California Regional Water Quality Control Board

Central Valley Region

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SUBJECT: DRAFT MERCURY OFFSET PROJECT OPTIONS, SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT, SACRAMENTO COUNTY

Order No. 5-00-188, issued to Sacramento Regional County Sanitation District (SRCSD), requires the completion of mercury offset feasibility and development studies by 30 March 2005. SRCSD has been evaluating various options to comply with the permit requirements, and has requested, by letter dated 14 March 2003, input from Regional Board staff regarding possible offset projects that could be considered. The following information is based on input from several staff, and should be viewed as a discussion draft. It should not be deemed an endorsement of any particular suite of projects or individual components, but only some ideas to consider. A list of projects that staff currently considers unsuitable for offset credits is also provided.

Offset projects could come from the following areas: (1) projects that are close to the discharge site, (2) projects in the watershed that may be more remote, but might provide more substantial load reduction, (3) special studies to evaluate NPDES discharges to further mercury science and the development of the Delta mercury TMDL, and (4) public outreach and education. Regional Board staff believe that an offset program proposal that consists of several of these components is necessary to satisfy the legal requirements for a defensible pre-TMDL offset program, which include, but are not limited to anti-degradation requirements and federal regulations prohibiting point sources from contributing to excursions above water quality standards.

The offset program submittal should include a discussion of the costs of the proposed mercury offset program and the alternative costs for a mercury load reduction program at the Sacramento Regional Wastewater Treatment Plant (SRWTP). The costs to perform the offset package and monetary savings proposed as a result of not implementing an adequate mercury load reduction program at the SRWTP should be considered in evaluating the substantiality of the offset program.

The load reduction program at the SRWTP should include projects that reduce both total and methyl mercury loads. SRCSD's annual contribution to the Sacramento River's raw total mercury load at Greene Landing is approximately 2% (2 kg/108 kg), while the raw total methyl mercury load is about

7 % (150gms /2150gms). This may indicate that mercury in the plant's effluent is more bioavailable for methylation than is River mercury. Projects that reduce the methyl mercury loads from the SRWTP should be included in the assessment of costs for a load reduction program.

POTENTIAL OFFSET PROJECTS

Direct reduction of mercury transported from abandoned mine sites

There are two possibilities to reduce total mercury loads from abandoned mine sites: remediation of the Cache Creek mercury mines and the Sierra gold mines.

UC Davis recently completed loading studies from all major mercury mines in the Cache Creek watershed. Unfortunately the studies were conducted in two dry years but the results are valuable in determining relative contributions. Tetra-Tech Engineering is presently completing engineering feasibility studies to reduce off site movement of mercury at these same sites. The Tetra-Tech study should be completed soon. Therefore, the TMDL unit may be able to recommend one or more Cache Creek mine sites for remediation within the next six months.

Ten of the mercury mines evaluated in the study are on private property. The mines are identified as Abbott Mine, Turkey Run Mine, Elgin Mine, Central Mine, Cherry Hill Mine, Empire Mine, Manzanita Mine, West End Mine, Wide Awake Mine, and Petray (North) Mine. As an offset project, SRCSD could be involved with the development and implementation of remediation plans for these mines. Responsibility could include development of design/build plans, permitting, QA/QC for construction, monitoring, development and management of contracts, and operation and maintenance of the remediation projects.

There are many gold mine sites contaminated with mercury in the Sierras. The BLM and the Forest Service are currently conducting remediation activities at a number of select sites on public lands due to safety hazards and the presence of elemental mercury. There is little monitoring available to establish loads from mining regions and no comprehensive engineering feasibility studies on what should be done to correct the problems. Therefore, an essential step would be to assemble a list of sites, conduct monitoring to determine background concentrations and undertake engineering studies to determine the cost and likely efficacy of various control measures. The final step of implementing a control effort is likely 3 to 5 years away. The focus should be on private lands.

