FINAL SCOPING REPORT

Summary of Scoping Meeting Reviewing Questions for the Independent Review Panel on Appropriate Measurement June 15th, 2001

OVERVIEW:

On June 15th, CALFED convened a Scoping Meeting for the Independent Review Panel on Appropriate Measurement. The six-hour meeting was held to review and refine the questions that will frame the Panel's full deliberations later this year. A follow-up teleconference with panelists was held on June 21st to finalize their recommendations. This Scoping Report summarizes the outcome of both discussions.

BACKGROUND:

The August 2000 Record of Decision calls on the CALFED Bay-Delta Program to: 1) convene a panel to provide guidance on formulating a definition of "appropriate" measurement of water use; and then, 2) work with the Legislature to help develop a bill that would require "appropriate" measurement of all water uses in California.

> *"An independent review panel on appropriate measurement will be convened. This panel will provide guidance that will help define appropriate measurement as it relates to surface and groundwater usage. The panel will prepare a consensus definition of appropriate measurement by the end of 2001. At the completion of this stakeholder/technical process, CALFED Agencies will work with the California State Legislature to develop legislation for introduction and enactment in the 2003 legislative session requiring the appropriate measurement of all water uses in the State of California." (August 2000 CALFED Record of Decision)*

The Independent Review Panel's deliberations are focused exclusively on agricultural water use. The results of the Panel's deliberations will be combined with comparable urban language – developed through a separate process – to prepare a comprehensive, draft definition of appropriate measurement that will be disseminated to and discussed with CALFED agencies, policymakers and interested members of the public. CALFED will then work with the Legislature and the Governor to develop legislation related to appropriate water use measurement. CALFED recognizes that the Legislature and Governor retain sole responsibility for the enactment of statewide legislation. (A more detailed overview of the Panel background and process is included in the Terms of Reference included as **Attachment 1**.)

The primary aim of the Scoping Meeting was to brief interested members of the public on CALFED's rationale for convening the Panel, and to offer stakeholders and the general public an opportunity to review CALFED's proposed structure for the Panel's October deliberations. Panel members were also given the opportunity to guide the structure of their future deliberations by reframing questions, as needed, and to identify additional information they require in order to ensure their discussions are as productive as possible.

The process – modeled after CALFED's Agricultural Water Conservation Potential Panel convened in December 1998 – encompasses five primary steps: 1) gathering background information; 2) conducting the Scoping Meeting; 3) executing an agreed-upon Scope of Work needed to inform the Panel's subsequent deliberations; 4) convening the Panel, and 5) drafting and finalizing a Panel Report. The panel's work is expected to be completed by December 2001. All facets of the Panel design were discussed with an ad hoc group of interested agricultural, environmental, and agency representatives.

SESSION STRUCTURE:

The one-day Scoping Meeting was structured to foster an open and informed dialogue among CALFED staff and consultants, Panel members, technical advisors and interested stakeholders.

Participation:

Panelists were recruited based on their collective ability to provide understanding of: measurement technology, resource economics, groundwater hydrology, technical water policy and irrigation engineering. Additionally, each panelist needed to meet the following criteria: 1) objectivity, as reflected in the perceived willingness / ability to integrate diverse viewpoints; 2) ability to work collaboratively; 3) understanding of the various objectives related to measurement; 4) practical experience with on-the-ground use of measurement; 5) competent and comfortable with analysis, storage, dissemination and use of measurement data; and, 6) availability. Based on the criteria, CALFED recruited the following panelists:

Panelist	Affiliation	Expertise
Naomi Duerr	Deputy Executive Director of Water Resource Management, South Florida Water Management District	Technical Water Policy Advisor
Thomas Harter	Professor, Department of Land, Air and Water Resources, UC Davis	Groundwater Hydrology
Steve Hatchett	Economist, Western Resource Economics	Resource Economics
Jack Keller	Professor Emeritus of Agricultural and irrigation Engineering, Utah State; Founder and CEO, Keller-Bliesner Engineering	Irrigation Engineering
John Replogle	Research Hydraulic Engineer and Chief Scientist, U.S. Water Conservation Laboratory	Measurement Technology

The panelists were supported in their deliberations by nine Technical Advisors selected by the agricultural and environmental communities, as well as federal and state agencies. The Technical Advisors included:

Agriculture	Environmental	Agency
Lloyd Fryer (Kern Co. Water Agency)	Dana Haasz (Pacific Institute)	Arturo Carvajal (USDA / NRCS)
Roger Reynolds (Summers Engineering)	Spreck Rosecrans (Environmental Defense)	Luana Kiger (DWR)
Marc Van Camp (MBK)	Roberta Borgonovo (League of Women Voters)	Tracy Slavin (USBR)

Finally, the Scoping Meeting was facilitated by Tom Gohring, Program Manager for CALFED's Water Use Efficiency Program, and Scott McCreary and Bennett Brooks of CONCUR, Inc. A group of technical consultants completed CALFED's Core Team in the substantive areas of engineering, law and economics. Team members include Mark Roberson, David Purkey, Lee Axelrad, Scott Feistel, Kevin Johansen and Lisa Whitman. CALFED staffperson Mary Berkowitz serves as team coordinator. (Detailed biographies of panelists, Technical Advisors and Core Team members are included as **Attachment 2**.)

Meeting Structure Overview:

The one-day Scoping Meeting began with a welcome, introduction of the Panelists, and a brief review of the meeting agenda. This was followed by several background briefings: a review of the CALFED Bay-Delta Program by Steve Shaffer with the California Department of Food and Agriculture; a summary of the Water Use Efficiency (WUE) Program presented by WUE Program Manager Tom Gohring; and an overview of the Panel purpose and suggested approach (also presented by Tom Gohring). Scott McCreary reviewed the Panel process and Ground Rules.

