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STATE WATER RESOURCES CONTROL BOARD
BOARD MEETING SESSION- DIVISION OF WATER QUALITY
[DATE-TBD], 2009

ITEM #

SUBJECT

CONSIDERATION OF A RESOLUTION APPROVING AN AMENDMENT TO THE WATER QUALITY CONTROL PLAN FOR THE SAN FRANCISCO BAY REGION (BASIN PLAN) TO ESTABLISH A TOTAL MAXIMUM DAILY LOAD (TMDL) AND IMPLEMENTATION PLAN FOR POLYCHLORINATED BIPHENYLS (PCBs) IN THE SAN FRANCISCO BAY

BACKGROUND

On February 13, 2008, the San Francisco Bay Regional Water Quality Control Board (San Francisco Bay Water Board) adopted Resolution R2-2008-0012 amending the Basin Plan to establish a TMDL for PCBs in the San Francisco Bay. All San Francisco Bay segments were placed on the Federal Clean Water Act section 303(d) list in 1998 for total PCBs and dioxin-like PCBs as a result of an interim health advisory for fish consumption. In 2002, the list was revised to include specific locations in the Lower Bay Segment, and the listings were maintained in 2006. San Francisco Bay fails to meet either the narrative water quality objective, which states that controllable water quality factors may not cause a detrimental increase in toxic substances found in bottom sediments or aquatic life, or the numeric water quality objective of 0.00017 micrograms per liter (µg/L) total PCBs in water as required in the Basin Plan. This TMDL is intended to achieve protection of commercial and sport fishing (COMM), preservation of rare and endangered species (RARE), estuarine habitat (EST), and wildlife habitat (WILD) beneficial uses.

Legacy Sources

Concentration of PCBs is known to increase through bioaccumulation, causing detrimental effects to aquatic and estuarine species through trophic transfers. Human consumption and exposure can lead to cancer risk and other health concerns. PCBs were produced in very large quantities until the late 1970's. Their use in an industrialized San Francisco Bay area was widespread, and resulted in runoff into the bay and subsequent accumulation in the bay and estuarine sediments. PCBs can remain dissolved in water, or be re-suspended attached to sediment.

Although the use of PCBs in capacitors and transformers are well known, they were also used in a wide variety of applications, including some uses that involved direct contact with the environment. There are 209 known congeners of PCBs which were mainly marketed as Aroclors. The congener compositions of manufactured Aroclors are known, yet the fate of the various congeners in the environment is not as well understood. Fate and stability of the different congeners varies with the degree and location of chlorination, making source identification of environmental PCBs difficult.

Current Sources

A variety of current sources of PCBs to the San Francisco Bay exists. The major current sources to the Bay come from the Delta and urban stormwater runoff. Sediments from the Central Valley carry measurable amounts of PCBs; however, concentrations are lower than in-Bay sediments, and will attenuate over time.

Even if all current sources of PCBs to the bay are eliminated, exposure to historically contaminated sediment may turn out to be a significant PCB source to organisms. The San Francisco Bay Region has several locales where contaminated sediments from historical use may still be contributing to background levels of PCBs. Some of these locations are identified as "Superfund" sites and regulated under the Comprehensive Environmental Response, Compensation, and Liability Act. In addition, there are several sites that are currently identified under the Bay Protection and Toxic Clean-up Program. These contaminated sites have varying concentrations of PCBs that are several orders of magnitude higher than ambient in-bay sediment monitoring levels.

In-bay sediments are a potential source of PCBs. During the time of highest PCBs production and use, the continual deposition of PCB-laden sediment released into San Francisco Bay from land and maritime-based activities created a large reservoir of PCBs in San Francisco Bay sediments. Studies have shown that sediments in portions of the bay are now eroding due to a decrease of sediments entering the bay from the Sacramento and San Joaquin Rivers, the major drainages into the Bay Delta. This erosion could uncover contaminated sediments, resulting in increased availability of PCBs to the food web. This creates an increased concern with navigational dredging activities in the San Francisco Bay Region that cause disturbances in the bay sediments.

