Scientific Resources Associated

May 2, 2011

Mr. Don Gabrielson
Ms. Anu Jain
Pinal County Air Quality Control District
31 N. Pinal Street
Building F
Florence, AZ 85132

RE: Pinal Power Authority to Construct Permit V20644.000

Dear Mr. Gabrielson and Ms. Jain:

Thank you for the opportunity to discuss your additional data needs on the Draft Authority to Construct Permit V20644.000 for the Pinal Power Biomass Facility in Maricopa, AZ. Following our discussion on your additional questions on April 22, 2011, Pinal Power is providing the attached clarifications. Pinal Power believes that the issues raised are already addressed in permit conditions and requirements within the existing draft Authority to Construct Permit V20644.000.

Pinal Power has also revised the Air Quality Impact Assessment (AQIA) to reflect boiler stack parameters provided by the proposed boiler vendor, McBurney, and the updated facility layout. Based on the updated AQIA, the impacts will be below the Significant Impact Levels for CO, 3-hour and annual SO_2, and $PM_{10}/PM_{2.5}$. The analysis indicates that impacts will not result in a significant contribution to PM levels in the region. While Pinal Power has agreed to provide some mitigation for PM emissions, the project is not a major source of PM emissions and therefore no further action or mitigation is required.

Please let us know if you have any questions or require any additional information. We appreciate your assistance in this matter.

Sincerely,

Valorie L. Thompson

Valorie L. Thompson, Ph.D.
Principal

1328 Kaimalino Lane San Diego, CA 92109 (858) 488-2987

Pinal Power has updated the Air Quality Impact Analysis (AQIA) submitted to the PCAQCD to reflect boiler stack parameters provided by the boiler manufacturer. Based on the updated modeling, the results indicate that CO, 3-hour and annual SO_2, and PM impacts are below the U.S. EPA's Significant Impact Levels (SILs), and require no further analysis. The additional analysis conducted for NO_2 and SO_2 impacts indicate that the impacts from the Pinal Power project would not result in an exceedance of an air quality standard. The results of the AQIA are summarized below.

Summary of Maximum Predicted Impacts

Pollutants	Period	Model Result µg/m^3	SIL µg/m^3
Carbon Monoxide (CO)	8-Hr	30.50	500
	1-Hr	48.09	2,000
Nitrogen Dioxide (NO_2)	Annual	1.39[1]	1
	1-Hr	36.07[1]	N/A
Sulfur Dioxide (SO_2)	3-Hr	15.35	25
	24-Hr	10.50	5
	Annual	0.771	1
Particulate Matter (PM_{10}/$PM_{2.5}$)	24-Hr	3.60	5

[1] Adjusted for ozone-limiting using the U.S. EPA's default conversion factor of 0.75.

The following provides responses to additional questions raised by the PCAQCD.

Additional Comments – Pinal Power ATC

1. What is the CEMS going to measure? How will emissions be verified?

According to the Authority to Construct, Pinal Power will be required to install a CEMS that measures both NOx and CO. The CEMS are discussed on Page 4, which indicates that "this permit requires that the boiler be equipped with a continuous emission monitoring system (CEMS) for both NOx and CO. NOx will be monitored in accordance with EPA's acid rain requirements, and the Permittee will be required to implement CO CEMS that meets the Performance Specifications contained in 40 CFR 60 Appendix B. This will involve either direct measurement of CO or measurement of CO based on a parameterization relationship established during source testing.

The permit conditions are Condition 4.B.2. and Condition 4.B.3., which requires the CEMS to track actual NOx and CO daily emissions on a rolling basis.

2. How will the SO_2 emissions be verified?

According to the Authority to Construct, Condition 6.B.1., there is an initial performance test required that includes SO_2 testing (source testing). Further, in accordance with Condition 6.B.6,

performance testing for SO_2 will be required. Under Condition 6.C.4.b, Pinal Power will be required to test SO_2 emissions on a biannual basis (source testing). Under Condition 7.B.6, as a surrogate method for monitoring emissions of SO_2, Pinal Power must maintain daily records reflecting fuel consumption. Condition 7.C.4 requires weekly testing of fuels to determine sulfur content at a minimum.

3. Do we have an ammonia slip level?

The Application for Authority to Construct has indicated that Pinal Power will meet an ammonia slip limit of 20 ppm.

4. How will the CO limit will be monitored – will we be using a CO CEMS?

As stated above, the permit includes a requirement for a CO CEMS.

