Bay Area Clean Water Agencies

DRAFT

2011 Mercury Watershed Permit Group Report

March 15, 2012

Prepared by RMC Water and Environment

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Introduction

On November 1, 2007 the San Francisco Bay Regional Water Quality Control Board (Regional Water Board) adopted the mercury watershed permit, also known as National Pollutant Discharge Elimination System (NPDES) Permit No. CA0038849, Regional Water Board Order No. R2-2007-0077. The purpose of the mercury watershed permit was to implement requirements associated with the mercury Total Maximum Daily Load (TMDL), which was adopted by the Regional Water Board in August 2006, approved by the State Water Resources Control Board (State Water Board) in July 2007, and approved by the United States Environmental Protection Agency (USEPA) in February 2008.

The mercury watershed permit became effective on March 1, 2008 and established limitations and requirements on the discharge of mercury from current municipal and industrial NPDES permittees which discharge treated wastewater to San Francisco Bay or its tributaries. The permit superseded all existing mercury requirements in existing individual wastewater permits to ensure consistent, complete, and coordinated implementation of the TMDL's requirements. This group report is for municipal permittees associated with the watershed permit.

Watershed Permit Group Reporting Requirements

One of the requirements indicated in the watershed permit is for agencies to report mercury mass loads and source control activities on an annual basis. The permit allows permittees to report this and other information either individually, or as part of a group. The Bay Area Clean Water Agencies (BACWA) opted to form a group and invite municipal permittees to participate. If permittees desired to participate in a group process, they needed to notify the Regional Water Board by February 1, 2012 (deadline for annual Self-Monitoring Report, or SMR) of this intent.

Electronic forms for BACWA group participants were prepared to facilitate the reporting process for both participants and the organizer. These electronic forms were developed in MS Excel, based on the forms in the watershed permit, and were emailed to potential group participants with a readily available email address on January 3, 2012. The due date for submittal of data under the group reporting program was February 15, 2012.

Data Collection and Compilation

The annual reporting forms were organized into three parts as follows:

- Part 1 – Basic Information
- Part 2 – Mercury Data
- Part 3A – General Source Control Information
- Part 3B – Specific Source Control Checklist

Reporting forms for Part 1 and Part 2 were drawn directly from the mercury watershed permit. The reporting form for Part 3A is identical to mercury watershed permit Part 3. This form was re-numbered in order to incorporate an additional form (Part 3B), which was developed by BACWA and distributed to permittees for the 2011 report in order to obtain more consistent and complete information about source control measures employed. The need for this additional form was identified during compilation of the first BACWA Group Report in 2008

Completed forms were received on time from all 37 of the municipal agencies included in the mercury watershed permit. Data were received from group participants by email, fax, and regular mail. Data received by email were in a PDF or MS Excel format. Signed certification pages (in Part 1) were received from all participating agencies by the deadline. The forms received are shown in **Appendix A**. The distribution of participating municipal permittees in the BACWA group is shown in **Table 1**, below.

Table 1. BACWA Group Participants

Municipal Permittees Participating in BACWA Group		Municipal Permittees Not Participating in BACWA Group
• American Canyon, City of • Benicia, City of • Burlingame, City of • Calistoga, City of • Central Contra Costa Sanitary District • Central Marin Sanitation Agency • Crockett Community Services District – Port Costa • Delta Diablo Sanitation District • East Bay Dischargers Authority • East Bay Municipal Utilities District • Fairfield-Suisun Sewer District • Las Gallinas Valley Sanitary District • Marin County (Paradise Cove), Sanitary District No. 5 of • Marin County (Tiburon), Sanitary District No. 5 of • Millbrae, City of • Mt. View Sanitary District • Napa Sanitation District • Novato Sanitary District • Palo Alto, City of	• Petaluma, City of • Pinole, City of • Rodeo Sanitary District • Saint Helena, City of • San Francisco, City and County of, SF Int'l Airport (sanitary plant) • San Francisco (Southeast Plant), City and County of • San Jose/Santa Clara, Cities of • San Mateo, City of • Sausalito-Marin City Sanitary District • Sewerage Agency of Southern Marin • Sonoma Valley County Sanitation District • South Bayside System Authority • South San Francisco and San Bruno, Cities of • Sunnyvale, City of • US Naval Support Activity, Treasure Island • Vallejo Sanitation and Flood Control District • West County Agency • Yountville, Town of	None

