

DRAFT
Significance of Bromide
to
Selection of a CALFED Delta Alternative

April 30, 1998

Background

The CALFED Water Quality Common Program addresses water quality degradation from sources such as abandoned and inactive mines, urban storm water runoff, waste water discharges and agricultural drainage. Pollution from these sources adversely affects beneficial uses of Bay-Delta waters, especially the quality of habitats of the species inhabiting the region. When planned corrective actions are implemented, adverse impacts on these beneficial uses should be reduced and the waters made more suitable to support critical species and recreational uses of Bay-Delta waters.

Salinity, on the other hand, has negative effects on agricultural and drinking water beneficial uses of Delta waters, but will not be greatly affected by the actions of the Water Quality Common Program. The primary source of salinity in the system is the connection of the fresh water Bay-Delta system to the saline San Francisco Bay and the Pacific Ocean. The most important factor affecting the salinity of drinking and irrigation water taken from the Delta is the degree to which Bay-ocean water is allowed to co-mingle with fresh water in the Delta. Among the CALFED alternatives, Alternative 2 would more effectively prevent salinity co-mingling (intrusion) than Alternative 1 and Alternative 3 would more effectively prevent salinity intrusion than Alternative 2. Therefore, the choice of Delta alternatives is critical in determining the degree to which drinking water and agricultural uses of the water are improved through the CALFED process.

Salinity is important to agriculture because in elevated concentrations it harms crops, and it also reduces the ability to reuse irrigation water and, thus, conserve fresh water supplies. Salt in drinking water supplies is important because it reduces the useful life of water systems and water using equipment and appliances. Also, especially in southern California where water supplies are blended, it reduces the ability to stretch water supplies. In addition, salty water is much less useful for water recycling, thus further eroding the ability to use water efficiently.

Bromide, one of the salts that enters the Delta from the Bay-ocean, is of particular significance to drinking water suppliers. Bromide has the potential to react chemically with disinfectant chemicals used in drinking water treatment, and to produce chemical byproducts in treated drinking water that are thought to cause cancer and, possibly, other health effects such as increased incidence of reproductive failure in humans. Research into health effects of brominated compounds known to be present in drinking water is not yet highly advanced, and concern exists that bromide may react to form harmful chemicals in drinking water that are as yet unidentified.

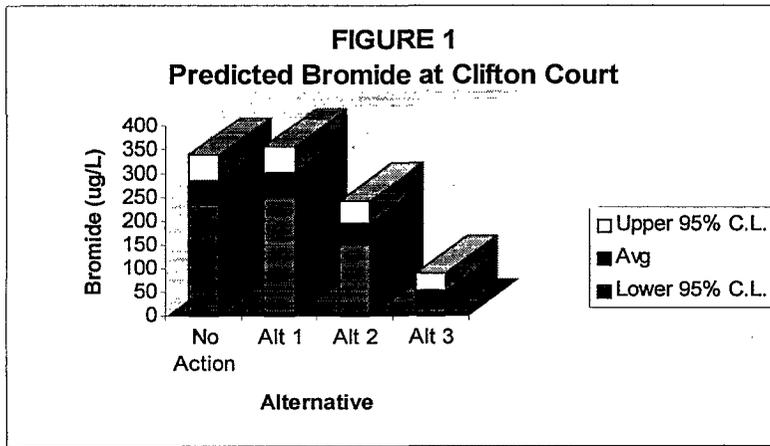
A \$200 million national research, data collection and analysis program is underway as part of a drinking water rule-making process of the U.S. Environmental Protection Agency to evaluate health effects, occurrence, and potential treatment approaches for disinfection byproducts. Within a period of about four years, this process will produce information to be used in reviewing the current Disinfectants and Disinfection Byproducts Rule and modification of that rule as necessary to reflect the additional understanding that will exist by then. If the current rule is revised, the new rule is likely to have important implications for the cost and treatability of Delta waters to meet the new standards.

While the additional knowledge gained over the next few years will certainly advance the understanding of the effects of bromide in drinking water sources, it is unrealistic to expect that even this large scale effort will completely resolve all technical and human health questions associated with the presence of bromide in source waters. Nor is it necessarily the case that the next stage of drinking water rule-making will be the last.

Based on the current schedule for finalizing the CALFED EIS/EIR in the immediate future, a decision among Delta alternatives will have to be made some years in advance of the time when a revised Disinfectants and Disinfection Byproducts Rule would be promulgated, and many years before all significant scientific questions about bromide and drinking water can be resolved. The CALFED decision must, therefore, somehow give appropriate weight to the bromide issue in the decision making process, in the absence of important information.

