TAB D

PSD BASELINE EMISSION INVENTORY (2004-2005)

Plantwide Total Emissions — Baseline 2004-2005

EU Description	PM tons/yr	PM_{10} tons/yr	$PM_{2.5}$ tons/yr	SO_2 tons/yr	NO_X tons/yr	CO tons/yr	VOC tons/yr	Lead tons/yr	Fluoride tons/yr
Kiln System	436.12	406.59	365.26	11,848.70	5,231.45	969.36	216.38	0.16	0.43
Kiln Preheaters & Coal Mill Booster Heaters	0.67	0.48	0.43	28.85	4.06	1.02	0.07		
Kiln System (Total)	436.79	407.08	365.69	11,877.55	5,235.51	970.38	216.44	0.16	0.43
Clinker Coolers	111.76	93.88	50.29						
Miscellaneous Point Sources	304.92	256.13	137.21						
Process Equipment Fugitives	19.77	9.30	1.44						
Storage Piles	6.68	3.34	0.50						
Quarry Operations	26.51	9.52	2.26						
Roads	172.20	47.79	5.16						
Total	**1,078.62**	**827.04**	**562.56**	**11,877.55**	**5,235.51**	**970.38**	**216.44**	**0.16**	**0.43**

Clinker production = **1,731,000 tons/yr**
1,570,353 metric

Notes
Actual emissions are shown above for all pollutants except SO2 and NOx emitted by the kiln system.
The lower-than-actual SO2 and NOx emissions are values agreed to in discussions with EPA and DEC.
Kiln PM emissions include condensibles. See "Kiln System" sheet for details.

Operation/Material	Capacity	Average	Baseline Thruput			2005			2004		
	tons/hr	tons/hr	tons/yr	hrs/yr	%	tons	hours	%	tons	hours	%
Quarry											
Overburden moved			12,768			0			25,536		
New Scotland LS (to waste)			3,005,772			3,096,463			2,915,080		
Kalkberg			46,489			0			92,978		
Coeymans			1,977,977			2,006,690			1,949,263		
Becraft			64,362			53,347			75,376		
New Scotland LS (Callanan)			978,085			956,169			1,000,000		
Total			3,066,912			3,016,206			3,117,617		
Primary Crusher		884	3,574,883	4,044		3,016,206	3,795		4,133,560	4,292	
Raw Materials Used											
Kalkberg			46,489			0			92,978		
Aggregate (plant roads etc)			15,000			15,000			15,000		
Coeymans			2,145,055			2,274,167			2,015,943		
Becraft			25,411			31,512			19,310		
Subtotal LS reclaim			2,170,466			2,305,679			2,035,253		
Bauxite			29,155			39,572			18,737		
Gypsum			108,051			112,440			103,662		
Total (Belt 3/4)			2,307,672			2,457,691			2,157,652		
Secondary Crusher	1,250	287		8,040			7,319			8,760	
Iron			46,971			65,417			28,524		
Coke			61,960			38,920			85,000		
Subtotal (auxilliary hopper)			108,931			104,337			113,524		
Fly Ash transfer	33		103,740	8,760		79,687	8,760		127,792	8,760	
Total (Raw Mill Input)			2,350,331			2,490,355			2,210,306		
Raw Mill #1	300	234	1,384,879	5,916		1,385,094	5,873		1,384,664	5,959	
Raw Mill #2	300	240	1,399,957	5,840		1,341,894	5,864		1,458,020	5,817	
Raw mix produced	600	474	2,784,836			2,726,988			2,842,684		
Raw mix used			2,607,795			2,746,023			2,469,566		
Dry kiln feed			2,831,920			2,812,939			2,852,157		
Kiln #1 & Clinker Cooler #1	130	117	843,000	7,182		868,054	7,395		817,549	6,970	
Kiln #2 & Clinker Cooler #2	130	119	888,000	7,475		856,834	7,392		919,980	7,557	
Clinker produced	260	232	1,731,000	7,475		1,724,663	7,395		1,737,529	7,557	
Dust Scoop System	55			7,183			7,395			6,970	
Clinker Hall Silo #8			865,548	2,394		862,332	2,465		868,765	2,323	
Clinker Hall Silo #11			865,548	2,394		862,332	2,465		868,765	2,323	
Clinker Hall Storage Bins			519,300		30%	517,399		30%	521,259		30%
CKD Pugmill (Pelletizer)		68	111,005	1,632		106,435	1,600		115,575	1,664	
Dry basis			100,914								
Kiln Fuels Used											
Coal			229,682			258,851			200,513		
Coke			56,131			44,498			67,764		
Subtotal solid fuels			285,813			303,349			268,277		
Fuel oil (gallons)			406,394			448,210			364,577		
Natural gas (MMCF)			6.2			12.2			0.1		
Finish Materials											
Gypsum			108,051		5.9%	112,440		6.0%	103,662		5.8%
Finish Mills (Cement)											
Cement Mill #1	90	86	448,646	5,236		482,736	5,442		414,555	5,030	
Cement Mill #2	90	89	469,360	5,300		453,968	5,037		484,751	5,562	
Cement Mill #3	90	76	465,510	6,104		491,105	6,097		439,914	6,112	
Cement Mill #4	90	73	444,411	6,076		451,680	5,659		437,141	6,493	

