Appendix C
Select Responses to
PPRP Data Requests
PSC Case No. 9229

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Select Responses to
PPRP Data Request No. 1

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RESPONSE TO PPRP DATA REQUEST No. 1
Morgantown Ash Beneficiation Project – PSC Case No. 9229
Mirant Mid-Atlantic, LLC

1-1 PPRP requests that Mirant file a revised Section 6.0 – Effects of Plant Operation – Air Quality of the CPCN Application that is supplemented with the below requested data.

(a) Nonattainment NSR analysis for $PM_{2.5}$, NO_x, and ozone. NNSR analysis needs to be based on net emissions increase including projects within the contemporaneous period of the last 5 years.

1.0 NON-ATTAINMENT NEW SOURCE REVIEW

The preconstruction review requirements for major new sources or major modifications locating in nonattainment areas NNSR are as follows:

- Lowest achievable emission rate (LAER), not BACT, applies for non-attainment pollutants;
- The source must provide emission offsets for nonattainment pollutants; and
- The applicant must certify that all other sources owned by the applicant in the State are complying with all applicable requirements of the CAA, including all applicable requirements in the SIP.

The Project is located in Charles County, which has been designated as non-attainment for O_3 and $PM_{2.5}$. Based on the potential project emissions, Table 6.1-1, non-attainment NSR review is only required for SO_2 as a precursor of $PM_{2.5}$.

1.1 Lowest Achievable Emission Rate (SO_2 as a precursor to $PM_{2.5}$)

For major new sources or major modifications in nonattainment areas, LAER is the most stringent emission limitation derived from either of the following:

- The most stringent emission limitation contained in the implementation plan of any State for such class or category of source; or
- The most stringent emission limitation achieved in practice by such class or category of source.

The most stringent emission limitation contained in a SIP for a class or category of source must be considered LAER, unless (1) a more stringent emissions limitation has been achieved in practice, or (2) the SIP limitation is demonstrated by the applicant to be unachievable. By definition LAER cannot be less stringent than any applicable new source performance standard (NSPS).

1.1.1 Emission Limitations from SIP and NSPS

The ash beneficiation facility uses a "Staged Turbulent Air Reactor" technology referred to as "STAR", which is designed to thermally process fly ash using a proprietary process developed by The SEFA Group. The STAR process is not subject to any NSPS or SIP emission limitations.

1.1.2 Previous LAER Determinations

As part of the LAER analysis, a review was performed of previous SO_2 LAER determinations for similar units listed in the RACT/BACT/LAER Clearinghouse on EPA's web page and recent permitting activity. No similar units were identified in the RACT/BACT/LAER Clearinghouse.

As discussed in the BACT analysis of the CPCN, similar carbon burnout or ash beneficiation projects have been permitted at the following facilities:

- Seminole Electric Cooperative, Palatka, Florida
- Progress Energy Florida, Crystal River, Florida
- TECO Big Bend Station, Tampa, Florida
- Santee Cooper, Winyah Station, South Carolina
- South Carolina Electric & Gas, Wateree Station, Richland County, South Carolina
- The Chesapeake Energy Center, Chesapeake, Virginia
- Brayton Point Power Station, Massachusetts

However, these facilities were not permitted as LAER projects. In addition, these projects recover heat from residual carbon increasing the host utility's generation efficiency. In some cases, the flue gases of the carbon burnout (CBO) units or ash beneficiation projects are routed to the electric utility boiler's control system.

As a result of heat recovery, the host boiler is included in the permitting applicability analysis, and as a result these projects are not directly comparable to the Project. For the ash beneficiation systems routed through existing control equipment, the actual control efficiency is unknown and individual compliance with any emission standard cannot be established with certainty. The amount of flue gas entering the existing control system from the ash beneficiation system is small compared to the overall flow rate of power generating unit. Moreover, the actual SO_2 emission limits are not based on the amount of control but based on average emissions. In contrast, the amount of control with the proposed Project will be measurable and compliance demonstrated for this particular emissions unit.

1.1.3 Control Technology Analysis

As a result of no applicable SIP or NSPS limitation, and no previously permitted similar facilities in nonattainment areas, an evaluation of LAER is provided that is based on technology resulting in the greatest emission reduction that has been demonstrated on this type of emission unit..

1.1.3.1 Wet Scrubbers

Devices that are based on absorption principles include packed towers, plate, columns, venturi scrubbers, and spray chambers. Absorption is a mass transfer operation in which one or more soluble components of a gas mixture is dissolved in a liquid that has low volatility under the process conditions. The pollutant diffuses from the gas into the liquid when the liquid contains less than the equilibrium concentration of the gaseous component. The difference between the actual and the equilibrium concentration provides the driving force for absorption.

Wet FGD includes technologies such as lime; limestone forced or inhibited oxidation, and magnesium-enhanced lime FGD. These systems create solid and liquid waste streams, which must be treated before disposal. SO_2 control efficiencies for wet limestone FGD range from 50 to 98 percent, depending on the type of device and design, with an average of 90 percent.

1.1.3.2 Spray Dry Scrubbers

Dry FGD systems include lime spray drying, dry lime furnace injection, and dry lime duct injection. These systems must be followed by a highly efficient PM control device, which is typically a fabric filter, although an ESP could also be used. Lime spray drying efficiency ranges from 70 to 96 percent, with an average of 90 percent.