Data submitted by BACWA group participants included all effluent mercury concentration data collected throughout the 2011 calendar year, which were also averaged by month, as well as daily flow rates for sampling days, and a computed annual mass emission. All computations for group participants were checked for accuracy and usage of proper formulas for calculations, at a minimum. As indicated in the mercury watershed permit, if data were not available for every month that discharge occurred, an estimated annual mass emission was computed by normalizing the available data over applicable discharge months.

Estimated Mercury Mass Loads for 2011

The estimated annual mercury mass emission was determined for all municipal permittees listed in the mercury watershed permit. Results for each permittee and the sum for the group are shown in **Table 2**.

Table 2. Estimated Weighted 2011 Annual Mass Emission for Municipal Permittees

Municipal Permittee	2011 Annual Mass Emission (kg/yr)	Notes on Computations Conducted for This Report
American Canyon, City of	0.0070	Used agency data and calculations.
Benicia, City of	0.0137	Used agency data and calculations.
Burlingame, City of	0.0101	Computed weighted annual mass emission from data provided.
Calistoga, City of	0.0025	Computed weighted annual mass emission from data provided.
Central Contra Costa Sanitary District	0.3746	Used agency data and calculations.
Central Marin Sanitation Agency	0.0726	Used agency data and calculations.
Crockett Community Services District - Port Costa	0.0003	Used agency data and calculations.
Delta Diablo Sanitation District	0.0537	Used agency data and calculations.
East Bay Dischargers Authority	0.5777	Used agency data and calculations.
East Bay Municipal Utility District	0.4832	Used agency data and calculations.
Fairfield-Suisun Sewer District	0.0375	Computed weighted annual mass emission from data provided.
Las Gallinas Valley Sanitary District	0.0307	Computed weighted annual mass emission from data provided.
Marin County (Paradise Cove), Sanitary District No. 5	0.0000264	Used agency data and calculations.
Marin County (Tiburon), Sanitary District No. 5	0.0024	Used agency data and calculations.
Millbrae, City of	0.0176	Used agency data and calculations.
Mt. View Sanitary District	0.0134	Used agency data and calculations.
Napa Sanitation District	0.0166	Used agency data and calculations.
Novato Sanitary District	0.0167	Used agency data and calculations.
Palo Alto, City of	0.0635	Used agency data and calculations.
Petaluma, City of	0.0111	Used agency data and calculations.
Pinole, City of	0.0226	Used agency data and calculations.
Rodeo Sanitary District	0.0126	Computed weighted annual mass emission from data provided.
Saint Helena, City of	0.0016	Computed weighted annual mass emission from data provided.
San Francisco, City and County of, SF Int'l Airport	0.0021	Used agency data and calculations.
San Francisco (Southeast Plant), City and County of	0.2449	Used agency data and calculations.
San Jose/Santa Clara, Cities of	0.2313	Used agency data and calculations.

Municipal Permittee	2011 Annual Mass Emission (kg/yr)	Notes on Computations Conducted for This Report
San Mateo, City of	0.0593	Used agency data and calculations.
Sausalito-Marin City Sanitary District	0.0185	Used agency data and calculations.
Sewerage Agency of Southern Marin	0.0501	Used agency data and calculations.
Sonoma Valley County Sanitation District	0.0055	Used agency data and calculations.
South Bayside System Authority	0.0853	Used agency data and calculations.
South San Francisco and San Bruno, Cities of	0.0461	Used agency data and calculations.
Sunnyvale, City of	0.035	Used agency data and calculations.
US Naval Support Activity, Treasure Island	0.0038	Used agency data and calculations.
Vallejo Sanitation and Flood Control District	0.1451	Used agency data and calculations.
West County Agency	0.0974	Used agency data and calculations.
Yountville, Town of	0.00047	Used agency data and calculations.
TOTAL	**2.9**	

Interpretation of Estimated Mass Load Results

The estimated annual mass emission for 2011 is 2.9 kg/yr, which is lower than the previous three years and lower than the mass limit of 17 kg/yr. The estimated group emission was 3.9 kg/yr for 2010, 4.6 kg/yr for 2009, and 4.5 kg/yr for 2008. These results are illustrated in **Figure 1**, below.

