

Summary of Maximum Daily PM Emissions by Source

Process	Emissions Source		Maximum Daily Emissions (lb/day)											
	Source #	Source Description	PM ₁₀				Filterable PM _{2.5}				Condensable PM _{2.5}			
			Without SO ₂ Wet Scrubber		With SO ₂ Wet Scrubber		Without SO ₂ Wet Scrubber		With SO ₂ Wet Scrubber		Without SO ₂ Wet Scrubber		With SO ₂ Wet Scrubber	
			"Water On" Conditions	"Water Off" Conditions	"Water On" Conditions	"Water Off" Conditions	"Water On" Conditions	"Water Off" Conditions	"Water On" Conditions	"Water Off" Conditions	"Water On" Conditions	"Water Off" Conditions	"Water On" Conditions	"Water Off" Conditions
General Facility	233	General welding	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0				
	239	Fugitive dust from vehicle traffic on paved roads	54.6	54.6	54.6	54.6	8.1	8.1	8.1	8.1				
	240	Fugitive dust from loading and dumping waste	2.0	2.0	2.0	2.0	0.31	0.31	0.31	0.31				
	241	Plant-wide natural gas combustion emissions	30.8	30.8	30.8	30.8	30.8	30.8	30.8	30.8				
	242	Plant-wide propane combustion emissions	2.3E-02	2.3E-02	2.3E-02	2.3E-02	2.3E-02	2.3E-02	2.3E-02	2.3E-02				
Green Carbon	188	Paste plant baghouse stack	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
	189	Phase "A" ball mill baghouse stack	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1				
	190	Phase "A" mixer fugitives	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3				
	191	Phase "B" ball mill baghouse stack	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1				
	192	Phase "B" mixer fugitives	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3				
	193	KVS ball mill baghouse stack	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1				
	194	Pet coke baghouse stack	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7				
	232	Butts baghouse stack	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5				
	243	Paste plant roof vents	1.1	1.1	1.1	1.1	0.22	0.22	0.22	0.22				
	244	Phase "A" paste cooling conveyor fugitives	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5				
	245	Phase "B" paste cooling conveyor fugitives	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5				
	248	Scrap paste storage bins	1.0E-02	1.0E-02	1.0E-02	1.0E-02	1.6E-03	1.6E-03	1.6E-03	1.6E-03				
	249	Paste plant vacuum system baghouse stack	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62				
	316	Pitch fume treatment system	56.6	56.6	56.6	56.6	56.6	56.6	56.6	56.6				
Baked Carbon	187	Bake oven dry scrubber/baghouse stack	66.1	66.1			29.1	29.1	323.3	323.3	27.9	27.9	27.9	27.9
	250	Packing coke silo vent	1.2E-03	1.2E-03	1.2E-03	1.2E-03	1.8E-04	1.8E-04	1.8E-04	1.8E-04				
	251	Anode bake building monitor roof	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0				
	252	Anode block hole blower	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4				
Anode Rodding	198	Rod shop baghouse stack (west)	45.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3				
	199	Rod shop baghouse stack (east)	45.3	45.3	45.3	45.3	45.3	45.3	45.3	45.3				
	253	Rod shop roof vents (north)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
	254	Rod shop roof vents (south)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0				
	255	Hot anode butts transport	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30				
	256A,B	Rod shop crust recovery discharge to storage bins #1 and #2	8.1E-02	8.1E-02	8.1E-02	8.1E-02	1.2E-02	1.2E-02	1.2E-02	1.2E-02				
	257A,B	Rod shop crust recovery discharge to truck from bins #1 and #2	0.81	0.81	0.81	0.81	0.12	0.12	0.12	0.12				
	258A,B	Rod shop carbon recovery discharge to storage bins #1 and #2	0.12	0.12	0.12	0.12	1.7E-02	1.7E-02	1.7E-02	1.7E-02				
	259A,B	Rod shop carbon recovery discharge to truck from bins #1 and #2	1.2	1.2	1.2	1.2	0.17	0.17	0.17	0.17				
	260	Aluminum spray cyclone stack	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7				
	263	Cooling of cast iron dross sows outside rod shop	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3				
	312	Rod shop induction furnace stack (east)	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1				
313	Rod shop induction furnace stack (west)	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1					
Potlines	22-180	Potline secondary emission control system stacks	2,633	13,641	2,633	13,641	988.8	5,122	988.8	5,122	946.7	4,904	946.7	4,904
	181-186	Potline primary emission control system stacks	2,063	2,063			110.5	110.5	3,401	3,401	1,695	1,695		
	238	Auxiliary diesel generators	31.7	31.7	31.7	31.7	31.7	31.7	31.7	31.7				
Metal Products	3, 6, 9, 12, 15	Casting pit steam exhaust stacks	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3				
	4, 5, 7, 8, 10, 11, 13, 14, 16-19	Aluminum holding furnace stacks	126.8	126.8	126.8	126.8	29.9	29.9	29.9	29.9	50.9	50.9	50.9	50.9
	21	Pigger cooling conveyor exhaust stack	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26				
	217	Remelt furnace stack	5.0	5.0	5.0	5.0	0.67	0.67	0.67	0.67	1.3	1.3	1.3	1.3
	220a, 220b, 221a, 221b	MHD holding furnaces	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7				
	266	Casthouse monitor roof	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6				
	269	Pigger aluminum furnace door exhaust hood	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16				
315	Dross/silicon storage baghouse	56.6	56.6	56.6	56.6	56.6	56.6	56.6	56.6					

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	Source #	Source Description	PM ₁₀				Filterable PM _{2.5}				Condensable PM _{2.5}						
			Without SO ₂ Wet Scrubber		With SO ₂ Wet Scrubber		Without SO ₂ Wet Scrubber		With SO ₂ Wet Scrubber		Without SO ₂ Wet Scrubber		With SO ₂ Wet Scrubber				
			"Water On" Conditions	"Water Off" Conditions	"Water On" Conditions	"Water Off" Conditions	"Water On" Conditions	"Water Off" Conditions	"Water On" Conditions	"Water Off" Conditions	"Water On" Conditions	"Water Off" Conditions	"Water On" Conditions	"Water Off" Conditions			
Ancillary Equipment	195	Primary WTP kiln wet scrubber stack	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3					
	196	Primary WTP reclaimed storage silo baghouse stack	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5					
	206	Pangborn baghouse stack	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1					
	207	Annex paste plant baghouse stack	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7					
	208	Ladle cleaning (Elkem/Bailey) baghouse stack	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5					
	209	Autogenous mill baghouse stack	82.4	82.4	82.4	82.4	82.4	82.4	82.4	82.4	82.4	82.4					
	210	TAC station baghouse stack	3.5E-02	3.5E-02	3.5E-02	3.5E-02	3.5E-02	3.5E-02	3.5E-02	3.5E-02	3.5E-02	3.5E-02	3.5E-02				
	211	Alumina ore silo #1 baghouse stack	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82				
	212	Alumina ore silo #2 baghouse stack	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82				
	213	Alumina ore silo #3 baghouse stack	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82				
	214	Alumina ore silo #4 railcar unloader baghouse stack	20.2	20.2	20.2	20.2	20.2	20.2	20.2	20.2	20.2	20.2	20.2				
	215	Alumina ore pier-head transfer point baghouse stack	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6				
	216	Alumina ore ship unloading baghouse stack	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1				
	226	Aluminum fluoride silo baghouse stack	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43				
	228	Covered annex bunkers for crust and digout	0.81	0.81	0.81	0.81	0.12	0.12	0.12	0.12	0.12	0.12	0.12				
	229	Brick crushing facility baghouse stack	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6				
	273	Alumina ore handling fugitive dust	7.2	7.2	7.2	7.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1				
	274	Alumina silo #4 truck loader baghouse stack	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1				
	275	Aluminum fluoride/anthracite railcar unloading fugitive dust	3.3E-02	3.3E-02	3.3E-02	3.3E-02	5.0E-03	5.0E-03	5.0E-03	5.0E-03	5.0E-03	5.0E-03	5.0E-03				
	276	Coke unloading and transfer fugitive dust	2.1	2.1	2.1	2.1	0.31	0.31	0.31	0.31	0.31	0.31	0.31				
	280	Annex cathode assembly area roof vents	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3				
	281	Annex ramming paste area roof vents	2.6E-02	2.6E-02	2.6E-02	2.6E-02	3.2E-03	3.2E-03	3.2E-03	3.2E-03	3.2E-03	3.2E-03	3.2E-03				
	282	Annex ladle rebuild area roof vents	72.5	72.5	72.5	72.5	72.5	72.5	72.5	72.5	72.5	72.5	72.5				
	284	Annex west pitch melter stack	1.4E-02	1.4E-02	1.4E-02	1.4E-02	1.4E-02	1.4E-02	1.4E-02	1.4E-02	1.4E-02	1.4E-02	1.4E-02				
	285	Annex east pitch melter stack	1.4E-02	1.4E-02	1.4E-02	1.4E-02	1.4E-02	1.4E-02	1.4E-02	1.4E-02	1.4E-02	1.4E-02	1.4E-02				
	286	Annex ramming paste mixer stack	2.8E-02	2.8E-02	2.8E-02	2.8E-02	2.8E-02	2.8E-02	2.8E-02	2.8E-02	2.8E-02	2.8E-02	2.8E-02				
	287	Autogenous mill silo baghouse stack	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5				
	293	Baghouse hopper unloading	0.48	0.48	0.48	0.48	7.3E-02	7.3E-02	7.3E-02	7.3E-02	7.3E-02	7.3E-02	7.3E-02				
	295	Landfill - solid waste	4.4	4.4	4.4	4.4	0.67	0.67	0.67	0.67	0.67	0.67	0.67				
	296	Landfill - RCRA waste	1.3	1.3	1.3	1.3	0.20	0.20	0.20	0.20	0.20	0.20	0.20				
306	Alumina ore ship unloader clamshell	24.1	24.1	24.1	24.1	3.6	3.6	3.6	3.6	3.6	3.6	3.6					
Maintenance	222	Paint shop shot blaster baghouse stack	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6					

Summary of Maximum Daily NO_x Emissions by Source

Process	Emissions Source		Maximum Daily NO _x Emissions (lb/day)
	Source #	Source Description	
General Facility	241	Plant-wide natural gas combustion emissions	405.8
	242	Plant-wide propane combustion emissions	0.74
Green Carbon	243	Paste plant roof vents	7.2E-02
Baked Carbon	187	Bake oven dry scrubber/baghouse stack	745.2
Potlines	238	Auxiliary diesel generators	446.4

Summary of Maximum Daily SO_x Emissions by Source

Process	Emissions Source		Maximum Daily SO _x (lb/day)	
	Source #	Source Description	Without SO ₂ Wet Scrubber	With SO ₂ Wet Scrubber
General Facility	241	Plant-wide natural gas combustion emissions	5.8	5.8
	242	Plant-wide propane combustion emissions	7.8E-04	7.8E-04
	247	Potline primary control system	42,758	2,138
		Potline secondary control system	2,250	2,250
Green Carbon	243	Paste plant roof vents	0.45	0.45
Baked Carbon	187	Bake oven dry scrubber/baghouse stack	993.6	49.7
Potlines	238	Auxiliary diesel generators	29.5	29.5

<u>Parameter</u>	<u>Value</u>	<u>Units</u>	<u>Reference</u>
Maximum annual aluminum production rate	307,000	tons/year	Washington Department of Ecology Air Permit DE 04 AQIS-1070, Condition D1
Maximum daily aluminum production rate	1,013.4	tons/day	Maximum historical average daily production rate (based on maximum month of production for 1984-2000)
Annual average daily aluminum production rate	841.1	tons/day	Based on maximum annual production rate limit
Maximum daily emissions factor	1.2	(relative to annual average daily emissions)	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate
Maximum number of anodes per month	55,719	anodes/month	Maximum monthly baked anode production for 1999-2000
Average number of anodes per day	1,857	anodes/day	Based on maximum number of anodes per month
Anode weight	556.7	lb/anode	Maximum monthly average baked anode weight for 1999-2000
Anode weight lost in baking	37.0	lb/anode	1999-2000 maximum monthly average; assume 100% of loss is pitch
Liquid pitch sulfur content	0.66%		Maximum liquid pitch sulfur content (for 1991-2005)
Maximum coke sulfur content	3.3%		Maximum coke sulfur content (for 1990-2005)
Net carbon	0.409	lb C/lb Al	Maximum historical net carbon at full production (for 1990-2000)
Maximum daily natural gas usage (anode bake furnace)	1.1	MMscf/day	Maximum monthly usage for 1999-2000, divided by 30 day/month
Maximum daily natural gas usage (casthouse furnaces)	2.0	MMscf/day	Maximum daily usage for 2004-2005
Maximum daily natural gas usage (remelt furnace)	0.27	MMscf/day	Maximum historical daily usage
Maximum total annual facility-wide propane usage	11,822	gal/yr	Maximum for 2004 and 2005

Emission Scenario: Maximum Daily Emissions

Process 1: General Facility

Source Number: 233

Emission Source: General Welding

Introduction:

Generation points include arc welding and conventional torch welding at the facility. The welding rod used at this facility that emits the greatest quantity of pollutants is the Hobart 6001 type arc rod. For the purpose of emissions calculations it was assumed that all of the rod consumed annually emits pollutants at the rate of the Hobart 6001 type arc rod.

