Creek.

Woods (2001) has indicated that the US EPA is also developing guidance for implementing the methylmercury tissue-based criterion. A draft of this guidance was scheduled to be available in 2002; however, recent events have caused the US EPA to shift the personnel working in this area to other activities related to terrorism.

**References**

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U.S. Environmental Protection Agency. 1999d. Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories, Vol. II, Risk Assessment and Fish Consumption Limits, Second Edition, US EPA 823-B-97-004, US Environmental Protection Agency, Office of water, Washington D.C.

U.S. Environmental Protection Agency. 2000a. Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California; Rule, US Environmental Protection Agency, Region 9, *Federal Register* 40 CFR Part 131, Vol. 65, No. 97, [FRL-6587-9], RIN 2040-AC44, San Francisco, CA.

U.S. Environmental Protection Agency. 2001b. Water Quality Criteria for the Protection of Human Health: Methylmercury, US Environmental Protection Agency, Office of Water, US EPA-833-F-01-001, Washington, D.C.

U.S. Environmental Protection Agency. 2001c. Water Quality Criteria: Notice of Availability of Water Quality Criterion for the Protection of Human Health: Methylmercury, US Environmental Protection Agency, *Federal Register*, 66(5):1344-1359, Washington, D.C.

Woods, P. 2000. pers. comm., US Environmental Protection Agency, Region 9, San Francisco, CA.

Woods, P. 2001. pers. comm.., US Environmental Protection Agency, Region 9, San Francisco, CA.

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Recently Phil Woods of the US EPA Region 9 has provided the following information with respect to future regulation of mercury:

Phil Woods
US EPA Region 9
San Francisco, CA

Phil,

Recently I have been comparing the US EPA CTR criteria for California against the US EPA National Recommended Water Quality Criteria 2002, which was published in November of last year. In some cases I am finding that there are significant differences. Is the US EPA updating the CTR criteria for California to reflect the 2002 Recommended Criteria? What is the status of the Recommended Criteria with respect to states having to adopt them? Any guidance you can provide on these issues would be appreciated.
Fred

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Fred,

The 2002 criteria are the current national 304(a) criteria guidance. As such, states should use this guidance as they carry out WQS reviews. A few entities in Region 9 are in that process, and we expect that others will gradually join in that effort. Also, this criteria guidance can be applied currently in quantifying narrative WQS requirements in implementing various individual planning and regulatory requirements.

EPA (Region 9 with HQ) began preparing revisions to the CTR for Hg and Cd before the 2002 criteria were published based on their individual criteria publications. As part of the national Hg criteria publication, EPA made a commitment to develop implementation guidance to go with the tissue based criterion. That process has been delayed, and, therefore, the CTR amendment has not moved to FR proposal yet. We expect that Hg will move "soon"; however, I think you know what "soon" means as well as I do.

In general, there is intent to update existing promulgations (such as the CTR) as national 304(a) criteria guidance becomes available/is published. Under current circumstances, we expect that most individual states will be able to act more quickly than the federal government can. (Note also that some of the 1999 criteria were so significantly changed that EPA solicited public comment. As I recall, these were all human health criteria changes based on the 2000 human health methodology. I have not heard how significant the public comments were. In any case, responses will be developed, and these additional criteria revisions will be added to the revisions you have observed in the 2002 publication before anyone even considers updating existing promulgations.)

Phil