BEFORE THE DEPARTMENT OF WATER RESOURCES

OF THE STATE OF IDAHO

IN THE MATTER OF THE PETITION FOR DELIVERY CALL OF A&B IRRIGATION DISTRICT FOR THE DELIVERY OF GROUND WATER AND FOR THE CREATION OF A GROUND WATER MANAGEMENT AREA	)	CM-DC-2011-001 **ORDER REGARDING PETITION FOR RECONSIDERATION**

On April 27, 2011, the Director of the Idaho Department of Water Resources ("Director" or "Department") issued a *Final Order on Remand Regarding A&B Irrigation District's Delivery Call* ("Final Order on Remand"). The Final Order on Remand found, by clear and convincing evidence, that A&B was not materially injured. Pursuant to Idaho Code § 67-5246, petitions for reconsideration, if any, were required to be filed with the Department within fourteen days of the date of service of the Final Order. *Final Order on Remand* at 22. The Final Order on Remand was served on April 27, 2011.

On May 11, 2011, A&B Irrigation District ("A&B") filed a *Petition for Reconsideration of Interim Director's April 27, 2011 Final Order on Remand/Request for Hearing* ("Petition"). The Petition identifies several issues with the Final Order on Remand that will be addressed in the order in which they were raised.

On June 1, 2011, the Director issued his *Order Granting Petition for Reconsideration to Allow Time for Further Review*, in which he stated that an order on reconsideration would issue no later than June 9, 2011. On June 9, 2011, the Director issued his *Amended Order Granting Petition for Reconsideration to Allow Time for Further Review*, in which he stated he would issue an order on reconsideration no later than June 30, 2011.

Issued contemporaneously with this decision is an *Amended Final Order on Remand Regarding the A&B Irrigation District Delivery Call* ("Amended Final Order on Remand"). The Amended Final Order on Remand incorporates the findings and conclusions discussed herein and supersedes the April 27, 2011 Final Order on Remand.

If an issue is not addressed herein, it is deemed denied.

1. Readjudication of A&B's Water Right, 36-2080 (*Petition* 2-4)

In its Petition, A&B argues that the "Director gives no presumption to A&B's decree and unlawfully re-adjudicates the water right." It is undisputed that A&B's senior water right, 36-2080, authorizes the diversion of 1,100 cfs for the irrigation of 62,604.3 acres. A&B is authorized to divert water within the limits of its decree. The Director's examination of A&B's water right, in the context of conjunctive administration, is in accord with Idaho law. The amount of water necessary for beneficial use may be less than the decreed quantity; therefore, a senior may receive less than the decreed quantity, but not suffer injury.

On November 2, 2010, the district court reaffirmed its previous holding regarding the clear and convincing evidentiary standard of review. *Memorandum Decision and Order on Petitions for Rehearing*, CV-2009-647 (Fifth Jud. Dist., Nov. 2, 2010) ("Memorandum Decision on Rehearing"). "[A]ny determination by the Director that the senior is entitled to less than the decreed quantity needs to be supported by [clear and convincing evidence]." *Memorandum Decision on Rehearing* at 7. Pursuant to the district court's instructions on remand, *Memorandum Decision and Order on Petition for Judicial Review*, CV-2009-647 (Fifth Jud. Dist., May 4, 2010) ("Memorandum Decision"),[1] the Director applied the clear and convincing evidentiary standard of proof to the record, and found that A&B was not materially injured. The Director denies A&B's request.

2. Request for Hearing (*Petition* 4-5)

Citing Idaho Code § 42-1701A(3), A&B requests a hearing. Idaho Code § 42-1701A(3) states that a hearing may occur if a hearing "has not previously been afforded . . . ." Here, an 11-day administrative hearing was conducted in which argument, evidence, and testimony were presented. Each of the issues raised by A&B is based on the record before the district court. The Director denies A&B's request.

3. A&B's Well System (*Petition* 5-7)

A. Interconnection

A&B asks the Director to reconsider the requirement that A&B interconnect wells that comprise the project's delivery system. A&B is factually correct that all of its wells are not interconnected. According to the district court, "The decision of the Director to evaluate material injury to the 36-2080 water right based on depletion to the cumulative quantity as opposed to determining injury based on depletions to individual points of diversion is affirmed." *Memorandum Decision* at 50. This holding was not appealed. The Director denies A&B's request.

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[1] The *Memorandum Decision* was signed on May 4, 2010; however, due to errors in service, the court has treated "the date of entry of the *Memorandum Decision* . . . as May 20, 2010." *Order of Extension Re: Filing Date of Memorandum Decision* (May 19, 2010).

B. Diversion Data/Irrigation Requirement

A&B asks the Director to reconsider his use of diversion data. In its Petition, A&B criticized the Department's use of monthly data for purposes of determining material injury. According to one of its experts, Dr. Charles C. Brockway ("Brockway"), "the peak capacity period for irrigation occurs on a daily basis and . . . failure to obtain sufficient water within an irrigation week will cause crop damage during a high-demand period." *Petition* at 7. A&B claims this means it needs a maximum diversion requirement of 0.89 miner's inches per acre at the wellhead to meet its crop needs during the peak period. Ex. 200 at 4-7; Tr. Vol. XI, pp. 2240-2241.