The main portion of the agenda was structured to review a series of three broad questions proposed by CALFED to serve as the focus for the Panel's deliberations.

Question One:	What are the objectives of measurement? Which of these support CALFED Program objectives? What additional data collection and research is required to support the Panel's deliberation on this question?
Question Two:	What considerations can impact the "appropriateness" of measurement? What are the reasons for not measuring? Please characterize the differing cost-and-benefit relationship formats across California's diverse agricultural water realm. What additional data collection and research is required to support the Panel's deliberations on this question?
Question Three:	What is the analytic framework for determining appropriate measurement for the diverse range of agricultural water uses in California? What are the necessary elements to incorporate into a workable definition of appropriate measurement? What might the framework of such a definition look life? What additional data collection and research is required to support the Panel's deliberation on this question?

The review of each proposed question began with a brief presentation by CALFED Program staff to set the appropriate context. Panelists then followed with questions and comments. Next, Technical Advisors were asked to offer their perspectives. Remarks from the public constituted the final level of review, followed by a synthesis of the comments by the facilitation team. All participants were asked to focus their analysis of each question around three specific issues:

- Are we asking the right question?
- Have we asked the question in the right way?
- What information and/or preparation is needed to support the Panelists' deliberation on this question?

A copy of the full agenda is included as **Attachment 3**.

OUTCOME OF SCOPING SESSION:

Key Themes:

The Panel's deliberations on the proposed questions – initiated during the June 15 Scoping Meeting and continued during the follow-on June 21 teleconference – focused around several broad themes. These themes, outlined below, provide important guidance to the CALFED Core Team in preparing for the Panel deliberation session in the fall. They are:

- **Clearly articulate problem definition.** Panel members emphasized the need for CALFED to more clearly articulate the purpose of agricultural water measurement – both for surface and groundwater and at different levels (on-farm, district, regional, statewide). As one panelist said: "What's broken that you need to fix?" Focused problem definition is essential, Panel members said, if they are to provide meaningful guidance on defining "appropriate" measurement.

- **Understand breadth and limitations of California's current approach.** Panel members agreed that any future deliberations related to appropriate measurement must be grounded in a solid understanding of the state's current approach to regulating measurement. More specifically, Panel members felt it was critical that they have a complete picture of the current laws and regulations related to both surface and groundwater and how these laws and regulations have developed over time. Additionally, panelists called for a deeper understanding of: 1) compliance with and verification of existing laws and regulations; 2) achievements and limitations of existing local, state and federal measurement programs; and, 3) existing measurement databases currently developed and maintained.

- **Learn from other states.** Several panelists and other participants noted that other Western states have experience implementing different measurement approaches for agricultural use of both surface and groundwater. Given this track record, panelists called on CALFED to take stock of the lessons learned elsewhere and use these other states' experiences to flesh out information related to purposes, benefits and available options/strategies. This comparison could, in particular, explore the rationale other states use in implementing a top-down, Best Management Practices-like approach versus an objective-driven effort.

- **Identify programs benefiting from measurement.** Panelists emphasized that the benefits of measurement are derived from other programs and not from measurement itself. Measurement, for example, is used to help statewide water managers make policy decisions, districts make allocation decisions, and on-farm users make day-to-day planning decisions. The Panel called on CALFED to develop a comprehensive list of the local, state and federal programs that can benefit from some type of measurement. Preparing a more comprehensive listing of these benefits is particularly important, several panelists and others noted, if CALFED intends to look at the cost-effectiveness of measurement.

- **Consider range of possible approaches.** Crafting a mandate to conduct measurement, Panel members noted, can be approached in any number of ways. It

can, for example, be driven by a top-down and likely mechanistic and prescriptive Best Management Practices-oriented approach. Or it can, as CALFED suggested, be shaped by an objective-driven approach. To facilitate comprehensive deliberations on this topic, Panel members emphasized the importance of considering the range of possible approaches and then selecting the approach that best meets the stated purposes.

- **Clarify linkage between Panel's deliberations and future legislative steps.** Several panelists were unclear how the Panel's work fit with the Record of Decision's call for the eventual introduction of statewide legislation. CALFED staff explained that this effort is, in fact, a two-step process. The first step is for the Panel to define appropriate measurement. Once the definition is complete, CALFED will initiate the second step: working with CALFED agencies, the Legislature and Governor, interested stakeholders and others to develop proposed legislation widely perceived as both necessary and viable.

Other Issues:

The discussion yielded a number of additional comments. Some of the observations, outlined below, focused around substantive issues. They included:

- Tailor the level of accuracy to fit the intended use of the information. Several panelists and Technical Advisors commented on the need to understand: 1) the linkage between accuracy and intended use; 2) the ramifications of combining precise data with rough estimates; and, 3) the value of sampling versus extensive measurement.

- Define "measurement." Several panelists and others commented on the need to more precisely define measurement. Is it, for example, continuous or occasional, operational- or policy-focussed, precise or estimated?

- Explore the use and availability of data. Panel members agreed that decisions on recording, dissemination and analysis of measurement values are crucial to the value and acceptance of measurement. For example: How is data to be collected, analyzed and disseminated? Who are the end users, who stores the data and who can access the information and how?

- Understand more completely the extent of current groundwater measurement and estimation practices. Both panelists and Technical Advisors stressed the need to better understand the extent to which groundwater data is measured and stored. As well, one panelist emphasized the need to review existing alternative technologies for estimating groundwater usage (in lieu of well head measurement).

Other comments were more process-oriented. They included:

- **Recruit an additional Panel member with operator perspective.** Panel members and other speakers agreed on the need to expand the Panel to include a water district operator intimately familiar with agricultural irrigation in California.

