HUDBAY

February 3, 2015

Coronado National Forest
300 West Congress Street
Tucson, AZ 85701

Attn: Jim Upchurch, Forest Supervisor

Dear Mr. Upchurch:

In your letter dated January 16, 2015, you requested that we provide analysis of air emissions using updated emissions factors provided by Caterpillar (CAT). On January 28, we provided an update to the air analysis presented in Table 42 in the EIS, which now requires further clarification.

The emission factors from CAT were provided without explanation and I assumed that they corresponded to the updated Tier 4 Final emissions factors. However, that was an incorrect assumption. The emission factors from CAT were not Tier 4 Final for all vehicles, but instead reflected the emissions information for currently available equipment, not the Tier 4 Final equipment being required by Rosemont or the Forest. It became necessary to tie back to the emissions information previously provided to the Forest Service so that it was clear what factors were included in the EIS process.

Haul Truck Emissions Factor Evolution

Type	NOx+ VOC	CO	PM	Units	Reference
Tier 2- Emission certification values from CAT	4.55	1.72	0.14	g/hp-hr	Provided by CAT in October 2009 and converted from units of g/kW-hr to units of g/hp-hr. These values were used in the July 2010 document titled *Emission Inventory Information*.
Tier 2	4.8	2.6	0.15	g/hp-hr	From 40 CFR 89.112, Table 1, >560 kW and converted from units of g/kW-hr to units of g/hp-hr. These values were used for all haul trucks in the April 2011 document titled *Amendment to: Emission Inventory Information*. The values were also used for 25 of the haul trucks in the Rosemont calculations from February 2013.
Tier 2 (Tier 4i)	4.55	1.72	0.142	g/hp-hr	These are what CAT gave the Forest Service in March/April 2014. The factors are Tier 2 Certified as Tier 4i under Flex provisions.
Tier 4f	2.75	2.6	0.03	g/hp-hr	From 40 CFR 1039.101, Table 1, >560 kW and converted from g/kW-hr to g/hp-hr. These values were used for the remainder of the haul trucks (outside of the 25 Tier 2 haul trucks) in the Rosemont calculations from February 2013.

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The values from the Rosemont calculations from February 2013 correspond to the values included in Table 42 of the EIS (reproduced below). These are also the same values that were used in the final modeling analyses included in the EIS.

Revised Table 42a is presented below and corresponds to the emission calculations resulting from using all of the updated emission factors regardless of standard provided by CAT in March/April 2014. This table was provided to the Forest Service on January 28, 2015. As previously described, the updated emission factors from CAT reflected the emissions information for currently available equipment, not necessarily the Tier 4 Final equipment that is to be used by Rosemont in all equipment (except 25 of the haul trucks and the two 2,000 hp front end loaders). Therefore, Table 42a shows an artificial increase in emissions for some pollutants as compared to the original Table 42.

A new Revised Table 42b is presented below and corresponds to using the updated emission factors from CAT only for 25 of the haul trucks, the skid steer loaders, and the D11T crawler dozers. As described in the Haul Truck Emissions Factor Evolution table above, emissions from the 25 haul trucks were previously calculated using the Tier 2 emission standards. The updated emission factors from CAT result in a decrease in emissions from the 25 haul trucks. Additionally, the updated Tier 4 Final emission factors provided by CAT in March/April 2014 for the skid steer loaders and the D11T crawler dozers also show a decrease in emissions. No other emission sources were changed when developing Revised Table 42b. Emissions from all remaining mobile sources were calculated using the Tier 4 Final emission standards (except for the two 2,000 hp front end loaders, which continue to use the Tier 2 emission standards).

Table 42. Maximum annual point and fugitive source emissions within the perimeter fence under the action alternatives in tons per year.

Alternative	Pollutant PM_{10}	Pollutant $PM_{2.5}$	Pollutant SO_2	Pollutant NO_x	Pollutant CO	Pollutant Pb
Proposed action	943.2	138.9	20.6	1,194.8	1,476.8	0.39
Phased Tails	943.2	138.9	20.6	1,194.8	1,476.8	0.39
Barrel	1,037.7	147.8	20.5	1,190.2	1,475.1	0.43
Barrel Trail	1,003.1	145.3	20.6	1,243.1	1,524.9	0.42
Scholefield-McCleary	1,109.8	157.2	20.6	1,355.8	1,637.2	0.46

Revised Table 42a.