The irony of this criticism is that Brockway used annual and monthly diversion evapotranspiration ("ET") data to theoretically compute the 0.89 miner's inches per acre maximum crop need. Use of monthly ET values is consistent with A&B's evidentiary reliance on monthly diversion data. In addition, the Department used the monthly diversion data provided by A&B and relied upon by A&B's experts to examine injury. Expert witnesses for junior ground water users also used the same annual and monthly diversion data to develop their responses to A&B's claim of injury. *See e.g.* Ex. 301. These data were testified to at the hearing, admitted into evidence, and made part of this record. Using the data offered and relied upon by A&B, the Department can evaluate A&B's claimed need of 0.89 miner's inches per acre.

A&B's hypothetical maximum instantaneous wellhead flow rate requirement of 0.89 miner's inch per acre is not supported by annual measurements of wellhead instantaneous flow measurements converted to calculated consumptive use. In addition, A&B's assertion that 68,047 acre-feet is its peak monthly wellhead volume demand cannot be reconciled with actual measured peak monthly pumping by A&B over the history of the project.

i. How A&B computed its maximum instantaneous wellhead requirement of 0.89 miner's inches per acre

In its expert report, which was co-authored by Brockway, A&B calculated a peak pumping rate of 0.89 miner's inches per acre to satisfy the maximum water consumption of a growing crop. Brockway's cross examination testimony by counsel for Pocatello offers some insight into the method of calculation:

> Q. [BY MS. KLAHN] Okay. And would you agree that the rate of delivery to the B unit farmers during the peak demand period is among the most important disputes in this case?
>
> A. Among the most important, yes.
>
> Q. Okay. And the rate of delivery that the A & B consultants and you, including you, computed for the peak delivery for the B unit farmers is .89 miner's inches per acre; is that correct?
>
> A. Yes.

Tr. Vol. XI, pp. 2239.

And further in Brockway's testimony:

> Q. [BY MS. KLAHN] And your .89 miner's inches per acre irrigation requirement was a number at the well, was it not?
>
> A. It was, yes.
>
> Q. So if we wanted to compute the amount of water at the farm turnout that you're recommending, we would apply a -- what? -- 3 percent conveyance loss to that?
>
> A. I believe we said it was between zero and 5 and that 3 would be a good number to use.
>
> Q. Okay. Does that work out to about .86 miner's inches per acre?
>
> A. Well, it would be 97 percent of .88 [sic]. Whatever that is.
>
> Q. Will you accept .86, subject to check?
>
> A. Subject to your calculation, yes.

Tr. Vol. XI, pp. 2240-2241.

The following quoted cross examination exchange between Brockway and counsel for Pocatello about computation of the instantaneous rate explains the process by which irrigation application losses are accounted for in the relationship between the field headgate requirement and the consumptive use requirement of the crop. The examination appears to establish that the maximum instantaneous water diversion requirement of 0.89 miner's inches per acre was computed using ET for the peak monthly consumption. The discussion is about monthly periods.

> Q. [BY MS. KLAHN] So is it true that your irrigation requirements analysis included ET for the crops on the B unit? So is it true that your irrigation requirements analysis included ET for the crops on the B unit?
>
> A. Yes.
>
> Q. That's one of the inputs?
>
> A. Yeah.
>
> Q. Okay. Inputs. So it included ET. And it included crop distribution; correct?

A. It did.

Q. Okay. And it included acreage; is that correct?

A. Yes.

Q. Acreage for each well system; right?

A. Yes.

Q. It included a farm efficiency number, farm application efficiency?

A. Yes.

Q. How would you like me to indicate that? Just "efficiency?" Is that okay?

A. Well, I think "application efficiency" is appropriate.

Q. Okay. And conveyance loss; is that correct?

A. Yes.

Q. Have I left out any inputs?

A. I don't think so.

Q. Okay. Now, for these data for ET, this was a month-by-month, year-by-year ET value, right, based on each crop? So it was districtwide; right?

A. It was weighted, yes.

Q. And it was a districtwide number in the sense that you used the districtwide crop distribution to figure out how the ET was distributed?

A. I believe we did, but the analysis was for individual well systems.

Tr. Vol. XI, pp. 2246-2247.

Finally, Brockway testified again about the method of accounting for application efficiency losses:

Q. [BY MS. KLAHN] Okay. So starting at the field, you took the ET and crop distribution and acreage and then applied the application efficiency and then another conveyance loss to sort of back up from the field to the well, is that fair, as far as how you did your irrigation requirements?

A. That's fair.

Q. Okay. Because your irrigation requirement is at the well, isn't it?

A. That's right, uh-huh.

Q. Okay. And you did that on a monthly basis over your study period for each well system; right?

A. That's right. And we varied the efficiency -- application efficiency by month, by the period.

Tr. Vol. XI, pp. 2249-2250.

This information, taken together, shows that, to compute its maximum instantaneous wellhead diversion flow rate requirement, A&B started at the field with crop irrigation requirement and worked backward to the wellhead. Tr. Vol. XI, pp. 2249-2250. A&B considered ET, crop distribution, irrigated acreage, irrigation efficiency, and conveyance loss from the field headgate to the well. Ex. 200 at 4-1-6; Tr. Vol. XI, pp. 2249-2250. A&B examined this information over the period 1995-2007. Ex. 200 at 4-1. For the 1995-2007 average July[2] conditions, the theoretical irrigation requirement at the wellhead was 0.79 miner's inches per acre. Ex. 200 at Tbl. 4-11.

