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9 **BEFORE THE ARIZONA NAVIGABLE STREAM**  
10 **ADJUDICATION COMMISSION**

11 In re Determination of Navigability of the ) No. 03-007-NAV  
12 Gila River )  
13 ) **SALT RIVER PROJECT'S**  
14 ) **OPENING POST-HEARING**  
15 ) **MEMORANDUM**

16  
17 The Salt River Project Agricultural Improvement and Power District and Salt River  
18 Valley Water Users' Association (collectively, "SRP") submit their opening post-hearing  
19 memorandum regarding this Commission's determination of whether the Gila River was  
20 "navigable" when Arizona became a state on February 14, 1912. A table of contents appears  
21 on the following page. Section III of this memorandum summarizes the evidence presented to  
22 the Commission at and before its hearings held on October 14, 2003 (in Safford); October 15,  
23 2003 (in Clifton); March 9, 2004 (in Florence); November 15, 2004 (in Globe); January 24,  
24 2005 (in Yuma); and November 16 and 17, 2005 (in Phoenix). Section IV presents SRP's  
25 legal and factual arguments.

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1 **I. INTRODUCTION**

2 The Gila River's lack of navigability is illustrated by, among other things, two  
3 historical accounts of the river, separated by almost one hundred years. The first account was  
4 by John R. Bartlett of the United States Army Corps of Topographical Engineers in 1854. Mr.  
5 Bartlett, who worked on surveying the boundary between the United States and Mexico from  
6 1850 to 1853 and subsequently "prepared a two-volume report that was essentially a travel  
7 book," stated: "**It is doubtful whether [the Gila River] can ever be navigated, except at its**  
8 **floods, and these are by no means regular.** At such times [i.e., during irregular floods,] flat-  
9 bottomed boats might pass to the mouth of the Salinas [Salt River], near the Pima villages."<sup>1</sup>

10 The second account comes from Christmas 1944, when a group of German POWs  
11 escaped from a World War II prison camp at Papago Park in Phoenix. Three of those  
12 escapees carried a homemade boat they hoped would float them down the Gila River to  
13 freedom by way of Mexico. Their expectations of navigability, based upon a blue line on a  
14 Conoco gas station map, were erroneous:

15 Several miles downstream from their "island," now no longer surrounded  
16 by water, they tried to launch the boat, but once they put their gear in, it just sat  
17 there, resting on the bottom. "There simply was not enough water in the mighty  
18 Gila to float our tiny craft," Clarus recalls with a grin. "It was one of those  
19 frustrating moments in life when you don't know whether to laugh, cry, swear or  
20 kick the ground in disgust. All that work for nothing!"

20 During that night and the next they tried to use the boat, tugging it along  
21 behind them like some huge toy. Occasionally they would find a short section  
22 of the river with sufficient water to float the craft, then they would have to carry  
23 the boat, their pack, everything around a dam to another stretch of water, often  
24 too shallow for their purposes. At last they gave up, destroyed the boat and set  
25 out on foot for Yuma. "**We should have known," Clarus says, "that the Gila**

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24 <sup>1</sup> Fuller, et al., Arizona Stream Navigability Study for the Upper Gila River, Safford to the State  
25 Boundary, and San Francisco River, Gila River Confluence to the State Boundary 3-14 (June 2003)  
26 (EI 2) ("SLD/Upper") (emphasis added); see also *id.* at 5, 8-4. To distinguish between the two reports  
27 submitted by the State Land Department ("SLD") for the Gila River, this memorandum refers to the  
report on the Upper Gila River as "SLD/Upper" and to the report on the Lower Gila River as  
"SLD/Lower." See Fuller, et al., Arizona Stream Navigability Study for the Gila River: Colorado  
River Confluence to the Town of Safford (June 2003) (EI 4) ("SLD/Lower").

1           **wasn't much of a river. Of course, everyone who lives in Arizona knows**  
2           **that. We didn't."**

3 Moore, The Faustball Tunnel: German POWs in America and Their Great Escape 196 (1978)  
4 (EI 13) (emphasis added).

5           These accounts, coming more than fifty years before and more than thirty years after  
6 statehood, highlight the many reasons the river would not be navigated. The Gila has a  
7 braided channel and variable flows. See Section III(B), infra. The river is not, was not in  
8 1912, and never has been used or susceptible to being used as a "highway for commerce."  
9 The evidence submitted prior to and at the Commission's hearings supports a finding of "non-  
10 navigability," and no credible evidence was presented to support a finding that the river is  
11 now or ever was "navigable." SRP requests that the Commission find the river "non-  
12 navigable."

## 13 **II. THIS COMMISSION'S TASK**

14           This Commission has exclusive jurisdiction to determine which, if any, Arizona  
15 watercourses were "navigable" on February 14, 1912. See A.R.S. § 37-1123(G). The  
16 Commission's statutory obligation for determining navigability is relatively succinct:

17           If the preponderance of the evidence establishes that the watercourse was  
18 navigable, the commission shall issue its determination confirming that the  
19 watercourse was navigable. If the preponderance of the evidence fails to  
20 establish that the watercourse was navigable, the commission shall issue its  
determination confirming that the watercourse in question was nonnavigable.

21 A.R.S. § 37-1128(A). The statute defines "navigable" or "navigable watercourse" as:

22           A watercourse that was in existence on February 14, 1912, and at that time was  
23 used or was susceptible to being used, in its ordinary and natural condition, as a  
24 highway for commerce, over which trade and travel were or could have been  
conducted in the customary mode of trade and travel on water.

25 Id. § 37-1101(5).

26           The statutes provide that the proponents of navigability have the burden of proof. In  
27 order for the Commission to determine that a particular watercourse is "navigable," the

1 proponents of navigability must establish that fact by the “preponderance of the evidence.”  
2 See A.R.S. § 37-1128(A). If sufficient evidence is not presented to show navigability for a  
3 particular watercourse, the Commission must find the watercourse non-navigable. Under the  
4 “preponderance of the evidence” standard, “a party who has the burden of proof must  
5 persuade you, by the evidence, that the claim is probably more true than not true.”  
6 Recommended Arizona Jury Instructions (Civil) Standard 9 (1997). “Preponderance of the  
7 evidence” requires “[e]vidence which is of greater weight or more convincing than the  
8 evidence which is offered in opposition to it; that is, evidence which as a whole shows that the  
9 fact sought to be proven is more probable than not.” Black’s Law Dictionary 1064 (5th ed.  
10 1979).<sup>2</sup>

### 11 **III. REVIEW OF THE EVIDENCE IN THE RECORD**

12 This Commission solicited and received voluminous evidence with respect to the  
13 navigability of the Gila River. The Commission held six hearings, in six different county  
14 seats, over the course of more than two years. The transcript of the November 2005 Phoenix  
15 hearing alone consists of 607 pages.<sup>3</sup> This memorandum discusses the historical, hydrologic,  
16 geomorphic, and other evidence in the record.

#### 17 **A. History of the Gila River**

18 None of the historical evidence introduced in this proceeding supports a finding of  
19 navigability. To the contrary, all of the credible evidence weighs in favor of non-navigability.

#### 20 **1. The prehistoric Gila River**

21 The report submitted by the SLD’s consultants, and their hearing testimony, provide  
22 evidence regarding the condition of the Gila River in the period before settlement by non-  
23 natives. One SLD report states that “it is known that the Gila River played a major role in the

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24 <sup>2</sup> See also generally Maricopa County Juvenile Action No. J-84984, 138 Ariz. 282, 283, 674 P.2d 836,  
25 837 (1983) (quoting Cole v. Town of Miami, 52 Ariz. 488, 497, 83 P.2d 997, 1001 (1938)) (“the  
26 ultimate test is, does the evidence convince the trier of fact that one theory of the case is more  
probable than the other”); Hewett v. Industrial Comm’n, 72 Ariz. 203, 209, 232 P.2d 850, 854 (1951).

27 <sup>3</sup> “Tr. at [date: page]” refers to the Reporter’s Transcript of the November 2005 hearing. For instance,  
“Tr. at 17:1” would refer to page 1 of the transcript from November 17, 2005.



