APPENDIX C

Public Comments Received

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Appendix C

Public Comment Letters Received On the Basin Plan Amendment and Staff Report

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Associated General Contractors of California and the Bay Planning Coalition, *et al*

ARCADIS U.S., Inc.

Bay Area Clean Water Agencies

Bay Area Stormwater Management Agencies Association

Baykeeper and Clean Water Action

California Chamber of Commerce and General Electric, Part 1, Latham and Watkins

California Chamber of Commerce and General Electric, Part 2, Dr. David Sunding

California Department of Transportation, Division of Environmental Analysis

Roger James

Mirant Delta, LLC

Pacific Gas and Electric

San Francisco Public Utilities Commission

City of San Jose, Environmental Services Department

US Environmental Protection Agency

TMDL COMMENTS
San Francisco Bay PCBs TMDL

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August 20, 2007

Executive Summary

- Best Management Practices (BMPs) can reduce sediment loading in stormwater and, to a degree, should reduce polychlorinated biphenyl (PCB) loading associated with sediment in stormwater to the San Francisco Bay (the Bay).

- BMPs alone will be insufficient to achieve the concentrations/loading reductions required by the total maximum daily load (TMDL); thus, active collection and treatment of stormwater will be required across the Bay.

- The Best Available Technology (BAT) for PCB removal is activated carbon; however, even with advanced technologies used in conjunction with activated carbon, achievement of the target PCB stormwater concentrations of 640 – 8,050 picograms per liter (pg/L) corresponding to the TMDL stormwater waste load allocation is not feasible in full-scale applications.

- The collection and treatment of stormwater across the San Francisco Bay is technically impracticable and infeasible. The approach would require storage of almost 59,000 million gallons of water, which would require 28 square miles of land around the San Francisco Bay. This land is not likely available and use of this land for stormwater storage could cause environmental damage to sensitive areas.

- ARCADIS has significant concerns with a number of mathematical errors that directly affect the magnitude of the TMDL and the implementation plan. In order to accurately assess the impact of the TMDL, these mathematical errors need to be corrected.

Expert Report

The Total Maximum Daily Load (TMDL) for polychlorinated biphenyls (PCBs) in the San Francisco Bay Proposed Basin Plan Amendment and Staff Report ("PCB TMDL Amendment and Staff Report") (California Regional Water Quality Control Board [CRWQCB] 2007) indicates that waste load allocations for municipal and industrial wastewater discharges will be implemented through National Pollutant Discharge Elimination System (NPDES) permits. These permits require implementing Best Management Practices (BMPs) to maintain optimum treatment

performance for solids removal and to identify and manage controllable PCB sources. The regulatory analysis section of the PCB TMDL Amendment and Staff Report states: "These BMPs and other forms of mitigation, which are both feasible and already in common use as standard industry practice, are expected to reduce all potentially significant impacts to less than significant levels." (p. 75)

Controlling PCBs in stormwater is largely dependent on the removal of PCB-containing solids; ARCADIS agrees that BMPs are an important tool for removing PCBs from stormwater in the San Francisco Bay Area (the Bay Area). However, the PCB TMDL Amendment and Staff Report states that stormwater collection and treatment also will need to be employed to address PCBs in stormwater, including urban runoff. The collection and treatment of urban runoff from the entire Bay Area drainage is a monumental task, which is technically impracticable and economically infeasible for municipalities and industries that may be subject to this requirement. Removal of PCBs from stormwater to the target concentrations corresponding to the TMDL stormwater waste load allocation at the scale and magnitude necessary to attain the TMDL has not been demonstrated to be achievable. These concerns are discussed further below.

The scientific basis for many of the assumptions used in the PCB TMDL Amendment and Staff Report is suspect due to the number of significant math errors. While ARCADIS was not able to perform a thorough review of the data and calculations in the entire report, we discovered significant math inaccuracies. The mathematics presented in the PCB TMDL Amendment and Staff Report are critical to the overall evaluation of PCBs in the Bay Area, and, as such, deserve their own commentary.

ARCADIS's Expert Report focuses on three main topics:

- The use of BMPs to achieve the TMDL for PCBs in the Bay.
- The technical feasibility of achieving the TMDL using the current best available technology (BAT).
- The presence of mathematical errors in the formulation of the Bay TMDL in the PCB TMDL Amendment and Staff Report.

A more detailed discussion of each of these three areas is presented below.

Use of Best Management Practices

As BMPs have been developed for a variety of applications, case studies have demonstrated not only the success, but also the flexibility of the BMP approach in controlling waste loading to receiving waters. Currently available BMPs are often general in nature and focus on such topics as good housekeeping, management, construction practices and sediment control. BMPs specifically discussed in the PCB TMDL Amendment and Staff Report are routine maintenance BMPs to reduce the discharge of sediment to the Bay (e.g., storm drain inlets, detention basins, street sweeping and construction site maintenance) (pp. 69, 81, 82, 85, 88). The PCB TMDL Amendment and Staff Report states that ongoing attainment of suspended solids effluent limits

provides a surrogate indicator of PCB control. Thus, BMPs used to decrease suspended solids loading are appropriate to assist in the achievement of the PCB TMDL in the Bay Area.

Additional state-specific guidance regarding BMPs is provided in a series of four Stormwater Best Management Practices Handbooks (California Stormwater Quality Association [CSQA] 2003): New Development and Redevelopment, Construction, Industrial and Commercial, and Municipal. These four handbooks represent the current practices and standards in California. The purpose of the Industrial and Commercial handbook is "…to provide general guidance for selecting and implementing BMPs to reduce the discharge of pollutants in runoff from industrial facilities and selected commercial businesses to waters of the state." (CSQA 2003, p. 1-1) This handbook further states that it "…provides guidance on the identification and selection of BMPs that are the cornerstone of an effective Storm Water Pollution Prevention Plan. Due to the diversity in receiving waters, site conditions, and local requirements across California, it is not the intent of this handbook to dictate the actual selection of BMPs…but rather to provide the framework for an informed selection of BMPs." (p.1-1)

The BMPs listed in the Industrial and Commercial Handbook are divided into four categories: non-structural, structural, source control and treatment control. The source control BMPs focus on: spill prevention, control and cleanup, vehicle and equipment management, material and waste management (e.g., loading, storage, handling, and safer alternatives) and building and grounds management. The treatment control portion of the handbook addresses the inspection and maintenance requirements for treatment control BMPs that may be in use at industrial and commercial facilities, particularly those BMPs in the public domain (e.g., those that are readily available without proprietary technology such as infiltration trenches and basins). A limited discussion is included in the handbook on general categories of proprietary technologies such as media filters, vortex separators and wet vaults. The BMPs described in the Industrial and Commercial Handbook represent broad classes of measures, many of which may already be in use by industries for reasons unrelated to stormwater pollution.

Additional BMP resources are provided below.

The California Environment Protection Agency provides access to BMP databases (http://www.swrcb.ca.gov/stormwtr/bmp_database.html) from sources such as the American Society for Civil Engineers, the Metropolitan Council of Minnesota and North Carolina State University.

The International Stormwater BMP database contains several studies focusing on the use of inlet filter traps and wet ponds (http://www.bmpdatabase.org/index.htm) that list PCBs as analytical parameters among a large suite of inorganic and organic pollutants. Only one of these studies contained sufficiently detailed BMP information to allow the evaluation of the effectiveness of the BMP for specific analytes; PCBs, however, were not detected in the influent or effluent in this study. Although lacking PCB-specific information, this database contains over 140 BMPs, including a performance evaluation of select BMPs' effectiveness at removing total suspended solids. Although influent concentrations were not provided, total suspended solids between 10 and 20 milligrams per liter (mg/L) were reported by the United States Environmental Protection

Agency (USEPA) in the effluent of BMPs such as retention ponds and wetland basins (USEPA 2007).

The Metropolitan Council of Minnesota's Urban Small Sites Best Management Practices Manual (http://www.metrocouncil.org/environment/watershed/bmp/manual.htm) includes information on 40 BMPs for managing stormwater pollution at small urban sites in cold climates. The BMPs described are divided into two categories: runoff pollution prevention BMPs and stormwater treatment BMPs, with specific fact sheets for each BMP. Each fact sheet includes a graphical depiction of the degree of design benefit for the removal of total suspended solids.

The North Carolina State University BMP information (http://www.bae.ncsu.edu/stormwater/) also focuses on general BMPs such as bioretention areas, green roofs, stormwater wetlands, permeable pavers and water harvesting systems.

The USEPA maintains a National Menu of Stormwater BMPs (http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm), is divided into six areas: public education and involvement, illicit discharge detection and elimination, construction and post-construction practices, and pollution prevention/housekeeping operations for municipal facilities.

The USEPA defines a stormwater BMP as "…a technique, measure or structural control that is used for a given set of conditions to manage the quantity and improve the quality of storm water runoff in the most cost-effective manner" (USEPA 1999a). The USEPA's NPDES program provides several general documents regarding the development, design and cost of BMPs, including:

- Guidance Manual for Developing Best Management Practices (USEPA 1993).
- Preliminary Data Summary of Urban Stormwater Best Management Practices (USEPA 1999a).
- Stormwater Management Fact Sheet: Non-Stormwater Discharges (USEPA 1999b).

Much of the industry-specific information included in these documents encourages good housekeeping, water use reduction, and appropriate chemical handling, storage and disposal.

One common BMP in urban areas like much of the Bay Area is street sweepings. USEPA (1999a) reported that mechanical street sweepers can reduce sediment loading by up to 30% and vacuum-assisted wet sweepers can reduce sediment loading by up to almost 90%. Another common BMP is removal of sediment from storm drains and catch basins. These common BMPs focus on removing sediment before storm water washes the particles away from the source. However, while there is a large body of knowledge that exists regarding the selection, implementation and effectiveness of BMPs for the removal of total suspended solids, there is no information on the effectiveness of BMPs alone to meet the target PCB stormwater concentrations of 640 – 8,050 picograms per liter (pg/L). Therefore, treatment of stormwater will be required as discussed below.

Technical Feasibility of Achieving the TMDL Using Best Available Technology

Implementing BMPs will reduce the overall PCB waste load to the Bay; however, active treatment methods will be required to approach the effluent levels consistent with the proposed total PCB waste load of 10 kilograms per year (kg/yr). Of the proposed 10 kg/yr total PCB waste load, 3.0 kg/yr is allocated to stormwater runoff (2.0 kg/yr – through public storm drains; 0.9 kg/yr treated through publicly-owned treatment works) and non-urban stormwater runoff (0.1 kg/yr) (see Table 22, p. 60 of the PCB TMDL Amendment and Staff Report).

The PCB TMDL Amendment and Staff Report notes that stormwater collection and treatment will need to be employed to address PCBs in stormwater, particularly urban runoff. We concur with the CRWQCB's implication that BMPs alone will not result in compliance with the TMDL. We disagree, however, with the CRWQCB's conclusion that adding stormwater capture and treatment will achieve such compliance. In reality, achieving the stormwater PCB waste load of only 3.0 kg/yr is not feasible even with complete capture and treatment of the stormwater to effluent concentrations below current analytical method detection limits.

The collection and treatment of urban runoff from the entire Bay Area drainage is a monumental task which is technically impracticable and economically infeasible for municipalities and industries that may be subject to this requirement. As an example of the technical impracticability, the area required to store the water that will require treatment is estimated at 28 square miles, primarily for retention basins (see calculation below); these land requirements cannot likely feasibly be met in the Bay Area, and the CRWQCB makes no attempt to characterize or address this issue. The Alameda Countywide Clean Water Program (2004) concurred by stating that "stormwater detention ponds, swales and constructed wetlands would likely be infeasible for built-out areas in which undeveloped land is at a premium." Further discussion of the collection and treatment of the urban runoff from the Bay Area is presented below. The impracticability and feasibility of the collection and treatment of urban runoff needs to be considered as part of the implementation plan for the PCB TMDL.

As discussed above, BMPs alone will not remove PCBs in water in order to achieve the target PCB concentrations corresponding to the proposed TMDL stormwater waste load allocation (i.e., 640 – 8,050 pg/L PCBs in stormwater discharge). Therefore, collection and treatment of stormwater will be required. ARCADIS has conducted a thorough review of available treatment technologies for the removing PCBs from water, which included literature reviews, engineering evaluations of existing treatment systems and interviews with technology vendors. As noted in the PCB TMDL Amendment and Staff Report, a critical component in the treatment effectiveness is solids removal. The more efficiently a system removes solids, the more efficiently the system will remove PCBs associated with solids. Thus, most systems designed to remove PCBs from water will first include aggressive solids removal systems (e.g., settling, sand filters, coagulation/flocculation, etc.) to remove solids prior to subsequent treatment processes. A number of systems then include advanced oxidation processes to further reduce (through chemical destruction) the concentration of PCBs in water. However, upon evaluating available information, ARCADIS determined that activated carbon is the most widely used technology as the final treatment process and constitutes BAT for PCB removal. USEPA (2000) concurred with this finding by stating that "granular activated carbon (GAC) adsorption has been used

successfully for the advanced (tertiary) treatment of municipal and industrial wastewater…to adsorb the relatively small quantities of soluble organics (see Table 1)." Table 1 in this document provides a list of organic compounds that are amenable to adsorption by carbon, which includes PCBs.

As noted above, using readily available information, ARCADIS examined the feasibility of capturing and treating the stormwater runoff flow resulting from a 24-hour rain event equal to at least 0.2 inches per hour intensity in the Bay Area watershed. While ARCADIS realizes that the entire basin will not have this amount of rain at the same time, we cannot design a single capture system for the entire basin. ARCADIS based the design on dividing the basin into 55 equal sections. Each section will have to be ready for a full rain event. Thus, the total design numbers are based upon each of the sections being designed for 0.2 inches of rain per hour in their area. While the 55 treatment systems will not all be needed at the same time, they all have to be designed to be ready for the design-basis rain event. Additional activities involved selecting a stormwater flow rate, determining the necessary storage capacity, calculating the influent PCB concentration, investigating treatment processes, and calculating a cost estimate to implement a system to store and treat the Bay Area stormwater. These activities are described in greater detail in subsequent sections.

Stormwater Flow Rate

ARCADIS initially examined the stormwater flow rate contained in a Kinnetic Laboratories, Inc. (KLI) report upon which the PCB TMDL Amendment and Staff Report based its estimates of PCB loads to the Bay (KLI 2002). KLI utilized a simple area-weighted model to generate average runoff volumes from the 17 Bay Area watersheds based on estimates of annual average rainfall taken from long-term records from the National Climatic Data Center Cooperative rain gauges located throughout the region. The overall range of rainfall was 14 – 49 inches per year and the most consistent range was 20 – 25 inches rainfall per year. Using this method, KLI (2002) calculated a total stormwater runoff flow rate by first estimating the percentage of 5 different land uses (i.e., residential, commercial, industrial, agricultural and open) of each of the 17 Bay Area watersheds and then multiplying by the total area in each watershed to get the drainage area by land use. Each of these drainage areas by land use in each watershed were multiplied by the average annual rainfall in each watershed and a runoff coefficient for each type of land use (range from 0.94 for commercial use to 0.01 for open land). Following unit conversion, the result is a stormwater runoff flow rate of 744 million gallons per day (mgd) for the Bay Area.

Annual average rainfall from KLI (2002) is the value that the PCB TMDL Amendment and Staff Report used to calculate the loadings to the Bay. The problem with the KLI (2002) approach, however, is that stormwater runoff is not well approximated by this statistic of using rainfall totals on an annual basis. Rain doesn't fall in small volumes each day throughout the year but instead rainfall occurs during a limited number of storm events. In the case of the Bay Area, the climate concentrates these storm events almost exclusively to the winter period of November to March. To account for this, standard practice is to base stormwater treatment volume on the system being able to store the runoff water from a design rain storm (e.g., 25-year, 24-hour), and then subsequently treat the water. Typically, historical rain records are reviewed and the design is

based upon a level of rain that occurs on a certain frequency. CRWQCB did not follow this standard practice.

In order to obtain a representative volume and flow rate for urban and non-urban stormwater runoff in the Bay Area, ARCADIS examined several alternative data sources including:

- Precipitation-Frequency Atlas of the Western United States (U.S. Department of Commerce 1973).
- San Francisco Maximum Daily Rainfall (Golden Gate Weather Services 2005a).
- San Francisco Storm Return Periods (Golden Gate Weather Services 2005b).

These sources indicated that it is reasonable to assume a design storm event that can produce 4 – 5 inches of rainfall per day. This rainfall is about the volume expected by a 25-year, 24-hour storm event in this area.

ARCADIS investigated existing stormwater design criteria for the State of California to determine if a previously-approved method of determining stormwater flow rates exists. ARCADIS identified one applicable set of design criteria previously used in the Bay Area for municipal stormwater dischargers.

The CRWQCB for the Bay Area ordered the San Mateo County Municipal Stormwater dischargers to design pollutant removal treatment systems based on either a volume or flow hydraulic basis (CRWQCB 2003). In the volume design basis, the maximum stormwater capture volume for the area is approximated by the 85th percentile 24-hour storm runoff event or the volume of annual runoff required to achieve 80 % or more stormwater capture based on local rainfall data. In the flow design basis, treatment measures should be sized to treat either:

- 10% of the 50-year peak flow rate; or
- the flow of runoff produced by a rain event equal to at least two times the 85th percentile hourly rainfall intensity for the applicable area, based on historical records of hourly rainfall depths; or
- the flow of runoff resulting from a rain event equal to at least 0.2 inches per hour intensity.

Using the flow design basis presented by the CRWQCB (2003), a 24-hr storm event would produce 4.8 inches of rainfall. While ARCADIS understands that the entire Bay Area will not likely be subject to 4.8 inches of rain simultaneously, a series of stormwater retention systems for the Bay Area would be sized and designed for that flow rate. Because any given 24-hour storm event could occur anywhere in the Bay Area watershed, each stormwater retention system must be able to collect runoff from the design storm event. ARCADIS used this rainfall input in the KLI (2002) model to derive a total stormwater runoff event flow of 58,870 mgd across the 17 Bay Area watersheds. As described above, this calculation used the same methods (e.g., 5 different land

use types and 17 Bay Area watersheds) as KLI (2002), but the design 24-hour rainfall of 4.8 inches was used in place of the average annual rainfall. This approach is consistent with the reality that rainfall occurs during a limited number of storm events throughout the year.

Stormwater Storage Capacity

Using 58,870 mgd as the stormwater flow design basis, ARCADIS calculated the amount of storage capacity necessary to hold this water prior to and during active treatment. Assuming a 10-foot deep retention basin and not accounting for treatment during the rainstorm event, a total of 18,000-acres or 28-square miles of retention basins would be required to collect the stormwater. Stormwater collection and conveyance systems would also need to be constructed for stormwater collection and treatment.

Because a single 28-square mile stormwater retention basin is not practical for the entire Bay Area, ARCADIS assumed 55 retention units of about 330 acres each with a maximum flow rate of 1,070 mgd (1/55th of the total stormwater flow for the Bay),. Using this much land for stormwater retention would have a significant environmental effect on the Bay Area. It should also be noted that each of the systems would be required to obtain effluent levels sufficiently low to reach the proposed PCB TMDL stormwater allocation of 3 kg/yr (i.e., 640 – 8,050 pg/L PCBs in stormwater discharge).

Available Treatment Options

ARCADIS examined treatment options for attaining effluent levels consistent with the proposed reduction of the total PCB waste load from stormwater runoff from 40.1 kg/yr to 3.0 kg/yr (a 93% reduction in PCB waste load). Available treatment technologies rely on the physical and chemical properties of PCBs; the most important PCB property, from a treatment, perspective, is aqueous solubility. PCBs have a low solubility in water with solubility generally decreasing with increasing congener chlorine content. PCBs have a much greater affinity for suspended materials in a solution than for the water phase. Thus, any treatment train needs to consider the two main categories of PCB-impacted water: PCBs attached to suspended solids/particulates in water; and PCBs dissolved in water.

The currently available and/or potentially applicable technology for PCB removal generally involves a two-step process: the conventional treatment, which is to pre-treat PCB-containing water and follow-up with chemical precipitation and/or biological removal; and advanced treatment, which consists of advanced oxidation, membrane technology and/or activated carbon treatment. Additionally, the application of coagulation, sedimentation and filtration forms the basis of many water treatment processes for PCBs.

Conventional treatment technologies for removing PCBs attached to suspended solids/particulates include: source solids removal (prior to water treatment), broad solids removal (e.g., oil-water separation, gravity settling), and/or enhanced solids removal (e.g., chemical or biological clarification, sand/multi-media filtration). These treatment technologies can remove PCBs down to the range of 1,000,000 to 100,000,000 pg/L.

Following the conventional treatment, advanced treatment systems such as advanced oxidation, membrane processes or activated carbon treatment, can then be applied to further reduce PCB levels. However, treatment effectiveness of most advanced technologies can be greatly impacted by feed water quality so effective removal of solids using conventional treatment is required.

Advanced oxidation processes (AOPs) attempt to degrade organic compounds, including PCBs. Common AOPs include: UV/H_20_2, $UV/0_3$, UV/TiO_2, Fenton's, O_3/H_2O_2, and combinations of these processes. The purpose of most AOPs is to produce hydroxyl radicals (OH) in water, which are highly reactive oxidizing agents that react with and destroy most organic pollutants in water. AOPs can destroy waterborne contaminants with no secondary disposal requirements. The limitations of AOPs are the high capital and operating cost requirements and the limited field demonstrations of PCB removal effectiveness.

Membrane processes use a thin layer of material capable of separating PCBs as a function of their physical and chemical properties when a driving force is applied across the membrane. Membranes can be classified into four types: reverse osmosis, nanofiltration, ultrafiltration, and microfiltration. Reverse osmosis can remove PCBs to effluent concentrations of less than 50,000 pg/L, making it the most likely membrane technology candidate for achieving extremely low effluent levels; however, this process produces large volumes of highly concentrated waste materials containing PCBs and many other hazardous substances in the treated water, making it unattractive from a financial and regulatory perspective

GAC adsorption, currently the BAT for PCB removal, is often used at the end of a PCB removal treatment train, following other conventional and/or advanced treatment processes. GAC treatment can typically achieve effluent concentrations of PCBs of less than 65,000 to 1,000,000 pg/L, and generally requires moderate capital and moderate to high operating expenses. As one example, GAC treatment has been successfully used following UV/H_20_2 in Hudson Falls, New York to consistently achieve an effluent PCB concentration of less than 65,000 pg/L. However, in this case, the influent concentration is 38,600 pg/L, as calculated based on the loading assessment presented in KLI (2002), is already below the BAT for PCB removal. Assuming 75% solids removal, which corresponds to 75% PCB removal, the effluent using BAT may be in the range of 10,000 pg/L. The GAC would likely only provide marginal reduction of PCBs at these levels, although there is no analytical data to verify this.

GAC treatment effectiveness can be limited by the presence of solids/particulates carrying PCBs in the influent. Solids removal is necessary to: decrease solids loading during GAC treatment; increase GAC operating life; and decrease GAC backwashing, which reduces the probability of PCB-containing solids in the effluent.

Based on the available information for performance and cost, the BAT for the treatment of PCBs to levels below 1,000,000 pg/L is a conventional solids removal step(s) followed by GAC treatment. However, a database does not exist to demonstrate that this BAT will achieve the extremely low levels of PCBs required by the PCB TMDL Amendment and Staff Report.

The treatment technologies discussed above are not typically used in Publicly Owned Treatment Works (POTWs). POTWs efficiently remove solids and typically provide biological treatment and,

therefore, would remove a portion of the PCBs present in the influent; however, treatment of stormwater in POTWs to effluent concentrations below current analytical method detection limits has not been documented. Although the TMDL indicates that the POTWs are discharging relatively low concentrations of PCBs in their effluent, the TMDL does not present the associated influent data. Thus, we can not evaluate the removal efficiencies of the existing POTW systems. Due to the large volumes of stormwater storage and treatment necessary under the proposed TMDL, it is highly unlikely that the existing POTWs can handle the addition of any significant stormwater flow; in fact, most POTW systems are designed and operated to minimize/eliminate stormwater inflows due to storage and treatment capacity limitations. Even if treatment capacity is available, storage of stormwater would still be needed for the municipal systems and their use for treatment will not lower the total land requirements discussed above. The TMDL needs to address the storage and treatment capacity limitations, as well as the PCB removal efficiencies, of the existing POTWs. Removal of PCBs from stormwater to the target concentrations corresponding to the TMDL stormwater waste load allocation at the scale and magnitude necessary to attain the TMDL has not been demonstrated to be achievable.

Cost Estimating

ARCADIS examined the feasibility of capturing and treating stormwater from a reasonably foreseeable rain event by calculating a cost estimate. Costing assumptions include the following:

- Maximum flow rate = 1,070 mgd per treatment system (Total for 55 systems = 58,870 mgd).
- Design flow rate = 74,300 gallons per minute (gpm) based on emptying each retention basin in 10 days.
- Storage capacity = 330-acre retention basin 10 feet deep per treatment system (Total for 55 systems = 18,065-acre or 28-square mile retention basin, 10 feet deep).
- Influent concentration = 38,600 pg/L, which is calculated based on the loading assessment presented in KLI (2002).
- Effluent target concentration = 640 – 8,050 pg/L.
- Treatment by settling, filtration and GAC.
- Costs for a stormwater collection and conveyance system are not included.
- Carbon disposal in a properly permitted landfill or carbon regeneration.

In order to produce a reasonable cost estimate, ARCADIS assumes that the retention basins serve a dual purpose of storing the stormwater and acting as the settling function of the treatment system. While this will significantly reduce the capital costs of the treatment system, it will require

higher operations and maintenance (O&M) as the solids settled in the basins will need to be removed via dredging and disposed of in a properly permitted landfill on a periodic basis.

After settling, the solids will have to be further reduced by sand or dual media filters. GAC adsorption will follow the sand filters to remove soluble PCBs. Each of the 55 retention systems will require a separate treatment system. Each system will also require dewatering equipment to reduce the volume of solids that will require disposal. The result of this analysis is an estimated cost of $145,000,000 for each stormwater treatment system designed to reduce PCB effluent concentrations using BAT. The total cost for all 55 systems is almost $8 billion. These costs are understated because they don't included land acquisition, stormwater collection (e.g., stormwater conveyance systems) and annual O&M costs for the treatment systems.

In addition to the implementation costs, the O&M costs would be high for the following reasons. All of the sludge collected would have to be disposed of in a landfill. By dividing the total suspended solids loading by the total average flow listed in the KLI report (2002) and converting units, an average suspended solids concentration of about 170 mg/L is calculated. Using the average flow from the KLI report (2002), this suspended solids concentration and assuming an average 30% cake solids with a density of 2,500 kilogram per cubic meter (about 21 pounds per gallon), the treatment plants would annually produce a total of about 300,000 cubic yards of waste sludge for area landfills. The second major O&M cost would be GAC. Most carbon is replaced every other year as a minimum or as the system becomes saturated with the PCBs. Assuming the minimum amount of the approximately 3,000,000 pounds of carbon is replaced, the treatment system would require about 700 tons of carbon per year.

Additional key considerations regarding the implementability of such a project that would require further consideration include the following:

- Acquisition of vast amounts of land required to provide storage capacity in the Bay Area, which is an already densely populated area.
- Supply, transport and disposal/regeneration of large volumes of GAC.
- Disposal of the large volume of solids generated during the settling and filtration process.
- Impracticality of routinely monitoring compliance with extremely low level effluent limits.

In summary, the collection and treatment of stormwater runoff during a reasonably foreseeable rainfall event appears to be infeasible at present. As stated above, even with an extraordinary expenditure, the extremely low levels of PCBs required by the PCB TMDL Amendment and Staff Report would not be achieved.

Potential Environmental Impacts of Treating Urban Stormwater Runoff

Potentially significant environmental impacts are likely to result from the construction, and operation and maintenance of 55 stormwater treatment systems in the Bay Area. These impacts include: removal of significant acreage from other potentially beneficial uses within the Bay Area for the construction of retention basins (e.g., conflict with habitat conservation plans); alteration of local hydrology and drainage patterns; emission of construction-related particulates and diesel/vehicle exhaust; transport and disposal of large volumes of soil generated during retention basin construction; increased noise from the construction and operation of the treatment systems; generation, transport, and disposal of large volumes of potentially hazardous material (i.e., spent GAC and sludge); and increased energy consumption due to system construction and operation.

PCB Analytical Challenges

There are challenges associated with the detection of PCBs at the low levels required for compliance with the TMDL. The PCB TMDL Amendment and Staff Report notes that PCBs are a "difficult to measure pollutant that is present at very low levels." (p. 67) A numeric effluent limit of 0.5 µg/L is proposed for inclusion in NPDES permits as an "enforceable backstop against poor performance." (p. 67)

The numeric effluent limit of 0.5 µg/L proposed in the PCB TMDL Amendment and Staff Report reflects the level of achievable quantitation with USEPA Method 608. The PCB TMDL Amendment and Staff Report calls for the use of USEPA Method 1668A on a periodic basis to verify continued attainment of PCB waste load allocations. The detection limits and quantitation levels in this method are usually dependent on the level of interferences and laboratory background levels, rather than instrument limitations (USEPA 1999c). This method can achieve a method detection limit of 5 pg/L for select PCBs with no interferences present, although the estimated minimum levels of quantitation (the lowest concentration at which individual PCBs can be measured reliably with common laboratory interferences present) are typically higher (range = 10 – 1,000 pg/L) (USEPA 1999c). Current analytical limitations prevent verification through testing that PCB waste loads in effluents are being achieved.

Mathematical Errors in Formulating the TMDL

The mathematics presented in the PCB TMDL Amendment and Staff Report significantly impact the overall evaluation of PCBs in the Bay Area. Specific comments regarding mathematical errors reflected in the PCB TMDL Amendment and Staff Report are presented below.

The PCB TMDL Amendment and Staff Report contains several significant math inaccuracies. Specific examples of these math inaccuracies follow.

- Dredging – (p. 46) – the PCB TMDL Amendment and Staff Report states that material containing 23 kg of PCBs are dredged from the Bay each year. Of this material 13 kg are disposed outside of the Bay Area and 10 kg are disposed inside of the Bay. The report erroneously reports the math to state that 13 kg are removed and 10 kg are placed in the Bay each year. The report concludes that the two amounts cancel each others respective positive

and negative effects and that dredging does not have to be included in the overall calculation of PCBs in the Bay.

This is inaccurate. Since all of the 23 kg originally came from the Bay, the 13 kg disposed outside the Bay represent a net removal of 13 kg each year. This 13 kg represents over 15% of the 80 kg of PCBs entering the Bay as calculated by the PCB TMDL Amendment and Staff Report, which means this number is extremely significant and needs to be included in the subsequent calculations.

This particular math mistake was already spotted by one of the Board's own reviewers as noted in Appendix C of the PCB TMDL Amendment and Staff Report. Kevin Farley in his May 27, 2007 review of the TMDL states, "Based on the current wording, shouldn't the net loss be 13 not 3, kg of PCBs?" There is no explanation of why this was not corrected in the PCB TMDL Amendment and Staff Report.

- Cost of Treatment for Stormwater – (p. 99) - the PCB TMDL Amendment and Staff Report states:

> *Overall, the proposed urban stormwater runoff allocations will likely require the largest implementation costs. At this time, we project an upper bound to urban stormwater runoff expenditures of approximately $500 million annually. This is the current overall cost associated with municipal wastewater management. Municipal and industrial wastewater dischargers are not likely to have significant new implementation costs since their allocations reflect current treatment performance*

The Staff did have data on flows, concentrations and effluent requirements for stormwater and PCBs. ARCADIS used the data provided in the reports to calculate our cost estimates presented previously in these comments. The costs of wastewater treatment in POTWs are very different than the costs of stormwater treatment for PCBs. The main costs of stormwater treatment are collection and storage, while the main costs of wastewater treatment are collection and treatment. There are no similarities between the two types of treatment systems (POTWs do not typically employ BAT for PCB removal) and we are not aware of any existing references that even try to compare these two systems. Therefore, there is no basis for using $500 million.

- Total PCBs in the Bay – (p. 99) - the PCB TMDL Amendment and Staff Report states:

> *In-Bay sources of PCBs are primarily associated with Bay-margin sites that have concentrated localized deposits of PCBs-contaminated sediment. Efforts to remediate these "hot spots" are currently underway at a number of locations and some projects have already been completed. Costs to remediate these sites may be substantial, but they are costs that would be incurred with or without the PCBs TMDL. (pg. 99, PCB TMDL)*

ARCADIS' concern with this statement is that it states that the efforts to remediate these "hot spots" are already underway. However, we did not see any place where the staff tried to include the amount of PCBs removed with these efforts in their calculations presented in the PCB TMDL Amendment and Staff Report.

- PCBs in sediment – (p. 61, third paragraph) - the PCB TMDL Amendment and Staff Report states:

> *Existing PCBs loads from urban stormwater runoff are estimated at 40 kg/yr. The proposed total waste load allocation for urban stormwater runoff is 2 kg/yr. It reflects the resulting PCBs load when all sediment in urban stormwater runoff has a concentration of 1 µg/kg [microgram per kilogram], the sediment PCBs concentration goal, assuming the sediment loads used to calculate the current PCBs load do not change.*

This statement is incorrect. If the PCB estimated mean concentration coming from all land uses is 1 µg/kg and the TSS load is unchanged, then the proposed urban stormwater runoff PCB load is actually 0.2 kg/yr, representing an order of magnitude difference from the proposed urban stormwater runoff waste load allocation as presented in the PCB TMDL Amendment and Staff Report.

ARCADIS concludes that the conclusions reached in this report are not adequately based upon actual conditions in the Bay and the several parts of the evaluation process should be redone with careful and standardized review of each calculation. These parts include:

1. The amount of PCBs currently being removed by dredging

2. The cost of stormwater collection and treatment

3. The environmental impact of stormwater collection and treatment

4. The calculation of the proposed urban stormwater PCB waste load allocation

In summary, ARCADIS believes that had the external PCB load to the Bay been calculated more accurately and a true cost estimate of treating urban stormwater runoff been generated, the PCB TMDL Amendment and Staff Report may have reached a different conclusion regarding reliance on stormwater treatment as a necessary method to reach the TMDL.

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AGC CALIFORNIA

BPC BAY PLANNING COALITION

California Alliance for Jobs

California Business Properties Association

California Manufacturers & Technology Association

CSAC

CICC

CICWQ

CELSOC
Consulting Engineers and Land Surveyors of California

August 20, 2007

Mr. Fred Hetzel
San Francisco Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

Re: Establishing a Total Maximum Daily Load (TMDL) for Polychlorinated Biphenyls in San Francisco Bay and an Implementation Plan to Achieve the TMDL

Dear Mr. Hetzel:

Our organizations appreciate the opportunity to provide comments regarding the proposed amendment to the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) to establish a total maximum daily load (TMDL) for polychlorinated biphenyls (PCBs) in San Francisco Bay, and an implementation plan to achieve the TMDL. (Please see the attached Statement of Interests document briefly describing the signatory organizations)

Our organizations believe we need to work constructively with regulatory agencies in order to develop policies and permits – including the development of TMDLs – that protect the quality of our waters and at the same time enable the State to prosper economically. We support efforts to protect and improve water quality in a meaningful way through attainable implementation measures. We are concerned that the proposed PCBs TMDL and implementation plan is inconsistent with one of our fundamental regulatory rulemaking principals – seeking common-sense and economically reasonable solutions to address water quality problems.

Issues of concern our organizations have with the San Francisco Bay Regional Water Quality Control Board (Board) proposed action include:

- *Stringency* -- We understand that the Board staff previously calculated a fish target of 111 parts per billion ("ppb"), 11 times greater than the current proposal, and, as recently as January 2004, proposed a target that was more than twice as high as the current proposal. The TMDL is 3.4 to 8.9 times as stringent as the California Toxics Rule water-quality criteria set by the U.S. EPA to protect human health. The Board bears a heavy burden to demonstrate why it needs to subject the regulated community to such an extraordinarily stringent target.

- *Benefits to Human Health* -- The ostensible benefits of the TMDL are minimal and speculative, as the TMDL is addressing theoretical risks, and is intended to protect a segment of the sport fishing population that probably does not even exist (hypothetical extreme anglers who eat large quantities of bottom fish loaded with PCBs every week for 70 years).

HOME BUILDERS ASSOCIATION OF NORTHERN CALIFORNIA

Industrial Environmental Association

naiop The Forum for Commercial Real Estate

Regional Council of Rural Counties

WECA-IEC

Even if the TMDL would result in attainment of the 10 ppb fish-tissue target and even if such hypothetical anglers existed, such anglers would be able to legally buy and consume fish from markets and at restaurants that meet the federal Food and Drug Administration's national tolerance level of 2000 ppb PCBs.

- *Benefits to the Ecosystem* -- The TMDL would result in no material benefits to the ecosystem as current levels of PCBs are not hurting fish or wildlife. Bay waters are in compliance with the California Toxics Rule for the protection of aquatic life. Likewise the vast majority of PCB concentrations in Bay sediment are well below screening levels set by the U.S. EPA for the protection of wildlife.

- *Costs* -- The TMDL calls for a 95 percent reduction of PCBs in stormwater to help meet the TMDL's proposed water column concentration of 19 to 49 parts per quadrillion. BMPs could not be expected to achieve these extremely low concentrations--in fact, there is no technology demonstrated to achieve these levels in stormwater on a wide-scale basis. Nevertheless, the TMDL calls for hundreds of millions of dollars to be spent annually on removal of PCBs from stormwater, without analysis to demonstrate that such removal is necessary or feasible at any particular Bay locations. Additional huge sums would be necessary to physically remove PCBs from sediments in the Bay margin, where the Board calls for mass removal of PCBs through dredging and capping, without regard to any risk reduction benefits that might accrue. Also, the TMDL will place a cloud over port and waterfront businesses and activities, as the TMDL classifies bottom sediments in these areas as contaminated, adding complexity and cost to economic activity along the entire perimeter of the Bay.

- *Balance* -- Given the potentially huge costs of the TMDL, and the very minimal benefits associated with it, the TMDL does not reflect a reasonable balance between costs and benefits. Adoption of the TMDL would violate the economic and business priorities of the Administration, and the reasonable balance called for by the Board's governing statute, the Porter-Cologne Act.

- *Proper Technical Conditions* -- The TMDL has serious errors in its data, modeling, and analysis that leaves the Board without an accurate understanding of PCBs in the Bay. By applying a model that violates basic principles of physics (i.e., conservation of mass, the TMDL significantly understates the ability of the Bay to assimilate PCBs. The TMDL also ignores extensive, reliable data showing that the Bay is recovering from PCBs with half the PCBs dissipating every six to twelve years. External loads from the Central Valley, non-urban runoff, the atmosphere and rainfall are indefinite, and based on inappropriate, incomplete, or the faulty interpretation of data. The TMDL uses an

uncalibrated model to calculate stormwater loads and then arbitrarily assigns load reductions to counties based on their populations.

- *Impacts Review* -- Our organizations believe that an analysis of economic and environmental impacts of the Board's proposal must be conducted and that the Board has not yet developed that information. The information that is available shows that implementing the TMDL will have a potentially huge price tag, however, and will cause significant environmental impacts—including destroying healthy benthic communities, emissions of criteria pollutants, consumption of landfill capacity, and emissions of greenhouse gases.

The TMDL is another example of an unsound regulatory proposal that is not supported by science and that likely will impose very significant costs on California in general, and the San Francisco Bay Area regional economy specifically, without commensurate environmental benefit.

Our organizations are interested in working with the Board to find economically-feasible and environmentally-beneficial solutions to address PCBs in the San Francisco Bay. To that end, our organizations request the Board to pursue less costly, more environmentally sensitive alternatives to the proposed TMDL such as monitored natural attenuation with an education and outreach program for subsistence fisherman. In the alternative, if the Board moves forward with the current proposal, we ask the Board to grant us an additional forty-five days to consider and comment on the proposal. The current public comment period, initiated just prior to the Fourth of July holiday, and ending on August 20, does not provide a meaningful opportunity to review the proposed TMDL. In the meantime, we incorporate by reference as if fully set forth herein, comments submitted under separate cover by the California Chamber of Commerce.

Thank you once again for the opportunity to comment on the proposed PCBs TMDL and implementation plan.

Sincerely,

Thomas T. Holsman
Associated General Contractors of California

Ellen Johnck
Bay Planning Coalition

Joseph Cruz
California Alliance for Jobs

Rex S. Hime
California Business Properties Association

Mike Rogge
California Manufacturers and Technology Association

Karen Keene
California State Association of Counties

John Ulrich
Chemical Industry Council of California

Mark Grey
Construction Industry Coalition on Water Quality

Paul Meyer
Consulting Engineers and Land Surveyors of California

Paul Campos
Home Builders Association of Northern California

Patti Krebs
Industrial Environmental Association

James Camp
National Association of Industrial and Office Properties – California Chapters

Kathy Mannion
Regional Council of Rural Counties

Richard Markuson
Western Electrical Contractors Association

Statement of Interests

The organizations signatory to the letter each have an interest in the TMDL as their members include public and/or private entities with business, employment and/or governmental activities in the Bay area that may be affected, and impacted adversely, by the proposed TMDL. The signatory organizations are more particularly described below:

The Associated General Contractors of California (AGC), the voice of the construction industry since 1920, is an organization of responsible construction firms and industry-related companies dedicated to skill, integrity and responsibility in improving our physical environment. AGC of California is comprised of over 1,200 member companies, consisting of general contractors, subcontractors, suppliers and service firms throughout the state of California. Our members build the state's highways, tunnels, utility systems, hospitals and schools and are committed to improving the air within in the state as their employees and families live and work here. We assist our members in labor relations, safety and health, legislative advocacy, and regulatory compliance.

Bay Planning Coalition (BPC) - Founded in 1983, the BPC is a non-profit, membership-based organization representing the maritime industry and related shoreline business, ports and local governments, landowners, recreational users, environmental and business organizations, and professional service firms in engineering, construction, law, planning, and environmental sciences. The mission of the BPC is to advocate for the balanced use and regulation of San Francisco Bay-Delta resources to ensure the economic prosperity and environmental protection of the region.

The California Alliance for Jobs is dedicated to improving the livelihoods of the men and women of the Northern and Central California heavy construction industry. We believe heavy construction is an engine for our state's prosperity and the key to a better quality of life. We also believe that an investment in our infrastructure is an investment in the future. Together, the Alliance and its members are building a better California, today and for generations to come.

California Business Properties Association (CBPA) is the recognized voice of all aspects of the commercial retail industrial real estate industry in California - representing the largest commercial real estate consortium with almost 10,000 industry members. CBPA proudly serves property owners, tenants, developers, retailers, contractors, lawyers, brokers, and other professionals in the industry by representing their interests at the State Capitol and in Washington, D.C., as well as responding to the never-ending regulatory actions of dozens of state and federal agencies.

The California Manufacturers and Technology Association (CMTA) works to improve and preserve a strong business climate for California's 30,000 manufacturers, processors and technology based companies. For more than 85 years, CMTA has worked with state government to develop balanced laws, regulations and policies that stimulate economic growth and create new jobs while safeguarding the state's environmental resources. CMTA represents businesses from the entire manufacturing community - a segment of our economy that contributes more than $250 billion annually and employs more than 1.5 million Californians.

California State Association of Counties - The mission of CSAC is to represent county government before the California Legislature, U.S. Congress, state and federal agencies and other entities, while educating the public about the value and need for county programs and services. CSAC provides a broad range of services to all 58 counties in California through its Finance Corporation activities, public policy development, training, insurance service programs, research and a variety of communication tools, including Internet services. CSAC is committed to assisting California counties in providing a vital and efficient system of public services for the general health, welfare and public safety of every resident. County governments spend in excess of $30 billion a year and comprise a work force of more than 280,000 professionals. Each day county government directly or indirectly touches the lives of every Californian. The magnitude of this human effort demands strong and credible participation in our democratic institutions.

The Chemical Industry Council of California (CICC) is a voluntary trade association comprised of large and small chemical manufacturers and distributors throughout California. CICC represents multiple facilities throughout California, including: forty-three (43) manufacturing plants; five (5) research laboratories; and sixty-seven (67) sales, service, and distribution centers. Our California members account for annual sales in excess of $3,000,000,000 and directly employ more than 5700 workers, with combined annual payroll in excess of $283,000,000. An additional 11,000 indirect jobs are created by CICC member companies with an additional combined annual payroll of some $360,000,000.

