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IN THE SUPERIOR COURT OF THE STATE OF ARIZONA

IN AND FOR THE COUNTY OF MARICOPA

IN RE: THE GENERAL ADJUDICATION OF ALL RIGHTS TO USE WATER IN THE GILA RIVER SYSTEM AND SOURCE,	No. W-1 (Salt) No. W-2 (Verde) No. W-3 (Upper Gila) No. W-4 (San Pedro) Contested Case No. W1-11-232 **FREEPORT MINERALS CORPORATION'S EIGHTH SUPPLEMENTAL DISCLOSURE STATEMENT** (Assigned to the Honorable Mark H. Brain)

CONTESTED CASE NAME: *In re San Pedro Riparian National Conservation Area*

DESCRIPTIVE SUMMARY: Freeport Minerals Corporation submits its eighth supplemental disclosure statement.

NUMBER OF PAGES: 4

STATEMENT OF CLAIMANT NOS: 39-02297 *et al.* (numerous claims)

DATE OF FILING: July 25, 2017.

Freeport Minerals Corporation ("Freeport") submits its eighth supplemental disclosure statement for this contested case regarding the Federal Government's claimed federal reserved rights for the San Pedro Riparian National Conservation Area ("SPRNCA"). Freeport reserves the right to supplement and amend its disclosures.

8. EXHIBITS THAT FREEPORT MAY USE AT TRIAL.

Supplementing prior disclosures, Freeport discloses these documents that Freeport may use at trial. Freeport makes these disclosures without waiving any objection to the use of these documents as trial, including, without limitation, evidentiary objections, such as hearsay.

1. Electronic copies of documents relied upon by Dr. Steve Carothers in forming his expert opinions, (SPRNCA-CAROTHERS000001-8197);
2. Electronic copies of Chris Garrett files that were previously produced pursuant to subpoena (SPRNCA-GARRETT023901-23967);
3. Electronic copies of Rich Burtell files that were previously produced pursuant to subpoena (SPRNCA-BURTELL009970-9973), and
4. Electronic copies of Fort Huachuca Trial Exhibits 345, 346, and 1164.

9. DOCUMENTS THAT MAY BE RELEVANT TO THIS CASE.

Supplementing prior disclosures, Freeport discloses the following documents that may be relevant to the subject matter of this contested case. Freeport makes these disclosures without waiving any objection to the use of these documents as trial, including, without limitation, evidentiary objections, such as hearsay.

1. Electronic copies of documents obtained by Rich Burtell from Blakemore Thomas July 22, 2017 (SPRNCA-THOMAS000001-9).

A CD is included herewith containing electronic copies of all documents listed above.

DATED this 25th day of July, 2017.

SNELL & WILMER L.L.P.

L. William Staudenmaier
Attorneys for Freeport Minerals Corporation

FENNEMORE CRAIG, P.C.

By ______________________
Sean T. Hood
Brian J. Heiserman
Attorneys for Freeport Minerals Corporation

ORIGINAL of the foregoing filed
this 25th day of July, 2017 with:

Clerk of Maricopa County Superior Court
Attn: Water Case
601 West Jackson Street
Phoenix, Arizona 85003-2205

COPY hand-delivered this same day to:

Hon. Mark H. Brain
Judge of the Superior Court
Central Court Building, Suite 12A
201 West Jefferson
Phoenix, AZ 85003

Susan Ward Harris
Special Master
Central Court Building, Ste 3A
201 West Jefferson
Phoenix, AZ 85003-2205

COPY mailed this same day to
all persons appearing on the Court-
approved mailing list in W1-11-232 dated
June 26, 2017

By: [signature]

13085435.1

Rich Burtell

From:	Blake Thomas [blakemore.e.thomas@gmail.com]
Sent:	Saturday, July 22, 2017 11:53 AM
To:	Rich Burtell
Subject:	Re: Your interpretation from updating USGS Professional Paper 1712
Attachments:	Interpretation San Pedro update.docx

Rich,

Attached is the file with my interpretation of the results of the update of USGS Professional Paper 1712.

Blake

On Fri, Jul 21, 2017 at 6:04 PM, Rich Burtell <plateauresources@gmail.com> wrote:

Blake,

Back in August 2015, you tried to mail me a flash drive with your interpretation from updating USGS Professional Paper 1712. I don't recall receiving that flash drive and was hoping you could email me your interpretation. The Department of Justice recently requested a copy as part of ongoing litigation of SPRNCA's federal reserved water right claims.

