Jerry R. Rigby ISBN 2470
Hyrum Erickson ISBN 7688
RIGBY, ANDRUS & RIGBY LAW, PLLC
Attorneys at Law
25 North Second East
Rexburg, Idaho 83440
Telephone: 208-356-3633

Attorneys for Fremont Madison Irrigation District, Madison Ground Water District, Brigham Cook and Clark Hamilton, all as representative clients designated as "Upper Valley Pumpers"

BEFORE THE DEPARTMENT OF WATER RESOURCES
OF THE STATE OF IDAHO

IN THE MATTER OF DISTRIBUTION OF WATER TO WATER RIGHT NOS. 36-00134B, 36-00135A, AND 36-15501	)	Docket No. CM-DC-2014-004
	)	**CERTIFICATE OF SERVICE**
(RANGEN, INC.)	)	

I hereby certify that on the 11th day of February, 2015, I served **"Upper Valley Pumpers, Rebuttal Report of Bryce Contor"** by electronic mail of the same, to the following:

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
Racine Olson
P.O. Box 1391
Pocatello, ID 83204
rcb@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
Kimi White
Idaho Department of Water Resources
P.O. Box 83720
Boise, ID 83720
garrick.baxter@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

Candice McHugh
Chris M. Bromley
McHugh Bromley, PLLC
380 S. 4th St., Ste. 103
Boise, ID 83702
cmchugh@mchughbromley.com
cbromley@mchughbromley.com

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

Robert E. Williams
Williams, Meservy & Lothspeich, LLP
P.O. Box 168
Jerome, ID 83338
rewilliams@cableone.net

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

Jerry R. Rigby

Rocky Mountain ENVIRONMENTAL ASSOCIATES, INC.

REBUTTAL REPORT
IN THE MATTER OF
DISTRIBUTION TO WATER RIGHTS
HELD BY RANGEN, INC.
Docket No. CM-DC-2014-004
(June 2014 Call for 1957-priority Right)

February, 2015
Upper Valley Pumpers
Bryce A. Contor

Introduction

This document is the Upper Valley Pumpers' Rebuttal Report in the matter of the June 2014 delivery call filed by Rangen, Inc. It responds to four reports, in alphabetical order by first listed author.

Water Right, Water Measurement and Groundwater Modeling Evaluation of Rangen 2014 Delivery Call. Charles M. Brendecke, PhD, P.E., and Sophia Sigstedt

The authors provide details of the implementations of numerical aquifer model ESPAM2.1 used to derive the estimates referenced in the report. This prompts reporting of additional detail of the implementations of the model used to prepare estimates referenced in the Upper Valley Pumpers Technical Report:

ESPAM2.1 Steady-State Model

The Steady-State (infinite time) version of the model was implemented for the Upper Valley Pumpers using a text file generated by Idaho Department of Water Resources (IDWR) and obtained from the ESPAM2.1 modeling website. The filename is "SSRF_E121025A001_IDWR.txt" and was accompanied in the download by an explanatory "readme" file, whose contents are supplied with this Rebuttal Report as Appendix 1.

The text file contains one entry for each active model cell. Each entry contains the modeled steady-state response to a unit stress for each of the modeled reaches. Responses for all reaches sum to very nearly 1.0. The file was utilized by appending it to a Geographical Information Systems (GIS) data set (shapefile) of the model grid, also

provided by IDWR. Joining was accomplished on the field containing the "Cell Integer" in the attribute table of the shapefile. Further GIS processing allowed selection, combination, and calculation of results for desired subsets of model cells and modeled reaches.

ESPAM2.1 Transient Model

The modeling framework used for transient evaluations for the Upper Valley Pumpers was based upon the "SuperTransient10yr_monthly" realization of the model, also obtained from IDWR. This model was supplied without documentation. The file structure of the downloaded directory is listed in Appendix 2. File creation dates range from July 2010 to November 2012. In addition to the files in Appendix 2, running the transient model required files "mf2k18.exe" and "bud2smp.exe," also obtained from IDWR.

As the name implies, this is a ten-year model. A ten year period is inadequate to capture the timing of effects from all but the nearest model cells to Curren Tunnel. Therefore, the model was adapted to a 150-year model run, consistent with prior implementations of ESPAM1.1. The first year was divided into 12 stress periods of (365.25/12) or 30.4375 days. These 12 stress periods were set to each contain a single time step. The remaining years of the modeling period were dividing into 149 stress periods of 365.25 days, each containing 12 time steps. Individual model runs were performed for each model cell of interest. Results were archived for future use.

Early experimentation using the model showed that if the stresses were small, numerical instability could result in unreasonable results. Checking confirmed that when results appeared unreasonable, the "list" file output from the model run showed that the water budget had not balanced during the run. Through experimentation an arbitrarily large stress was identified which never was found to result in a meaningful cumulative water-balance percentage discrepancy in the final time step. In response, each run utilized input of an arbitrarily large stress (10^9 ft^3/day) in Stress Period One, for a single model cell. Results were extracted using the utilities provided by IDWR and archived.

For model use, archived results for the cell in question were divided by the arbitrary stress and multiplied by the stress of interest. This is computationally equivalent to the unit-stress approach used in IDWR's ESPAM1.1 Transfer Tool spreadsheet modeling implementation, but it overcomes the numerical instability that would have invalidated a unit-stress approach with the "SuperTransient10yr_monthly" realization of ESPAM2.1.

For multi-cell model runs, the results from the relevant cells were summed.