The greatest computed July theoretical demand occurred in 2007. *Id.* Using July 2007 ET data, and applying the method described in Brockway's testimony, A&B computed a July 2007 maximum monthly pumping demand of 68,047 acre-feet at the wellhead. *See* Ex. 200 at Tbl. 4-9. The July 2007 ET data were adjusted for rainfall and for crop mix to estimate the quantity of water that must be available for the crop to grow. Because additional water is necessary to apply and deliver the irrigation water to the crop, an additional quantity of water was added for application efficiency and conveyance loss. The entire computation resulted in a 68,047 acre-feet maximum monthly water demand at the wellhead. Ex. 200 at 4-1-6. The underlying computations for deriving this volume of water are not clearly established in the exhibits and testimony.

Dividing 68,047 acre feet by the number of acres authorized by A&B's water right (62,604.3 acres) equals approximately 1.09 acre-feet per acre maximum irrigation volume during July 2007. Table 4-11 converts the 1.09 acre-feet per acre per month to 1,107 cfs,[3] or 0.89[4]

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[2] In its expert report, A&B analyzed "July" ET. To "ensure consistency between crop ET estimates and pumping volumes . . . the Agrimet crop ET data was reduced from the daily data to monthly data using the same period as A&B's pumping data (middle of the previous month to middle of the current month)." Ex. 200 at 4-2. Therefore, A&B's reference to July ET is actually a reference to ET data collected over a 30-day period, June 15 to July 15.

[3] In order to calculate 1,107 cfs, the monthly volume has to be divided by 31 days, instead of the actual 30 days between June 15 and July 15.

[4] The 68,047 acre-feet volume is equivalent to 0.88 miner's inches per acre for a 31-day month, and 0.91 miner's inches per acre for a 30-day month. A flow rate of 0.89 miner's inches per acre converts to an equivalent flow rate of 0.0178 cfs per acre, or 1,114 cfs for the entire project, which slightly exceeds A&B's asserted flow rate of 1,107

miner's inches per acre. Ex. 200 at 4-7. A&B's water right authorizes diversion of 1,100 cfs over 62,604.3 acres, which equates to 0.88 miner's inches per acre.

ii. A&B's computed theoretical flow of 0.89 miner's inches per acre maximum instantaneous wellhead requirement is not supported by the record

A&B asked the Director to examine peak water use for purposes of assessing material injury. *Petition* at 7. Although A&B refers to "peak capacity" or "peak water use" as a daily or weekly value, the 0.89 miner's inches is interpreted as an instantaneous flow rate.

In addition to recording monthly pumping volumes, A&B periodically measures its well capacities, or instantaneous flow rates, across the project. Instantaneous flow rate data is compiled in its Annual Report for the years 1963 through 2007. Ex. 132 (A&B 2281-2516); Ex. 133; Tr. Vol. VI, pp. 1284-1289. The Annual Report describes "high" and "low" open valve discharge readings or well capacity. *Id.* When these flow rates are measured, the well valves are completely open, and are not throttled back. Tr. Vol. VI, p. 1286. The high flow measurements are usually taken early in the irrigation season. Ex. 132 (A&B 2281-2516); Ex. 133; R. at 1118; Tr. Vol. VI, pp. 1284-1289. The low flow rates are usually measured over a period of days during the peak irrigation season (i.e., June 15 to July 15). *Id.* The low flow open valve readings represent maximum daily discharge or well capacity during the peak season. Tr. Vol. VI, p. 1285-1286. A&B relied on these low flow data in its 1994 *Petition for Delivery Call* and 2007 *Motion to Proceed* to demonstrate that its available peak water supply was less than 1,100 cfs. R. at 13 ("974 cfs") & 835 ("970 cfs"). By converting past year's low flow measurements to water available for crop consumption using the methods described by Brockway's testimony, converting the 0.89 miner's inches to a consumptive irrigation flow rate applying 2007 conveyance and application efficiencies, and comparing the two values, the Director can determine whether A&B is injured by a decline in wellhead capacity flow rates.

In its expert report, A&B asserted a maximum peak diversion requirement of 0.89 miner's inches per acre at the wellhead. Using the licensed flow rate of 1,100 cfs, adjusted for A&B's 2007 efficiency estimate of 3 percent conveyance loss, Ex. 200 at 4-4, and July 2007 irrigation efficiency of 79.2 percent,[5] the theoretical maximum instantaneous consumptive use flow rate is 845 cfs (0.67 miner's inches per acre). This theoretical maximum crop demand will be compared to the measured instantaneous low flow rates available in past years after adjusting for efficiencies in each of the target years to determine whether the theoretical maximum consumptive instantaneous flow has ever been delivered or needed by crops growing on A&B lands.

A&B's water right was licensed on June 10, 1965. Ex. 157B; Tr. Vol. VI, pp. 1151-1152. The peak low flow measurement for 1965 was 1,035.7 cfs. Ex. 132 (1965 Annual Report

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cfs from its expert report. For purposes of discussion, the Director will accept A&B's stated wellhead flow rate requirement of 0.89 miner's inches per acre.

[5] In its expert report for the months May-August, A&B estimated gravity efficiency at 60 percent and sprinkler efficiency at 80 percent. Ex. 200 at Tbl. 4-7. In 2007, 4 percent of A&B acres were irrigated by gravity, and 96 percent of acres were irrigated by sprinkler. *Id.* at Tbl. 4-6. Combining the percent gravity and sprinkler systems in July 2007 results in a weighted irrigation efficiency of 79.2 percent.