5. If the boiler employs flue gas recirculation, how is the CEMS going to verify how it is being used?

The FGR will be used in the fuel spouts and will act to reduce NOx. The conversion of fuel bound nitrogen to NOx can be reduced by starving the fuel for oxygen at the moment of devolatilization. When fuel is first introduced into the furnace it first dries and then the volatiles are expressed as well as nitrogen in a reactive form (only "N" and not "N_2). Reducing the amount of oxygen at that time insures that most of the reactive nitrogen combines with another nitrogen atom to make N_2, the most common constituent in our atmosphere.

Operators will look for the proper balance between the use of more or less FGR and reducing the amount of SNCR reagent that will be required to reach compliance. The CEMS will provide an indication of the NOx emissions at the stack, which will be controlled by a combination of the SNCR and FGR.

6. We indicating that the fuel will be monitored for quality and sizing. What is the frequency of fuel testing?

As stated above, fuel testing is required weekly according to Condition 7.C.4.

7. Will the fly ash will contain any moisture? How we will test fly ash to determine moisture content?

Based on information provided by the project engineers, all the ash will have a nominal moisture content, as the flue gases will contain water vapor. The mix of combustion air with some amount of absolute humidity and solid fuel which ranges from 15% to 32% moisture content by weight. Ash particles in the $PM_{2.5}$ and PM_{10} size range will pick up some of this water vapor by surface adhesion after particle formation, and water vapor adhesion is also one of the processes for formation of organic ash during combustion.

Available references regarding fly ash collection and moisture content generally deal with coal ash or 90/10 coal/biomass mixes. Coal has an inherent moisture content from 2.2% to 16.3% (covering both bituminous and anthracite coals). The 90/10 study data utilized switchgrass as the biomass fuel, which typically contains 15-22% moisture content as burned. These data show the moisture content of fly ash from coal as a minimum 0.70% and from switchgrass as a minimum 1.04%. Based on the moisture content of the fuels proposed and anticipated by Pinal Power, the minimum moisture content of the fly ash should be at least 1.04%, since switchgrass-similar fuels will be the driest that would be combusted. In addition, if needed, Pinal Power can achieve almost any moisture content via a rotary drum unloader, which uses water (recycled water such as RO reject stream could be used for this) spray to moisten the ash so that it can be effectively transported between silo and trucks.

Without artificial drying, it is in fact impossible to achieve a "zero moisture" ash. The moisture content of the ash is anticipated to be at a minimum slightly in excess of 1.0%. With the addition of air and additional moisture if and to the extent needed, the emissions of $PM_{2.5}$ and PM_{10} from fly ash handling will be reduced to the levels provided in the attached calculation. For conservative purposes, the calculation is based on the assumption that the fly ash moisture content is 1%. Emissions from fly ash handling would not result in an exceedance of the major source thresholds.

8. Truck loading operations may generate a lot of blowback of fly ash. Is there a physical seal on the truck? The County would like to know how the seal will be and what the dust control will be.

The fly ash will be collected in a silo to be stored for unloading, therefore, there is substantial compression and adhesion as a result of weight and time. Truck loading operations will not create significant blow back. The loader itself has air-tight seals that fit (depending on design) over rail car flanges or flanges on tanker trucks. It is also possible to load open top trucks without particulate transfer. The loader seal will be designed for the type of railcar or trucks to be used in the ash transport. In accordance with Condition 5.E.2, the permit includes an opacity limit for all sources; the opacity limit indicates that opacity shall not be greater than 20% as determined in Method 9 in 40 CFR Part 60, Appendix A, ash shipment is covered under this requirement. This method involves visual testing by a trained tester.

9. What is the duration of and frequency of startups and shutdowns?

The ATC indicated that Boiler emissions during startup and shutdown are included in the annual emissions estimates; startup/ shutdown cycles are limited to no more than 12 per year and the duration is limited to less than 12 hours.

10. How do we meter the trona to ensure that HCl is controlled so that the boiler will not be a major source of HAPs? How will HCl emissions be evaluated to verify that the boiler will not be a major source of HAPs.

Under Condition 6.C.4.b, Pinal Power will be required to conduct an initial source test for HCl. The initial source test will provide data to use in a parametric equation based on boiler load to indicate the amount of trona that will be injected to control HCl. The trona injection is based on the assumption that chlorine in the fuel will be converted to HCl by as much as 50%; due to alkali in the fuels, conversion will be lower than 50% and using this assumption to set forth trona injection amounts will provide a conservative basis to ensure proper controls. As required in Condition 7.C.4, weekly testing of fuels is required and will be conducted to verify the amount of chlorine in the fuels. Biannual testing for HCl is also required.

