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7 **BEFORE THE**
8 **CALIFORNIA STATE WATER RESOURCES CONTROL BOARD**

9 HEARING IN THE MATTER OF
10 CALIFORNIA DEPARTMENT OF
11 WATER RESOURCES AND UNITED
12 STATES BUREAU OF
13 RECLAMATION
14 REQUEST FOR A CHANGE IN POINT
15 OF DIVERSION FOR CALIFORNIA
16 WATER FIX

ARGUMENT FOR ALLOWING FULL
CROSS EXAMINATION ON SCIENTIFIC
EVIDENCE IN THE PROCEEDING

17 Most of the evidence presented in support of this petition relies on complex scientific
18 evidence, and layered computer models for which there has been no independent external
19 review. While it is time consuming, Deirdre Des Jardins, Principal at California Water Research
20 (“California Water Research”) argues that full consideration of issues of reliability and
21 probativeness of the complex scientific evidence is essential for both due process under Article I,
22 § 7 of the California Constitution, and the Fourteenth Amendment to the U.S. Constitution and a
23 fair hearing under California Code of Civil Procedure § 1094.5(b).

1 Adjudicative proceedings before the State Water Board are governed by Evidence Code
2 §§ 801 to 805. (Cal. Code Regs., tit. 23, § 648.) Careful consideration of the reliability and
3 probativeness of the scientific evidence and computer models and the associated testimony is
4 required under Evidence Code §§ 801 and 802. These requirements were clarified in the recent
5 California Supreme Court decision, *Sargon Enterprises v. University of Southern California*
6 (2012) 55 Cal.4th 747. The Court ruled that under Evidence Code § 801, “the foundational
7 matter relied on must provide a reasonable basis for the particular opinion offered” (*Id* at 770).
8 For Evidence Code § 802, the Court noted:

9 The reasons for the experts' opinions are part of the matter on which they are
10 based just as is the type of matter ... This means that a court may inquire into, not only
11 the type of material on which an expert relies, but also whether that material actually
12 supports the expert's reasoning ... A court may conclude that there is simply too great an
13 analytical gap between the data and the opinion proffered. (*Sargon*, supra at 771.)

14 The Petitioners have argued that disclosure of objective, verifiable data from testing,
15 errors, calibration, and validation of the CALSIM II model is not necessary because the model
16 can be used in relative mode. Petitioners’ witnesses have also stated that the DSM2 model has
17 been tested and calibrated, but have not provided exhibits documenting the testing and
18 calibration, or a discussion of known errors. This failure has been an issue of significant
19 controversy in the WaterFix Hearing.

20 California Water Research believes the cross-examination on August 26, 2016 (portions
21 quoted in the Attachment) shows that attempting to resolve the controversies over model use in
22 the hearing by barring cross-examination on errors can create significant issues.

23 In *Sargon Enterprises v. University of Southern California*, supra, the Court stated:
24 But courts must also be cautious in excluding expert testimony. The court must not weigh
25 an opinion's probative value or substitute its own opinion for the expert's opinion." (*Id.* at
26 772.) Further, "The court does not resolve scientific controversies." (*Ibid.*)

1 California Water Research argues that this caution by the California Supreme Court applies not
2 only to excluding direct testimony on scientific controversies, but also applies to barring cross-
3 examination on scientific controversies, which also produces expert testimony for the Hearing
4 Record.

5 Finally, California Water Research again points out that the opinion of the Board's own
6 2012 scientific and technical panel on Analytical Tools for Evaluating the Water Supply,
7 Hydrodynamic, and Hydropower Effects of the Bay-Delta Plan (Exhibit DDJ-104) provides
8 clear, objective guidelines from independent experts:

9
10 **6. Models and model results used in Board proceedings should be better**
11 **documented and include a discussion of the strengths, weaknesses, and limitations**
12 **for each application.**

13 [...]

14 Model weaknesses can include major differences of results from field data, including an
15 assessment of the causes of these discrepancies. All models will fail to some degree to
16 reproduce field data for reasons that include inaccurate field data, inaccurate boundary
17 conditions (for example, Delta inflows or in-Delta diversions and returns may be poorly
18 known), model calibration, inability to represent an important process (such as turbulent
19 diffusion), or simplifications required for the model. (Models also can fit well for the
20 wrong reasons in calibration, and then perform poorly.) Knowledge of model weaknesses
21 allows for better interpretations of results. For example, documentation describing the
22 degree to which a salinity model is inaccurate at one location compared to field data,
23 even though it may be relatively accurate at other locations, helps in interpreting and
24 assessing model results. Such an assessment is not possible, however, if weaknesses are
25 not revealed, discussed, and documented. A model with no documented or discussed
26 weaknesses should be considered to be a questionable and likely weak model.