Part 2). In 1965, conveyance loss and irrigation efficiency were estimated at 8 percent and 56 percent, respectively. R. at 1115 & 1148; Ex. 113 at 58 (A&B 609) (As stated by the USBR, "The 20-year (1963-82) average annual conveyance losses . . . in Unit B were 8 percent . . . ."). Adjusting for conveyance loss and irrigation efficiency, the maximum amount of water available for consumptive use by crops in 1965 was 534 cfs (0.43 miner's inches per acre),[6] or 311 cfs less than the computed instantaneous consumptive demand of 845 cfs.

Assuming water was available in 1965 to divert the full decreed flow rate of 1,100 cfs, adjusted for 8 percent conveyance loss and 56 percent application efficiency, the computed total instantaneous flow rate available for crop consumption would have been 567 cfs (0.45 miner's inches per acre), or 278 cfs less than the computed instantaneous consumptive demand of 845 cfs.[7]

Applying conveyance and application efficiencies existing in 1965, A&B would have had to divert 1,640 cfs to achieve 845 cfs of consumptive use. This exceeds the authorized diversion rate of 1,100 cfs, and the greatest recorded peak season low flow capacity of 1,087 cfs.

In 1987, the actual peak low flow capacity of A&B production wells was 1,024.6 cfs. Ex. 132 (1987 Annual Report Part 2).[8] In 1987, 67 percent of A&B acres were irrigated by gravity, and 33 percent of acres were irrigated by sprinkler. R. at 1115, Fig. 4. In its expert report for the months May-August, A&B estimated gravity efficiency at 60 percent and sprinkler efficiency at 80 percent. Ex. 200 at Tbl. 4-7. Combining the percent gravity and sprinkler systems in July 1987 results in a weighted irrigation efficiency of 66.6 percent. In a 1985 planning study, the USBR estimated conveyance loss as 5 percent. R. at 1115; Ex. 113 at 58 (A&B 609). Five percent is the best evidence available for determining conveyance loss in 1987.

Beginning with a diversion of 1,024.6 cfs, and adjusting for 5 percent conveyance loss and 66.6 percent irrigation efficiency, the maximum amount of water available for consumptive use by crops in July 1987 was 648 cfs (0.52 miner's inches per acre), or 197 cfs less than the computed instantaneous consumptive use demand of 845 cfs.

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[6] The consumptive use requirement computed here is virtually identical to the consumptive use requirement planned for by the USBR in the 1955 Definite Plan Report, Ex. 111A. In the 1955 Definite Plan Report, the USBR stated that the Unit B system "will provide 1.01 acre-feet per acre at the pump or 0.96 acre-feet per acre at the farm head gates during a 31-day peak demand period." Ex. 111A at 50. The 1.01 acre-feet per acre at the pump and 0.96 acre-feet per acre at the farm head gate delivery amounts are equivalent to 0.82 miner's inches per acre and 0.78 miner's inches per acre, respectively. Applying 56 percent irrigation efficiency to the 0.78 miner's inches per acre farm head gate delivery rate means that, as designed, the Unit B system provided 0.44 miner's inches per acre for consumptive use by crops during the peak demand period.

[7] The greatest recorded peak season low flow capacity, 1,087 cfs, occurred in 1974. CM Rule 42.01.c.

[8] The *Final Order on Remand* incorrectly found that the 1987 peak low flow capacity was 1,054 cfs. *Final Order on Remand* at 8. The high flow well capacity for 1987 was 1,054 cfs. The peak low flow well capacity for 1987 was 1,024.6 cfs. The Department inadvertently transposed the values.

Assuming that a diversion rate of 1,100 cfs was available in July 1987, and adjusting that diversion for 5 percent conveyance loss and 66.6 percent irrigation efficiency, the amount of water available for consumptive use by crops would have been 696 cfs (0.56 miner's inches per acre), or 149 cfs less than the computed instantaneous consumptive use demand of 845 cfs.

Applying conveyance and application efficiencies existing in July 1987, A&B would have had to divert 1,336 cfs to achieve 845 cfs of consumptive use. This exceeds the authorized diversion rate of 1,100 cfs, and the greatest recorded peak season low flow capacity of 1,087 cfs.

In 1991, the peak low flow capacity of A&B production wells was 1,013.4 cfs. Ex. 133 (1991 Annual Report Part 2). In 1991, 50 percent of A&B acres were irrigated by gravity, and 50 percent of acres were irrigated by sprinkler. R. at 1115, Fig. 4. Using A&B's efficiency values for gravity and sprinkler irrigation systems, Ex. 200 at Tbl. 4-7, for July 1991, weighted irrigation application efficiency was 70 percent.

Beginning with a diversion of 1,013.4 cfs, and adjusting for 5 percent conveyance loss and 70 percent irrigation efficiency, the maximum amount of water available for consumptive use by crops in July 1991 was 674 cfs (0.54 miner's inches per acre), or 171 cfs less than the computed instantaneous consumptive use demand of 845 cfs.

Assuming that a diversion rate of 1,100 cfs was available in July 1991, and adjusting that diversion for 5 percent conveyance loss and 70 percent irrigation efficiency, the amount of water available for consumptive use by crops would have been 732 cfs (0.58 miner's inches per acre), or 114 cfs less than the computed instantaneous consumptive use demand of 845 cfs.

Applying conveyance and application efficiencies existing in July 1991, A&B would have had to divert 1,271 cfs to achieve 845 cfs of consumptive use. This exceeds the authorized diversion rate of 1,100 cfs, and the greatest recorded peak season low flow capacity of 1,087 cfs.