Table B-1
Particulate Emissions - Dozer Biomass Pile Processing, Outdoor Storage Area
Pinal Power LLC

					Emission Factor, EF			Short term PTE (lb/hr)			Long-term PTE (tpy)		
Process	**Material Silt Content, S%**	**Material Moisture Content, %**	**Number of Dozers, n**	**Annual Operating Hours**	**PM**	**PM10**	**PM2.5**	**PM**	**PM10**	**PM2.5**	**PM**	**PM10**	**PM2.5**
Dozer use on Biomass Storage Areas	0.16	30	2	8760	0.007596	0.000999	0.00014	0.015191	0.001999	0.00028	0.066537	0.008755	0.001226

Calculation Method:

EF_{PM} (lb/hr/dozer) = $(5.7 * S^{1.2})/(M^{1.3})$

EF_{PM10} (lb/hr/dozer) = $(0.75 * S^{1.2})/(M^{1.3})$

$EF_{PM2.5}$ (lb/hr/dozer) = $(0.105 * S^{1.2})/(M^{1.3})$

SOURCE: USEPA AP-42, Table 11.9-1, Bulldozing, Overburden

Table B-2
Wind Erosion Particulate Emissions
Pinal Power LLC

Frequency of Disturbance (days/year)	365
Total Pile Surface Area, A (m^2)	40,000
Threshold Friction Velocity, u_t* (m/s) [(a)]	0.58
Anticipated Control Efficiency, C [(b)]	50

Particle Size Multipliers		
PM	**PM10**	**PM2.5**
1	0.5	0.075

Erosion Potential					**Fugitive Emissions, tons/disturbance**		
Wind Speed during High Wind Event ($u^*_{z,i}$)	**Reference Anemometer Height (m)**	**10-m Ref Height wind speed ($u^*_{10,i}$)**	**Friction Velocity u_i* (m/s)**	**Erosion Potential, P_i (g/m^2)**	**PM**	**PM_{10}**	**$PM_{2.5}$**
10.23	3	12.1554	0.6442	1.8452	0.0814	0.0407	0.0061
10.28	3	12.2148	0.6474	1.9480	0.0859	0.0429	0.0064
10.29	3	12.2267	0.6480	1.9687	0.0868	0.0434	0.0065
10.4	3	12.3574	0.6549	2.1993	0.0970	0.0485	0.0073
10.44	3	12.4049	0.6575	2.2845	0.1007	0.0504	0.0076
10.59	3	12.5832	0.6669	2.6107	0.1151	0.0576	0.0086
10.89	3	12.9396	0.6858	3.2942	0.1453	0.0726	0.0109
10.94	3	12.9990	0.6889	3.4122	0.1505	0.0752	0.0113
11.87	3	14.1041	0.7475	5.8154	0.2564	0.1282	0.0192
12.08	3	14.3536	0.7607	6.4132	0.2828	0.1414	0.0212
Total Uncontrolled Emissions, tons/year					**1.4018**	**0.7009**	**0.1051**
Total Controlled Emissions, tons/year					**0.7009**	**0.3504**	**0.0526**

Note: 10 highest wind speeds measured at Cowtown monitoring station from 2006 - 2008.
Notes:
(a) Threshold friction velocity assumed to be 0.58 m/s from AP-42, Table 13.2.5-1, for midrange size
(b) Assume 50% control efficiency due to moisture content of biomass

Calculation Method (from AP-42, Section 13.2.5)

$u^*_{10,i} = u^*_{z,i}$ (ln(10/0.005)/ln(z/0.005))

$u^*_i = 0.053\ u^*_{10,i}$

$P_i = 58\ (u^*_i - u_t^*)2 + 25\ (u^*_i = u_t^*)$, for $u^*_i > u_t^*$

$P_i = 0$ for $u^*_i < u_t^*$

$R_i = kP_iA$

$R = \Sigma^j R_i$

$R_c = R\ (1-C)$

$u^*_{10,i}$ = fastest mile wind speed for the ith disturbance normalized to 10-m anemometer height

$u^*_{z,i}$ = fastest mile wind speed for the ith disturbance measured at anemometer with height of z meters

u^*_i = friction velocity for the ith disturbance

u_t^* = threshold friction velocity

P_i = erosion potential for the ith disturbance

R_i = emission rate for the ith disturbance

k = particle size multiplier

R = total uncontrolled emission rate, annual emissions

C = control efficiency, %

R_c = controlled emission rate

Table B-3
Estimated Particulate Emission Rates for Fuel Handling Operations
Pinal Power LLC