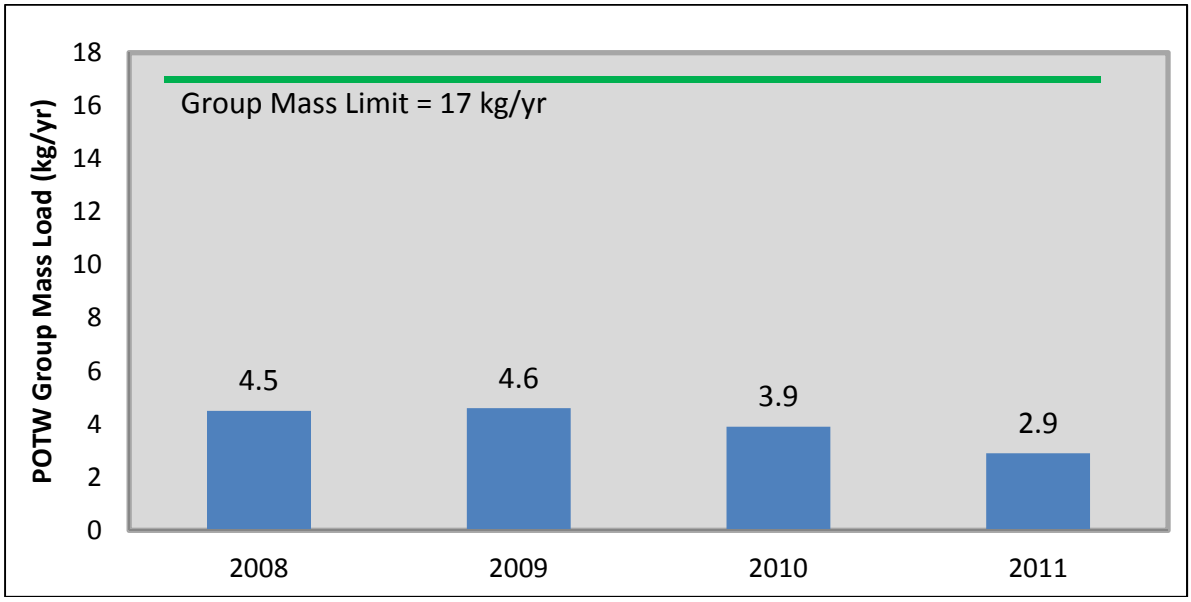

Figure 1. Trend in Estimated Annual Mercury Mass Emissions for Municipal Dischargers to San Francisco Bay Compared to Annual Mass Limit

The total group mass emission for 2011 is lower than the last three years, indicating a currently decreasing trend in mercury concentrations. However, it is uncertain if this trend will continue due to uncertainty in laboratory results and significant one-time treatment plant improvements in 2011.

Overall, the average mercury concentrations reported by BACWA group participants in the 2011 reporting period was approximately 20% lower than the average for the 2010 reporting period, a

significant reduction. By comparison, the concentration reduction from 2009 to 2010 was similar at 19%, but was only 5% from 2008 to 2009.

Approximately 65% of municipal agencies had a lower mercury mass emission and approximately 32% higher, compared to 2010. For mercury concentration, 65% also reported lower average concentrations, while 32% of participating agencies reported higher average concentrations for 2011.

Based on the comparisons of 2010 and 2011 data, it is expected that mercury loads will continue to be variable among agencies from year to year. A number of additional years of data will be needed in order to identify specific trends. It is also of note that of the estimated 1,220 kg/yr of mercury discharged to San Francisco Bay[1], the estimated municipal agency contribution is 2.9 kg/yr, or 0.2% of the total mass emission to the Bay.