1 human settlement patterns and occupational successes of prehistoric development within the  
2 study area.” SLD/Upper, supra, at 2-3; see also SLD/Lower, supra, at III-20. “[M]ost of the  
3 prehistoric habitations in the study area were close to the river.” SLD/Upper, supra, at 3; see  
4 also id. at 2-18, 2-19. Yet, despite the concentration of prehistoric population on the banks of  
5 the river, “[a]rchaeological research has not documented any use of the river for commercial  
6 trade and travel or any regular flotation of logs” on the river. Id. at 3, 2-23, 8-2. In fact, no  
7 evidence was presented to the Commission to support the existence of **any** prehistoric use of  
8 boats on the river (commercial or otherwise) or **any** flotation of logs (regular or irregular).

9 **2. Historic Indian use of the river**

10 The evidence shows that native inhabitants also did not use the river for navigation  
11 during recorded history. Allen Gookin, testifying on behalf of the Gila River Indian  
12 Community through whose reservation the Gila River directly flows, stated that he was aware  
13 of no evidence that any Indians residing in the area ever used canoes or other watercraft on the  
14 river. See Gookin, Presentation to Arizona Stream and Navigability Commission 3  
15 (November 16, 2005) (EI 15); Tr. at 16:227 (Gookin). “[T]he Pimas lived on both sides of the  
16 river for extensive distances.” Gookin, supra, at 3. They engaged in trade with various  
17 groups of Indians and non-Indians located all along the river. Id. Their mode of  
18 transportation was to run on foot beside the river. Id. If the river had been navigable, it surely  
19 would have been easier, faster, and more efficient for the Pimas to use boats to travel rather  
20 than to run these long distances.

21 None of the other evidence detracts from Mr. Gookin’s testimony. The SLD’s  
22 consultants, for instance, noted that the Chiricahua Apaches, another tribe residing in the area  
23 of the Gila River, “were know to construct boats made of bull hides stretched over wooden  
24 frame for crossing streams,” but no evidence exists that these Apaches ever used such boats  
25 on the Gila River. SLD/Upper, supra, at 5; see also Tr. at 16:67-68 (Gilpin).

26 ...

27 ...

1                   **3.     Early non-Indian exploration of the area**

2                   The evidence is also indisputable that early forms of non-Indian transportation along  
3 the Gila River were limited to horses, mule trains, wagons, and stagecoaches. See  
4 SLD/Upper, supra, at 3-1, 3-25; SLD/Lower, supra, at IV-64. No evidence exists that any of  
5 the early explorers who ventured into the Gila River Valley ever used the Gila River as a  
6 regular means of transportation or commerce. Instead, they traveled on horseback or on foot.  
7 See SLD/Upper, supra, at 4; Tr. at 16:68-69 (Gilpin). This is true despite the fact that many of  
8 these same explorers are known to have used canoes, rafts, and other watercraft when they  
9 reached the navigable Colorado River on these same expeditions. See SLD/Upper, supra, at  
10 4; see also id. at 3-1 (“Although these trappers constructed canoes and rafts to use on the  
11 Colorado River, they apparently did not float the upper Gila and San Francisco rivers.”); id. at  
12 8-2.

13                   **4.     Federal land surveys and patents**

14                   Another group of individuals who were present along the Gila River at a relatively  
15 early date were the federal land surveyors who were responsible for conducting the  
16 rectangular survey in the new territory. Dr. Douglas Littlefield testified regarding surveys on  
17 the lower portion of the river (downstream from the Salt River confluence) at the November  
18 2005 hearing. Each of these surveyors was under specific instructions to distinguish between  
19 navigable and non-navigable streams. See Littlefield, Assessment of the Navigability of the  
20 Gila River Between the Mouth of the Salt River and the Confluence with the Colorado River  
21 Prior to and on the Date of Arizona’s Statehood, February 14, 1912 10-20 (November 3,  
22 2005) (EI 12); Tr. at 16:128 (Littlefield). None of these Government representatives ever  
23 indicated that the Gila River was navigable: “[W]hile those surveys were done at varying  
24 times of the year, in different years, and by several individuals, all of the descriptions and  
25 plats from this work consistently portrayed the Gila River as being a non-navigable stream.”  
26 See Littlefield, supra, at 55.

1 Similarly, the federal and state land patents issued along the river are persuasive  
2 evidence of non-navigability. The Federal Government granted over ninety-five separate  
3 patents that touched or overlay the lower portion of the Gila River (below the Salt River  
4 confluence) to private individuals. See Littlefield, supra, at 88; Tr. at 16:135 (Littlefield). In  
5 not one case did any of those patents (or the supporting patent files) indicate that acreage was  
6 being withheld because the river was navigable. See Littlefield, supra, at 88; Tr. at 16:135  
7 (Littlefield). Dr. Littlefield, summarizing his conclusions based upon hundreds of hours of  
8 historical research from a wide variety of sources (including survey records, land patents,  
9 other government documents, and newspapers), stated: “From this wealth of information,  
10 covering a huge array of documentary sources only one conclusion can be reached: The Gila  
11 River was not navigable or susceptible of navigation on or before February 14, 1912.”  
12 Littlefield, supra, at 136.

#### 13 **5. Attempts to boat the river prior to statehood**

14 Additional evidence in support of a finding of **non-navigability** comes from the  
15 accounts of the Gila River in the decades prior to statehood, including the early accounts of  
16 attempts by an ambitious few to actually float boats on the river. The evidence shows the  
17 calamitous record of those few brave souls who actually did attempt to navigate the river  
18 between 1846 and 1909. The SLD’s reports discuss fourteen accounts of attempts to boat the  
19 river before statehood. SLD/Lower, supra, at IV-2 to IV-14; SLD/Upper, supra, at 3-27 to 3-  
20 29. Those attempts are addressed in detail in Appendix A attached hereto. This scattered  
21 collection of boating expeditions on the river does not provide evidence that the Gila River is  
22 “navigable” as defined in A.R.S. § 37-1101(5). To the contrary, these fourteen accounts not  
23 only are insufficient to satisfy the navigability proponents’ burden of proof under A.R.S. § 37-  
24 1128(A), they are persuasive evidence that the river was **non-navigable**, for several reasons.

25 First, the accounts of attempted boating consist mostly of anecdotal evidence from  
26 local newspaper articles. These articles do not provide a sufficient basis to support a finding  
27 of navigability. For example, one newspaper article was written the day before the supposed

1 boating trip (Account 5) was to occur on the Salt and Gila Rivers, but there was no article or  
2 any other record corroborating that the trip actually occurred. See SLD/Lower, supra, at IV-7.  
3 The only record of another boating account (Account 3) is based upon an unsigned letter to an  
4 out-of-state newspaper claiming that travelers along the Gila River used boats to reach the  
5 Colorado River, but it is unclear the time of year this took place or the distance that these  
6 travelers were from the Colorado River. See id. at IV-3. The evidentiary basis for each of the  
7 boating “attempts” reported only in newspaper articles is shaky, to say the least.<sup>4</sup>

8         Second, and perhaps more important, the accounts of attempted boating on the river are  
9 so full of mishaps and misery that they themselves prove that the river was not used or  
10 susceptible to being used as a “highway for commerce.” On at least two occasions (Accounts  
11 11 and 13), the parties could not launch the boats on the Gila River. See id. at IV-13. During  
12 one account (Account 12) the boat capsized, losing much of its cargo. Id. In two other  
13 instances (in Accounts 1 and 8), the boats went aground or were badly damaged. Id. at IV-2,  
14 IV-8. A trip that occurred in November 1881 (Account 6) on a boat called “Yuma or Bust”  
15 appears to have “busted” as the participants were “wading in water up to their knees” and had  
16 to push their boat much of the time. Id. at IV-7.

17         Third, the only recorded opinions on navigability by the participants themselves show  
18 that the river was not suitable as a “highway for commerce.” For example, in G.W. Evans and  
19 Amos Adams’ trip from Clifton along the San Francisco River and then down the Gila River  
20 to Riverside (Account 8), Evans called the trip along the Gila River “a torturous route” as he  
21 made his way through the rapids and falls of a canyon. Id. at IV-8. Evans concluded that “I  
22 would not engage to make the trip down (the Gila’s) hazardous waters again.” Id.

