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TECHNICAL MEMORANDUM

DATE: November 14, 2023 **PROJECT #:** 605.751

TO: Will Antone and Casey McKeon, Resolution Copper

FROM: Hale Barter and Tim Bayley

PROJECT: Resolution Copper

SUBJECT: Comparison of 2023 Phoenix AMA Groundwater Model and Resolution EIS Groundwater Model

INTRODUCTION

NEPA analyses must assess cumulative effects, which are the impact on the environment resulting from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions. To assess the cumulative impact associated with use of groundwater for the Resolution Copper Project, modeling of proposed Resolution Desert Wellfield (DWF) pumping in East Salt River Valley (ESRV) was conducted in 2020 in support of an Environmental Impact Statement (EIS) using what was then ADWR's current Phoenix AMA groundwater model. Results indicate that without Resolution DWF pumping, but including all other reasonably foreseeable future uses, pumping depths to groundwater beneath the Desert Wellfield at the end of a 100-year predictive period would be approximately 550 feet. In June 2023, ADWR published an updated version of the Phoenix AMA model showing new depth to water projections for the 100-year predictive period would be approximately 800 to more than 1,000 feet beneath the Desert Wellfield.

REVIEW OF 2023 AMA MODEL RESULTS IN ESRV

The updated projections show significantly more drawdown because the 2023 Phoenix AMA model simulates approximately 2 times higher net groundwater withdrawals in the ESRV than the 2020 EIS DWF model (without DWF pumping) for the 100-year predictive period. The 2023 model shows 83% of this net groundwater withdrawal increase is attributed to resumed New Magma Irrigation and Drainage District (NMIDD) agricultural pumping simulated at 76,000 AF/yr for 100 years. ADWR assumes that cessation of CAP-sourced water currently irrigating NMIDD crops will result in full resumption of historic groundwater pumping for agriculture irrigation. This amount of pumping is unrealistic and not reasonably foreseeable for an irrigation district that is surrounded by expansive housing developments that have rapidly emerged in recent years. Much of NMIDD land is owned by developers who will continue to convert farmland to residential developments. The EIS DWF model assumed the NMIDD farmland would be converted to residential development and corresponding water supply by 2030, with no

irrigation pumping. The June 2023 model assumes most of the farmland will be converted to residential development, with corresponding residential pumping for the 100-year predictive period; however, there is no proportional reduction from the 76,000 AF/yr historical NMIDD agriculture pumping, resulting in the updated model incorrectly simulating simultaneous agricultural and residential pumping for future residentially developed NMIDD land.

FUTURE NMIDD GROUNDWATER DEMANDS

In a July 5, 2023, meeting with Resolution representatives, NMIDD operators indicated future irrigation pumping will not exceed 8,000 AF/yr and will cease completely by 2050 due to residential development of NMIDD land. This confirms the basic assumptions about cessation of NMIDD irrigation pumping simulated in the DWF EIS predictive model. Additional information provided by NMIDD representatives included:

- Developers own the vast majority of the land in the NMIDD district.
- Depth to water is currently 290 to 330 feet in the district.
- NMIDD currently has 20 to 25 total wells; 11 of them are well leases. Three other farmers are operating private wells.
- 10,000 to 12,000 AF/yr is the maximum NMIDD could pump with existing wells, but the wells would need to be rehabilitated and brought back into production.
- NMIDD no longer grows a significant amount of cotton and other high demand crops; they have switched to mainly lower water demand crops, which reduce demand by up to 75%. For example, if the district historically used 80,000 AF/yr, they could farm the entire district using only 20,000 AF/yr.
- NMIDD pays approximately $32/AF for in-lieu CAP water supply, which is substantially less than for groundwater at $52/AF (power costs only at today's DTW). When they provide water at higher costs, farmers use less with higher potential to cease agricultural activities and sell their land to developers sooner.
- NMIDD is working on acquiring treated effluent from EPCOR – 3,000 to 5,000 AF/yr– some of which is available now and some of which would build out from several facilities in the coming years. This would further reduce reliance on groundwater pumping.

