IN THE SUPERIOR COURT OF THE STATE OF ARIZONA
IN AND FOR THE COUNTY OF MARICOPA

IN RE THE GENERAL ADJUDICATION OF ALL RIGHTS TO USE WATER IN THE GILA RIVER SYSTEM AND SOURCE	W-1 (Salt) W-2 (Verde) W-3 (Upper Gila) W-4 (San Pedro) (Consolidated) Contested Case No. W1-103 ORDER GRANTING MOTION TO STRIKE

CONTESTED CASE NAME: *In re San Pedro Subflow Technical Report.*

HSR INVOLVED: San Pedro River Watershed Hydrographic Survey Report.

DESCRIPTIVE SUMMARY: Order granting Motion to Strike Testimony of Robert Harding and related exhibits.

NUMBER OF PAGES: 7

DATE OF FILING: May 29, 2018

On March 12, 2018, the Gila River Indian Community filed a Motion to Strike the Testimony of Robert Harding and Related Exhibits ("Motion") on the grounds that the testimony about a group of wells considered in *Maricopa County Municipal Water Conservation Dist. No. 1 v. Southwest Cotton Co.*, 39 Ariz. 65, 4 P. 2d 369 (1931), *reh'g denied and opinion modified,*

39 Ariz. 367, 7 P. 2d 254 (1932) is not relevant to the determination of the appropriate methodology to adopt for cone of depression testing. On March 26, 2018, the Arizona State Land Department filed its Response, joined by Freeport Minerals Corporation on March 29, 2018.

The purpose of this proceeding is to choose the appropriate groundwater methodology to test whether a well in the San Pedro River watershed may have a current or future depletive effect on the stream for the purposes of establishing the court's jurisdiction over that well to adjudicate water rights based on state law. Significant amounts of evidence about three proposed methodologies were presented at trial: MODFLOW, Aquifer^{WIN}, and the Jacob Non-equilibrium Equation with an Image Well ("Jacob Equation"). The evidence in dispute is relevant if it has any tendency to make the validity of the proposed methodologies more or less probable than would be the case without the evidence and it is of consequence to deciding the issue in dispute. Rule 401, Ariz. R. Evid.

Over the objections of Salt River Project and San Carlos Apache Tribe and Tonto Apache Tribe, [1] Mr. Harding testified about the two reports he prepared applying the Thiem equation and Aquifer^{WIN} to six *Southwest Cotton* wells located in a watershed many miles from the San Pedro watershed. [030618:67 (Harding)] He provided no testimony or analysis of the use of MODFLOW. Prior to the issuance of its final report, ADWR rejected the use of the Thiem equation as a methodology to determine the cone of depression impact. As the use of the Thiem equation was not under consideration, the testimony and report related to the Theim equation offered by Mr. Harding has no probative value to the decision of whether to adopt MODFLOW,

[1] At the trial, Salt River Project, joined by the San Carlos Apache Tribe and Tonto Apache Tribe, re-urged its motion in limine to preclude the testimony of and exhibits related to Mr. Harding, which had been denied on narrow grounds and a broad reading of Rule 401, Ariz. R. Evid. [030618:49]

Aquifer^{WIN}, the Jacob Equation, or some combination thereof, and is therefore not relevant. In contrast, the possible use Aquifer^{WIN} was at issue. Thus, Mr. Harding's analysis of six high-volume, irrigation wells using Aquifer^{WIN} is relevant if it is probative of whether Aquifer^{WIN} provides results that have a high degree of reliability mandated by the Arizona Supreme Court in *In re the General Adjudication of All Rights to Use Water in the Gila River System and Source*, 198 Ariz. 330, ¶48, 9 P.3d 1069, 1083 (2000), *cert. denied sub nom. Phelps Dodge Corp. v. U.S.*, 533 U.S. 941 (2001) ("*Gila IV*").

The first question is whether Mr. Harding properly applied Aquifer^{WIN} to the Agua Fria River watershed. Aquifer^{WIN} requires correct data with respect to two distances: (1) the distance from the well to the subflow zone boundary; and (2) the distance from the well to the source of recharge. [030518:28 (Trembly)] Mr. Harding, a geologist by training, testified about how he set the boundaries of the subflow zone of the Agua Fria River based on his review of the mapping of the Arizona Geological Survey in the area. [030618:63 (Harding)] With respect to the second distance, despite recognizing that the distance between the well and the source of recharge affects the development of a cone of depression [030618:109 (Harding)], Mr. Harding apparently elected or was directed to not make any study as to the appropriate source of recharge to the irrigation wells in relevant area of the Agua Fria watershed. Instead, Mr. Harding used the Agua Fria River as the source of recharge because ADWR had used the San Pedro River as the source of recharge in its final report.[2] [030618: 68-69, 70 (Harding)] In the absence of evidence about such fundamental facts, the results generated have questionable validity.

