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Jeanine Townsend
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812-2000

Subject: Draft Technical Report on the Scientific Basis for Alternative San Joaquin River Flow and Southern Delta Salinity Objectives

Dear Ms. Townsend:

Contra Costa Water District (CCWD) appreciates the opportunity to comment on the Draft Technical Report on the Scientific Basis for Alternative San Joaquin River Flow and Southern Delta Salinity Objectives. We recognize that the public comment period has passed, but given the comments and questions the State Water Resources Control Board (SWRCB) have received thus far, we feel it is essential to comment and clarify some of the misinformation that has been presented. There are two main points that must be clarified:

1) **There are municipal intakes in the Southern Delta.** The San Joaquin River Group Authority posed the question in their submitted panel questions, "Are there any municipal intakes in the Southern Delta? If there are "none", and none are anticipated, why should there be any objectives set for M&I water uses?" CCWD would like to remind the San Joaquin River Group Authority and the State Water Resources Control Board that CCWD has recently completed a new intake at Victoria Canal and that is a municipal intake in the Southern Delta. In addition, the Jones and Banks pumping plants provide drinking water to most of California's population and are also municipal and industrial intakes in the South Delta. The list of M&I intakes affected by conditions in the South Delta is not limited to these. It is imperative that water quality objectives be set and maintained protecting municipal and industrial beneficial uses in the Southern Delta.

2) **Contra Costa Water District pumping does not have a major effect on OMR flows.** The State Water Contractors and Delta Mendota Water Authority stated in their comment letter that CCWD has a 'major' effect on Old and Middle River (OMR) flows (page 5 line 10). Although it should be obvious by simple visual inspection of Figure 1 in the Attachment that CCWD does not have a major effect on OMR flows, CCWD has also provided a more thorough technical analysis of the OMR model submitted by the State Water Contractors and found that CCWD pumping is statistically insignificant in comparison to other factors. If each of the variables (San Joaquin River flow at Vernalis,

pumping at Banks, pumping at Tracy, pumping at CCWD's Old River intake, and the net channel depletion) is examined individually, it becomes clear that CCWD's contribution to Old and Middle River flows is insignificant. CCWD's maximum pumping is an order of magnitude smaller than export pumps and the San Joaquin River flow, and as such cannot be a major factor. The attachment also shows that variation in CCWD's pumping at Old River contributes less than 0.2% to the variation in reverse flows on Old and Middle River. By comparison, the variation in total export pumping contributes more than 96% to the variation in net reverse flows in Old and Middle River. Only in the unlikely case of San Joaquin River inflows less than 1000 cfs with no export pumping at all could CCWD's south Delta diversions be considered to.have a "major" effect on OMR flows, and in even in this case CCWD's diversions would be small compared to daily net tidal fluctuations.

Please contact me if you have any questions or concerns at (925) 688-8100. CCWD will attend the workshop and look forward to continuing to provide input to the San Joaquin River Flow and Southern Delta salinity objectives.

Sincerely,

Greg Gartrell
Assistant General Manager

GG/MM:wec

Attachment

cc: Mark Gowdy, State Water Resources Control Board
Daniel Nelson, San Luis & Delta Mendota Water Authority
Terry Erlewine, State Water Contractors
Dennis W. Westcot, San Joaquin River Group

Attachment
Technical Analysis of Old and Middle River Flows

The State Water Contractors submitted Dr. Paul Hutton's 2008 report on calculating Old and Middle River flows. Although the report provides an in-depth method to calculate Old and Middle River flows, the findings of the work have been misinterpreted by the State Water Contractors. Contra Costa Water District (CCWD) pumping is included in Hutton's calculation of OMR but that does not mean it has a major or significant effect. CCWD pumping is within the error of the method proposed by Hutton. Figure 1 below shows measured Old and Middle River flows (USGS gages), CCWD pumping at Old River, and the residual (predicted minus observed) of Hutton's model. It is obvious that the magnitude of CCWD pumping is less than the uncertainty of Hutton's model.

