Comments on
Notice of Tentative Waste Discharge Requirements for the United States Army Corps of Engineers, Water Resources Department and Port of Stockton Stockton Deep Water Ship Channel Maintenance Dredging Contra Costa, Sacramento, & San Joaquin Counties

Comments Submitted by
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Presented below are comments on the Tentative Waste Discharge Requirements for the maintenance dredging of the San Joaquin River Deep Water Ship Channel. These comments are based on my over 30 years of work on evaluating the water quality impacts of dredging and dredged sediment disposal. Beginning in the 1970s, I conducted over $1 million of university graduate-level research on the water quality aspects of dredging and dredged sediment disposal. I have been active in this topic area since then. A summary of my findings on this topic is presented in,

> Lee, G. F. and Jones-Lee, A., "Water Quality Aspects of Dredging and Dredged Sediment Disposal," In: Handbook of Dredging Engineering, Second Edition, McGraw Hill, pp. 14-1 to 14-42 (2000).

Additional information is provided on my website, www.gfredlee.com, in the Contaminated Sediment section.

Overall, this draft tentative waste discharge requirements for maintenance dredging of the San Joaquin River Deep Water Ship Channel covers many of the key issues that need to be considered in evaluating the environmental and public health impacts of maintenance dredging of the San Joaquin River Deep Water Ship Channel and managing of the dredged sediments. There are several issues, however, that need to be addressed. These are discussed below.

Page 4, item 19 states that, *"Dredging operations expose the sediment/materials to oxygenated water and aerobic conditions that oxidize the sulfide complexes to sulfate salts resulting in an increase in acidity."* That statement does not properly describe the process of acid production. The acidity associated with confined disposal is due to extended drying of the sediments and their oxidation. There is insufficient oxygen entering the sediments during the dredging operation to lead to a significant oxidation of the dredged sediments. This is an issue I studied in detail in several locations throughout the US during the Dredged Material Research Program, where I conducted studies on the characteristics of hydraulic dredging pipeline disposal

operations in open water. Only a very small part of the sediments were oxidized during the dredging operation. I am also familiar with the work that has been done over the years on the water quality impacts of so-called "confined" on-land disposal of dredged sediments.

Page 8, Table 2 lists the analytical results from the year 2000 sediment testing. It should be specified how many different sediments were tested, where they were taken from and what was the range and standard deviation of the results – i.e., how representative are these averages? There should be sediment testing along the channel in each of the areas that are to be dredged, in order to properly characterize the sediments. The analytical method detection limits used for the organochlorine pesticides should be specified for each of the pesticides measured.

Beginning on page 16 there are several tables of discharge applicability data for the solid phase and elutriates. As I understand this information, the maximum concentration of soluble constituents, such as in Table A.3, is applicable to the elutriates, where exceedance of the concentrations in the table could become a discharge limit. Adopting this approach could lead to over-regulation. What should be done is for the project proponents to conduct a site-specific evaluation of the potential effects of the discharge of potential pollutants from the on-land disposal operation on the water quality of the receiving water.

One of the issues that needs to be specified is what is the type of water used in the elutriate test. This can make a difference in the test results.

Page 21, Table A.3 (continued) lists some organochlorine pesticides. The maximum concentration of soluble constituents listed in that table is not a valid approach for regulating these chemicals. These pesticides, as well as PCBs and dioxins, tend to be strongly sorbed on particulates, and could be present in the discharge from "confined" disposal areas associated with fine particulates in the discharge. This could lead to the presence of finely divided particulate pesticides, as well as pesticides associated with colloidal particles, in the receiving waters and/or an accumulation of these pesticides in the receiving water sediments that can lead to excessive bioaccumulation in fish of the area. If fish taken from the waters in the vicinity of where the dredged sediment discharge occurs have concentrations in excess of OEHHA critical concentrations, then monitoring of the effluent for concentrations above US EPA criteria should be done, based on total concentrations, not just dissolved. This same issue applies to all chemicals that tend to bioaccumulate in fish tissue, causing threats to human health.

Because of the importance of methylmercury as a cause of excessive bioaccumulation in fish in the Delta, discharges from dredged sediment disposal areas should be monitored for methylmercury, to be certain that these areas are not generating methylmercury that is released to the Delta waterways. Dr. Chris Foe of the Central Valley Regional Water Quality Control Board can provide information on this issue.

During 2002 Dr. Anne Jones-Lee and I (Lee and Jones-Lee, 2002) conducted a detailed review of the information available on the excessive bioaccumulation of the organochlorine pesticides, PCBs, dioxins, etc., in Central Valley waterbody fish. The chemicals of concern tend to be associated with aquatic sediments, where they bioaccumulate through the food web to excessive concentrations in edible fish tissue. This problem is one of the most important

chemically caused human health-related water quality problems in the Central Valley. As we discussed, due to funding limitations it is not being adequately addressed by the Central Valley Regional Water Quality Control Board. The Central Valley Regional Water Quality Control Board should require that those doing the maintenance dredging (or other dredging) in the Deep Water Ship Channel and associated marinas and ports conduct bioaccumulation testing of the sediments that are to be dredged, to determine if they have concentrations of bioaccumulatable chemicals, such as the organochlorine legacy pesticides (DDT, et al.), PCBs, dioxins and furans. The procedure that should be used is,

> US EPA, "Methods for Measuring the Toxicity and Bioaccumulation of Sediment-Associated Contaminants with Freshwater Invertebrates," Second Edition, U.S. Environmental Protection Agency, EPA/600/R-99/064, Washington, D.C. (2000).