In 2002, the peak low flow well capacity of A&B production wells was 973.9 cfs. Ex. 133 (2002 Annual Report Part 2). In 2002, 14 percent of A&B acres were irrigated by gravity, and 86 percent of acres were irrigated by sprinkler. R. at 1115, Fig. 4. Using A&B's efficiency values for gravity and sprinkler irrigation systems, Ex. 200 at Tbl. 4-7, for July 2002, weighted irrigation efficiency was 77.2 percent. In A&B's expert report and at the hearing, conveyance loss for this time period was established as 3 percent. Ex. 200 at 4-4; R. at 3088.

Beginning with a diversion of 973.9 cfs, and adjusting for 3 percent conveyance loss and 77.2 percent irrigation efficiency, the amount of water available for consumptive use by crops was 729 cfs (0.58 miner's inches per acre), or 116 cfs less than the computed instantaneous consumptive use demand of 845 cfs.

If it is assumed that a diversion rate of 1,100 cfs was available in July 2002, and adjusting that diversion for 3 percent conveyance loss and 77.2 percent irrigation efficiency, the amount of water available for consumptive use by crops would have been 824 cfs (0.66 miner's inches per acre), or 21 cfs less than the computed instantaneous consumptive use demand of 845 cfs.

Applying conveyance and application efficiencies existing in July 2002, A&B would have had to divert 1,128 cfs to achieve 845 cfs of consumptive use. This exceeds the authorized diversion rate of 1,100 cfs, and the greatest recorded peak season low flow capacity of 1,087 cfs.

In 2006, the peak low flow capacity of A&B production wells was 970 cfs. Ex. 133 (2006 Annual Report Part 2); *Final Order on Remand* at 18. In 2006, 6 percent of A&B acres were irrigated by gravity, and 94 percent of acres were irrigated by sprinkler. R. at 1115, Fig. 4. For July 2006, weighted irrigation efficiency was 78.8 percent.

Beginning with a diversion of 970 cfs, and adjusting for 3 percent conveyance loss and 78.8 percent irrigation efficiency, the amount of water available for consumptive use by crops was 741 cfs (0.59 miner's inches per acre), or 104 cfs less than the computed instantaneous consumptive use demand of 845 cfs.

Assuming that a diversion rate of 1,100 cfs was available in July 2006, and adjusting that diversion for 3 percent conveyance loss and 78.8 percent irrigation efficiency, the amount of water available for consumptive use by crops would have been 841 cfs (0.67 miner's inches per acre), or 4 cfs less than the computed instantaneous consumptive use demand of 845 cfs.

Applying conveyance and application efficiencies existing in July 2006, A&B would have had to divert 1,106 cfs to achieve 845 cfs of consumptive use. This exceeds the authorized diversion rate of 1,100 cfs, and the greatest recorded peak season low flow capacity of 1,087 cfs.

Therefore, despite reduced peak low flow diversions that are less than 1,100 cfs, A&B's improved efficiencies, over time, have allowed it to provide more water for consumptive use by crops than was available at the time the right was licensed. A&B's calculated maximum peak diversion rate requirement (1,107 cfs) is greater than the licensed maximum rate of diversion (1,100 cfs), and the greatest recorded peak season low flow (1,087 cfs). During its historical record, the Unit B well system has never been able to produce the licensed maximum rate during the peak demand period or been able to satisfy the maximum peak period consumptive use requirement asserted by A&B in its expert report.

iii. A&B's assertion that increases in efficiency have been "offset" by increased ET and a change in crop mix are not supported by the record

A&B argues that any increase in efficiency is "offset" by increased ET. Ex. 200 at 4-18. In its expert report, A&B found an increase in ET by comparing weather data from the Rupert Agrimet station for the period 1995-2007 with a 1955 ET estimate from the USBR's 1955 Definite Plan Report. *Id.* at 4-9-10, Tbl. 4-12. A&B concluded in its expert report that average July crop ET has increased by 40 percent, and that peak July crop ET has increased by 53 percent. *Id.* at 4-18. A&B asserts the increase in ET "offsets the decrease in demand that may occur from efficiency gains from installing sprinklers." *Id.*

A&B's comparison of ET, based on the 1955 Definite Plan Report, and 1995-2007 ET from Rupert Agrimet is not reliable. The estimates were determined for different time periods using different methods and different data.

The Agrimet ET estimate is based on application of a physically based, standardized ET equation using daily data from a single weather station. In contrast, the 1955 Definite Plan Report's original irrigation season diversion requirement was semi-quantitatively determined by comparing results from a different temperature-based consumptive use algorithm with observations of irrigation requirements for crops grown on project lands in the vicinity of A&B. Ex. 111A at 39, 42-43. The monthly distribution of farm deliveries was assumed to be the same as that for the South Side Pumping Unit of the Minidoka Project (i.e., Twin Falls Canal Company). *Id.* at 45.

In its expert report, Pocatello examined June, July, and August ET from 1907-2002 from the National Weather Service's Rupert weather station. Ex. 334 at 20. The source of the analysis was a University of Idaho publication, authored by Richard G. Allen and Clarence W. Robison, and titled *Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho*. In analyzing the data, Pocatello concluded that there is no "long-term trend in ET." *Id.*

The Director agrees with Pocatello's conclusion. Instead of comparing a period of recent record with a single historical year—based on two different methods for determining ET from different locations—Pocatello's analysis examined nearly 100 years' worth of data from the same weather station. The Director finds there is no reasonably discernable long-term July ET trend, and that A&B's improved efficiencies have not been "offset" by increased ET.

