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SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF LOS ANGELES

Coordination Proceeding Special Title (Rule 1550(b)) **ANTELOPE VALLEY GROUNDWATER CASES** Included actions: Los Angeles County Waterworks District No. 40 v. Diamond Farming Co., et al. Los Angeles County Superior Court, Case No. BC 325 201 Los Angeles County Waterworks District No. 40 v. Diamond Farming Co., et al. Kern County Superior Court, Case No. S-1500-CV-254-348 Wm. Bolthouse Farms, Inc. v. City of Lancaster Diamond Farming Co. v. City of Lancaster Diamond Farming Co. v. Palmdale Water District Riverside County Superior Court, Consolidated Action, Case nos. RIC 353 840, RIC 344 436, RIC 344 668 **AND RELATED CROSS ACTIONS**	Judicial Council Coordination Proceeding No. 4408 **FEDERAL DEFENDANTS' PHASE 3 TRIAL BRIEF** Phase 3 Trial Date: Date: January 4, 2011 Time: 9:00 a.m. Dept: 1, LASC

Cross-Defendant United States of America respectfully submits this trial brief in advance of the Phase 3 trial proceedings scheduled to begin in this matter on January 4, 2010. The evidence in the record currently before the Court, and the evidence that the parties will present at trial, demonstrates with a reasonable degree of scientific certainty that the safe yield of the Antelope Valley Groundwater Basin ("Basin") is 110,000 acre-feet per year (afy), that the Basin is in overdraft and that there is a basis for the Court to exercise its equitable jurisdiction, including the implementation of a "physical solution."

I. BACKGROUND.

The relief sought in this coordinated case is the comprehensive adjudication of all the parties' claims to rights to withdraw groundwater within the Antelope Valley adjudication area. The United States remains a party to this litigation because the Court decided that the adjudication, as currently structured, will be a comprehensive adjudication of all rights to groundwater in the aquifer. *See* 43 U.S.C. § 666(a); Order After Hearing on Jurisdictional Boundaries, at 4, filed Nov. 3, 2006 ("Phase 1 Order")("These boundaries are established for purposes of ensuring that the most reasonably inclusive boundaries will be used to ensure a complete and final adjudication of rights to the ground water.")

In Phase 1 of this litigation, the Court concluded that "the alluvial basin as described in California Department of Water Resources Bulletin 118-2003 should be the basic jurisdictional boundary for purposes of this litigation." Phase 1 Order at 4. The resulting Antelope Valley area of adjudication is characterized generally by water-bearing, mostly-consolidated alluvium and other unconsolidated deposits containing sufficient water for consumptive and other economic use. Although the Basin functions hydrologically as a single basin, a question was raised as to whether faults or other structural geologic features separated the Basin into regions or hydrologic sub-basins within the adjudication area.

In Phase 2 of this litigation, the Court addressed whether sub-basins exist in the Antelope

Valley adjudication area. Case Management Order for Phase 2 Trial ¶ 2, filed Sept. 9, 2008. Following a six day trial and the presentation of copious evidence, the Court concluded that there is sufficient hydraulic connection throughout the Basin such that "ground water actually or potentially moves from one part of the basin to the other with the potential to affect the water status or condition of the other portion of the basin aquifer." Order After Phase Two Trial on Hydrologic Nature of Antelope Valley, at 3, filed November 12, 2008.

On March 3, 2010, the Court ordered trial on the third phase of litigation, the "Status of Aquifer and Issue of Overdraft." Amended Order & Notice to All Counsel Regarding Phase 3 Trial on Status of Aquifer and Issue of Overdraft, at 1. In this third phase of trial, the Court informed the parties that it

> will hear evidence to determine whether the basin, as previously defined by the Court in trial phases one and two, is in such overdraft [as alleged by the public water provider parties] and to determine whether there is a basis for the Court to exercise its equitable jurisdiction, including the implementation of a "physical solution," as prayed for by the public water provider parties.

Order After Case Management Conference on May 6, 2010, at 3, filed May 25, 2010. The Court further stated that "it expects to hear evidence concerning total pumping and total recharge from all sources, with a further breakdown showing the amount of imported water on an annual basis." Order After Case Management Conference on March 22, 2010, at 3, filed March 22, 2010. The evidence presented on the safe yield of the Antelope Valley Basin aquifer and whether the Basin aquifer is in a state of overdraft will inform the Court on the need to "exercise equitable powers to protect the aquifer from detriment caused by any such overdraft." Order After Hearings Held on November 18, 2010, at 2, filed November 19, 2010.

