Jerry R. Rigby ISBN 2470
Hyrum Erickson ISBN 7688
Robert H. Wood, ISBN 8229
RIGBY, ANDRUS & RIGBY, *Chartered*
Attorneys at Law
25 North Second East
Rexburg, Idaho 83440
Telephone: 208-356-3633

Attorneys for FMID

BEFORE THE DEPARTMENT OF WATER RESOURCES
OF THE STATE OF IDAHO

IN THE MATTER OF THE PETITION DELIVERY CALL OF RANGEN, INC.'S WATER RIGHT NOS. 36-02551 & 36-7694	)	Docket No. CM-DC-2011-004
	)	**FREMONT MADISON IRRIGATION DISTRICT RESPONSE TO IDWR STAFF MEMORANDUM IN THE MATTER OF THE RANGEN DELIVERY CALL**

INTRODUCTION

In October 2012, Bryce A. Contor of Rocky Mountain Environmental Associates (RMEA) submitted an expert report in the matter of the Rangen Delivery Call, in behalf of RMEA's client Fremont Madison Irrigation District. In December 2012, Contor provided a supplemental report in the same matter, in behalf of the same client.

On February 27, 2013, Jennifer Sukow, P.E. of Idaho Department of Water Resources (IDWR) issued a document entitled "Staff memorandum in response to expert reports submitted for Rangen Delivery Call (In the Matter of Distribution for Water to Water Right Nos. 36-02551 and 36-07694)."

This document is Contor's response to Sukow's memorandum, in behalf of Fremont Madison Irrigation District. In this response, Sukow's document will be referred to as the "Memo." Contor's October report will be referred to as "2012a" and the December supplement as "2012b," corresponding to Sukow's nomenclature. References to works of "IGWA" are to Idaho Ground Water Appropriators' documents addressed in the Memo.

This response does not constitute endorsement of findings or statements which are not addressed in this response.

Responses are provided in the order of each topic's appearance in the Memo. Text in *italics* refers to the Memo or quotes from it. Plain text indicates Contor's responses, with underlined text used occasionally for emphasis.

INDIVIDUAL RESPONSES

1. Page 2: The Memo states:

"In the opinion of Contor (2012), the model is only capable of providing a reasonable prediction of the response at the Buhl to Lower Salmon Falls reach."

Contor neither mentions this reach by name, provides modeling results for this reach, nor makes blanket statements of what the model is "only capable of." He states that the model "is a good tool… [which] should be used with careful attention to the limitations described above. Great caution should be used whenever results depend on spatial discretization smaller than the inter-Pilot-point distance…" (2012a, p. 24).

2. Page 2: The Memo states:

"...junior groundwater pumping is a dispersed, regional aquifer stress."

While this is true in aggregate, shutting off a particular well is in fact an application of model results to that single well, and therefore an implicit determination that model results are reliable for it.

3. Page 3: The Memo states:

"ESPAM2.1 was developed in an open... environment."

IDWR should acknowledge that the opinion of openness is not unanimously held within the ESHMC.

4. Page 4 Point 4: The Memo states:

"These calibration targets reflect the impact of geologic features on hydrologic responses."

This is a true but incomplete statement. A more complete statement would be "<u>These calibration targets reflect the aggregate impact of geologic features on hydrologic responses to widespread,</u>

regional stresses combined with localized stresses sharing similar temporal patterns." The importance of this distinction is independently explained by Contor and IGWA, and demonstrated by Contor's "additional illustration" (2012b, p. 2 - 6). The crux of the matter is this; the calibration process cannot distinguish between the effects of different stresses which have similar temporal signals at the spring. Calibration considers all stresses in aggregate, but curtailment evaluation isolates particular stresses. While this is most problematic with nearby stresses (relative to the scale of representation of heterogeneity) as shown in the "additional illustration," an error in response to a nearby stress must of necessity propagate into error in the residual response imputed to the remaining stresses.

For example, the calibration fit of Contor's "additional illustration" scenario (2012b, p. 2 – 6) was visually as good as the calibration of the Rangen reach in ESPAM2.1, and the mean error and root mean square error were reasonable. IDWR did not challenge the illustration. The hydrogeologic condition the illustration relies upon is very plausible for the Snake River plain aquifer.