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24  
25 <sup>4</sup> These newspaper reports must also be considered in the context of the nature of 19th century  
26 Western newspapers, which often acted not only as reporters of news but also as “boosters” for the  
27 local community in an effort to attract settlers to growing towns. See Littlefield, supra, at 110-12.  
These early newspapers had substantial incentive to exaggerate the benefits of their local  
communities. Id. at 112.

1 Finally, the other boating accounts relate to ferries that are known to have operated at  
2 some times on the Gila River. The records of ferries (Accounts 4, 7, and 10) provide evidence  
3 that ferries were used only to cross the river, as opposed to travel upstream and downstream.  
4 See Appendix A. Beginning in 1867, Morgan's Ferry operated near Maricopa Wells. See  
5 SLD/Lower, supra, at IV-5. Later, in 1891, a ferry operated by the Straus, Dallman & Co. was  
6 used to cross the river. Id. at IV-8. In 1905, there were three other ferry boats that were also  
7 operated on the river. Id. at IV-13.

8 All of the ferries were used to traverse the river, serving as the functional equivalent of  
9 a bridge. See, e.g., North Dakota v. United States, 770 F. Supp. 506, 511 (D.N.D. 1991),  
10 aff'd, 972 F.2d 235 (8th Cir. 1992) (evidence of ferries used to provide crossings on the river  
11 have the functional equivalent of bridge and do not establish the river as a channel for useful  
12 commerce; rather, they establish that the river is an obstruction to commerce which must be  
13 overcome); see also United States v. Crow, Pope & Land Ents., Inc., 340 F. Supp. 25, 35  
14 (N.D. Ga. 1972) ("the existence of ferries is no more an example of commercial use than the  
15 presence of a bridge or railroad trestle whose primary purpose is to avoid the river rather than  
16 employ it as a means for trade and transportation.").

17 The fourteen accounts of boating on the Gila River over the course of sixty-three years  
18 are not sufficient to satisfy the burden of proof for navigability and, in fact, they prove just the  
19 opposite. People generally met with disastrous consequences, with some people losing their  
20 supplies, damaging their craft, or never even launching the boat. These ill-fated attempts  
21 show that the Gila River is not and never has been "navigable." Furthermore, the use of  
22 ferries to cross the river does not demonstrate that navigation along the stream occurred or  
23 could have occurred.

#### 24 **B. Hydrology and Geomorphology of the Gila River**

25 The other evidence presented to the Commission is similarly insufficient to constitute a  
26 "preponderance of the evidence" in favor of navigability. The hydrologic evidence shows that  
27 the river was erratic and never included sufficient flows to support a "highway for

1 commerce.” The geomorphic evidence shows that the river was braided in long reaches and  
2 also contained bedrock controls, including numerous rapids, that would be natural  
3 impediments to navigation.

4 **1. Hydrologic evidence**

5 The hydrologic information submitted to the Commission does not support a finding of  
6 navigability. There were few stream gauge records available for this reach of the river at or  
7 before statehood. See SLD/Upper, supra, at 5-19. The first flow data on the upper portions of  
8 the river, for instance, was gathered in 1899. See SLD/Upper, supra, at 5-16; SLD/Lower,  
9 supra, at VI-4. This was a one-day reconnaissance trip, and no continuing data was recorded.  
10 See SLD/Upper, supra, at 5-16.

11 The SLD’s reports rely primarily upon average annual flow data collected after  
12 statehood. The reports themselves acknowledge that data regarding “average” conditions is of  
13 dubious value for purposes of determining whether a river is navigable, however:

14 It is important to note that the flow characteristics presented in Table 23  
15 represent the average condition at discrete points along the study reaches. There  
16 is no doubt that there will be reaches which have obstacles such as broad  
17 shallow areas, sand bars, rapids, and irrigation diversions which, at certain  
18 discharges, will have significantly different flow characteristics. These  
19 conditions may, in some cases, preclude or at least hinder the use by any boat,  
20 especially for travel in the upstream direction.

21 SLD/Upper, supra, at 5-45. Knowing the average annual flow of an erratic stream like the  
22 Gila River provides little information about whether that river is or ever was navigable.<sup>5</sup>

23 Even if the Commission finds the “average annual flow” information to be important,  
24 that information does not support a finding of navigability. A document compiled and  
25 submitted by SRP, Information Regarding Navigability of Selected U.S. Watercourses (April  
26 2003) (“Watercourse Information”), contains information on every federal or state court  
27 decision SRP could locate in which the “navigability” of a river was actually determined.

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<sup>5</sup> For the same reasons, knowing (or estimating) the “average depth” of a river is likewise of limited value to determining whether it was “navigable.”

1 Appendix B attached hereto summarizes the annual mean (average) flow information,  
2 compiled by the United States Geological Survey, for each of the twenty-one watercourses  
3 discussed in that document.

4 The SLD's consultants estimated the average annual flow of the Upper Gila River,  
5 without considering the presence of any dams or diversion structures, at 200 to 439 cubic-feet  
6 per second ("cfs"). See SLD/Upper, supra, at 7, 5-32. The SLD report for the Lower Gila  
7 River does not contain a similar estimated flow number for that reach, but it does report a pre-  
8 statehood average monthly flow of 1,277 cfs at the downstream gauging station at Dome. See  
9 SLD/Lower, supra, VI-4.<sup>6</sup>

10 Four of the twenty-one watercourses listed in Appendix B have been found  
11 "navigable," in whole or in part, by a state or federal court. Of those four "navigable"  
12 watercourses, the lowest annual average flow is 2,277 cfs—for the Great Miami River in  
13 Ohio, which was found navigable in part and non-navigable in part. See Appendix B. The  
14 other three "navigable" watercourses had average annual flow rates of 7,316 cfs (the Colorado  
15 River in Utah), 6,930 cfs (the Green River in Utah), and 4,066 cfs (the McKenzie River in  
16 Oregon). Id. Six rivers that courts have specifically determined to be non-navigable (the  
17 Arkansas River in Oklahoma, the Chattahoochee River in Georgia, the Little River in  
18 Arkansas, the Neosho River in Kansas, the Red River on the border between Oklahoma and  
19 Texas, and the Rio Grande) have average annual flow rates higher than those estimated for the  
20 Gila River. See Appendix B; see also Watercourse Information, supra.

21 The evidence also shows that the Gila River is "susceptible to wide seasonal and  
22 annual variations in discharge rates." SLD/Upper, supra, at 8. The SLD's consultants

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23  
24 <sup>6</sup> Dr. Hjalmar Hjalmarson, a hydraulic engineer and hydrologist retained by the Flood Control District  
25 of Maricopa County ("County") assumed, based upon estimates of predevelopment upstream flows,  
26 that the flow of the river downstream from the Salt River confluence "typically was at least 1,750 cfs  
27 for 50% of each year." See Hjalmarson, Navigability Along the Natural Channel of the Gila River 15  
(October 25, 2002) (EI 23) ("Hjalmarson Report"). This number, even if it were correct, still appears  
to be substantially below the reported average flow of any river that any court has ever found  
navigable.

1 estimated minimum monthly average flows for the Upper Gila, for example, to range from 15  
2 to 100 cfs. Id. at 7, 5-32. This low flow contrasts with irregular floods that create up to  
3 140,000 cfs in flow. See SLD/Upper, supra, at 5-46; see also id. at 3-22 to 3-23 (describing  
4 torrential floods in the Clifton area in the 1870s, 1880, 1891, 1903, 1905, 1906, and 1916);  
5 SLD/Lower, supra, at IV-42 (describing 1891 flood).

## 6 **2. Geomorphic evidence**

7 The geomorphologic evidence in the record also refutes, rather than supports, a finding  
8 of navigability. Substantial portions of the river prior to statehood, especially in the lower  
9 portions of the river below the Salt River confluence, consisted of a braided channel. Such  
10 channels are associated with sand bars and other impediments to navigation. See Schumm,  
11 Geomorphic Character of the Lower Gila River 3 (June 2004) (EI 6) (“Schumm”).  
12 Geomorphologist Dr. Stanley Schumm presented a written report and testified at the  
13 November 2005 hearing regarding the geomorphology of the lower portion of the river. In his  
14 report, Dr. Schumm stated that “[t]he Gila River is characterized by inherent instability and  
15 frequent and destructive channel migration.” Id. at 3. Dr. Schumm concluded that, in part  
16 due to the large floods that occurred in 1905 and 1906, the “[g]eomorphic and hydrologic  
17 evidence demonstrates that on February 14, 1912 the lower Gila River was not navigable.” Id.  
18 at 16; see also Tr. at 17:17 (Schumm).