Alternative	Pollutant PM_{10}	Pollutant $PM_{2.5}$	Pollutant SO_2	Pollutant NO_x	Pollutant CO	Pollutant Pb
Proposed action	944.3	139.9	20.6	1,224.3	1,276.9	0.39
Phased Tails	944.3	139.9	20.6	1,224.3	1,276.9	0.39
Barrel	1,038.7	148.8	20.5	1,219.7	1,275.2	0.43
Barrel Trail	1,004.1	146.4	20.6	1,272.6	1325.0	0.42
Scholefield-McCleary	1,110.8	158.2	20.6	1,437.3*	1,385.3*	0.46

* These values were inadvertently switched in the January 28, 2015 letter. 1,437.3 tons/year should have corresponded to CO and 1,385.3 tons/year should have corresponded with NOx.

Revised Table 42b.

Alternative	Pollutant PM_{10}	Pollutant $PM_{2.5}$	Pollutant SO_2	Pollutant NO_x	Pollutant CO	Pollutant Pb
Proposed action	941.8	137.5	20.6	1,155.6	1,322.4	0.39
Phased Tails	941.8	137.5	20.6	1,155.6	1,322.4	0.39
Barrel	1,036.3	146.4	20.5	1,151.1	1,320.7	0.43
Barrel Trail	1,001.7	144.0	20.6	1,203.9	1,370.5	0.42
Scholefield-McCleary	1,108.4	155.8	20.6	1,316.7	1,482.8	0.46

Because not all of the emissions factors provided by CAT meet the standards set by the regulation for Tier 4 Final compliance and instead represent compliance under the flex provisions, we believe the emissions calculated using those factors (and incorporated into Revised Table 42a) do not represent the final fleet that will be used at the Rosemont Project. As we stated in our January letter, the requirements set by Rosemont will be best met by the standards set using horsepower standards rather than interim standards where the configurations may not be known.

I believe Revised Table 42b represents the best information we have at this time regarding emissions calculations and I apologize if my prior correspondence did not fully explain our reservations.

Please let me know if you have any questions regarding the information provided.