- **Include State Board as Technical Advisor.** Meeting participants strongly recommended that the Technical Advisor tier be broadened to include a representative from the State Water Resources Control Board.
- **Conduct additional, aggressive outreach prior to October session.** Given the lower-than-expected turnout (about 13 members of the public) and the need for broader buy-in to the approach, several speakers suggested that CALFED consider an additional outreach strategy between the Scoping and full Panel deliberations.

Information Needs

Finally, as requested, participants identified an extensive list of information that would be useful to the Panel's subsequent deliberations. This list of tasks – to be refined in subsequent conversations among the Core Team and panelists – included the following:

- Conduct a strategic review of California and other states' current agricultural water measurement approaches, laws and compliance / verification. This effort should focus on both surface and groundwater.
- Survey water users, water suppliers, and water conservation advocates to better understand attitudes and practices related to measurement.
- Develop a draft list of possible objectives / benefits served by measurement. This list should include linkages beyond WUE and CALFED.
- Compare districts and / or regions with varying levels of measurement intensity to evaluate the benefits of measurement.
- Identify examples that highlight the ability / inability of the current measurement approach to capture information related to: CALFED quantifiable objectives, water transfers, groundwater banking, scale / accuracy needs.
- Provide detailed cost data related to measurement (hardware, installation, O&M, data collection / storage / analysis, etc.).
- Develop a set of groundwater measurement strategies from local to regional levels and identify where they could be used in California.
- Define relationship between the accuracy of measurement and particular objectives.
- Prepare an overview of the existing alternative technologies for estimating groundwater usage.

Reframed Questions:

Based on the key themes identified above – and building on the other comments and suggestions offered during the deliberations – the Core Team drafted a revised set of proposed questions. These proposed questions, provided below and accompanied by an explanation of each question's intent, were reviewed and confirmed during the June 21 teleconference with Panel members.

Reframed Questions	Explanation
Question One: What is the purpose of agricultural water measurement? (What problems does it address?)	The CALFED team will provide to and discuss with the Panel a draft answer to this question by late August 2001. The draft answer, to be either revised or confirmed during the Panel's fall deliberations, would be driven by a review of current statewide ag water measurement laws / practices and a survey of interested parties. It also would be informed – though not driven – by a look at other states.
Question Two: How do ag water measurement activities support / enable the implementation of various programs?	This question is intended to facilitate the Panel's articulation of the objectives associated with ag water measurement. The question is built on the assumption that ag water measurement's benefits are derived from its support of other efforts / programs.
Question Three: What options are currently available to meet the purposes (Question One) and objectives (Question Two) of agricultural water measurement? What additional options, if any, are needed?	This question is intended to foster the Panel's deliberation on the measurement tools (known approaches) available to support the range of purposes outlined in Question One. It also anticipates a discussion of the considerations or "dimensions" that can affect the "appropriateness" of measurement. Finally, this question is intended to trigger discussion on existing tools (CA and elsewhere); gaps in known approaches; and possible designs of new, incremental and / or value-added approaches.
Question Four: What are alternative workable definitions (programs) of appropriate ag water measurement? What rationale or process might be used to advance particular elements into draft legislation?	This question is intended to integrate answers to the preceding questions in a comprehensive framework (program) for defining appropriate measurement. One possible framework is to consider various "If, then" scenarios, where the Panel links specific purposes with recommended approaches. The Panel may wish to go one step further – articulating a rationale for CALFED to use in selecting among the various potential elements for incorporation into proposed legislation.

A detailed work plan outline also was suggested and discussed with the Panel during the June 21 teleconference. As recommended by Panel members, the Core Team will convene periodic teleconferences with the Panel to ensure the suggested work plan outline is moving forward in a manner that will inform the Panel's October deliberations. As necessary, the work plan will be revised to meet resource and time constraints. A copy of the Work Plan is included as **Attachment 4**.

NEXT STEPS:

As a result of the Panel's deliberations, the Core Team has outlined a series of next steps. The primary next steps are:

- **Fully Develop Work Plan.** The CALFED Core Team will be developing the scope of work needed to execute the agreed-upon work plan outline. This detailed scope of work will be circulated among Panel members for their review and comment.

- **Recruit Additional Participants.** The CALFED Core Team will identify potential candidates to fill the recommended Panel spot for a California water district operator. CALFED will rely on the selection criteria used to recruit the current panelists. As well, CALFED will discuss its candidates with an ad-hoc work group of environmental, agricultural and agency representatives. Similarly, CALFED will invite and encourage the State Water Resources Control Board to nominate a Technical Advisor.

- **Convene Panel.** CALFED currently intends to convene the Panel October 29-31 to begin its deliberations and develop a consensus definition of appropriate measurement. The Panel is expected to meet in either Davis or Sacramento. Background materials will be made available to panelists, Technical Advisors and others in advance of the two-and-a-half day session.

- **Launch Post-Panel Work Plan.** Following the Panel's October deliberations, the CALFED Core Team will summarize the results into a Panel Report, which will be reviewed and finalized by the panelists. CALFED will then fold comparable urban-related language into a draft consensus definition of appropriate measurement to be disseminated to and discussed with policymakers, CALFED member agencies, and interested stakeholders. Finally, after a series of statewide workshops, CALFED will develop and forward its legislative recommendations to the Legislature and Governor for their consideration and further deliberation.

For further information regarding this Scoping Meeting or the Independent Review Panel initiative, please contact Tom Gohring with the CALFED Bay-Delta Program at 916-653-3790.

ATTACHMENTS:

Attachment 1: Terms of Reference
Attachment 2: Biographies
Attachment 3: Agenda
Attachment 4: Work Plan Outline

ATTACHMENT 1

SCOPING MEETING FOR
INDEPENDENT REVIEW PANEL ON
APPROPRIATE MEASUREMENT
University Club – University of California, Davis
June 15th, 2001

TERMS OF REFERENCE

PURPOSE:

The CALFED Bay-Delta Program is to convene an Independent Review Panel on Appropriate Measurement to assist in defining appropriate measurement as it relates to agricultural water use efficiency.