The use of this control technology requires multiple particulate control equipment to avoid contaminating the processed fly ash with $CaSO_4$. The spray dryer and the additional particulate control device would have to be added after the primary particulate control device collecting fly ash. Otherwise, the fly ash would be contaminated rendering the mixture unusable as a cement substitute.

1.1.4 SO_2 LAER Selection

The proposed LAER SO_2 emission limit for the STAR Process is 0.4 pound per million British thermal unit (lb/MMBtu). The STAR process will minimize SO_2 emissions through use of a wet limestone FGD system. As discussed above, this technology offers the greatest emission reduction that has been demonstrated on this type of emission unit and represents LAER for the project. This emission rate equates to 93.2-percent removal efficiency, which is consistent with the range of control efficiency of wet scrubbing systems as described above.

1.2 Emission Offsets

A major source or major modification planned in a nonattainment area must obtain emission offsets as a condition for approval. These offsets, generally obtained from existing sources located in the vicinity of the proposed source, must (1) offset the emissions increase from the new source or modification and (2) provide a net air quality benefit.

Mirant will obtain the necessary offsets prescribed as follows:

POLLUTANT	OFFSET RATIO
Direct PM2.5	At least 1:1
SO2 Precursor	40:1
NOx Precursor	200:1 (East) 100:1 (West)

1.3 Status of Other Sources Owned by the Applicant

The applicant has certified that all other sources owned by the applicant in the State are complying with all applicable requirements of the CAA, including all applicable requirements in the SIP.

1-1 PPRP requests that Mirant file a revised Section 6.0 – Effects of Plant Operation – Air Quality of the CPCN Application that is supplemented with the below requested data.

(g) Quantified greenhouse gas emissions (as CO_2 equivalent) from the project for the purpose of reporting and permitting applicability determination.

RESPONSE:

CO_2 equivalents (CO_2e) are provided based on the protocols outlined for General Stationary Fuel Combustion Sources under the Mandatory Reporting of Greenhouse Gases, Final Rule, 40 CFR Part 98. CO_2e for the STAR process will include CO_2 direct emissions from ash processing, and CO_2 direct and CH_4 and N_2O equivalent from propane firing. Per 40 CFR 98.33, CO_2e of CH_4 and N_2O mass emissions are only required for units firing fuels listed in Table C-2. Therefore, CO_2e includes only CH_4 and N_2O as a result of propane firing.

Ash Processing

$$CO2 = Fuel * CC * 0.91 \text{ (Eq. C-3)}$$

CO2 = (400,000 tons ash) * (0.0773) * 0.91 = 28,137 tons per year CO2

Where:
Fuel = Annual mass of the solid fuel combusted, from company records as defined in § 98.6 (short tons).
CC = Annual average carbon content of the solid fuel (percent by weight, expressed as a decimal fraction, e.g., 95% = 0.95).

Propane Combustion

Based on an estimated 16 cold starts per year with 3,000 gallons of propane per cold startup and estimated 30 warm starts per year with 1,500 gallons of propane per warm startup. The total annual propane consumption is estimated at 93,000 gallons.

$$CO2, CH4 \text{ or } N2O = 1 \times 10^{-3} * fuel * HHV * EF \text{ (Eq. C-8)}$$

CO2 = 1×10^{-3} * 93,000 gallons * 0.091 MMBtu/gal * 61.46 kg CO2/MMBtu = 520 tons per year CO2

CH4 = 1×10^{-3} * 93,000 gallons * 0.091 MMBtu/gal * 3.0×10^{-3} kg CH4/MMBtu = 0.025 tons per year CH4

N2O = 1×10^{-3} * 93,000 gallons * 0.091 MMBtu/gal * 6.0×10^{-4} kg N2O/MMBtu = 0.005 tons per year N20

Total CO_2e

$$CO2e = CO2_{ash} + CO2_{Propane} + 21(CH4) + 310(N2O)$$

$$CO2e = 28{,}137 + 520 + 21(0.025) + 310(0.005) = 28{,}659 \text{ tons per year.}$$

The CO2e emissions of 28,659 tons replace the CO2 emissions presented in Table 10.2-20 of the CPCN EA. The CO2 emissions presented in Table 10.2-20 for the Project equal 80,000 tons and were based on an assumption of emissions equal to 1/3 that generated from equivalent Portland cement production, where the Portland cement CO2 emissions are based on EPA AP-42 emission factors.

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(i) Quantified construction emissions from the project.

<u>RESPONSE:</u>

See attached Tables 10.2-22 through 10.2-31.

TABLE 10.2-22
STAR PROJECT CONSTRUCITON EMISSIONS

	Tons per Year (TPY)								
Pollutant	**Wheel Loader**	**Crane**	**Excavator**	**Dump Truck**	**Forklift**	**Welding**	**Backhoe**	**Unpaved Roads**	**Total**
NMHC+NOx	1.59	1.57	0.82	0.97	0.51	0.19	0.26	NA	**5.92**
CO	0.86	0.83	0.45	0.53	0.34	10.42	0.20	NA	**13.63**
SO2	0.80	0.77	0.41	0.49	0.22	0.01	0.13	NA	**2.83**
PM	0.05	0.05	0.03	0.03	0.03	NA	0.01	0.80	**0.99**
PM10	0.05	0.05	0.03	0.03	0.03	NA	0.01	0.229	**0.42**
PM2.5	0.05	0.05	0.03	0.03	0.03	NA	0.01	0.002	**0.20**

Source: Golder, 2010.

