Arizona Navigable Stream Adjudication Commission
In re Determination of Navigability of the Santa Cruz River
(Case No. 03-002-NAV)
Tucson, Arizona, March 28, 2014

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Wade Noble	Chairman	Rich Burtell	Witness
Jim Henness	Vice Chair	Sean Hood	Attorney representing Freeport-McMoRan Copper and Gold, Inc.
Bill Allen	Commissioner	Joy Herr-Cardillo	Attorney for the Arizona Center for Law in the Public Interest
Jim Horton	Commissioner		
George Mehnert	Director		
Fred Breedlove	Attorney representing the Commission		

Ms. Herr-Cardillo: What are they used for?

Mr. Burtell: They are used for a lot of different things, but my understanding first – how it's generated is you take all of the data. It's usually daily stream flow data from the gauge, and you put it all into one box, if you will; and, the furtheration curve is simply an ordering of all that data. Because flows differ throughout the year, you are capturing for the period record that you had when that flow as measured. You are ordering the smallest flows in order all the way up to the biggest flow. And then when you are done with that, you are able, because it's all ordered, you can say for this flow data set, for half of the time when this gauge was monitored the flow was either greater than this amount or less than.

Ms. Herr-Cardillo: And you showed the Commissioners several pictures of the Santa Cruz River channel, which I haven't seen because I was behind you.

Mr. Burtell: Sure.

Ms. Herr-Cardillo: But you described them and I think – well do you want to review, what were the dates?

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Mr. Burtell: Yes.

Ms. Herr-Cardillo: That those pictures were taken.

Mr. Burtell: Yes, I have those here. As you recall, the data that I used from the Nogales gauge was in the 1910s in through the 1930s and I have a figure that shows what the gauge looked like on November 24, 1930; I have a picture of what the gauge looked like on May 21, 2001; I contacted the USGS office and they gave me a series of photographs of the gauge site. I will give you these dates. Quite frankly this supports Mr. Hjalmarson's criticism of the use of the gauge. He repeatedly talked about the fact that the Nogales – the Santa Cruz River in the Nogales area was a broad sandy channel whose rating curve changed over time. And so what we fortunately have is a series of photographs. This one is June 5, 1930; another one that is dated 1930 but I don't know the month and the day that shows shallow flow across the channel. This is a picture in 1947 of the channel and a fellow is standing there for scale. This line here is where they had a cable car that they would use when they went out to measure the flow during high flow events when it was dangerous to be in the channel. And then a couple of upstream/downstream views. This is January 30, 1964, again this one is looking upstream and this one is looking downstream.

And the point to me of these is I fully agree with Mr. Hjalmarson, your expert, that the channel is variable, it's a sandy channel, and it changes after flood events. And that is the reason why when I created my rating curve, I didn't just look at a few years of data. I looked at over 30 years of data to see how this channel changes after storm events, and used that rating curve then to evaluate what his pre-development flows, let alone my flow data, would look in terms of average depths.

Ms. Herr-Cardillo: For those years that you have pictures for, 1930 I think was the earliest one I heard you say to, there was one in 1954, one in 2001.

Mr. Burtell: That's most recent is in 2001.

Ms. Herr-Cardillo: 2001. The river was not in its natural condition at any point. Of those years.

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Mr. Burtell: Okay, I will again. I guess we will have to go through this again. I have tried to explain myself. I agree that the flow in the stream, the quantity of flow, was affected by diversions. And I've addressed that. But,

Ms. Herr-Cardillo: That's all I wanted to establish.

Mr. Burtell: But if I could talk to the commission,

Chairman Noble: Mr. Hood might want to rehabilitate that.

Mr. Burtell: Okay. Thanks.

Chairman Noble: Next year.

Ms. Herr-Cardillo: Okay, Appendix B, you mentioned.

Mr. Burtell: Appendix B –

Ms. Herr-Cardillo: I will get there. Mr. Hjalmarson's report you testified regarding Appendix B, Item 3, page 2 of Appendix B and you talk about the river was 60' wide with a stony bottom and firm banks. Earlier in that description of Item 3, it talks about land at this location had been farmed for about a century where flow was perennial. Correct?

Mr. Burtell: Yes.

Ms. Herr-Cardillo: Do you have much experience yourself, personally, boating?

Mr. Burtell: I had boated down the Green and Colorado Rivers through Canyonlands National Park and I've also taken a recreational river rafting trip on the Arkansas River when I lived in Colorado.

Ms. Herr-Cardillo: So that's two separate boating trips or multiple trips on Green.

Mr. Burtell: Multiple trips along the Green and the Colorado.

Ms. Herr-Cardillo: In your experience, that when you are traveling down those rivers, you are able to determine what the deepest part of the river is.

Mr. Burtell: No, actually. My experience has been that I would, even on the Green River; now I would do it in the springtime, as well as in

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autumn, usually it's the best time to be out there. But, I am embarrassed to say that more times than not I would run myself onto shallow areas, which was surprising to me.

Ms. Herr-Cardillo: Okay, that's all I have.

Chairman Noble: Is there anyone else who wishes to ask Mr. Burtell questions?

[inaudible]

Chairman Noble: Well, okay, let's wait a second here.

Mr. Hood: I have one follow up question is all, Mr. Chairman.

Chairman Noble: Mr. Hood.

Mr. Hood: My lone follow up question for you, Mr. Burtell, is you were starting to explain the difference between flow and the geomorphology as is it relates to ordinary and natural conditions. Can you complete that please?

Mr. Burtell: Yes, I think Ms. Herr-Cardillo was trying to make me state, if you will, that we can't use recent measurements of the relationship between stream flow data and flow because these are recent measurements when there have been diversions and the river is no longer in its natural and ordinary condition. I strongly disagree with that statement. What one needs to be cautious about, obviously, is looking at the flow measurements by themselves recently that could have been affected by diversions. But, there's been no evidence that has been entered by the Center or anyone else that I can remember, including the State Land Department's expert, Fuller, which talked about the channel. The geomorphology of the channel changing in the Nogales area.

What I mean by that is the shape and the configuration of the channel. In having been down there, both during low flow events and high flow events, diversions in my opinion are not effecting the geomorphology of that river. What effects the geomorphology of that river is storm events. Monsoonal flood events and the occasional winter event. I have been down there after those events and I talked to the USGS. It changes the configuration of the channel. It's a sand channel. You got high flows, that channel is

going to change its configuration. So it's – it's a variable channel. In fact, Mr. Hjalmarson mentions that. That's a variable channel that's going to change after every large storm event. So the geomorphology is always changing and will continue to change. I took a 30-year period of time where I tried to capture all that change. I didn't see any evidence that would suggest that that 30 years of changes that I looked at in channel geomorphology would have been any different than the changes that channel geomorphology before that.

Mr. Hood: And again, the changes of flow in convergence, any of the records you looked at you accounted for those versions.

