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April 6, 2001

Dr. Kenneth H. Reckhow  
Chair, Committee to Assess the Scientific Basis of the  
Total Maximum Daily Load Approach to Water Pollution Reduction  
National Academy of Sciences  
2101 Constitution Avenue, NW  
Washington, D.C. 20418

Dear Dr. Reckhow:

On January 25, 2001 I was pleased to deliver a presentation to the National Academy of Sciences (NAS) Committee on total maximum daily loads (TMDLs) on behalf of the Association of Metropolitan Sewerage Agencies (AMSA). AMSA represents the interests of the nation's publicly-owned wastewater treatment works (POTWs). AMSA member agencies serve the majority of the sewered population in the United States and treat and reclaim more than 18 billion gallons of wastewater every day. The proper development and equitable implementation of the TMDL program is a top priority for AMSA.

To supplement my oral remarks, I am submitting additional information for your consideration on a TMDL that was developed by the San Francisco Regional Water Quality Control Board (Regional Board) for San Francisco Bay, California (Bay). It is AMSA's opinion that the TMDL was properly developed and included the appropriate pollution reduction requirements. However, because it was subsequently rejected by the U.S. Environmental Protection Agency (EPA) Region IX, we believe that it is illustrative of the difficulties encountered by stakeholders in developing scientifically sound TMDLs. AMSA requests that the Committee review this TMDL as a case study under Phase I of the Academy's study for the following reasons:

1. The TMDL was developed using the best available information and analytical tools. The Regional Board:
  - a. Accounted for the reservoir of contaminated sediments and the influence of

- those sediments on the ability to achieve standards (i.e., the legacy problem);
- b. Did mass balance calculations that show that control of ongoing NPDES sources will have no discernible effect on the achievement of standards;
  - c. Identified an implementation plan that will have the greatest near term water quality benefit; and
  - d. Will continue research and data collection to explore additional steps to reduce the flux of methyl mercury into fish tissue. The ultimate goal of the Regional Board is to reduce mercury levels in fish tissue and in Bay sediments.
2. EPA Region IX's override of the Regional Board's analysis appears designed to preserve NPDES permitting policies (i.e., capping or reducing mass inputs from point sources) (see Attachment 1 - Draft Interim Permitting Guidance). Permitting policies that are inappropriate for the case of the Bay appear to be prevailing over the scientific evidence provided in the Regional Board's TMDL report.
  3. While the Regional Board has a plan to begin improving water quality through prioritized mercury reductions aimed at major sources, EPA Region IX's approach will lead to stringent point source controls despite the insignificance of those sources.
  4. AMSA, local POTWs, and other stakeholders support the Regional Board's analysis and oppose EPA Region IX's intervention to change the TMDL and wasteload allocation to reach a different outcome.

A more thorough explanation of mercury contamination in San Francisco Bay and the development of the TMDL follows. A one-page summary of key Bay TMDL issues is attached for the committee's use.

### ***1. Background on the San Francisco Bay TMDL***

The San Francisco Bay was placed on the 1998 Clean Water Act (CWA) §303(d) list for mercury, based on its exceedence of the San Francisco Basin Plan numeric objective for mercury in water (0.025 parts per billion (ppb)) and the finding of mercury bioaccumulation in fish above non-enforceable advisory screening levels (not water quality standards). This led to an interim fish consumption advisory for San Francisco Bay.

In August 2001, the San Francisco Regional Water Quality Control Board (Regional Board) issued a final draft document entitled, A Watershed Management of Mercury in the San Francisco Bay Estuary: Total

Maximum Daily Load, Report to U.S. EPA (see Attachment 2)<sup>1</sup>. The report, developed through a comprehensive stakeholder process, represented the first of a two-phase process to complete both the TMDL and an implementation plan for San Francisco Bay.

In December 2000, EPA Region IX informed the Regional Board that further analyses were needed before the Bay TMDL could be approved under the Clean Water Act (see Attachment 3).

## ***II. Historical Mining Legacy in Watersheds Draining to San Francisco Bay***

The San Francisco Bay Region of Northern California has a unique historical legacy that sets it apart from other regions of the country and further complicates the TMDL process. To the east of San Francisco Bay lies the Central Valley watershed, where abandoned gold mines, abandoned mercury mines, natural mercury deposits, and geothermal mercury sources have contaminated water and sediment that is transported into the northern reaches of San Francisco Bay. To the south lies the Guadalupe River watershed, which contains numerous abandoned mercury mines and the legacy of contaminated sediments derived from those mining operations.

The primary mercury loads to the San Francisco Bay include mercury-contaminated sediments from the Central Valley watersheds, resuspension of contaminated sediment already in the Bay, and mercury-contaminated sediments from the Guadalupe River watershed.

