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Gentlemen:

Following the February 26th CALFED Bay-Delta Workshop No. 5, I've had some thoughts on refining and narrowing the evaluation of the 20 core action alternatives. As was noted in our breakout group (moderated by Dale Flowers with Rick and others as a resource persons) there was a strong concern about the absence of objective measures and costs to permit assessing the relative merits of the alternatives. I was frankly bewildered by the myriad of attributes characterizing each alternative, divided among the components of water supply, water quality, ecosystem quality and system vulnerabily. It seemed to me that some approach was needed to facilitate generalizing the pros and cons of each alternative, with a view to identifying synergies or links among them.

I have found that color coding of descriptive attributes (e.g., basic, moderate and extensive) among categories of activity in a matrix helps to spot patterns and relationships. Also, it is very helpful to have at least a notional idea of the general cost of an activity as a basis for ranking the alternatives. I did this with the matrix of draft alternatives handed out at the workshop, which is attached as Table 1. The table is identical to the workshop's matrix but with the addition of several lines of data at the top. The first three rows show CalFed's descriptors of the potential levels of attainment of the three system quality objectives projected for each alternative (EQ, SV and WQ -- basic, moderate or extensive -- taken from the "Table of Alternatives" for the 20 alternatives also handed out at the workshop). Then the fourth row shows my ordinal ranking of each alternative, based on a very rough estimate of what the overall dollar cost of each would be relative to the others. I did not estimate actual dollar values, but rather asked the question whether each alternative, in turn, would likely cost more or less than the others. This was an iterative process, and one that should be refined whenever good cost data are available. But the process yielded an estimate of the ordinal value of the alternatives (which included some implicit allowance for administration and compliance costs as well as direct investment and operations costs). A "1" indicates the

lowest cost alternative (Alternative No. 4), while a "20" indicates my estimate of what would be the highest cost (No. 15). I have no idea of the actual range of cost between the lowest and highest, nor of the distance on a cost scale that might separate each alternative from its neighbors. Also, it was difficult to guess whether one alternative that emphasized storage and/or conveyance might cost more or less than another that emphasized levee improvements and restoration of habitat. So, the rankings are a judgement call, but at least they're a start on rationalizing the evaluation, and they're amenable to improvement with better data.

I then color-coded each cell with an entry from the workshop matrix: yellow for basic, blue for moderate and red for extensive. The column header for each alternative is also color-coded to match the occurrance of descriptors from the "Table of Alternatives," i.e., if the EQ, SV, and WQ descriptors for an alternative were all "basic," then the header cell would colored yellow (as is the case for Alternatives 1, 2, 4, 7, and 17). Alternatives 3, 9, 10, 11, 12, 13, 14, 15, and 18 were all "moderate" (therefore blue), while Alternative 16 was all "extensive" (red). Alternatives 6, 8, 19, and 20 were combinations of "extensive" with either "basic" or "moderate," so I coded them purple. For cells providing numerical values for conveyance or storage projects I applied colors that seemed consistent with the relative magnitude of the item. For example, for the small and large isolated conveyances, I coded the 7 cfs ones blue ("moderate") while coloring the others -- all 10 or more cfs -- red ("extensive). For the upstream or downstream storage projects I coded those less than 0.5 MAF as yellow (i.e., "basic"), 0.5-1 MAF as blue ("moderate"), and those greater than 1 MAF as red ("extensive"). For the in-Delta storage project and the two projects for obtaining and storing water for the environment, I coded the 100 TAF options yellow ("basic") while coding the higher ones (300 to 600 TAF) as blue ("moderate"). Again, it was a judgement call of the relative significance of each one's costs, which turned out to be a fairly lengthy process before establishing the rank ordering.

The next step was to array the alternatives in rank order, in Table 2, from lowest to highest. This turns out to be fairly interesting in that several alternatives that had been classified as "System Reoperation Alternatives" (presumably lower cost) find themselves among the higher cost "Reoperation and New Facilities" and "New Facilities" alternatives (notably Nos. 5, 6 and 9 -- No. 6 in particular because of its extensive emphasis on habitat restoration and levee improvements). At this point I started to look for possible consolidations of alternatives, as requested in the green Workshop 5 - Alternatives Comment Sheet. What became evident was not so much **consolidations** of alternatives but **sequences** of certain alternatives that would cumulatively yield desired levels of Bay-Delta system conditions, hopefully at lower aggregate cost than other sequences.