In late 2010 and 2011 a few Bay Area municipal agencies completed treatment plant improvements that potentially contributed to the overall decrease in mercury loadings observed during 2011. The most significant change occurred with the Novato Sanitary District, which completed construction of a new treatment plant and brought it online in September 2010. This new treatment plant included significant improvements to all major treatment processes. Novato Sanitary District's data showed a 77% decrease in mercury loadings between 2010 and 2011.

Source Control Activities

Permittees participating in the BACWA group conducted numerous source control activities during the reporting period, as shown in **Table 3** on the following page. Highlights of the source control activities are as follows:

- Dental Amalgam Programs
- Thermometer and/or Thermostat Exchanges
- Fluorescent Light Recycling
- Household Hazardous Waste Collection
- Public Outreach and Education
- Controls for Vehicle Service Facilities
- Battery Recycling
- Environmentally Preferable Purchasing Policy
- Hospital/Medical Clinic Mercury Inspections and/or Related Source Reduction Activities
- HVAC Wholesaler and Demolition Contractor Outreach

A checklist of possible source control activities was developed and provided to group participants as Part 3B of the reporting forms (as described above) in January 2012. This checklist resulted in more consistent reporting of source control activities. A detailed summary of Bay Area municipal mercury reduction activities in 2011 is shown in **Table 3**.

[1] Source: *Mercury in San Francisco Bay, Total Maximum Daily Load (TMDL) Proposed Basin Plan Amendment and Staff Report*, California Regional Water Quality Control Board, San Francisco Bay Region, September 2004.

Table 3. Mercury Source Control Activities By Agency for 2011

Municipal Agency Listed in Watershed Permit	Mercury Source Control Projects Underway or Planned, as Reported by Agencies to BACWA **a = project was completed or underway in 2011 (and may be continuing)** **b = project is continuing or planned for the near future**					
	Dental Amalgam Program	Fluorescent Light Recycling	Household Hazardous Waste Collection	Public Outreach/ Education	Thermometer and/or Thermostat Exchange	Vehicle Service Facilities
American Canyon, City of	a,b	a,b	a,b	a,b	a,b	a,b
Benicia, City of	a	a	a	a	a	
Burlingame, City of	a	a	a	a,b		b
Calistoga, City of	a					
Central Contra Costa Sanitary District	a,b	a,b	a,b	a,b	a,b	a,b
Central Marin Sanitation Agency	a,b	a,b		a,b	a,b	a
Crockett Community Services District (Port Costa)		a	a	a	a	
Delta Diablo Sanitation District	a,b	a	a	a	a	a
East Bay Dischargers Authority	a,b	a,b	a,b	a,b	a,b	a,b
East Bay Municipal Utility District	a,b			a	a	a
Fairfield-Suisun Sewer District	a,b	a	a,b	a		a
Las Gallinas Valley Sanitary District	a,b	a,b	a	a,b	a,b	
Marin County (Paradise Cove), San. District No. 5 of	a			a		
Marin County (Tiburon), San. District No. 5	a			a		
Millbrae, City of	a,b	a	a	a	a	a
Mt. View Sanitary District	a,b	a,b	a,b	a,b	a,b	a,b
Napa Sanitation District	a,b	a	a	a,b	a,b	
Novato Sanitary District	a	a	a	a	a	
Palo Alto, City of	a,b	a,b	a,b	a,b	a,b	a,b
Petaluma, City of	a,b	a	a	a		a
Pinole, City of	a,b		a,b	a,b	a,b	a,b
Rodeo Sanitary District	a,b	a		a	a	
Saint Helena, City of	b	a		a	b	
San Francisco, City and County of, SF Int'l Airport		a	a		a	a
San Francisco (Southeast Plant), City and County of	a,b	a,b	a	a	a,b	
San Jose/Santa Clara, Cities of	a	a	a	a	a	
San Mateo, City of	a,b	a	a	a	a	
Sausalito-Marin City Sanitary District	a	a,b	b	a,b	b	
Sewerage Agency of Southern Marin	a,b	a	a,b	a,b	a,b	a
Sonoma Valley County Sanitation District	a,b		a	a		a