The Construction Industry Coalition on Water Quality (CICWQ) is comprised of the four major construction and building industry trade associations in Southern California: the Associated General Contractors of California (AGC), the Building Industry Association of Southern California (BIA/SC), the Engineering Contractors Association (ECA) and the Southern California Contractors Association (SCCA). The membership of CICWQ is comprised of construction contractors, labor unions, landowners, developers, and homebuilders who work collectively to provide the region with housing, commercial buildings and development, institutions, and public works projects.

Consulting Engineers and Land Surveyors of California (CELSOC) is a 50-year-old, nonprofit association of private consulting engineering and land surveying firms. As a statewide organization, we are dedicated to enhancing the consulting engineering and land surveying professions, protecting the general public and promoting use of the private sector in the growth and development of our state. Our members provide services for all phases of planning, designing and constructing projects. Member services include civil, structural, geotechnical, electrical and mechanical engineering and land surveying for all types of public works, residential, commercial and industrial projects.

The Home Builders Association of Northern California (HBANC) is a professional, non-profit association committed to promoting housing for people of all income levels and the production of quality homes. HBANC's membership comprises about 1,000 home builders, trade contractors, suppliers and industry professionals in the Bay Area.

The Industrial Environmental Association promotes environmental responsibility through effective communication and interaction with our members, government, regulatory agencies, business and the community. We use proven technology, scientific methods and common sense to achieve a beneficial relationship between environmental protection, public health and economically sustainable growth.

National Association of Industrial and Office Properties – California Chapters (NAIOP) is the nation's leading trade association for developers, owners, investors, asset managers and other professionals in industrial, office and mixed-use commercial real estate. NAIOP provides communication, networking and business opportunities for all real estate related professionals; provides a forum for continuing education; and promotes effective public policy, through its grassroots network, to create, protect and enhance property values. There are six (6) NAIOP chapters in California - Inland Empire, Sacramento Valley, San Diego, San Francisco Bay, Silicon Valley, and Southern California.

Regional Council of Rural Counties (RCRC) is a non-profit corporation representing the unique interests of its 30 member counties (Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Glenn, Imperial, Inyo, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Mono, Napa, Nevada, Placer, Plumas, San Benito, San Luis Obispo, Shasta, Sierra, Siskiyou, Sutter, Tehama, Trinity, Tuolumne). RCRC members participate through their respective Boards of Supervisors. RCRC represents the elected general governments of over half of California's counties – local governments with regulatory and public trust responsibilities over lands, surface waters, groundwater, natural resources, fish and wildlife, and overall environmental quality within their respective jurisdictions.

The Western Electrical Contractors Association (WECA-IEC) began 79 years ago, has over 200 members and represents more than 6,000 electrician employees. WECA-IEC contractor members are engaged in the business of electrical construction, maintenance or repair and must have a current C-10 or C-7 license on file with the state Contractors License Board. WECA-IEC offers one of just four currently operating electrical apprenticeship programs approved by the California Apprenticeship Council (CAC). WECA-IEC trains approximately 600 students a year in its classes at its modern training centers in Sacramento and San Diego. WECA-IEC has trained more than 6,000 journeymen in preparation for state certification. All WECA-IEC employers pay their apprentices' wages and apprenticeship program tuition as well as providing major medical insurance for them. WECA-IEC is approved to train and dispatch apprentices state-wide.

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Bay Area Clean Water Agencies

A Joint Powers Public Agency

P.O. Box 24055, MS 702
Oakland, California 94623

August 17, 2007

VIA EMAIL AND FACSIMILE (510) 622-2460

Bruce Wolfe,
Executive Officer, San Francisco Bay
Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

Re: Establishing a TMDL for the PCBs in the San Francisco Bay and an Implementation Plan to Achieve the TMDL

Dear Mr. Wolfe:

The Bay Area Clean Water Agencies (BACWA) appreciate the opportunity to comment on the proposed TMDL and implementation plan for achieving the TMDL for PCBs. BACWA members own and operate publicly-owned treatment works (POTWs) that discharge to San Francisco Bay and its tributaries. Collectively, BACWA's members serve over 5 million people in the nine-county Bay Area, treating all domestic, commercial and a significant amount of industrial wastewater. BACWA was formed to develop a region-wide understanding of the watershed protection and enhancement needs through reliance on sound technical, scientific, environmental and economic information and to ensure that this understanding leads to long-term stewardship of the San Francisco Bay Estuary. BACWA member agencies are public agencies, governed by elected officials and managed by professionals who are dedicated to protecting our water environment and the public health.

The proposed TMDL indicates that Municipal Wastewater (Clean Water Agencies) discharge a small fraction of the total load of PCBs to the Bay. Our facilities operate every day at a high level of performance under very specific discharge permits. We understand that the wide spread use of PCBs has created a legacy pollution issue that is both land based and water based in our sediments. We also recognize that PCBs are still present in devices that are either still in use, or stored and which leach into the environment.

The members of BACWA have several specific comments on the PCB TMDL, these are:

1. **BACWA strongly recommends that Table A-3 be eliminated from the TMDL**; we clearly understand that the implementation of a TMDL must be through an NPDES permit. We support the allocation of 2 kg/yr for the source category of Municipal Wastewater which will result in individual permit limits for each clean water agency in their NPDES permit. We do not believe that it is necessary for the TMDL to allocate to each clean water agency a portion of the Municipal Wastewater WLA. The source category WLAs, can lead to enforceable requirements that are applied to particular sources in individual permits - as long as those requirements are "consistent with the assumptions and requirements" in a TMDL, 40 C.F.R. 122.44(d)(1)(vii). As the WLA is so small, we suggest that individual allocations be eliminated. Attainment of the TMDL and the WLA would be determined through compliance with the permit numeric effluent limit and the periodic quantification of loads as is already required by the TMDL. Please see Attachment A for more examples of USEPA approved TMDLs that do not include individual WLA for point sources.

2. **BACWA Supports the Fish Tissue Target**; BACWA supports the fish tissue target for this PCB TMDL. BACWA believes that the CTR criterion for water column concentration is not an appropriate basis for a target (and in fact is not the basis for the 303(d) listing). There is no established relationship between the water column and the fish tissue concentrations.

3. **Numeric Effluent Limit of 0.5 ug/L**; we believe that this number has been proposed because it is the lowest level of quantitation. The analysis that must be done to determine if this level is quantitated is done with Gas Chromatography. This analysis can result in multi-peak conditions that can easily be misread. We believe that a numeric effluent limit of **1.0 ug/L** would be more realistic based on the limit of current technology and available methods for measurement of PCBs. The limit you are proposing is so close to the method detection limits that we can anticipate effluent limit excursions due to analytical variability and not real constituent presence.

4. **BACWA Fully Supports Adaptive Implementation**; BACWA is supporting the development of a multi-box model so that we can better understand the fate and transport of contaminated sediments. As this information becomes available it is essential that we plan to adjust this TMDL and others. In addition, BACWA and others continue to support studies at SFEI, through our Bay Area Pollution Prevention Group and through WERF and other organizations. The investment in adaptive management studies and analyses must be targeted and focused to ensure that they will indeed further our understanding of the fish tissue target and the sediment target. Our total and joint public funding is limited; we should focus on the largest scientific uncertainties and the most significant controllable sources of the pollutant. We fully anticipate that in 10 years our understanding of issues in the Bay, as well as pollution prevention and remediation will be more advanced than it is now. Our support of this research and investigations is intended to inform policy development. We fully anticipate that this TMDL and others will be adapted as necessary as more information becomes available.

5. **BACWA Supports Risk Management**; BACWA is now engaged with the Water Board and other stakeholders to develop a Risk Reduction Management program for the San Francisco Bay. It is our understanding that this will engage other State agencies, community based organizations and county public health organizations. This is not the core work of BACWA, rather it is the responsibility of county and state public health organizations. We intend to continue to support the development of a sustainable program; we do not anticipate that such a program would ever entail the development and delivery of health care. We also request that the last bullet on page A-11 of the proposed TMDL be changed to state:
    - **Conduct or cause to be conducted special studies needed to support health assessment and risk communication.**
6. **Urban Stormwater Treatment at POTWs;** BACWA fully appreciates the incentives and encouragement that the 0.9 kg/year allocation of PCB represents for agencies that provide redirection of stormwater to POTWs. We fully understand that the proposed WLA does not represent a requirement; rather it is fully and entirely voluntary. We are not aware of any clean water agency that is ready to take advantage of this particular part of the TMDL. As you can imagine, there are many financial and regulatory issues associated with intentional diversion of stormwater to POTWs.

7. **Limited ability to reduce Loading;** BACWA members are extremely limited in their ability to reduce future loading of PCBs. Broad based source control is not effective, it must be extremely well targeted and focused; implementing a water recycling program requires public acceptance and a stable market; and pollution prevention efforts, although important from a public education standpoint, are limited in their impact on the Bay. Going beyond these limited possibilities must be voluntary for BACWA members, not required. BACWA must insist that the State develop a mass offset program which provides credits to any BACWA member (or other discharger) who volunteers to implement more advanced tools such as land based remediation of PCBs, for reducing PCB concentrations in the Bay that originate from sources other than POTWs.

BACWA members do not believe we are part of the problem that created this impairment in San Francisco Bay, but as public stewards to the Bay we want to be part of the solutions that will result in public health protection and improvements in water quality. Thank you for the opportunity to provide these comments. Should you have any questions, please feel free to contact me.

Sincerely,

Michele M Pla,
Executive Director

ATTACHMENT A

EXAMPLES WHERE EPA HAS APPROVED SOURCE CATEGORY WLAs

In developing and approving TMDLs, EPA has consistently indicated that there is some flexibility in the manner in which point source wasteload allocations are expressed. Normally, there will be a specific allocation for each individual source. However, that is not required for all sources. EPA has stated that when there is not sufficient data or information to assign individual allocations, it may be reasonable to assign one allocation to multiple sources. EPA set forth this policy as applied specifically to stormwater discharges in a 2002 guidance document - http://www.epa.gov/npdes/pubs/final-wwtmdl.pdf. Because there is no legal distinction in the TMDL program between stormwater and other sources, there is no reason that this approach cannot be applied to other sources. In fact, EPA itself has used this approach in establishing TMDLs, and in establishing other TMDL guidance. For example:

1. In its 2000 guidance on developing TMDLs, EPA Region 9 stated that "circumstances may arise in which it is appropriate to set wasteload allocations that cover more than one discharge (e.g., discharges covered by a general permit)." http://www.epa.gov/region09/water/tmdl/303d-2002pdfs/caguidefinal.pdf.

2. In the mercury TMDL for the Savannah River in Georgia, issued in 2001, EPA Region 4 set a cumulative wasteload allocation for all point sources. EPA also set individual allocations for some, but not all, of those sources - but even those allocations were not absolutely numeric. EPA gave the state the option of either using individual numeric allocations to set numeric limits, or using allocations equal to "the level of mercury in a point source's effluent after implementation, when appropriate, of appropriate and cost-effective mercury minimization measures," which would be used to establish "minimization plan" requirements in individual permits. http://www.epa.gov/owow/tmdl/examples/mercury/ga_savfinal.pdf.

3. In the Newport Bay/San Diego Creek TMDL for toxic pollutants, issued in 2002, EPA Region 9 determined that for several pollutants, "insufficient information was available to support delineation of individual WLAs for each NPDES-permitted discharge." Therefore, EPA set up a group WLA for a category of "other NPDES permittees." EPA noted that when the permits for these facilities are issued, the state should include in the fact sheet an explanation of how it has allocated the total WLA among the dischargers, including the specific levels that have been assigned to that particular source.
http://www.epa.gov/region09/water/tmdl/nbay/summary0602.pdf.

4. In the San Gabriel River TMDL for metals and selenium, issued in March 2007, EPA Region 9 provided "grouped" WLAs for dry-weather and wet-weather discharges from MS4s and Caltrans. EPA explained that this was based on insufficient information being available to assign individual WLAs. http://www.epa.gov/region09/water/tmdl/san-gabriel/final_sangabriel_metalstmdl_3-27-07.pdf.

5. In the Little River/Catahoula Lake TMDL for mercury, issued in 2003, EPA Region 6 set a cumulative WLA for all point sources. EPA also set individual WLAs, equal in each case to a concentration equal to the water quality standard (there, 12 ng/l), but stated that

the state permit writer could adjust the individual WLA to reflect a higher value, as long as the sum of all individual WLAs does not exceed the cumulative WLA and the adjusted source-specific WLA reflects levels achievable through a facility-specific mercury minimization program. http://www.epa.gov/waters/tmdldocs/little_cat_hg_f.pdf

6. In the Minnesota statewide TMDL for mercury, issued by the Minnesota Pollution Control Agency and approved by EPA Region 5 in March 2007, the state set two WLAs: one for each of the two regions of the state. The WLA "is by region and is not specific to each source, thereby providing a cap for the region that includes reserve capacity." http://www.pca.state.mn.us/publications/wq-iw4-01b.pdf . EPA, in approving the TMDL, stated that it "agrees that these wasteload allocations are reasonable in light of the significant contribution of mercury from air deposition, which as described in Section 5.1 of the TMDL report, is approximately uniform across the State, and the relatively small contribution of other sources of mercury." As for permitting of these sources, EPA stated that "at the time a permit is issued or renewed for a point source the permitting authority will need to assure that the permit is consistent with the assumptions and conditions that went into development of these wasteload allocations." http://www.pca.state.mn.us/publications/reports/tmdl-mercury-finalreport.pdf .

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Alameda Countywide
Clean Water Program

Contra Costa
Clean Water Program

Fairfield-Suisun
Urban Runoff
Management Program

Marin County
Stormwater Pollution
Prevention Program

San Mateo Countywide
Stormwater Pollution
Prevention Program

Santa Clara Valley
Urban Runoff Pollution
Prevention Program

Vallejo
Sanitation and Flood
Control District

B A S M A A

August 20, 2007

Fred Hetzel
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1515 Clay Street, Suite 1400
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Subject: PCBs Total Maximum Daily Load (TMDL) in San Francisco Bay
Proposed Basin Plan Amendment and Staff Report, June 22, 2007

Dear Fred:

This letter is submitted on behalf of the Bay Area Stormwater Management Agencies Association (BASMAA) in response to the invitation to submit comments on the document entitled *Total Maximum Daily Load for PCBs in San Francisco Bay, Proposed Basin Plan Amendment and Staff Report*, dated June 22, 2007 (hereinafter referred to as the "PCB Report/BPA"). The PCB Report/BPA was prepared by staff of the California Regional Water Quality Control Board, San Francisco Bay Region (Water Board) and, in addition to providing details on the development of the Bay PCBs TMDL, includes a plan to implement the TMDL.

BASMAA member agencies appreciate the opportunity to comment on the PCB Report/BPA and commend Water Board staff on the hard work put into this challenging project. Release of the PCB Report/BPA is an important milestone. We would also like to recognize the staff and participants of the San Francisco Estuary Regional Monitoring Program (RMP) for their important contributions to the project.

BASMAA is committed to addressing urban runoff-related impairments to beneficial uses of San Francisco Bay. We agree that reducing impairment of the Bay's beneficial uses by PCBs should be a high priority to all Bay Area public agencies and citizens. As public agencies we recognize the importance of this task, and therefore seek a fair, objective and transparent PCBs TMDL. A TMDL development process based on the best available information, sound science, feasibility, and cost-effectiveness will help establish the legitimacy and legality of the TMDL and inspire the public's confidence. Furthermore, the implementation plan must be one that can reasonably and realistically achieve the TMDL goals and wasteload allocations.

The PCB Report/BPA updates and expands upon a Water Board staff report entitled *PCBs in San Francisco Bay Total Maximum Daily Load (TMDL) Project Report,* dated January 8, 2004. BASMAA submitted comments on the January 2004 report in a letter dated February 20, 2004. Most of these comments have not been adequately addressed but remain highly pertinent; they are therefore reiterated below as appropriate. With regard to the Water Board process for adoption of this TMDL, BASMAA's February 2004 letter requested sufficient time for a meaningful official public comment process and dialogue with staff once a proposed Basin Plan amendment is released. Our letter stated as follows:

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"Because of the significant implications of such an amendment, the demands it will impose, and the amount of time and public resources it will likely consume, we would like to emphasize that our current exchange of information will be no substitute for providing adequate time (in our estimation at least six to nine months) for meaningful peer review of and public comment on a proposed Basin Plan amendment. We also request, as was done with the Bay mercury TMDL, the opportunity to review, comment on and discuss with Water Board staff and yourself an early draft version (i.e., before public release) of the sections of the PCBs Basin Plan amendment and related PCB actions relevant to urban runoff."

Rather than the requested six to nine months for review and comment, Water Board staff is providing the minimum public comment period of 45 days, a period of time that is inadequate. In addition, Water Board staff did not provide BASMAA with an early draft version of the urban runoff-related sections of the proposed Basin Plan amendment, despite promising to do so in a December 22, 2006 e-mail.[1] Further, the comment period occurs during the summer time period when many public agency staff and councils are on vacation. Thus the comments in this letter should be considered preliminary and may be revised or expanded in the future. In addition, although we are communicating with the large number (about 90) of Bay Area co-permittees covered under municipal stormwater NPDES permits, the 45-day public comment period precludes their meaningful involvement in preparing these comments. Thus, these comments do not necessarily represent the views of all the municipal stormwater co-permittees, and they may choose to provide their own comments within or after the 45-day public comment period.

It should also be noted that while the adoption of a TMDL containing wasteload allocations and load allocations may be a federally mandated requirement, the Water Board's discretionary determination to assign load reductions and implementation plan responsibilities to municipal stormwater agencies is not required by the Clean Water Act (CWA) and hence, represents a new State-imposed program and/or level of service increase which is subject to the subvention requirements of Article XIII B, section 6 of the California Constitution. (See County of Los Angeles v. Comm'n on State Mandates, Cal. App. 4th (Cal. Ct. App., May 10, 2007).).

Our goal is to work cooperatively with Water Board staff to reach common ground in establishing this important TMDL and the related implementation plan. The preliminary comments in this letter are intended to be constructive; as such, specific suggested improvements are provided in relation to each issue discussed. We request that Water Board staff incorporates our suggested comments and improvements into a revised PCB Report/BPA. We believe that our recommended changes are significant enough in breadth and scope to warrant revision of this document. Our principal comments and recommendations are summarized below; the attachment contains a more detailed discussion of each comment and provides references to specific sections and pages of the PCB Report/BPA.

Summary of BASMAA's Comments

- There is substantial anecdotal evidence that PCB-containing oils were historically used for dust control, resulting in direct releases of PCBs to the environment. In addition, the use of hydraulic fluids containing PCBs had significant potential to result in releases to the environment, since hydraulic systems were designed to leak slowly to provide lubrication.

[1]Prior to release of the PCB Report/BPA, BASMAA did have the opportunity to discuss with Water Board staff short-term aspects of the implementation plan relating to the ongoing Municipal Regional Permit development process. This, however, is not a substitute for more comprehensive discussions of the TMDL itself.

The PCB Report/BPA should be revised to discuss these uses and their relatively high potential to result in releases to the environment.

- Bay Area equipment that may continue to contain PCBs includes PG&E electrical equipment with dielectric fluids, such as substation transformers. The PCB Report/BPA should be revised to include a discussion of PG&E's historic and current use of PCBs. Furthermore, the PCB Report/BPA should acknowledge the need for additional documentation of the status of PG&E's efforts to remove PCBs from their equipment, the fate and management of such removed equipment, and the past, current, and future potential for PG&E equipment (removed and in-service) to release PCBs to the environment. This is an important potential source of PCBs that require further documentation and investigation.

- The PCB Report/BPA incorporates an estimate of PCB loading from urban runoff into the Bay of 40 kg/year. This very preliminary and highly uncertain estimate was developed by the Joint Stormwater Agency Project and was calculated using concentrations of PCBs in bedded sediments from stormwater conveyances. As such it should not be incorporated into regulatory criteria or actions such as the PCB TMDL. The PCB Report/BPA should instead be revised to designate the 40 kg/year estimate as preliminary and describe the associated assumptions, uncertainties and limitations of the estimate, per the Joint Stormwater Agency Project report. Furthermore, the PCB Report/BPA should state that the 40 kg/year estimate will be revised in the adaptive management process once sufficient data are available to extrapolate a loading estimate from ongoing RMP and future urban runoff program studies.

- The linkage analysis and calculation of the total TMDL of 10 kg/year rely on a simple one-box pollutant fate model. The PCB Report/BPA should be revised to clearly describe the limitations of this model. For example, it does not account for how processes such as pollutant loading and sediment erosion/deposition vary among different Bay segments. A multi-box fate model that is currently under development will supersede the one-box model and will help address the limitations. The PCB Report/BPA should be revised to clarify that the linkage analysis and TMDL of 10 kg/year are preliminary pending incorporation of the multi-box model. The linkage analysis and calculation should then be revised accordingly. Although the PCB Report/BPA does acknowledge the need for improved fate and transport modeling, the requested revisions are necessary to inform stakeholders and the public about the current uncertainty in our understanding of how the recovery of the Bay would respond to load reductions caused by management actions.

- The explanation of how the proposed total wasteload allocation for urban runoff of 2 kg/year was calculated is inadequate. The PCB Report/BPA should be revised to include a detailed explanation of the calculation, including all assumptions, justified values for all parameters, and the exact mathematical calculation used. This explanation and wasteload allocation is especially important to BASMAA member agencies.

- The proposed urban runoff allocation of 2 kg/year represents a 95% reduction in PCBs loads, based upon the estimated existing urban runoff load of 40 kg/year. Two kg/year is also estimated to be the resulting load when all sediment in urban runoff has a concentration of 1 ug/kg, the sediment PCB concentration goal. Meeting this allocation and sediment target in the proposed 20-year time frame is almost certainly unrealistic, impracticable and infeasible. A thorough technical and economic analysis of the feasibility of using available technologies to achieve the urban runoff wasteload allocation must be developed and

included in a revised PCB Report/BPA.

- BASMAA acknowledges that implementing the TMDL may include remediating selected on-land areas with elevated PCBs. However, it would be unfair and legally inappropriate to burden municipalities with cleaning up these sites. Thus, PCB site cleanups should not be pursued through municipal stormwater NPDES permits. Other regulatory programs and funding sources exist (e.g., Proposition 13 and the State Cleanup and Abatement Account), present reliable enforcement mechanisms, have a proven track record of success, and should instead be used by the Water Board. Existing models used to cleanup polluted sites (e.g., CERCLA actions and site cleanup requirements, waste discharge requirements and Section 13267 requests issued by the Water Board under the California Water Code) should be applied, which include identifying the real responsible parties whenever possible. These are the appropriate legal and regulatory mechanisms for implementation of PCB site cleanups, with assistance from municipalities in this effort. Some sites are currently being cleaned up under such programs; the PCB Report/BPA should be revised to discuss the need to establish coordination between these programs and the TMDL.

- The PCB Report/BPA proposes relatively large load reductions for two external sources: the Central Valley watershed and urban runoff. The PCB Report/BPA should include an estimate of the timeframe for the Central Valley watershed to achieve its proposed wasteload allocation and discuss the relationship between that timeframe and the proposed 20-year timeframe for urban runoff in the context of achievement of the overall TMDL.

- Stormwater agencies have generally been supportive of linking implementation planning with TMDL development. However, BASMAA also strongly desires that implementation policies, actions and schedules be developed in a separate but parallel process from development of the TMDL (i.e., calculation of acceptable loading and allocations) and its approval by USEPA. Separating the TMDL per se from related implementation considerations will allow the Water Board to more expeditiously submit the former for approval by USEPA (which is not required to review or approve implementation aspects of TMDLs under the CWA) and, by so doing, will preserve the State's maximum authority and flexibility to work with local governments on addressing the challenges that will be presented. Thus the PCB Report/BPA should be revised to remove the implementation sections; these sections should be presented in a separate report.

- The economic analysis presented in the PCB Report/BPA is inadequate, poorly supported, and presents numerous assumptions without basis or justification. The PCB Report/BPA states that the basis of cost information includes "similar work performed elsewhere." However, no information or examples are provided to support this statement. The PCB Report/BPA should be revised to include a thorough and detailed economic analysis of the costs associated with the implementation and monitoring activities that might result from the proposed Basin Plan Amendment. The analysis should clearly document and justify all assumptions used to develop the costs.

- Based upon the information in the PCB Report/BPA, a gross upper-bound estimate of the anticipated cost to restore the Bay's beneficial uses that are impaired by PCBs (i.e., attain the sediment target of 1 ug/kg and the fish tissue target of 0.01 mg/kg) is 70 years at $500 million per year, or about $35 billion. This equates to an estimated cost of approximately $14.3 million per kg PCBs removed. Such a comparison of the costs and assumed benefits of the proposed implementation actions should be included in the PCB Report/BPA and

used to inform a debate among the Water Board, stakeholders and public regarding whether a reasonable relationship exists between the anticipated costs and benefits. Only then can a meaningful dialogue occur with respect to reasonable and affordable implementation actions and load reductions.

- The PCB Report/BPA asserts that the proposed implementation plan schedule provides opportunity to analyze alternative means of compliance and allows time for urban runoff agencies to secure funding. However, potential sources of such funding are not identified. Unfortunately, the BASMAA member agencies that will be required to implement the urban runoff PCB reduction strategies are under severe budget restrictions and furthermore, as we have repeatedly stated, Proposition 218 severely limits the ability of local government to generate additional revenues for urban runoff programs. Thus, the PCB Report/BPA should be revised to discuss the financial constraints on local agencies and the need for the Water Board to provide flexibility to ensure that the targets, allocations and implementation measures are economically attainable and technically feasible.

We hope you find these preliminary comments and suggested improvements to the PCB Report/BPA useful. Please contact me at 925-313-2373, Jon Konnan (BASMAA PCBs representative) at 510-832-2852 x.108, or Geoff Brosseau (BASMAA Executive Director) at 510-622-2326 if you have any questions regarding the comments or suggested revisions.

Sincerely,

Donald P. Freitas
BASMAA Executive Board Chair and CCCWP

cc: Jim Scanlin, ACCWP
Kevin Cullen, FSURMP
Matt Fabry, SMCWPPP
Lance Barnett, VSFCD
Liz Lewis, MCSTOPPP
Adam Olivieri, SCVURPPP
Jon Konnan, BASMAA PCBs Representative
Geoff Brosseau, BASMAA Executive Director
Gary Grimm, Law Office of Gary J. Grimm
Tom Mumley, SFBRWQCB
Bruce Wolfe, SFBRWQCB
Mike Connor, SFEI

ATTACHMENT

This attachment discusses each of BASMAA's comments in detail and provides references to specific sections and pages of the PCB Report/BPA.

4.3. Production and Uses

There is substantial anecdotal evidence that PCB-containing oils were historically used for dust control, resulting in direct releases of PCBs to the environment. In addition, the use of hydraulic fluids containing PCBs had significant potential to result in releases to the environment, since hydraulic systems are designed to leak slowly to provide lubrication (Binational Toxics Strategy. *Draft Options Paper: Virtual Elimination of PCBs.* USEPA Great Lakes National Program Office. October 1998). The PCB Report/BPA should be revised to discuss these uses and their potential to cause releases to the environment. These are important sources of PCBs that require further documentation and investigation.

Equipment in the Bay Area that potentially contains PCBs includes PG&E electrical equipment with dielectric fluids, such as substation transformers. A letter from PG&E to Water Board staff (Doss, R., letter from Pacific Gas and Electric Company to Lawrence B. Kolb, Acting Executive Officer, California Regional Water Quality Control Board, San Francisco Bay Region, September 1, 2000) indicates that the *"vast majority of PCB-filled electrical equipment"* was removed from its system during the mid-1980s. The letter also states*: "Distribution line equipment and all other fluid-filled substation electric equipment contains mineral oil dielectric fluid. ...The over 900,000 mineral oil-filled distribution line pieces of equipment in service are generally not tested for PCBs until fluid is removed at the time of servicing, or in the event of a spill or release of such fluid. PG&E's experience has been that, in general, approximately ten percent of such units contain PCBs at concentrations of 50 parts-per-million (ppm) or greater, and fewer than one percent of these units contain PCBs at concentrations of 500 ppm or greater."* A follow-up letter (Doss, R., letter from Pacific Gas and Electric Company to Loretta K. Barsamiam, Executive Officer, California Regional Water Quality Control Board, San Francisco Bay Region, December 21, 2000) states*: "The declining percentage of oil-filled units which contain PCBs reflects our efforts to remove such units during servicing, as well as the replacement programs PG&E conducted in the mid-1980s."*

The PCB Report/BPA should be revised to include a discussion of PG&E's historic and current use of PCBs. Furthermore, the PCB Report/BPA should acknowledge the need for additional documentation of the current status of PG&E's efforts to remove PCBs from their equipment, the fate and management of such removed equipment, and the past, current, and future potential for PG&E equipment (removed and in-service) to release PCBs to the environment.

7.2. External Sources

The PCB Report/BPA incorporates an estimate of PCB loading into the Bay from urban runoff of 40 kg/year. This estimate is from the Joint Stormwater Agency Project report (Kinnetic Laboratories, Inc. et al. *Final Report, Joint Stormwater Agency Project to Study Urban Sources of Mercury, PCBs, and Organochlorine Pesticides*. April 2002). As explained in this report, the loading estimate was very preliminary, was calculated using concentrations of PCBs in bedded sediments from stormwater conveyances, and is highly uncertain. The associated assumptions and uncertainties are described in the Joint Stormwater Agency Project report, but not in the PCB Report/BPA. Furthermore, San Francisco Estuary Institute staff has commented that it is not possible to determine the bias and error associated with loading estimates based on bedded

sediment concentrations. It is inappropriate to incorporate load estimates based on pollutant concentrations in bedded stormwater sediments into regulatory criteria or actions such as the Bay PCBs TMDL. For example, though not clearly documented (see below comment on 10.3. Wasteload Allocations), we understand that the PCB Report/BPA directly used the urban runoff loading estimate in calculating the urban runoff wasteload allocation.

A more appropriate method to estimate total stormwater loads of PCBs into the Bay would be to extrapolate the results of current and planned pollutant loading studies in representative individual Bay Area watersheds. Some of these studies are currently being conducted through the RMP's "Observation Watershed" approach. Load estimates are currently available for the Guadalupe River watershed, a large watershed in the southern portion of the Bay Area with mixed urban and open space land uses. More recently, estimates are being developed for a small, highly urban watershed in the eastern Bay Area referred to as "Zone 4 Line A." The RMP tentatively plans to perform similar loading studies in other representative Bay Area watersheds in the future.

In addition, Bay Area urban runoff programs are proposing to supplement the RMP studies by conducting pollutant loading monitoring in additional selected Bay Area watersheds. The details of this monitoring are being established through the MRP development process.

The PCB Report/BPA should be revised to designate the above load estimate of 40 kg/year as preliminary and describe the associated assumptions and uncertainties in the Joint Stormwater Agency Project report. Furthermore, the PCB Report/BPA should state that through the adaptive management process the 40 kg/year estimate will be replaced once sufficient data are available to extrapolate a loading estimate from the RMP and urban runoff program studies.

9.2. Mass Budget Model

The linkage analysis and calculation of the total TMDL of 10 kg/year rely on a simple one-box mass budget model. Limitations of this model include:

- The model does not account for how processes such as pollutant loading and sediment erosion/deposition vary among different Bay segments. As discussed in the PCB Report/BPA (p.8), recent studies indicate that sediments are eroding in portions of the Bay. Sediments deposited during earlier periods of Bay Area industrialization and high PCB use are now being uncovered in some areas. These sediments may contain relatively high levels of PCBs, resulting in increased availability of PCBs to the Bay food web. Even if all current external PCBs sources to the Bay are eliminated, exposure of historically contaminated sediment may be a significant PCBs source to organisms. Since this process could potentially significantly delay recovery of the Bay despite any new management actions taken to reduce external loads, sediment dynamics needs to be incorporated into the long-term modeling of the fate of PCBs in the Bay.

- Currently there is a significant discrepancy between direct estimates of PCBs loads to the Bay and estimates based on the model, highlighting the current uncertainty in the model's predictions.

- An uncertainty analysis was not conducted during the modeling. Such an analysis would provide more information on how the model's predictions vary with the uncertainty and variability in input parameters.

The PCB Report/BPA should be revised to clearly describe the limitations of the one-box model. A multi-box fate model currently under development will supersede the one-box model and help address the above limitations. The PCB Report/BPA should therefore be revised to clarify that the linkage analysis and TMDL of 10 kg/year are preliminary pending incorporation of the multi-box model. Although the PCB Report/BPA does acknowledge the need for improved fate and transport modeling (p.74), the requested revisions are necessary to inform stakeholders and the public about the current uncertainty in our understanding of how the recovery of the Bay would respond to load reductions caused by management actions.

The above observations are supported by the external scientific peer review (Appendix C of the PCB Report/BPA, p.C-6 through C-8).

10.3. Wasteload Allocations

Basis of Urban Runoff Allocation

The proposed total wasteload allocation for urban runoff is 2 kg/year. The PCB Report/BPA states that it *"reflects the resulting PCBs load when all sediment in urban stormwater runoff has a concentration of 1 µg/kg, the sediment PCBs concentration goal, assuming the sediment loads used to calculate the current PCBs load do not change."* This explanation of how the allocation was calculated is inadequate, and should be replaced by a detailed explanation that includes all assumptions, justified values for all parameters, and the exact mathematical calculations used.

One of the external scientific peer reviewers also stated that the calculation methodologies for urban runoff and other allocations need to be explained (Appendix C of the PCB Report/BPA, p.C-12).

Feasibility

The proposed urban runoff allocation of 2 kg/year represents a 95% reduction in PCBs loads, based upon the estimated existing urban runoff load of 40 kg/year. Two kg/year is also estimated to be the resulting load when all sediment in urban runoff has a concentration of 1 ug/kg, the sediment PCB concentration goal. The feasibility of meeting this allocation and sediment target in the proposed 20-year time frame is highly questionable given:

- the large reservoir of PCBs typically found in urban areas;
- the wide distribution of sources (most of which are unknown);
- the difficulties in obtaining funding to cleanup former and current industrial/military facilities with PCBs;
- the lack of control by urban runoff programs over many sources (e.g., on-land polluted sites); and
- the potentially prohibitive cost of treating runoff from all such sites.

This observation is supported by the external scientific peer review (Appendix C of the PCB Report/BPA, p.C-13). A thorough technical and economic analysis of the feasibility of using

available technologies to achieve the wasteload allocation for urban runoff needs to be developed and included in a revised PCB Report/BPA.

Remediation of On-land Areas with Elevated PCBs

BASMAA acknowledges that implementing the TMDL may include remediating selected on-land areas with elevated PCBs. However, it would be unfair and legally inappropriate to burden municipalities with cleaning up these sites. Thus PCB site cleanups should not be pursued through municipal stormwater NPDES permits. Other regulatory programs and funding sources exist (e.g., Proposition 13 and the State Cleanup and Abatement Account), present reliable enforcement mechanisms, have a proven track record of success, and should instead be used by the Water Board. Existing models used to cleanup polluted sites (e.g., CERCLA actions and waste discharge requirements, site cleanup requirements and Section 13267 requests issued by the Water Board under the California Water Code) should be applied, which include identifying the real responsible parties whenever possible. Some sites are currently being cleaned up under such programs; the PCB Report/BPA should be revised to discuss the need to establish coordination between these programs and the TMDL.

One example is the Delta Star site in the City of San Carlos in San Mateo County. Relatively high levels of PCBs were found in a storm drain sediment sample collected by BASMAA agencies downstream of this site. Electrical equipment containing PCBs was formerly manufactured at the Delta Star property and PCBs have been found in soil and groundwater at the site. Thus this site may be a source of PCBs in storm drain sediments. The Water Board is the lead agency overseeing an ongoing site cleanup.

For a few sites that have been identified to date (such as Delta Star), BASMAA agencies have already requested that Water Board staff work with appropriate parties (e.g., PG&E, the Department of Toxic Substances Control and non-TMDL staff within the Water Board) to investigate the possibility that PCBs have entered storm drains. The PCB Report/BPA should acknowledge and distinguish this type of issue from those that are appropriately addressed directly through municipal stormwater program activities, both in the context of current cleanup sites and sites that may be identified in the future.

11. Implementation

Urban runoff wasteload allocations in the PCBs TMDL will be implemented through Bay Area municipal stormwater NPDES permits. Water Board staff is proposing to replace the existing Phase I countywide permits in the Bay Area with a single Municipal Regional Permit (MRP) covering all Bay Area municipalities with existing Phase I coverage. The overarching goal is to standardize urban runoff-related requirements in the region. Water Board staff released an administrative draft of the MRP on May 1, 2007. BASMAA and Water Board staff met several times in June 2007 to discuss the details of the May 1, 2007 administrative draft. We found the discussions informative and constructive and appreciate that Water Board staff is willing to work with us to develop permit provisions aimed at reducing urban runoff pollutant loads to the maximum extent practicable. The revisions to the PCB TMDL-related administrative draft permit provisions preliminarily and tentatively agreed upon at these meetings appear generally consistent with the corresponding *short-term* actions (i.e., over the next five years) described in the implementation plan in the PCB Report/BPA.

The PCB Report/BPA proposes relatively large load reductions for two external sources: the Central Valley watershed and urban runoff. It is proposed that the Central Valley watershed

load reduction (and corresponding wasteload allocation) will be attained through "*anticipated natural attenuation.*" Furthermore, although the PCB Report/BPA proposes that the urban runoff load reduction will be achieved within 20 years, a timeframe for achieving the Central Valley watershed load reduction is not discussed. The PCB Report/BPA should include an estimate of this timeframe for the Central Valley watershed to achieve its proposed allocation and discuss the relationship between that timeframe and the urban runoff timeframe in the context of achievement of the overall TMDL.

Stormwater agencies have generally been supportive of linking implementation planning with TMDL development. BASMAA, however, also strongly desires that implementation policies, actions and schedules be developed in a separate but parallel process from development of the TMDL (i.e., calculation of acceptable loading and allocations) and its approval by USEPA. BASMAA also strongly desires that implementation planning, with respect to municipal stormwater, be conducted in a manner consistent with the maximum extent practicable standard set forth in the CWA. (33 U.S.C. § 1342(p)(3)(B).) Separating the TMDL per se from related implementation considerations will allow the Water Board to more expeditiously submit the former for approval by USEPA (which is not required to review or approve implementation aspects of TMDLs under the CWA) and, by so doing, will preserve the State's maximum authority and flexibility to work with local governments on addressing the challenges that will be presented.[2] Thus the PCB Report/BPA should be revised to remove the implementation sections; these sections should be presented in a separate report.

12.6. Economic Considerations Related to Potential Implementation Plan Actions

The economic analysis presented in the PCB Report/BPA is inadequate, poorly supported, and presents several assumptions without bases or justifications. For example, the PCB Report/BPA states (p.98 – 99):

"... the most costly actions will be identified and evaluated through phased pilot and feasibility studies. These assessments need to be completed before the dischargers select which action or combination of actions will be most effective and appropriate to their allocations. Also, as mentioned previously, many of the implementation measures are part of ongoing programs, and will only result in incremental increases to costs of existing programs.

[2]The CWA recognizes the authority and sovereignty of the states by distinguishing between the process of establishing TMDLs and the process of implementing TMDLs, and by providing states with flexibility and independence to implement TMDLs. The CWA requires that each TMDL, which includes one or more numerical targets that represent attainment of the applicable standards and the allocation of the target or load among the various sources of the pollutant, be reviewed and approved by USEPA. (33 U.S.C. § 1313(d).) However, the CWA gives states the flexibility to implement TMDLs as they see fit, without requiring that TMDL implementation plans be approved by USEPA. Instead, the implementation of TMDLs is governed by state law, such as section 13242 of the Porter Cologne Act, which requires a program of implementation to achieve water quality objectives.

In order to satisfy its directive under the Porter Cologne Act, the Water Board should separate the process of establishing the PCBs TMDL and other TMDLs from the process of developing implementation plans for TMDLs. The Porter-Cologne Act requires the Water Board to consider factors in addition to the considerations mandated by the CWA. When developing implementation plans for TMDLs, the Water Board must take into account beneficial uses of the impaired waters, environmental characteristics of the hydrographic unit under consideration, reasonable limitations on water quality conditions, economic considerations, the need for developing housing, and the need to develop and use recycled water. (Water Code § 13241.) In contrast, USEPA is not required to consider all these factors. Therefore, to maintain the flexibility and independence to implement the PCBs TMDL and other TMDLs in accordance with the considerations required by the Porter-Cologne Act, the Water Board should separate the process into two stages, developing the TMDL first, subject to USEPA approval, and then developing the TMDL implementation in a separate process.

These factors result in the likelihood that short-term costs will be modest."

Justification is not given as to why pilot and feasibility studies and incremental increases to existing programs would incur only modest costs. Furthermore, while it true that some measures would be incremental expansions of existing programs, other measures would require completely new programs.

The PCB Report/BPA projects that municipal wastewater management costs of approximately $500 million annually provide an upper bound cost for urban stormwater dischargers to implement the TMDL. Justification is not presented for this assumption. Furthermore, if this assumption could be justified, then even the most rudimentary level of analysis should include, in addition to the $500 million annual cost, the capital costs to construct the treatment plants, which was on the order of several billion dollars.[3]

On p.101 the PCB Report/BPA states:

"Additional monitoring will be necessary to sufficiently quantify loads from urban stormwater runoff and the loads reduced from urban stormwater runoff control actions. As with the control measures, this loads monitoring would also address other pollutants of concern such as heavy metals, pesticides, and petroleum hydrocarbons. This additional monitoring could cost $500 thousand to $1 million per year, but it would inform decisions to implement controls that may total upwards of $100 million per year. There are critical data needs to improve our understanding of PCBs fate and transport, particularly PCBs in Bay sediments. Also, a better understanding of the rate of natural attenuation of PCBs in Bay environments is needed to predict with more certainty the recovery time of the Bay, and to inform whether more implementation actions are needed. We estimate these costs, which would be shared by all source category dischargers, urban stormwater dischargers, and dredgers, would total approximately $1 to 3 million, some of which would be accounted for within the existing RMP."

Justifications and bases are not provided for the above costs associated with monitoring.

The PCB Report/BPA should be revised to include a thorough and detailed economic analysis of the costs associated with the implementation methods and monitoring that might result from the proposed Basin Plan Amendment. The analysis should clearly document and justify all assumptions used to develop the costs.

An analysis of whether a reasonable relationship exists between the costs and assumed benefits of the proposed implementation actions is also needed. Although problems with the economic analysis and pollutant fate modeling are described above, we use that information here in a simple cost-benefit analysis, for lack of better information being available at this time. Water Board staff estimate an upper-bound cost of about $500 million per year to implement the TMDL, essentially all of which would be borne by urban runoff dischargers. The PCB Report/BPA describes this as *"a gross estimate of what it might cost to treat urban stormwater."* Annual costs for monitoring, special studies and risk management activities are also estimated by Water Board staff but are small relative to $500 million. Based on the information in the PCB Report/BPA, it is difficult to estimate how long it would take to attain the fish tissue target and therefore restore the beneficial uses in the Bay that are the subject of this TMDL (ocean,

[3]The Water Board has reported that between 1960 and 1985, over three billion dollars had been spent in the Bay Area to upgrade and construct wastewater treatment plants and to move outfalls into deeper water.

commercial and sport fishing and wildlife habitat-related uses). The Basin Plan amendment states that urban stormwater runoff wasteload allocations shall be achieved within 20 years. Assuming that in 20 years the total TMDL of 10 kg/year is attained, the pollutant fate model (p.58, Figure 28) suggests that it would take another approximately 50 years to attain the sediment target of 1 ug/kg, which according to the food web modeling would result in attainment of the fish tissue target of 0.01 mg/kg. (The fish tissue target is based upon standard risk assessment calculations, including a one in 100,000 carcinogenic risk and a highly conservative fish consumption rate based on the 95th percentile upper bound estimate of fish intake reported for all Bay fish-consuming anglers.) The pollutant fate model (p.58, Figure 28) also indicates that the corresponding reduction in mass of PCBs in the Bay would be about 2,440 kg (i.e., from about 2,600 kg to about 160 kg). Thus, based upon the information in the PCB Report/BPA, a gross upper-bound estimate of the anticipated cost to restore the Bay's beneficial uses that are impaired by PCBs is 70 years at $500 million per year, or about $35 billion. This equates to an estimated cost of approximately $14.3 million per kg PCBs removed. Such a comparison of the costs and assumed benefits of the proposed implementation actions should be included in the PCB Report/BPA and used to inform a debate among the Water Board, stakeholders and public regarding whether a reasonable relationship exists between the anticipated costs and benefits.