Parameters:

Annual welding rod usage	12	tons/yr
Average daily welding rod usage	65.8	lb/day
Maximum daily emissions factor	1.2	

Notes

Based on annual welding rod usage
Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission factor:

PM	3.8E-02	lb/lb welding rod
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Reference

AP-42, Section 12.19

Emission estimates:

Maximum daily PM emissions $3.8E-02 \text{ lb/lb welding rod} \times 65.8 \text{ lb/day} \times 1.2 = 3.0 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 1: General Facility

Source Number: 239

Emission Source: Fugitive Dust from Vehicle Traffic on Paved Roads

Introduction:

- Generation points include:
- A. Alumina ore transfer from silos to primary air pollution control equipment
 - B. Anode transfer from the rod shop to the potlines and back
 - C. Crust transfer from rod shop to autogenous mill and back
 - D. Waste transfer to RCRA landfill
 - E. Finished product transfer to storage
 - F. Finished product transfer from loading area to plant entrance
 - G. Miscellaneous vehicle traffic

A. Alumina ore transfer from silos to primary air pollution control equipment

Parameters:

		<u>Notes</u>
Annual alumina ore usage	592,200 tons/yr	
Average daily alumina ore usage	1,622 tons/day	Based on annual alumina ore usage
Vehicle capacity	35 tons	Title V application
Number of truck trips	46 trips/day	Calculation
Average round-trip distance	8,000 ft	Title V application
Total vehicle miles	70.2 VMT/day	Calculation
Mean vehicle weight	55 tons	Facility estimate
Silt loading	0.35 g/m ²	Facility silt loading test (May 2002)
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission factor:

		<u>Reference</u>
PM ₁₀	0.41 lbs/VMT	AP-42, Section 13.2.1
PM _{2.5}	6.0E-02 lbs/VMT	AP-42, Section 13.2.1

Emissions estimate:

Maximum daily PM ₁₀ emissions	0.41 lb/VMT	x	70.2 VMT/day	x	1.2	=	34.3 lb/day
Maximum daily PM _{2.5} emissions	6.0E-02 lb/VMT	x	70.2 VMT/day	x	1.2	=	5.1 lb/day

B. Anode transfer from the rod shop to the potlines and back

Parameters:

		<u>Notes</u>
Maximum number of anodes transferred per month	55,719 anodes/month	Maximum monthly baked anode production for 1999-2000
Average number of anodes transferred per day	1,857 anodes/day	Based on maximum number of anodes transferred per month
Number of anodes per trip	24 anodes	Title V application
Average number of truck trips per day	77 trips/day	Calculation
Average round-trip distance	6,600 ft	Title V application
Average total vehicle miles per day	96.7 VMT/day	Calculation
Mean vehicle weight	9 tons	Facility estimate
Silt loading	0.35 g/m ²	Facility silt loading test (May 2002)
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission Scenario: Maximum Daily Emissions

Process 1: General Facility

Source Number: 239

Emission Source: Fugitive Dust from Vehicle Traffic on Paved Roads

Emission factor:

PM ₁₀	2.6E-02 lbs/VMT	Reference	AP-42, Section 13.2.1
PM _{2.5}	3.7E-03 lbs/VMT		AP-42, Section 13.2.1

Emission estimate:

Maximum daily PM ₁₀ emissions	2.6E-02 lb/VMT	x	96.7	VMT/day	x	1.2	=	3.1	lb/day
Maximum daily PM _{2.5} emissions	3.7E-03 lb/VMT	x	96.7	VMT/day	x	1.2	=	0.43	lb/day

C. Crust transfer from rod shop to autogenous mill and back

Parameters:

Annual crust quantity	20,000	tons/yr	Notes	
Average daily crust quantity	54.8	tons/day	Based on annual crust quantity	
Vehicle capacity	12	tons	Title V application	
Average number of truck trips per day	5	trips/day	Calculation	
Average round-trip distance	1,400	ft	Title V application	
Average total vehicle miles per day	1.2	VMT/day	Calculation	
Mean vehicle weight	9	tons	Facility estimate	
Silt loading	0.35	g/m ²	Facility silt loading test (May 2002)	
Maximum daily emissions factor	1.2		Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate	

Emission factor:

PM ₁₀	2.6E-02 lbs/VMT	Reference	AP-42, Section 13.2.1
PM _{2.5}	3.7E-03 lbs/VMT		AP-42, Section 13.2.1

Emission estimate:

Maximum daily PM ₁₀ emissions	2.6E-02 lb/VMT	x	1.2	VMT/day	x	1.2	=	3.8E-02	lb/day
Maximum daily PM _{2.5} emissions	3.7E-03 lb/VMT	x	1.2	VMT/day	x	1.2	=	5.4E-03	lb/day

D. Waste transfer at landfills

Parameters:

Waste hauled per year	25,000	tons/yr	Notes	
Average waste hauled per day	68.5	tons/day	Based on waste hauled per year	
Vehicle capacity	12	tons	Title V application	
Average number of truck trips per day	6	trips/day	Calculation	
Average round-trip distance	7,000	ft	Title V application	
Average total vehicle miles per day	7.6	VMT/day	Calculation	
Mean vehicle weight	17.5	tons	Facility estimate	
Silt loading	0.35	g/m ²	Facility silt loading test (May 2002)	
Maximum daily emissions factor	1.2		Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate	

Emission Scenario: Maximum Daily Emissions

Process 1: General Facility

Source Number: 239

Emission Source: Fugitive Dust from Vehicle Traffic on Paved Roads

Emission factor:

PM ₁₀	7.2E-02 lbs/VMT	<u>Reference</u>
PM _{2.5}	1.1E-02 lbs/VMT	AP-42, Section 13.2.1

Emission estimate:

Maximum daily PM ₁₀ emissions	7.2E-02	lb/VMT	x	7.6	VMT/day	x	1.2	=	0.66	lb/day
Maximum daily PM _{2.5} emissions	1.1E-02	lb/VMT	x	7.6	VMT/day	x	1.2	=	9.6E-02	lb/day

E. Finished products transfer to storage

Parameters:

Maximum daily aluminum production rate	1,013	tons/day	<u>Notes</u>
Vehicle capacity	2	tons	Maximum historical average daily production rate (based on maximum month of production for 1984-2000)
Average number of truck trips per day	507	trips/day	Title V application
Average round-trip distance	400	ft	Calculation
Average total vehicle miles per day	38.4	VMT/day	Title V application
Mean vehicle weight	12.5	tons	Calculation
Silt loading	0.35	g/m ²	Facility estimate
			Facility silt loading test (May 2002)

Emission factor:

PM ₁₀	4.3E-02 lbs/VMT	<u>Reference</u>
PM _{2.5}	6.2E-03 lbs/VMT	AP-42, Section 13.2.1

Emission estimate:

Maximum daily PM ₁₀ emissions	4.3E-02	lb/VMT	x	38.4	VMT/day	=	1.7	lb/day
Maximum daily PM _{2.5} emissions	6.2E-03	lb/VMT	x	38.4	VMT/day	=	0.24	lb/day

F. Finished products transfer from loading area to plant entrance

Parameters:

Maximum daily aluminum production rate	1,013	tons/day	<u>Notes</u>
Vehicle capacity	15	tons	Maximum historical average daily production rate (based on maximum month of production for 1984-2000)
Average number of truck trips per day	68	trips/day	Title V application
Average round-trip distance	1,600	ft	Calculation
Average total vehicle miles per day	20.5	VMT/day	Title V application
Mean vehicle weight	55	tons	Calculation
Silt loading	0.35	g/m ²	Facility estimate
			Facility silt loading test (May 2002)

Emission factor:

PM ₁₀	0.41	lbs/VMT	<u>Reference</u>
PM _{2.5}	6.0E-02	lbs/VMT	AP-42, Section 13.2.1

Emission Scenario: Maximum Daily Emissions

Process 1: General Facility

Source Number: 239

Emission Source: Fugitive Dust from Vehicle Traffic on Paved Roads

Emission estimate:

Maximum daily PM₁₀ emissions 0.41 lb/VMT x 20.5 VMT/day = 8.3 lb/day
 Maximum daily PM_{2.5} emissions 6.0E-02 lb/VMT x 20.5 VMT/day = 1.2 lb/day

G. Miscellaneous vehicle traffic

Parameters:

Maximum daily emissions factor 1.2

Notes

Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission estimate:

Annual average PM₁₀ emissions 1.0 tons/yr
 Annual average PM_{2.5} emissions 0.15 tons/yr

Reference

Engineering judgment (Title V application)
 Assume same ratio of PM₁₀ to PM_{2.5} as other paved road sources

Maximum daily PM₁₀ emissions 1.0 tons/yr x 2,000 lb/ton / 365 days/yr x 1.2 = 6.6 lb/day
 Maximum daily PM_{2.5} emissions 0.15 tons/yr x 2,000 lb/ton / 365 days/yr x 1.2 = 0.99 lb/day

Source	PM ₁₀ Emissions	PM _{2.5} Emissions
A	34.3 lb/day	5.1 lb/day
B	3.1 lb/day	0.43 lb/day
C	3.8E-02 lb/day	5.4E-03 lb/day
D	0.66 lb/day	9.6E-02 lb/day
E	1.7 lb/day	0.24 lb/day
F	8.3 lb/day	1.2 lb/day
G	6.6 lb/day	0.99 lb/day
TOTAL	54.6 lb/day	8.1 lb/day

Emission Scenario: Maximum Daily Emissions

Process 1: General Facility

Source Number: 240

Emission Source: Fugitive Dust from Loading and Dumping Waste

Introduction:

Generation point is the transfer of waste from various locations by truck to the landfills.

Parameters:

		<u>Notes</u>
Waste hauled per year	25,000 tons/year	
Average waste hauled per day	68.5 tons/day	Based on waste hauled per year
Mean wind speed	15 mph	Assumption (upper end of applicable range for AP-42 equation)
Material moisture content	1 %	Assumption (Title V application)
Number of transfers	2	
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission factor:

		<u>Reference</u>
PM ₁₀	1.2E-02 lbs/ton	AP-42, Section 13.2.4
PM _{2.5}	1.9E-03 lbs/ton	AP-42, Section 13.2.4

Emission estimates:

Maximum daily PM ₁₀ emissions	1.2E-02 lb/ton	x	68.5 tons/day	x	2 transfers	x	1.2	=	2.0 lb/day
Maximum daily PM _{2.5} emissions	1.9E-03 lb/ton	x	68.5 tons/day	x	2 transfers	x	1.2	=	0.31 lb/day

Emission Scenario: Maximum Daily Emissions

Process 1: General Facility

Source Number: 241

Emission Source: Plant-wide Natural Gas Combustion

Introduction:

This calculation includes natural gas consumption for all facility-wide burners, boiler, and furnaces.

Parameters:

Maximum daily natural gas usage

Anode bake furnace	1.1 MMscf/day
Casthouse furnaces	2.0 MMscf/day
Remelt furnace	0.27 MMscf/day
Total	3.4 MMscf/day

Maximum daily emissions factor

1.2

Reference

Maximum monthly usage for 1999-2000, divided by 30 day/month

Maximum daily usage for 2004-2005

Maximum historical daily usage

Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Natural gas combustion emission factors:

PM₁₀ 7.6 lb/MMcf

SO₂ 1.4 lb/MMcf

NO_x 100 lb/MMcf

Reference

AP-42, Section 1.4, Table 1.4.2

Based on sulfur content of 0.5 gr/100 ft³ (per Al Newman of WDOE)

AP-42, Section 1.4, Table 1.4.1, Small Industrial Boilers

Emission estimates:

Maximum daily PM₁₀ emissions 3.4 MMscf/day x 7.6 lb/MMcf x 1.2 = 30.8 lb/day

Maximum daily SO_x emissions 3.4 MMscf/day x 1.4 lb/MMcf x 1.2 = 5.8 lb/day

Maximum daily NO_x emissions 3.4 MMscf/day x 100 lb/MMcf x 1.2 = 405.8 lb/day

Emission Scenario: Maximum Daily Emissions

Process 1: General Facility

Source Number: 242

Emission Source: Plant-wide Propane Combustion

Introduction:

Generation points include propane consumption for all facility-wide burners, boiler, and furnaces as a backup fuel in the event of a gas curtailment or outages from gas piping maintenance work.

Parameters:

			<u>Notes</u>
Total annual facility-wide propane usage	11,822	gal/yr	Maximum for 2004 and 2005
Average daily facility-wide propane usage	32.4	gal/day	Based on annual facility-wide propane usage
Maximum daily emissions factor	1.2		Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Natural gas combustion emission factors:

			<u>Reference</u>
PM ₁₀	0.6	lb/Mgal	AP-42, Section 1.5
SO ₂	2.0E-02	lb/Mgal	AP-42, Section 1.5; sulfur content of 0.2 gr/100 ft ³
NO _x	19	lb/Mgal	AP-42, Section 1.5

Emission estimates:

Maximum daily PM ₁₀ emissions	32.4	gal/day	x	0.6	lb/Mgal	/	1,000	gal/Mgal	x	1.2	=	2.3E-02	lb/day
Maximum daily SO _x emissions	32.4	gal/day	x	2.0E-02	lb/Mgal	/	1,000	gal/Mgal	x	1.2	=	7.8E-04	lb/day
Maximum daily NO _x emissions	32.4	gal/day	x	19	lb/Mgal	/	1,000	gal/Mgal	x	1.2	=	0.74	lb/day

Emission Scenario: Maximum Daily Emissions

Process 1: General Facility

Source Number: 247

Emission Source: Potline Sulfur Dioxide Emissions

Introduction:

Generation points include the aluminum reduction pots, the anode bake ovens, and paste plant heaters and mixers. The discharge point does not include SO₂ emissions from natural gas combustion. Sulfur dioxide emissions for the entire plant are calculated by mass balance, assuming that 100% of the sulfur contained in the raw materials is emitted as sulfur dioxide. Of all the raw materials, only the coke and pitch used for anode production contain significant amounts of sulfur. The percent of sulfur in these two raw materials is used to calculate the total sulfur available to be released.

Parameters:

		<u>Notes</u>
Maximum daily aluminum production rate	1,013 tons/day	Maximum historical average daily production rate (based on maximum month of production for 1984-2000)
Maximum net carbon	0.409 lb C/lb Al	Maximum historical net carbon at full production (for 1990-2000)
Maximum liquid pitch sulfur content	0.6%	Washington Department of Ecology Air Permit DE 04 AQIS-1070, Condition D2
Maximum coke sulfur content	3.3%	Maximum coke sulfur content (for 1990-2005)
Pitch content of green anodes	15.1%	
Coke content of green anodes	84.9%	
Maximum green anode sulfur content	2.9%	Calculated based on pitch and coke content of green anodes and maximum historical sulfur content data for pitch and coke
Percent of sulfur emitted as SO ₂	95%	Facility estimate
Percent of potline SO ₂ emitted from primary potline controls	95%	Facility estimate
Percent of potline SO ₂ emitted from secondary potline controls	5%	Facility estimate
SO ₂ wet scrubber control efficiency	95%	

Emission estimates:

Maximum daily SO ₂ emissions from primary potline controls (without SO ₂ control)	1,013 tons/day x 0.409 x 2.9% x 2 ton SO ₂ /ton S x 95% x 95% x 2,000 lb/ton = 42,758 lbs/day
Maximum daily SO ₂ emissions from primary potline controls (with SO ₂ wet scrubber)	1,013 tons/day x 0.409 x 2.9% x 2 ton SO ₂ /ton S x 95% x 95% x 5% x 2,000 lb/ton = 2,138 lbs/day
Maximum daily SO ₂ emissions from secondary potline controls	1,013 tons/day x 0.409 x 2.9% x 2 ton SO ₂ /ton S x 95% x 5% x 2,000 lb/ton = 2,250 lbs/day

Emission Scenario: Maximum Daily Emissions

Process 2: Green Carbon

Source Number: 188

Emission Source: Paste Plant Baghouse Stack

Introduction:

Generation points include the coke/pitch weigh feeders.

