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March 1, 2000

Evaluation of the Potential Water Quality Significance of Mercury in UCD LEHR Superfund Site Stormwater Runoff

LEHR Superfund Site RPMs and PRPs

Following up on yesterday's discussions about the need to reliably monitor, for the first time, mercury in stormwater runoff from the LEHR site to Putah Creek, I wish to provide the following information.

Analytical Methods

Last fall, in connection with the work that I am doing with Region 8, Santa Ana Regional Water Quality Control Board, on Upper Newport Bay and its watershed water quality, I checked with Dr. Chris Foe of the Central Valley Regional Water Quality Control Board (CVRWQCB) regarding doing the low-level mercury analyses for the CALFED-sponsored Cache Creek mercury studies. He recommended that I contact Battelle Marine Sciences Laboratory (MSL) in Sequim, Washington.

In November 1999 I contacted Battelle MSL and obtained a quote for low-level mercury analyses. Brenda Losorsa of Battelle MSL provided the following information:

Parameter	Current MDL ($\mu\text{g/L}$)	Method	Cost per Sample
Total Mercury-Water	0.00018	EPA 1831	\$ 85
Dissolved Mercury	0.00018	EPA 1831	\$585

The total mercury is determined after digestion and the dissolved mercury is after filtration. Teflon bottles are used for sample collection and transport. The cost per sample will depend on the number of samples processed. In the Upper Newport Bay watershed study, we were planning on six to nine samples at a time. It is suggested that Brenda Lasorsa be contacted at (360)681-3650 for the cost of analyses of LEHR site stormwater runoff.

Battelle MSL uses a US EPA approved procedure, which has the necessary detection limits to measure mercury at potentially significant concentrations, considering future US EPA changes in mercury water quality criteria.

Mercury Water Quality Criteria

The current US EPA water quality criterion for mercury of 12 ng/L total recoverable mercury is set forth in the US EPA "Quality Criteria for Water 1986," EPA 440/5-86-001, May, 1987. This value is based on the information available in the early 1980s with respect to the bioaccumulation potential of mercury in fish tissue from water. At that time it was believed to be a worst case based criterion, that would be protective at all locations. It was known that there are forms of mercury that are less bioavailable than other forms.

The US EPA, in 1997, proposed "Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California; Proposed Rule," Federal Register 40 CFR Part 131, August, 1997. This is known as the California Toxics Rule (CTR). As discussed in this Federal Register, the US EPA has proposed to change the way it develops the criterion for mercury, with the result that the new criterion, when the CTR criteria are adopted, will be 50 or 51 ng/L total recoverable mercury, dependent on whether it is water or water and fish as the source of the mercury for human consumption.

As I discussed at the LEHR Superfund site RPM meeting, the US EPA is in the process of revising the proposed CTR mercury criterion to a value on the order of about 2 to 5 ng/L. This is the value that is considered to be protective under worst case conditions for bioaccumulation from water in fish tissue. Presented below is a copy of an email that I received from Phil Woods regarding the mercury criterion situation. Phil is head of Criteria and Standards for the US EPA Region 9 and is highly knowledgeable in this topic.

Subj: Re: Regulating Hg
Date: 12/7/99 12:37:54 PM Pacific Standard Time
From: Woods.Philip@epamail.epa.gov
To: Gfredlee@aol.com
CC: FoeC@rb5s.swrcb.ca.gov

Fred, although the human health criteria in the CTR for mercury of 50 and 51 ng/l are not called interim values, we have committed to revise our 304(a) national criteria guidance for mercury by January 2002. New human health criteria for mercury for California waters could be proposed (by California or EPA) within a year of the 304(a) guidance revision. Also, the state adopted criterion of 25 ng/l will remain in effect in the waters of the San Francisco Bay Basin where it applies.

In the meantime, EPA is saying that meeting the numeric human health criteria in the CTR is necessary but may not be sufficient to protect all beneficial uses designated in a specific waterbody. For example, these criteria may not be sufficient to protect aquatic species and aquatic-dependent wildlife species and, therefore, not satisfy California's narrative criteria. If a species of concern is determined to have concentrations of methyl mercury that exceed

appropriate tissue level limits, or a fish consumption advisory has been issued for an area, or sediment levels are similarly of concern, the State should take appropriate action such as capping or reducing mercury loadings to the water body.

The current published science base that we are using in advising states and tribes who are working on WQS revisions is EPA's Mercury Study Report to Congress, December 1997. The human health values derived from the Report to Congress BAFs, RfD, etc., is about 2 ng/l although it could approach 5 ng/l if a fish consumption value of 6.5 g/d were used.

Congress has directed EPA to contract with the NAS to review mercury health research and prepare recommendations on the appropriate level for a mercury level reference dose. The NAS review is scheduled to be completed in July 2000 and will probably further alter the human health criteria for mercury when it is released.