The PCB Report/BPA also asserts that the proposed implementation plan schedule provides opportunity to analyze alternative means of compliance and allows time for urban runoff agencies to secure funding. However, potential sources of such funding are not identified. Unfortunately, the BASMAA member agencies that will be required to implement the urban runoff PCB reduction strategies are under severe budget restrictions, which have in many cases forced these agencies to cut back on important municipal services. Furthermore, Proposition 218 severely limits the ability of local government to generate additional revenues for urban runoff programs.[4] Thus the PCB Report/BPA should be revised to discuss the financial constraints on local agencies and the need for the Water Board to provide flexibility to ensure that the targets, allocations and implementation measures are economically attainable and technically feasible.

[4]Section 6 of Article XiII D of the California Constitution, a part of Proposition 218, requires that property-related fees or charges shall not be imposed or increased unless such fee or charge is approved by either a majority vote of the owners of the affected properties or, at the option of the agency imposing the fee or charge, by a 2/3 vote of the voters residing in the area affected by the fee or charge.

BAYKEEPER
Defending Our Waters—from the High Sierra to the Golden Gate

CLEAN WATER ACTION
Our Water, Our Health, Our Future

August 17, 2007

Mr. Fred Hetzel
San Francisco Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

Sent via electronic mail to fhetzel@waterboards.ca.gov

RE: Proposed Basin Plan Amendment Establishing a Total Maximum Daily Load for PCBs in the San Francisco Bay

Dear Mr. Hetzel:

On behalf of San Francisco Baykeeper and Clean Water Action, please accept the following comments on the draft Basin Plan Amendment establishing a Total Maximum Daily Load ("TMDL") for Polychlorinated biphenyls ("PCBs") in the San Francisco Bay ("PCBs TMDL") and the implementation plan to achieve that TMDL. Baykeeper and Clean Water Action appreciate the time and energy that Water Board staff has dedicated to developing this TMDL. We commend the Water Board for its efforts and hope that staff will carefully consider and address the issues raised by our comments below.

To put today's comments into context it is important to consider the broad purpose of TMDLs and the characteristics of PCBs. TMDLS are the Clean Water Act's—and the Water Board's—primary tool for cleaning up waters that are too polluted to be safe for basic uses such as fishing and drinking. The assumptions and commitments in the TMDL provide the basis for identifying and prioritizing the actions necessary to improve water quality. As the framework for future action, the TMDL must be as precise and detailed as feasible to ensure that implementation is consistent with and occurs within the timeframe contemplated by the TMDL.

PCBs are an unquestionably challenging environmental problem. Despite an almost thirty year ban on production PCBs are ubiquitous in the environment—from industrialized urban areas to the arctic[1]—and have been found in human cord blood,

[1] Herbert, B.M. *et al.*, "Rapid changes in PCB and OC pesticide concentrations in arctic snow," *Environ. Sci. Technol.* 39(9):2998-3005 (2005 May).

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maternal blood, and mother's milk.[2] Across the country more than 2,000 rivers, lakes, bays, and creeks contain PCBs at levels that prevent attainment of beneficial uses.[3]

PCBs bioaccumulate in the fatty tissue of fish, and therefore pose a significant health threat to top predators and anglers, especially those anglers who relay on Bay fish for subsistence. Research has linked chronic, low level exposure in humans to severe impacts, such as neurological disorders (especially in infants exposed prenatally), liver damage, reproductive harm, immune suppression, endocrine disruption, developmental disorders, stunted intellectual function, and cancer.[4] Other human health impacts include gastrointestinal disease and cardiovascular problems.[5] Impacts to wildlife are also significant and include reproductive and behavioral effects. Disturbingly, PCBs levels in the blood of San Francisco Bay seals has been found to be up to three times higher than the level at which scientists have observed reduced reproductive success and impaired immune function.[6]

Despite the pervasiveness of PCBs in the environment, the major sources of PCBs to the San Francisco Bay appear to be relatively well understood. A remaining question is what level of effort is necessary to reduce PCBs in and around the Bay in order to make regular consumption of Bay fish safe within a reasonable timeframe. While this TMDL makes significant progress towards understanding and reducing PCBs loading, Baykeeper and Clean Water Action believe that room for improvement exists.

A. TMDL Numeric Targets

<u>The fish tissue target in the proposed TMDL is not adequate to protect beneficial uses.</u>

The proposed fish tissue target is unreasonably high in light of information about fish contamination and consumption in the Bay Area. One in ten Bay anglers consumes more fish than considered safe by the Office of Environmental Health Hazard Assessment ("OEHHA").[7] In addition to PCBs, those fish may also contain high levels of other pollutants such as polybrominated diphenylethers ("PBDEs"), DDT and dioxins. Therefore, according to peer reviewer, Dr. David Carpenter, setting a fish tissue target based solely on PCBs is likely to significantly underestimate the risk of Bay fish consumption.

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[2] Guvenius, D.M. *et al.*, "Human prenatal and postnatal exposure to polybrominated diphenyl ethers, polychlorinated biphenyls, polychlorobiphenylols, and pentachlorophenol". *Environ. Health Perspec.* 111(9):1235-1241 (2003).
[3] USEPA National 303(d) List, http://iaspub.epa.gov/waters/national_rept.control#TPOL.
[4] http://delta-institute.org/publications/HealthImpactFS.pdf.
[5] Johnson *et.al.*, "Public Health Implications of Exposure to Polychlorinated Biphenyls (PCBs)," Agency for Toxic Substances and Disease Registry Public Health Service U.S. Department of Health and Human Services and U.S. Environmental Protection Agency,http://www.atsdr.cdc.gov/DT/pcb007.html.
[6] Young, D., et al., "GC/MS analysis of PCB congeners in blood of the harbor seal Phoca vitulina from San Francisco Bay," *Chemosphere* 37(4):711-33 (August 1998).
[7] San Francisco Estuary Institute "San Francisco Bay Seafood Consumption Study," p. 46 (2000).

Given both the serious health impacts of even low level chronic exposure and the existence of subsistence fishing in the region, Baykeeper and Clean Water Action strongly urge the Water Board to recalculate the fish tissue target using more conservative assumptions, including a risk factor of at least 1 in 1,000,000. A more stringent fish tissue target is necessary to ensure that the TMDL is consistent with the requirement to bring the Bay back into compliance with the beneficial use of fishing.

We further note that a less protective target has significant environmental justice implications. Of the fishermen who eat more than two meals each month of Bay fish—the maximum amount recommended by OEHAA—seventy-five percent (75%) are persons of color with incomes under $45,000 a year.[8] Low income communities and communities of color, therefore, are disproportionately affected by PCBs contamination and will not be adequately protected unless the fish tissue target is recalculated. While risk reduction strategies are to be employed as part of TMDL implementation, the reality is that these many communities will remain at great risk until the Bay's fish are once again safe to eat.

The TMDL should contain a sediment target.

Unlike the PCBs TMDL staff report prepared in 2004,[9] the proposed TMDL lacks a numeric target for bedded sediments. According to the 2004 report, sediments are the largest environmental reservoir of PCBs in the Bay and PCBs uptake by biota from sediment is "likely to be *the* most important pathway for PCBs bioaccumulation in fish."[10] As explained in the 2004 report, a sediment target is necessary because reducing concentrations in Bay sediments is the most effective means of reducing fish tissue PCBs concentration and the TMDL is largely focused on reducing PCBs through reductions in sediment loads and PCBs concentrations in those loads.[11] Considering the previous report's emphasis on a sediment target and the relationship between sediment and fish tissue concentrations, the rationale for removing the sediment target is unclear. Accordingly, the PCBs TMDL should be revised to include a sediment target. Should the Water Board decline to reinsert a sediment target, the TMDL must explain the scientific and policy reasons for removing it.

[8] *Id.*
[9] San Francisco Bay Regional Water Quality Control Board, "PCBs San Francisco Bay Total Maximum Daily Load Project Report," p. 47 (January 8, 2004).
[10] *Id.* at 46 (emphasis added). This point is made several times throughout the report. In Section 4.4, Key Points and Issues, the report notes that "[s]ince benthic organisms are the major prey food for the fish species of concern, sediments may be a more important source of PCBs to biota than the water column." *Id.* at 26.
[11] San Francisco Seafood Study, *supra* note 7.

B. Urban Stormwater

More detail is needed about implementation of urban stormwater load reductions.

A TMDL is intended to be a regulatory driver: its provides a basis and rationale for actions to reduce pollutant loading to the extent necessary to achieve water quality standards. The proposed TMDL's implementation description lacks sufficient detail to ensure implementation of urban stormwater load reductions within the specified time. While it states that reductions in urban stormwater loading should occur within twenty years, it fails to state how those reductions will occur or on what timeframe. At a minimum, the TMDL should identify the specific TMDL-related actions in the proposed municipal regional stormwater permit and state a schedule for completion of each. For example, the TMDL should require completion of each of the pilot projects identified by 2010 and require identification, investigation and abatement of land with elevated PCBs concentrations by 2018.

Attainment of Wasteload Allocations for stormwater should be demonstrated using multiple methods.

Urban stormwater is by far the largest Bay Area source of PCBs and is responsible for the greatest reductions in loading. For the TMDL to be successful, therefore, loading from urban stormwater must be dramatically reduced and that reduction must be quantifiable and demonstrable. The draft TMDL, however, allows stormwater permittees to show progress towards wasteload allocations using widely different methods, each of which is based on different assumptions and is likely to produce very different assessments of whether compliance is achieved.

Moreover, the proposed TMDL fails to articulate the basis for selecting these methods and we question whether they will produce meaningful information about actual reductions in loading. For example, PCBs strongly associate with sediments, yet the proposed TMDL would allow permittees to rely only on flow and water column data to estimate reductions. Similarly, the proposed TMDL allows permittees to estimate load reductions resulting from pollution prevention activities and source and treatment controls yet we fail to see how a specific load reduction could be assigned to a pollution prevention activity or other control given all the variables that affect PCBs loading.

Before specifying any methods to quantify reductions in loading, the Water Board must explain the rationale for selecting those methods and the limitations of each. If multiple methods are available, the TMDL should require a "weight of evidence approach" that involves the use of all available methods. The use of multiple methods will provide a better understanding of the limitations of each method and would be a more valid way of evaluating progress toward attaining the TMDL's wasteload allocations. We ask that the Water Board explain the basis for selecting the three methods identified on page A-9 of the draft TMDL and consider requiring permittees to demonstrate progress using all three methods and a weight of evidence approach.

The TMDL and any municipal stormwater permit should require municipalities' stormwater inspection programs to include abandoned sites.

The primary way that the PCBs TMDL will reduce loading is through implementation of the municipal stormwater permit once it is adopted. One significant limitation of the draft permit and current stormwater programs is that they do not require stormwater inspections of industrial facilities that are abandoned or no longer in operation. The TMDL should specify the regulatory actions the Water Board will take to ensure all sites which are potentially significant sources of PCBs (i.e., industrial sites active at any time from the 1940s through the early 1980s) will be identified, investigated, prioritized for sampling and inspection, and followed up with appropriate cleanup action.

Codification of the MEP and BAT standards is inappropriate.

The implementation plan for controlling PCBs inappropriately specifies that all municipal stormwater permits requirements will be based on the maximum extent practicable standard ("MEP") and that pollution from construction and industrial sites shall reduce discharges based on the best available technology economically achievable ("BAT") standard.[12] Not only does this unnecessarily restrict the Water Board's ability to control PCBs in stormwater, it is inconsistent with the intent of the Clean Water Act and the basic goal of TMDLs.

The most basic purpose of a TMDL is to clean up a waterway that cannot support designated beneficial uses. To this end, section 303(d) of the Clean Water Act requires identification of waters for which existing technology-based controls are not stringent enough to ensure achievement of water quality standards.[13] The State must then determine the maximum amount of pollutant that a waterway can accept from each discharger and still achieve water quality standards taking into account neither economic feasibility nor economic consequences. The NPDES permit for each discharger, then, must contain effluent limits based on and consistent with the TMDL's wasteload allocated for that discharger.[14]

The language in the draft PCBs TMDL is inconsistent with the TMDL regime because it restricts permit limits to those based on MEP or BAT for municipal and non-municipal stormwater permittees respectively. Instead, the draft TMDL should state that stormwater permits shall contain requirements based on the applicable standard (MEP for municipalities and BAT for other dischargers) and any more stringent requirements necessary to implement the wasteload allocations in the TMDL. This change will ensure that the Water Board retains its ability to include in permits more stringent requirements should they be necessary to implement the TMDL and achieve water quality standards.

[12] PCBs TMDL at A-9.
[13] 33 U.S.C. 1313(d)(1)(a).
[14] 40 C.F.R. § 122.44(d)(vii)(B).

The TMDL should commit the Water Board to ensuring that on-land site cleanup standards are protective of water quality.

One of the comments repeatedly raised during the October 2006 TMDL Roundtable Meeting was that the standards for a cleanup under CERCLA or RCRA are designed to be protective of human health and not water quality. Efforts to reduce PCBs loading in stormwater, therefore, are likely to be frustrated if site cleanups fail to remediate PCBs levels to the extent or in such a way that these sites no longer remain a significant source of PCBs in stormwater. This possibility was explicitly recognized in the Clean Estuary Project's 2006 PCBs TMDL Implementation Plan Development Report, which noted that washoff from remediated sites could be substantial as "annual washoff quantity is usually not a PCB-contaminated site remediation endpoint," and sites that may have undergone remediation may still have significant amounts of PCBs present in soils.[15] The TMDL, therefore, should commit the Water Board to developing clean up standards for on-land sites that may contribute to PCBs loading and to ensuring that those standards become part of all cleanups.

C. In-Bay Contaminated Sites

The TMDL must specify a timeframe for clean up of in-Bay contaminated sites.

Currently, the proposed PCBs TMDL provides a deadline for including specific actions into site cleanup plans but lacks a date by which all clean-ups must be completed. As mentioned above, a TMDL is intended to initiate action to cleanup a waterway. Without sufficient detail regarding implementation, the TMDL's effectiveness is limited. In order to drive cleanups and ensure expeditious completion of those already underway, the TMDL should state a deadline by which the cleanup plans for all in-Bay contaminated sites will be completed.

The TMDL should address the likelihood that erosion may uncover contaminated sediments.

As recognized by Water Board staff, certain sections of the Bay are believed to be eroding and this erosion could uncover contaminated sediments.[16] While the draft TMDL acknowledges that the uncovering of contaminated sources may contribute to loading, it makes no attempt to quantify this source or to address this possibility in terms of the margin of safety or other mechanism.[17] We are deeply concerned that erosion may ultimately increase fish tissue concentrations and request that the TMDL more explicitly address this possibility.

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[15] Clean Estuary Project, PCBs TMDL Implementation Plan Development, p. 26, prepared by Larry Walker Associations (May 2006).
[16] San Francisco Bay Regional Water Quality Control Board, "PCBs San Francisco Bay Total Maximum Daily Load Project Report," p. 8 (June 22, 2007); 1: Davis, J.A. *et al.*, Polychlorinated biphenyls (PCBs) in San Francisco Bay, *Environ Res.* (April 2007).
[17] PCBs TMDL at A-4.

D. Municipal and Industrial Wastewater

A recent study of PCBs in wastewater undertaken in support of a PCBs TMDL for the Delaware River concluded that wastewater was a more significant source than previously estimated.[18] The study was based on data submitted by all the NPDES permit holders in the watershed as required by their permits and the Delaware River PCBs TMDL. As part of the study, all dischargers analyzed effluent using an analytical method—Method 1668A—to quantify PCB concentrations at picogram per liter concentrations. The study results demonstrated discharges from wastewater were of sufficient magnitude to cause the water quality standards to be exceeded. It also concluded that most of the loading during wet weather was associated with combined sewer overflows.

Many NPDES permits issued by the Water Board currently contain effluent limits for PCBs of 0.5 µg/L, which is the reporting limit for the method used by the dischargers. To our knowledge, no Bay Area dischargers have exceeded this limit in recent memory. Because the limit is equal to the reporting limit, the dischargers report that PCBs were not detected or detected but not quantified. Calculating the annual mass of PCBs discharged by permittees is difficult because the reporting limit and their effluent limits are typically higher than the concentration being emitted. Considering that many of these permittees discharge millions of gallons each day, PCB concentrations less than 0.5 µg/L may equal a substantial mass of PCBs discharged annually.

The TMDL appears to circumvent the reporting limit challenge by calculating loadings from all municipal dischargers based on two sampling events conducted on the effluent of five dischargers using secondary treatment and four sampling events for the four using advanced treatment.[19] Similarly, the loads for refineries were calculated based only on two sampling events, although at all Bay Area refineries. Considering the limited sampling size, the recognized variability in PCB concentrations across municipal wastewater treatment plants, the possibility of temporal variability, and the results of the Delaware River study, we believe that additional monitoring is appropriate. We strongly recommend that the Water Board revise the TMDL to require all NPDES permit holders to use Method 1668A to better determine actual loading from point sources. This data can then provide a basis for revising the TMDL wasteload allocations should loading from wastewater be greater or less than originally estimated.

Finally, we note that studies have clearly shown a relationship between decreased effluent PCBs concentration and increased wastewater treatment. Most, if not all, Bay area publicly-owned treatment works regularly discharge untreated or partially treated wastewater in the form of sewer overflows, combined sewer overflows, and bypassing and blending events. Please clarify whether the load allocations for municipal wastewater takes into account loading from wet weather events.

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[18] Delaware River Basin Commission, Estuary Toxics Management Program, "Study of the Loadings of Polychlorinated Biphenyls from Tributaries And Point Sources Discharging to the Tidal Delaware River" (June 1998). Available at http://www.state.nj.us/drbc/regs/pcb-new.pdf.
[19] 2007 TMDL Staff Report, *Supra* note 17 at 41.

E. Central Valley Load Allocation and Implementation

According to the draft TMDL, the Central Valley is the largest source of PCBs loading to the San Francisco Bay, contributing an estimated 42 kg/year.[20] The TMDL assigns the Central Valley a final load allocation of 5 kg/yr but neither the TMDL nor the staff report explain how that load allocation will be achieved other than through natural attenuation. Reliance solely on natural attenuation to achieve a 37 kg/year reduction is concerning. In fact, estimates of the degree and time in which other contaminates attenuate, such as some pesticides, have proven to be overly optimistic. We remind the Board that the Clean Water Act contemplates that water quality be brought into compliance within a reasonably quick period of time, with the expectation that specific strategies be carried out to meet those goals. We ask, therefore, that the Water Board identify any and all actions necessary to ensure that the Central Valley load allocation will be achieved within the expected timeframe.

* * *

We trust that the Water Board will carefully consider and respond to all of the issues and questions raised in our comments. In particular, we wish to emphasize the TMDL's need for a more conservative fish tissue target, reinsertion of a sediment target; increased specificity for stormwater implementation, including development of a clean-up standard; and a requirement that all NPDES permit holders better quantify the concentration and variability of PCBs in their effluent.

Thank you for your consideration of these comments.

Sincerely,

Amy Chastain, Staff Attorney
Sejal Choksi, Program Director & Baykeeper
SAN FRANCISCO BAYKEEPER

Andria Ventura, Program Manager
CLEAN WATER ACTION

[20] Draft TMDL at A-4.

August 20, 2007

VIA EMAIL

Fred Hetzel, Ph.D
San Francisco Bay Regional Water Quality Control Board
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Re: Public Comment on RWQCB's June 22, 2007 Total Maximum Daily Load for PCBs in San Francisco Bay, Proposed Basin Plan Amendment and Staff Report ("Proposed TMDL")

Dear Mr. Hetzel:

The California Chamber of Commerce and its member, General Electric Company, hereby are submitting to the California Regional Water Quality Control Board, San Francisco Bay Region, the enclosed comments and expert report. We also submitted under separate cover dated August 18 an appendix of expert reports and supporting materials. We are submitting today by personal delivery a supplemental appendix and Professor David Sunding will be submitting a report analyzing the economic impacts of the Proposed TMDL under separate cover today on our behalf. Our testimony, if any, at the public hearings on the Proposed TMDL will be based on these materials.

We appreciate the opportunity to provide this public comment. We are available to discuss our comments with the agency at your convenience, and look forward to continued constructive participation in this matter.

Best regards,

Valerie Nera

Valerie Nera, Director
Agriculture and Resources, Water & Privacy

Enclosures

COMMENTS ON CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD'S

TOTAL MAXIMUM DAILY LOAD FOR PCBs IN SAN FRANCISCO BAY

PROPOSED BASIN PLAN AMENDMENT AND STAFF REPORT

JUNE 22, 2007

Submitted by: Date: August 20, 2007

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On behalf of the California Chamber of Commerce (the "Chamber") and General Electric Company, we appreciate the opportunity to submit public comment to the California Regional Water Quality Control Board, San Francisco Bay Region ("RWQCB" or "Board"), in response to the Board's issuance on June 22, 2007 of a proposed Basin Plan Amendment (the "proposed BPA") and Total Maximum Daily Load (the "proposed TMDL") for polychlorinated biphenyls ("PCBs") in San Francisco Bay ("SFB" or the "Bay"), and request for public comment on these proposed agency actions.[1] The Chamber and its members including General Electric have a particular interest in this matter, as we believe the proposed TMDL does not strike a reasonable balance among competing objectives including the need to avoid significant economic impact and other adverse consequences that are not warranted by any realistic assessment of potential benefits, and as a different TMDL would have been proposed had the agency been informed by technically sound analysis and modeling. As an association representing business interests in the State, and General Electric as a company with such business interests, we request that the TMDL be revised to avoid undue economic impacts on the business community without commensurate environmental benefit, fostering a climate unfavorable to the growth and competitiveness of the California economy, and to Bay-area businesses.

I. EXECUTIVE SUMMARY.

The TMDL documentation does not provide an adequate technical foundation for RWQCB to make an informed decision regarding the control of PCBs in the Bay. On critical points, the assumptions in the TMDL documentation are based on mistakes in modeling and analysis. On other points, the TMDL documentation is without the underlying data necessary to produce a reliable understanding of PCBs in the Bay. Principal concerns include the following:

- Assimilative Capacity Understated – The model used to calculate the Bay's ability to assimilate PCBs artificially traps PCBs in the Bay that in reality flow out under the Golden Gate Bridge and to the open ocean. This artifact of the TMDL's analytical approach results in an estimate of the Bay's ability to assimilate PCBs that is too low by at least a factor of 2.5, which is very significant especially in light of the small quantities of PCBs allowed under the proposed TMDL.

- Natural Recovery Discounted – The TMDL does not quantify natural recovery or compare its ameliorative effects on PCBs with the TMDL's proposed plan. Mussel, sediment, and water column data show that tidal flushing and other natural processes are reducing PCB levels in the Bay materially, with a half-life

[1] These comments are based on RWQCB's report entitled, "Total Maximum Daily Load for PCBs in San Francisco Bay, Proposed Basin Plan Amendment and Staff Report" (hereinafter "Staff Report"), and attachments thereto. We respectfully request that these public comments, and related expert reports, appendices, and attachments submitted under separate cover be given appropriate consideration, be placed in the administrative record for the Basin Plan Amendment and the TMDL, and be maintained in the agency's records.

of six to twelve years, a process which shows no evidence of slowing. Even if RWQCB takes no action to reduce external loads, the Bay will reach ambient sediment concentrations much lower than the current concentration of ten parts per billion ("ppb") (as estimated in the TMDL) – and may reach a concentration of five ppb in the next ten years. Natural recovery is a well accepted alternative for sites with residual levels of legacy compounds like PCBs, and should not be marginalized, as does the TMDL, by equating it with a "no project" alternative.

- Arbitrary Stormwater Loadings From An Uncalibrated Model – The TMDL's estimate of current PCBs in stormwater is based on an uncalibrated model that does not account for the spatial and temporal variability of stormwater loads to the Bay. The TMDL proposes to reduce these loads through an arbitrary allocation to each county in proportion to population, such that it is estimated San Francisco County would be allowed to discharge stormwater with a PCB concentration of 8,050 parts per quadrillion ("ppq"), but more rural Napa County must reduce PCBs in stormwater to a concentration of 640 ppq.

- Reduction Of Indefinite Central Valley Loads Not Reasonably Assured – The current load of PCBs from the Central Valley is effectively unknown as the TMDL assumed a rate of freshwater flow from the Central Valley that was seven to ten times too high and used PCB concentration data that were temporally biased and taken from sampling stations that are not representative of freshwater flows. Although attainment of the TMDL is predicated upon dramatic reductions in PCBs from the Central Valley, the TMDL contains no measures to reduce this source of PCBs and does not provide reasonable assurances that this load reduction will occur. This predicted reduction conflicts with the Central Valley RWQCB's analysis showing that the rate of any decline of PCBs in the Central Valley is unclear and cannot be predicted.

- The TMDL Cannot Be Met Without Added Treatment At POTWs – The load of PCBs from publicly owned treatment works ("POTWs") is understated as the TMDL did not use available site-specific data to calculate the load, and did not properly account for future growth. The TMDL's assumption that the POTWs will be able to meet their allocation of two kg/year without additional treatment is not correct, frustrating the potential attainment of the TMDL as such treatment is not part of the TMDL.

- The PCB Load From Atmospheric Deposition Is Essentially Unknown – The rate of atmospheric deposition of PCBs is effectively unknown, but is likely larger than the 0.35 kg/year assumed by the TMDL, which value the TMDL's own peer reviewer does not believe, and which includes no load for PCBs in rainfall. PCB loads to other water bodies can be very significant, and, in a number of cases, have been shown to be greater than 10 kg/yr – the proposed value for the entire TMDL from all sources.

The technical problems in the TMDL are not just sources of uncertainty that RWQCB can address by using "conservative" assumptions. Rather, they are mistakes in the TMDL's

data, modeling, and analysis that obscure a true understanding of the processes controlling PCB levels in the Bay, yielding results that are contrary to observed, empirical data. For example, there is no uncertainty that measured PCB concentrations in mussels, the water column, and sediment have been declining, and that natural recovery at meaningful levels is occurring; but the TMDL does not account for these facts.

RWQCB must balance competing environmental and economic objectives when adopting a TMDL. The TMDL documentation does not provide RWQCB adequate information about the costs and benefits of the TMDL to make an informed, balanced decision. But it is evident from the available information that achieving the TMDL is not feasible, and would come at great environmental and economic cost, with little benefit to the environment or human health.

- Stormwater Treatment Infeasibility – Attempting to meet the stormwater load would require capture and treatment of stormwater on a region-wide scale, as Best Management Practices will not meet the TMDL's concentration requirements. The costs for acquiring the land for stormwater capture and treating stormwater with best available technology would be astronomical, even for a typical design storm volume. Even such sophisticated treatment has not been demonstrated to meet the stringent PCB levels called for by the TMDL.

- Dredging And Capping Infeasibility – Dredging and capping are the only implementation measures in the TMDL for contaminated sediments, identified as sediments containing more than 10 ppb PCBs. Given the many millions of cubic yards of sediment that presently exceed 10 ppb, dredging and capping this volume would entail an unprecedented effort, many times greater than any remedial project ever attempted in the United States. Even dredging and capping just the 22 sites identified in the TMDL as being of particular interest would potentially be the largest remedial project undertaken in the United States. The costs would be astronomical, the time to complete years if not decades, and the benefits minimal as technical analysis shows that these particular locations are not driving fish-tissue levels on a regional basis, and as natural recovery is reducing PCB levels at these sites at a rate certainly comparable to the timescale for any such undertaking, if not faster.

- Infeasible PCB Numerical Targets And Goals – The proposed PCB targets and goals are much more aggressive (in some cases by orders of magnitude) than levels generally found to be acceptable at sites assessed under U.S. EPA oversight. While the TMDL states that the one ppb sediment "goal" is not a cleanup standard, it sets the bar so low that even trying to approach it through remedial projects would be extremely onerous and potentially impossible and, as described above, unnecessary. If the TMDL, as it seems to imply, is not meant to affect PCB cleanups, the TMDL needs to be revised to create a clear separation between the TMDL and cleanup programs, lest the PCB targets and goals be used as *de facto* standards, or Applicable or Appropriate and Relevant Requirements ("ARARs").

- Adverse Environmental Impacts Of The TMDL – Implementing the TMDL would cause significant environmental impacts, including destruction of and/or damage to healthy benthic communities, emissions of criteria pollutants and greenhouse gases, consumption of landfill capacity, and land use impacts. Mass removal of PCBs from contaminated sediment sites will result in adverse impacts, as equipment to remove and transport the material likely will generate diesel exhaust, and greenhouse gases, and the act of sediment removal likely will reintroduce into the water column PCBs otherwise sequestered in the sediment.

- Adverse Consequences To Bay Management – The TMDL will make it more difficult and expensive to manage sediment in the Bay, whether that entails removing it from places where it impedes navigation and commerce at ports, handling it as part of waterfront redevelopment, or utilizing it as a resource for habitat restoration or the construction of wetlands. The TMDL may adversely affect maintenance dredging and the ability to keep the region's ports open for business, and the costs of, and options for, disposal of dredged material. The TMDL may adversely affect waterfront development and redevelopment since such economic activity will encounter sediment with levels greater than one ppb. The TMDL may affect adversely, and increase the cost of, projects to restore or reclaim habitat, or construct wetlands, given that such projects typically rely on the availability of sediment that can be used as a resource.

- No Apparent Ecological Benefit – Adopting the TMDL would not appear to have material ecological benefits as the current PCB levels in fish, sediment, and the water column are below levels that are considered protective by U.S. EPA and NOAA. During multiple impairment proceedings over the last decade, data showing that PCBs are impairing the Bay's ecological standards have not been identified; nor does the TMDL show such impairment.

- Health Benefits Theoretical And Speculative – The fish-tissue target is based on such an extreme scenario that adopting the TMDL would not prevent a single case of cancer. Very few, if any, persons eat an average of eight ounces of uncooked white croaker or surf perch from the Bay every week for 70 years – which is the hypothetical population the TMDL is designed to protect. The TMDL's water-column goal of 19 to 49 parts per quadrillion is 3.4 to 8.9 times more stringent than the state-wide standard for PCBs set by U.S. EPA to protect sport fisheries, further underscoring the unrealistic risks on which the TMDL is based.

- No Risk To General Population – The TMDL proposes a safe level for PCBs in fish that is 200 times lower than the national tolerance level for commercial seafood set by the federal Food and Drug Administration. While the TMDL proposes to protect anglers from consuming fish with over 10 ppb of PCBs, those very same anglers can legally be served fish in a Bay-area restaurant or purchase fish at a Bay-area market containing PCBs with up to 2,000 ppb.

- No Consideration Of Epidemiology – The TMDL does not account for the extensive scientific literature showing that PCBs do not cause cancer or non-cancer effects in humans. As no human study has shown that PCBs are a carcinogen, U.S. EPA considers PCBs to be only a probable carcinogen.

- Adoption Of Suspect United Nations' Toxicity Values – The TMDL sets a fish-tissue level for dioxin-like PCBs based on a United Nations approach to comparing the relative toxicities of dioxin with these PCBs, when federal officials including the National Academy of Sciences have called into question the UN approach.

The federal Clean Water Act requires RWQCB to establish proper technical conditions to demonstrate that any particular compound is suitable for development of a TMDL. For the above and other reasons, the proposed TMDL is not supported by proper technical conditions, and is not technically defensible. Adoption of it as proposed would be arbitrary and capricious. California law requires RWQCB to put the TMDL through a thorough review of economic and environmental consequences, to define the project with specificity, and to examine feasible alternatives to it. These requirements are especially important here, as the proposed plan for reduction of PCBs from runoff and mass removal of PCBs from sediments, although not adequately defined, likely will entail the construction of stormwater capture and treatment facilities, large-scale dredging, and the use of diesel-emitting heavy equipment, among other measures. Despite the pressing need for economic and environmental review, however, the TMDL contains no economic analysis that can be recognized as such, and the environmental review of the proposal is not adequate. The proposed TMDL does not conform with a number of other applicable legal requirements, as more particularly described infra, Section IV.

Further underscoring the importance of thorough analysis, feasible alternatives might avoid the environmental and economic costs of the proposed TMDL. For example, monitored natural attenuation coupled with institutional controls would protect those consuming Bay-caught fish from any potential risk to which they might be exposed, without causing the significant environmental impacts that an unprecedented dredging/capping and stormwater treatment program would entail. The TMDL must identify the feasible alternatives to the proposed plan and analyze these alternatives fully, so as to identify the superior environmental alternative, and comply with law.

II. THE PROPOSED TMDL IS TECHNICALLY UNSOUND AND INFEASIBLE, MAY BE IMPOSSIBLE TO ACHIEVE, AND IS BEING PURSUED AT GREAT COST AND RISK OF SERIOUS, ADVERSE ENVIRONMENTAL IMPACT WITHOUT PROMISE OF MATERIAL BENEFIT, WHEN PRUDENT ALTERNATIVES EXIST.

RWQCB is required to strike a reasonable balance among competing objectives when preparing a TMDL, and must establish a technically sound basis in order to inform TMDL implementation measures. As more particularly described below, the proposed TMDL does not meet these basic requirements.

- The TMDL's technical analysis has numerous problems, leaving RWQCB without an adequate understanding of the sources and processes that affect PCB levels in the Bay, and in turn without the requisite technical compass necessary to make rational decisions about whether and how to reduce PCB levels in fish – the TMDL's stated objective.

- The TMDL's fish-tissue target is based on an exaggerated assessment of the risk of eating fish from the Bay containing PCBs, and on hypothetical angler consumption of such fish that is at most an extreme conduct engaged in by only a handful of persons, and which has not been demonstrated to be occurring at all.

- The TMDL's implementation focus on stormwater and contaminated sediments is misplaced, as the TMDL's stormwater analysis is compromised by significant error, the TMDL's stormwater goals are unattainable, and the TMDL's assumption that cleanup of contaminated sediments will accelerate attainment of the fish-tissue target is not correct.

- In addition, it is very difficult to square the TMDL's suggestion that the TMDL will not be the but-for cause of greatly expanded cleanups of contaminated sediments with the TMDL's stringent numerical goals and standards.

- The TMDL will require great public and private expenditures to achieve very little benefit, and also will result in significant adverse environmental impacts that RWQCB has not anticipated or characterized adequately.

- The capacity of the Bay to assimilate and recover from PCBs is much greater than portrayed in the TMDL, and the TMDL materially understates the loss of PCBs from the Bay due to natural recovery processes. As a result, the TMDL analysis has overlooked several reasonable alternatives such as monitored natural recovery and institutional controls – alternatives which RWQCB fully should consider.

Under these circumstances, and as more particularly described below, RWQCB must reformulate the TMDL based on sound science and in accordance with its statutory mandates to craft a reasonable regulation that strikes a proper balance among various objectives, including the objective of achieving the highest water quality that is reasonable, given economics and technical feasibility. Also, RWQCB should incorporate into the TMDL the safeguards necessary to ensure that the TMDL does not supplant typical PCB cleanup levels, which generally are orders of magnitude greater than the PCB values of the TMDL.

A. <u>The Benefits Of The TMDL Are Minimal And Likely Illusory</u>.

The document does not support a claim of ecological benefit from the proposed TMDL. PCB concentrations in Bay waters have been below the aquatic life standard of the California Toxics Rule ("CTR") since 2000. While the TMDL claims that PCBs are preventing the Bay from meeting ecological standards, RWQCB has not made this argument during prior periodic agency proceedings where SWRCB, in cooperation with the State's RWQCBs, compiles a comprehensive state-wide list of all water bodies not meeting standards for particular

compounds. RWQCB has made no such showing during these prior proceedings for an ecological impairment of the Bay by PCBs; and RWQCB offers no such showing in the TMDL. RWQCB points to a U.S. EPA sediment screening level of 160 ppb, which U.S. EPA considers protective of wildlife. The overwhelming majority of surficial sediments in the Bay are below this screening value.

The TMDL documentation attempts to make a case for material risk to people from eating fish in the Bay; but the risk scenario is hypothetical, without plausible basis in fact, and is unrelated to any risk to which the general population may be exposed. The overall angler population in the Bay area is on the order of 125,000 persons. Using straightforward probability analysis, it can be shown that very few anglers – fewer than 100 – possibly would be engaging in the conduct assumed by the TMDL. The number may in fact be zero, as the year-long angler intercept survey conducted in the Bay area from July 1998 to June 1999 likely would have found such an angler, if he or she existed. In any event, this tiny group may be exposed to a slight incremental cancer risk, assuming PCB concentrations and toxicology as characterized in the TMDL documentation. The group is so small that not a single additional cancer would be expected to occur from the target exposure, or even much higher exposures.

The minimal benefit is underscored further by the undisputed fact that no epidemiological study has shown PCBs to cause cancer in people. For this reason, U.S. EPA identifies PCBs as a probable human carcinogen. Not one of fifty epidemiologic studies have shown a link between cancer and PCB exposure – in many studies at concentrations well above levels present in the Bay. While one of RWQCB's peer reviewers believes that PCBs can be harmful to people at any levels, and offered that the TMDL is not stringent enough, this expert has been disqualified as an expert in federal court, and has testified under oath that his assumption about PCBs being a threat regardless of threshold is based on faith – not science. RWQCB cannot rely on its peer reviewer's faith-based assumption, especially in light of the substantial empirical information showing an absence of human carcinogenicity.

The benefits of a fish-tissue target of 10 ppb must be considered in light of the national tolerance level for PCBs in commercial seafood set by the federal Food and Drug Administration (the "FDA"). The proposed 10 ppb target of the TMDL is 200 times more stringent than the FDA tolerance level of 2,000 ppb. While the TMDL is designed to protect anglers from fish containing PCBs over 10 ppb, those very same anglers can buy fish in any fish market or restaurant in the Bay area with PCBs of up to 2,000 ppb.

B. <u>The TMDL Is Infeasible, And May Be Impossible, To Achieve</u>.

The stated objective of the TMDL to reduce PCB loads to the Bay to 10 kg/yr cannot be achieved. The plan requires dramatic reductions in PCBs in urban runoff that cannot feasibly be met with Best Management Practices and, as such, would require stormwater capture and treatment. It does not appear possible that the land requirements for stormwater capture on a regional scale could be met, because the land is neither available nor affordable. In addition, no known large-scale stormwater treatment technology has been demonstrated to meet the very low PCB concentrations required to satisfy the allocation for urban runoff; existing treatment technologies are prohibitively expensive on a regional basis, even if only a design-storm volume (not all stormwater) were treated.

Other sources of PCBs not controlled under the proposed plan in combination or alone likely will frustrate the attainment of the TMDL's 10 kg/yr goal. The TMDL has not made the case that Central Valley PCBs will drop dramatically in the years ahead – declines that are fundamental to the 10 kg/yr goal, as RWQCB estimates that the current load from the Central Valley is 42 kg/yr, far greater than the goal. There is no present plan to control this source, as it is under the jurisdiction of a different agency, the Central Valley RWQCB, which has not developed a TMDL for these PCBs, and has found that future declines cannot be assumed or predicted. The SF RWQCB's estimate of this load is technically flawed and unreliable, and RWQCB has not made any independent evaluation upon which it can reasonably assure that its proposed Central Valley allocation (5 kg/yr) will be met.

The TMDL assumes that PCBs in nonurban runoff are minimal (0.1 kg/yr), and will not frustrate its 10 kg/yr objective, when recent studies indicate that this load is at least 2 kg/yr (20 percent of the 10 kg/yr goal), and may be as high as 11 kg/yr (110 percent of the 10 kg/yr goal). RWQCB needs to identify and quantify the magnitude of this source, which it has no plan to control, and which alone could absorb the 10 kg/yr goal, materially or even entirely.

The TMDL's estimate of PCBs entering the Bay from the atmosphere is questioned by RWQCB's peer reviewer, and likely is much higher than the TMDL assumes, providing yet another source beyond RWQCB's control that may frustrate the attainment of the 10 kg/yr goal. RWQCB would need to identify and quantify the magnitude of this source before it could ascertain with confidence that its 10 kg/yr goal can be attained, even if all other implementation measures were achievable.

The TMDL proposes to accelerate attainment of its fish-tissue target through dredging and capping of contaminated sediments, which RWQCB defines as sediments with PCB concentrations greater than 10 ppb. Since dredging cannot achieve levels below the Bay ambient level of 10 ppb, even if all the sediments in the Bay margin were reduced to ambient levels, under the TMDL's logic bottom-feeding fish in the margin would not meet the fish-tissue target of 10 ppb. The TMDL assumes that PCBs in fish are 10 times higher than PCBs in sediment, and that fish derive their PCBs principally from the sediment. Under these assumptions, bottom-feeding fish in the margin would have PCB levels of about 100 ppb, even if sediments in the margin were reduced to ambient levels.

In addition, the particular sites identified in the TMDL for possible remediation represent a very small percentage of the Bay; remediation of all of these sites will not materially promote attainment of the fish-tissue target, showing that the TMDL's focus is misplaced. Roughly 60 percent of the PCBs in the Bay are outside the Bay margin, and will continue to exert a significant influence on regional PCB levels, even if the entire Bay margin were to be remediated.

C. <u>The TMDL's Implementation Plan Calls For Extraordinary Measures, Entailing Potentially Staggering Costs</u>.

The cost information provided in the TMDL does not consider the economic impacts of measures to achieve the TMDL. The TMDL documentation has left the public with no

meaningful information on the costs of the proposal. RWQCB must address this deficiency in order to satisfy its disclosure obligations, and balance these costs against potential benefits.

1. Stormwater.

The TMDL's use of current annual wastewater treatment costs to assess the costs of the stormwater proposals is not sound. Wastewater is treated at several Bay-area Publicly Owned Treatment Works ("POTWs") already in existence and designed to treat domestic sewage and industrial wastewater. Treating PCBs in stormwater would deploy different technologies (e.g., granular activated carbon versus activated sludge), has different land requirements (because of the need to capture and store for treatment large stormwater volumes that arrive in pulses), and entails different annual operating and maintenance costs.

Capital costs to build the storage and treatment works for a 25-year storm volume (standard RWQCB design storm) is estimated to be $8 billion. These costs do not include land acquisition or the operation and maintenance of the stormwater treatment system, which would include replacing 700 tons of activated carbon per year and transporting over 8 million square feet of waste sludge to area landfills.

Even this investment, however, will not achieve the TMDL's stormwater allocation, which calls for effluent concentrations that existing technologies have not been demonstrated to meet in the treatment of stormwater. Whatever PCBs exist in stormwater in excess of the design-storm volume will continue to enter the Bay unabated – a fact the TMDL does not acknowledge.

2. Dredging and capping; remediation of industrial sites.

The TMDL's discussion of dredging and capping costs similarly is deficient. If such costs should not be ascribed to the TMDL, as the documentation seems to suggest, RWQCB needs to explain why the TMDL contains these implementation measures, and how the TMDL's PCB goals, which are much more stringent than typical PCB cleanup levels, will have no influence on PCB cleanups.

The TMDL suggests that its PCB goals are not applicable to PCB cleanups. RWQCB should make this point very clear and explicit. Under the ARARs cleanup programs established under federal and California law, the responsible agency can look to nonapplicable standards that may be "relevant and appropriate," or to standards or objectives that fall in the category of "to be considered." Absent very clear language from RWQCB, the PCB goals of the TMDL could be misinterpreted to be legally enforceable cleanup goals regardless of their status in RWQCB's regulatory regime. These concerns are particularly important give that portions of Bay, including Hunter's Point, have been designated as Superfund sites. RWQCB either must revise the TMDL to remove the focus on contaminated sediments and thereby create a clear separation between sediment cleanups and the TMDL, or properly analyze the costs and impacts of dredging and capping.

The only cost contained in the TMDL for dredging is an estimate of the "tipping fees" for disposing of dredged spoils at a landfill ($10 to $100 per cubic yard). Tipping fees are only a

single component of the myriad costs of a remedial dredging project. Overall unit costs are more accurately estimated to be in the range of $111 to $1014 per cubic yard.

The TMDL documentation does not address how much dredging will be required. Since the TMDL classifies all sediments with over 10 ppb PCBs as contaminated, dredging of all such sediments is one scenario, although the scale and cost of this scenario plainly is not feasible. Even accelerated dredging at the particular sites identified by RWQCB would involve extraordinary activity and staggering cost.

In light of ongoing natural recovery (which the TMDL discounts without basis) it makes little sense to focus efforts on remediation of sediments where cleanups will take years, if not decades, of study and implementation to effect. An accelerated dredging program is not feasible, as dredging only the particular sites identified in the TMDL could result in one of the largest remedial dredging programs ever undertaken in the United States, requiring a massive commitment of equipment and manpower dredging six days a week for 14 years to complete. By the time such a massive, and probably infeasible, dredging program is completed, PCB levels in the target sites would have declined significantly, due to ongoing natural recovery. This rapid natural recovery undermines any perceived imperative for dredging, and avoids the adverse environmental consequences inherent in dredging.