Sincerely,

Katherine Ann Arnold, P.E.
Director of Environment

Attachment: *Emissions Worksheets (3)*

cc: Mindy Vogel, Coronado National Forest
Melissa Polm, SWCA

Doc. No. 013/15-15.3.1

Rosemont Copper Project - Summary of Emissions for the Proposed Action and Each Alternative (revised February 3, 2015)																
Operating Scenario and Corresponding Year of Operation [3]	**Emissions Source**	**Emissions (tpy)**														
		PM/TSP [1]	**PM_{10} [1]**	**$PM_{2.5}$ [1]**	**Lead**	**CO**	**NO_x**	**SO_2**	**VOC**	**H_2SO_4**	**SO_4 [2]**	**Soot [2]**	**CO_2**	**CH_4**	**N_2O**	**CO_2e [5]**
Proposed Action Year 1	Non-Fugitive Emissions	78.46	39.03	10.23	0.005	9.00	16.76	0.06	1.51	0.02	-	-	6,040.20	0.25	0.05	6,060.93
	Fugitive Emissions	2,791.22	765.20	88.32	0.33	635.83	161.33	18.98	3.77	0	-	-	5,375.60	0.22	0.04	5,394.05
	Tailpipe Emissions [4]	28.01	28.01	28.01	-	677.57	977.55	1.54	70.27	-	0.03	22.28	163,786.04	-	-	163,786.04
	Total Emissions	**2,897.69**	**832.24**	**126.57**	**0.33**	**1,322.4**	**1,155.6**	**20.6**	**75.55**	**0.02**	**0.03**	**22.28**	**175,201.84**	**0.46**	**0.09**	**175,241.02**
Proposed Action Year 5	Non-Fugitive Emissions	78.46	39.03	10.23	0.005	9.00	16.76	0.06	1.51	0.02	-	-	6,040.20	0.25	0.05	6,060.93
	Fugitive Emissions	3,238.04	874.81	99.24	0.38	606.22	153.82	18.10	3.77	0	-	-	5,125.23	0.21	0.04	5,142.82
	Tailpipe Emissions [4]	28.00	28.00	28.00	-	674.76	977.23	1.54	70.12	-	0.03	22.27	163,247.91	-	-	163,247.91
	Total Emissions	**3,344.50**	**941.8**	**137.5**	**0.39**	**1,289.97**	**1,147.80**	**19.69**	**75.40**	**0.02**	**0.03**	**22.27**	**174,413.35**	**0.45**	**0.09**	**174,451.66**
Phased Tailings Alternative Year 1	Non-Fugitive Emissions	78.46	39.03	10.23	0.005	9.00	16.76	0.06	1.51	0.02	-	-	6,040.20	0.25	0.05	6,060.93
	Fugitive Emissions	2,791.22	765.20	88.32	0.33	635.83	161.33	18.98	3.77	0	-	-	5,375.60	0.22	0.04	5,394.05
	Tailpipe Emissions [4]	28.01	28.01	28.01	-	677.57	977.55	1.54	70.27	-	0.03	22.28	163,786.04	-	-	163,786.04
	Total Emissions	**2,897.69**	**832.24**	**126.57**	**0.33**	**1,322.4**	**1,155.6**	**20.6**	**75.55**	**0.02**	**0.03**	**22.28**	**175,201.84**	**0.46**	**0.09**	**175,241.02**
Phased Tailings Alternative Year 5	Non-Fugitive Emissions	78.46	39.03	10.23	0.005	9.00	16.76	0.06	1.51	0.02	-	-	6,040.20	0.25	0.05	6,060.93
	Fugitive Emissions	3,238.04	874.81	99.24	0.38	606.22	153.82	18.10	3.77	0	-	-	5,125.23	0.21	0.04	5,142.82
	Tailpipe Emissions [4]	28.00	28.00	28.00	-	674.76	977.23	1.54	70.12	-	0.03	22.27	163,247.91	-	-	163,247.91
	Total Emissions	**3,344.50**	**941.8**	**137.5**	**0.39**	**1,289.97**	**1,147.80**	**19.69**	**75.40**	**0.02**	**0.03**	**22.27**	**174,413.35**	**0.45**	**0.09**	**174,451.66**
Barrel Alternative Year 1	Non-Fugitive Emissions	78.46	39.03	10.23	0.005	9.00	16.76	0.06	1.51	0.02	-	-	6,040.20	0.25	0.05	6,060.93
	Fugitive Emissions	3,110.45	847.33	96.54	0.37	635.83	161.33	18.98	3.77	0	-	-	5,375.60	0.22	0.04	5,394.05
