Rebuttal Report In Support of Rangen, Inc.'s Delivery Call for Water Right No. 36-15501

Prepared for:

Rangen, Inc.

February 16, 2015

Project No. 1159-01-2011 and 1179MSB01

The technical material in this report was prepared by or under the supervision and direction of the undersigned, whose seals as a Professional Geologist and Professional Engineer are affixed below.

Charles E. Brockway, Ph.D., P.E. Brockway Engineering

David C. Colvin, P.G. Leonard Rice Engineers, Inc.

Table of Contents

Contents

1 INTRODUCTION

On June 27, 2014, Rangen, Inc. (Rangen) submitted a Petition for Delivery Call[1] (Call) for Water Right Nos. 36-15501, 36-134B, and 36-135A. On January 26, 2015, we provided our Expert Report In Support of Rangen, Inc.'s Delivery Call for Water Right No. 36-15501 (Rangen Expert Report).

On February 9, 2015 Idaho Department of Water Resources (IDWR) staff filed a Memorandum for Rangen, Inc. Delivery Call, Water Right 36-15501, CM-DC-2014-004 (Staff Memo). On January 26, 2015 the following expert reports were filed by respondents (Respondent Reports):

- Charles M. Brendecke, Ph.D., P.E. and Sophia Sigstedt, prepared for Idaho Groundwater Appropriators, Inc. (IGWA Report)
- Gregory K. Sullivan, P.E., prepared for the City of Pocatello (Pocatello Report)
- Bryce A. Contor, prepared for Upper Valley Pumpers (Upper Valley Pumper Reports)

This report presents our rebuttal opinions to the references listed above.

2 CURREN TUNNEL FLOW MEASUREMENT

It is our opinion that the Curren Tunnel flow measurement is sufficiently accurate and that improved measurement would not substantially change the finding of impacts to Rangen's water rights or the administration of mitigation water. The historical measurements of Curren Tunnel flow have been and are sufficiently accurate. We generally agree with the discussion presented in the Staff Memo. Improvement of water measurement devices as discussed in the Pocatello Report and Staff Memo should be evaluated. Any improvements should be made outside the context of this delivery call.

3 AVAILABILITY OF WATER FOR RIGHT 36-15501

Water right no. 36-15501 has a priority date of July 1, 1957, and a diversion rate of 1.46 cubic feet per second (CFS) from the Curren Tunnel for a period of January 1 through December 31. As shown in our Rangen Expert Report and the Staff Memo, there was insufficient flow in the Curren Tunnel to meet the water right no. 36-15501 for many days in 2014. Any mitigation for this Call will need to fulfill the 1.46 CFS, year-round in addition to the mitigation ordered for Rangen's 1962 water right call.

3.1 MORRIS EXCHANGE CREDIT

[1] Rangen's 2014 Petition for Delivery Call
http://www.idwr.idaho.gov/News/WaterCalls/1000Spring%20Users%20Calls/2014/06Jun/Rangen's%20Petition%20for%20Delivery%20Call%202014.pdf

The Staff Memo correctly identified that the Morris exchange credit has already been applied as mitigation for Rangen's 1962 water right call:

> *"The Director's order approving portions of IGWA's first mitigation plan included approval of IGWA's proposal to divert water from Curren Tunnel pursuant to water rights held by Howard and Rhonda Morris ("Morris") and deliver the water to Rangen to fulfill a portion of junior groundwater users' mitigation obligation for injury to Rangen's July 13, 1962 water right ("Morris exchange credit agreement")."*

In 2014, there was very little, if any, water available in the Curren tunnel to satisfy water right 36-15501. This is expected to continue to be the case in the future.

3.2 ESPAM 2.1 PREDICTED BENEFITS OF CURTAILMENT

The Eastern Snake Plain Aquifer Model version 2.1 (ESPAM2.1) is widely accepted as the best available science for evaluating impacts to spring flow from pumping from the Eastern Snake Plain Aquifer (ESPA).