TABLE 10.2-23
PERFORMANCE AND EMISSION DATA FOR THE WHEEL LOADER

Parameter		Wheel Loader
Performance		
Model		990H
Fuel Type		Diesel
hp		**627**
No. of Units		1
Fuel Use (Gal/hr)*		33.2
Gal/yr		15,936
Hr/day		8
Days/week		5
Weeks/yr		12
Hrs/yr		480
Emissions		
NMHC+NOx - Basis (g/hp-hr)		4.80
Emission rate	(lb/hr)	6.63
	(tpy)	1.59
SO_2 - Basis (g/hp-hr)		
% S*		0.05
Emission rate	(lb/hr)	3.32
	(tpy)	0.80
CO - Basis (g/hp-hr)		2.60
Emission rate	(lb/hr)	3.59
	(tpy)	0.86
PM/PM10 - Basis (g/hp-hr)		0.15
Emission rate	(lb/hr)	0.21
	(tpy)	0.05

Notes:
* Diesel fuel use based on 18.9 hp-hr/gal.
** SO2 emissions based on 0.05 % S Diesel and 100% conversion to SO2.
NMHC - nonmethane hydrocarbons
Emission factors were taken from EPA's Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling--Compression-Ignition, EPA420-P-04-009, April 2004.

TABLE 10.2-24

PERFORMANCE AND EMISSION DATA FOR THE CRANE

Parameter		Crane
Performance		
Model		45 Ton Rough Terrain
Fuel Type		Diesel
hp		**279**
No. of Units		1
Fuel Use (Gal/hr)*		14.8
Gal/yr		15,392
Hr/day		8
Days/week		5
Weeks/yr		26
Hrs/yr		1,040
Emissions		
NMHC+NOx - Basis (g/hp-hr)		4.90
Emission rate	(lb/hr)	3.01
	(tpy)	1.57
SO_2 - Basis (g/hp-hr)		
% S*		0.05
Emission rate	(lb/hr)	1.48
	(tpy)	0.77
CO - Basis (g/hp-hr)		2.60
Emission rate	(lb/hr)	1.60
	(tpy)	0.83
PM/PM10 - Basis (g/hp-hr)		0.15
Emission rate	(lb/hr)	0.09
	(tpy)	0.05

Notes:
* Diesel fuel use based on 18.9 hp-hr/gal.
** SO2 emissions based on 0.05 % S Diesel and 100% conversion to SO2.
NMHC - nonmethane hydrocarbons
Emission factors were taken from EPA's Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling--Compression-Ignition, EPA420-P-04-009, April 2004.

TABLE 10.2-25

PERFORMANCE AND EMISSION DATA FOR THE EXCAVATOR

Parameter		Excavator
Performance		
Model		Caterpillar 345C
Fuel Type		Diesel
hp		**325**
No. of Units		1
Fuel Use (Gal/hr)*		17.2
Gal/yr		8,256
Hr/day		8
Days/week		5
Weeks/yr		12
Hrs/yr		480
Emissions		
NMHC+NOx - Basis (g/hp-hr)		4.80
Emission rate	(lb/hr)	3.44
	(tpy)	0.82
SO_2 - Basis (g/hp-hr)		
% S*		0.05
Emission rate	(lb/hr)	1.72
	(tpy)	0.41
CO - Basis (g/hp-hr)		2.60
Emission rate	(lb/hr)	1.86
	(tpy)	0.45
PM/PM10 - Basis (g/hp-hr)		0.15
Emission rate	(lb/hr)	0.11
	(tpy)	0.03

Notes:

* Diesel fuel use based on 18.9 hp-hr/gal.

** SO2 emissions based on 0.05 % S Diesel and 100% conversion to SO2.

NMHC - nonmethane hydrocarbons

Emission factors were taken from EPA's Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling--Compression-Ignition, EPA420-P-04-009, April 2004.

TABLE 10.2-26

PERFORMANCE AND EMISSION DATA FOR THE DUMP TRUCK

Parameter		Dump Truck
Performance		
Model		
Fuel Type		Diesel
hp		**384**
No. of Units		1
Fuel Use (Gal/hr)*		20.3
Gal/yr		9,744
Hr/day		8
Days/week		5
Weeks/yr		12
Hrs/yr		480
Emissions		
NMHC+NOx - Basis (g/hp-hr)		4.80
Emission rate	(lb/hr)	4.06
	(tpy)	0.97
SO_2 - Basis (g/hp-hr)		
% S*		0.05
Emission rate	(lb/hr)	2.03
	(tpy)	0.49
CO - Basis (g/hp-hr)		2.60
Emission rate	(lb/hr)	2.20
	(tpy)	0.53
PM/PM10 - Basis (g/hp-hr)		0.15
Emission rate	(lb/hr)	0.13
	(tpy)	0.03

Notes:

* Diesel fuel use based on 18.9 hp-hr/gal.

** SO2 emissions based on 0.05 % S Diesel and 100% conversion to SO2.

NMHC - nonmethane hydrocarbons

Emission factors were taken from EPA's Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling--Compression-Ignition, EPA420-P-04-009, April 2004.