MODEL COMPARISONS

The ESRV predictive water balance comparison between the DWF EIS Model and the 2023 AMA model (not including DWF pumping) is shown on Figure 1, indicating the 83% increase in net groundwater withdrawals in the 2023 model.

ESRV Predictive Water Balance

Water Balance in East SRV (Million Acre-Feet over 100-Year Predictive Time Period)			
	EIS DWF Model	ADWR Phoenix AMA Model	Difference (ADWR minus EIS)
Inflow (Recharge)	3.3	5.1	1.8
Outflow (Pumping)	5.3	15.7	10.5
Net (In - Out)	-1.9	-10.6	-8.7
NMIDD Ag Pumping	0.4	7.6	7.2

Conclusions

- 83% of the 8.7 million acre-feet (MAF) net increase in outflows is attributed to 7.2 MAF NMIDD pumping
- The EIS assumption that NMIDD pumping ceases in 2030 remains reasonable

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4

Figure 1. ESRV Predictive Water Balance

The 2023 AMA model-simulated historical and predictive NMIDD irrigation pumping is shown on Figure 2, reflecting the assumed resumption of NMIDD pumping at 76,000 AF/yr starting in 2023.

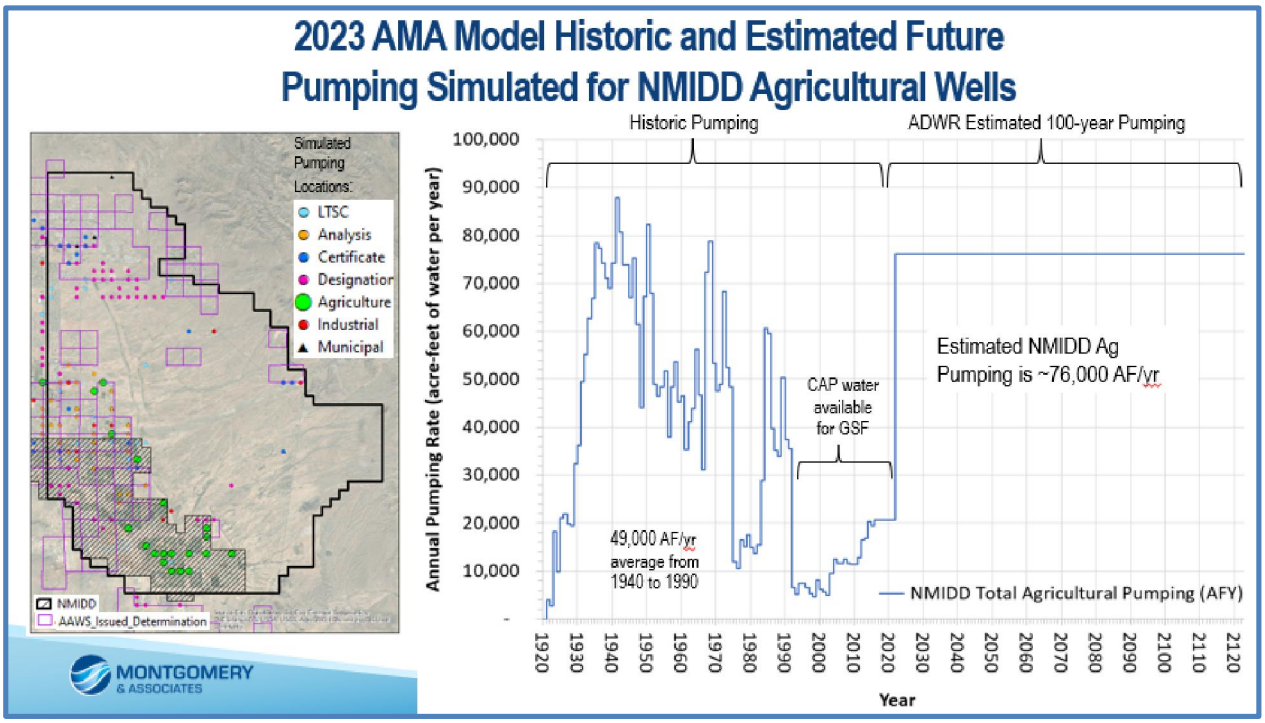

Figure 2. 2023 AMA Model Historical and Estimated Future Pumping Simulated for NMIDD Agricultural Wells

Comparison of combined ESRV pumping simulated in the DWF EIS Model and 2023 AMA models (not including DWF pumping) is shown on Figure 3, reflecting the resumption of NMIDD irrigation pumping at 76,000 AF/yr starting assumed in the 2023 model.

