Attachment C

(Summary notes from the April 2005 Gaming Exercise to explore alternative water management operations to "flex" the Delta Outflow objective)

Gaming Notes
May 2, 2005
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Just some quick notes on the game before I forget what we did. Please don't send me any nasty notes because I didn't cover your issue adequately. I am just trying to get this out on the wire before I disappear into the PSP deliberations tomorrow morning. People should send out any additional ideas they have to the group.

I was personally pleased with how the games went last week. I know that not everyone was satisfied with what we gamed. And we didn't end up gaming all that many scenarios. Nevertheless, I feel that a lot of issues bubbled up to the surface. I think we are now in a much better position to think about what process to recommend to the SWRCB. Also, given that the deadline for submitting comments to the SWRCB has been moved back into June, we probably do have time to work with the gaming model a bit more if people feel that more information would be useful.

We will get out our gaming results as soon as possible. After that, people may want to perform some additional postprocessing to look at particular benefits and impacts that were generated by the various scenarios.

Observations

- Over-Compliance. We reduced American River releases in 2003 (30 TAF) and 2004 (50 TAF). In 2003 the main justification was American River flow fluctuations. In 2004 the main reason was carryover storage. **The Port Chicago standard was still met during both years**. That is, there was enough over-compliance in those years that reducing upstream releases did not lead inexorably to violation. I asked Armin to run a scenario in 2004 in which we also reduced Keswick releases by 130 TAF in addition to the American River reductions (for a total reduction of 180 TAF). Even then we still only missed meeting the Port Chicago standard by 1 day (17 days compliance, 18 required).
- Risk Paradigm. The fact that we could still meet the Port Chicago standard, even with fairly substantial reductions in upstream releases, is important for how we think about the process and accounting issues. It is not my intent to make any criticism of the operators. They are required to meet standards. Given all the uncertainties w/r barometric pressure, depletions, tides; given

the long lag times between release times from upstream reservoirs and arrival in the Delta they simply cannot fine tune compliance. The operators must err on the side of caution to reduce the risk of non-compliance to a very small value. However, the implications are striking. We saw in the two months gamed, that in order to eliminate risk of noncompliance in the Delta, the operators had to take steps upstream that were suboptimal for fish upstream. By contrast, in the game we essentially told the operators that, for the two months gamed, meeting the Port Chicago standard was no longer their paramount concern. Rather, managing releases to avoid river fluctuations and to enhance carryover storage was the highest concern (at least w/r the American). The result was an operation that:

- Increased the risk of non-compliance with the nominal Port Chicago standard.
- Deprived the Delta of the benefits of having X2 a bit farther downstream – at least temporarily. Later releases of additional water might have eliminated most or all effects on average X2.
- Provided immediate benefits to the American w/r flow fluctuations.
- Reduced the risk upstream posed by low cold water pools and low carryover storage upstream (provided that the water was not re-released for outflow).

I wonder whether the terms "flex" and "relaxation" are even appropriate for what we are talking about. It is more that we are "deconstraining" project operations in order to generate benefits. There is still a significant probability that all standards will be met.

- Implications for Accounting of a Risk Paradigm (as opposed to a relaxation paradigm). The fact that flexing decisions do not necessarily lead to non-compliance with the nominal standards makes the accounting more difficult and raises process issues. In the game, accounting is easy. We know what historic operations were and we know how we changed operations. The difference between the two represents change in outflow, change in pumping, and change in storage. In real operations, the baseline of operations will not be so clear. We can probably come up with an accounting system to estimate, very roughly, the volume of water it would have taken to comply with the Port Chicago standard if we end up out of compliance. But, as we have seen above, we may end up in total compliance even after we "flex". In such a situation, how do we talk about backing up water? We would need to know by how much we would have over-complied without the flex, and then compare that to actual over compliance. This could get very sticky. And is it even appropriate to estimate how much water is backed upstream if all standards were met?? On the other hand, if such water simply becomes

Project water, then the fish agencies may become less interested in allowing the flex operation in the first place. Interesting questions.

- How Much Flexibility? I heard a lot of discussion about how much flexibility should be sought from the SWRCB. On the one hand, I heard that we should really just be trying to solve American River fluctuation problems (though I don't think Leo Winternitz agrees with this). I am pretty much at the other end, feeling that we should seek as much discretion as we can justify. We don't know where the science is going to lead us. We heard suggestions that April May outflow is very important for smelt. If so, we might be thinking about backing February/March water in order to increase April/May outflow. Or we might want to build up supplies for a big outflow pulse in July and August to help smelt. Or we might decide that increased fall upstream flows are much more important than small changes in average X2. Or we could determine that EWA export cuts matter more than X2 so that we want to relax X2 in order to help give EWA more assets. I don't know the answers to all the questions, but I am certain that our opinions on optimum operations will change over time. So I think we should be flexible. If, in fact, we have a five agency Russian veto on any change in operations plus a SWRCB review, then I think we can feel pretty certain that nothing will be done that does not have significant scientific support. That is not to say that we shouldn't have sideboards. But the kinds of benefits we are seeking should not be constrained.

- B2 Linkages. We tracked b2 during the game. The concern that reduced b2 costs would translate into higher export cuts funded with b2 did not materialize, though to be sure we only looked at two years. In 2003, the water we backed into Folsom was not charged to b2 in the first place (due to flood control considerations). Thus, we could not have had any negative impact on the exporters and, in fact, could have reduced b2 charges for exports if b2 was charged when the water was re-released. In 2004, the water backed up did reduce the draw on b2. However, this was a year in which the b2 account effectively went over 800 TAF, so the savings would more likely have gone into reducing the overage. (Yes, I know that it is impossible by definition to spend more than 800 TAF. But it seems to happen all the same.) The other interesting interaction in 2004 was that the water backed into Folsom would most likely have been released in the 2005 accounting year for b2. In some scenarios that could mean that DOI would need to find another place to use extra b2 during the 2004 accounting year. Changing the accounting year to calendar year would eliminate this problem as would calling the saved water "stored b2 water".

Additional Work

I have heard a number of suggestions for additional gaming and analysis. I have also come up with several on my own. I wanted to compile what I have heard. We could either all sit down and try to game some of these, or people could work with us to game these in a smaller group, then report back the results to the larger group.

- The Denton/Herbold proposal. As I read it:
  - Seek operational shifts to avoid the need for flexing in the first place, even if reop creates net risk to Project water supplies.
  - Only seek to avoid the problem of American River fluctuations, not carryover storage.
  - Release all/some the water backed up in order to protect outflow/<X2> neutrality.

  I have a lot of issues with this proposal – it could result in even more over-compliance with Port Chicago than we have seen so far on average. But we can argue about that another time.
- BJ Miller's methodology for modifying exports to minimize spring smelt take while maximizing exports. I think this method deserves a careful look prior to next winter, particularly given the high level of concern over smelt.
- Fullerton proposal. I would like to look at 2003 and 2004 and simply assume that we backed water into Oroville and Shasta as well as Folsom to look at the operational shifts and Port Chicago compliance patterns + possible subsequent use of the water + shifts in b2 accounts.
- Peter Louie wants to go back further in time to look at possible opportunities in earlier years (even if b2 accounting is no longer accurate).