
**Comments on Final WEI Report
Response to Condition Subsequent No. 3 from the
Order Confirming Motion for Approval of the Peace II Documents
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In response to your request for review of the subject report, following are comments that result from that review. My comments are organized to first address the responses in the subject report to the specific directions included in your Special Referee's Final Report and Recommendations on Motion for Approval of Peace II Documents, December 20, 2007, followed by expanded discussion of some of the responses that did not quite fully "respond", as well as comments on a couple of other topics in the subject report.

Responses to Recommendations in Final Special Referee's Report

The Special Referee's Final Report recommended that the new report, hereafter the WEI Final Response Report, should essentially be a stand-alone version of Chapter 7 of the previous WEI technical report (*Final Report, 2007 CBWM Groundwater Model Documentation and Evaluation of the Peace II Project Description*, November 2007), which provided documentation of the development and calibration of the 2007 Watermaster Model and its application for analysis of two potential basin reoperation scenarios (Alternatives 1A and 1B). The stand-alone report was to completely document what Watermaster has analyzed as the expected Basin response to its proposed reoperation strategy (Alternative 1C), including whether hydraulic control is projected to occur, when it is projected to be achieved, whether hydraulic control will be "robust" (and what that means in quantitative terms), and what the Basin yield resulting from reoperation is projected to be over time. Tables were to be included to summarize projected pumping, replenishment, and changes in storage in a format equivalent to previously submitted tables (Tables 4-4 and 3-3 from WEI reports in April and December 2006, respectively).

The WEI Final Response Report fully satisfies the recommendation that it be a stand-alone documentation of what Watermaster has analyzed as the expected Basin response to its then-proposed reoperation strategy. The WEI Final Response Report specifically describes and illustrates that hydraulic control is projected to occur via a groundwater level depression along the linear alignment of the overall desalter well field; it reports that hydraulic control "is

achieved in 2017” (although there is no illustration or discussion of how that date was determined); it reports that the pumping depression and resultant hydraulic control “appears to be much more robust than the Baseline Alternative” (robustness was not defined in quantitative terms; robustness is further discussed below); and it tabulates the projected yield of the Basin resulting from reoperation over time. Tabular summaries of projected pumping, replenishment, and changes in groundwater storage were not included in a format equivalent to previously submitted tables; however, a summary graph of groundwater storage was included.

The Special Referee’s Final Report also recommended that the new report illustrate how replenishment obligations will be calculated given a declining safe yield, how credit for new yield will be based on model projections, and how Watermaster will be monitoring and interpreting actual Basin response to reoperation, ultimately to describe two key factors: actual change in groundwater storage and actual new yield.

The WEI Final Response Report describes how replenishment obligations for the reported analysis were calculated on the basis of a projected declining safe yield (although there is some ambiguity in the text regarding exactly which declining safe yield was used, i.e. Baseline or Reoperation; the differences between the two, however, are generally small so the exact choice of which declining safe yield would not significantly affect the modeled analysis). Of course, what was simulated is one thing; what will actually be implemented by Watermaster might be another. The WEI Final Response Report recommends that Watermaster consider future redeterminations of safe yield on a short frequency (every two to three years) until the 400,000 af of reoperation water is used up (2030 according to the schedule for Alternative 1C in Table 3-5C); it is unclear why the same recommendation does not extend through the rest of the simulated period, i.e. through 2060, through which safe yield is projected to decline.

Ultimately with regard to the overall issue of declining safe yield, the WEI Final Response Report reports what WEI analyzed and recommends a frequency for redetermination of safe yield to Watermaster. In order to respond to the Special Referee’s Final report, Watermaster will have to separately submit what it intends to do with regard to that as well as how replenishment obligations will be calculated. The most logical place for this to occur is when Watermaster responds to Condition Subsequent No. 7 at the end of this year. It would be logical for Watermaster to include its scheduling of redetermination of safe yield and methodology for calculation of replenishment obligations in that response.

The WEI Final Response Report also describes how future changes in groundwater storage will be computed using a new model that will make use of all lithologic data from boreholes in combination with measured groundwater levels to compute groundwater storage changes at unspecified times. The report notes that the existing groundwater level monitoring programs will be expanded via construction of new monitoring wells for two purposes: assessment of the state of hydraulic control and determination of changes in groundwater storage. Details regarding expansion of the existing groundwater monitoring programs are not presented in the WEI Final Response Report, and will presumably be forthcoming at some future time, potentially in compliance with Condition Subsequent No. 9.

