



# California Regional Water Quality Control Board

## San Francisco Bay Region



Alan C. Lloyd, Ph.D.  
Agency Secretary

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Arnold Schwarzenegger  
Governor

### ITEM 7 – ATTACHMENT B

**TO: Chevron Products Company  
Conoco Phillips  
Shell Opus Refining Company  
Ultramar Golden Eagle  
Valero Refining Company**

**DATE: February 17, 2005**

### **REQUIREMENT UNDER CALIFORNIA WATER CODE SECTION 13267 FOR SUBMITTAL OF TECHNICAL REPORTS ON THE FATE OF MERCURY IN CRUDE OIL IN BAY AREA PETROLEUM REFINERIES AS THEY RELATE TO DISCHARGES OF MERCURY INTO SAN FRANCISCO BAY**

Pursuant to California Water Code (CWC) Section 13267, as a petroleum refinery discharging mercury into San Francisco Bay (the Bay), you are hereby required to submit the technical reports described in Table 1 (below) regarding the fate of mercury in crude oil processed in your refinery as they relate to discharges of mercury into the Bay. The reports shall be submitted in accordance with the schedule in Table 1 for Executive Officer concurrence. We prefer that you collaborate with the above named recipients to produce a single study. However, if you choose not to participate with the other refineries, you will be required to submit an identical study that pertains only to the atmospheric mercury emissions from your facility according to the schedule in Table 1.

Although there are other possible pathways by which refinery mercury could enter the Bay, the focus of this information request is on the portion of mercury in crude oil processed in Bay Area petroleum refineries that is emitted from the refineries directly to the atmosphere and that could then enter the Bay via direct deposition to the Bay surface or deposition to the Bay's watershed and subsequent transport to the Bay via tributaries or urban runoff. The Water Board and the refineries are conducting an information exchange concerning the other pathways.

The estimates shall be based on a sampling and analysis program that accounts for intra- and inter-annual variability. The desired outcomes of the reports are:

- An estimate of the total mass of mercury emitted directly to the atmosphere per year from all Bay Area refineries combined;
- A thorough discussion of calculation methodology, uncertainties in the estimate, and assumptions used in the calculation; and
- A discussion of the fate of this emitted mercury and an estimate of how much of this mercury would be discharged to the Bay via direct or indirect deposition along with a discussion of the basis for this estimate.

Table 1 Schedule of Deliverables		
Report	Due Date	Comments
Draft Sampling, Analysis, and Calculation Methodology Plan for Bay Area Petroleum Refinery Mercury Air Emissions and Fate.	July 31, 2005	Water Board staff will review the draft to confirm that the plan is suitable to address information needs.
Final Sampling, Analysis, and Calculation Methodology Plan for Bay Area Petroleum Refinery Mercury Air Emissions and Fate.	November 30, 2005	The Executive Officer will approve or disapprove the Final Plan, subject to any conditions.
Draft Report on Bay Area Petroleum Refinery Mercury Air Emissions and Fate.	February 28, 2007	Water Board staff will review the Draft Report to confirm that the report addresses the intent of the information request.
Final Report on Bay Area Petroleum Refinery Mercury Air Emissions and Fate.	May 31, 2007	The Executive Officer will approve or disapprove the Final Report, subject to any conditions.

The Water Board needs the information in the required reports in order to better assess the significance of petroleum refineries as a source of mercury discharges into San Francisco Bay, as well as to more accurately adapt implementation actions for petroleum refineries commensurate with their mercury loads to the Bay as part of the Mercury TMDL. The Mercury TMDL Staff Report identifies this information need as a major source of uncertainty that needs to be resolved for successful TMDL implementation (Water Board 2004, pages 77, 90).

### Technical Background Relevant to Information Request

As explained in the Mercury TMDL Staff Report (Water Board 2004), the fate of mercury originally contained in crude oil is not well understood. This mercury may be emitted directly to the air from the refinery, transferred to a variety of refinery products, discharged in wastewater, or contained in solid waste. The amount of mercury in refinery crude oil processed in the Bay Area is about 380 kg/yr (Water Board 2003(b)). Based on refinery wastewater monitoring data, a very small amount of this mercury (less than 1 kg/yr) is discharged in wastewater effluent (Water Board 2003(a)). Based on monitoring information, only about 5 kg per year of mercury ends up in automobile fuels (Conaway et al. 2005). Therefore, we cannot account for approximately 370 kg/yr of mercury, some of which is likely being discharged (directly or indirectly) to the Bay through atmospheric deposition or other pathways. As set forth in the Staff Report, petroleum refineries



should “evaluate the significance of their atmospheric emissions by providing a more precise estimate of the amount of mercury contained in Bay Area refined crude oil and investigating the ultimate fate of the mercury originally contained in crude oil” (Staff Report, p. 90). More-detailed information is available in the Water Board’s public file for the Mercury TMDL for San Francisco Bay. The purpose of this information request is to determine the extent to which mercury entering petroleum refineries reaches San Francisco Bay via one of the potential pathways (direct emission to the air and subsequent direct and indirect deposition).

Failure to comply with the requirements of this CWC Section 13267 Order may subject you to civil liability of a maximum amount of \$1,000 per day of violation. Examples of non-compliance include, but are not limited to, failure to timely submit a required plan or report or failure to submit an adequate plan or report. Any request to amend the requirements of this Order must be set forth in writing. Any approval of such a request will be made by the Executive Officer and must be in writing in order to be effective.

If you have any question, please contact Richard Looker at (510) 622-2451, or via e-mail at [rlooker@waterboards.ca.gov](mailto:rlooker@waterboards.ca.gov).

Sincerely,

Bruce H. Wolfe  
Executive Officer

Cc: Kevin Buchan, Western States Petroleum Association



**References**

Conaway, Christopher H. et al. 2005. "Estimate of mercury emissions from gasoline and diesel fuel consumption, San Francisco Bay area, California." *Atmospheric Environment* 39 no. 1.

San Francisco Bay Regional Water Quality Control Board (Water Board). 2003(a). *Revised Statistical Analysis of Mercury Data from Bay Area Refineries*. Prepared by R. Schlipf. February 18.

San Francisco Bay Regional Water Quality Control Board (Water Board). 2003(b). "Estimated Mercury Mass in Bay Area Automobile Emissions and Crude Oil Processed By Bay Area Refineries." Prepared by R. Looker, April 1.

San Francisco Bay Regional Water Quality Control Board (Water Board). 2004. *Mercury in San Francisco Bay: Total Maximum Daily Load (TMDL). Proposed Basin Plan Amendment and Staff Report*. September 2.