

**Davis South Campus Superfund Oversight Committee**

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October 17, 2005

Remedial Project Managers  
LEHR Superfund Site  
UC Davis Campus  
Davis, CA 95616

Dear RPMs,

It is DSCSOC's goal that the investigation of the LEHR Superfund site adequately investigate the threat to human health, water quality and the environment and that the remediation at LEHR be protective of the citizens of Davis and our environment. DSCSOC has raised concerns about the inadequate investigation being conducted on stormwater runoff at the site during the ten years it has participated at LEHR.

Dr. G. Fred Lee, provided me with his comments, "Regulating Mercury in LEHR Site Stormwater Runoff" and I have attached them to this letter. His comments review past and current mercury investigation activities including a study now being conducted by the CVRWQCB. This agency is beginning to address measures to control the excessive bioaccumulation of mercury in Putah Creek fish and all potential sources of mercury including the LEHR Superfund site.

DSCSOC requests that UCD be required to use analytical methods with sufficient sensitivity to determine if the LEHR site's stormwater runoff contains mercury in concentrations that cause violations of the CTR criterion and is contributing to the excessive bioaccumulation of mercury in Putah Creek, the Delta and San Francisco Bay.

If you have any questions or comments regarding Dr. Lee's comments, please contact him.

Sincerely,

Julie Roth  
Executive Director

## Regulating Mercury in LEHR Site Stormwater Runoff

October 16, 2005

Julie Roth, Executive Director  
DSCSOC

Julie,

One of the issues of concern to the DSCSOC is the inadequate attention that has been given to the UCD/DOE LEHR Superfund site stormwater runoff as a source of mercury that is contributing to the excessive mercury in Putah Creek fish. Recently, the Central Valley Regional Water Quality Control Board (CVRWQCB) has held several meetings that have discussed the regulation of mercury in Central Valley waterbodies fish. At these meetings information was provided by the CVRWQCB staff that is pertinent to regulating mercury in LEHR Superfund site stormwater runoff. Presented below is a review of this matter. Backup reports that provide discussion of the comments presented below are on the DSCSOC website, <http://members.aol.com/dscsoc/doc.htm>.

### **Background**

*ATSDR/US EPA Studies.* Since DSCSOC first became involved in UCD/DOE LEHR Superfund site review in 1995, DSCSOC has been concerned about the potential for LEHR site stormwater runoff to contain chemicals that cause or contribute to excessive bioaccumulation of hazardous chemicals in Putah Creek fish that are a threat to human health and/or wildlife. DSCSOC's initial concern that the LEHR Superfund site investigation did not include monitoring to examine this situation led to DSCSOC recommending to ATSDR representatives that excessive bioaccumulation of hazardous chemicals in Putah Creek fish should be part of the LEHR site investigation. ATSDR worked out an arrangement for the US EPA to collect fish from Putah Creek that were to be examined for excessive mercury and the organochlorine "legacy" pesticides. Of particular concern was chlordane that was used at the LEHR site for control of fleas on dogs.

The ATSDR/US EPA initial study of Putah Creek fish was conducted on Putah Creek under low flow conditions. There was no water in Putah Creek upstream of where the UCD wastewater treatment plant discharges to Putah Creek. The initial studies showed that some of the fish taken from Putah Creek near the UCD campus wastewater treatment plant discharge/LEHR site had excessive mercury tissue concentrations compared to public health guidelines. This study also found some fish that contained radioactive mercury apparently from campus wastewater discharges. It was not clear whether the excessive mercury in Putah Creek fish was caused by UCD discharges of mercury and/or from mercury that was already present in Putah Creek that was converted to methyl mercury as a result of the discharge of particulate biodegradable organics in the campus wastewaters that created conditions in Putah Creek that promotes the formation of methyl mercury that bioaccumulates in Putah Creek fish.

The ATSDR/US EPA initial study of Putah Creek fish did not produce data on the organochlorine pesticides due to problems with US EPA handling of the fish samples.

ATSDR/US EPA conducted a second sampling of Putah Creek fish under higher flow conditions where it was possible to collect fish from upstream of the UCD wastewater discharges. This study showed that some fish taken in the vicinity of the LEHR site and upstream of LEHR also contained excessive mercury relative to concentrations that are acceptable levels for human (children and pregnant women) consumption. Based on these data, ATSDR recommended that Putah Creek be posted to warn the public that some fish taken from Putah Creek contained excessive mercury.

**Slotten Studies.** Subsequently, UCD funded D. Slotten to conduct an additional study of mercury accumulation in Putah Creek fish and other organisms. Dr. Slotten's study confirmed that some fish in Putah Creek contained excessive mercury relative to public health protection guidelines.

