IN THE OFFICE OF ADMINISTRATIVE HEARINGS

In the Matter of the Application for a Permit To Transport Water Out of State Permit No. 33-96790 Applicant: Wind River Resources, L.L.C.	**No. 07A-TR001-DWR** **ADMINISTRATIVE LAW JUDGE DECISION**

HEARING: March 2, 3 and 4, 2007 at Beaver Dam High School, 3470 East Rio Virgin Road, Beaver Dam, Arizona. The record was held open until October 10, 2007 for post-hearing submissions.

APPEARANCES:

Parties: M. Byron Lewis and Maxine M. Becker of Salmon, Lewis & Weldon, P.L.C., attorneys for Wind River Resources, L.L.C.; and Deputy Counsel Janet L. Ronald and Deputy Counsel Scott M. Deeny for the Arizona Department of Water Resources.

Interested persons: J. Craig Smith, Smith Hartvigsen, PLLC and Sheila B. Schmidt Gust Rosenfeld PLC, attorneys for Brigham Young University; Michael Pearce, McGuire and Pearce PLLC, attorneys for Great American Land, LLC; Maureen R. George, Law Office of Maureen Rose George, PC, attorneys for Beaver Dam Water Company; Steven L. Wene, Moyes Storey, attorneys for Biasi Water Company; William W. Quinn, Jr., U.S. Department of Interior, attorneys for the Bureau of Land Management; and State Representative Nancy McLain.

ADMINISTRATIVE LAW JUDGE: Thomas Shedden

The issue is to determine whether the Director of the Arizona Department of Water Resources ("ADWR") should approve or deny Wind River Resources, LLC's Application to transport water out of the state. Wind River plans to pump groundwater

from Mormon Wells near Beaver Dam, Arizona and sell it to the public utility serving Mesquite, Nevada. A copy of Wind River Exhibit 66, a Lansat photographic image of the area is provided in the Appendix.

The ADWR staff is recommending that the Director deny Wind River's Application because it is inaccurate in certain respects, and because ADWR determined that Wind River did not submit studies that are satisfactory to determine the probable hydrologic impact on the Mormon Wells area.

Wind River believes that ADWR has applied the wrong standards with respect to determining the probable hydrologic impact and that Wind River has shown that the probable hydrologic impact to the alluvial system and current water users in the area will be minimal. Wind River's experts assert that there is a confining layer present in the area that will isolate the pumping from the alluvial system. Wind River's position is that any inaccuracies are in background information only and the maximum volume of water to be exported as stated in the Application has not changed.

Wind River argues that A.R.S. § 45-292 is unconstitutional as applied to its Application. Because A.R.S. § 45-292 is central to this matter, it is set out in full in the Appendix.

FINDINGS OF FACT

Background

1. Wind River Resources LLC ("Wind River") is an Arizona limited liability company formed in May 2004. Mr. Jim Marsh and Ms. Erika Van Alstine are Wind River's managing members.[1] Mr. John Michael is the executive director.

2. The Virgin Valley Water District ("VVWD") is a Nevada quasi-municipal governmental agency that purveys water in Mesquite, Nevada and the surrounding Virgin Valley.

3. Wind River and VVWD entered a contract under which Wind River would sell water to VVWD for use in Mesquite. *See* ADWR Ex. 1k (the parties' First Amended Agreement, dated February 17, 2005).[2] Wind River was formed for the purpose of

[1] Ms. Van Alstine lives in Beaver Dam, Arizona.
[2] All documents filed in this matter are accessible at http://www.azoah.com/Water.htm.

bringing water to Mesquite. Wind River does yet not have the infrastructure or export permit required to develop and deliver the water to VVWD.

4. Wind River envisioned that VVWD would become the regional water provider for the entire Virgin River Groundwater Basin. Wind River's proposed plan called for 70% of the water exported from Arizona to be returned for use in Arizona.

5. Wind River plans to pump groundwater from an area referred to as Mormon Wells, about five miles north of Beaver Dam, Arizona and deliver it to VVWD through a pipeline.[3]

6. Beaver Dam is located in the area known as the Arizona Strip in the northwest corner of the state. Other Arizona communities in this part of the Arizona Strip include Littlefield, Scenic, Arvada and Desert Springs.[4] Beaver Dam is about 10 miles from Mesquite, Nevada and about 30 miles from St. George, Utah.

Wind River's Application for Export Permit Filed

7. On March 15, 2005 Wind River filed its Application for a permit to export water from Arizona to Nevada. *See* ADWR Exs. 1 ("Application") and 1A through 1L (supporting documentation).

8. The quantity of water to be exported each year is listed in the Application's Table I. Wind River's plan was to export 800 acre feet per annum ("AFA") beginning in 2006, with the volume increasing to 14,000 AFA in 2045.

9. Wind River plans to pump the water from three wells drilled through the Beaver Dam Wash alluvium and completed in the Muddy Creek aquifer.

10. Wind River asserts that its pumping will have a minimal impact on the alluvial aquifer or Beaver Dam Wash because the Muddy Creek formation acts as a confining layer separating the pumping zone from the alluvial system.

11. The Muddy Creek aquifer underlies all of the Virgin River Valley and extends into the area around Kingman, Arizona. VVWD has existing Nevada-based rights to pump 11,500 AFA of groundwater from the Muddy Creek formation in Nevada.

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[3] The proposed well site is located on 40 acres in Township and Range 41 N 16 W Section 12 (Gila and Salt River Baseline and Meridian).

[4] Beaver Dam, Littlefield, Arvada, Desert Springs, and Scenic prepared the Virgin River Communities Area Plan, adopted by Mohave County in 1998. ADWR Ex. 4D. These communities are working to incorporate as one entity.

12. The annual quantity for export was based on "projected demands and on the limited use of wells in Nevada anticipated to occur due to Arsenic levels." ADWR Ex. 1 at ¶ 6.

13. According to the Application, the exported water was to be blended with VVWD's existing supplies in Nevada for compliance with the new arsenic standards that took effect in 2006 and this blending would enable VVWD to meet the new arsenic standard without the need for treatment plants.

14. In October 2006, VVWD informed ADWR that it did not intend to use the water for blending purposes. *See* ADWR Ex. 15. At hearing, the testimony showed that blending was not required to meet the arsenic standard because VVWD has treatment plants being built with funds secured in 2002 and it has an exemption allowing it until 2009 to comply with the new arsenic standard. VVWD's treatment plants would have been operational in 2006 but for plant-design and red-tape delays.

15. At hearing, Wind River conceded that blending the water to meet the arsenic standards is not a purpose for which the water will be used. Wind River has not amended its Application to show this change.

16. The Application calls for a maximum of 4,200 AFA to be used in Nevada (30% of 14,000) and the remaining 9,800 AFA (70%) to be returned to Arizona.

17. VVWD does not have a current CC&N (certificate of convenience and necessity) required to serve water in Arizona. VVWD did provide water to two sections in Mohave County until Beaver Dam Water Company ("BDWC") took over that distribution. VVWD provides BDWC water for fire protection and emergencies.[5]

18. The water Wind River intended to return to Arizona was to be served by the Vista Verde Water Improvement District ("WID"), which according to the Application would have been assisted by VVWD.

19. Subsequent to Wind River filing its Application, the Mohave County Board of Supervisors revoked Vista Verde WID's authority to operate. Wind River's Mr. Michael testified that this was due to political pressure, however, BDWC's Mr. Robert Frisby testified that BDWC is approved to serve the same area, and there is no need for the

[5] The contract between VVWD and BDWC was to expire in 2007 and there was uncertainty about its renewal.

Vista Verde WID. Regardless of the reason for the revocation, Vista Verde WID cannot serve the water in Arizona.

20. As of the hearing date there are no plans to return water to Arizona and the entire volume exported is intended to be used in Nevada. Wind River has not amended its Application to show this change. Wind River does, however, state its continued willingness to serve water to Arizona, but there is no entity authorized by Arizona that has expressed a willingness to serve that water.

21. The Wind River-VVWD Agreement does not require VVWD to return any water to Arizona. ADWR asserts that Wind River will be required to have an export permit issued by Nevada before it can make any return of water. *See* ADWR Ex. 27 (Nevada Revised Statutes 533.515 and 533.520).

22. ADWR's Water Management Support Section reviewed the Application. Initially the reviewing group was attorneys Scott Deeny and Jan Ronald, hydrologist Andy Kurtz and Ms. Elizabeth Logan, the section's manager; subsequently Mr. Frank Corkhill joined the group because he is a registered geologist and the senior hydrologist.

23. ADWR issued a first Notice of Deficiency on July 8, 2005. ADWR Ex. 3 ("1st NOD").

24. ADWR received Wind River's "1st Response" and additional supporting information on September 6, 2005. ADWR Exs. 4 (1st Response) and 4A through 4Z (additional supporting material).

25. ADWR issued a Notice of Completeness on September 12, 2005, which triggered the substantive review period.

26. ADWR issued a second NOD on April 17, 2006. ADWR Ex. 6 ("2nd NOD").

27. The 2nd NOD informed Wind River that it would need to amend its Application to reflect any changes, including any corrections Wind River listed in its 1st Response. *See* ADWR Exhibit 6 at ¶ 3b.

28. ADWR received Wind River's 2nd Response and additional supporting information on May 25, 2006. ADWR Exs. 7 (2nd Response) and 7A through 7P (additional supporting material). Wind River's 2nd Response included its statement that it was not necessary for Wind River to amend the Application at that time. *See* ADWR Ex. 7 at ¶ 3b.

29. ADWR's staff is recommending that the Director deny the Application. This decision was made by the reviewing group after all the documents including Wind River's Responses had been submitted, but Ms. Logan could not remember the date. ADWR's substantive review was based on the information that Wind River provided.

Public Involvement and Director Guenther's Involvement

30. For some applications (e.g., surface water permits) ADWR is required to provide public notice. ADWR did not "notice" the Application because export applications are not subject to such notice.

31. Public involvement with respect to the Application began when Mr. Jack Riley called ADWR and requested a copy of the Application.[6] Soon many people were calling and asking for information. *See* ADWR Exhibit 11 (communications log).