Mr. Burtell: Yeah, maybe Ms. Herr-Cardillo didn't hear my testimony, but I did fully look at the flow data from the teens and the 1930s but I was also very cognizant of the amount of irrigated acres and diversions that occurred above those gauges, and even mentioned, I think in my direct testimony that if you take those diversions and add it on to the flow data that was gauged, it still does not result in conclusion that the flow depths were typically greater than a foot. Even when those diversions are accounted for.

Mr. Hood: May I ask one more question that occurred to me, Mr. Chairman? I apologize I promised one and I have two.

Chairman Noble: I'm glad something's occurred to you.

[laughter]

Mr. Hood: Mr. Burtell, Ms. Herr-Cardillo asked some questions about certain crafts and whether they qualified as commercial vessels, etc. Do you recall having reviewed in the special master's report in the Utah case, the discussion of the vessels that were typical of trade and travel during that general time period?

Mr. Burtell: Yes, the boats that he considered for trade and travel were not, certainly in my reading of his reports were not recreational vehicles. Or recreational crafts. In fact, he had discounted the occasional use by prospectors of rafts going down because in his mind they would use them for short stretches, but weren't able to even pull – they'd have to pull the rafts back upstream. There was a discussion where his – as I read his case – he did not use the

occasional recreational use by a canoeist as a measure or a fact in his findings of navigability. He focused on larger boats, motor driven boats. Either steam or by that time, when he wrote his decision, there was actually gasoline powered boats. Those boats that he considered and looked at from a navigability perspective –

Mr. Hood: He looked at the drafts required by a variety of commercial vessels.

Mr. Burtell: That's correct.

Mr. Hood: That's all I have. Thank you.

Chairman Noble: Thank you. Anyone else have any questions?

Comm. Horton: Mr. Chairman Just a comment. I was at San Xavier six months ago, and you pronounced it correctly.

Mr. Burtell: Okay. My counsel had me worried that I had been pronouncing it wrong, and I assume you pronounced it like the basketball team. Which I think is Xavier.

Comm. Horton: Yeah. Down there they say San Xavier.

Mr. Burtell: I thought that was the case. I still get Prescott versus Prescott wrong.

Chairman Noble: Okay. No one else has any questions then we'll open it up the Commission. Commissioner Allen.

Comm. Allen: Could you define the difference between average and median flow just for the Commission's benefit please?

Mr. Burtell: Sure. What I look at in my report as median flows. I happened to look at median flows on a monthly basis, but, obviously you could look at a median flows on an annual basis. The median flows is the middle of the distribution. If you had a whole bunch of measurements, and you wind them up from the smallest of those measurements all the way to the largest, the median flow was that measurement that occurs right smack dab in the middle. That is to be contrasted with the average flow where all the flow data are taken in its entirety. And average flows for streams in Arizona as described by Fuller, both in the San Pedro and in the Santa Cruz,

as a measure of typical stream flow conditions, averages are usually not considered as appropriate because Arizona streams are known and for those of us that have been out there, it's a scary time, but when you do have flood flows, they are unusually high events. And those events have a disproportionate effect on all those other values, resulting in an average value that for most Arizona streams and those streams in the Southwest, the average flows are higher than the median flows. Median flows seem to be used more commonly for things like navigability determinations because it's a better measure of typical flow conditions that are less effected by those extreme high events.

Comm. Allen: Can you tell me when the infiltration gallery was installed in Nogales.

Mr. Burtell: Yes, in fact, in my report, I specifically made sure not to include a few years of data, when the gauge site was downstream of that infiltration gallery. And so, if you would let me refer to my table – it's in one of my footnotes, Commissioners, so if I could turn to that – it will take me a second. I know you just asked me for the year, and I apologize, I should know that off the top of my head, but – okay. And, I say it in my text. I say from March 13 to December 4, 1915 and from April 28, 1921 through 1922. The gauge was located half mile downstream at the Nogales pumping plant. Due to potential impacts from the plant on stream flows, data collected during these months are not included. So the plant was installed some time before 1915.

Comm. Allen: Prior to 1915.

Mr. Burtell: At least on or before March of 1915. The –

Comm. Allen: I'm sorry I can't hear. Fifty or 15?

Mr. Burtell: Fifteen, excuse me.

Comm. Allen: Okay.

Mr. Burtell: And the USGS when they would record these stream flow records, they would talk about any diversions that occurred above the gauge. And they mentioned when the gauge was temporarily located downstream of that pumping plant, I didn't include those

data for obvious reasons. I didn't know what the pumpage was from the Nogales Plant – that infiltration gallery.

Comm. Allen: It was significant.

Mr. Burtell: I believe so.

Comm. Allen: There was a change in stream channel morphology that occurred in the late 1800s, when the arroyo formations occurred throughout the state. So, as we recognize did occur on the San Pedro. And, at what point in time do you see that occurring and was it – I'll end with that.

Mr. Burtell: Sure. No, it's an excellent question and it's another document that I will suggest to counsel that I enter into evidence. It is a study that was done of how the channel in the Tucson area has changed over time. They've done a lot of archeological work in the Tucson area and what it shows is they go back several thousand – two, three thousand years. It shows how the channel has naturally changed. There has been erosion, and then infilling, and erosion and infilling, they encountered these changes in the channel geomorphology there as part of their archeological studies. Anyone who has spent any time in the Tucson area will see that it's an entrenched channel here. I think when you look at the photographs – and there's also entrenchment and a long history of entrenchment, Commissioner Allen, in the San Pedro area as well as in the Tucson area.

When you look at these photographs of the Nogales gauge, as well as if you've been to the Lochiel gauge, the entrenchment that was noted in the San Pedro and in the Tucson area was not noted or I have not seen in the Nogales area. And, in fact, the figures from the 1930s through the 60s all the way to now, shows little, if any entrenchment in the channel in the Nogales area. So what that leads me to believe is that there are different levels of entrenchment. I am certainly very familiar and you unfortunately weren't with us at the time, but we spent a lot of time discussing the changes in the geomorphology of the San Pedro River.

Comm. Allen: I was there.

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Mr. Burtell: You might have been, that's right, maybe you were in the audience.

Comm. Allen: Right.

Mr. Burtell: And, there's a lot of evidence of that entrenchment. When you look at the records for the upper Santa Cruz, in that portion where the Nogales gauge is, I simply have not found any studies that showed that area suffered that type of entrenchment. Certainly, within the Tucson area, there is a long, long, long history of entrenchment in many studies that have been done, which I am sure you are familiar with, including the USGS. Were they'd look back in time, starting as you said in the 1880s and certainly some of that entrenchment may have been effected or not by man's activities in the Tucson area. I think what we concluded, or I certainly concluded in the San Pedro, and I would also conclude in the Santa Cruz, or at least in the Tucson area, is it's not clear to me that those entrenchment events were simply caused by man. When you look archeologically…

Comm. Allen: I would agree.

Mr. Burtell: I think archeologically, when you go back three or four thousand years and you see that those same events, have been mapped in the Tucson area shows that it's a natural event. I don't know why the area in the Nogales range has not become more entrenched. I don't know why.

Comm. Allen: So you're assuming, then, that the channel changed very, very little between the late 1800s and the current conditions that exist there.