27 (p. 4, emphasis added.)

It is thus information on model weaknesses which needs to be revealed and discussed in
the Hearing. For the above reasons, California Water Research requests that the Hearing Officer

1 allow full cross-examination on the complex scientific evidence in the Hearing. While time-
2 consuming, it is the only way to provide needed information for fairly weighing the evidence.

3
4 Respectfully submitted,

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7 Deirdre Des Jardins,
8 Principal, California Water Research

1 Attachment

2 **Excerpts from August 26, 2016 Hearing Transcript**

3
4 In Part 1A, Mr. Berliner objected to a question on CALSIM model errors by Deirdre Des
5 Jardins:

6 MR. BERLINER: So just for the record, I have an objection to the question on the
7 grounds that I stated earlier. An additional point to be made is that we have reiterated
8 over and over again in this proceeding we are using the model in the comparative basis
9 not the predictive. So questions about the predictive value aren't relevant to our
10 testimony. (R.T. August 26, 2016, 15:8-15:15.)

11 The Hearing Officer later attempted to resolve the controversy and preclude further cross-
12 examination on model errors:

13 CO-HEARING OFFICER DODUC: All right.

14 Microphone on, please.

15 We are back in session. Took a little bit
16 longer, but before you begin, Mr. Eichenberg, let's do
17 a bit of -- see if I could help refine some of the
18 things that Ms. DesJardins is probably thinking about
19 addressing.

20 Let me look at Mr. Mizell and witnesses. I
21 think one of the things that you have established
22 throughout the course of this hearing is that the
23 CalSim modeling and DSM2, for that matter, are not
24 predictive tools and that they are meant to be used for
25 comparative purposes.

26 For the record, would you stipulate that,
27 indeed, these models do not do a good job and should
not be used and are not being used for predictive
purposes?

MR. MIZELL: I would like to talk to the
modelers about the breadth of that stipulation, but for
the purposes of the direct testimony, both written and
oral that we've given alone, we are using the models in
a -- in a comparative mode not a predictive mode.

1 In terms of how the models are used globally,
2 I don't think I am currently in a position to say
3 uniformly that we never use them in a predictive mode.
4 But for the purposes of this hearing and the testimony
5 before you, I believe I can make that stipulation, but
6 I would like to check with my modelers at some point,
7 or they can weigh in now to clarify that. (R.T. August 26, 2016 22:11-23:14.)

8
9 At the time the Hearing Officer attempted to make the ruling to exclude further cross-
10 examination in the Hearing on model errors, the Hearing Officer was unfamiliar with the opinion
11 of the 2003 CALSIM II Strategic Review panel that they were "somewhat skeptical" of DWR's
12 proposal that model errors didn't matter when model results were used for relative comparisons.
13 This opinion was introduced during later cross-examination on the same day by Mr. Eichenberg
14 and Mr. Brodsky. Mr. Brodsky read the statement in the 2003 CALSIM II Strategic Review
15 Report (Exhibit DDJ-103, p. 9):

16 MR. BRODSKY: Okay. And the point is, as I'll
17 read the next section, "Suggestion is that, while the
18 model may not generate a highly reliable absolute
19 prediction because of errors in model specification
20 and/or estimation, nevertheless, it might produce a
21 reasonable reliable estimate of the relative change in
22 outcome.

23 "The Panel is somewhat skeptical of this
24 notion because it relies on the assumption that the
25 model errors, which render an absolute forecast
26 unreliable, are sufficiently independent of or
27 orthogonal to the change being modeled that they do not
28 similarly affect the forecast of change in outcome.
29 They mostly cancel out."

30 And my point is that, what the Panel is
31 skeptical of, the assumption that it can be not
32 accurate in an absolute sense but accurate in a
33 comparative sense, that's what the Panel's skeptical
34 of, and that's exactly what they did. (R.T. August 26, 2016 222:8-223:1.)

1 The Hearing Officer had earlier questioned the witnesses on this paragraph:

2 MR. EICHENBERG: You said it might produce a reasonably reliable estimate of the
3 relative change in outcome, "The panel is somewhat skeptical of this notion."