In addition to arguing that an increase in ET has "offset" its improved irrigation efficiencies, A&B also asserts that, "one reason for the higher current evapotranspiration requirements and the higher peak month ET requirements is the change in crop distribution." Ex. 200 at 4-10. A&B considered impacts on mid-season crop water demand of a change in crop mix from what was originally assumed in the USBR's 1955 Definite Plan Report to support its theoretically based consumptive use requirement. *Id.* As shown in the table below, the following crop mixes were evaluated in A&B's ET analysis:

Crop Type	1955 Definite Plan Report	A&B's 1995-2007 study period
Grain	13%	49%
Potatoes	15%	12%
Sugar Beets	11%	24%
Beans & Peas	14%	7%
Alfalfa & Clover	36%	7%
Pasture	9%	1%
Miscellaneous	2%	1%

Ex. 200 at Tbls. 4-3 & 4-14. *See also* Ex. 111A at 47.

According to A&B, "it is reasonable to assume that this crop mix represents the average current crop distribution for the study period." *Id.* at 4-2.

In Table 7 of the 1955 Definite Plan Report, the farm delivery requirements for Unit A during the peak demand period were identified. Ex. 111A at 47. The USBR considered the same crop mix for Unit B but the peak demand rates for Unit B had to be adjusted based on the relative proportions of different land classifications. *Id.* at 47-48. The USBR's justification for assuming the same crop mix was that, "There is only a very slight difference in the anticipated cropping programs. The only significant difference which would affect the farm delivery is the distribution of land classes." *Id.* at 46. The highest crop-specific, peak period water application depth was for potatoes (16 inches) followed by alfalfa and pasture (12 inches). *Id.* at 47. The lowest peak period water application depth was for grain (6 inches). *Id.*

As shown in the table below, applying the USBR's estimates for the peak period water demand depths for Unit A soils, Ex. 111A at 47, to the crop mixes used in the A&B expert report analysis, Ex. 200 at Tbl. 4-3, results in the prediction of a lower peak water demand for the crop mix evaluated for A&B's 1995-2007 study period (8.4 in.) than for the crop mix assumed in the Definite Plan Report (10.7 in.). This result is consistent with the USBR's determination that, "The July and August water requirement for row crops is considerably higher than that for grain" *Id.* at 42.

	1955 Definite Plan Report		Study period for A&B's expert report (1995-2007)	
Crop Type	Percent	Water Application Depth During Peak Demand Period (in.)	Percent	Water Application Depth During Peak Demand Period (in.)
Grain	13	6	49	6
Potatoes	15	16	12	16
Sugar Beets	11	8	24	8
Beans & Peas	14	8	7	8
Alfalfa & Clover	36	12	7	12
Pasture	9	12	1	12
Miscellaneous	2	6	1	6
Total	100	weighted average = 10.7	101	weighted average = 8.4

Presently, A&B irrigates more sugar beets than it did historically. However, A&B also irrigates considerably more grains than it did historically. A&B no longer irrigates as much alfalfa and clover as it did historically. The Director finds that ET has not increased as a result of changes in crop mix.

Because there is no discernable long-term July ET trend and A&B's crop mix has not become more consumptive, the Director finds that increases in efficiency have not been "offset" by ET or a change in crop mix.

iv. A&B's asserted 68,047 acre-feet peak monthly pumping volume is theoretically based and not supported by the record

A&B argues it should be entitled to a maximum instantaneous wellhead flow rate of 0.89 miner's inches per acre. As stated above, A&B derived 0.89 miner's inches per acre from a peak monthly pumping volume of 68,047 acre-feet at the wellhead. This is a theoretical peak monthly volume, not a measured monthly volume. As stated above, the theoretical volume was derived from monthly values. If A&B were to pump 68,047 acre-feet of water over a 30-day period, the equivalent flow rate would be 1,144 cfs.

The maximum, monthly volume of water ever diverted by A&B was 58,528 acre-feet, pumped in July 1963, and occurred over a 31-day period (July 1 to July 31). Ex. 132 (A&B 1450). In 1963, the project was irrigated by gravity systems with greater losses and less efficiencies than today's pressurized systems with the attendant reductions in losses and resulting increases in efficiencies. R. at 1111, 1148. In 2007, the maximum, monthly volume diverted was 51,245 acre-feet, pumped from June 15 to July 15. Ex. 132 (A&B 1450). In 2007, 96 percent of the place of use was converted to sprinkler irrigation and conveyance loss was reduced to 3 percent. Ex. 200 at Tbl. 4-6; R. at 1114-1115; R. at 3088. A&B's theoretically based peak monthly volumetric diversion requirement (68,047 acre-feet) is 9,519 acre-feet more than the greatest monthly volume of water ever pumped on the project (58,528 acre-feet). The testimony by farmers at the hearing, together with crop yield records, and the Department's METRIC and NDVI analyses, supports a determination that the current water supply is sufficient for A&B to grow crops to maturity. *Final Order on Remand* at 10-12.

v. The Director concludes by clear and convincing evidence that A&B is not materially injured

As stated by the district court in its May 4, 2010 *Memorandum Decision*,

> Conditions surrounding the use of water are not static. Post-adjudication circumstances can result where a senior may not require the full quantity decreed. The most obvious example would be if the senior is not irrigating the full number of acres for which the right was decreed. Efficiencies, new technologies and improvements in delivery systems that reduce conveyance loss can result in a circumstance where the full decreed quantity may not be required to irrigate the total number of decreed acres. The subsequent lining or piping of a ditch or the conversion from gravity fed furrow irrigation to sprinkler irrigation can reduce the quantity of water needed to accomplish the purpose of use for which the right was decreed.