Operation/Material	Capacity	Average	Baseline Thruput			2005			2004		
	tons/hr	tons/hr	tons/yr	hrs/yr	%	tons	hours	%	tons	hours	%
Total cement	360	324	1,827,925			1,879,489			1,776,361		
Customer Silos			339,062	8,760		404,909	8,760		273,214	8,760	
Masonry Fringe Silo				8,760			8,760			8,760	
Buffer Silos			1,324,618	8,760		1,427,806	8,760		1,221,429	8,760	
Buffer Silos Discharge			1,324,618	2,595		1,427,806	2,190		1,221,429	3,000	
Truck Loading											
Bulk cement			339,062			404,909			273,214		
Bulk masonry			55,064			55,064					
Total			394,126	2,628		459,973	3,066		273,214	1,821	
Truck Loadout N/S (each)	214	150	197,063	1,314		229,987	1,533		136,607	911	
CKD truck loadout			32,506	1,664		28,235	1,664		36,776	1,664	
Rail Loading (cement)		500	14,600	29		29,199	58		0	0	
Packhouse			106,449	2,915		107,420	3,084		105,477	2,747	
Bags packed (number)			2,798,591	2,915		2,960,257	3,084		2,636,925	2,747	
Packing E/W (each)	70.5	37	53,224	1,458		53,710	1,542		52,739	1,373	
Vacuum system				1,458			1,542			1,373	
Bag shredder				0			0			0	
Barge Loading (cement)	1,000	510	1,324,618	2,595		1,427,806	2,190		1,221,429	3,000	
Rail Unloading											
Coal			216,724			228,689			204,758		
Coke			61,960			38,920			85,000		
Total			278,684	4,992		267,609	4,992		289,758	4,992	
Barge Unloading											
Gypsum			152,349	1,248		119,737	1,248		184,960	1,248	
Truck Unloading											
Fly Ash (silo)			103,376	8,760		79,088	8,760		127,663	8,760	
Bauxite			34,085			50,026			18,144		
Iron			24,795			33,282			16,308		
Total			162,256			162,396			162,115		
Miscellaneous											
Quarry Drilling (feet)			219,954			272,862			167,045		
Blasts (number)			157			152			161		

Kiln System (Main Stack)

Pollutant	Emission Factor	lb/T basis	Note	Test lbs/hr	Total tons/yr	Average lbs/hr	Permit Limits				
PM (Filterable)	0.139	kiln feed	1	52.08	196.82	52.66	0.30	lb/T KF	Total Kiln Feed	2,831,920	TPY
PM10 (Filterable)	0.118	kiln feed	2	44.27	167.30	44.76			Total Clinker	1,731,000	TPY
PM2.5 (Filterable)	0.089	kiln feed	3	33.33	125.96	33.70			Operation	7,475	hrs/yr
Condensible PM	0.169	kiln feed	1	63.36	239.30	64.03					
PM (Total)				115.44	436.12	116.69					
PM10 (Total)				107.63	406.59	108.79					
PM2.5 (Total)				96.69	365.26	97.73					
SO2	13.69	clinker	4	3073	11848.70	3170.4					
NOX	6.04	clinker	5	NA	5231.45	1399.8					
CO	1.12	clinker	6	252.4	969.36	259.4	300	1,446.25	lbs/hr & tons/yr		
VOC	0.25	clinker	6	55.2	216.38	57.9					
Lead	1.13E-04	kiln feed	6	0.040	0.16	0.043					
Fluoride	3.01E-04	kiln feed	6,7	0.108	0.43	0.114					

Notes

1 Pollutant emissions derived from March 2005 kiln stack test
2 PM10 estimated at 85% of PM emissions for kilns with ESPs using AP-42 Table 11.6-5
3 PM2.5 estimated at 64% of PM emissions for kilns with ESPs using AP-42 Table 11.6-5
4 SO2 emissions derived from February 2004 kiln stack test
5 NOx annual emissions from 2004-2005 CEMS data
6 Pollutant emissions derived from February 2004 kiln stack test
7 Fluoride emissions not detected. Emissions are shown at the detection limit.

Clinker Cooler #1 Stack

Pollutant	Emission Factor	lb/T basis	Note	Test lbs/hr	Total tons/yr	Average lbs/hr	Permit Limits				
PM	0.093	kiln feed	8	17.80	63.92	17.80	0.10	lb/T KF	Kiln Feed	1,379,148	TPY
PM10	0.078	kiln feed	9	14.95	53.70	14.95			Clinker	843,000	TPY
PM2.5	0.042	kiln feed	10	8.01	28.77	8.01			Operation	7,182	hrs/yr

Clinker Cooler #2 Stack

Pollutant	Emission Factor	lb/T basis	Note	Test lbs/hr	Total tons/yr	Average lbs/hr	Permit Limits				
PM	0.066	kiln feed	8	12.80	47.84	12.80	0.10	lb/T KF	Kiln Feed	1,452,768	TPY
PM10	0.055	kiln feed	9	10.75	40.18	10.75			Clinker	888,000	TPY
PM2.5	0.030	kiln feed	10	5.76	21.53	5.76			Operation	7,475	hrs/yr

Clinker Cooler #1 and #2 Total

Pollutant	Emission Factor	lb/T basis	Note	Test lbs/hr	Total tons/yr	Average lbs/hr	Permit Limits				
PM				30.60	111.76	29.90			Kiln Feed	2,831,916	TPY
PM10				25.70	93.88	25.12			Clinker	1,731,000	TPY
PM2.5				13.77	50.29	13.46			Operation	7,475	hrs/yr

Notes

8 Pollutant emissions from 2002 clinker cooler stack test
9 PM10 estimated at 84% of PM emissions with fabric filters using AP-42 Table 11.6-5
10 PM2.5 estimated at 45% of PM emissions with fabric filters using AP-42 Table 11.6-5

Kiln Preheaters & Booster Heaters (External Combustion)

Annual Emissions:

Unit ID	Exhaust Point ID	Description	Fuel	Fuel Rate 1000 gal/yr	PM tons/yr	PM10 tons/yr	PM2.5 tons/yr	SO2 tons/yr	NO_X tons/yr	CO tons/yr	VOC tons/yr
		Emissions w/ Filterable PM	No. 2 fuel oil	406.394	0.41	0.22	0.17	28.85	4.06	1.02	0.07
		Condensible PM	No. 2 fuel oil	406.394	0.26	0.26	0.26				
		Total Emissions			0.67	0.48	0.43	28.85	4.06	1.02	0.07

Notes:
Burner firing rate, each 6.1 MW/hr / 0.2931 MW/MMBtu = 20.8 MMBtu/hr (startup only)
Controlled PM emissions from natural gas combustion are negligible; PM emissions are included elsewhere in the finish mill baghouse emission estimates.