Mr. Burtell: In the Nogales area, I have not seen any evidence to say otherwise. In the Nogales area. Certainly in the Tucson area, I agree.

Comm. Allen: That'd be true of Lochiel?

Mr. Burtell: I would say the same thing at Lochiel. That I have not seen any evidence of substantial entrenchment of the channel in the Lochiel area.

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Comm. Allen: Okay, but if you look upstream from Lochiel, there has been head cutting occur. Is that correct?

Mr. Burtell: I have noticed it, yes. There is some head cutting.

Comm. Allen: So, undoubtedly, there has been some change in the channel geometry at that spot.

Mr. Burtell: There could be then, in the Lochiel area. I would then also offer to the Commission's consideration that in that area, there has been little if any development.

Comm. Allen: That's true.

Mr. Burtell: And so aside from …

Comm. Allen: Aside from the mining that's occurred in that area.

Mr. Burtell: In the Patagonia mountains adjacent. But I was thinking in the actual Lochiel –

Comm. Allen: Bed of the channel?

Mr. Burtell: In the Lochiel Valley, per se, there has been minimal agriculture, which leads me to conclude that this might be another indication of channel entrenchment where it does occur, can occur under natural conditions.

Comm. Allen: And then I would assume that both you and Hjalmarson would contend that there's been a little change in the precipitation that's occurred over the past 200 years.

Mr. Burtell: When I look at tree grain records, I think they show what most people have concluded and that is there are dry periods and wet periods. But there hasn't been a wholesale change.

Comm. Allen: Yep, not only has there been a wholesale change in the amount of precipitation, but during the time of the year when the precipitation has occurred.

Mr. Burtell: Some have argue that the entrenchment that occurred in the Tucson area is, and the USGS has reported that more than once that their opinion is a major factor in the entrenchment that

occurred in the Tucson area was caused by the change in frequency of flood events. Frequency of high precipitation events in the area. I think they also recognize that man's engineering project in the river in the Tucson area may have had some effect, but the ultimate driver of those events was precipitation and how that precipitation has changed.

Comm. Allen: When we go back to your Table 4.

Mr. Burtell: Okay.

Comm. Allen: And look at the depth versus discharge, what would be the point where it would be the amount of water that was discharged, now I believe you've given it in acre feet in Table 4, correct?

Mr. Burtell: What I did in Table 4 is I show the median flows.

Comm. Allen: Okay, median flow.

Mr. Burtell: Month by month. And it's kind of a shorthand. I highlighted in bold red, those median flows where, when you compare those flows to the measurements of the relationship between average stream flow depth and flow as the USGS measured those flows would result in average depth of great event flow. They would still be less than two feet, but they would be greater than a foot. The foot was kind of a bench mark that Mr. Hjalmarson even admitted to that in his opinion recreational watercraft would have difficult times perhaps navigating if it was less than a foot.

Comm. Allen: So at what point would it exceed one foot?

Mr. Burtell: Well, to answer that question, you have to go to my figure. And I apologize for having to just go back and forth here. If you look at my Figure 4, and this again is my relationship between measured discharge in the stream and average stream depth. And, if you look along the x axis, Mr. Hjalmarson indicated I shouldn't have put stream depth on the x axis, but it doesn't make any difference if you plot it on the y axis, you can still do the exercise. But if you go across the x axis and go over the one foot, and then work your way up the graph, you can see those field measurements of discharge where the average stream depth is greater than a foot.

So to answer your question, to get greater than a foot of water in the stream, you typically have to get greater than 100 CFS of flow.

Comm. Allen: It says ten.

Mr. Burtell: I'm sorry, it says ten?

Comm. Allen: It says ten, on the table on Figure 4. Are you talking about figure 3?

Comm. Allen: Oh, I'm Figure 4 of the Nogales case.

Mr. Burtell: Okay, just a second. Oh, I'm sorry, I thought you were referring to the Nogales case. You're on the Lochiel ---

Comm. Allen: No, let's stay with Nogales.

Mr. Burtell: Okay. So there was one measurement that you can see that the discharge was – looks like it's about 15 CFS, which was about 1.2 feet. But that looked like an outlier. All the other measurements, if you come over to 1 feet, an average stream depth of 1 and work your way up, you'll see that you start to get stream flow depth greater than 1 when the discharge exceeds 100.

Comm. Allen: Or 150.

Mr. Burtell: Or 150. That's correct. Mr. Hjalmarson's pre-development stream flows for that area was on the order of 20 to 30 CFS. So, as I said during my direct testimony, I don't necessarily disagree with his average stream flows during pre-development time are unreasonable. But when you look at those average flows in relationship to what type of associated depths that they would have of flow, it would be less than a foot in my opinion.

Comm. Allen: I have a little trouble understanding that 10 times different between Lochiel and Nogales. And, I'm assuming that that's based solely on the width of the channel.

Mr. Burtell: I'm sorry, I didn't quite understand your comments about Lochiel.

Comm. Allen: The depth at Lochiel is 10 CFS where it reaches one foot.

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Mr. Burtell: Yeah, when, and that probably gets back to your point about there being more entrenchment there and that the channel is actually in more of a confined channel where it's more concentrated, and thus, it results in greater depths.

Comm. Allen: The only point that I would make in that regard is that there is a – if it were entrenched at Lochiel, and it had to have been entrenched to a certain degree at Nogales, you can't get upward erosion occurring unless you've got some physical thing happening in Lochiel, in the valley above Lochiel, where we do know entrenchment occurred, if you didn't have it down at the Nogales, because Nogales is downstream.

Mr. Burtell: Unless the, my understanding – the entrenchment works its way upstream,

Comm. Allen: That's correct. That's my point.

Mr. Burtell: And I guess my point would be is that unless there is some cause geological or otherwise for entrenchment to occur upstream of Nogales, but downstream of the Lochiel gauge and it worked its way up the channel up to the headwaters.

Comm. Allen: Okay. I've got no further questions.

Chairman Noble: Mr. Henness?

Comm. Henness: Nothing.

Chairman Noble: Mr. Horton?

Chairman Noble: Anyone else out there want to prolong this?

Mr. Breedlove: I do.

Chairman Noble: Mr. Breedlove does.

Mr. Breedlove: It's all right, I just have a couple of questions for clarification. Ms. Herr-Cardillo was asking you some questions that I've actually written down myself, and I just wanted a few clarifications.

Mr. Burtell: Please.

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Mr. Breedlove: So, actually, let's get back to the Utah Special Master Report.

Mr. Burtell: Okay.

Mr. Breedlove: Did it list a flat bottom canoe as a boat that was used in the timeframe that Arizona became a state?

Mr. Burtell: It certainly listed lots of different boats, including those that were used. That's correct.

Mr. Breedlove: And, do you know what the draft is on – I think it was talked about during the San Pedro hearing. Do you remember what the draft is on a flat bottom canoe or, I'm sure it's dependent on how much weight is in the canoe and that sort of thing.

