

Santa Clara Valley Urban Runoff Pollution Prevention Program Mercury Pollution Prevention Plan

March 1, 2002

Introduction

The California Regional Water Quality Control Board, San Francisco Bay Region (Regional Board) adopted a reissued National Pollutant Discharge Elimination System (NPDES) permit for the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP), Order Number 01-024 on February 21, 2001. The reissued NPDES permit states that municipal stormwater discharges may be causing or contributing to exceedances of water quality standards for mercury.

Information from the U.S. Fish and Wildlife Service indicates that mercury in sediment may cause increased mortality and teratogenesis of rainbow trout embryos. In addition, the concentrations of mercury in Guadalupe River watershed invertebrates and prey fish may be adversely affecting the consuming fish. The concentrations of mercury in fish from most locations within the watershed also exceed concentrations that may be harmful to fish-eating birds, such as the common merganser, black-crowned night heron and belted kingfisher.

Mercury is also a neurotoxin that affects the human brain and nervous system. Children and developing fetuses are the most susceptible to mercury's adverse effects. A loss of physical coordination and mental retardation are among the potential impacts from chronic exposure to mercury. The greatest risk of exposure to mercury is through consumption of fish from contaminated waters. Methylated mercury is readily absorbed and bioaccumulates in fish.

Mercury has been found in sediment from the South San Francisco Bay and the Guadalupe River Watershed. Some types of fish caught in the Bay contain mercury and other pollutants at concentrations that may threaten the health of humans consuming those fish. In response, the California Office of Environmental Health and Hazard Assessment issued an interim fish consumption advisory. The U.S. Environmental Protection Agency (EPA) has listed the Bay and the Guadalupe River Watershed (including the Guadalupe River, Alamitos Creek, Guadalupe Creek, Calero Reservoir, and Guadalupe Reservoir) as impaired by mercury under Section 303(d) of the Clean Water Act. In accordance with Section 303(d), the Regional Board is required to establish a Total Maximum Daily Load (TMDL) for mercury in the South San Francisco Bay and the Guadalupe River Watershed.

This Mercury Pollution Prevention Plan (Mercury Plan) was developed by SCVURPPP to address Provision C.9.c. of the SCVURPPP reissued NPDES permit. Permit Provision C.9.c. requires a mercury pollution prevention plan that includes the following elements:

- i. Development and adoption of policies, procedures, and/or ordinances calling for:*
 - *The virtual elimination of mercury from controllable sources in urban runoff, including the identification of mercury-containing products used by the Dischargers and a schedule for their timely phase out; and*
 - *Coordination with solid waste management agencies to ensure maximum recycling of fluorescent lights and/or establishment of "take back" programs for the public collection*

of mercury-containing household products (potentially including thermometers and other gauges, batteries, fluorescent and other lamps, switches, relays, sensors and thermostats);

- ii. A schedule for assisting the Regional Board staff in conducting an assessment of the contribution of air pollution sources to mercury in the Dischargers' urban runoff (potentially including an identification of significant mercury air emission sources, an inventory of relevant mercury air emissions and a review of options for reducing or eliminating mercury air emissions);*
- iii. Assessment of the sediment mercury concentrations and percentage of fine material at the base of key watersheds, above the tide line;*
- iv. A public education, outreach and participation program designed to reach residential, commercial and industrial users or sources of mercury-containing products or emissions; and*
- v. Participation with other organizations to encourage the electric light bulb manufacturing industry to reduce mercury associated with the disposal of fluorescent lights through product reformulation.*

Since the permit was reissued in February 2001 including the Mercury Pollution Prevention Plan requirements, progress has been made with the passage of new legislation and through the work of existing programs.