As shown in Table 1 of the Staff Memo and our Rangen Expert Report, the Eastern Snake Plain Aquifer Model version 2.1 (ESPAM2.1) predicts that sufficient water will be made available for water right no. 36-15501 from a July 1, 1957 curtailment date.

The timing of curtailment benefits to the Curren Tunnel presented in the Respondent Reports are not applicable because they don't consider the widespread spatial extent of junior groundwater pumping throughout the ESPA.

In our 2012 expert report for the 2011 Call[2], we provided additional opinions regarding the ESPAM 2.1 model that are still applicable today. We also provided opinions on the inappropriate use of a trim line. These opinions also hold true today.

4 TRIM LINE

The Respondent Reports cite the low percentage of benefits of curtailment at the Curren Tunnel as compared to the total amount of water curtailed as one of the justifications for a trimline. The implementation of a trimline reduces the amount of mitigation required for injury to a senior water right. The ESPAM2.1 simulations predict significant impacts from junior groundwater pumping to Rangen's water rights and curtailment of junior pumping to July 1, 1957 shows that the entire flow of 1.46 allowed under water right no. 36-15501 will be obtained at the Curren tunnel. Simulations of a July 1, 1957 curtailment performed for this report show that Curren tunnel flow will be

[2] Expert Report in the Matter of Rangen Inc. - Availability of Spring Flow and Injury to Water Rights; December 201, 2012.
http://www.idwr.idaho.gov/Browse/Legal/Rangen/Rangen's%20Expert%20Witness%20Reports/Brockway%20Colvin%20Brannon/Final%20Report.pdf

increased by 15.03 cfs for the entire model domain and 12.20 cfs if a trimline at the Great Rift is assumed. In either case, the July 1, 1957 Rangen water right is fulfilled by curtailment. Therefore, there is no justification for implementation of a trimline and the call is not futile.

5 FUTILITY

The concept of a futile call is predicated on a determination that the Watermaster is unable to deliver water to a senior user due to hydraulic conditions. Rangen has a reasonable diversion facility and can beneficially use the water as required. In no case that we are aware of does the watermaster decide that delivery is 'futile' based on his determination that either the senior or junior water right holder has the 'better' right because of the type of beneficial use, a comparison of the economics of the various water user's enterprise, or some 'uncertainty' as to whether or not the delivery to the senior user is possible. The senior right holder is entitled to his authorized water at the specified time, place, and quantity, unless there is certainty, as determined by the watermaster that the delivery is futile.

Identification of the injuring party requires the determination of an 'area of common groundwater'. In the case of the ESPA, the identification of injuring parties has been settled by the adoption by the State of an 'area within which a hydraulic connection is identified' or 'an area of common groundwater'. This area is also identified as the 'source' of water for the water rights on springs issuing from the aquifer and any party with a well in this 'source area' has the same source as all other well owners and spring water right owners. Wells pumping outside the area of common groundwater are not included in the aquifer and therefore have no simulated impact on any springs.

The respondents assert that a futile call can be justified by the fact that curtailment of a well within the 'area of common groundwater' which is 'a long way' 'away from the affected spring will have a very small impact on the spring. The concept or justification for a futile call based on the quantity of flow attributed to the injuring party or the response time of curtailment is not applicable.

There is no criteria that we know of for impact delay time which will trigger the determination of a futile call. Potential delay in the injury does not justify a determination of futility.

6 ESPAM 2.1 ADEQUACY

Mr. Contor in his technical Report attempts to point out areas where the ESPAM2.1 model is deficient and implies that there are areas where it is currently used but should not be used. It should be noted that the ESPAM 2.1 model has been reviewed and adopted by the State as the 'best available science 'for use where ground water modelling is required for water rights administration in Idaho. A water call is not the correct forum to suggest or theorize on hypothetical changes to the model.

Mr. Contor suggests that:
The model cannot be used to determine which junior beneficial uses have a hydrologic effect upon Curren Tunnel discharges. He alleges that the model "was constructed and its predecessors were constructed in such a way that every cell within the model boundary must show a hydrologic effect to the model containing the tunnel, and conversely, that no location outside the model boundary can possibly show an effect to that cell. Mr. Contor is implying that the developers of ESPAM 2.1 selected the incorrect aquifer boundary and that they knew it was incorrect.