Mr. Burtell: Yeah, it depends. I am not a boating expert as I think Ms. Herr-Cardillo was asking me, I am in no way a boating expert, but having canoed on rivers myself, certainly the size of the boat, the type of the boat, and the load of the boat is going to effect that draft. And so, I guess I bring to the Commission's attention when the Colorado River was being used for navigation purposes, prior to the dams being constructed, and prior to the railroad, that many times those boats that had very shallow drafts on waters, my understanding of less than a foot, would run aground. And they would run aground because those channels shifted, number one; and also, if they were loaded coming up from San Francisco that would have a bearing. So it's hard to give "a" answer – it depends on the boat and it depends on the load. I think the point though to contrast that being used for commercial purposes, is someone either by themselves or in a two person kayak, which would have a very minimal load, that would have a very shallow draft. Those type of boats in my mind are not meaningfully similar to those that were being used at statehood for commercial purposes.

Mr. Breedlove: Keeping in mind, I know that the record shows that there was little or no commercial boat travel on the river at the time of statehood. I know that, I just going into the question I am having – I'm going to ask you.

Mr. Burtell: I'm sorry, Mr. Breedlove, which river are you referring to the Santa Cruz or the ...

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Mr. Breedlove: Yes.

Mr. Burtell: Okay.

Mr. Breedlove: Just hypothetically speaking, Ms. Herr-Cardillo talked about James O'Patty and whether a canoe – whether that was actually a commercial use transporting beaver hydes or what have you. And I think you said that you didn't think so according to what you understood of the definition in existing jurisprudence, is that correct?

Mr. Burtell: No. I think I said I tried to explain my knowledge of what Patty actually did and she said, I don't want to put words in her mouth, or anyone's mouth, but I think she said, "Well, let's not worry about whether he was dragging his canoe along the stream with furs in it." If he was actually in the canoe on some river, floating down, loaded with furs, would that constitute a commercial use? And I would say, that probably would be. I would counter if his canoe, depending on the size of it, was loaded with furs, then it's going to have some draft to it, depending on how many furs he's got in there. And it's also going to have to be a pretty large canoe.

Mr. Breedlove: Just, hypothetically speaking, if somebody had a canoe, a flat bottom canoe and was transporting mail, I mean just hypothetically.

Mr. Burtell: Sure.

Mr. Breedlove: You know, down the San – do you remember which river we are on? The Santa Cruz.

Mr. Burtell: Sure.

Mr. Breedlove: Would that be a commercial use?

Mr. Burtell: If, yes. I think if somebody was using the river to transport mail up and down the river, I would say that would be a use of the river for trade or travel and that is a type of commerce.

Mr. Breedlove: Taxi service, hypothetically speaking.

Mr. Burtell: Yes, a taxi service, yes.

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Mr. Breedlove: Just a second, I just want to look at my notes.

Mr. Burtell: And, Mr. Breedlove, as you are looking at your notes, if I could add a point; in light of the time when there was occupation along the river, and during those months, because there was irrigation going on during the fall harvest period, or during the years, not just a month or two, but whole years when the area was largely abandoned, there were people in the area, but there's no accounts. Like for example, mail and supplies, would need to get to these people, but they didn't use the river, and I guess that's the point I tried to make in my report. For example, Mowry, who ran those mines in the Patagonia area that Commissioner Allen and I were discussing, he got his supplies from the Port of Guaymas and brought them up to Patagonia. He makes no mention of using the river, even during the period when it was all he could do to keep himself from being killed by the Apaches when he was operating those mines. And so, there was a need. There was a need for commercial use. I don't know how much mail was being transported at that time, but certainly supplies for his, he had a smelter there for gosh sakes. They had to get all those supplies. All those supplies got brought in by wagon.

Mr. Breedlove: So you were – just confirming. Your analysis really is that – you know that the test isn't whether it actually was used for commercial use, but it was susceptible to commercial use at the time. And so your argument then is that because there wasn't enough flow, in the stream channel at the time or that, you know, that it wasn't then susceptible to commercial use.

Mr. Burtell: No. I'm saying, I'm saying two things. I think both there – there wasn't enough flow, number one; but, in times when there was no diversions there was a need – but it simply wasn't being used. So, unlike the Utah case where the Utah case, I think, and I'm not a lawyer, but as I read it, the court wanted the point to be made that just because there wasn't evidence of historic navigation, by itself doesn't mean that there wasn't susceptible to navigation, with the understanding that maybe there wasn't anyone in the area at the time, so there was no need to bring supplies in or to transport people, etc. My argument in the Santa Cruz, is that there was a need. There was a military base. There were mines. And, even at times of year when there weren't any diversions, during several

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years when the area was largely abandoned, but there's still a mine down there and there was still a military base, they still didn't use the river. So,

Mr. Breedlove: Thanks, Rich, Mr. Burtell.

Chairman Noble: Thank you Mr. Burtell. Is there anyone here that foresees a need or wants to have further oral testimony on the Santa Cruz?

The record will remain open until April 15, at noon for any further evidence that anyone wishes to submit or any response to evidence that has been submitted.

Now, let's see what we have coming up.

On April 25 we have a scheduling conference, 9 a.m., Phoenix, and I think – do we have other things on the calendar that we want to talk about?

Mr. Mehnert: April 24 in Globe for the Upper Salt.

Chairman Noble: April 24 in the Upper Salt in Globe.

Mr. Mehnert: [inaudible]

Chairman Noble: [inaudible]

Mr. Mehnert: [inaudible]

Chairman Noble: 'til noon.

Unknown: Yeah.

Unknown: Added April 15 is also when the Verde evidence is due, that's the initial due date.

Chairman Noble: The initial due date for the Verde evidence is also April 15 at noon.

Unknown: Correct.

Chairman Noble: Any questions about any of those things? Well then, we appreciate you being here, it's been fun to be here. Yes, Joy.

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Ms. Herr-Cardillo: Do we know when the briefing schedule is going to be on Santa Cruz, do you want to set that today?

Chairman Noble: Since the evidence isn't closing until the 15th and we're having a schedule conference on the 25th, let's just set it up at the scheduling conference. Okay.

Ms. Herr-Cardillo: Okay.

Chairman Noble: Let's just set it the briefing schedule, and the briefing schedule for everything at the scheduling conference.

Ms. Herr-Cardillo: I'm down for that.

Chairman Noble: If there is nothing else, this hearing is over. Thank you Mr. Allen.

[recording ends]

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I, Barbara Leach, declare:

1. I work in the word processing department at Fennemore Craig, P.C.

2. At the request of Sean Hood, I reviewed and transcribed tape 4 of 4 of the March 28, 2014 hearing held in Tucson, Arizona in *In re In re Determination of Navigability of the Santa Cruz River* (Case No. 03-002-NAV). Mr. Hood provided assistance to identify certain speakers, words, and spellings that I was unsure about.

3. The foregoing transcription of tape 4 of 4 accurate to the best of my ability to hear and discern the questions, testimony, and other statements captured on the tape.