Parameters:

		<u>Notes</u>
Air flow rate	19,000 dscfm	Vendor literature
PM emission concentration	5.0E-04 gr/dscf	Source Test Summary #21
Maximum hours of operation	24 hrs/day	

Emission estimate:

Maximum daily PM emissions $5.0E-04 \text{ gr/dscf} \times 19,000 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 2.0 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 2: Green Carbon

Source Numbers: 189 and 191

Emission source: Phase "A" and "B" Ball Mill Baghouse Stacks

Introduction:

Generation points are the phase "A" and "B" ball mills.

Parameters:

		<u>Notes</u>
Air flow rate	10,000 dscfm	Vendor literature
PM emission concentration	8.3E-03 gr/dscf	Source Test Summary #21 (average of two tests)
Maximum hours of operation	24 hrs/day	

PM emission estimates:

Maximum daily PM emissions - Phase "A" ball mill baghouse stack	$8.3E-03 \text{ gr/dscf} \times 10,000 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 17.1 \text{ lb/day}$
Maximum daily PM emissions - Phase "B" ball mill baghouse stack	$8.3E-03 \text{ gr/dscf} \times 10,000 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 17.1 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 2: Green Carbon

Source Number: 190

Emission Source: Phase "A" Mixer Stack

Introduction:

Generation points include the phase "A" paste preheaters, paste top mixers, and paste bottom mixers. Sulfur dioxide emissions for these points are represented in the plant-wide sulfur dioxide emissions.

Parameters:

		<u>Notes</u>
Maximum annual aluminum production rate	307,000 tons/yr	
Mt. Holly aluminum production rate	204,600 tons/yr	Title V application
Percentage of total facility pitch usage	50%	
Maximum hours of operation	24 hrs/day	
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission rates:

		<u>Reference</u>
PM (Mt. Holly)	5.82E-02 lb/hr	Source test summary #1 (Mt. Holly)
PM	8.7E-02 lb/hr	Source test summary #1 (Mt. Holly facility); scaled to aluminum production rate

Emission estimates:

Maximum daily PM emissions $8.7E-02 \text{ lb/hr} \times 50\% \times 24 \text{ hrs/day} \times 1.2 = 1.3 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 2: Green Carbon

Source Number: 192

Emission Source: Phase "B" Mixer Stack

Introduction:

Generation points include the phase "B" paste preheaters, paste top mixers, and paste bottom mixers. Sulfur dioxide emissions for these points are represented in the plant-wide sulfur dioxide emissions.

Parameters:

		<u>Notes</u>
Maximum annual aluminum production rate	307,000 tons/yr	
Mt. Holly aluminum production rate	204,600 tons/yr	Title V application
Percentage of total facility pitch usage	50%	
Maximum hours of operation	24 hrs/day	
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission rates:

		<u>Reference</u>
PM (Mt. Holly)	5.82E-02 lb/hr	Source test summary #1 (Mt. Holly)
PM	8.7E-02 lb/hr	Source test summary #1 (Mt. Holly facility); scaled to aluminum production rate

Emission estimates:

Maximum daily PM emissions $8.7E-02 \text{ lb/hr} \times 50\% \times 24 \text{ hrs/day} \times 1.2 = 1.3 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 2: Green Carbon

Source Number: 193

Emission Source: KVS Ball Mill Baghouse Stack

Introduction:

Generation point is the KVS ball mill.

Parameters:

Air flow rate	1,100	dscfm
PM emission concentration	5.0E-03	gr/dscf
Maximum hours of operation	24	hrs/day

Notes

Vendor literature (Title V application); assumed dscfm equals scfm (conservative assumption)

Engineering judgment

Emission estimate:

Maximum daily PM emissions $5.0E-03 \text{ gr/dscf} \times 1,100 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 1.1 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 2: Green Carbon

Source Number: 194

Emission Source: Pet Coke Baghouse Stack

Introduction:

Generation points include the coke unloading from railcars, three coke storage silos, the coke classifier, and the classified coke storage tanks.

Parameters:

		<u>Notes</u>
Air flow rate	7,500 dscfm	Vendor literature
PM emission concentration	5.0E-03 gr/dscf	Engineering judgment
Maximum hours of operation	24 hrs/day	

Emission estimates:

Maximum daily PM emissions $5.0E-03 \text{ gr/dscf} \times 7,500 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 7.7 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 2: Green Carbon

Source Number: 232

Emission Source: Butts Baghouse Stack

Introduction:

Generation points include the Arco silo, butts silo, carbon/coke classifier, and butts crusher.

Parameters:

		<u>Notes</u>
Air flow rate	18,000 dscfm	Vendor literature
PM emission concentration	5.0E-03 gr/dscf	Engineering judgment
Maximum hours of operation	24 hrs/day	

Emission estimate:

Maximum daily PM emissions $5.0E-03 \text{ gr/dscf} \times 18,000 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 18.5 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 2: Green Carbon

Source Number: 243

Emission Source: Paste Plant Roof Vents

Introduction:

Generation points include fugitives from the coke classifier, coke grinding in the ball mills, classified coke storage tanks, weigh feeders, phase "A" and "B" paste preheaters, phase "A" and "B" top mixers, phase "A" and "B" bottom mixers, phase "A" and "B" anode presses, phase "A" and "B" anode cooling, and green anode storage.

A. Coke Handling

The first four generation points involve handling and grinding of coke through four basic steps. All points are controlled by baghouses. Based on engineering judgment, it is assumed that 10 percent of the dust produced is not captured by the baghouses and 50 percent of the uncaptured dust remains in the building. One uncontrolled drop for the classified coke storage silos is added to account for possible excess emissions from these points (engineering judgment for conservative estimate).

Parameters:

		<u>Notes</u>
Annual coke usage	101,100 tons/yr	
Average daily coke usage	277.0 tons/day	Based on annual coke usage
Mean wind speed	5 mph	Assumption for indoors (Title V application)
Material moisture content	1 %	Assumption (Title V application)
Baghouse capture efficiency	90%	Assumption (Title V application)
Building capture efficiency	50%	Assumption (Title V application)
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission factor:

		<u>Reference</u>
PM ₁₀	3.0E-03 lbs/ton	AP-42, Section 13.2.4
PM _{2.5}	4.5E-04 lbs/ton	AP-42, Section 13.2.4

Emission estimate:

Controlled drop daily PM ₁₀ emissions	3.0E-03 lb/ton x 277.0 tons/day x 10% x 50% x 1.2 = 4.9E-02 lb/day
Uncontrolled drop daily PM ₁₀ emissions	3.0E-03 lb/ton x 277.0 tons/day x 1.2 = 0.99 lb/day
Total maximum daily PM ₁₀ emissions	4.9E-02 lb/day + 0.99 lb/day = 1.0 lb/day
Controlled drop daily PM _{2.5} emissions	4.5E-04 lb/ton x 277.0 tons/day x 10% x 50% x 1.2 = 7.5E-03 lb/day
Uncontrolled drop daily PM _{2.5} emissions	4.5E-04 lb/ton x 277.0 tons/day x 1.2 = 0.15 lb/day
Total maximum daily PM _{2.5} emissions	7.5E-03 lb/day + 0.15 lb/day = 0.16 lb/day

Emission Scenario: Maximum Daily Emissions

Process 2: Green Carbon

Source Number: 243

Emission Source: Paste Plant Roof Vents

B. Paste Handling

Emissions from paste handling generation points are estimated using emission rates from the paste cooling conveyor stacks (Sources 2_244 and 2_245). Engineering judgment estimate of emissions from the roof vents assumes 99 percent of emissions from paste handling are emitted through the paste cooling conveyor stacks.

Parameters:

Paste cooling conveyor stack fraction of paste handling emissions 99%
Maximum daily emissions factor 1.2

Notes

Facility estimate
Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission factors:

PM₁₀ 0.21 lb/hr
SO_x 1.6 lb/hr
NO_x 0.25 lb/hr

Emission estimates:

Maximum daily PM₁₀ emissions 0.21 lb/hr x 24 hrs/day / 99% x 1% x 1.2 = 6.1E-02 lb/day
Maximum daily SO_x emissions 1.6 lb/hr x 24 hrs/day / 99% x 1% x 1.2 = 0.45 lb/day
Maximum daily NO_x emissions 0.25 lb/hr x 24 hrs/day / 99% x 1% x 1.2 = 7.2E-02 lb/day

Emission Scenario: Maximum Daily Emissions

Process 2: Green Carbon

Source Numbers: 244 and 245

Emission Source: Phase "A" and "B" Paste Cooling Conveyor Fugitives

Introduction:

Generation points are the phase "A" and "B" paste cooling conveyors. Sulfur dioxide emissions for these points are represented in the plant-wide sulfur dioxide emissions.

Parameters:

		<u>Notes</u>
Maximum annual aluminum production rate	307,000 tons/yr	
Mt. Holly aluminum production rate	204,600 tons/yr	Title V application
Maximum hours of operation	24 hrs/day	
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission rates:

		<u>Reference</u>
PM (Mt. Holly)	5.82E-02 lb/hr	Source test summary #1 (Mt. Holly)
PM	8.7E-02 lb/hr	Source test summary #1 (Mt. Holly facility); scaled to aluminum production rate

Emission estimates:

Maximum daily PM emissions - Phase "A" paste cooling conveyor	$8.7E-02 \text{ lb/hr} \times 24 \text{ hrs/day} \times 1.2 = 2.5 \text{ lb/day}$
Maximum daily PM emissions - Phase "B" paste cooling conveyor	$8.7E-02 \text{ lb/hr} \times 24 \text{ hrs/day} \times 1.2 = 2.5 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 2: Green Carbon

Source Number: 248

Emission Source: Scrap Paste Storage Bins

Introduction:

Generation points include two scrap anode paste storage bins. Assumed as a conservatively high estimate that 0.1 percent of anode paste is stored as scrap and two drop transfers from paste scrap handling produce fugitive dust.

Parameters:

		<u>Notes</u>
Annual pet coke usage	101,100 tons/yr	
Average daily pet coke usage	277.0 tons/day	Based on annual pet coke usage
Annual liquid pitch usage	26,400 tons/yr	
Average daily liquid pitch usage	72.3 tons/day	Based on annual liquid pitch usage
Mean wind speed	15 mph	Assumption (upper end of applicable range for AP-42 equation)
Material moisture content	1 %	Assumption (Title V application)
Percent of anode paste stored as scrap	0.1%	Assumption (Title V application)
Number of drop transfers	2	Assumption (Title V application)
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission factor:

		<u>Reference</u>
PM ₁₀	1.2E-02 lbs/ton	AP-42, Section 13.2.4
PM _{2.5}	1.9E-03 lbs/ton	AP-42, Section 13.2.4

Emission estimates:

Maximum daily PM ₁₀ emissions	$1.2\text{E-}02 \text{ lb/ton} \times 349.3 \text{ tons/day} \times 0.1\% \times 2 \text{ transfers} \times 1.2 = 1.0\text{E-}02 \text{ lb/day}$
Maximum daily PM _{2.5} emissions	$1.9\text{E-}03 \text{ lb/ton} \times 349.3 \text{ tons/day} \times 0.1\% \times 2 \text{ transfers} \times 1.2 = 1.6\text{E-}03 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 2: Green Carbon

Source Number: 249

Emission Source: Paste Plant Vacuum System Baghouse Stack

Introduction:

Generation point is housekeeping throughout the paste plant.

Parameters:

			<u>Notes</u>
Air flow rate	600	dscfm	Vendor literature (Title V application); assumed dscfm equals scfm (conservative assumption)
PM emission concentration	5.0E-03	gr/dscf	Engineering judgment
Maximum hours of operation	24	hrs/day	

Emission estimate:

Maximum daily PM emissions $5.0E-03 \text{ gr/dscf} \times 600 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 0.62 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 2: Green Carbon

Source Number: 316

Emission Source: Pitch Fume Treatment System

Introduction:

The pitch fume treatment system is assumed to capture 95 percent of the emissions from the Phase "A" and "B" mixers and paste cooling conveyors. The pitch fumes are mixed with coke fines which absorb the pitch fumes.

Parameters:

Capture efficiency	95%	<u>Notes</u> Facility estimate
Maximum hours of operation	24 hrs/day	

Emission rates:

PM	2.36 lb/hr	<u>Reference</u> Washington Department of Ecology Air Permit DE 04 AQIS-1070, Condition A12
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Emission estimates:

Maximum daily PM emissions $2.36 \text{ lb/hr} \times 24 \text{ hrs/day} = 56.6 \text{ lb/day}$

Emission Scenario: Maximum Daily Emission:

Process 3: Baked Carbon

Source Number: 187

Emission Source: Bake Oven Dry Scrubber/Baghouse Stack

Introduction:

Generation points are the phase "A" and "B" bake oven lines, phase "A" and "B" top mixers, and phase "A" and "B" bottom mixers. VOC emissions from this point are represented in the plant-wide natural gas combustion emissions.