The TMDL sets a numeric, concentration-based target for total PCBs in fish tissue in San Francisco Bay. The target is based on protecting human health risks associated with consumption of recreationally-caught PCBs-contaminated San Francisco Bay fish and on protection of wildlife. This will be achieved primarily by limiting the amount of PCBs associated with discharges to San Francisco Bay.

TMDL TARGETS AND ALLOCATIONS

A numeric target to protect both human health and wildlife has been adopted as a fish tissue concentration of 10 micrograms total PCBs per kilogram of typically-consumed fish, on a wet weight basis (10 µg/kg wet weight). This represents about a ten-fold reduction in fish tissue concentration of PCBs from current levels. Attainment of the fish tissue target for PCBs in San Francisco Bay will be evaluated initially by comparing the average total concentration of PCBs in the edible portion of two fish species, white croaker (size class, 20 to 30 centimeters in length) and shiner surfperch (size class, 10 to 15 centimeters in length) to the target. These two species of fish had the highest concentration of PCBs measured in San Francisco Bay sport-fish assessments. The screening value protective of Bay sport-fish consumers was calculated using the upper 95^{th} percentile consumption rate of all consumers, equivalent to 32 grams per day of consumed fish, which incorporates a margin of safety. This numeric fish tissue target is applicable to fish collected in summer and fall seasons, when fish tissue concentrations are most elevated.

The TMDL is a total maximum yearly load target of 10 kilograms of PCBs and represents the assimilative capacity of the Bay. This TMDL necessitates achieving a load reduction of about

24 kg/yr to reduce total PCBs in the Bay's active sediment layer to 160 kg in about 30 years. This is equivalent to achieving the sediment PCBs concentration goal of 1 µg/kg, which will result in attainment of the fish tissue target of 10 µg/kg. The TMDL is expressed as an average annual rather than as a daily load for several related reasons. First, the TMDL is derived from a mass budget model that depicts the long-term (decadal) fate of PCBs. This model uses daily time steps derived by averaging annual load estimates, as the loadings data are not refined enough to provide discrete daily loads and therefore do not reflect variability in the data. Future data collection to verify attainment of the TMDL will also be collected on an annual timeframe, due to the large cost associated with these types of data. Also, the response of fish tissue PCBs concentrations to PCBs load reductions will not be instantaneous. Even with immediate or rapid attainment of the sediment goal, there would be a delay in attainment of the numeric fish tissue target, due to the time required for depuration (shedding from body) of PCBs by biota to occur. Finally, the TMDL is expressed as an average annual load because the natural variability in quantifying PCBs loads is much greater than the expected rate of load reductions. Long-term averaging of the loads is necessary to dampen the variability in the data.

The TMDL implementation includes allocation of the total maximum yearly load among various San Francisco Bay sources of PCBs, the Central Valley watershed, urban and non-urban stormwater, and industrial and municipal wastewater. Calculation of the TMDL is based on two models: a food-web PCBs bioaccumulation model and a long-term fate mass balance model. The model results predict that attainment of the numeric fish tissue target will occur when the total PCBs concentration in surface sediments in the bay declines to one µg/kg, which will be achieved when loads from external sources are reduced to 10 kg/year.

IMPLEMENTATION

The implementation plan includes three general categories: (1) control of external loadings of PCBs to the bay, (2) control of internal sources of PCBs within the bay, and (3) actions to control risks to consumers of bay fish. The amendment also includes a monitoring program to measure the attainment of the numeric fish tissue target and load allocations, as well as progress toward implementing the plan. The plan will be implemented in phases through an adaptive implementation strategy. The strategy requires actions in each implementation category based on the current state of knowledge of sources of PCBs and the known control measures. At the same time, the implementation plan requires studies that are designed to improve understanding of the sources of PCBs, control options, and fate of PCBs in the environment.

