## Responses to August 26, 1998 Letter Re CALFED Analysis

### Bromide

Question: "Based on MWD's own information, how can the MWD Board conclude that the isolated facility is the BEST solution for ensuring water quality to Southern California?"

Bromide is a key precursor in the formation of disinfection byproducts (DBPs). The source of bromide is from seawater intrusion. Metropolitan has taken a position that 45 micrograms per liter (ug/L) of bromide is necessary to meet future drinking water quality regulations to ensure healthy and safe drinking water. This value is consistent with the recommendation of an independent panel of experts commissioned by California Urban Water Agencies (CUWA). This represents a source water quality level below which extra-ordinary treatment actions may be avoided. As source water bromide levels exceed this value, the extra-ordinary treatment actions required to meet projected health based standards could be very costly, and in some cases may not even be feasible.

Our initial modeling, shown in Figure 1, indicated that a conveyance system with an isolated facility significantly decreases both the concentration levels and the variability of bromide in State Water Project (SWP) water when compared to existing conditions. The decreased levels would greatly reduce DBP formation, especially the brominated species. Another important benefit is the reduction in the variability or range of bromide concentrations in SWP supplies. Water quality consistency is a key to effective water treatment operations to protect the public from acute and chronic effects of pathogens and disinfection byproducts.

While the dual conveyance system provides substantial water quality improvements, additional measures are required to meet the health-based target for bromide because of the mixing of SWP and Central Valley Project (CVP) waters at the O'Neill Forebay and San Luis Reservoir. Measures to further improve water quality under investigation include operational changes for SWP and CVP and the use of storage to improve water quality, and plumbing changes to separate the better quality water for urban uses.

Furthermore, salinity of seawater origin is a major contribution to the salinity of agricultural return flows to the San Joaquin River which ultimately end up at the SWP and CVP export facilities. Improvements in the Delta that minimize seawater intrusion would also improve the salinity and bromide in the CVP. Currently, a significant amount (40 to 50%) of the bromide appearing at Banks Pumping Plant during the spring months is also attributable to the re-circulated bromide in the San Joaquin River. Bromide and salinity levels in the San Joaquin River will improve over time as less saline water is delivered to CVP water users.



D-045005

## CALFED Stage 1 Actions

Question: "What water quality improvement actions, proposed by MWD, will be included in the mid-September draft of Stage 1 actions? Which of your recommended actions will not be included in the draft?"

Metropolitan is concerned that the CALFED Stage 1 action plan has not adequately addressed drinking water quality concerns. Metropolitan, together with other urban water agencies, has developed a list of water quality actions as input to CALFED's Stage 1 plan. This list (see attachment A) has been provided to CALFED through the water quality technical teams as well as direct communication with CALFED staff working on the Stage 1 plan. It should be noted that we do not expect that these actions will be sufficient to ultimately achieve water quality levels required for meeting future drinking water quality regulations. However, these actions will be helpful in identifying the extent to which the water quality common program can be successful in meeting target levels.

Question: "What water quality improvement in salinity, bromide, and TOC could be achieved in Stage 1 through the re-operation of the Delta pumps? Or, with continued low demand for SWP supplies, what percent of the time can MWD meet its salinity, bromide and TOC objectives?

Preliminary studies by Metropolitan estimated a 10 to 30 mg/L reduction in SWP salinity levels could be achieved by selective shifting of CVP pumping at Tracy Pumping Plant to the Banks Pumping Plant using enhanced flexibility of the joint point of operations to minimize commingling of CVP water at O'Neill Forebay or San Luis Reservoir. This action needs further study as it may be constrained by or conflict with fish-take, contractual, operational, and water rights issues. We do not expect any significant improvement in bromide or TOC levels through the re-operation of the pumps.

Water quality improvements can also be realized if the Stage 1 plan includes channel enlargements that would increase the conveyance of Sacramento River water into the central Delta and export vicinity. The extent of water quality improvement would depend on the nature of channel modifications and operating criteria. Channel modifications need to be integrated with the ecosystem program because there is a concern that Sacramento River water drawn into central Delta may adversely impact fisheries.

An imported supply with the salinity levels between 500 to 550 mg/L TDS is needed to maintain and expand water recycling and groundwater conjunctive programs within the region. Failure to implement such regional water management programs would result in increased reliance on SWP supplies to meet future demands, particularly in dry years. Metropolitan blends SWP supplies with the higher-salinity (about 700 mg/L TDS) Colorado River Aqueduct (CRA) water. If salinity of SWP were high, Metropolitan would be required to use more SWP water for blending purposes. As illustrated in Figure 2, Metropolitan's need for SWP water to meet a salinity target diminishes when SWP

water has a lower TDS level.[1] For example, if SWP salinity were at 300 mg/L TDS, Metropolitan would need to curtail 300 TAF of CRA deliveries to meet its salinity target for 9 months of each year. If SWP salinity were at 150 mg/L, only 90 TAF of CRA water would be curtailed to meet the same target.

Annual changes in SWP salinity greatly affect Metropolitan's ability to achieve the salinity target through blending. During wet years, such as 1998, the availability of low salinity SWP has resulted in salinity lower than the target in Metropolitan's water. In contrast, Metropolitan would not be able to meet its salinity target in dry periods when SWP supply is limited and salinity reaches over 400 mg/L. Metropolitan's interim policy is to provide imported supply at salinity levels between 500 mg/L and 550 mg/L for six months (April through September) of the year, and requires proportionally less curtailment of CRA deliveries. Because the region's demand is currently low for the remaining six months, to meet the salinity target would mean significant increase in SWP supplies and significant curtailment of CRA supplies during those periods. Under current conditions, analysis shows that on average, Metropolitan can meet its salinity target for 6 months of the year in about 7 out of every 10 years.[1] As shown in Figure 2, Metropolitan may be required to curtail up to 160 TAF of CRA deliveries, depending on the SWP salinity, to met this modest salinity target.

