"Minutes" of April 1, 19997 CALFED presentation by Darell G. Slotton

I will be preparing a more extensive summary of the California mercury issue, including many key graphics of representative data as seen at the presentation, and with a series of recommendations. This will be ready in ~2 weeks. In the meantime, as "minutes" for my presentation at the last meeting, the following suggestions I prepared for CALFED earlier in the year cover many of the key ideas.

DGS

California MERCURY Issues Most Critical for Immediate Research

Results of recent and ongoing work indicate the following research areas to be among the most critical for our understanding of the mercury cycle and bioavailability in California. Results could strongly influence the future direction and effectiveness of potential remedial plans and actions. Qualified researchers are involved with this work already. They are available to move in these appropriate directions and are in fact anxious to do so, pending funding.

EXPAND RESEARCH OF CALIFORNIA MERCURY SOURCES, TRANSPORT, AND FATE

We are developing preliminary indications of relative mercury loading from key regions of the state to the Bay-Delta. The Cache Creek watershed, in particular, appears to be a major source. Recent work suggests that another important source region exists somewhere along the west slope of the Sacramento Valley north of Cache Creek. The Coast Range south of the Bay-Delta may also be important. Additional mass load work is needed. Coast Range sources are linked directly to historic mercury mining regions. It is not clear whether the mercury emanating from these areas is highly localized to abandoned mercury mines, however, recent research indicates that Coast Range mercury export sources may indeed be highly localized and potentially effectively remediated. Another major site of large scale, bulk mercury contamination exists in the Sierra Nevada gold mining belt, where refined mercury was used extensively in the gold extraction process. Here, much of the downstream transport of mercury is apparently trapped in foothill reservoirs, rendering the Sierra Nevada a secondary source region.. It is critical that we refine our understanding of these California mercury export regions and determine the potential for effective localized source remediation. Additionally, we must differentiate between source types of mercury and their behavior in aquatic systems. Recent research suggests that much or most of the bulk mercury transported down California watersheds to the Bay-Delta may in fact be biologically inert, with only a very small fraction available for conversion to methyl mercury and subsequent movement into and through the food web. Studies of the short and long term fate of the various important mercury fractions are critical, directed both at the upstream source regions and the depositional sediments of the Bay-Delta. We may find that we should be focusing our efforts on very specific sources. Results of this work will guide and determine the feasibility of effective mercury remediation actions. The ultimate goal is to significantly reduce the human and environmental mercury hazard (primarily with regard to consumption of fish, etc.) for the Bay-Delta and California as a whole.

UTILIZE BIOINDICATOR SPECIES TO EXPAND DATA BASE FOR BIOAVAILABLE MERCURY SOURCES THROUGHOUT THE BAY-DELTA WATERSHED

U.C. Davis has developed a bioindicator approach to mercury monitoring and source identification. The technique has been effectively used to determine source areas of bioavailable mercury on a highly localized level, to rank the various tributaries within watersheds as to time-integrated bioavailable mercury concentration, and to link the mercury uptake in benthic invertebrate bioindicators to corresponding levels in edible fish tissue. Particularly as supplemental and contrasting information to the aqueous, bulk mercury grab sampling data otherwise available, this biological methodology focuses on the mercury fractions that are of true relevance to localized and downstream food web mercury concerns. A massive amount of bulk, inorganic, and largely biologically unavailable mercury exists in California, confusing the interpretation of standard water quality data. The U.C. Davis bioindicator approach has been used to rank source tributaries throughout the northwestern Sierra Nevada and in selected drainages of the Coast Range, including preliminary work on Cache Creek. Similar work is needed for tributaries throughout the entire Bay-Delta watershed, particularly from potentially very high source regions indicated by previous work. These include as yet unspecified drainages along the west slope of the Sacramento Valley north of Cache Creek and, in the Sierra Nevada, the un-dammed Cosumnes River and the major rivers of the central Sierra.

DETERMINE HUMAN HEALTH MERCURY HAZARD FROM EDIBLE FISH IN SIERRA NEVADA FOOTHILL RESERVOIRS

In the course of U.C. Davis studies of bioavailable / food web mercury in the gold mining region of the Sierra Nevada, results indicated that the foothill reservoirs are acting to trap much of the downstream flow of organic, bioavailable mercury, as well as the sediment-bound, inorganic, bulk load. While this may be beneficial with regard to Bay-Delta concerns, a significant problem is indicated within the Sierra foothill reservoirs themselves, with some relatively very high mercury concentrations found in edible fish. As one of the major public uses of these reservoirs is fishing, an accurate assessment of the current hazard is advisable. Diverse samples of fish should be taken from these reservoirs and analyzed for mercury content in edible tissue, sufficient for analysis by OEHA to update consumption recommendations. Very little data exists, particularly from recent years. However, the data that are available indicate the strong likelihood of a localized problem.