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MEMORANDUM

To: Mojave Basin Area Watermaster

From: Robert C. Wagner, P.E.

Date: February 28, 2024

Re: Updates for PSY, Consumptive Uses, and Free Production Allowance Recommendations (FPA) for Water Year 2024-25

We have completed an update to the Production Safe Yield (PSY) for each of the five subareas consistent with direction from the Court during hearings from June 2022, and 2023. The PSY, indicated FPA and proposed FPA for 2024-25 are shown below.

Table 1
Updated Production Safe Yield and Proposed Free Production Allowance 2024-25

Subarea	Current PSY	Current FPA	Surplus/ (Deficit)	Indicated PSY	Indicated FPA	Proposed FPA
Alto	59,409	50.4%	(17,475)	62,005	53.3%	53.3%
Baja	12,189	20.4%	---	12,749	19.3%	20.4%
Centro	21,088	55.0%	11,540	31,420	61.6%	60.0%
Este	4,728	55.0%	---	5,108	25.3%	50.0%
Oeste	1,712	50.0%	(1,566)	2,970	41.9%	50.0%

Notes:

1. Current PSY as set by Watermaster, May 1, 2023.
2. Current FPA as set by Court September, 2023.
3. Alto and Oeste deficit determined by Upper Mojave River Basin Model (UMBM).
4. Baja PSY assumes $\Delta S=0$ based on Baja Hydrographs (Appendix E).
5. Centro surplus from proposed Table 5-1 based on UMBM. PSY includes adjustment for return flow from pumping the surplus (Appendix A).
6. Este, Fifteen Mile Valley surplus, 134 acre-feet per UMBM, for Lucerne Valley, $\Delta S=0$ based on water level response over time, see Este Hydrographs (Appendix D).
7. Surplus/Deficit for Oeste; see Appendix G. Proposed PSY see Appendix C.

With respect to the Oeste Subarea as shown in Table 1, the PSY and the FPA recommendations are based on an assessment of water level trends and is discussed in Appendix C. As indicated in Appendix C, we recommend PSY be set at 3,634 acre feet, and FPA at 50% of BAP.

The Appendices for each subarea discuss various elements of water supply use and disposal specific to that subarea. We have combined the Alto/Centro discussion into one document as those subareas are directly affected by the water supply conditions in Alto.

Different from previous evaluations for the Alto subarea, we have incorporated the UMBM to represent conditions in Alto, above the Lower Narrows, and in Oeste and the Fifteen Mile Valley portion of the Este subarea. A description of the model, its inputs, assumptions and output is included as Appendix G. The model results agree well with the water balance approach for Alto, that has traditionally been reported as Table 5-1 of the Watermaster Annual Report (Appendix A, Fig. 3)

Figure 1, generally shows the adjudicated boundary and the boundary of the five subareas. Figure 2, shows the area of investigation for the Model, as well as the Model boundary, and areas modified from the original model to isolate Oeste, Este and the upper portion of the Alto subarea. The original model's domain covered the Upper Mojave Basin from the Los Angeles County line in the west, to include Fifteen Mile Valley in the east; from the upper Mojave River watershed to include portions of the Transition Zone and including the VVWRA discharges.

The Court previously asked that we consider a drier and more recent hydrologic planning period. Water supply as measured at the Forks, during the 11-year period between 2011 and 2022 was only about 42% of the long-term average (1931-1990) supply.

This raised the concern that the basin could experience an average water supply over a long period of time, but over an extended dry period water supply shortages could result. For example, the 20 year period 1946-65 was the driest 20 years on record, about 50% of the 60 year Judgment's base period average; yet this was significantly wetter than the 11 years preceding 2023. Consequently, we updated the hydrologic base period for purposes of establishing PSY for Alto and Centro (2001-2020). This period is consistent with the guidance from California Department of Water Resources, Bulletin 84, 1967 that was used as guidance for the base period in the Judgment.

“The base period conditions should be reasonably representative of long-time hydrologic conditions and should include both normal and extreme wet and dry years. Both the beginning and the end of the base period should be preceded by a series of wet years or a series of dry years, so that the difference between the amount of water in transit within the zone of aeration at the beginning and end of the base period would be a minimum. The base period should also be within the period of available records and should include recent cultural conditions as an aid for projections under future basin operational studies.” (Bulletin 84, page, 12)

The period 2001-2020 (61,635 acre feet) was preceded by dry years and ended with dry years as measured by USGS at the Forks. The period is about 6% drier than the base period average (65,538 acre feet). The period is entirely within the period of available record and includes recent cultural conditions. Water year 2022, the most recent year that data is available is assumed to represent pumping and consumptive uses on a forward-looking basis. For purposes of establishing PSY, and recommending FPA, 2001-2020 is an acceptable base period (Figure 3).

Each Subarea is discussed separately in the appendices as well as the consumptive use update for 2022 and the description of the UMBM:

Appendix A: Alto/Centro

Appendix B: Transition Zone

Appendix C: Oeste

Appendix D: Este

Appendix E: Baja

Appendix F: Consumptive Use Memo

Appendix G: Upper Mojave Basin Model