From that illustration, the "true" condition is that curtailment of 100 acre feet of pumping at Well B and 100 acre feet of pumping at Well C would generate 96 acre feet of benefit. The correct assignment of responsibility for the nearby well is (95/96 = 99%), with only 1% appropriately attributable to the distant well. If the calibrated model were used, the assignment of responsibility for the nearby well would be (50/70 = 71%), with nearly 29% attributed to the distant. This difference has practical significance, and the difficulties are compounded when some wells are junior and some senior.

While this is not a test of whether such conditions exist at any particular spring, it is an illustration of how they could exist in the presence of apparently good calibration fitting to target data.

5. Page 4 Point 5: The Memo describes the calibration data for the single model cell known as the Rangen reach.

This section would be more complete with the following additional information:

a. The Rangen data were provided by the party seeking relief in this water call.
b. There are other water rights from the Curren Tunnel and spring complex.
c. As described on Page 19 of the Memo, there may be "contributions from other springs to Billingsley Creek."

6. Page 4 Point 6: The Memo again asserts an "open" process.

Please see Response 3 above.

7. Page 5 Point 8: The Memo asserts that Contor proposed modeling the Buhl to Lower Salmon Falls reach.

Contor did not suggest or perform modeling of the Buhl to Lower Salmon Falls reach.

8. Page 5 Points 10 and 11: The Memo discusses the trim line, which is a de minimus concept.

Discussion of de minimus considerations should also include the concept of Futile Call as raised by Contor (2012a, p. 5, 6, 23).

9. Page 10 Point 4 under "Model uncertainty." The Memo states that the IDWR Predictive Uncertainty incorporated water-budget uncertainty, because the calibration routines manipulated in the Predictive Uncertainty analysis were allowed to adjust some water-budget components.

This is a correct assertion, though the calibration routines may not have been set to adjust all components to their full range of uncertainty. Nevertheless, the Memo's correct assertion on page 21 that uncertainty "cannot be assigned a single numeric value" is consistent with the fact that some Predictive Uncertainty results are better, and some worse, than Contor's overall estimate based on basic Water Budget components.

10. Page 10 Point 5 under "Model uncertainty:" The Memo discusses IGWA's modeling exploration of the effects of heterogeneity.

Contor's independent Monte Carlo demonstration (2012a, Appendix C) supports IGWA's explanation of mechanisms by which small-scale heterogeneity can cause large differences in model estimates made at single model cells. IDWR did not challenge the Monte Carlo exercise.

ESPAM2.1 does not represent small-scale heterogeneity. The IDWR Predictive Uncertainty analyses did not test the effects of small-scale heterogeneity.

11. Page 11 Point 8: The Memo asserts that:

"These [expert] evaluations do not contradict IDWR's conclusion that ESPAM2.1 is capable of providing a reasonable prediction of the response of groundwater pumping at the Rangen spring cell."

Contor and IGWA both explain how it is that a model can simultaneously perform reasonably well with historical data and be less reliable for evaluating stresses or scenarios not explicitly represented in the calibration data. Contor's Monte Carlo simulation (2012a, Appendix C) and "additional illustration" (2012b, p. 2 – 6) explore the potential effects of heterogeneity at scales smaller than the inter-pilot-point distance. Together, these evaluations do contradict the

unqualified acceptance of model results for any single discharge cell.

12. Page 11 Point 8: The Memo asserts that the expert reports:

"...do not contradict IDWR's conclusion that ESPAM2.1 is the best available scientific tool to estimate the quantity of the response."

The reports do contradict a notion that ESPAM2.1 alone is adequate to use on a single model cell, without qualification, reservation, or use of additional technical analysis.

13. *Page 18: The Memo states:*

"Contor (2012a) simulated benefits to the Buhl to Lower Salmon Falls reach..."

As stated in the heading to Table 2 (2012a, p. 6), Contor's modeling exercise was of "Benefits to the Rangen Reach." Contor explained his modeling (2012a, Appendix A) and provided all the modeling files he used.

14. *Page 19: The Memo implies that Contor directs aggregation of reaches in a particular way.*

Contor simply states that "uncertainty will be greatly reduced" if reaches are aggregated (2012a, p. 8) and that this is "technically desirable" (2012, p. 23).

15. Page 31: The Memo states that "whether the [Curren] tunnel is considered a well" is a legal question.

Certainly the definition of a well is a legal question, answered by the section of Idaho Code quoted in the Memo. There are also technical questions, properly answered in the affirmative:

a. Is the Curren Tunnel an artificial excavation?
b. Is it more than eighteen (18) feet in vertical depth below land surface?
c. Is groundwater obtained?