Emissions Basis:

Pollutant	Emission Factor	EF Units	Source of EF
PM	2	lb/1000gal	AP-42 Table 1.3-1
PM10	1.08	lb/1000gal	AP-42 Table 1.3-7
PM2.5	0.83	lb/1000gal	AP-42 Table 1.3-7
Condensible	1.3	lb/1000gal	AP-42 Table 1.3-2
SO_2	142	lb/1000gal	AP-42 Table 1.3-1
NO_X	20	lb/1000gal	AP-42 Table 1.3-1
CO	5	lb/1000gal	AP-42 Table 1.3-1
VOC	0.34	lb/1000gal	AP-42 Table 1.3-3

Process Group	Emission Point ID	Description	Control Device	Material Processed	Oper-ation hrs/yr	Note	Flow ACFM	Grain Loading gr/acf	PM Emis lb/hr	PM Emis TPY	PM10 Fraction	PM10 Emis TPY	PM2.5 Fraction	PM2.5 Emis TPY	Future Source	PM BL Future Equip TPY	PM10 BL Future Equip TPY	PM2.5 BL Future Equip TPY
PCR	32002	Primary Crusher-Rock Box D/C	DC	Limestone	4,044		3,000	0.02	0.51	1.04	0.84	0.87	0.45	0.47	X	1.04	0.87	0.47
PCR	32002	Primary Crusher-Belt 1 D/C	DC	Limestone	4,044		4,500	0.02	0.77	1.56	0.84	1.31	0.45	0.70	X	1.56	1.31	0.70
LCR, RX1	34301	Secondary Crusher D/C	DC	Raw mix	8,040		15,000	0.02	2.57	10.34	0.84	8.68	0.45	4.65	X	10.34	8.68	4.65
RM1	35101	Raw Mill 1 Scrubber	IPS	Raw mix	0	2	10,000	0.02	1.71	0.00	0.84	0.00	0.45	0.00				
RM2	35201	Raw Mill 2 Scrubber	IPS	Raw mix	0	2	10,000	0.02	1.71	0.00	0.84	0.00	0.45	0.00				
K12	43101	Main Kiln Stack	ESPs	CKD	7,475		880,000	0.007	52.66	196.82	0.85	167.30	0.64	125.96				
CC1	45101	Kiln 1 Clinker Cooler D/C	DC	Clinker	7,182		137,500	0.015	17.80	63.92	0.84	53.70	0.45	28.77				
CC2	45201	Kiln 2 Clinker Cooler D/C	DC	Clinker	7,475		137,500	0.011	12.80	47.84	0.84	40.18	0.45	21.53	X	47.84	40.18	21.53
FAX	46012	Fly Ash Silo (W) D/C	DC	Fly ash	8,760		7,000	0.02	1.20	5.26	0.84	4.42	0.45	2.37				
FAX	46013	Fly Ash Transfer D/C	DC	Fly ash	8,760		2,500	0.02	0.43	1.88	0.84	1.58	0.45	0.84				
RX2	46017	Belt 7 Discharge D/C	DC	Raw mix	8,040		4,000	0.02	0.69	2.76	0.84	2.32	0.45	1.24	X	2.76	2.32	1.24
FX1	53102	CM 1 Separator D/C	DC	Cement	5,236		45,000	0.02	7.71	20.20	0.84	16.96	0.45	9.09				
FX2	53202	CM 2 Separator D/C	DC	Cement	5,300		45,000	0.02	7.71	20.44	0.84	17.17	0.45	9.20				
FX3	53302	CM 3 Separator D/C	DC	Cement	6,104		45,000	0.02	7.71	23.55	0.84	19.78	0.45	10.60				
FX4	53402	CM 4 West Separator D/C	DC	Cement	6,076		48,000	0.02	8.23	25.00	0.84	21.00	0.45	11.25				
FX5	53403	CM 4 East Separator D/C	DC	Cement	6,076		48,000	0.02	8.23	25.00	0.84	21.00	0.45	11.25				
DS1	43102	Kiln 1 Feed End D/C	DC	Raw mix	7,182		4,000	0.02	0.69	2.46	0.84	2.07	0.45	1.11				
DS1	43103	Dust Scoop D/C	DC	CKD	7,183		15,000	0.02	2.57	9.23	0.84	7.76	0.45	4.16				
CX1	46008	Silo 8 D/C	DC	Clinker	2,394		5,000	0.02	0.86	1.03	0.84	0.86	0.45	0.46	X	1.03	0.86	0.46
CX1	46011	Silo 11 D/C	DC	Clinker	2,394		5,000	0.02	0.86	1.03	0.84	0.86	0.45	0.46	X	1.03	0.86	0.46
CX2	46018	Kiln 1 Clinker Transport D/C	DC	Clinker	7,182		22,000	0.02	3.77	13.54	0.84	11.38	0.45	6.09				
CX2	46019	Kiln 2 Clinker Transport D/C	DC	Clinker	7,475		16,050	0.02	2.75	10.28	0.84	8.64	0.45	4.63				
CM1	52101	CM 1 Auxillary D/C	DC	Cement	5,236		10,200	0.02	1.75	4.58	0.84	3.85	0.45	2.06	X	4.58	3.85	2.06
CM2	52201	CM 2 Auxillary D/C	DC	Cement	5,300		10,200	0.02	1.75	4.63	0.84	3.89	0.45	2.09				
CM3	52301	CM 3 Auxillary D/C	DC	Cement	6,104		10,200	0.02	1.75	5.34	0.84	4.48	0.45	2.40	X	5.34	4.48	2.40
CM4	52401	CM 4 Auxillary D/C	DC	Cement	6,076		21,000	0.02	3.60	10.94	0.84	9.19	0.45	4.92				
	57001	Buffer Silo Trans. to Belt 8A	DC	Cement	2,595		5,000	0.02	0.86	1.11	0.84	0.93	0.45	0.50	X	1.11	0.93	0.50
	57002	Belt 8A/8B Transfer House	DC	Cement	2,595		6,000	0.02	1.03	1.33	0.84	1.12	0.45	0.60	X	1.33	1.12	0.60
	57003	Belt 8A/9 Transfer House	DC	Cement	2,595		3,000	0.02	0.51	0.67	0.84	0.56	0.45	0.30	X	0.67	0.56	0.30
CMX	62001	Transfer to/from Buffer Silo Belt	DC	Cement	8,760		5,660	0.02	0.97	4.25	0.84	3.57	0.45	1.91	X	4.25	3.57	1.91
CM1	53101	CM 1 Discharge D/C	DC	Cement	5,236		25,000	0.02	4.29	11.22	0.84	9.42	0.45	5.05	X	11.22	9.42	5.05
CM2	53201	CM 2 Discharge D/C	DC	Cement	5,300		25,000	0.02	4.29	11.36	0.84	9.54	0.45	5.11				
CM3	53301	CM 3 Discharge D/C	DC	Cement	6,104		25,000	0.02	4.29	13.08	0.84	10.99	0.45	5.89	X	13.08	10.99	5.89
CM4	53401	CM 4 Discharge D/C	DC	Cement	6,076		16,500	0.02	2.83	8.59	0.84	7.22	0.45	3.87				
CL1	62007	West Truck Loading D/C	DC	Cement	1,314		7,000	0.02	1.20	0.79	0.84	0.66	0.45	0.35	X	0.79	0.66	0.35
CL2	62008	East Truck Loading D/C	DC	Cement	1,314		7,000	0.02	1.20	0.79	0.84	0.66	0.45	0.35	X	0.79	0.66	0.35
CL3	62009	Railcar Loading D/C	DC	Cement	29		7,000	0.02	1.20	0.02	0.84	0.01	0.45	0.01	X	0.02	0.01	0.01
BAG	63001	Bagging D/C (West)	DC	Cement	1,458		6,000	0.02	1.03	0.75	0.84	0.63	0.45	0.34	X	0.75	0.63	0.34
BAG	63002	Bagging D/C (East)	DC	Cement	1,458		6,000	0.02	1.03	0.75	0.84	0.63	0.45	0.34	X	0.75	0.63	0.34
PVC	63003	Packhouse Vacuum	DC	Cement	1,458		120	0.02	0.02	0.01	0.84	0.01	0.45	0.01	X	0.01	0.01	0.01
PBS	63004	Bag Shredder D/C	DC	Cement	0		4,000	0.02	0.69	0.00	0.84	0.00	0.45	0.00	X	0.00	0.00	0.00
PUG	00100	CKD Pelletizer	DC	CKD	1,632	1	7,000	0.02	1.20	0.98	0.84	0.82	0.45	0.44	X	0.98	0.82	0.44
CMB	58001	Transfer from Belt 9 to Barge	DC	Cement	2,595		10,000	0.02	1.71	2.22	0.84	1.87	0.45	1.00	X	2.22	1.87	1.00
	46014	Masonry Silo D/C	DC	Cement	8,760		2,000	0.02	0.34	1.50	0.84	1.26	0.45	0.68	X	1.50	1.26	0.68
	55001	Buffer Silo #6 D/C	DC	Cement	8,760		5,500	0.02	0.94	4.13	0.84	3.47	0.45	1.86	X	4.13	3.47	1.86
	55002	Buffer Silo #5 D/C	DC	Cement	8,760		5,500	0.02	0.94	4.13	0.84	3.47	0.45	1.86	X	4.13	3.47	1.86