II. UNITED STATES' WITNESS.

At the Phase 3 trial in this case, the United States will present the testimony of Dr. June Oberdorfer in its case-in-chief. Dr. Oberdorfer is a hydrogeologist and is offered as an expert in the safe yield determinations of a basin aquifer and whether an aquifer is overdrafted. An expert

opinion is generally admissible when it is "[r]elated to a subject that is sufficiently beyond common experience that the opinion of an expert would assist the trier of fact . . . ." Cal. Evid. Code. § 801(a); *Summers v. A.L. Gilbert Co.*, 69 Cal. App. 4th 1155, 1178 (Cal. Ct. App. 1999). The opinion must be based on matter of a type that reasonably may be relied upon by an expert in the field. Cal. Evid. Code. § 801(b).

In the Phase 3 trial, Dr. Oberdorfer will offer her expert opinion, based upon her review and independent study, that the "The Summary Expert Report, Phase 3 Trial on Safe Yield and Overdraft, Antelope Valley Area of Adjudication" (the "Summary Expert Report" or "Report") prepared by a team of the leading groundwater experts in California contains a reliable and reasonably accurate analysis of the natural recharge, sustainable yield, sensitivity analysis, and overdraft in the Antelope Valley Groundwater Basin. Dr. Oberdorfer will testify that she has reviewed hydrologic information from the Basin and the methodologies used by other hydrologic experts in analyzing Basin data to arrive at a safe yield value of 110,000 acre-feet per year, and she will opine that the safe yield value is reasonable and supportable by the data. She will also opine that because groundwater pumping exceeds the safe yield of the basin aquifer, the resulting overdraft has demonstrable undesirable results.

III. LAW REGARDING SAFE YIELD AND OVERDRAFT.

The California Supreme Court has defined safe yield as "the maximum quantity of water which can be withdrawn annually from a ground water supply under a given set of conditions without causing an undesirable result." *City of Los Angeles v. City of San Fernando*, 14 Cal. 3d 199, 278 (1975). An "undesirable result" includes the "gradual lowering of the ground water levels resulting eventually in depletion of the supply." *Id.* at 278 (*citing City of Pasadena v. City of Alhambra*, 33 Cal. 2d 908, 929 (1949).

Safe yield is a "complicated calculation." A. DAN TARLOCK, LAW OF WATER RIGHTS AND RESOURCES § 4:14 (2010). In *City of San Fernando*, the California Supreme Court approved the

use of a twenty-nine year base period of wet and dry years to determine the period over which the basin will balance. The Court also approved the use of an adjusted figure for net groundwater recharge which takes into account

> (A) recharge from (1) native precipitation and associated runoff, (2) return flow from delivered imported water, and (3) return flow from delivered ground water less (B) losses incurred through natural ground water depletions consisting of (1) subsurface outflow, (2) excessive evaporative losses in high ground water areas and through vegetation along streams, (3) ground water infiltration into sewers, and (4) rising water outflow, or water emerging from the ground and flowing . . . down the river channel to the sea.

Id. at 278-279. These factors were specific to the San Fernando basin. Thus, the "given set of conditions" for a safe yield determination is dependent on the physical factors of the particular groundwater basin.

Overdraft has been broadly defined as an excess of groundwater extractions over safe yield. *See generally, City of Pasadena.* "Overdraft commences whenever extractions increase, or the withdrawable maximum decreases, or both, to the point where the surplus ends." *City of San Fernando,* 14 Cal. 3d at 280. The concept depends "on the facts of the case." *Id.* While safe yield and overdraft are couched primarily in terms of the water supply, nothing in the formulation of "safe yield" would preclude an environmental "undesirable result" from evidencing an overdraft. Such an environmental trigger could include land subsidence and surface fissuring.[1/]

IV. THE HYDROGEOLOGIC EVIDENCE DEMONSTRATES THAT THE OVERALL SAFE YIELD OF THE BASIN IS 110,000 AFY.

The evidence that the parties present at trial will demonstrate that the Basin's overall safe or sustainable yield with both native and supplemental water is approximately 110,000 afy. Dr. Oberdorfer's testimony will focus on her independent review of the data sets, scientific

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[1/] The California legislature recognized the importance of avoiding and eventually preventing long-term overdraft and land subsidence when it created the Pajaro Valley Water Management Agency and its management authority. *See Pajaro Valley Water Mgmt. Agency v. Amrhein*, 150 Cal. App. 4th 1364, 1371 (Cal. Ct. App. 2007).

methodologies, and ultimate conclusions reached to arrive at a safe yield value of 110,000 afy. She participated in a Technical Committee of experts who were tasked with determining the Basin's safe yield and the extent of the overdraft using the best scientific data available. After more than four years of effort analyzing volumes and decades of data, members of the Technical Committee issued their Summary Expert Report consisting of several hundred pages of analysis and findings.