19 Dr. Schumm’s statements regarding the braided nature of the river channel are  
20 consistent with information included in the SLD’s reports and the specific findings of Dr.  
21 Huckleberry, the SLD’s geomorphologist. According to the SLD’s report, environmental  
22 reconstructions for the Gila River Valley show that the river has been braided through most of  
23 its existence. Evidence of braiding exists back as early as 798-899 A.D. See SLD/Lower,  
24 supra, at III-23. According to that evidence, the river varied between a bar-braided channel  
25 and an island-braided channel from 798 A.D. to 1500 A.D. Id.

26 Dr. Huckleberry reported that the river has experienced “alternating periods of channel  
27 stability and instability, and specifically, changes in channel form (e.g., braided vs.



1 meandering)” during the past 10,000 years. SLD/Lower, supra, at VII-2. “Periods of  
2 increased large flood frequency are more likely to be associated with wide, braided channel  
3 conditions on the Gila River.” Id.; see also Tr. at 16:56-57 (Huckleberry). Dr. Huckleberry  
4 concluded:

5           The Gila River is a classic example of a dryland river that seldom seeks  
6 equilibrium form. Unlike rivers in humid regions that have more stable  
7 channels adjusted for more continuous streamflow with less variance in  
8 discharge, the dryland rivers are inherently more unstable and more prone to  
9 changes in channel configuration. . . . [A] basic premise of this study is that the  
10 Gila River responds to secular climatic variability by radical changes in channel  
configuration, and that periods of increased, large flood frequency correlate with  
unstable, braided channel conditions.

11 SLD/Lower, supra, at VII-10.

12           These conclusions that at least large parts of the Gila River consist of a braided channel  
13 are also supported by early anecdotal descriptions of the river. In 1899, for instance, the bed  
14 of the river was described as “sandy and shifting.” See SLD/Lower, supra, at IV-9. That  
15 same 1899 account stated that “[t]he channel of the (Gila) river at the buttes is composed of  
16 quicksand and likely to change daily with any considerable amount of water in the river.” Id.  
17 at IV-10.<sup>7</sup>

18           Although Dr. Schumm did not address the portions of the river above the Salt River  
19 confluence, the SLD’s consultants did. Those consultants reported that the bedrock geology  
20 of these portions of the river “made access to the river difficult during the period around  
21 statehood, prevented development of extensive irrigation systems, and prevented the  
22 development of large population centers near the river.” SLD/Upper, supra, at 4-18; see also  
23 Tr. at 16:60 (Fuller). These same conditions likewise limited any type of navigation on the  
24 upper reaches of the river.

25 \_\_\_\_\_  
26 <sup>7</sup> See also, e.g., id. at IV-12 (1904: “The bed of the stream is composed of sand and gravel, free from  
27 vegetation, and shifting.”); id. (1905: “At every flood the channel shifts.”); id. at IV-13 (1908: “the  
constantly shifting channel”); id. at IV-14 (1910: “The bed of the stream is composed of shifting sand  
and silt.”); id. (1910: “The bed of the stream is wide and composed of shifting sand”).

1 **IV. ARGUMENT**

2 The Commission must review all of the evidence and determine whether the Gila River  
3 was “navigable” on February 14, 1912. SRP submits that, when the Commission has  
4 considered the entirety of the evidence, it should and will find that no evidence supports a  
5 finding that the Gila River is or ever was used or susceptible to being used as a “highway for  
6 commerce.”

7  
8 **A. Based upon the Evidence in the Record, the Gila River is Not “Navigable”  
as Defined in A.R.S. § 37-1101(5).**

9 In its 2001 decision in Defenders of Wildlife v. Hull, the Arizona Court of Appeals  
10 stated that “all evidence should be examined during navigability determinations and no  
11 relevant facts should be excluded.” 199 Ariz. 411, 425, 18 P.3d 722, 736 (App. 2001).<sup>8</sup> “[A]  
12 river is navigable in law when it is navigable in fact.” Muckleshoot Indian Tribe v. FERC,  
13 993 F.2d 1428, 1431 (9th Cir. 1993). Thus, the Commission must consider all of the evidence  
14 in the record before it. When the Commission reviews the evidence, it must determine that  
15 the Gila River never has been used or susceptible to being used as a “highway for commerce,”  
16 regardless of how the Commission interprets the particular legal details of the test for  
17 “navigability.”

18  
19  
20 <sup>8</sup> It is important to note the procedural posture of the Court of Appeals’ decision in Hull. That court  
21 **did not** decide whether any particular watercourse was navigable. See 199 Ariz. at 430, 18 P.3d 741  
22 (Thompson, J., concurring in part, dissenting in part). Rather, the court was faced with deciding the  
23 constitutionality of the 1994 statute, which contained a variety of presumptions and evidentiary  
24 exclusions. The court considered each of the provisions of the 1994 statute as though it was an all-or-  
25 nothing proposition. For example, the Court stated: “[W]e conclude that a mandatory finding of non-  
26 navigability for watercourses that flow in direct response to precipitation, **although such a fact may**  
27 **be probative**, is contradictory to the *Daniel Ball* test.” Id. at 422, 18 P.3d at 733 (emphasis added).  
The court determined that the provisions of Section 37-1128 in effect under the 1994 statute created a  
“one strike and you’re out” test. The court found that these individual restrictions did not comply  
with the federal standard. The court recognized, however, that the Commission could and should  
consider most (if not all) of the factors contained in those statutes as part of the totality of the  
evidence in determining navigability. See id. at 425, 18 P.3d at 736. The Legislature simply could  
not require that each watercourse satisfy **all** of the factors in order to be navigable.

1           **1. The Gila River has never actually been used as a “highway for**  
2           **commerce.”**

3           A watercourse can meet the test for “navigability” under the Arizona statute and the  
4 case law if it satisfies either of two elements: (1) If it was actually used as a “highway for  
5 commerce,” or (2) if it was “susceptible to being used” as a “highway for commerce.” See  
6 A.R.S. § 37-1101(5); see also generally Elder v. Delcour, 263 S.W.2d 221, 226 (Mo. App.  
7 1953) (“As a general rule, the character of the commerce essential to navigability is that which  
8 is useful and has practical utility to the public. It is generally held that the stream must be  
9 navigable for some useful purpose, such as trade or agriculture, rather than for mere pleasure,  
10 and that the mere fact that waters have been used, or are capable of being uses, by small boats  
11 or pleasure craft, such as canoes, rowboats, small skiffs, or launches, does not of itself render  
12 them navigable.”) (citing 65 C.J.S., Navigable Waters, § 6, p. 54).<sup>9</sup>

13           It is beyond reasonable dispute that the Gila River has never been actually used as a  
14 “highway for commerce.” No evidence exists of any prehistoric boating or flotation of logs  
15 on the river. See Section III(A), supra. Likewise, no evidence exists that the early explorers  
16 or soldiers in the area near the river, who traveled through the area on several occasions, ever  
17 used the river—for “commerce” or otherwise. See id.; see also Lykes Bros., Inc. v. Corps of  
18 Eng’rs, 821 F. Supp. 1457, 1459 (M.D. Fla. 1993), aff’d 64 F.3d 630 (11th Cir. 1995) (court  
19 found that had river been navigable, it would seem obvious that military and settlers would  
20 have used the river to transport men and supplies rather than carrying them overland). The  
21 evidence of the isolated accounts of attempted boating on the river between 1846 and 1909,  
22 discussed in detail in Appendix A, does not establish that the river was used for any type of  
23 regular (or even periodic) trade or transportation during the period immediately before and at  
24 statehood. See id.

25  
26  
27 <sup>9</sup> The Commission has requested that the parties submit separate legal briefs on certain issues  
associated with the definition of “highway for commerce” by February 27. SRP intends to submit  
such a brief, which is incorporated herein by this reference, on or before that date.

