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 **AMENDED FINAL ORDER ON REMAND REGARDING THE A&B IRRIGATION DISTRICT DELIVERY CALL**

On June 30, 2011, the Director of the Idaho Department of Water Resources ("Director" or "Department") issued his *Order Regarding Petition for Reconsideration*, filed by the A&B Irrigation District ("A&B"). The corrections and clarifications contained in the *Order Regarding Petition for Reconsideration* are incorporated herein. This *Amended Final Order on Remand Regarding the A&B Irrigation District Delivery Call* supersedes the April 27, 2011 *Final Order on Remand Regarding the A&B Irrigation District Delivery Call.*

FINDINGS OF FACT

I. Procedural Background

1. This matter comes before the Department as a result of a remand from the Fifth Judicial District Court, in and for the County of Minidoka, of the Director's June 30, 2009 *Final Order Regarding the A&B Delivery Call* ("June 2009 Final Order"). Before discussion of the court's decision and the specific nature of the remand, a brief procedural history will be recited.

2. This proceeding originally came before the Department on July 26, 1994 when A&B[1] filed a petition for delivery call ("Petition for Delivery Call"). The Petition for Delivery Call sought administration of junior-priority ground water rights diverting from the Eastern Snake Plain Aquifer ("ESPA") and the designation of the ESPA as a ground water management area ("GWMA"). On May 1, 1995, A&B, the Department, and other participants entered into an agreement that stayed the petition for delivery call until such time as a motion to proceed ("Motion to Proceed") was filed with the Director. On March 16, 2007, A&B filed a Motion to

[1] The A&B Irrigation District is made up of a surface water division, Unit A, and a ground water division, Unit B. Unless specified otherwise, all references to A&B in this order are to the ground water pumping division, Unit B.

Proceed seeking the administration of junior-priority ground water rights, and the designation of the ESPA as a GWMA.

3. On January 29, 2008, former Director David R. Tuthill, Jr. issued his initial final order ("January 2008 Final Order"), which found that A&B was not materially injured and denied its petition for creation of a GWMA.

4. On December 3, 2008, a hearing on A&B's delivery call was commenced before hearing officer Gerald F. Schroeder ("Hearing Officer"). Over the course of approximately eleven days, evidence and testimony was presented to the Hearing Officer by the Department and participating parties: A&B, the City of Pocatello ("Pocatello"), the Freemont Madison Irrigation District *et al.* ("Freemont Madison"), and the Idaho Ground Water Appropriators, Inc. ("IGWA").

5. On March 27, 2009, the Hearing Officer entered his *Opinion Constituting Findings of Fact, Conclusions of Law and Recommendations* ("Recommended Order"). In his Recommended Order, the Hearing Officer agreed with the Director's determination that A&B had not suffered material injury to its senior ground water right. The Hearing Officer disposed of A&B's petitions for reconsideration and clarification in his May 29, 2009 *Order Granting in Part and Denying in Part A&B's Petition for Reconsideration*, and June 19, 2009 *Response to A&B's Petition for Clarification.*

6. The Director subsequently issued his June 30, 2009 Final Order ("June 2009 Final Order"). In the June 2009 Final Order, the Director agreed with the Hearing Officer that A&B was not materially injured and denied its request for creation of a GWMA. Unless specifically discussed and modified, the June 2009 Final Order adopted the findings from the January 2008 Final Order and the recommendations from the Hearing Officer. *June 2009 Final Order* at 4.

7. A&B filed a timely petition for judicial review with the Fifth Judicial District Court, in and for the County of Minidoka. Respondents to the action were the Department, Freemont Madison, IGWA, and Pocatello.

8. On May 4, 2010, the court issued its *Memorandum Decision and Order on Petition for Judicial Review* ("Memorandum Decision") in CV-2009-647.[2] In its *Memorandum Decision*, the court affirmed the Director's decisions that: (1) Idaho's Ground Water Act applies retroactively to A&B's pre-1951 irrigation water right, 36-2080; (2) that A&B was not materially injured and its reasonable pumping levels had not been exceeded; (3) that A&B's water right was properly analyzed as an integrated system; (4) that it was not necessary to create a GWMA because the Director had already created water districts; and (5) that the final order complied with Idaho Code § 67-5248. *Memorandum Decision* at 1-2 & 49-50.

[2] 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).

9. In its Memorandum Decision, the court held that the proper evidentiary standard of review to apply in response to a conjunctive management delivery call between hydraulically connected ground water rights is clear and convincing. *Id.* 38. Because the June 2009 Final Order was silent on which evidentiary standard of review the Director applied in his material injury analysis, the court remanded the Director's finding that the decreed quantity "exceeds the quantity being put to beneficial use for purposes of determining material injury. No further evidence is required." *Id.* at 49. "On remand, following the application of the appropriate evidentiary standard a finding of material injury may require that the Director reevaluate" his finding that A&B has not exceeded its reasonable pumping levels. *Id.* at 50.

10. Petitions for reconsideration regarding the evidentiary standard of review were filed by IGWA and Pocatello. On November 2, 2010, the court reaffirmed its previous holding regarding the clear and convincing evidentiary standard of review. *Memorandum Decision and Order on Petitions for Rehearing* ("Memorandum Decision on Rehearing"). "The [*Memorandum Decision*] contemplates that there are indeed circumstances where the senior making the call may not at the present time require the full decreed quantity and therefore is not entitled to administration based on the full decreed quantity. The [*Memorandum Decision*] holds, however, that any determination by the Director that the senior is entitled to less than the decreed quantity needs to be supported by a high degree of certainty." *Memorandum Decision on Rehearing* at 7.

11. Notices of appeal to the Idaho Supreme Court were filed by A&B, the Department, IGWA, and Pocatello. The evidentiary standard of review, which is the subject of the remand, was appealed by the Department, IGWA, and Pocatello. No stay of the proceeding has been sought, and the court has directed the Department to "forthwith comply with the remand instructions set forth in the *Memorandum Decision and Order on Petition for Judicial Review . . . .*" *Order Granting Motion to Enforce in Part and Denying Motion to Enforce in Part* (February 14, 2011). On April 14, 2011, the Department filed a *Motion to Withdraw Notice of Appeal and Amended Notice of Appeal* with the Idaho Supreme Court.

12. On March 14, 2011, the Department received the *City of Pocatello's Proposed Order on Remand* and *Motion for the Director to Consider City of Pocatello's Proposed Order on Remand.* On March 16, 2011, the Department received *A&B Irrigation District's Motion to Strike* in response to Pocatello's March 14 motion and proposed order. On March 28, 2011, the Department received IGWA's *Response to City of Pocatello's Motion for the Director to Consider the City of Pocatello's Proposed Order on Remand.* On March 30, 2011, the Department received a second *Motion to Strike* from A&B in response to IGWA's March 28 filing. On April 4, 2011, IGWA and Pocatello filed a *Joint Response to Motions to Strike.* On April 7, 2011, the Director denied A&B's motions to strike. *Order Denying Motions to Strike.* On April 12, 2011, the Director granted A&B's request to file a proposed order no later than April 18, 2011. *Order Authorizing Filing of Proposed Order; and Amended Notice of Intent to Issue Final Order.* On April 18, 2011, the Department received *A&B Irrigation District's Proposed Order on Remand.*

13. The Director recognizes and considers the record created in CV-2009-647. Consistent with the district court's Memorandum Decision, no additional evidence has been considered by the Director.

II. Review of Evidence in the Record Regarding Material Injury

A. Water Right No. 36-2080

14. The A&B Irrigation District (Units A and B) was originally developed by the United States Bureau of Reclamation ("USBR") to irrigate approximately 78,000 acres of land, of which 62,604 acres would be irrigated by the Unit B ground water division. *January 2008 Final Order* at 7. A license for water right 36-2080 was issued by the Department to the USBR on June 10, 1965. Ex. 157B; Tr. Vol. VI, pp. 1151-1152. Water right 36-2080 authorizes diversion of ground water for irrigation purposes and bears a priority date of September 9, 1948. In 1990, a claim was filed for the water right in the Snake River Basin Adjudication ("SRBA"). Water right 36-2080 was partially decreed by the SRBA on May 7, 2003. Ex. 139. The right authorizes a maximum diversion rate of 1,100 cfs for irrigation of 62,604.3 acres. *Id.* In miner's inches per acre, the authorized maximum, project-wide diversion rate for irrigation of 62,604.3 acres is 0.88.