Process	Biomass Throughput, T		Number of Drop Points during Handling [a]	Effecive Biomass Handled, T_{eff}		Mean wind speed, u (mph) [c]	Material Moisture Content, M %	Air Pollutant Emission Factor			Annual Emissions		
	Maximum (tons/hr) [b]	Average (tons/hr)		Hourly (tons/hr)	Annual (tons/year)			(lbs emitted/ton throughput)			tons/yr		
								PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$
Truck Dumpers	131.73	42.40052185	12	1580.76	4457142.86	5.12	30	5.51E-05	2.61E-05	3.95E-06	1.23E-01	5.81E-02	8.80E-03
Secondary Processing Conveyor Drop Points	131.73	42.40052185	6	790.38	2228571.43	5.12	30	5.51E-05	2.61E-05	3.95E-06	6.14E-02	2.90E-02	4.40E-03
Primary Coarse Screen Supply Conveyor Drop Points	131.73	42.40052185	6	790.38	2228571.43	5.12	30	5.51E-05	2.61E-05	3.95E-06	6.14E-02	2.90E-02	4.40E-03
Secondary Coarse Screen Supply Conveyor Drop Points	131.73	42.40052185	6	790.38	2228571.43	5.12	30	5.51E-05	2.61E-05	3.95E-06	6.14E-02	2.90E-02	4.40E-03
Fine Screen Supply Conveyor Drop Point	131.73	42.40052185	6	790.38	2228571.43	5.12	30	5.51E-05	2.61E-05	3.95E-06	6.14E-02	2.90E-02	4.40E-03
Outdoor Storage Conveyor Drop Point	131.73	42.40052185	3	395.19	1114285.71	5.12	30	5.51E-05	2.61E-05	3.95E-06	3.07E-02	1.45E-02	2.20E-03
Outdoor Storage Bypass Conveyor	131.73	42.40052185	1	131.73	371428.571	5.12	30	5.51E-05	2.61E-05	3.95E-06	1.02E-02	4.84E-03	7.33E-04
Indoor Fuel Storage	131.73	42.40052185	6	790.38	2228571.43	5.12	30	5.51E-05	2.61E-05	3.95E-06	6.14E-02	2.90E-02	4.40E-03
Total Emissions											**4.71E-01**	**2.23E-01**	**3.37E-02**

Notes:
(a) Assumed based on similar facility design
(b) Maximum based on input of 131.73 tons/hour from mass balance. Average based on 260,000 bone dry tons/year, divided by 0.7 to account for 30% moisture content.
(c) From Cowtown meteorological data

Calculation Method:
Throughput, T_{eff} = T x No. of drop points in process
Emission Factor, EF (lb/ton) = k x $(0.0032 * (U/5)^{1.3} / (M/2)^{1.4})$ from AP-42, Section 13.2.4
k = Particle size multiplier
u = mean wind speed, miles/hour
M = moisture content of material %

k = Particle size multiplier		
PM	PM10	PM2.5
0.74	0.35	0.053

Table B-3
Estimated Particulate Emission Rates for Fuel Handling Operations
Pinal Power LLC

Process	Biomass Throughput, T		Number of Drop Points during Handling [a]	Effecive Biomass Handled, T_{eff}		Mean wind speed, u (mph) [c]	Material Moisture Content, M %	Air Pollutant Emission Factor			Maximum Hourly Emissions		
	Maximum (tons/hr) [b]	Average (tons/hr)		Hourly (tons/hr)	Annual (tons/year)			(lbs emitted/ton throughput)			lbs/hr		
								PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$
Truck Dumpers	131.73	42.40052185	12	1580.76	4457142.86	27.02	30	4.79E-04	2.27E-04	3.43E-05	7.57E-01	3.58E-01	5.42E-02
Secondary Processing Conveyor Drop Points	131.73	42.40052185	6	790.38	2228571.43	27.02	30	4.79E-04	2.27E-04	3.43E-05	3.79E-01	1.79E-01	2.71E-02
Primary Coarse Screen Supply Conveyor Drop Points	131.73	42.40052185	6	790.38	2228571.43	27.02	30	4.79E-04	2.27E-04	3.43E-05	3.79E-01	1.79E-01	2.71E-02
Secondary Coarse Screen Supply Conveyor Drop Points	131.73	42.40052185	6	790.38	2228571.43	27.02	30	4.79E-04	2.27E-04	3.43E-05	3.79E-01	1.79E-01	2.71E-02
Fine Screen Supply Conveyor Drop Point	131.73	42.40052185	6	790.38	2228571.43	27.02	30	4.79E-04	2.27E-04	3.43E-05	3.79E-01	1.79E-01	2.71E-02
Outdoor Storage Conveyor Drop Point	131.73	42.40052185	3	395.19	1114285.71	27.02	30	4.79E-04	2.27E-04	3.43E-05	1.89E-01	8.95E-02	1.36E-02
Outdoor Storage Bypass Conveyor	131.73	42.40052185	1	131.73	371428.571	27.02	30	4.79E-04	2.27E-04	3.43E-05	6.31E-02	2.98E-02	4.52E-03
Indoor Fuel Storage	131.73	42.40052185	6	790.38	2228571.43	27.02	30	4.79E-04	2.27E-04	3.43E-05	3.79E-01	1.79E-01	2.71E-02
Total Emissions											**2.90E+00**	**1.37E+00**	**2.08E-01**

