

## MEMORANDUM

**To:** SWCA Environmental Consultants, Brad Sohm  
**From:** JBR Environmental Consultants C/O Rosemont Copper Corp.  
**Date:** March 26, 2013  
**Subject:** CALPUFF Far-Field Analysis, Revised Impact Tables

---

Subsequent to providing CALPUFF modeling data to the Coronado National Forest for the Final Environmental Impact Statement (FEIS) in support of the Rosemont Copper Project, it was requested by the Forest Service that the CALPUFF modeled visibility impacts be reported based on the 98th percentile impact interval rather than the maximum modeled impact. As a result, The CALPUFF outputs were analyzed to determine the 98th percentile impact value. This was completed by reviewing the 24-hr visibility impacts for each day of each modeled meteorological year. The days were ranked for each year and the 8th highest value was selected for each year. The highest eight high for each modeled meteorological year were then averaged. This value was reported as the 98th percentile value. The maximum modeled delta-deciview value and the days that the maximum receptor delta-deciview value exceeded 0.5 and 1.0 deciview was still reported.

In addition, while compiling the 98th percentile visibility impacts, the previously reported impact were reviewed. During this process, a transcription error in the impact spreadsheets came to light. The error was limited to the maximum determination for the Mine Plan of Operations during the year one emissions assessments. This resulted in a few subtle changes to the impact tables for those scenarios. As a result, the affected tables for this scenario have been revised and included in this memorandum for inclusion in the final Air Quality Technical Support Document. The limited changes are highlighted for ease of review in those tables. The table numbers of the tables in this memorandum are those that are used in CALPUFF modeling report.

**Table 9.1.1**

<b>Mine Plan of Operations Saguaro National Monument West Maximum Impact</b>			<b>Year 1 Emissions</b>	<b>Year 5 Emissions</b>
<b>Visibility</b>	Days Above 0.5dv		35	6
	Days Above 1.0dv		10	1
	98% dV Impact <sup>1</sup>		1.10	0.49
	Max dV Impact		2.39	1.24

<sup>1</sup> 24-Hr Highest Eighth High (Chronologically) Averaged over 3 Meteorological Years

**Table 9.1.2**

<b>Barrel Alternative Saguaro National Monument West Maximum Impact</b>			<b>Year 1 Emissions</b>	<b>Year 12 Emissions</b>
<b>Visibility</b>	Days Above 0.5dv		14	7
	Days Above 1.0dv		4	0
	98% dV Impact <sup>1</sup>		0.71	0.49
	Max dV Impact		4.21	0.94

<sup>1</sup> 24-Hr Highest Eighth High (Chronologically) Averaged over 3 Meteorological Years

**Table 9.1.3**

<b>Barrel Trail Alternative Saguaro National Monument West Maximum Impact</b>			<b>Year 1 Emissions</b>	<b>Year 5 Emissions</b>
<b>Visibility</b>	Days Above 0.5dv		11	7
	Days Above 1.0dv		0	0
	98% dV Impact <sup>1</sup>		0.53	0.48
	Max dV Impact		0.87	0.87

<sup>1</sup> 24-Hr Highest Eighth High (Chronologically) Averaged over 3 Meteorological Years

**Table 9.1.4**

<b>Scholefield-McCleary Alternative Saguaro National Monument West Maximum Impact</b>			<b>Year 1 Emissions</b>	<b>Year 5 Emissions</b>
<b>Visibility</b>	Days Above 0.5dv		15	16
	Days Above 1.0dv		1	1
	98% dV Impact <sup>1</sup>		0.58	0.61
	Max dV Impact		1.02	1.10

<sup>1</sup> 24-Hr Highest Eighth High (Chronologically) Averaged over 3 Meteorological Years

**Table 9.2.1**

<b>Mine Plan of Operations Chiricahua National Monument</b>		
<b>Maximum Impact</b>		
<b>Visibility</b>		
	Days Above 0.5dv	2
	Days Above 1.0dv	0
	98% dV Impact <sup>1</sup>	0.26
	Max dV Impact	0.91

<sup>1</sup> 24-Hr Highest Eighth High (Chronologically) Averaged over 3 Meteorological Years