Municipal Agency Listed in Watershed Permit	Mercury Source Control Projects Underway or Planned, as Reported by Agencies to BACWA **a = project was completed or underway in 2011 (and may be continuing)** **b = project is continuing or planned for the near future**					
	Dental Amalgam Program	Fluorescent Light Recycling	Household Hazardous Waste Collection	Public Outreach/ Education	Thermometer and/or Thermostat Exchange	Vehicle Service Facilities
South Bayside System Authority	a,b			a	a	
South San Francisco and San Bruno, Cities of	a,b	a		a	a,b	a
Sunnyvale, City of	a	a	a	a,b	a,b	a
US Naval Support Activity, Treasure Island		a	a	a	a	
Vallejo Sanitation and Flood Control District	a,b	a,b		a,b	a,b	a
West County Agency	a	a	a	a	a	a
Yountville, Town of	a	a	a	a		

Dental Amalgam Programs

In 2010, BACWA completed a methodology to assess regional progress on the two dental program metrics in the watershed permit.[2] The methodology was approved by the Regional Water Board in a letter to BACWA dated March 17, 2011. Because the preliminary results indicated that dental practitioner participation was at 76%, rather than the permit metric of 85%, it was agreed that BACWA would conduct a follow-up survey and present the results by June 2012. A follow-up survey to co-permittees was completed in November 2011. Draft results have been completed and are currently under review by BACWA; final results will be submitted to the Regional Water Board by June 2012.

In the meantime, many agencies reported on the continuing development of their dental amalgam programs in 2011 -- details are provided on the original forms shown in **Appendix A**. Some preliminary quantitative information was also reported this year. For example, the Central Contra Costa County Sanitary District reported a 70% reduction of mercury observed in the treatment plant influent since 2004, prior to implementing the Dental Amalgam Program.

Collection of Other Mercury-Containing Wastes

Many agencies in the Bay Area were involved in the collection of household hazardous and other wastes in 2011, and some were able to quantify the mass of mercury collected. Examples of the specific estimates are as follows:

- The City of San Jose recycled approximately 7,516 lbs (3,416 kg) of fluorescent lights from municipal operations during Fiscal Year 2010-2011.
- The Sewerage Agency of Southern Marin (SASM) collected and recycled 4,440 lbs (2,018 kg) of household batteries from six locations throughout the City of Mill Valley and SASM facilities.
- The City of Sunnyvale recycled approximately 20,902 fluorescent and compact fluorescent lamps; 212 high intensity discharge (HID), metal halide, and mercury vapor lamps; and 48 lbs (21.8 kg) of laboratory waste and mercury switches from City operations.
- The Central Contra Costa Sanitation District collected 109.1 lbs (49.6 kg) of mercury, including 94.3 lbs (42.92 kg) of elemental mercury during 2011. Annual mercury collection is more than seven times the amount of mercury that enters the wastewater treatment plant. In addition, the District has collected an estimated 1,119 lbs (509 kg) of mercury since 2004.
- The Mt. View Sanitary District recycled more than 610 mercury-containing UV lamps used in their UV Disinfection Facility in FY2010/2011.

Public Outreach and Education

Significant public education also occurred during 2011 throughout the Bay Area. For example, the Marin County Stormwater Pollution Prevention Group (which the six wastewater agencies in Marin County participate in) provided 40,000 residents with calendars which included a month titled "Help Keep Mercury Out of San Francisco Bay." The calendar information addressed how to reduce mercury discharge to the sanitary sewer; how to dispose of fluorescent bulbs, thermometers,

[2] "Mercury Watershed Dental Permit Metrics" October 1, 2010.

batteries, and other mercury containing devices; and included information about requesting non-amalgam fillings from dentists.

In addition to efforts by individual agencies, the Bay Area Pollution Prevention Group (BAPPG), a committee of BACWA, continued its coordinated regional dental outreach pollution prevention activities. BAPPG presented mercury pollution prevention information to 259 dental assistant or dental hygiene students via 9 visits to schools around the Bay Area during 2011. The BAPPG outreach effort also included presentations to 278 working professionals through additional presentations to a local branch of the Dental Assistant Association, the state-wide California Dental Assistant Association (CDAA) and the California Dental Association (CDA).