**Listing of Putah Creek as Water Quality Impaired.** Based on the ATSDR/US EPA and the Slotten data, as an individual concerned about Putah Creek water quality, you requested that the CVRWQCB list Putah Creek as a Clean Water Act section 303(d) list of impaired waterbodies. The CVRWQCB recommended that Putah Creek be listed as impaired because of excessive mercury concentrations in edible fish. This listing was approved by the US EPA. This listing set in motion the need for the CVRWQCB to conduct a total maximum daily load (TMDL) study of the Putah Creek mercury sources that lead to excessive mercury concentrations in Putah Creek fish.

**LEHR Site Stormwater Runoff.** Each year for many years DSCSOC has pointed out that the stormwater runoff from the LEHR site potentially contains concentrations of mercury that violate the CA Toxics Rule criterion/CVRWQCB water quality objective (WQO). Concentrations of mercury in NPDES permitted discharges, such as UCD stormwater runoff, is a violation of the Clean Water Act. While, as DSCSOC has discussed in the reviews of the UCD annual water quality monitoring reports, some stormwater runoff from the LEHR site contains mercury at over 500 ng/L, many of the concentrations were reported as less than the analytical methods detection limits of 200 ng/L. DSCSOC has repeatedly pointed out that it is inappropriate for UCD to use a mercury analytical method detection limit of 200 ng/L when the US EPA CTR regulatory limit is 50 ng/L.

DSCSOC provided information to the RPMs on the analytical method that UCD/DOE should be using on stormwater runoff to determine if the "non-detect" mercury concentrations represented violations of the CTR criterion. Susan Timm, the RPM representative of the CVRWQCB, required that UCD use these methods in an evaluation study. It was found that many of the non-detects were above the CTR regulatory limit. At this time however, UCD has reverted back to using inadequate analytical methods for mercury in stormwater runoff from the LEHR site with the result that the data being generated by UCD is unreliable in providing information on the magnitude of the mercury CTR violations in LEHR stormwater runoff.

DSCSOC provided the LEHR site RPMs with information that was provided by Phil Woods of the US EPA Region 9 on the situation with respect to the adequacy of the

mercury CTR criterion. Prior to developing the CTR criterion, the US EPA “Goldbook” mercury criterion was 12 ng/L. This criterion was based on finding that in some waters mercury concentrations above this amount were associated with excessive bioaccumulation of mercury in edible fish tissue. As discussed by Mr. Wood, the US EPA in developing the CTR criterion changed the approach for developing bioaccumulation based criteria. This resulted in temporarily increasing the mercury criterion from 12 to 50 ng/L. These values are based on total recoverable mercury in a water column sample. According to Mr. Woods, total recoverable mercury above about 5 ng/L in some waters leads to excessive bioaccumulation of mercury in fish tissue.

**CVRWQCB Proposed Mercury Regulation.**

An issue that will be important in regulating the excessive bioaccumulation of mercury in Central Valley waterbodies is the current CVRWQCB development of a Delta Mercury TMDL. In August 2005, the CVRWQCB(2005) issued a draft Sacramento San Joaquin Delta TMDL Methyl and Total Mercury Report. On September 29, 2005 the Board staff held a Delta Mercury TMDL CEQA Scoping Meeting in Stockton, CA. Information on this report and meeting is available at, <http://www.waterboards.ca.gov/centralvalley/programs/tmdl/delta.htm>

***Mercury Tissue Based Approach.*** One of the key issues that were discussed at the recent CVRWQCB meeting was the approach for assessing compliance with the mercury TMDL target. The CVRWQCB staff is proposing that the methyl mercury TMDL target be 0.28 mg/kg (wet weight) in certain edible fish of a certain size. This value represents a change in approach for regulating mercury from assuming a worst case approach where water concentrations of a few ng/L mercury leads to excessive bioaccumulation, to using measured fish tissue residues as the basis for regulating mercury. This is the approach that the US EPA (2001) proposed for regulating mercury. While the US EPA has not yet finalized this regulatory approach, the CVRWQCB is moving ahead with proposing to adopt this approach for regulating mercury excessive bioaccumulation in Delta and Delta tributary fish.

It has been known since the early 1970s, that there are many factors that influence the bioaccumulation of mercury in fish. These factors cause the relationship between mercury concentrations in water and fish tissue residues to be waterbody specific. The US EPA/CVRWQCB in changing the approach for regulating mercury from a worst case water concentration approach to a fish tissue residue approach is focuses on finding an excessive bioaccumulation problem and then determining the source(s) of the pollutants that are causing/contributing to the problem. This is the approach that some including G. F. Lee have been advocating for over 30 years.