15. While some of A&B's well systems are interconnected, other well systems are not. A&B's water right provides it with flexibility because no rate of diversion or volumetric limitation is decreed to a particular point of diversion or place of use for 36-2080. *Memorandum Decision* at 40.

16. Water right 36-2080 currently authorizes 188 points of diversion (wells), but only 177 wells are in production. *Memorandum Decision* at 5. A&B's place of use is described by digital boundary. Tr. Vol. VI, p. 1160. A&B has 11 wells that may be put into production at any time or the wells may be reconstructed at another location. Tr. Vol. VI, p. 1161-1162. If additional wells are sought, A&B would have to file a transfer with the Department. Tr. Vol. VI, p. 1162.

B. Geologic and Hydrogeologic Environment

17. A&B is located in the southern portion of Minidoka County and the southeast part of Jerome County. *January 2008 Final Order* at 7. The north/south line separating Ranges 21 East and 22 East is the boundary line between southeastern Jerome County and western Minidoka County. *Id.* Driller's logs for project irrigation wells in the northern part of the district and private wells in adjacent areas east and north of A&B show a stratigraphy dominated by basalt with minor sedimentary interbeds of sand, silt, and clay. *Id.* at 23. South of A&B at Burley and Declo, the upper 400 to 500 feet of the subsurface is mostly clastic sediments, which are underlain by basalt to an unknown depth. *Id.* In between the south and north areas of A&B is an inherent geologic transition zone in which the upper 500 feet are characterized by basalt intercalated with clastic sediments (Burley lake bed sediments) with a ratio of approximately 50 percent sediments and 50 percent basalt. *Id.* Based on evaluation of available geologic and

hydrogeologic data, the southwestern portion of A&B is located in this geologic transition zone. *Id. See* Exhibit 121; *Recommended Order* at 12-15. The transition zone was known to the USBR as early as 1948, but ground water development was not anticipated at the time. *January 2008 Final Order* at 24.

18. The geologic transition zone is visually depicted in Exhibit 106 ("Geologic Cross-Sections"). Cross-sections A-A' through E-E' each plots wells from west to east. Ex. 106 at 1-6 (A&B 83-88). The closer the plot is to the southern boundary of the A&B project (historic Lake Burley), the more sedimentary layers are present in the well. *Id.* at 3, B-B' (A&B 85). As the plots move northward, sediments are replaced by basalt. *Id.* at 6, E-E' (A&B 88). A review of the south to north plots show that the sedimentary environment is more pronounced in the south and west, but less so in the north and east. *Id.* at 7-14, F-F' through L-L' (A&B 89-96).

19. The geologic transition zone greatly effects well yield. Ex. 121 at 19 (A&B 1090). "Wells in sections 9 and 10 of T9S R22E penetrate multiple sedimentary interbeds. About 50 percent of the saturated thickness (water level elevation minus the bottom hole elevation) is composed of sediment in a well in section 9. About 38 percent of the saturated thickness of a well in section 10 is composed of sediment." *Id.* at 11 (A&B 1082). "The majority of the ground-water production by the A&B Irrigation District occurs in the northern portion of the project area with about two-thirds in townships T8S R23E, T8S R24E and T8S R25E." Ex. 121 at 16 (A&B 1091). Because of the basalt environment, the likelihood of achieving additional yield with depth in the northern portion of the project is "high." Tr. Vol. I, p. 90. Conversely, the likelihood of achieving additional yield with depth in the southern portion of the project is "low" because of the historic Burley lake bed sediments. *Id.* The probabilities of success are "inherently contingent upon the geologic environment." Tr. Vol. I, pp. 90-91.

20. 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." *January 2008 Final Order* at 24. "[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 24-25. 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.

21. 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.[3] 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

[3] 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.

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.

22. In its Motion to Proceed and in information provided to the Department after its filing, A&B asserted that it has been forced to abandon certain wells, that certain wells will not yield additional water, and that certain wells have been drilled to replace existing wells that could not provide adequate water. *January 2008 Final Order* at 27-28.

23. With the exception of one well in Township 8 South, Range 25 East, which was replaced because of a crooked borehole, Tr. Vol. IX, p. 1759, every problem well identified by A&B is located in the geologic transition zone described above. Exhibit 215A.[4] Wells located in Townships 9 and 10 South, Range 22 East, have been documented as problematic since they were originally drilled by the USBR. Exs. 152P, 152Q, 152BB, 152II, 152 QQ, 152TT, and 152BBB (USBR letters documenting well problems from the late 1950s to early 1960s).[5] Wells that have been drilled, but not used by A&B, are also located in the geologic transition zone.[6] The problems associated with these wells derive from the inherent hydrogeologic environment. *Recommended Order* at 34. "Basically, everything that you want a well to do, is more difficult in the southwest area." Tr. Vol. IX, pp. 1756-1757.

24. On lands located in the geologic transition zone, A&B has converted approximately 1,447 acres from ground water to surface water. *January 2008 Final Order* at 9. As early as 1960, the USBR discussed the need to import surface water to those lands because of poorly performing wells. *Recommended Order* at 15; Ex. 152QQ; Tr. Vol. IX, pp. 1765-1767. The project was not completed until 1963. *Memorandum Decision* at 5.

C. Development of the Project

25. The A&B project was developed at a time when ground water levels were at or near their peak. *Recommended Order* at 9; *Memorandum Decision* at 5. Because of reduced incidental recharge, a sustained period of drought, and ground water pumping, aquifer levels have declined since A&B appropriated its right. *Recommended Order* at 9; *January 2008 Final Order* at 4.[7] Because of the Department's 1992 moratorium for permits, the best evidence at the time of the hearing was that the depletive effect of ground water pumping is within 5 percent of being fully realized, "not more than ten percent and perhaps lower than five percent." *Recommended Order* at 39.

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[4] Circled in red on Exhibit 215A are the abandoned wells, circled in black are the wells with no additional yield, and circled in blue are wells that have been replaced or drilled deeper.

[5] Circled in silver on Exhibit 215A are the wells characterized as problematic by the USBR.

[6] Circled in green on Exhibit 215A are the unused wells.

[7] According to the USBR in its report entitled Minidoka Project, Idaho-Wyoming, North Side Pumping Division Extension – Planning Report/Draft EIS, Hydrology Appendix (USRB 1985), the major influence upon ground water level declines and recoveries is climate. *January 2008 Final Order* at 43. The declines, according to the USBR, are further aggravated by changes in irrigation practices. *Id.*

26. At the time A&B appropriated its right, wells were sited at geographical high points, with water flowing downhill through a system of mainly unlined ditches and laterals. *January 2008 Final Order* at 7; Tr. Vol. VI, pp. 1164-1165. Originally, 62,604.3 acres were irrigated by gravity flow. *Memorandum Decision* at 6. The original conveyance system included 109.71 miles of laterals and 333 miles of drains. *Id.* at 6. From 1963 through 1982, average conveyance loss was estimated by the USBR at 8 percent. *January 2008 Final Order* at 12; Ex. 113 at 58 (A&B 609) ("The 20-year (1963-82) average annual conveyance losses . . . in Unit B were 8 percent . . . .").

27. Currently, the system includes 51 miles of laterals, 138 miles of drains, and 27 miles of distribution piping. *Memorandum Decision* at 6. Sixty-nine injection wells have been eliminated and the water applied to other purposes. *Id.* By 1982, 25 percent of the 62,604.3 acres were irrigated by sprinkler. *January 2008 Final Order* at 10. By 1987, approximately 30 percent of the 62,604.3 acres were irrigated by sprinkler. *Id.* at 11. By 1992, approximately more than 50 percent of the 62,604.3 acres were irrigated by sprinkler. *Id.* By 2007, 96 percent of the 62,604.3 acres were irrigated by sprinkler. *Id.* at 10-11. The use of sprinkler irrigation was expected to reduce the per acre water requirement by 19.6 percent. *Id.* at 11. Through efficiencies, conveyance loss has been reduced to 3 percent. *Recommended Order* at 11; Ex. 200, 4-4, -22. With improved efficiencies, A&B's need for water has decreased. *January 2008 Final Order* 9-15; Tr. Vol. VI, pp. 1201-1202. Other irrigation providers in the vicinity of A&B have similarly converted to sprinkler irrigation. Ex. 473; Tr. Vol. VII, pp. 1367-1368 (down gradient conversions by North Side Canal Company may have had a significant impact on water levels at A&B).