Assuming that Mr. Harding made a legally and physically correct determination of the boundaries of the subflow zone of the Agua Fria River and the Agua Fria River is the primary

[2] In a supplemental report, ADWR also presented results based on mountain front recharge and recharge from the river.

source of recharge in the watershed, the second issue is whether the evidence that the chosen six wells may at some point cause a drawdown in the subflow zone are probative of the validity of Aquifer^{WIN} . The Arizona State Land Department, joined by Freeport Minerals Corporation, has argued that the results prove that Aquifer^{WIN} is not a valid methodology because the results are contrary to the decision in *Southwest Cotton.* In *Southwest Cotton,* the Court determined the plaintiffs had no rights by reason of appropriation to water from an unspecified group of wells "not in or immediately adjacent to the bed of the Agua Fria river." *Southwest Cotton* at 101, 4 P. 2d at 382.

The *Southwest Cotton* decision has unquestionably served as a touchstone against which subsequent decisions in this adjudication have been made. It, however, should not be stretched to apply beyond its actual holdings. *Southwest Cotton* arose from an action brought to enjoin a neighboring water user's actions to divert and store water in an effort to protect the plaintiffs' well fields from immediate, irreparable harm. The issue before the Court was whether the plaintiffs' wells were currently pumping subflow. Here, the question is much broader: Do the wells now or will they in the future due to their theoretical, maximum cones of depression pump subflow? As Mr. Harding recognized, cones of depression change over time. [030618:109 (Harding)] Factual findings made in *Southwest Cotton* about the impact of those wells more than 80 years ago should not be considered determinative of their impact today or in the future and used to validate or invalidate the results generated by Aquifer^{WIN} that the maximum, theoretical cones of depression of high production agricultural wells pumping thousands of acre-feet of water per year[3] would eventually impact Mr. Harding's determination of the subflow boundaries.

[3] 620 gallons per minute = 1000 acre-feet per year.

The Arizona Supreme Court has cautioned that subflow analysis in *Southwest Cotton* "should not serve as a straitjacket that restricts us from reaching in the direction of the facts and, so far as possible under those decisions, conforming to hydrological reality." *Gila IV* at ¶27, 1079. The test for a well's inclusion in the adjudication does not depend upon whether the location of the well is in or immediately adjacent to a particular river bed. The Arizona Supreme Court has explicitly stated that "all wells located outside the subflow zone that are pumping water from a stream or its subflow, as determined by DWR's analysis of the well's cone of depression, are included in this adjudication." *Id.* at ¶48, 1083. No longer is there an implicit assumption that distance alone determines impact. As the science of hydrology has advanced, the law has followed becoming more sophisticated in its analysis and testing requirements. Thus, the fact that the Aquifer^{win} results for the six wells included in Mr. Harding's report show the wells may impact the subflow zone does not invalidate Aquifer^{win} simply because the Court determined that the wells did not pump subflow more than 80 years ago solely based on the location of the wells.

Even assuming that distance between the well and the subflow zone were the appropriate test (distance is actually only one of a set of multiple variables), the Aquifer^{win} results for the six selected wells does not aid in the determination of the appropriate methodology. All three methodologies incorporating mountain front recharge, including the methodology advocated by the expert called by Freeport Minerals Corporation, would very likely have included in this adjudication similar wells pumping at the high volumes reported for the *Southwest Cotton* wells located at longer distances from subflow zone boundary, assuming similar transmissivity values. As shown in Table 1 below, the six wells selected for study pumped at rates ranging from 270 to 862 gallons per minute and were located from 9,545 feet to 29,827 feet from the designated subflow zone boundary. Exh. FMC 0027, Table 1. In its supplemental report, ADWR tested

nine wells that pumped more than 100 gallons per minute located from 3,100 to more than 56,000 feet from the subflow zone. Each of the nine wells caused more than a 0.1 foot drawdown at the subflow zone boundary under each methodology. *See* Table 1.

Southwest Cotton Well No.	Pumping Rate	Distance from Subflow Zone	ADWR Well No.	Pumping Rate	Distance from Subflow Zone
			28	129.4	3,858
			32	176.4	44,202
			33	176.4	45,338
16-C	270	9,573	34	176.4	45,809
16-A	307	9,545	35	176.4	46,485
9-B	440	13,440	38	190.5	50,997
36-B	591	28,015	4	390.7	3,155
25-C	852	29,306	7	395.8	3,054
24-B	862	29,827	39	399.9	56,497

Table 1.
Sources: Exh. FMC 0027, Table 1; ADWR Supplemental Report, Table 1; ADWR Demonstration Project Report, Table 3-1.

Finally, and very tellingly, in Mr. Harding's scientific opinion, the Aquifer^{win} testing results for the six wells are not relevant to the determination of the appropriate choice of methodologies:

> Q. So if the purpose of this proceeding is for the Court to decide between competing methodologies, your report is really not of any utility in making that determination, is it?
>
> A. No, it is not.

[030618:108 (Murphy; Harding)]

Accordingly, based on the foregoing reasons the testimony and exhibits at issue presented at trial did not assist the trier of fact to understand the evidence regarding the validity and reliability of Aquifer^{win} or to make a determination as to the appropriate groundwater model to be used to evaluate a well's maximum cone of depression to establish the court's jurisdiction,

IT IS ORDERED granting the Motion and striking the testimony of Mr. Robert Harding and exhibits FMC 0016, FMC 0027 and FMC 0029.

Susan Ward Harris
Special Master

A copy of this order is mailed to all persons listed on the Court-approved mailing list for contested case no. W1-103.

Barbara Brown
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