Executed on this _____ day of April, 2014

_____
Barbara Leach

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Arizona Navigable Stream Adjudication Commission
In re Determination of Navigability of the Santa Cruz River
(Case No. 03-002-NAV)
Tucson, Arizona, March 28, 2014

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Wade Noble	Chairman	Rich Burtell	Witness
Jim Henness	Vice Chair	Sean Hood	Attorney representing Freeport-McMoRan Copper and Gold, Inc.
Bill Allen	Commissioner	Joy Herr-Cardillo	Attorney for the Arizona Center for Law in the Public Interest
Jim Horton	Commissioner		
George Mehnert	Director		
Fred Breedlove	Attorney representing the Commission		

Ms. Herr-Cardillo: What are they used for?

Mr. Burtell: They are used for a lot of different things, but my understanding first – how it's generated is you take all of the data. It's usually daily stream flow data from the gauge, and you put it all into one box, if you will; and, the furtheration curve is simply an ordering of all that data. Because flows differ throughout the year, you are capturing for the period record that you had when that flow as measured. You are ordering the smallest flows in order all the way up to the biggest flow. And then when you are done with that, you are able, because it's all ordered, you can say for this flow data set, for half of the time when this gauge was monitored the flow was either greater than this amount or less than.

Ms. Herr-Cardillo: And you showed the Commissioners several pictures of the Santa Cruz River channel, which I haven't seen because I was behind you.

Mr. Burtell: Sure.

Ms. Herr-Cardillo: But you described them and I think – well do you want to review, what were the dates?

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Mr. Burtell: Yes.

Ms. Herr-Cardillo: That those pictures were taken.

Mr. Burtell: Yes, I have those here. As you recall, the data that I used from the Nogales gauge was in the 1910s in through the 1930s and I have a figure that shows what the gauge looked like on November 24, 1930; I have a picture of what the gauge looked like on May 21, 2001; I contacted the USGS office and they gave me a series of photographs of the gauge site. I will give you these dates. Quite frankly this supports Mr. Hjalmarson's criticism of the use of the gauge. He repeatedly talked about the fact that the Nogales – the Santa Cruz River in the Nogales area was a broad sandy channel whose rating curve changed over time. And so what we fortunately have is a series of photographs. This one is June 5, 1930; another one that is dated 1930 but I don't know the month and the day that shows shallow flow across the channel. This is a picture in 1947 of the channel and a fellow is standing there for scale. This line here is where they had a cable car that they would use when they went out to measure the flow during high flow events when it was dangerous to be in the channel. And then a couple of upstream/downstream views. This is January 30, 1964, again this one is looking upstream and this one is looking downstream.

And the point to me of these is I fully agree with Mr. Hjalmarson, your expert, that the channel is variable, it's a sandy channel, and it changes after flood events. And that is the reason why when I created my rating curve, I didn't just look at a few years of data. I looked at over 30 years of data to see how this channel changes after storm events, and used that rating curve then to evaluate what his pre-development flows, let alone my flow data, would look in terms of average depths.

Ms. Herr-Cardillo: For those years that you have pictures for, 1930 I think was the earliest one I heard you say to, there was one in 1954, one in 2001.

Mr. Burtell: That's most recent is in 2001.

Ms. Herr-Cardillo: 2001. The river was not in its natural condition at any point. Of those years.

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Mr. Burtell: Okay, I will again. I guess we will have to go through this again. I have tried to explain myself. I agree that the flow in the stream, the quantity of flow, was affected by diversions. And I've addressed that. But,

Ms. Herr-Cardillo: That's all I wanted to establish.

Mr. Burtell: But if I could talk to the commission,

Chairman Noble: Mr. Hood might want to rehabilitate that.

Mr. Burtell: Okay. Thanks.

Chairman Noble: Next year.

Ms. Herr-Cardillo: Okay, Appendix B, you mentioned.

Mr. Burtell: Appendix B –

Ms. Herr-Cardillo: I will get there. Mr. Hjalmarson's report you testified regarding Appendix B, Item 3, page 2 of Appendix B and you talk about the river was 60' wide with a stony bottom and firm banks. Earlier in that description of Item 3, it talks about land at this location had been farmed for about a century where flow was perennial. Correct?

Mr. Burtell: Yes.

Ms. Herr-Cardillo: Do you have much experience yourself, personally, boating?

Mr. Burtell: I had boated down the Green and Colorado Rivers through Canyonlands National Park and I've also taken a recreational river rafting trip on the Arkansas River when I lived in Colorado.

Ms. Herr-Cardillo: So that's two separate boating trips or multiple trips on Green.

Mr. Burtell: Multiple trips along the Green and the Colorado.

Ms. Herr-Cardillo: In your experience, that when you are traveling down those rivers, you are able to determine what the deepest part of the river is.

Mr. Burtell: No, actually. My experience has been that I would, even on the Green River; now I would do it in the springtime, as well as in

autumn, usually it's the best time to be out there. But, I am embarrassed to say that more times than not I would run myself onto shallow areas, which was surprising to me.

Ms. Herr-Cardillo: Okay, that's all I have.

Chairman Noble: Is there anyone else who wishes to ask Mr. Burtell questions?

[inaudible]

Chairman Noble: Well, okay, let's wait a second here.

Mr. Hood: I have one follow up question is all, Mr. Chairman.

Chairman Noble: Mr. Hood.

Mr. Hood: My lone follow up question for you, Mr. Burtell, is you were starting to explain the difference between flow and the geomorphology as is it relates to ordinary and natural conditions. Can you complete that please?

Mr. Burtell: Yes, I think Ms. Herr-Cardillo was trying to make me state, if you will, that we can't use recent measurements of the relationship between stream flow data and flow because these are recent measurements when there have been diversions and the river is no longer in its natural and ordinary condition. I strongly disagree with that statement. What one needs to be cautious about, obviously, is looking at the flow measurements by themselves recently that could have been affected by diversions. But, there's been no evidence that has been entered by the Center or anyone else that I can remember, including the State Land Department's expert, Fuller, which talked about the channel. The geomorphology of the channel changing in the Nogales area.

What I mean by that is the shape and the configuration of the channel. In having been down there, both during low flow events and high flow events, diversions in my opinion are not effecting the geomorphology of that river. What effects the geomorphology of that river is storm events. Monsoonal flood events and the occasional winter event. I have been down there after those events and I talked to the USGS. It changes the configuration of the channel. It's a sand channel. You got high flows, that channel is

going to change its configuration. So it's – it's a variable channel. In fact, Mr. Hjalmarson mentions that. That's a variable channel that's going to change after every large storm event. So the geomorphology is always changing and will continue to change. I took a 30-year period of time where I tried to capture all that change. I didn't see any evidence that would suggest that that 30 years of changes that I looked at in channel geomorphology would have been any different than the changes that channel geomorphology before that.

Mr. Hood: And again, the changes of flow in convergence, any of the records you looked at you accounted for those versions.

Mr. Burtell: Yeah, maybe Ms. Herr-Cardillo didn't hear my testimony, but I did fully look at the flow data from the teens and the 1930s but I was also very cognizant of the amount of irrigated acres and diversions that occurred above those gauges, and even mentioned, I think in my direct testimony that if you take those diversions and add it on to the flow data that was gauged, it still does not result in conclusion that the flow depths were typically greater than a foot. Even when those diversions are accounted for.