	Tailpipe Emissions [4]	28.01	28.01	28.01	-	677.57	977.55	1.54	70.27	-	0.03	22.28	163,786.04	-	-	163,786.04
	Total Emissions	**3,216.92**	**914.37**	**134.79**	**0.37**	**1,322.4**	**1,155.6**	**20.6**	**75.55**	**0.02**	**0.03**	**22.28**	**175,201.84**	**0.46**	**0.09**	**175,241.02**
Barrel Alternative Year 12	Non-Fugitive Emissions	78.46	39.03	10.23	0.005	9.00	16.76	0.06	1.51	0.02	-	-	6,040.20	0.25	0.05	6,060.93
	Fugitive Emissions	3,626.61	969.77	108.48	0.43	527.83	133.93	15.76	3.77	0	-	-	4,462.49	0.18	0.04	4,477.80
	Tailpipe Emissions [4]	28.00	28.00	28.00	-	674.49	977.20	1.54	70.10	-	0.03	22.27	163,196.11	-	-	163,196.11
	Total Emissions	**3,733.07**	**1,036.8**	**146.7**	**0.43**	**1,211.31**	**1,127.88**	**17.35**	**75.39**	**0.02**	**0.03**	**22.27**	**173,698.80**	**0.43**	**0.09**	**173,734.84**
Barrel Trail Alternative Year 1	Non-Fugitive Emissions	78.46	39.03	10.23	0.005	9.00	16.76	0.06	1.51	0.02	-	-	6,040.20	0.25	0.05	6,060.93
	Fugitive Emissions	3,022.55	824.64	94.26	0.36	635.83	161.33	18.98	3.77	0	-	-	5,375.60	0.22	0.04	5,394.05
	Tailpipe Emissions [4]	28.57	28.57	28.57	-	725.69	1,025.86	1.54	72.89	-	0.03	22.70	172,989.84	-	-	172,989.84
	Total Emissions	**3,129.57**	**892.23**	**133.06**	**0.36**	**1,370.5**	**1,203.9**	**20.6**	**78.18**	**0.02**	**0.03**	**22.70**	**184,405.65**	**0.46**	**0.09**	**184,444.82**
Barrel Trail Alternative Year 5	Non-Fugitive Emissions	78.46	39.03	10.23	0.005	9.00	16.76	0.06	1.51	0.02	-	-	6,040.20	0.25	0.05	6,060.93
	Fugitive Emissions	3,468.82	934.11	105.17	0.41	606.22	153.82	18.10	3.77	0	-	-	5,125.23	0.21	0.04	5,142.82
	Tailpipe Emissions [4]	28.55	28.55	28.55	-	722.88	1,025.53	1.54	72.74	-	0.03	22.69	172,451.72	-	-	172,451.72
	Total Emissions	**3,575.83**	**1,001.7**	**144.0**	**0.42**	**1,338.09**	**1,196.11**	**19.69**	**78.02**	**0.02**	**0.03**	**22.69**	**183,617.15**	**0.45**	**0.09**	**183,655.47**
Scholefield-McLeary Alternative Year 1	Non-Fugitive Emissions	78.46	39.03	10.23	0.005	9.00	16.76	0.06	1.51	0.02	-	-	6,040.20	0.25	0.05	6,060.93
	Fugitive Emissions	3,177.47	864.44	98.24	0.38	635.83	161.33	18.98	3.77	0	-	-	5,375.60	0.22	0.04	5,394.05
	Tailpipe Emissions [4]	29.85	29.85	29.85	-	837.98	1,138.57	1.54	79.01	-	0.03	23.68	194,465.39	-	-	194,465.39
	Total Emissions	**3,285.78**	**933.33**	**138.33**	**0.38**	**1,482.8**	**1,316.7**	**20.6**	**84.29**	**0.02**	**0.03**	**23.68**	**205,881.19**	**0.46**	**0.09**	**205,920.37**
Scholefield-McLeary Alternative Year 5	Non-Fugitive Emissions	78.46	39.03	10.23	0.005	9.00	16.76	0.06	1.51	0.02	-	-	6,040.20	0.25	0.05	6,060.93
	Fugitive Emissions	3,879.00	1,039.50	115.71	0.46	606.22	153.82	18.10	3.77	0	-	-	5,125.23	0.21	0.04	5,142.82
	Tailpipe Emissions [4]	29.84	29.84	29.84	-	835.16	1,138.25	1.54	78.86	-	0.03	23.67	193,927.26	-	-	193,927.26
	Total Emissions	**3,987.30**	**1,108.4**	**155.8**	**0.46**	**1,450.38**	**1,308.82**	**19.69**	**84.14**	**0.02**	**0.03**	**23.67**	**205,092.70**	**0.45**	**0.09**	**205,131.01**