28. Because of sprinklers, A&B is able to irrigate acres that it could not irrigate with its gravity system. Ex. 200, 4-24. Presently, A&B irrigates 66,686.2 acres. *January 2008 Final Order* at 8. In order to irrigate the additional 4,081.9 acres that could not be irrigated under 36-2080, A&B obtained junior and enlargement water rights. *Id.* None of the junior water rights are the subject of this delivery call. Of the junior acres, 2,063.1 acres are enlargements, which provide no additional rate of flow and are subordinated to April 12, 1994. *Id.*; *Recommended Order* at 41.

D. Analysis of A&B Pumping and Diversion Records

29. In its 1994 Petition for Delivery Call, A&B stated that the supply for its calling water right, 36-2080, was 974 cfs. R. at 13. In its 2007 Motion to Proceed, A&B stated that the supply for the same water right was 970 cfs. R. at 835. In its Motion to Proceed, A&B stated it "was able to deliver at least 0.75 miner's inch prior to the major impacts caused by junior ground water pumping." R. at 837. In its Motion to Proceed, A&B also asserted it "is unable to divert an average of 0.75 of a miner's inch per acre which is the minimum amount necessary to irrigate lands within A&B during the peek [sic] periods when irrigation water is most needed." R. at 836.

30. In its expert report, A&B stated the "0.75 miner-inch criteria is a minimum rate below which A&B begins the process to improve or deepen wells." Ex. 200 at 4-19. The "0.75

miners-inch is [not] the project's irrigation diversion requirement . . . . The Unit B irrigation diversion requirement needed to meet peak monthly demand as calculated in this study is about 1.09 acre-ft/acre or about 0.89 miners-inch." *Id.* A&B supported the 0.89 miner's inches per acre peak demand diversion requirement with a 1995-2007 theoretical analysis. *Id.* at 4-1; Tbl. 4-11. The theoretical information was "used to determine whether A&B's irrigation system has been able to meet their irrigation diversion requirements and whether shortages are occurring on Unit B." *Id.* at 4-1.

31. At the hearing, A&B further explained that 0.75 miner's inches per acre is an internal "rectification standard" for its wells. Tr. Vol. III, p. 639. When a well is no longer capable of producing 0.75 miner's inches per acre, based upon, among other things, its Annual Report, A&B schedules the well for maintenance. Tr. Vol. III, pp. 538-540.

32. At the hearing, the peak season was generally defined as a period in June and July and may extend through the latter part of August. *Recommended Order* at 22. The peak season is a thirty-day period of time. Tr. Vol. IV, pp. 654-655. Since 1972, A&B has kept diversion records from the 15th to the 15th of each month. Ex. 132 (A&B 1450-1451); Tr. Vol. III, p. 511. The peak season typically runs from June 15 to July 15, but in some years, it has run from July 15 to August 15. Ex. 155; Tr. Vol. VI, p. 1199. During the peak season, A&B goes on what is referred to as "allotment." *Recommended Order* at 23. Allotment occurs when the irrigators' demand for water from a well system exceeds the amount of water the well system will produce. *Id.* During allotment, each well user receives a proportional amount of his or her share from the well system's total output. *Id.*

33. A&B admitted during the hearing that even during the hot summer months when demand for water is at its greatest, it has no ability to limit distribution of water under 36-2080 to the original 62,604.3-acre place of use; rather, A&B patrons irrigate all junior and/or subordinated enlargement acres with water pumped under its senior right. Tr. Vol. III, pp. 605-606; Tr. Vol. IV, pp. 741-743. *See also* Ex. 200, Figs. 4-15, 4-16; Ex. 201AC; Ex. 201AD. The practice of irrigating all beneficial use and enlargement acres with water diverted under water right 36-2080 is referred to as "water spread[ing]." Tr. Vol. III, p. 525. Therefore, A&B irrigates 4,081.9 more acres than is authorized under its calling water right.

34. In addition to recording monthly pumping volumes at the wellhead, which is contained in a spreadsheet titled "WaterPumpedrevised.xls," Ex. 132 (A&B 1145-2276), A&B periodically measures its well capacity, or instantaneous flow rate, 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.

35. 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.

36. 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").

37. In the January 2008 Final Order, the Director found that the peak season low flow capacity from A&B production wells was 1,007 cfs in 1963 and 1,034 cfs in 1982. *January 2008 Final Order* at 14. In reviewing the Annual Reports for purposes of this order, the Director finds that the greatest peak season low flow capacity from A&B production wells was 1,087 cfs in 1974 (0.87 miner's inches per acre). Ex. 132. The next greatest low flow capacity measurement from A&B production wells was 1,079 cfs in 1971. *Id.* The Director also finds that the greatest high flow capacity from A&B production wells, 1,100 cfs (0.88 miner's inches per acre), occurred in 1973. *Id.* In 1987, the Director finds that the peak season low flow well capacity was 1,024.6 cfs. *Id.* In 1991, the Director finds that the peak season low flow well capacity was 1,013.4 cfs. Ex. 133 (1991 Annual Report Part 2). In 2002, the Director finds that the peak season low flow well capacity was 973.9 cfs. *Id.* (2002 Annual Report Part 2).

38. The 2006 peak season low flow capacity of 970 cfs, as cited in the Motion to Proceed, equates to 0.77 miner's inches per acre for the 62,604.3-acre place of use for water right 36-2080. *January 2008 Final Order* at 15. Adjusted for 3 percent conveyance loss, *Recommended Order* at 11, the on-farm delivery is 0.75 miner's inches per acre. When water diverted under 36-2080 is applied to 66,686.2 acres, and adjusted for 3 percent conveyance loss, Ex. 200 at 4-4, the on-farm delivery is 0.71 miner's inches per acre. The place of use for water right 36-2080 is 62,604.3 acres. *January 2008 Final Order* at 8.

39. Analyzing A&B's actual diversions at the wellhead contained in the WaterPumpedrevised.xls spreadsheet, the Department converted the low flow volumetric total from the peak season to miner's inches per acre. Ex. 155; Tr. Vol. VI, p. 1196, lns. 4-25; p. 1197, lns. 1-25; p. 1198, lns. 1-25; p. 1199, lns. 1-9. From 1960 through 1969, the mean peak season water use was 0.72 miner's inches per acre. Ex. 155. From 1970 through 1980, the mean peak season water use for A&B was 0.69 miner's inches per acre. *Id.* From 1981 through 1990, the mean peak season water use for A&B was 0.69 miner's inches per acre. *Id.* From 1991 through 2000, the mean peak season water use for A&B was 0.66 miner's inches per acre. *Id.* From 1994 through 2007, the mean peak season water use for A&B was 0.65 miner's inches per acre. *Id.* From 1960 through 2007, the mean peak season water use for A&B was 0.69 miner's inches per acre. *Id.* This information is graphically depicted in Exhibit 155A. All values presented are unadjusted for conveyance loss and irrigation efficiency.

40. Only during three occasions in the 47 years of actual diversion data available in the record (1963, 1964, and 1967) did A&B meet or exceed 0.75 miner's inches per acre during the peak season. *Id.* In those three years, the low flow diversions were 0.76, 0.75, and 0.76 miner's inches per acre, respectively. *Id.* As stated above, during those years water was diverted through unlined ditches and laterals, with conveyance losses of 8 percent, and applied predominantly by gravity systems. R. at 1115 & 1148; Ex. 113 at 58 (A&B 609).

41. From 1982, when 25 percent of A&B was irrigated by sprinkler, to 1991, when 50 percent of the project was irrigated by sprinkler, actual diversions during the peak season averaged 0.69 miner's inches per acre. Ex. 155; *January 2008 Final Order* at 10-11. A&B's most junior water right, which is also its largest enlargement right (1,751.5 acres), bears an April 1, 1984 priority date. *January 2008 Final Order* at 8. All enlargement rights are subordinated to April 12, 1994.

42. From 1992, when more than 50 percent of the project was irrigated by sprinkler, to 2007, when 96 percent of the project was irrigated by sprinkler, the actual diversions during the peak season averaged 0.65 miner's inches per acre. Ex. 155; *January 2008 Final Order* at 10-11.