The TMDL will mainly be implemented through National Pollutant Discharge Elimination System (NPDES) industrial and municipal wastewater permits and storm water permits, including the Regional Municipal Separate Storm Sewer Systems permit, the California Department of Transportation (Caltrans) permit, and 401 water quality certifications issued for navigational dredging activities. When it is appropriate, the San Francisco Bay Water Board may issue Cleanup and Abatement Orders pursuant to California Water Code section 13304.

The TMDL proposes attainment of the target mostly through large reductions of PCBs in urban runoff. Urban runoff management agencies can reduce PCBs loads by preventing PCBs sources from contaminating sediment or by reducing the amount of contaminated sediment discharged to the bay. Stormwater runoff wasteload allocations must be achieved within 20 years and will be implemented through the NPDES stormwater permits issued to stormwater runoff management agencies and Caltrans. The TMDL implementation plan calls for dischargers to conduct pilot studies of best management practices and control measures.

Based on these studies the effective, cost-efficient control measures will be implemented through NPDES permits.

NPDES permittee implementation measures may include:

- Removal and disposal of PCBs from building materials
- Remediation of contaminated soil or sediment in public rights-of-way, wastewater conveyances, and private property
- Street cleaning (includes sweeping or washing)
- Storm drain and inlet maintenance (above and beyond normal practices)
- Construction, operation, and maintenance of facilities/units to intercept, divert, and treat urban stormwater runoff (e.g., detention basins, wetlands, underground sand filters, swales)
- Possible diversion of urban storm water runoff to wastewater treatment

In addition, stormwater permittees will be required to develop and implement a monitoring system to quantify PCBs urban stormwater runoff loads and the load reductions achieved through treatment, source control, and other actions; support actions to reduce the health risks of people who consume PCBs-contaminated San Francisco Bay fish; and conduct monitoring and studies to fill critical data needs.

Wastewater dischargers will be issued NPDES permits that require implementation of best management practices to maintain optimum treatment performance for solids removal and the identification and management of controllable sources. NPDES permits will include effluent limits based on current performance and a requirement for quantification of PCBs loads to the bay in order to determine attainment of the wasteload allocations.

The proposed sediment dredging and disposal implementation actions are based on the Long Term Management Strategy (LTMS) for the Placement of Dredged Material in the San Francisco Bay Region that is already being implemented.

The projected TMDL implementation time frame is 20 years. The amendment uses an adaptive implementation plan which will use collected data and relevant scientific information to determine the progress towards meeting the fish tissue target. The San Francisco Bay Water Board will receive an annual report from its staff on TMDL implementation progress, and it will evaluate new and relevant information from implementation actions, monitoring, special studies, and scientific literature. Within ten years of the effective date of the TMDL, any necessary modifications to the targets, allocations, or implementation plan will be incorporated into the Basin Plan.

In the short-term, human health concerns associated with commercial and sport fishing activities will also be addressed with risk management activities. These range from studies designed to support health risk assessment to communication of the risks associated with eating San Francisco Bay fish. Other required activities include providing outreach and advice to both the general public and to regular consumers of San Francisco Bay fish, while investigating and implementing direct actions that reduce the actual and potential exposure of, and mitigate health impacts to people and communities most likely to consume PCBs-contaminated fish from San Francisco Bay.

MONITORING

Monitoring is needed to demonstrate progress toward attainment of allocations and the numeric target. The discharger-funded Regional Monitoring Plan (RMP) currently monitors PCBs in San Francisco Bay fish, sediments, and water. Monitoring will also provide information on the progress in attaining the TMDL target and, therefore, the success of actions implemented. Data collected over a long period of time are needed to verify the recovery rate of the San Francisco Bay, and to compare actual data with a model-predicted recovery rate. These efforts will also inform whether the actions being implemented by dischargers are effective in reducing PCBs to the TMDL target, or whether further actions are required. A refined understanding of long-term PCBs concentration trend data in water, sediment, and biota could lead to a recalculation of the TMDL, or revised load and wasteload allocations.