The TMDL identifies as an implementation measure the remediation of on-land PCB-contaminated soils. But the TMDL omits any discussion regarding the costs of this measure; it does not even contain an inventory of industrial sites along the Bay margin where the TMDL might require such remediation. The costs of remediating on-land sites could be considerable; RWQCB must identify the sites it is targeting for such remediation and quantify the costs.

RWQCB has failed to properly assess the true cost to implement the proposed TMDL. The secondary economic consequences of the TMDL, such as the impacts on jobs, housing and competitiveness, have not been considered at all. RWQCB must undertake an economic analysis that begins with a definition of the actions that will be necessary under the TMDL, who will be responsible for such actions, and what those actions realistically will cost.

D. The Adverse Environmental Consequences Of The TMDL Are Significant.

The plan to reduce PCBs will be disruptive from an environmental standpoint. Not only will the TMDL's implementation measures result in significant adverse impact, its new classification scheme whereby all sediment with over 10 ppb PCBs is classified as contaminated could complicate and potentially frustrate habitat restoration and beneficial reuse opportunities for dredged sediments. Since loss of habitat is a significant environmental threat to the Bay, any impediment to restoration such as the proposed TMDL must be tailored carefully to avoid negatively impacting restoration projects.

The TMDL's classification scheme also could complicate and impede levee reinforcement and maintenance, with life safety, property and economic implications. Private and public economic activity, development and redevelopment may encounter Bay sediments classified as contaminated under the TMDL's scheme, potentially delaying and/or reducing such activity, with potential economic and environmental costs.

The direct impacts of the TMDL's implementation measures also are apparent. The energy needs to construct and operate stormwater treatment plants and to dredge and cap sediments are sizeable, and will produce greenhouse gases, and air pollution, including emissions for which the Bay area is in non-attainment. In addition, dredging the Bay will destroy healthy benthic communities, which typically require four years to re-colonize the impacted area. The habitat modification and turbidity caused by the dredging may impact sensitive species, including juvenile fish. Land uses would be impacted, as stormwater treatment and staging areas for dredging will occupy significant land, and the designation of dredged material as "waste" will impede the beneficial re-use of that material in habitat restoration and redevelopment projects.

E. Prudent Alternatives To The TMDL Exist, And Must Be Considered By RWQCB.

Feasible alternatives to the TMDL have not been considered by RWQCB. The TMDL cannot dismiss natural recovery by equating it with the No Project alternative. When natural recovery is monitored, it represents a viable alternative, typically combined with institutional controls. A realistic assessment of natural recovery in the Bay shows that half of the PCBs are dissipating every six to twelve years. This robust level of recovery is promoted by tidal flushing, which has not been modeled properly in the TMDL.

To satisfy its obligation to consider feasible alternatives, RWQCB must direct that the assessment of natural recovery be corrected and that monitored natural recovery with institutional controls be assessed properly as a stand-alone alternative to the proposed TMDL.

Other feasible alternatives exist. U.S. EPA sponsored a recently released report on TMDLs which describes two alternatives that RWQCB must analyze. The first approach is to require equal-percent reductions across all sources – an approach that has been used in other TMDLs. The equal-reduction approach stands in contrast to the proposed TMDL, which arbitrarily requires each county to meet vastly different stormwater concentrations, and purports to require no reduction of PCBs from POTWs (although this assertion does not seem correct). As an alternative to treating stormwater and wastewater differently, and placing disproportionate burdens on different counties, RWQCB must examine an equal-percent reduction approach, as identified in the EPA-sponsored TMDL report.

The other alternative recommended in the EPA-sponsored report is an allocation that meets the TMDL at the lowest possible cost. This alternative is consistent with the balancing RWQCB must undertake, and the legal requirements to consider the cost of complying with the TMDL. This approach, too, has been used in other TMDLs, and must be evaluated by RWQCB.

Another alternative that RWQCB should evaluate is a TMDL designed to protect against real risk from bioaccumulation as opposed to theoretical effects in a hypothesized but unobserved population. This alternative is consistent with the narrative standard for bioaccumulation, which protects against increasing concentrations of toxic substances that are "detrimental" – rather than theoretical risks from PCB concentrations that are declining.

III. THE TMDL'S TECHNICAL PROBLEMS ARE SIGNIFICANT AND LEAVE RWQCB WITHOUT THE PROPER TECHNICAL CONDITIONS TO ADOPT THE TMDL.

The TMDL materially understates the Loading Capacity of the Bay, and does not provide reasonable estimates of the key sources of PCBs to the Bay. The Loading Capacity incorrectly assesses natural recovery; the fish-tissue target, which drives the TMDL's calculation of Loading Capacity, is too low due to an exaggerated assessment of risk. Current loading estimates for stormwater, the Central Valley, POTWs, and the atmosphere are indefinite and in error for a variety of reasons. Similarly, the load reductions proposed in the TMDL are problematic and either unattainable or unnecessary. These problems leave RWQCB without the proper technical conditions necessary to support adoption of the TMDL as proposed.

A. Natural Recovery In The Bay Is Occurring At A Robust Rate, Promoting The Bay's Ability To Assimilate PCBs, A Linkage The TMDL Misses.

We pointed out the importance of natural recovery in our February 2004 comments, and indicated that RWQCB could not achieve a realistic assessment of natural recovery unless it accounted for the ebb and flow of the tides in the Bay which promote the removal of PCBs from the system. While a tidal component has been added to the model, the model remains inaccurate, in large part because it artificially limits the outflow of PCBs in the Bay, trapping them in the Bay when in reality they flow out under the Golden Gate Bridge. This artifact of the model prevents a reliable characterization of the Bay's ability to recover from and assimilate PCBs.

The TMDL used a scaling factor in the one-box model to account for a drop in PCB concentrations near the seaward boundary of the Bay. But the drop is explained fully by dilution with ocean water, and mixing processes, and is related to transport of PCBs from the Bay on the outgoing tide. Introducing the scaling factor interfered with the model's conservation of mass equations, and misspecified the boundary between the Bay and the ocean. The results are model calculations that retain PCBs in the Bay that actually exit the Bay in the outgoing tide, and false conclusions about natural recovery and assimilation because of a basic failure to conserve mass. Correcting this single error shows that the Loading Capacity of the Bay is at least 2.5 times greater than assumed in the TMDL.

The TMDL continues to rely on the inaccurate application of the one-box model instead of using available empirical information and data that unequivocally demonstrate natural recovery. Available data for mussels, the water column, and sediment uniformly show that PCB concentrations are declining, such that PCB levels are cut in half every six to twelve years. Fish-tissue data has shown a decreasing, long-term trend since the 1950s, although more recent data are insufficient to support a short-term trend analysis. There is no evidence that the rate of recovery is slowing; the natural, ongoing processes at work in the Bay may result in sediments in the Bay reaching an ambient PCB level of five ppb (half the current estimated level) in six to twelve years.

B. The TMDL For Stormwater Is Based On Speculative Loading Values, Assumes Without Basis That The Bay Cannot Assimilate PCBs In Stormwater, Allocates The Load On An Arbitrary Basis, And Is Unachievable With Any Known Technology.

The TMDL's estimate of current PCBs in stormwater is based on an uncalibrated model, the predictive ability of which has not been established, making the proposed use of the estimate suspect. PCB concentrations in storm sewer sediments vary throughout the region, and the majority of the PCB stormwater load enters the Bay during storm events. For example, the average PCB concentrations in sewer sediment samples collected from Alameda and San Mateo Counties are 156 and 1,042 ppb, respectively, reflecting significant variation across the region. Yet, the TMDL relied on an uncalibrated model of rainfall and subsequent stormwater runoff that held PCB concentrations for each land use invariant across the region, and ignored the temporal peaking that is inherent in stormwater loads. The TMDL documentation ignored both the spatial and temporal variability of PCB loads, and did not calibrate the model, which would have enabled the agency to evaluate the influence of the TMDL's assumptions. In the absence of a calibration, and given the assumptions which are not consistent with known conditions, the TMDL's calculations of current stormwater loads are speculative, and not technically defensible.

The TMDL states that PCB levels on sediments in stormwater must be reduced to one ppb in order to achieve the sediment goal and the fish target. This approach assumes that the Bay has no capacity to assimilate PCBs in stormwater as it requires PCBs entering the system in stormwater pipes to be at the same concentration (one ppb) as the sediment goal (one ppb), and is akin to setting a numeric effluent limit for urban runoff of one ppb sediment PCBs. The TMDL documentation offers no study of assimilative capacity to support its implicit conclusion that the Bay cannot assimilate PCBs in stormwater. The TMDL's own analysis inadvertently demonstrates that the Bay can assimilate PCBs in stormwater.

The TMDL proposes to spread the stormwater Waste Load Allocation of two kg/yr among the nine counties which drain to the Bay. Using the TMDL's own information, it can be estimated from these county-by-county allocations what sediment concentrations correspond to each. These concentrations are presented in the QEA report submitted herewith, and are reproduced below:

County	Estimated Current Load (kg/yr)	Load Allocation (kg/yr)	Required % Reduction	Resulting PCB Water Column Concentration (ppq)	Particulate PCB Concentration (ppb)
Alameda	8.86	0.5	94	2,370	19
Contra Costa	6.55	0.3	95	3,250	27
Marin	4.07	0.1	98	890	7
Napa	2.08	0.05	98	640	2
San Francisco	1.08	0.2	81	8,050	79
San Mateo	4.91	0.2	96	1,800	17
Santa Clara	8.94	0.5	94	2,270	18
Solano	1.97	0.1	95	1,530	4
Sonoma	1.55	0.05	97	870	2

As can be seen in the last column above, the proposed TMDL does not require PCBs in stormwater sediment to be reduced to one ppb. In fact, PCBs in stormwater sediment range from a low of two ppb (Napa and Sonoma Counties) to a high of 79 ppb (San Francisco County), with an average of about eleven ppb. The inconsistency between the stormwater allocations and the TMDL's goals relates to an order-of-magnitude error in the translation of the sediment goal of one ppb into these allocations. If corrected, the proposed allocations and the associated concentrations would be reduced by a factor of ten (e.g., the corrected Waste Load Allocation is 0.2 kg/yr). But, by concluding that the fish-tissue target can be met with a two kg/yr load from stormwater and eleven ppb PCB levels in stormwater sediments, the TMDL actually has demonstrated that stormwater need not have sediment PCB levels at one ppb. In other words, the Bay does assimilate PCBs in stormwater at concentrations in excess of the TMDL's goals. Thus, the TMDL documentation erred in implicitly assuming that the Bay has no such assimilative capacity. QEA's independent analysis of assimilative capacity and natural recovery also demonstrates the Bay's ability to achieve recovery with sediment PCBs entering the Bay at concentrations in excess of one ppb.

The county-by-county allocations in the above table are arbitrary, incorrect and unachievable with any known large-scale stormwater treatment technology. The current PCB stormwater loads (column two) were based on an assumed association between land use and PCB levels. In allocating that load among the various Bay-area counties (column three), however, the TMDL departed from this association, and, instead, distributed the assigned load on the basis of county population. This approach was inconsistent with the land-use based approach through which the current loads were calculated, and also arbitrary in that the TMDL documentation provides no rational for why population centers should receive a greater PCB allocation than less populated areas. Thus, while Napa and Solano Counties have estimated current loads that are very similar (about two kg/yr), Napa's allocation is only half as much as Solano's because Napa has a smaller population. San Francisco County can maintain PCB loads at 19 percent of current estimates, while less populated Marin and Napa Counties must achieve future loads that are a mere two percent of current estimates. These results are arbitrary and are not technically defensible, and also place burdens onto the counties disproportionately without plausible basis.

The TMDL's approach results in nondefensible allocations, where some counties will be required to achieve stormwater concentrations that are much lower than concentrations from other counties. The TMDL documentation offers no explanation as to why urban runoff from Napa County must be reduced to PCB levels of 640 ppq, whereas San Francisco County will be allowed discharges at levels more than ten times greater, at 8,050 ppq.

Whether RWQCB persists with the proposed allocation of two kg/yr, or corrects the TMDL documentation's error and adjusts the allocation to 0.2 kg/yr, the allocation is unachievable. While the TMDL documentation makes the good point that Best Management Practices should be used to reduce sediment, and thus PCBs, in stormwater, Best Management Practices do not clean stormwater to the ppq levels in the above table. In fact, not even the best available technology is known to achieve these levels in stormwater. The best systems will produce PCB levels below 1,000,000 ppq, and maybe even below 65,000 ppq, but no one has demonstrated their ability to reach 8,050 ppq, or 640 ppq. With a corrected math error, the proposed TMDL allows only up to 805 ppq in stormwater – below any demonstrated technology for large-scale stormwater treatment.

Further, the TMDL fails to adequately consider PCBs in nonurban stormwater that is not gathered in the region's public storm drain systems subject to the Clean Water Act's NPDES program. The TMDL estimates that the current PCB load from nonurban stormwater is only 0.1 kg/yr; the TMDL does not contain any measures to reduce PCBs from this largely uncontrollable source. More recent studies place the current load from this source in the range of two to eleven kg/year, potentially greater than the entire Loading Capacity of the Bay calculated by the TMDL, and raising questions about attainment. RWQCB needs to better characterize this source before it can demonstrate with confidence that implementation of the proposed TMDL will achieve water quality standards, as RWQCB has interpreted them.

C. The Current Load Estimated For The Central Valley Is Neither Supported Nor Reliable; There Is No Reasonable Basis To Expect A Precipitous Reduction In That Load.

The TMDL did not use the available data correctly when it calculated the existing load of PCBs entering the Bay from the Central Valley. Both the flow data and the PCB concentration data have problems that render the TMDL's estimate of current loading from the Central Valley unreliable and unsupported. The rate of freshwater flow that the TMDL assumed (212,000 cubic feet per second) was too high by a factor of seven to ten. Actual river flow entering the Bay from the Central Valley is in the range of 22,000 to 30,000 cubic feet per second. Using the higher, incorrect value caused the TMDL to ascribe certain measured PCB concentrations to much more freshwater flow than it should have. We believe the problem arose from using flow information from an area affected by the ebb and flow of the tides, and from not isolating the net flow from the Central Valley towards the Bay from the influence of the tides.

The PCB concentration data relied upon by the TMDL also was incorrect as these data were collected with a bias towards the summer dry season, when it is anticipated that the higher PCB loads would be associated with the rainy season. In addition, the data were taken at a point where Bay water and river water were mixed together; thus, the data cannot be assumed to be representative of the freshwater influence of the Central Valley rivers. The combined flow and

concentration errors yield an unreliable, unsupported estimate of the PCB load entering the Bay from the Central Valley.

Nor has the TMDL established the case for a dramatic reduction in Central Valley PCBs, which RWQCB predicts will drop from 42 kg/yr to 5 kg/yr without any implementation measures. Not only is the current loading value of 42 kg/yr unreliable, the TMDL did not include an independent evaluation of PCB sources in the Central Valley, an area outside its jurisdiction, to examine the potential for load reduction. The Central Valley RWQCB, however, has investigated the rate of PCB declines in that region, concluding that the rate of decline is unclear and cannot be predicted:

> "[I]n the Central Valley, PCB . . . concentrations appeared to be declining at some sites but did not show apparent trends in others sites. . . . The available data cannot be used to predict future rates of decline since the temporal and spatial variation observed in this study is relatively high, and the number of individual sampling years (and sample size within years) is relatively low. . . . [T]race organic contaminant concentrations [including PCBs] in Central Valley fish may remain relatively stable for the foreseeable future."

B.K. Greenfield, E. Wittner, N. David, S. Shonkoff, and J.A. Davis, Monitoring trace organic contamination in Central Valley fish: current data and future steps, Report to the Central Valley Regional Water Quality Control Board, SFEI Contribution #99 at page 16-18 (available at http://www.sfei.org/rmp/reports/delta_organics/ delta_organics_report.pdf)(2004). RWQCB's own peer reviewer commented: "I do have some question as to whether the anticipated natural attenuation within the Central Valley watershed . . . is realistic. . . ." Staff Report at C-13.

Despite the contrary conclusions of the Central Valley RWQCB's study of PCB sources and potential attenuation in that region, and without its own independent evaluation, the TMDL concludes that Central Valley PCBs will diminish dramatically to achieve the Load Allocation. This conclusion is not technically defensible, especially in light of the errors the TMDL has made in assessing PCB inputs from the upstream Central Valley.

D. Absent New Treatment At Secondary Plants, PCB Discharges From POTWs Will Frustrate Attainment Of The TMDL; The TMDL Arbitrarily Favors Wastewater Over Stormwater.

The effluent PCB levels from Bay-area POTWs vary significantly, even when comparing effluent data from POTWs that use comparable wastewater treatment technology. For example, both the East Bay Municipal Utility District ("EBMUD") POTW and the Central Costa County Sanitary District ("CCCSD") POTW are secondary treatment plants, yet the TMDL reports effluent PCB levels for these plants of 5,700-7,900 ppq and 1,100-1,400 ppq, respectively. Notwithstanding this documented five-fold difference, the TMDL assumed that the effluent concentrations from these two plants, and all other area plants with secondary treatment, were the same.

The total POTW load estimated using the uniform-concentration approach was 2.3 kg/yr, which value supposedly accounted for future growth and anticipated increases in wastewater flows. Had the TMDL used the available site-specific data, and assumed future PCB loads grow proportionately to future increases in wastewater flow (the standard and most reasonable assumption), the overall POTW load would have been 3.1 kg/yr. The 0.8 kg/yr incremental difference between these two values represents eight percent of the Bay's Loading Capacity as calculated by the TMDL documentation.

The TMDL reduced its already-low estimate of 2.3 kg/year of PCBs in POTW effluent by 15 percent to a value of two kg/year. The TMDL documentation explained this reduction as a rounding adjustment. The effect of it, however, is to leave the POTWs with an allocation set at an artificially depressed estimate of current loading. Since the TMDL does not include implementation measures to reduce PCBs in POTW effluent, future discharges will be on the order of 3.1 kg/yr, which will cause the TMDL of 10 kg/yr to be exceeded by 1.1 kg/yr from this source alone, another indication that the TMDL will not be attained. Achieving the POTW Waste Load Allocation of two kg/yr would require a 35 percent reduction in PCBs from POTWs – a reduction that likely could be achieved only through additional treatment at the secondary treatment plants, which is not required by the TMDL.

The TMDL does not explain its disproportionate treatment between wastewater and stormwater. For example, the EBMUD POTW currently discharges sediments with an average PCB concentration of 340 ppb. This value is more than four times greater than the highest PCB concentration allowed on stormwater sediments (79 ppb for San Francisco County; see above table). The TMDL does not explain why PCBs on stormwater sediments must be reduced to the 2-79 ppb range (0.2 to 7.9 ppb if RWQCB corrects the TMDL's math error) while POTW sediments can contain much higher levels, yet warrant no reduction.

The TMDL proposes to allow EBMUD and other POTWs to discharge at concentrations of up to 500,000 ppq, as the TMDL proposes a numeric effluent limit ("NEL") of that value for the POTWs. In comparison, PCBs in county stormwater must be at or below 8,050 ppq (or 805 ppq if RWQCB corrects the TMDL's math error). This disproportionate treatment of these two sources is not explained and appears arbitrary. PCBs in stormwater are not understood to pose any greater threat than PCBs in wastewater effluent, suggesting that similar NEL values should be acceptable.

Moreover, the TMDL does not account for the local effects of discharges by POTWs. For example, the EBMUD plant discharges between 17 to 73 percent of the regional PCB load within the vicinity of its discharge. Because the plant accounts for such a large percentage of the regional PCB load, it is unreasonable to assume that reductions in stormwater loads alone would be beneficial without EBMUD load reductions.

E. <u>The TMDL's Estimate Of Atmospheric Deposition Of PCBs Is Not Believable And Does Not Include PCBs In Rainfall, Which Are Known To Be Material</u>.

The TMDL assumes that more PCBs leave the Bay by volatilizing into the atmosphere than enter the Bay through atmospheric input. But this assumption is based on an estimate that only 0.35 kg/year of PCBs enter the Bay through the atmosphere which, according to RWQCB's

own peer reviewer, is "simply not believable." Staff Report at C-11. In contrast, up to 90 percent of the PCB load to Lake Superior is through the atmosphere, and atmospheric inputs into Lakes Ontario, Erie and Michigan are 64, 257, and 3,200 kg/yr, respectively. Given that the Bay is bordered by a largely urbanized area, with industrial centers in the cities of San Francisco, Oakland, and San Jose, and in light of atmospheric loads to other water bodies, the TMDL's loading estimate is suspect.

The 0.35 kg/yr value is not based on site-specific data, which are essential to obtaining accurate loading estimates of atmospheric deposition. The report containing the 0.35 kg/yr value acknowledges that, "[o]btaining comprehensive measurements of site-specific parameters is critical to the accurate estimate of the magnitude as well as direction of the fluxes for . . . PCBs over the Estuary." Critical site-specific data regarding PCB concentrations in the air and wind speed were not used to calculate the 0.35 kg/year value. Measurements of PCB concentrations in air were taken at only one monitoring station, despite the size of the region, and its various microclimates.

The 0.35 kg/yr value is based only on dry deposition of PCBs from the atmosphere. But PCBs are known to enter water bodies in rainfall as well. While the TMDL made no attempt to quantify this source of PCBs, scientific literature indicates that PCB loads in rainfall can be as large as, or greater than, PCB loads during dry periods. PCBs are present in rainfall at meaningful levels (80-520 ppq), in comparison with the TMDL's goal of achieving 19-49 ppq in the Bay. Because the TMDL ignored this source, the amount of PCBs entering the Bay in rainfall remains indefinite. Since available information indicates this source likely is significant, this source must be quantified as part of a proper demonstration that the TMDL, as proposed, could achieve the target water column concentrations and Loading Capacity.

Because the TMDL omitted the load from PCBs in rainfall, did not use site-specific data, and has not convinced its peer reviewer that the loading estimate is plausible, and in light of much larger PCB fluxes to other water bodies from the atmosphere, the true rate of atmospheric deposition to the Bay is unknown, and very likely is larger than the TMDL assumes.

F. PCBs Are Not Causing Violations Of Ecological Standards In The Bay.

Federal Clean Water Act ("CWA") Section 303(d) listing proceedings for the Bay, information on benthic ecology and aquatic life in the Bay, and wildlife screening values all indicate a healthy Bay ecosystem. As the TMDL documentation acknowledges, "current conditions" in the Bay "are protective of aquatic life from chronic toxicity." Since aquatic toxicity could occur only at levels higher than chronic thresholds, aquatic life in the Bay is not at risk from PCBs. Therefore, a TMDL is not necessary to protect aquatic life and the TMDL will not produce benefits to aquatic life.

1. The Bay is not impaired for EST, RARE and WILD.

The TMDL documentation states that the PCBs in the Bay are impairing estuarine and wildlife habitat (the "EST" and "WILD" beneficial uses), and also the preservation of rare and endangered species (the "RARE" beneficial use). The TMDL documentation, however, lacks a presentation of any information that establishes how current levels of PCBs are harming such

habitats or species. The only information provided in the Staff Report relating to potential ecological effects is the statement, "evidence that wildlife may be affected by PCBs exists as bird egg PCBs concentrations that have been measured at levels near the effects threshold." This statement does not indicate that bird egg concentrations are greater than a relevant and appropriate effects threshold and, therefore, does not support the contention that birds or any other ecological receptors are being impacted negatively by PCBs.

RWQCB previously has not identified PCBs as impairing the Bay for the EST, RARE and WILD beneficial uses. The TMDL provides no grounds upon which, for the first time, to find the Bay impaired for EST, RARE and WILD. If the Bay were impaired for EST, RARE and WILD, such impairment would have been identified during the semiannual process of updating the CWA Section 303(d) list of impaired waters, which requires RWQCBs to assemble and evaluate all existing and readily available water quality-related data and information to develop the list and to provide documentation for listing or not listing a particular region's waters as impaired. SWRCB, Water Quality Control Policy For Developing California's Clean Water Act Section 303(d) List (2004). Neither the proposed 2006 CWA Section 303(d) list, nor the 2002 and 2004 lists, however, includes such impairment designations.

As neither the current nor prior 303(d) lists include listings for San Francisco Bay for RARE, EST, or WILD designated uses, and as the proposed TMDL does not provide data or analysis consistent with the listing policy, the ecological impairments claimed as a basis for the TMDL are unsupported.

2. Current levels of PCBs in the Bay are not harming aquatic life or the benthic ecosystem.

The proposed TMDL does not make independent findings that the Bay's ecology is being injured by PCBs, nor would such claims be supportable. The TMDL itself recognizes that PCB concentrations in Bay waters generally are below the CTR standard for aquatic life (i.e., 30,000 ppq). The TMDL refers to a U.S. EPA screening level for the protection of wildlife of 160 ppb; average PCB concentrations in Bay sediments are well below this threshold, as are the vast majority of surficial sediments in the Bay.

Concentrations of PCBs in sediment in the Bay are well below thresholds used by U.S. EPA as potential measures of harm. The risk-based sediment concentrations protective of ecological receptors developed for specific locations in San Francisco Bay under U.S. EPA oversight range from 97-24,000 ppb – well above ambient PCB concentrations in the Bay, and two to five orders of magnitude higher than the TMDL's sediment goal of one ppb. The fact that ambient Bay sediments do not exceed these values suggests that U.S. EPA would not find general harm to ecological receptors in the Bay from PCBs.

Concentrations of PCBs in fish tissue are below thresholds U.S. EPA has determined are protective of fish. Since 2000, all tissues from fish collected from the Bay have had PCB concentrations below 760 ppb – the concentration U.S. EPA set to protect the most sensitive fish species. Based on this conservative threshold, it is apparent that current concentrations of PCBs in fish tissues are not causing detrimental effects to fish in the Bay.

Localized pockets of degraded benthic communities have not been linked to PCBs. For example, the benthic community in San Leandro Bay, one of the contaminated sediment locations identified in the Staff Report, is generally healthy and is not considered injured from PCBs. Healthy benthic communities, or ones not harmed by PCBs, are located at other sites listed in the Staff Report.

G. PCBs In Bay Fish Are Not Placing Any Angler Population At Significant Risk.

PCBs in the Bay pose no material risk to the general population. The TMDL is targeted at a hypothetical, small group of anglers that probably does not exist: anglers who (i) eat an average of eight ounces a week; (ii) of raw white croaker and shiner surfperch; (iii) caught in the Bay; (iv) every week for 70 years. Even if the TMDL's assumption that anglers who catch and eat fish in one four-week period will continue to do so for 70 years is correct, the TMDL would at most protect a population of 6,250 to 8,000 persons from a one in 100,000 cancer risk (which is roughly comparable to the one in 280,000 risk of being struck by lightning). But since it is very unlikely that any anglers are so consistent in their consumption of Bay-caught fish, the TMDL likely protects zero anglers from such a risk.

The assumed fish consumption pattern is an unfounded extrapolation of an angler survey conducted by the San Francisco Estuary Institute ("SFEI"). Of 1,331 anglers, interviewed by SFEI, only 537 reported eating fish from the Bay in the prior four-week period. A small group (53 anglers) reported eating at least an average of eight ounces of fish from the Bay for each week in the prior four-week period. The TMDL applies these eating habits, based on the four-week period preceding the interview, to all 910 four-week periods over seventy years. But doing so is inconsistent with the SFEI survey results themselves, as such anglers were not identified. Had they existed, this kind of year-long angler intercept survey very likely would have identified them.

In fact, very few consumers eat fish from the Bay every month for even a single year. Because the SFEI study reports the probability of a consumer of Bay fish eating Bay fish in a four-week period was approximately 50 percent, it follows from basic probability concepts that the probability of a person eating Bay fish in each of the 13 four-week periods in a year would be 0.5^{13} (or less than 1 in 8000) if each period were independent. While each period may not be entirely independent, it is clear that very few, if any, consumers of Bay fish would fall into the extreme, every-month-for-70-years scenario assumed in the TMDL.

The eight-ounce rate, is the 95th percentile consumption rate over only a four-week period. This short-term rate is an overstatement of the true long-term rate. Even if it were applicable to the long term, any 95th percentile is not representative of the population of consumers of Bay fish, but represents an extreme scenario. The San Francisco angler population is estimated to be about 125,000, out of nearly 6.5 million Bay Area residents. Assuming that five percent of the Bay angler population eats at least eight ounces per week of Bay-caught fish, the resultant population is only 6,250 out of 6.5 million. Protecting these persons from excess cancer at a risk level of one in 100,000, as the TMDL proposes to do, will not prevent a single cancer. From a public health perspective, the TMDL provides little, if any, cancer-prevention benefit.

The TMDL documentation adds to its unrealistic assumptions by using white croaker and shiner surfperch as the measure of whether the 10 ppb PCB fish-tissue target is being attained. The SFEI consumption rates, however, were calculated over all species, not just croaker and shiner surfperch. The SFEI data show that only 28 percent of the consumer population is even willing to eat white croaker, and only 7.5 percent of consumers of Bay fish actually ate white croaker in the four-week period prior to their interview. For shiner surfperch, the figure was only 1.7 percent.

The TMDL documentation does not account for the PCBs that are lost when fish are cooked, which reduces PCBs in fish on the order of 40 percent. The SFEI survey results show that eating raw fish is very rare among Bay-area anglers. Fully 99 percent of white croaker consumers never ate raw white croaker. It is unrealistic for the TMDL to assume that consumers are eating large amounts of uncooked fish.

Meeting the TMDL would not reduce the amount of potential risk accepted for consumers of commercial fish in the Bay Area. The FDA enforces a Tolerance Level for PCBs of 2,000 ppb in commercially sold fish. The TMDL fish-tissue target is 200 times lower than the FDA Tolerance Level. More of the SFEI survey respondents (53 percent) reported eating fish from a store or restaurant in the preceding four weeks than reported consuming fish from the Bay (40 percent). Even if the hypothetical population of the TMDL exists, after implementation of the TMDL (assuming it could be achieved), the risk level would be unchanged within the general population, who could continue to eat fish from stores and restaurants containing up to 200 times as much PCBs as fish caught from the Bay.

H. The OEHHA Fish Advisory Does Not Mean That Toxic Levels Of PCBs Are Present In Bay Fish.

As discussed in our 2004 comment letter, RWQCB cannot rely upon the 1994 OEHHA advisory as a basis to claim that the TMDL will provide benefits. The advisory was issued in 1994, according to OEHHA, to "be prudent." It was a precautionary advisory, not based on the establishment of a safe/unsafe threshold but, rather, advising the public as to conservative practices that might be adopted to avoid any risk altogether. OEHHA never has claimed that failure to adopt the recommended practices will expose people to unacceptable risk. In fact, the primary finding made by OEHHA when it issued the advisory was that a "health evaluation and risk assessment" should be conducted in light of the data upon which the advisory was issued. Because no formal risk assessment has been conducted, the conditions and data on which the advisory was based have materially changed, and the advisory was not completed in accordance with current standards of the California Water Code, or then-applicable standards of the Fish & Game Code, the advisory provides no basis upon which RWQCB may conclude rationally that fish PCB levels must be reduced significantly to protect people.

I. Dr. Carpenter's Opinions Regarding The Health Effects Of PCBs Are Not Credible.

Dr. David Carpenter served as one of the peer reviewers for the TMDL. A court recently has held that Dr. Carpenter's opinions regarding PCBs "are not sufficiently reliable and therefore inadmissible . . . ." Allgood v. General Motors Corp., 2006 WL 2669337, at *27 (S.D. Ind. Sept.

18, 2006). In the Allgood case, the court found that, "Dr. Carpenter failed to use reliable methodology" and that his "methodological flaw . . . cannot be overlooked by the court." Id. at *28-29. The Allgood court explained that, under Dr. Carpenter's "approach, one would expect half the world's population of approximately six billion people (everyone with [blood serum] levels above the median) to be entitled to a special medical monitoring program, at least if they could identify the sources of their exposure to PCBs." Id. at *28.

Dr. Carpenter has testified under oath that, on the basis of faith, he assumes that PCBs can be harmful down to any level, no matter how miniscule. He admitted that he makes this assumption without scientific fact to support it, as shown in the following excerpt from his deposition:

> "A. I can't give you any scientific evidence on [sic] factual basis that there are diseases that result from very low concentrations of PCBs. . . . I'm making the assumption these effects [of PCBs] on biological molecules are ultimately the effect of the basis for the human disease.
>
> "Q. That's the faith part?
>
> "A. That's the faith part."

Long v. Monsanto Abernathy, Calhoun County Alabama Circuit Court (Case No. CV 97-767), Deposition of David O. Carpenter, M.D., held on 12/16/1998.

Further, Dr. Carpenter ascribes a whole host of ailments (including memory loss, heart disease, and high blood pressure) to PCB exposure, without scientific basis. Dr. Carpenter even testified under oath that a man's 1978 knee surgery was required because of PCB exposure. Clopton v. Pharmacia Corporation, Federal District Court, N. Dist. of Alabama (Case No. 2:30-CV-3369-UWC), Deposition of David O. Carpenter, M.D. at 56, held on January 31, 2007. As a result of motion practice on the reliability of Dr. Carpenter's opinions, Dr. Carpenter did not testify in Clopton as to the health effects of PCBs in specific individuals.

Given both Dr. Carpenter's unscientific, faith-based opinions about PCBs and his demonstrably flawed methodology, RWQCB lacks a rational basis to rely upon Dr. Carpenter – either as to the health effects of PCBs or to whether the TMDL should be set even lower.

J. The TMDL Ignores Overwhelming Evidence That PCBs Do Not Cause Cancer Or Non-Cancer Effects In People.

There is little (if any) evidence that current exposure to PCBs in the environment causes cancer or neurological effects in humans. The overwhelming scientific literature regarding the potential human health effects of PCBs does not establish a link between PCBs and cancer or any other illness in humans. The TMDL does not account for this publicly available information and concludes, against the weight of scientific evidence, that PCBs cause cancer in humans.

In 2001, a comprehensive review of available scientific literature regarding the human health effects of PCBs was submitted to U.S. EPA. That review included over 40 cancer studies, over 90 studies of non-cancer effects, and over 25 studies regarding neurodevelopmental effects.

The review authors reported no credible evidence that PCBs cause cancer or any other illness in humans. Since 2001, a number of scientists who previously reported an association between PCBs exposure and human health effects published new reports finding no such link.

Additionally, recent studies show that human cells are many times less sensitive to PCBs than rat and monkey cells – significant findings as the current approach to human risk assessment is based on extension of the results from animal studies to humans. The National Academy of Sciences has reviewed the results of some of these studies and concluded that, if the toxic effect of PCBs on human cells is significantly less than the effect on non-human cells, the toxic equivalency factor for PCBs should be revised accordingly. National Research Council, Health Risks from Dioxin and Related Compounds—Evaluation of the EPA Reassessment at 61 (2006).

The TMDL should be advised to take into account the current understanding of PCB toxicity, as reflected above and in the technical reports submitted herewith.

K. The TMDL's Fish Screening Goal For Dioxin-Like PCBs Improperly Relies On Highly Suspect United Nations' Toxicity Values.

The TMDL improperly based its fish screening value for the so-called dioxin-like PCBs on toxicity information from the United Nations World Health Organization ("WHO"). WHO created a scheme whereby it tried to establish a correspondence between the toxicity of dioxin, a known human carcinogen, and certain congeners of PCBs, which apparently bear structural similarities to dioxin. WHO generated Toxicity Equivalency Quotients ("TEQs"), which purported to reflect the toxicity of the PCB congeners as a fraction of dioxin's toxicity. The TMDL used WHO's original TEQs from 1994 to derive the proposed dioxin-like PCBs fish-tissue value of 0.14 parts per trillion.

The proposed TMDL does not reflect any critical evaluation of the WHO TEQ scheme; it adopts it wholesale. This is problematic for several reasons. WHO has updated its TEQ values twice since 1994, yet the TMDL uses the outdated 1994 values without any indication of awareness of the more recent values, or explanation as to why they were not used.

More fundamentally, WHO did not publish the values through any kind of a public process, nor did WHO subject the values to peer review before publication. It has been up to the scientific community to ascertain to what extent WHO's TEQ scheme has any value in predicting and characterizing PCB toxicity. Such value has not been established to date.

The equivalency between PCBs and dioxin which WHO hoped to establish is fraught with assumptions, the truth of which have not been established. For example, the National Toxicology Program ("NTP") of the United States Department of Health and Human Services recently evaluated the chronic toxicity and carcinogenicity of dioxin, "dioxin-like" compounds, structurally similar PCBs, and mixtures of these compounds, in order to address "the lack of data on the adequacy of the TEQ methodology for predicting relative potency for cancer risk." NTP, Technical Report on the Toxicology and Carcinogenesis Studies of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) (CAS No. 1746-01-6) in Female Harlan Sprague-Dawley Rats (Gavage Studies) (NTP TR 521), National Toxicology Program (2006). The stated purpose of NTP's

evaluation indicates that the adequacy of the TEQ methodology to predict toxicity has not been established. The National Academy of Science review of U.S. EPA's draft Dioxin Reassessment, stated that "[i]t remains to be determined whether the current WHO TEFs, which were developed to assess the relative toxic potency of a mixture to which an organism is directly exposed by dietary intake, are appropriate for body burden toxic equivalent quotient (TEQ) determinations." National Research Council of the National Academies, Health Risks from Dioxin and Related Compounds: Evaluation of the EPA Reassessment of TCDD and Related Compounds (2006).

Notwithstanding these problems, the TMDL uses the TEQ values without any recognition that they have not been established as a valid or reliable means to characterize PCB toxicity. The WHO TEQs do not provide a technically defensible basis to establish a fish screening value for dioxin-like PCBs.

L. Remediation Of Contaminated Sediment Sites Will Not Accelerate Attainment Of The Fish-Tissue Target.

The presumed effectiveness of dredging sites with elevated PCB concentrations is predicated on the implicit belief that these sites are a major source of PCBs to the Bay. This assumption is not correct; remediation will yield minimal benefits because of the relatively small PCB mass contained in these sites. The TMDL documentation fails to demonstrate that the locations identified as "In-Bay Contaminated Sites" in Table 26 of the Staff Report are important sources of PCBs to the Bay. The maximum sediment PCB concentrations listed in the table are actually buried PCBs found well below the active sediment layer.

QEA used sediment PCB data to evaluate whether the identified PCB contaminated sites are a major external source of PCBs to the Bay, as the TMDL assumes, and concluded is that it is unlikely these sites contain sufficient PCB mass to limit the recovery of the Bay. For example, the bioavailable sediments in San Leandro Bay contain about 12 kg of PCBs, which amounts to merely 0.8 percent of the total 1,500 kg of PCBs in surficial sediments throughout the Bay . QEA concluded that the total PCB mass in San Leandro Bay sediments cannot keep the sediments of SFB contaminated or materially reduce the rate of ongoing natural recovery. Although insufficient data exist to make this type of quantitative assessment for other areas of the Bay, it is unlikely that similar analyses would show that any of the other PCB-contaminated sites are an important source of PCBs to the Bay.

Any attempt to clean up contaminated sediments in the Bay margin would be undermined by recontamination from the main Bay. The identified sediment sites are likely depositional areas that trap particulate matter that enters the Bay with each tidal cycle and storm event. Ambient PCB concentrations in suspended particles exceed the sediment target by as much as an order of magnitude or more. Such particles would settle on remediated areas, re-contaminating them. While the PCB-contaminated sites the TMDL has identified have insufficient PCB mass to keep the Bay contaminated, the Bay has sufficient PCB mass to re-contaminate any such site that is remediated.

The inclusion of remediation of PCB contaminated sites in the implementation plan is inappropriate because no analysis has been done to establish potential benefits of such

remediation on PCB levels in water and in fish; remediating such sites will yield minimal benefits because of the relatively small PCB mass contained therein; and recontamination will undercut the goals of any such remediation.

M. Bay-Wide Monitoring Of PCBs At Parts Per Quadrillion Concentrations For TMDL Compliance Is Problematic.

High-volume water sampling and U.S. EPA Method 1668, Revision A, likely will be necessary to show TMDL compliance, as conventional methods cannot detect PCBs in the parts per quadrillion range. Since Method 1668 has not been approved by U.S. EPA, RWQCB independently must develop a program to ensure consistency and accuracy of sampling analyses, based on the use of standardized procedures and periodic assessment of laboratory performance. The TMDL presents no such program, and the reliability of Method 1668 has not been established.

Method 1668 suffers from various technical challenges associated with detecting chemical compounds in the low ppq range. Interlaboratory calibrations and comparisons have been elusive, as results of samples split between laboratories have not been reproducible on a consistent enough basis. Quality assurance and control is a challenge, as high volume water sampling introduces significant opportunity for introduction of ambient and background PCBs, or interferents, into the sample. Simply obtaining samples that are adequate for testing is a time-intensive process that requires either using specialized equipment or collecting and shipping large volumes of water to the testing facility. Even with careful collection of samples, Method 1668 is so sensitive to background contamination that it may not be able to determine consistently whether ambient conditions meet the TMDL's water-quality objectives.

Even if the TMDL could ensure consistency between the results of different laboratories and could avoid quality control issues, sampling to measure compliance with the TMDL will be expensive. The cost for collecting one sample and analyzing it with Method 1668 exceeds $1,000, and can approach $2,000, greatly exceeding typical costs to analyze a sample for total PCBs (about $50 to $100 per sample).

RWQCB is premising measuring attainment with the TMDL on the assumption that the large-scale use of unapproved Method 1668 can yield accurate, reproducible results – an assumption that the TMDL documentation does not support, and one that is highly suspect. The proper technical conditions are not present for the TMDL to rely on Method 1668 for TMDL attainment demonstrations.

N. The Analysis Of The TMDL's Environmental Impacts Does Not Describe The Project's Significant Environmental Impacts.

The TMDL's analysis of project impacts is technically flawed; the TMDL as proposed will have significant environmental impacts that cannot be mitigated.

Because the project is not well-defined, we made certain assumptions in the assessment of the environmental impacts, including with respect to proposed implementation measures for contaminated sediments. We assumed that dredging at the sites identified in the Staff Report would be limited to a depth of four feet, and that the volume of dredging of such sites would be

up to 110 million cubic yards. Dredging even just these sites would be a massive dredging operation – comparable to or larger than the largest remedial dredging projects in the country. An operating and processing area necessary to support the dredging project would require many acres of near shore land, which even if it were available, would have its own environmental impacts. Disposing of the dredged material would exhaust the landfill capacity at many existing facilities, and could result in the need for new landfills, which would have its own environmental impacts. Even if the actual area of dredging were substantially less, the conclusions below would still apply (though for some of them – such as air quality – at a different magnitude).

The likely designation of the dredged materials as "waste" would likely render them unfit for beneficial reuse, which is an important part of the San Francisco Bay Long Term Management Strategy. Beneficial reuse opportunities the TMDL would impact include habitat restoration, levee maintenance, and redevelopment.

Dredging "contaminated sites" will result in emissions of criteria pollutants that exceed Bay Area Air Quality Management District significance thresholds – including nitrous oxides, particulate matter, and reactive organic gasses – and significant emissions of greenhouse gases. RWQCB has failed to consider these emissions.

Dredging will damage benthic communities. Once destroyed by dredging or damaged by capping, it can take up to four years for benthic ecosystems to re-colonize. The TMDL does not characterize the health of the benthic communities at the "contaminated sites," but some of them are known to be generally healthy, and localized pockets of degraded benthic communities have not been linked to PCBs.

Dredging "contaminated sites" will cause significant impacts to species. The TMDL did not consider potential impacts to the long list of protected species that live in the Bay. Habitat modification, increased turbidity, and re-suspension of contaminants into the water column could result in significant impacts to some of those species.

The recently proposed organochlorine TMDL for Newport Bay corroborates that a large dredging operation will cause significant environmental impacts. In that TMDL (which includes PCBs), the Santa Ana RWQCB concluded that implementing the TMDL, and dredging in particular, would cause significant impacts to biological resources, air quality, noise, traffic, and landfill capacity. The proposed TMDL for SFB will cause greater impacts than the organochlorine TMDL for Newport Bay since the sediment goal for SFB is lower than the one proposed for Newport Bay, and SFB is larger than Newport Bay. The TMDL must address the significant discrepancies between the proposed Newport Bay TMDL and the proposed TMDL for SFB, and explain why Santa Ana RWQCB recognizes significant impacts despite having a much higher PCB sediment goal.

Further impacts will be caused by the treatment of stormwater, which will entail, among other things, constructing massive storage basins, the size of which is estimated to be up to 28 square miles. RWQCB has not examined the land use, economic, and habit impacts of this aspect of the TMDL.