With regard to new yield, the WEI Final Response Report notes that there is no direct way to measure the increase in new yield created by reoperation, and that the only way to assess new yield is through the use of groundwater flow models. The whole concept of “increasing” a component of Basin yield in a setting where the safe yield is currently projected to decline for the next 50+ years is challenging to understand, and is further discussed below. That said, in response to the direction in the Special Referee’s Final Report, the WEI Final Response Report describes a comparative modeling approach whereby Watermaster will first recalibrate its 2007 Model through 2010, and will then use the model to estimate discharge to the Santa Ana River and recharge from the Santa Ana River and tributaries to the Chino Basin under reoperation conditions. A second set of estimates will be generated by simulating an artificial basin operating condition whereby the desalters are fully replenished via a replenishment plan that Watermaster will develop solely for use in that simulation; it is unclear how this scenario will differ from the “Baseline” that is presented in subject WEI Final Response Report. Ultimately, the simulated estimates of Santa Ana River discharge and recharge, under reoperation and under fully replenished conditions, will then be compared to determine the new yield resulting from reoperation. It would be logical for Watermaster to progressively report on updated simulations of new yield, generally in compliance with Condition Subsequent No. 9.

A final recommendation in the Special Referee’s Final Report was that the new report should discuss constraints related to the availability of recharge capacity and water for recharge, and should include discussion of what quantity of recharge capacity and water availability would be needed to overcome the potential imposition of pumping limits (as now described in Section 3.7 of the WEI Final Response Report). The WEI Final Response Report thoroughly discusses and tabulates the interrelationship between reliability of supplemental water and required replenishment capacity in order to achieve the groundwater production plans originally stated in the Appropriators’ 2005 Urban Water Management Plans, i.e. to overcome the imposition of pumping limits included in the analysis in the WEI Final Response Report. Depending on the reliability of supplemental water for replenishment purposes, the required increase in replenishment capacity could range from relatively small (33,000 afy at the currently assumed integrated reliability of 83%) to very large (more than doubling to nearly quadrupling the current recharge capacity if reliability were to be 50% or less). The assumed reliability of supplemental water will be a most critical input to the Recharge Master Planning effort that is to be scoped by July 1, 2008, status reported on January 1 and July 1, 2009, and finally reported by July 1, 2010.

In summary with regard to what was detailed in the Special Referee’s Final Report, the WEI Final Response Report is a thorough documentation of the technical simulation and interpretation of anticipated Basin response to what Watermaster proposed (now approved) to do in reoperating the basin. That said, it should be recognized that the WEI Final Response Report is an after-the-fact simulation of a management program desired by the parties. What is now separately reported in the WEI Final Response Report represents the only scenario ever crafted that would involve 400,000 af of controlled overdraft resulting from under-replenishment of desalter production **and** achieve hydraulic control. That scenario was not analyzed (with the 2007 Watermaster Model, or with any earlier model) until after Watermaster submitted its Motion for Approval of the Peace II Documents. The after-the-fact simulations thus did not serve as technical input to the selection of the proposed, now approved, reoperation management

program. As a consequence, the results of the analysis documented in the WEI Final Response Report do not represent any kind of optimized or other evaluation to arrive at a technically preferred management plan compared to anything else (except the Baseline). While the reader can understand what is expected to result from the reoperation as described (Alternative 1C), and can understand that hydraulic control is expected to be achieved and to be “robust”, the reader is also left to wonder about the condition of the Basin that will result in order to achieve the reported results. The **total** depletion of groundwater storage projected to occur from the now-approved reoperation of the Basin is about 500,000 af; resultant “new yield” is projected to be all of about 5,600 afy by 2030; the “increase” in Basin safe yield is projected to be about 7,000 afy by about 2040, but that’s an “increase” only in the sense that safe yield ultimately only declines to about 127,000 afy when compared to a decline to about 120,000 afy under “Baseline” conditions. The reader is also left to wonder why nothing else was apparently considered; for example, as discussed below, if the Baseline formed “weak” hydraulic control, and if the goal was to achieve “robust” hydraulic control, why was no consideration given to something like incremental increments of controlled overdraft, e.g. 100,000, 200,000, or 300,000 af, to see whether hydraulic control could be achieved at any of those levels, and how “robust” it might be at those increments.