1           The only witness who opined that the Gila River had actually been used as a “highway  
2 for commerce” at or before statehood was Donald Jackson, a history professor from Lafayette  
3 College in Pennsylvania retained by the County. Dr. Jackson filed no formal report with the  
4 Commission, but rather relied upon an eighteen-page Power Point presentation—a substantial  
5 portion of which consisted of an explanation of his layman’s view of various decisions by the  
6 United States Supreme Court. See Jackson, “Lower Gila River Navigability” (November 16,  
7 2005) (EI 21).

8           Dr. Jackson opines that the river was navigable at statehood based upon his cursory  
9 review of the historical evidence. See id. His opinion relies exclusively upon nine scattered  
10 pieces of spotty and often contradictory evidence:

11           1.       Dr. Jackson cites a statement by a member of the 1846 Kearney expedition that  
12 the river was “about 100 yards wide and flowing along a sandy bottom.” Id. at 8. Dr. Jackson  
13 fails to note, however, that the Kearney expedition itself traveled over land along the river and  
14 not by boat on the water.

15           2.       Dr. Jackson refers to anecdotal evidence that members of the Mormon Battalion  
16 in 1847 attempted to float down the lower reaches of the river by making a boat out of two of  
17 their wagons. Id. at 9. He largely ignores the documentary evidence, however, which clearly  
18 provides that the wagons “went aground on numerous occasions” and that the participants  
19 were “forced to jettison a portion of the cargo.” SLD/Lower, supra, at IV-2; see Tr. at 17:208  
20 (Jackson).

21           3.       Dr. Jackson discusses a purported trip of unknown length down the river in  
22 1849 by Mrs. Howard/Pancoast. See Jackson, supra, at 10. Dr. Jackson himself  
23 acknowledges that the details of the trip as reported in the source documents “are not always  
24 consistent,” however. Id.

25           4.       Dr. Jackson cites a letter sent from “Camp Salvation” to the *New York Tribune*  
26 in February 1850, which indicates that some undisclosed number of westward travelers had  
27 made use of boats on the Gila River. Id. at 10. Dr. Jackson does not state (and the record

1 does not otherwise indicate) the length of the trip or the location of “Camp Salvation.” See id.  
2 Dr. Jackson’s reliance upon this account also ignores that evidence in the record showing that  
3 February is typically a month of high runoff from precipitation events and snow melt.

4 5. Dr. Jackson relies upon an 1881 newspaper article stating that two persons  
5 (Cotton and Bingham) were “scheduled to leave the next day” on a trip down the Gila. See id.  
6 at 11. Even Dr. Jackson acknowledges, however, that no evidence exists that this trip actually  
7 occurred. See id.

8 6. Dr. Jackson cites the now-infamous “Yuma or Bust” episode, whereby Buckey  
9 O’Neil and others unsuccessfully attempted to float a boat down the Gila River to Yuma in  
10 1881. Id. Although Dr. Jackson acknowledges that “at times the boat had to be pushed by  
11 men wading in water ‘up to their knees,’” he insists that this account is evidence that the river  
12 was navigable at statehood. Id. at 12. In fact, Dr. Jackson testified that he considers **walking**  
13 when pushing a boat to be a part of navigation on a watercourse. See Tr. at 17:215 (Jackson).

14 7. As the “linchpin” for his opinion, Dr. Jackson relies upon an 1895 account of an  
15 attempt by Amos Adams and J.W. Evans to float a boat the entire length of the river. Id.; Tr.  
16 at 17:212-15 (Jackson). Dr. Jackson ignores the documented fact that the boat itself was  
17 badly damaged and that it was, in places, lowered by a 200-foot rope through rapids and  
18 between boulders. See SLD/Lower, supra, at IV-8. Although Dr. Jackson acknowledges that  
19 the actual participants in the trip stated that they would not do it again, he disregards their  
20 sentiments by concluding that their trip is evidence that the full length of the Gila River was  
21 susceptible to navigation. See Tr. at 17:215 (Jackson).

22 8. Dr. Jackson refers to a 1905 newspaper article about an attempt by Jack Shibley  
23 to boat the river from Phoenix to Gila Bend. See Jackson, supra, at 13. That particular boat,  
24 however, capsized at least once and lost its cargo. See SLD/Lower, supra, at IV-13.

25 9. Lastly, Dr. Jackson places substantial reliance upon a statement by Gustavus  
26 Streitz that he used a “skiff” to cross the river while doing work as a county surveyor. See  
27 Jackson, supra, at 14. Dr. Jackson opines that this limited act of using a boat to cross the river

1 in 1893 proves that the river was “navigable” at statehood. Id. at 16; see Tr. at 17:200  
2 (Jackson).<sup>10</sup>

3 Dr. Jackson’s cursory and undocumented review of the historical evidence does not  
4 support a finding that the river was actually used as a “highway for commerce” at or before  
5 statehood. Dr. Jackson is neither a lawyer nor an expert on issues of navigability, the public  
6 trust doctrine, or the equal footing doctrine.<sup>11</sup> His Power Point presentation does not prove  
7 that the Gila River is or ever was “navigable.”

8  
9 **2. The Upper Salt River has never been “susceptible to being used” as a  
“highway for commerce.”**

10 Because the river was never actually used as a “highway for commerce,” the only way  
11 it can be considered navigable is if it was “susceptible” to such use. No evidence exists in the  
12 record to show that the river, in any condition at any time, was capable of acting as “a corridor  
13 or conduit within which the exchange of goods, commodities or property or the transportation  
14 of persons may be conducted.” A.R.S § 37-1101(3) (defining “highway for commerce”).

15  
16 **a. If the Gila River had been “susceptible” to navigation, people  
would have navigated it.**

17 Although the river existed in close proximity to much of the exploration and settlement  
18 in early Arizona, it was never used for any type of regular trade or transportation. In order for  
19 the Commission to determine that the river was “susceptible to being used . . . as a highway  
20 for commerce,” it must find that the prehistoric inhabitants, the early explorers, the Pima-  
21 Maricopas and Chiricahua Apaches, and thousands of citizens who resided along the river and  
22 in the general area prior to statehood simply failed to comprehend the potential usefulness of  
23 the river as an avenue for navigation. No evidence exists to support such a finding. See also,

24 <sup>10</sup> But see Lykes Bros., 821 F. Supp. at 1461 (non-navigable river’s only use by watercraft involved  
25 small, shallow-draft canoes and small dugouts; canoes ranged from 10-15 feet long, 3-4 feet wide, and  
26 draw 3 to 6 inches).

27 <sup>11</sup> See Deposition of Donald C. Jackson, A-Tumbling-T v. Paloma Investment 13 (January 15, 2003)  
(EI 22) (“Q. Is this the first voyage into the issue of navigability for you? A. Into the legal issues  
regarding equal footing, yes.”).

1 e.g., Webb v. Board of Comm'rs of Neosho County, 257 P. 966 (Kan. 1927) (although  
2 evidence existed of log driving, ferry use, and light boats, some by motor power for transfer of  
3 passengers for pleasure and to limited extent for hire, the court nevertheless held that the river  
4 was not navigable because: (1) boats could not move any substantial distance up or down the  
5 river at ordinary times without being pushed or helped over riffles; and (2) the river had never  
6 been used for the transportation of products of the area along the river).