Notes:
(a) Assumed based on similar facility design
(b) Maximum based on input of 131.73 tons/hour from mass balance. Average based on 260,000 bone dry tons/year, divided by 0.7 to account for 30% moisture content.
(c) From Cowtown meteorological data

Calculation Method:
Throughput, T_{eff} = T x No. of drop points in process
Emission Factor, EF (lb/ton) = k x $(0.0032 * (U/5)^{1.3} / (M/2)^{1.4})$ from AP-42, Section 13.2.4
k = Particle size multiplier
u = mean wind speed, miles/hour
M = moisture content of material %

k = Particle size multiplier		
PM	PM10	PM2.5
0.74	0.35	0.053

Table B-4
Estimated Particulate Emission Rates for Fly Ash Handling Operations
Pinal Power LLC

Process	Ash Throughput, T		Number of Drop Points during Handling [a]	Effecive Ash Handled, T_{eff}		Mean wind speed, u (mph) [c]		Material Moisture Content, M %	Air Pollutant Emission Factor			Annual Emissions		
	Maximum (tons/hr) [b]	Average (tons/hr)		Hourly (tons/hr)	Annual (tons/year)				(lbs emitted/ton throughput)			tons/yr		
									PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$
Bottom Ash Handling														
Convective Pass Hoppers	0.872	0.872	3	2.616	22916.16	5.12		5	6.77E-04	3.20E-04	4.85E-05	7.76E-03	3.67E-03	5.56E-04
Convective Pass Hopper Ash Collection Conveyor	0.872	0.872	3	2.616	22916.16	5.12		5	6.77E-04	3.20E-04	4.85E-05	7.76E-03	3.67E-03	5.56E-04
Convective Pass Hopper Ash Transfer Conveyor	0.872	0.872	3	2.616	22916.16	5.12		5	6.77E-04	3.20E-04	4.85E-05	7.76E-03	3.67E-03	5.56E-04
Fly Ash Handling														
Baghouse Hoppers	1.312	1.312	3	3.936	34479.36	5.12		1	6.44E-03	3.05E-03	4.62E-04	1.11E-01	5.26E-02	7.96E-03
Collecting Conveyors	1.31	1.31	3	3.93	34426.8	5.12		1	6.44E-03	3.05E-03	4.62E-04	1.11E-01	5.25E-02	7.95E-03
Baghouse Ash Transfer Conveyor	1.31	1.31	3	3.93	34426.8	5.12		1	6.44E-03	3.05E-03	4.62E-04	1.11E-01	5.25E-02	7.95E-03
Ash Storage														
Ash Transfer Conveyor	2.182	2.182	3	6.546	57342.96	5.12		1	6.44E-03	3.05E-03	4.62E-04	1.85E-01	8.74E-02	1.32E-02
Ash Elevating Conveyor	2.182	2.182	3	6.546	57342.96	5.12		1	6.44E-03	3.05E-03	4.62E-04	1.85E-01	8.74E-02	1.32E-02
Ash Handling												**7.26E-01**	**3.43E-01**	**5.20E-02**
Ash Shipment														
Ash Silo to Ash Conditioner Drop Point	80	80	3	80	175200	5.12		1	6.44E-03	3.05E-03	4.62E-04	5.65E-01	2.67E-01	4.04E-02
Ash Silo , Ash Conditioner Chutes	80	80	3	80	175200	5.12		1	6.44E-03	3.05E-03	4.62E-04	5.65E-01	2.67E-01	4.04E-02
Total Emissions												**1.13E+00**	**5.34E-01**	**8.09E-02**
												8.77E-01	1.33E-01	