Settling Basins

The Cache Creek settling basin is located at the base of Cache Creek prior to its discharge into the Yolo Bypass. The Regional Board estimated that Cache Creek exported 1,000 kg of mercury in 1995 (a wet year). Half of this mercury was trapped in the settling basin while the rest was transported to the Delta through the Yolo Bypass. By comparison the Sacramento Watershed above the City of Sacramento is 23 times larger than the Cache Creek basin and was estimated by Larry Walker and Associates to only export 640 kg during the same time period. The Regional Board, CALFED and the Army Corps have a joint engineering feasibility study underway to determine whether the Settling Basin could be modified to trap additional mercury during high flows and what could be done with this material once trapped. The results of this study will not be available for several years. If modifications appear feasible, then it

is possible that CALFED could pay for the structural modifications to the settling basin through Proposition 13 funding. However, CALFED generally cannot pay for operation and maintenance. The major maintenance cost would be the periodic removal and disposal of the mercury-contaminated sediment. SRCSD could potentially participate in the operation and maintenance of the Cache Creek settling basin.

Another option is to evaluate other potential sites that could be developed and operated as settling basins. Basins may be situated downstream of mercury or gold mining regions or downstream of mercury enriched soils where erosion rates are high. On the Sierra side, reservoirs trap sediment and mercury (resulting in elevated levels of mercury in fish). Long-term mercury management strategies will likely include mercury reduction plans for the reservoirs. Again, there is a need to assess reservoirs and undertake engineering studies to determine the cost and likely efficacy of various control measures. As part of a long-term offset program, SRCSD could then implement control measures.

TMDL and Mercury Science Needs

The following is a short list of high priority science projects that NPDES facilities might fund as part of an offset program to be performed as part of an offset suite. Two possible projects are described below.

Develop a standard mercury bioavailability test.

Methyl mercury is the form of the metal that accumulates in fish tissue and when consumed is a potent human and wildlife neurotoxin. Methyl mercury is produced by sulfate reducing bacteria. The aquatic chemistry of mercury is complex. The metal exists in 3 oxidation states and readily complexes to a variety of organic and inorganic ligands. There is evidence that these different forms of mercury have different methyl mercury conversion rates but researchers do not yet understand why, and are unable *a priori* to predict relative methylation rates of different mercury sources and forms. About 2 % (2.2 kg methyl mercury/108 kg total mercury) of the mercury in the Sacramento River is in a methyl mercury form while 7 % (0.15 kg/2.0 kg) of the mercury in SRCSD's effluent is methyl mercury. As noted earlier, this may indicate that mercury in the plant's effluent is more bioavailable for methylation than is River mercury. If so, this would be valuable to know and consider when setting up a trading program and establishing the TMDL.

A valuable contribution to all mercury TMDLs would be the funding and development of a standard protocol to determine the relative bioavailability of different mercury forms. Once developed, the peer-reviewed protocol would be used to assess the bioavailability of mercury from both the plant's effluent and from the Sacramento River upstream of the plant's discharge. The protocol would have widespread use in selecting and prioritizing mercury sources for remediation.

Bank stabilization studies.

A major conclusion of the recent CALFED study and of the CALFED sponsored Mercury Strategic Plan is that the largest source of mercury in California is already sitting in the channels and in the banks of Central Valley Rivers. There may be little that can be done about mercury already present in channel sediment but there may be a suite of bank stabilization projects that can be undertaken to minimize the input of new mercury.

NPDES dischargers may wish to consider funding a survey of a river reach, for example the Feather River between the confluence of the Sacramento and Bear Rivers, and determine mercury

concentrations in bank sediments. Next, use computer models (e.g. Hec-4) to predict localized bank erosion rates and mercury loads as a function of 1, 5, 10, 25, and 50-year storm events. Finally, conduct engineering feasibility studies on 3 to 5 of the most erosive features containing the highest mercury concentrations and recommend bank stabilization alternatives to minimize their movement. As part of a long-term offset program, SRCSD could then implement an approved plan to stabilize the stream banks.

Public outreach/education to reduce methylmercury exposure

Following are four tasks related to public education and outreach that could be funded as a component of a mercury offset program. Humans may be exposed to excess levels of mercury through consumption of contaminated fish. Some fish in the lower Sacramento River and the Delta, particularly bass, catfish and other sport fish, contain levels of mercury greater than USEPA's recommended criterion to protect human health. A first step in safeguarding human health is to educate consumers about the mercury risks from eating locally caught fish.