TABLE 10.2-27

PERFORMANCE AND EMISSION DATA FOR THE FORKLIFT

Parameter		Forklift
Performance		
Model		3-5 Ton - Steel
Fuel Type		Diesel
hp		**80**
No. of Units		1
Fuel Use (Gal/hr)*		4.2
Gal/yr		4,368
Hr/day		8
Days/week		5
Weeks/yr		26
Hrs/yr		1,040
Emissions		
NMHC+NOx - Basis (g/hp-hr)		5.60
Emission rate	(lb/hr)	0.99
	(tpy)	0.51
SO_2 - Basis (g/hp-hr)		
% S*		0.05
Emission rate	(lb/hr)	0.42
	(tpy)	0.22
CO - Basis (g/hp-hr)		3.70
Emission rate	(lb/hr)	0.65
	(tpy)	0.34
PM/PM10 - Basis (g/hp-hr)		0.30
Emission rate	(lb/hr)	0.05
	(tpy)	0.03

Notes:
* Diesel fuel use based on 18.9 hp-hr/gal.
** SO2 emissions based on 0.05 % S Diesel and 100% conversion to SO2.
NMHC - nonmethane hydrocarbons
Emission factors were taken from EPA's Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling--Compression-Ignition, EPA420-P-04-009, April 2004.

TABLE 10.2-28

PERFORMANCE AND EMISSION DATA FOR THE WELDING MACHINE

Parameter		Welding Machine
Performance		
Model		400A
Fuel Type		Gasoline
hp		**20**
No. of Units		1
Fuel Use (Gal/hr)*		1.8
Gal/yr		1,872
Hr/day		8
Days/week		5
Weeks/yr		26
Hrs/yr		1,040
Emissions		
NMHC+NOx - Basis (g/hp-hr)		8.4
Emission rate	(lb/hr)	0.37
	(tpy)	0.19
SO_2 - Basis (g/hp-hr)		
% S*		0.008
Emission rate	(lb/hr)	0.03
	(tpy)	0.01
CO - Basis (g/hp-hr)		455
Emission rate	(lb/hr)	20.04
	(tpy)	10.42
PM/PM10 - Basis (g/hp-hr)		NA
Emission rate	(lb/hr)	NA
	(tpy)	NA

Notes:

*SO2 emissions based on 80 ppm Gasoline and 100% conversion to SO2.

Gasoline NOx and CO emission factors from EPA Emission Standards Reference Guide for Heavy Duty a

TABLE 10.2-29

PERFORMANCE AND EMISSION DATA FOR THE BACKHOE LOADER

Parameter		Backhoe Loader
Performance		
Model		Catapillar 446D
Fuel Type		Diesel
hp		**101**
No. of Units		1
Fuel Use (Gal/hr)*		5.3
Gal/yr		2,544
Hr/day		8
Days/week		5
Weeks/yr		12
Hrs/yr		480
Emissions		
NMHC+NOx - Basis (g/hp-hr)		4.90
Emission rate	(lb/hr)	1.09
	(tpy)	0.26
SO_2 - Basis (g/hp-hr)		
% S*		0.05
Emission rate	(lb/hr)	0.53
	(tpy)	0.13
CO - Basis (g/hp-hr)		3.70
Emission rate	(lb/hr)	0.82
	(tpy)	0.20
PM/PM10 - Basis (g/hp-hr)		0.22
Emission rate	(lb/hr)	0.05
	(tpy)	0.01

Notes:
* Diesel fuel use based on 18.9 hp-hr/gal.
** SO2 emissions based on 0.05 % S Diesel and 100% conversion to SO2.
NMHC - nonmethane hydrocarbons
Emission factors were taken from EPA's Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling--Compression-Ignition, EPA420-P-04-009, April 2004.

TABLE 10.2-30
Hazardous Air Pollutant Emission Factors and Emissions for the Diesel Construction Equipment

HAPs (Section 112(b) of Clean Air Act)	Emission Factor	Gal/year: 56,240
		TPY
	EPA AP-42 3.4 (lb/MMBtu)	
Acrolein	7.88E-06	3.01E-05
Acetaldehyde	2.52E-05	9.64E-05
Benzene	7.76E-04	2.97E-03
Formaldehyde	7.89E-05	3.02E-04
Naphthalene	1.30E-04	4.97E-04
Toluene	2.81E-04	1.07E-03
Xylene	1.93E-04	7.38E-04
Acenaphthene	4.68E-06	1.79E-05
Acenaphthylene	9.23E-06	3.53E-05
Anthracene	1.23E-06	4.70E-06
Benzo(a)anthracene	6.22E-07	2.38E-06
Benzo(b)fluoranthene	1.11E-06	4.24E-06
Benzo(k)fluoranthene	2.18E-07	8.34E-07
Benzo(g,h,i)perylene	5.56E-07	2.13E-06
Benzo(a)pyrene	2.57E-07	9.83E-07
Chrysene	1.53E-06	5.85E-06
Dibenzo(a,h)anthracene	3.46E-07	1.32E-06
Fluoanthene	4.03E-06	1.54E-05
Fluorene	4.47E-06	1.71E-05
Indo(1,2,3-cd)pyrene	4.14E-07	1.58E-06
Phenanthrene	1.05E-06	4.02E-06
Propylene	2.79E-03	1.07E-02
Pyrene	3.71E-06	1.42E-05
	EPA AP-42 Table 1.3-10 ($lb/10^{12}$ Btu)	
Arsenic	4.0	1.53E-05
Beryllium	3.0	1.15E-05
Cadmium	3.0	1.15E-05
Chromium	3.0	1.15E-05
Copper	6.0	2.29E-05
Lead	9.0	3.44E-05
Mercury	3.0	1.15E-05
Manganese	6.0	2.29E-05
Nickel	3.0	1.15E-05
Selenium	15.0	5.74E-05
Zinc	4.0	1.53E-05
HAPs (Total)		**1.66E-02**

Source: EPA AP-42, Golder 2010.