## ***III. TMDL Lead Agency and Stakeholder Process***

Over the past two years, the Regional Board has engaged community stakeholders, including wastewater agencies, stormwater agencies, industry, the state dental association, and environmental groups in a comprehensive process to develop a TMDL for the Bay. The level of information and education received by meeting participants far exceeded the minimum public information requirements as outlined in EPA regulations and guidance.

The Regional Board scientists performed a methodical, scientifically-based TMDL analysis, which acknowledged a number of uncertainties and identified areas in need of additional scientific data. The Regional Board's Phase I findings are as follows:

1. To meet the current water quality objective of 0.025 ug/l in the San Francisco Basin Plan (derived from USEPA 304(a) criterion for protection of human health), the concentration of mercury in surface sediments of the Bay must be reduced from current levels.
2. A lowering of mercury levels in surface sediments would likely reduce levels of methyl

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<sup>1</sup> This draft document was released for public review in June 2000.

mercury in fish, since methylation occurs in anoxic sediments through the action of sulfate-reducing bacteria.

3. The dynamics of the methylation process in the Bay are not well understood and require additional research.
4. The recommended Phase I TMDL implementation plan should focus on actions which will have the greatest direct effect in the reduction of mercury levels in the sediment, including:
  - a. Reductions in inputs from the Guadalupe River where mercury concentrations in sediments are extremely elevated; and
  - b. Reductions in contributions to regional atmospheric mercury pool through controls on previously unregulated sources.

Of most significance to POTWs was the Regional Board's finding that further controls on existing NPDES point source discharges to the Bay would have no detectable effect on mercury concentrations in Bay sediments. As a matter of public policy, the Regional Board proposed that point source dischargers be required to meet a standard of performance dictated by the performance of well-operated treatment facilities. This included placement of mass limits based on specific mercury effluent concentrations and requirements for implementation of aggressive source control programs for mercury.

#### *IV. Scientific Uncertainties and On-going Contributions from Historical Sources*

EPA Region IX is pursuing a different approach. Following a series of communications between EPA Region IX and the Regional Board, the Region is pursuing:

1. The use of the recently published USEPA mercury fish tissue advisory criterion of 0.3 mg/kg as a trigger for the San Francisco Bay TMDL;
2. The application of USEPA guidelines to translate the fish tissue into NPDES permit limits:
  - a. Calculation of a bioaccumulation factor (BAF) for San Francisco Bay by dividing measured mercury levels in fish by measured mercury concentrations in water;
  - b. Dividing the USEPA fish tissue criterion by the above-calculated BAF; and
  - c. Applying the resultant mercury concentration in water derived from the above calculation to NPDES permits as an end-of-pipe effluent limit.

EPA concludes that as a result of the Bay's impairment and its exceedence of the calculated water column numbers, no dilution credits are therefore allowable, and the water column numbers are to apply at the end-of-pipe. AMSA believes this approach contradicts the scientifically-supported findings of the Regional Board that stringent treatment-forcing limits on NPDES dischargers would provide no water quality benefit.

In its comments on the Regional Board's TMDL, EPA Region IX asserts that the Regional Board's analysis is flawed because it fails to address human health issues. However, the water quality objective that the Regional Board TMDL is designed to achieve (0.025 ug/l) is a human health-based objective, derived from the USEPA 1985 304(a) criterion. EPA, in the California Toxics Rule, stated that the Basin Plan objectives for San Francisco Bay are adequate for protection of uses of the Bay. In May 2000, Region IX approved the Basin Plan and the included objectives. Since violations of this objective were a reason for the §303(d) listing for mercury, the Regional Board acted properly in structuring its TMDL to meet these adopted human health-based objectives. EPA Region IX now is asking the Regional Board to change the human health-based mercury water quality objectives in the TMDL process without following a standard setting process.

EPA Region IX also finds that the Regional Board's TMDL does not address the achievement of wildlife "standards". No numeric, wildlife-based water quality standards have been adopted in California, however, and no serious discussion regarding appropriate numeric standards for wildlife in fish tissue or the water column has occurred. The 1998 §303(d) listing for mercury in San Francisco Bay does not mention appropriate numeric standards for protection of wildlife. EPA Region IX places the Regional Board in the position of developing a new wildlife numeric criterion in the TMDL process as a prerequisite for EPA approval of the TMDL.

In response to comments received from EPA Region IX, the Regional Board has provided technical justification to support the TMDL based on their examination of scientific uncertainties and current realities of sediment loads from historical mining sources.