Thanks for your help…hope all has been well.

Regards,

Rich Burtell, PG

Plateau Resources LLC

602.327.7486

Interpretation of the UpdatedAnalysis of Trends in Precipitation at Tombstone and Streamflow of the San Pedro River

by Blake Thomas (August 21, 2015)

I will go through each figure and table and give you my interpretation. I will evaluate the overall results and the differences between the analysis of 1913-2002 data (PP 1712) and the analysis of the updated data (1913-2014). I will try and keep this brief because you can see the numbers and results as well as I can. I'll offer any interpretations and insights that I learned from working closely with the data.

Trends in Monthly and Seasonal Precipitation (fig. 1 and table 1) (and some comments on total streamflows)

The updated trends for seasonal precipitation were similar to trends in PP 1712 (fig. 1). July precipitation had significant negative trends from 1913 to 2002 (PP 1712; table 9) and July had a significant negative trend from 1913-2000 in this study (table 1).

Trends in precipitation for selected time periods (table 1) were similar to trends for the entire record. The trendsthat are notable to me are the significant positive trends for September precipitation in the later time periods—1989-2014 and 2001-2014; and the *almost* significant positive trend in summer precipitation from 2001 to 2014 (p=0.150) (table 1).You can see a corresponding increase in July and August total flows from 1995 to 2014 (fig. 3b). There is increased variability of September total flows for 1995 to 2014 (fig. 3c), but no appreciable increase in total flows from the increased September precipitation. I don't have a theory about why that occurred, except just natural variability in runoff.

The most important result to me is the lack of significant trends in precipitation for almost all months for the entire record and for early and late time periods.The non-significant trends in precipitation are in sharp contrast to the large negative trends in streamflow. This is evidence that other factors besides precipitation have caused the declines in streamflow.

Trends in Seasonal Streamflow of San Pedro River(fig. 2)

The updated annual and seasonal flows (fig. 2) had significant negative trends and the trends are similar to the trends in PP 1712.

The notable thing to me is the nature of the flows in the updated period (2003-2014). Winter and spring flows were almost constant and had little variability. Summer flows during 2003-2014 had a similar large variability as the rest of the record, but there is a slight upward trend in the updated period. This upward trend for summer flows is nearly significant for 1989 to 2014 ($p=0.071$) (table 2).

Trends in Seasonal Streamflow of the San Pedro River at Palominas and Charleston (table 2)

Trends in summer flows are interesting. Palominas had no significant trends in all time periods, but Charleston had significant or nearly significant trends in all time periods except the latest (2001-2014).Of course, you need to be cautious about Palominas because of missing data. I don't know much about the watershed above Palominas and if there have been changes in vegetation, groundwater pumping, or anything else. But, these trends indicate that something has been happening between the gages. These trends are not precipitation adjusted, so maybe precipitation patterns and amounts were different above and below Palominas.

Adjustment of Streamflow for Precipitation and Testing for Trends
in Precipitation-Adjusted Flows

LOWESS regression equations (tables 3 and 4)

I don't think there is much to explain about the results shown tables 3 and 4. The equations were pretty successful in explaining variation in streamflow. The low flow equations for June through December were less accurate than the total flow equations for the same months (lower R^2 values). This is expected because precipitation has more influence on total flowswhich contain runoff from precipitation. Low flows contain some runoff in the summer and little or no runoff in the fall and winter.

The comparison of equations in PP 1712 with updated equations show that the updated equations were generally less accurate. Equations for total flow in PP 1712 had slightly higher R^2 values than the updated equations for all the months (an average of about 4 points). Equations for low flow in PP 1712 had slightly higher R^2 values for October through May (average of 7 points) and moderately higher for July, August, and September (average of 16 points). All the new equations are still valid. The residuals meet all the necessary assumptions and all the LOWESS lines fit through the center of the data, so there is no bias.

The following four paragraphs are probably too much information. The text explains some of my theories about why the new equations are slightly less accurate.