BACKGROUND:

The CALFED Bay-Delta Program is a cooperative effort among state and federal agencies and the public to ensure a healthy ecosystem, reliable water supplies, good quality water, and stable levees in California's Bay-Delta system. The Water Use Efficiency Program is one of several Program elements CALFED is implementing through an integrated approach.

In its August 2000 Record of Decision, CALFED committed to accomplishing the following task as part of its Stage 1 Actions associated with the Water Use Efficiency Program:

> "An independent review panel on appropriate measurement will be convened. This panel will provide guidance that will help define appropriate measurement as it relates to surface and groundwater usage. The panel will prepare a consensus definition of appropriate measurement by the end of 2001."

CALFED believes the Independent Review Panel on Appropriate Measurement can play an important role in framing issues as they relate to agricultural water use. The Panel's deliverable will be a consensus definition of appropriate measurement. This definition is expected to provide a flexible framework – not a one-size-fits-all prescription.

A separate process will be used to address urban water use. The results of both processes will be folded into a comprehensive set of recommendations.

The outcome of the Panel's deliberations will be used as a foundation for the following additional ROD task: "CALFED Agencies will work with the California State Legislature to develop legislation for introduction and enactment in the 2003 legislative

session requiring the appropriate measurement of all water uses in the State of California." CALFED recognizes that its work is advisory only; the Legislature and the Governor retain sole responsibility for the enactment of statewide legislation.

OBJECTIVES:

As noted above, the Panel – a cross-disciplinary mix of independent experts – is to provide guidance that will help define appropriate measurement as it relates to agricultural surface and groundwater usage. In carrying out its work, the Panel will likely focus on the following questions: 1) what are the potential benefits and costs of measurement to water users, suppliers and the broader public; 2) how do the potential benefits and costs vary with conditions and what are the prevailing drivers; and, 3) what are the barriers – technical, economic, institutional or political – to measurement. The specific questions to be engaged will be framed during a Scoping Meeting by the panelists themselves, in discussion with CALFED staff and stakeholders.

This initiative – to be launched in the spring of 2001 and completed by December 2001 – is guided by several key principles:

- **Objective-driven effort.** A critical underpinning of the Agricultural Water Use Efficiency (WUE) Program is to link water management practices to objectives. This same approach is being applied to discussions regarding appropriate measurement. The Panel's deliberations will be structured to first explore the objectives of measurement (both surface and groundwater) and then develop a definition that is consistent with the identified objectives. The discussion also will be shaped to link the Panel's deliberations on appropriate measurement to the WUE Program's overall goal of achieving regional and / or statewide Targeted Benefits (objectives) related to timing and flows, quality and quantity.

- **Open process with stakeholder involvement.** CALFED's Record of Decision acknowledges the value of and calls for stakeholder involvement. To facilitate this involvement, the Panel's deliberations will be structured to allow for and encourage stakeholder input. As was done with the December 1998 Independent Review Panel on Agricultural Water Conservation Potential, stakeholders will be invited to nominate technical advisors to participate in the discussions. As well, the Panel's deliberations will be conducted in public. Finally, CALFED-convened, stakeholder groups representing diverse agricultural, environmental and agency interests are to serve as a sounding board regarding Panel design, panelists selection and outcomes.

- **Outcome-focused.** It is CALFED's intention to use the Panel process to elicit concrete recommendations regarding the definition of appropriate measurement in the context of drafting legislation. These recommendations will be included in a report that summarizes the Panel's findings and deliberations and suggests critical elements and concepts to incorporate into a legislative proposal. This guidance will then be used by CALFED staff, in consultation with stakeholders, the legislature and others, to inform the drafting of proposed legislation related to appropriate measurement.

- **Legitimacy, accountability, neutrality.** To ensure the process is credible and results in advice useful to CALFED and accepted by stakeholders, it is essential that the Panel's work be structured in a manner that fosters legitimacy, accountability and neutrality. Accordingly, the Panel process outlined below incorporates a handful of key elements – meaningful stakeholder involvement, joint scoping of questions to be addressed, criteria to guide panelist and technical advisor selection, and deliberations in public – that are intended to facilitate such an atmosphere.

APPROACH:

Participants:

Panel Members. The Program intends to recruit nationally recognized technical experts who collectively can provide understanding of the following areas:

- Measurement technology / hardware. This panelist is to bring an understanding of existing and emerging measurement technologies and hardware. He / she should also be familiar with the technological limitations.

- Resource economics. This panelist is to bring expertise related to the costs and benefits associated with measurement. He / she should also be familiar with issues related to financing measurement improvements.

- Groundwater hydrology. This panelist is to bring an understanding of the purposes, benefits, limitations and costs associated with groundwater measurement. Ideally, he / she would have experience working in and out of adjudicated basins.

- Technical water policy advisor. This panelist is to bring an in-depth understanding of how the integration and interpretation of large data sets can be used to inform public-sector policy making. This includes understanding: 1) what's required to collect and use data, and, 2) what are the relative costs and benefits of maintaining centralized data.

- Senior integrator / irrigation engineering. This panelist is to contribute expertise related to irrigation engineering. As well, this panelist will bring practical experience in recommending measurement programs for water agencies.

Additionally, the following criteria will apply across all panelists: 1) technical capability to cover the required disciplines; 2) objectivity, as reflected in the perceived willingness / ability to integrate diverse viewpoints; 3) ability to work collaboratively; 4) understanding of the various objectives related to measurement; 5) practical experience with on-the-ground use of measurement; 6) competent and comfortable with analysis, storage, dissemination and use of measurement data; and, 7) availability.

A list of the panelists, along with their expertise and affiliation, is provided in the chart on the following page.