Recent Legislation

On October 10, 2001, Senate Bill 633 was signed, enacting the California Mercury Reduction Act of 2001. The Mercury Reduction Act will legislate the following:

- Limit the sale of "mercury fever thermometers" to patients with a prescription after July 1, 2002
- Prohibit the sale of "mercury-added novelties" on or after January 1, 2003
- Prohibit schools from purchasing devices containing mercury (with the exception of measuring devices for use in school laboratories)
- Require that DTSC provide technical assistance to auto dismantlers to improve removal and recovery of mercury-containing vehicle light switches
- Prohibit the sale of vehicles containing mercury-containing light switches on or after January 1, 2005

TMDL Efforts

The most recent draft of the San Francisco Bay Regional Water Quality Control Board staff report entitled "Water Quality Attainment Strategy for Mercury in San Francisco Bay," was made available to the stakeholders (San Francisco Mercury Watershed Council) for comment on November 7, 2001. SCVURPPP is a stakeholder in the San Francisco Bay Mercury TMDL process and has attended the Mercury Council meetings for the past several years. The draft

report identified and quantified the following potential sources of mercury to the San Francisco Bay:

- Central Valley watershed sources, approximately 58 to 74%
- Sediment remobilization, approximately 17 to 30%
- Urban stormwater runoff, approximately 4%
- Guadalupe River, approximately 1 to 4%
- Local watershed background load, approximately 1 to 3%
- Wastewater discharges, approximately 1 to 2%
- Direct (on-bay) atmospheric deposition, approximately 1%

Potential sources of mercury to stormwater runoff in Santa Clara County include indirect atmospheric deposition and improper disposal of mercury-containing products. The most likely controllable source of mercury in urban runoff is eliminating or reducing the improper use and disposal of mercury-containing products.

Historic mining, including ore processing and waste disposal, is believed to be the major source of mercury to the Guadalupe River watershed. Concentrations of mercury in sediment generally decrease progressively from creeks in the historic mining areas to downstream locations. Soil erosion of mercury-contaminated sediments is another potential source of mercury in stormwater runoff.

The Santa Clara Basin Watershed Management Initiative (WMI) is serving as the stakeholder forum for the development of the Guadalupe River TMDL Report. The Guadalupe River Watershed encompasses parts of San Jose, Los Gatos, Campbell, Monte Sereno, and Santa Clara. SCVURPPP is a stakeholder in the Guadalupe River TMDL process. The Santa Clara Valley Water District (SCVWD) and the City of San Jose are taking the lead in representing SCVURPPP in the TMDL development process.

A Memorandum of Understanding (MOU) regarding development of a Water Quality Attainment Strategy for San Francisco Bay-Delta and Tributaries was entered into by the Regional Board, Bay Area Clean Water Agencies (BACWA), and Bay Area Stormwater Management Agencies Association (BASMAA) on August 6, 2001, and includes the development of TMDLs for 303(d) pollutants including mercury. As a member agency of BASMAA, SCVURPPP is involved in the development and funding of potential projects for the mercury TMDL.

Approach

The success of this plan lies in a Bay area-wide approach and coordination in addressing mercury pollution prevention. Evidence of this type of cooperation is exhibited in the MOU. For this reason, many of the actions identified in the Plan are for Program-level participation in regional efforts. These efforts are supplemented by county-wide and local efforts as appropriate.

Mercury-Containing Products

Mercury has been used in many products and applications historically, and is still in wide use today. Paint and pesticides no longer contain mercury, but batteries, fluorescent and other mercury-containing lamps, pharmaceuticals, preservatives, thermometers, thermostats and many other products still do. Mercury is used in many types of facilities, including medical, veterinary and dental offices, hospitals, laboratories, dairies and schools. A comprehensive list of mercury-containing products is included in Attachment A. Releases of mercury related to improper disposal, breakage or spillage of these products could potentially lead to contamination of stormwater runoff.

The following are the mercury-containing products that would most likely be used by the co-permittees (the municipalities and other agencies that make up SCVURPPP):

- Fluorescent lamps
- Thermostats
- Switches and gauges
- Detergents and cleaners

Fluorescent lamp tubes appear to have the greatest potential among the above products to impact stormwater runoff. Breakage of this very common product may comprise a significant fraction of mercury air emissions in the Bay area. Atmospheric deposition of mercury from fluorescent lamp tubes in local watersheds could potentially lead to contamination of stormwater runoff. The draft San Francisco Bay TMDL states that, "the most likely controllable source of mercury in Bay Area urban runoff is the improper disposal of mercury-containing devices, including fluorescent lights, switches, and thermostats." Therefore, the Plan identifies the development of a fluorescent lamp recycling public outreach and education program as a priority.