Memorandum Decision at 30.

In its November 2, 2010 *Memorandum Decision on Rehearing*, the district court went on to say, "In the delivery call, the senior's present water requirements are at issue. If it is determined that the senior's present use does not require the full decreed quantity, then the quantity called for in excess of the senior's present needs would not be put to beneficial use or put differently would be wasted." *Memorandum Decision on Rehearing* at 8. "[I]n order to give proper presumptive weight to a decree any finding by the Director that the quantity decreed exceeds that being put to beneficial use must be supported by clear and convincing evidence." *Memorandum Decision* at 38.

It is undisputed that A&B's calling water right, 36-2080, authorizes a maximum diversion rate of 1,100 cfs for the irrigation of 62,604.3 acres (0.88 miner's inches per acre). To the extent water is available, A&B is authorized to divert water within the limits of its water right. It is undisputed that the A&B project has changed from a predominantly gravity fed flood/furrow system to the highly efficient, sprinkler irrigation system that exists today. It is undisputed that conversion of A&B's system has occurred over time. It is undisputed that the flow rate diverted and volume pumped by A&B has decreased over time.

Due to decreased conveyance loss and improved irrigation efficiencies, the Director concludes that A&B's efficiencies have allowed it to increase available water to grow crops to maturity. The Director concludes that there is no discernible long-term trend in ET and that A&B's efficiencies have not been "offset" by increased ET or different cropping patterns. This conclusion further supported by testimony at the hearing by farmers, crop yield records, and the Department's METRIC and NDVI analyses. A&B may change to a more consumptive crop mix, which could require more water than is available under current circumstances; however, based on examination of historical and current crop mixes contained in this record, the Director concludes that A&B has sufficient water to raise crops to maturity. The Director concludes that A&B's asserted maximum irrigation requirement, as presented in its expert report, is not supported by its actual water use over the history of the project. The Director concludes by clear and convincing evidence that A&B is not materially injured. A&B is authorized to divert water within the limits of its decree and may revert to less efficient means of irrigation, which could require more water than is available under current conditions. *See* Idaho Code §§ 42-223(9) and 42-250. The Director denies A&B's request.

4. A&B's Water Supply (*Petition* 7)

A&B states that the Director found "that well capacities and available ground water level in 1974 are still available to A&B today." *Petition* at 7. The Final Order did not find that 1974 well capacities and ground water levels are still available today. The finding and supporting conclusion show that 1974 was the year that had the highest cumulative recorded well capacities during the peak irrigation season (1,087 cfs), and that maximum capacity did not provide A&B the ability to divert 0.88 miner's inches per acre for the 62,604.3-acre place of use under the calling right during the peak season. CM Rule 42.01.c. Adjusted for 8 percent conveyance loss, R. at 1148; Ex. 113 at 58 (A&B 609), the amount of water available for on-farm delivery during the peak season was 1,000 cfs (0.80 miner's inches per acre). Further adjusted for 56 percent irrigation efficiency, the computed total instantaneous flow rate available for crop consumption would have been 560 cfs (0.45 miner's inches per acre). The Director denies A&B's request.

5. The Geologic Transition Zone (*Petition* 9-11)

A&B states that the Director contradicted himself in his discussion of the geologic transition zone in the Final Order. A&B asserts that the Final Order criticizes well construction and well placement. The Final Order does neither. The question is whether A&B may curtail junior ground water pumping because of inherent hydrogeology. The hydrogeology in the southwestern area is inherently poor and was documented as such by numerous letters from the late 1950s to the early 1960s. *Final Order on Remand* at 4-5. The problems discussed in the letters were not the result of junior ground water pumping by others. Additional inherent hydrogeological factors that were not specifically discussed in the Final Order on Remand, but are part of the record, directly impact water availability in the southwestern area.

Compared with the rest of the A&B project, the southwestern area has a high ground water hydraulic gradient. R. at 1128-1129. In 1956, the USGS published a report that mapped, among other things, the water table gradient across the project. *Id.* at 1129, Fig. 14. "The gradient of the water table averages about 3 feet per mile beneath most of Unit B Pumping Division, but under the western part of the Division, the gradient steepens to about 12 feet or more per mile." *Id.* at 1128. "[D]ifferences in the gradient are probably caused by differences in the permeability of the basalt and by the presence of nonpermeable fine-grained sediments intercalated with the basalt." *Id.* at 1128-1129. The fine-grained sediments were deposited by historic Lake Burley. The greater hydraulic gradient translates into lower aquifer transmissivity, which, in the southwestern area, directly impacts well yield. Tr. Vol. IX, pp. 1740-1743.

Specific capacity is the pumping rate for a well in the aquifer divided by the drawdown in the well. Tr. Vol. I, p. 59. Low transmissivity contributes to low well yield. Tr. Vol. I, pp. 58-60. *See also* Ex. 113D.[9] The lower the specific capacity, the lower the yield. Tr. Vol. I, p. 80. "All of the irrigation wells with specific capacities that are less than 100 gpm/feet are for wells in the southwest project townships (T8S/R21E, T9S/R21E, T9S/R22E, T9S/R23E, and T10S/R22E). None of the irrigation well specific capacities that are less than 100 gpm/ft are for irrigation wells in the northeast project townships (T8S/R23E, T8S/R24E, T7S/R23E, T7S/R24E, and T7S/R25E)." These are inherent factors that are consistent with the hydrogeology of the area. Tr. Vol. I, pp. 95-97.