**Table 9.2.2**

<b>Barrel Alternative Chiricahua National Monument</b>		
<b>Maximum Impact</b>		
<b>Visibility</b>		
	Days Above 0.5dv	0
	Days Above 1.0dv	0
	98% dV Impact <sup>1</sup>	0.19
	Max dV Impact	0.33

<sup>1</sup> 24-Hr Highest Eighth High (Chronologically) Averaged over 3 Meteorological Years

**Table 9.2.3**

<b>Barrel Trail Alternative Chiricahua National Monument</b>		
<b>Maximum Impact</b>		
<b>Visibility</b>		
	Days Above 0.5dv	0
	Days Above 1.0dv	0
	98% dV Impact <sup>1</sup>	0.19
	Max dV Impact	0.40

<sup>1</sup> 24-Hr Highest Eighth High (Chronologically) Averaged over 3 Meteorological Years

**Table 9.2.4**

<b>Scholefield-McCleary Alternative Chiricahua National Monument</b>		
<b>Maximum Impact</b>		
<b>Visibility</b>		
	Days Above 0.5dv	1
	Days Above 1.0dv	0
	98% dV Impact <sup>1</sup>	0.20
	Max dV Impact	0.42

<sup>1</sup> 24-Hr Highest Eighth High (Chronologically) Averaged over 3 Meteorological Years

**Table 9.3.1**

<b>Mine Plan of Operations Chiricahua Wilderness Area</b>		
<b>Maximum Impact</b>		
<b>Visibility</b>		
	Days Above 0.5dv	
	Days Above 1.0dv	
	98% dV Impact <sup>1</sup>	
	Max dV Impact	
		<b>Year 1 Emissions</b>
		<b>Year 5 Emissions</b>
		0
		1
		0
		0.12
		0.11
		0.46
		0.67

<sup>1</sup> 24-Hr Highest Eighth High (Chronologically) Averaged over 3 Meteorological Years

**Table 9.3.2**

<b>Barrel Alternative Chiricahua Wilderness Area</b>		
<b>Maximum Impact</b>		
<b>Visibility</b>		
	Days Above 0.5dv	
	Days Above 1.0dv	
	98% dV Impact <sup>1</sup>	
	Max dV Impact	
		<b>Year 1 Emissions</b>
		<b>Year 12 Emissions</b>
		0
		0
		0.10
		0.14
		0.23
		0.35

<sup>1</sup> 24-Hr Highest Eighth High (Chronologically) Averaged over 3 Meteorological Years

**Table 9.3.3**

<b>Barrel Trail Alternative Chiricahua Wilderness Area</b>		
<b>Maximum Impact</b>		
<b>Visibility</b>		
	Days Above 0.5dv	
	Days Above 1.0dv	
	98% dV Impact <sup>1</sup>	
	Max dV Impact	
		<b>Year 1 Emissions</b>
		<b>Year 5 Emissions</b>
		0
		0
		0.09
		0.10
		0.22
		0.30

<sup>1</sup> 24-Hr Highest Eighth High (Chronologically) Averaged over 3 Meteorological Years

**Table 9.3.4**

<b>Scholefield-McCleary Alternative Chiricahua Wilderness Area</b>		
<b>Maximum Impact</b>		
<b>Visibility</b>		
	Days Above 0.5dv	
	Days Above 1.0dv	
	98% dV Impact <sup>1</sup>	
	Max dV Impact	
		<b>Year 1 Emissions</b>
		<b>Year 5 Emissions</b>
		0
		0
		0.11
		0.12
		0.24
		0.30

<sup>1</sup> 24-Hr Highest Eighth High (Chronologically) Averaged over 3 Meteorological Years

Table 9.4.1

<b>Mine Plan of Operations Galiuro Wilderness Area</b>		
<b>Maximum Impact</b>		
<b>Visibility</b>		
	Days Above 0.5dv	16
	Days Above 1.0dv	9
	98% dV Impact <sup>1</sup>	1.23
	Max dV Impact	7.71

<sup>1</sup> 24-Hr Highest Eighth High (Chronologically) Averaged over 3 Meteorological Years