Notes:
(a) Assumed based on similar facility design
(b) Maximum based on twice fuel handling rate for 465 MMBTU/hr boiler, assuming 8,500 BTU/lb fuel, for 27.35 tons/hr
(c) From Cowtown meteorological data

Calculation Method:
Throughput, T_{eff} = T x No. of drop points in process
Emission Factor, EF (lb/ton) = k x $(0.0032 * (U/5)^{1.3} / (M/2)^{1.4})$ from AP-42, Section 13.2.4
k = Particle size multiplier
u = mean wind speed, miles/hour
M = moisture content of material %

k = Particle size multiplier		
PM	PM10	PM2.5
0.74	0.35	0.053

Table B-4
Estimated Particulate Emission Rates for Fly Ash Handling Operations
Pinal Power LLC

Process	Ash Throughput, T		Number of Drop Points during Handling [a]	Effecive Ash Handled, T_{eff}		Mean wind speed, u (mph) [c]	Material Moisture Content, M %	Air Pollutant Emission Factor			Maximum Hourly Emissions		
	Maximum (tons/hr) [b]	Average (tons/hr)		Hourly (tons/hr)	Annual (tons/year)			(lbs emitted/ton throughput)			lbs/hr		
								PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$
Bottom Ash Handling													
Convective Pass Hoppers	0.872	0.872	3	2.616	22916.16	27.02	5	5.89E-03	2.78E-03	4.22E-04	1.54E-02	7.28E-03	1.10E-03
Convective Pass Hopper Ash Collection Conveyor	0.872	0.872	3	2.616	22916.16	27.02	5	5.89E-03	2.78E-03	4.22E-04	1.54E-02	7.28E-03	1.10E-03
Convective Pass Hopper Ash Transfer Conveyor	0.872	0.872	3	2.616	22916.16	27.02	5	5.89E-03	2.78E-03	4.22E-04	1.54E-02	7.28E-03	1.10E-03
Fly Ash Handling													
Baghouse Hoppers	1.312	1.312	3	3.936	34479.36	27.02	0.1	1.41E+00	6.66E-01	1.01E-01	5.54E+00	2.62E+00	3.97E-01
Collecting Conveyors	1.31	1.31	3	3.93	34426.8	27.02	0.1	1.41E+00	6.66E-01	1.01E-01	5.53E+00	2.62E+00	3.96E-01
Baghouse Ash Transfer Conveyor	1.31	1.31	3	3.93	34426.8	27.02	0.1	1.41E+00	6.66E-01	1.01E-01	5.53E+00	2.62E+00	3.96E-01
Ash Storage													
Ash Transfer Conveyor	2.182	2.182	3	6.546	57342.96	27.02	0.1	1.41E+00	6.66E-01	1.01E-01	9.21E+00	4.36E+00	6.60E-01
Ash Elevating Conveyor	2.182	2.182	3	6.546	57342.96	27.02	0.1	1.41E+00	6.66E-01	1.01E-01	9.21E+00	4.36E+00	6.60E-01
											3.51E+01	**1.66E+01**	**2.51E+00**
Ash Shipment													
Ash Silo to Ash Conditioner Drop Point	80	80	3	80	175200	27.02	0.1	1.41E+00	6.66E-01	1.01E-01	1.13E+02	5.32E+01	8.06E+00
Ash Silo , Ash Conditioner Chutes	80	80	3	80	175200	27.02	0.1	1.41E+00	6.66E-01	1.01E-01	1.13E+02	5.32E+01	8.06E+00
Total Emissions											**2.25E+02**	**1.06E+02**	**1.61E+01**

NOTE: assume 2 shipments per day

Notes:
(a) Assumed based on similar facility design
(b) Maximum based on twice fuel handling rate for 465 MMBTU/hr boiler, assuming 8,500 BTU/lb fuel, for 27.35 tons/hr
(c) From Cowtown meteorological data

Calculation Method:
Throughput, T_{eff} = T x No. of drop points in process
Emission Factor, EF (lb/ton) = k x $(0.0032 * (U/5)^{1.3} /(M/2)^{1.4})$ from AP-42, Section 13.2.4
k = Particle size multiplier
u = mean wind speed, miles/hour
M = moisture content of material %

k = Particle size multiplier		
PM	PM10	PM2.5
0.74	0.35	0.053