NOTES:

[1] PM/TSP, PM_{10}, and $PM_{2.5}$ emissions shown in this summary are the controlled emissions. See individual Emission Inventories for additional details.

[2] SO_4 and Soot emissions are from operation of diesel-fueled vehicles.

[3] The Proposed Action and each alternative include emissions from SX/EW Operations. See the "SX_EW Emissions" sheet for a summary of emissions from the SX/EW Operations.

Rosemont Copper Project - Change in Tailpipe Emissions Due to the Updated Emission Factors from Empire/CAT																				
Mobile Vehicle Description	**Annual Process Rate (hours/ vehicle)**	**Fleet Size**	**HP Rating**	**Load Factor**	**Previous Annual Emissions (tpy)** As Incorporated into the 02/28/2013 Emissions Summary Tables				**Updated Emission Factors Provided by Empire/Cat in April 2014 (g/hp-hr)**				**Revised Annual Emissions (tpy)** Based on Emission Factors Provided by Empire/Cat in April 2014				**Change in Annual Emissions (tpy)**			
					$PM/PM_{10}/PM_{2.5}$	**CO**	**NO_X**	**VOC**	**$PM/PM_{10}/PM_{2.5}$**	**CO**	**NO_X**	**VOC**	**$PM/PM_{10}/PM_{2.5}$**	**CO**	**NO_X**	**VOC**	**$PM/PM_{10}/PM_{2.5}$**	**CO**	**NO_X**	**VOC**
Proposed Action - Year 1																				
Haulage Trucks, 250 tons [1]	6,600	25	2,650	0.32	23.14	401.01	694.06	46.27	0.14	1.72	4.26	0.28	21.85	264.53	657.73	43.85	-1.28	-136.48	-36.33	-2.42
Crawler Dozers, D11T Class	4,000	3	850	0.575	0.19	16.81	16.81	0.91	0.01	0.007	2.22	0.12	0.10	0.05	14.36	0.78	-0.10	-16.76	-2.45	-0.13
246C/D Skid Steer Loader	6,570	2	73	0.30	0.006	1.17	1.05	0.06	0.001	0.03	2.18	0.13	0.0005	0.009	0.69	0.04	-0.006	-1.16	-0.36	-0.02
Total Change in Tailpipe Emissions for Proposed Action - Year 1:																	**-1.39**	**-154.41**	**-39.13**	**-2.57**
Proposed Action - Year 5																				
Haulage Trucks, 250 tons [1]	6,600	25	2,650	0.32	23.14	401.01	694.06	46.27	0.14	1.72	4.26	0.28	21.85	264.53	657.73	43.85	-1.28	-136.48	-36.33	-2.42
Crawler Dozers, D11T Class	4,000	3	850	0.575	0.19	16.81	16.81	0.91	0.01	0.007	2.22	0.12	0.10	0.05	14.36	0.78	-0.10	-16.76	-2.45	-0.13
246C/D Skid Steer Loader	6,570	2	73	0.30	0.006	1.17	1.05	0.06	0.001	0.03	2.18	0.13	0.0005	0.009	0.69	0.04	-0.006	-1.16	-0.36	-0.02
Total Change in Tailpipe Emissions for Proposed Action - Year 5:																	**-1.39**	**-154.41**	**-39.13**	**-2.57**

