

Molybdenum By-Product Plant

Concentrate Throughput =	2,000	lb/hr
Concentrate Throughput =	8,760	tons/year
Operating hours	8,760	hours

(1) Filter Press Drop to Dryers

Description - Transfer Point of Moly Concentrate

Ore Throughput	2,000	lb/hr	
Ore Throughput	8,760	ton/year	
Emission Factor (TSP) =	0.01	lb/ton	(Reference: AP-42, Table 11.24-2, High Moisture Ore, Material Handling)
Emission Factor (PM ₁₀) =	0.004	lb/ton	(Reference: AP-42, Table 11.24-2, High Moisture Ore, Material Handling)
Emission Factor (PM _{2.5}) =	0.0017	lb/ton	(Moly Plant Restart Minor Permit Application)
Percent Capture =	90%		

(2) Dryer Drop to Product Packaging

Description - Transfer Point of Moly Concentrate

Ore Throughput	2,000	lb/hr	
Ore Throughput	8,760	ton/year	
Emission Factor (TSP) =	0.12	lb/ton	(Reference: AP-42, Table 11.24-2, High Moisture Ore, Material Handling)
Emission Factor (PM ₁₀) =	0.06	lb/ton	(Reference: AP-42, Table 11.24-2, High Moisture Ore, Material Handling)
Emission Factor (PM _{2.5}) =	0.017	lb/ton	(Moly Plant Restart Minor Permit Application)
Percent Capture =	90%		

(3) Product Packaging

Description - Transfer Point of Moly Concentrate

Ore Throughput	2,000	lb/hr	
Ore Throughput	8,760	ton/year	
Emission Factor (TSP) =	0.12	lb/ton	(Reference: AP-42, Table 11.24-2, High Moisture Ore, Material Handling)
Emission Factor (PM ₁₀) =	0.06	lb/ton	(Reference: AP-42, Table 11.24-2, High Moisture Ore, Material Handling)
Emission Factor (PM _{2.5}) =	0.0170	lb/ton	(Moly Plant Restart Minor Permit Application)
Percent Capture =	90%		

Emission Unit	Emission Rate	Exhaust Flow	Emissions (Controlled)					
			PM	PM ₁₀	PM _{2.5}	PM	PM ₁₀	PM _{2.5}
	(gr/dscf)	(scfm)	(lb/hr)	(lb/hr)	(lb/hr)	(ton/yr)	(ton/yr)	(ton/yr)
Filter Press Drop to Dryers (see Note #1)	n/a	n/a	0.001	0.0004	0.00017	0.004	0.002	0.002
SSMP-1; Moly Scrubber (see Note #2)	0.022	7,000	1.31	1.31	1.31	5.74	5.74	5.74
Dryer Drop to Product Packaging (see Note #1)	n/a	n/a	0.01	0.006	0.0017	0.05	0.03	0.01
Product Packaging (see Note #1)	n/a	n/a	0.01	0.006	0.0017	0.05	0.03	0.01
Subtotal						5.85	5.80	5.76

Ore Assay										
Sb	As	Be	Cd	Cr	Co	Pb	Mn	Hg	Ni	Se
(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
2.5	6.6	0.025	1.7	13	5.2	13	500	0.025	0.9	0.5

Emission Unit	HAP Emissions										
	Sb	As	Be	Cd	Cr	Co	Pb	Mn	Hg	Ni	Se
	(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)
Filter Press Drop to Dryers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SSMP-1; Moly Scrubber	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dryer Drop to Product Packaging	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Product Packaging	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CFMP-1 and CFMP-2 Dryers

Dryer	Size	Gas Fire Rate	Operating Hours
	(Btu/hr)	(ft ³ /hr)	(hours)
CFMP-1	3,000,000	2,857	8,760
CFMP-2	3,000,000	2,857	8,760

Emission Factors for CFMP-1 and CFMP-2 Dryers

Criteria Pollutants

(Reference: AP-42, Table 1.4-1 and 1.4-2)

Emission Factor (SO ₂)	0.6	lb/MMscf
Emission Factor (NO ₂)	100	lb/MMscf
Emission Factor (CO)	84	lb/MMscf
Emission Factor (PM Total)	7.6	lb/MMscf
Emission Factor (VOC)	5.5	lb/MMscf
Emission Factor (CO ₂) =	120,000	lb/MMscf
Emission Factor (CH ₄) =	2.3	lb/MMscf
Emission Factor (N ₂ O) =	2.2	lb/MMscf

HAPs

(Reference: AP-42, Table 1.4-3)