Note: 136,000 btu/gallon

TABLE 10.2-31

Estimation of PM Emission Factors and Rates from Unpaved Roads For Construction Equipment

Parameters		
Scenario		
PM(TSP)	Data	Units/Comments
E=k x $(sl/12)^a$ x $(w/3)^b$; where a = 0.7 and b= 0.45, k = 4.9 for TSP	9.435	round trip lb/VMT
sl = 8.5 AP-42 13.2.2.2	720	round trip miles per year
w estimated = 22 tons average vehicle weight		
	6,793	lb/year
	3.40	tons/year uncontrolled without rainfall
Accounting for rainfall using (1-1.2P/8760), where P = hours	2.00	tons/year controlled with rainfall
ter sprays (Based on 42% to 75% from EPA, 1992)	60	Emission control removal efficiency, %
	0.80	tons/year controlled with water sprays
PM_{10}		
E=k x $(sl/2)^a$ x $(w/3)^b$; where a = 0.9 and b= 0.45, k = 1.5 for PM_{10}	2.696	round trip lb/VMT
sl = 8.5 AP-42 13.2.2.2	720	round trip miles per year
w = 32.5 tons, 12.5 tons per empty truck		
	1,941	lb/year
	0.97	tons/year uncontrolled without rainfall
Accounting for rainfall using (1-1.2P/8760), where P = hours	0.57	tons/year controlled with rainfall
ter sprays (Based on 42% to 75% from EPA, 1992)	60	Emission control removal efficiency, %
	0.23	tons/year controlled with water sprays
$PM_{2.5}$		
E=k x $(sl/2)^a$ x $(w/3)^b$; where a = 0.9 and b= 0.45, k = 0.15 for $PM_{2.5}$	0.270	round trip lb/VMT (average empty/full truck)
sl = 8.5 AP-42 13.2.2.2	720	round trip miles per truck (estimated)
w = 32.5 tons, 12.5 tons per empty truck		
	194	lb/year
	0.01	tons/year uncontrolled without rainfall
Accounting for rainfall using (1-1.2P/8760), where P = hours	0.01	tons/year controlled with rainfall
ter sprays (Based on 42% to 75% from EPA, 1992)	60	Emission control removal efficiency, %
	0.0023	tons/year controlled with water sprays

Source: USEPA, 2003; AP-42, Section 13.2.2.2 for Unpaved Roads. Golder 2010

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(j) Attached vendor guarantees for emissions rates and control technology efficiencies.

RESPONSE:

Attached are the SO2 FGD Guarantee from Bionomic and the performance guarantee for the STAR Baghouse from MicroPul. Note that while there is no vendor guarantee as to NOx, the SEFA Group's Emission Test Report, provided in response to Question 6, summarizes predicted NOx emissions performance.

(MicroPul Emission Guarantee Redacted – Marked Confidential)

THE SEFA GROUP
Marketing • Manufacturing • Transportation
www.sefagroup.com

May 21, 2010

Mirant Mid-Atlantic
8301 Professional Place
Suite 230
Landover, MD 20785
Phone: (301) 955-9000

Attention: Andy Bilmanis

Subject: Morgantown Project – NOx Predicted Performance
Ref: SEFA Project #06114 – Mirant STAR II

Andy,

Per your request, this letter serves to state the predicted performance of the proposed STAR II facility regarding Nitrogen Oxides (NOx), along with back up to demonstrate how these numbers were determined. For the purposes of permitting, etc., it was established that the STAR facility would achieve thermal NOx emissions at or below 0.05 pounds per million BTU.

The 0.05 lb / MM Btu emission factor is equivalent to approximately 35 ppmv under the nominal operating conditions of the Morgantown facility. Original testing conducted on the Morgantown fly ash at SEFA's McMeekin STAR facility in February 2009, resulted in an average nitrogen oxide concentration of 120 ppmv (as summarized in the TRC Emission Test Report). During these test runs, the average fuel input to the unit was 26.33 million BTU's per hour, resulting in a calculated emission factor of 0.337 lb / MM BTU (based on the calculated emission rate of 8.88 lb/hr).

Subsequent NOx testing at the McMeekin STAR has demonstrated substantial improvement in emissions, with NOx concentrations at or below 20 ppmv. This equates to approximately 0.038 lb/MM Btu. These lower emissions have been achieved with proper tuning of air flows and water sprays in the combustion zone of the STAR reactor.

Administrative Office
217 Cedar Road.
Lexington, SC 29073
Tel (803) 520-9000
Fax (803) 520-9001

Regional Office
P.O. Box 1311
Greeneville, TN 37744
Tel (423) 639-8531
Fax (423) 639-1876

Corporate Office
P.O. Box 6
Moncks Corner, SC 29461
Tel (843) 761-1999
Fax (843) 899-7213

I trust this letter answers your questions, should you have any comments please do not hesitate to contact me.