Rosemont Copper Project - Change in Tailpipe Emissions Due to the Updated Emission Factors from Empire/CAT																				
Mobile Vehicle Description	**Annual Process Rate (hours/ vehicle)**	**Fleet Size**	**HP Rating**	**Load Factor**	**Previous Annual Emissions (tpy)** As Incorporated into the 02/28/2013 Emissions Summary Tables				**Updated Emission Factors Provided by Empire/Cat in April 2014 (g/hp-hr)**				**Revised Annual Emissions (tpy)** Based on Emission Factors Provided by Empire/Cat in April 2014				**Change in Annual Emissions (tpy)**			
					$PM/PM_{10}/PM_{2.5}$	**CO**	**NO_X**	**VOC**	**$PM/PM_{10}/PM_{2.5}$**	**CO**	**NO_X**	**VOC**	**$PM/PM_{10}/PM_{2.5}$**	**CO**	**NO_X**	**VOC**	**$PM/PM_{10}/PM_{2.5}$**	**CO**	**NO_X**	**VOC**
Phased Tailings Alternative - Year 1																				
Haulage Trucks, 250 tons [1]	6,600	25	2,650	0.32	23.14	401.01	694.06	46.27	0.14	1.72	4.26	0.28	21.85	264.53	657.73	43.85	-1.28	-136.48	-36.33	-2.42
Crawler Dozers, D11T Class	4,000	3	850	0.575	0.19	16.81	16.81	0.91	0.01	0.007	2.22	0.12	0.10	0.05	14.36	0.78	-0.10	-16.76	-2.45	-0.13
246C/D Skid Steer Loader	6,570	2	73	0.30	0.006	1.17	1.05	0.06	0.001	0.03	2.18	0.13	0.0005	0.009	0.69	0.04	-0.006	-1.16	-0.36	-0.02
Total Change in Tailpipe Emissions for Phased Tailings Alternative - Year 1:																	**-1.39**	**-154.41**	**-39.13**	**-2.57**
Phased Tailings Alternative - Year 5																				
Haulage Trucks, 250 tons [1]	6,600	25	2,650	0.32	23.14	401.01	694.06	46.27	0.14	1.72	4.26	0.28	21.85	264.53	657.73	43.85	-1.28	-136.48	-36.33	-2.42
Crawler Dozers, D11T Class	4,000	3	850	0.575	0.19	16.81	16.81	0.91	0.01	0.007	2.22	0.12	0.10	0.05	14.36	0.78	-0.10	-16.76	-2.45	-0.13
246C/D Skid Steer Loader	6,570	2	73	0.30	0.006	1.17	1.05	0.06	0.001	0.03	2.18	0.13	0.0005	0.009	0.69	0.04	-0.006	-1.16	-0.36	-0.02
Total Change in Tailpipe Emissions for Phased Tailings Alternative - Year 5:																	**-1.39**	**-154.41**	**-39.13**	**-2.57**

Rosemont Copper Project - Change in Tailpipe Emissions Due to the Updated Emission Factors from Empire/CAT																				
Mobile Vehicle Description	**Annual Process Rate (hours/ vehicle)**	**Fleet Size**	**HP Rating**	**Load Factor**	**Previous Annual Emissions (tpy)** As Incorporated into the 02/28/2013 Emissions Summary Tables				**Updated Emission Factors Provided by Empire/Cat in April 2014 (g/hp-hr)**				**Revised Annual Emissions (tpy)** Based on Emission Factors Provided by Empire/Cat in April 2014				**Change in Annual Emissions (tpy)**			
					$PM/PM_{10}/PM_{2.5}$	**CO**	**NO_X**	**VOC**	**$PM/PM_{10}/PM_{2.5}$**	**CO**	**NO_X**	**VOC**	**$PM/PM_{10}/PM_{2.5}$**	**CO**	**NO_X**	**VOC**	**$PM/PM_{10}/PM_{2.5}$**	**CO**	**NO_X**	**VOC**
Barrel Alternative - Year 1																				
Haulage Trucks, 250 tons [1]	6,600	25	2,650	0.32	23.14	401.01	694.06	46.27	0.14	1.72	4.26	0.28	21.85	264.53	657.73	43.85	-1.28	-136.48	-36.33	-2.42
Crawler Dozers, D11T Class	4,000	3	850	0.575	0.19	16.81	16.81	0.91	0.01	0.007	2.22	0.12	0.10	0.05	14.36	0.78	-0.10	-16.76	-2.45	-0.13
246C/D Skid Steer Loader	6,570	2	73	0.30	0.006	1.17	1.05	0.06	0.001	0.03	2.18	0.13	0.0005	0.009	0.69	0.04	-0.006	-1.16	-0.36	-0.02
Total Change in Tailpipe Emissions for Barrel Alternative - Year 1:																	**-1.39**	**-154.41**	**-39.13**	**-2.57**
Barrel Alternative - Year 12																				
Haulage Trucks, 250 tons [1]	6,600	25	2,650	0.32	23.14	401.01	694.06	46.27	0.14	1.72	4.26	0.28	21.85	264.53	657.73	43.85	-1.28	-136.48	-36.33	-2.42
Crawler Dozers, D11T Class	4,000	3	850	0.575	0.19	16.81	16.81	0.91	0.01	0.007	2.22	0.12	0.10	0.05	14.36	0.78	-0.10	-16.76	-2.45	-0.13
246C/D Skid Steer Loader	6,570	2	73	0.30	0.006	1.17	1.05	0.06	0.001	0.03	2.18	0.13	0.0005	0.009	0.69	0.04	-0.006	-1.16	-0.36	-0.02
Total Change in Tailpipe Emissions for Barrel Alternative - Year 12:																	**-1.39**	**-154.41**	**-39.13**	**-2.57**