32. ADWR responded to these inquiries by posting information on the ADWR website, providing an email address for comments, and holding a public meeting in Beaver Dam.

33. Ms. Logan testified that she had not reviewed the entire public communications log, but she acknowledged that there had been a lot public and political pressure.

34. ADWR Director Guenther is "walled off" from those ADWR employees that have been working on the Application, but not from members of the public (or other state officials who are not ADWR employees). The communications log shows that State Representative Nancy McLain sent Mr. Guenther a letter and that Assistant Director Karen Smith sent an email to Rep. McLain in response. Ms. Smith is not "walled off" from the ADWR staff.

35. Ms. Logan does not know if Ms. Smith will decide the matter if Mr. Guenther is unable to do so.

36. Ms. Logan was unaware of any request by ADWR that the Arizona Corporation Commission ("A.C.C.") get involved in this matter. Ms. Logan was unaware of any request from Ms. Smith to A.C.C. Commissioner Mayes relating to such involvement.

37. Ms. Logan testified that Mr. Guenther was not at any meetings at which the Application was discussed. When Ms. Logan was asked whether or not Mr. Guenther

[6] Mr. Riley is manager of Great American Land LLC that appeared as an interested person.

had expressed an opinion about whether or not the Application should be granted, she testified "Not to me and not that I know of."

Notice of Hearing Issued

38. On January 12, 2007 ADWR issued a Notice of Hearing setting the matter for March 2 through 4, 2007. The hearing was held in Beaver Dam, Arizona. The record was held open to allow Wind River to submit written rebuttal testimony and to allow both parties to submit written closing arguments. The record closed on October 10, 2007.

39. The Notice of Hearing identified the issue as: "to determine whether the Director of the Arizona Department of Water Resources should approve or deny an application filed by Wind River Resources, LLC to transport water out of the state."

40. At the time the Notice of Hearing was issued, ADWR had compiled a list of over 500 members of the public who had expressed an interest in the matter. The Notice of Hearing was provided to each of these persons.

41. The assigned Administrative Law Judge ("ALJ") determined that the 500 members of the public could be considered "interested persons" as defined in A.R.S. § 45-292(E) and the Office of Administrative Hearings ("OAH") mailed to each such interested person (and ADWR and Wind River) Case Management Order ("CMO") No. 1 detailing procedural requirements for participation in the Hearing process, which included a requirement that all contact with OAH be done by electronic filing and that such filing would constitute proper service.[7]

42. Under A.R.S. § 45-292(E), interested persons were allowed to appear and submit written or oral testimony. Sworn testimony was submitted by interested persons BDWC, Biasi Water Company ("Biasi"), Brigham Young University ("BYU"), and Great American Land LLC ("Great American").

43. Other interested persons submitted about 325 comments that were reviewed and considered by the ALJ before the hearing.

44. The ALJ issued an Order requiring interested persons who wanted to present oral testimony to submit requests for time. Six interested persons submitted such requests and each was granted permission to present 30 minutes of testimony (in

[7] CMO No. 1 was subsequently modified by CMO No. 2.

addition to any written testimony). By arrangement of these interested persons, this time was reapportioned among them. By Order of the ALJ, these interested persons were not subject to cross examination by either party.[8]

45. Interested persons BDWC, Biasi Water Company, BYU, and Great American each made a motion (or motions) to intervene. Wind River filed Responses in Opposition to each interested person's Motion and ADWR stated that it was not opposed to the proposed interventions. The Motions to Intervene were denied. *See* CMO No. 6.

46. Wind River presented the testimony of its executive director Mr. Michael, hydrologist Mr. Michael Johnson, Mesquite City Councilman David Bennett, and hydrogeologist Dr. John Jansen.

47. ADWR presented the testimony of Ms. Logan and Mr. Corkhill. Although ADWR disclosed Assistant Director Sandra Fabritz-Whitney as a witness, ADWR did not call her, and Wind River called her as a witness.

48. Interested persons Rep. McLain, BDWC, Biasi, BYU, the Bureau of Land Management ("BLM"), and Great American presented oral testimony.

49. All witnesses gave credible testimony. There were, however, differing opinions from the experts about the known hydrology of the area and what conclusions can be drawn regarding the probable hydrologic impact of the proposed pumping. There are also issues related to reliability and probative value of some testimony based on witness' knowledge of some issues.

Wind River Witnesses

50. Mr. John Michael, Wind River's executive director.

a. Mr. Michael has worked for Wind River since its inception and he is now the executive director.

b. Mr. Michael did not prepare the Application, but he did a piecemeal review of parts when it was prepared.

[8] The interested persons were also not allowed to cross examine other witnesses, as would have been required if they were parties. *See* A.R.S. § 41-1001(12) (defining "party") and A.R.S. § 41-1092.07(B)(affording parties the right to cross-examine witnesses).

c. Mr. Michael did not assist in preparing Wind River's 1st Response but he has reviewed the 1st Response.

d. Mr. Michael did not prepare Wind River's 2nd Response, but he was involved through consultation and discussion, and he has reviewed it.

e. Mr. Michael has reviewed ADWR's 1st and 2nd NODs, but not when these were issued.

f. Responding to questions related to the change in plan with respect to blending the water, Mr. Michael testified that he was not aware that ADWR was so concerned about the water going to Mesquite and what would happen to the water in Mesquite.

g. Mr. Michael was asked questions about hydrology, but Mr. Michael is not a hydrologist or geologist and generally deferred when questioned on those subjects. To the extent that Mr. Michael did testify about hydrology or geology, this testimony is not given any appreciable weight.

51. Mr. Michael Johnson, VVWD's chief hydrologist. *See* WR Ex. 84 (curriculum vitae).

a. Mr. Johnson is a geologist by education and a hydrogeologist by professional training. Mr. Johnson started working in and on the Virgin River Valley in 1992 and has been VVWD's chief hydrologist since 1999. Mr. Johnson's duties include participating in groundwater investigations, looking for potable water sources, and overseeing paperwork associated with federal land transfers.

b. Mr. Johnson worked on VVWD's on-site drilling program, including installation of VVWD Well #26, Palms Well No. 1, Palms Well No. 2, and Palms Well No. 3, all high-volume production wells pumping from the Muddy Creek formation.

c. Mr. Johnson has also been involved in the preparation of numerous technical reports, including reports that were admitted into evidence.

d. Mr. Johnson prepared most of the hydrologic and geologic information for the Application taking the information from existing reports, but he did not review the Application itself.

e. Mr. Johnson testified that policy questions are the VVWD Board's responsibility and he generally deferred answering such questions. To the extent that he did answer such questions these answers are considered to be Mr. Johnson's opinions, and not VVWD's.

52. Dr. John Jansen, Senior Geoscientist with Aquifer Science & Technology. *See* WR Ex. 85 (curriculum vitae).

a. Dr. Jansen has about 28 years of professional experience, including specialized work in groundwater geophysics, hydrogeology, groundwater modeling, pumping test analysis, and services related to developing high-capacity municipal wells and water resource studies.

b. He has studied the geology and hydrology of the southern basin and range province in which Wind River proposes to drill its wells and is familiar with the Application and the hydrology and geology reports filed with the Application.

53. Mesquite City Councilman David Bennett. Mr. Bennett has been a Mesquite councilman for about 8 years and was appointed as a member of the VVWD Board in about 2001.

ADWR's Witnesses

54. Ms. Elizabeth Logan, Manager of ADWR's Water Management Support Section.

a. Ms. Logan's duties in the review of the Application were to consider the supply and demand in Nevada, and to consider Wind River's plan to make return deliveries to Arizona; she was also responsible for the administrative record.

b. Ms. Logan is not a hydrologist and was not offering testimony on hydrologic issues. To the extent that Ms. Logan did testify on hydrology, this testimony is not given any appreciable weight.

c. Ms. Logan explained that ADWR is recommending the Application be denied because ADWR has not received all the information required by statute and substantive changes have been made to the Application without any amendment being filed.

d. Ms. Logan did not agree that ADWR had denied the Application on technical grounds only, because in the 1st NOD, ADWR requested additional information that Wind River never provided.

55. Mr. Frank Corkhill, supervisor in ADWR's Technical Support Section. *See* ADWR Ex. 44 (resume).

a. Mr. Corkhill a registered geologist who has been a supervisor for 12 years; he also worked in ADWR's groundwater modeling section for 7 years. Before starting at ADWR he was a seismologist whose duties included processing geophysical data from oil wells.

b. Mr. Corkhill reviewed the Application, supporting material, correspondence, and additional reports from Wind River, and in January 2007 he visited the Mormon Wells site. His photographs are ADWR Exhibit 35.

c. Mr. Corkhill's understanding of A.R.S. § 45-292(B)(6) is that it requires well impact studies to determine the probable impact of the proposed pumping.

d. Mr. Corkhill's opinion is that ADWR did not receive any site specific information from Wind River. The reports that Wind River provided are general in nature and do not provide any information specific to Mormon Wells, which then requires assumptions be made to evaluate the proposed pumping.

e. On cross examination Mr. Corkhill admitted that he did not have the expertise to do a detailed analysis of the Zohdy electrical resistivity study (ADWR Exhibit 1c).[9] But Mr. Corkhill also stated that he had reviewed that report, a 1974 report by Zohdy, the Holmes report, and the available soil data, from which he drew interpretations.

[9] The Zohdy report shows the results of electrical resistivity studies. Resistivity is the inverse of conductivity and shows how easily electricity can flow through a material. Lower resistivity correlates to fine grained material and water with higher total dissolved solids ("TDS"). Higher resistivity correlates to coarser material and water with lower TDS. Higher TDS values indicate poor quality water. Wind River's experts believe that the Zohdy study supports their position that there is a confining layer at the Mormon Wells site.

f. Mr. Corkhill answered a series of questions specifically directed at his understanding of Zohdy. Mr. Corkhill demonstrated that he possesses the requisite specialized knowledge to assist the ALJ as trier of fact in understanding the Zohdy report and Holmes' comments on the same.