***Environmental Justice Issues.*** The CVRWQCB TMDL target of 0.28 mg/kg mercury in fish tissue is based on the consumption of about one 8-oz. meal of catfish &/or bass every two weeks. In order to protect the health of fetuses and young children who consume more than this amount, the allowed fish tissue concentration would need to be decreased. This is an important environmental justice issue that needs to be considered in

establishing the mercury TMDL target and therefore the allowed mercury discharge limit for sources of mercury to Putah Creek and the Delta.

***All Mercury Can Become Methyl Mercury.*** At the recent CVRWQCB Delta mercury TMDL CEQA scoping meeting, Dr. Chris Foe of the CVRWQCB staff reported that the studies that have been conducted in the Central Valley waterbodies have found that there is a strong relationship between the methyl mercury concentrations in a waterbodies water column and the concentrations in fish tissue. Further, he reported that Putah Creek is a significant contributor of methyl mercury to the Delta. It was also mentioned that there is need to increase the priority that the CVRWQCB gives to beginning to address developing a TMDL to control excessive bioaccumulation of mercury in Putah Creek fish. Once the Putah Creek TMDL studies are underway, it will be necessary to investigate all potential sources of mercury for Putah Creek including the UCD LEHR Superfund site. Since all sources of mercury can contribute mercury that can be converted to methyl mercury that can bioaccumulate in fish, ultimately the regulation of mercury in LEHR site stormwater runoff could need to be considered in establishing ARARs for the LEHR site.

***Need for Regulation of LEHR Mercury Runoff.*** It is clear that greater attention needs to be given to regulation of mercury in stormwater runoff from the LEHR site. The first step should be to require that UCD monitor mercury in stormwater runoff from LEHR with an analytical method with sufficient sensitivity to determine if the stormwater runoff contains mercury concentrations that cause violations of the CTR criterion. Also there is need to consider that so long as LEHR site stormwater runoff contains total recoverable mercury above about 5 ng/L that the LEHR site is contributing mercury to Putah Creek that is contributing to excessive bioaccumulation of mercury in Putah Creek, the Delta and San Francisco Bay.

### **Overall Assessment**

- Some Putah Creek and the Delta fish contain sufficient mercury to be a threat to human health,
- All sources of mercury for these waterbodies can be converted to methyl mercury that has the potential to bioaccumulate in edible fish to sufficient concentrations to be a public health threat to some of those who use Putah Creek fish as food,
- LEHR site stormwater runoff has been repeatedly found to contain sufficient mercury to contribute to the excessive mercury bioaccumulation problem in Putah Creek and the Delta,
- As part of the LEHR Superfund site investigation UCD should be required to use mercury analytical methods that can monitor the concentrations of mercury that could contribute to excessive bioaccumulation of mercury in Putah Creek fish.
- There is need to develop an assessment of approaches that could be used to control excessive mercury concentrations in LEHR site stormwater runoff.

If you or others have questions on this matter please contact me.

Fred

G. Fred Lee, PhD, DEE  
Technical Advisor to DSCSOC.

### **Selected References**

The following references are some of the references that contain backup information on DSCSOC's reports on LEHR site mercury issues. Several other reports on the DSCSOC's website, <http://members.aol.com/dcsoc/doc.htm> also contain information on this topic.

Lee, G. F., "Review of the June 2005 Draft '2004 Comprehensive Annual Water Monitoring Report' for the University of California, Davis LEHR Site prepared by the University of California, Davis and Brown and Caldwell," Comments submitted to DSCSOC by G. Fred Lee, G. Fred Lee & Associates, El Macero, CA, August 1 (2005). (Also see each year's DSCSOCS comments on UCD quarterly and annual monitoring reports.)

Lee, G. F., "UCD Report on Low Level Mercury Analysis of LEHR Superfund Site Stormwater Runoff," Comments submitted to DSCSOC by G. Fred Lee & Associates, El Macero, CA, May (2004).

Lee, G. F., "Listing of Lower Putah Creek as CWA 303(d) Impaired due to Mercury," Report to DSCSOC by G. Fred Lee & Associates, El Macero, CA, August (2003).

Lee, G. F., "Comments on the Mercury Concentrations in Stormwater Runoff from the LEHR Superfund Site: Other Potential Bioaccumulation Problems," March 7, 2001.

Lee, G. F., "Evaluation of the Potential Water Quality Significance of Mercury in UCD LEHR Superfund Site Stormwater Runoff," March 2000.

Lee, G. F., "Evaluation of the Potential Water Quality Significance of Mercury in UCD LEHR Superfund Site Stormwater Runoff," March 2000.

### **Other References**

CVRWQCB "Sacramento San Joaquin Delta TMDL Methyl and Total Mercury Report" Draft report of the Central Valley Regional Water Quality Control Board Rancho Cordova, CA August (2005).

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).  
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U.S. Environmental Protection Agency, 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 (2000).

U.S. Environmental Protection Agency, 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. (2001).

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

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

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