Parameters:

Maximum number of anodes per month	55,719	anodes/month	Notes
Average number of anodes per day	1,857	anodes/day	Maximum monthly baked anode production for 1999-2000
Anode weight lost in baking	37.0	lb/anode	Based on maximum number of anodes per month
Maximum liquid pitch sulfur content	0.6%		1999-2000 maximum monthly average; assume 100% of loss is pitch
Maximum daily emissions factor	1.2		Washington Department of Ecology Air Permit DE 04 AQIS-1070, Condition D2
PM ₁₀ fraction of PM emissions	0.76		Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate
PM _{2.5} fraction of PM emissions	0.66		Alcoa data for Mt. Holly facility
Condensable fraction of PM _{2.5} emissions	0.49		Alcoa data for Mt. Holly facility
Filterable fraction of PM _{2.5} emissions	0.51		Alcoa data for Mt. Holly facility
SO ₂ wet scrubber control efficiency	95%		
SO ₂ wet scrubber exhaust PM concentration	20	ppm	
SO ₂ wet scrubber stack diameter	2.6	m	
SO ₂ wet scrubber stack radius	1.3	m	
SO ₂ wet scrubber exit temperature	336	K	
SO ₂ wet scrubber exit velocity	18.3	m/s	

Emission rates:

PM	71.9	lb/day	Reference
PM ₁₀	54.9	lb/day	Source Test Summary #16
Filterable PM _{2.5} emission rate	24.2	lb/day	Source Test Summary #16 and PM ₁₀ fraction of PM emissions
Condensable PM _{2.5} emission rate	23.1	lb/day	Source Test Summary #16, PM _{2.5} fraction of PM emissions, and filterable fraction of PM _{2.5} emissions
NO _x	18	lb/ton coal	Source Test Summary #16, PM _{2.5} fraction of PM emissions, and condensable fraction of PM _{2.5} emissions
			AP-42, Section 1.2, Table 1.2-1, pulverized anthracite coal combustion

Emission estimates:

Maximum daily PM emissions (without SO ₂ control)	71.9	lb/day	x	1.2	=	86.6	lb/day										
Maximum daily PM ₁₀ emissions (without SO ₂ control)	54.9	lb/day	x	1.2	=	66.1	lb/day										
Maximum daily filterable PM _{2.5} emissions (without SO ₂ control)	24.2	lb/day	x	1.2	=	29.1	lb/day										
Maximum daily filterable PM _{2.5} emissions (with SO ₂ wet scrubber)	20	ppm	/	1000	x	1.3	m x 1.3 m x 3.14 x 18.3 m/s x 293.5 K / 336 K x 3600 s/hr x 24 hr/day / 453.592 g/lb = 323.3 lb/day										
Maximum daily condensable PM _{2.5} emissions	23.1	lb/day	x	1.2	=	27.9	lb/day										
Maximum daily SO ₂ emissions (without SO ₂ control)	1,857	anodes/day	x	37.0	lb/anode	x	0.60%	x	2	lb SO ₂ /lb S	x	1.2	=	993.6	lb/day		
Maximum daily SO ₂ emissions (with SO ₂ wet scrubber)	1,857	anodes/day	x	37.0	lb/anode	x	0.60%	x	2	lb SO ₂ /lb S	x	1.2	x	5%	=	49.7	lb/day
Maximum daily NO _x emissions	18	lb/ton coal	x	1,857	anodes/day	x	37.0	lb/anode	/	2,000	lb/ton	x	1.2	=	745.2	lb/day	

Emission Scenario: Maximum Daily Emissions

Process 3: Baked Carbon

Source Number: 250

Emission Source: Packing Coke Silo Vent

Introduction:

Generation point is the packing coke silo. Packing coke is manufactured in the paste plant and stored in this silo until it is transferred to the baking oven cranes. The silo has a vent on top with no dust control. Based on engineering judgment, it is assumed that 50 percent of the dust produced remains in the silo.

Parameters:

Parameters:		Notes
Annual packing coke usage	250 tons/yr	
Average daily packing coke usage	0.68 tons/day	Based on annual packing coke usage
Mean wind speed	5 mph	Assumption for indoors (Title V application)
Material moisture content	1 %	Assumption (Title V application)
Silo control efficiency	50%	Assumption (Title V application)
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission factor:

Emission factor:		Reference
PM ₁₀	3.0E-03 lbs/ton	AP-42, Section 13.2.4
PM _{2.5}	4.5E-04 lbs/ton	AP-42, Section 13.2.4

Emission estimate:

Maximum daily PM ₁₀ emissions	$3.0E-03 \text{ lb/ton} \times 0.68 \text{ tons/day} \times 50\% \times 1.2 = 1.2E-03 \text{ lb/day}$
Maximum daily PM _{2.5} emissions	$4.5E-04 \text{ lb/ton} \times 0.68 \text{ tons/day} \times 50\% \times 1.2 = 1.8E-04 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 3: Baked Carbon

Source Number: 251

Emission Source: Anode Bake Building Monitor Roof

Introduction:

Generation points include scrap baked anode storage, bake oven cooling fans, covering anodes with packing coke, bake oven crane baghouses, and blowhouse/core sampler baghouse. Sulfur dioxide emissions for this point are represented in the plant-wide sulfur dioxide emissions. NO_x and VOC emissions from this point are represented in the plant-wide natural gas combustion emissions.

Parameters:

		<u>Notes</u>
Maximum annual aluminum production rate	307,000 tons/yr	
Mt. Holly aluminum production rate	204,600 tons/yr	Title V application
Maximum hours of operation	24 hrs/day	
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission rates:

		<u>Reference</u>
PM (Mt. Holly)	0.554 lb/hr	Source test summary #3 (Mt. Holly)
PM	0.83 lb/hr	Source test summary #3 (Mt. Holly facility); scaled to aluminum production rate

Emission estimates:

Maximum daily PM emissions 0.83 lb/hr x 24 hrs/day x 1.2 = 24.0 lb/day

Emission Scenario: Maximum Daily Emissions

Process 3: Baked Carbon

Source Number: 252

Emission Source: Anode Block Hole Blower

Introduction:

Generation point is packing coke dust blown out of the anode eyes, with no controls, after baking.

Parameters:

			<u>Notes</u>
Maximum number of anodes per month	55,719	anodes/month	Maximum monthly baked anode production for 1999-2000
Average number of anodes per day	1,857	anodes/day	Based on maximum number of anodes per month
Maximum daily emissions factor	1.2		Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission factor:

			<u>Reference</u>
PM	1.0E-02	lb PM/anode	Engineering judgment as a conservatively high estimate (Title V application)

Emission estimate:

Maximum daily PM emissions 1,857 anodes/day x 1.0E-02 lb PM/anode x 1.2 = 22.4 lbs/day

Emission Scenario: Maximum Daily Emissions

Process 4: Anode Rodding

Source Numbers: 198 and 199

Emission Source: Rod Shop Baghouse Stacks (East and West)

Introduction:

Generation points include the butts cleaning machine stations #1 and #2 (crust and carbon recovery), the crust and carbon storage bins, and the cast iron cleaning wheelabrator.

Parameters:

		<u>Notes</u>
Air flow rate	50,000 dscfm	Vendor literature
Maximum hours of operation	24 hrs/day	

Emission rates:

		<u>Reference</u>
PM emission concentration	4.4E-03 gr/dscf	Source Test Summary #21 (average of east and west stack test results)

PM emission estimates:

Maximum daily PM emissions - Rod shop baghouse stack (west) $4.4E-03 \text{ gr/dscf} \times 50,000 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 45.3 \text{ lb/day}$

Maximum daily PM emissions - Rod shop baghouse stack (east) $4.4E-03 \text{ gr/dscf} \times 50,000 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 45.3 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 4: Anode Rodding

Source Number: 253a and 253b

Emission Source: Rod Shop Roof Vents (North)

Introduction:

Generation points include fugitives from the butts cleaning machine stations, cast iron removal from rods, pin and stem repair, mating station, aluminum spray, pig box heater, cast iron ladle preheaters, and cast iron storage.

Parameters:

		<u>Notes</u>
Maximum annual aluminum production rate	307,000 tons/yr	
Mt. Holly aluminum production rate	204,600 tons/yr	Title V application
Maximum hours of operation	24 hrs/day	
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission rates:

		<u>Reference</u>
PM (Mt. Holly)	0.116 lb/hr	Source Test Summary #22 (Mt. Holly)
PM	0.17 lb/hr	Source Test Summary #22 (Mt. Holly facility); scaled to aluminum production

Emission estimates:

Maximum daily PM emissions 0.17 lb/hr x 24 hrs/day x 1.2 = 5.0 lb/day

Emission Scenario: Maximum Daily Emissions

Process 4: Anode Rodding

Source Number: 254a and 254b

Emission Source: Rod Shop Roof Vents (South)

Introduction:

Generation point is hot anode butts cooling in the rod shop. It is assumed (engineering judgment as a conservatively high estimate) that 10 percent of emissions from anode butts cooling occur in the south end of the rod shop. This is different than the Mt. Holly process, where nearly 100 percent of cooling occurs in the rod shop.

Parameters:

		<u>Notes</u>
Maximum number of anodes per month	55,719 anodes/month	Maximum monthly baked anode production for 1999-2000
Average number of anodes per day	1,857 anodes/day	Based on maximum number of anodes per month
Percent of cooling emissions in rod shop	10%	Facility estimate (Title V application)
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission rates:

		<u>Reference</u>
PM	1.3E-02 lb/anode	Source Test Summary #25 (Mt. Holly)

Emission estimates:

Maximum daily PM emissions	1.3E-02 lb/anode x 1,857 anodes/day x 10% x 1.2 = 3.0 lb/day
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Emission Scenario: Maximum Daily Emissions

Process 4: Anode Rodding

Source Number: 255

Emission Source: Hot Anode Butts Transport

Introduction:

Generation point is hot anode butts transport from the potrooms to the rod shop. Emissions from hot anode butts transport are assumed (based on engineering judgment) to be 10 percent of anode cooling in the rod shop. This assumption yields a conservatively high estimate of emissions since the transport time is very short, and, therefore, most of the emissions during cooling occur in the rod shop.

Parameters:

Percent of emissions occurring during transport (relative to rodshop) 10%

Notes

Engineering judgment (Title V application)

Emission estimates:

Maximum daily PM₁₀ emissions

$$3.0 \text{ lb/day} \times 10\% = 0.30 \text{ lb/day}$$

Emission Scenario: Maximum Daily Emissions

Process 4: Anode Rodding

Source Numbers: 256A and 256B

Emission Source: Rod Shop Crust Recovery Discharge to Storage Bins #1 and #2

Introduction:

Generation points include discharge of recovered crust to two outdoor storage bins. Crust is removed from anode butts and transferred to two storage bins. There are two transfer points equipped with baghouses. Based on engineering judgment, it is assumed that 90 percent of the dust produced is captured by the baghouse.

Parameters:

		<u>Notes</u>
Annual crust production	20,000 tons/yr	
Average daily crust production	54.8 tons/day	Based on annual crust production
Mean wind speed	15 mph	Assumption (upper end of applicable range for AP-42 equation)
Material moisture content	1 %	Assumption (Title V application)
Baghouse capture efficiency	90%	Assumption (Title V application)
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission factor:

		<u>Reference</u>
PM ₁₀	1.2E-02 lbs/ton	AP-42, Section 13.2.4
PM _{2.5}	1.9E-03 lbs/ton	AP-42, Section 13.2.4

Emission estimates:

Maximum daily PM ₁₀ emissions	$1.2E-02 \text{ lb/ton} \times 54.8 \text{ tons/day} \times 10\% \times 1.2 = 8.1E-02 \text{ lb/day}$
Maximum daily PM _{2.5} emissions	$1.9E-03 \text{ lb/ton} \times 54.8 \text{ tons/day} \times 10\% \times 1.2 = 1.2E-02 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 4: Anode Rodding

Source Numbers: 257A and 257B

Emission Source: Rod Shop Crust Recovery Discharge to Trucks from Bins #1 and #2

Introduction:

Generation points include discharge of recovered crust to trucks from two outdoor storage bins. Crust is removed from anode butts and transferred to two storage bins. The crust is then periodically dumped from the storage bins into trucks for transport.

Parameters:

			<u>Notes</u>
Annual crust production	20,000	tons/yr	
Average daily crust production	54.8	tons/day	Based on annual crust production
Mean wind speed	15	mph	Assumption (upper end of applicable range for AP-42 equation)
Material moisture content	1	%	Assumption (Title V application)
Maximum daily emissions factor	1.2		Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission factor:

			<u>Reference</u>
PM ₁₀	1.2E-02	lbs/ton	AP-42, Section 13.2.4
PM _{2.5}	1.9E-03	lbs/ton	AP-42, Section 13.2.4

Emission estimates:

Maximum daily PM ₁₀ emissions	1.2E-02 lb/ton	x	54.8 tons/day	x	1.2 = 0.81 lb/day
Maximum daily PM _{2.5} emissions	1.9E-03 lb/ton	x	54.8 tons/day	x	1.2 = 0.12 lb/day

Emission Scenario: Maximum Daily Emissions

Process 4: Anode Rodding

Source Numbers: 258A and 258B

Emission Source: Rod Shop Carbon Recovery Discharge to Storage Bins #1 and #2

Introduction:

Generation points include discharge of recovered carbon to two outdoor storage bins. After the crust has been removed from the anode butts, the carbon is transferred to two storage bins. There are two transfer points equipped with a baghouse. Based on engineering judgment, it is assumed that 90 percent of the dust produced is captured by the baghouse.

Parameters:

			<u>Notes</u>
Maximum number of anodes per month	55,719	anodes/month	Maximum monthly baked anode production for 1999-2000
Average number of anodes per day	1,857	anodes/day	Based on maximum number of anodes per month
Anode weight	556.7	lb/anode	Maximum monthly average baked anode weight for 1999-2000
Mean wind speed	15	mph	Assumption (upper end of applicable range for AP-42 equation)
Material moisture content	1	%	Assumption (Title V application)
Anode butt percentage of anode	15%		Engineering judgment of typical value (Title V application)
Baghouse capture efficiency	90%		Assumption (Title V application)
Maximum daily emissions factor	1.2		Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission factor:

		<u>Reference</u>
PM ₁₀	1.2E-02 lbs/ton	AP-42, Section 13.2.4
PM _{2.5}	1.9E-03 lbs/ton	AP-42, Section 13.2.4

Emission estimates:

Maximum daily PM₁₀ emissions 1.2E-02 lb/ton x 15% x 1,857 anodes/day x 556.7 lb/anode / 2,000 lb/ton x 10% x 1.2 = 0.12 lb/day

Emission Scenario: Maximum Daily Emissions

Process 4: Anode Rodding

Source Numbers: 259A and 259B

Emission Source: Rod Shop Carbon Recovery Discharge to Truck from Bins #1 and #2

Introduction:

Generation points include discharge of recovered carbon to two outdoor storage bins. After the crust has been removed from the anode butts, the carbon is transferred to two storage bins. The carbon is then periodically dumped from the storage bins to trucks for transport.