56. Ms. Fabritz-Whitney is an Assistant Director in the water management division that oversees permitting, the Active Management Areas, the assured and adequate water supply program, and the artificial recharge program. Ms. Fabritz-Whitney was familiar with Application and related documents.

Interested Persons

57. State Representative Nancy McLain's district includes the Beaver Dam area and she considered it part of her duty to advocate against granting the Application because she does not believe it is in the best interest of the area. Rep. McLain confirmed that it was Ms. Smith that responded to her letter to Director Guenther, not the Director.

58. BDWC has served water in the Arizona Strip for over 20 years. It has CC&Ns authorizing it to serve over 6,000 acres and has additional applications pending. BDWC is concerned that Wind River's proposed pumping will deplete available water supplies to the detriment of BDWC's customers. BDWC presented written and oral testimony by its president Mr. Robert Frisby.

59. Biasi holds a CC&N authorizing it to serve water in the Beaver Dam area. Biasi is concerned that the proposed pumping will adversely affect the area water supply and its ability to serve its customers. Biasi presented written and oral testimony by geologist Chuck Dickens.

60. BYU owns the Lytle Ranch Preserve located in Utah along Beaver Dam Wash about 12 miles north of Mormon Wells. BYU is concerned that the proposed pumping will have an adverse affect on the ecology of the area and that the proposed pumping would reduce the educational value of Lytle Ranch. BYU presented the written testimony of hydrologist Steven J. Brooks, plant identification specialist Dr. Stanley Welsh and biology professor Dr. Larry L. St. Clair, the oral testimony of Mr. Brooks and

proffered oral testimony from Dr. Welsh, who did not arrive at the hearing as scheduled.[10]

61. BLM has pending at ADWR several applications to appropriate water from the Beaver Dam Wash and Virgin River for in-stream flow uses for wildlife, fisheries and recreation. BLM is concerned that Wind River's proposed pumping would negatively impact water quality to the detriment of threatened and endangered species. BLM presented the oral testimony of soil scientist Robert Smith.

62. Great American is a holding company that owns, and is developing, about 2000 acres just west of the confluence of Beaver Dam Wash and the Virgin River. Great American is concerned that the proposed pumping will dewater the Muddy Creek aquifer, which will negatively impact Great American's planned future development of its land. Great American presented the written and oral testimony from its manager Mr. Jack Riley and hydrologist Mr. James Oliver.

63. After the interested persons presented their oral testimony, the ALJ closed the record to further submissions by the interested persons.[11]

Basic Physical Setting

64. Beaver Dam Wash is tributary to the Virgin River; Mormon Wells is about 6 miles upstream (north) of the confluence. The Wash's total drainage area is about 820 square miles, 51% in Utah, 33 % in Nevada and 16 % in Arizona.

65. Beaver Dam Wash is perennial near the confluence with the Virgin River. Its stream flow provides crucial riparian habitat for a number of species including two bird species listed as endangered. The Wash has a diverse plant community in comparison to other Virgin River tributaries. *See* WR Ex. 110. Beaver Dam Wash is spinedace habitat, but the area near Mormon Wells dries up in the summer so few spinedace are located in that area. At the confluence of Beaver Dam Wash and the Virgin River, and up near Lytle Ranch are good spinedace habitat.

66. Beginning at the ground surface and going down, the geologic units of primary interest are: the alluvial (or channel fill) aquifers along the Beaver Dam Wash and Virgin

[10] BYU's counsel subsequently learned that Dr. Welsh was absent because he had been hospitalized.

River; the post-Muddy Creek deposits; the Muddy Creek formation or aquifer; and a carbonate aquifer system.

67. The alluvial aquifer is in direct connection with Beaver Dam Wash but the degree of connection among the other units is not well known. A key disputed issue in this matter is whether or not the Muddy Creek formation is in direct connection with the alluvial aquifer. Dr. Jansen's and Mr. Johnson's opinion is that there is a confining layer of fine grained soil separating these units. Mr. Corkhill's opinion is that Wind River has not provided enough data to demonstrate that such a confining layer exists and that there is information showing that there is a connection between the units.

Relationship Between the Arizona Strip Communities and Mesquite

68. Mr. Bennett and Rep. McLain provided testimony about the relationship between the communities in the Arizona Strip and Mesquite.

69. Mr. Bennett has seen studies that show that the majority of the Beaver Dam, Littlefield and Scenic residents are employed in Mesquite. Mesquite provides a number of services to the Arizona residents, including senior and recreational services and landfill services.

70. Rep. McLain testified that her constituents are truly frightened that if Wind River's Application is approved the water transfer will adversely affect their retirements and businesses. This has caused a rift between the residents of the two states. The public meeting held by ADWR answered a lot of area residents' questions, but did not assuage their fears.

71. Rep. McLain has found that cooperation is the rule with state border communities such as this one, and she is hopeful that once this issue is behind them, these people will reach out to each other again.[12]

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[11] The Arizona Corporation Commission submitted written material, but that submission was received after the initial deadline established by the ALJ and after the ALJ closed the record to further submissions from interested persons. Consequently, the A.C.C.'s submission was not accepted into the record.

[12] Rep. McLain's district also includes the border communities of Bullhead City (across from Laughlin, Nevada) and Fredonia (which is a "sister city" to Kanab, Utah).

Compliance with A.R.S. § 45-292

72. An applicant to transport water out of state must show a reasonable and beneficial use in another state for that water and must file an application meeting statutory requirements. *See* A.R.S. § 45-292(A) and (B).

73. The Director of ADWR is required to consider seven factors in determining whether to approve or deny any application. *See* A.R.S. § 45-292(C).

74. An administrative hearing is required to be held on any application. All interested persons may appear and present written or oral testimony. *See* A.R.S. § 45-292(E).

A.R.S. § 45-292(B)(1), (B)(2), and (B)(5)

75. Ms. Erika Van Alstine is Wind River's statutory agent and an address for service was provided in the Application as required by A.R.S. § 45-292(B)(1).

76. Groundwater outside an Active Management Area is the legal basis for Wind River's acquisition of the water to be transported. *See* A.R.S. § 45-292(B)(2).

77. Wind River provided a proposed duration of fifty years. *See* A.R.S. § 45-292(B)(5).

A.R.S. § 45-292(B)(3) The purpose for which the water will be used.

78. The Application and supporting material provide that the water will be used for municipal purposes and that this water is needed to blend with VVWD's existing supplies to meet the 2006 arsenic standards.

79. It is undisputed that blending is not currently a purpose for which the water will be used and the preponderance of evidence shows that VVWD never required blending to meet the 2006 arsenic standard.

80. This change in purpose is significant because VVWD's existing supplies are adequate to last until about 2025 according to the Application. When asked what VVWD would do with this water before its current supplies run out, Mr. Michael responded that Wind River understands that VVWD does need the water and that the question was best directed to VVWD.

81. The preponderance of evidence shows that Wind River's Application does not accurately state the purpose for which the water would be used.

A.R.S. § 45-292(B)(4) The annual amount of water in acre-feet for which the application is made.

82. The Application, at Table I, shows an export volume of 800 AFA in 2006, increasing to 14,000 AFA in 2045. Mr. Michael testified that Wind River considers the quantities in Table I to be an estimate or projection only.

83. With respect to Table I, Mr. Michael did add that what is clear, and what has not changed, is that 14,000 AFA of water would ultimately go to Nevada. Although true, this is not fully consistent with the Application, because the Application shows that Wind River intended to use in Nevada only 30% of the exported volume (4,200 AFA), and was going to return the remaining 70% to Arizona.[13]

84. Arguably, in isolation, this might be considered a small point provided that Wind River did not attempt to export more water in a given year than the corresponding estimate in Table I (adjusting for the 70% to be returned to Arizona). But Wind River must show a demand in Nevada for the exported water (and a reasonable and beneficial use) and the Director must have values on which to evaluate the factors set out in A.R.S. § 45-292(C) and, consequently, the Table I values cannot properly be considered in isolation.

85. Because Wind River no longer has plans to return any water to Arizona, it is actually requesting up to 9,800 AFA more water for use in Nevada than its Application shows, which will affect the supply of water available to Arizona and requires Wind River to show a corresponding increased demand in Nevada.

86. At hearing, Wind River presented testimony to show that VVWD's demand is more than the 3 to 5% Wind River shows in the Application, but as discussed below, this testimony was not persuasive. And, even if the new demand figures are correct, Wind River's Application is not accurate.

87. The preponderance of evidence shows that Wind River's Application does not include an accurate value of the annual volume of water to be exported and that Wind

[13] Wind River suggests that the 9,800 AF it planned to return to Arizona was not an export of water. *See* ADWR Ex. 4 at ¶ 3B (the Application did not give the location of the benefited lands in Arizona because "they are not considered to be an exportation of water.").

River now intends to use in Nevada over three times as much water as it requested in the Application.

A.R.S. § 45-292(B)(6) Studies satisfactory to the director of the probable hydrologic impact on the area from which the water is proposed to be transported.

Site Specific Studies

88. Wind River, in its Post-Hearing Brief, argues that ADWR's request for "site specific studies" exceeds ADWR's discretion under the statute, and that Wind River was not made aware that ADWR required site specific studies until ADWR submitted its Pre-Hearing Brief.

89. The Application, at Item 14, required Wind River to attach certain information including: "Hydrologic Studies: These studies must be of sufficient magnitude and quality to allow the Department to determine the hydrologic impact on the area from which water will be transported." *See* ADWR Ex. 1.

90. Wind River argues that ADWR provided no further information or guidelines as to what studies ADWR would consider to be of sufficient magnitude and quality to meet the statutory requirement.

91. In the 1st NOD, ADWR informed Wind River that the reports it submitted with its Application were regional in nature and did not specifically address the probable hydrologic impact on the Mormon Wells area. In seven numbered paragraphs (23a through 23g) ADWR then requested certain specific information.[14] *See* ADWR Exhibit 3 at ¶ 23.