Mercury Pollution Prevention Plan

The Mercury Pollution Prevention Plan addresses five general goals:

- I. **Municipal Use of Mercury-Containing Products** – Eliminate all unnecessary municipal use of mercury-containing products and establish proper disposal methods for products that cannot be eliminated.
- II. **Household Hazardous Waste Collection** – Provide mercury-containing product disposal services through household hazardous waste (HHW) collection programs for residents and small businesses, and encourage use of these programs.
- III. **Monitoring and Science** – Participate in coordinated monitoring efforts to support mercury TMDL development and implementation, including assessment of air pollution sources of mercury and concentrations of mercury in sediment.
- IV. **Regional, State, and Federal Coordination** – Actively participate in regional, state, and federal coordination efforts to achieve a reduction in the amount of mercury in urban runoff and air emissions.

- V. **Public Education and Outreach** –Increase awareness of proper disposal of mercury-containing products and available non-mercury containing alternatives.

This Plan identifies whether actions will be implemented at the Program level, municipality level, or both, as well as the schedule for initiation and/or completion of Program-level actions. The details of municipality actions and schedules will be included in the individual co-permittee Work Plans and/or Annual Reports, as appropriate.

Attachment B summarizes the way in which the following Work Plan actions satisfy each of the requirements of Provision C.9.c of the SCVURPPP reissued NPDES permit.

Legend:

- “X” = will implement at this level (SCVURPPP or municipality)
- “N” = not being implemented at this level
- “A” = assist with or develop guidance for implementation
- “R” = coordinate with regional effort
- “O” = optional
- “FY” = fiscal year
- “TBD” = to be decided

Work Plan

I. Municipal Use of Mercury-Containing Products Goal I. Eliminate all unnecessary municipal use of mercury-containing products and establish proper disposal methods for products that cannot be eliminated. Actions –	SCVURPPP	Municipality	Completion Date
I.A. Develop a process to survey the types of mercury-containing products used by municipal departments. Identify appropriate municipal personnel to conduct survey. For those products with a potential to enter stormwater runoff, identify possible alternatives or proper disposal procedures.	X	A	September 2002
I.B. Complete and report results of survey of mercury-containing products used by municipal departments.	A	X	Report to Program December 2002; include in Annual Report September 2003
I.C. Develop guidelines for a mercury policy or ordinance requiring the virtual elimination of mercury from controllable sources in urban runoff from agency operations. (The word “virtual” acknowledges that total elimination of mercury-containing products may be impossible due to technological or economic factors.)	X	N	June 2003
I.D. Adopt a mercury policy or ordinance requiring the virtual elimination of mercury from controllable sources in urban runoff from agency operations.	N	X	FY03/04
I.E. Develop guidelines for mercury-containing products reduction and management. These guidelines will include a schedule for the timely phase-out of mercury-containing products identified for virtual elimination as well as reporting requirements, possibly to track recycling, replacement, and reduction in use of mercury-containing products.	X	A	Draft December 2002; Final March 2003
I.F. Implement guidelines developed under Action I.E.	N	X	FY03/04
Monitoring Mechanism I. Document completion of tasks in annual reports. Use mercury-containing product reporting guidelines (to be developed under Action I.E).	A	X	Annually (beginning in FY 02/03 report)

II. Household Hazardous Waste Collection Goal II. Provide mercury-containing products disposal services through household hazardous waste (HHW) collection programs for residents and small businesses, and encourage use of these programs. Actions –	SCVURPPP	Municipality	Completion Date
II.A. Assist HHW collection agencies with preparation of a technical memorandum summarizing infrastructure and budgetary concerns regarding the anticipated increase in fluorescent bulbs and other mercury-containing products to be recycled.	X	N	June 2002
II.B. Provide mercury-containing products disposal services for residents and small businesses.	X	X	Ongoing
II.C. Develop guidelines for documenting and reporting quantities of mercury-containing products disposed of by city. ¹	X	A	Draft December 2002; Final March 2003
II.D. Implement guidelines developed under Action II.C.	X	TBD	FY03/04
II.E. Assist HHW collection agencies in developing a Prop 13 Program grant proposal for a HHW fluorescent light recycling program (Action II.F). <ul style="list-style-type: none"> • Submit concept proposal • Submit full proposal • Decision deadline 	X	N	Feb. 2002
	X	N	June 2002
			Nov. 2002
II.F. Work with HHW collection agencies to develop and help publicize fluorescent light recycling program. ²	X	X	FY03/04
Monitoring Mechanism II.A. Evaluate whether household hazardous waste collection programs adequately serve residents and businesses.	X	N	FY03/04 (periodic review)
Monitoring Mechanism II.B. Document quantities of mercury-containing products disposed at household hazardous waste collection facilities (see Action II.C). ¹	X	N	Annually (beginning in FY03/04 report)