Mr. Hood: May I ask one more question that occurred to me, Mr. Chairman? I apologize I promised one and I have two.

Chairman Noble: I'm glad something's occurred to you.

[laughter]

Mr. Hood: Mr. Burtell, Ms. Herr-Cardillo asked some questions about certain crafts and whether they qualified as commercial vessels, etc. Do you recall having reviewed in the special master's report in the Utah case, the discussion of the vessels that were typical of trade and travel during that general time period?

Mr. Burtell: Yes, the boats that he considered for trade and travel were not, certainly in my reading of his reports were not recreational vehicles. Or recreational crafts. In fact, he had discounted the occasional use by prospectors of rafts going down because in his mind they would use them for short stretches, but weren't able to even pull – they'd have to pull the rafts back upstream. There was a discussion where his – as I read his case – he did not use the

occasional recreational use by a canoeist as a measure or a fact in his findings of navigability. He focused on larger boats, motor driven boats. Either steam or by that time, when he wrote his decision, there was actually gasoline powered boats. Those boats that he considered and looked at from a navigability perspective –

Mr. Hood: He looked at the drafts required by a variety of commercial vessels.

Mr. Burtell: That's correct.

Mr. Hood: That's all I have. Thank you.

Chairman Noble: Thank you. Anyone else have any questions?

Comm. Horton: Mr. Chairman Just a comment. I was at San Xavier six months ago, and you pronounced it correctly.

Mr. Burtell: Okay. My counsel had me worried that I had been pronouncing it wrong, and I assume you pronounced it like the basketball team. Which I think is Xavier.

Comm. Horton: Yeah. Down there they say San Xavier.

Mr. Burtell: I thought that was the case. I still get Prescott versus Prescott wrong.

Chairman Noble: Okay. No one else has any questions then we'll open it up the Commission. Commissioner Allen.

Comm. Allen: Could you define the difference between average and median flow just for the Commission's benefit please?

Mr. Burtell: Sure. What I look at in my report as median flows. I happened to look at median flows on a monthly basis, but, obviously you could look at a median flows on an annual basis. The median flows is the middle of the distribution. If you had a whole bunch of measurements, and you wind them up from the smallest of those measurements all the way to the largest, the median flow was that measurement that occurs right smack dab in the middle. That is to be contrasted with the average flow where all the flow data are taken in its entirety. And average flows for streams in Arizona as described by Fuller, both in the San Pedro and in the Santa Cruz,

as a measure of typical stream flow conditions, averages are usually not considered as appropriate because Arizona streams are known and for those of us that have been out there, it's a scary time, but when you do have flood flows, they are unusually high events. And those events have a disproportionate effect on all those other values, resulting in an average value that for most Arizona streams and those streams in the Southwest, the average flows are higher than the median flows. Median flows seem to be used more commonly for things like navigability determinations because it's a better measure of typical flow conditions that are less effected by those extreme high events.

Comm. Allen: Can you tell me when the infiltration gallery was installed in Nogales.

Mr. Burtell: Yes, in fact, in my report, I specifically made sure not to include a few years of data, when the gauge site was downstream of that infiltration gallery. And so, if you would let me refer to my table – it's in one of my footnotes, Commissioners, so if I could turn to that – it will take me a second. I know you just asked me for the year, and I apologize, I should know that off the top of my head, but – okay. And, I say it in my text. I say from March 13 to December 4, 1915 and from April 28, 1921 through 1922. The gauge was located half mile downstream at the Nogales pumping plant. Due to potential impacts from the plant on stream flows, data collected during these months are not included. So the plant was installed some time before 1915.

Comm. Allen: Prior to 1915.

Mr. Burtell: At least on or before March of 1915. The –

Comm. Allen: I'm sorry I can't hear. Fifty or 15?

Mr. Burtell: Fifteen, excuse me.

Comm. Allen: Okay.

Mr. Burtell: And the USGS when they would record these stream flow records, they would talk about any diversions that occurred above the gauge. And they mentioned when the gauge was temporarily located downstream of that pumping plant, I didn't include those

data for obvious reasons. I didn't know what the pumpage was from the Nogales Plant – that infiltration gallery.

Comm. Allen: It was significant.

Mr. Burtell: I believe so.

Comm. Allen: There was a change in stream channel morphology that occurred in the late 1800s, when the arroyo formations occurred throughout the state. So, as we recognize did occur on the San Pedro. And, at what point in time do you see that occurring and was it – I'll end with that.

Mr. Burtell: Sure. No, it's an excellent question and it's another document that I will suggest to counsel that I enter into evidence. It is a study that was done of how the channel in the Tucson area has changed over time. They've done a lot of archeological work in the Tucson area and what it shows is they go back several thousand – two, three thousand years. It shows how the channel has naturally changed. There has been erosion, and then infilling, and erosion and infilling, they encountered these changes in the channel geomorphology there as part of their archeological studies. Anyone who has spent any time in the Tucson area will see that it's an entrenched channel here. I think when you look at the photographs – and there's also entrenchment and a long history of entrenchment, Commissioner Allen, in the San Pedro area as well as in the Tucson area.

When you look at these photographs of the Nogales gauge, as well as if you've been to the Lochiel gauge, the entrenchment that was noted in the San Pedro and in the Tucson area was not noted or I have not seen in the Nogales area. And, in fact, the figures from the 1930s through the 60s all the way to now, shows little, if any entrenchment in the channel in the Nogales area. So what that leads me to believe is that there are different levels of entrenchment. I am certainly very familiar and you unfortunately weren't with us at the time, but we spent a lot of time discussing the changes in the geomorphology of the San Pedro River.

Comm. Allen: I was there.

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Mr. Burtell: You might have been, that's right, maybe you were in the audience.

Comm. Allen: Right.

Mr. Burtell: And, there's a lot of evidence of that entrenchment. When you look at the records for the upper Santa Cruz, in that portion where the Nogales gauge is, I simply have not found any studies that showed that area suffered that type of entrenchment. Certainly, within the Tucson area, there is a long, long, long history of entrenchment in many studies that have been done, which I am sure you are familiar with, including the USGS. Were they'd look back in time, starting as you said in the 1880s and certainly some of that entrenchment may have been effected or not by man's activities in the Tucson area. I think what we concluded, or I certainly concluded in the San Pedro, and I would also conclude in the Santa Cruz, or at least in the Tucson area, is it's not clear to me that those entrenchment events were simply caused by man. When you look archeologically…

Comm. Allen: I would agree.

Mr. Burtell: I think archeologically, when you go back three or four thousand years and you see that those same events, have been mapped in the Tucson area shows that it's a natural event. I don't know why the area in the Nogales range has not become more entrenched. I don't know why.

Comm. Allen: So you're assuming, then, that the channel changed very, very little between the late 1800s and the current conditions that exist there.

Mr. Burtell: In the Nogales area, I have not seen any evidence to say otherwise. In the Nogales area. Certainly in the Tucson area, I agree.