Due to the incomplete project description, it cannot be ascertained exactly when and where the impacts discussed above will occur, pointing to the need for a better-defined project.

IV. THE TMDL MUST BE REVISED TO CONFORM WITH APPLICABLE LEGAL REQUIREMENTS.

The proposed TMDL must meet various legal requirements of the Porter-Cologne Water Quality Control Act (the "PCA"), the federal Clean Water Act (the "CWA"), the California Environmental Quality Act ("CEQA"), the California Administrative Procedures Act, the California Health & Safety Code (pertaining to peer review), as well as the due process requirements of the federal and state constitutions. The TMDL does not satisfy a number of applicable legal requirements, as discussed below.

A. The TMDL Is Defective As A Matter Of Law As It Cannot Feasibly Be Met.

The PCA, the CWA, RWQCB's Basin Plan interpreting these statutes, and RWQCB's project objectives for the TMDL require RWQCB to adopt a reasonable TMDL that can be implemented feasibly, and accomplished. The proposed TMDL does not meet these standards.

1. The law requires water quality standards, and plans to implement them, to be achievable.

Attainability is a touchstone of the PCA, which incorporates a reasonableness standard specified by the California Legislature. Under the PCA, "activities and factors which may affect the quality of the waters of the state shall be regulated to attain the highest water quality which is reasonable, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible."

Water quality standards are established to provide "reasonable" protection of beneficial uses, and are set in light of "[w]ater quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality" in a particular area. Cal. Water Code § 13241. Economics, the housing needs of the region, and the need to develop and use recycled water each must be considered under PCA when setting water quality objectives. Id. The PCA allows "the quality of water to be changed to some degree without unreasonably affecting beneficial uses." Id. The Chief Counsel's Office of the SWRCB has recognized the importance of attainability in water quality control planning, stating that RWQCBs "should review any available information on receiving water and effluent quality to determine whether the proposed objective is currently being attained or can be attained." Memorandum from William R. Attwater, Chief Counsel, State Water Resources Control Board, to Regional Water Board Executive Officers at 4 (January 4, 1994)("1994 State Board Memo").

RWQCB's narrative standard for bioaccumulative toxic substances incorporates the PCA's requirements that water quality standards be reasonable and feasible: "[c]ontrollable water quality factors shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life" (the TMDL documentation omits the words "concentrations of" when quoting this standard), and "[e]ffects on aquatic organism, wildlife, and human health will be considered" in determining whether this narrative standard is met. Basin Plan at 3-1. "Controllable water quality factors" are defined as "those actions, conditions,

or circumstances resulting from human activities that may influence the quality of the waters of the state and that may be reasonably controlled." Id.

Similarly, the CWA requires vigorous protection of water quality where attainable, requiring fishing to be designated as a use "wherever attainable." 33 U.S.C. § 1251(a)(2). States can remove a designated use if it is determined that such use is infeasible. 40 C.F.R. § 131.10(g). Relevant factors when assessing the feasibility of a use include economics, and "[h]uman caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place." Id.; 40 C.F.R. § 131.3(g). The National Research Council recommends analyzing use attainability before adopting a TMDL for water bodies with legacy pollutants, such as PCBs, that cannot be removed without causing environmental damage. National Research Council, Assessing the TMDL Approach to Water Quality Management at 92-3 (2001).

A valid TMDL corresponds to the maximum amount of a pollutant that can be discharged into a water body and still meet water quality standards. City of Arcadia v. State Water Resources Control Bd. (2006) 135 Cal. App. 4th 1392, 1404. In other words, a TMDL must be a reasonable interpretation of a water quality standard – not an ultra-conservative, unreasonable calculation resulting in a value that is far below what is necessary to meet the standard. Since a TMDL implements a water quality standard, and since such standards must be feasible and reasonable, the TMDL itself must be feasible and reasonable. The project objective for the TMDL, which states "[a]void actions that will have unreasonable costs relative to their environmental benefits," is consistent with these principles. The TMDL itself, however, is not.

2. The TMDL is infeasible and invalid on that basis.

As discussed supra, Section III, the TMDL as proposed is infeasible. Although the TMDL's estimates of PCB loads to the Bay are indefinite, the loads from various sources that the TMDL does not propose to reduce (e.g., nonurban runoff, POTWs, the Central Valley, rainfall and the atmosphere) appear to be so significant that even full implementation of the TMDL's control measures would not achieve the 10 kg/yr Loading Capacity. Further, we are aware of no large-scale technology demonstrated to clean stormwater to PCB levels to the target range of 640 to 8,050 ppq (or 64 to 805 ppq if the TMDL's math error is corrected). The land requirements for stormwater collection, even when limited to a 25-year storm, appear to be infeasible to satisfy. Physically removing PCBs from just the 22 "contaminated sites" is infeasible, in any meaningful time frame.

3. The TMDL's references to adaptive implementation do not render the TMDL feasible.

Adaptive implementation, or the present-tense general expression of flexibility in future enforcement, is no substitute for adopting a TMDL that is feasible to achieve in the first instance. Adaptive implementation does not relieve RWQCB of the responsibility to adopt a TMDL that is based on sound data and is feasible.

The California Attorney General recently has asserted that once a regulation (like a TMDL) is in a basin plan, it is an inflexible mandate. "The Basin Plan is a planning document

that serves as the basis for the Water Board's implementation of programs to meet water quality standards and their resulting objectives. These standards and objectives do not vary from permit to permit; they remain the same regardless of the mechanism the Water Boards use to implement them." Reply in Supp. of Dem. at 4:10-15, State Water Resources Control Board v. City of Arcadia, Orange County Superior Court Case No. 06CC02974 (2006). Once a water quality based effluent limitation such as a Waste Load Allocation is established, dischargers must comply with it without regard to the limits of practicability. Defenders of Wildlife v. Browner (9th Cir. 1999) 191 F.3d 1159, 1163; 40 C.F.R. § 130.2(h) ("WLAs constitute a type of water quality-based effluent limitation."). "The language of the [CWA] Act does not allow for incremental achievement of water quality standards through successive approval of TMDLs that fall short of the required standard." NRDC v. Fox (S.D.N.Y. 1998) 30 F. Supp. 2d 369.

Adaptive TMDLs must be achievable and must meet the same basic requirements as other TMDLs, including the need for adequate information to support the needed regulatory determinations. In guidance on phased TMDLs, which share certain features with adaptive TMDLs, U.S. EPA has stated that "each phase must be established to attain and maintain the applicable water quality standard." EPA Memorandum from Benita Best-Wong, Director, Watershed Assessment and Protection Division to Water Division Directors, Regions I-X, "Clarification regarding 'Phased' Total Maximum Daily Loads" (Aug. 2, 2006). "Some reasonable minimum amount of reliable data is always needed in TMDL development." Report of the Federal Advisory Committee on the Total Maximum Daily Load (TMDL) Program, EPA-100-R-98-006 at p. G-1 (July 1998).

B. To The Extent The TMDL Is Impossible To Meet, It Is Unlawful.

"The law never requires impossibilities." Cal. Civ. Code § 3531. The conditions called for by the TMDL discussed supra are so extreme, they may well be impossible to attain. Dischargers and other potentially responsible parties ("PRPs") cannot avoid violating the TMDL, as, for example, counties cannot capture and clean stormwater to the TMDL's arbitrary concentration requirements, and PRPs cannot achieve the fish-tissue target or the sediment goals due to ambient PCB concentrations, other sources, and the impossibility of remediating to the TMDL's standards.

Impossible dimensions of the TMDL violate not only the Civil Code, but also state and federal due process protections. It long has been settled that a governmental directive to perform an impossible task violates due process. See, e.g., Consolidated Gas Co. of New York v. Prendergast (S.D.N.Y. 1925) 6 F.2d 243, 277, modified and affirmed, 272 U.S. 576 (1926) (affirming referee report finding state utility law invalid because, *inter alia*, requiring transmission of natural gas at standard of 650 B.T.U. per cubic foot "is commercially and physically impossible for the company to comply with"; "it can be safely found that the enforcement of the 650 B.t.u. standard would be in effect a confiscation of the coal gas plants of the company, and render it impossible to operate them under such standard"). Similarly, the TMDL is invalid to the extent that compliance with its requirements is impossible.

Even strict liability statutes for regulatory offenses – which ordinarily require no showing of fault or mens rea – may not be applied to a defendant who can show that compliance was objectively impossible. United States v. Park (1975) 421 U.S. 658, 673 (sustaining conviction

for strict liability offence because the statute did "not require that which is objectively impossible"). The Ninth Circuit has assumed the existence of an "objective impossibility" defense. United States v. Y. Hata & Co., Ltd. (9th Cir. 1976) 535 F.2d 508, 510; United States v. Starr (9th Cir. 1976) 535 F.2d 512, 515-16; see also Laurie L. Levenson, Good Faith Defenses: Reshaping Strict Liability Crimes, 78 Cornell L. Rev. 401, 460 n.299 (1993) ("when it is objectively impossible for a defendant to avoid violating the law, the statute becomes arbitrary and vulnerable to a due process challenge."). For these reasons discussed supra, the objective impossibility defense is satisfied, and the TMDL violates due process.

C. RWQCB Must Disclose The Economic And Non-Economic Costs And Benefits Of The TMDL And Reasonably Balance All Factors Before Adopting The TMDL.

PCA requires RWQCB to consider and balance the economic and environmental benefits and harms associated with the TMDL. The CWA does not prohibit such a balancing; guidance interpreting the CWA encourages the consideration of costs in developing TMDLs.

1. RWQCB is required to consider economics in developing the TMDL.

Water quality targets and allocations must take into consideration that water quality which reasonably is achievable in light of social and economic factors. Cal. Water Code § 13241 (economics must be considered in setting water quality objectives.); 1994 State Board Memo at 7 ("For a TMDL whose goal is to achieve a standard based primarily on nonattainment of a designated beneficial use, for which there are no applicable objectives, a numeric target is established for each pollutant or stressor that interferes with attaining the use. Establishing a numeric target in these instances is analogous to establishing water quality objectives"); id. at 4 (acknowledging that RWQCBs "cannot fulfill this duty [to consider economic impacts] simply by responding to economic information supplied by the regulated community.").

CEQA requires a consideration of costs when an agency establishes a performance standard. Cal. Pub. Res. Code § 21159. SWRCB has acknowledged that TMDL "numeric targets and load allocations would probably fall into the category of performance standards." Memorandum from William R. Attwater, Chief Counsel, Office of Chief Counsel of SWRCB, to Executive Officer of Santa Ana Regional Water Quality Control Board, "Do TMDLs Have to Include Implementation Plans?" at 7 (March 1, 1999). Thus, "[u]nder CEQA, the Regional Water Board would have to identify the reasonably foreseeable methods of compliance with any TMDL provisions that established performance standards or treatment requirements [under Section 21159]."). Id. at 6-7. RWQCB also must analyze the costs of the TMDL under the California Administrative Procedures Act. Cal. Gov't Code § 11346.3.

2. A TMDL must strike a reasonable balance among economic and non-economic factors.

Once RWQCB has characterized and disclosed the various costs, benefits and potential harms of a TMDL, it must proceed to balance these factors before adoption. "The regional boards must balance environmental characteristics, past, present, and future beneficial uses, and economic considerations (both the cost of providing treatment facilities and the economic value

of development)." Study Panel Report at 13; see also City of Burbank v. State Water Resources Control Bd. (2005) 35 Cal. 4th 613, 618 (California law allows consideration of economics when imposing pollutant restrictions more stringent than required by CWA).

The CWA does not limit RWQCB's ability to satisfy its statutory mandate under the PCA and engage in substantive balancing when developing the TMDL. TMDL implementation plans are under the purview of state authority as U.S. EPA has no CWA authority to develop and enforce them. 42 U.S.C. § 1313(d) (implementation plan not required as part of TMDL under CWA); Memorandum from William R. Attwater, Chief Counsel, Office of Chief Counsel of SWRCB, to Executive Officer of Santa Ana Regional Water Quality Control Board, "Do TMDLs Have to Include Implementation Plans?" at 7 (March 1, 1999). U.S. EPA has identified several factors that bear on a state's allocation of Loading Capacity, including "technical and engineering feasibility; cost or relative cost; economic impacts/benefits; cost effectiveness; fairness/equity; ability to monitor implementation and effectiveness; assurance and timeliness of attainment of the TMDL and water quality standards; relative source contributions; and/or other appropriate criteria." U.S. EPA Region IX, Guidance for Developing TMDLs in California at 6 (Jan. 7, 2000) (hereinafter "Guidance"). The CWA directs RWQCB to interpret its water quality standards to fulfill Congress's intent to establish maximum Loading Capacity, in part to avoid unreasonable water quality requirements. Economic cost is an appropriate consideration under the CWA, as the values of the water can be taken into account in setting water quality standards. 33 U.S.C. § 1313(c)(2)(A); see also Idaho Mining Ass'n v. Browner (2000) 90 F. Supp. 2d 1078, 1101 (costs may be "an integral component of a [use attainability analysis]").

3. The TMDL does not reflect economics or a reasonable balance among all factors.

The TMDL has not considered economics. Alhough there is a "Discussion of Costs" heading in the TMDL documentation, the report contains no meaningful assessment of the costs of the TMDL, and does not rise to the level of a consideration of economics. The disclosure and analysis of costs is far too thin to inform adequately RWQCB's decision making.

The minimum level of assessment RWQCB must conduct for a meaningful consideration of economics and to satisfy PCA includes: (1) identifying baseline risk levels; (2) listing the benefits to be achieved; (3) identifying alternative strategies to achieve the benefits; (4) estimating the costs of each alternative; (5) assessing uncertainty; (6) comparing the cost effectiveness of each alternative; and (7) identifying the most cost-effective alternative. Absent such an assessment, RWQCB is without the information to balance economic considerations versus other factors, and the public is left without any assurance that RWQCB is proposing a properly balanced regulation.

The proposed TMDL does not strike any reasonable balance between competing economic and environmental factors. The human-health and environmental benefits of the TMDL are minimal and otherwise speculative. In contrast, the economic costs of treating stormwater and dredging contaminated sediments could range from several to many billions of dollars. Attempting the dredging and stormwater treatment measures suggested by the TMDL will have significant adverse environmental impacts, including destruction of healthy benthic

communities, emissions of greenhouse gases and criteria pollutants, and various land-use impacts.

D. The Technical Conditions To Support The TMDL Are Not Present.

As discussed supra, and in the technical reports submitted herewith, the foundation for the proposed TMDL is not sound and the TMDL's analysis, modeling and data have significant problems. Because of these technical problems, PCBs in the Bay presently are not suitable to be regulated under the TMDL program, and the proposed TMDL is not technically defensible.

1. PCBs are suitable for calculation of a TMDL only if proper technical conditions are met; those conditions are not present in the instant case.

CWA Section 303(d)(1)(C) provides:

> "Each State shall establish for [impaired waters], the total maximum daily load, for those pollutants which the Administrator identifies under [CWA § 304(a)(2)] as suitable for such calculation." 33 U.S.C. § 1313(d)(1)(C) (emphasis added).

Section 304(a)(2)(D) in turn requires U.S. EPA to develop and publish "information . . . for the purposes of [Section 303] on and the identification of pollutants suitable for maximum daily load measurement correlated with the achievement of water quality objectives." 33 U.S.C. § 1314(a)(2). U.S. EPA complied with this statutory mandate through a "notice" issued in 1978. Total Maximum Daily Loads Under Clean Water Act, 43 Fed. Reg. 60,662 (Dec. 28, 1978); see also 43 Fed. Reg. 42,303 (Sept. 20, 1978) (proposal). In its final notice, U.S. EPA determined that "[a]ll pollutants, under the proper technical conditions, are suitable for the calculation of total maximum daily loads." 43 Fed. Reg. at 60,665.

In other words, states are required to calculate TMDLs for all pollutants where "proper technical conditions" are present. U.S. EPA's 1978 notice explains:

> "'Proper technical conditions' refers to the availability of the analytical methods, modeling techniques and data base necessary to develop a technically defensible TMDL. These elements will vary in their level of sophistication depending on the nature of the pollutant and characteristics of the segment in question. They must be determined on a case-by-case basis. It is impossible to detail the proper technical conditions for all pollutants in all situations. Moreover, EPA does not want to preclude States from developing their own approaches." Id. at 60,662.

U.S. EPA recognizes that, "proper techniques do not exist for all pollutants in all situations; however, proper techniques can be developed for any pollutant given adequate resources. A limited list of specific pollutants [suitable for calculation of TMDLs] would be too restrictive because it might preclude the States from determining TMDLs for other pollutants for which proper techniques can be developed." Id. at 60,662-63.

Specifically, U.S. EPA interprets pollutants to be suitable for calculation of a TMDL only where "proper technical conditions" are met, i.e., where there exist (1) analytical methods;

(2) modeling techniques; and (3) data necessary to develop a "technically defensible" TMDL. These proper technical conditions must be met with regard to each element of the TMDL. In the instant case, no such showing has been made.

a. The TMDL has not established the Bay's Loading Capacity for PCBs.

The principal parameter that an agency must establish to promulgate a proper TMDL is the assimilative capacity of a waterbody with respect to a particular compound. The TMDL itself corresponds to this assimilative capacity, referred to in TMDL terminology as "Loading Capacity." "Loading Capacity" is defined as "the greatest amount of loading [i.e., mass of a particular compound introduced into a receiving water] that a water can receive without violating water quality standards." 40 C.F.R. § 130.2(f). Particularly where narrative (e.g., the COMM beneficial use, and the narrative toxicity standard in this case) standards are used, a TMDL will be "technically defensible" only if the analytical methods, modeling techniques, and data are adequate to establish that a particular amount of loading is the maximum that the water body can receive while still complying with the standards. In the instant case, RWQCB must determine the "greatest amount" of PCBs that the Bay can receive without violating the COMM and bioaccumulation standards. The TMDL has not done so.

In order to determine how much loading a water body can take without violating the applicable water quality standard, it is necessary to understand the water body's capacity to assimilate loading. Where an assimilative capacity study has not been done, or where that study is not supported by "technically defensible" analytical methods, modeling, or data, the proper technical conditions for calculation of a TMDL are not present. "The loading capacity is the critical quantitative link between the applicable water quality standards (as interpreted through numeric targets) and the TMDLs. Thus a maximum allowable pollutant load must be estimated to address the site-specific nature of the impairment. . . ." Guidance at 3.

The TMDL presents no adequate study of assimilative capacity, and mischaracterizes "the critical quantitative link" for a TMDL. It does not account for declining trends in PCBs, which indicate that current PCB inputs are not overwhelming the ability of the Bay to flush PCBs out of the system. Where concentrations of a compound are declining, one would expect assimilative capacity to be much closer to current loads than RWQCB calculates. On the basis of incorrect analysis and modeling, the TMDL miscalculates in concluding that Loading Capacity is 10 kg per year – far below 84 kg per year, its estimate of current loading. Correction of one modeling error alone shows that Loading Capacity is at least 2.5 times greater than estimated in the TMDL.

b. The proposed sediment goal does not reflect a correct translation between fish-tissue PCBs and PCBs in sediment.

The relationship ("translator") between water quality standards and the numeric loading capacity (i.e., the TMDL) must be technically defensible. As U.S. EPA explained in its 2000 TMDL Guidance for California, "[n]umeric water quality target(s) must be identified, and an adequate basis for target(s) as interpretation of water quality standards must be specifically documented in the submittal." Id.

A technical problem with the TMDL's sediment goal is that it is not based on knowledge of the extent to which fish in the Bay obtain PCBs from a food web connected to bottom sediments. The goal assumes that fish derive all (or the vast majority) of their PCBs from sediment, but this assumption is not plausible. Spatial gradients in PCB concentrations in the fish do not support a direct sediment linkage. Whereas sediment concentrations are three times lower in the North Bay than in the South Bay, fish concentrations are not significantly different in these locations. This finding is consistent with evidence concerning fish diets and movement patterns, which indicate that food resources in the water column are of importance to the fish community. PCBs within the water column likely originate from a wide area of the Bay, and thus PCBs in fish, even those near contaminated sediments, likely come from a combination of local and bay-wide sources.

The TMDL is not justified in concluding that fish are getting all of their PCBs from the sediments in the Bay; a one ppb sediment goal is not a proper translation of the COMM and bioaccumulation standards. The TMDL's translation overstates the importance of local sediments as a source of PCBs in fish.

c. RWQCB has not demonstrated that full implementation of the TMDL will attain water quality standards.

Under CWA § 303(d)(1)(C) and U.S. EPA regulations, a TMDL must be "established at a level necessary to implement the applicable water quality standards . . . ." 33 U.S.C. § 1313(d)(1)(C); 40 C.F.R. § 130.7(c)(1). U.S. EPA's 2000 Guidance emphasizes that "[t]he TMDL and associated waste load and load allocations must be set at levels necessary to result in attainment of all applicable water quality standards . . . ." Guidance at 2.

The TMDL and the LAs and WLAs must be calculated such that implementation of the TMDL will attain water quality standards. "Proper technical conditions" may not be present where available methods, models, and data are not adequate to ensure that implementation will lead to attainment. This concern is not directed to the practical feasibility of implementing the TMDL, but rather to whether full implementation of the chosen numeric standards would in fact lead to attainment. Proper technical conditions are not satisfied, for example, where the decision maker has not characterized or to taken account of significant sources – e.g., aerial deposition, nonurban stormwater runoff, and POTW discharges – such that reductions in other sources in accord with the TMDL may not actually lead to attainment. The proposed TMDL's inadequate accounting for assimilative capacity, spatial arrangement of sources (possibly resulting in "hot spots"), bioavailablity, seasonal variations, and critical weather events present similar problems. The TMDL has set its target so low and relied on such poor data and analysis to characterize existing PCB loads, it has not been established that the proposed implementation actions will achieve the 10 kg/yr Loading Capacity, which RWQCB equates to its standards.

d. RWQCB lacks the necessary reliable, technically defensible data to adopt the TMDL.

The current PCB load of the Bay is unknown because RWQCB lacks the necessary data, including reliable, site-specific data for the PCB load from non-urban runoff, atmospheric deposition, the Central Valley, stormwater, and POTWs.

E. The TMDL Erred In Assigning Half Of The Proposed 10 kg/yr Load To The Central Valley, Improperly Reducing The Loading That Should Be Assigned To Point Sources Such As Stormwater.

The TMDL characterizes PCB loading from the Central Valley as a nonpoint source with a current loading of 42 kg/yr, and specifies a Load Allocation of 5 kg PCBs per year to this incoming, upstream source.

Where, as here, a Load Allocation is specified in the TMDL, the TMDL must include a demonstration that loading reductions to meet the allocation are practicable, technically feasible and reasonably assured of being implemented in a reasonable period of time. Guidance at 4. This demonstration provides "[r]easonable assurances" that "the measures identified will actually obtain the predicted reductions and that the State is able to assure this result." Id.; see also U.S. EPA, Guidance for Water Quality Based Decisions: The TMDL Process, Pub. No. 440/4-91-001 at Chapter 2 (1991)("In order to allocate loads among both nonpoint and point sources, there must be reasonable assurances that nonpoint source reduction will in fact be achieved."). Here, the TMDL assigned 5 kg/yr to the Central Valley without providing reasonable assurances that the Central Valley can meet this Load Allocation.

The TMDL documentation does not explain how or why Central Valley loads will drop by 88 percent. The TMDL documentation speculates that the current Central Valley load is 42 kg per year, when the analysis and data are so suspect that the load is essentially unknown. It may be that the TMDL overestimated the Central Valley load, but without reliable data, it is impossible to determine by how much, or whether the load – even if overestimated – will diminish to a level of 5 kg per year without any controls.

The TMDL documentation assumes the Central Valley Load Allocation will be met through attenuation. The SF RWQCB has no jurisdiction, however, to monitor attenuation in that region and it has done no study of the Central Valley to support its attenuation assumption. The TMDL presents no information as to what sources constitute the current (incorrect) load of 42 kg per year, or how these sources are being addressed, to support its reliance on attenuation for significant future reductions.

Nor does the Central Valley RWQCB have in place, or have planned, a PCBs TMDL for the Central Valley. Had there been a TMDL for PCBs in the Central Valley, and had that TMDL included valid calculations showing reductions in PCBs exiting that region down to 5 kg per year, RWQCB would have been positioned to provide reasonable assurances that the Load Allocation for the Central Valley would be met. But, there is no such upstream PCBs TMDL, nor is there any comparable plan for PCB control in the Central Valley region.

Finally, while the SF RWQCB may claim authority to regulate nonpoint sources, the proposed Load Allocation is unenforceable by it because the allocation is set at or near a political boundary beyond which its jurisdiction does not extend. The SF RWQCB cannot provide reasonable assurances that the proposed Load Allocation will be met in a reasonable period of time.

Where, as is this case here, an agency cannot provide reasonable assurances to support a Load Allocation, the entire load reduction must be assigned to point sources in the form of Waste Load Allocations. Id. In this case, the absence of reasonable assurances with respect to the Central Valley load means that RWQCB must assign the entire Loading Capacity to point sources, such as stormwater.

F. Adoption Of The Proposed TMDL Would Be Arbitrary And Capricious.

At a minimum, the TMDL must satisfy the arbitrary and capricious test of California law, and also cannot be entirely lacking in evidentiary support. Various aspects of the proposed TMDL, alone or in combination, violate these standards. The problems with the TMDL are systemic, rendering any adoption of the TMDL without evidentiary support. Illustrative of the problems with the TMDL are, without limitation, the following:

Infeasibility – An agency action establishing requirements with which compliance is not feasible, or requiring conditions that cannot be achieved, is arbitrary and capricious. An impossible order is "irrational" and may not be enforced: "[t]he condition was unreasonable, because it could not be complied with. [The district court] might as well have asked the plaintiff's attorney to hold his breath [for several hours]. . . . We cannot uphold an irrational ruling." Diehl v. H.J. Heinz Co. (7th Cir.1990) 901 F.2d 73, 75.

Setting Sediment Goals That Invite More Stringent Cleanups – The TMDL's proposed sediment classification scheme, where sediments containing PCBs above 10 ppb are classified as contaminated, invites much more stringent PCB cleanups. If, as the TMDL suggests, the intent is not to make PCB cleanups any more stringent or frequent, the TMDL must be clearly separated from such cleanups, lest the TMDL's stringent PCB values drive cleanups as *de jure* or *de facto* cleanup standards. It would be arbitrary and capricious for RWQCB to invite unnecessary and wasteful cleanups to the levels of the proposed TMDL. It also would be arbitrary and capricious for RWQCB to not create a clear separation between sediment cleanups and the TMDL, especially given the potentially enormous stakes involved, and the dredging and capping implementation measures in the proposed TMDL.

Acting In Contradiction To Stated Principles – It is capricious to identify reasonable principles, and state that the TMDL intends to avoid high costs that are not warranted by environmental threat, but then set a TMDL at levels that are so unnecessarily low that almost any action, no matter how draconian, can be justified under the stated principles.

Unexplained Departure From Precedent – The draft TMDL departs significantly from the January 2004 proposal when RWQCB released a previous draft TMDL that contained a fish-tissue target of 23 ppb and a sediment target of 2.5 ppb. The TMDL documentation provides no adequate explanation why a much more stringent TMDL is needed today than it was in January 2004, and largely has ignored the earlier version of its TMDL, and the many significant differences between it and the current proposal. In addition, the proposed target is 11 times more restrictive than one previously calculated by staff. See 2004 Project Report, comment of Fred Hetzel regarding fish screening values from electronic files produced by RWQCB ("If I use mean for all consumers (6.3 g/day), I get a target of 111 ng/g. With 95%ile number used for mercury, I get 22 ng/g. With 95%ile number for recent consumers (108g/day, I get 6 ng/g.

THIS IS A POLICY ISSUE TO BE DISCUSSED."). "[A]n agency changing its course must supply a reasoned analysis indicating that prior policies and standards are being deliberately changed, not casually ignored, and if an agency glosses over or swerves from prior precedents without discussion it may cross the line from the tolerably terse to the intolerably mute." Greater Boston Television Corp. v. FCC (D.C. Cir. 1971) 444 F.2d 841, 852 (internal citations omitted), cited in California Hotel & Motel Assn. v. Industrial Welfare Commission (1979) 25 Cal. 3d 200, 210 and 219. RWQCB is required to "supply a reasoned analysis indicating that prior" PCBs TMDLs "are being deliberately changed, not casually ignored."

Modeling That Violates Conservation Of Mass Principles – The TMDL's reliance on a model that violates a first principle of physics – conservation of mass – is arbitrary and capricious and renders the TMDL wholly without evidentiary support. The model assumes that PCBs are trapped at the seaward boundary, when in reality they pass through to the open ocean as a correct model would demonstrate. A court generally will defer to an agency as to "the determination of fit between the facts and the model . . . , so that the agency rather than the court may balance marginal losses in accuracy against marginal gains in administrative efficiency and timeliness of decision making." Chemical Mfrs. Ass'n v. EPA (1994) 28 F.3d at 1265. "The more inflexibly the agency intends to apply the model, however, the more searchingly will the court review the agency's response when an affected party presents specific detailed evidence of a poor fit between the agency's model and that party's reality." Id. The conservation-of-mass mistake produces a poor fit; not correcting it would render the TMDL invalid.

Reliance On An Erroneous Calculation Of Loading Capacity – The principal feature of a TMDL is the Loading Capacity, to which the TMDL is equated. Here, Loading Capacity is depressed arbitrarily because modeling errors led the TMDL documentation to assume without rational basis that the capacity is much lower than it is in reality.

Without A Valid Calculation, Dismissing Natural Recovery – The basic flaw in the model causes an error with respect to natural recovery, which occurs much faster than the erroneous model predicts.

Arbitrary Reliance On Modeling Results That Are Contrary To Site-Specific, Empirical Information – Rich data sets of mussel, sediment and water column PCB levels constitute material evidence of natural recovery and the Bay's ability to assimilate PCBs, but are not used to examine recovery and assimilation, or even to calibrate the TMDL's model. Instead, the TMDL uses a model that does not provide a good fit with these data and thus incorrectly predicts that recovery is slowing or minimal. In so doing, the TMDL does not adequately consider all relevant factors. See Sequoia Union High School Dist. v. Aurora Charter High School (2003) 112 Cal. App. 4th 185, 195 ("However, courts must ensure that an agency has adequately considered all relevant factors, and has demonstrated a rational connection between those factors, the choice made, and the purposes of the enabling statute."); Chemical Mfrs. Ass'n v. EPA, supra at 1265.

Numerous Data And Analysis Errors – The errors in the TMDL are such that RWQCB does not have a rational basis to act on the proposed BPA. The TMDL's stormwater values are speculative and based on an uncalibrated model, the current loads from the Central Valley are effectively unknown as they are based on incorrect flow data and biased PCB-concentration data,

the estimate of POTW loads is incorrect as it does not use site-specific data, the estimate of the PCB load from atmospheric deposition is flawed and "not believable," PCBs entering the Bay in rainfall are ignored, and the TMDL documentation does not account for data that show the TMDL is not needed to protect human health or the environment.

Stormwater Loads Based On Population Statistics – RWQCB is without rational basis to allocate stormwater loads on a flawed and illogical methodology that allocates PCB loads among the nine affected counties in a manner inversely proportional to county population size.

Arbitrary Allocation Of Loads – The TMDL offers no rationale for its allocation of PCB loads among sources. For example, the TMDL offers no reason for allocating half of the 10 kg/yr load to the Central Valley or for discriminating among counties on the basis of their population density for stormwater allocation. There is no principled reason articulated for any of the allocations in the TMDL.

Arbitrary Preference For Allowing Discharges Of PCBs From POTWs Compared With PCBs In Stormwater – The TMDL offers no rationale as to why it does not propose implementation measures for wastewater and proposes to tolerate PCB discharges from POTWs at concentrations of up to 500,000 ppq, when each county must reduce PCBs in stormwater dramatically to levels no greater than 8,050 ppq, and in many cases far lower.

Reliance On An Unqualified Expert – RWQCB is without a rational basis to rely upon Carpenter's opinions as to the health effects of PCBs, and whether the TMDL should be set even lower.

Noncompliance With Executive Order S-2-03 – Executive Order S-2-03, issued on November 17, 2003, required California agencies to cease processing any "proposed regulatory action," in order to provide time to analyze the proposed regulation's potentially adverse impacts on the economy and business interests. Though the TMDL is covered by the Executive Order, RWQCB arbitrarily has not complied with its requirements.

RWQCB Has Not Articulated Its Rationale Of Decision – RWQCB has not demonstrated a satisfactory rationale for its decision to adopt the TMDL in light of all relevant factors and the statutory purposes of TMDLs. Id. U.S. EPA guidance for the development of TMDLs in California states that "assumptions must be stated and the basis behind the margin of safety must be documented." Guidance at 7. Yet the TMDL documentation does not provide its sources of uncertainty, how large the margin of safety is, or explain why the margin of safety is reasonable.

G. The Narrative Toxicity Standard Is Void For Vagueness And Violates Due Process, As Applied In The TMDL.

California courts consistently have held that due process of law is violated by "a statute which either forbids or requires the doing of an act in terms so vague that men of common intelligence must necessarily guess at its meaning and differ as to its application." Britt v. City of Pomona (1990) 223 Cal. App. 3d 265, 278; Franklin v. Leland Stanford Junior Univ. (1985) 172 Cal. App. 3d 322, 347. Due process requires the prohibition or regulation be clearly defined in order to provide fair notice to the public and to avoid arbitrary and discriminatory application of the standard. Britt, 223 Cal. App. 3d at 347; People v. Townsend (1998) 62 Cal. App. 4th

1390, 1400 ("A statute must be definite enough to provide a standard of conduct for its citizens and guidance for the police to avoid arbitrary and discriminatory enforcement.").

California courts look not only at the face of the regulation, but also consider vagueness challenges to statutes in light of the facts of the case at hand. Arellanes v. Civil Serv. Com'n (1995) 41 Cal. App. 4th 1208, 1217 (as-applied vagueness challenge not limited to where First Amendment freedoms at risk). In determining the sufficiency of fair notice, the challenged statute must be examined in light of the conduct with which the person allegedly violated it. Cranston v. City of Richmond (1985) 40 Cal. 3d 755, 764.

Under these principles, RWQCB's narrative toxicity standard is unconstitutionally vague as applied in the TMDL because it does not provide any notice to the public that it: (1) would be implemented using the various parameters of the hypothetical risk scenario upon which the target was derived, and by which the public will be bound, (2) corresponds to a fish-tissue target for PCBs of 10 ppb and other quantitative proxies, and (3) encompasses theoretical toxicity.[2]

1. The narrative standard does not provide notice that it corresponds to various numerical proxies for PCBs, such as the proposed fish tissue target of 10 ppb.

The narrative standard does not explain how RWQCB equates the standard to various quantitative measures of PCBs, including a fish-tissue target of 10 ppb, a dioxin-like PCBs fish-tissue target of 0.14 parts per trillion, a sediment concentration goal of 1 ppb, a sediment PCBs mass goal of 160 kg for the entire Bay, a water-column goal of 19 to 49 ppq PCBs, and a Loading Capacity for the Bay of 10 kg per year. These numerical proxies for the standard are indiscernible from the standard itself, which provides the public no notice that the standard also stands for these measures of PCBs. One could not have anticipated reasonably that RWQCB would interpret its narrative toxicity standard as it proposes to do in the TMDL.

This TMDL is analogous to the situation in Simpson Tacoma Kraft Co., where the trial court invalidated a narrative toxicity standard that an agency translated without notice into a very low numerical value for dioxin, using a specific, but previously undisclosed, risk level. Simpson Tacoma Kraft Co. v. Dep't of Ecology (Wash. 1992) 835 P.2d 1030 (affirming the trial court's judgment that the agency had not followed proper rule-making procedures and vacating on other grounds the ruling that the administrative rule was unconstitutionally vague). The trial court found that the State Department of Ecology's narrative standard was void for vagueness and violated due process where the agency applied it to create an effluent limit for dioxin of 0.013 ppq using a one in one million risk level. Simpson Tacoma Kraft Co. v. Dep't of Ecology, No.

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[2] The narrative toxicity standard is also not the kind of criterion that can be used as a basis for the PCBs TMDL. When a toxic pollutant "could reasonably be expected to interfere with . . . designated uses," CWA Section 303(c)(1)(B) specifies that numeric criteria or criteria based on biological monitoring or assessment methods consistent with CWA Section 304(a)(8) shall be developed. The narrative toxicity standard is none of these, and the TMDL clearly assumes that PCBs are reasonably expected to interfere with designated uses. As such, RWQCB must develop the type of criteria required by CWA Section 303(c)(1)(B) and base the TMDL on those criteria.

90-2-00398-9, at 6 (Wash. Super. Ct. 1990). Similar to RWQCB's narrative standard, the Ecology narrative standard stated that toxic substances shall not be introduced into a waterbody at levels that may adversely affect public health. See id. Ecology's failure to include in its narrative rule notice to the public that it might be applied in a manner such as the one at issue violated due process. In the instant case, also in violation of due process, RWQCB gave no notice when it promulgated the narrative standard that it might apply it to PCBs to create PCB proxies that correspond to the standard itself.

2. The narrative standard provides no notice to the public that it will be adjudged to be violated on the basis of highly theoretical assumptions as to fish consumption and PCB exposure.

The TMDL documentation determined that 10 ppb in fish must be achieved to meet the standard based on a highly speculative scenario that could not have been anticipated based on empirical fact. See, discussion, supra, Section III.G. But the narrative standard provides no notice that it will be applied this way, combining one assumption upon another and positing unrealistic consumption and exposure.

Rather than providing more definite guidance as to how to apply the narrative standard, which the agency could have done, the TMDL created a scenario – based on multiple assumptions – that is not likely to occur. The application of the standard in the TMDL was highly unpredictable; the narrative standard provides no notice of the human health parameters to be employed by RWQCB.

3. The narrative standard provides no notice to the public that it prohibits potential toxicity, no matter how theoretical.

The theoretical fish consumption and health risk scenario created by the TMDL is vague and also inconsistent with a 1998 RWQCB Staff Report, where the agency explained that "one must observe a toxic effect to consider this a failure of the standard." Staff Report, Ambient Concentrations of Toxic Chemicals in San Francisco Bay Sediments at 4 (May 1998). While it appears that RWQCB may have been referring to a second, related narrative toxicity standard, this expression of policy would make sense for the overall narrative program. RWQCB made clear that "there can, and usually will be, potentially toxic chemicals detected at some concentration," distinguishing the mere presence of toxic chemicals from a violation, where the concentrations are sufficient to present a toxic concern, and respecting the basic principle of toxicology that the dose is what can result in a threat. Id. The public could not have anticipated that RWQCB's narrative toxicity program would be applied to instances of theoretical toxicity, as the agency proposes in the TMDL. RWQCB has given inadequate notice that its narrative standard is intended to cover hypothetical toxicity; it is thus void for vagueness.

Because RWQCB's narrative toxicity standard – as used in the TMDL for hypothetical, unobserved effects on an angler population not known to exist – does not give the public notice of the standards by which it will be regulated, the standard is void for vagueness and violates due process.

H. The COMM Beneficial Use Standing Alone Does Not Provide A Basis For The TMDL.

The TMDL is far more stringent that the CTR value for aquatic life. As discussed supra, Section III, the TMDL is not based on protection of the ecosystem as current levels of PCBs in the Bay are not the cause of any injury to plants and animals, and as the Bay is not impaired for ecological uses. As discussed supra, Section IV.G, the TMDL cannot be supported by the Basin Plan's narrative toxicity standard since that standard, as RWQCB proposes to apply it in this TMDL, violates due process. Nor does the COMM beneficial use provide a basis for the TMDL.

RWQCB cannot equate the COMM standard with a series of proxies for PCBs in fish, sediment, and the water column. The TMDL has used extreme risk parameters and scenarios to conclude, contrary to empirical fact, that sport fishing behavior is placing anglers and others at risk from PCBs in the Bay. The OEHHA Advisory does not provide a basis for impairment of the COMM standard. In fact, in 1995 RWQCB said just the opposite – that the Advisory was not evidence that persons were at risk from eating fish from the Bay. Thus, application of the COMM use to support the TMDL is also inconsistent with due process (see supra, Section IV.G), and is arbitrary and capricious (see supra, Section IV.F).

I. The TMDL's Alternatives Analysis Is Not Adequate.

1. PCA, CEQA, and SWRCB's regulations require RWQCB to analyze alternatives.

RWQCB is required to develop and analyze any feasible alternatives that would result in fewer environmental impacts than the TMDL. This requirement stems in part from CEQA. See, e.g., 14 Cal. Code Regs. § 15126.6. In addition, the balancing the PCA requires can be achieved only with a probing analysis of alternatives. See, e.g., County of Inyo v. City of Los Angeles (1977) 71 Cal. App. 3d 185, 192-193 (accurate project description and alternatives analysis facilitates balancing). California Public Resources Code Section 21159 and SWRCB guidelines also require RWQCB to analyze project alternatives and their environmental impacts. 23 Cal. Code Regs. § 3777(a)(2).

2. The alternatives analysis does not meet minimum standards.

The alternatives discussion consists of one page of the Staff Report (and an additional half page discussing the project itself). The discussion consists of a mere identification of three alternatives (no project, alternative load allocations, and an alternative fish-tissue target). There is no discussion, analysis, or data regarding the potential environmental impacts of these alternatives. Each of the alternatives is rejected summarily as not meeting the project objectives. The description and analysis of alternatives in the TMDL is insufficient to comply with CEQA, and does not give RWQCB or the public adequate information to engage in the balancing required under PCA.

The California Supreme Court has found a very similar approach to alternatives analysis to violate CEQA. In Laurel Heights Improvement Assn. v. Regents of University of California (1988) 47 Cal. 3d 376, 403, the Court stated that an adequate alternatives discussion "must contain facts and analysis, not just the agency's bare conclusions or opinions." Id. at 404. The

facts and analysis RWQCB includes in the CEQA analysis must consist of a "quantitative, comparative analysis" of the relative environmental impacts of the proposed TMDL and each alternative. Kings County Farm Bureau v. City of Hanford (1990) 221 Cal. App. 3d 692, 735.

CEQA requires a lead agency to chose alternatives that "would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project." 14 Cal. Code Regs. § 15126.6. In contrast, the TMDL documentation analyzed only alternatives that were claimed not to meet the project objectives. If RWQCB still concludes that there is no project alternative that would meet the project objectives after actually analyzing the alternatives, RWQCB has defined the project objectives too narrowly. City of Santee v. County of San Diego (1989) 214 Cal. App. 3d 1438, 1455 (improperly narrow description of project and project objectives resulted in inadequate alternatives analysis).

3. RWQCB must revise the alternatives analysis.

RWQCB must describe both the project and each alternative and their environmental and economic impacts in enough detail to allow a meaningful comparison. RWQCB must quantify the impacts of the project and alternatives with respect to each environmental resource listed on Appendix B of RWQCB's CEQA checklist. To allow balancing under PCA, RWQCB also must quantify the costs of the proposed TMDL and each alternative using the criteria identified supra Section IV.C.

To allow for a meaningful comparison, RWQCB also must describe the benefits of the project and each alternative. This must include a quantitative discussion of the ecological and human health benefits of the TMDL, if any. The analysis must compare the water quality that will be attained in the near and long-term with the project and with the alternatives to the project. If that comparison shows a difference in the water quality endpoints between the project and the alternatives, RWQCB must describe and quantify the human health and ecological benefits, if any, between the water quality conditions attained with the project and those attained with the alternatives.

In addition, RWQCB must broaden the alternatives discussion to include an analysis of alternatives that would meet most of the basic project objectives. At a minimum, RWQCB must analyze the alternatives described below.

a. Monitored natural attenuation with institutional controls.

This alternative would involve adopting a TMDL with an implementation plan that consists of letting PCBs in the Bay naturally attenuate coupled with institutional controls such as an outreach program to educate any subpopulations that RWQCB believes are susceptible to PCBs in fish caught in the Bay. An effective suite of institutional controls should be just as protective as the TMDL, but would avoid the environmental and public health impacts of implementing the TMDL. U.S. EPA has adopted this adopted this alternative in other PCBs TMDLs, including the PCBS TMDLs for the Shenandoah River, the Missouri River, and Lake Worth.

U.S. EPA's Contaminated Sediment Management Strategy specifically recognizes that natural attenuation can be the best strategy in certain circumstances, stating, in pertinent part:

> "In certain circumstances, the best strategy may be to implement pollution prevention measures as well as point and nonpoint source controls to allow natural attenuation."