Table 9.4.2

<b>Barrel Alternative Galiuro Wilderness Area</b>		
<b>Maximum Impact</b>		
<b>Visibility</b>		
	Days Above 0.5dv	9
	Days Above 1.0dv	3
	98% dV Impact <sup>1</sup>	0.61
	Max dV Impact	2.58

<sup>1</sup> 24-Hr Highest Eighth High (Chronologically) Averaged over 3 Meteorological Years

Table 9.4.3

<b>Barrel Trail Alternative Galiuro Wilderness Area</b>		
<b>Maximum Impact</b>		
<b>Visibility</b>		
	Days Above 0.5dv	8
	Days Above 1.0dv	2
	98% dV Impact <sup>1</sup>	0.50
	Max dV Impact	2.32

<sup>1</sup> 24-Hr Highest Eighth High (Chronologically) Averaged over 3 Meteorological Years

Table 9.4.4

<b>Scholefield-McCleary Alternative Galiuro Wilderness Area</b>		
<b>Maximum Impact</b>		
<b>Visibility</b>		
	Days Above 0.5dv	9
	Days Above 1.0dv	2
	98% dV Impact <sup>1</sup>	0.58
	Max dV Impact	2.44

<sup>1</sup> 24-Hr Highest Eighth High (Chronologically) Averaged over 3 Meteorological Years

**Table 9.5.1**

<b>Mine Plan of Operations Superstition Wilderness Area</b>			
<b>Maximum Impact</b>			
		<b>Year 1 Emissions</b>	
		<b>Year 5 Emissions</b>	
<b>Visibility</b>	Days Above 0.5dv	1	0
	Days Above 1.0dv	0	0
	98% dV Impact <sup>1</sup>	0.11	0.05
	Max dV Impact	0.61	0.28

<sup>1</sup> 24-Hr Highest Eighth High (Chronologically) Averaged over 3 Meteorological Years

**Table 9.5.2**

<b>Barrel Alternative Superstition Wilderness Area</b>			
<b>Maximum Impact</b>			
		<b>Year 1 Emissions</b>	
		<b>Year 12 Emissions</b>	
<b>Visibility</b>	Days Above 0.5dv	0	0
	Days Above 1.0dv	0	0
	98% dV Impact <sup>1</sup>	0.06	0.06
	Max dV Impact	0.33	0.28

<sup>1</sup> 24-Hr Highest Eighth High (Chronologically) Averaged over 3 Meteorological Years

**Table 9.5.3**

<b>Barrel Trail Alternative Superstition Wilderness Area</b>			
<b>Maximum Impact</b>			
		<b>Year 1 Emissions</b>	
		<b>Year 5 Emissions</b>	
<b>Visibility</b>	Days Above 0.5dv	0	0
	Days Above 1.0dv	0	0
	98% dV Impact <sup>1</sup>	0.06	0.05
	Max dV Impact	0.27	0.25

<sup>1</sup> 24-Hr Highest Eighth High (Chronologically) Averaged over 3 Meteorological Years

**Table 9.5.4**

<b>Scholefield-McCleary Alternative Superstition Wilderness Area</b>			
<b>Maximum Impact</b>			
		<b>Year 1 Emissions</b>	
		<b>Year 5 Emissions</b>	
<b>Visibility</b>	Days Above 0.5dv	0	0
	Days Above 1.0dv	0	0
	98% dV Impact <sup>1</sup>	0.06	0.06
	Max dV Impact	0.31	0.32

<sup>1</sup> 24-Hr Highest Eighth High (Chronologically) Averaged over 3 Meteorological Years

Table 8.1.1 - Mine Plan of Operations / Phased Tailings Alternative: Impacts at Saguaro National Monument West