7         It might be theoretically possible that, on one or more occasions in particular years, it  
8 would have been feasible for a person to boat or float logs down some portion of the river.  
9 Occasional use in exceptional times does not, however, support a finding of navigability.<sup>12</sup>  
10 “The mere fact that a river will occasionally float logs, poles, and rafts downstream in times of  
11 high water does not make the river navigable.” Crow, Pope & Land, 340 F. Supp. at 32  
12 (citing United States v. Rio Grande Dam & Irr. Co., 174 U.S. 690 (1989)). “The waterway  
13 must be susceptible for use as a channel of useful commerce and not merely capable of  
14  
15  
16

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17 <sup>12</sup> Miami Valley Conservancy Dist. v. Alexander, 692 F.2d 447, 451 (6th Cir. 1982) (“limited,”  
18 “sporadic,” “minimal,” and “uniformly unsuccessful” evidence of boat use on creek does not establish  
19 navigability, without specific evidence of successful commercial navigation); see also United States v.  
20 Oregon, 295 U.S. 1, 23 (1935) (evidence of sporadic and ineffective use of boats was not enough to  
21 find water course navigable); North Dakota v. United States, 770 F. Supp. at 509-10 (unique, isolated  
22 tie drive in time of high water was not enough to establish river navigability); see also United States  
23 v. Harrell, 926 F.2d 1036, 1040 (11th Cir. 1991); Harrison v. Fite, 148 F. 781, 784 (8th Cir. 1906) (“A  
24 theoretical or potential navigability, or one that is temporary, precarious, and unprofitable, is not  
25 sufficient. While the navigable quality of a water course need not be continuous, yet it should  
26 continue long enough to be useful and valuable in transportation. . . . Mere depth of water, without  
27 profitable utility, will not render a water course navigable in the legal sense . . . nor will the fact that it  
is sufficient for pleasure boating or to enable hunters or fishermen to float their skiffs or canoes.”); In  
re River Queen, 275 F. Supp. 403, 407 (W.D. Ark. 1967) (when determining navigability, court  
“inquiry should be made as to the number of persons the stream would accommodate and the nature  
and extent of the kinds of vessels it would carry. The mere fact that the stream might at times carry  
single logs or canoes or the average row boat used by fishermen is not sufficient to establish the  
navigability of the stream. It must serve a useful purpose in opening a commercial route for the  
people living along its banks”) (citing 56 Am. Jur., Waters §§ 180-181).

1 exceptional transportation during periods of high water.” Id. (citing Brewer-Elliott Oil & Gas  
2 Co. v. United States, 260 U.S. 77 (1922)).<sup>13</sup>

3 No government agency, including federal land surveyors, ever indicated that the Gila  
4 River was navigable. See Section III(A), supra; see also United States v. Oregon, 295 U.S. at  
5 23 (courts should consider government’s treatment of watercourse as non-navigable in their  
6 analysis of navigability); see also Washington Water Power Co. v. Federal Energy Regulatory  
7 Comm’n, 775 F.2d 305, 332 (D.C. Cir. 1985) (government’s, including Army Corps of  
8 Engineers’, description and treatment of river is relevant to determination of river  
9 navigability). Likewise, no federal or state land patent indicated that the Gila River was  
10 navigable. See id.; see also Lykes Bros., 821 F. Supp. at 1460 (court found actions by State  
11 show that, for many years, it considered river non-navigable, e.g., land bordering river had  
12 been deeded to private ownership and owners paid taxes); Koch v. Department of Interior, 47  
13 F.3d 1015, 1019 (10th Cir. 1995) (because Federal Government did not express intent to  
14 retain island in non-navigable river, title to island passed to patent holder).

15  
16 ***b. Dr. Hjalmarson’s testimony does not support a finding that the Gila***  
***River was ever “susceptible” to navigation.***

17 The only evidence that purports to support a finding of “susceptibility” to navigation is  
18 the report and testimony by Hjalmar Hjalmarson, a hydraulic engineer and hydrologist  
19 retained by the County.<sup>14</sup> Mr. Hjalmarson’s work was limited to answering the following  
20 question: “Was the lower Gila River susceptible to navigation in it’s [sic] natural and  
21 ordinary condition at statehood using the Federal Standard?” Hjalmarson Power Point, supra,  
22

23 <sup>13</sup> See also United States v. Harrell, 926 F.2d at 1036 (“susceptibility of use as a highway for  
24 commerce should not be confined to ‘exceptional conditions or short periods of temporary high  
25 water’”) (quoting United States v. Utah, 283 U.S. 64, 87 (1931)); Lykes Bros., 821 F.Supp. at 1463,  
aff’d 64 F.3d 630 (11th Cir. 1995) (“Evidence of navigation during periods of flooding or abnormally  
high water is not sufficient to support a finding of navigability.”) (citations omitted).

26 <sup>14</sup> See Hjalmarson Report, supra; Hjalmarson, Power Point Presentation entitled “Navigability Along  
27 the Natural Channel of the Gila River, AZ” (November 16, 2005) (EI 23) (“Hjalmarson Power  
Point”).



1 at 1. He did not examine whether the river had ever actually been used as a “highway for  
2 commerce.” See id.

3 In his report filed with this Commission in October 2002, Dr. Hjalmarson concluded:  
4 “It is my opinion the Gila River, from the confluence with the Salt River to the mouth at the  
5 Colorado River, was susceptible to navigation at the time of statehood (February 14, 1912) in  
6 its ordinary and natural condition.” Hjalmarson Report, supra, at 30. Subsequent to the  
7 completion of that report, however, Mr. Hjalmarson was deposed in litigation involving  
8 Gillespie Dam on the lower Gila River. In that deposition, Mr. Hjalmarson testified:

9 Q. (By Mr. Barker) Mr. Hjalmarson, in your opinion, was the Gila  
10 River predictable enough for someone who wanted to conduct commercial  
11 navigation on it in 1912 to be able to do so on a regular basis?

12 A. I don’t know.

13 Deposition of Hjalmar Hjalmarson, at 20, A-Tumbling-T v. Paloma Investment 44 (January  
14 16, 2003) (EI 24) (“Hjalmarson Deposition”).<sup>15</sup>

15 Mr. Hjalmarson’s work submitted to this Commission recognizes that the data  
16 necessary to prove that the river ever was susceptible to navigation is severely lacking.<sup>16</sup>  
17 Faced with this dearth of data, Mr. Hjalmarson did perhaps the best he could. First, he  
18 obtained estimates of pre-development flows in the river at the Gila River and Salt River  
19 Indian Reservations. See Hjalmarson Report, supra, at 12-14. Those estimates were based

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21 <sup>15</sup> See also Hjalmarson, “Confidential Notes: The Ability to Navigate the Gila River Under Natural  
22 Conditions, Below the Confluence with the Salt River to the Mouth at Yuma, Arizona” 45 (July 2001)  
23 (EI 25) (“2001 Notes”) (“My limited research on the history of navigability of the Gila River suggests  
24 that it was not used on a regular basis for any kind of water transportation of bulk commodities such  
as furs or covered wagons or people. . . . Clearly, no accounts that the river was developed for  
navigation were found.”).

25 <sup>16</sup> See also Hjalmarson Report, supra, at 9 (“There are few known direct observations of the flow and  
26 of the morphology of the river. There are no measurements of streamflow by the U.S. Geological  
27 Survey (USGS) until 1888. There are no aerial photographs or detailed topographic maps of the river  
channel. . . . There are only a few available recorded observations of the river hydraulics and  
morphology made by explorers.”).

1 upon a USGS numerical model “developed to **simulate** ground-water flow, stream-aquifer  
2 connection, and evapotranspiration for purposes of evaluating predevelopment hydrologic  
3 conditions on the reservation.” Id. at 14 (emphasis added). Mr. Hjalmarson then summed  
4 these two estimates together and ran that combined flow estimate through some equations to  
5 obtain a hypothetical width and depth of the river. Id.<sup>17</sup> As Mr. Hjalmarson candidly  
6 admitted in his report, in order to do what the task he was asked to perform, it was “necessary  
7 to **estimate** the size and shape of the river channel before about 1860 when the flow was  
8 natural.” Id. at 10 (emphasis added).<sup>18</sup>

9 In the unedited 2001 version of his report, Mr. Hjalmarson further acknowledged the  
10 lack of important data for a determination of susceptibility to navigation:

11 Obviously, a large number of historic measurements of channel characteristics,  
12 especially channel width and depth for dry-weather flows, would be important  
13 information for assessment of navigability. However, in the absence of historic  
14 measurements of channel geometry at several locations along the river, the  
15 hydraulic geometry is considered a **reliable general estimate** of channel width  
and depth.

16 2001 Notes, supra, at 45 (emphasis added).<sup>19</sup>

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20 <sup>17</sup> See 2001 Notes, supra, at 34 (“The problem with estimating channel size and shape corresponding  
21 to the natural flow characteristics is there is little reliable evidence of channel width and depth before  
22 about 1860. A solution is the use of regional hydraulic geometry relations to **estimate** channel width  
using the estimate of mean annual discharge for natural watershed conditions.”) (emphasis added).