Municipal and industrial wastewater dischargers and urban runoff stormwater agencies will be required to conduct monitoring to demonstrate progress towards attainment of their load allocations. The RMP also conducts regular monitoring of PCBs loads from the Central Valley and some limited monitoring of PCBs loads from local tributaries. The San Francisco Bay Water Board will also call on dischargers, by way of the RMP, to verify ongoing loads and load reductions to allow evaluation of trends in the loads of PCBs from the Central Valley watershed, and to confirm that loads are being reduced as a result of attenuation.

ECONOMIC CONSIDERATIONS

The costs of implementation actions are difficult to estimate. The PCBs TMDL implementation plan applies to the entire nine-county, San Francisco Bay-wide region, and applies to numerous public agencies and individual dischargers. Dischargers have a variety of ways to comply with the plan and will be guided in selecting those implementation measures by their technical needs and budgetary constraints. Thus, it is difficult to anticipate which implementation measures are most likely to be adopted. Furthermore, phased pilot or feasibility studies will be used to identify and evaluate the feasibility (which includes relative costs and effectiveness) of most compliance measures. 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.

Achieving the proposed allocations set by the TMDL may be more difficult and expensive for some dischargers. However, the implementation plan and schedule provide an opportunity to analyze alternative means of compliance and time to identify and secure adequate funding. Furthermore, PCBs adhere to sediments, like numerous other pollutants such as polybrominated diphenyl ethers (PBDEs), polycyclic aromatic hydrocarbons (PAHs), chlorinated legacy pesticides, and heavy metals. This will allow efforts to reduce PCBs loads from sediments to the San Francisco Bay to produce multi-pollutant reduction benefits. Thus, some of the compliance measures and associated costs for this TMDL will also result in compliance with other TMDLs and regulatory requirements for those other pollutants. Thus, the overall compliance costs for the specified pollutants may turn out to be less than they would be otherwise.

Since wastewater dischargers are only expected to maintain current performance standards in the short-term, the costs of implementing the TMDL are considered to be incidental increases associated with identifying and managing controllable sources.

The costs of attaining load reductions above and beyond normal attenuation may be substantial for stormwater dischargers. Estimates of annual cost per household for six local stormwater

programs surveyed ranged from $18 to $46, mainly for street sweeping and debris and litter removal. As part of this TMDL, diversion of urban stormwater runoff to wastewater treatment plants is being discussed as an option for attainment of the TMDL. As an estimate of the high end, if the cost of treating wastewater is used as a measurement of the additional cost of treating stormwater, the additional cost will equal approximately $500 million annually, or $200 per household. The control of internal sources of PCBs within the San Francisco Bay is already outlined in the LTMS for the San Francisco Bay Region. Little or no new costs should be incurred as a result of this PCBs TMDL and implementation plan resulting from navigational dredging and required disposal actions or in-Bay contaminated site cleanup activities. Cleanup has already been completed at a number of sites within the San Francisco Bay, others are currently undergoing remediation or feasibility studies to determine the type and level of clean-up required. These sites will be subject to cleanup with or without this TMDL. Little or no new costs are anticipated as a result of this TMDL, because the costs of cleanup will be driven by other regulatory programs.

The RMP conducted by the San Francisco Estuary Institute will be responsible for the majority of monitoring to address critical data needs. The RMP is jointly funded by municipal and industrial wastewater dischargers. The current budget for the program is $3.4 million, which includes monitoring of PCBs and other pollutants in water, sediment, and fish throughout the San Francisco Bay. Additional monitoring could cost $500,000 to $1,000,000 per year. Critical data will provide a better understanding of the fate and transport of PCBs in the San Francisco Bay; this will help to inform on the adaptive implementation plan. The San Francisco Bay Water Board staff estimates that these costs would total approximately $1,000,000 to $3,000,000, some of which will be included in the existing RMP. All source category dischargers, urban stormwater dischargers, and dredgers will share the costs.

The costs associated with risk management activities will likely range between $100,000 and $1,000,000 per year. Responsibility and costs associated with these activities will be shared among the California Office of Environmental Health Hazard Assessment, the California Department of Toxic Substances Control, the California Department of Health Services, dischargers, community-based organizations, and the State Water Board. Some of these costs are likely to be incurred without this TMDL because the San Francisco Bay mercury TMDL and mercury watershed NPDES permit require similar risk management activities.