Process Group	Emission Point ID	Description	Control Device	Material Processed	Oper-ation hrs/yr	Note	Flow ACFM	Grain Loading gr/acf	PM Emis lb/hr	PM Emis TPY	PM10 Fraction	PM10 Emis TPY	PM2.5 Fraction	PM2.5 Emis TPY	Future Source	PM BL Future Equip TPY	PM10 BL Future Equip TPY	PM2.5 BL Future Equip TPY
	55003	Buffer Silo #4 D/C	DC	Cement	8,760		5,500	0.02	0.94	4.13	0.84	3.47	0.45	1.86	X	4.13	3.47	1.86
	55004	Buffer Silo #3 D/C	DC	Cement	8,760		5,500	0.02	0.94	4.13	0.84	3.47	0.45	1.86	X	4.13	3.47	1.86
	55005	Buffer Silo #2 D/C	DC	Cement	8,760		5,500	0.02	0.94	4.13	0.84	3.47	0.45	1.86	X	4.13	3.47	1.86
	55006	Buffer Silo #1 D/C	DC	Cement	8,760		5,500	0.02	0.94	4.13	0.84	3.47	0.45	1.86	X	4.13	3.47	1.86
	62002	Customer Silos 1,9 D/C	DC	Cement	8,760		5,500	0.02	0.94	4.13	0.84	3.47	0.45	1.86	X	4.13	3.47	1.86
	62003	Customer Silos 2,10,11 D/C	DC	Cement	8,760		5,500	0.02	0.94	4.13	0.84	3.47	0.45	1.86	X	4.13	3.47	1.86
	62004	Customer Silos 3,4,12 D/C	DC	Cement	8,760		5,500	0.02	0.94	4.13	0.84	3.47	0.45	1.86	X	4.13	3.47	1.86
	62005	Customer Silos 5,13 D/C	DC	Cement	8,760		5,500	0.02	0.94	4.13	0.84	3.47	0.45	1.86	X	4.13	3.47	1.86
	62006	Customer Silos 6,7,8,14,15,16	DC	Cement	8,760		5,500	0.02	0.94	4.13	0.84	3.47	0.45	1.86	X	4.13	3.47	1.86
KCM	62010	K-Cement Railcar Loading	DC	Cement	0	2	1,800	0.02	0.31	0.00	0.84	0.00	0.45	0.00				
		Grand Total							192.16	613.50		517.30		313.47		160.40	134.74	72.18
		Total Without Kilns & Coolers							108.90	304.92		256.13		137.21				
															Equipment to be shut down	144.52	121.39	65.03

Notes

1 CKD pelletizer was replaced with a pugmill and 4500 acfm DC in 2006
2 Equipment is not operational or does not exist
3 Exempt equipment is not included

Emission Factor Calculation Sheet (Fugitives)