Best Regards,
The SEFA Group

William R. Fedorka, P.E.
Director, Engineering

cc: Jim Clayton, SEFA
Jimmy Knowles, SEFA

Attachments:

RESPONSE TO PPRP DATA REQUEST No. 1
Morgantown Ash Beneficiation Project – PSC Case No. 9229
Mirant Mid-Atlantic, LLC

1-3 Please provide the Morgantown ash study prepared by SEFA Group's consultant. Mirant's anticipated deliverable date for this request was May 21, 2010. Please provide the requested data as soon as possible.

RESPONSE:

Attached is the TRC February, 2009 Emission Test Report. Note that in this test, no attempt was made to minimize NOx emissions and exhaust gases were sampled after the baghouse but before SO2 FGD system. Thus, the results of subsequent testing in The SEFA Group, Inc.'s Emission Test Report, also attached, should be relied on with respect to NOx.

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Select Pages from the TRC Emission Test Report Provided in Response to PPRP Data Request No. 1, Question 1-3

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TRC

EMISSION TEST REPORT

COAL COMBUSTION BY-PRODUCT (CCB) FLY ASH BENEFICIATION (FAB) REACTOR

The SEFA Group, Inc.
Columbia, South Carolina

Prepared for:

Mirant Mid-Atlantic, LLC
8301 Professional Place, Suite 230
Landover, MD 20785

Prepared by:

TRC Environmental Corporation
5540 Centerview Drive, Suite 100
Raleigh, NC 27606
(919) 828-3150

TRC Project No. 158563

February 2009

TABLE 1-1
TEST LOG

Unit Tested	Sampling Objective	Test Method	Test Date	Run Numbers	Volumetric Air Flow Rate
FAB Reactor Baghouse Outlet	O_2/CO_2, SO_2, NO_X and CO	EPA 3A, 6C, 7E, and 10	2/05/09 2/05/09 2/05/09	CEM - 1 CEM - 2 CEM - 3	M5/29 - 1 M5/29 - 2 M5/29 - 3
	Particulate and Metals Mercury Speciation	EPA M5/29 FAMS	2/05/09 2/05/09 2/05/09 2/05/09 2/05/09 2/05/09	M5/29 - 1 M5/29 - 2 M5/29 – 3 FAMS - 1 FAMS - 2 FAMS – 3	M5/29 - 1 M5/29 - 2 M5/29 – 3 M5/29 - 1 M5/29 - 2 M5/29 – 3
	PM2.5	EPA OTM27 & 202	2/06/09 2/06/09 2/06/09	OTM27/202 - 1 OTM27/202 - 2 OTM27/202 - 3	OTM27/202 - 1 OTM27/202 - 2 OTM27/202 - 3
	SO_3	Controlled Condensation Method	2/06/09 2/06/09 2/06/09	CC - 1 CC - 2 CC - 3	OTM27/202 - 1 OTM27/202 - 2 OTM27/202 - 3
Raw Feed Ash Sample	Metals, organic carbon, total carbon, total sulfur	Composite Grab Samples	2/05/09 2/05/09 2/05/09	RF - 1 RF - 2 RF - 3	n/a n/a n/a
	Various parameters (C-618 analysis)	Composite Grab Sample	2/05/09	Mo 090205 Comp RF	n/a
Product Ash Sample	Metals, organic carbon, total carbon, total sulfur	Composite Grab Samples	2/05/09 2/05/09 2/05/09	P - 1 P - 2 P - 3	n/a n/a n/a
	Various parameters (C-618 analysis)	Composite Grab Sample	2/05/09	Mo 090205 Comp BH	n/a

SECTION 2

SUMMARY OF TEST RESULTS

Tables 2-1 through 2-3 present summaries of the test results. Detailed test results are presented in **Appendix A**. Field data is given in **Appendix B**. The analytical data can be found in **Appendix C**, and calibration data is presented in **Appendix D**. Plant process data can be found in **Appendix E.**

TABLE 2-1
PM, PM2.5, SO_2, NO_X, CO, AND SO_3
EMISSIONS SUMMARY

	Test Run 1	Test Run 2	Test Run 3	Average
Concentration, ppmvd				
Sulfur Dioxide	1,896	1,925	1,930	1,917
Nitrogen Oxides	109	126	123	120
Carbon Monoxide	114	88.6	86.3	96.3
Sulfur Trioxide	0.124	0.550	1.50	0.726
Concentration, gr/dscf				
Particulate Matter	0.0253	0.0242	0.0236	0.0244
PM2.5	0.0110	0.0124	0.0125	0.0120
Emission Rate, lb/hr				
Sulfur Dioxide	190	200	204	198
Nitrogen Oxides	7.87	9.44	9.32	8.88
Carbon Monoxide	5.00	4.03	3.98	4.34
Sulfur Trioxide	0.0179	0.0205	0.0297	0.0227
Particulate Matter	2.18	2.16	2.14	2.16
PM2.5	1.09	1.23	1.32	1.22
Emission Rate, lb/ton				
Sulfur Dioxide	12.5	13.1	13.4	13.0
Nitrogen Oxides	0.516	0.619	0.611	0.582
Carbon Monoxide	0.328	0.264	0.261	0.284
Sulfur Trioxide	0.00120	0.00137	0.00198	0.00151
Particulate Matter	0.143	0.142	0.140	0.142
PM2.5	0.0726	0.0822	0.0883	0.0810