He further asserts that the selection of the model boundary 'never contemplated that the model was intended to include all cells, and only those cells, that would have an effect upon the Curren Tunnel' and that the model calibration never considered which wells have affects. He is correct in this assertion for the simple reason that the developers could not have been cognizant of the Rangen call or any other water call. If the developers of the model could have made a determination of which wells have effects, they would not have needed a model.

Lastly, Mr. Contor alleges that the model fails to honor basic hydrologic reasoning in the context of determining who has an effect upon the Curren Tunnel. The need for a scientific tool that accurately represents hydrologic relationships in the aquifer/river system is what motivates the decision to use a model. The complexity of ESPA hydrologic relationships warrants the use of a model. ESPAM 2.1 is intended to evaluate the impacts of groundwater pumping on spring flows and it's development has been informed by hydrologic reasoning.

On page 2 of his report, Mr. Contor attempts to demonstrate 'hypothetical points' in the context of 'hydrologic reasoning' His attempt is to show that the model cannot simulate the effect of a well outside the model boundary or the 'area of common groundwater' such as in the Big Wood River and that increasing distance from a the point of diversion of a water call decreases the impact of pumping wells. He further asserts that the geologic anomalies such as the Great Rift and the Mud Lake Barrier and other springs along the Snake River ' would be expected to intercept essentially all of any remaining accrual, leaving effectively nothing to accrue to Point A' (Curren Tunnel). As a result of this reasoning, Mr. Contor asserts on page 4 that 'there is no reasonable expectation of meaningful accrual from curtailment of beneficial use occurring east of the Great Rift, regardless of model constraints and indications." Mr. Contor has reasoned therefore, that the calibrated and verified model is incorrect and his hydrologic reasoning is more reliable than the model simulation. We disagree.

Mr. Contor expended considerable effort in explaining the hydrogeology of the Big Wood River/Silver Creek aquifer and how the hydraulic relationship between the ESPA and the Big Wood River/Silver Creek aquifer could be estimated (pp 4-4, Contor report). Since the Big Wood/Silver aquifer is not within the ESPA 'area of common groundwater' this effort seems moot. It does reveal that Mr. Contor believes the failure of the model developers of ESPAM 2.1 to include this adjacent

aquifer might make ESPAM2.1 unsuitable for hydrologic evaluations for these proceedings. We disagree

7 AQUIFER RESPONSE TIME

Mr. Contor's report on Pages 6-8 attempts to quantify his 'criterion of futility'. Figure 3 of the Contor report is the familiar USGS estimate total annual flow of northside springs and the calculated reach gain in the near-Blackfoot to Neeley reach of the Snake River. The implication by Mr. Contor is that, because the spring flow shows increases from the period about 1910 to 1950 that the response time of the aquifer is 50 years. This is an incorrect conclusion from visual observation of integrated spring responses caused primarily by variable increases in surface irrigation incidental recharge, conversions to sprinkler irrigation, variable climatic changes and changes in tributary contributions to the aquifer. The shape of the outflow graph integrates the response of the aquifer water levels and spring flows from all time-variant and spatially variant input over the full area of the aquifer from King Hill to Ashton. It does not represent the time of response of the Rangen spring complex to a recharge or pumping event at a specific site on the aquifer.

Mr. Contor asserts that the simulations of response times using ESPAM2.1 model output are not consistent with his 'hydrological reasoning' or his selected empirical evidence. He utilizes several simplistic assumptions of variable consumptive use and diversion volumes per acre over the aquifer to show the obvious: that the closer a recharge or depletion event is to the spring, the faster the response of the spring discharge. This phenomenon can be ascertained without a model. Mr. Contor attributes his allegation that the ESPAM2.1 model simulates more rapid propagation than do analytical models his allegation that ESPAM 2.1 was not "taught" to make 'estimates of the long-range timing of effects from distant events such as curtailment' It should be pointed out that the model is not a human creature and probably should not be referred to in an anthropomorphic way.