43. The Preliminary Report of C.E. Brockway, titled *A&B Irrigation District—Use of Drain Water In Re: SRBA Case No. 39576*, dated August 2, 2000, states that, "elimination of all drainage wells and pumping back surface runoff to existing irrigated lands allows reduction of pumped ground water, reduction in retention pond size, and increased project irrigation efficiency . . . the amount of water pumped from the aquifer can be reduced by 21,920 acre-feet per year." *January 2008 Final Order* at 9.

44. A review of the Department's Resource Protection Bureau database shows eight active drainage (injection disposal) wells within A&B. *January 2008 Final Order* at 35. During a January 4, 2008 meeting with Department staff at the Department's state office in Boise, A&B representatives stated that the drainage wells are primarily used for storm water runoff disposal. It was also indicated that piping and pressurized irrigation and pump back systems for re-use on crops has nearly eliminated return flows and very little irrigation waste water has been discharged into wetlands or drainage wells in recent irrigation seasons. *Id.*

45. The average annual amount of ground water pumped by A&B from 1963 through 1982 was 201,736 acre-feet. The mean annual amount of ground water pumped from 1994 through 2007 was 180,095 acre-feet. *January 2008 Order* at 9. The difference in mean annual diversion volume between the periods 1963-1982 and 1994-2007 is 21,641 acre-feet, a 10.7 percent decrease.

46. Based on ground water delivery records provided by A&B, the mean peak water use from 1963 through 1982 was 54,468 acre-feet. *January 2008 Final Order* at 14. By 1982, 25 percent of A&B was irrigated by sprinkler. *Id.* at 10-11. The mean peak water use from 1994 through 2007 was 50,262 acre-feet, a total average decrease of 4,206 acre-feet from the period 1963 through 1982, or 7.7 percent. *Id.* at 14. By 1994, 58 percent of the project was irrigated by sprinkler, and by 2006, 96 percent was irrigated by sprinkler. *Id.* at 10-11.

47. Converted to a monthly volume of water, the 2006 peak season low flow well capacity of 970 cfs is 59,643 acre-feet. As reported in the WaterPumpedrevised.xls spreadsheet, the 2006 low flow volume of water actually pumped during the peak season was 49,855.3 acre-feet. Ex. 132 (A&B 1450). Therefore, in 2006, A&B had the ability or capacity on a project-wide basis to pump nearly 10,000 acre-feet of additional water during the peak demand period.

48. Reductions in peak water use by A&B, over time, reasonably parallels its conversion from predominantly flood irrigation to predominantly sprinkler irrigation, and its improvements in irrigation efficiency. *January 2008 Final Order* at 11-15; Ex. 156; Tr. Vol. VI, pp. 1201-1202. Other irrigation providers have similarly converted from flood to sprinkler irrigation. Ex. 473. "Comparison of the historic and projected on-farm delivery requirements suggests that the use of sprinkler irrigation was expected to reduce the per acre water requirement by 19.6 percent." *January 2008 Final Order* at 11. Conveyance loss has been reduced from 8 to 3 percent. *Id.* at 44.

49. Due to efficiency measures, A&B's percent reduction in water use is similar to surrounding surface water providers. Tr. Vol. VI, p. 1179-1180. "Burley Irrigation District has had decreases in these same time periods of about 20 percent. Miler Irrigation District has had decreases more similar to A&B. . . . But I believe theirs was also around 8 percent. And that's annual diversions for the same time period." Tr. Vol. VI, p. 1180.

50. A&B's response to the *Order Requesting Information* indicates that the District is now irrigating approximately 1,323 acres of Unit B land with Unit A surface water. *January 2008 Final Order* at 9. Department analysis of the shapefile, *B_Land_Temp_Served_by_A*, provided by A&B, indicates that the total conversion acreage is 1,447 acres, which is approximately 2.3 percent of the 62,604.3 acres that are the subject of A&B's delivery call under water right 36-2080. *January 2008 Final Order* at 9.

E. Analysis of A&B's Asserted Irrigation Requirement

51. In its *Petition for Reconsideration of Interim Director's April 27, 2011 Final Order on Remand/Request for Hearing* ("Petition for Reconsideration"),[8] 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 for Reconsideration* 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.

52. 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.

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[8] In its Petition for Reconsideration, A&B requested a hearing. The Director denied A&B's request in his June 30, 2011 *Order Regarding Petition for Reconsideration.*

53. 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

54. 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.

55. 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.

56. 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.

57. 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.

58. 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[9] conditions, the theoretical irrigation requirement at the wellhead was 0.79 miner's inches per acre. Ex. 200 at Tbl. 4-11.

59. 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 resulting 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.

60. 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,[10] or 0.89[11] 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

61. In its Petition for Reconsideration, A&B asked the Director to examine peak water use for purposes of assessing material injury. *Petition for Reconsideration* 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.

62. As explained previously, 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.

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[9] 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.

[10] 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.

[11] 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 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.

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.

63. 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,[12] 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 low flow instantaneous 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.

64. 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 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),[13] or 311 cfs less than the computed instantaneous consumptive demand of 845 cfs.

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[12] 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.

[13] 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.

65. 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.[14]

66. 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.

67. 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).[15] 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.

68. 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.

69. If it is assumed 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.

70. 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.

71. 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

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[14] The greatest, recorded peak low flow capacity, 1,087 cfs, occurred in 1974. CM Rule 42.01.c. Adjusted for 8 percent conveyance loss and 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).

[15] 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.

efficiency values for gravity and sprinkler irrigation systems, Ex. 200 at Tbl. 4-7, for July 1991, weighted irrigation application efficiency was 70 percent.

72. 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.

73. If it is assumed 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.

74. 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.

75. 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.

76. 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.

77. 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.

78. 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.

79. 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.

80. 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.

81. If it is assumed 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.

82. 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.

83. 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 capacity (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

84. 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.*

85. 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.

86. 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.

87. 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.*

88. 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.

89. 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.

90. 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.*

91. 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

92. 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.

93. 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

94. 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.

95. 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.

F. Analysis of Evidence and Testimony Concerning A&B Cropping

96. During the hearing, A&B farmers were called by A&B and IGWA to testify about water use on the A&B project and adjacent areas. A&B farmers called by A&B testified uniformly that they could put additional water to beneficial use. An A&B farmer called by IGWA testified that, "[a]s a general rule, farmers want more water not less." Tr. Vol. X, p. 2106 (Stevenson).

97. Witnesses called by A&B and IGWA testified that pivot corners are routinely not irrigated. Some witnesses testified that pivot corners are not irrigated because of reduced water supply, while other witnesses testified that pivot corners are not irrigated because of labor costs. *See e.g.* Tr. Vol. V, pp. 962-963 (Kostka); Tr. Vol. X, p. 2086 (Stevenson).

98. A&B farmers called by A&B testified they meet their producer contracts for crops such as potatoes, sugar beets, and barley. Tr. Vol. IV, pp. 826-828 (Eames); Tr. Vol. V, pp. 1027-1030 (Mohlman); Tr. Vol. V, pp. 907-908 (Adams); Tr. Vol. V, p. 994 (Kostka).

99. Three of the four farmers called by A&B were "plaintiffs in a federal lawsuit claiming crop damage and yield reductions due to the application of a herbicide called 'Oust.'" *Recommended Order* at 27. The lawsuit "precluded inquiry into crop yields and the circumstances surrounding those yields for the period from 2001-2005 . . . ." *Id.*

100. A&B farmers called by IGWA testified they were able to raise crops to full maturity on A&B lands. Tr. Vol. X, p. 2088 (Stevenson); Tr. Vol. X, p. 2138 (Maughan). An A&B farmer called by IGWA testified that on lands immediately adjacent to the A&B project, he was able to raise crops to full maturity with less water from private wells. Tr. Vol. X, pp. 2074-2076, 2090 (Stevenson).

101. An A&B farmer called by IGWA testified that on his A&B acres, he "replace[s] water with management." Tr. Vol. X, p. 2102 (Stevenson). Speaking to management, an A&B farmer called by A&B testified "there is no comfort zone. There is no getting ahead. There is no point in the irrigation season that I can say: Maybe I'd like to go camping this weekend. It's a lot more intense management . . . ." Tr. Vol. V, p. 966 (Kostka).

102. An IGWA witness who farms in the American Falls area testified that he grows crops to full maturity with a delivery rate of 0.41 miner's inches per acre on one farm, and 0.90 miner's inches per acre on another farm. Tr. Vol. X, p. 1070 (Deeg). The witness testified that the 0.90 delivery rate has likely gone down because he converted to "center pivot and we're [using] much less water now, but I don't know exactly what it is." *Id.* An IGWA witness who farms within the boundary of the North Side Canal testified that for grain crops he irrigates with 0.60 to 0.65 miner's inches per acre. Tr. Vol. X, p. 2036 (Carlquist).