16. Page 43. The Memo states:

"...uncertainty does not mean that it is uncertain whether or not there will be a response to curtailment, it means there is uncertainty in the magnitude of the response."

This assertion is technically correct, but it presupposes that the presence or absence of a response is the only question to be asked. In reality, the presence of a response is a foregone conclusion. Because no cells are allowed to have a transmissivity of zero, it is unavoidable that the model will indicate a response between any well within the active model boundary, and Rangen. This is

not an outcome of the model, it is one of the inputs to it.

There are contexts where Contor believes the magnitude of response could be important:

a. The model might be used to assess de minimus status, whether temporally-based or quantity-based.
b. The model might be used to determine the priority cut for a given call, affecting who is subject to it. This may or may not pertain to any particular call, but Contor is concerned with general principles of model use.
c. The modeled magnitude of effect might be used to assess the efficacy of a proposed mitigation plan.
d. The modeled magnitude of effect might be used to assign responsibility for mitigation or other costs.

17. Page 44. The Memo represents that Contor talked about apportioning benefits to individual diversions within the Buhl to Salmon Falls reach.

Contor meant to convey that he did not apportion benefits to diversions within the single-cell Rangen reach.

18. *Page 44. Criticizing Contor's representation of the IDWR Predictive Uncertainty Results, the Memo states:*

"The IDWR Predictive Uncertainty work does not indicate predictive uncertainty exceeding 500%. Further, high percentage differences in predictive uncertainty are misleading in cases where the predicted response is small."

a. The IDWR Predictive Uncertainty results for the effects of WD99 upon the Near Blackfoot to Minidoka reach report that one calibrated ESPAM2.x-framework model indicates a capture fraction of 3.02%, while another indicates a fraction of 29.7%.
b. The larger value is approximately 990% of the smaller.
c. 990% exceeds 500%.
d. 29.7% is not small.
e. The dismissal of differences in small predicted responses presupposes an administrative finding on de minimus issues. Contor is not aware that such a finding has been made. Concern over uncertainty in small modeled effects is not unfounded; for instance, in the context of evaluating mitigation for new water rights using the current IDWR Transfer Tool modeling product, no de minimus allowances are currently made. RMEA has encountered cases where large mitigation efforts can indeed be required to satisfy minuscule modeled requirements. A large percentage difference in a minuscule modeled effect could result in a large change in a large and costly mitigation effort, and therefore uncertainty in even a small requirement has practical significance.
f. The IDWR Predictive Uncertainty work explores uncertainty in the components that

were adjusted during the evaluation exercise. This excludes conceptual-model uncertainties and the effects of small-scale heterogeneity. Hence, the IDWR findings do not contradict the discussions of Contor and others regarding these additional sources of uncertainty.

19. Page 44. The Memo states:

"It is not clear how Contor estimated the volume of curtailed use."

a. Contor (2012a) states on page A2 of Appendix A: "Acres were calculated assuming 50 acres per each cubic foot per second of water right, consumptive use was estimated at two feet per acre, and diversion volume was calculated assuming 80% consumed fraction of field applied groundwater."
b. He points out that due to the "coarseness of the assumption used, the modeling results are best interpreted in terms of the ratio or percentage of benefit to curtailed volume" (2012a, p. A2).

20. Page 44. The Memo takes issue with Contor's modeling of a one-year curtailment event.

By the principle of superposition, the effects of multiple-year events are simply the sum of the effects of individual events. Hence, the cumulative benefit after 150 years of continuous curtailment would be 0.04% of the curtailed volume for the first year of curtailment, plus some lesser fraction of the volume of the second year of curtailment, plus an even lesser fraction of the volume of third year curtailment, etc. As read from Contor's Table 2 (2012a, p. 6), the sum would include 0.002% of the 145th year curtailment and 1.5 x 10^{-6}% of the 150th year curtailment volume. If curtailment were then lifted, after an additional 150 years the total modeled accrued benefit would be very nearly 0.04% of total curtailed volume, as indicated by the last entry in Contor's table and confirmed by IDWR's independent results reported on page 44 of the Memo.

21. Page 44. The Memo states:

"Contor's methods underestimate the fractional response to a continuous curtailment at the Buhl to Lower Salmon Falls reach by an order of magnitude."

Contor did not model effects to the Buhl to Lower Salmon Falls reach, but to the single cell of the Rangen reach. For the Rangen reach, his Table 2 (2012a, p. 6) indicates a 150-year response fraction of 0.04%, identical to results reported by IDWR on page 44 of the Memo for the same reach.