Parameters:

			<u>Notes</u>
Maximum number of anodes per month	55,719	anodes/month	Maximum monthly baked anode production for 1999-2000
Average number of anodes per day	1,857	anodes/day	Based on maximum number of anodes per month
Anode weight	556.7	lb/anode	Maximum monthly average baked anode weight for 1999-2000
Mean wind speed	15	mph	Assumption (upper end of applicable range for AP-42 equation)
Material moisture content	1	%	Assumption (Title V application)
Anode butt percentage of anode	15%		Engineering judgment of typical value (Title V application)
Maximum daily emissions factor	1.2		Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission factor:

		<u>Reference</u>
PM ₁₀	1.2E-02 lbs/ton	AP-42, Section 13.2.4
PM _{2.5}	1.9E-03 lbs/ton	AP-42, Section 13.2.4

Emission estimates:

Maximum daily PM ₁₀ emissions	1.2E-02 lb/ton	x	15% x 1,857 anodes/day x 556.7 lb/anode / 2,000 lb/ton x 1.2 = 1.2 lb/day
Maximum daily PM _{2.5} emissions	1.9E-03 lb/ton	x	15% x 1,857 anodes/day x 556.7 lb/anode / 2,000 lb/ton x 1.2 = 0.17 lb/day

Emission Scenario: Maximum Daily Emissions

Process 4: Anode Rodding

Source Number: 260

Emission Source: Aluminum Spray Cyclone Stack

Introduction:

Generation points include two molten aluminum sprayers to coat anode blocks.

Parameters:

Maximum number of anodes per month	55,719 anodes/month
Average number of anodes per day	1,857 anodes/day
Aluminum sprayed to cover each anode	1 lb/anode
Maximum daily emissions factor	1.2

Notes

Maximum monthly baked anode production for 1999-2000
Based on maximum number of anodes per month
Assumption based on engineering judgment
Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission factors:

PM (pouring and cooling)	4.2 lb/ton Al
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Reference

AP-42, Section 12.10

Emission estimate:

Maximum daily PM emissions	4.2 lb/ton Al x	$1,857 \text{ anodes/day} \times 1 \text{ lb/anode} / 2,000 \text{ lb/ton} \times 1.2 = 4.7 \text{ lb/day}$
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Emission Scenario: Maximum Daily Emissions

Process 4: Anode Rodding

Source Number: 263

Emission Source: Cooling of Cast Iron Dross Sows Outside Rod Shop

Introduction:

Generation point is outdoor cooling of cast iron dross from rod shop furnaces. AP-42 emission factor for pouring and cooling is reduced by one-half since only cooling occurs at this location.

Parameters:

			<u>Notes</u>
Maximum number of anodes per month	55,719	anodes/month	Maximum monthly baked anode production for 1999-2000
Average number of anodes per day	1,857	anodes/day	Based on maximum number of anodes per month
Iron used to attach rod	20	lb/anode	Assumption (engineering judgment)
Percent dross in iron	5%		Assumption (Title V application)
Maximum daily emissions factor	1.2		Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

PM emission factor:

			<u>Reference</u>
Cooling	2.1	lb/ton dross	AP-42, Section 12.10; reduced emission factor by one-half since only cooling occurs at this location

Emission estimate:

Maximum daily PM emissions	2.1	lb/ton dross	x	1,857	anodes/day	x	20	lb iron/anode	x	5%	dross in iron	/	2,000	lb/ton	x	1.2	=	2.3	lb/day
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Emission Scenario: Maximum Daily Emissions

Process 4: Anode Rodding

Source Numbers: 312 and 313

Emission Source: Rod Shop Induction Furnace Stacks (East and West)

Introduction:

Generation points include two phase "A" and two phase "B" electric induction furnaces. In the mating of rods to anode blocks, cast iron is melted in induction furnaces, then poured into the anode block eyes and allowed to cool. Emissions from pouring and cooling are exhausted through the rod shop roof vents.

Parameters:

		<u>Notes</u>
Maximum number of anodes per month	55,719 anodes/month	Maximum monthly baked anode production for 1999-2000
Average number of anodes per day	1,857 anodes/day	Based on maximum number of anodes per month
Iron used to attach rod	20 lb/anode	Assumption (engineering judgment)
Annual cast iron usage per furnace	2,500 tons/yr	Throughput for each furnace is half of the total facility usage
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission rates:

		<u>Reference</u>
PM emission rate	0.9 lb/ton cast iron	AP-42, Section 12.10

Emission estimate:

Maximum daily PM emissions - East stack	0.9 lb/ton cast iron x 1,857 anodes/day x 20 lb iron/anode / 2,000 lb/ton x 1.2 = 20.1 lb/day
Maximum daily PM emissions - West stack	0.9 lb/ton cast iron x 1,857 anodes/day x 20 lb iron/anode / 2,000 lb/ton x 1.2 = 20.1 lb/day

Emission Scenario: Maximum Daily Emissions**Process 5: Potlines****Source Numbers: 22 through 180****Emission Source: Potline Secondary Emission Control System Stacks**

Introduction:

Generation points include fugitives from aluminum reduction pots, alumina feeding, anode charging, bath/metal tapping, bath chemicals handling, reduction cell rebuilding, beam raising, housekeeping, and maintenance activities. Sulfur dioxide emissions for these points are represented in the plant-wide sulfur dioxide emissions. Nitrogen dioxide emissions from these points are negligible; stack test data show that the exhaust gas concentration is below the instrument detection limit of 0.04 ppmv (Source Test Summary #17).

Parameters:

Wet scrubber total flowrate	16,000,000	scfm	Notes
Wet scrubber control efficiency	81%		Washington Department of Ecology Air Permit DE 04 AQIS-1070
PM ₁₀ fraction of PM emissions	0.72		Average control efficiency based on "water on" and "water off" source tests for days with at least 4 "water off" source tests (1995-1999 data)
PM _{2.5} fraction of PM emissions	0.53		Alcoa data for Mt. Holly facility
Condensable fraction of PM _{2.5} emissions	0.49		Alcoa data for Mt. Holly facility
Filterable fraction of PM _{2.5} emissions	0.51		Based on condensable fraction

Emission rates:

Maximum wet scrubber PM emission rate	1.1E-03	gr/dscf	Reference
Maximum wet scrubber PM ₁₀ emission rate	8.0E-04	gr/dscf	Maximum daily average emission rate for wet scrubber "water on" conditions for days with at least 4 source tests (1995-1999 data)
Maximum wet scrubber filterable PM _{2.5} emission rate	3.0E-04	gr/dscf	Maximum daily average PM emission rate and PM ₁₀ fraction of PM emissions
Maximum wet scrubber condensable PM _{2.5} emission rate	2.9E-04	gr/dscf	Maximum daily average PM emission rate, PM _{2.5} fraction of PM emissions, and filterable fraction of PM _{2.5} emissions

Emission estimates:

Maximum daily PM emissions ("water on" conditions)	1.1E-03	gr/dscf	x	16,000,000	scf/min	x	60	min/hr	x	24	hr/day	/	7,000	gr/lb	=	3,681	lb/day		
Maximum daily PM ₁₀ emissions ("water on" conditions)	8.0E-04	gr/dscf	x	16,000,000	scf/min	x	60	min/hr	x	24	hr/day	/	7,000	gr/lb	=	2,633	lb/day		
Maximum daily filterable PM _{2.5} emissions ("water on" conditions)	3.0E-04	gr/dscf	x	16,000,000	scf/min	x	60	min/hr	x	24	hr/day	/	7,000	gr/lb	=	988.8	lb/day		
Maximum daily condensable PM _{2.5} emissions ("water on" conditions)	2.9E-04	gr/dscf	x	16,000,000	scf/min	x	60	min/hr	x	24	hr/day	/	7,000	gr/lb	=	946.7	lb/day		
Maximum daily PM emissions ("water off" conditions)	1.1E-03	gr/dscf	x	16,000,000	scf/min	x	60	min/hr	x	24	hr/day	/	7,000	gr/lb	/	19%	=	19,065	lb/day
Maximum daily PM ₁₀ emissions ("water off" conditions)	8.0E-04	gr/dscf	x	16,000,000	scf/min	x	60	min/hr	x	24	hr/day	/	7,000	gr/lb	/	19%	=	13,641	lb/day
Maximum daily filterable PM _{2.5} emissions ("water off" conditions)	3.0E-04	gr/dscf	x	16,000,000	scf/min	x	60	min/hr	x	24	hr/day	/	7,000	gr/lb	/	19%	=	5,122	lb/day
Maximum daily condensable PM _{2.5} emissions ("water off" conditions)	2.9E-04	gr/dscf	x	16,000,000	scf/min	x	60	min/hr	x	24	hr/day	/	7,000	gr/lb	/	19%	=	4,904	lb/day

Emission Scenario: Maximum Daily Emissions

Process 5: Potlines

Source Numbers: 181 through 186

Emission Source: Potline Primary Emission Control System Stacks

Introduction:

Generation points include 720 aluminum reduction cells. Sulfur dioxide emissions for these points are represented in the plant-wide sulfur dioxide emissions. Nitrogen dioxide emissions from these points are negligible; stack test data show that the exhaust gas concentration is below the instrument detection limit of 0.04 ppmv (Source Test Summary #17).

Parameters:

Dry scrubber total flowrate	1,750,000	scfm
PM ₁₀ fraction of PM emissions	0.89	
PM _{2.5} fraction of PM emissions	0.78	
Condensable fraction of PM _{2.5} emissions	0.94	
Filterable fraction of PM _{2.5} emissions	0.06	
SO ₂ wet scrubber exhaust PM concentration	20	ppm
SO ₂ wet scrubber stack diameter	8.1	m
SO ₂ wet scrubber stack radius	4.1	m
SO ₂ wet scrubber exit temperature	310	K
SO ₂ wet scrubber exit velocity	18.3	m/s

Notes

Washington Department of Ecology Air Permit DE 04 AQIS-1070
Alcoa data for Mt. Holly facility
Alcoa data for Mt. Holly facility
Alcoa data for Mt. Holly facility
Alcoa data for Mt. Holly facility

Emission rates:

Maximum dry scrubber PM emission rate	6.4E-03	gr/dscf
Maximum dry scrubber PM ₁₀ emission rate	5.7E-03	gr/dscf
Maximum dry scrubber filterable PM _{2.5} emission rate	3.1E-04	gr/dscf
Maximum dry scrubber condensable PM _{2.5} emission rate	4.7E-03	gr/dscf

Reference

Maximum daily average emission rate for dry scrubbers for days with at least 4 source tests (1995-1999 data)
Maximum daily average PM emission rate and PM₁₀ fraction of PM emissions
Maximum daily average PM emission rate, PM_{2.5} fraction of PM emissions, and filterable fraction of PM_{2.5} emissions
Maximum daily average PM emission rate, PM_{2.5} fraction of PM emissions, and condensable fraction of PM_{2.5} emissions

Emissions estimate:

Maximum daily PM emissions (without SO ₂ control)	6.4E-03	gr/dscf	x	1,750,000	scf/min	x	60	min/hr	x	24	hr/day	/	7,000	gr/lb	=	2,321	lb/day																	
Maximum daily PM ₁₀ emissions (without SO ₂ control)	5.7E-03	gr/dscf	x	1,750,000	scf/min	x	60	min/hr	x	24	hr/day	/	7,000	gr/lb	=	2,063	lb/day																	
Maximum daily filterable PM _{2.5} emissions (without SO ₂ control)	3.1E-04	gr/dscf	x	1,750,000	scf/min	x	60	min/hr	x	24	hr/day	/	7,000	gr/lb	=	110.5	lb/day																	
Maximum daily filterable PM _{2.5} emissions (with SO ₂ wet scrubber)	20	ppm	/	1000		x	4.1	m	x	4.1	m	x	3.14	x	18.3	m/s	x	293.5	K	/	310	K	x	3600	s/hr	x	24	hr/day	/	453.592	g/lb	=	3,401	lb/day
Maximum daily condensable PM _{2.5} emissions (without SO ₂ control)	4.7E-03	gr/dscf	x	1,750,000	scf/min	x	60	min/hr	x	24	hr/day	/	7,000	gr/lb	=	1,695	lb/day																	

Emission Scenario: Maximum Daily Emissions

Process 5: Potlines

Source Number: 238

Emission Source: Auxiliary Diesel Generators

Introduction:

Generation points include six diesel-fired auxiliary generators. These diesel engine powered generators are maintained on standby for emergency use in case of utility power failure. Each engine is rated at 100 horsepower. The units are only run periodically for testing purposes and during emergencies, which are infrequent.

Parameters:

Maximum hours of operation	24	hrs/day	
Number of generators	6		
Diesel generator engine horsepower	100	HP	Title V application

Reference

Diesel emission factors:

PM ₁₀	2.2E-03	lb/hp-hr	AP-42, Section 3.3, Table 3.3-1
SO ₂	2.1E-03	lb/hp-hr	AP-42, Section 3.3, Table 3.3-1
NO _x	3.1E-02	lb/hp-hr	AP-42, Section 3.3, Table 3.3-1

Reference

Emissions estimate:

Maximum daily PM ₁₀ emissions	24	hrs/day	x	6	generators	x	2.2E-03	lb/hp-hr	x	100	HP	=	31.7	lb/day
Maximum daily SO ₂ emissions	24	hrs/day	x	6	generators	x	2.1E-03	lb/hp-hr	x	100	HP	=	29.5	lb/day
Maximum daily NO _x emissions	24	hrs/day	x	6	generators	x	3.1E-02	lb/hp-hr	x	100	HP	=	446.4	lb/day

Emission Scenario: Maximum Daily Emissions

Process 6: Metal Products

Source Numbers: 3, 6, 9, 12, and 15

Emission Source: Casting Pit Steam Exhaust Stacks

Introduction:

Generation points include five vertical direct casting (VDC) stacks. Emissions from the steam exhaust stacks consist primarily of steam from aluminum casting coolant water and PM and VOC from casting oil usage. Based on engineering judgment, it is assumed that 5 percent of the oil is emitted as PM (smoke), 10 percent is emitted as VOC, and the remainder is recovered by the casthouse WTP or clings to the aluminum product. Approximately 10 percent of casthouse oil is used in the pigger caster and exhausted through the pigger cooling conveyor stack; oil usage for the casting pit steam exhaust stacks has been correspondingly reduced in the emissions calculations below.

