

**APPENDIX H**  
**AIR QUALITY ANALYSIS**



**Sonoma In-Stream Mining Worst-Case Operation-Related Emissions**

**Exhaust Emissions of ROG, NOx, CO, and PM10**

**Worker Commute Emissions**

		Values		See Section 3.6, Traffic and Circulation					
Miles/One-Way Trip	20.00	Default Model Setting (Dowden 2007)							
One-way trips/Day	20.00	5 workers, traveling 4 20-mile oneway trips per day							
Total Miles/Day	400.00								
Day/Year	110.00	5 month construction period, 22 work days/month							
Emission rate (grams/mile)	ROG*	NOx*	CO*	PM10*	CO2e^	CO2** CH4****	N2O****		
Emission rate (grams/trip)	0.24	0.44	5.10	0.04			0.05	0.04	
Pounds per Day	1.37	0.62	13.67	0.02					
Tons per Year	0.27	0.41	5.10	0.04			0.04	0.04	
	0.01	0.02	0.28	0.00	62.47	61.88	0.00	0.00	

\*Based on EMFAC emission factors for as contained in the Construction Emissions Model (SMAQMD 2006).  
 \*\*Based on EMFAC emission factors as contained in URBEMIS 2007 Versions 9.2.0 (Rimpo 2007).  
 \*\*\*Emission Factors from CCAR General Reporting Protocol V3.0

**Off-Site, On-Road Material Transport Emissions**

		Material Transport							
User Input	12.10	350000 tons of material, 14,000 truck loads of 25 tons, 28,000 one-way trips/year, 12.1miles/one-way trip, 338,800 total miles/year. 12.1 miles is based on paved travel between the Syar processing plant in Hea							
Miles/One-Way Trip	28000.00								
One-way trips/Year	338800.00								
Vehicle Miles Traveled/Year (calculated)									
Emission rate (grams/mile)	ROG*	NOx*	CO*	PM10*	CO2e^	CO2** CH4****	N2O****		
Pounds per Year	0.65	7.23	6.11	0.24			0.08	0.05	
Tons per Year	485.07	5395.43	4559.62	179.10	622.14	616.32	0.03	0.02	

\*Based on EMFAC emission factors for heavy-duty trucks as contained in the Construction Emissions Model (SMAQMD 2006).  
 \*\*Based on EMFAC emission factors as contained in URBEMIS 2007 Versions 9.2.0 (Rimpo 2007).  
 \*\*\*Emission Factors from CCAR General Reporting Protocol V3.0  
 ^ Metric Tonnes

**On-Site, Off-Road Heavy-Duty Equipment Emissions**

Number of Vehicles	Type	ROG*	NOx*	CO*	PM10*	CO2e^	CO2** CH4****	N2O****	(g/hr)	HP	Usage	Hrs/Day	ROG	CO	Nox	Sox
1	Motor Grader	0.4	4.3	1.2	0.2	575.6	413.1	0.8	0.5	250.00	0.48	5.00	79.86	223.50	813.04	0.88
1	Dozer	0.8	6.9	3.8	0.3	736.1	573.6	0.8	0.5	401.00	0.54	5.00	131.47	630.97	1,165.30	0.95
1	Front End Loader	1.0	10.7	3.3	0.4	1520.8	1358.3	0.8	0.5	458.00	0.43	10.00	109.32	352.61	1,132.69	1.61
1	Off-Highway Trucks	1.1	10.1	3.3	0.4	1352.2	1189.7	0.8	0.5	479.00	0.57	8.00	108.27	327.28	1,007.96	1.16
1	Fuel and Lube Truck	0.3	2.5	0.8	0.1	459.9	297.4	0.8	0.5	479.00	0.57	2.00	108.27	327.28	1,007.96	1.16
1	Water Truck	0.5	4.9	1.3	0.2	666.1	503.6	0.8	0.5	189.00	0.50	8.00	56.22	147.37	554.49	0.64
1	Crane***	0.0	0.1	0.0	0.0	173.7	11.2	0.8	0.5	399.00	0.43	0.18	65.88	239.27	641.31	0.64
	Pounds per Day	3.33	32.11	11.57	1.22	5484.44										
	Tons per Year	0.18	1.77	0.64	0.07	273.65										

\*Based on Offroad emission factors as contained in the Construction Emissions Model (SMAQMD 2006).  
 \*\*Based on EMFAC emission factors as contained in URBEMIS 2007 Versions 9.2.0 (Rimpo 2007).  
 \*\*\*\*The crane will only operate 10 days of the 110 days of operations per season  
 \*\*\*\*CH4 and N2O emissions are based on emissions per ton of material moved (BAAQMD 1999 and CCAR 2008)  
 ^ Metric Tonnes