U.S. EPA, Contaminated Sediment Management Strategy, EPA-823-R-98-001 at 56 (April 1998) ("EPA's Contaminated Sediment Management Strategy"). U.S. EPA reiterated that position most recently in December 2005, when it stated that "each of the three remedy approaches (MNR [monitored natural recovery], in-situ capping, and removal) should be considered at every site at which they might be appropriate . . . ." U.S. EPA, Contaminated Sediment Remediation Guidance for Hazardous Waste Sites, EPA-540-R-05-012 (December 2005) ("Contaminated Sediment Remediation Guidance").

Some of the factors identified in EPA's Contaminated Sediment Remediation Guidance to determine whether natural attenuation is appropriate include:

- Whether "contaminant concentrations are low and cover diffuse areas." Id. at 4-3.
- Whether "natural recovery processes have a reasonable degree of certainty to continue at rates that will contain, destroy or reduce the bioavailability or toxicity of contaminants within an acceptable time frame." Id.
- Whether "contaminant concentrations in biota and in the biologically active zone of sediment are moving towards risk-based goals of their own." Id.

Evidence of the efficacy of natural recovery exist if there are long-term decreasing trends in higher tropic level biota, water column concentrations, sediment core data or surface sediment concentrations. Contaminated Sediment Remediation Guidance at 4-9. Given that PCBs in Bay sediment meet all of the factors above, the cited U.S. EPA guidance strongly suggests that monitored natural attenuation is a feasible alternative for the PCBs TMDL.

This alternative also is consistent with RWQCB policy, and has been adopted by RWQCB as the final remedy for site cleanups in other contexts. See, e.g., San Francisco Regional Water Quality Control Board, ORDER NO. 01-053, WXI/696 Realty LLC and Quebecor World, Inc., 696 East Trimble Road, San Jose, Santa Clara County – Adoption of Final Site Cleanup Requirements (May 22, 2001).

The TMDL documentation dismisses natural attenuation with institutional controls as not meeting project objectives, without first comparing the water quality endpoints between this alternative and the proposed TMDL. As discussed in greater detail in Section III.A, supra, monitored natural attention would be effective in greatly reducing PCB concentrations in fish tissue and in-Bay sediments. This alternative also would have the benefit of letting RWQCB and the public focus on other pollutants that cause more harm. It is anticipated that this alternative would not have the significant environmental impacts that the proposed project would cause.

b. Equal reduction of PCBs across all sources.

The recently-released report, Adaptive Implementation of Water Quality Improvement Plans: Opportunities and Challenges, describes two alternatives that RWQCB must analyze. L. Shabman et al., Adaptive Implementation of Water Quality Improvement Plans: Opportunities and Challenges (2007 draft). The first approach is to require equal-percent reductions across all sources. Id. at 32. This alternative specifically is recommended when an adaptive implementation approach, such as the one the TMDL purports to be applying, is used. Id. This approach has been used in other TMDLs. See, e.g., Florida Department of Environmental Protection, Fecal and Total Coliform TMDLs for the Cedar River (2005) (requiring all source categories to reduce fecal and total coliforms by equal amounts); Pennsylvania Department of Environmental Protection, Little Juniata River Watershed TMDL (2004) (equal reductions across sources in a TMDL that focused entirely on non-point sources); U.S. Environmental Protection Agency, Total Mercury in Fish Tissue Residue TMDL for Savannah River Watershed (2001) (reduction of mercury loads divided proportionally between air deposition (99%) and point sources where air deposition was acknowledged to be responsible for 99% of mercury load).

c. Lowest-cost reduction of PCB loads.

The other alternative recommended in Adaptive Implementation of Water Quality Improvement Plans: Opportunities and Challenges is an allocation "that meets the TMDL at the lowest possible cost." L. Shabman at 32. This alternative is consistent with the balancing in which RWQCB must engage under PCA, the requirements of CEQA Cal. Pub. Res. Code § 21159(c), and the project objective that RWQCB avoid actions that will have unreasonable costs relative to their environmental benefits. This approach, too, has been used in other TMDLs. See, e.g., Idaho Department of Environmental Quality, Snake River – Hells Canyon TMDL at 21 (2004) (TMDL employs "pollutant trading which enables stakeholders to commit limited financial resources to implement the most cost-effective control strategies within watershed(s)").

d. RWQCB should develop an alternative that protects against non-negligible toxicity.

The water quality standard for bioaccumulation indicates that the mere presence of PCBs does not violate the Basin Plan unless it is "detrimental" and causes an "effect." Basin Plan at 3.3.2. Consistent with this, RWQCB should develop an alternative that would protect against non-negligible risk to a sizeable population, rather than theoretical risk to a hypothesized, and unobserved population.

e. Organochlorines alternative.

The Bay is listed as impaired for dioxins, furan, DDT, and PCBs – all of which are organochlorines. RWQCB should develop and analyze an alternative TMDL that addresses all organochlorines in one regulatory action. This sensible alternative would reduce the regulatory burden and avoid overlapping, potentially inconsistent, rules for different classes of organochlorines. It also would prevent a "piece-mealing" CEQA violation by considering related parts of what appears to be a single project – reduction of organochlorines – as a whole.

The Santa Ana RWQCB proposed a similar TMDL for Newport Bay that would replace the currently operative June 2002 TMDL. U.S. EPA issued an organochlorines TMDL for Newport Bay in Orange County in June 2002.

J. The TMDL Does Not Comply With CEQA.

1. The TMDL is not excused from a CEQA analysis because of RWQCB's certified regulatory program or alleged inability to conduct a project-level analysis.

Because the basin planning process by which RWQCB proposes to add the TMDL to the Basin Plan is a "certified regulatory program," certified by the California Secretary of Resources, RWQCB must produce a document that is "functionally equivalent" to an Environmental Impact Report ("EIR") – but not an EIR *per se*. Lead agencies following CEQA under a "certified regulatory program" are exempted only from Chapters 3 and 4 (EIR contents/process), and Section 21167 (time period for CEQA challenges, replaced by Section 21080.5(g) for certified regulatory programs) of CEQA; such lead agencies must comply with all other CEQA provisions. RWQCB cannot limit its CEQA review because it proposes to adopt the TMDL under a certified regulatory program. Envtl. Prot. Info. Ctr. v. Johnson (1985) 170 Cal. App. 3d 604, 618 ("Nothing in section 21080.5 supplies a basis for concluding that the Legislature intended the section to stand as a blanket exemption from CEQA's thorough statutory scheme and its salutary substantive goals.").

The TMDL documentation states that "the Water Board cannot mandate adoption of any specific compliance method, the analysis provided here should be viewed as comparable to a programmatic or Tier 1 environmental impact review." The TMDL documentation appears to base this on California Water Code Section 13360, which prohibits orders of RWQCB from specifying the means of compliance. Cal. Water Code § 13360. By its plain terms, Section 13360 is limited in application, however, to "orders," and not rules and regulations such as the TMDL. Even if Section 13360 applied to the TMDL, it does not purport to limit the scope of the CEQA analysis RWQCB must conduct.

A programmatic-level CEQA analysis is not appropriate here. The TMDL involves a basin plan amendment, and RWQCB must provide a detailed plan to achieve compliance with the TMDL, including a description of actions that must be undertaken to meet the TMDL's requirements, when those actions must be undertaken, and a monitoring plan to determine compliance with the TMDL. See Cal. Water Code § 13242. Though the project is not described with adequate specificity to meet the project objectives and statutory obligations, if it were adequately described, it appears the information would have supported a project-level CEQA review.

But even if a program-level CEQA analysis were appropriate, "tiering is not a device for deferring the identification of significant environmental impacts that the adoption of a specific plan can be expected to cause." Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova (2007) 40 Cal. 4th 412, 429 (citation omitted). Had RWQCB conducted an in-depth analysis of just portions of the implementation plan, it would have found the TMDL would cause significant environmental impacts that must be mitigated.

As a certified regulatory program, RWQCB is required to respond in writing to all significant environmental points raised in public comments. 23 Cal. Code Regs. § 3779; Cal. Pub. Res. Code § 21080.5(d)(2)(D). Failure to provide "reasoned responses" to public comments on a certified regulatory program's environmental analysis is a violation of CEQA. Gallegos v. State Bd. Of Forestry (1978) 76 Cal. App. 3d 945, 954. RWQCB also must summarize the main areas of disagreement between experts and explain its reasons for relying on one expert over another. 14 Cal. Code Regs. § 15151.

Here, RWQCB must provide reasoned, written responses to all of the points raised in these comments. The technical and legal defects of the TMDL all implicate CEQA in that they result in an inaccurate project description and baseline environmental assumptions that compromise the analysis of impacts and the evaluation of alternatives.

2. The project description is inadequate.

Without a detailed, accurate project description, the CEQA process cannot yield accurate, clear results and public review is frustrated. County of Inyo v. City of Los Angeles (1977) 71 Cal. App. 3d 185, 192. The "project" that must be described includes everything needed for implementation of the overall action. 14 Cal. Code Regs. § 15003(h). RWQCB must "[d]escribe the whole action involved, including but not limited to later phases of the project, and any secondary, support, or off-site features necessary for its implementation." CEQA Guidelines, Appendix G.

The TMDL documentation falls short of providing an adequate project description by proposing a TMDL and then not describing in detail the measures "necessary for its implementation." The Staff Report's "TMDL Implementation" section provides only generalizations as to how TMDL allocations will be achieved in each load category.

- The TMDL documentation does not quantify the amount of dredging that the TMDL will require, the boundaries of the dredging, the landing and dewatering sites for the dredged material, the disposal sites for the dredged material, the types and quantities of equipment that are expected to be used, and other critical elements of the dredging portion of the project. It is impossible for the public to tell from reading the TMDL whether it will require dredging of just certain identified "contaminated sites," the entire Bay margin, the entire Bay to ambient conditions, or some other scenario.

- The TMDL documentation states that current maintenance dredging in the Bay is approximately 2,000,000 cubic yards per year, but that this volume is targeted for reduction to approximately 1,000,000 cubic yards per year. RWQCB further states that "sediments disposed of in Bay should have total PCBs concentrations no greater than that in ambient surface sediments in Bay." Yet the TMDL documentation does not quantify the amount of dredged material the TMDL will cause to be unsuitable for in-Bay disposal, or determine the location and environmental suitability of alternate disposal sites.

- The TMDL documentation indicates that project implementation will include the treatment of stormwater runoff. Yet there is no description of the efforts that will be required for stormwater treatment. The TMDL documentation suggests that the TMDL does not require all stormwater to be treated, but does not describe the volume of stormwater that would be treated, or even give a standard that would allow the public to make a reasonably educated estimate of that volume.

- As described infra, Section IV.N, the TMDL appears to include adoption of a sediment quality objective; a 303(d) listing for RARE, EST, and WILD beneficial uses; and incorporation of the CTR and the WHO TEQs into the basin plan. None of these aspects of the TMDL are described as part of the project or analyzed for potential environmental impacts.

3. The description of the environmental baseline is inadequate.

RWQCB is required to analyze potentially significant effects the project may have on the environment. CEQA Guidelines § 15252(b). RWQCB cannot make a meaningful assessment of the potential environmental effects (i.e., any benefits and adverse impacts) of a PCBs TMDL without first characterizing the baseline environment. Save Our Peninsula Committee v. Monterey County Board of Supervisors (2001) 87 Cal. App. 4th 99, 120.

RWQCB must evaluate alternative methodologies for determining baseline conditions rather than simply relying on one approach (i.e., the "one-box model"), while dismissing other approaches that have been brought to its attention during the TMDL process. As one court stated, "[i]f an EIR presents alternative methodologies for determining a baseline condition . . . we believe CEQA requires that each alternative be supported by reasoned analysis and evidence in the record so that the decision of the agency is an informed one." Id. RWQCB's response to these comments must include an analysis of the alternative methods of assessing baseline conditions recommended herein, including the level of natural attenuation, fish consumption rates, and human health risk from PCBs.

The TMDL documentation does not consider adequately the factors affecting the baseline condition of the Bay, and places disproportionate focus on the impacts due to PCBs in sediments. The Bay has been subject to numerous non-contaminant factors contributing to baseline, including a 79 percent loss in tidal marsh habitat during the last 200 years. "[T]he loss of these habitats accounts for most of the decline in ecological function of the tidal marsh . . . . [H]abitat losses have undoubtedly contributed to population decline." San Francisco Bay Area Wetlands Ecosystem Goals Project, Baylands Ecosystem Habitat Goals – A Report of Habitat Recommendations (1999). Moreover, the benthic ecology has been impacted by introduction of exotic species. The TMDL must include a more extensive discussion of the current baseline condition, the factors that are most responsible for contributing to that baseline condition, and the critical factors that will limit or regulate the future enhancement of ecological resources in the Bay.

RWQCB must characterize the environmental baseline for each environmental resource listed in Appendix B of the Staff Report. Among others, RWQCB must analyze the following environmental resources, which the project is likely to significantly impact:

- Quantify current air quality conditions, including an assessment of criteria pollutants for which the San Francisco air basin is in non-attainment.

- Quantify current greenhouse gas emissions to the Bay from the San Francisco region and the globe. Include an assessment of the environmental impact that global climate change is currently having on the Bay region and California.

- Describe and inventory the current land uses surrounding the Bay margin, including recreational, commercial, and institutional uses. The focus must be on uses that could be impacted by the dredging and other implementation actions contemplated in the TMDL.

- Describe the biological resources in the Bay and in the vicinity of the Bay that could be impacted by dredging and other implementation activities. All rare, endangered, and threatened species in the Bay should be identified. Wetlands, eelgrass beds, benthic communities, and other important habitats should be identified and characterized. In order to enable the public to assess the merits of project alternatives, describe any observable, toxic effects on wildlife and habitat caused by current PCBs levels.

- Identify likely disposal sites for dredged materials and their capacity to accommodate the dredge volumes contemplated by the TMDL.

- Describe and quantify the effect of the recently-adopted mercury TMDL on the baseline concentrations of PCBs. Will the management practices required in the mercury TMDL have any effect on future PCBs concentrations?

4. The TMDL does not adequately assess the environmental impact of implementing the TMDL.

The TMDL documentation's assertion that RWQCB "will not require any actions or project to implement the PCBs TMDL that would lead to significant, permanent, negative impacts on the environment" is not relevant to the CEQA analysis, and is unsupported. The project includes both a numeric target for PCBs concentrations in fish tissue and an implementation plan to achieve that target. For purposes of the CEQA analysis, RWQCB and any reviewing court must assume that the entire project will be completed – including all implementation actions necessary to meet the fish-tissue target. Stanislaus Natural Heritage Project v. County of Stanislaus (1996) 48 Cal. App. 4th 182, 206 ("While it might be argued that not building a portion of the project is the ultimate mitigation, it must be borne in mind that the EIR must address the project and assumes the project will be built.").

The TMDL documentation does not adequately characterize the project and the environmental baseline conditions, and that has made a full environmental review of the implementation plan impossible. But even with the limited time and information available, it is believed that the project likely will have significant environmental impacts on environmental resources, including land use, landfill capacity, air quality, global climate change, benthic communities, and species and habitat.

5. The TMDL omits an assessment of cumulative impacts, as required by CEQA.

The full environmental impacts of the TMDL cannot be ascertained until RWQCB conducts a cumulative impacts analysis. Whitman v. Board of Supervisors (1979) 88 Cal. App. 3d 397, 408 ("[An] agency may not . . . [treat] a project as an isolated 'single shot' venture in the face of persuasive evidence that it is but one of several substantially similar operations, each of which will have the same polluting effect in the same area. To ignore the prospective cumulative harm under such circumstances could be to risk ecological disaster.") (citation omitted). The TMDL documentation's discussion of cumulative impacts appears to be limited to a single sentence that reads: "In addition, there are no significant cumulative impacts that are anticipated from actions to implement the PCBs TMDL." This is no analysis at all and does not meet CEQA's requirement to analyze the project's impacts together with those of "closely related past, present, and reasonably foreseeable probable future projects." 14 Cal. Code Regs. § 15355(b).

CEQA requires analysis of cumulative impacts to use either the list approach or the summary-of-projections approach. 14 Cal. Code Regs. § 15130(b)(1). The summary-of-projections approach is appropriate only where an adopted general plan or prior certified environmental document "described or evaluated regional or area wide conditions contributing to the cumulative impact." 14 Cal. Code Regs. § 15130(b)(1)(B). There appears to be no such general plan or prior environmental document analyzing the cumulative impacts of implementing the TMDL. As such, RWQCB must use the list approach. It must begin this exercise by listing all potential dredging projects, development projects on the Bay margin, habitat restoration projects, the recently adopted mercury TMDL, any future dioxins or furan TMDLs, and other projects in the TMDL project area that could affect the environmental resources impacted by the TMDL. 14 Cal. Code Regs. § 15130(b)(1)(B)(2). Once the cumulative project list is identified, RWQCB must analyze the impacts of the TMDL together with those other projects.

K. The Absence Of A Translation Procedure Violates The CWA.

Where a state seeks to regulate the discharge of toxic pollutants into a water quality limited segment based on narrative criteria, as with the proposed PCBs TMDL, federal CWA regulations require the state first to adopt a translator procedure describing how such narrative criteria will be translated in a manner such that the standard can be applied to point source discharges. 40 C.F.R. § 131.11(a)(2) ("Where a State adopts narrative criteria for toxic pollutants to protect designated uses, the State must provide information identifying the method by which the State intends to regulate point source discharges of toxic pollutants on water quality limited segments based on such narrative criteria.").

RWQCB's Basin Plan does not contain a translator procedure for the narrative toxicity standard, which is the basis for the TMDL. Nor did RWQCB identify the method by which it proposed to apply the narrative standard to water quality limited segments listed as impaired under CWA Section 303(d). RWQCB did not provide information that it would apply the narrative standard to PCB compounds, use a method that included a certain risk level, and make assumptions about PCB toxicity and exposure to PCB-containing fish. RWQCB did not explain that it would translate the narrative standard to regulate point source discharges like stormwater

by assuming a scenario where anglers were eating PCB-containing fish at a rate of eight ounces per week, every week, for 70 years.

The absence of a translator procedure violates the CWA, and renders the TMDL unlawful, as the translator procedure is a condition precedent to a TMDL in which a narrative standard is applied. This situation is analogous to the case involving the Los Angeles RWQCB's Basin Plan, where the City of Los Angeles challenged the Basin Plan's absence of a translator procedure. See City of Los Angeles v. U.S. EPA, CV 00-08919, Statement of Decision, at 10 (C.D. Cal. 2001) (granting summary judgment and remanding to RWQCB based on absence of translator). In that case, the District Court allowed the City's challenge to the L.A. Basin Plan, stating that the City "may properly challenge the Basin Plan's provisions, or lack thereof, on any legal ground, to the extent . . . [the City's] NPDES permit and/or permit process is affected thereby." Likewise, we may make, and are making, an as-applied challenge to the Basin Plan as the absence of a translator now affects us, through the proposed TMDL.

(To the extent that the 1998 language in which RWQCB interpreted its narrative program as applying to observed – but not potential – toxicity may constitute the requisite translator, the TMDL violates any such translator in that it attempts to extend the narrative standard to theoretical toxicity alleged to be associated with long-term consumption of PCBs by a hypothetical population.)

L. Because The TMDL Adopts Current Treatment Of Municipal And Industrial Wastewater As Stringent Enough, RWQCB Is Without Jurisdiction Under CWA Section 303(d)(1)(A) To Promulgate The Proposed TMDL.

TMDLs are promulgated for a specific class of water bodies, namely "those waters . . . for which the effluent limitations required by section 1311(b)(1)(A) and section 1311(b)(1)(B) . . . are not stringent enough to implement any water quality standard applicable to such waters." The referenced statutory sections set technology-based standards for municipal and industrial point source discharges of wastewater. The proposed TMDL would adopt current performance of PCB removal from such wastewater sources as sufficient treatment to satisfy the narrative toxicity standard. Accepting the TMDL at face value, one must conclude that the CWA Section 301(b)(1)(A) and (B) effluent limitations are stringent enough to implement the narrative standard. If these limitations were "not stringent enough," surely RWQCB would set Waste Load Allocations for these sources that were more stringent than its estimates of current performance.

By setting the TMDL at current performance for municipal and industrial wastewater, RWQCB undermines the basis for it to take jurisdiction under CWA Section 303(d)(1)(A) to prepare a PCBs TMDL for the Bay. The CWA anticipates situations like this and does not leave RWQCB without recourse. RWQCB still could develop an information-only PCBs TMDL under CWA Section 303(d)(3).

M. The TMDL Violates The Applicable Peer Review Statute, Suspending RWQCB's Authority To Adopt The TMDL.

The TMDL violates the statutorily required procedures for scientific peer review and, therefore, RWQCB lacks the authority to take final action on the TMDL. The Health & Safety Code ("HSC") provides: "No board, department, or office within the agency [California EPA] shall take any action to adopt the final version of a rule" unless certain conditions are met. HSC Code § 57004(d).

Those conditions include submitting "the scientific portions of the proposed rule, along with a statement of the scientific findings, conclusions, and assumptions on which the scientific portions of the proposed rule are based and the supporting scientific data, studies, and other appropriate materials, to the external scientific peer review entity for its evaluation." If RWQCB "disagrees with any aspect of the finding of the external scientific peer review entity," it is required to "explain, and include as part of the rulemaking record, its basis for arriving at such a determination in the adoption of the final rule, including the reasons why it has determined that the scientific portions of the proposed rule are based on sound scientific knowledge, methods, and practices." HSC § 57004(d)(2). The TMDL documentation states that the peer reviewers "concluded that the scientific basis of the proposed Basin Plan amendment is based on sound scientific knowledge, methods, and practices." But this statement is at odds with certain specific findings by the peer reviewers.

The peer review conducted by Dr. David Carpenter finds: "With all of the cities and waste cites around the Bay it is simply not believable that only 0.35 kg/yr enter the Bay by atmospheric transport of gas phase PCBs." Staff Report at C-11 and C-12. Dr. Carpenter also expressed doubts regarding the rate of natural attenuation in the Central Valley: "I do have some question as to whether the anticipated natural attenuation within the Central Valley watershed. . . is realistic . . . . " Id. at C-13. Both the rate of atmospheric deposition and the rate of natural attenuation in the Central Valley are key elements of the TMDL, yet the TMDL does not address Dr. Carpenter's critique. In addition, the peer review of Kevin J. Farley identifies a significant miscalculation regarding the net loss of PCBs due to sediment dredging. Id. at C-6.

The TMDL documentation has explained neither why RWQCB disagrees with these aspects of the peer review (assuming it does), nor why it has ignored these points. HSC § 57004(d)(2) requires that RWQCB revise its rule or explain its reasons for disregarding these aspects of the peer review; to date, RWQCB has not met this condition. As stated in the State Board's TMDL Policy, RWQCB must add a new section to the Staff Report containing specific responses to all peer review comments. See supra Appendix A to the TMDL Policy at page A-4. Because RWQCB has not complied with the procedures for scientific peer review, it lacks the authority to take final action on the TMDL.

N. The Proposed Action Improperly Includes A Sediment Quality Objective, Multiple 303(d) Listings, Adoption CTR, And Adoption Of The United Nations' WHO TEQs.

The TMDL appears to include: a sediment quality objective; new 303(d) listings for the RARE, EST, and WILD beneficial uses; and an improper adoption of the CTR and the United Nations' WHO TEQs. RWQCB is without statutory authority to adopt a sediment quality objective under any circumstances, and did not comply with the statutory requirements for the 303(d) listing and adoption of the CTR or the TEQs. RWQCB may not adopt the TMDL as it currently is drafted.

PCA defines a sediment quality objective as "that level of a constituent in sediment which is established with an adequate margin of safety, for the reasonable protection of the beneficial uses of water or the prevention of nuisances." Cal. Water Code § 13391.5. The draft TMDL proposes to establish such an objective for PCBs in Bay sediment. But the PCA mandates detailed procedures for adoption of a sediment quality objective with which RWQCB has not complied. Cal. Water Code §§ 13392.6(a), 13393. Only the SWRCB may adopt a sediment quality objective. Cal. Water Code § 13392.6(a). RWQCB must remove the sediment quality objective from the TDML.

The TMDL documentation also states that PCBs impair the Bay's RARE, EST, and WILD beneficial uses. None of these uses are currently listed as impaired by PCBs. RWQCB has not complied with the requirements for listing the Bay as impaired for RARE, EST, and WILD uses, and may not adopt these portions of the TMDL. 40 C.F.R. § 130.7(b)(5).

The TMDL documentation states that the CTR applies to the Bay, but the CTR has not been made part of the Basin Plan. Unless and until RWQCB adopts the CTR as part of the Basin Plan, and conducts the balancing required by PCA, the CTR is not an applicable water quality objective. Cal. Water Code § 13241. Likewise, the TMDL adopts toxicity values of the United Nations WHO, in that it proposes to set a fish-tissue value for dioxin-like PCBs of 0.14 parts per trillion, on the basis of WHO's TEQs for these compounds. The TEQs and the BPA fish-tissue value set on their basis cannot be adopted without first complying with the PCA.

Finally, for all of the reasons stated in this letter and in our previous submittals to RWQCB, RWQCB's initial 303(d) listing for the COMM use and the narrative standard was arbitrary and capricious and unsupported by the evidence. There is no competent evidence that fishing in the Bay is harmed at the current levels of PCBs.

O. RWQCB Has Not Provided The Documents Upon Which The TMDL Is Based As Required By The APA And CEQA.

RWQCB has not met its burden under CEQA and the California Administrative Procedure Act to disclose and make available for public review materials upon which the TMDL is based.

1. California Administrative Procedure Act.

Certain provisions of the Administrative Procedure Act ("APA") apply to RWQCB's adoption of the TMDL and the BPA. The APA "does not apply to 'the adoption or revision of state policy for water quality control' unless the agency adopts a 'policy, plan, or guideline, or any revision thereof.' (Gov. Code, § 11353, subds. (a), (b)(1).) The Water Boards contend that . . . the Trash TMDL and amendment adding it to the 1994 Basin Plan are policies or plans covered by the APA . . . ." City of Arcadia v. State Water Resources Control Bd. (2006) 135 Cal. App. 4th 1392, 1434-1435. In other words, the State Board and the Los Angeles Regional Water Quality Control Board have acknowledged, as they must, that the rulemaking procedures of the APA apply to the adoption of a TMDL and the amendment of a Basin Plan. A California Court of Appeal interpreted the legislation adding Section 11353 to the Government Code and concluded that the legislation "amends sections of the APA providing, essentially, that any new water quality control programs must comply with the APA . . . ." State Water Resources Control Bd. v. Office of Admin. Law (1993) 12 Cal. App. 4th 697, 707. The court "read the new legislation as rejecting the State Board's proposals to expressly exempt water quality control plans from the APA, and as clarifying existing law as making APA compliance mandatory." Id.

The APA requires that "[e]very agency shall maintain a file of each rulemaking that shall be deemed to be the record for that rulemaking proceeding . . . and during all subsequent periods of time that the file is in the agency's possession, the agency shall make the file available to the public for inspection and copying during regular business hours." Gov Code § 11347.3(a). The "rulemaking file shall include: . . . (6) All data and other factual information, any studies or reports, and written comments submitted to the agency in connection with the adoption, amendment, or repeal of the regulation. (7) All data and other factual information, technical, theoretical, and empirical studies or reports, if any, on which the agency is relying in the adoption, amendment, or repeal of a regulation, including any cost impact estimates as required by Section 11346.3." Cal. Gov Code § 11347.3(b)(6-7). Accordingly, RWQCB must provide the public with all the data, factual information, technical, theoretical, and empirical studies or reports that RWQCB is relying on in the adoption of the TMDL and/or in amending the Basin Plan.

Similarly, the APA requires that a state agency fully explain the rationale for each regulation it proposes to adopt. This rationale must be set forth in the "Initial Statement of Reasons," which must be submitted to the Office of Administrative Law ("OAL") and made available to the public upon request. Gov. Code § 11346.2. The Initial Statement of Reasons must include, *inter alia*: "An identification of each technical, theoretical, and empirical study, report, or similar document, if any, upon which the agency relies in proposing the adoption, amendment, or repeal of a regulation." Gov. Code § 11346.2(b)(2).

Accordingly, RWQCB must provide the public with the Initial Statement of Reasons submitted to the OAL, which hereby is requested pursuant to Government Code Section 11346.2. In this Initial Statement of Reasons, RWQCB is required to identify "each technical, theoretical, and empirical study, report, or similar document, if any, upon which . . . [RWQCB] relies in proposing" the TMDL. Gov. Code § 11346.2(b)(2).

2. CEQA.

The content of administrative records in CEQA proceedings is governed by Public Resources Code Section 21167.6; subdivision (e) specifically enumerates what must be included, but does not exclude materials absent from the subdivision. See County of Orange v. Superior Court (2003) 113 Cal. App. 4th 1, 7. The "actual text of subdivision (e) . . . contemplates that the administrative record will include pretty much everything that ever came near a proposed . . . [project] *or* to the agency's compliance with CEQA in responding to that . . . [project]." Id. at 8. The broad language of Public Resources Code Section 21167.6 encompasses any and all expert reports reviewed by RWQCB, including any and all data underlying those reports.

RWQCB is required to make all documents incorporated into the Staff Report available for public inspection. CEQA Guidelines § 15150(b)("Where part of another document is incorporated by reference, such other document shall be made available to the public for inspection at a public place or public building.") As such, all technical and expert reports incorporated into the TMDL documentation must be disclosed. The adoption of the TMDL under a certified regulatory program does not affect RWQCB's obligation under CEQA to make the technical and expert reports available; the environmental documents of a certified regulatory program must be available for review and comment by the general public. Pub. Res. Code § 21080.5(d)(3)(B); Schoen v. Dep't of Forestry & Fire Prot. (1997) 58 Cal. App. 4th 556, 566.

Similarly, RWQCB's Notice of Filing of a Draft Environmental Document ("Notice") was required to disclose the "address where copies of . . . all documents referenced in the . . . [Environmental Document] will be available for public review." CEQA Guidelines § 15087(c)(5). The June 22, 2007 Notice properly lists a website where "other documentation" will be available online. See Notice (available at http://www.swrcb.ca.gov/rwqcb2/TMDL/SFBayPCBs/pubnoticePCBsTMDL.pdf). To the extent the listed website does not include all of the documents referenced in the Staff Report, RWQCB has not complied with CEQA.

To comply with the APA and CEQA, RWQCB must make available to the public all of the documents and data considered in developing the draft TMDL. For example, we understand RWQCB has documentation regarding the inability of Best Management Practices to reach the TMDL's targets for stormwater – documentation developed with Proposition 13 funds under a RWQCB-led program entitled, "Regional Stormwater Monitoring and Urban BMP Evaluation: A Stakeholder-Driven Partnership to Reduce Contaminant Loadings." This documentation and other documents and data considered by RWQCB in developing the TMDL must be made available to the public.

P. The TMDL Proceedings Must Be Reformed To Reflect Their Quasi-Judicial Character.

Although portions of the TMDL may be characterized as quasi-legislative, portions of the TMDL are directed at a small group of specifically known entities, and must be considered quasi-judicial.

The Staff Report identifies specific "contaminated sites" that are targeted for dredging and remedial action. RWQCB has identified specific parties that it believes are responsible for at

least some of the contaminated sites. For example, RWQCB has been focusing on the Oakland Service Shop since 1980, when it issued a Cleanup and Abatement Order for the site. In its Consolidated Cleanup Plan adopted and approved on June 17, 1999, the SWRCB identified a specific Oakland facility when listing the basis for identifying San Leandro Bay as a candidate "hot spot." Thus, portions of the TMDL are focused on determining the rights and obligations of specific entities. This is the essence of a quasi-judicial proceeding. Department of Alcoholic Beverage Control v. Alcoholic Beverage Control Appeals Bd. (1987) 195 Cal. App. 3d 812, 817 ("the determination of specific rights in regard to a specific fact situation" is quasi-judicial conduct); Graves Advice Letter, 1998 WL 473136 at *7 ("The issuance of regulatory letters by the regional board (and subsequent compliance by responsible parties) for the purpose of investigating and remediating UST contamination are properly characterized as quasi-judicial proceedings since the regulatory actions involve specific parties.").

When an agency engages in mixed rule-making and adjudication, it must segregate the proceedings, or adopt the more rigorous procedural protections of a quasi-judicial proceeding for the entire action. See, e.g., L & M Professional Consultants, Inc. v. Ferreira (1983) 146 Cal. App. 3d 1038.

RWQCB must reform the TMDL proceedings to protect the procedural due process rights of the entities whose rights and obligations RWQCB is adjudicating. Specifically, RWQCB must grant parties subject to the quasi-judicial portions of the TMDL a full, fair administrative hearing with the right to discovery, cross-examination of witnesses, and the procedural protections afforded by the California Administrative Procedures Act.

V. CONCLUSION.

For the foregoing reasons, we respectfully request that RWQCB not adopt the TMDL as proposed. Rather, RWQCB should conduct a realistic risk assessment and revise the TMDL on the basis of sound science. RWQCB should adopt a reasonable and achievable TMDL that balances environmental and economic factors. The TMDL that is adopted should not result in more stringent or more frequent cleanups of already-existing PCBs within the Bay, and RWQCB should take steps to ensure that the TMDL does not result in such an outcome. RWQCB should separate the cleanup program from the TMDL, as the TMDL's implementation measures for contaminated sediments will not promote attainment of the TMDL, and are technically and economically unsound and unachievable on a scale anywhere close to the TMDL's proposed goals.

Comments on California Regional Water Quality Control Board's Total Maximum Daily Load for PCBs in San Francisco Bay Proposed Basin Plan Amendment and Staff Report, June 22, 2007

Submitted by:
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Date: August 20, 2007

I appreciate the opportunity to submit this comment to the California Regional Water Quality Control Board, San Francisco Bay Region, in response to the Board's issuance of a Proposed Basin Plan Amendment and Total Maximum Daily Load for PCBs in San Francisco Bay. I am submitting these comments on behalf of General Electric Company and the California Chamber of Commerce.

My background and qualifications are listed on the curriculum vitae attached as an exhibit to this comment. I am a principal of Berkeley Economic Consulting, Inc., an economics research firm specializing in energy, labor, environmental and natural resource economics. I am also a professor of environmental and natural resource economics at UC Berkeley, and the Co-Director of the Berkeley Water Center. From 1996 to 1997, I served as senior economist at President Clinton's Council of Economic Advisers, where I had responsibility for environmental, agricultural, natural resource and energy policy.

1. Summary of Comments

The following summarizes my comments contained in this letter:

- The staff of the Regional Board has not met its burden under Porter-Cologne to consider economics in the development of the TMDL. The plan for implementing the proposed regulation is not described in enough detail to permit an adequate calculation of costs. The report makes no mention of who will bear the costs of complying with the regulation (for example, public or private entities), or of the potential regional economic implications of the action. The report does not acknowledge the potential employment impacts of the proposed TMDL, or the effect of the cleanup plan on competitiveness of California businesses. It does not attempt to gauge the significance of the action and does not discuss costs in relation to the level of benefits likely to be achieved. There is no mention of discounting, let alone any actual attempt to control for the fact that positive and negative impacts will occur over a period lasting perhaps decades into the future. All of these errors and omissions place the Staff Report analysis outside the bounds of standard economic analysis, and should be remedied.

- The costs of the proposed regulation are not adequately described in the staff report. Available information demonstrates that the assertions of the Staff Report regarding the

costs of compliance are misleading. For example, the report does not accurately reflect dredging costs at other locations in the Bay and nationwide. The report also mischaracterizes the actual costs of impounding and treating stormwater to the levels required by the TMDL. Using more accurate information, the costs of the TMDL could reach into the hundreds of millions or billions of dollars.

- The Regional Board staff erred in its description of the benefits of the proposed TMDL. The proposed screening levels are based on a flawed survey of recreational anglers, and the survey results were misapplied to the problem at hand. Controlling for actual exposure to PCBs in fish tissue, and recognizing that the proposed TMDL is designed to benefit only a small group of people engaging in an extreme behavior, I conclude that the action does not significantly reduce human health risk, and therefore does not result in significant benefits. This circumstance is in violation of the State requirement that major regulations are subject to a demonstration of economic value.

- The proposed action is likely to result in an unacceptably high level of costs in relation to the actual benefits achieved. The staff report fails to demonstrate that the Regional Board considered alternatives to the proposed TMDL that would be less burdensome, or that it considered the relative cost effectiveness of alternative standards. This is inconsistent with basic principles of economic analysis of regulation, and in contradiction to established federal guidelines promulgated by the US Environmental Protection Agency and the Office of Management and Budget. It is also inconsistent with the stated objectives of the proposed action listed in the staff report.

- The high costs of the proposed TMDL, coupled with its insubstantial benefits, means that the regulation will result in a net increase in human health risk. Regulatory costs pose their own risks to human health as money is diverted away from actions that reduce health risk and improve wellbeing. Recent research in environmental economics shows that regulations with a cost in excess of around $21 million per life saved pose more health risk than the harms they are intended to address. The proposed TMDL fails this test and will thus do more harm than good. There are also direct health risks posed by the measures to implement the TMDL. For example, contaminated sediment will need to be trucked to landfills around the Bay Area, and dredging equipment will need to operate for a period of years. These machines emit particulate matter and other pollutants that pose their own health risks. The Staff Report does not adequately address such direct health risks in its benefits analysis, or net them out of the claimed improvements in human health resulting from the regulation. Finally, the proposed TMDL also poses risks to the environment that should be considered. Numerous wetland restoration projects at the Bay margins may be jeopardized by the Regional Board's labeling of large swaths of the Bay as contaminated zones.

2. Failure to Consider Economics

Under the Porter-Cologne Water Quality Control Act, the State Water Resources Control Board has the ultimate authority over State water rights and water quality policy. Porter-Cologne also

establishes that the nine Regional Water Quality Control Boards shall oversee water quality on a day-to-day basis at the local and regional level. The Regional Boards engage in a number of water quality functions in their respective regions. One of the most important is preparing and periodically updating Basin Plans. Each Basin Plan establishes beneficial uses of water designated for each water body to be protected; water quality objectives for both surface water and groundwater; and actions necessary to maintain these standards in order to control nonpoint and point sources of pollution to the State's waters.

Porter-Cologne requires that when determining water quality targets the Regional Boards shall consider the following factors: "the beneficial uses to be protected, the water quality objectives reasonably required for that purpose, other waste discharges, the need to prevent nuisance, and the provisions of Section 13241." Section 13241 in turn lists six "factors to be considered," including "economic considerations" and "water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area."

CEQA also requires the Regional Boards to consider costs when establishing a performance standard. Discussing the application of CEQA to TMDLs, the State Board has acknowledged that "numeric targets and load allocations would probably fall into the category of performance standards." Thus, CEQA requires that the Regional Board should detail the likely methods and costs of compliance with the proposed TMDL.

2.A. Economic Assessment of Environmental Regulations

Over last 200 years, economists have developed a rigorous methodology to assess the impacts of government actions. The approach derives from the basic principles of public finance and welfare economics. It takes a holistic perspective by considering many groups in society, and articulates the tradeoffs among policy alternatives. The economist's approach to assessing government actions also combines considerations of efficiency and equity, and has been widely applied to problems of environmental regulation. At its heart, economic analysis of regulation is an accounting of the consequences of a governmental action. This accounting is often quantitative, but many first-rate economic analyses also treat impacts qualitatively, especially for nonstandard commodities. Ideally, economic analysis will also give information on the distributional impacts of the intervention, or a description of which groups in society are affected by the action, and how much.

A requirement to "consider economics" is not the same as a directive to adopt only those regulations that pass a cost-benefit test. Agencies can use the results of economic analysis, but not be bound by "bottom-line" numbers. Most economists would not argue that quantified costs and benefits tell the whole story, or that precise measurements of either are always possible. But when economic analysis reveals low or nonexistent benefits and high costs, something seems amiss. Indeed, the California legislature sought to avoid just such a socially undesirable outcome by mandating a consideration of economics when setting water quality standards.

The federal government has maintained a decades-long commitment to economic analysis of regulation. This practice began in the Nixon Administration, which initiated Quality of Life

Reviews of federal regulations in 1970. The two main events in the history of economic analysis at the federal level, however, occurred in the Reagan and Clinton Administrations. President Reagan issued Executive Order 12,291, perhaps the most decisive step in the cost-benefit record. This Executive Order established a set of principles for agencies to follow to the extent permitted by law, including a commitment to cost-benefit analysis. The order required Regulatory Impact Analysis of major rules, and also established a formal mechanism for OMB oversight of interventions. President Clinton issued Executive Order 12,866, which reaffirmed the basic commitments to economic analysis and conferred bipartisan legitimacy. This order also introduced some reforms to the economic analysis process that were designed primarily to assuage fears of industry capture. These reforms included procedures for conflict resolution and inclusion of equity considerations.

2.B. Standards for Consideration of Economics under Porter-Cologne

While the requirement to consider economics under Porter-Cologne is absolute, the water boards have done little to particularize it. For statutes like Porter-Cologne in which economic impacts are to be "considered," there is a threshold level of assessment that should be performed.

The most basic type of economic analysis is a cost-effectiveness analysis that evaluates alternatives that are presumed to produce similar levels of benefits. This type of analysis is relatively uncontroversial in that it avoids a comparison of benefits and costs, and in particular avoids value judgments about the worth of benefits produced by regulation, although such benefit-cost comparisons are commonplace and a standard part of environmental economics. The basic steps to be followed in a cost-effectiveness analysis include the following:

- Identify a baseline,
- List the benefits to be achieved,
- Identify alternative strategies to achieve the benefits,
- Estimate costs for each alternative,
- Assess uncertainty,
- Compare the cost effectiveness of each alternative,
- Identify the most cost-effective alternative,
- Compare costs to the benefits likely to be produced.

The Staff Report shows that the Regional Board has failed to meet these requirements for a meaningful consideration of economic factors.

Starting with the first step in the list above, the Staff Report does not adequately describe the baseline. A baseline should describe the current situation without the proposed rule, in this case the proposed TMDL. This is one of the most important steps in an economic analysis, which is by nature incremental.[1] There are numerous data inconsistencies in the Staff Report, and exhibits that are poorly explained, or not explained at all. To take one example, the Staff Report contains

[1] *Guidelines for Preparing Economic Analyses*. U.S. Environmental Protection Agency, Report Number 240-R-00-003. 2000.

numerous references to "hot spots" in the Bay, or areas with high concentrations of PCBs in sediments. However, there is no definitive list of these sites in the Report. In fact, the Staff Report contains three separate tables listing hot spots, each with a different group of sites. Staff needs to do a much better job of characterizing current conditions for the economic analysis to have meaning.

The second step in an economic analysis is an identification of alternatives, regulatory and otherwise, to the proposed intervention that would achieve approximately the same level of benefits. For example, the Staff Report acknowledges that PCB levels are declining at many locations throughout the Bay as a result of physical processes. One alternative to the proposed TMDL could be a natural recovery option that would allow sedimentation, tidal action and other processes to reduce the risks from PCB exposure; this approach could be coupled with other measures to reduce risks to recreational anglers such as education and outreach. The relative costs of such an approach are not discussed even though it could be designed to produce an equivalent level of benefits.

Similarly, with respect to the wasteload allocations, the Staff Report acknowledges that abatement costs are different for the various sources of PCB loads to the Bay. However, it does not include any discussion of alternative wasteload allocations, and contains little description of why the proposed allocation was selected, despite the enormous cost falling on agencies that control and treat stormwater.

The most important step when considering economic factors is the third one above, calculation of the costs of compliance. Here too, the Regional Board staff has not demonstrated that economic factors were considered. The proposed implementation plan is so vague that its cost cannot be quantified with any certainty. With respect to control of in-Bay sources of PCBs, for example, the Staff Report contains only a single paragraph on cost, and the only figures presented in this paragraph have to do with sediment disposal costs, not any of the other costs associated with dredging. The discussion of the cost to impound and treat stormwater, which the Regional Board acknowledges is "substantial," consists solely of an inapt comparison to the total cost of collecting and treating municipal wastewater.

The Staff Report contains no information on who is likely to bear the costs of complying with the proposed TMDL. The scope of the proposed regulation means that it will affect municipalities, private industry and other entities. Most likely, some or all of these costs will be passed on to taxpayers and consumers. It is also likely that expenditures to comply with the TMDL will crowd out other programs, particularly in the public sector. The report makes no attempt to gauge the regional economic impacts of the TMDL, and does not even hint at job losses, even though such analyses are commonly performed by economists when assessing environmental regulations.[2]

In summary, the Regional Board has failed to show that it has considered economics in the drafting of this proposed TMDL, at odds with the requirements of both Porter-Cologne and CEQA.

