State of California

The Resources Agency

Memorandum

Date: SEP 2 2 2005

To: Monterey Plus EIR Committee

From: **Department of Water Resources**

Subject: The Department of Water Resources' Use of Central Valley Project/State Water Project's Current Operations Model (CALSIM II)

Over the last year, there has been considerable discussion in the Monterey Plus Environmental Impact Report (EIR) Committee meeting about the Department of Water Resources' (DWR) use of current Central Valley Project and State Water Project (CVP/SWP) operations model (CALSIM II) for analyzing the effects of the Monterey Amendment. CALSIM II is an important tool used by DWR and other State and federal agencies to study many technical and policy issues related to water supply reliability, environmental management and performance, water demands, economics, hydrology and climate, and regulatory compliance. Several studies currently being conducted by DWR are using, or will use, the CALSIM II model to estimate how new actions, projects, or programs could potentially affect the operations of the SWP and Central Valley Project, local and regional hydrology, and SWP and CVP water deliveries.

DWR's use of a model to simulate actions in the system is a valid and recognized practice. Models are often used to evaluate potential environmental impacts associated with water projects and other alternatives as required by the California Environmental Quality Act and the National Environmental Policy Act. The use of CALSIM II for environmental impact analysis and planning is an accepted and valuable analysis method. In fact, DWR and other agencies have consistently used CALSIM II and its predecessors to provide a basis to evaluate the potential impacts of SWP actions for many years. DWR believes that CALSIM II will provide the essential and adequate data needed to allow decision-makers to make well-informed, intelligent decisions concerning some of the project's environmental consequences. DWR's use of CALSIM II is part of a good faith and in-depth analysis of the environmental effects of the Monterey Amendment. Using CALSIM II as the chief tool to assess water supply and hydrology impacts for this project was not an arbitrary decision, but a carefully reasoned choice after hearing comments and reviewing evidence from the EIR committee and subcommittee, DWR staff, and other expert opinions.

CALSIM II has received considerable public scrutiny because it is the model selected for assessing water projects of statewide significance and for Central Valley water operations. Since release of *The State Water Project Delivery Reliability Report 2002,* DWR and the Bureau of Reclamation (Reclamation) have performed several studies and analyses to advance acceptance and build additional broad support and

confidence in the CALSIM II model and modeling studies. An important step in this process was an external peer review conducted by the CALFED Bay-Delta Program of CALSIM II in 2003.

The key questions assessed by the review panel were:

- Has the CALFED program adopted an appropriate approach to modeling the CVP/SWP Central Valley system?
- Is the general CALSIM II modeling approach appropriate for predicting the performance of the system and for use in allocation planning, assessing water supply reliabilities, and carrying out operational studies?

The panel considered a variety of CALSIM II issues and how future model development activities can be managed to assure quality results for current and proposed applications. The panel published its results in *A Strategic Review of CALSIM II and its Uses for Water Planning, Management, and Operations in Central California* (Close et al., 2003, available at http://science.calwater.ca.gov/pdf/CALSIM_Review.pdf

The Strategic review's findings included:

- A unique aspect of CALSIM II is the level of cooperation between federal (i.e. the Bureau of Reclamation) and State (Department of Water Resources) interests in its development. This kind of cooperation is rare, and in fact this may be the only such example of such coordination for a system of this scale and complexity... CALSIM II can provide a showcase for other states as to what can be accomplished with federal and State cooperation for river basin management. (p18)

- The use of an optimization engine for simulating the hydrology and for making allocation decisions is an appropriate approach and is in fact the approach many serious efforts of this kind are using. (p 2)

- CALSIM II represents a state-of-the-art modeling system that is similar in general concept, while differing in specific details, to other data-driven river basin modeling systems such as ARSP, MODSIM, OASIS, REALM, RiverWare, and WEAP. (p4)

In general, the panel concluded that the current modeling was appropriate and addressed many of the complexities of the CVP/SWP system and its water management decisions. To balance the competing needs of those who require greater detail from the model and those who require less detail, the panel recommended steps to achieve a more comprehensive, modular, and flexible approach in modeling practices and tools. To increase user confidence in model results and to provide a basis for gauging the model's ability to produce absolute predictive results of system behavior, the panel suggested calibration and verification of the model, as well as analyses in sensitivity and uncertainty.

Traditional model calibration and verification process is difficult to apply to a planning model, such as CALSIM II, that simulates operations and water supplies at a fixed level of development. A specially designed study to evaluate performance of CALSIM II under recent historical conditions was conducted to simulate the historical 24 year period of 1975 through 1998. In this study, model parameters such as historical land use, the Delta standards, and water demands were allowed to vary to mimic the historical trend. Results of this study demonstrated quite well the adequacy of CALSIM II. A technical report on the results of this effort was published in November 2003 and is available at http://science.calwater.ca.gov/pdf/CalSimII_Simulation.pdf. In addition, another study on the sensitivity and uncertainty of major CALSIM II model parameters has been recently completed; a report on this study will soon be released.

In August 2004, DWR and Reclamation jointly responded to the questions, comments, and recommendations of the review panel in a report, *Peer Review Response: A Report by DWR/Reclamation in Reply to the Peer Review of the CALSIM II Model Sponsored by the CALFED Science Program in December 2003 Peer Review Response,* available at http://baydeltaoffice.water.ca.gov/modeling/hydrology/Peer Review Response (August 2004).pdf. The agencies' report outlined ongoing and model development plans and the agencies' priorities in improving CALSIM II. The report also highlighted the ongoing and planned efforts to establish trust in and credibility for the model by improving documentation, conducting sensitivity and uncertainty analyses of the model parameters and results, enhancing the level of detail in the geographic representation of the system, and improving hydrologic input and software development.

Many of the elements of model development features outlined in the *Peer Review Response* are in progress and will be implemented in the updated version of the model, CALSIM III. In the case of the Monterey Plus EIR modeling studies, a modeling subcommittee was formed early in the planning process to review assumptions that would be input to the model. All documentation and data sets were made available and reviewed by the subcommittee as they were developed.

In summary, DWR has confidence in the model as a tool to examine the hydrologic and environmental consequences of SWP projects including the Monterey Amendment. CALSIM II was designed to mimic historical conditions as closely as possible by using historical data wherever available, and by making reasonable assumptions where reliable historical data are not available. DWR is taking reasonable steps to address technical controversies expressed by interested stakeholders and the public regarding the perceived strengths and weaknesses of the model. DWR is confident that it is using the model in an appropriate way. As CALSIM III develops, DWR will make it available to other agencies and the public, and DWR will continue to further refine our modeling abilities as our technical knowledge and resources increase.

If you have additional questions, about CALSIM II or the ongoing work to complete the work required to address comments from the *Strategic Review*, please address your comments about the model to Francis Chung (916) 653-5924 or his e-mail address: chung@water.ca.gov. If you have questions about the preparation of the Monterey Plus EIR, please address your comments to Delores Brown at (916) 227-2407 or via e-mail at delores@water.ca.gov.

Sincerely,

Original Signed By
Gerald E. Johns

Gerald E. Johns
Deputy Director