TABLE 2-2
MERCURY SPECIATION
EMISSIONS SUMMARY

	Test Run 1	Test Run 2	Test Run 3	Average
Mercury Speciation				
Particulate Hg, %	0.9	0.3	0.3	0.5
Elemental – Hg (0), %	4.5	11.4	6.3	7.4
Oxidized – Hg (II), %	94.6	88.4	93.4	92.1

TABLE 2-3
METALS
EMISSIONS SUMMARY

	Test Run 1	Test Run 2	Test Run 3	Average
Concentration, mg/dscm				
Antimony	0.00136	< 0.00159	< 0.00161	< 0.00152
Arsenic	0.00577	0.00555	0.00551	0.00561
Barium	0.0457	0.0462	0.0500	0.0473
Beryllium	0.00109	0.00100	0.00102	0.00103
Cadmium	0.000350	0.000219	0.000270	0.000279
Chromium	0.0226	0.0178	0.0176	0.0193
Cobalt	0.00344	0.00295	0.00459	0.00366
Copper	0.0173	0.0142	0.0137	0.0151
Lead	0.00642	0.00514	0.00511	0.00556
Manganese	0.0150	0.0123	0.0128	0.0134
Mercury	0.00441	0.00656	0.00993	0.00696
Nickel	0.0235	0.0175	0.0178	0.0196
Phosphorus	0.127	0.132	0.128	0.129
Selenium	0.295	0.428	0.424	0.382
Silver	0.00584	0.00148	0.00316	0.00349
Thallium	< 0.000843	< 0.000827	< 0.000803	< 0.000824
Zinc	0.0551	0.0335	0.0339	0.0408

TABLE 2-3 (continued)
METALS
EMISSIONS SUMMARY

	Test Run 1	Test Run 2	Test Run 3	Average
Emission Rate, lb/hr				
Antimony	5.12E-05	< 6.22E-05	< 6.37E-05	< 5.91E-05
Arsenic	2.17E-04	2.17E-04	2.18E-04	2.17E-04
Barium	1.72E-03	1.80E-03	1.98E-03	1.84E-03
Beryllium	4.10E-05	3.90E-05	4.03E-05	4.01E-05
Cadmium	1.32E-05	8.53E-06	1.07E-05	1.08E-05
Chromium	8.49E-04	6.96E-04	6.96E-04	7.47E-04
Cobalt	1.29E-04	1.15E-04	1.82E-04	1.42E-04
Copper	6.51E-04	5.53E-04	5.44E-04	5.83E-04
Lead	2.42E-04	2.01E-04	2.02E-04	2.15E-04
Manganese	5.64E-04	4.82E-04	5.07E-04	5.18E-04
Mercury	1.66E-04	2.56E-04	3.93E-04	2.72E-04
Nickel	8.86E-04	6.82E-04	7.05E-04	7.58E-04
Phosphorus	4.78E-03	5.16E-03	5.07E-03	5.01E-03
Selenium	1.11E-02	1.67E-02	1.68E-02	1.49E-02
Silver	2.20E-04	5.76E-05	1.25E-04	1.34E-04
Thallium	< 3.17E-05	< 3.23E-05	< 3.18E-05	< 3.19E-05
Zinc	2.07E-03	1.31E-03	1.34E-03	1.57E-03

**TABLE 2-3 (continued)
METALS
EMISSIONS SUMMARY**

	Test Run 1	Test Run 2	Test Run 3	Average
Emission Rate, lb/ton				
Antimony	3.36E-06	< 4.08E-06	< 4.18E-06	< 3.87E-06
Arsenic	1.42E-05	1.42E-05	1.43E-05	1.43E-05
Barium	1.13E-04	1.18E-04	1.30E-04	1.20E-04
Beryllium	2.69E-06	2.55E-06	2.64E-06	2.63E-06
Cadmium	8.64E-07	5.59E-07	7.01E-07	7.08E-07
Chromium	5.57E-05	4.56E-05	4.56E-05	4.90E-05
Cobalt	8.48E-06	7.56E-06	1.19E-05	9.32E-06
Copper	4.27E-05	3.63E-05	3.56E-05	3.82E-05
Lead	1.58E-05	1.31E-05	1.33E-05	1.41E-05
Manganese	3.70E-05	3.16E-05	3.33E-05	3.39E-05
Mercury	1.09E-05	1.68E-05	2.58E-05	1.78E-05
Nickel	5.81E-05	4.47E-05	4.62E-05	4.97E-05
Phosphorus	3.14E-04	3.39E-04	3.33E-04	3.28E-04
Selenium	7.28E-04	1.09E-03	1.10E-03	9.75E-04
Silver	1.44E-05	3.78E-06	8.20E-06	8.79E-06
Thallium	< 2.08E-06	< 2.12E-06	< 2.09E-06	< 2.09E-06
Zinc	1.36E-04	8.57E-05	8.81E-05	1.03E-04

APPENDIX C

ANALYTICAL REPORT

4. RAW FEED AND PRODUCT SAMPLES
(metals, organic carbon, total carbon, and total sulfur)

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

TRC Environmental Corporation
5540 Centerview Dr.
Suite 100
Raleigh, NC 27606
Attention: Jeff Kunstling

Project Name: **SEFA**

Lot Number: **KB11042**
Date Completed: **02/18/2009**

Brooke Montgomery

R. Brooke Montgomery
Project Manager

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.