¹ Guidelines for documenting and reporting quantities of mercury-containing products disposed of by city will developed, taking into consideration whether it is possible to separate mercury from other waste streams and whether it is possible to track mercury-containing product disposal by municipality.

² Action II.F may be conducted in conjunction with Public Education and Outreach Actions (see Section V of this Work Plan). Completion date for Action II.F is contingent upon award of a Prop 13 Program grant.

III. Monitoring and Science Goal III. Participate in coordinated monitoring efforts to support mercury TMDL development and implementation, including assessment of air pollution sources of mercury and concentrations of mercury in sediment. Actions –	SCVURPPP	Municipality	Completion Date
III.A. Continue financial support of the Regional Monitoring Program (RMP), including the Mercury Deposition Network Pilot Study. Continue to actively participate in the RMP steering committee and technical review committee. <ul style="list-style-type: none"> • Supported completion of the San Francisco Bay Atmospheric Deposition Pilot Study Part 1: Mercury • The City of San Jose will continue to provide in-kind services for the maintenance of the Mercury Deposition Network site near San Jose. 	X X N	A A O ³	Ongoing Submitted August 2001 Ongoing, through 2004
III.B. Provide financial and staff support for a coordinated regional plan to collect data for the mercury TMDL, as defined in the RWQCB/BACWA/BASMAA MOU.	X	A	To be defined as MOU actions are planned
III.C. Continue financial and staff support for the Joint Stormwater Agency Project to Study Urban Sources of Mercury to assess sediment mercury concentrations and percentage of fine material. <ul style="list-style-type: none"> • Completed the Work Plan Joint Stormwater Agency Project – Year Two Investigation of Urban Sources of Mercury, PCBs and Organochlorine Pesticides • Preparing the Joint Stormwater Agency Project to Study Urban Sources of Mercury, PCBs and Organochlorine Pesticides - Year Two Report. 	X X X	A A A	Ongoing Submitted June 2, 2001 Due April 2002
III.D. Develop and implement a five-year program of monitoring efforts.	X	N	Draft due March 2002; implement beginning July 2002
Monitoring Mechanism III. Submit monitoring data and reports to the Regional Water Quality Control Board and other interested parties (such as USEPA). Review monitoring data and reports and develop follow-up recommendations.	X	N	Ongoing, when available

³ Participation in this action by municipalities is limited to the City of San Jose.

<u>IV. Regional, State, and Federal Coordination</u> Goal IV. Actively participate in regional, state, and federal coordination efforts to achieve a reduction in the amount of mercury in urban runoff and air emissions. Actions –	SCVURPPP	Municipality	Completion Date
IV.A. Participate in the activities of the Bay Area Stormwater Management Agencies Association, the California Storm Water Quality Task Force, and the San Francisco Estuary Institute and communicate Program efforts.	X	N	Ongoing
IV.B. Collaborate in technical studies to support TMDL development and implementation including the Santa Clara Basin WMI Guadalupe River Mercury TMDL Workgroup.	X	O ⁴	Ongoing
IV.C. Support and participate in development of the WMI Watershed Action Plan.	X	O ⁵	Ongoing
IV.D. Submit the SCVURPPP draft Mercury Pollution Prevention Plan to the WMI to ensure that efforts are coordinated.	X	N	March 2002
IV.E. Support, participate in, and advocate increased regional collaboration with the RWQCB and the Bay Area Air Quality Management District (BAAQMD).	X	N	Ongoing, beginning FY02/03
IV.F. Support and track the progress of the U.S. Department of Energy (DOE) Office of Building Technology's Vision 2020 Lighting Technology Roadmap. ⁶	X	N	As needed
Monitoring Mechanism IV. Document participation of Program staff in collaborative efforts and progress of these efforts.	X	N	Annually (beginning in FY 02/03 report)

⁴ The City of San Jose and the Santa Clara Valley Water District are participating in the development of the Guadalupe River Mercury TMDL.

