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    Thomas M. and Julie Bookman, Bruce Burrows, 300 A 40 H, LLC, B.J. Calandri, John Calandri,
6   John Calandri as Trustee of the John and B.J. Calandri 2001 Trust, Calmat Land Company, Cameo
    Ranching Co., Sal and Connie L. Cardile, Consolidated Rock Products, Del Sur Ranch LLC, Forrest
7   G. Godde, Forrest G. Godde as Trustee of the Forrest G. Godde Trust, Lawrence A. Godde,
    Lawrence A. Godde and Godde Trust, Gorrindo Family Trust, Leonard and Laura Griffin, Healy
8   Enterprises, Inc., Hines Family Trust, Habod Javadi, Juniper Hills Water Group, Eugene V., Beverly
    A., & Paul S. Kindig, Paul S. & Sharon R. Kindig, Kootenai Properties, Inc., Dr. Samuel Kremen,
9   Gailen Kyle, Gailen Kyle as Trustee of the Kyle Trust, James W. Kyle, James W. Kyle as Trustee of
    the Kyle Family Trust, Julia Kyle, Wanda E. Kyle, Malloy Family Partners, Jose Maritorena Living
10 Trust, Richard H. Miner, Barry S. Munz, Terry A. Munz and Kathleen M. Munz, Eugene B.
    Nebeker, R and M Ranch, Inc., John and Adrienne Reca, Edgar C. Ritter, Paula E. Ritter, Paula E.
11 Ritter as Trustee of the Ritter Family Trust, Sahara Nursery, Marygrace H. Santoro as Trustee for the
    Marygrace H. Santoro Rev Trust, Marygrace H. Santoro, Mabel Selak, Jeffrey L. & Nancee J.
12 Siebert, Helen Stathatos, Savas Stathatos, Savas Stathatos as Trustee for the Stathatos Family Trust,
13 Tierra Bonita Ranch Company, Beverly Tobias, Vulcan Lands, Inc., **collectively known as the**
    Antelope Valley Ground Water Agreement Association ("AGWA")
14

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16   **SUPERIOR COURT OF THE STATE OF CALIFORNIA**

17   **FOR THE COUNTY OF LOS ANGELES**

18 **ANTELOPE VALLEY**   ) Judicial Council Coordination Proceeding
    GROUNDWATER CASES   ) No. 4408
19   )
    Included Actions:)
20   ) **Santa Clara Case No. 1-05-CV-049053**
    Los Angeles County Waterworks District No.) Assigned to The Honorable Jack Komar
21 40 v. Diamond Farming Co. Superior Court of)
    California County of Los Angeles, Case No. BC)
22 325 201 Los Angeles County Waterworks) **DECLARATION OF DR. JOEL**
    2District No. 40 v. Diamond Farming Co.) **KIMMELSHUE IN RE SURREBUTTAL**
23 Superior Court of California, County of Kern,) **TESTIMONY**
    Case No. S-1500-CV-254-348Wm. Bolthouse)
24 Farms, Inc. v. City of Lancaster Diamond) **PHASE 3 TRIAL**
    Farming Co. v. City of Lancaster Diamond)
25 Farming Co. v. Palmdale Water Dist. Superior)
26 Court of California, County of Riverside,)
    consolidated actions, Case No. RIC 353 840,)
27 RIC 344 436, RIC 344 668   )
)
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DECLARATION

2   I, Joel Kimmelshue, do hereby declare and state as follows:

3   1.   I have reviewed the *Declaration of Joseph Scalmanini Re Rebuttal Testimony*, with

4   particular focus on that part of the Declaration regarding my testimony.

5   2.   Mr. Scalmanini's comparisons between my estimates and the purveyors' estimates of

6   applied water and return flows from agricultural irrigation are all presented in units of acre-feet.

7   This unit of water volume is simply derived from the multiplication of irrigated land (in acres) and

8   estimated values of applied water or return flow (in feet). The following simple equation

9   demonstrates such a calculation for agricultural return flows:

10   Irrigated Ag Area (Acres) x Return Flow (Feet) = Ag Return Flow (Acre-Feet)

11   3.   Mr. Scalmanini's Exhibit Scalmanini-163 is used to support his claim that my

12   estimates of agricultural return flows are practically identical to those of the purveyors. However,

13   any similarities in results in acre-feet of water between my estimates and the purveyors' estimates

14   are likely only as a result of cancellation of differences from the two independent determinations of

15   irrigated acres and desktop estimates of feet of return flow, as explained below.

16   **Irrigated Agricultural Acreage:**

17   4.   The irrigated agricultural areas (in acres), as estimated within the Summary Expert

18   Report, for the years of 1986 through 2006 were always higher (with the exception of 1989) than my

19   estimates. (Exhibit A-97.) On average, the differences in irrigated acres throughout this time span

20   were approximately 20 percent depending on the period selected. Overall, the differences ranged

21   from -16 percent (1989) to +50 percent (2002). Prior to 1986, these differences were even greater,

22   sometimes in excess of 100 percent. (Exhibit A-98.)

23   5.   Focusing on the mid-1980s to present, and excluding 1989, the purveyors consistently

24   estimate higher irrigated agricultural areas as compared to my estimates. This indicates a systematic

25   difference in the methodologies used to determine agricultural acreage. In both cases, remotely

26   sensed information was developed from the mid-1980s through 2006. However, it is clear that these

27   methods resulted in differing estimates within and between years. As discussed further herein, this

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1 difference is likely partially caused by differences in classification between irrigated agricultural and

2 urban landscapes in addition to different approaches in the remote sensing methodologies

3 themselves.