92. In its 1st Response, Wind River replied that to answer the questions ADWR posed in ¶¶ 23a, b, c, e & f would require the installation of a full scale production well and two monitoring wells. Wind River's Response included a proposal and cost estimate for well construction and testing prepared by IES, Inc. that includes "Task 6.0 Aquifer Testing." IES proposed installing wells and conducting two pump tests to collect data for use in determining the aquifer properties and, to analyze for any impact on the Beaver Dam alluvial aquifer. *See* ADWR Ex. 4Y. Wind River went on to explain that it was unwilling to spend the estimated $729,000 required to carry out the IES proposal

[14] This includes a request for information about the impact on water rights in the Wash and Virgin River including BLM's in-stream flow applications.

without some assurance that a permit would be granted.[15] Wind River stated that it was willing to work with ADWR and would accept a reduced quantity of water if testing revealed that pumping 14,000 AFA would have an adverse impact on downstream well owners. *See* ADWR Ex. 4 at ¶ 23. This shows that Wind River recognized that ADWR was requesting that pumping tests be conducted at Mormon Wells to determine the probable hydrologic impact in the area.

93. Wind River also informed ADWR that it had no data addressing the possibility of subsidence that might occur as a result of Wind River's proposed pumping. *See* ADWR Ex. 4 at ¶ 23G.

94. ADWR's 2nd NOD informed Wind River that its 1st Response was not adequate and ADWR again requested much of the same information. *See* ADWR Ex. 6 at ¶ 23.

95. In its 2nd Response, Wind River admits that there are no studies that show the probable impact on the area: "All studies pertaining to the hydrology and potential impacts for this proposed project have been included in the two previous submittals.… [The] Dixon and Katzer [report] attempts to address the potential impacts that may occur as a result of pumping from the Muddy Creek Formation but not specifically in the area of the proposed well field site. <u>No specific study has been conducted that specifically identifies the probable impacts on the area from which the water is proposed to be transported</u>." (Underscore added). *See* ADWR Ex. 7A at ¶ 23.

96. The preponderance of evidence shows that Wind River did not submit to ADWR studies that show the probable hydrologic impact at Mormon Wells and, that Wind River knew that pumping tests conducted in the Mormon Wells area would be required to develop the data for a study that would show the probable hydrologic impact.

<u>ADWR's Request for Site Specific Data was Reasonable.</u>

97. Wind River's admissions are persuasive evidence that ADWR's request for site specific information was reasonable. As set out below, the experts' testimony and other hydrologic evidence confirms this.

98. Dr. Jansen described the Mormon Wells area as "definitely a structurally complex area, and … it's a very interesting aquifer, a very unusual aquifer." The other

[15] Wind River may have overstated the cost based on testimony that the required data could be obtained with test-wells as opposed to a full scale production well.

hydrologists provided similar testimony about the complexity and variation of the Virgin River Basin, and it may be the only point on which they all agreed.

99. ADWR questioned whether or not the Mormon Wells site could yield substantial amounts of groundwater and requested more information from Wind River. *See* ADWR Exhibit 3 at ¶ 24. Wind River responded that until a production well was installed and the hydraulic parameters established any predicted production rate would be speculative.

100. Transmissivity ("T") is an aquifer parameter that is a measure of how easily water will flow through that aquifer. Generally, pumping from an aquifer with a high T value will result in a shallow drawdown extending over a large area, whereas pumping at the same rate from an aquifer with a low T value will result in a deeper drawdown over a smaller area.

101. Mr. Johnson testified that there "is variability within the Muddy Creek. We see that in each individual borehole and production well that's been drilled" when he was asked if transmissivities of the aquifers in the Muddy Creek unit vary significantly based on location.

102. The evidence shows that transmissivity values for the Muddy Creek aquifer range from about 1,000 to over 15,000 feet squared per day ("*fspd*"). Dr. Jansen, in his rebuttal testimony, acknowledged that "the project would not be economically feasible or physically possible" if the transmissivity at Mormon Wells is significantly lower than the estimate of 15,000 *fspd* used by Wind River's experts[16] and the well field would not be constructed.[17]

[16] The T value of 15,000 *fspd* was taken from the Burbey study of VVWD Well #31. Mr. Johnson acknowledged that Well #31 is located in a fault zone that may not be 100% like Mormon Wells. Dr. Jansen testified that he calculated a T value of 2,233 *fspd* (based on a pump test) for Palms Well 2 that is located about 8 miles from Mormon Wells. The Application uses a T value of 5,000 *fspd*, taken from the Holmes report.

[17] Wind River's position is that it will first build a production well and then determine the actual aquifer parameters. There is a distinction between building the entire well field (three wells) and one production well, but Dr. Jansen does not address what would happen with that one well if testing shows that T is not 15,000 *fspd*. Wind River asserts that it will cost several million dollars to build that one well, and it is reasonable to assume that Wind River would want to recover that money through pumping and sales to VVWD.

103. Dr. Jansen's testimony confirms that site specific data is required to determine whether or not the Muddy Creek formation at Mormon Wells will yield substantial amounts of water.

104. Mr. Corkhill's opinion is that without more specific data, a number of assumptions are required to evaluate the Application.

105. Mr. Brooks' written testimony gave his opinion that there were "data gaps" in Wind River's analysis and suggested procedures to fill those gaps. Whether or not all Mr. Brooks' suggested procedures would need to be undertaken is not an issue that requires resolution through this hearing process, but this testimony is supportive of ADWR's position that more information is required to properly evaluate the Application.

106. Mr. Oliver's written testimony compares the level of specificity required for an adequate water supply ("AWS") study with that of Wind River's Application and his opinion is that more data is required. Although Wind River asserts that the AWS rules do not apply, Mr. Oliver's testimony and the AWS requirements are additional evidence of the level of detail required to determine the probable hydrologic impact of the proposed pumping.

107. Mr. Dickens' written testimony gave several examples where Wind River's Application used aquifer parameters that were not consistent with values given in the Holmes report, and his opinion is that more specific data is required.

108. Dr. Jansen's opinion is that, given the scale of the project, common sense dictates using a more regional view rather than "unduly focusing on potential small scale variations at the project site."

109. Without site specific data there is no way to determine the actual extent of any local variations. Dr. Jansen was clear that verification of site parameters through testing would be required. Mr. Johnson also testified that his opinions about site conditions were subject to verification through testing or additional data collection. These experts recognize the need for site specific data.

110. The preponderance of evidence shows that ADWR's request for site specific information was reasonable because site specific information is required to determine the probable hydrologic impact of the proposed pumping on the Mormon Wells area.

Probable Hydrologic Impact

111. Potential hydrologic system impacts include: dewatering the shallow alluvial wells near Beaver Dam and Littlefield and the existing wells completed in the Muddy Creek aquifer; drying up the springs at Littlefield and other springs along the Beaver Dam Wash; reversal of groundwater flow gradients, including drawing in poor quality groundwater that would adversely affect the riparian habitat; and land subsidence.

112. Dr. Jansen's opinion is that the probable hydrologic impact on the shallow water and the alluvial aquifers would be minimal to none subject to confirmation with on-site testing.

113. Mr. Johnson's opinion is that the impact on existing wells is expected to be minimal but one can never say the impact would be zero and there is a need to monitor and reduce pumping if required.

114. Dr. Jansen and Mr. Johnson are of the opinion that there is a high probability that a confining layer isolates the Muddy Creek formation from existing uses in the alluvial aquifer. They infer that this layer exists at Mormon Wells primarily from data that shows confining layers exist in other parts of the basin and the Zohdy resistivity study.

115. In considering an aquifer's response to pumping there are two extremes: a fully confined response, which is not realistic and would represent all horizontal and no vertical flow, and at the other extreme, an unconfined response in which there is no restriction on vertical movement from the surface. Intermediate between those is a leaky confined aquifer where there is a confining unit but it is not impermeable. In the unconfined response there will be some leakage, but to determine whether the leakage is coming from the top or the bottom requires testing with observation wells in the other aquifers.

116. Dr. Jansen's opinion is that the Muddy Creek aquifer would exhibit a leaky-confined to a confined response to pumping.

117. Mr. Corkhill's opinion is that Wind River did not provide enough information to support its contention that Muddy Creek aquifer is isolated from the alluvium and, reports submitted to ADWR by Wind River (Holmes, Dixon and Katzer and Zohdy) lead Mr. Corkhill to believe that there is a connection between the Muddy Creek formation and the alluvial aquifer.

118. Mr. Corkhill's opinion is that the Muddy Creek aquifer is heterogeneous and is semi-confined to unconfined depending on the area and can not be characterized one way or another.

Confining Layer

Dr. Jansen's Testimony

119. Dr. Jansen's opinion is that the alluvial aquifer interacts with the surface water and is probably subflow, but the Muddy Creek aquifer is a distinct aquifer based on the respective flow gradients, the water quality, the lithology, and the water levels.[18]

120. Dr. Jansen toured the Mormon Wells area and observed that the Muddy Creek formation. Dr. Jansen was surprised that 1,500 to 3,000 gallons per minute can be pumped from the Muddy Creek formation given the amount of fine grained material. Conduits are required to produce that flow rate and at Mormon Wells he could see faults on the surface.

121. The Zohdy resistivity study shows that the alluvial aquifer has a high resistivity and the Muddy Creek formation corresponds to a low resistivity. Cross section B-B´ at Mormon Wells shows a fine grained unit that would be consistent with a confining unit at the top of the Muddy Creek. The soundings on either side of B-B´ show that the unit of low-resistivity is continuous laterally. *See* ADWR Ex. 1c. Dr. Jansen's opinion is that the well log from the Paparella/Michael well provides good confirmation that the Zohdy resistivity data is correlated to the grain size. *See* ADWR Ex. 56 (also admitted as WR Ex. 104).

122. Dr. Jansen found the Fogg report (WR Exhibit 110) to be significant because: (1) it shows that the water levels in the Muddy Creek aquifer barely change and do not seem to correlate with the stream flow, which indicates a lack of connection; (2) it shows that the Muddy Creek flows at 90 degrees from the surface water and the alluvial aquifer; (3) the water quality in the Muddy Creek is not the same as the water quality in alluvial aquifer; and (4) observation wells drilled into the Muddy Creek formation indicate that the groundwater occurs under confined conditions in either the upper most part of

[18] Whether or not the alluvial aquifer is "subflow" is a legal, not hydrologic, question that does not required resolution in this hearing process.

the Muddy Creek formation or in the overlying post-Muddy Creek tertiary gravels at or near the contact with the Muddy Creek formation.