**Fugitive Emissions of PM10**

		Tons per Year			
(EPA 2006)		<b>PM10</b>			
<b>Handling and Storage</b>	Pounds of PM10 per Ton Removed	0.0047	0.42		
*Based on an emission factor calculations from AP-42 Section 13.2.4		Includes a 50% reduction for watering as described in the project description			
<b>Wind Erosion of Piles of Material</b>	Grams of PM10 per Square Meter Disturbed	6.51	0.14		
*Based on an emission factor calculations from AP-42 Section 13.2.5		Assumes 12 days of disturbance and 1 square meter of disturbance per ton of material and includes a 50% reduction for watering as described in the project description			
<b>Unpaved Road Hauling</b>	Pounds of PM10 per VMT	3.68	78.14		
*Based on an emission factor calculations from AP-42 Section 13.2.2		350000 tons of material, 14,000 truck loads of 25 tons, 28,000 one-way trips/year, 3 miles/one-way trip/unpaved, 84,000 total miles/year Includes a 50% reduction for watering as described in the project description Assumes roundtrip travel on unpaved roads and through gravel bars from Route 5 to Bar S-14, which provides the longest reasonably foreseeable distance possible using an alternative route.			
		78.69			
<b>Total (Unmitigated)</b>	ROG	NOx	CO	PM10	CO2e
	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
	8.01	81.57	58.12	1433.56	
	tons/year	tons/year	tons/year	tons/year	tons/year
	0.44	4.49	3.20	78.85	958.26
<b>Total (Mitigated)</b>	ROG	NOx	CO	PM10	CO2e
	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
	8.01	81.57	58.12	715.34	
	tons/year	tons/year	tons/year	tons/year	tons/year
	0.44	4.49	3.20	39.34	

**Sonoma In-Stream Mining Worst-Case Operation-Related Emissions**

**Exhaust Emissions of ROG, NOx, CO, and PM10**

**Worker Commute Emissions**

		Values		See Section 3.6, Traffic and Circulation					
Miles/One-Way Trip	20.00	Default Model Setting (Dowden 2007)							
One-way trips/Day	20.00	5 workers, traveling 4 20-mile oneway trips per day							
Total Miles/Day	400.00								
Day/Year	110.00	5 month construction period, 22 work days/month							
Emission rate (grams/mile)	ROG*	NOx*	CO*	PM10*	CO2e^	CO2** CH4****	N2O****		
Emission rate (grams/trip)	0.24	0.44	5.10	0.04			0.05	0.04	
Pounds per Day	1.37	0.62	13.67	0.02				0.04	0.04
Tons per Year	0.27	0.41	5.10	0.04					
Tons per Year	0.01	0.02	0.28	0.00	62.47	61.88	0.00	0.00	

\*Based on EMFAC emission factors for as contained in the Construction Emissions Model (SMAQMD 2006).  
 \*\*Based on EMFAC emission factors as contained in URBEMIS 2007 Versions 9.2.0 (Rimpo 2007).  
 \*\*\*\*Emission Factors from CCAR General Reporting Protocol V3.0

**Off-Site, On-Road Material Transport Emissions**

		Material Transport							
User Input	12.10	132000 tons of material, 5,280 truck loads of 25 tons, 10,560 one-way trips/year, 12.1 miles/one-way trip, 127,776 total miles/year. 12.1 miles is based on paved travel between the Syar processing plant in Heald							
Miles/One-Way Trip	10560.00								
One-way trips/Year	127776.00								
Vehicle Miles Traveled/Year (calculated)									
Emission rate (grams/mile)	ROG*	NOx*	CO*	PM10*	CO2e^	CO2** CH4****	N2O****		
Emission rate (grams/trip)	0.65	7.23	6.11	0.24			0.08	0.05	
Pounds per Year	182.94	2034.85	1719.53	67.55			22.52	14.07	
Tons per Year	0.09	1.02	0.86	0.03	618.52	616.32	0.01	0.01	

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1	Front End Loader	1.0	10.7	3.3	0.4	1520.8	1358.3	0.8	0.5	458.00	0.43	10.00	109.32	352.61	1,132.69	1.61
1	Off-Highway Trucks	1.1	10.1	3.3	0.4	1352.2	1189.7	0.8	0.5	479.00	0.57	8.00	108.27	327.28	1,007.96	1.16
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1	Crane***	0.0	0.1	0.0	0.0	173.7	11.2	0.8	0.5	399.00	0.43	0.18	65.88	239.27	641.31	0.64
Pounds per Day	3.33	32.11	11.57	1.22	5484.44											
Tons per Year	0.18	1.77	0.64	0.07	273.65											

\*Based on Offroad emission factors as contained in the Construction Emissions Model (SMAQMD 2006).  
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		Tons per Year			
(EPA 2006)		<b>PM10</b>			
<b>Handling and Storage</b>	Pounds of PM10 per Ton Removed	0.0047	0.16		
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		29.41			
<b>Total (Unmitigated)</b>	ROG	NOx	CO	PM10	CO2e
	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
	5.26	51.02	32.30	536.69	
	tons/year	tons/year	tons/year	tons/year	tons/year
	0.29	2.81	1.78	29.52	954.64
<b>Total (Mitigated)</b>	ROG	NOx	CO	PM10	CO2e
	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
	5.26	51.02	32.30	267.41	
	tons/year	tons/year	tons/year	tons/year	tons/year
	0.29	2.81	1.78	14.71	