Panelist	Affiliation	Expertise
Naomi Smith Duerr	Deputy Executive Director of Water Resources Management, South Florida Water Management District	Technical Water Policy Advisor
Thomas Harter	Professor, Department of Land, Air and Water Resources, University of California, Davis	Groundwater Hydrology
Steve Hatchett	Economist, Western Resource Economics	Resource Economics
Jack Keller	Professor Emeritus of Agricultural and Irrigation Engineering, Utah State; Founder and Chief Executive Officer, Keller-Bliesner Engineering	Irrigation Engineering
John Replogle	Research Hydraulic Engineer and Chief Scientist, U.S. Water Conservation Laboratory	Measurement Technology

Technical Advisors: Stakeholders will be encouraged to name technical representatives to provide additional information to the Independent Review Panel. Stakeholders will be asked to select representatives who: 1) have expertise in relevant areas; 2) have strong communication skills; and 3) are willing to disclose their various affiliations. Between the scoping and full panel deliberations, technical advisors may also be asked to help CALFED better understand local issues and information sources. Each major stakeholder group – agricultural, environmental and agency – will be asked to name three technical representatives. Finally, CALFED staff and consultants will be on hand to provide additional expertise, as needed.

Public Participation: A broad range of stakeholders and other interested parties will be invited by CALFED to observe the deliberations of the Independent Review Panel. The public will be given periodic opportunities to address the panel.

Process:

CALFED envisions a Panel process that will begin in the spring of 2001 and end in December 2001. The process – modeled after the Agricultural Water Conservation Potential Panel – encompasses four primary steps: 1) gathering background information; 2) conducting Scoping Session; 3) executing Scope of Work; and 4) convening Panel. Each of these steps is further detailed below.

Step One: **Information Gathering and Pre-Panel Briefing.** CALFED staff and consultants will review the existing literature to develop initial background materials related to the following topics:

- Descriptions of prevailing usage, emphasizing types of measurement, geographical distribution and factors driving usage (costs and benefits).

- Available measurement technologies, including both current and emerging options.
- Discussion of linkage between water management objectives, flow path management and flow path quantification within the context of a standard water balance structure.
- An overview of the legal landscape related to measurement, highlighting relevant state statutes and characterizing the range of, trends in and rationales for legal approaches at the local / regional level.

These materials will help both CALFED staff and panelists frame the topics to be engaged at the Scoping Session and in subsequent work undertaken by consultants and in future Panel deliberations.

Step Two: **Conduct Scoping Session.** Panelists, technical advisors and CALFED staff and consultants will participate in a Scoping Session, where participants will: 1) review and distill key lessons from background information distributed prior to the session; 2) frame specific questions to be engaged by the Panel at a later date; 3) identify information needed to inform the Panel's future deliberations on appropriate measurement; 4) identify other preparatory needs; 5) develop a work plan needed to inform subsequent panel discussions; and, 6) describe capabilities required to execute the proposed work plan.

Step Three: **Execute Scope of Work.** Based on the Panel's deliberations at the Scoping Session, CALFED will develop a scope of work necessary to inform subsequent Panel deliberations. The scope of work is likely to include, among other tasks, a survey that gathers information statewide related to: objectives of measurement; variations in approach to and objectives of measurement by region; and types and extent of measurement already being used. CALFED intends to rely on outside consultants to execute the proposed scope of work, which will then be disseminated to Panel members, technical advisors and interested stakeholders.

Step Four: **Convene Panel.** Using the information generated through the scope of work, the Independent Review Panel will attempt to meet its objectives through deliberations during a public multi-day session. Stakeholder technical representatives will be invited to provide background information and to observe the deliberations. Members of the public also will be invited to attend. The Panel may opt to caucus for a portion of the deliberations in order to digest and synthesize their findings before reporting back. At the end of the session (or subsequent sessions, if necessary), the Panel will produce a report that offers a draft definition of the elements of appropriate measurement. A consensus opinion is preferred; panelists will be provided the opportunity to submit minority opinions.

Following the Panel's deliberations, CALFED will develop a draft definition that will then be disseminated to and discussed with CALFED agencies, policymakers and interested members of the public. This draft definition will be combined with

comparable urban-related language to ensure CALFED is putting forward a comprehensive recommendation. CALFED envisions holding multiple workshops throughout the state to ensure broad public review and input. CALFED's recommendations will then be forwarded to the Legislature and the Governor, who retain sole responsibility for the enactment of statewide legislation.

Deliverable

The Independent Review Panel's primary deliverable will be a final written report, which is to include: a draft definition of the elements of appropriate measurement; potential elements to incorporate into a legislative proposal; and supporting materials. This definition will assist CALFED in working with the Legislature to draft legislation on appropriate measurement.

It is anticipated that this definition will provide a framework for determining the most appropriate measurement for given situations. It is not expected to dictate a one-size-fits-all prescription for measurement.

Timing:

CALFED staff proposes a timeline that is responsive to the commitments made in the Record of Decision, yet sensitive to the time needed to develop a thoughtful response to the issues under discussion. Accordingly, CALFED intends to move forward with the Scoping Session as early as possible, but develop a consensus definition of appropriate measurement by the end of 2001. A more detailed timeline follows below.

March-May 2001:	Identify and recruit Panelists and Technical Advisors Gather and disseminate background information Prepare for Scoping Session
Mid-June 2001:	Convene Scoping Session *(expected to last one day)* Develop consensus scope of work
June-Oct 2001:	Recruit and select additional consultant(s), as needed Execute agreed-upon scope of work
November 2001:	Convene Panel *(expected to last two to three days)*
December 2001:	Conduct additional work / Panel discussions, as necessary Develop consensus definition of appropriate measurement
Post-2001:	Refine draft consensus definition of appropriate measurement; fold in comparable urban-related language. Meet with policymakers, CALFED agencies and interested stakeholders to discuss draft consensus definition. This effort is expected to include statewide workshops. Forward recommendations to Legislature and Governor for their consideration and further deliberation.