⁵ The Cities of San Jose, Sunnyvale, and Palo Alto, SCVWD, and SCVURPPP (on behalf of the other co-permittees) are signatories to the WMI and participate in the Core Group and subgroups.

⁶ DOE's Vision 2020 Lighting Technology Roadmap includes the following as one of its goals for the year 2020, "Highly efficient, reduced-mercury fluorescent sources will come to market." Sustainable Conservation's September 27, 2000 report entitled "Reducing Mercury Releases From Fluorescent Lamps: Analysis of Voluntary Approaches," concluded that "we do not believe that starting a new collaborative approach with manufacturers to create mercury-free fluorescent lamps is the most effective use of resources at this time." Instead, Sustainable Conservation recommends focusing on voluntary recycling of mercury-containing lamps.

V. Public Education and Outreach Goal V. Increase awareness of proper disposal of mercury-containing products and available non-mercury containing alternatives. Target audiences include residential, commercial, and industrial users and municipal employees. Actions –	SCVURPPP	Municipality	Completion Date
V.A. Develop various outreach programs to educate target audiences about proper disposal of mercury-containing products and alternative non-mercury containing products. Outreach programs will include, but may not be limited to, the following: <ul style="list-style-type: none"> • Develop and begin to implement a fluorescent light recycling outreach program to educate residential users and encourage proper disposal of fluorescent lights. • Develop and begin to implement a fluorescent light recycling outreach program to educate small businesses and conditionally exempt small quantity generators and encourage proper disposal of fluorescent lights. (For example, the small business outreach program might include coordination with local chapters of the Building Owners and Managers Association [BOMA] or the National Association of Industrial and Office Properties [NAIOP].) • Coordinate with municipal inspectors to integrate mercury outreach to industrial businesses into their existing routine pretreatment, source control, and/or hazardous materials inspection processes. • Develop and distribute “tailgate safety meeting cards” about mercury to inspectors and other municipal employees. (The Program will first review the product developed by the Fairfield-Suisin Sewer District when it is made available to the Bay Area Pollution Prevention Group [BAPPG].) 	X	A	TBD
	X	A	FY 02/03
	X	A	FY 03/04
	A	X	FY 03/04
	X	X	TBD
V.B. Develop or adapt existing mercury outreach materials, as needed, for outreach programs.	X	A	Begin FY 02/03
V.C. Attend community events and distribute outreach materials.	X	X	Periodically, beginning FY 02/03
Monitoring Mechanism V.A. Document quantities of mercury-containing products disposed at household hazardous waste collection facilities. (See Monitoring Mechanism II.B.)	X	N	Annually (beginning FY 02/03)
Monitoring Mechanism V.B. In the Annual Report, document and evaluate each outreach activity, including the target audience and number of residents and/or businesses reached.	X	X	Annually (beginning FY 02/03)
Monitoring Mechanism V.C. Survey local public attitudes and behavior to evaluate the success of outreach efforts and the saturation of outreach messages (coordinate survey with Watershed Watch Campaign Survey).	X	A	TBD

Attachment A
List of Mercury-Containing Products

Product	User(s)/Application
Caustic soda and chlorine	Industrial, commercial, households
Clothing dyes and pigment	Households, commercial, laundries
Contact lens solution	Households, medical facilities
Dental amalgam	Dental fillings
Detergents, cleanser and disinfectants	Industrial, commercial, households
High pressure sodium lamps	Industrial, commercial, households
Instruments Barometers Hydrometers Pyrometers Sphygmomanometers Manometers	Industrial and commercial
Lamps Fluorescent Metal halide High pressure sodium	Industrial, commercial, households
Novelty items	Consumers
Paints and glues Gold porcelain paint Corrugated cardboard glue	Industrial, commercial, households
Pharmaceuticals Eye area cosmetics Diuretics Hemorrhoidal ointments Homeopathic remedies Nasal sprays Skin bleaching creams Teething powder Vaccines	Medical, dental, veterinary, households
Switches and relays	Industrial, commercial, households, automobiles
Thermometers	Medical facilities, industrial, commercial, households
Thermostats	Industrial, commercial, households
Veterinary products	Veterinary clinics

Attachment B

Fulfillment of Permit Provisions

The actions identified in this Mercury Pollution Prevention Plan have been developed in order to reduce mercury in urban runoff and to satisfy the requirements of Provision C.9.c. of the SCVURPPP reissued NPDES permit.