The Situation

Figure 1 depicts bromide concentrations to be expected in waters exported from the

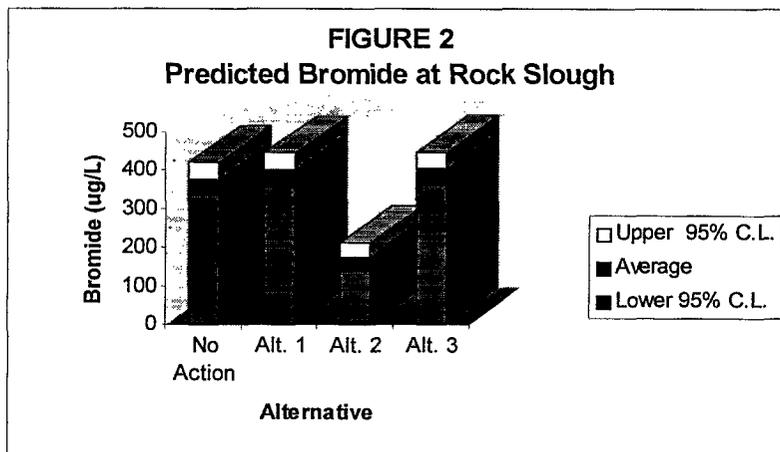


south Delta under the No Action Alternative (the condition in the year 2020 if the CALFED program is not implemented), along with the bromide concentrations expected in export waters associated with the three alternatives.

Waters exported from the south Delta under the No-Action Alternative would average 285

ug/L(parts per billion) bromide, and would average 302 ug/L, 197 ug/L and 52 ug/L, bromide for Alternatives 1, 2, and 3, respectively. Compared to Alternative 1, Alternative 3 would bring a nearly six-fold reduction in bromide concentration, whereas Alternative 2 would result in about a 1-1/2 fold reduction, compared to Alternative 1.

Waters taken by Contra Costa Water District from Rock Slough are predicted to have bromide concentrations as depicted in Figure 2.



Average concentrations for the No Action Alternative and for Alternatives 1, 2, and 3 are predicted to be 375 ug/l, 398 ug/L, 175, ug/L, and 401 ug/L, respectively. Only Alternative 2 would result in a significant change in bromide concentrations in water taken from this location, amounting to more than a 2-fold reduction as compared to Alternatives 1 or 3. If Alternative 3 were to be chosen, it would be necessary to give consideration to relocating the Contra Costa Water District point of diversion to the south Delta if that agency were to share the benefit in bromide reduction that would result from implementing Alternative 3.

Considerations

All other factors being equal, it is desirable for any drinking water supplier to take water from the best quality source available. This approach will generally result in drinking water of consistently high quality, that minimizes the possibility of waterborne disease, and minimizes cost of treatment. However, of course, selection of a Delta alternative must take into account many critical factors. Therefore, within the context of a Delta decision, consideration of the bromide problem must include treatment options as well as source water quality.

Water treatment methods are capable of largely overcoming the adverse effects that can be caused by bromide in drinking water sources, though there are a number of complex technical issues, and potentially very significant cost considerations associated with treatment options. An additional consideration is that, while large urban agencies have the technological and financial capacity to undertake complicated treatment options, smaller agencies can be faced with serious

challenges in using treatment technology to overcome disadvantages in source water quality.

Formation of Expert Panel

Given the inability to reach scientific certainty on the full significance of bromide in Delta drinking water sources within the CALFED decision making time frame, expert advice is needed to aid the decision making process.

A panel of independent experts will be commissioned to examine available information and provide technical perspective to CALFED to enable decision makers to give appropriate weight to the bromide issue among the factors that must be considered. We anticipate the panel would consist of between three and five persons who are independent, nationally recognized technical experts on the subject. The panel would meet for one to three days to be briefed on the problem and their tasks, and to deliberate.

Panel Selection Process

CALFED agencies and stakeholders are being consulted with regard to identifying candidates for panel membership. The current plan is to invite each major stakeholder group to identify several persons who would be acceptable to that group. CALFED staff, in consultation with agency staffs will evaluate the slate of prospective panelists with respect to balanced technical expertise and reputation for fairness and independence.

Tasks of the Panel

The basic technical tasks to be accomplished are:

- To help CALFED assure the issues and tradeoffs are characterized fully.
- To develop observations and questions regarding Delta water quality which may be useful to the EPA national review process.
- To help CALFED ensure that the decision making process neither overstates the potential for bromides to be a significant decision factor, nor eliminates opportunities to respond effectively to potential for future drinking water standards and protect public health.

Stakeholders and CALFED agency staffs will be consulted in formulating the detailed charge to the committee based on these tasks. The objective is to establish very clearly defined tasks that provide unambiguous direction to the panel and that, when completed, will provide useful information for CALFED decision making relative to bromide.

These are examples of specific tasks that might be identified:

- Perform further mathematical modeling work to confirm earlier bromide and organic carbon predictions.
- Assess treatment plant performance characteristics of specific agencies supplying drinking water from the Delta water to identify the range of treatment options and capabilities that exist among these entities.
- Compare the quality of Delta source water to that of other public water systems nationally with respect to treatability and capability of meeting future drinking water regulations.

- Identify costs associated with available treatment options for producing good quality drinking water from the Delta.

Deliverable

The panel will produce a report to CALFED as specified in the charge to the panel.

Schedule

The following tentative schedule is planned:

TASK	DUE DATE
Formulate List of Prospective Panelists and Draft Panel Tasks, distribute for internal and stakeholder review	May 15, 1998
Progress Report to Management Team	May 21, 1998
Progress Report to Policy Group	June 1998 meeting
Organize Panel - contracting, etc.	July 15, 1998
Convene Panel	July 21-24, 1998
Draft Panel Report to CALFED	August 17, 1998
Submit Panel Report to Management Team and Policy Group	August/Sept. 1998 meetings

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