ATTACHMENT 2

SCOPING MEETING FOR
INDEPENDENT REVIEW PANEL ON
APPROPRIATE MEASUREMENT
University Club – University of California, Davis
June 15th, 2001

PANELIST BIOGRAPHIES

NAOMI DUERR is currently Deputy Executive Director for the South Florida Water Management District (SFWMD), a $524-million agency responsible for flood control, environmental restoration, water allocation, and protection of natural systems in a 16-county area covering 10 million people. Ms. Duerr received her BS in Geology and her Masters of Public Administration and Policy (MPA) with a specialty in water policy, both from the University of Nevada - Reno. She is a Certified Professional Geologist.

Ms. Duerr's areas of responsibility with SFWMD include water supply planning, water conservation, watershed management, environmental regulation, construction and engineering. She is currently leading the district's effort to establish minimum flows and levels for the Everglades and other water bodies, and has recently been tasked with heading up the effort to manage the drought in south Florida. Her staff are involved in projects to restore Kissemmee River Basin, Lake Okeechobee and the Everglades, as well as the construction of 200 aquifer storage and recovery wells.

From 1993 to 2000, Ms. Duerr was the State Water Planner and head of the Division of Water Planning in Nevada, the driest state in the nation. There she led a team of scientists and planners in developing the state drought plan, state water conservation plan, and regional watershed plans, and initiated the state natural resource plan and state floodplain management program. The Nevada State Water Plan, developed under her direction, was selected as the *Most Notable Document of the Year 2000* by the National Conference of State Legislators. As State Water Planner, Ms. Duerr was also responsible for implementing data analysis and water education programs, and a $50 million program of grants for water conservation and construction of water systems. Prior to joining the state of Nevada, Ms. Duerr was the Deputy Director of the Regulation Department at the St. Johns River Water Management District in Florida, where she led the effort to develop new water conservation and water measurement rules. Professional honors include: *Florida Regulatory Person of the Year* by the Florida Rural Water Association, and recipient of the *Golden Pinecone Award*, Nevada's most significant environmental achievement award.

THOMAS HARTER is currently Associate Cooperative Extension Specialist in Subsurface Hydrology and a faculty member of the Department of Land, Air, and Water Resources at UC Davis. He received his Ph.D. in Hydrology from the University of Arizona, where he also was a Fulbright Scholar and Harshbarger Fellow. He earned his M.S. in Physical Geography / Hydrology from the Universities of Freiburg and Stuttgart, Germany.

Dr. Harter is conducting research on deep vadose zone characterization and groundwater resources assessment through groundwater flow and contaminant transport modeling. He is serving as principal investigator for developing a regional groundwater and surface

water model of a 1,500-square-mile watershed in the San Joaquin Valley, a risk analysis of production aquifer salinization in the Western San Joaquin Valley, and an assessment of groundwater quality impacts from animal farming operations. As a technical reviewer for the state of Arizona, he has advised on project design and research implementation involving groundwater development projects. Dr. Harter has also taught numerous courses on topics including Groundwater Flow and Transport Modeling, Vadose Zone Modeling, and Applied Groundwater Hydrology.

Dr. Harter is a member of the American Geophysical Union, the European Geophysical Society, the International Association of Hydrologic Sciences, the National Ground Water Association, and the Groundwater Resources Association of California. He has contributed articles to numerous publications and conferences including "Environmental Science and Technology," "Journal of Hydrology," and "Water Resources Research."

STEVE HATCHETT is an economist specializing in agriculture, water resources, and mathematical and statistical analysis. He received his Ph.D. in Agricultural Economics from the University of California at Davis in 1984. Dr. Hatchett is owner of Western Resource Economics, a private consulting firm specializing in agriculture and water resources in the western U.S. Prior to opening his private practice in early 1999, Dr. Hatchett served as economist and project manager in the Sacramento office of CH2MHILL for more than 11 years.

Dr. Hatchett has led the economic analysis for numerous projects related to agricultural water use. Clients include the Bureau of Reclamation (Mid-Pacific and Pacific Northwest Regions), CALFED, California Dept. of Water Resources, and many local agencies. Dr. Hatchett is a recognized expert in the economics of irrigated agriculture. Among his activities, he has:

- Developed a comprehensive database of agricultural land use, water use, production, prices, and costs for the Central Valley of California;
- Evaluated the trade-offs between on-farm irrigation costs, water use, and management for major Central Valley crops;
- Evaluated the effects of changes in water supply and pricing on irrigation water use in California;
- Assisted CALFED in quantifying agricultural water conservation targets and developing guidelines to evaluate water conservation proposals.

Dr. Hatchett has prepared numerous project reports, articles in professional journals, and presentations to professional conferences.

JACK KELLER is currently Professor Emeritus of Agricultural and Irrigation Engineering for the Biological and Irrigation Engineering Department at Utah State University, and founder and Chief Executive Officer of Keller-Bliesner Engineering. He received his Ph.D. in Irrigation Engineering from Utah State University, and his M.S. in Irrigation Engineering from Colorado State University.

During his tenure at the University, Dr. Keller has taught and carried out research in sprinkle and trickle irrigation, and served as Department Chairman from 1979 through 1985. While at the University he was the Co-Director (from 1978 through 1989) of the multi-disciplinary Water Management Synthesis Projects, funded by the U.S. Agency for International Development, to provide socio-technical assistance for transferring irrigation

technologies worldwide. Before joining Utah State University in 1960, Dr. Keller was the Chief Irrigation Engineer for W.R. Ames Company, a leading manufacturer of irrigation equipment in the United States. Over the years, he has served as a consultant to the Ames Company, as well as several other irrigation system manufacturing companies.