Metropolitan recognizes that using low salinity SWP supplies for blending is not enough to manage salinity in the region's water supply. Metropolitan's proposed Salinity Management Plan consists of four basic components: (1) imported water source control actions for both SWP and CRA supplies; (2) distribution system salinity management actions, including blending and integrating water quality and quantity objectives in planning and negotiating facility and resource development; (3) collaborative actions with federal, State, and local agencies to develop a regional strategy with involved parties recognizing their respective roles and responsibilities; and (4) local actions to protect groundwater and recycled water supplies. Metropolitan cannot solve the salt imbalance problem alone, and needs participation and assistance by others as outlined in its proposed action plan.

With regard to bromide levels in Metropolitan's current SWP supplies, bromide levels exceeds 230 ug/L fifty percent of the time, and exceeds 100 ug/L 99 percent of the time. With regard to TOC, SWP supplies exceeds 3 mg/L about 75 percent of the time. While Metropolitan is able to meet all drinking water quality standards today, it is uncertain whether Metropolitan can meet projected drinking water quality standards with the levels of bromide and TOC in SWP under the existing situation.

[1] Metropolitan Water District, U.S. Bureau of Reclamation, "Salinity Management Study, Final Draft Report," June 1998.

**Accuracy of the Demand Estimates in CALFED draft PEIS/PEIR Modeling**

Question: "Given the serious problems with Bulletin 160-98, which is the basis for CALFED analysis of options, of what conclusions can MWD Board Members be certain at this point?"

According to DWR, the demand estimates used in CALFED modeling are not directly tied to DWR's Bulletin 160-98. DWR uses Bulletin 160-98 land use projections in estimating water demands in the Sacramento Valley and the resulting inflows into the Delta from the Sacramento River watershed. DWR also uses Bulletin 160-98 land use changes to estimate in-Delta water consumption. For the San Joaquin Valley watershed, the inflow to the Delta is based on Bureau of Reclamation's analysis of CVP demands as documented in the CVPIA PEIS.

The export demands used in the models are not related to Bulletin 160-98 estimates. For modeling 2020 scenarios, CALFED assumes the following CVP demands totaling 3,822 TAFY. These demands, including canal losses, are detailed as follows:

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| Contra Costa Canal | 202 TAFY |
| DMC and Exchange | 1,561 |
| CVP San Luis Unit | 1,447 |
| San Felipe Unit | 196 |
| Cross Valley Canal | 128 |
| Wildlife refuges | 288 |

It should be noted that while CVP water user demands total approximately 3.5 MAF, the model-estimated deliveries to the water users range from 2.39 to 2.55 MAF on average and 1.68 to 1.96 MAF during dry years, under the various CALFED alternatives.[2] In other words, the model projects shortages for CVP contractors for most years except very wet periods.

For the SWP, DWR uses a variable demand pattern capped at the contractual maximum 4.2 MAF. The demands for most contractors vary in response to local wetness indexes. Metropolitan provided estimated SWP demands consistent with the IRP to CALFED for use in their modeling. The demands used for the model runs reflect the need to fill ground and surface storage during wet periods when supplies are abundant. The resultant modeled SWP deliveries range from 3.25 to 3.90 MAF on average and 2.08 to 2.79 MAF during dry years.[2]

Metropolitan expects the use of local resources and storage capacity available as determined through its IRP such that we would import water during wet years for storage and reduce demands on the system during dry years. As shown in Table 1, Metropolitan's critically dry year resource mix includes significant use of demand management, local resources, withdrawal from storage, as well as water transfers from the Central Valley.

[2] CALFED Bay-Delta Program, "Storage and Conveyance Refinement Process: A Status Report on System Modeling Using DWRSIM," October 30, 1997.

Management of imported water salinity is very important to the region's overall supply mix, especially in the ability to continue and expand groundwater recharge and water recycling programs. In general, recycled water with total dissolved solids (TDS) levels over 1,000 mg/L becomes unusable for irrigation and industrial reuse. In addition, the Regional Water Quality Control Boards often set groundwater quality objectives well below 1,000 mg/L of TDS in order to protect existing high-quality groundwater basins. During the drought, when SWP salinity was well above 400 mg/L, some wastewater treatment plants experienced problems in meeting discharge requirements and producing recycled water of acceptable quality.

Your letter asked about the direct relationship of Delta water quality problems and increases in water demand levels at 2020. The CALFED draft PEIR/PEIS indicated that under the No Action Alternative, "water quality in the Delta would gradually deteriorate as water diversions from the Delta and urban wastewater and stormwater pollutant loading from point and non-point sources in the Central Valley increase." "The salinity of water at the CVP and SWP pumps could increase by 10% to 20% or more in dry periods." (Draft PEIS/PEIR, page 6.1-56) Communications with CALFED staff indicated that CALFED did not quantify the increase in pollutant loading from upstream of the Delta. Model analyses show that the 16-year averaged TDS at the Delta pumps increase under the 2020 No Action Alternative over existing condition. TDS increases at Delta pumps are caused by both the decrease in Sacramento River inflow (typical at 100 mg/L TDS) as a result of increased upstream consumption, and the increased export demands. Typically TDS is already high in the dry and critical years due to the natural low-flow conditions and instream flows constitute urban and agricultural return flows from upstream of the Delta. As discussed earlier, neither the 2020 "No Action Alternative" nor the existing condition provide satisfactory salinity to southern California for resource management and public health protection. CALFED must pursue long-term solutions that would provide Delta export water with salinity levels at approximately 150 parts per million, TOC levels at 3 mg/L, and bromide at 45 ug/L, during both wet and dry years.