123. But Fogg also reported that at the confluence with the Virgin River there may be discharge from the Muddy Creek formation to the Beaver Dam Wash and, that there is recharge to the alluvial aquifer from the sand and gravel in the upper part of the Muddy Creek formation.

124. Palms Well No. 2 is completed in the Muddy Creek formation, with the well bore sealed off from the poor quality water in the alluvial aquifer. Dr. Jansen and Mr. Johnson each gave testimony about water quality data collected after that well had been pumped for nearly six years, which in their opinions, supports the conclusion that Muddy Creek has a confining unit.

125. On rebuttal, Dr. Jansen testified that after six years of pumping "TDS and nitrate levels have not changed significantly. This indicates that the confining unit has effectively prevented the poor quality water from the alluvial aquifer from migrating into the well in response to pumping. This also indicates that no significant capture of shallow water has occurred as a result of pumping from the Muddy Creek formation." *See* Dr. Jansen rebuttal testimony. But this testimony has limited evidentiary value because it shows only that water from the alluvial aquifer has not yet been captured by the well and not the degree to which water from the alluvial aquifer may have migrated into the Muddy Creek aquifer.

126. Dr. Jansen analyzed data related to pumping tests conducted at the EnnerConnect Well and Palms Well 2 and based on that analysis, the flowing artesian wells, geophysics, and the outcrops, it is his opinion that the that Muddy Creek Aquifer is confined to semi-confined.

127. In his rebuttal, Dr. Jansen responded to the other hydrologists' testimony that the continuity of the confining unit at Mormon Wells has not been documented and that to assume such a unit exists is not reasonable without more information.

128. Dr. Jansen disagreed with that assessment based on the information set out immediately above. But despite this disagreement, in his rebuttal Dr. Jansen does not actually testify that it is his opinion that there is a continuous confining layer at Mormon Wells.

129. Dr. Jansen did testify that: (1) all the lithology indicates the presence of material consistent with one or more confining units within the Muddy Creek formation; (2) the "continuity of the fine grained nature of the Muddy Creek formation was confirmed" in the Zohdy report; (3) pumping tests show that the formation has a confined to semi-confined leaky drawdown; (4) that the Muddy Creek is not unconfined; (5) Muddy Creek aquifer is confined over a large area around Mormon Wells and a that largely continuous confining unit must be present to create that condition; and (6) based on the "data in hand" he can see "no credible reason to believe that Muddy Creek formation will respond as anything else than a confined to leaky confined aquifer." *See* Dr. Jansen's rebuttal testimony.

130. Dr. Jansen further states in rebuttal that the evidence shows conclusively that the Muddy Creek is regionally confined and the confining unit is laterally extensive. Dr. Jansen acknowledged that there may be local variations in the confining unit but he found these to be less important than the regional characteristics.

131. Dr. Jansen testified that faulting was more common in earlier times, which indicates that there are likely to be more faults in the deeper strata than at the depth of the confining layer.

Mr. Johnson's Testimony

132. Mr. Johnson believes that there is a confining layer at Lytle Ranch because the well at Lytle Ranch is separated from the water table aquifer as demonstrated by the artesian flow that exists. Evidence of a confining layer in the structurally controlled river corridor or Beaver Dam Wash corridor is shown by conditions at the Bunkerville Well #2, the monitor well at the Riverside Bridge in Nevada, and the Biasi Dairy well that are flowing artesian wells.

133. Mr. Johnson's opinion is that these artesian wells and the information from the Zohdy study (ADWR 1c) show that there is a high probability of a confining layer at Beaver Dam Wash. Mr. Johnson acknowledged that he knew of no site specific data for Mormon Wells. To "verify [his] theory that there is no connection between the two aquifers" Mr. Johnson would require monitoring of the Muddy Creek aquifer and the alluvial aquifer.

134. Mr. Johnson's opinion is that it is fair to say that the lateral continuity of the clay dominated units at VVWD Well 31 is unknown. Mr. Johnson acknowledged that it is not really known where these confining layers are in every part of the basin.

135. With respect to what might happen at Mormon Wells, Mr. Johnson said that one can never be absolutely sure until one installs the well and does the appropriate monitoring.

Mr. Corkhill's Testimony

136. Mr. Corkhill heard Dr. Jansen's testimony that generally there is a leaky confined response in the Muddy Creek aquifer. Mr. Corkhill's opinion is that pumping from a leaky confined aquifer would allow vertical leakage. This leakage could lower the alluvial aquifer, perhaps impacting riparian areas and the base flow in Beaver Dam Wash, but there is not enough information to determine the likelihood of these impacts. In addition to leakage, there could be potential impacts such as a reduction in the head in the Muddy Creek aquifer and land subsidence.

137. Wind River assumes that Muddy Creek Aquifer is producing useable quantities of water because it has faults that are a conduit for flow and that the confining layer is undisturbed by these faults. Mr. Corkhill's opinion is that it is unlikely that the combination of these two conditions exists.

138. Dixon and Katzer conclude that Beaver Dam Wash is a major conduit for groundwater and surface water. That report shows the faults near Beaver Dam Wash, including a fault that intersects the Wash at Mormon Wells. *See* ADWR Ex. 1d. Mr. Corkhill believes he photographed that fault. *See* ADWR. Ex. 35.

139. The Paparella/Michael well (registration # 55-591311) is located in township and range 41 N 16 W Section 12, which is the Mormon Wells site.[19] The Paparella well is slotted from 146 to 236 feet below ground surface ("bgs").[20] *See* ADWR Ex. 56. Mr. Corkhill's opinion is that this log shows that the driller (or well owner) thought the well would be productive at those depths and, that this log does not indicate a confining

[19] Wind River's Application shows that it had data from a recently drilled well that supported its theory that there is a confining layer, but in response to ADWR's request for the well information, Wind River reported that it was not able to locate the data. Mr. Corkhill checked an ADWR database and located this information.

layer, but is more suggestive of a semi-confined or unconfined aquifer. This well log does not provide sufficient for Mr. Corkhill to determine whether the clay layers present represent a confining or semi-confining layer.

140. Figures in the Holmes report show that within several miles of Mormon Wells there are several wells that penetrate to the Muddy Creek formation, but the figures do not show that there is a confining layer present. *See* ADWR Exhibit 1b at pp. 14 - 16. On cross-examination, Mr. Corkhill agreed that these figures do not allow one to predict the vertical conductivity of the geologic unit with any degree of certainty.

141. Mr. Corkhill's opinion is that there is infiltration from Beaver Dam Wash to the Muddy Creek Aquifer. Holmes did a water budget that shows there is a hydraulic connection between Muddy Creek formation and the Beaver Dam Wash. According to Holmes, water flows into the Wash from the Muddy Creek and from the Wash into the Muddy Creek. *See* ADWR Ex. 1b at p. 32 and p. 39. This information does not support the Wind River assertion that there is a confining layer, but it also does not establish that no such layer exists.

142. The Holmes report shows that near the mouth of the Beaver Dam Wash, the water quality changes from east to west as the Muddy Creek water mixes in. *See* ADWR Ex. 1b at p. 43. This suggests that a connection exists. On cross-examination Mr. Corkhill acknowledged that the Holmes report did not have any direct measurements of flow from the Muddy Creek aquifer to the alluvial aquifer and Holmes was basing his calculations on changes in conductivity in the water. It is possible that the conductivity changes measured by Holmes were due to a source other than water from the Muddy Creek, but Mr. Corkhill's opinion is that that is unlikely.

143. Beaver Dam Wash is a major conduit for groundwater and surface water, which Mr. Corkhill also found supports his opinion that there is a connection between the Wash and the Muddy Creek Formation. *See* ADWR Exhibit 29 at p. 288 and p. 299.

144. Groundwater contours for the lower Virgin Valley show that recharge is from the mountains and the ephemeral washes. The water elevation points are clustered near the Beaver Dam Wash. From the contours it can be inferred that the water is

[20] The slots allow the groundwater to enter the well casing. There was clay from 140 to 185 feet bgs; gravel and some clay from 185 to 205 feet bgs; and clay from 205 to 236 feet bgs.

flowing away from the Wash, which may represent recharge to the Muddy Creek. *See* ADWR Ex. 1d at plate 3.

145. Mr. Corkhill reviewed a report prepared by Zohdy in 1974. *See* ADWR Exhibit 34. Mr. Corkhill compared the number and density of resistivity soundings shown in Figure 38 of the1974 report to the number and density of soundings in the 1994 Zohdy study of the Mormon Wells region. Mr. Corkhill's opinion is the 1994 survey was a regional reconnaissance and, that the one profile (B - B´) through Mormon Wells is not enough points to infer that there is a confining layer present.

146. The preponderance of evidence does not show that the Muddy Creek aquifer in the Mormon Wells area is sufficiently impermeable to isolate the alluvial aquifer and Beaver Dam Wash from the effects of the proposed pumping.

Drawdown

147. Mr. Johnson's opinion is that a reasonable estimate of the worst-case drawdown resulting from the proposed pumping is 61 feet of drawdown in the Muddy Creek aquifer at a radius of 35,000 feet after 100 years.

148. Wind River used a T (transmissivity) value of 15,000 *fspd* taken from the Burbey study of VVWD Well #31, which is about 14 miles from Mormon Wells, and the Theis equation was used. *See* ADWR Ex. 7n. Mr. Johnson acknowledged that Well #31 is located in a fault zone that may not be 100% like Mormon Wells. Mr. Johnson also states that because the groundwater flow would be controlled by faults, the 61 foot drawdown would not be uniform.

149. Wind River's experts presented no estimate of the drawdown at any distance other than 35,000 feet and no evidence was adduced that accurately shows where the faults are located. Consequently, Wind River's information is not actually probative of the predicted drawdown at any given location in the Mormon Wells area.