Rosemont Copper Project - Change in Tailpipe Emissions Due to the Updated Emission Factors from Empire/CAT																				
Mobile Vehicle Description	**Annual Process Rate (hours/ vehicle)**	**Fleet Size**	**HP Rating**	**Load Factor**	**Previous Annual Emissions (tpy)** As Incorporated into the 02/28/2013 Emissions Summary Tables				**Updated Emission Factors Provided by Empire/Cat in April 2014 (g/hp-hr)**				**Revised Annual Emissions (tpy)** Based on Emission Factors Provided by Empire/Cat in April 2014				**Change in Annual Emissions (tpy)**			
					$PM/PM_{10}/PM_{2.5}$	**CO**	**NO_X**	**VOC**	**$PM/PM_{10}/PM_{2.5}$**	**CO**	**NO_X**	**VOC**	**$PM/PM_{10}/PM_{2.5}$**	**CO**	**NO_X**	**VOC**	**$PM/PM_{10}/PM_{2.5}$**	**CO**	**NO_X**	**VOC**
Barrel Trail Alternative - Year 1																				
Haulage Trucks, 250 tons [1]	6,600	25	2,650	0.32	23.14	401.01	694.06	46.27	0.14	1.72	4.26	0.28	21.85	264.53	657.73	43.85	-1.28	-136.48	-36.33	-2.42
Crawler Dozers, D11T Class	4,000	3	850	0.575	0.19	16.81	16.81	0.91	0.01	0.007	2.22	0.12	0.10	0.05	14.36	0.78	-0.10	-16.76	-2.45	-0.13
246C/D Skid Steer Loader	6,570	2	73	0.30	0.006	1.17	1.05	0.06	0.001	0.03	2.18	0.13	0.0005	0.009	0.69	0.04	-0.006	-1.16	-0.36	-0.02
Total Change in Tailpipe Emissions for Barrel Trail Alternative - Year 1:																	**-1.39**	**-154.41**	**-39.13**	**-2.57**
Barrel Trail Alternative - Year 5																				
Haulage Trucks, 250 tons [1]	6,600	25	2,650	0.32	23.14	401.01	694.06	46.27	0.14	1.72	4.26	0.28	21.85	264.53	657.73	43.85	-1.28	-136.48	-36.33	-2.42
Crawler Dozers, D11T Class	4,000	3	850	0.575	0.19	16.81	16.81	0.91	0.01	0.007	2.22	0.12	0.10	0.05	14.36	0.78	-0.10	-16.76	-2.45	-0.13
246C/D Skid Steer Loader	6,570	2	73	0.30	0.006	1.17	1.05	0.06	0.001	0.03	2.18	0.13	0.0005	0.009	0.69	0.04	-0.006	-1.16	-0.36	-0.02
Total Change in Tailpipe Emissions for Barrel Trail Alternative - Year 5:																	**-1.39**	**-154.41**	**-39.13**	**-2.57**