Through his public and private activities, Dr. Keller has provided advisory services on irrigation matters in over 50 different countries in all regions of the world. He is recognized as an international expert in the field of irrigation technology transfer, irrigation and irrigated agricultural policy formulation, and the problems associated with improving irrigated agriculture in both developed and developing countries. He is currently serving as Senior Policy Advisor in Kansas, Egypt, Morocco and California, and as a Senior Integrator with CALFED's Water Use Efficiency Program. He previously served as a panel member on the Independent Review Panel on Agricultural Water Conservation Potential. Dr. Keller is also serving as the Science Liaison Officer and Fellow for the international Water Management Institute, which is one of the CGIAR Centers. He is the author of 88 technical papers, 15 popular articles, 46 consulting reports, 5 handbooks, 2 textbooks, and 4 patents.

JOHN REPLOGLE is currently a Research Hydraulic Engineer and Chief Scientist at the U.S. Water Conservation Laboratory in Phoenix. He received his B.S and M.S. in Agricultural Engineering, and his Ph.D. in Civil Engineering, from the University of Illinois.

Dr. Replogle's past work has included leading research related to crop water management and on-farm irrigation system performance, irrigation delivery systems and their impacts on farm operations, and hardware and management techniques to improve delivery system capabilities to deliver water in response to on-farm crop water needs (on-demand). At the Water Conservation Laboratory, he serves as Lead Scientist and Research Hydraulic Engineer for developing control schemes, flow measurements methods related to irrigation management, and technology transfer methods related to irrigation. His work in canal flow measuring methods has led to frequent travels to irrigated areas of the world including Bangladesh, Pakistan, Nepal, and India. Clients for this work have included USAID, USDA, United Nations Development, Education Development Center, Inc., and Winrock International. He has authored or co-authored over 100 technical papers, including several books, book chapters and related articles on irrigation and irrigation system flow measurement, control, and management.

During the past decade Dr. Replogle has earned the Hancor Soil and Water Engineering Award, the Hydraulics Structures Medal, and the Royce J Tipton Award "...for a distinguished record of accomplishments in the field of irrigation and drainage engineering through research and service." He is a member of the American Society of Agricultural Engineers, the American Society of Civil Engineers, the International Commission on Irrigation and Drainage, and the American Association for the Advancement of Science.

TECHNICAL TEAM BIOGRAPHIES

TOM GOHRING is Program Manager of the Water Use Efficiency element of the CALFED Bay-Delta Program, a cooperative effort among state and federal agencies and the public to ensure a healthy ecosystem, reliable water supplies, good quality water, and stable levees in California's Bay-Delta. Mr. Gohring earned his M.S. in Irrigation Engineering from U.C. Davis and his B.S. in Agricultural Engineering from Cal Poly, San Luis Obispo. Prior to joining the CALFED team, he led several interdisciplinary water management and water use efficiency projects under the employ of large and small public and private entities including the U.S. Bureau of Reclamation, the Kings River Conservation District, and CH2M Hill, Inc.

LEE AXELRAD is an attorney with Resources Law Group, LLP. Mr. Axelrad's practice focuses on matters relating to natural resources, environmental, land use, and local government law, in both the administrative process and litigation and in conservation real estate transactions. Mr. Axelrad received his law degree from U.C. Berkeley's Boalt Hall School of Law and a master's degree in city and regional planning from U.C. Berkeley's College of Environmental Design.

SCOTT J. FEISTEL is an Assistant Water Resources Engineer at Provost & Pritchard Engineering Group, Inc. (P&P), a diverse civil engineering firm specializing in agricultural engineering. Mr. Feistel has a Bachelor of Science in Agricultural Engineering from California Polytechnic State University, San Luis Obispo. His professional endeavors include investigations, planning, evaluation, modeling, and design for irrigation districts, farms, the San Joaquin Area Flood Control Agency, U. S. Bureau of Reclamation, and the CALFED Bay-Delta Program.

KEVIN R. JOHANSEN is a Senior Water Resources Engineer at Provost & Pritchard Engineering Group, Inc. (P&P), a diverse civil engineering firm specializing in agricultural engineering. P&P is the district engineer or provides consulting engineering services for 25 water agencies in the San Joaquin Valley and provides district management services to four of those water districts. Mr. Johansen has an extensive background in investigations, planning, design, and administration of water distribution systems, water district management, water transfers, groundwater recharge facilities, and on-farm water management. Mr. Johansen earned his Bachelor of Science in Agricultural Engineering from Cal Poly, San Luis Obispo.

DAVID PURKEY is a founder and Principal Hydrologist with West World Water, a firm specializing in developing and applying innovative analytical tools in support of water management planning initiatives. He earned his Ph.D. and M.S. degrees from the University of California, Davis where he focused primarily on hydrologic processes in irrigated watersheds. His Bachelors Degree in Geology was awarded by Carleton College in Northfield, Minnesota. In recent months Dr. Purkey has focused his efforts on initiatives to promote groundwater banking in California and on efforts to account for the hydrologic and economic implications of environmental regulations on the Klamath Irrigation Project.

MARK ROBERSON is an Independent Consultant based in Sacramento, California. He has been under contract to the Water Use Efficiency element of CALFED for the past two years. He earned his Ph.D. in Soil and Water Sciences from the University of California. He has a M.S. in Agriculture from Cal Poly and a B.S. in Biochemistry from the University of California. He has extensive experience working at the district and farm level on innovative water management solutions.

FACILITATION TEAM BIOGRAPHIES

SCOTT T. McCREARY is Co-founder and Principal of CONCUR, Inc., a firm providing services in environmental policy analysis & strategic planning, agreement-focused facilitation, and negotiation training. Since its establishment in 1987, the firm has resolved over 30 complex environmental disputes across a wide range of water resource and other environmental issues. Dr. McCreary has facilitated CALFED Independent Review Panels on Agricultural Water Conservation Potential and the Ecosystem Restoration Program Plan. He earned his Ph.D. in Urban Studies and Planning and Conflict Resolution from MIT. He has a Masters of Landscape Architecture and Environmental Planning from the University of California, Berkeley, and a Bachelor of Arts in Biology and Environmental Planning from the University of California, Santa Cruz.