103. In these proceedings, water use by junior-priority ground water users was examined and found to be reasonable. *January 2008 Final Order* at 13-14; *Recommended Order* at 3106-3107.

104. Witnesses testified that crop yields have generally increased over time. Tr. Vol. X, p. 2042 (Carlquist); Tr. Vol. X, p. 2090-2091 (Stevenson); Tr. Vol. X, pp. 2139-2140; Tr. Vol. IV, pp. 721-722 (Temple); Tr. Vol. IV, pp. 845-846 (Eames). This is consistent with evidence submitted at the hearing showing an increase in Minidoka County crop yields, over time. Ex. 357. Two A&B farmers who testified at the hearing, for whom data was prepared, had higher crop yields than the Minidoka County average. Ex. 355A (Eames); Ex. 358 (Mohlman).

105. The testimony and exhibits concerning crop yield is supported by a Department analysis of ET on and around the A&B project. *January 2008 Final Order* 19-23. Vol. VI p. 1104, 1106. Alfalfa is used as the reference crop because it "has the highest ET of all the crops." Tr. Vol. VI p. 1104. Because all other crops are less consumptive, the analysis did not require knowledge of cropping, rotation practices, or diversions. Tr. Vol. VI, pp. 1117-1118.

106. METRIC[16] ET data were used to compute and map consumptive water use on and around the A&B project. ET data were analyzed from three 2006 Landsat image dates: June 20, July 22 (hottest day of the summer), and August 7. Tr. Vol. VI, pp. 1108-1109; *January 2008 Final Order* at 21. While images are taken every 16 days and could be analyzed, monthly

[16] "METRIC is an acronym for mapping evapotranspiration at high resolution with internalized calibration. It is a model developed by the University of Idaho to take Landsat data, and using a remote sensing and energy-balanced approach, convert that to evapotranspiration data." Tr. Vol. VI, p. 1098. METRIC was developed by Dr. Rick Allen of the University of Idaho, Kimberly Research Station. *Id.*

images depict the necessary fluctuations in ET upon which to base the analysis. Tr. Vol. VI, p. 1109. METRIC has been peer reviewed, is used by other western states for water use analyses, and is recommended for use by the ESPA modeling committee. Tr. Vol. VI, pp. 1198-1103. The analysis compared the mean ET for acres within A&B that were specifically alleged by A&B as water short (Item-G lands), acres within A&B that were not alleged by A&B as water short, and adjacent acres outside the A&B project boundary that were not alleged as water short. Tr. Vol. VI, pp. 1107-1108; *January 2008 Final Order* at 20.

107. Imagery from 2006 was selected because it was the only year specific acres were alleged by A&B to be water short. Tr. Vol. VI, p. 1106. Further analysis normalized the ET data using NDVI (Normalized Difference Vegetation Index) to adjust for any differences caused by cropping patterns. *January 2008 Final Order* at 21-23. The NDVI analysis showed crop health and the amount of vegetation on the ground. Tr. Vol. VI, pp. 1105-1106. NDVI is also a peer reviewed analysis. *Id.*

108. On the hottest day of the summer, July 22, the Item-G lands had the highest consumptive use of all acres analyzed for purposes of mean ET and mean ETrF. *January 2008 Final Order* at 21-22, Figs. 10-12. In terms of the ratio of ETrF and NDVI, Item-G lands had the highest consumptive use per amount of vegetation of all acres analyzed on June 20 and August 7. *January 2008 Final Order* at 23, Fig. 13. Item-G lands generally had higher consumptive use than other ground water irrigated acres within A&B. *January 2008 Final Order* at 21-23, Figs. 10-13. Consumptive use on A&B acres was generally higher than other acres analyzed. *Id.* The higher consumptive use by crops on Item-G lands supports the conclusion that A&B is not water short. Tr. Vol. VI, pp. 1116-1117, 1136.

109. A&B's crop distribution records show that its lands are planted with a variety of crops. In its expert report, A&B presented its "average current crop distribution for the study period [1995 to 2007]." Ex. 200, 4-2. In Table 4-3, A&B reports that 49 percent of its lands are planted with grains, 24 percent are planted with beets, 12 percent are planted with potatoes, 7 percent are planted with alfalfa, 1 percent is planted with corn and peas, and 1 percent is pasture. Ex. 200, Tbl. 4-3.[17] The results of the ET analyses showed that with its diverse crop mix A&B was not water short. *January 2008 Final Order* at 21-23, Figs. 10-13; Tr. Vol. VI, pp. 1143-1144.

CONCLUSIONS OF LAW

1. In its Memorandum Decision, the district court remanded the Director's finding of no material injury because he did not state which evidentiary standard of proof he applied. *Memorandum Decision* at 37-38. The district court held that the burden of proof required in conjunctive administration of hydraulically connected ground water rights is "clear and convincing evidence." *Id.* at 34. "No further evidence is required." *Id.* at 49.

[17] In its expert report, Pocatello averaged A&B's crop distribution as follows: 26.9 percent spring grain, 26.1 percent sugar beets, 20.1 percent winter grain, 11.4 percent potatoes, 6.7 percent alfalfa, 5.7 percent dry beans, 1.5 percent silage corn, 0.9 percent pasture, 0.5 percent peas, and 0.2 percent sweet corn. Ex. 301, A-4-5.

2. In ordinary civil actions, "the burden of proof is by a preponderance of the evidence, which means more probable than not." *Bourgeois v. Murphy*, 119 Idaho 611, 622, 809 P.2d 472, 483 (1991). "Preponderance of evidence means such evidence as, when weighed with that opposed to it, has more convincing force and from which it results that the greater probability of truth lies therein." *Id.* Under the preponderance standard, when the evidence is evenly balanced then the finding must be against the party who bears the burden of persuasion. *Big Butte Ranch, Inc. v. Grasmick*, 91 Idaho 6, 9, 415 P.2d 48, 51 (1966).

3. "Clear and convincing evidence refers to a degree of proof greater than a mere preponderance." *Idaho State Bar v. Topp*, 129 Idaho 414, 416, 925 P.2d 1113, 1115 (1996) (internal quotations removed). "Clear and convincing evidence is generally understood to be '[e]vidence indicating that the thing to be proved is highly probable or reasonably certain.'" *State v. Kimball*, 145 Idaho 542, 546, 181 P.3d 468, 472 (2008) citing *In re Adoption of Doe*, 143 Idaho 188, 191, 141 P.3d 1057, 1060 (2006); *see also Idaho Dept. of Health & Welfare v. Doe*, 150 Idaho 36, 41, 244 P.3d 180, 185 (2010).

4. On remand, the Director is required to apply the clear and convincing evidentiary standard of proof to the evidence in the record in order to determine if "the quantity decreed to A&B's 36-2080 exceeds the quantity being put to beneficial use for purposes of determining material injury." *Memorandum Decision* at 49. "[T]he senior is not guaranteed the decreed quantity nor is the Director required to administer strictly in accordance with the decreed quantity. While a senior may not be guaranteed the decreed quantity in a delivery call, he should have assurances that any reduced quantity determined to be sufficient to satisfy current needs is indeed sufficient." *Memorandum Decision on Rehearing* at 7. "Simply put, the senior is entitled to the quantity reflected in the decree unless it can be shown by clear and convincing evidence that the full quantity is not or would not be put to beneficial use." *Memorandum Decision* at 34, fn. 12.

5. "In Idaho, water rights are real property." *Olson v. Idaho Dept. of Water Resources*, 105 Idaho 98, 101, 666 P.2d 188, 191 (1983); Idaho Code § 55-101. "[T]he right of property in water is usufructuary, and consists not so much of the fluid itself as the advantage of its use. . . . . [R]unning water, so long as it continues to flow in its natural course, is not, and cannot be made, the subject of private ownership. A right may be acquired to its use which will be regarded and protected as property, but it has been distinctly declared in several cases that this right carries with it no specific property of the water itself." Samuel C. Wiel, *Water Rights in the Western States* § 18 (1911). *See also Joyce Livestock Co. v. United States*, 144 Idaho 1, 7, 156 P.3d 502, 508 (2007) (a water right "does not constitute ownership of the water"). "All waters within the state when flowing in their natural channels and all ground waters are property of the State. Idaho Code §§ 42-101 & 42-226. The state has the duty to supervise their appropriation and allotment to those diverting such waters for any beneficial purpose. *Id.*" *Clear Springs Foods, Inc. v. Spackman*, ___ Idaho ___, 252 P.3d 71, 96 (2011).