150. Mr. Corkhill's opinion is that the drawdown analysis provided by Wind River is not informative with respect to what the impact from the proposed pumping will be because the T and storativity values Wind River used are not from the Mormon Wells site and, because the values Wind River used are at the high end of those for the Virgin Valley. Mr. Corkhill's opinion is that site specific information is required to determine an appropriate T value for the Mormon Wells area.

151. Mr. Corkhill's review of the data shows that T values in the basin range from 1, 000 to 35,000 *fspd*, with the 35,000 *fspd* in the unconfined area of the aquifer. Dr. Jansen testified that he calculated a T value of 2,233 *fspd* for Palms Well 2, which is located about 8 miles from Mormon Wells. The Application uses a T value of 5,000 *fspd*, taken from Holmes.

152. Mr. Brooks and Mr. Oliver questioned whether it was appropriate to use the VVWD Well #31 given that there are other wells with known (or calculated) T values that are located closer to Mormon Wells site.

153. The Burbey report from which Wind River took the T value of 15,000 *fspd* included a range of calculated T values for VVWD Well #31, with 15,000 *fspd* being the highest.

154. Mr. Brook's written testimony presented a range of drawdown values calculated using the other T values from the Burbey report. Using the T of 5,000 *fspd* given in the Holmes report and the Application, Mr. Brooks calculated that the 100-year drawdown at a 35,000 foot radius would be 150 feet.

155. Mr. Brooks also gave written testimony that the drawdown calculations should be adjusted because the Beaver Dam Mountains are likely to create a no-flow boundary, which the Wind River calculation did not account for. Mr. Brooks ran a second set of calculations adding this adjustment and predicted drawdown values increased by over 50% of the non-adjusted values.

156. Mr. Brooks' opinion is that if Wind River is correct and the flow is through the faults, then the practical value of any of these drawdown calculations is limited because the Theis equation being used is not valid for flow under those conditions.

157. Mr. Oliver's written testimony also shows several drawdown values that result from different T values that have been reported in the basin. Mr. Oliver's calculations show that for a T of 1,000 *fspd*, the drawdown at Littlefield would be close to 600 feet after 50 years.

158. The preponderance of evidence shows that Wind River has not submitted an accurate estimate of the possible range of drawdown values that may result from the proposed pumping.

Aquifer Production Capability

159. In both the 1st and 2nd NODs, ADWR requested more information as to whether or not the Muddy Creek formation could transmit the quantities of water Wind River proposes to pump.

160. In its 2nd Response Wind River acknowledged that determining the production capability of the Muddy Creek aquifer will require aquifer parameters that can not be inferred without an actual production well.[21] Wind River also asserted that the Holmes report could be read to either to provide support for Wind River's proposed plan or not, depending on how that report is interpreted. *See* ADWR Ex. 7a at ¶ 24.

161. Dr. Jansen's rebuttal testimony acknowledges that if the transmissivity is found to significantly lower that the 15,000 *fspd* used by Wind River in its drawdown calculation then the wells will not produce the anticipated volume, in which case the project would not be physically or economically viable.

162. The Application shows that Wind River's wells were to be 700 feet deep.[22] The Zohdy report shows that beginning at about 130 meters (440 feet) below ground surface (bgs) the Mormon Wells area has resistivity of 20 ohm meters or less.[23] According to Zohdy, these readings represent silty sand with high clay content and are generally not good aquifers. According to Mr. Johnson, all the production in the Muddy Creek is from a silty sand with about 50 ohm meters in resistivity.

163. The Holmes report also shows that resistivity values of less than 20 ohm meters corresponds to predominantly fine grained soils with poor quality water.

164. The Holmes report states that the Muddy Creek formation has a poorly sorted, fine grained nature that restricts groundwater movement and well withdrawals.

165. The preponderance of evidence shows that Wind River has not submitted sufficient information from which to determine whether or not the Muddy Creek formation is capable of transmitting the quantities of water Wind River proposes to pump.

Subsidence

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[21] At hearing the expert testimony showed that a production well may not be required to determine the aquifer parameters.

[22] The notices of intent to drill for those wells have expired.

[23] The vertical scale (less than 2 inches represents 400 meters) is not sufficient to make any accurate determination.

166. In its 1st Response Wind River states that there is no data that addresses the possibility of subsidence that may result from its proposed pumping and Wind River's only source of information was VVWD, which is monitoring subsidence near Mesquite.

167. Mr. Johnson testified that VVWD is very concerned about subsidence and participates in extensive monitoring including the NASA and Virginia Tech programs and using GPS data to monitor any earth movement in real time. The next phase of the Burbey study (ADWR Exhibit 7n) is to study the optimal pumping to avoid creating or exacerbating subsidence.

168. Mr. Johnson's opinion is that due to the presence of the Littlefield formation, the Mormon Wells area is generally not susceptible to subsidence except where the Muddy Creek formation is exposed at the ground surface. Mr. Johnson believes that subsidence is possible in areas where the Muddy Creek formation is exposed at the ground surface.

169. Mr. Corkhill's opinion is that the proposed pumping will result in subsidence in the Mormon Wells area because that pumping will likely result in significant drawdown for a large distance around Mormon Wells. But Mr. Corkhill acknowledged that he did not have sufficient data on the mechanical properties of the subsurface in the Muddy Creek area to make an accurate determination.

170. Mr. Corkhill's opinion is that although the Littlefield formation is rigid, that formation would move down as the Muddy Creek formation subsided.

171. Mr. Corkhill acknowledged that subsidence is related to over-drafting of groundwater and that he has not seen enough information to determine whether or not the Virgin River basin is currently being over-drafted.

172. The Dixon and Katzer report shows that the Muddy Creek formation is highly susceptible to subsidence and cites the experience in the Las Vegas Valley as described by Bell in ADWR Exhibit 28. According to Dixon and Katzer, it is difficult to predict subsidence without a proper groundwater model, and even then, predictions may not be valid given variability in sediments. *See* ADWR Ex. 1d.

173. The evidence shows that there has been significant subsidence in the Las Vegas Valley, but it also shows that there has been a rebound. *See* ADWR Ex. 28. The Littlefield formation does not extend into the Las Vegas Valley area.

174. The preponderance of evidence shows that Wind River has not provided enough information from which the possibility of subsidence due to the proposed pumping can be evaluated.

A.R.S. § 45-292(C)(2) Potential harm to the public welfare of the citizens of this state.

175. There is no dispute that there are hundreds of existing wells in the area, some of which are completed in the Muddy Creek aquifer, and some of which are well used by BDWC and Biasi to serve their customers in the area.

176. BLM and BYU presented substantial evidence to show that the Beaver Dam Wash is a sensitive riparian habitat.[24]

177. Because there is insufficient evidence on which to determine the probable hydrologic impact, there is no sound basis on which to determine whether or not the proposed pumping will harm the public welfare.

178. The preponderance of evidence shows that the proposed pumping might adversely impact the existing well and riparian habitat, but that there is insufficient hydrologic data to determine that impact.

A.R.S. § 45-292(C)(3) The supply of water to this state and current and future water demands in this state in general and the proposed source area in particular.

Supply in Arizona

179. Dr. Jansen testified that the literature shows that there is a lot of question as to the source of recharge to the Muddy Creek formation, but his opinion is that most of the recharge to that formation occurs from the underlying carbonate aquifer.

180. Mr. Johnson's opinion is that Wind River will pump water that originates as recharge in the Clover Mountains in Nevada and Utah and in the Beaver Dam Mountains in Utah.

181. The Application states that the total recharge to the Muddy Creek formation is 44,000 AFA, based on the Holmes report and that recharge to the entire Virgin River basin is 85,000 AFA.

[24] Pre-hearing comments submitted by the Arizona Game and Fish Department and the U.S. Fish and Wildlife Service expressed similar concerns.

182. Wind River Exhibit 103 gives an estimated recharge to the entire Muddy Creek Aquifer of about 66,000 AFA, which Mr. Johnson found is in close agreement to the Dixon and Katzer estimate.[25]

183. Mr. Johnson testified that an attachment to Exhibit 103 that was not with the copy submitted into evidence shows that the recharge to Muddy Creek formation in the Beaver Dam Wash sub-basin is approximately 55,000 AFA, but that only a small percentage originates in Arizona.

184. Other evidence shows that this recharge occurs over the entire Virgin River Basin and, Mr. Corkhill's opinion is that all of the basin recharge would not be available at Mormon Wells. Nevertheless, accepting Mr. Johnson's value of 55,000 AFA, Wind River would be exporting 25% of the annual recharge. Using the Application's value of 44,000 AFA, Wind River's exports would be 32%.

Current Demand in Arizona

185. The current demand in the area is being served primarily by BDWC, Biasi and private wells.

[25] This exhibit was not provided to ADWR during the review of the Application. According to Mr. Johnson the values in this exhibit were taken from an incomplete groundwater model of the Virgin River Basin being prepared by VVWD and the University of Nevada at Las Vegas.

Future Demand in Arizona

186. Mr. Michael testified that Wind River could not locate any accurate demand reports for Arizona, which is consistent with Wind River's 1st and 2nd Responses.

187. According to Mr. Michael, Wind River projected the demand in the pumping area but focused mainly on Scenic, Arizona. In the Application, Wind River implied that it had population projections for Littlefield, Beaver Dam and Scenic. When ADWR requested more information and documentation, Wind River responded that it had no documentation to establish these demands. Wind River did explain the process it used to calculate the projected demand for the Scenic area, but according to Wind River the private lands around Beaver Dam and Littlefield are mostly developed and already being served by private water companies.

188. The preponderance of evidence shows that Wind River submitted insufficient evidence on which to evaluate the future water demand in the Mormon Wells area.

A.R.S. § 45-292(C)(5) The availability of alternative sources of water in the other state.

189. The Application shows that the only source of water in Nevada is groundwater from the Muddy Creek aquifer but no groundwater is actually available because the Nevada portion of the Muddy Creek aquifer (known as Basin 222) is fully appropriated. *See* ADWR Exhibit 1 at ¶8.