BENNETT BROOKS is a Senior Associate in the Berkeley office of CONCUR, Inc. He earned his M.P.P. from the Kennedy School of Government, Harvard University, and his B.A. in Political Science from Tufts University. At CONCUR, Mr. Brooks provides services in policy analysis, facilitation, and process design. Recent work includes facilitating CALFED-sponsored dialogues on water use efficiency and ecosystem restoration. He also co-facilitated CALFED's Independent Review Panel on Agricultural Water Conservation Potential. Prior to joining CONCUR, Mr. Brooks worked as a senior trade and economic development official with the Alaska State government. He also worked as a journalist in the U.S. and Asia.

LISA WHITMAN is an Associate in the Berkeley office of CONCUR, Inc. She earned her B.S. in Environmental Science and Philosophy from Allegheny College. At CONCUR, Ms. Whitman provides services in facilitation, natural resource planning, and conflict assessment. Most recently, she conducted a stakeholder analysis process to assess the applicability of mediation to a Superfund case in southern California, and has been involved in a number of water planning projects. Ms. Whitman also helped facilitate CALFED's Independent Review Panel on Agricultural Water Conservation Potential.

ATTACHMENT 3

SCOPING MEETING FOR
INDEPENDENT REVIEW PANEL ON
APPROPRIATE MEASUREMENT
University Club – University of California, Davis
June 15, 2001

AGENDA

9:00	**Welcome and Introductions**	
	General Welcome	*Scott McCreary, CONCUR*
	Panel Introductions	*Tom Gohring, CALFED*
	Overview, CALFED Program	*Steve Shaffer, CALFED*
	Overview, WUE Program	*Tom Gohring*
	Process / Ground Rules	*Scott McCreary*
9:45	**Overview, Independent Review Panel**	
	Context / Background	*Tom Gohring*
	Panel Comment	*Panel Members*
	Technical Advisors / Public Comment	*Stakeholders/General Public*
10:15	**Break**	
10:30	**Draft Panel Question One: Objectives**	
	Context / Background	*Tom Gohring/Technical Team*
	Panel Comment	*Panel Members*
	Technical Advisors / Public Comment	*Stakeholders/General Public*
	Synthesis	*Scott McCreary*
11:30	**Draft Panel Question Two: Considerations**	
	Context / Background	*Tom Gohring/Technical Team*
	Panel Comment	*Panel Members*
	Technical Advisors / Public Comment	*Stakeholders/General Public*
	Synthesis	*Scott McCreary*
12:30	**Lunch**	
1:45	**Draft Panel Question Three: Framework**	
	Context / Background	*Tom Gohring/Technical Team*
	Panel Comment	*Panel Members*
	Technical Advisors / Public Comment	*Stakeholders/General Public*
	Synthesis	*Scott McCreary*
2:45	**Possible Additional Questions/Preparatory Needs**	
	Context / Background	*Tom Gohring*
	Panel Comment	*Panel Members*
	Technical Advisors / Public Comment	*Stakeholders/General Public*
	Synthesis	*Scott McCreary*
3:30	**Wrap-Up**	
	Synthesis	*Scott McCreary*
	Next Steps	*Tom Gohring*
4:00	**Adjourn**	

Please see the attached page for a listing of the questions being considered for deliberation by the Independent Review Panel on Appropriate Measurement.

Technical Team members include: Mary Berkowitz, CALFED; Mark Roberson, CALFED consultant; Bennett Brooks and Lisa Whitman, CONCUR; Kevin Johansen and Scott Feistel, Provost & Pritchard Engineering Group; Lee Axelrad, Resources Law Group; and, David Purkey, West World Water

ATTACHMENT 4

Independent Review Panel on Appropriate Agricultural Water Measurement Work Plan Outline[1]

Task 1: Conduct strategic review of other states' current ag water measurement approach (surface and groundwater)
- Purpose
- Parties (entities that plan, manage or make use of data)
- Scope (location, time, accuracy, etc.)
- Compliance
- Storage / analysis / dissemination
- Gaps

Task 2: Conduct comprehensive review of current ag water measurement approach in California (surface and groundwater; laws, programs and databases; etc.)
- Purpose
- Parties (entities that plan, manage or make use of data)
- Scope (location, time, accuracy, etc.)
- Compliance
- Storage / analysis / dissemination
- Gaps

Task 3: Survey water users, water suppliers and water conservation advocates on issues related to measurement
- Purpose
- Practices
- Socio-political context
- Considerations
- Data storage, analysis, dissemination

Task 4: Develop draft list of possible objectives served by measurement. Candidate list might include:
- WUE-specific
- CALFED-wide
- Other local / state / federal programs
- Statewide water management planning
- Water transfers

Task 5: Compare districts / regions with varying level of measurement intensity

Task 6: Prepare examples that highlight ability / inability of the current measurement approach to capture information related to: quantifiable objectives, water transfers, groundwater banking; scale / accuracy needs; etc. (Purkey measurement matrix / water balance may be helpful here.)

Task 7: Detail considerations or "dimensions" that can affect the "appropriateness" of measurement. Possible considerations include: purposes, geography, water rights type; position in distribution system; type of beneficial use; measurement costs (at various scales / tasks); access to / use of information; complementary information (i.e., cropping patterns, prevailing economic conditions), etc.

Task 8: Prepare overview of existing alternative technologies for estimating groundwater usage (other than wellhead metering).

Task 9: Draft "strawman" alternative definitions of appropriate measurement.

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[1] Work Plan implementation is dependent on available CALFED funding.