Parameters:

		<u>Notes</u>
Annual casthouse castor oil usage	15,000 lbs/year	
Annual casthouse graphite oil usage	500 lbs/year	
Average daily casthouse castor oil usage	41.1 lb/day	Based on annual casthouse castor oil usage
Average daily casthouse graphite oil usage	1.4 lb/day	Based on annual casthouse graphite oil usage
Percent of oil used in pigger caster	10%	Exhausted through the pigger cooling conveyor exhaust stack (Title V application)
Percent of oil emitted as PM	5%	Engineering judgment (Title V application)
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission estimates:

Maximum daily PM emissions 42.5 lbs/day x 90% x 5% x 1.2 = 2.3 lb/day

Emission Scenario: Maximum Daily Emissions

Process 6: Metal Products

Source Numbers: 4, 5, 7, 8, 10, 11, 13, 14, 16, 17, 18, 19, and 20

Emission Source: Aluminum Holding Furnace Stacks

Introduction:

Generation points include 13 natural gas-fired aluminum holding furnaces. Emissions due to natural gas combustion for these furnaces are represented in the plant-wide natural gas combustion emissions.

Parameters:

		<u>Notes</u>
Maximum hours of operation	24 hrs/day	
Number of furnaces	13	
Maximum daily emissions factor	1.2	Maximum historical average daily production rate (based on maximum month of production for 1984-2000)
PM ₁₀ fraction of PM emissions	0.99	Alcoa data
Filterable PM _{2.5} fraction of PM emissions	0.23	Alcoa data
Condensable PM _{2.5} fraction of PM emissions	0.40	Alcoa data

Emission rates:

		<u>Reference</u>
PM	0.34 lb/hr/furnace	Source Test Summary #20
PM ₁₀	0.34 lb/hr/furnace	Source Test Summary #20 and PM ₁₀ fraction of PM emissions
Filterable PM _{2.5}	0.08 lb/hr/furnace	Source Test Summary #20 and filterable PM _{2.5} fraction of PM emissions
Condensable PM _{2.5}	0.14 lb/hr/furnace	Source Test Summary #20 and condensable PM _{2.5} fraction of PM emissions

Emission estimates:

Maximum daily PM emissions	0.34 lb/hr/furnace x 24 hrs/day x 13 furnaces x 1.2 = 127.8 lb/day
Maximum daily PM ₁₀ emissions	0.34 lb/hr/furnace x 24 hrs/day x 13 furnaces x 0.99 = 126.8 lb/day
Maximum daily filterable PM _{2.5} emissions	0.08 lb/hr/furnace x 24 hrs/day x 13 furnaces x 0.23 = 29.9 lb/day
Maximum daily condensable PM _{2.5} emissions	0.14 lb/hr/furnace x 24 hrs/day x 13 furnaces x 0.40 = 50.9 lb/day

Emission Scenario: Maximum Daily Emissions

Process 6: Metal Products

Source Number: 21

Emission Source: Pigger Cooling Conveyor Exhaust Stack

Introduction:

Generation point is the pigger cooling conveyor. Emissions from the pigger conveyor exhaust stack consist primarily of steam from aluminum casting coolant water and PM and VOC from casting oil usage. Based on engineering judgment, it is assumed that 5 percent of the oil is emitted as PM (smoke), 10 percent is emitted as VOC, and the remainder is recovered by the casthouse WTP or clings to the aluminum product.

Parameters:

		<u>Notes</u>
Annual casthouse castor oil usage	15,000 lbs/year	
Annual casthouse graphite oil usage	500 lbs/year	
Average daily casthouse castor oil usage	41.1 lb/day	Based on annual casthouse castor oil usage
Average daily casthouse graphite oil usage	1.4 lb/day	Based on annual casthouse graphite oil usage
Percent of oil used in pigger caster	10%	Exhausted through the pigger cooling conveyor exhaust stack (Title V application)
Percent of oil emitted as PM	5%	Engineering judgment (Title V application)
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission estimates:

Maximum daily PM emissions 42.5 lb/day x 10% x 5% x 1.2 = 0.26 lb/day

Emission Scenario: Maximum Daily Emissions

Process 6: Metal Products

Source Number: 217

Emission source: Remelt Furnace Stack

Introduction:

Generation point is the natural gas-fired remelt furnace. Emissions due to natural gas combustion for this furnace are represented in the plant-wide natural gas combustion emissions.

Parameters:

Maximum hours of operation	24 hrs/day
Maximum daily emissions factor	1.2
PM ₁₀ fraction of PM emissions	0.51
Filterable PM _{2.5} fraction of PM emissions	0.07
Condensable PM _{2.5} fraction of PM emissions	0.14

Notes

Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate
Alcoa data
Alcoa data
Alcoa data

Emission rates:

PM	0.34 lb/hr/furnace
PM ₁₀	0.17 lb/hr/furnace
Filterable PM _{2.5}	0.02 lb/hr/furnace
Condensable PM _{2.5}	0.05 lb/hr/furnace

Reference

Source Test Summary #20
Source Test Summary #20 and PM₁₀ fraction of PM emissions
Source Test Summary #20 and filterable PM_{2.5} fraction of PM emissions
Source Test Summary #20 and condensable PM_{2.5} fraction of PM emissions

Emissions estimates:

Maximum daily PM emissions	$0.34 \text{ lb/hr/furnace} \times 24 \text{ hrs/day} \times 1.2 = 9.8 \text{ lb/day}$
Maximum daily PM ₁₀ emissions	$0.17 \text{ lb/hr/furnace} \times 24 \text{ hrs/day} \times 1.2 = 5.0 \text{ lb/day}$
Maximum daily filterable PM _{2.5} emissions	$0.02 \text{ lb/hr/furnace} \times 24 \text{ hrs/day} \times 1.2 = 0.67 \text{ lb/day}$
Maximum daily condensable PM _{2.5} emissions	$0.05 \text{ lb/hr/furnace} \times 24 \text{ hrs/day} \times 1.2 = 1.3 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 6: Metal Products

Source Numbers: 220a, 220b, 221a, 221b

Emission Source: MHD Holding Furnaces

Introduction:

Generation points are the natural gas-fired MHD furnaces #1 and #2.

Parameters:

		<u>Notes</u>
Maximum hours of operation	24 hrs/day	
Number of furnaces	2	
Maximum daily emissions factor	1.2	Maximum historical average daily production rate (based on maximum month of production for 1984-2000)

Emission concentrations:

		<u>Reference</u>
PM	0.34 lb/hr/furnace	Source Test Summary #20

Emission estimates:

Maximum daily PM emissions $0.34 \text{ lb/hr/furnace} \times 2 \text{ furnaces} \times 24 \text{ hrs/day} \times 1.2 = 19.7 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 6: Metal Products

Source Number: 266

Emission Source: Casthouse Monitor Roof

Introduction:

Generation points include fugitives from the aluminum holding furnaces, two electric induction furnaces, the remelt furnace, sows and pigs casting, HDC cooling steam, natural gas-fired spout and float preheaters, and natural gas-fired ladle heaters. Generation points also include the Loma saw, five Hunter saws, the Hunter and Loma saw hammer mills, the bailer, the bailer bunker, and forced air cooling of aluminum product from the homogenizing furnaces. Emissions from the natural gas-fired equipment are represented in the general facility natural gas combustion emissions.

Parameters:

		<u>Notes</u>
Maximum annual aluminum production rate	307,000 tons/yr	
Mt. Holly aluminum production rate	204,600 tons/yr	Title V application
Maximum hours of operation	24 hrs/day	
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission rates:

		<u>Reference</u>
PM (Mt. Holly)	3.8E-02 lb/hr	Source test summary #23 (Mt. Holly)
PM	5.7E-02 lb/hr	Source test summary #23 (Mt. Holly facility); scaled to aluminum production rate

Emission estimates:

Maximum daily PM emissions 5.7E-02 lb/hr x 24 hrs/day x 1.2 = 1.6 lb/day

Emission Scenario: Maximum Daily Emissions

Process 6: Metal Products

Source Number: 269

Emission Source: Pigger Aluminum Furnace Door Exhaust Hood

Introduction:

Generation point is the pigger aluminum holding furnace. Emissions from the pigger furnace hood are similar to those from the casthouse hot side roof vents and are assumed (based on engineering judgment) to be equal to 10 percent of the emissions from the casthouse hot side roof vents.

Parameters:

	<u>Notes</u>
Percent of casthouse hot side roof vent emissions	10% Engineering judgment (Title V application)

Emissions estimate:

Maximum daily PM ₁₀ emissions	$1.6 \text{ lb/day} \times 10\% = 0.16 \text{ lb/day}$
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Emission Scenario: Maximum Daily Emissions

Process 6: Metal Products

Source Number: 315

Emission Source: Dross/Silicon Storage Baghouse

Introduction:

Generation point is the dross/silicon storage baghouse.

Parameters:

Air flow rate 55,000 dscfm
Maximum hours of operation 24 hrs/day

Notes

Washington Department of Ecology Air Permit DE 04 AQIS-1070

Emission concentrations:

PM 5.0E-03 gr/dscf

Reference

Washington Department of Ecology Air Permit DE 04 AQIS-1070, Condition E29

Emission estimates:

Maximum daily PM emissions $5.0E-03 \text{ gr/dscf} \times 55,000 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 56.6 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 195

Emission Source: Primary WTP Kiln Wet Scrubber Stack

Introduction:

Generation point is the natural gas-fired WTP kiln. Emissions due to natural gas combustion for this unit are represented in the plant-wide natural gas combustion emissions.

Parameters:

Air flow rate	2,650	dscfm	Notes
Maximum hours of operation	24	hrs/day	Vendor literature

Emission concentrations:

PM	2.8E-02	gr/dscf	Reference
			Source Test Summary #12

Emission estimates:

Maximum daily PM emissions $2.8E-02 \text{ gr/dscf} \times 2,650 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 15.3 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 196

Emission Source: Primary WTP Reclaimed Storage Silo Baghouse Stack

Introduction:

Generation point is the primary WTP reclaimed storage silo.

Parameters:

Air flow rate 1,500 dscfm
Maximum hours of operation 24 hrs/day

Notes

Vendor literature (Title V application); assumed dscfm equals scfm (conservative assumption)

Emission concentration:

PM 5.0E-03 gr/dscf

Reference

Engineering judgment

Emission estimate:

Maximum daily PM emissions $5.0E-03 \text{ gr/dscf} \times 1,500 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 1.5 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 206

Emission Source: Pangborn Baghouse Stack

Introduction:

Generation point is shot blasting of cathode bars.

Parameters:

Air flow rate	1,050	dscfm
Maximum hours of operation	24	hrs/day

Notes

Vendor literature (Title V application); assumed dscfm equals scfm (conservative assumption)

Emission concentration:

PM	5.0E-03	gr/dscf
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Reference

Engineering judgment

Emission estimate:

Maximum daily PM emissions $5.0E-03 \text{ gr/dscf} \times 1,050 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 1.1 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 207

Emission Source: Annex Paste Plant Baghouse Stack

Introduction:

Generation points include the annex ball mill, roll crusher, anthracite silo, and anthracite storage bins.

Parameters:

Air flow rate	5,500	dscfm	<u>Notes</u>
Maximum hours of operation	24	hrs/day	Vendor literature

Emission concentration:

PM	5.0E-03	gr/dscf	<u>Reference</u>
			Engineering judgment

Emission estimate:

Maximum daily PM emissions $5.0E-03 \text{ gr/dscf} \times 5,500 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 5.7 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

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Process 7: Ancillary Equipment

Source Number: 208

Emission Source: Ladle Cleaning (Elken/Bailey) Baghouse Stack

Introduction:

Generation point is ladle refractory removal in the annex ladle rebuild area.

Parameters:

		<u>Notes</u>
Air flow rate	14,100 dscfm	Vendor literature
Maximum hours of operation	24 hrs/day	

Emission concentration:

		<u>Reference</u>
PM	5.0E-03 gr/dscf	Engineering judgment

Emission estimate:

Maximum daily PM emissions $5.0E-03 \text{ gr/dscf} \times 14,100 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 14.5 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 209

Emission Source: Autogenous Mill Baghouse Stack

Introduction:

Generation points include the grizzly feeder and ball mill.

Parameters:

			<u>Notes</u>
Air flow rate	45,000	dscfm	Measured
Maximum hours of operation	24	hrs/day	

Emission rates:

			<u>Reference</u>
PM emission concentration	8.9E-03	gr/dscf	Source Test Summary #4

Emission estimates:

Maximum daily PM emissions $8.9E-03 \text{ gr/dscf} \times 45,000 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 82.4 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 210

Emission Source: TAC Station Baghouse Stack

Introduction:

Generation point is the Treatment of Aluminum Crucibles (TAC) station for lithium removal from molten aluminum.

Parameters:

			<u>Notes</u>
Air flow rate	3,000	dscfm	Vendor literature (Title V application); assumed dscfm equals scfm (conservative assumption)
Maximum hours of operation	24	hrs/day	

Emission concentrations:

		<u>Reference</u>
PM	5.6E-05 gr/dscf	Source Test Summary #14

Emission estimates:

Maximum daily PM emissions $5.6E-05 \text{ gr/dscf} \times 3,000 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 3.5E-02 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Numbers: 211, 212, and 213

Emission Source: Alumina Ore Silo #1, #2, and #3 Baghouse Stacks

Introduction:

Generation points include the alumina ore storage silos #1, #2, and #3 and ore truck loading.