Reliability of Supplemental Water and Recharge Capacity

In Section 3.3, the WEI Final Response Report notes that the average recharge rate of existing recharge facilities was provided by the IEUA (citing to IEUA, 2007 but there is no citation listed in the References) and ultimately reports that the estimated average capacity of existing facilities is about 61,000 afy, and that the estimated average recharge capacity will increase to about 91,000 afy with the addition of new facilities that are expected to be online in 2008. The average capacity is reportedly based on an assumed availability of 75 percent (recharge facilities available nine out of twelve months, and unavailable for maintenance reasons in the other three months). In order to analyze basin operation in a projected condition of declining safe yield, which requires greater replenishment obligations, the analysis in the WEI Final Response Report increased the assumed average recharge capacity to about 104,000 afy (which then became the “actual” capacity, e.g. in Table 5-3) by reducing the annual maintenance period from three to two months. Ultimately, the recharge capacity was combined with currently estimated availability of replenishment water (SWP water from MWD and recycled water from IEUA) to assess the adequacy of replenishment capability and to estimate the need for, and timing of, additional recharge capacity.

The preceding description of recharge capacity raises two comments or questions. First, in his testimony to the Court on November 29, 2007, Ken Manning, Watermaster CEO described the expense to implement the Phase 1 and Phase 2 improvements in Watermaster’s Recharge Master Plan and concluded that, when the latter improvements were completed in 2008, there would be a resultant recharge capacity of about 75,000 to 80,000 afy “depending upon how we operationalize those facilities”. It is unclear what “operationalize” means but the 75,000 to 80,000 afy range of recharge capacity is notably smaller than what is used in the WEI Final Response Report (91,000 afy before the increase to 104,000 afy described above). There needs to be some reconciliation between what Watermaster reported to the Court and what was used in

the technical analysis in the WEI Final Response Report in order to eliminate question about the conclusions reached in the WEI Final Response Report about the adequacy of existing and projected recharge capacity. Secondly, the assumed increase in recharge capacity in the WEI Final Response Report (by reducing the maintenance period from three to two months) raises question about actual operation. Since Watermaster does not own or operate any recharge facilities, is the use of reduced maintenance periods a legitimate assumption and consistent with how the actual operator would maintain the recharge facilities?

Embedded in the overall assessment of Watermaster's recharge capability in the WEI Final Response Report is an assumption that the average reliability of Metropolitan's delivery of SWP water for replenishment in the Chino Basin will be 80 percent. That assumption is described to derive, in part, from DWR's 2002 State Water Project Delivery Reliability Report (cited but not listed in the References). The average reliability derived from that report was 72 percent. However, as is well known, the SWP Delivery Reliability Report has been updated since 2002, most recently in December 2007 (DWR, *The State Water Project Delivery Reliability Report 2007*, Draft, December 2007); in that report, projected average reliability of Table A Amounts of SWP water ranges from 63 to 69 percent over the next 20 years. The WEI Final Response Report also notes that the 80 percent reliability of replenishment water from MWD derives from interpretation of results from MWD's Integrated Regional Planning simulations, from which "it appears that Metropolitan believes it will meet the full replenishment demands of Watermaster about 80 percent of the time." Ultimately, there is nothing in the WEI Final Response Report that cites to such a level of reliability having been expressed by MWD.

The assumptions in the WEI Final Response Report are acceptable for the purposes of the analysis reported therein (arguably, a more current version of the SWP Delivery Reliability Report would have been more applicable, even if not the 2007 update). However, in light of today's overall water supply picture, it is difficult to envision that MWD can actually take SWP water, currently projected to have 63 to 69 percent reliability, and make it available to meet the full replenishment demands in the Chino Basin 80 percent of the time. In light of significant replenishment obligations that are projected to increase in the Chino Basin due to a combination of increasing desired pumping and declining safe yield, the assumed reliability of replenishment water will be a most critical input to the upcoming Recharge Master Planning effort. Watermaster should highlight and show support for whatever it assumes for replenishment water reliability in all the reporting to the Court as scheduled in Conditions Subsequent No. 5 and No. 8.