Rosemont Copper Project - Change in Tailpipe Emissions Due to the Updated Emission Factors from Empire/CAT																				
Mobile Vehicle Description	**Annual Process Rate (hours/ vehicle)**	**Fleet Size**	**HP Rating**	**Load Factor**	**Previous Annual Emissions (tpy)** As Incorporated into the 02/28/2013 Emissions Summary Tables				**Updated Emission Factors Provided by Empire/Cat in April 2014 (g/hp-hr)**				**Revised Annual Emissions (tpy)** Based on Emission Factors Provided by Empire/Cat in April 2014				**Change in Annual Emissions (tpy)**			
					$PM/PM_{10}/PM_{2.5}$	**CO**	**NO_X**	**VOC**	**$PM/PM_{10}/PM_{2.5}$**	**CO**	**NO_X**	**VOC**	**$PM/PM_{10}/PM_{2.5}$**	**CO**	**NO_X**	**VOC**	**$PM/PM_{10}/PM_{2.5}$**	**CO**	**NO_X**	**VOC**
Scholefield-McCleary Alternative - Year 1																				
Haulage Trucks, 250 tons [1]	6,600	25	2,650	0.32	23.14	401.01	694.06	46.27	0.14	1.72	4.26	0.28	21.85	264.53	657.73	43.85	-1.28	-136.48	-36.33	-2.42
Crawler Dozers, D11T Class	4,000	3	850	0.575	0.19	16.81	16.81	0.91	0.01	0.007	2.22	0.12	0.10	0.05	14.36	0.78	-0.10	-16.76	-2.45	-0.13
246C/D Skid Steer Loader	6,570	2	73	0.30	0.006	1.17	1.05	0.06	0.001	0.03	2.18	0.13	0.0005	0.009	0.69	0.04	-0.006	-1.16	-0.36	-0.02
Total Change in Tailpipe Emissions for Scholefield-McCleary Alternative - Year 1:																	**-1.39**	**-154.41**	**-39.13**	**-2.57**
Scholefield-McCleary Alternative - Year 5																				
Haulage Trucks, 250 tons [1]	6,600	25	2,650	0.32	23.14	401.01	694.06	46.27	0.14	1.72	4.26	0.28	21.85	264.53	657.73	43.85	-1.28	-136.48	-36.33	-2.42
Crawler Dozers, D11T Class	4,000	3	850	0.575	0.19	16.81	16.81	0.91	0.01	0.007	2.22	0.12	0.10	0.05	14.36	0.78	-0.10	-16.76	-2.45	-0.13
246C/D Skid Steer Loader	6,570	2	73	0.30	0.006	1.17	1.05	0.06	0.001	0.03	2.18	0.13	0.0005	0.009	0.69	0.04	-0.006	-1.16	-0.36	-0.02
Total Change in Tailpipe Emissions for Scholefield-McCleary Alternative - Year 5:																	**-1.39**	**-154.41**	**-39.13**	**-2.57**

NOTE:

[1] In the previous annual emission calculations, 25 of the haul trucks were Tier 2 and the remaining were Tier 4F. As of January 20, 2015, the former Tier 2 haul trucks are certified Tier 4I under the flex provisions. The change in tailpipe emissions for the former Tier 2 haul trucks are reflected in this table. There is no change in tailpipe emissions for the Tier 4F haul trucks.

Rosemont Copper Project - Summary of SX/EW Emissions (revised February 3, 2015) [1]															
Emissions Source	**Emissions (tpy)**														
	PM/TSP	**PM_{10}**	**$PM_{2.5}$**	**Lead**	**CO**	**NO_X**	**SO_2**	**VOC**	**H_2SO_4**	**SO_4**	**Soot**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Solvent Extraction	-	-	-	-	-	-	-	3.77	-	-	-	-	-	-	-
Electrowinning	-	-	-	-	-	-	-	-	0.02	-	-	-	-	-	-
Diesel Electrowinning Hot Water Generator	0.63	0.44	0.30	0.0002	0.96	3.84	0.04	0.04	-	-	-	4,453.51	0.18	0.04	4,469
Electrowinning Building Emergency Generator	0.01	0.01	0.01	-	0.14	0.12	0.0002	0.007	-	-	-	19.13	0.0008	0.0002	19
SX/EW Fire Water Pump	0.03	0.03	0.03	-	0.58	0.61	0.001	0.04	-	-	-	114.14	0.005	0.0009	115
Total Emissions	**0.68**	**0.49**	**0.34**	**0.0002**	**1.67**	**4.57**	**0.04**	**3.86**	**0.02**	**-**	**-**	**4,587**	**0.19**	**0.04**	**4,603**

NOTES:

[1] Emissions from SX/EW Operations are identical for the Proposed Action and each alternative.

[2] As of January 20, 2015, the calculation of CO_2e has been updated to use the current global warming potentials.