6. Idaho Code § 42-602, addressing the authority of the Director over the supervision of water distribution within water districts, provides:

> The director of the department of water resources shall have direction and control of the distribution of water from all natural water sources within a water district to the canals, ditches, pumps and other facilities diverting therefrom. Distribution of water within water districts created pursuant to section 42-604, Idaho Code, shall be accomplished by watermasters as provided in this chapter and supervised by the director. The director of the department of water resources shall distribute water in water districts in accordance with the prior appropriation doctrine. The provisions of chapter 6, title 42, Idaho Code, shall apply only to distribution of water within a water district.

7. "Given the nature of the decisions which must be made in determining how to respond to a delivery call, there must be some exercise of discretion by the Director." *American Falls Res. Dist. No. 2 v. Idaho Dept. Water Resources*, 143 Idaho 862, 875, 154 P.3d 433, 446 (2007). "The agency's experience, technical competence, and specialized knowledge may be utilized in the evaluation of the evidence." Idaho Code § 67-5251(5); IDAPA 37.01.01.600.

8. Idaho Code § 42-603, which grants the Director authority to adopt rules governing water distribution, provides as follows:

> The director of the department of water resources is authorized to adopt rules and regulations for the distribution of water from the streams, rivers, lakes, ground water and other natural water sources as shall be necessary to carry out the laws in accordance with the priorities of the rights of the users thereof. Promulgation of rules and regulations shall be in accordance with the procedures of chapter 52, title 67, Idaho Code.

9. In addition, Idaho Code § 42-1805(8) provides the Director with authority to "promulgate, adopt, modify, repeal and enforce rules implementing or effectuating the powers and duties of the department." In accordance with the authority granted to him, the Director promulgated the *Rules for Conjunctive Management of Surface and Ground Water Resources* ("CM Rules"). IDAPA 37.03.11.000. "The policy of securing the maximum use and benefit, and least wasteful use, of the State's water resources applies to both surface and underground waters, and it requires that they be managed conjunctively." *Clear Springs* at 89.

10. Water district nos. 100, 110, 120, 130, and 140 were created to provide for the administration of ground water rights in areas overlying the ESPA, pursuant to the provisions of chapter 6, title 42, Idaho Code, for the protection of prior surface and ground water rights.

11. Injury to senior-priority water rights by diversion and use of junior-priority ground water rights occurs when diversion under the junior rights intercept a sufficient quantity of water to interfere with the exercise of the senior water right for the authorized beneficial use. CM Rule 10.14. Depletion does not automatically constitute material injury. *American Falls Reservoir District No. 2 v. Idaho Department of Water Resources*, 143 Idaho 862, 868, 154 P.3d 433, 439 (2007).

12. The prior appropriation doctrine, as established by Idaho law, protects holders of

senior-priority water rights. Idaho Const. Art. XV, § 3. This protection is not, however, absolute. A senior's use must be reasonable, beneficial, and not result in monopolization or waste of the resource. CM Rule 20.03; *Schodde v. Twin Falls Water Co.*, 224 U.S. 107 (1911); *Clear Springs* at 89-90; *Mountain Home Irrigation District v. Duffy*, 79 Idaho 435, 319 P.2d 965 (1957). "Economy must be required and demanded in the use and application of water." *Clear Springs* at 89 citing *Farmer's Co-operative Ditch Co. v. Riverside Irrigation District, Ltd.*, 16 Idaho 525, 535, 102 P. 481, 483 (1909). The Director must "equally guard all the various interests involved." *Clear Springs* at 89 citing Idaho Code § 42-101.

13. Because the amount of water necessary for beneficial use can be less than decreed or licensed quantities, it is possible for a senior to receive less than the decreed or licensed amount, but not suffer injury. *Memorandum Decision on Rehearing* at 7. The "public waters of this state shall be subjected to the highest and greatest duty." *Clear Springs* at 89 citing *Niday v. Barker*, 16 Idaho 73, 79, 101 P. 254, 256 (1909). Thus, a senior water right holder cannot demand that junior ground water right holders diverting water from a hydraulically connected aquifer be required to make water available for diversion unless that water is necessary to accomplish an authorized beneficial use. "The policy of the law of this State is to secure the maximum use and benefit, and least wasteful use, of its water resources." *Clear Springs* at 89 citing *Poole v. Olaveson*, 82 Idaho 496, 502, 356 P.2d 61, 65 (1960).

14. As between junior- and senior-priority ground water users, Idaho Code § 42-226's dual principles of full economic development and reasonable pumping levels apply. *Clear Springs* at 85, 88-89; *Baker v. Ore-Ida*, 95 Idaho 575, 513 P.2d 627 (1973). In responding to delivery calls under the CM Rules, the Director is required to evaluate all principles of the prior appropriation doctrine. CM Rule 20.03.

15. In *American Falls*, the Court acknowledged the complexities of conjunctive administration:

> Typically, the integration of priorities means limiting groundwater use for the benefit of surface water appropriators because surface water generally was developed before groundwater. The physical complications of integrating priorities often have parallels in the administration of solely surface water priorities. The complications are just more frequent and dramatic when groundwater is involved.
>
> . . . .
>
> When water is diverted from a surface stream, the flow is directly reduced, and the reduction is soon felt by downstream users unless the distances involved are great. When water is withdrawn from an aquifer, however, the impact elsewhere in the basin or on a hydrologically connected stream is typically much slower.

American Falls, 143 Idaho at , 154 P.3d at 448 citing Douglas L. Grant, *The Complexities of Managing Connected Surface and Ground Water Under the Appropriation Doctrine,* 22 Land & Water L. Rev. 63, 73, 74 (1987).

16. CM Rules 30 and 40 specifically group calls together that are "made by the holders of senior-priority surface or ground water rights against the holders of junior-priority ground water rights . . . ." *See also* CM Rules 1 & 10.03. A delivery call by the holder of a senior-priority ground water right against the holders of junior-priority ground water rights is therefore just as complex as a delivery call by the holder of a senior-priority surface water right against the holders of junior-priority ground water rights, if not more so.

17. CM Rule 40 sets forth procedures to be followed for responses to calls for water delivery made by the holders of senior-priority water rights against the holders of junior-priority ground water rights from areas having a common ground water supply in an organized water district. A&B's delivery call has proceeded under CM Rule 40. *January 2008 Final Order* at 42.

18. Factors that may be considered by the Director in determining whether junior-priority ground water rights are causing injury to A&B are set forth in CM Rule 42:

> **01. Factors**. Factors the Director may consider in determining whether the holders of water rights are suffering material injury and using water efficiently and without waste include, but are not limited to, the following:
>
> **a**. The amount of water available in the source from which the water right is diverted.
>
> **b**. The effort or expense of the holder of the water right to divert water from the source.
>
> **c**. Whether the exercise of junior-priority ground water rights individually or collectively affects the quantity and timing of when water is available to, and the cost of exercising, a senior-priority surface or ground water right. This may include the seasonal as well as the multi-year and cumulative impacts of all ground water withdrawals from the area having a common ground water supply.
>
> **d**. If for irrigation, the rate of diversion compared to the acreage of land served, the annual volume of water diverted, the system diversion and conveyance efficiency, and the method of irrigation water application.
>
> **e**. The amount of water being diverted and used compared to the water rights.
>
> **f**. The existence of water measuring and recording devices.
>
> **g**. The extent to which the requirements of the holder of a senior-priority water right could be met with the user's existing facilities and water supplies by employing reasonable diversion and conveyance efficiency and conservation practices; provided, however, the holder of a surface water storage right shall be entitled to maintain a reasonable amount of carry-over storage to assure

water supplies for future dry years. In determining a reasonable amount of carry-over storage water, the Director shall consider the average annual rate of fill of storage reservoirs and the average annual carry-over for prior comparable water conditions and the projected water supply for the system.

h. The extent to which the requirements of the senior-priority surface water right could be met using alternate reasonable means of diversion or alternate points of diversion, including the construction of wells or the use of existing wells to divert and use water from the area having a common ground water supply under the petitioner's surface water right priority.