Comm. Allen: That'd be true of Lochiel?

Mr. Burtell: I would say the same thing at Lochiel. That I have not seen any evidence of substantial entrenchment of the channel in the Lochiel area.

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Comm. Allen: Okay, but if you look upstream from Lochiel, there has been head cutting occur. Is that correct?

Mr. Burtell: I have noticed it, yes. There is some head cutting.

Comm. Allen: So, undoubtedly, there has been some change in the channel geometry at that spot.

Mr. Burtell: There could be then, in the Lochiel area. I would then also offer to the Commission's consideration that in that area, there has been little if any development.

Comm. Allen: That's true.

Mr. Burtell: And so aside from …

Comm. Allen: Aside from the mining that's occurred in that area.

Mr. Burtell: In the Patagonia mountains adjacent. But I was thinking in the actual Lochiel –

Comm. Allen: Bed of the channel?

Mr. Burtell: In the Lochiel Valley, per se, there has been minimal agriculture, which leads me to conclude that this might be another indication of channel entrenchment where it does occur, can occur under natural conditions.

Comm. Allen: And then I would assume that both you and Hjalmarson would contend that there's been a little change in the precipitation that's occurred over the past 200 years.

Mr. Burtell: When I look at tree grain records, I think they show what most people have concluded and that is there are dry periods and wet periods. But there hasn't been a wholesale change.

Comm. Allen: Yep, not only has there been a wholesale change in the amount of precipitation, but during the time of the year when the precipitation has occurred.

Mr. Burtell: Some have argue that the entrenchment that occurred in the Tucson area is, and the USGS has reported that more than once that their opinion is a major factor in the entrenchment that

occurred in the Tucson area was caused by the change in frequency of flood events. Frequency of high precipitation events in the area. I think they also recognize that man's engineering project in the river in the Tucson area may have had some effect, but the ultimate driver of those events was precipitation and how that precipitation has changed.

Comm. Allen: When we go back to your Table 4.

Mr. Burtell: Okay.

Comm. Allen: And look at the depth versus discharge, what would be the point where it would be the amount of water that was discharged, now I believe you've given it in acre feet in Table 4, correct?

Mr. Burtell: What I did in Table 4 is I show the median flows.

Comm. Allen: Okay, median flow.

Mr. Burtell: Month by month. And it's kind of a shorthand. I highlighted in bold red, those median flows where, when you compare those flows to the measurements of the relationship between average stream flow depth and flow as the USGS measured those flows would result in average depth of great event flow. They would still be less than two feet, but they would be greater than a foot. The foot was kind of a bench mark that Mr. Hjalmarson even admitted to that in his opinion recreational watercraft would have difficult times perhaps navigating if it was less than a foot.

Comm. Allen: So at what point would it exceed one foot?

Mr. Burtell: Well, to answer that question, you have to go to my figure. And I apologize for having to just go back and forth here. If you look at my Figure 4, and this again is my relationship between measured discharge in the stream and average stream depth. And, if you look along the x axis, Mr. Hjalmarson indicated I shouldn't have put stream depth on the x axis, but it doesn't make any difference if you plot it on the y axis, you can still do the exercise. But if you go across the x axis and go over the one foot, and then work your way up the graph, you can see those field measurements of discharge where the average stream depth is greater than a foot.

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So to answer your question, to get greater than a foot of water in the stream, you typically have to get greater than 100 CFS of flow.

Comm. Allen: It says ten.

Mr. Burtell: I'm sorry, it says ten?

Comm. Allen: It says ten, on the table on Figure 4. Are you talking about figure 3?

Comm. Allen: Oh, I'm Figure 4 of the Nogales case.

Mr. Burtell: Okay, just a second. Oh, I'm sorry, I thought you were referring to the Nogales case. You're on the Lochiel ---

Comm. Allen: No, let's stay with Nogales.

Mr. Burtell: Okay. So there was one measurement that you can see that the discharge was – looks like it's about 15 CFS, which was about 1.2 feet. But that looked like an outlier. All the other measurements, if you come over to 1 feet, an average stream depth of 1 and work your way up, you'll see that you start to get stream flow depth greater than 1 when the discharge exceeds 100.

Comm. Allen: Or 150.

Mr. Burtell: Or 150. That's correct. Mr. Hjalmarson's pre-development stream flows for that area was on the order of 20 to 30 CFS. So, as I said during my direct testimony, I don't necessarily disagree with his average stream flows during pre-development time are unreasonable. But when you look at those average flows in relationship to what type of associated depths that they would have of flow, it would be less than a foot in my opinion.

Comm. Allen: I have a little trouble understanding that 10 times different between Lochiel and Nogales. And, I'm assuming that that's based solely on the width of the channel.

Mr. Burtell: I'm sorry, I didn't quite understand your comments about Lochiel.

Comm. Allen: The depth at Lochiel is 10 CFS where it reaches one foot.

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Mr. Burtell: Yeah, when, and that probably gets back to your point about there being more entrenchment there and that the channel is actually in more of a confined channel where it's more concentrated, and thus, it results in greater depths.

Comm. Allen: The only point that I would make in that regard is that there is a – if it were entrenched at Lochiel, and it had to have been entrenched to a certain degree at Nogales, you can't get upward erosion occurring unless you've got some physical thing happening in Lochiel, in the valley above Lochiel, where we do know entrenchment occurred, if you didn't have it down at the Nogales, because Nogales is downstream.

Mr. Burtell: Unless the, my understanding – the entrenchment works its way upstream,

Comm. Allen: That's correct. That's my point.

Mr. Burtell: And I guess my point would be is that unless there is some cause geological or otherwise for entrenchment to occur upstream of Nogales, but downstream of the Lochiel gauge and it worked its way up the channel up to the headwaters.

Comm. Allen: Okay. I've got no further questions.

Chairman Noble: Mr. Henness?

Comm. Henness: Nothing.

Chairman Noble: Mr. Horton?

Chairman Noble: Anyone else out there want to prolong this?

Mr. Breedlove: I do.

Chairman Noble: Mr. Breedlove does.

Mr. Breedlove: It's all right, I just have a couple of questions for clarification. Ms. Herr-Cardillo was asking you some questions that I've actually written down myself, and I just wanted a few clarifications.

Mr. Burtell: Please.

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Mr. Breedlove: So, actually, let's get back to the Utah Special Master Report.

Mr. Burtell: Okay.

Mr. Breedlove: Did it list a flat bottom canoe as a boat that was used in the timeframe that Arizona became a state?

Mr. Burtell: It certainly listed lots of different boats, including those that were used. That's correct.

Mr. Breedlove: And, do you know what the draft is on – I think it was talked about during the San Pedro hearing. Do you remember what the draft is on a flat bottom canoe or, I'm sure it's dependent on how much weight is in the canoe and that sort of thing.