23 <sup>18</sup> In his 2003 deposition, Mr. Hjalmarson testified that his analysis focused solely upon hydrology  
24 and hydraulic geometry and “excluded a number of other things that others have testified that they  
utilized in trying to determine navigability, historical data and observations of pioneers and things like  
that.” Hjalmarson Deposition, supra, at 123.

25 <sup>19</sup> See also Hjalmarson Deposition, supra, at 20 (referring to his 2001 Notes: “These are – what I did  
26 in the production of the report and because of the way I – because of my history of commonly  
27 producing reports from the work I do, the way I go about doing the job is I put things together as if it’s  
going to be published.”); see also id. at 21-22 (clarifying that report generated from 2001 Notes was  
the one filed with this Commission).

1 Even using Mr. Hjalmarson's estimates and assumptions,<sup>20</sup> the river would not be  
2 particularly susceptible to navigation. Mr. Hjalmarson acknowledged that "about 70% of the  
3 time the flow is less than the mean annual flow. In terms of using a vessel on the Gila River,  
4 the lower flows such as the base runoff, may limit navigability for at least part of a typical  
5 year." Hjalmarson Report, supra, at 16. Mr. Hjalmarson also conceded that, although he  
6 opined that the river would be "very easy" to navigate, it would be subject to difficulties  
7 associated with "obstacles" such as sand bars and riffles. Id. at 24-25.

8 One of the tests Mr. Hjalmarson used to determine susceptibility to navigation was the  
9 Langbein method, which estimates the river's tractive force. According to the report, "[m]ajor  
10 navigation appears to be associated with river tractive forces of less than 0.001." Id. at 27.  
11 "Within the range from 0.002 to 0.001, navigation is usually limited to ferry or short-run  
12 operations." Id. "[R]iver tractive forces of 0.001 and 0.002 are near the maximum feasible  
13 for commercial navigation." Id. The tractive force Mr. Hjalmarson reports for the Gila River  
14 is 0.001. Id. Even under Mr. Hjalmarson's own analysis, the tractive force for the river is (1)  
15 above (i.e., worse for navigation than) that associated with "major navigation," (2) above (i.e.,  
16 worse for navigation than) the "maximum feasible for commercial navigation," and (3) in the  
17 range "usually limited to ferry or short-run operations." See id.

18 The most obvious flaw in Mr. Hjalmarson's analysis, however, is that his final report  
19 assumed that the "natural" Gila River was a single meandering, smooth, parabolic channel.  
20 See Hjalmarson Power Point, supra, at 33; see also id. at 27; Tr. at 17:265-66 (Hjalmarson).  
21 This assumption directly conflicts with the opinions by Drs. Schumm and Huckleberry (the  
22 geomorphologists), who opined that the river was unstable and had a braided channel. See  
23 Section III(B)(2), supra. The assumption also is contrary to the historical evidence that the  
24 river had a sandy, shifting bottom. See id.

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26 <sup>20</sup> See 2001 Notes, supra, at 44 ("Several assumptions and simplifications must be made before  
27 Manning's equation can be used to estimate" the depth relative to the amount of discharge (C) and the  
slope of the discharge-depth relation (*f*)).

1 Perhaps more important, that assumption is contrary to Mr. Hjalmarson's own opinions  
2 presented in the July 2001 unedited version of his report. See 2001 Notes, supra. In that  
3 document, Mr. Hjalmarson repeatedly referred to the multiple channels and braiding of the  
4 river, both in its predevelopment and current condition:

5 1. "Two of the sites where [sic] selected because they were braided channels that  
6 represented the worst-case condition for navigability. It is unknown if the braided conditions  
7 were representative of natural conditions." Id. at 35.

8 2. "Following very large floods[,] the channel may have become destabilized and  
9 reaches may have developed multiple channels of braids. Braided channels divide and  
10 combine." Id.

11 3. "There may have been channel braiding in places along the Gila River as  
12 suggested by the oldest available USGS topographic maps. There was also at least one  
13 historic account of multiple channels." Id.

14 4. "Following a very large food, the channel may more than double in width (at the  
15 expense of flood-plain areas), straighten, and modify to a braided pattern. Most silt and fine  
16 sand may be washed from the bed material, and coarse-sand to gravel sizes would be added by  
17 destruction and reworking of flood-plain deposits. This braided channel condition would be  
18 unstable." Id. at 41.

19 5. "Navigability of the Gila River below Gillespie Damsite was limited by areas  
20 with multiple (braided) channels because flow was divided among two or more channels." Id.  
21 at 66.<sup>21</sup>

22 ...

23 ...

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24 <sup>21</sup> See also Hjalmarson Deposition, supra, at 79-80 ("Q. Is it your opinion that under the hypothetical  
25 situation, with your estimated mean annual flow, it was not braided? . . . A. I would – in most places,  
26 I would expect it not to be braided. But because of the nature of the channels like the Gila, I would  
27 expect to have localized areas of braided like conditions following large floods. You'd get increases  
in gradient and so forth from some deposition, and braided – and braiding-like conditions might –  
might – might occur.").

1 Mr. Hjalmarson's hypothetical analysis fails if his assumption regarding a single,  
2 parabolic channel is incorrect.<sup>22</sup> If there is not a single, smooth channel, his estimates  
3 regarding the width and depth of the river have no basis. The only way to get from an  
4 estimated flow rate to a width and depth is to assume that such flow goes through single,  
5 smooth channel (like a man-made canal). Otherwise, the flow is dispersed into the multiple  
6 braided channels, and it is impossible to reliably estimate the width or depth of the channel(s).  
7 If the channel is braided, unstable, shifting, or not smooth, Mr. Hjalmarson's calculations have  
8 no meaning.

9 The primary problem with Mr. Hjalmarson's opinion is that the Gila River is not and  
10 never was a single, smooth, parabolic channel. It is a real-life river and, according to the  
11 geomorphology experts and all available evidence, it is and has been primarily a braided  
12 river.<sup>23</sup> Mr. Hjalmarson's opinions are unpersuasive because the key assumptions upon which  
13 he relies are demonstrably incorrect.

14 ...

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18 <sup>22</sup> See 2001 Notes, supra, at 50 ("Navigation during low flows was limited where the low-water  
19 channels may have been braided. Flow appears to divide into two or more channels in these areas and  
20 there may not have been much depth for rafts and small boats during long-dry periods when base  
21 runoff was low. Where low water was in a single channel all of the low water was confined to the  
22 channel and flow depths, the major limiting parameter for navigation on the Gila River, were greatest  
23 where low water was in three channels the low water was distributed and more total flow was needed  
24 to produce the needed depths.").

25 <sup>23</sup> See, e.g., Oklahoma v. Texas, 258 U.S. 574 (1922) (river one-fourth to 1½ miles in width, depths  
26 ranging from four inches to one foot and above, with "continual shifting of the river bed, which  
27 moves from one side of the valley to the other," is not navigable watercourse); see also Lykes Bros.,  
821 F.Supp. at 1463 ("To be considered susceptible for commercial navigation, the waterway in its  
ordinary and natural condition must have a sufficiently well-defined, passable channel, and the water  
levels must be able to sustain commercial navigation on a predictable and reliable basis.") (citations  
omitted); Hanes v. Oklahoma, 973 P.2d 330, 334 (OK CR 1999) (although river supported some past  
commerce in its upper reaches, court held that river lacked sufficient water and channel depth for at  
least fifty percent of its length to support useful commerce; river ranged from two to four feet deep  
over its one-hundred mile length).

1 **V. SUMMARY AND REQUESTED ACTION**

2 Nothing in the record supports a finding that the Gila River is, was at statehood, or ever  
3 has been used or susceptible to being used as a "highway for commerce." The Commission  
4 should find the river "non-navigable."

5 DATED this 6th day of February, 2006.

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# APPENDIX A

**APPENDIX A**  
**INFORMATION ON FOURTEEN ACCOUNTS OF ATTEMPTS, SUCCESSFUL**  
**OR OTHERWISE, TO BOAT OR TO TRANSPORT GOODS DOWN THE GILA**  
**RIVER BETWEEN 1846 AND 1909**

1. **December 1846-January 1847:** Captain Philip St. George Cooke and the Mormon Battalion constructed a raft from two wagon beds to float supplies via a raft down the Gila River from Gila Bend to Yuma during the Mexican War. The raft went aground numerous times, however. Additionally, Lieutenant George Stoneman, who was in charge of the trip, “was forced to jettison a portion of the cargo.” Fuller, et al., Arizona Stream Navigability Study for the Gila River: Colorado River Confluence to the Town of Safford, at IV-2 (June 2003) (EI 4) (“SLD/Lower”); see Reporter’s Transcript of Proceedings, at 16:38, 70 (November 16-17, 2005) (“Tr.”) (Gilpin).