The data sets and the scientific methodologies used to determine safe yield and overdraft in the Report are reliable and widely accepted in water resources studies. Expert Witness Declaration, Exhibit B, at 2 ("Oberdorfer Decl."), filed July 15, 2010. The natural recharge of the Basin was calculated with a reasonable degree of scientific certainty. Three reliable methods utilized in the Summary Expert Report provided essentially the same value of about 56,000 afy for natural recharge. A mountain-front, water-balance approach (Report, Appendix C.3.1) included an estimation of precipitation, evapotranspiration, and playa flooding for the time period 1949 to 2005. The resulting estimate of average natural recharge was about 55,000 acre-feet per year (afy). A precipitation-yield method (Report, Appendix C.3.3) estimated surface runoff and groundwater inflow from the mountains for the time period 1949 to 2005. The resulting estimate of average natural recharge was about 56,000 afy. A groundwater-basin, water-balance approach (Appendix E.3) included estimations of pumpage, return flows, and change in groundwater storage for the time period 1951 to 2005. The resulting estimate of natural recharge was about 56,000 afy. Amendment to Declaration of June Oberdorfer ("Oberdorfer Am. Decl."), at 2, filed July 27, 2010. Each independent method is a scientifically appropriate methodology to assess recharge and the data sets to which the methods were applied are the best available data. That independent methods relying on distinct data sets give such similar estimates for natural recharge increases confidence in the reliability of the results. Oberdorfer Decl. at 2.

Earlier estimates of natural recharge in the Basin developed by the U.S. Geological Survey (USGS) were much lower than the Summary Expert Report. *Id.* at 3. The additional data

available for analysis in the Report and the rigorous evaluation of those data described in the Report make the estimate of natural recharge in the Summary Expert Report more accurate and reliable. The sound scientific methodology in the Report discussed above suggests that the USGS underestimated natural recharge.

The native sustainable yield is the amount of water that can be pumped from the Basin based on a combination of natural recharge and return flows of pumped groundwater. The sustainable groundwater yield was calculated by quantifying and including return flows from imported water as "supplemental sustainable yield." The total sustainable yield is the sum of the supplemental sustainable yield plus the native sustainable yield. Oberdorfer Decl., at 4.

The Summary Expert Report calculated first the native yield that would result from a rounded natural recharge rate (60,000 afy) and return flows from groundwater pumpage that additionally would contribute to recharge. The native sustainable yield ranges from 80,000 to 82,300 afy depending on variations in land use. The approach used is appropriate, and the resulting estimates are reasonable. Oberdorfer Decl., at 4. The supplemental sustainable yield, representing return flows from imported surface water, will vary with time as the quantity of imported water utilized changes and the land use practices change. For current conditions, the Report estimates the total sustainable yield, including the native sustainable yield and the supplemental sustainable yield, to be about 110,000 afy. *Id.* at 5. Again, the methodology is appropriate, and the resulting estimate accurate within a reasonable degree of scientific certainty. *Id.*

Dr. Oberdorfer performed a rough, independent check on the total sustainable yield value during the period of 1985 to 1991 when there was no significant change in the amount of groundwater in storage in the basin according to determinations in the Summary Expert Report. Groundwater pumping during that period ranged from 85,000 afy to 144,000 afy and averaged 114,000 afy based upon pumping rates reported in the Summary Expert Report. Oberdorfer Am. Decl., at 2. This average pumping rate for a period when the amount of groundwater in storage

was stable (1985 to 1991) is very comparable to the estimated sustainable yield under current conditions. Oberdorfer Decl., at 5. These comparable results, between stable groundwater storage with 114,000 afy pumping and a calculated yield of 110,000 afy, increases confidence in the overall safe yield estimate.

The Summary Expert Report also contains a sensitivity analysis on several critical parameters in the groundwater-basin, water-balance approach. The sensitivity analysis used methodologies that are scientifically sound and appropriate and the resulting conclusions are reasonable. Oberdorfer Decl., at 5. The results of the sensitivity analysis show that the water budget is moderately sensitive to changes in the parameters tested. The changes in total sustainable yield produced by varying those parameters as described above are 10% or less of the 110,000 afy calculated, and so do not change the results of the analysis significantly. *Id.* at 6.

V. EVIDENCE OF OVERDRAFT IS APPARENT AT EDWARDS AIR FORCE BASE.

Prior to pumping and development of groundwater from the basin aquifers in the southern Antelope Valley, all the groundwater flowed from the recharge areas near the mountain fronts in the San Gabriel and Tehachapi mountains towards the primary discharge areas in the vicinity of Rosamond and Rogers Lake. Summary Expert Report, Figure E2-3. These two dry lakes and adjacent areas are within the current boundaries of Edwards Air force Base (EAFB). Thus, until about a century ago, the majority of the groundwater within the basin flowed onto current EAFB property where it was naturally discharged.