It seems like there is a little disconnect or change in the precipitation-streamflow relations for thenew data compared to the PP 1712 data. The change occurred mostly in the total flows for July, August, and September, and in the low flows for August to November. The change for the new data can be seen in the plots of precipitation-adjusted flows. There is a larger scatter in adjusted total flowssince about 1995 in July, August (fig. 3b), and September (fig. 3c). There is also a larger scatter in adjusted low flows since 1995in August (fig. 4b), September, October, and November (fig. 4c).

I think one cause of the increased scatter since 1995 is simply that summer total streamflows (July-September) were more variable in 1995 to 2014 compared to the previous years (1913-1994). From the early period to the late period, the <u>coefficient of variation (COV) for summer totalstreamflow (log values) increasedby 48 percent</u>. In contrast, total volume of summer streamflow decreased by 16 percent from the early period to late period. The volume and variability of summer precipitation remained essentially the same (changes in volume and COV were less than 5 percent). So, if summer precipitation did not change and the volume of summer total flows changed only slightly, why did the variability of summer flows increase substantially?

The other decrease in accuracy (larger scatter of data) of the regression models from the early period (1931-1994) to the late period (1995-2014) was in the adjusted low flows in late summer and early fall (August-November).The COV of the log low flows increased by an average of 85 percent for this period and the average log low flow decreased by an average of 25 percent. Precipitation did not change substantially—the COV decreased by an average of 2 percent and total precipitation increased by an average of 6 percent. So, we have the same problem explaining the increased scatter in late summer and early fall adjusted low flows as we did in thesummer adjusted total flows—little or no change in precipitation and a large increase in variability of streamflows. One possible reason for the large scatter in late summer and early fall adjusted low flows is that the large variability of summer total streamflows carried over into the fall when a corresponding large variability in bank storage was released.

A different regression model might work better for the new data. Different combinations of monthly precipitation might have a better fit. The characteristics and variability of precipitation and runoff within monthsalso might have changed. That is not accounted for in these models of monthly precipitation and flows. Another factor that I haven't thoroughly discussed before is that we used monthly precipitation at Tombstone as a relative indicator of monthly precipitation for the entire watershed. That seemed to work well for the data used in PP 1712. Maybe, the spatial distribution of monthly precipitation in the watershed changed during 1995-2014 and Tombstone wasn't as good an indicator variable as it was during 1913-2002.

I think there are a couple good choices for future research in the watershed to get better models of precipitation-runoff relations: (1) study changes in the characteristics of precipitation within months and (2) study changes in spatial distribution of precipitation. Number (1) would take some time but it would not be complicated. You could do it at Tombstone, Coronado National Monument, Y Lighting Ranch, Fort Huachuca, Sierra Vista, and others? Number (2) could also use the same sites, but it would be more difficult to determine. Other people have probably already thought of this, but I don't know if the research has been done.

Trends in streamflow and streamflow adjusted for variation in precipitation (tables 5 and 6; and figs. 3 and 4)

The results in tables 5 and 6 are pretty easy to see and interpret. The principal conclusion I see is that adding data for 2003-2014 resulted in some changes in trends for winter and spring flows. There are more significant negative trends in actual total flows and low flows and in adjusted total flows and low flows. It appears that there could have been some change in the watershed or environment during 2003-2014. Precipitation did not decrease from 2001 to 2014 (table 1) and changes in precipitation should be accounted for in the adjusted flows. I think increased temperatures might be a factor. I was pretty confident that regional year-round groundwater pumping had not affected winter low flows up until 2002, because of the non-significant trends in adjusted low flows for four months (January through April) (PP 1712, table 19). Now there are only two winter months (February and March) with non-significant trends in adjusted low flows (table 6). This is still important, and it can still be interpreted as evidence that pumping has not affected winter low flows. It just makes me a little less confident than I was for the analyses of streamflows up to 2002.

<u>Step trends in Streamflow</u>

I'm sure you know this, but I'll just repeat what these tests are for. We are testing for differences between regression relations between rainfall and runoff. This is another way of determining differences in streamflow or runoff over time while accounting for precipitation.
We test for difference in slope first. An assumption of the test for intercept is that the regression slopes must be parallel. If they aren't parallel, we can't test for intercepts. I used the significance tests for slope and defined slopes as parallel when the p-value was greater than 0.10. I couldn't find any clear statement about the definition of parallel in a couple textbooks, so I picked a fairly conservative p-value. When the slopes are parallel, the test for intercept is the same as a test for differences in the mean of streamflow.