19. In its 1994 Petition for Delivery Call A&B asserted that:

> By reason of the diversions of water by junior ground water appropriators located within the E[SPA], the Petitioner is suffering material injury as a result of the lowering of the ground water pumping level within the E[SPA] by an average of twenty (20) feet since 1959, with some areas of the Aquifer lowered in excess of forty (40) feet since 1959, reducing the diversions of A&B . . . to nine hundred seventy-four (974) cfs, a reduction of one hundred twenty-six (126) cfs from the diversion rate provided in the water right referenced above.

R at 13.

20. In its 2007 Motion to Proceed, A&B requested that:

> the Director to lift the stay agreed to by the parties . . . for the delivery of ground water . . . and that said Director proceed, without delay, in the administration of the E[SPA] in such a manner as to provide ground water to A&B under its ground water rights that are being interfered with and materially injured by junior ground water appropriators in the ESPA . . . .

R. at 830.

21. Contrary to the assertion of A&B, and as previously stated, depletion does not equate to material injury. Material injury is a highly fact specific inquiry that must be determined in accordance with CM Rule 42.

22. CM Rule 40.03 asks the Director to "consider" whether junior-priority ground water users are "using water efficiently and without waste." In the course of these proceedings, water use by junior-priority ground water users was examined and found to be reasonable.

23. While some of A&B's well systems are interconnected, other well systems are not. A&B's water right provides it with flexibility because no rate of diversion or volumetric limitation is decreed to a particular point of diversion or place of use for 36-2080. *Memorandum Decision* at 40. A&B has a reasonable duty to interconnect its system prior to seeking curtailment of junior-priority ground water users. "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. The holding of the district court was not appealed.

24. A&B's delivery call is based upon alleged shortages to its senior water right, 36-2080. 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.

25. While A&B is authorized to divert from 188 points of diversion, the record established that only 177 wells are in production. Therefore, A&B has 11 additional wells that must be put to use if more water is needed to fully utilize its existing facilities before seeking curtailment of junior-priority ground water rights. CM Rule 42.01.g, h.

26. A&B holds additional junior and subordinated enlargement rights that authorize irrigation of 4,081.9 acres. A&B's junior and subordinated enlargement rights are not part of its delivery call. A&B admits it has no mechanism to limit water diverted under water right no. 36-2080 to its place of use, 62,604.3 acres. A&B admits it applies water diverted under 36-2080 to junior and subordinated enlargement acres even during hot summer months when demand for water is at its greatest. Therefore, A&B irrigates 4,081.9 more acres than are authorized to be irrigated under its calling water right, 36-2080. Before the Director will curtail junior-priority ground water rights, of which A&B's beneficial use and enlargement acres are potentially a part, A&B must be able to account for how its calling right can be administered without those acres. The Director will not curtail junior ground water pumping until A&B has provided the accounting of acreage to which water would no longer be delivered.

27. Regarding A&B's enlargement rights—totaling 2,063.1 acres—the district court explained as follows: "The indirect result is that the enlargement rights are protected under the September 9, 1948, priority date and the subordination provision that applies to all enlargement rights is circumvented." *Memorandum Decision* at 41. The Director concurs with this statement. To conclude otherwise would result in injury to water right holders who are junior to A&B's 36-2080 right, but senior to its enlargement rights. Idaho Code § 42-1426; *Fremont-Madison Irr. Dist. and Mitigation Group v. Idaho Ground Water Appropriators, Inc.*, 129 Idaho 454, 460-61, 926 P.2d 1301, 1307-08 (1996).

28. In its 1994 Petition for Delivery Call, A&B stated its "diversions" under water right 36-2080 were 974 cfs. In its 2007 Motion to Proceed, A&B stated its "diversions" under the same right were 970 cfs. As stated in the Findings of Fact, the measurements provided by A&B in its Petition and Motion to Proceed are peak season low flow well capacity measurements. In its Motion to Proceed, A&B stated it "was able to deliver at least 0.75 miner's inch prior to the major impacts caused by junior ground water pumping."

29. The 2006 water supply of 970 cfs is the low flow capacity of A&B's pumps

during the peak season, which equates to 0.77 miner's inches per acre for the 62,604.3-acre place of use for water right 36-2080. Adjusted for 3 percent conveyance loss, the on-farm delivery is 0.75 miner's inches per acre. However, because A&B does not limit irrigation to 62,604.3 acres, the on-farm delivery for 66,686.2 acres, adjusted for 3 percent conveyance loss, is 0.71 miner's inches per acre. The Director concludes that if A&B limited irrigation under 36-2080 to 62,604.3 acres, it would satisfy the criteria set forth in its Motion to Proceed.

30. In its Motion to Proceed, A&B stated that 0.75 miner's inches is "the minimum amount necessary to irrigate lands within A&B during the peek [sic] periods when irrigation water is most needed." R. at 836. At the hearing and in its expert report, A&B stated that 0.75 is a well rectification standard, not an irrigation requirement. In its expert report, A&B presented a theoretical analysis to support its position that 0.89 miner's inches per acre is its diversion requirement during the peak season. As will be explained below, A&B theoretical analysis ignores that its actual diversions during the peak season have never met its stated diversion requirement.

31. A&B is authorized to divert 1,100 cfs (0.88 miner's inches per acre) under water right 36-2080, and the record supports the fact that A&B is capable of diverting 1,100 cfs. The evidence in the record establishes that 1,100 cfs has not been available for diversion during the peak season when demand for water is at its greatest. Based on the Annual Report, Part 2, the Director concludes that the maximum low flow capacity of A&B production wells during the peak season, 1,087 cfs (0.87 miner's inches per acre), occurred in 1974. Adjusted for 8 percent conveyance loss, the amount of water available for on-farm delivery during the peak season is 1,000 cfs, Ex. 113 at 58 (A&B 609), or 0.80 miner's inches per acre. Therefore, the Director concludes that 0.88 miner's inches per acre has not been available for diversion during the peak season. CM Rule 42.01.c. *See also Order on Petition for Judicial Review*, CV-2008-444, pp. 21-22 (Fifth Jud. Dist., June 19, 2009) (Director's consideration of a water right's seasonal variability is authorized by the CM Rules).

32. Based on the WaterPumpedrevised.xls spreadsheet, which measures diversions at the wellhead, the Director concludes that the maximum amount of water actually diverted during the peak season was 0.76 miner's inches per acre in 1963 and 1967. CM Rule 42.01.c. In 1964, A&B actually diverted 0.75 miner's inches per acre. *Id.* In those years, water was diverted predominantly through unlined ditches and laterals and applied by gravity systems. These values are not adjusted for conveyance loss and irrigation efficiency.

33. In comparing peak season low flow well capacity from the Annual Report, Part 2 with actual diversions from the WaterPumpedrevised.xls spreadsheet, the Director concludes that A&B is not making full use of its diversion works during the peak season. CM Rule 42.01.a, d, e, h. For example, in 2006, the year A&B filed its Motion to Proceed, 970 cfs (0.77 miner's inches per acre) was available for diversion; however, A&B actually diverted 0.65 miner's inches per acre.

34. Converted to a monthly volume, the 2006 peak season low flow discharge of 970 cfs is 59,643 acre-feet. In 2006, A&B pumped 49,855.3 acre-feet. Therefore, A&B had the ability or capacity on a project-wide basis to pump nearly 10,000 acre-feet of additional water

during the peak demand period. Moreover, A&B accomplished its diversions in 2006 from 177 of 188 wells.

35. The Director concludes that, during the peak season, A&B could divert additional water for irrigation purposes. CM Rule 42.01.e. Further, if more water is needed, A&B has additional wells that could be put into production. CM Rule 42.01.g. Requiring curtailment when there are sufficient reasonable alternative means of diversion is contrary to the full economic development of the State's water resources. CM Rule 20.03; Idaho Code § 42-226.

36. The Director concludes that A&B has the capacity to pump more water if it in fact needs more water. For purposes of conjunctive administration, A&B may not seek curtailment of junior-priority ground water rights when it is not fully utilizing its capacity to divert water. CM Rule 20.03; Idaho Code § 42-226; *Clear Springs* at 90.

37. The Director concludes that ground water declines across the ESPA and within A&B's boundary have occurred because of conversion from application by gravity flood/furrow irrigation to sprinkler systems, a sequence of prolonged drought, and ground water diversions for irrigation and other consumptive purposes.