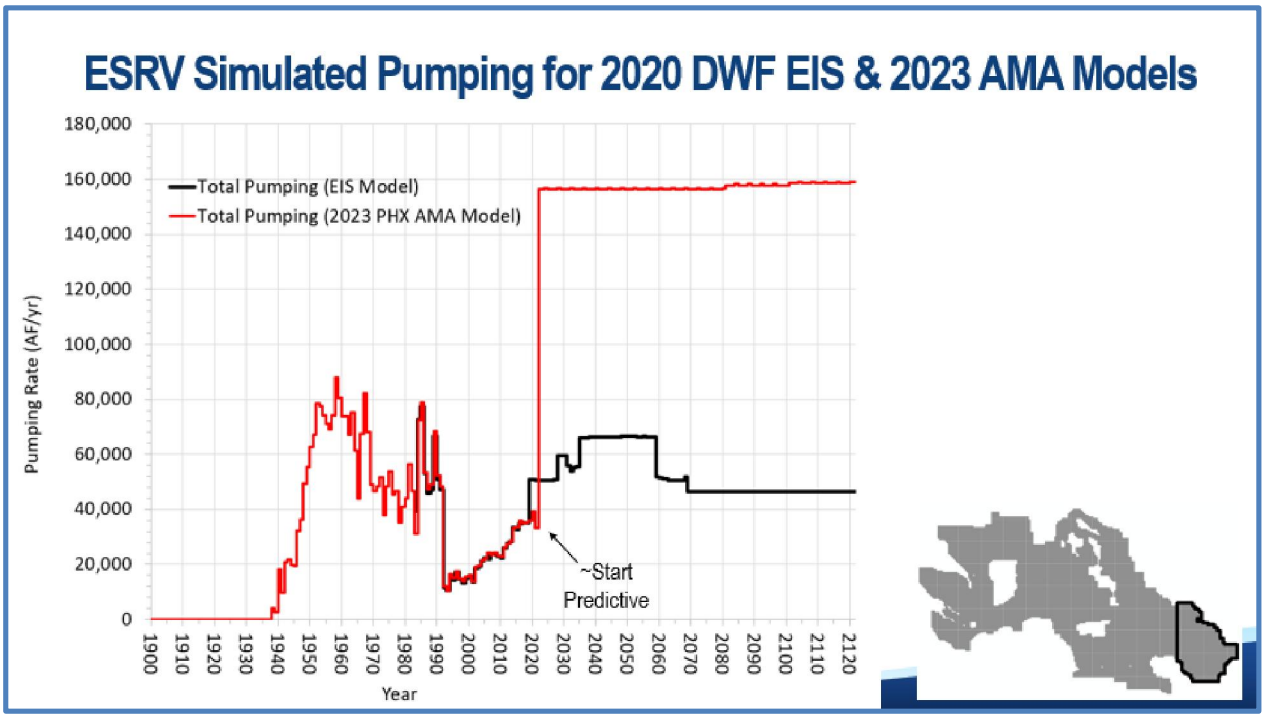

Figure 3. ESRV Simulated Pumping for 2020 DWF EIS and 2023 AMA Models

SUMMARY

The EIS DWF model more closely represents the most likely future NMIDD groundwater pumping for agricultural irrigation. Since the 76,000 AF/yr NMIDD 100-year predictive pumping simulated in the 2023 AMA model accounts for almost all the difference in ESRV groundwater withdrawals between the two models, the EIS DWF projected depth to groundwater at the Desert Wellfield should be considered to more accurately reflect future conditions.