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[2] *Ibid.*

3. Costs of Implementing the TMDL

The vagueness of the proposed TMDL makes it impossible to accurately calculate its costs. However, a reasonable assessment of potential costs leads to the conclusion that compliance expenditures may well reach into the billions of dollars.

3.A. Sediments

The Staff Report downplays the costs of the TMDL relating to contaminated sediment. A review of the available information, for example information on actual and planned dredging projects in the San Francisco Bay, suggests that these costs will be substantial. The TMDL reports that sediment disposal costs should range from $10 to $100 per cubic yard removed, and presents no information at all on dredging costs.[3] Readily available information, however, indicates that unit costs of dredging are significantly higher. The range of costs reported for selected sites in the Bay is from $111/cy to $1014/cy.

The TMDL calls for conducting or causing to conduct monitoring and special studies to fill critical data gaps and to participate in risk management activities.[4] These studies cost hundreds of thousands of dollars.[5] There are a few studies available that have been conducted recently to meet these data gaps. The site studies available for comparison are Alameda Seaplane Lagoon (SPL), Moffett Airfield (MF), and Hunters Point Shipyard (HPS).

The general structure of each of these studies is the same. The feasibility study begins with sediment sampling to assess the extent of contamination and the risk to human health. Once this is determined the extent of contamination is translated into remediation goals and remediation action objectives. The remediation activities are then designed to target the specific areas of contamination and the contaminants of concern at the location. No site had an incidence of a single contaminant. In addition other chemicals were present which contribute to the degradation of the environment and human health. Estimated costs for the studies for SPL, HPS and MF included capital costs, engineering and contingency plans, and operations and maintenance costs.

Generally, an examination of these sites demonstrates the need for site-specific investigations to determine cleanup costs. For example, when comparing sites such as Seaplane Lagoon (SPL), Hunters Point Shipyard (HPS) and Moffett Field (MF), it is clear that dredging and capping may not be the preferred alternative for all sites. In addition, there is a wide variation in the volume of material dredged, making it difficult to estimate costs based on the skeletal information presented in the Staff Report.

The development of the remediation activities proposed in the feasibility studies prepared for SPL, HPS and MF are based on all the applicable best management practices (BMP) designed to

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[3] *San Francisco Regional Water Quality Control Board Final TMDL, June 2007* (P. 100)
[4] *Ibid.*
[5] *Ibid.*

protect the environment and human health. The alternatives examined are No action, Institutional Controls and Long-Term Monitoring, Non-Removal (monitored natural recovery and containment), In Situ Treatment, In Situ Stabilization, Removal Management of Removed Sediments (dewatering and transportation), Ex Situ Treatment, and Disposal Actions. The outcome for each site could be one or a combination of each of these alternatives.

The following summary discusses the differences in remediation alternatives and dredging costs for SPL, HPS and MF.

Seaplane Lagoon
SPL underwent a thorough examination in 2005 and based on the 2007 Record of Decision (ROD) the sediment remediation alternative chosen was a combination of activities described as Dredging, Monitoring, Dewatering, and Upland Confinement. In addition the 2005 feasibility study estimated the costs of this alternative to be between $7.6 million and $8.9 million.[6] However, according to the ROD the actual costs for the remediation alternative selected were $24.6 million which is approximately 30 to 35% higher than the totals estimated in the 2005 feasibility study.[7]

Hunters Point
HPS finished the final feasibility study in 2007. The sediment remediation alternatives developed were similar to SPL but the actions suggested to best meet the desired remediation goal combined Focused Removal, Off-Site Disposal, Armored Cap, Monitored Natural Recovery, and Institutional Controls. The costs associated with this remediation alternative range from $26,880,000 to $28,970,000.[8] The final costs of this cleanup have yet to be determined as this feasibility study is currently under review.

Moffett Field
The feasibility study for MF was completed in 2005. The remediation alternatives were different than the previously discussed sites, primarily due to the area being described as a tidal marsh or wetland. The remediation activities best suited to MF are In Situ/Ex Situ Treatment, Excavation, Off-Site Disposal, Restoration, and Ecological Monitoring. The costs associated with this suite of alternatives are estimated to be $6.7 million to $6.8 million.[9]

Table 1 reports a summary for the locations listed above that included costs data from the Feasibility Studies and Records of Decision.

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[6] Prepared by Battelle for Base Realignment and Closure Program Management Office West, *Final Feasibility Study Report, Seaplane Lagoon, Alameda Point, California, Appendix E,* July 22, 2005 (P. 20, 24)
[7] *Record of Decision for Site 17 Seaplane Lagoon.* U.S. Environmental Protection Agency, October 2006 (P. 12-2)
[8] Prepared by Barajas & Associates, Inc. for Base Realignment and Closure Program Management Office West, *Revised Draft Feasibility Study Report for Parcel F Hunters Point Shipyard, San Francisco, California,* May 11, 2007 (P. 5-2, 5-5)
[9] . Prepared by SulTech and Tetra Tech EM, Inc. for Base Realignment and Closure Program Management Office West, *Draft Addendum to the Revised Final Station-Wide Feasibility Study Site 25,* June 21, 2005, (P. D-8.)

Table 1: Summary of Remediation Costs for Selected Sites in the SF Bay

Site	Sediment Removed in cy	Total Cost in $ Millions	Cost per cy	Lead Agency
Oyster Point[10]	9,860	10	1,014	SFRWQCB
Sea Plane Lagoon	63,000	25	390	EPA / Navy
Moffett Air Field	47,400 - 61,500	6.5 - 8.3	111 - 146	Navy
Hunters Point Shipyard[11]	51,910 - 161,000	23.9 - 43.6	226 - 639	Navy

The Staff Report characterizes a total of 22 locations in the Bay as contaminated with PCBs.[12] Five of these contaminated sites have been classified as completed.[13] The remediation to pre-TMDL standards has been completed. However, it is not understood that these sites have been cleaned up to levels relevant to the proposed TMDL (i.e., a 10µg/kg level distinguishing "ambient" from contaminated sites. The costs presented in Table 1 likely would have been much more had cleanup to these levels been undertaken.

The following information was gathered from Feasibility Studies, publicly available documents and conversations with caseworkers at the Regional Board.

Emeryville Crescent
Environmental investigations were carried out more than 10 years ago. The site is now part of the Eastshore State Park. According to the TMDL there was at least one sample observed at some point in time with total PCB concentrations of greater than 1000µg/kg.[14] No post-remediation measurements were available to compare the effectiveness of the remediation activities.

Oyster Point
This site was completed in 2001 and significant sediment removal took place. Approximately two acres were removed at a depth of 2-3 feet with a twelve inch cap put in place for a total cost of $10 million.[15] According to the TMDL, there was at least one sample observed at some point in time with total PCB concentrations of greater than 1000µg/kg.[16] No post-remediation measurements were available to compare the effectiveness of the remediation activities.

Peyton Slough
The contaminants of concern at Peyton Slough were copper and zinc. There is no real evidence of PCB contamination at this site.[17] This site underwent extensive environmental investigation,

[10] The costs per cubic yard for Oyster Point are for all dredging and capping activities
[11] Hunters Point Shipyard are composite costs that range from the complete dredging scenario to comparative unit cost of sediment removed for other alternatives.
[12] *San Francisco Regional Water Quality Control Board Final TMDL June 2007*, (P. 71)
[13] *Ibid* (P. 55)
[14] *Ibid* (P. 36)
[15] Correspondence with Randy Lee SFRWQCB July 25, 2007
[16] *San Francisco Regional Water Quality Control Board Final TMDL June 2007* (P.36)
[17] Correspondence with Lindsay Whalin SFRWQCB July 26, 2007

and significant sediment removal was completed in November 2006.[18] The extent of sediment removed and post-remediation sample information was not available.

Redwood City Harbor
This site was dredged about 10 years ago. The sediment was not classified for in-bay disposal due to 1 composite sample with about 2ppm PCBs. Follow-up analyses could not confirm that PCB concentration. Sediment was disposed of upland and consequently paved over.[19] According to the TMDL there was at least one sample observed at some point in time with total PCB concentrations of greater than 2000µg/kg.[20] Post remediation samples were unavailable for comparison.

Hamilton Army Airbase – Coastal Salt Marsh
Limited information was available regarding this site. It was expected to be completed in 2003.[21] According to the Wetland Tracker website approximately 900 acres of former Hamilton Airfield is planned for wetland restoration.[22] No information was listed in the TMDL as to the extent of PCB contamination or remediation activities that were completed.

Richmond Harbor/Potrero Point
Point Potrero was designated for clean up due to high concentrations of PCBs and DDT.[23] According to the TMDL there was at least one sample observed at some point in time with total PCB concentrations of greater than 10,000µg/kg.[24]

Stege Marsh
Preliminary investigations have found elevated concentrations of arsenic, cadmium, copper, lead, selenium and zinc at Stege Marsh. Organic compounds detected at concentrations above San Francisco Bay ambient sediment concentration include chlordanes, dieldrin, hexachlorohexanes, DDTs and PCBs.[25] According to the TMDL there was at least one sample observed at some point in time with total PCB concentrations of greater than 1,000,000µg/kg.[26]

Mission Creek
Chromium, lead, and chlordane, mercury, copper, silver, zinc, dieldrin, PCBs, phenanthrene, and PAHs were found in Mission Creek. In addition, chlorpyrifos and mirex levels were in the top 10% of samples in the statewide BPTCP database.[27] According to the TMDL there was at least

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[18] *Ibid*
[19] Correspondence with Fred Hetzel SFRWQCB July 20, 2007
[20] *San Francisco Regional Water Quality Control Board Final TMDL June 2007* (P.36)
[21] http://www.swrcb.ca.gov/cwphome/dod/docs/hamilton.pdf
[22] http://www.wetlandtracker.org/GISInfoCatalog/servlet/org.sfei.GISInfoCatalog.UserInterface?directive=viewproject&project_name=Hamilton+Airfield
[23] State Water Resource Control Board, State of California; Draft Consolidated Toxic Hot Spots Cleanup Plan August 2003 Volume II: Regional Cleanup Plans. (P. 2-77)
[24] *San Francisco Regional Water Quality Control Board Final TMDL June 2007* (P.36)
[25] State Water Resource Control Board, State of California; Draft Consolidated Toxic Hot Spots Cleanup Plan August 2003 Volume II: Regional Cleanup Plans. (P. 2-62)
[26] *San Francisco Regional Water Quality Control Board Final TMDL June 2007* (P. 36)
[27] State Water Resource Control Board, State of California; Draft Consolidated Toxic Hot Spots Cleanup Plan August 2003 Volume II: Regional Cleanup Plans. (P. 2-89-90)

one sample observed at some point in time with total PCB concentrations of greater than 200µg/kg.[28]

Islais Creek
Dieldrin, PCBs, and low molecular weight PAHs and endosulfan sulfate were found at levels of concern in Islais Creek.[29] According to the TMDL there was at least one sample observed at some point in time with total PCB concentrations of greater than 200µg/kg.[30]

San Leandro Bay
San Leandro Bay has been designated as a toxic hotspot in the *State Water Resource Control Board, State of California; Draft Consolidated Toxic Hot Spots Cleanup Plan August 2003 Volume II: Regional Cleanup Plans*. Samples from this report established ambient conditions; however, the actual extent of contamination and remediation necessary are unknown at present.[31] According to the TMDL there was at least one sample from San Leandro Bay observed at some point in time with total PCB concentrations of greater than 1,000µg/kg.[32]

The following sites had limited information available and are not summarized in this comment letter: Yosemite Slough Channel, Moffett Field/NASA Ames-Northern Channel, Cerrito Creek, Codornices Creek, Guadalupe Slough, Oakland Harbor, Richardson Bay, San Francisco Airport, Oakland Army Base, and Vallejo Ferry Terminal.

Costs of Environmental Dredging Projects in Other Areas of the Nation

There have been about 65 major sediment remediation projects throughout the United States as of 2005.[33] The remediation methods employed have consisted of dredging and wet/dry excavation. Six sites have had remediation quantities removed of greater than 200,000 cy.[34] The total volume of sediment remediated is approximately 1.2 billion cy.[35] Sites of notable significance in volume of sediment removed are summarized in Table 2.[36] Sites range from 425,000 cy to over 10 million cy. A summary of cost information for completed projects is summarized in Table 3.[37] The costs of dredging range from $174/cy to $1635/cy.

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[28] *San Francisco Regional Water Quality Control Board Final TMDL June 2007* (P.36)
[29] State Water Resource Control Board, State of California; Draft Consolidated Toxic Hot Spots Cleanup Plan August 2003 Volume II: Regional Cleanup Plans (P. 2-102)
[30] *San Francisco Regional Water Quality Control Board Final TMDL June 2007* (P.36)
[31] State Water Resource Control Board, State of California; Draft Consolidated Toxic Hot Spots Cleanup Plan August 2003 Volume II: Regional Cleanup Plans (P. 2-11)
[32] *San Francisco Regional Water Quality Control Board Final TMDL June 2007* (P.36)
[33] Steven C. Nadeau, *A National Contaminated Sediment Update*, May 2005 http://www.smwg.org/ (P. 6)
[34] *Ibid*
[35] *Ibid* (P. 5)
[36] *Ibid* (P. 8)
[37] *Ibid* (P. 4)

Table 2: Large Site Dredging Projects

Site Name	Sediment Removal Completed or Planned
Hudson River (NY)	2.65 million cubic yards
Fox River (WI)[38]	7.1 million cubic yards
Grand Calumet (IN)	> 2 million cubic yards
Detroit River (MI)	2-4 million cubic yards
River Raisin (MI)	425,000 cubic yards

Source: Nadeau, 2005

Table 3: National Sites with Dredging Underway or Completed and Estimated Cost

National Sites	Sediment Removed in cy	Total Cost in $ millions	Cost per cy ($)
New Bedford Harbor, MI	14,000	20.1	1,435
Sheboygan River, WI	3,800	2.6 (w/o disposal)	700 (w/o disposal)
Ruck Pond/Cedar Creek, WI	7,500	7	935
St. Lawrence River, NY	13,250 (1,800cy boulders)	7 (w/o disposal)	460 (w/o disposal)
Waukegan Harbor, IL	32,000 and 18,000(soil)	21	420 (including soil)
Grasse River, NY	2,600 + 400 boulders	4.9	1,635
Manistique Harbor, MI	117,000 – 13,0000	48	EOP unit cost 276
Hudson River, NY[39]	2,650,000	460	174

Source: Nadeau 2005

Upon examination of various sites post-remediation, the remediation goals were not readily achieved in that sediment sampling showed higher average PCB concentration after remediation, as well as increased short-term bioavailability of PCBs in the water column as a result of remediation projects.[40]

As discussed above, the lack of definition in the TMDL implementation plan makes it impossible to quantify the costs of the regulation with any certainty. Nonetheless, a review of the available evidence suggests that sediment remediation costs could range into the hundreds of millions or even billions of dollars. Comments submitted by Anchor Environmental quantify the possible range of dredge volumes by examining three scenarios: cleanup of all Bay sediments with PCBs contamination above 0.01 ppm, cleanup of Bay margins above 0.01 ppm, and cleanup of 22 "hot spots" defined in the Staff Report. The most modest scenario, the "hot spot" case, may involve over 16,000 acres and 110 million cubic yards of sediment. In the event that 10 percent of these "hot spots" require remediation and dredging costs are $200 per cubic yard (at the lower end of the range of costs reported above), dredging costs would exceed $2 billion.

[38] *Lower Fox River and Green Bay Superfund Site,* Record of Decision Amendment, June 2007; U.S. Environmental Protection Agency

[39] *Hudson River Record of Decision*, U.S. Environmental Protection Agency (P. 94)

[40] Steven C. Nadeau, *A National Contaminated Sediment Update*, May 2005 http://www.smwg.org/ (P. 9-14)

3.B. Urban Stormwater Runoff

Comments submitted by ARCADIS shed light on the possible costs of capturing and treating stormwater from a reasonably foreseeable rain event. Costing assumptions include the following:

- Maximum flow rate = 1,070 mgd per treatment system (Total for 55 systems = 58,870 mgd).
- Design flow rate = 74,300 gallons per minute (gpm) based on emptying the retention ponds in 10 days.
- Storage capacity = 330-acre retention basin 10 feet deep per treatment system (Total for 55 systems = 18,065-acre or 28-square mile retention basin, 10 feet deep).
- Influent concentration = 38,600 pg/L calculated based on the loading assessment presented in KLI (2002).
- Effluent target concentration of 170 pg/L.
- Treatment by settling, filtration and Granular Activated Carbon (GAC).
- Costs for a stormwater collection and conveyance system are not included.
- Carbon disposal as a hazardous waste in a properly permitted landfill.

ARCADIS produces a low-end cost estimate by assuming that the retention basins store the stormwater and provide the settling function of the treatment system. After settling, the solids are further reduced by sand or dual media filtration. GAC adsorption will follow the sand filters to remove soluble PCBs. Each of the 55 retention systems will require a separate treatment system. Each system will also require dewatering equipment to reduce the volume of solids that will require disposal. The result of ARCADIS's analysis is an estimated cost of $145 million for each stormwater treatment system. The total cost for all 55 systems in the Bay Area is almost $8 billion, not including land acquisition, stormwater collection and annual O&M costs for the treatment systems.

In addition to infrastructure for collecting and treating stormwater collection, the Staff Report hints at remediation of upland industrial sites, but is not specific enough to quantify compliance costs. These costs can be substantial as well, and should be discussed in greater detail in the Staff Report if such cleanup efforts are under consideration.

4. Benefits of the Proposed TMDL

4.A. Summary

The Staff Report does not explicitly define the benefits associated with the proposed TMDL. Consequently, economic analyses of benefits can be conducted based directly on the report. Thus, the report fails to allow for an evaluation of objective 9 of the report – to avoid actions that will have unreasonable costs relative to the environmental benefits. The report simply claims that by reducing PCB concentrations, the risk of cancer from PCB exposure will reach an acceptable level of 1 in 100,000 over a 70-year period. No reference is made as to how this compares with the existing cancer risk and consequently to the magnitude of any reduction. Health benefits are not presented in terms of reduced risk or in terms of expected morbidity or mortality. As a result there is no way to quantify, let alone monetize, the benefits of the TMDL as required for an adequate economic analysis.

The report notes that since the TMDL concentration target is substantially below the level necessary to protect plant and animal life that additional benefits associated with their protection can also be claimed. There is, however, no measurement of specific improvement to plant and animal species found in the SF Bay or any specific attribution to the proposed TMDL. Finally, no specific impacts of the proposed TMDL on other beneficial uses that may apply to the SF Bay are calculated.

Although the Staff Report does not provide any form of benefits estimate, it does provide sufficient information regarding staff assumptions to crudely estimate human health benefits associated with reaching the proposed TMDL. As shown below, these benefits are very small.

4B. Benefits Calculation

Health benefits should be measured in terms of the cancer cases avoided by adopting the TMDL. This can be calculated as follows:

$$R_{Current} - R_{TMDL} \times \text{Population at Risk} = \text{avoided cancer cases} \qquad (1)$$

Where: R_{TMDL} is the risk of cancer per 100,000 once the TMDL is implemented
$R_{Current}$ is the risk of cancer per 100,000 under current coniditons
The Population at risk is the number of people exposed to the carcinogen

The R_{TMDL} according to the Staff Report is one in 100,000 or 10^{-5} representing the maximum acceptable risk level that will be reached under the TMDL because PCB concentrations in fish are expected to fall to 10ng/g. This level is calculated based on the following equation:

$$SVc = [(RL/CSF)]*BW]/CR \qquad (2)$$

Where:

SVc is the screening value for PCB concentration expected in fish under the TMDL (mg/kg)

RL is the maximum acceptable risk level 1/100,000, or R_{TMDL}

CSF is the oral cancer slope factor, upper bound estimate is 2mg/kg-day

BW is mean body weight of the population (70g)

CR is the fish consumption rate by all consumers, 32g/day

The Staff Report assumptions for each of these variables can be found in the report or in references to the report (with some exceptions noted below) where the calculation of the screening value for a carcinogen is presented.[41] Table 4 summarizes the Staff Report assumptions.

Table 4: Staff Assumptions for Cancer Risk

Variable	Value	Units	Source
Concentration (SVc)	0.01	mg/g	Target fish concentration (P. 23); TEQ = 0.14 pg/g, (P. 24)
Consumption Rate (CR)	32	g/day	maximum consumption (P. 23)
Exposure Duration	30	years	Not stated, but consistent with screening level calculation
Body Weight	70	kg	P. 23
Cancer Slope Factor (CSF)	2	mg/kg-day	P. 23, (although value of 1 at P. 50)

Source: TMDL

The Staff Report, however, does not provide a value for the current risk of cancer from fish consumption ($R_{Current}$). This value can be calculated though, solving equation (2) for RL rather than SVc :

$$RL = (SVc*CSF*CR)/BW \quad (3)$$

To solve for RL ($R_{Current}$) the screening value concentration (SVc) must be replaced by the current PCB concentration found in fish. To determine this concentration, PCB concentration data and fish consuming population data were collected and analyzed. The San Francisco Estuary Institute (SFEI) catalogs all Regional Monitoring Program results on their website. SFEI data are collected from stations expected to be representative of the entire Bay. Data are collected every three years. The data contains the PCB concentration levels for the species identified in the TMDL, namely the California Halibut, Jacksmelt, Leopard Shark, Shiner Perch, Stripped Bass, White Croaker and White Sturgeon. As a result the average PCB concentrations can be calculated for the species of interest. The average fish tissue concentration for the species of interest from the SFEI RMP data for sampled years is provided in Table 5.

[41] *San Francisco Regional Water Quality Control Board Final TMDL June 2007* (P. 23)

Table 5: PCB Fish Tissue Concentrations in ng/g

Species	1994	1997	2000	2003
California Halibut	26	16	22	10
Jacksmelt	0	70	39	28
Leopard Shark	27	12	17	9
Shiner Surfperch	110	216	161	157
Striped Bass	98	25	43	54
White Croaker	230	259	206	228
White Sturgeon	55	31	40	197

Source: SFEI RMP data

Data collected by the Pacific Coast Recreational Fishing Network (RECFIN) provides the basis for calculating weighted average fish consumption by species. The RECFIN Database collects information related to fish catch, angler population, desired species sought, and a variety of other information related to sport fishing. Data are compiled by field observations as well as intercept interviews and phone interviews. According to RECFIN there is a small percentage of anglers fishing for the reference species. Table 6 includes the percentages of anglers in the Bay who were seeking to catch a particular species. The species in bold are those identified in the Staff Report.

Table 6: Percent of Anglers Trying to Catch a Given Species in 2006

Species	**Percent**
Bat Ray	0.51%
California Halibut	**4.81%**
Chinook Salmon	0.10%
Jacksmelt	**4.05%**
Leopard Shark	**2.28%**
Monkeyface Prickleback	0.05%
Pacific Herring	0.15%
Pacific Sanddab	1.16%
Rockfish Genus	0.71%
Rubberlip Seaperch	0.05%
Sanddab Genus	0.86%
Shiner Perch	**0.56%**
Silverside Family	0.20%
Striped Bass	**13.71%**
Sturgeon Genus	29.76%
Surfperch Family	6.68%
Unidentified (Sharks)	2.23%
Unidentified Fish	26.67%
White Croaker	**1.57%**
White Sturgeon	**3.90%**

Source: RECFIN database

As shown by Table 6, relatively few anglers fish for the species exhibiting high PCB concentrations. Fewer than 2% seek white croaker – the species exhibiting the highest PCB concentration. Although a greater number fish for striped bass, only the larger bass have elevated concentrations.

These preferences are reflected in the actual fish caught. RECFIN also reports the total weight of fish caught. The data used from the RECFIN database represent kilograms of dead fish either observed in the field or reported in an interview. Fish caught and released were excluded as a result of posing no threat to humans. Table 7 displays the percent of species of interest caught during the period 2004 to 2006.

Table 7: Percent of Species of Concern Caught

Species	2004	2005	2006
California Halibut	15.32%	21.29%	5.16%
Jacksmelt	7.19%	5.14%	9.47%
Leopard Shark	9.17%	5.95%	2.86%
Shiner Perch	0.64%	0.37%	0.29%
Striped Bass	11.37%	35.59%	8.76%
White Croaker	3.91%	1.07%	0.87%
White Sturgeon	0.19%	1.98%	1.97%

Source: RECFIN database

Using the information in Table 7and the concentrations presented in Table 5 for 2003, the weighted average PCB concentration in fish tissue can be calculated. The results are shown in Table 8. The overall average concentration for fish actually consumed for the years 2004-2006 is 21ng/g. (This assumes the PCB concentration in fish not classified as fish of concern is zero.) Applying this value to equation (3) reduces the current risk level to a more reasonable 1.9 per 100,000. Thus, the proposed TMDL would only reduce cancer risk from 1.9 to 1 per 100,000.

Even 1.9 per 100,000, however, overstates current risk because it does not represent the attributes of the entire population. The affected population can be characterized in two categories: high-risk and low-risk. High-risk populations are those consuming more than 32 g/d as described in the SFEI study as the top 5% of respondents. The low-risk population is the remaining 95% of the population that consumes fish. According to the SFEI study, the average consumption rate of Bay fish is the measure of fish consumption reported within a 4-week and 12-month recall period. The 4-week period is presumed to be a more accurate and is thus used in our analysis.[42] As a result, the mean consumption rate for the remaining 95% of fish-consuming anglers is 6.3 g/d.[43] Using this average consumption rate (6.3 g/d) and tissue concentration (21ng/g) results in a current risk of 0.37 per 100,000. However, given the target fish tissue concentration of 10ng/g and the current average fish consumption of 6.3 g/day, the risk level would be 0.18 per 100,000. Thus, the TMDL would effectively reduce the risk of cancer from 0.37 to 0.18 per 100,000 a total change of 0.19 per 100,000. This finding suggests that using this

[42] SFEI *San Francisco Bay Seafood Consumption Study 2001* (P. 42)
[43] *Ibid*

lower number would be inclusive of the entire Bay Area population and imply that current risk levels are even lower.

Table 8: Weighted Average of PCBs in ng/g for Fish of Concern

	Year		
Species	**2004**	**2005**	**2006**
California Halibut	1.469246	2.04119	0.494739
Jacksmelt	2.018626	1.444351	2.659951
Leopard Shark	0.819753	0.531721	0.255241
Shiner Perch	1.008328	0.580068	0.448474
Striped Bass	6.100659	19.08982	4.696258
White Croaker	8.892883	2.43964	1.984865
White Sturgeon	0.382898	3.89763	3.878849
Total Average PCBs	**20.69239**	**30.02442**	**14.41838**

4.B. Consumption of Fish from the San Francisco Bay

Incidence rate change alone, however, does not provide a useful measure of potential benefits. The population affected by the change must be considered. As shown in equation 1, benefits should be measured as the product of the incidence change and the affected population. Although the Staff Report does not make such a calculation, it implies that the health of the entire Bay Area population is affected by the proposed TMDL. Clearly this is not the case. Only those who consume SF Bay fish are potentially affected. Among this population, moreover, only those who consume certain fish with PCB concentrations above current advisory levels on a regular basis are affected.

Nowhere in the Staff Report is there any reference to such a number. Indeed, the staff asserts that the SVc level of 1 in 100,000 is conservative and designed to provide a margin of safety because it is based in part on the fish consumption level of those who consume the most SF Bay fish rather than on consumption levels for the general population of the Bay Area.[44] The staff claims that this margin implicitly recognizes the long-term goal of increasing the viability of fish consumption and commercial harvest from the Bay.[45] This is an unsubstantiated claim. There is no basis to claim that meeting the proposed TMDL will have any sizable impact on general or commercial consumption. Sport fishing rates, measured by fishing licenses issued, have fallen modestly in the Bay Area Counties since before the first fish advisories were issued. Note that there is a general nationwide trend of declining participation in fishing.[46] Observed reductions are in part attributable to mercury rather than PCB advisories. Consequently, PCB concentration reductions are unlikely to influence substantially sport fishing demand in the Bay. Commercial fishing in the Bay is also unlikely to be influenced by the proposed TMDL. PCB concentrations

[44] The Staff assumes a 32g/day consumption level that represents consumption at the 95% upper bound of the SFEI survey. Thus, 95 percent of those surveyed consumed less than 32 g/day.
[45] *San Francisco Regional Water Quality Control Board Final TMDL June 2007* (P. 23)
[46] American Sportfishing Association
http://www.asafishing.org/asa/statistics/participation/fishlicense_2001_05.html

have not been demonstrated as a cause for the decline in commercial fishing. Concentrations are below the advisory level in fish historically caught commercially. Declining fish populations have not been attributed to PCB concentrations either.

A careful accounting for exposure is critical for accurate measurement of benefits. According to California sport fishing license data reported by the California Department of Fish and Game, there are approximately 125,259 licensed anglers in Alameda, Contra Costa, Marin, Santa Clara, San Francisco and San Mateo counties. Furthermore RECFIN surveys report that 33% of interviewed anglers reported fishing in saltwater. This suggests that the angling population of the Bay is approximately 41,700 (125,259 * 0.33). Thus, if it is assumed that the average household size of anglers is the average for the SF CMSA or 2.7 and every member of the household is consuming fish the potential affected population is 112,552. However, according to the SFEI study only 5 percent of the high-risk anglers or about 2,100 consumes greater than 32g/d of Bay-caught fish. The total affected population increases to perhaps 5,600 assuming that families consume as well. The low-risk population would be the remaining population, or less than 107,000 people. The actual number is probably far smaller because not all licensed anglers fish in the Bay nor consume fish caught in the Bay. The available evidence indicates that the population of anglers and their families potentially exposed to PCBs is small.

Table 9: Fishing License Data

California Resident Fishing License Sales for 2005

County	2005
Alameda	33,406
Contra Costa	34,648
Marin	10,525
San Francisco	3,972
San Mateo	12,240
Santa Clara	30,468
Total	**125,259**

Source: CA DFG
http://www.dfg.ca.gov/licensing/pdffiles/county_101_2005.pdf

Fish catch data collected by the RECFIN survey indicates that fish species presenting the highest PCB concentration (white croaker, jacksmelt, leopard shark, and shiner perch) account for only 16.9 percent of total Bay catch over the period 2004-2007). This circumstance also suggests a modest exposure. As shown in Table 6, white croaker – the fish with the highest PCB concentration – accounts for under 2 percent of the catch. The shiner perch accounts for less than 1 percent. The SFEI survey found that only 5 percent of those surveyed consumed 32g/day or more of Bay-caught fish. Therefore, most anglers consume much less than the acceptable risk level calculation assumes. Mean consumption rates for all low risk anglers were reported at 6.3g/day and the median value was 0g/day, reflecting the fact that over half the respondents reported eating no Bay-caught fish over the 4 weeks prior to their interview (SFEI, p.40-42).

Setting a concentration target based on 32g/day is clearly grossly conservative. It does not merely create a "safety margin," as suggested by Staff.

Staff's reliance on the SFEI survey is problematic for other reasons as well. The survey itself is seriously flawed. The sampling design relies on incorrect weights for fishing location. SFEI reports that 62 percent of fishing is shore based (SFEI, p15). According to RECFIN data, however, pier locations account for only 17.6 percent of fish caught by weight and beaches account for another 8.9 percent. Therefore, only 26.5 percent of fish are caught from shore-based sites. The SFEI weight biases the results toward on-shore locations where higher shares of high-contamination fish are caught. Further, the survey's approach to determining typical fish consumption by amount and species is biased. The initial focus on high-PCB concentration species (i.e., white croaker, leopard shark and striped bass) rather than identifying all fish types reveals a bias on the part of the interviewer. The failure to ask about all forms of disposition of fish caught is also a problem. Respondents, for example, could be questioned whether they use a particular fish as bait or whether they throw them back as a means to test the accuracy of their responses regarding consumption.

4.C. The Benefits of the Proposed TMDL are Insubstantial

The benefits associated are composed of two groups of anglers: the allegedly high-risk population consuming greater than 32g/d and the low-risk population consuming an average of 6.3g/d. As a result, the total net present value of the benefits associated with the TMDL is approximately $380,000. This benefit accounts for 0.004 avoided incidence of cancer per year.

The following calculations are based on equation 1 and the following equation:

((Change in risk x population at risk) / 70 years) x $7 million = benefit in dollars (4)

The high risk group faces a current risk level of 1.9 per 100,000. Assuming the proposed TMDL does achieve a risk level of 1 cancer cases in 100,000 over 70 years and that current risk level is reduced by 0.9 cancer cases in 100,000 over 70 years, using this risk level the benefits associated with the TMDL can be estimated. The reduction in cancer cases for the affected population, including households, of 5,627 indicates that ((0.00001*5,627)/70) or 0.0008 cancer cases are avoided per year. If we further assume very conservatively that each cancer case is fatal, the proposed TMDL will avoid the equivalent number of deaths. The benefits of the TMDL spreading the avoided deaths over the 70 years results in an annual benefit of approximately $5,660. This represents a present value of $80,144. This value reflects a value of $7 million per statistical life, consistent with US EPA guidelines, and assumes that every incidence of cancer results in mortality.[47]

When calculating the benefits for the low risk population, the population size including those in the household is 106,925. The average consumption level is 6.3g/day. The current risk level the low risk population faces is 0.37 per 100,000. The reduced risk level as a result of the TMDL is 0.18 per 100,000 thus reducing the risk level by about half. The reduction in cancer cases for the

[47] US EPA, *Guidelines for Preparing Economic Analyses*, EPA 240-R-00-003, September 2000.

affected population of 106,925 indicates that ((0.19*106,925)/70) or 0.003 cancer cases avoided per year. The benefits of the TMDL spreading the avoided deaths over 70 years results in an annual benefit of $21,171 or a net present value of $299,792.

The total benefits of the TMDL are calculated by adding the benefits from the high risk group and the low risk group for a total net present value of $379,937 ($80,144 + $299,792 = $379,937). Avoided deaths are calculated similarly by adding the avoided deaths per year of the high risk and low risk populations (0.0008 + 0.003 = 0.004).

5. Cost-Effectiveness and Consistency with Other Interventions

The proposed TMDL imposes an unacceptably high level of costs in relation to the actual benefits achieved. Requiring society to spend hundreds of millions or even billions of dollars to achieve less than one million dollars of benefit over 70 years is not reasonable public policy.

The proposed TMDL is far outside the mainstream of health and safety regulations in the United States, even for environmental regulations that are often relatively expensive in terms of dollars per lives saved. That is, most heath and safety regulations promulgated at the federal and state level are vastly more cost effective. For example, a recent study conducted by an official of the Office of Management and Budget and published in the *Journal of Risk and Uncertainty*, examined 76 regulatory actions aimed at saving lives. The proposed TMDL for PCBs is more expensive per life saved than all 76 interventions studied.[48]

The staff report fails to demonstrate that the Regional Board considered alternatives to the proposed TMDL that would be less burdensome than the one proposed, or that it considered the relative cost effectiveness of alternative standards. This omission is inconsistent with basic principles of economic analysis of regulation, and is contradictory to established federal guidelines promulgated by the US Environmental Protection Agency and the Office of Management and Budget.

The selection of a TMDL with an insubstantial level of benefits and possibly enormous cost is also inconsistent with the stated objectives of the proposed action listed in the Staff Report.

6. Competing Risks

Risks almost never exist in isolation, and attempts to deal with one risk usually affect the level of other risks. The benefits of the proposed TMDL are so small, and the direct and indirect costs so large, that it is likely the regulation will do more harm than good. That is, taking all effects of the proposed TMDL into account, it is likely that the regulation will generate more risks than it reduces. Further, while the Staff Report does not emphasize the effects of the TMDL on the aquatic environment, it is also possible that the TMDL will impede projects that move or disturb sediment in the Bay. This restricted movement may affect numerous environmental restoration projects and other activities that depend on the ability to move sediment around the region.

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[48] John Morrall, *Saving Lives: A Review of the Record, The Journal of Risk and Uncertainty*, 27:3; 221-237, 2003

6.A. Health-Health Analysis

The performance of the proposed TMDL is poor in that it has a high implicit cost per life saved, being far more expensive than the $7 million per life saved threshold adopted in standard economic analyses of health risks. Another key threshold is the cutoff point at which cost-ineffective regulations do more harm than good in that they pose more risk to society than the problems they intend to address. The proposed TMDL fails this test as well, and by a wide margin.

Relatively new research in environmental economics suggests a technique for assessing regulation that does not involve monetizing benefits. The technique of "health-health" analysis allows analysts to estimate non-monetized benefits and evaluate regulations without passing judgment on the value of a statistical life. The logic of this technique rests on two principles. First, risk reduction is a so-called normal good, or one where purchases rise with the level of income. Second, regulations have to be financed. Money for compliance must ultimately come from individuals, and paying the costs of regulation reduces individuals' ability to purchase risk reduction privately.[49]

Best estimates of the threshold of cost per life saved above which regulations do more harm than good are around $21 million per life saved.[50] That is, every $21 million of compliance cost induces one fatality. The proposed TMDL fails that health-health test by a wide margin. To see this, recall that the TMDL is expected to result in 0.004 cancer cases avoided per year. Taking cancer cases as equivalent to deaths, compliance costs would need to be less than $84,000 annually to pass the health-health test (0.004 x 21,000,000= 84,000). Even if one if mindful of the uncertainties surrounding compliance costs for this proposed TMDL, it is not possible that they will be below this threshold.

6.B. Effects on Sediment Movement in the Bay and Wetlands Restoration Projects

Even though the TMDL does not recognize any impacts to habitat restoration plans it fails to explain the existence of a number of plans at the Bay margin which may be caused harm by the establishment of this TMDL. As is stated in the TMDL,

> [s]ignificant impacts to land use and planning would occur if a project ... caused conflict with a habitat conservation plan. There are no projects related to the PCBs TMDL that would be of a type or scale to cause any impacts in this category. Projects anticipated by the PCBs TMDL implementation plan would occur on industrial sites or on the Bay margin and would not result in substantial

[49] Lutter, Randall and John Morrall. *Health-Health Analysis: A New Way to Evaluate Health and Safety Regulations. Journal of Risk and Uncertainty* 8, pp. 43-66, 1994.
[50] Lutter, Randall, John Morrall and W. Kip Viscusi. *The Cost per Life Saved Cutoff for Safety Enhancing Regulations. Economic Inquiry* 37, pp. 599-608, 1999

changes to established communities or land use patterns. There are no known or reasonably foreseeable impacts to land use and planning.[51]

According to the Bay Area Wetland Tracker, there are approximately 150 sites that are planned for restoration, mitigation, creation, and enhancement projects.[52] A map of selected sites completed and planned is shown in Figure 1. The majority of these sites are located at the Bay margins with sediment mitigation being an integral part of restoration activities. There is only limited information on sediment management for the Bay as a whole. Several projects listed remediation activities ranging from natural attenuation of sediment through active monitoring to incorporating 10.6 million cubic yards of sediment into the restoration project.[53]

There are many sites that are currently classified as both hotspots and designated for habitat restoration activities. Two such sites are the South Bay Salt Ponds Project and the Hamilton Army Base. Each site has plans to undergo creation of tidal wetlands habitat and have PCBs present. The passage of this TMDL may require that these sites forego the restoration activities and furthermore necessitate remediation action. The potential scope of damages is unknown because the TMDL does not provide an adequate description of how remediation locations at the Bay margin designated for other uses will be handled.

Restoration projects range in size and scope, with sites of less than an acre to nearly 9,000 acres. For example the South Bay Salt Ponds Project has about 25 sites and a total of approximately 4,700 acres designated for a variety of remediation projects aimed at restoring the salt ponds. The main problem with the current status of the salt ponds being that the tidal lands have subsided from above sea level and currently require sediment deposition to create tidal wetlands.[54] Natural deposition could take as much as 120 years for full recuperation and determining the most cost effective way of accelerating it may be difficult. In addition the presence of mercury in the sediment poses environmental problems of its own. Figure 2[55] illustrates the diversity of the projects surrounding the South Bay Salt Ponds.

Additionally Hamilton Army Base has been designated as a toxic hotspot as well as a restoration project. The nearly 800 acre project is aimed at providing a range of wetlands such as subtidal open water, intertidal mudflats, low, middle and high intertidal marsh, channels, interior tidal ponds, and tidal panes. The precise wetland use has yet to be determined but the potential for restoring wetlands requires 10.6 million cubic yards of sediment to raise site elevations necessary to encourage vegetation growth[56].

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[51] *San Francisco Regional Water Quality Control Board Final TMDL June 2007* (P. 93)
[52] www.wetlandtracker.org
[53] Philip Williams and Associates; *Hamilton Airfield Tidal Wetland Restoration* http://www.pwa-ltd.com/ProjectSummaries/HamiltonField.html
[54] Zimmerman, Richard; Restoring *the South Bay Salt Ponds,* The Loma Prietan March/April 2004 http://lomaprieta.sierraclub.org/lp0403_SaltPonds.html ;
[55] http://maps.southbayrestoration.org/sbsp/viewer.htm
[56] Philip Williams and Associates *Hamilton Airfield Tidal Wetland Restoration* (P. 2) http://www.pwa-ltd.com/ProjectSummaries/HamiltonField.html

Figure 1: Wetland Tracker Restoration Projects

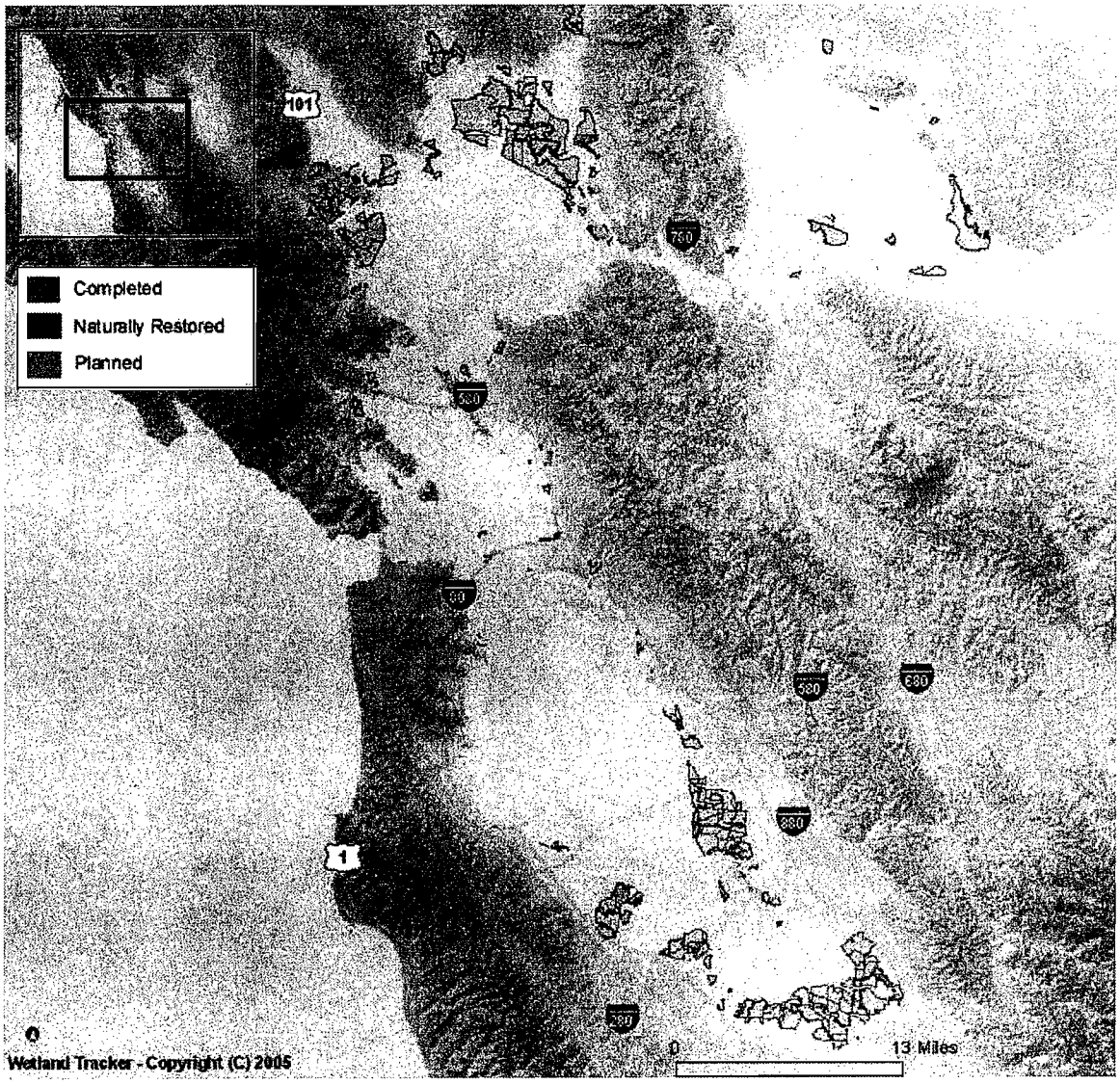

Figure 2: South Bay Salt Ponds

In addition the *Long Term Management Strategy for the Placement of Sediment in the San Francisco Bay, "Management Plan 2001"* outlines goals related to limiting the disposal of sediments in the bay and disposing of dredged material in the most environmentally sound manner. The TMDL states that projects should have preliminary work started in 5 years and site completed within 10. In addition the LTMS targets limiting in Bay disposal of sediments to 1 million cy per year by 2012.[57] This would suggest that there would be limiting factors on the quantity of disposed remediated sediment in the Bay and imply that disposal would have to be in an upland storage facility such as a landfill.