4 MR. BERLINER: I'm going to object to this interpretation of the document. The
5 document has plain language in it that can be read and should not be reinterpreted by the
6 questioner.

7 CO-HEARING OFFICER DODUC: Actually, I'm very interested in this paragraph, and I
8 wish to understand it better. (R.T. August 26, 2016 96:20-97:5.)

9 [...]

10 CO-HEARING OFFICER DODUC: So read the
11 sentence, "The panel is somewhat skeptical." Read the
12 entire sentence. You don't have to read it out loud.

13 They seem to say that there's -- the errors
14 that makes a prediction unreliable are not independent
15 enough that it would not similarly affect comparative
16 analysis. At least that's the way I read it.

17 WITNESS MUNEVAR: So, like, I can give you
18 only my best representation --

19 CO-HEARING OFFICER DODUC: Please.

20 WITNESS MUNEVAR: -- of what this is.

21 Virtually all modeling is done with a base
22 case and a comparative mode. I believe -- without
23 trying to interpret the minds of the panel members
24 here, I believe what they are suggesting is that you
25 would like to have the most accurate of the base model
26 such that, when you do comparisons, the changes are
27 most representative.

The basis of all modeling not just for DWR
but in general is based on applying a change and evaluating
the effects of that change compared to a run without
that change. And that is the basis of comparative
analysis. I can't speak to why the panel would be
skeptical of that notion
(R.T. August 26, 2016 99:2-99:25.)

28 [...]

29 CO-HEARING OFFICER DODUC: I think that's the
30 best you're going to get, Mr. Eichenberg.

1 MR. EICHENBERG: Yeah, it does seem that way.
2 And especially without getting into the -- questioning
3 the base assumption of CalSim, which I won't do.

4 CO-HEARING OFFICER DODUC: Actually, now I'm
5 curious. What would you ask?

6 MR. EICHENBERG: I didn't have much more on
7 this anyway, but the -- I think that this is asking --
8 this is saying they are skeptical of the idea of a
9 comparative analysis without some sort of historic
10 validation.

11 And I think that goes back to what was
12 objected to in Ms. DesJardins's cross, which was
13 questioning whether -- how the model -- how the early
14 modeling or the basis modeling had been calibrated and
15 validated, and whether they compared to historical
16 averages at some point, whether those historical
17 averages supported the use of the model for predicting
18 future events.

19 And I think that the -- that this panel, this
20 review is expressing skepticism. So I guess I would
21 ask, is there any basis to that skepticism of a model
22 being run in comparative mode without any historical
23 validation?

24 CO-HEARING OFFICER DODUC: Your response to
25 that?

26 MR. EICHENBERG: I just want to point out that
27 I believe in response to this at the same time there
28 was a historical validation prepared by DWR which
29 covered the period of '87 to '92, I believe; the
30 historic period of '87 to '92 in which the model was
31 run in a kind of quasi historical mode.

32 And those are the values that I reported in my
33 testimony in which the flows into the Delta and out of
34 the Delta were on the order of a couple percent
35 difference from historic, and the deliveries I believe
36 were on the order of 4 or 5 percent of historic.

37 CO-HEARING OFFICER DODUC: Was that
38 announcement made available to Mr. Eichenberg and other
39 parties?

40 WITNESS MUNEVAR: It was part of my testimony.
41 Yes.

1 MR. EICHENBERG: So Ms. DesJardins I think was
2 trying to question the accuracy of that historical
3 model. That was my understanding of where her
4 testimony was going, so I didn't want to go down the
5 same road.

6 CO-HEARING OFFICER DODUC: Well, we might --
7 you know what? We might have to revisit that with her,
8 but since you've raised the issue and questioned the
9 use of the model for comparative purposes, which is
10 what Petitioners are proposing, I'll grant you some
11 leeway with that, if you focus on the model and the
12 basis of the model for the use of comparative purposes.

13 MR. EICHENBERG: Right. I understand. I
14 didn't prepare more detailed questions.

15 CO-HEARING OFFICER DODUC: All right.

16 MR. EICHENBERG: I was planning on going after
17 Ms. DesJardins, and I may have been able to follow up
18 at that time, but as I said, she's much more
19 knowledgeable about some of these modeling questions.
20 And I think we've seen what attorneys can do with
21 modeling information and how confusing it gets. I
22 didn't want to go down through the same. (R.T. August 26, 2016 100:21-103:2.)
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