Gfredlee@aol.com on 12/06/99 09:00:27 PM

To: Philip Woods/R9/USEPA/US@EPA
cc: FoeC@rb5s.swrcb.ca.gov
Subject: Regulating Hg

Phil, I am working with the Sacramento River Watershed Program developing a Hg control program. A consultant for the Program has developed a report covering TMDL targets for Hg which discusses the 51 ng/L CTR proposed criterion. Based on your discussions of this issue I understand that the CTR criterion is an interim value that will be replaced by a criterion of about 5 ng/L. Is there anything published on this issue especially as it relates to the 5 ng/L value. When will this or a similar value likely be proposed? Is there any more info on the expected value? Any information you can provide on this value would be appreciated. Thanks for your help. Fred

Based on Phil's email, if the total recoverable mercury in LEHR site stormwater runoff is found to be less than 2 ng/L after appropriate measurements from several storms over a year, it can be concluded, at least at this time, that the stormwater runoff from LEHR is not contributing to Putah Creek that could be contributing to the excessive mercury bioaccumulation problem that exists in some Putah Creek fish. If, however, the concentrations of total recoverable mercury are above about 2 ng/L, it is possible that the LEHR site contributed mercury is contributing to the excessive mercury problem in Putah Creek fish.

It should be understood that finding that now LEHR stormwater runoff is not contributing to excessive mercury does not mean that in the future stormwater runoff

would not contain excessive mercury. The LEHR site is undergoing considerable excavation, which will continue for years. This activity could lead to exposure of mercury-containing soils that could cause excessive mercury to be discharged in stormwater runoff from the LEHR Superfund site.

It should be noted that, while at this time, Putah Creek is not listed as a 303(d) listed "impaired" waterbody due to the excessive bioaccumulation of mercury in fish, there is little doubt, based on the ATSDR studies, with the next 303(d) listing performed by the CVRWQCB, that Putah Creek will be listed as an impaired waterbody, where a TMDL will have to be developed to control the sources of mercury that contribute to the excessive bioaccumulation. Should it turn out that the CVRWQCB does not list Putah Creek as an impaired waterbody due to excessive mercury in fish tissue, then the US EPA Region 9, either alone, or with the assistance of the public and the DeltaKeeper, could cause Putah Creek to be listed as an impaired waterbody due to excessive mercury bioaccumulation in fish.

The listing of Putah Creek as a 303(d) listed waterbody for mercury bioaccumulation would mean that all NPDES-permitted sources of mercury, including stormwater runoff, would be violating their permit by discharging total recoverable mercury above the US EPA criteria/California Toxics Rule. While the statement was made by a UCD staff member at the RPM meeting that LEHR is not subject to the NPDES stormwater permit, Superfund sites must comply with ARARs, which include State water quality standards. Further, contrary to the statements made at the RPM meeting, this issue is not a relative issue. As I understand the Clean Water Act implementation approach, NPDES-permitted sources cannot discharge regulated constituents above water quality standards if the receiving water is water quality limited, i.e., does not meet the standards.

There was discussion at the RPM meeting about the LEHR site mercury being mercury sulfide, which is highly insoluble. This was given as a reason for not having to consider the mercury in the LEHR site soils a threat to water quality. A couple of weeks ago, I received an email note from a Weiss Associates staff member, asking if I concurred with that assessment. I responded that that assessment is not correct with respect to the potential for mercury to be converted to methyl mercury, which can bioaccumulate in fish tissue to excessive concentrations. Subsequent to my email to Weiss Associates on this matter, I have had an opportunity to discuss this with members of the Delta Mercury Council at a recent mercury modeling meeting. Dr. Chris Foe, of the CVRWQCB, who heads up the Board's mercury TMDL control efforts, indicated that there are several papers in the literature that point out that mercury sulfides can be methylated, and in fact, there is evidence that it may be a preferred form for methylation.

Another issue to consider, based on the analysis that Weiss Associates provided me, is that some of the mercury present in the soils at LEHR is in a metallic form. It is well known that mercury metal can lead to methyl mercury in fish. In light of the information available, it cannot be assumed that the mercury present in LEHR site surface soils, some of which becomes part of the stormwater runoff from the site, is not

contributing to excessive mercury in the Putah Creek and, for that matter, Delta and San Francisco Bay, fish. As I have indicated repeatedly over the past three years, this is an area that needs attention as part of the LEHR site investigations.

Further, if the Yolo County and Solano County Departments of Health act in a manner similar to what Contra Costa Health Services has done, with respect to issuing a fish consumption advisory for San Pablo Reservoir, Putah Creek should, in accord with the ATSDR recommendations of several years ago, be posted as hazardous for fish consumption.

It is going to be extremely difficult to prove that mercury contributed in stormwater runoff from the LEHR site does not contribute to the excessive mercury concentrations that are occurring in Putah Creek fish. The statements that were made at the RPM meeting about Slotton not finding the fish and other organisms near LEHR with higher concentrations being proof that LEHR is not a contributor to the excessive mercury bioaccumulation, is not technically valid. The site of methylation for LEHR site-derived mercury could be considerable distances downstream from LEHR.

I am providing a copy of these comments to the CVRWQCB (Chris Foe, Val Connor and Sue McConnell) and Phil Woods for their comments, should they have any comments on my discussion of issues.

Please contact me if there are questions about these comments.

G. Fred Lee, PhD, DEE