POLICY ISSUE

Should the State Water Board approve the amendment to the Basin Plan to establish a TMDL for PCBs in San Francisco Bay?

FISCAL IMPACT

San Francisco Bay Water Board and State Water Board staff work associated with or resulting from this action will be addressed with existing and future budgeted resources.

REGIONAL WATER BOARD IMPACT

Yes, approval of this resolution will amend the San Francisco Bay Water Board’s Basin Plan.

STAFF RECOMMENDATION

That the State Water Board:

1. Approves the amendment to the Basin Plan adopted under San Francisco Bay Water Board Resolution R2-2008-0012.

2. Authorizes the Executive Director, or designee, to transmit the amendment adopted under San Francisco Bay Water Board Resolution R2-2008-0012 to the Office of Administrative Law and the TMDL to the U.S. Environmental Protection Agency for approval.

State Water Board action on this item will assist the Water Boards in reaching Goal 1 of the Strategic Plan Update: 2008-2012 to implement strategies to fully support the beneficial uses for all 2006-listed water bodies by 2030. In particular, approval of this item will assist in fulfilling Action 1 to prepare, adopt, and take steps to carry out Total Maximum Daily Loads (TMDLs), designed to meet water quality standards, for all impaired water bodies on the 2006 list.

D R A F T

STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 2009-

APPROVING AN AMENDMENT TO THE WATER QUALITY CONTROL PLAN FOR THE SAN FRANCISCO BAY REGION (BASIN PLAN) TO ESTABLISH A TOTAL MAXIMUM DAILY LOAD (TMDL) FOR POLYCHLORINATED BIPHENYLS (PCBs) IN THE SAN FRANCISCO BAY

WHEREAS:

1. On February 13, 2008, the San Francisco Bay Regional Water Quality Control Board (San Francisco Bay Water Board) adopted Resolution R2-2008-0012 amending the Basin Plan to establish a TMDL for the San Francisco Bay.

2. The amendment meets the necessity standard of the Administrative Procedures Act, Government Code section 11353, subdivision (b).

3. San Francisco Bay Water Board found that the adoption of this amendment would be consistent with the State Antidegradation Policy (State Water Board Resolution No. 68-16) and federal antidegradation requirements (40 Code of Federal Regulations 131.6).

4. The San Francisco Bay Water Board found that the analysis contained in the TMDL staff report, the California Environmental Quality Act (CEQA) Checklist, and the responses to public and peer review comments comply with the requirements of the State Water Resources Control Board's (State Water Board's) certified regulatory CEQA process, as set forth in California Code of Regulations title 23, section 3775 et seq.

5. State Water Board staff finds that the Basin Plan amendment is in conformance with Water Code section 13240 and 13242, which specifies that Regional Water Quality Control Boards may revise Basin Plans and implement programs for achieving water quality objectives. The State Water Board also finds that the TMDL is consistent with the requirements of federal Clean Water Act section 303(d).

6. The TMDL establishes a numeric fish tissue target of 10 µg total PCBs per kilogram of typically consumed fish, on a wet weight basis.

7. The Basin Plan amendment does not become effective until approved by the State Water Board and until the regulatory provisions are approved by the Office of Administrative Law (OAL). The TMDL must also be approved by the U.S. Environmental Protection Agency (U.S. EPA).

THEREFORE BE IT RESOLVED THAT:

The State Water Board:

1. Approves the amendment to the Basin Plan adopted under San Francisco Bay Water Board Resolution R2-2008-0012.

2. Authorizes the Executive Director, or designee, to transmit the amendment adopted under San Francisco Bay Water Board Resolution R2-2008-0012 to OAL and the TMDL to the U.S. EPA for approval.

CERTIFICATION

The undersigned, Clerk to the Board, does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Resources Control Board held on (TBD).

Jeanine Townsend
Clerk to the Board