Table 7 shows the significance tests for differences in the regression equations for three time periods and figure 7 shows the plots of the regression equations for three time periods. I've also included two extra tables to help in the interpretation. Table 8 provides information on the three regression equations for each month. It shows the regression coefficients, R^2, standard error, and significance of the regression (p-value). Table 9 shows the outliers that I removed from the analysis.

First, I want to state a couple limitations of this analysis. The time periods are fairly short. The number of years tested is even smaller because of (1) missing precipitation data, (2) removal of data with less than 0.3 inches of precipitation (no runoff below that value), and (3) removal of some outliers. The main point is that you need to be cautious in interpreting the significance tests and you need to look carefully at the plotted data. With small data sets, a few points and outliers can have a large influence on the regression relations and make differences in the significance tests.

I removed 22 outliers from the regression analysis; 16 were high outliers and 6 were low outliers (table 9). As I said in the above paragraph, you need to evaluate points that can have a large influence on the regression equations. The main purpose of this analysis is to determine regression relations that represent the rainfall-runoff relations for most of the data. High outliers typically cause a much higher slope than is shown in most of the data and usually cause a poor fit of the equations to most of the data. So, I removed the outliers to obtain the best fit of the regression equations to most of the data. I still used most of the data. Between 89 and 95 percent of the data in each time period was used after removal of the outliers (table 9).

You can see the results in table 7 as well as I can, so I won't discuss all the tests. I'll point out the patterns that show up in the tests. In the tests between all three time periods and between the early and middle periods, the slopes of the equations were significantly different more often than the intercept. In the tests between the middle and late time periods and between the early and late time periods, slopes were not as significant and most of the tests for intercepts were significant. It's all kind of messy, and I was surprised there were so many significant differences.

There are some limitations in the distribution of precipitation data in the three time periods that likely affect the computed regression relations and significance tests. Ideally, you want to have a similar range of precipitation in all three time periods with similar minimums and maximums.

Data in the time periods of March, April, August, October, and November do not have similar distributions of precipitation, so we need to be cautious in interpreting the regression relations and significance tests for these months.

All the months with an uneven distribution of data have a common problem. The problem is at the low end of the precipitation data. Two of the time periods in those months have data starting near 0.4 inch. The third time period has data starting at higher values, typically at about 1.0 inch.

In March and April, the early and late time periods have quite a bit of data at low precipitation values from about 0.4 to 1.0 inch (fig. 7a). The lowest precipitation in the middle time period is about 1.0 inch. The middle period also has higher precipitation than the early and late periods. We don't know what would happen to the slope of the middle period if there were low precipitation values in the 0.4 to 1.0 inch range. Therefore, we need to be cautious in interpreting the slope of the middle period – it might not be as steep as this data distribution shows.

In August, the early and middle time periods have similar distributions of precipitation data starting at about 0.6 inch. The lowest precipitation value for the late period is about 1.0 inch.

In October and November, there are differences in the distribution of precipitation at both ends in all three time periods (fig. 7b). This might be why the slopes are so different and the plots look odd.

I'll mention one more way of interpreting these regression relations. Just ignore the slopes and look at the center of the plotted data for the three time periods. The regression equations are the most accurate at the center of the data. Looking at just the plots doesn't give you the significance tests and p-values, but I think it is useful. Select the precipitation value at the center of the data and go up to where it intercepts the regression relations. You can say that for this value of precipitation, runoff is larger or smaller for the three time periods.

I think you can find common relations for three groups of months.

1) February, March, May, September,and November—runoff is similar in the early and middle periods (1954-1994) and there is less runoff in the late period (1995-2014).

2) July and August—runoff was highest in the early period (1954-1974) and similar in the middle and late periods (1975-2014). I don't know why the middle period in July had such a steep slope.You can see a large variability in July total flows in the middle period (1975 to 1994) in the trend plot in figure 3b. But, there was no large variability in July precipitation for the same period (see graph below). It looks like there is a downward trend in precipitation and streamflow from 1975 to 1994, but I don't know how that would translate to a steep rainfall-runoff relation.

3) April and October—there were only small changes in runoff across the three periods. October is difficult to interpret because of the large differences in slope of the three regression relations, but at the center of the data, there appears to be only small differences in runoff.