Material Transfer Operations		**PM**	**PM-10**	**PM-2.5**
k (particle size multiplier)		0.74	0.35	0.053
Mean Wind Speed (mph) Albany, NY *(Source: NCDC, long-term average)*	8.9	**PM EF (lb/ton handled)**	**PM-10 EF (lb/ton handled)**	**PM-2.5 EF (lb/ton handled)**
Limestone Average Moisture Content (%)	3	2.84E-03	1.34E-03	2.03E-04
Bauxite Average Moisture Content (%)	12	4.08E-04	1.93E-04	2.92E-05
Coal Average Moisture Content (%) As Rcvd	3.2	2.60E-03	1.23E-03	1.86E-04
Coke Average Moisture Content (%)	3.3	2.49E-03	1.18E-03	1.78E-04
Gypsum Average Moisture Content (%)	15	2.98E-04	1.41E-04	2.14E-05
Iron Average Moisture Content (%)	9	6.10E-04	2.89E-04	4.37E-05
Clinker Average Moisture Content (%)	0.05	8.77E-01	4.15E-01	6.28E-02
Additives Average Moisture Content (%)	10	5.26E-04	2.49E-04	3.77E-05
Raw Mix Average Moisture Content (%)	4	1.90E-03	8.98E-04	1.36E-04
CKD (Dry) Moisture Content (%)	0.05	8.77E-01	4.15E-01	6.28E-02
CKD (Conditioned) Moisture Content (%)	10	5.26E-04	2.49E-04	3.77E-05
Overburden Average Moisture Content (%)	2.1	4.68E-03	2.21E-03	3.35E-04

Material transfer factors from AP-42 Section 13.2.4.3 (Aggregate Handling and Storage Piles, 11/06)

$E = k * 0.0032 * (U/5)^{1.3} / (M/2)^{1.4}$

E = transfer emission factor (lb/ton)
k = particle size multiplier
U = mean wind speed (mph)
M = material moisture content (%)

Crushing Operations	**Reference**	**PM EF (lb/ton)**	**PM-10 EF (lb/ton)**	**PM-2.5 EF (lb/ton)**
Primary crusher	1	0.0012	0.00054	0.00010

1) AP-42 Table 11.19.2-2 (Crushed Stone Processing, 8/04) (wet crushing = controlled)

Area	Emission Point ID	Description	Material	Control Type	Efficiency %	Throughput tons/yr	TSP Factor lbs/ton	TSP tons/yr	PM_{10} Factor lbs/ton	PM_{10} tons/yr	$PM_{2.5}$ Factor lbs/ton	$PM_{2.5}$ tons/yr
Primary Crushing		Truck unloading to crusher hopper	Limestone	None		3,574,883	2.84E-03	5.08	1.34E-03	2.40	2.03E-04	0.36
Primary Crushing		Primary crusher	Limestone	None		3,574,883	0.0012	2.14	0.00054	0.97	0.0001	0.18
Primary Crushing	NP20	Belt 1 to Belt 2 transfer point	Limestone	Covered	25	3,574,883	2.84E-03	3.81	1.34E-03	1.80	2.03E-04	0.27
Secondary Crushing	32001	Belt 2 drop to storage piles	Limestone	Spray system	50	3,574,883	2.84E-03	2.54	1.34E-03	1.20	2.03E-04	0.18
Secondary Crushing		Bauxite unloading	Bauxite	None		34,085	4.08E-04	0.01	1.93E-04	0.00	2.92E-05	0.00
Secondary Crushing		Gypsum unloading	Gypsum	None		108,051	2.98E-04	0.02	1.41E-04	0.01	2.14E-05	0.00
Secondary Crushing		Iron unloading	Iron Ore	None		24,795	6.10E-04	0.01	2.89E-04	0.00	4.37E-05	0.00
Secondary Crushing		Rock storage piles reclaim to Belt 3	Limestone	U/G Enclosure	90	2,170,466	2.84E-03	0.31	1.34E-03	0.15	2.03E-04	0.02
Secondary Crushing		Bauxite transfer to Stamler Feeder	Bauxite	None		29,155	4.08E-04	0.01	1.93E-04	0.00	2.92E-05	0.00
Secondary Crushing		Bauxite feeder to Belt 3	Bauxite	U/G Enclosure	90	29,155	4.08E-04	0.00	1.93E-04	0.00	2.92E-05	0.00
Secondary Crushing		Gypsum storage pile reclaim to Belt 3	Gypsum	U/G Enclosure	90	108,051	2.98E-04	0.00	1.41E-04	0.00	2.14E-05	0.00
Secondary Crushing	34101	Coal rail shaker/unloading hopper	Coal & Coke	Enclosure	50	278,684	2.60E-03	0.18	1.23E-03	0.09	1.86E-04	0.01
Secondary Crushing		Coal cracker	Coal & Coke	None		278,684	0.0012	0.17	0.00054	0.08	0.0001	0.01
Secondary Crushing	NP21	Coal Belt 4	Coal & Coke	None		278,684	2.60E-03	0.36	1.23E-03	0.17	1.86E-04	0.03
Secondary Crushing		Coal Belt 5	Coal	None		216,724	2.60E-03	0.28	1.23E-03	0.13	1.86E-04	0.02
Secondary Crushing	33005	Belt 5 drop to coal pile	Coal	Telescope chute	90	216,724	2.60E-03	0.03	1.23E-03	0.01	1.86E-04	0.00
Secondary Crushing		Coke Belt 6	Coke	None		61,960	2.49E-03	0.08	1.18E-03	0.04	1.78E-04	0.01
Secondary Crushing		Belt 6 drop to coke pile	Coke	None		61,960	2.49E-03	0.08	1.18E-03	0.04	1.78E-04	0.01
Secondary Crushing		Coal reclaim hopper	Coal	None		229,682	2.60E-03	0.30	1.23E-03	0.14	1.86E-04	0.02
Secondary Crushing	NP22	Coal Belt 6A	Coal	None		229,682	2.60E-03	0.30	1.23E-03	0.14	1.86E-04	0.02
Secondary Crushing	NP23	Auxilliary hopper/feeder (Coke & Iron)	Coke	None		108,931	2.49E-03	0.14	1.18E-03	0.06	1.78E-04	0.01
Secondary Crushing	NP24	Feeder to Belt 7 (Coke & Iron)	Coke	None		108,931	2.49E-03	0.14	1.18E-03	0.06	1.78E-04	0.01
Secondary Crushing		Raw Silos	Limestone	Enclosed in building	90	2,170,466	2.84E-03	0.31	1.34E-03	0.15	2.03E-04	0.02
Secondary Crushing		Raw Silos	Bauxite	Enclosed in building	90	29,155	4.08E-04	0.00	1.93E-04	0.00	2.92E-05	0.00
Secondary Crushing		Raw Silos	Iron Ore	Enclosed in building	90	46,971	6.10E-04	0.00	2.89E-04	0.00	4.37E-05	0.00
Secondary Crushing		Raw Silos	Gypsum	Enclosed in building	90	108,051	2.98E-04	0.00	1.41E-04	0.00	2.14E-05	0.00
Secondary Crushing		Coal Silos	Coal & Coke	Enclosed in building	90	285,813	2.60E-03	0.04	1.23E-03	0.02	1.86E-04	0.00
Secondary Crushing	50001	Conveyor 12 drop to aggregate surge pile	Limestone	Spray system	50	15,000	2.84E-03	0.01	1.34E-03	0.01	2.03E-04	0.00
Raw Mill 1		Raw Mill 1 additive belt	Additives	Enclosed in building	90	38,063	5.26E-04	0.00	2.49E-04	0.00	3.77E-05	0.00
Raw Mill 1		Raw Mill 1 feed belt	Raw Mix	Enclosed in building	90	1,384,879	1.90E-03	0.13	8.98E-04	0.06	1.36E-04	0.01
Raw Mill 2		Raw Mill 2 additive belt	Additives	Enclosed in building	90	38,063	5.26E-04	0.00	2.49E-04	0.00	3.77E-05	0.00
Raw Mill 2		Raw Mill 2 feed belt	Raw Mix	Enclosed in building	90	1,399,957	1.90E-03	0.13	8.98E-04	0.06	1.36E-04	0.01
CKD System	NP41	Waste dust silo truck loadout	CKD	Water spray	95	32,506	8.77E-01	0.71	4.15E-01	0.34	6.28E-02	0.05
CKD System		CKD Pugmill truck loading	CKD	None		111,005	5.26E-04	0.03	2.49E-04	0.01	3.77E-05	0.00