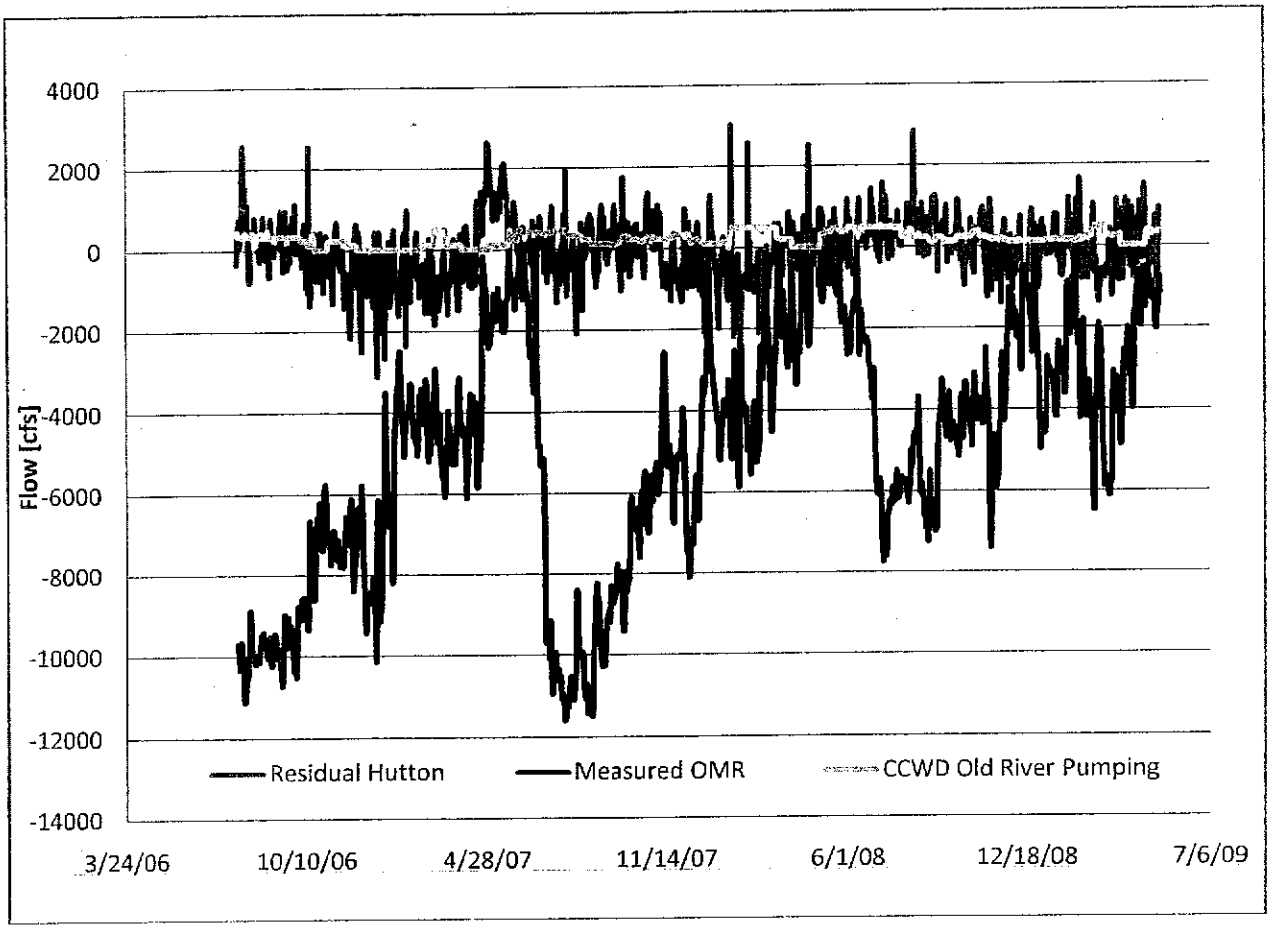

Figure 1 Comparison of measured OMR flows, CCWD pumping and the residual (predicted minus observed) of Hutton's model