Robustness of Hydraulic Control

It is still a little unclear exactly what commitments are required by the 2004 Basin Plan Amendment, specifically as related to hydraulic control. Commitment No. 8 listed in the WEI Final Response Report says "achievement and maintenance of hydraulic control of the subsurface outflows **from the Chino Basin** to protect Santa Ana River water quality" (emphasis added). WEI interprets the specific language that it quotes from the Basin Plan Amendment (no outflow from the Chino Basin) to be defined as the reduction of groundwater discharge **from the Chino North Management Zone** to the Santa Ana River to de minimus quantities" (emphasis

added). Contour maps of equal groundwater elevation in the WEI Final Response Report still show outflow from the basin to Prado (for both Alternative 1C and Baseline) but they also show “more robust” hydraulic control resulting from Alternative 1C as regards outflow from the Chino North Management Zone. Ultimately, it is up to the Regional Board to interpret what specifically is required by Commitment No. 8, and that will presumably be reported by Watermaster in its response to Condition Subsequent No. 6 by July 1, 2008.

Regardless of what specific commitment is required by the Regional Board regarding hydraulic control, the entire discussion of “robustness” in the WEI Final Response Report misses the direction in the Special Referee’s Final Report. In summary, after noting that the use of “robustness” is relative (in other words, not describing it in quantitative terms), the WEI Final Response Report describes the simulated level of hydraulic control in the Baseline Alternative to be “clearly tenuous, given the uncertainties in the system design and future basin management changes”. No uncertainties are identified; “tenuous” is another relative term; and it is unclear what future basin management changes might be. The WEI Final Response Report goes on to describe the linear pumping depression along the Chino Creek Well Field under reoperation to be at least three times that of the Baseline Alternative and concludes that, as such, it “appears to be much more robust than the Baseline Alternative”. There is no question that, in seeking to form a hydraulic pumping trough, in this case to intercept groundwater discharge from the Chino North Management Zone, more drawdown in the target depression is “more robust” than less drawdown. Technical logic indicates that progressive decreases in replenishment (from full replenishment in the Baseline to lower amounts in reoperation) would progressively increase the level of “robustness”. The real question is not whether Alternative 1C is more robust than the Baseline; rather, the real question is how robust is robust enough. In other words, going back to the amount of controlled overdraft associated with unreplenished desalter production, why 400,000 af and not some other number (whether smaller or bigger)? Watermaster ultimately submitted its proposal for reoperation with the claim that it was guided by the highest level of technical analysis. However, until the after-the-fact analysis now separately documented in the WEI Final Response Report, there had never been a technical analysis, with either the 2007 Watermaster model or its predecessor, of any scenario that **both** reduced groundwater storage by 400,000 af and achieved hydraulic control. There should be some documentation of the technical input and analysis that led Watermaster to land on the level of robustness that it did. The WEI Final Response Report would logically have been that place; however, since it isn’t, it would be appropriate for Watermaster to separately document that input and analysis by including it in its response to Condition Subsequent No. 6.

Baseline Basin Operation

The majority of “evaluation” of Alternative 1C, basin reoperation, in the WEI Final Response Report is conducted via comparison to a “Baseline” that, as far as desalters are concerned, would involve the same amount of desalter pumping but with full replenishment of all desalter pumping. This operational program was chosen to serve as the Baseline in the WEI Final Response Report because “it is currently authorized and will occur without the adoption of the Peace II Instruments.” Ultimately, the Baseline affords the opportunity to claim that reoperational results are not the net change in basin conditions that are projected to occur in the

future; rather, some of the results of reoperation are discounted by assigning them to the Baseline because those results would occur without reoperation. For example, total changes in groundwater levels are discounted by as much as 60 to 70 feet because they are attributable to Baseline operations; total change in storage is discounted by about 100,000 af attributable to Baseline operations. In the extreme, as noted above, reoperated safe yield is actually claimed to be “increased” despite the fact that it is projected to decrease from 140,000 afy to about 127,000 afy (because Baseline yield would be even lower, about 120,000 afy). In summary, Baseline is projected to cause a number of adverse effects (lower groundwater levels throughout much of the basin, decreased groundwater storage, and substantial decrease in safe yield); but that is summarily dismissed as already “authorized”. As a result, reoperational results can be described as relatively smaller adverse effects, or even an “improvement” in the case of safe yield.