Parameters:

Air flow rate	5,000 dscfm	<u>Notes</u>
Maximum hours of operation	24 hrs/day	Vendor literature (Title V application); assumed dscfm equals scfm (conservative assumption)

Emission concentration:

PM	8.0E-04 gr/dscf	<u>Reference</u>
		Source Test Summary #21

Emission estimate:

Maximum daily PM emissions - Silo #1	$8.0E-04 \text{ gr/dscf} \times 5,000 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 0.82 \text{ lb/day}$
Maximum daily PM emissions - Silo #2	$8.0E-04 \text{ gr/dscf} \times 5,000 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 0.82 \text{ lb/day}$
Maximum daily PM emissions - Silo #3	$8.0E-04 \text{ gr/dscf} \times 5,000 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 0.82 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 214

Emission Source: Alumina Ore Silo #4 Railcar Unloader Baghouse Stack

Introduction:

Generation point is the railcar bottom dump unloader.

Parameters:

			<u>Notes</u>
Air flow rate	19,628	dscfm	Vendor literature
Maximum hours of operation	24	hrs/day	

Emission concentration:

			<u>Reference</u>
PM	5.0E-03	gr/dscf	Engineering judgment

Emission estimate:

Maximum daily PM emissions $5.0E-03 \text{ gr/dscf} \times 19,628 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 20.2 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 215

Emission Source: Alumina Ore Pier-Head Transfer Point Baghouse Stack

Introduction:

Generation point is the pier-head transfer point.

Parameters:

Air flow rate 2,500 dscfm
Maximum hours of operation 24 hrs/day

Notes

Vendor literature (Title V application); assumed dscfm equals scfm (conservative assumption)

Emission concentration:

PM 5.0E-03 gr/dscf

Reference

Engineering judgment

Emission estimate:

Maximum daily PM emissions 5.0E-03 gr/dscf x 2,500 dscfm x 60 min/hr x 24 hrs/day / 7,000 gr/lb = 2.6 lb/day

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 216

Emission Source: Alumina Ore Ship Unloading Baghouse Stack

Introduction:

Generation point is the ship unloader.

Parameters:

Air flow rate	1,100	dscfm	<u>Notes</u>
Maximum hours of operation	24	hrs/day	Vendor literature

Emission concentration:

PM	5.0E-03	gr/dscf	<u>Reference</u>
			Engineering judgment

Emission estimate:

Maximum daily PM emissions $5.0E-03 \text{ gr/dscf} \times 1,100 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 1.1 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 226

Emission Source: Aluminum Fluoride Silo Baghouse Stack

Introduction:

Generation point is the aluminum fluoride silo.

Parameters:

Air flow rate 420 dscfm
Maximum hours of operation 24 hrs/day

Notes

Vendor literature (Title V application); assumed dscfm equals scfm (conservative assumption)

Emission rates:

PM emission concentration 5.0E-03 gr/dscf

Reference

Engineering judgment

Emission estimates:

Maximum daily PM emissions $5.0E-03 \text{ gr/dscf} \times 420 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 0.43 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 228

Emission Source: Covered Annex Bunkers for Crust and Digout

Introduction:

Generation points include six bunkers for storing crust and digout. Crust recovered from anode butts and processed by the autogenous mill is stored in these bunkers. Two drop transfers from crust handling produce fugitive dust. Based on engineering judgment, windblown dusts are assumed to be negligible as the bunkers have roofs and walls on three sides.

Parameters:

		<u>Notes</u>
Annual crust quantity	20,000 tons/yr	
Average daily crust quantity	54.8 tons/day	Based on annual crust quantity
Mean wind speed	15 mph	Assumption (upper end of applicable range for AP-42 equation)
Material moisture content	1 %	Assumption (Title V application)
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission factor:

		<u>Reference</u>
PM ₁₀	1.2E-02 lbs/ton	AP-42, Section 13.2.4
PM _{2.5}	1.9E-03 lbs/ton	AP-42, Section 13.2.4

Emission estimates:

Maximum daily PM ₁₀ emissions	$1.2\text{E-}02 \text{ lb/ton} \times 54.8 \text{ tons/day} \times 1.2 = 0.81 \text{ lb/day}$
Maximum daily PM _{2.5} emissions	$1.9\text{E-}03 \text{ lb/ton} \times 54.8 \text{ tons/day} \times 1.2 = 0.12 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 229

Emission Source: Brick Crushing Facility Baghouse Stack

Introduction:

Generation point is the brick crushing facility.

Parameters:

Air flow rate 20,000 dscfm
Maximum hours of operation 24 hrs/day

Notes

Vendor literature

Emission concentration:

PM 5.0E-03 gr/dscf

Reference

Engineering judgment

Emission estimate:

Maximum daily PM emissions $5.0E-03 \text{ gr/dscf} \times 20,000 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 20.6 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 273

Emission Source: Alumina Ore Handling Fugitive Dust

Introduction:

Generation points include alumina ore handling operations. Alumina ore is brought to the facility in ships and is then transferred through several steps to the potlines. The transfer points are equipped with baghouses. Based on engineering judgment, it is assumed that 90 percent of the dust produced is captured by the baghouses.

Parameters:

		<u>Notes</u>
Annual alumina usage	592,200 tons/yr	
Average daily alumina usage	1,622 tons/day	Based on annual alumina usage
Mean wind speed	15 mph	Assumption (upper end of applicable range for AP-42 equation)
Material moisture content	1 %	Assumption (Title V application)
Baghouse capture efficiency	90%	Engineering judgment (Title V application)
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission factor:

		<u>Reference</u>
PM ₁₀	1.2E-02 lbs/ton	AP-42, Section 13.2.4
PM _{2.5}	1.9E-03 lbs/ton	AP-42, Section 13.2.4

PM₁₀ emission estimates:

Maximum daily PM ₁₀ emissions - Ship or railcar unloading	1.2E-02 lb/ton x 1,622 tons/day x 10% x 1.2 = 2.4 lb/day
Maximum daily PM ₁₀ emissions - Pier-head transfer point	1.2E-02 lb/ton x 1,622 tons/day x 10% x 1.2 = 2.4 lb/day
Maximum daily PM ₁₀ emissions - Alumina silos #1, #2, #3, and #4 truck loading	1.2E-02 lb/ton x 1,622 tons/day x 10% x 1.2 = 2.4 lb/day
Maximum daily PM _{2.5} emissions - Ship or railcar unloading	1.9E-03 lb/ton x 1,622 tons/day x 10% x 1.2 = 0.36 lb/day
Maximum daily PM _{2.5} emissions - Pier-head transfer point	1.9E-03 lb/ton x 1,622 tons/day x 10% x 1.2 = 0.36 lb/day
Maximum daily PM _{2.5} emissions - Alumina silos #1, #2, #3, and #4 truck loading	1.9E-03 lb/ton x 1,622 tons/day x 10% x 1.2 = 0.36 lb/day

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 274

Emission Source: Alumina Silo #4 Truck Loader Baghouse Stack

Introduction:

Generation point is the ore truck loader.

Parameters:

Air flow rate	5,000	dscfm	<u>Notes</u>
Maximum hours of operation	24	hrs/day	Vendor literature

Emission concentration:

PM	5.0E-03	gr/dscf	<u>Reference</u>
			Engineering judgment

Emission estimate:

Maximum daily PM emissions $5.0E-03 \text{ gr/dscf} \times 5,000 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 5.1 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 275

Emission Source: Aluminum Fluoride/Anthracite Railcar Unloading Fugitive Dust

Introduction:

Generation points include fugitives from aluminum fluoride and anthracite railcar unloading. Aluminum fluoride and anthracite are brought to the facility in railcars. There are two transfer points equipped with baghouses. Based on engineering judgment, it is assumed that 90 percent of the dust produced is captured by the baghouses.

Parameters:

			<u>Notes</u>
Annual aluminum fluoride usage	7,350	tons/yr	
Annual anthracite usage	716	tons/yr	
Average daily aluminum fluoride usage	20.1	tons/day	Based on annual aluminum fluoride usage
Average daily anthracite usage	2.0	tons/day	Based on annual anthracite usage
Mean wind speed	15	mph	Assumption (upper end of applicable range for AP-42 equation)
Material moisture content	1	%	Assumption (Title V application)
Baghouse capture efficiency	90%		Engineering judgment (Title V application)
Maximum daily emissions factor	1.2		Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission factor:

		<u>Reference</u>
PM ₁₀	1.2E-02 lbs/ton	AP-42, Section 13.2.4
PM _{2.5}	1.9E-03 lbs/ton	AP-42, Section 13.2.4

Emission estimates:

Maximum daily PM ₁₀ emissions	$1.2E-02 \text{ lb/ton} \times 22.1 \text{ tons/day} \times 10\% \times 1.2 = 3.3E-02 \text{ lb/day}$
Maximum daily PM _{2.5} emissions	$1.9E-03 \text{ lb/ton} \times 22.1 \text{ tons/day} \times 10\% \times 1.2 = 5.0E-03 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 276

Emission Source: Coke Unloading and Transfer Fugitive Dust

Introduction:

Generation point is coke handling operations. Coke is brought to the facility in railcars and then transferred through several steps to the anode paste plant. The transfer points are equipped with baghouses. Based on engineering judgment, it is assumed that 90 percent of the dust produced is captured by the baghouses.

Parameters:

		<u>Notes</u>
Annual coke usage	101,100 tons/yr	
Average daily coke usage	277.0 tons/day	Based on annual coke usage
Mean wind speed	15 mph	Assumption (upper end of applicable range for AP-42 equation)
Material moisture content	1 %	Assumption (Title V application)
Baghouse capture efficiency	90%	Engineering judgment (Title V application)
Number of transfers for railcar unloading to silos	2 transfers	Title V application
Number of transfers from silo to classifier and paste plant	3 transfers	Title V application
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission factor:

		<u>Reference</u>
PM ₁₀	1.2E-02 lbs/ton	AP-42, Section 13.2.4
PM _{2.5}	1.9E-03 lbs/ton	AP-42, Section 13.2.4

PM₁₀ emission estimates:

Maximum daily PM ₁₀ emissions - Railcar unloading to silos	1.2E-02 lb/ton x 277.0 tons/day x 10% x 2 transfers x 1.2 = 0.82 lb/day
Maximum daily PM ₁₀ emissions - Transfer from silo to classifier and paste plant	1.2E-02 lb/ton x 277.0 tons/day x 10% x 3 transfers x 1.2 = 1.2 lb/day
Maximum daily PM _{2.5} emissions - Railcar unloading to silos	1.9E-03 lb/ton x 277.0 tons/day x 10% x 2 transfers x 1.2 = 0.12 lb/day
Maximum daily PM _{2.5} emissions - Transfer from silo to classifier and paste plant	1.9E-03 lb/ton x 277.0 tons/day x 10% x 3 transfers x 1.2 = 0.19 lb/day

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 280

Emission Source: Annex Cathode Assembly Area Roof Vents

Introduction:

Generation points include the natural gas-fired bar and block heaters, the two cast iron induction furnaces, and the pouring of molten iron to bond cathode and bar. Emissions due to natural gas combustion for these sources are represented in the plant-wide natural gas combustion emissions.

Parameters:

Annual cast iron usage	614 tons/yr
Average daily cast iron usage	1.7 tons/day
Maximum daily emissions factor	1.2

Notes

At baseline aluminum production rate
Based on annual cast iron usage
Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

PM emission factors:

Induction furnace	0.9 lb/ton cast iron
Pouring and cooling	4.2 lb/ton cast iron

Reference

AP-42, Section 12.10
AP-42, Section 12.10

PM emissions estimate:

Maximum daily PM emissions - Induction furnace	0.9 lb/ton cast iron	x	1.7 tons/day	x	1.2	=	1.8 lb/day
Maximum daily PM emissions - Pouring and cooling	4.2 lb/ton cast iron	x	1.7 tons/day	x	1.2	=	8.5 lb/day

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 281

Emission Source: Annex Ramming Paste Area Roof Vents

Introduction:

Generation points include fugitives from the ball mill/roll crusher, anthracite separator, anthracite storage bins, two natural gas-fired pitch melters, and two natural gas-fired ramming paste mixers. Emissions for natural gas-fired equipment are represented in the general facility natural gas combustion emissions.

A. Anthracite handling

The first three generation points involve handling and grinding of anthracite through three basic steps. The ball mill/roll crusher and the storage bins are controlled by baghouses. As a worst case engineering judgment, it is assumed that all emissions from anthracite handling are uncontrolled. Emissions from these operations are estimated by three drop transfers.

Parameters:

		<u>Notes</u>
Annual anthracite usage	716 tons/yr	At baseline aluminum production rate
Average daily anthracite usage	2.0 tons/day	Based on annual anthracite usage
Mean wind speed	5 mph	Assumption for indoors (Title V application)
Material moisture content	1 %	Assumption (Title V application)
Number of drop transfer	3 transfers	
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission factor:

		<u>Reference</u>
PM ₁₀	3.0E-03 lbs/ton	AP-42, Section 13.2.4
PM _{2.5}	4.5E-04 lbs/ton	AP-42, Section 13.2.4

Emission estimate:

Maximum daily PM ₁₀ emissions	3.0E-03 lb/ton	x	2.0 tons/day	x	3 transfers	x	1.2	=	2.1E-02 lb/day
Maximum daily PM _{2.5} emissions	4.5E-04 lb/ton	x	2.0 tons/day	x	3 transfers	x	1.2	=	3.2E-03 lb/day

B. Ramming paste handling

Emissions from ramming paste handling generation points are estimated using emission rates from the annex pitch melter and mixer stacks. Engineering judgment estimate of emissions from the roof vents is 10 percent of total pitch melter and mixer emissions.

Parameters:

		<u>Notes</u>
Percent of annex pitch melter and mixer stack emissions	10%	Engineering judgment (Title V application)

Emission estimates:

Maximum daily PM ₁₀ emissions	3.2E-03 lb/day	x	10%	=	5.5E-03 lb/day
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Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 282

Emission Source: Annex Ladle Rebuild Area Roof Vents

Introduction:

Generation points include fugitives from refractory removal, twelve natural gas-fired ladle preheaters, ladle rebricking, and four ladle burnout torches. Fugitive emissions from the ladle preheaters and burnout torches are considered negligible based on engineering judgment since both have separate stacks and natural gas combustion emissions from these sources are included in the general facility natural gas combustion emissions. Refractory brick removal emissions are controlled by the ladle cleaning baghouse. It is assumed, based on engineering judgment, that 95 percent of emissions are captured by the baghouse emission (assumed 99% control efficiency) and the remaining 5 percent of emissions are released as fugitives through the roof vents. Refractory brick installation does not produce appreciable fugitives since bricks are relatively dust free. It is assumed that emission are equal to brick removal.