Process Fugitives

Area	Emission Point ID	Description	Material	Control Type	Efficiency %	Throughput tons/yr	TSP Factor lbs/ton	TSP tons/yr	PM_{10} Factor lbs/ton	PM_{10} tons/yr	$PM_{2.5}$ Factor lbs/ton	$PM_{2.5}$ tons/yr
CKD System		CKD unloading (landfill)	CKD	None		111,005	5.26E-04	0.03	2.49E-04	0.01	3.77E-05	0.00
Fuel Preparation		Coal Silo 1 to Belt C235	Coal & Coke	Enclosed in building	90	142,907	2.60E-03	0.02	1.23E-03	0.01	1.86E-04	0.00
Fuel Preparation		Belt C235 to feeder (Coal Mill 2)	Coal & Coke	Enclosed in building	90	142,907	2.60E-03	0.02	1.23E-03	0.01	1.86E-04	0.00
Fuel Preparation		Coal Silo 2 to Belt C135	Coal & Coke	Enclosed in building	90	142,907	2.60E-03	0.02	1.23E-03	0.01	1.86E-04	0.00
Fuel Preparation		Belt C135 to feeder (Coal Mill 1)	Coal & Coke	Enclosed in building	90	142,907	2.60E-03	0.02	1.23E-03	0.01	1.86E-04	0.00
Clinker Handling	NP40	Clinker drop to storage hall	Clinker	Enclosed & vented*	99	519,300	8.77E-01	2.28	4.15E-01	1.08	6.28E-02	0.16
Barge Unloading		Gypsum barge unloading hopper	Gypsum	None		152,349	2.98E-04	0.02	1.41E-04	0.01	2.14E-05	0.00
Barge Unloading	34401	Gypsum unloading belt	Gypsum	Water spray	50	152,349	2.98E-04	0.01	1.41E-04	0.01	2.14E-05	0.00
Barge Unloading		Gypsum belt drop to pile	Gypsum	Water spray	50	152,349	2.98E-04	0.01	1.41E-04	0.01	2.14E-05	0.00
Barge Unloading		Gypsum truck loading	Gypsum	None		152,349	2.98E-04	0.02	1.41E-04	0.01	2.14E-05	0.00
							Totals:	19.77		9.30		1.44

Notes
* Clinker storage hall vented to clinker cooler air intake. Estimate 99% capture of fugitive emissions.

Emission Point ID	Pile Material	Material Category	Moisture Content (%)	Throughput (tons/yr)	Storage Capacity (tons)	Active Days (n) (days/yr)	Silt Content (s) percent	Base Radius (ft)	Pile Height (ft)	PILE AREA (A) (acres)	Wind Speed > 12 mph (f) percent	Rain Days (p) (days/yr)	Control Efficiency (%)	TSP Emission Factor (lb/acre/day)	TSP Wind Emissions (T/yr)	PM10 Wind Emissions (T/yr)	PM2.5 Wind Emissions (T/yr)
NP01	Kalkberg	Limestone	3	46,489	150,000	365	1.6	162.5	127	2.42	10	146	0	1.13	0.50	0.25	0.04
NP02	Beecraft	Limestone	3	64,362	100,000	365	1.6	162.5	127	2.42	10	146	0	1.13	0.50	0.25	0.04
NP03	Coeymans	Limestone	3	1,977,977	300,000	365	1.6	162.5	127	2.42	10	146	0	1.13	0.50	0.25	0.04
NP04	Callanan Aggregate	Limestone	3	978,085	350,000	365	1.6	162.5	127	2.42	10	146	0	1.13	0.50	0.25	0.04
NP05	Aggregate (Surge)	Limestone	3	15,000	50,000	365	1.6	120	90	1.30	10	146	0	1.13	0.27	0.13	0.02
NP06	Gypsum	Gypsum	15	108,051	2,000	365	3.9	40	16	0.12	10	0	50	2.29	0.05	0.03	0.00
NP10	Bauxite	Bauxite	12	29,155	2,000	365	4	40	16	0.12	10	0	50	2.35	0.05	0.03	0.00
NP07	Iron	Iron ore	9	46,971	2,500	365	5.4	30	15	0.07	10	0	50	3.17	0.04	0.02	0.00
NP08	Coal	Coal	3	229,682	100,000	365	4.6	238	100	4.43	10	146	0	3.24	2.62	1.31	0.20
NP09	Coke	Coke	3	56,131	35,000	365	4.9	140	30	1.45	10	146	0	3.45	0.91	0.46	0.07
TBA	Gypsum (Barge)	Gypsum	15	152,349	60,000	365	3.9	140	45	1.48	10	146	0	2.75	0.74	0.37	0.06
	Totals														6.68	3.34	0.50