When the Peace Agreement and the OBMP Implementation Plan were approved, “authorizing” the installation of the desalters as “required” in the OBMP, the desalters were specifically to replace the estimated then-remaining agricultural pumping as it further declined in the southern part of the Basin, specifically to avoid rising groundwater levels, to avoid associated increases in outflow from the Basin, and to avoid a resultant loss of safe yield. The focus at that time was to avoid rising groundwater levels; there was no mention of the widespread declines in groundwater levels and storage now attributed to that “authorized” operation. The focus at that time was also to preserve safe yield; there was no hint that safe yield could significantly decline, by about 20,000 afy.

Overall, in the context of what is now presented, the Baseline is set up to take a large part of the total impacts resulting from planned operation of the Basin when none of the Baseline-related impacts have ever been previously identified or quantified. It’s as if tens of feet of groundwater level decline, and 100,000 af of decreased groundwater storage, and a loss of 20,000 afy of safe yield have all been previously “authorized”, so the results of reoperation can be incrementally described as relatively small or, in the extreme, “better”. At a minimum, such a presentation is misleading. It would seem that a more thorough and complete explanation of all the impacts that will derive from now-approved Basin management should be addressed in the CEQA documentation that responds to Condition Subsequent No. 4.

Material Physical Injury

Evaluation of the Planning Alternative, i.e. the then-proposed, now approved Basin reoperation program in Section 4 begins with the Peace Agreement definition of Material Physical Injury. One of the illustrative definitions of Material Physical Injury is “increases in pump lift”. The quoted definition concludes by noting that “once fully mitigated, physical injury shall no longer be considered material.” In its discussion of projected groundwater levels in the Chino Basin in Section 4.3, the WEI Final Response Report discusses and illustrates the magnitude of changes associated with both the Baseline Alternative and Alternative 1C. The former are ultimately described as significant throughout the basin, while the latter are simply noted to occur throughout the basin. In summary, the WEI Final Response Report acknowledges that “some water agencies will experience greater lift and related energy expenses from reoperation” and that, “at face value, this would appear to be a material physical injury”. However, the report

goes on to dismiss such apparent material physical injury by noting that “the parties to the Judgment have indicated that they are willing to accept an increase in energy expenses with the expectation of other financial gains and certainties made possible by implementing the Peace II project description and other Peace II related agreements”, then concluding that “therefore, no material physical injury is projected to occur from the decline in groundwater levels”. There is no identified mitigation of the **physical** conditions, widespread lowering of groundwater levels and associated “increases in pump lift”, that are described and illustrated in detail in Section 4 of the WEI Final Response Report. Thus, in that technical report, the conclusion that “no material physical injury is projected to occur” does not have any evident support. There is nothing in the definition that eliminates the physical occurrence of something like increases in pump lifts simply because the parties are willing to accept them. Given the widespread support for the Peace II measures by the parties, they obviously believe that the results of reoperation override the impacts, but that does not make the impacts go away. The WEI Final Response Report dismisses a technical finding without support in this case, i.e. without any identified mitigation.

Minor Comments

Since the WEI Final Response Report has been submitted as a final report, it is probably academic to make minor comments of a mostly editorial nature. However, in the interest of a complete record, there are a few places where some editorial correction is needed: some housekeeping of numbers is needed in Section 3.4 to make it consistent with the referenced table regarding desalter capacity; reference to Alternative 1A in Section 3.6 would appear to be Alternative 1C instead; there is reference to a non-existent Section 7 in Section 5.1. In Section 2.1, there is reference to three WEI reports prepared in 2006; two are cited (as WEI 2006a and b, actually 2006a and c), but the third cannot be identified. Finally, in the tabular schedule that summarizes the now-approved reoperation management program, Alternative 1C in Table 3-5c, the total of unreplenished desalter production is nearly 409,000 af; it is unclear why that total exceeds the emphasized maximum of 400,000 af.