2. **1849:** The Edward Howard party constructed a boat to float down the Gila River from Gila Bend to Yuma. There is no information in the record indicating what time of year this trip took place or whether it may have occurred during a flood. SLD/Lower, supra, at IV-2; see Tr. at 16:70 (Gilpin).

3. **1850:** An unsigned letter to the *New York Daily Tribune* from a traveler at Camp Salvation reported that the “expedient of lightening down teams by building small boats on the Gila” had been tried and succeeded. There was no other contemporaneous report indicating that it was common practice for travelers during the Gold Rush in this region to travel on the Gila River by boat to the Colorado River. The letter also does not indicate what time of year this trip took place. SLD/Lower, supra, at IV-3; see Tr. at 16:71 (Gilpin).

4. **1867:** Henry Morgan operated Morgan’s Ferry near Maricopa Wells for 25 years beginning in 1867. The ferry was used only to cross the river. There is no information indicating how many trips this ferry took or whether it was operated only on a seasonal basis. SLD/Lower, supra, at IV-5; see also Tr. at 16:71-72 (Gilpin).

5. **February 1881**: Two men, Cotton and Bingham, reported to be planning a trip to Yuma via the Salt and Gila Rivers in an 18-foot skiff, flat-bottom boat. It is unclear whether this trip actually occurred because the newspaper article (the only record of this supposed trip) was written the day before the trip. SLD/Lower, supra, at IV-7; see also Tr. at 16:74 (Gilpin).

6. **November 1881**: Three men, including William “Buckey” O’Neill, departed Phoenix for Yuma in a 20-foot long, 5-foot wide boat called “Yuma or Bust.” During the trip, it is reported that the men were “wading in water up to their knees.” The editor of the *Phoenix Gazette* doubted claims by the O’Neill party that the trip was a success, and reported that the men had been “compelled to wade in the water the greater part of the time, while pushing the craft ahead of them.” SLD/Lower, supra, at IV-7; see also Tr. at 16:73 (Gilpin).

7. **March 1891**: Straus, Dallman & Co. operated a ferry crossing the Gila River. The ferry was used only to cross the river. There is no information indicating how many trips this ferry took or whether it was operated only on a seasonal basis. SLD/Lower, supra, at IV-8; see also Tr. at 16:71-72 (Gilpin).

8. **January 1985**: G.W. Evans and Amos Adams reportedly boated down the San Francisco River from Clifton, then down the Gila River to Riverside. This trip was reported in two newspaper articles—one was a letter to the editor in the *Arizona Sentinel*, and the other was a publication of a letter from Evans and Adams documenting the trip *Graham County Bulletin*. The two articles detail the difficulties the pair experienced. In the Upper Gila River, the pair experienced problems due to “a continuous series of rough rapids and falls for 81 miles.” Fuller, et al., Arizona Stream Navigability Study for the Upper Gila River, Safford to State Boundary, and San Francisco River, Gila River Confluence to the State Boundary, at 3-28 (June 2003) (EI 2) (“SLD/Upper”). At one point, Evans fell out of the water and swam or was carried by the current downstream. Evans called it “a torturous route.” The boat itself was damaged

due to the rapids, with “one end being entirely submerged” and Adams had to “bail[] out the water from the stern.” SLD/Lower, supra, at IV-8; see also Tr. at 16:74-75 (Gilpin).

9. **February 1895**: Upon reaching Sacaton, Evans and Adams hauled their boat overland via train and then boated down the Salt and Gila Rivers to Yuma. The pair did not boat the entire length of the Gila River. Upon reaching Yuma, Evans concluded that he “would not engage to make the trip down (the Gila’s) hazardous waters again.” SLD/Upper, supra, at 3-28; SLD/Lower, supra, at IV-8 to IV-9; see also Tr. at 16:75 (Gilpin).

10. **1905**: Two new ferry boats began operating on the Gila River. A new ferry, The Gila King, began operating a month later. The ferry was used only to cross the river. There is no information indicating how many trips this ferry took or whether it was operated only on a seasonal basis. SLD/Lower, supra, at IV-13; see also Tr. at 16:71-72 (Gilpin).

11. **March 1905**: A new model boat that had “hand-driven, side-propellers” was unable to cross the Gila River. It was reported that “nothing short of a ten horse power engine” would be needed to cross the river. SLD/Lower, supra, at IV-13; see also Tr. at 16:76 (Gilpin).

12. **April 1905**: Jack Shibely boated the Gila River downstream after he launched his boat from Phoenix. A newspaper article reported that the trip was not without difficulties. The boat capsized once. Although the boat was eventually turned upright, it lost much of its cargo. SLD/Lower, supra, at IV-13; see also Tr. at 16:40 (Gilpin). Pre-statehood stream flow gauge records indicate large discharges in March 1905, indicating that the river may have been in flood stage when Mr. Shibely took his trip. SLD/Lower, supra, at VI-4.

13. **December 1905**: This boating attempt was unsuccessful, in part because the parties could not launch the boat. When the Phoenix railway bridge was washed out, there was an attempt to use a boat to cross the Gila River. The launch of the boat failed,

however, because reportedly “the current was too swift.” SLD/Lower, supra, at IV-13; see also Tr. at 16:76 (Gilpin).

14. **1909:** There is one report that Stanley Sykes canoed the entire length of the Gila River. Some doubt is cast on whether this trip occurred because the account does not appear in Sykes’ biographical sketch, nor is there any other contemporaneous record of this incident. SLD/Upper, supra, at 3-29; see also Tr. at 16:76-77 (Gilpin).

# APPENDIX B

**APPENDIX B**  
**COMPARISON OF ANNUAL MEAN FLOW RATE FOR VARIOUS STREAMS (cubic-**  
**feet per second)**

<b>River</b>	<b>Navigable?</b>	<b>Cfs</b>	<b>Data Source</b>
Gila River at Dome (AZ)	To be determined	1,277	SLD/Lower, at VI-4
Gila River—upper reaches (AZ)	To be determined	200 to 439	SLD/Upper, at 7, 5-32
Upper Salt River (AZ)	To be determined	1,455	Fuller Report, at 5-18 (Table 14)
Lower Salt River (AZ)	No	1,455	Fuller Report
Arkansas River (OK)	No	7,561	USGS data at Tulsa, OK (1926-1999)
Cedar River (WA)	No	164	USGS data near Cedar Falls, WA (1946-2000)
Chattahoochee River (GA)	No	2,031	USGS data at Buford Dam, GA (1943-2000)
Colorado River (UT)	Yes	7,316	USGS data near Cisco, UT (1914-2000)
Fisheating Creek (FL)	No	252	USGS data at Palmdale, FL (1932-2000)
Great Miami River (OH)	In part	2,277	USGS data at Dayton, OH (1914-1999)
Green River (UT)	Yes	6,930	USGS data at Green River, UT (1895-2000)
Little River (AR)	No	2,892	USGS data at Rivervale, AR (1948-1976)
Little Missouri River (ND)	No	555	USGS data near Watford City, ND (1935-1999)
McKenzie River (OR)	Yes	4,066	USGS data near Vida, OR (1925-2000)
Neosho River (KS)	No	2,764	USGS data near Parsons, KS (1922-2000)
Red River (OK/TX)	No	9,363	USGS data at Arthur City, TX (1906-1999)
Rio Grande (NM)	No	1,513	USGS data at Otowi Bridge, NM (1896-2000)
Sinnemahoning Creek (PA)	No	399	USGS data at Sinnemahoning, PA (1954-2000)
White River (AR)	No	563	USGS data at Fayetteville, AR (1964-1993)
Wolf River (TN)	No	1,107	USGS data at Germantown, TN (1970-2000)

Source: For all rivers other than Salt and Gila, see Information Regarding Navigability of Selected U.S. Watercourses (April 2003).