7. Documents Relied On

In reaching these conclusions, I have relied on the following documents:

- *Total Maximum Daily Load for PCBs in San Francisco Bay: Proposed Basin Plan Amendment and Staff Report.* California Regional Water Quality Control Board, San Francisco Bay Region. June 22, 2007.

- Bay Area Wetland Tracker. Website developed by the San Francisco Estuary Institute, Wetlands and Water Resources, Inc. and the Point Reyes Bird Observatory.

[57] EPA, SFRWQCB *Long Term Management Strategy for the Placement of Sediment in the San Francisco Bay, Management Plan 2001* (P. 1-14)

http://www.wetlandtracker.org/GISInfoCatalog/servlet/org.sfei.GISInfoCatalog.UserInterface?directive=viewproject&project_name=Hamilton+Airfield

- *Draft Consolidated Toxic Hot Spots Cleanup Plan Volume II: Regional Cleanup Plans.* California State Water Resources Control Board. August 2003.

- *Final Feasibility Study Report, Seaplane Lagoon, Alameda Point, California.* Prepared by Battelle for Base Realignment and Closure Program Management Office West, July 22, 2005

- *Draft Addendum to the Revised Final Station-Wide Feasibility Study Site 25.* Prepared by SulTech and Tetra Tech EM, Inc. for Base Realignment and Closure Program Management Office West, June 21, 2005.

- *Revised Draft Feasibility Study Report for Parcel F Hunters Point Shipyard, San Francisco, California.* Prepared by Barajas & Associates, Inc. for Base Realignment and Closure Program Management Office West, May 11, 2007

- Nadeau, S., *A National Contaminated Sediment Update,* Presentation to the American Chemistry Council, May 19, 2005

- Daum, T., et al. *Sediment Contamination in San Leandro Bay, CA*, San Francisco Estuary Institute, December 2001

- *Record of Decision for Site 17 Seaplane Lagoon.* U.S. Environmental Protection Agency, October 2006

- *Record of Decision for Hudson River PCBs Site New York.* U.S. Environmental Protection Agency, February 2002. http://www.epa.gov/hudson/d_rod.htm#record

- Zimmerman, R. *Restoring the South Bay Salt Ponds The Loma Prietan* March/April 2004 http://lomaprieta.sierraclub.org/lp0403_SaltPonds.html

- South Bay Salt Pond Restoration Project. California Department of Fish and Game, The Coastal Conservancy, The U.S. Fish and Wildlife Service. http://maps.southbayrestoration.org/sbsp/viewer.htm

- Philip Williams & Associates. *Hamilton Airfield Tidal Wetland Restoration* http://www.pwa-ltd.com/ProjectSummaries/HamiltonField.html

- *Long-Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region.* Prepared by U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, San Francisco Bay Conservation and Development Commission, San Francisco Bay Regional Water Quality Control Board, 2001.

- Freeman, A. Myrick. *Environmental Policy since Earth Day I: What Have We Gained? The Journal of Economic Perspectives,* Vol. 16, No. 1. (Winter 2002), pp. 125-146

- Morrall, John F. *Saving Lives: A Review of the Record; Journal of Risk and Uncertainty* 27:3; pp. 221-237, 2003

- *Guidelines for Preparing Economic Analysis*; U.S. Environmental Protection Agency, September 2000

- *2006 Report to Congress on the Costs and Benefits of Federal Regulations and Unfunded Mandates on State, Local, and Tribunal Entities;* Office of Management and Budget 2006

- Lutter, Randall and John Morrall. *Health-Health Analysis: A New Way to Evaluate Health and Safety Regulations. Journal of Risk and Uncertainty* 8, pp. 43-66, 1994.

- *San Francisco Bay Seafood Consumption Report,* Environmental Health Investigations Branch of the California Department of Health Services, San Francisco Estuary Institute, 2000

- Pacific States Recreational Fisheries Monitoring (RECFIN). www.recfin.org

- American Sportfishing Association http://www.asafishing.org/asa/statistics/participation/fishlicense_2001_05.html

- Lutter, Randall, John Morrall and W. Kip Viscusi. *The Cost per Life Saved Cutoff for Safety Enhancing Regulations. Economic Inquiry* 37, pp. 599-608, 1999.

- *Lower Fox River and Green Bay Superfund Site,* Record of Decision Amendment, June 2007; U.S. Environmental Protection Agency

- San Francisco Estuary Institute, Regional Monitoring Project. http://www.sfei.org/rmp/

- California Department of Fish and Game, Sportfishing license statistics http://www.dfg.ca.gov/licensing/pdffiles/county_101_2005.pdf

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Flex your power!
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August 20, 2007

Mr. Fred Hetzel
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612
By: email - fhetzel@waterboards.ca.gov

SUBJECT: Total Maximum Daily Load (TMDL) for polychlorinated biphenyls (PCBs) for San Francisco Bay

Dear Mr. Hetzel:

The California Department of Transportation (Department) appreciates the opportunity to comment on the proposed Basin Plan Amendment and supporting staff report incorporating a TMDL for PCBs for San Francisco Bay. This TMDL proposes substantial reductions in the loadings of PCBs carried by stormwater and therefore could potentially impact the Department's runoff control program in the Bay area. Approximately 27 square miles of Department right-of-way within Region 2 drains to the San Francisco Bay. This area represents 0.7% of the total watershed (4,000 square miles).

We support the Regional Board's efforts to improve water quality in the Bay but have concerns regarding the viability of the proposed strategy.

Comment #1 With respect to the Department, the proposed Basin Plan Amendment (Appendix A) includes the following statement:

Urban stormwater runoff wasteload allocations shall be achieved within 20 years and shall be implemented through the NPDES stormwater permits issued to urban stormwater runoff management agencies and the Department. The urban stormwater runoff wasteload allocations implicitly include all current and future permitted discharges, not otherwise addressed by another allocation, and unpermitted discharges within the geographic boundaries of urban runoff management agencies including, but not limited to, Caltrans roadway and non-roadway facilities and rights-of-way, atmospheric deposition, public facilities, properties proximate to stream banks, industrial facilities, and construction sites. [*Page A-9*]

It would be premature to develop strategy for corrective actions or effectively control when the sources are largely unknown. While some hot spots have been identified, there is little information demonstrating that those and other hot spots are responsible for the majority of

PCBs contributed by urban runoff. We believe that additional research is needed to identify the sources. We are concerned that the strategy of focusing on hotspots will not achieve the high reductions (95%) required of urban watersheds. As a result, structural controls for runoff may be the only option for meeting the allocation. However, structural BMPs are not considered viable for controlling PCBs in urban runoff. Therefore, the report should clearly demonstrate how the hotspot strategy will achieve those reductions or thoroughly discuss the use of structural BMPs, including their costs, impacts, siting and other feasibility issues.

Comment #2: The Staff Report proposes routing urban stormwater runoff through municipal wastewater treatment facilities as an efficient means of reducing PCBs and other particle-associated contaminant loads to the Bay. The TMDL includes an additional allocation for PCBs (0.9 kg/yr) for the stormwater flows directed to POTWs. Routing of stormwater flows to POTWs could be beneficial. However, the following potential constraints and regulatory issues should addressed in the TMDL:

- Stormwater pollutants could cause POTWs to exceed their water quality-based effluent limits (WQBEL) or worsen current exceedances. Recent permits issued (or proposed to be issued) to POTWs include enforcement orders due to exceedance of WQBELs for dioxin, mercury, and other constituents. Dioxin, in particular, is present generally due to infiltration or inflow of stormwater into sewer systems. Monitoring by the Board has found high levels of dioxin in stormwater runoff.[i] Dioxins in runoff can be as much as two orders of magnitude higher than water quality criteria (objectives). POTWs will be unlikely to accept urban runoff—with its heavy load of dioxins—that is certain to exacerbate permit compliance.
- During larger storms, POTW capacity is typically exceeded to the extent that all flows do not receive full secondary treatment. Increasingly, regulatory pressure is being applied to POTWs to improve their treatment levels during wet weather. As a result, POTWs are going to be reluctant to accept stormwater flows that may put them at risk of not providing full treatment to all flows.

Comment #3: It is not clear how the TMDL can make an appropriate and substantiated allocation to external sources (stormwater runoff, etc.) until the contribution of internal sources has been better quantified. The Staff Report notes that *bed erosion* and in-*bay contaminated sediment* have not been quantified. Nevertheless, the modeling done for the TMDL concludes that attaining the desired Bay sediment concentration of one ug/kg will require a reduction in external loadings to 10 kg/yr.

[i] Online at: http://www.swrcb.ca.gov/rwqcb2/download/DioxinStormwaterSurvey1997.pdf

Comment #4: The Basin Plan Amendment specifies that:

Requirements in each NPDES permit issued or reissued [including the Caltrans permit], shall be based on an updated assessment of best management practices and control measures intended to reduce PCBs in urban runoff. Control measures implemented by urban runoff management agencies and other entities (except construction and industrial sites) shall reduce PCBs in urban runoff to the maximum extent practicable. [*Page A-9*]

It then identifies the measures that "demonstrate progress toward attainment," which include:

- Selection of one of three options for quantifying PCB loading in the permittee's drainage.
- Development and implementation of a "monitoring system to quantify PCBs urban runoff loads and the load reductions achieved through treatment, source control and other actions…"
- Support for "actions to reduce the health risks of people who consume PCBs-contaminated San Francisco Bay fish…"
- Conducting or causing "to be conducted monitoring, and studies to fill critical data needs identified in the adaptive implementation section."

Who completes the updated assessment for permitting purposes? Specifically what BMPs or other control measures will the Department need to implement? This vague requirement places no bounds on information collection efforts. In addition, we are not convinced that permittees will have a responsibility to take direct actions, other than reducing pollutant discharges that reduce health risks for those consuming contaminated Bay fish. It is not clear what the Board is proposing. Does it include educational messages or providing alternative food sources? These proposed actions should be further developed to include information on purpose, scope, and costs, before it is possible to evaluate whether they are appropriate.

The Department will work in cooperation with other urban dischargers and the Board to find equitable ways to implement the TMDL. However, we strongly encourage the Board to address the issues raised above prior to adopting the Basin Plan Amendment.

We hope these comments are helpful. If you have any questions, please call Keith Jones of my office at (916) 653-4947.

Sincerely,

for G. SCOTT McGOWEN
Chief Environmental Engineer

Memorandum

To: Fred Hetzel
From: Roger James
Date: August 20, 2007

SUBJECT: PCB TMDL for San Francisco Bay

The following comments are submitted regarding the PCB TMDL and are specific to the Urban Storm Water Runoff implementation measures beginning on page 67.

Application of MEP to TMDLs
The reduction of pollutants to the "maximum extent practicable" is a technology based standard in the Clean Water Act, does not apply to compliance with water quality based standards and should be deleted in the 2nd paragraph on page 68.

Urban Storm Water Treatment by POTWs
While I agree that this should be explored, the feasibility is questioned and reliance on this as a possible solution should be quickly addressed and feasibility determined. The feasibility is questioned because runoff from areas with elevated PCBs in ***soils/ sediments*** will be from pervious areas.

Studies by Pitt and Bozeman, 1982 *Sources of Urban Runoff Pollution and Its Effects on an Urban Creek*, USEPA-600/S2-82-090 have reported on the relative solids and other pollutant loadings from pervious and impervious areas in the San Jose area. They found that total solids loadings from pervious areas were over six times those from impervious areas.

Dry weather nuisance flows from pervious areas will be minimal. Storm event runoff from pervious areas occurs later in a storm event, during larger events and during short-duration periods of high storm intensities when the ground is saturated. POTWs during these periods of rainfall will have minimal additional capacity to treat storm water runoff. McKee et al 2005 found a seasonal SSC "first flush", but also found that 90% of the annual loads occur during floods and that the maximum PCB concentration coincided with a high stream flows and maximum SSCs.

The ability or willingness of POTWs to accept storm water runoff discharges during periods of high runoff or storm events should be quickly addressed so that the effort to identify effective BMPs can focus on other feasible control measures in the TMDL implementation plan and Regional Storm Water Permit.

Storm Design Criteria
The investigation of strategic runoff treatment retrofits must also include a requirement to develop the storm event volume, duration and short-term (5-15 minute) rainfall intensities that mobilize the sediments and associated PCB concentrations by particle size from the pervious areas with elevated PCBs in ***soils/sediments.*** The current storm event design criteria in the State's BMP manuals and NPDES Permits were not developed considering these criteria. It is highly likely that larger capacity flow thorough treatment BMPs will be required to address PCBs.

Improved System Design Operation and Maintenance

Street sweeping or street washing will not be effective BMPs in controlling runoff from pervious areas with elevated PCBs in ***soils/sediments*** unless those sediments were deposited on streets by wind from adjacent pervious areas with elevated PCBs in ***soils/sediments*** or were deposited on the streets during previous runoff events. Storm drain inlets are not effective in trapping sediments unless they have large sumped catch basins. Street sweeping, street washing and storm drain inlets should be deleted from further consideration because they will not be effective.

Control measures should focus on source control to prevent or abate PCBs in runoff, preventing erosion of soils from pervious areas with elevated PCBs in ***soils/sediments*** and treatment of discharges from the storm drain systems. The fewer options given to municipalities for further study and evaluation will lead to quicker implementation of feasible control measures.

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August 17, 2007

MIRANT℠

Mr. Bruce H. Wolfe
Executive Officer
San Francisco Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, California 94612

Attn: Mr. Fred Hetzel

Subject: **Comments on Proposed Basin Plan Amendment**
San Francisco Bay Polychlorinated Biphenyls TMDL

Dear Mr. Wolfe:

Thank you for the opportunity to comment on the proposed polychlorinated biphenyls (PCBs) TMDL for San Francisco Bay. In general, Mirant supports the efforts of the San Francisco Bay Regional Water Quality Control Board (Regional Board) and commends your staff on the development of a well-thought out approach to addressing PCBs in the Bay. Mirant has only a couple of matters it wishes to draw to the Board's attention:

1. The TMDL does not account for Ambient PCBs in Once-Through Cooling Water

PCBs are ubiquitous in Bay sediment and will, from time to time, appear in the water column due to air deposition or stirring up of the bay as a result of wind, storms, tidal action or the actions of others. These suspended PCBs may be drawn into the intake structures of facilities using Bay water as once-through cooling water and may then appear in effluent monitoring for those facilities. A facility is not responsible for ambient PCBs, yet the wasteload allocations for industrial facilities (Table A-4) make no provision for ambient PCBs in once-through cooling water.

This same issue was resolved in the Regional Board's Basin Plan amendment for the San Francisco Bay Mercury TMDL which was recently approved by the State Water Resources Control Board. In the amendments for the Mercury TMDL, the Regional Board added footnote (c) to the individual wasteload allocations for industrial discharges table. That footnote reads:

> **Wasteload allocations for industrial wastewater discharges do not include mass from once-through cooling water. The Water Board will apply intake credits to once-through cooling water as allowed by law.**

See Footnote (c) to Table 4-z of Mercury TMDL for San Francisco Bay, approved by the Regional Water Quality Control Board on August 9, 2006 and approved by the State Water Resources Control Board on July 17, 2007.

Mirant suggests the same language be added as a footnote to Table A-4 of the San Francisco Bay PCBs TMDL.

2. Financial Burdens for Monitoring and Evaluation should not be placed Exclusively on Point Source Dischargers

As the TMDL recognizes, the single most significant source of source of PCBs to fish, equal to all other quantified sources combined, is inflow to the San Francisco Bay from the Central Valley. (Draft PCB TMDL, Table A-1 at Page A-4). Nonetheless, the TMDL proposes to place the entire financial burden of monitoring and evaluation of the TMDL's success on the discharger-funded Regional Monitoring Program (RMP). (Draft PCB TMDL at Page A-11). Point-source dischargers (wastewater and stormwater) should not continue to be the sole source of funding for the monitoring of PCB conditions in the Bay. We would suggest that the Regional Board actively seek additional funding at the local, state, and federal levels. One recommendation to the Regional Board is to make the TMDL expressly contingent on obtaining funding at the state and federal levels, proportionate to the "non-point source" contribution. Since the TMDL must be approved at both the state and federal levels, making the TMDL contingent on appropriate state and federal funding would assure that the costs implementing the TMDL are shared among all the appropriate parties.

Thank you for your consideration of these thoughts and comments. Please call Steve Bauman of my staff at (925) 427-3381 if you have any questions.

Sincerely,

Jeffrey S. Russell
President, Mirant California, LLC

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August 20, 2007

Ms. Jodi Bailey
San Francisco Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

RE: PROPOSED BASIN PLAN AMENDMENT FOR PCB TMDL IN SAN FRANCISCO BAY

Dear Ms. Bailey

On behalf of Pacific Gas and Electric Company (PG&E), thank you for the opportunity to provide comments on the proposed basin plan amendments for San Francisco PCB Total Maximum Daily Load (TMDL). In addition to comments on the proposed amendment, PG&E would like to provide information on our voluntary PCB reduction programs.

PG&E is committed to reducing PCBs and has been recognized for its efforts to remove PCBs from its equipment. Since the early 1980's PG&E has completed a number of programs to eliminate PCBs while maintaining reliable energy services and avoiding unnecessary rate increases. PG&E is active in the EPA's Voluntary Accelerated Reduction Program and has been recognized as significantly contributing to the program. A copy of EPA's letter recognizing PG&E is attached.

PG&E's programs represent one of the most extensive PCB removal efforts undertaken by an electric utility. PG&E has removed and safely disposed of the vast majority of the PCBs that previously existed in its electric distribution system. PG&E's programs have been aimed at every major source of PCBs in utility electric equipment, including capacitors, network transformers (underground), and distribution transformers.

PG&E'S PCB ELIMINATION AND ASSESSMENT PROGRAM

Completed Programs

PCBs have not been manufactured since 1979 and for 27 years, PG&E has implemented a number of specific programs to reduce PCB's in its electrical system, including:

- Replacement of PCB capacitors, which are sealed metal containers usually mounted near the top of power poles that help maintain proper voltage on the system;
- Replacement or retrofill of PCB transformers near food or feed facilities;

- Replacement of more than 15,000 capacitors in four major transmission substations connected to the 500 kV line; and
- Replacement of nearly 1,000 underground network transformers.

In the late 1990s, PG&E performed a detailed study that, in part, evaluated the presence of PCBs in hundreds of soil samples from over a dozen substations, which was submitted to the San Francisco Regional Water Quality Control Board (SFRWQCB) and the Department of Toxic Substances Control. It found that PCBs are detected only rarely, and at concentrations well below Toxic Substances Control Act (TSCA) levels.

Current Program

As part of our on-going maintenance program, more than 10,000 transformers are tested annually to determine their PCB content. When a transformer is found to contain 2 ppm PCBs or more, it is drained and refilled with non-PCB mineral oil or replaced with a new non PCB transformer.

Additionally, if a customer is concerned with a distribution transformer PG&E will inspect it; if PG&E determines that it should be removed, it is replaced with a non PCB transformer.

Due to PG&E's PCB removal efforts, the continual replacement of aging equipment, and completion of the series capacitor bank replacement projects, PG&E is confident that the major sources (network transformers and series capacitor banks) of PCBs in PG&E's electric system have been removed and PCBs within the system have been substantially reduced.

COMMENTS ON THE PROPOSED BASIN PLAN AMENDMENT

The following items are PG&E's specific comments to the basin plan amendment:

- PG&E supports the SFRWQCB's efforts to use good science to reduce PCB loading to San Francisco Bay.

- PG&E operates throughout northern and central California and is concerned with consistent implementation of the TMDL. PG&E urges the Board to take the necessary steps to ensure a consistent approach and further, encourage and foster cooperation amongst the various jurisdictions implementing the TMDL program

- The direct allocations for industrial dischargers includes an allocation for Hunters Point Power Plant. Hunters Point Power Plant closed in May 2006 and its NPDES permit was rescinded in June 2006. The plant is being demolished and the area will be remediated to residential standards. All activities at the site are covered by an industrial storm water discharge permit. Sara Everitt of PG&E spoke with Fred Hetzel of the SFRWQCB on August 17, 2007, and it is our understanding that Hunters Point will be removed from the allocation list for industrial dischargers.

PG&E looks forward to continuing to work with the SFRWQCB on this important matter and would be happy to meet with you to explain the reduction programs further or provide any other information.

If you have any questions please contact Sara Everitt at (415) 973-0707.

Sincerely

Korbin Creek
Director of Environmental Services

cc: K Jones
D Harnish
F Flint
A Jackson
A Leung

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SFPUC
WATER
HETCH HETCHY WATER & POWER
CLEAN WATER

SAN FRANCISCO PUBLIC UTILITIES COMMISSION
WASTEWATER ENTERPRISE
1155 Market St. 11th Floor, San Francisco, CA 94103 • Tel. (415) 554-3155 • Fax (415) 554-3161

August 20, 2007

Bruce Wolfe
Executive Officer, San Francisco Bay
Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

Re: Comments on the Proposed Basin Plan Amendment San Francisco Bay PCBs TMDL

Dear Mr. Wolfe,

The San Francisco Public Utilities Commission (SFPUC) appreciates the opportunity to review and comment on the Proposed Basin Plan Amendment for the PCB Total Maximum Daily Load (TMDL) and implementation strategy for San Francisco Bay. As you know, the City and County of San Francisco (City) has a combined sewer system that discharges both treated stormwater and wastewater into San Francisco Bay. The requirements and methodology of administering the PCB TMDL have a potential effect on the operations of the SFPUC sewers and wastewater treatment facilities.

As a member of the Bay Area Clean Water Agencies (BACWA), San Francisco supports the comments submitted by BACWA. In addition, San Francisco has specific comments pertaining to our unique system.

1. Treatment of Wet Weather Flows

San Francisco has a combined sewer system that collects and treats both wastewater and urban stormwater runoff. Discharges from the system during wet weather are regulated under U.S. EPA's Combined Sewer Overflow (CSO) Control Policy. During wet weather events, treatment of combined flows occurs at the Southeast Plant, the North Point Wet Weather Facility, and within the storage/transport boxes.

The SFPUC appreciates that the efforts San Francisco has put in place to treat stormwater have been considered in the PCB wasteload allocation designated for San Francisco stormwater. However, to be fully accurate, a clarification must be made to reflect the fact that treatment of stormwater flows occurs not just at the

Southeast Plant, but also at the North Point Wet Weather Facility and the storage/transport facilities. Therefore, we recommend the following modification of *Table A-5 County-Based Watershed Wasteload Allocations for Urban Stormwater Runoff*, Footnote C (Page A-8):

> [c] Does not account for treatment provided by San Francisco's combined sewer system. The treatment provided by the City and County of San Francisco's Southeast Plant, North Point Wet Weather Facility, and storage/transport facilities (NPDES permit CA0037664) will be credited toward meeting the allocation and load reduction.

2. Urban Stormwater Runoff Treatment

Like other agencies that are responsible for both stormwater and wastewater management, San Francisco has been given a separate stormwater wasteload allocation from its wastewater wasteload allocation. Unlike all of the other agencies in the San Francisco Bay Region, San Francisco operates a combined sewer system that is designed to direct stormwater to treatment facilities. Therefore by definition, San Francisco is already implementing the "Urban Stormwater Runoff Treatment by POTWs" option. The benefit from implementing stormwater treatment by POTWs that other agencies may receive when they elect to accept stormwater flows to their POTWs, must also be inherently recognized for San Francisco and included as a footnote to *Table A-3 Individual Wasteload Allocations for Municipal Wastewater Dischargers* (Page A-6).

> [c] Does not include a percentage of the "Urban Stormwater Runoff Treatment by POTWs" for the stormwater treatment that is provided by San Francisco's combined sewer system. The San Francisco Southeast Plant allocation will be modified to include a reasonable portion of this allocation.

3. Cumulative Stormwater and Wastewater Waste Load Allocations

As a combined system, the majority of San Francisco's wet weather and sewer flows are collected, treated, and discharged through the same sewer system. Considering this intrinsic design, it would be sensible to allow the stormwater and wastewater wasteload allocations to be met collectively. For example, the stormwater and wastewater mass loadings would be able to collectively meet 0.5 kilograms per year. This value is the combination of the individual municipal wastewater wasteload allocation of 0.3 kilograms per year and the urban stormwater runoff allocation of 0.2 kilograms per year.

The TMDL should explicitly state that the stormwater and wastewater wasteload allocations given to San Francisco may be combined. This may require that a footnote be added to Table A-3 and Table A-5 that states something to the following:

> [c] For San Francisco's combined stormwater and wastewater system, stormwater and wastewater wasteload allocations can be combined and met collectively.

If you have any questions regarding these comments, please contact me at (415) 934-5731.

Sincerely,

Arleen Navarret

Arleen Navarret
Regulatory Manager/Acting Planning Division Manager
San Francisco Public Utilities Wastewater Enterprise

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CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Environmental Services Department

August 20, 2007

Fred Hetzel
Environmental Scientist
San Francisco Bay Regional Water Quality Control Board
1515 Clay St., Suite 1400
Phone: (510) 622-2357
Fax: (510) 622-2460
E-mail: FHetzel@waterboards.ca.gov

SUBJECT: City of San Jose comments on Total Maximum Daily Load (TMDL) for PCBs in San Francisco Bay; Proposed Basin Plan Amendment and Staff Report

Dear Mr. Hetzel:

The City of San Jose (City) appreciates the opportunity to submit comments on the TMDL Staff Report (Report) and proposed Basin Plant Amendment (BPA) for PCBs on behalf of the San José/Santa Clara Water Pollution Control Plant (Plant) and the City of San José Urban Runoff Program. The Plant provides wastewater treatment services to the cities of San José and Santa Clara, and other cities and agencies within the tributary area. The tributary service area includes the City of Milpitas, West Valley Sanitary District (Cities of Campbell, Los Gatos, Monte Sereno and Saratoga), Burbank Sanitary District, Cupertino Sanitary District (City of Cupertino), Sunol Sanitary District, and County Sanitation Districts #2 and #3. The service area includes approximately 1.5 million residents and over 16,000 businesses in Silicon Valley.

The City is also a major provider of funding and technical support for studies to identify sources of PCBs as a member of the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP), the Regional Monitoring Program (RMP) and the Clean Estuary Partnership. The City strongly supports the San Francisco Bay Regional Water Quality Control Board's (Water Board) adaptive management, phased approach to the PCBs TMDL.

The City's chief concerns with the Report and BPA are that the data limitations and scientific uncertainties make waste load allocations development extremely difficult. Therefore, this TMDL effort necessitates the development of a long-term regional plan to address PCBs and related uncertainties in a cost-effective manner. In particular, implementation actions should be consistent with the standard of "maximum extent practicable."

The following focused comments and concerns are provided:

Linkage Analysis; Sediment Target Uncertainties

- The City agrees that the sediment target will only be achieved after "reduction of external loads, targeted action on internal reservoirs of PCBs, and degradation or burial of PCBs in Bay sediments." (p. 56). However, there is no timeline specified for achievement of the proposed sediment target based on the Food Web Model or single box, Mass Budget Model.

Recommendation: The Report should include a preliminary timeframe that estimates when attainment of the sediment target will occur. This preliminary timeframe should state explicitly that the timeframe could be adjusted as new information becomes available.

Linkage Analysis; Mass Balance Model

- The Mass Balance Model used to calculate the total TMDL of 10 kg/year is a simple one-box fate model. This simple model incorporates major inputs and pathways such as outflow through the Golden Gate, degradation, burial, deposition and re-suspension. However, it does not account for how these processes vary throughout the Bay.

Recommendation: A development of amulti-box fate model is currently under development, which will provide a multi-box sediment budget that would benefit all TMDLs for contaminants associated with sediment. The Report and BPA should clarify that the TMDL of 10 kg/year and all associated load allocations are preliminary until the results of the multi-box model are available.

Central Valley Input

- The Central Valley contributes a large mass of PCBs to the Bay based upon current loading estimates. Although sediment PCB concentrations from the Central Valley are lower than ambient Bay concentrations, they still exceed the sediment PCB target. The BPA calls for load reductions from the Central Valley, but no actions are required to meet this reduction and no information is presented to justify that this reduction is reasonable or expected.

Recommendation: The Report and BPA should include a solid rationale for the reduction from the Central Valley and a preliminary timeline estimating when these reductions are expected. A timeline appropriate for this source category should be specified as it is for other sources (Urban Runoff attainment is expected in 20 years with a review and possible modification of timeline at 10 years).

Sources and Loads – Urban Runoff

- Estimated PCB loads from urban runoff conveyance systems were developed based on studies that only evazluated the concentrations of PCBs in bedded storm drain sediment.

This measure was adequate for comparing differences between land use types as was the original intent of the Joint Storm Water Agency study. However, these studies deliberately searched for the suspected, most contaminated sites, not the average contaminant load from urban runoff systems. These results are therefore inappropriate for estimating loads from Urban Runoff.

Recommendation: The Water Board should qualify the data used to estimate urban runoff loads as highly conservative. Furthermore, the BPA should clearly identify that adaptive management will be used to refine estimates from urban runoff as new information becomes available. The Water Board should not base load reduction activities upon these estimates since the ability to measure success will not be possible given the high level of uncertainty. Until uncertainty levels have been reduced, any urban runoff loading estimates should be classified as preliminary and highly uncertain.

Sources and Loads – Municipal Wastewater Dischargers

- Municipal Wastewater is a "de minimis" contributor of PCBs to San Francisco Bay. The Report estimates PCBs loading from Municipal Wastewater Dischargers at 2.3 kg/year. While this represents a "de minimis" contribution, this loading estimate is based on a paucity of data collected 6 to 8 years ago. No more than 4 data points exist for any single Municipal Wastewater Discharger. There is a high level of uncertainty over current loading estimates for Municipal Wastewater Dischargers, and yet each discharger is to receive a separate waste load allocation. With this level of uncertainty, measuring success again will be technically difficult.

Recommendation: The City recognizes that the available data is the best technical information for estimating Municipal Wastewater Discharger loads. However, these load estimates should be specified as preliminary pending additional monitoring and analysis. Refinement of this estimate should occur through the adaptive management process and the proposed monitoring in the Implementation section of the Report and BPA.

Sources and Loads – Absence of Loss Terms

- Both the Conceptual Model (Figure 25) and the Mass Balance Model (Figure 27) include processes that result in losses of PCBs (Golden Gate outflow and degradation) or of PCBs becoming biologically unavailable (burial). However, it is unclear how, or if, these loss terms are incorporated into calculating the long-term TMDL of 10 kg/year.

Recommendation: Include these losses as separate categories in the TMDL indicating negative loading terms or explicitly state how they contribute over time to attainment of waste load allocations assigned to various Source Categories. For example, what percentage (if any) is the Central Valley Watershed load reduction from 42 kg/year to 5 kg/year expected to come from Golden Gate Outflow over time?

TMDL Implementation – Load and Wasteload Allocation

- Urban Runoff – Prior to requiring any significant load reduction effort, the 2kg/year load allocation for urban runoff must be verified. The level of uncertainty for this load allocation is too great to make the proposed load reductions defensible.

Recommendation: The City recommends that uncertainties be addresses prior to requiring additional load reduction activities and implementation actions be developed consistent with "maximum extent practicable." The Report should indicate load reductions and implementation actions for urban runoff dischargers are preliminary. The City recognizes the net environmental benefit of sediment control measures for PCBs and other particle bound pollutants. However, measuring and demonstrating PCBs load reduction resulting from sediment control actions is not currently practicable or feasible.

TMDL Implementation – Urban Stormwater Runoff Treatment by Municipal Wastewater Dischargers

- The augmentation of 0.9 kg/year Bay-wide for Municipal Wastewater Dischargers that accept Urban Stormwater Runoff may not be sufficient. There does not appear to be a mathematical or scientific justification for this allocation reserve.

Recommendation: A more rigorous and transparent justification for this reserved allocation of 0.9 kg/year is required. An analysis of how this reserved allocation will provide adequate protection for POTWs should be included in the Report and BPA. The City recognizes that targeted diversion of Urban Stormwater for Municipal Wastewater treatment could provide a net environmental benefit. However, since POTWs are expected to maintain current performance with respect to PCBs removal, the City is concerned that the 0.9 kg/year augmentation may not provide sufficient protection for POTWs that accept Urban Stormwater into their system. Given the uncertainty regarding PCBs loads and allocations for Urban Stormwater, it could be possible for POTWs to exceed even the augmented Waste Load Allocation if they accept PCBs loads from Urban Stormwater.

Other Known Uncertainties: South Bay Salt Pond Restoration Project

- The South Bay Salt Pond Restoration Project will cause dramatic changes in hydrology, sediment transport and habitat in the South San Francisco Bay. The restoration project could profoundly impact the time it takes to attain the long-term PCBs sediment target of 1.0 ug/kg. Since the TMDL focuses on sediment transport, changes in the rates and spatial extent of erosion and deposition of Bay sediment could either accelerate or delay recovery of the southern segments of the Bay. Modeling suggests that Bay sediments will most likely be transported into and accumulate in existing salt ponds. This could potentially concentrate

contaminated sediments in areas that will be future salt marshes, thus increasing food web exposure and further delaying recovery.

Recommendation: The South Bay Salt Pond Restoration Project should be described as a current and future uncertainty that will be considered in the adaptive management process. While it is impossible to predict the impacts of the restoration project on the recovery of the Bay from PCB impairment, it is known that the restoration is occurring, on-going, and likely to affect sediment bound pollutants in some fashion.

In closing, the City wishes to incorporate by reference comments submitted by the Bay Area Stormwater Management Agencies Association (BASMAA) and the Bay Area Clean Water Agencies (BACWA). If you have any questions or comments on our recommendations please contact David Tucker at 408-945-5316.

Sincerely,

John Stufflebean, Director
Environmental Services Department

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

August 20, 2007

Naomi Feger
San Francisco Bay Regional Water Quality Control Board
1515 Clay Street
Oakland, CA 94612

Dear Ms. Feger:

Thank you for the opportunity to review and comment on the proposed Basin Plan Amendment and Staff Report for the Total Maximum Daily Load for PCBs in San Francisco Bay, dated June 22, 2007. We appreciate the hard work to develop this proposed TMDL and its implementation provisions. Below are comments on two issues of particular concern; attached are additional staff comments.

We have reviewed the proposed load and wasteload allocations. Before approving a TMDL in which some of the load reductions are allocated to nonpoint sources in lieu of additional load reductions allocated to point sources, there must be specific reasonable assurances that the nonpoint source reductions will in fact occur. Therefore, it is necessary for the Regional Board to explain in greater detail in this TMDL, with specific reasonable assurances, how the Central Valley load reduction from 42 kg/yr to 5 kg/yr will be achieved, and how the Urban Stormwater Runoff load reduction from 40 kg/yr to 2 kg/yr will be achieved, in order to allocate mass-based loads to point sources based on current concentrations and flows.

The draft Basin Plan language provides only a brief discussion concerning implementation of the PCB TMDL through NPDES permitting for wastewater and industrial sources. It is unclear how Water Board staff intends to calculate water quality-based effluent limits that are consistent with the wasteload allocations for NPDES dischargers, and whether the NPDES permits will require any reductions from these sources. Please explain further how these waste load allocations will be implemented. We look forward to working with you on this issue.

Our comments in this letter and its attachment do not constitute an approval, disapproval or determination by EPA under Clean Water Act section 303(d). We will act upon any TMDL submittal following State adoption and submittal to EPA.

In closing, we are pleased to see the proposed TMDL package for PCBs, and believe it will enhance the Board's ability to protect human health and the environment. If you have any questions, please call me at (415) 972-3452, or refer staff to Diane Fleck at (415) 972-3480; for permitting issues, please contact Nancy Yoshikawa at (415) 972-3535.

Sincerely,

(original signed by)

Janet Hashimoto
Chief, Monitoring and Assessment Office

cc: Fred Hetzel

Attachment

US EPA Region 9 Comments on Proposed Basin Plan Amendment and Staff Report for the Total Maximum Daily Load for PCBs in San Francisco Bay

1. Page 1of Staff Report: Introduction: Second Paragraph: This paragraph says that the Basin Plan delineates the water quality standards for PCBs in San Francisco Bay. While the Basin Plan contains the beneficial uses, the California Toxics Rule contains the numeric water quality criteria for PCBs in San Francisco Bay. Similarly, on page 3 of the Staff Report, under Project Definition, the third paragraph states that the PCB objective of 0.00017 ug/l total PCBs in water is not attained. The 0.00017 ug/l total PCBs value in water is the CTR *criterion*.

2. Page 23 of Staff Report: Fish Tissue Studies: This section calculates a screening value using a risk level of 10(-5), defined as the maximum acceptable risk level, which is later used as the numeric target for the TMDL. However, the CTR promulgated PCB human health criteria at a 10(-6) risk level (10 times more stringent). This section uses a fish consumption rate of 32 g/day, while the CTR uses a fish consumption rate of 6.5 g/day. The resulting CTR water column value is 170 pg/l (in 2002, EPA updated its recommended fish consumption rate to 17.5 g/day, resulting in a revised Clean Water Act section 304(a) criterion of 65 pg/l). The calculation in this section results in a screening value of 10 ng/g, while using the CTR values, the calculation results in a screening value of 5.3 ng/g. (This 5.3 ng/g value is used as the numeric target in the Calleguas Creek TMDL, dated June 20, 2005.) On page 20, it states that the CTR criterion was developed to protect the general population from an increased risk of no more than one in one million, but that sub-populations that consume greater quantities of fish may be less protected. However, it is not clear that the general population is sufficiently protected at a 10(-6) risk level consistent with the CTR which reflects a screening value of 5.3 ng/g, since the screening value used as the numeric target for this TMDL is 10 ng/g.

On page 51 of the Staff Report, in Section 8.1, Fish Tissue Target, the report states that the fish tissue numeric target is consistent with the CTR criterion of 170 pg/l, and that the CTR criteria will be attained when the fish tissue target for white croaker is attained. This is based on a calculation of actual bioaccumulation factors (BAFs) for the Bay, which are listed in Table 21 on page 52. Please include the fish tissue and water column data, from which the BAFs were calculated, and whether the data are spatially and temporally consistent.

We note that the report used an appropriate cancer slope factor of 2 in Section 6.2 to calculate the screening value/numeric target, but Section 8.1 states that a slope factor of 1 was used. It appears Section 8.1 needs to be corrected.

3. Page 23 of Staff Report: Fish Tissue Studies: At the bottom of the page, the report states that the calculated screening level of 10 ng/g wet-weight is equivalent to a sediment PCBs concentration of 1 ng/g, as discussed in Section 7.2. However, this discussion appears to be in Section 9.1, not Section 7.2. Section 9.1 discusses the SFEI food web model and references the Gobas and Arnot 2005 Final Technical Report as the source of the Figure 26, Conceptual Model of PCBs Movement and Fate in San Francisco Bay. Please clearly include the reference to the report that shows the relationship (how it was calculated) between the fish tissue value of 10 ng/g and sediment concentration of 1 ng/g.

4. Page 24 of Staff Report: Fish Tissue Studies: At the top of the page, the report states that the screening level of 10 ng/g wet-weight is protective of wildlife beneficial uses because it equates to a sediment concentration of 1 ng/g, and an EPA document calculated a screening level for the protection of wildlife of 160 ng/g of PCBs in sediment. (This is also noted at page 55, Section 9.1.) However, it is not clear that the 10 ng/g fish tissue value is appropriate for and protective of wildlife in San Francisco Bay. More discussion is needed. If you have not already done so, we request you discuss whether the projected target for the protection of human health will also protect wildlife in the San Francisco Bay with the Sacramento U.S. Fish and Wildlife Service.

5. Page 56-57 of Staff Report: Section 9.2 Mass Budget Model: The report discusses the SFEI simple mass budget model for PCBs and that the model predicts that reduction of external loads to 10 kg/yr is needed to attain a PCBs mass in the Bay of 160 kg, which is equivalent to the sediment goal of 1 ug/kg. Therefore, the report concludes that the assimilative capacity of the Bay is 10 kg/yr from external sources. Figure 28 reflects this model and the time line to achieve different reduction scenarios. It appears that the chosen scenario will take about 100 years to achieve, although this is not mentioned. More discussion of the model and the length of time necessary to achieve water quality standards in the Bay based on this model should be included.

Similarly, in section 11.2 Internal Sources, it states that the clean-up of PCB hot spots will "help accelerate the recovery of the Bay from its current impairment" but there is no attempt to quantify their affect or how their clean-up would affect the length of time necessary to achieve water quality standards. This important discussion should be more detailed.

6. Page 59 of Staff Report: Section 10.1 Total Maximum Daily Load: This section expresses the TMDL as an average annual load. As discussed in EPA's guidance memorandum dated November 15, 2006, EPA recommends that TMDLs and associated load allocations and wasteload allocations be expressed in terms of daily time increments. TMDLs and allocations may also be expressed in terms of both daily and non-daily time increments to help facilitate implementation of the applicable water quality standards.

7. Page 61 of Staff Report: Section 10.3 Wasteload Allocations/Urban Stormwater Runoff: Although this section in the Staff Report does not say how long stormwater agencies will have to achieve their individual wasteload allocations, the Draft Basin Plan Amendment at page A-9 states that "Urban stormwater runoff wasteload allocations shall be achieved within 20 years and shall be implemented through the NPDES stormwater permits issued to urban stormwater runoff management agencies and the California Department of Transportation (Caltrans)." If the schedule is to be implemented through compliance schedules in NPDES permits, and if its terms would not be covered by a compliance schedule-authorizing provision already in existence, the State will need to submit to EPA, and EPA will need to approve, a compliance schedule-authorizing provision under Clean Water Act section 303(c). The provision will need to be approved before the State can allow dischargers to exceed water quality-based effluent limitations (WQBELs) based on final WLAs in permits. The provision will need to include the State's rationale to allow for compliance schedules of up to 20 years to achieve final WLAs. Any authorizing compliance schedule provision must be consistent with EPA regulations at 40 CFR 122.47, which require that the compliance schedule be appropriate, require compliance as soon as possible, and include interim requirements at specified time intervals. When the State submits the compliance-schedule authorizing provision to EPA, it should clearly indicate how

these requirements have been satisfied, or how they will be satisfied during the permit process.

8. Page 64 of Staff Report: Section 10.4 Load Allocations: The report indicates that the Central Valley Watershed allocation is 5 kg/yr, down from a present loading of 42 kg/yr. In Section 11.1, Implementation/External Sources, the report states that sediments entering from the Central Valley have lower PCBs concentrations than in-bay sediments, and that major PCBs mass loading events that occur during episodic high flow events mostly flow directly out of the Bay through the Golden Gate. The report further states "[t]he allocation will be attained through anticipated natural attenuation of PCBs in the Central Valley watershed." Please reference the information or basis used to make this assumption, and the time necessary to achieve this. As noted previously, please explain in more detail how the Central Valley allocation will be achieved.

9. Page 64 of Staff Report: Section 10.5 Margin of Safety: The report indicates that the Margin of Safety is implicit because of several conservative assumptions, one of which is the conservative approach used to derive the fish tissue target. However, the TMDL uses a 10(-5) risk level, thus the target is 10 times less conservative than the risk level used in the CTR to protect the general population. Using a higher fish consumption rate of 32 g/day for the target in the TMDL, as opposed to the 6.5 g/day used in the CTR, does not offset the 10 fold difference in the risk level, as discussed in comment 3 above.

10. Page 73 of Staff Report: Section 11.5 Adaptive Implementation/Periodic Review: This section states that the Water Board will review new information periodically, but does not say how often it will review this information and consider amendments to the TMDL. We suggest the Board consider a more definite timeframe for review of technical information and consideration of amendments to update the TMDL.