Other Mercury Reduction Activities

In addition to source control activities listed above, some agencies have taken mercury pollution prevention a step further to help prevent future mercury waste. For example, the City of San Leandro converted all outdoor lighting to mercury-free lamps and also implemented an Environmentally Preferable Purchasing Policy (through a city Ordinance) that requires product-substitution for mercury-containing products.

Also, many agencies in the Bay Area operate recycled water programs, conveying a portion of their treated wastewater to turf and landscape irrigation, industrial uses, and agriculture. This recycled water does not enter San Francisco Bay, yet most agencies didn't include these programs as an element of their source control in individual reports.

Mercury Special Studies

The Mercury Watershed Permit requires that permittees conduct or cause to be conducted "studies aimed at better understanding mercury fate, transport, the conditions under which mercury methylation occurs, and biological uptake in San Francisco Bay, its contiguous segments, and tidal areas," and "studies to evaluate the presence of, or potential for, local effects on fish, wildlife, and rare and endangered species in the vicinity of wastewater discharges." [3]

BACWA member agencies have and continue to meet these requirements through support of and participation in the Regional Monitoring Program (RMP) Mercury Strategy, developed in 2007, which articulates a five-year plan for mercury studies and identifies them as a top priority for the RMP.[4] To date, the RMP Mercury Strategy has resulted in a substantial body of work that includes three years of intensive spatial and temporal monitoring in small fish; a two-year study of mercury isotopes; and a two-year study of passive samplers for aqueous methylmercury. The results of these studies are being synthesized now and will be incorporated into a special journal article featuring synthesis papers for seven major ocean regions as part of the Coastal and Marine Mercury Ecosystem Research Collaborative, sponsored by the Dartmouth College Toxic Metals Superfund Research Program.

[3] Waste Discharge Requirements for Municipal and Industrial Wastewater Discharges of Mercury to San Francisco Bay (Order No. R2-2007-0077, NPDES No. CA0038849, Provision V.C.3.).

[4] More detailed information about the Mercury Strategy is available on the San Francisco Estuary Institute's RMP webpage at http://www.sfei.org/rmp/mercury.

Risk Reduction

Activities related to risk reduction that have occurred since the BACWA March 1, 2010 progress report include the following: development of a needs assessment from stakeholders; continued meetings of the Stakeholder Advisory Group (SAG); a one-page description of the risk communication framework completed in Spring 2011; a finalized Request for Proposals (RFP) for a grant program to community groups; a convening of a panel to review grant applications; and dissemination of four grants (out of nine applications). A final report is expected in the fall of 2012.

Summary and Conclusions

The weighted annual average mercury mass load for all municipal permittees to San Francisco Bay for 2011 was estimated to be 2.9 kg/yr. This mass load is 27% lower than the mass load estimated for the 2010 calendar year, 3.9 kg/yr. The mass load in 2009 was estimated to be 4.6 kg/yr, and in 2008, 4.5 kg/yr. The 2011 estimated annual mercury mass emission is lower than the 17 kg/yr limit.

Agencies participating in the BACWA group conducted many mercury source control programs, and in some cases quantified the amount of mercury collected. For the collections that were quantified, nearly 700 lbs (318 kg) of mercury were collected at household hazardous waste disposal facilities around the region.

BAPPG also continued its coordinated regional dental outreach pollution prevention activities by presenting mercury pollution prevention information to 259 dental assistant or dental hygiene students at nine schools around the Bay Area.

In addition to pollution prevention activities that may have contributed to the reduction in mercury loadings, some Bay Area agencies also completed treatment plant improvements. The new Novato Sanitary District treatment plant, which includes significant improvements to all major treatment processes, was brought online in late 2010 and resulted in a 77% decrease in loadings between 2010 and 2011.

Individual agencies as well as BAPPG plan to continue mercury pollution prevention activities throughout 2012.