Hutton used the following variables to predict OMR flows: San Joaquin River flow at Vernalis, pumping at Banks, pumping at Tracy, pumping at Old River and a net channel depletion term. Hutton combined the pumping and depletion terms and performed a linear regression to find coefficients for the following equation:

$$Q_{OMR} = A * Q_{Vernalis} + B * Q_{Diversion} + C$$

Hutton expanded the analysis to account for various conditions such as the temporary barriers and different San Joaquin River flow conditions. Hutton reported an R^2 of 0.99. CCWD performed the same linear regression for all recent data (7.26.2006 – 10.25.2010). San Joaquin flow was less than 16,000 cfs during that time and barrier installation was limited. Table 1 contains the coefficients found when the same regression was performed for recent data. Although the revisted results are not identical to the originally published, the results are very similar.

Table 1: Regression Coefficients for Hutton's OMR model

	Hutton Originally Published*		Hutton Revisted (2006 – 2010)	
	coefficient	p-value	coefficient	p-value
A	0.47	?	0.54	<2E-16
B	-0.91	?	-0.9	<2E-16
C	83	?	-122	0.04
R^2	0.99	?	0.94	

* for conditions where no barriers are in and flow at Vernalis is less than 16,000 cfs. These conditions applied for almost the entire duration of the period revisted.

If each of the diversion terms is examined individually, it is possible to distinguish the relative contribution of each of those terms to flow in Old and Middle River. Applying a linear regression to the following equation CCWD was able to find the coefficient for each individual variable.

$$Q_{OMR} = A_{Vernalis} + B1_{Banks} + B2_{Tracy} + B3_{CCWD} + B4_{NCD} + C$$

Table 2 presents the coefficients for each term and a p-value for each of the coefficients. The overall goodness-of-fit for this analysis is nearly identical to Hutton's originally proposed method, $R^2 = 0.95$. The CCWD term has the smallest coefficient (smallest magnitude) and **it is the only coefficient that is not statistically significant (p-value is larger than 0.05)**. If CCWD is removed from the regression entirely, the goodness-of-fit does not change and the remaining coefficients also change minimally. This indicates that compared to the other terms, CCWD pumping is insignificant.

Table 2: Regression Coefficients for Expanded OMR Variables

	Expanded Terms With CCWD		Expanded Terms Without CCWD	
	coefficient	p-value	coefficient	p-value
$A_{Vernalis}$	0.49	<2E-16	0.49	<2E-16
$B1_{Banks}$	-0.87	<2E-16	-0.87	<2E-16
$B2_{Tracy}$	-0.87	<2E-16	-0.87	<2E-16
$B3_{CCWD}$	-0.04	**0.79**	NA	NA
$B4_{NCD}$	-1.83	<2E-16	-1.84	<2E-16
C	-138	0.05	-144	0.02
R^2	**0.95**		**0.95**	

In order to assess the relative importance of the various variables in determining Old and Middle River flows, standard partial regression coefficients were calculated. A high absolute value of a standard partial regression coefficient indicates it has a high degree of influence on Old and Middle River flows. The standardized regression coefficients for the expanded regression equation are presented in Table 3. The magnitude of the coefficients indicates that CCWD is the least important of the variables contributing to OMR flows and that compared to the other variables, variation in CCWD pumping contributes less than 0.2% to the variation in reverse flows in Old and Middle River.

Table 3: Standardized Partial Regression Coefficients for Expanded OMR Variables

	Standardized Coefficients	p-value
$A_{Vernalis}$	0.16	<2E-16
$B1_{Banks}$	-0.6	<2E-16
$B2_{Tracy}$	-0.36	<2E-16
$B3_{CCWD}$	-0.002	0.79
$B4_{NCD}$	-0.2	<2E-16
C	-0.04	0.05
R^2	**0.95**	