190. The information that Basin 222 is closed came to Wind River from VVWD. Wind River personnel did not have any conversations with the Nevada State Engineer about the issue.

191. Ms. Logan called the engineer for Basin 222, Mr. Hafeey, who told Ms. Logan that Basin 222 is "designated" and as such, preferred rights may still be issued (municipal rights are preferred rights). VVWD has applications for about 160,000 AFA pending.

192. According to Mr. Johnson, VVWD has also obtained from Southern Nevada Water Authority ("SNWA") applications that date to 1989, but these have not been acted on. VVWD obtained these applications through an exchange agreement between VVWD and SNWA by which after 2020, SNWA can purchase from VVWD up to 5,000 acre feet of Virgin River water.

193. At a January 2007 VVWD board meeting, general manager Mr. Winters told the board that although VVWD will be out of water in 2012, he could not believe that the Nevada State Engineer would deny VVWD's pending applications because no applications had been declined in any of the 14 years that Mr. Winters had been involved. *See* ADWR Exhibit 51.

194. Mr. Michael knew that VVWD has applications pending, but he did not know their status or what would be required for VVWD to get more groundwater in Nevada. The only thing that Mr. Michael can recall from any conversations with Mr. Winters is that VVWD will be running out of water.

195. Although the Application shows only groundwater as a possible source of water, the VVWD Integrated Water Resources Plan lists 10 ways to use surface water to free up groundwater. *See* ADWR Exhibit 7m.

196. Mr. Johnson testified that VVWD's Integrated Water Resource Plan looked at all sources of water available to the VVWD, including Virgin River water. It may be cost effective to treat Virgin River water in the future, but now the treatment cost is about $1,500 per acre foot. Brine disposal is also an issue because of the ZLD (zero liquid discharge) requirement.

197. Mr. Johnson testified that VVWD could use the Mormon Wells water as a bridge over the next 10 to 30 years as desalinization treatment technology improves.

198. Mr. Michael has read the VVWD Integrated Water Resources Plan but he was not particularly familiar with it and he had not discussed it with VVWD officials. Mr. Michael did not know what water sources other than those listed in the Application were considered, but the hydrologists do know.

199. The preponderance of evidence shows that Wind River submitted insufficient information on which to determine the availability of alternate sources of water in Nevada.

<u>A.R.S. § 45-292(C)(6)The demands placed on the applicant's supply in the other state.</u>

200. There was no evidence adduced to show that Wind River has any existing supply of water.

201. There was no evidence adduced to show that Wind River has any demand other than its contractual arrangement with VVWD.

202. The Application shows that VVWD has sufficient water rights to last until 2025. *See* ADWR Ex. 1 at ¶ 9 and Table III (11,500 AFA serving about 55,000 people).

203. According to Wind River, the demand quantities in Table III were "just estimates, which are sure to be different than the actual water demands" and the growth rate "could be less [,] it could be more." *See* ADWR Ex. 4 at ¶ 13b and ¶11b.

204. Wind River believes that the values in Table III are no longer current. According to Mr. Michael, the City of Mesquite has provided a figure of 8½ % growth, but Mr. Bennett testified that that figure was not provided by the City.

205. Mr. Michael found it unlikely that Wind River provided ADWR any documentation showing an 8 ½ % growth rate because a change in the growth rate is not important or substantive because the same volume of water will be going to Mesquite.

206. Based on an 8 ½ % growth rate, VVWD would run out of water about 15 years sooner than shown in the Application.

207. Mr. Michael did not believe that such a 15-year change was substantive based on the assertions that there is plenty of water in Arizona, they need water in Nevada, this plan will not hurt anyone, and because this is background information or a framework that is not set in stone. The context is accurate in that the maximum use at build out remains 14,000 AFA.

208. Mr. Michael did not know what population VVWD could serve with 11,500 acre feet.

209. When asked what VVWD would do with this water before its current supplies run out, Mr. Michael responded that Wind River understands that VVWD does need the water, and that the question was best directed to VVWD.

210. Mr. Michael's unsupported testimony is insufficient to show that there is, or will be, an 8 ½ % growth rate during the requested 50-year term. Mr. Bennett actually testified that he thought the growth rate was more than 8 ½ %, but that too was unsubstantiated, and the discrepancy between the two figures serves to show that without sufficient corroboration neither figure can be considered reliable.

211. Even if the 8 ½ % rate were accepted, based on Mr. Johnson's testimony VVWD has sufficient water to last until 2012 or 2014. Consequently, Wind River would have no reasonable and beneficial use until at least 2012.

212. The preponderance of evidence shows that Wind River submitted insufficient information on which to determine VVWD's demand in Nevada.

A.R.S. § 45-292(A)

213. Under A.R.S. § 45-292(A) a person may withdraw, or divert, and transport water from this state for a reasonable and beneficial use in another state if approved by the director pursuant to A.R.S. Title 45, Article 11.

214. The preponderance of evidence shows that Wind River submitted insufficient information on which to determine whether or not the water it plans to export will be put to a reasonable and beneficial use in Nevada.

CONCLUSIONS OF LAW

1. Wind River Resources LLC, as the party asserting a claim or right, bears the burden of proof to show that the Director should approve the Application. The standard of proof on all issues is by a preponderance of the evidence. *See* A.A.C. R2-19-119.

2. A preponderance of the evidence is "[e]vidence which is of greater weight or more convincing than the evidence which is offered in opposition to it; that is, evidence which as a whole shows that the fact sought to be proved is more probable than not." BLACK'S LAW DICTIONARY 1182 (6th ed. 1990). "A preponderance of the evidence is such proof as convinces the trier of fact that the contention is more probably true than not." Morris K. Udall, ARIZONA LAW OF EVIDENCE § 5 (1960).

3. A person with specialized knowledge may qualify and testify as an expert if his testimony will assist the trier of fact. *See* Arizona Rule of Evidence 702.

4. The matter is a contested case. The hearing was set pursuant to A.R.S. § 45-292(E) and is subject to the requirements of A.R.S. Title 41, Chapter 6, Article 10. *See* A.R.S. § 45-114. All interested persons may appear and present written or oral testimony at such a hearing. The ALJ must exercise reasonable control over the presentation of evidence and cross-examination of witnesses to make these "effective for ascertaining the truth [and] avoiding needless consumption of time[.]." A.R.S. § 41-1092.07(D). Consequently, the interested persons were not afforded all the rights that a party would have and were not subject to cross-examination. *See* A.R.S. § 41-1092.07(B); A.R.S. § 41-1001(12).

5. Wind River did not present any witness that gave fully probative evidence about the availability of alternative sources of water in Nevada or how VVWD would use the exported water before VVWD's existing uncommitted supply was exhausted. Wind River relied on VVWD for that information and, to the extent that Mr. Michael had knowledge of these matters, it was not independently gained, and Mr. Johnson could not speak to policy issues. Wind River's lack of probative evidence may be explained by the fact that Mr. Michael apparently was surprised by ADWR's level of concern about what would happen to the exported water in Nevada. Because Wind River did not understand the quality of information and level of detail required by ADWR to evaluate the Application, it had no reason to develop and submit detailed information to ADWR.

Site Specific Study

6. Wind River argues that it was not required to submit a site specific study and such a requirement is contrary to the statute. The chief goal in statutory interpretation is to give effect to the legislative intent. *See Scottsdale Healthcare, Inc. v. AHCCCS*, 206 Ariz. 1 (2003).

7. ADWR's Director is required to "be experienced and competent in water resources management and conservation, and shall have proven administrative ability." A.R.S. § 45-102(D).

8. The statute requires Wind River's Application to include studies satisfactory to the Director of the probable hydrologic impact on the Mormon Wells area. *See* A.R.S. § 45-292(B). The ALJ concludes that the legislative intent was to have the Director use his experience, competence and administrative ability to determine what studies were required for each export-site in light of the factors set out in A.R.S. § 45-292(C).

9. Director Guenther has not yet acted on the Application although ADWR staff members have evaluated the Application. The facts show that site specific information is necessary to ascertain the aquifer parameters required to determine the hydrologic impact on the Mormon Wells area. Consequently, ADWR's requirement that Wind River submit site specific studies is a reasonable exercise of the discretion granted to the Director and is not contrary to A.R.S. § 45-292.

Notice of Completeness

10. Wind River argues that when ADWR issued the Notice of Completeness, ADWR certified that Wind River had submitted all the necessary documentation required under the statute. Wind River acknowledges that this does not mean that the information submitted was sufficient for a permit to issue. Nevertheless, Wind River concludes that because ADWR first used the precise phrase "site specific study" in its pre-hearing brief and not in the NODs, ADWR must not have considered a site specific study to be a requirement of A.R.S. § 45-292.

11. Although ADWR did not use the precise terminology during the hearing process that it used during the Application review, this does not show that ADWR changed its position because the import in each instance was that more site specific data was required to evaluate the Application. In its Responses, Wind River acknowledged that site specific information was required. Consequently, the ALJ does not accept Wind River's conclusion that ADWR did not consider a site specific study to be required under A.R.S. § 45-292.

Estoppel

12. Wind River argues that ADWR is estopped from asserting that Wind River is required to submit a site specific study. The facts do not show that ADWR has taken inconsistent positions with respect to the quality of data required to determine the probable hydrologic impact on the Mormon Wells area, and the preponderance of evidence shows that site specific studies are required to determine that impact. Consequently, estoppel does not lie against ADWR. *See Valencia v. Az. Department of Revenue*, 191 Ariz. 565 (1998).

Probable Hydrologic Impact

13. Wind River argues that its experts confirmed that Wind River provided sufficient evidence to show the probable hydrologic impact and that the impact would not harm existing water users in the lower Virgin River Basin. This argument is not supported by the preponderance of evidence as set out in the Findings of Fact.

14. Wind River asserts that if ADWR wants more site specific hydrologic analysis that can be done as a reasonable condition for approval.

15. Although the Director may impose conditions if he approves the Application, studies showing the probable hydrologic impact are required as part of the Application.