Additional information on this issue is provided by,

> US EPA, "Bioaccumulation Testing and Interpretation for the Purpose of Sediment Quality Assessment: Status and Needs," U.S. Environmental Protection Agency, EPA-823-R-00-001, Washington, D.C. (2000), http://www.epa.gov/ost/cs/biotesting/

as well as in Lee and Jones-Lee (2002).

The use of benthic organism sediment uptake studies to assess bioavailable forms of organochlorine pesticides, PCBs, etc., has been demonstrated by Lee, et al. (2002) for sediments in Smith Canal, a city of Stockton waterway that is connected to the Deep Water Ship Channel.

Page 26, item 7 provides a list of constituents on the "current" 303(d) list of impaired waterbodies in the Delta and the Stockton Deep Water Ship Channel. A review of the US EPA approved (July 2003) 303(d) list of impaired waterbodies for Delta Waterways, Stockton Deep Water Channel and the Port of Stockton shows that "Stockton Deep Water Channel, Upper (Port Turning Basin)" is listed for pathogens. Since dredging operations can increase the concentration of pathogens in water through suspension of sediment, this issue should be considered in regulating dredging of the Deep Water Ship Channel, especially near the Port of Stockton.

On page 30, item 3, using the elutriate test results and US EPA water quality criteria (Basin Plan objectives) for protection of groundwater quality is inappropriate. The approach that should be taken to protect groundwaters from pollution is to require properly developed groundwater monitoring at the dredged sediment disposal area.

Page 31, item 7 mentions oxygen-demanding constituents of sulfide and ammonia. One of the primary oxygen-demanding constituents associated with dredged sediments is ferrous iron.

One of the issues not adequately addressed in this tentative WDR is the bioaccumulation of hazardous chemicals by terrestrial life that can pick up the hazardous chemicals from the on-land disposal site (DMD site) or through the food web associated with this site. Increasing attention is being given to concentrations of constituents in soils that are hazardous to terrestrial

life. I am involved in a Superfund site investigation at the Lava Cap Mine site near Nevada City, where the US EPA project manager and the US EPA consultant have provided information on the concentrations that are suggested to be used for protection of terrestrial life in contact with contaminated soils. Information in their reports may be of help in defining concentrations of constituents in DMD soils that are a threat to terrestrial life. David Seter (seter.david@epa.gov) of the US EPA Region 9 is the site manager.

Page 3, Table 3 of the monitoring and reporting program lists COD as a monitoring parameter. COD should be deleted from this evaluation, and TOC should be used in its place. COD does not measure a definable parameter. TOC does. TOC is also of importance with respect to potential impacts on drinking water.

On page 3 of the Monitoring and Reporting Program, the EPA method for MET Toxicity Bioassay is listed as EPA 600/4-90/027F. I do not believe this is the most recent update of this procedure. According to my understanding, the current references for freshwater toxicity testing are,

> US EPA, "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms," Fifth Edition, US Environmental Protection Agency, Office of Water, Washington, D.C. (2002).
> http://www.epa.gov/OST/WET/disk2/
>
> US EPA, "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms," EPA-821-R-02-013, US Environmental Protection Agency, Office of Water, Washington, D.C. (2002).
> http://www.epa.gov/OST/WET/disk3/

You may want to check with Karen Larsen on this matter.

Page 10 of the Information Sheet, under organochlorine pesticides, as discussed above, the approach of setting up detection limits as the discharge limit is not appropriate. Based on US EPA water quality criteria, bioaccumulation problems can occur with these constituents below that concentration.

Page 43, attachment D indicates that if ecological PRGs are exceeded, there can be no reuse for habitat restoration. Some of these restrictions may be grossly overprotective. Evaluation should be allowed to determine whether excessive concentrations based on ecological PRGs are, in fact, a reliable indication of potential problems. Ecological PRGs are not highly reliable, since they do not consider bioavailable forms of constituents.

References

Lee, G. F. and Jones-Lee, A., "Organochlorine Pesticide, PCB and Dioxin/Furan Excessive Bioaccumulation Management Guidance," California Water Institute Report TP 02-06 to the California Water Resources Control Board/Central Valley Regional Water Quality Control Board, 170 pp, California State University Fresno, Fresno, CA, December (2002). http://www.gfredlee.com/OClTMDLRpt12-11-02.pdf

Lee, G. F.; Jones-Lee, A.; and Ogle, R. S., “Preliminary Assessment of the Bioaccumulation of PCBs and Organochlorine Pesticides in *Lumbriculus variegatus* from City of Stockton Smith Canal Sediments, and Toxicity of City of Stockton Smith Canal Sediments to *Hyalella azteca*.” Report to the DeltaKeeper and the Central Valley Regional Water Quality Control Board, G. Fred Lee & Associates, El Macero, CA, July (2002).