As noted above, EPA Region IX is seeking a TMDL target based on the protection of human health and wildlife through new water quality standards that have not yet been adopted or numerically translated for point source dischargers. The Regional Board scientists have identified critical scientific uncertainties regarding the approach put forward by EPA to address bio-uptake of mercury. Therefore, in lieu of using a fish tissue target, the Regional Board has developed a sediment target for Phase I of the TMDL. Phase II of the TMDL would be developed within 10 years, following the collection of additional data to further understand the methylation mechanisms and relate total mercury in the water column to methyl mercury concentrations in fish tissue.

## ***V. Point Source Allocation Issues***

EPA Region IX asserts that POTW point source allocations must be reduced and that any mass increase allowed for point sources would be in violation of the Clean Water Act. However, under federal regulations, a water quality-based effluent limitation (WQBEL) only needs to be consistent with the wasteload allocation and other requirements of the TMDL. Accordingly, a WQBEL can be implemented that is substantially less stringent than the existing limitation, if, for instance, the increased share of the wasteload allocated to the point source is accommodated by reductions of other sources, or by other

appropriate actions of the TMDL.

Point source discharges are estimated to comprise 3 percent of the overall Bay mercury load. Recent monitoring data using better sampling and analytical techniques indicate this estimate is high. The highest concentrations of mercury tend to be found in South San Francisco Bay, which due to physical and hydrological constraints, is not well-mixed with the rest of the Bay. In this region, the Guadalupe watershed dominates the mercury load, and point source discharges are estimated to be only 1.5 percent of the total load. The complete removal of point source dischargers from the Bay area would not significantly reduce loadings to the Bay or mercury levels in the environmental compartments of the Bay.

## VI. Conclusion

In summary, AMSA believes the Regional Board's TMDL for the Bay presents the NAS Committee with a good case study of a complex TMDL based on good data and sound science. The Regional Board has exhibited a good-faith effort with its stakeholders throughout the TMDL process. Stakeholders have become increasingly concerned that the EPA Region IX approach will permanently disrupt the collaborative process, resulting in a redirected TMDL with wasteload allocations and point source effluent limits that will be scientifically unsupportable.

Thank you for the opportunity to provide this information. Should you have any questions, please feel free to contact me at (757) 460-4243.

Sincerely,



Norman E. LeBlanc  
Chair, AMSA Water Quality Committee

cc: Laura Ehlers, NAS

ATTACHMENTS

## *San Francisco Bay TMDL - Summary*

- San Francisco Bay was placed on the 1998 303(d) list for mercury based on exceedence of the 0.025 ug/l numeric water quality objective (derived from USEPA 304(a) criterion for protection of human health) and bioaccumulation of mercury in fish above non-enforceable advisory screening levels (not water quality standards).
- In August 2001, the San Francisco Regional Water Quality Control Board (Regional Board) issued a final draft TMDL that represented the first phase of a two-phase process to complete a TMDL and implementation plan for San Francisco Bay.
- To meet the 0.025 ug/l water quality objective, the concentration of mercury in surface sediments of the Bay must be reduced from current levels.
- A lowering of mercury levels in surface sediments would likely reduce levels of methyl mercury in fish, since methylation occurs in anoxic sediments through the action of sulfate reducing bacteria.
- The processes and dynamics of the methylation process in the Bay are not well understood and require additional research.
- The recommended Phase I TMDL implementation plan is to take actions that will have the greatest effect in reducing levels of mercury in sediment, including 1) reductions in inputs from upstream watersheds as mercury concentrations in sediments from some of these watersheds are extremely elevated, and 2) reductions in contributions to regional atmospheric mercury pool through control measures on unregulated sources.
- Further controls on existing NPDES point source discharges to the Bay would have no detectable effect on mercury concentrations in Bay sediments, and the Regional Board proposed that point source dischargers be required to meet a standard of performance dictated by the performance of well-operated treatment facilities. EPA objects to this.
- EPA Region IX is seeking that the TMDL target be based on fish tissue levels to ensure protection of human health and wildlife. This approach would require new water quality standards that have not yet been adopted or numerically translated for point source dischargers. EPA is advocating this approach through the TMDL process in lieu of the water quality standard setting process.
- Regional Board scientists have identified critical scientific uncertainties regarding the approach put forward by EPA to address bio-uptake of mercury. Therefore, in lieu of using a fish tissue target, the Regional Board has developed a sediment target for Phase I of the TMDL to address human health issues. Phase II of the TMDL would be developed within 10 years, following the collection of additional data to further understand the methylation mechanisms and relate total mercury in the water column to methyl mercury concentrations in fish tissue. EPA is seeking completion of the Phase II TMDL next year using the fish tissue target.