Parameters:

Ladle cleaning baghouse capture efficiency 95%
Ladle cleaning baghouse control efficiency 99%

Notes

Facility estimate
Facility estimate

Emission estimate:

Maximum daily PM emissions 14.5 lb/day / 1% x 5% = 72.5 lb/day

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Numbers: 284 and 285

Emission Source: Annex Pitch Melter Stacks (East and West)

Introduction:

Generation points are the east and west natural gas-fired annex pitch melters. Emissions for the east and west pitch melters are estimated using emission rates from the paste plant phase "A" mixers. Only melting occurs at the east and west pitch melter while melting and mixing occur at the phase "A" generation points. Therefore, emission will actually be less than estimated below. Adjustments are made for the differences in coke and pitch usage.

Parameters:

			<u>Notes</u>
Annual paste plant coke usage	101,100	lbs/yr	At baseline aluminum production rate
Annual paste plant pitch usage	26,400	lbs/yr	At baseline aluminum production rate
Average daily paste plant coke usage	277.0	lb/day	Based on annual paste plant coke usage
Average daily paste plant pitch usage	72.3	lb/day	Based on annual paste plant pitch usage
Annual annex anthracite usage	716	lbs/yr	At baseline aluminum production rate
Annual annex pitch usage	126	lbs/yr	At baseline aluminum production rate
Average daily annex anthracite usage	2.0	lb/day	Based on annual annex anthracite usage
Average daily annex pitch usage	0.35	lb/day	Based on annual annex pitch usage
Maximum hours of operation	24	hrs/day	
Maximum daily emissions factor	1.2		Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission rates:

	Paste Plant Phase "A" Mixer (lb/hr)	Annex Pitch Melter (lb/hr)
PM	8.7E-02	5.8E-04

East annex pitch melter stack emission estimates:

Maximum daily PM emissions - East stack	5.8E-04	lbs/hr	x	24 hrs/day	=	1.4E-02 lb/day
Maximum daily PM emissions - West stack	5.8E-04	lbs/hr	x	24 hrs/day	=	1.4E-02 lb/day

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 286

Emission Source: Annex Ramming Paste Mixers Stack

Introduction:

Generation points are two natural gas-fired annex ramming paste mixers. Emissions for the ramming paste mixers are estimated using emission rates from the paste plant phase "A" wet scrubber stacks. Only mixing occurs at the ramming paste mixers while melting and mixing occur at the phase "A" generation points. Therefore, emission will actually be less than estimated below. Adjustments are made for the differences in coke and pitch usage. Since two mixers are connected to this one stack, emissions are doubled.

Parameters:

			<u>Notes</u>
Annual paste plant coke usage	101,100	lbs/yr	At baseline aluminum production rate
Annual paste plant pitch usage	26,400	lbs/yr	At baseline aluminum production rate
Average daily paste plant coke usage	277.0	lb/day	Based on annual paste plant coke usage
Average daily paste plant pitch usage	72.3	lb/day	Based on annual paste plant pitch usage
Annual annex anthracite usage	716	lbs/yr	At baseline aluminum production rate
Annual annex pitch usage	126	lbs/yr	At baseline aluminum production rate
Average daily annex anthracite usage	2.0	lb/day	Based on annual annex anthracite usage
Average daily annex pitch usage	0.35	lb/day	Based on annual annex pitch usage
Maximum hours of operation	24	hrs/day	
Number of mixers	2		
Maximum daily emissions factor	1.2		Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission rates:

	Paste Plant Phase "A" Mixer (lb/hr)	Annex Paste Mixers (lb/hr)
PM	8.7E-02	5.8E-04

Emission estimates:

Maximum daily PM emissions 5.8E-04 lbs/hr x 24 hrs/day x 2 mixers = 2.8E-02 lb/day

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 287

Emission Source: Autogenous Mill Silo Baghouse Stack

Introduction:

Generation point is the autogenous mill silo.

Parameters:

Air flow rate 1,500 dscfm
Maximum hours of operation 24 hrs/day

Notes

Vendor literature (Title V application); assumed dscfm equals scfm (conservative assumption)

Emission concentration:

PM 5.0E-03 gr/dscf

Reference

Assumption based on engineering judgment

Emission estimate:

Maximum daily PM emissions $5.0E-03 \text{ gr/dscf} \times 1,500 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 1.5 \text{ lb/day}$

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 293

Emission Source: Baghouse Hopper Unloading

Introduction:

Generation points include hopper unloading for all plant-wide baghouses.

Parameters:

Mean wind speed	15	mph	<u>Notes</u>
Material moisture content	1	%	Assumption (upper end of applicable range for AP-42 equation)
Baghouse control efficiency	99.5	%	Assumption (Title V application)

Emission factor:

		<u>Reference</u>
PM ₁₀	1.2E-02 lbs/ton	AP-42, Section 13.2.4
PM _{2.5}	1.9E-03 lbs/ton	AP-42, Section 13.2.4

Maximum daily PM₁₀ emission estimates:

Paste plant baghouse	1.2E-02 lb/ton x 2.0 lb/day / 2,000 lb/ton / 0.5% = 2.4E-03 lb/day
Phase "A" ball mill baghouse	1.2E-02 lb/ton x 17.1 lb/day / 2,000 lb/ton / 0.5% = 2.1E-02 lb/day
Phase "B" ball mill baghouse	1.2E-02 lb/ton x 17.1 lb/day / 2,000 lb/ton / 0.5% = 2.1E-02 lb/day
KVS ball mill baghouse	1.2E-02 lb/ton x 1.1 lb/day / 2,000 lb/ton / 0.5% = 1.4E-03 lb/day
Pet coke baghouse	1.2E-02 lb/ton x 7.7 lb/day / 2,000 lb/ton / 0.5% = 9.5E-03 lb/day
Primary WTP reclaimed storage silo baghouse	1.2E-02 lb/ton x 1.5 lb/day / 2,000 lb/ton / 0.5% = 1.9E-03 lb/day
Rod shop baghouse (west)	1.2E-02 lb/ton x 45.3 lb/day / 2,000 lb/ton / 0.5% = 5.6E-02 lb/day
Rod shop baghouse (east)	1.2E-02 lb/ton x 45.3 lb/day / 2,000 lb/ton / 0.5% = 5.6E-02 lb/day
Dross/silicon storage baghouse	1.2E-02 lb/ton x 56.6 lb/day / 2,000 lb/ton / 0.5% = 7.0E-02 lb/day
Pangborn baghouse	1.2E-02 lb/ton x 1.1 lb/day / 2,000 lb/ton / 0.5% = 1.3E-03 lb/day
Annex paste plant baghouse	1.2E-02 lb/ton x 5.7 lb/day / 2,000 lb/ton / 0.5% = 7.0E-03 lb/day
Ladle cleaning (Elkem/Bailey) baghouse	1.2E-02 lb/ton x 14.5 lb/day / 2,000 lb/ton / 0.5% = 1.8E-02 lb/day
Autogenous mill baghouse	1.2E-02 lb/ton x 82.4 lb/day / 2,000 lb/ton / 0.5% = 0.10 lb/day
TAC station baghouse	1.2E-02 lb/ton x 3.5E-02 lb/day / 2,000 lb/ton / 0.5% = 4.3E-05 lb/day
Alumina ore storage silo #1 baghouse	1.2E-02 lb/ton x 0.82 lb/day / 2,000 lb/ton / 0.5% = 1.0E-03 lb/day
Alumina ore storage silo #2 baghouse	1.2E-02 lb/ton x 0.82 lb/day / 2,000 lb/ton / 0.5% = 1.0E-03 lb/day
Alumina ore storage silo #3 baghouse	1.2E-02 lb/ton x 0.82 lb/day / 2,000 lb/ton / 0.5% = 1.0E-03 lb/day
Alumina ore storage silo #4 railcar unloader baghouse	1.2E-02 lb/ton x 20.2 lb/day / 2,000 lb/ton / 0.5% = 2.5E-02 lb/day
Alumina ore pier-head transfer point baghouse	1.2E-02 lb/ton x 2.6 lb/day / 2,000 lb/ton / 0.5% = 3.2E-03 lb/day
Alumina ore ship unloading baghouse	1.2E-02 lb/ton x 1.1 lb/day / 2,000 lb/ton / 0.5% = 1.4E-03 lb/day
Paint shop shot blaster baghouse	1.2E-02 lb/ton x 20.6 lb/day / 2,000 lb/ton / 0.5% = 2.5E-02 lb/day
Aluminum fluoride/anthracite silos baghouse	1.2E-02 lb/ton x 0.43 lb/day / 2,000 lb/ton / 0.5% = 5.3E-04 lb/day
Brick crushing facility baghouse	1.2E-02 lb/ton x 20.6 lb/day / 2,000 lb/ton / 0.5% = 2.5E-02 lb/day
Butts (Denseveyor) baghouse	1.2E-02 lb/ton x 18.5 lb/day / 2,000 lb/ton / 0.5% = 2.3E-02 lb/day
Alumina silo #4 truck loader baghouse	1.2E-02 lb/ton x 5.1 lb/day / 2,000 lb/ton / 0.5% = 6.3E-03 lb/day
Autogenous mill silo baghouse	1.2E-02 lb/ton x 1.5 lb/day / 2,000 lb/ton / 0.5% = 1.9E-03 lb/day

Total PM₁₀ emissions 0.48 lb/day

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 295

Emission Source: Landfill - Solid Waste

Introduction:

Generation point is the surface of the solid waste landfill. Materials brought to the landfill include baghouse bags and waste dust, furnace brick, potliner brick, WTP sludge, and miscellaneous other plant refuse.

Parameters:

		<u>Notes</u>
Landfill area	30,351 m ²	Title V application
Threshold friction velocity	0.54 m/s	AP-42, Section 13.2.5 default value
Number of disturbances per year	1 disturbance/yr	Title V application
Fastest mile wind velocity	22 m/s	Engineering judgment, no onsite data available (Title V application)
Equivalent friction velocity	1.2 m/s	AP-42, Section 13.2.5, Equation 4
PM ₁₀ particle size multiplier	0.5	AP-42, Section 13.2.5
PM _{2.5} particle size multiplier	0.075	AP-42, Section 13.2.5
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission rates:

		<u>Reference</u>
PM ₁₀	20.1 g/m ²	AP-42, Section 13.2.5, Equation 3
PM _{2.5}	3.0 g/m ²	AP-42, Section 13.2.5, Equation 3

Emission estimates:

Maximum daily PM ₁₀ emissions	20.1 g/m ² x	30,351 m ² / 453.592 g/lb / 365 days/yr x 1.2 = 4.4 lb/day
Maximum daily PM _{2.5} emissions	3.0 g/m ² x	30,351 m ² / 453.592 g/lb / 365 days/yr x 1.2 = 0.67 lb/day

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 296

Emission Source: Landfill - RCRA

Introduction:

Generation point is the surface of the RCRA landfill. The RCRA waste landfill contains waste from plant-wide processes. The waste stream consists of secondary wastewater treatment plant sludge (CaF₂).

Parameters:

		<u>Notes</u>
Landfill area	8,903 m ²	Title V application
Threshold friction velocity	0.54 m/s	AP-42, Section 13.2.5 default value
Number of disturbances per year	1 disturbance/yr	Title V application
Fastest mile wind velocity	22 m/s	Engineering judgment, no onsite data available (Title V application)
Equivalent friction velocity	1.2 m/s	AP-42, Section 13.2.5, Equation 4
PM ₁₀ particle size multiplier	0.5	AP-42, Section 13.2.5
PM _{2.5} particle size multiplier	0.075	AP-42, Section 13.2.5
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission rates:

		<u>Reference</u>
PM ₁₀ emission rate	20.1 g/m ²	AP-42, Section 13.2.5, Equation 3
PM _{2.5}	3.0 g/m ²	AP-42, Section 13.2.5, Equation 3

Emission estimates:

Maximum daily PM ₁₀ emissions	20.1 g/m ² x	8,903 m ² / 453.592 g/lb / 365 days/yr x 1.2 = 1.3 lb/day
Maximum daily PM _{2.5} emissions	3.0 g/m ² x	8,903 m ² / 453.592 g/lb / 365 days/yr x 1.2 = 0.20 lb/day

Emission Scenario: Maximum Daily Emissions

Process 7: Ancillary Equipment

Source Number: 306

Emission Source: Alumina Ore Ship Unloader Clamshell

Introduction:

Generation points is the alumina ore ship unloader clamshell.

Parameters:

		<u>Notes</u>
Annual alumina ore usage	592,200 tons/yr	
Average daily alumina ore usage	1,622 tons/day	Based on annual alumina ore usage
Mean wind speed	15 mph	Assumption (upper end of applicable range for AP-42 equation)
Material moisture content	1 %	Assumption (Title V application)
Maximum daily emissions factor	1.2	Ratio of maximum daily aluminum production rate to annual average daily aluminum production rate

Emission factor:

		<u>Reference</u>
PM ₁₀	1.2E-02 lbs/ton	AP-42, Section 13.2.4
PM _{2.5}	1.9E-03 lbs/ton	AP-42, Section 13.2.4

Emission estimate:

Maximum daily PM ₁₀ emissions	1.2E-02 lb/ton	x	1,622 tons/day	x	1.2	=	24.1 lb/day
Maximum daily PM ₁₀ emissions	1.9E-03 lb/ton	x	1,622 tons/day	x	1.2	=	3.6 lb/day

Emission Scenario: Maximum Daily Emissions

Process 8: Maintenance

Source Number: 222

Emission Source: Paint Shop Blaster Baghouse Stack

Introduction:

Emissions from a baghouse that collects and controls particulate emissions from surface preparation and sand blasting of new and overhauled equipment and structural steel.

Parameters:

Air flow rate 20,000 dscfm
Maximum hours of operation 24 hrs/day

Notes

Vendor literature (Title V application); assumed dscfm equals scfm (conservative assumption)

Emission concentration:

PM 5.0E-03 gr/dscf

Reference

Engineering judgment

Emission estimate:

Maximum daily PM emissions $5.0E-03 \text{ gr/dscf} \times 20,000 \text{ dscfm} \times 60 \text{ min/hr} \times 24 \text{ hrs/day} / 7,000 \text{ gr/lb} = 20.6 \text{ lb/day}$