4 **Urban Irrigated Acreage and Return Flows:**

5 6. Mr. Scalmanini's declaration states that I have over-estimated urban irrigated applied

6 water, and subsequent return flows based on known quantities of water delivered to users by urban

7 water providers. The work performed for my estimates in no way correlated irrigated urban areas to

8 areas served by urban providers as was apparently done by the purveyors. I believe that the

9 purveyors simply assumed that 55 percent of the water provided to urban users is used outside of the

10 home. Of that 55 percent, 20 percent was assumed to be return flow. Conversely, my estimates

11 treated irrigated urban areas simply as another "crop" and did not correlate this information back to

12 records of served water. The likely difference in these two estimates of return flow centers on

13 irrigated area as well as assumed efficiencies. From an acreage standpoint, my estimates first used

14 California Department of Water Resources mapping products and then remote sensing

15 methodologies to delineate acres of agricultural irrigation. From there, the remaining irrigated areas

16 were classified as "urban" and were separated into four sub-categories (industrial, dense urban,

17 parks/playground/cemeteries and ranchettes) for the purposes of more accurately estimating actual

18 irrigated areas within these overall categories. It is highly likely that some of the "urban" land

19 classifications as defined by my estimates (e.g. ranchettes) were not served by municipal providers,

20 rather by other providers or groundwater wells. Therefore, Mr. Scalmanini's statements that I over-

21 estimated served or applied urban irrigation water and thus return flows are not accurate because two

22 different irrigated areas (mine being larger) were most likely used in the independent analyses.

23 **Agricultural Return Flows:**

24 7. A comparison between the purveyors' estimates and my estimates of average return

25 flows (in feet) by crop type indicates significant differences. When weighted by crop type, the

26 overall average return flows differed by about 30 percent annually, whereby the purveyors' estimates

27 were less than mine. (Exhibit A-99.) These differences are a result of differing assumptions and

28 approaches used when estimating applied water and resultant return flows. For example,

1   •   the purveyors used an irrigation efficiency of 80 percent for all crops over the entire

2   study period. My estimates varied irrigation efficiencies according to irrigation

3   method used (e.g. border check or sprinkler) and accounted for developments in

4   irrigation technology (increasing efficiencies) over time;

5   •   the purveyors assumed a single average precipitation for the entire basin for all years.

6   My estimates split the basin into four agricultural zones and applied actual monthly

7   precipitation in my modeling efforts;

8   •   the purveyors assumed 50 percent effective rainfall for only a portion of the year,

9   whereas my estimates assumed the same effective rainfall for all months of the year;

10   •   the purveyors did not account for soil storage, whereas my estimates did; and

11   •   the purveyors did not account for frost protection, whereas my estimates did.

12 There are additional reason and examples not listed here. As a result, the two methods used were

13 different in many ways (mainly due to the initial assumptions) and also resulted in differing

14 estimates of return flow by crop. (Exhibit A-99.)

15 **Summary**

16   8.   In summary, the purveyors' irrigated agriculture area estimates (in acres) exceed my

17 estimated acreages by about 20 percent on average. Alternately, my estimates of return flows (in

18 feet) exceed the purveyors' return flow estimates by about 30 percent on average. When multiplied

19 together, this results in a misleading cancellation of these true differences. The result (in acre-feet)

20 is not consistent with the actual differences and variability between the two estimates. It is derived

21 only from the fact of multiplying two results together that coincidentally are similarly opposite in

22 variability. Therefore, the differences between my estimates of irrigated area and return flows and

23 the purveyor's estimates are significant and can be excessive (in excess of 50 percent) for some

24 years. It should be noted that these same types of differences, although somewhat smaller, exist for

25 applied water because applied water too is simply a land area (in acres) multiplied by an application

26 amount (in feet). I have already indicated that the irrigated areas differ and correspondingly, so do

27 estimates of applied water (in feet). Again, these differences are simply a result of differences in

28 input variable assumptions and other approaches. A large portion of these assumptions and

1 approaches can be measured or verified in the field through proven methodologies (e.g. mobile

2 irrigation labs, in-line flow meters, soil investigations, more detailed remote sensing analysis, etc)

3 and a more accurate estimate of ultimate irrigated acres, applied water and return flows (in acre-feet)

4 achieved.

5   I declare under penalty of perjury under the laws of the State of California that the foregoing

6 is true and correct. Executed on April 11, 2011 at Sacramento, California.

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10   Dr. Joel Kimmelshue

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PROOF OF SERVICE

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**STATE OF CALIFORNIA,
COUNTY OF SANTA BARBARA**

4

5   I am employed in the County of Santa Barbara, State of California. I am over the age of 18
and not a party to the within action; my business address is: 21 E. Carrillo Street, Santa Barbara,
California 93101.

6

7   On April 11, 2011, I served the foregoing document described as:

8   **DECLARATION OF DR. JOEL KIMMELSHUE IN RE SURREBUTTAL
TESTIMONY**

9   on the interested parties in this action.

10   By posting it on the website by 5:00 p.m. on April 11, 2011.
          This posting was reported as complete and without error.

11

12   (STATE) I declare under penalty of perjury under the laws of the State of California
          that the above is true and correct.

13

     Executed in Santa Barbara, California, on April 11, 2011.

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     __MARIA KLACHKO-BLAIR_____   _____
19   **TYPE OR PRINT NAME**   **SIGNATURE**

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DECLARATION OF DR. JOEL KIMMELSHUE IN RE SURREBUTTAL TESTIMONY
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