22. Page 45. The memo states:

"Contor (2012a) recommends that ESPAM2.1 not be used to predict responses at reaches smaller than the distances between nearby transmissivity pilot points."

a. Contor does not give instruction to the Director; he informs that "uncertainty will be greatly reduced" (2012a, p. 8) if reaches for model use are at least as large as the nearby inter-pilot-point distance, and that this reduction in uncertainty is "technically desirable" (2012a, p. 23).
b. IDWR did not challenge the Monte Carlo modeling effort from which the conclusion is derived.
c. It is true that Contor examined only transmissivity effects in his Monte Carlo exercise. He acknowledges that his "is a steady-state test and therefore does not inform temporal considerations of heterogeneity." Because of this and other limitations, he acknowledges that "actual uncertainty arising from heterogeneity is expected to be greater than indicated" (Contor 2012a, p. C6).
d. Contor fails to point out that for spatial-temporal questions, the distance between storage-coefficient pilot points is also relevant. Despite this failure he never asserts that only transmissivity pilot points should be considered in determining appropriate reach lengths for model use.

DATED this 5th day of April, 2013.

Jerry R. Rigby, Attorney

Bryce A. Contor

Bryce A. Contor

CERTIFICATE OF SERVICE BY MAIL, HAND DELIVERY
OR FACSIMILE TRANSMISSION

I hereby certify that a true and correct copy of the foregoing document was on this date served upon the persons named below, at the addresses set out below their name, either by mailing, hand delivery or by telecopying to them a true and correct copy of said document in a properly addressed envelope in the United States mail, postage prepaid; by hand delivery to them; or by facsimile transmission.

DATED this 5th day of April, 2013.

RIGBY ANDRUS & RIGBY, Chartered

Jerry R. Rigby

Gary Spackman, Director
Idaho Department of Water Resources
P.O. Box 83720
Boise, ID 83720
deborah.gibson@idwr.idaho.gov

[X] Mail
[ ] Hand Delivery
[X] Electronic Mail

Robyn Brody
Brody Law Office
P.O. Box 554
Rupert, ID 83350
robynbrody@hotmail.com

[ ] Mail
[ ] Hand Delivery
[X] Electronic Mail

Randy Budge
Candice McHugh
Racine Olson
P.O. Box 1391
Pocatello, ID 83204
rcb@racinelaw.net
cmm@racinelaw.net
tjb@racinelaw.net

[ ] Mail
[ ] Hand Delivery
[X] Electronic Mail

J. Justin May
May Browning
1419 W. Washington
Boise, ID 83702
jmay@maybrowning.com

[ ] Mail
[ ] Hand Delivery
[X] Electronic Mail

Fritz Haemmerle
Haemmerle Haemmerle
P.O. Box 1800
Hailey, ID 83333
fxh@haemlaw.com

[ ] Mail
[ ] Hand Delivery
[X] Electronic Mail

Sarah Klahn
Mitra Pemberton
White & Jankowski
511 16th St., Ste. 500
Denver, CO 80202
sarahk@white-jankowski.com
mitrap@white-jankowski.com

[ ] Mail
[ ] Hand Delivery
[X] Electronic Mail

Garrick Baxter
Chris Bromley
Kimi White
Idaho Department of Water Resources
P.O. Box 83720
Boise, ID 83720
garrick.baxter@idwr.idaho.gov
chris.bromley@idwr.idaho.gov
kimi.white@idwr.idaho.gov

[ ] Mail
[ ] Hand Delivery
[X] Electronic Mail

Dean Tranmer
City of Pocatello
P.O. Box 4169
Pocatello, ID 83201
dtranmer@pocatello.us

[ ] Mail
[ ] Hand Delivery
[X] Electronic Mail

C. Thomas Arkoosh
Arkoosh Law Offices
P.O. Box 2900
Boise, ID 83701
tom.arkoosh@arkoosh.com
erin.cecil@arkoosh.com

[ ] Mail
[ ] Hand Delivery
[X] Electronic Mail

John K. Simpson
Travis L. Thompson
Paul L. Arrington
195 River Vista Place, Ste. 204
Twin Falls, ID 83301
tlt@idahowaters.com
jks@idahowaters.com
pla@idahowaters.com

[ ] Mail
[ ] Hand Delivery
[X] Electronic Mail

W. Kent Fletcher
Fletcher Law Office
P.O. Box 248
Burley, ID 83318
wkf@pmt.org

[ ] Mail
[ ] Hand Delivery
[X] Electronic Mail