Use of Superposition in both Steady-State and Transient Runs

As implied by the prefix "Super" in IDWR's folder name, and as reported by Brendecke and Sigstedt, the transient model is a numerical superposition rendition. Appendix 1 shows that the steady-state rendition is also a superposition model. This means that applying an arbitrarily large stress is valid and produces no distortion. It also means

that it is valid to scale the results for individual cells and to sum the results for multiple cells.

Brendecke and Sigstedt point out that Steady State is literally until infinite time. Because ESPAM1.1 was widely utilized with a 150-year time period, it may be tempting to assume that 150 years approaches steady state. Since neither the aquifer nor the model can create or destroy water, eventually the total of the stress volume must be expressed at the springs or river. Therefore, one way to check this assumption is to compare the total volume of a one-period applied stress to the total volume of modeled output. If the output equals the stress, all changes in storage have been exhausted and the result is essentially equivalent to Steady State. For most model cells, 150 years' simulation does approximate Steady State, but for some, steady-state and 150 years can differ by up to 40%.

Expert Report In Support of Rangen, Inc.'s Delivery Call for Water Right No. 36-15501. Charles E. Brockway, PhD, P.E., and David C. Colvin, P.G.

The Brockway and Colvin report was accompanied by a large number of exhibits which are not considered in this rebuttal. The report itself provided steady-state (infinite time) modeling results.

One criterion of Futile Call in the context of Conjunctive Administration is whether relief is expected to occur within a reasonable time. Transient modeling could provide useful information to allow consideration of this criterion, but the Brockway and Colvin report omits discussion of any transient modeling that may have been performed.

Another criterion of Futile Call is whether the curtailment constitutes a waste of the water resource. Ratios of relief to foregone beneficial use could have been obtained from steady-state modeling, and would have been useful in this evaluation. These also were not provided.

Fortunately, both the timing of effects and the ratios of relief to foregone beneficial use are addressed in the case record and in recently-submitted reports by other parties.

Technical Review of Coalition of Cities' Second Mitigation Plan. JenniferSukow, P.E., P.G., Hydrology Section, IDWR

The IDWR report is not addressed in this rebuttal.

Spronk Water Engineers, Inc. Expert Report for 2014 Rangen Delivery Call Prepared for the City of Pocatello. Gregory K. Sullivan, P.E.

On page 19 (the 22nd page of the *.pdf document), Sullivan refers to "estimated shortages to the 1957 water right that were experienced in May – July, 2014." Note the word *"estimated."* Sullivan, Brendecke and Sigstedt highlight significant issues of measurement and reporting. These cast doubt upon the estimates the call relies upon, and therefore upon whether the right actually might have been short in 2014.

Appendix I: Contents of "readme.txt" accompanying Steady State Response Functions

calculated response functions using batch file 'run_ssrf.bat'
the output file is ss_rf1.out
ss_rf1.out were loaded into 'ResponseFunctionCalculations.xlsx'
and made into PivotTable
PivotTable was copied to 'SteadyStateResponseFunction'
While copying PivotTable into spreadsheet 'SteadyStateResponseFunction' some rows were renamed or removed to eliminate
blank spaces, such as 'Grand Total' field was renamed 'Total' and 'Grand Total' row was eliminated.

Spreadsheet 'ESPAM21_ResponseFunction.xlsx' was joined using field 'Cell_Int' with 'Cell_Intgr' in 'ESPAM21_ModelGrid_06092011.shp' to make ESPAM2_SSRespFn.shp

Appendix II: File Structure of "SuperTransient10yr_monthly" directory supplied by IDWR

SuperTransient10yr_monthly_AsReceived ▸ SuperTransient10yr_monthly

Name	Date modified	Type	Size
superTR.riv	11/7/2012 7:22 AM	RIV File	23 KB
super.ghb	11/6/2012 6:57 PM	GHB File	13 KB
hcond2.ref	11/6/2012 8:54 AM	REF File	325 KB
sy2.ref	11/6/2012 8:54 AM	REF File	325 KB
standard.pcg	7/17/2012 9:01 AM	PCG File	1 KB
settings.fig	7/11/2012 3:25 PM	FIG File	1 KB
b2sriv.in	6/13/2012 2:38 AM	IN File	1 KB
b2sghb.in	6/13/2012 2:37 AM	IN File	1 KB
b2s_SpgRch.in	6/13/2012 2:37 AM	IN File	1 KB
b2s_RivGai.in	6/13/2012 2:37 AM	IN File	1 KB
b2s_GrpABSpgs.in	6/13/2012 2:37 AM	IN File	1 KB
SuperTR.dis	6/13/2012 1:46 AM	DIS File	5 KB
superTR.ocl	6/11/2012 3:22 PM	OCL File	33 KB
SuperTR.nam	5/21/2012 5:10 PM	NAM File	1 KB
SuperTR.bc6	5/9/2012 3:01 PM	BC6 File	1 KB
ABsprings.inf	2/27/2012 8:22 AM	Setup Information	43 KB
riv05.inf	2/27/2012 8:22 AM	Setup Information	300 KB
KimBulLsfKh.inf	12/15/2011 11:03 ...	Setup Information	43 KB
RespFn.inf	8/15/2011 10:06 AM	Setup Information	109 KB
ESPAM2.gsf	10/19/2010 4:02 PM	GSF File	1 KB
ibound.ibd	9/23/2010 8:25 AM	IBD File	43 KB
super.BA6	7/13/2010 8:12 AM	BA6 File	113 KB