Because the information from the hydrologic-impact studies is required to evaluate some of the factors in A.R.S. § 45-292(C), the Director must have this information in determining whether to approve the Application. Consequently, Wind River's suggestion that the information can be gathered later is not in conformity with the statutory requirements.

Wind River's Constitutional Arguments

16. Wind River argues that A.R.S. § 45-292 is unconstitutional as applied.

    a. Because Wind River has admitted that it did not submit sufficient information to adequately respond to ADWR's NODs, Wind River's constitutional challenge is premature.

    b. Although Wind River asserts that its constitutional challenge is limited to the application of A.R.S. § 45-292, Wind River's proposed activity is within the scope of A.R.S. § 45-292's regulatory scheme, and Wind River is raising a facial challenge, which is not subject to decision by ADWR or the ALJ.

    c. Wind River asserts that if it intended to use the water in Arizona that use would be subject only to A.R.S. §§ 45-453 and 45-454. But the evidence shows BDWC, Biasi and others that are pumping groundwater for use only in the basin of origin are subject to regulation in addition to A.R.S. §§ 45-453 and 45-454. Consequently, Wind River's constitutional argument is not factually accurate.

17. Wind River argues that ADWR engaged in public contacts not sanctioned by A.R.S. § 45-292 and these contacts violate the commerce clause. Because Wind River is an Arizona LLC and Ms. Van Alstine is an Arizona resident, Wind River is not an "unrepresented out of state interest." As such, Wind River's argument that ADWR's activities were not permissible under *Manning* is inapposite. *See Conservation Force v. Manning,* 301 F.3d 985 (9th Cir. 2002).

18. Wind River's constitutional arguments do not present any impediment to the Director making a determination on the merits in this matter.

The Statutory Requirements

19. As set forth above, the preponderance of evidence shows that Wind River's Application is not accurate because: (1) Wind River has made changes in its proposed plan but Wind River has not amended the Application; (2) Wind River included information in the Application that was not accurate; and (3) Wind River has not submitted studies that are sufficient to determine the probable hydrologic impact of the proposed pumping on the Mormon Wells area. Consequently, Wind River's Application does not meet the requirements of A.R.S. § 45-292(B).

20. The Application does not provide enough information on which the Director can effectively consider the requirements of A.R.S. § 45-292(C) and ADWR does not have sufficient information to verify that Wind River will make reasonable and beneficial use of the water in Nevada as required by A.R.S. § 45-292(A).

21. Because Wind River did not meet its burden to show by the preponderance of evidence that the Application should be approved, and because the preponderance of evidence shows that Wind River's Application does not meet the statutory requirements, the Director should deny the Application.

RECOMMENDED ORDER

IT IS RECOMMENDED that the Director of the Arizona Department of Water Resources deny Wind River Resources LLC's Application for a permit to transport water out of state.

Done this day, October 30, 2007

/s/ Thomas Shedden
Thomas Shedden
Administrative Law Judge

Original hand delivered this
30th day of October, 2007, to:

Department of Water Resources
Herb Guenther
ATTN: Kathleen Donoghue
3550 N. Central Ave.
Phoenix, AZ 85012

By _____

Copy posted to http://www.azoah.com/Water.htm
this 30th day of October 2007,
By CJV

APPENDIX

45-292. Approval required to transport water out of state; application; criteria; hearing

A. A person may withdraw, or divert, and transport water from this state for a reasonable and beneficial use in another state if approved by the director pursuant to this article. A person shall not transport water from this state unless approved by the director, but this article does not apply to or prohibit transporting water from this state as required by interstate compact, federal law or international treaty.

B. An application to transport water from this state for use in another state shall be filed with the director and shall include:

1. The name and address of the applicant's statutory agent in this state for service of process and other legal notices.
2. The legal basis for acquiring the water to be transported.
3. The purpose for which the water will be used.
4. The annual amount of water in acre-feet for which the application is made.
5. The proposed duration of the permit, not to exceed fifty years with an option to renew.
6. Studies satisfactory to the director of the probable hydrologic impact on the area from which the water is proposed to be transported.
7. Any other information which the director may require.

C. The director shall approve or reject the application. If the director approves the application, the director may prescribe terms and conditions for the approval. In determining whether to approve the application the director shall consider:

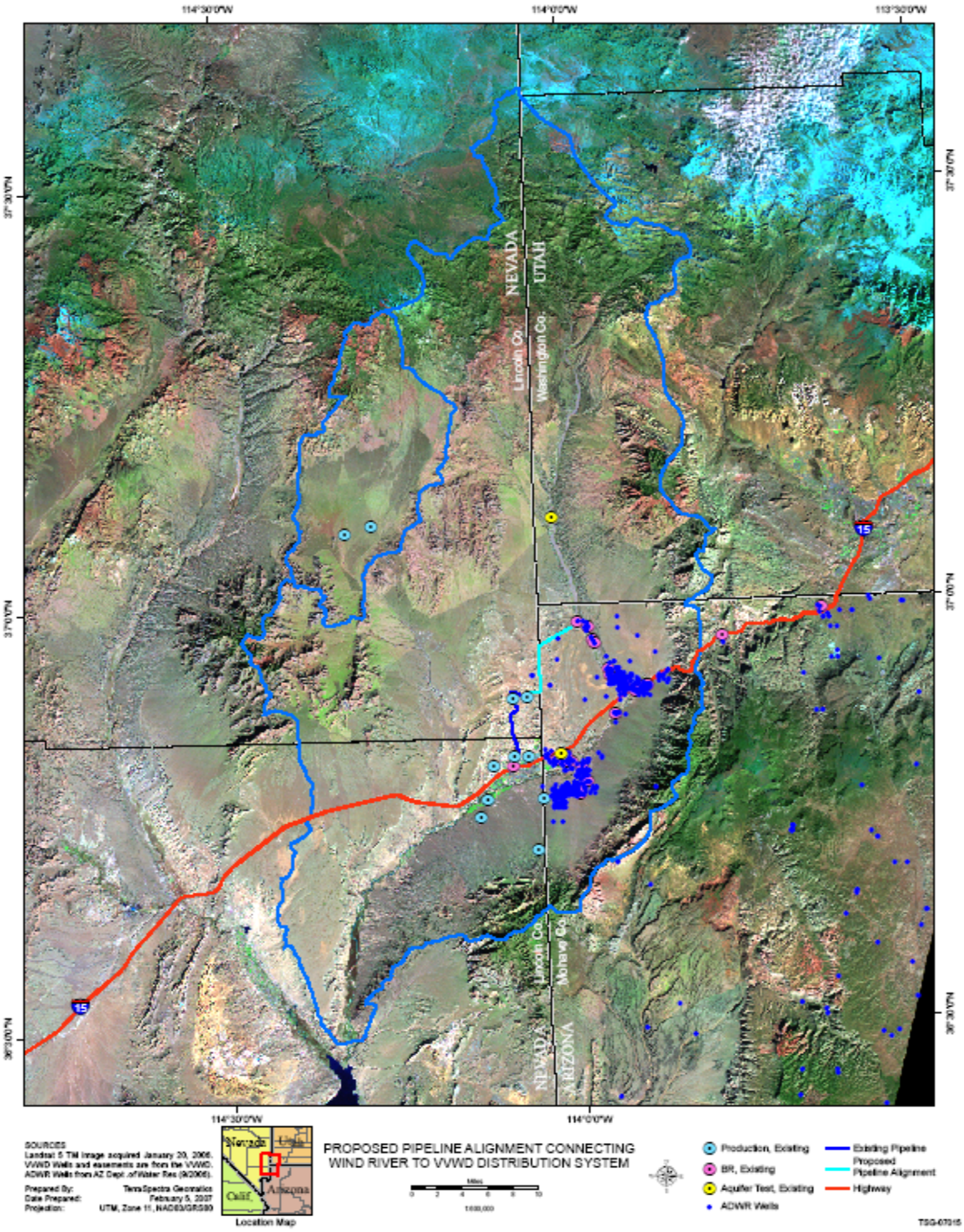
1. Whether the proposed action would be consistent with conservation of water, including any applicable management goals and plans.
2. Potential harm to the public welfare of the citizens of this state.
3. The supply of water to this state and current and future water demands in this state in general and the proposed source area in particular.
4. The feasibility of intrastate transportation of the water that is the subject of the application to alleviate water shortages in this state.
5. The availability of alternative sources of water in the other state.
6. The demands placed on the applicant's supply in the other state.

7. Whether the proposed action is prohibited or affected by other law, including sections 45-165 and 45-172 and chapter 2 of this title.

D. This article does not authorize and the director shall not approve transporting from this state water allocated to this state by federal law or interstate compact.

E. An administrative hearing shall be held on the application, and the director shall give notice of the hearing by publication once a week for three consecutive weeks in a newspaper of general circulation in the county or counties from which the applicant proposes to transport the water. The hearing shall be conducted in the area from which water is proposed to be transported. Any interested person, including the department, may appear and give oral or written testimony on all issues involved.

F. Section 45-114, subsections A and B govern administrative proceedings, rehearing or review and judicial review of final decisions of the director under this section.


114°30'0"W
114°0'0"W
113°30'0"W
37°30'0"N
37°0'0"N
36°30'0"N
NEVADA
UTAH
Lincoln Co.
Washington Co.
Mohave Co.
ARIZONA
15
SOURCES
Landsat 5 TM image acquired January 20, 2006.
VVWD Wells and easements are from the VVWD.
ADWR Wells from AZ Dept. of Water Res (9/2006).
Prepared By: TerraSpectra Geomatics
Date Prepared: February 5, 2007
Projection: UTM, Zone 11, NAD83/GRS80
Nevada
Utah
Calif.
Arizona
Location Map
PROPOSED PIPELINE ALIGNMENT CONNECTING
WIND RIVER TO VVWD DISTRIBUTION SYSTEM
Miles
0 2 4 6 8 10
1:600,000
Production, Existing
BR, Existing
Aquifer Test, Existing
ADWR Wells
Existing Pipeline
Proposed Pipeline Alignment
Highway
TSG-07015