A public education program will be an important component of the implementation plans for mercury TMDLs for the lower Sacramento River and the Delta. Because mercury contamination is so widespread, reducing levels of mercury in fish will likely take decades. Until mercury concentrations in fish have reached acceptable levels, consumers should be informed of the potential risks. Those eating large amounts of fish may be at risk even when targets are attained.

Regional Board staff is participating in a workgroup addressing issues of fish consumption in the Central Valley. Other participants include Department of Health Services Environmental Health Investigations Branch (DHS), Office of Environmental Health Hazard Assessment, Delta Tributaries Mercury Council (DTMC) and the California Bay Delta Authority (SRCSD is involved in this group as the contract manager of a contract from DTMC to DHS). DHS staff has collected preliminary information about fish consumption in the Delta. They found significant use of Delta fish resources by some ethnic groups and communities but very little awareness of potential risks of excess mercury exposure. From these groups, DHS staff has received numerous requests for education and materials.

The following tasks could be conducted by SRCSD with oversight by a technical review panel that includes Regional Board and DHS staff. Alternatively, money could be provided by SRCSD to DHS for completing the tasks. The appropriate geographic area for these tasks would be counties encompassing the Sacramento River downstream of Sacramento (Yolo and Sacramento counties) and the Delta.

Develop health education and outreach materials.

There are very few health education and outreach materials about fish contamination issues in the Delta watershed available for the public. Materials are needed both for the general public and non-English-speaking populations who catch and eat fish. These materials may include fact sheets, brochures, postcards, and posters. These materials will provide information on existing health advisories, health risks of mercury and other chemicals, sources of mercury contamination in fish, etc. These materials would be translated into 6-10 key languages for the area.

Dissemination of health education and outreach materials.

Once health education and outreach materials are developed, these materials need to be disseminated to appropriate populations. Dissemination activities may include presentations to local government

and community-based organization staff, attendance at community meetings and community fairs, and distribution via existing programs such as Women, Infants and Children (WIC), Head Start, and local maternal and child health programs, as well as appropriate health care providers (i.e., family practitioners, obstetricians, and pediatricians).

Needs assessment activities in additional counties.

A needs assessment is a systemic collection of information about an organization or group's knowledge, attitudes, level of concern, and resources on an issue. Needs assessments are conducted with local health jurisdictions, health care providers, community-based groups, and tribal nations. The information gathered will be used for identifying key fishing populations, outreach and education needs, and determining training and technical assistance.

Posting of fish consumption advisory for striped bass in the Delta.

The Office of Environmental Health Hazard Assessment (OEHHA) has issued guidance for consumption of striped bass and sturgeon in the Delta. Except at the Port of Stockton, there are no signs along waterways that inform anglers of the advisory. Neither the counties nor OEHHA is obligated to post signs after an advisory is issued. SRCSD may be able to work with the County of Sacramento to post signs in the Delta. (There is currently no advisory for the lower Sacramento River.)

PROJECTS CONSIDERED UNSUITABLE FOR OFFSET CREDITS

Regional Board staff assembled a list of projects that should not be considered for the mercury offset program. Any projects proposed by the SRCSD will be considered on a case-specific basis. No offset credit should be considered for the following types of projects:

No credit for ongoing mercury collection efforts.

The SWRCB along with county environmental health departments have established programs to collect elemental mercury as part of their hazardous waste collection programs.

No credit for projects subject to regulation by other programs or entities and TMDL load allocations.

These other programs may include:

- Other NPDES permitted municipal or industrial discharges
- MS4 stormwater programs
- Restoration projects for created (man-made) wetlands
- On-going in-Delta contaminated sediment dredging projects
- USFS and BLM mine remediation projects
- Mercury reduction projects where a PRP exists with sufficient resources

No credit for "compiled" studies.

Credit should not be given for compiling results of existing studies.

No credit for "in-house" studies.

Credit should not be given to studies that are constructed, carried out, and reviewed by SRCSD with no scientific peer or third party review.