The key to the analysis was noticing that several "Reoperation" and "Reoperation with New Facilities" alternatives seemed to yield a logical progression of incremental benefits, if their non-duplicative features were undertaken in sequence, coupled to the observation that some of the more ambitious alternatives yielded anomalous results. For example, Reoperation Alternative 4 followed by the non-duplicative features of No. 2 (namely, institution of moderate demand reduction and conjunctive use plus basic levels of water transfers and increased flows for water quality), followed by basic channel improvements from Alternative No. 7, would probably yield a cumulatively "moderate" overall level of system benefits. It could be that the cumulative cost of

the incremental approach would be less, taking advantage of learning curve effects and sequential financing, than a single project that relied more on major new facilities, like Nos. 15 or 16. It seemed to me, for example, that New Facilities Alternative No.15 -- Large West-Side Conveyance Facility -- has the anomalous situation of having the highest cost of any alternative (in my estimation) but yielding only "moderate" effects. Another example is Reoperation Alternative No. 6 -- Extensive Habitat Restoration with New Storage[1] -- which yields a mixture of moderate and extensive effects costing (I believe) significantly more than, say, Alternative 20, which could yield roughly comparable benefits.

Following this line of reasoning I assembled Table 3, which presents my suggestion of a least-cost sequence of alternatives that cumulatively -- based on adding increments of features from progressively more comprehensive alternatives -- would yield an overall "moderate" to "extensive" level of benefits among the three objective criteria (WQ, EQ and SV). The program would start with Alternative 4 and then add sequentially the non-duplicative components of Alternatives 7, 5, and 20. Referring to Table 2, it would not make sense to go from Alternative 4 in sequence through the intervening Reoperation alternatives before implementing No. 7 or No. 5 because they don't apparently buy any significantly greater system benefits (their overall quality rating is "basic," hence their yellow color-coding). The incremental components of No. 7 could be implemented to ensure attainment of "basic" system quality criteria. Otherwise the program could straight through to the non-duplicative components of Alternative No. 5, the next lowest cost alternative to yield an overall "moderate" level of system benefits. Following that, No. 20's non-duplicative components could be implemented to yield a mixed "extensive-moderate" level of benefits. If that did not result in an overall "extensive" level of system-wide benefits, the non-duplicative components of Alternative 6 could be implemented. Note that this sequence of projects does not include either a small or large isolated conveyance, but it does entail a moderate amount of new upstream and downstream storage (0.5-1 MAF).

I don't know if this analysis will be of any assistance to your deliberations, but I hope so. Please let me know if you have any questions, and I would be glad to meet with you to discuss the analysis further.

Sincerely,

Robert T. Mott

Robert T. Mott
Consulting Economist

P.S: Just to let you know about my background and interest in California water matters, I'm enclosing a brief professional resume.

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[1]Shouldn't this have been categorized as "Reoperation with New Facilities?"

ROBERT MOTT

Consulting Economist

Robert Mott is an economist with over 32 years' experience in regional economic impact analysis, financial and economic feasibility assessment, and resource development planning. Mr. Mott serves as project manager, principal investigator and senior analyst for a wide range of economic studies for public and private sector clients in the United States and overseas, employing econometric and input-output modeling, cost-benefit analysis and engineering economics methodologies in the appraisal of resource development projects and programs.

TECHNICAL CAPABILITIES

- Regional economic impact modeling (project experience and workshop training in REMI, IMPLAN, RIMS II and EIFS). Extensive applications for planning and permitting studies.
- Natural resource and infrastructure development project economic and financial feasbility assessments, employing cost-benefit and cost-effectiveness methodologies and incorporation of environmental economic values and tradeoff strategies.
- Benefit assessment and cost allocation studies for flood protection projects
- Economic analysis of regulatory rulemaking and legislation involving assessments of the distribution of impacts among affected parties.

EMPLOYMENT HISTORY

Independent Consulting Economist
Principal Economist and Partner, Dames & Moore
Senior Economist, Westwood Research, Inc.
Project Economist, SRI International
Staff Economist, Central Intelligence Agency

EDUCATION

M.A. Economics, University of California, Berkeley
B. Foreign Trade, American Graduate School of International Management
A.B. Spanish, Michigan State University

PROFESSIONAL ASSOCIATIONS

American Economics Association
National Association of Business Economists
American Water Resources Association
California Chamber of Commerce: Water Resources Committee

PROJECT EXPERIENCE

Regional Impact Analysis

- Evaluations of the regional economic impacts of Metropolitan Water District's 10-Year Capital Improvement Program and the Eastside Reservoir (Domenigoni Valley) Reservoir Project.
- Analysis of socioeconomic impacts of proposed offshore gas exploration and development in the Gulf of Mexico.
- Assessment of regional impacts of reduced State Water Project deliveries in southern California and southern San Francisco Bay areas.
- Evaluation of regional effects of reduced irrigation water supplies for major crops in Glenn and Colusa Counties.
- Assessment of potential impacts on Las Vegas/southern Nevada area of restricted Colorado River water availability.

Economic and Financial Assessments

- Evaluations of flood protection costs and benefits for three San Joaquin Delta reclamation districts, assessments of landowners' ability to pay, and development of cost allocation programs.
- Benefit-cost studies and revenue requirements assessments for World Bank-sponsored industrial waste management programs in the Philippines and Indonesia.
- Benefit-cost/ability to pay analyses of waste water treatment projects in Paraguay sponsored by the Inter-American Development Bank.

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