Mr. Contor proposes a specification a call to not be futile if it 'provides relief of X% or more of curtailed beneficial use within a period of Y years. This criteria, whatever X or Y is selected, is arbitrary and has no basis in law or rules for water administration.

Mr. Contor attempts to support his continued theory that any uncertainty in a model should be accounted for by the implementationof a trim line to eliminate curtailment on parts of the aquifer based on arbitrary criteria; either a specific part of the aquifer does not cause significant impact on a calling party or that it takes too long for the impact to reach the calling party point of diversion. All of Mr. Contor's suggested trim lime criteria appear to be based on estimated uncertainty in the models (ESPAM 1.1 and ESPAM 2.1). Even though the idea of model uncertainty and the relation to a trimline was thoroughly vetted in the first hearing, and the 10% uncertainty estimated was shown not to be based on valid statistical analysis, Mr Contor still clings to the idea that a 10% uncertainty and trimline configuration are appropriate for ESPAM 2.1. Mr. Contor refers to 'The Case Record' as evidence for a variety of assertions. He does state that 'determination of

uncertainty is impossible' which should make any objective scientist dubious about applying an arbitrary level of uncertainty to a calibrated model.

> In his October 2014 Order[3], Judge Wildman found that: *"While there is a higher level of predicted uncertainty or margin of error in the model results east of the Great Rift, based on the constitutionally established burdens of proof, any uncertainty or margin of error must operate in favor of Rangen, the senior right holder. By its very nature uncertainty does not support a finding of clear and convincing evidence. To allow model uncertainty to operate in favor of junior ground pumpers would shift the burden of proof to the senior to prove that junior ground pumpers east of the Great Rift were causing injury. Therefore, the Director's application of the trim line in this matter is set aside and remanded for further proceedings as necessary."*

On page 12 of his report, Mr. Contor states his primary conclusion is : "By any of these technological analyses the indication is that no meaningful quantity of relief will accrue to Curren Tunnel from curtailment of beneficial use in the areas irrigated by Upper Valley Pumpers. The only indication that any relief would accrue is from the numerical models, which were constrained by their very construction to show some quantity of relief." We disagree.

Mr. Contor represents the Upper Valley Pumpers in these proceedings but does not define in his report(s) the Upper Valley Pumpers place of use and does not provide any analysis of particular water rights or place of use.

8 SUMMARY OF OPINIONS

Our rebuttal opinions regarding the petition for delivery call of Water Right No. 36-15501 are summarized as:

1. The Curren tunnel flow measurements utilized in these proceedings are sufficiently accurate and that any improved flow measurement equipment or protocol would not change our opinions in this case.

2. The availability of the 1.46 cfs of water for Rangen's water right no. 36-15501 was insufficient for many days in 2014. We essentially agree with the IDWR measurement and analysis provided in the Staff Memo.

[3] October 24, 2014 MEMORANDUM DECISION AND ORDER ON PETITIONS FOR JUDICIAL REVIEW http://www.idwr.idaho.gov/files/legal/CV-2014-1338/CV-2014-1338_20141024_Memorandum_Decision_and_Order.pdf

3. We agree with the staff memorandum and our previous reports, because of the allocation of the Morris exchange credit to Rangen's 1962 water right, no water is available to satisfy water right 36-15501 many days of the year.

4. The ESPAM 2.1 ground water model is the best available science for evaluating the effect of junior ground water pumping from the Eastern Snake Plain Aquifer and the impacts to spring flows.

5. The predictions provided in the Staff Memo and the Rangen Expert Report are accurate and indicate that sufficient water will be made available for water right 36-15501 from a July 1, 1957 curtailment. Therefore, the call on Rangen's 1957 water right is not futile.

6. Utilization of a Trim Line is not warranted.

7. Evaluation of the injury and adequacy of any offered mitigation plan should include contributions from the entire ESPA model area.