Emission Factor (2-Methylnaphthalene)	2.40E-05	lb/MMscf	Emission Factor (Arsenic)	2.00E-04	lb/MMscf
Emission Factor (3-Methylchloranthrene)	1.80E-06	lb/MMscf	Emission Factor (Beryllium)	1.25E-05	lb/MMscf
Emission Factor (7,12-Dimethylbenz(a)anthracene)	1.60E-05	lb/MMscf	Emission Factor (Cadmium)	1.10E-03	lb/MMscf
Emission Factor (Acenaphthene)	1.80E-06	lb/MMscf	Emission Factor (Chromium)	1.40E-03	lb/MMscf
Emission Factor (Acenaphthylene)	1.80E-06	lb/MMscf	Emission Factor (Cobalt)	8.40E-05	lb/MMscf
Emission Factor (Anthracene)	2.40E-06	lb/MMscf	Emission Factor (Manganese)	3.80E-04	lb/MMscf
Emission Factor (Benz(a)anthracene)	1.80E-06	lb/MMscf	Emission Factor (Mercury)	2.60E-04	lb/MMscf
Emission Factor (Benzene)	2.10E-03	lb/MMscf	Emission Factor (Nickel)	2.10E-03	lb/MMscf
Emission Factor (Benzo(a)pyrene)	1.20E-06	lb/MMscf	Emission Factor (Selenium)	2.40E-05	lb/MMscf
Emission Factor (Benzo(b)fluoranthene)	1.80E-06	lb/MMscf			
Emission Factor (Benzo(g,h,i)perylene)	1.20E-06	lb/MMscf			
Emission Factor (Benzo(k)fluoranthene)	1.80E-06	lb/MMscf			
Emission Factor (Chrysene)	1.80E-06	lb/MMscf			
Emission Factor (Dibenzo(a,h)anthracene)	1.20E-06	lb/MMscf			
Emission Factor (Dichlorobenzene)	1.20E-03	lb/MMscf			
Emission Factor (Fluoranthene)	3.00E-06	lb/MMscf			
Emission Factor (Fluorene)	2.80E-06	lb/MMscf			
Emission Factor (Formaldehyde)	7.50E-02	lb/MMscf			
Emission Factor (Hexane)	1.80E+00	lb/MMscf			
Emission Factor (Indeno(1,2,3-cd)pyrene)	1.80E-06	lb/MMscf			
Emission Factor (Naphthalene)	6.10E-04	lb/MMscf			
Emission Factor (Phenanthrene)	1.70E-05	lb/MMscf			
Emission Factor (Pyrene)	5.00E-06	lb/MMscf			
Emission Factor (Toluene)	3.40E-03	lb/MMscf			

Emission Unit	Emissions (Uncontrolled)									
	SO ₂	NO ₂	CO	PM	VOC	SO ₂	NO ₂	CO	PM/PM ₁₀ / PM _{2.5}	VOC
	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)
CFMP-1 Dryer	0.002	0.286	0.240	0.022	0.016	0.008	1.251	1.051	0.095	0.069
CFMP-2 Dryer	0.002	0.286	0.240	0.022	0.016	0.008	1.251	1.051	0.095	0.069
TOTAL	0.00	0.57	0.48	0.04	0.03	0.02	2.50	2.10	0.19	0.14

Emission Unit	Emissions (Uncontrolled)			
	CO ₂	CH ₄	N ₂ O	CO ₂ e
	(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)
CFMP-1 Dryer	1,501.71	0.03	0.03	1,510.64
CFMP-2 Dryer	1,501.71	0.03	0.03	1,510.64
TOTAL	3,003.43	0.06	0.06	3,021.28

HAP	CFMP-1	CFMP-2
	(ton/yr)	(ton/yr)
2-Methylnaphthalene	0.000	0.000
3-Methylchloranthrene	0.000	0.000
7,12-Dimethylbenz(a)anthracene	0.000	0.000
Acenaphthene	0.000	0.000
Acenaphthylene	0.000	0.000
Anthracene	0.000	0.000
Benz(a)anthracene	0.000	0.000
Benzene	0.000	0.000
Benzo(a)pyrene	0.000	0.000
Benzo(b)fluoranthene	0.000	0.000
Benzo(g,h,i)perylene	0.000	0.000
Benzo(k)fluoranthene	0.000	0.000
Chrysene	0.000	0.000
Dibenzo(a,h)anthracene	0.000	0.000
Dichlorobenzene	0.000	0.000
Fluoranthene	0.000	0.000
Fluorene	0.000	0.000
Formaldehyde	0.001	0.001
Hexane	0.023	0.023
Indeno(1,2,3-cd)pyrene	0.000	0.000
Naphthalene	0.000	0.000
Phenanthrene	0.000	0.000
Pyrene	0.000	0.000
Toluene	0.000	0.000
Arsenic	0.000	0.000
Beryllium	0.000	0.000

Cadmium	0.000	0.000
Chromium	0.000	0.000
Cobalt	0.000	0.000
Manganese	0.000	0.000
Mercury	0.000	0.000
Nickel	0.000	0.000
Selenium	0.000	0.000
Total	0.02	0.02

Footnotes:

Note #1 - Particulate emissions from (1) Filter Press Drop to Dryers, (2) Dryer Drop to Product Packaging, and (3) Product Packaging are controlled by scrubber SSMP-1. Emission collection points are not completely enclosed which may not provide for complete capture and are therefore assigned a 90% capture efficiency.

Note #2 - SSMP-1 is limited to an emission rate of 0.05 grams/dscm (Condition Part B, Section 11, II.B.1). This emission rate is converted to grains/dscf, as follows, to support the emissions calculations.

Permitted emission rate =	0.05 grams/dscm
1 gram =	15.43 grains
1 cubic meter =	35.31 cubic feet
Permitted emission rate =	0.022 grains/dscf