Mr. Burtell: Yeah, it depends. I am not a boating expert as I think Ms. Herr-Cardillo was asking me, I am in no way a boating expert, but having canoed on rivers myself, certainly the size of the boat, the type of the boat, and the load of the boat is going to effect that draft. And so, I guess I bring to the Commission's attention when the Colorado River was being used for navigation purposes, prior to the dams being constructed, and prior to the railroad, that many times those boats that had very shallow drafts on waters, my understanding of less than a foot, would run aground. And they would run aground because those channels shifted, number one; and also, if they were loaded coming up from San Francisco that would have a bearing. So it's hard to give "a" answer – it depends on the boat and it depends on the load. I think the point though to contrast that being used for commercial purposes, is someone either by themselves or in a two person kayak, which would have a very minimal load, that would have a very shallow draft. Those type of boats in my mind are not meaningfully similar to those that were being used at statehood for commercial purposes.

Mr. Breedlove: Keeping in mind, I know that the record shows that there was little or no commercial boat travel on the river at the time of statehood. I know that, I just going into the question I am having – I'm going to ask you.

Mr. Burtell: I'm sorry, Mr. Breedlove, which river are you referring to the Santa Cruz or the ...

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Mr. Breedlove: Yes.

Mr. Burtell: Okay.

Mr. Breedlove: Just hypothetically speaking, Ms. Herr-Cardillo talked about James O'Patty and whether a canoe – whether that was actually a commercial use transporting beaver hydes or what have you. And I think you said that you didn't think so according to what you understood of the definition in existing jurisprudence, is that correct?

Mr. Burtell: No. I think I said I tried to explain my knowledge of what Patty actually did and she said, I don't want to put words in her mouth, or anyone's mouth, but I think she said, "Well, let's not worry about whether he was dragging his canoe along the stream with furs in it." If he was actually in the canoe on some river, floating down, loaded with furs, would that constitute a commercial use? And I would say, that probably would be. I would counter if his canoe, depending on the size of it, was loaded with furs, then it's going to have some draft to it, depending on how many furs he's got in there. And it's also going to have to be a pretty large canoe.

Mr. Breedlove: Just, hypothetically speaking, if somebody had a canoe, a flat bottom canoe and was transporting mail, I mean just hypothetically.

Mr. Burtell: Sure.

Mr. Breedlove: You know, down the San – do you remember which river we are on? The Santa Cruz.

Mr. Burtell: Sure.

Mr. Breedlove: Would that be a commercial use?

Mr. Burtell: If, yes. I think if somebody was using the river to transport mail up and down the river, I would say that would be a use of the river for trade or travel and that is a type of commerce.

Mr. Breedlove: Taxi service, hypothetically speaking.

Mr. Burtell: Yes, a taxi service, yes.

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Mr. Breedlove: Just a second, I just want to look at my notes.

Mr. Burtell: And, Mr. Breedlove, as you are looking at your notes, if I could add a point; in light of the time when there was occupation along the river, and during those months, because there was irrigation going on during the fall harvest period, or during the years, not just a month or two, but whole years when the area was largely abandoned, there were people in the area, but there's no accounts. Like for example, mail and supplies, would need to get to these people, but they didn't use the river, and I guess that's the point I tried to make in my report. For example, Mowry, who ran those mines in the Patagonia area that Commissioner Allen and I were discussing, he got his supplies from the Port of Guaymas and brought them up to Patagonia. He makes no mention of using the river, even during the period when it was all he could do to keep himself from being killed by the Apaches when he was operating those mines. And so, there was a need. There was a need for commercial use. I don't know how much mail was being transported at that time, but certainly supplies for his, he had a smelter there for gosh sakes. They had to get all those supplies. All those supplies got brought in by wagon.

Mr. Breedlove: So you were – just confirming. Your analysis really is that – you know that the test isn't whether it actually was used for commercial use, but it was susceptible to commercial use at the time. And so your argument then is that because there wasn't enough flow, in the stream channel at the time or that, you know, that it wasn't then susceptible to commercial use.

Mr. Burtell: No. I'm saying, I'm saying two things. I think both there – there wasn't enough flow, number one; but, in times when there was no diversions there was a need – but it simply wasn't being used. So, unlike the Utah case where the Utah case, I think, and I'm not a lawyer, but as I read it, the court wanted the point to be made that just because there wasn't evidence of historic navigation, by itself doesn't mean that there wasn't susceptible to navigation, with the understanding that maybe there wasn't anyone in the area at the time, so there was no need to bring supplies in or to transport people, etc. My argument in the Santa Cruz, is that there was a need. There was a military base. There were mines. And, even at times of year when there weren't any diversions, during several

years when the area was largely abandoned, but there's still a mine down there and there was still a military base, they still didn't use the river. So,

Mr. Breedlove: Thanks, Rich, Mr. Burtell.

Chairman Noble: Thank you Mr. Burtell. Is there anyone here that foresees a need or wants to have further oral testimony on the Santa Cruz?

The record will remain open until April 15, at noon for any further evidence that anyone wishes to submit or any response to evidence that has been submitted.

Now, let's see what we have coming up.

On April 25 we have a scheduling conference, 9 a.m., Phoenix, and I think – do we have other things on the calendar that we want to talk about?

Mr. Mehnert: April 24 in Globe for the Upper Salt.

Chairman Noble: April 24 in the Upper Salt in Globe.

Mr. Mehnert: [inaudible]

Chairman Noble: [inaudible]

Mr. Mehnert: [inaudible]

Chairman Noble: 'til noon.

Unknown: Yeah.

Unknown: Added April 15 is also when the Verde evidence is due, that's the initial due date.

Chairman Noble: The initial due date for the Verde evidence is also April 15 at noon.

Unknown: Correct.

Chairman Noble: Any questions about any of those things? Well then, we appreciate you being here, it's been fun to be here. Yes, Joy.

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Ms. Herr-Cardillo: Do we know when the briefing schedule is going to be on Santa Cruz, do you want to set that today?

Chairman Noble: Since the evidence isn't closing until the 15th and we're having a schedule conference on the 25th, let's just set it up at the scheduling conference. Okay.

Ms. Herr-Cardillo: Okay.

Chairman Noble: Let's just set it the briefing schedule, and the briefing schedule for everything at the scheduling conference.

Ms. Herr-Cardillo: I'm down for that.

Chairman Noble: If there is nothing else, this hearing is over. Thank you Mr. Allen.

[recording ends]

Arizona Navigable Stream Adjudication Commission
In re Determination of Navigability of the Santa Cruz River
(Case No. 03-002-NAV)
Tucson, Arizona, March 28, 2014

Transcription of audio tape 4 of 4

I, Barbara Leach, declare:

1. I work in the word processing department at Fennemore Craig, P.C.

2. At the request of Sean Hood, I reviewed and transcribed tape 4 of 4 of the March 28, 2014 hearing held in Tucson, Arizona in *In re In re Determination of Navigability of the Santa Cruz River* (Case No. 03-002-NAV). Mr. Hood provided assistance to identify certain speakers, words, and spellings that I was unsure about.

3. The foregoing transcription of tape 4 of 4 accurate to the best of my ability to hear and discern the questions, testimony, and other statements captured on the tape.

Executed on this 21st day of April, 2014

Barbara Leach

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