Equation for Wind Erosion:

Reference: Control of Open Fugitive Dust Sources, EPA-450/3-88-008, p. 4-17

Ef = 1.7*(s/1.5)*(f/15)*((365-p)/235)*(1-(C/100)) TSP (lbs/acre/day) PM10 fraction = 0.5

E = A*n*Ef/2000 TSP (tons/yr) PM2.5 fraction (AP-42) = 0.075

s =	Silt content of the aggregate (%)	Typical silt contents of materials from AP-42 Table 13.2.4-1
f =	Percent of time that the unobstructed wind speed exceeds 12 mph at the mean pile height	
p =	Number of days with >= 0.01 in. of precipitation per year	
C =	Overall control efficiency (%)	
A =	Size of the pile (acres)	
n =	Number of days per year the pile is continuously active	

Notes: Gypsum, iron, and bauxite piles are located under covered storage; wind effects are reduced by 50% due to partial enclosure; materials are not exposed to rain.

Quarry Miscellaneous Emissions Summary

Operation	Annual Emissions TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)	PM2.5 Emissions (Ton/yr)
Drilling	0.29	0.15	0.01
Blasting	0.95	0.49	0.03
Bulldozing	12.32	2.76	1.29
Loading/Unloading	12.95	6.13	0.93
Total	26.51	9.52	2.26

Quarry Drilling

Emission Point ID	Material	Drill Footage (ft/yr)	Average Depth (ft/hole)	Number of Holes (holes/yr)	TSP Emission Factor (lb/hole)	Control Efficiency (%)	TSP Emissions (T/yr)	PM10 Emissions (T/yr)	PM2.5 Emissions (T/yr)
NP92	Limestone	219,954	50	4,399	1.3	90	0.29	0.15	0.01

Notes
TSP emission factor from AP-42 Table 11.9-4
Assume PM10 and PM2.5 fractions are similar to emissions from blasting given below
Control efficiency based on drill rigs using dust collectors or water/methanol dust suppression

Quarry Blasting

Emission Point ID	Material	Number of Blasts (blasts/yr)	Average Blast Area, A (sq ft)	TSP Emission Factor (lb/blast)	Control Efficiency (%)	TSP Emissions (T/yr)	PM10 Emissions (T/yr)	PM2.5 Emissions (T/yr)
NP93	Limestone	152	9,250	12.45	0	0.95	0.49	0.03

Notes
TSP emission factor (lb/blast) from AP-42 Table 11.9-1
0.000014 x (A)^1.5
PM10 fraction is 0.52 from AP-42 Table 11.9-1
PM2.5 fraction is 0.03 from AP-42 Table 11.9-1

Bulldozing Overburden

Emission Point ID	Material	Silt Content s (%)	Moisture Content M (%)	Dozing Hours (hrs/yr)	TSP Emission Factor (lb/hr)	TSP Emission Factor (lb/hr)	Control Efficiency (%)	TSP Emissions (T/yr)	PM10 Emissions (T/yr)	PM2.5 Emissions (T/yr)
NP94	Overburden	7.5	2.1	4,044	24.38	5.45	75	12.32	2.76	1.29

Notes
Assume overburden bulldozing hours are approximately the same as hours for primary crusher operation
Assume 75% dust control with watering
TSP emission factor (lb/hr) from AP-42 Table 11.9-1
5.7 x (s)^1.2 / (M)^1.3
PM10 emission factor (lb/hr) from AP-42 Table 11.9-1
0.75 x 1.0 x (s)^1.5 / (M)^1.4
PM2.5 fraction of TSP is 0.105 from AP-42 Table 11.9-1

Truck Loading & Unloading

Emission			Control	Throughput	TSP		PM_{10}		$PM_{2.5}$	
Point ID	Description	Material	%	tons/yr	Factor lbs/ton	tons/yr	Factor lbs/ton	tons/yr	Factor lbs/ton	tons/yr
NP94	Truck loading	Overburden		12,768	4.68E-03	0.03	2.21E-03	0.01	3.35E-04	0.00
	Truck unloading	Overburden		12,768	4.68E-03	0.03	2.21E-03	0.01	3.35E-04	0.00
NP95	Truck loading	Limestone (total)		6,072,683	2.84E-03	8.62	1.34E-03	4.08	2.03E-04	0.62
NP95	Truck unloading	Limestone (waste)		3,005,772	2.84E-03	4.27	1.34E-03	2.02	2.03E-04	0.31
	Total					12.95		6.13		0.93

Note
Truck unloading of limestone to be crushed is included with emissions at primary crusher hopper

Location	Material	Quantity Transported (tons/yr)	Vehicle Type	Vehicle Weight (Empty)	Load Capacity (tons)	Total Trips
Quarry	New Scotland	3,005,772	Truck	68	91	33,030
Quarry	Coeymans	1,977,977	Truck	68	91	21,736
Quarry	Kalkberg	46,489	Truck	68	91	511
Quarry	Callanan Aggregate	978,085	Truck	68	91	10,748
Quarry	Beecraft	64,362	Truck	68	91	707
Quarry	Overburden	12,768	Truck	68	91	140
Plant	Fly Ash	103,376	Truck	20	25	4,135
Plant	Iron	24,795	Truck	20	25	992
Plant	Bauxite	34,085	Truck	20	25	1,363
Barge/Plant	Gypsum	152,349	Truck	93	50	3,047
Plant	Cement bulk	394,126	Truck	20	25	15,765
Plant	Cement bags	106,449	Truck	20	25	4,258
Plant	CKD (sales)	32,506	Truck	20	25	1,300
Plant	CKD (landfill)	111,005	Truck	20	25	4,440