By 1950 (and probably earlier), heavy pumping for agriculture in the area immediately south of the southern EAFB boundary had created a large cone of depression. Report, Figure E2-5. This heavy pumping had two impacts on the groundwater resources of EAFB. First, the natural flow of groundwater onto EAFB was stopped as that flow was intercepted. EAFB was cut off from the areas of natural recharge at the mountain front. Secondly, groundwater in the alluvium beneath the southwest corner of EAFB was being pulled to the south, essentially being

mined by agricultural pumpers. Water levels in the 1950s cone of depression south of the Base have only recovered a few tens of feet indicating a long-term loss of storage in that area.

In the late 1950s, the groundwater pumping by EAFB was about 4,000 afy, although it was projected to increase to a meet a demand of 8,000 afy as the Base grew. Pumping at EAFB had reached about 7,400 afy by 1964. In addition to losing water to off-Base pumpers, EAFB was forced to mine its own groundwater since it no longer had inflows from the recharge areas. As a consequence, water levels in the wells located on EAFB dropped. As the location of the cone of depression shifted further south (Report, Figures E2-6 through E2-13), the areas of the Base from which groundwater was captured grew smaller, but a portion of groundwater beneath the Base continued to be captured. At present, EAFB derives the groundwater it pumps entirely from groundwater storage beneath the Base property, mining the groundwater there. Lack of inflow from the recharge areas means that groundwater levels have dropped more rapidly than would have taken place if inflow from the recharge areas had been occurring.

An on-going consequence of groundwater overdraft is the subsidence in the Lancaster sub-basin (Report, Figures E2-16). The referenced figure shows land surface subsidence from 1930 to 1992. Subsequent studies have indicated that subsidence continued after 1992 over much of the same area, with a region with a particularly high rate of subsidence (about 25 mm per year) near Lancaster and another area with a similar high rate of subsidence at EAFB. The latest data available for the Basin as a whole showed continued subsidence through 1999. Data on land subsidence is available for much of the last decade for EAFB. Subsidence rates near Edwards for 1990 - 2004 averaged about 15 mm per year. More recent extensometer data provided by the U.S. Geological Survey show subsidence of about 11 mm/year at portions of EAFB for the period Sept. 2004 to Sept. 2009.

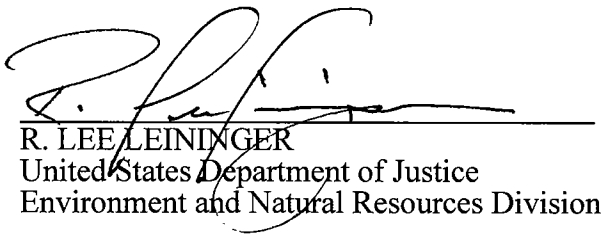
The ongoing subsidence is evidence of both past and current overdraft, exacerbated at EAFB by its isolation from areas of groundwater recharge due to off-reservation pumping closer to the natural recharge areas. The declining water levels and resulting land subsidence have

contributed to undesirable results at EAFB including sink-like depressions, and accelerated playa-surface erosion impacting runways at the Base. In fact, the high rate of land subsidence in the 1990s produced the undesirable effect of playa surface fissuring at the Base. The ongoing subsidence is evidence of both past and current overdraft.

VI. CONCLUSION

The methods and data utilized in the Summary Expert Report provide estimates of safe and sustainable groundwater yield and an evaluation of overdraft with a reasonable degree of scientific certainty. The analyses performed in the report are rigorous and utilize generally-accepted methodologies. These analyses were applied to the best available data sources. Consequently, the estimate of the overall yield of the Basin of 110,000 afy is reasonable and valid. Overdraft is shown by the excess pumping above the overall safe yield of the Basin, declining groundwater levels and the loss of storage in the Basin aquifers, and the deleterious and undesirable effects from land subsidence.

Respectfully submitted this 20th day of December, 2010.



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PROOF OF SERVICE

I, Karmen Robinson, declare:

I am a resident of the State of Colorado and over the age of 18 years, and not a party to the within action. My business address is U.S. Department of Justice, Environment and Natural Resources Section, 999 18th Street, South Terrace - Suite 370, Denver, Colorado 80202.

On December 20, 2010, I caused the foregoing document(s) described as: **FEDERAL DEFENDANTS' PHASE 3 TRIAL BRIEF**, to be served on the parties via the following service:

[X] BY ELECTRONIC SERVICE AS FOLLOWS by posting the document(s) listed above to the Santa Clara website in regard to the Antelope Valley Groundwater matter.

[ ] BY MAIL AS FOLLOWS (to parties so indicated on attached service list): By placing true copies thereof enclosed in sealed envelopes addressed as indicated on the attached service list.

[ ] BY OVERNIGHT COURIER: I caused the above-referenced document(s) be delivered to FEDERAL EXPRESS for delivery to the above address(es).

Executed on December 20, 2010, at Denver, Colorado.

/s/ Karmen Robinson
Karmen Robinson
Paralegal Specialist