Saguaro National Monument West								
Maximum Impact		Year 1 Emissions	Year 5 Emissions	Maximum Impacts	Class I Increment	Background ( $\mu\text{g}/\text{m}^3$ )	Total Impact ( $\mu\text{g}/\text{m}^3$ )	NAAQS ( $\mu\text{g}/\text{m}^3$ )
NO <sub>x</sub>	1-hr ( $\mu\text{g}/\text{m}^3$ )	4.84	4.84	4.84	N/A	24.50	29.34	188
	Ann ( $\mu\text{g}/\text{m}^3$ )	0.11	0.10	0.11	2.50	4.00	4.11	100
SO <sub>x</sub>	1-hr ( $\mu\text{g}/\text{m}^3$ )	0.40	0.40	0.40	N/A	17.20	17.60	195
	3-hr ( $\mu\text{g}/\text{m}^3$ )	0.18	0.17	0.18	25.00	43.00	43.18	1300
	24-hr	0.04	0.04	0.04	5.00	14.00	14.04	365
	Ann ( $\mu\text{g}/\text{m}^3$ )	6.40E-04	5.26E-04	6.40E-04	2.00	3.00	3.00	80
PM <sub>2.5</sub>	24-hr	0.15	0.12	0.15	2.00	11.40	11.55	35
	Ann ( $\mu\text{g}/\text{m}^3$ )	0.02	0.02	0.02	1.00	5.10	5.12	15
PM <sub>10</sub>	24-hr	0.49	0.60	0.60	8.00	47.60	48.20	150

Notes:  $\mu\text{g}/\text{m}^3$  = micrograms per cubic meter; Ann = annual, hr = hour

Table 8.4.1 - Mine Plan of Operations / Phased Tailings Alternative: Impacts at Galiuro Wilderness Area

Galiuro Wilderness Area								
Maximum Impact		Year 1 Emissions	Year 5 Emissions	Maximum Impacts	Class I Increment	Background ( $\mu\text{g}/\text{m}^3$ )	Total Impact ( $\mu\text{g}/\text{m}^3$ )	NAAQS ( $\mu\text{g}/\text{m}^3$ )
NO <sub>x</sub>	1-hr ( $\mu\text{g}/\text{m}^3$ )	56.96	56.96	56.96	N/A	24.5	81.46	188
	Ann ( $\mu\text{g}/\text{m}^3$ )	0.03	0.04	0.04	2.5	4	4.04	100
SO <sub>x</sub>	1-hr ( $\mu\text{g}/\text{m}^3$ )	0.42	0.42	0.42	N/A	17.2	17.62	195
	3-hr ( $\mu\text{g}/\text{m}^3$ )	0.22	0.20	0.22	25	43	43.22	1300
	24-hr	0.03	0.03	0.03	5	14	14.03	365
	Ann ( $\mu\text{g}/\text{m}^3$ )	4.70E-04	4.47E-04	4.70E-04	2	3	3.00	80
PM <sub>2.5</sub>	24-hr	0.41	0.75	0.75	2	11.4	12.15	35
	Ann ( $\mu\text{g}/\text{m}^3$ )	6.16E-03	9.35E-03	9.35E-03	1	5.1	5.11	15
PM <sub>10</sub>	24-hr	2.13	4.79	4.79	8	47.6	52.39	150

Notes:  $\mu\text{g}/\text{m}^3$  = micrograms per cubic meter; Ann = annual, hr = hour

**Table 10.1.1**

<b>Mine Plan of Operations Saguaro National Monument West</b>					
<b>Maximum Impact</b>		<b>Year 1 Emissions</b>	<b>Year 5 Emissions</b>	<b>Maximum Impacts</b>	<b>Western FLAG DAT</b>
<b>Deposition</b>	S(kg/hectar/yr)	1.39E-03	4.50E-04	1.39E-03	5.00E-03
	N(kg/hectar)	1.88E-02	1.61E-02	1.88E-02	5.00E-03

**Table 10.5.1**

<b>Mine Plan of Operations Superstition Wilderness Area</b>					
<b>Maximum Impact</b>		<b>Year 1 Emissions</b>	<b>Year 5 Emissions</b>	<b>Maximum Impacts</b>	<b>Western FLAG DAT</b>
<b>Deposition</b>	S(kg/hectar)	3.53E-04	4.76E-05	3.53E-04	5.00E-03
	N(kg/hectar)	1.68E-03	1.36E-03	1.68E-03	5.00E-03