Permit Provision C.9.c.i. requires the development and adoption of policies, procedures, and/or ordinances calling for the virtual elimination of mercury from controllable sources in urban runoff, including the identification of mercury-containing products used by the Dischargers and a schedule for their timely phase out. Part I of the Plan targets municipal use of mercury – containing products. Under Action I.B of the Plan, each municipality will conduct a survey of mercury-containing products used in its operations. Action I.D requires municipalities to adopt a mercury policy or ordinance requiring the virtual elimination of mercury from controllable sources in urban runoff from agency operations. Guidelines for mercury-containing products reduction and management (developed under Action I.E) will include a phase-out schedule.

Permit Provision C.9.c.i. also calls for coordination with solid waste management agencies to ensure maximum recycling of fluorescent lights and/or establishment of “take back” programs for the public collection of mercury-containing household products. Part II of the Plan targets household hazardous waste collection. Actions II.A, II.B, and II.E are focused on coordination with HHW collection programs to ensure that sufficient infrastructure and budget exist to support an increase in recycling of mercury-containing products. Action II.F, along with the public education outreach actions in Part V, is designed to raise public awareness about the importance of recycling mercury-containing products. Implementation of these actions should help to ensure maximum recycling of mercury-containing products, especially fluorescent lights.

Permit Provision C.9.c.ii. calls for a schedule for assisting the Regional Board staff in conducting an assessment of the contribution of air pollution sources to mercury in the Dischargers’ urban runoff. Any assessment of air pollution sources of mercury in urban runoff will need to be a regional effort conducted in conjunction with the BAAQMD. As stated in Action IV.E, SCVURPPP will support and participate in regional collaboration with the RWQCB and BAAQMD. In addition, SCVURPPP supports the RMP’s Mercury Deposition Network Pilot Study, and the City of San Jose provides in-kind services for the maintenance of one of the Mercury Deposition Network sites (as described in Action III.A).

Permit Provision C.9.c.iii. requires an assessment of the sediment mercury concentrations and percentage of fine material at the base of key watersheds. This assessment is being conducted as part of the Joint Stormwater Agency Project to Study Urban Sources of Mercury. As described in Action III.C, SCVURPPP provides financial and staff support for this project.

Permit Provision C.9.c.iv. calls for a public education, outreach and participation program designed to reach residential, commercial and industrial users of mercury-containing products and sources of mercury-containing emissions. Part V of the Plan targets public education and outreach. SCVURPPP’s public education and outreach focus for the near future will be on fluorescent light recycling. Action V.A outlines a phased fluorescent bulb recycling outreach program to residential users the first year and to small businesses the second year. Actions V.B and V.C require the development and distribution of fluorescent bulb recycling outreach materials. Action V.A also specifies that industrial users will be educated on proper disposal of fluorescent bulbs through routine Pretreatment and Source Control Program inspections.

Permit Provision C.9.c.v. calls for participation with other organizations to encourage the electric light bulb manufacturing industry to reduce mercury associated with the disposal of fluorescent lights through product reformulation. The U.S. Department of Energy's Vision 2020 Lighting Technology Roadmap includes the following as one of its goals for the year 2020, "Highly efficient, reduced-mercury fluorescent sources will come to market." In the shorter term, DOE is pushing for use of existing energy efficient lamp technology, including fluorescent bulbs. Under Action IV.E, SCVURPPP will support and track the progress of DOE's Vision 2020 Lighting Technology Roadmap. Sustainable Conservation's September 27, 2000 report entitled "Reducing Mercury Releases From Fluorescent Lamps: Analysis of Voluntary Approaches," examined the lamp manufacturing industry, the environmental effects of mercury, and the regulatory structure and concluded that "we do not believe that starting a new collaborative approach with manufacturers to create mercury-free fluorescent lamps is the most effective use of resources at this time." Instead, Sustainable Conservation recommends focusing on voluntary recycling of mercury-containing lamps.