All Roads Emission Summary

Road Type	Area	Total Mileage (Mi/yr)	Annual Emissions TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)	PM2.5 Emissions (Ton/yr)
Paved	Plant	39,675	13.16	2.57	0.64
Unpaved	Quarry	89,949	136.97	38.95	3.89
Unpaved	Plant	17,062	22.07	6.28	0.63
Total			172.20	47.79	5.16

Paved Roads

Route No.	Material Hauled	Round Trip (mi)	Silt Loading (g/m2)	Truck Weight Empty (Tons)	Truck Weight Load (Tons)	Truck Weight Loaded (Tons)	Avg Weight (Tons)	Material Thruput (T/yr)	Material Trips (#/yr)	Total Mileage (Mi/yr)	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	PM2.5 E Factor lb/VMT	Control Efficiency (%)	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)	PM2.5 Emissions (Ton/yr)
PR1	Fly Ash	1.5	8.2	20	25	45	32.5	103,376	4,135	6,203	6.63	1.29	0.32	90	2.06	0.40	0.10
PR2	Iron	1.5	8.2	20	25	45	32.5	24,795	992	1,488	6.63	1.29	0.32	90	0.49	0.10	0.02
PR3	Cement bulk	1.5	8.2	20	25	45	32.5	394,126	15,765	23,648	6.63	1.29	0.32	90	7.84	1.53	0.38
PR4	Cement bags	1.5	8.2	20	25	45	32.5	106,449	4,258	6,387	6.63	1.29	0.32	90	2.12	0.41	0.10
PR5	CKD sales	1.5	8.2	20	25	45	32.5	32,506	1,300	1,950	6.63	1.29	0.32	90	0.65	0.13	0.03
	Total									39,675					13.16	2.57	0.64

Notes:

Emissions based on AP-42 Section 13.2.1 (11/06), Equation (2).

$E = [k * (sL/2)^{0.65} * (W/3)^{1.5} - C] * (1 - P/4N)$

where

E = emission factor, lb/VMT	k (PM-30) =	0.082	lb/VMT
k = particle size multiplier	k (PM-10) =	0.016	lb/VMT
sL = road surface silt loading, g/m^2	k (PM-2.5) =	0.0024	lb/VMT
W = average vehicle weight, tons	C (PM-30) =	0.00047	lb/VMT
C = 1980's vehicle exhaust, brake & tire wear, lb/VMT	C (PM-10) =	0.00047	lb/VMT
P = number of days with >= 0.01 in precipitation	C (PM-2.5) =	0.00036	lb/VMT
N = number of days in the averaging period (365)	P =	136	days (Albany average)

ASSUMPTION: 90% control efficiency assumed due to watering and sweeping (per Fugitive Dust Plan).

Unpaved Roads

Route No.	Material Hauled	Round Trip (mi)	Surface Silt Content (%)	Truck Weights Empty (Tons)	Capacity	Loaded (Tons)	Truck Weight	Material Thruput (T/yr)	Material Trips (#/yr)	Total Mileage (Mi/yr)	TSP E Factor lb/VMT	PM10 E Factor lb/VMT	PM2.5 E Factor lb/VMT	Control Efficiency (%)	TSP Emissions (Ton/yr)	PM10 Emissions (Ton/yr)	PM2.5 Emissions (Ton/yr)
UR1	New Scotland	1.6	8.3	68	91	159	113.5	3,005,772	33,030	52,849	12.18	3.46	0.35	75	80.47	22.88	2.29
UR2	Coeymans	1.0	8.3	68	91	159	113.5	1,977,977	21,736	21,736	12.18	3.46	0.35	75	33.10	9.41	0.94
UR3	Kalkberg	1.25	8.3	68	91	159	113.5	46,489	511	639	12.18	3.46	0.35	75	0.97	0.28	0.03
UR4	Callanan Aggregate	1.25	8.3	68	91	159	113.5	978,085	10,748	13,435	12.18	3.46	0.35	75	20.46	5.82	0.58
UR5	Beecraft	1.6	8.3	68	91	159	113.5	64,362	707	1,132	12.18	3.46	0.35	75	1.72	0.49	0.05
UR6	Overburden	1.13	8.3	68	91	159	113.5	12,768	140	159	12.18	3.46	0.35	75	0.24	0.07	0.01
	Subtotal (Quarry)									89,949					136.97	38.95	3.89
UR7	Gypsum	3.5	8.3	93	50	143	118.0	152,349	3,047	10,664	12.40	3.53	0.35	75	16.53	4.70	0.47
UR8	CKD (landfill)	0.5	8.3	20	25	45	32.5	111,005	4,440	2,220	6.94	1.97	0.20	75	1.93	0.55	0.05
UR9	Bauxite	2.7	8.3	20	25	45	32.5	34,085	1,363	3,681	6.94	1.97	0.20	75	3.19	0.91	0.09
UR10	Iron	0.5	8.3	20	25	45	32.5	24,795	992	496	6.94	1.97	0.20	75	0.43	0.12	0.01
	Subtotal (Plant)									17,062					22.07	6.28	0.63
	TOTAL									107,010					159.04	45.23	4.52

Notes:

$E = k * (s/12)^a * (W/3)^b * (365 - P)/365$ for industrial unpaved roads

where
E = emission factor, lb/VMT
k = particle size multiplier
s = surface material silt content, %
W = average vehicle weight, tons
P = number of days with >= 0.01 in precipitation
a, b = constants for specific partical size

Constant	PM-30	PM-10	PM-2.5
k	4.9	1.5	0.15
a	0.7	0.9	0.9
b	0.45	0.45	0.45

P = 136 days (Albany average)

Emission factors from AP-42 Section 13.2.2 (11/06), Equations (1a) & (2). Silt content based on stone quarrying haul road (Table 13.2.2-1). A control efficiency of 75% was used to account for natural surface moisure or watering as needed at an equivalent surface moisture ratio of 2 (Figure 13.2.2-2).