38. The record establishes that A&B has successfully implemented numerous measures that have reduced the amount of water required to irrigate the 62,604.3 acres under its calling water right, 36-2080. These measures include: 1) conversion of 1,447 acres, or 2.3 percent of 62,604.3 acres, from ground water irrigation to surface water irrigation; 2) reduction of conveyance losses from 8 percent to 3 percent; 3) conversion of 96 percent of the project from gravity to sprinkler irrigation (sprinkler irrigation was expected to reduce the per acre water requirement by 19.6 percent); and 4) near completion of a drain well elimination program, which provides for re-use of storm water and waste water for the irrigation of crops.

39. The Director concludes that the total average decrease in peak monthly well production of 4,206 acre-feet, between the periods 1963 through 1982 and 1994 through 2007 (7.7 percent), is attributable to measures discussed above and the fact that A&B added 4,081.9 acres of irrigation development (junior and subordinated enlargement acres) beyond the 62,604.3 acres licensed under its calling water right, 36-2080. CM Rule 42.d, e.

40. The Director concludes that had A&B limited its ground water use to irrigation of the 62,604.3 acres under water right 36-2080, or if it had not developed 4,081.9 additional acres of irrigation (junior and subordinated enlargement acres), mean annual ground water use between 1982 and 2007 would be lower than the mean annual use actually recorded for that period. CM Rule 42.d, e.

41. An analysis of 2006 ET data using METRIC and NDVI modeling showed that A&B acres had higher consumptive use and biomass than surrounding irrigated acres that were not alleged to be water short. In 2006, A&B did not pump to its full capacity and actual peak season diversions were 0.65 miner's inches per acre. The METRIC and NDVI models have been published, peer reviewed, and are scientifically reliable. The Director concludes that A&B lands alleged to be water short have higher consumptive use and biomass than lands not alleged to be

water short. Based on these analyses, it is reasonably certain that A&B lands are not water short.

42. While witnesses called by A&B testified that they could put more water to beneficial use, based on the testimony and crop yield records, the Director concludes with reasonable certainty that A&B's crop mix is grown to maturity on A&B lands with the current water supply.

43. The southwestern area of the A&B project has been noted for its lack of productivity. The Director does not question well construction or well placement. The question is whether A&B may curtail junior-priority ground water rights because of inherent hydrogeological facts that cannot be attributed to junior ground water pumping. The hydrogeology in the southwestern area of the project is inherently poor and was documented as such by numerous letters that were written during the late 1950s and early 1960s. The problems discussed in the USBR letters were not the result of junior ground water pumping by others. The Director concludes that the inherent hydrogeologic environment in the southwestern area of the project—not depletions caused by junior-priority ground water users—is the primary cause of A&B's reduced pumping yields and the need to convert 1,447 acres from ground water to surface water irrigation. Wells placed in a poor hydrogeologic environment do not constitute a reasonable means of diversion. CM Rule 42.01.g, h. To curtail junior-priority ground water rights because of a poor hydrogeologic environment would countenance unreasonableness of diversion and hinder full economic development of the State's water resources. CM Rule 20.03; Idaho Code § 42-226; *Clear Springs* at 90-91 (a senior appropriator's means of diversion must be reasonable to sustain a delivery call).

44. In its *Memorandum Decision*, the district court stated that the Director must conclude by clear and convincing evidence "that the quantity decreed to A&B's 36-2080 exceeds the quantity being put to beneficial use for purposes of determining material injury." *Memorandum Decision* at 49. "Conditions surrounding the use of water are not static. Post-adjudication circumstances can result where a senior may not require the full quantity decreed." *Id.* at 30. "Efficiencies, new technologies and improvements in delivery systems that reduce conveyance losses 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." *Id.* at 30.

45. 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.

46. "Idaho law prohibits a senior from depriving a junior of water if the water called

for is not being put to beneficial use. Therefore a decree or license does not insulate a senior appropriator from an allegation of waste or the failure to put the decreed quantity to beneficial use." *Id.* at 33. "[T]here are indeed circumstances where the senior making the call may not at the present time require the full decreed quantity and therefore is not entitled to administration based on the full decreed quantity." *Memorandum Decision on Rehearing* at 7.

47. The Idaho Supreme Court recently stated: "The policy of the law of this State is to secure the maximum use and benefit, and least wasteful use, of its water resources." *Clear Springs* at 89. "Economy must be required and demanded in the use and application of water." *Id.*

48. The record establishes that A&B is authorized to divert up to 1,100 cfs for irrigation of 62,604.3 acres. The record establishes that A&B irrigates 4,081.9 acres more than are authorized under its calling water right. The record establishes that A&B's water use has decreased as a result of converting its project from gravity to sprinkler irrigation and employing other efficiency measures. The record establishes that A&B has not had the capacity to divert its full water right during the peak season, and does not utilize the capacity it has during the peak season when water is most needed. While A&B is authorized to divert from 188 points of diversion, it only pumps from 177 wells. The record establishes that since 1992, when a majority of the project had been converted to sprinklers—and not taking into consideration the 1,447 acres that were converted from ground water to surface water in the southwestern area of the project, or the capacity that could be gained from putting the 11 unused wells into production—A&B's actual diversions have averaged 0.65 miner's inches per acre during the peak season.

49. 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.

50. The Director concludes that, 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 (0.89 miner's inches per acre).

51. Based on the record, the Director concludes by clear and convincing evidence that

A&B is not materially injured. The clear and convincing evidence in the record supports the Director's conclusion that the 1,100 cfs (0.88 miner's inches per acre) decreed to A&B under 36-2080 exceeds the quantity being put to beneficial use for purposes of determining material injury. *Memorandum Decision* at 49. The clear and convincing evidence in the record supports the Director's conclusion that the quantity available to A&B is sufficient for the purpose of irrigating crops. *Memorandum Decision on Rehearing* at 7. 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.

52. Because A&B is not materially injured, it is not necessary to determine if A&B has exceeded its reasonable pumping levels. *Memorandum Decision* at 22-24; *January 2008 Final Order* at 5.

ORDER

Based upon and consistent with the foregoing, the Director hereby orders as follows:

IT IS HEREBY ORDERED that the Director concludes by clear and convincing evidence that A&B Irrigation District is not materially injured and its delivery call is DENIED.

IT IS FURTHER ORDERED that prior to seeking curtailment of junior-priority ground water users, A&B must provide the Department with an accounting of junior and/or enlargement acres to which water will not be diverted. Prior to seeking curtailment of junior-priority ground water users, A&B must exercise all of its appurtenant points of diversion.

IT IS FURTHER ORDERED that pursuant to sections 67-5270 and 67-5272, Idaho Code, any party aggrieved by the final order may appeal the final order to district court by filing a petition in the district court of the county in which a hearing was held, the final agency action was taken, the party seeking review of the order resides, or the real property or personal property that was the subject of the agency action is located. The appeal must be filed within twenty-eight (28) days: (a) of the service date of the final order; (b) of an order denying petition for reconsideration; or (c) the failure within twenty-one (21) days to grant or deny a petition for reconsideration, whichever is later. *See* Idaho Code § 67-5273. The filing of an appeal to district court does not in itself stay the effectiveness or enforcement of the order under appeal.

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.

John K. Simpson Travis L. Thompson Barker Rosholt & Simpson 113 Main Ave W., Ste. 303 P.O. Box 485 Twin Falls, ID 83303-0485 jks@idahowaters.com tlt@idahowaters.com	Randall C. Budge Candice M. McHugh Racine Olson Nye Budge & Bailey P.O. Box 1391 201 E. Center St. Pocatello, ID 83204-1391 rcb@racinelaw.net cmm@racinelaw.net	Sarah A. Klahn Mitra Pemberton White & Jankowski LLP 511 Sixteenth St., Ste. 500 Denver, CO 80202 sarahk@white-jankowski.com mitrap@white-jankowski.com
Jerry Rigby Rigby Andrus 25 North Second East P.O. Box 250 Rexburg, ID 83440 jrigby@rex-law.com	A. Dean Tranmer City of Pocatello P.O. Box 4169 Pocatello, ID 83201 dtranmer@pocatello.us	*Courtesy Copy:* Honorable Eric. J. Wildman 253 3rd Ave. N. P.O. Box 2707 Twin Falls, ID 83303-2707 pharrington@srba.state.id.us

Deborah J. Gibson

Deborah Gibson
Idaho Department of Water Resources