In its Petition, A&B says, "the Director now concludes that the U.S. Bureau of Reclamation should have never drilled wells in the southwest area in the first place." *Petition* at 10. The Final Order does not take issue with well siting in the southwestern area; it does, however, conclude that A&B cannot seek curtailment of junior-priority ground water rights because of inherent hydrogeological facts that cannot be attributed to junior ground water pumping. The Director denies A&B's request.

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[9] Exhibit 113D is not listed separately as an exhibit in the record index, but can be found within the documents comprising Exhibit 113, at .pdf page 200.

6. A&B's Enlargement Acres (*Petition* 11)

A&B asks the Director to reconsider his requirement that, "[b]efore seeking curtailment of junior-priority ground water rights under 36-2080, A&B must have mechanisms in place to self-regulate its junior and subordinated enlargement acres." *Petition* at 11 citing *Final Order* at 17. A&B states,

> [I]t is not obligated to "self-regulate" its enlargement rights. Such a condition results in unconstitutional administration of A&B's junior priority water rights. Moreover, the Director has no authority to impose a different standard upon A&B's enlargement water rights than other similarly situated enlargement water rights across the ESPA. If curtailment of junior priority water rights is necessary to satisfy A&B's senior water right no. 36-2080, then A&B's junior priority enlargement water rights will be subject to that administration. It's not the other way around. A&B does not have to curtail its own junior rights before the Director administers any other junior rights.
>
> Under the Director's flawed reasoning any water user with an enlargement water right could not request administration of its more senior rights until it "self-regulated" or curtailed its own junior right. The Director erroneously applied Idaho law in his analysis on this issue.

Id.

A&B admitted during the hearing that even during allotment, or the peak season, it has no ability to limit distribution of water under 36-2080 to the original 62,604.3 acres; rather, A&B patrons irrigate all junior and/or subordinated enlargement acres with water pumped under its senior right. Tr. Vol. IV, pp. 742-743. *See also* Ex. 200, Figs. 4-15-16; Ex. 20lAC; Ex. 201AD. Therefore, A&B irrigates 4,081.9 more acres than is authorized by its calling water right.

The Final Order on Remand improperly required A&B to "self-regulate," and on this point the Director grants A&B's request. Nonetheless, before the Director will curtail junior water rights, of which A&B's enlargement acres are potentially a part, A&B must be able to account for how its calling right can be administered without enlargement. The Director will not regulate junior water rights until A&B has provided the accounting of acreage to which water would no longer be delivered.

7. A&B's Motion to Proceed (*Petition* 12)

A&B states that the "Director erroneously relied upon A&B's 2007 *Motion to Proceed*, rather than the decreed diversion rate in analyzing material injury to water right no. 36-2080." *Petition* at 12. As stated previously, A&B is authorized to divert within the limits of its calling water right, 36-2080. "[I]n order to give the proper presumptive weight to a decree any finding by the Director that the quantity decreed exceeds the quantity being put to beneficial use must be supported by clear and convincing evidence." *Id.* at 38. In the Final Order on Remand, the Director considered all evidence in the record, including A&B's 1994 *Petition for Delivery Call*

and 2007 *Motion to Proceed*. As required by the district court's order of remand, the Director applied the clear and convincing evidentiary standard of proof to the record and concluded, by clear and convincing evidence, that A&B was not materially injured. The Director denies A&B's request.

8. Application of CM Rules to Juniors (*Petition* 12-13)

Citing CM Rule 20.05 and 40.03, A&B states that the Director must consider "the 'reasonableness' and 'efficiency' of water use of affected junior ground water right holders." *Petition* at 12. In accord with the CM Rules, water use by juniors was considered in the course of these proceedings, discussed, and found to be reasonable. R. at 1117-1118; R. at 3106-3107. The Director denies A&B's request.

9. Reasonable Pumping Levels (*Petition* 13)

A&B asks the Director to reconsider his decision not to set a reasonable pumping level. The district court's *Memorandum Decision* states as follows: "The decision of the Director that A&B has not been required to exceed reasonable pumping levels is affirmed. This is based on the finding of no material injury at existing pumping levels. On remand, following application of the appropriate evidentiary standard a finding of material injury may require that the Director reevaluate this determination." *Memorandum Decision* at 50. The Final Order on Remand found that A&B was not materially injured; therefore, the Director did not examine reasonable pumping levels. The Director denies A&B's request.

10. IGWA Witness Characterization (*Petition* 13)

The Final Order on Remand characterized an A&B farmer called by IGWA as an A&B board member. The Final Order on Remand cited to a portion of the transcript to support the finding. A&B refers to the same transcript cite and states that the witness is on the board of the Magic Valley Ground Water District, not A&B. Upon further review, A&B correctly states that the IGWA witness is not on the board of A&B. On this point, the Director grants A&B's request.

ORDER

Based upon the foregoing, IT IS HEREBY ORDERED that A&B's Petition for Reconsideration is GRANTED in part and DENIED in part.

IT IS FURTHER ORDERED that A&B's request for hearing is DENIED.

Dated this 30th day of June, 2011.

GARY SPACKMAN
Interim Director

CERTIFICATE OF SERVICE

I hereby certify that I served a true and correct copy of the following attached document on the persons listed below by mailing in the United States mail, first class with the correct postage affixed thereto, as well as by e-mail to those persons listed with e-mail addresses, on this 30th day of June, 2011.

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