Executive Summary
TRC Environmental Corporation
Lot Number: KB11042

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	RF-1	Solid	TOC	Walkley-Black	1700		mg/kg	7
001	RF-1	Solid	Aluminum	6010C	40000		mg/kg	7
001	RF-1	Solid	Antimony	6010C	12		mg/kg	7
001	RF-1	Solid	Arsenic	6010C	120		mg/kg	7
001	RF-1	Solid	Barium	6010C	550		mg/kg	7
001	RF-1	Solid	Beryllium	6010C	7.5		mg/kg	7
001	RF-1	Solid	Cadmium	6010C	1.2		mg/kg	7
001	RF-1	Solid	Calcium	6010C	12000		mg/kg	7
001	RF-1	Solid	Chromium	6010C	70		mg/kg	7
001	RF-1	Solid	Cobalt	6010C	26		mg/kg	7
001	RF-1	Solid	Copper	6010C	180		mg/kg	7
001	RF-1	Solid	Iron	6010C	33000		mg/kg	7
001	RF-1	Solid	Lead	6010C	240		mg/kg	7
001	RF-1	Solid	Magnesium	6010C	2600		mg/kg	7
001	RF-1	Solid	Manganese	6010C	94		mg/kg	7
001	RF-1	Solid	Mercury	7471B	0.26		mg/kg	7
001	RF-1	Solid	Nickel	6010C	60		mg/kg	7
001	RF-1	Solid	Potassium	6010C	7300		mg/kg	7
001	RF-1	Solid	Selenium	6010C	50		mg/kg	7
001	RF-1	Solid	Silver	6010C	1.5		mg/kg	7
001	RF-1	Solid	Sodium	6010C	2600		mg/kg	7
001	RF-1	Solid	Thallium	6010C	32		mg/kg	7
001	RF-1	Solid	Vanadium	6010C	160		mg/kg	7
001	RF-1	Solid	Zinc	6010C	96		mg/kg	7
002	RF-2	Solid	TOC	Walkley-Black	2000		mg/kg	8
002	RF-2	Solid	Aluminum	6010C	35000		mg/kg	8
002	RF-2	Solid	Arsenic	6010C	120		mg/kg	8
002	RF-2	Solid	Barium	6010C	500		mg/kg	8
002	RF-2	Solid	Beryllium	6010C	7.0		mg/kg	8
002	RF-2	Solid	Cadmium	6010C	1.1		mg/kg	8
002	RF-2	Solid	Calcium	6010C	10000		mg/kg	8
002	RF-2	Solid	Chromium	6010C	65		mg/kg	8
002	RF-2	Solid	Cobalt	6010C	23		mg/kg	8
002	RF-2	Solid	Copper	6010C	82		mg/kg	8
002	RF-2	Solid	Iron	6010C	28000		mg/kg	8
002	RF-2	Solid	Lead	6010C	41		mg/kg	8
002	RF-2	Solid	Magnesium	6010C	2400		mg/kg	8
002	RF-2	Solid	Manganese	6010C	86		mg/kg	8
002	RF-2	Solid	Mercury	7471B	0.27		mg/kg	8
002	RF-2	Solid	Nickel	6010C	54		mg/kg	8
002	RF-2	Solid	Potassium	6010C	4400		mg/kg	8
002	RF-2	Solid	Selenium	6010C	12		mg/kg	8
002	RF-2	Solid	Silver	6010C	1.4		mg/kg	8
002	RF-2	Solid	Vanadium	6010C	150		mg/kg	8
002	RF-2	Solid	Zinc	6010C	89		mg/kg	8

Executive Summary (Continued)

Lot Number: KB11042

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
003	RF-3	Solid	TOC	Walkley-Black	1500		mg/kg	9
003	RF-3	Solid	Aluminum	6010C	33000		mg/kg	9
003	RF-3	Solid	Arsenic	6010C	120		mg/kg	9
003	RF-3	Solid	Barium	6010C	480		mg/kg	9
003	RF-3	Solid	Beryllium	6010C	6.7		mg/kg	9
003	RF-3	Solid	Cadmium	6010C	1.0		mg/kg	9
003	RF-3	Solid	Calcium	6010C	9600		mg/kg	9
003	RF-3	Solid	Chromium	6010C	62		mg/kg	9
003	RF-3	Solid	Cobalt	6010C	21		mg/kg	9
003	RF-3	Solid	Copper	6010C	77		mg/kg	9
003	RF-3	Solid	Iron	6010C	26000		mg/kg	9
003	RF-3	Solid	Lead	6010C	39		mg/kg	9
003	RF-3	Solid	Magnesium	6010C	2200		mg/kg	9
003	RF-3	Solid	Manganese	6010C	82		mg/kg	9
003	RF-3	Solid	Mercury	7471B	0.26		mg/kg	9
003	RF-3	Solid	Nickel	6010C	50		mg/kg	9
003	RF-3	Solid	Potassium	6010C	4000		mg/kg	9
003	RF-3	Solid	Selenium	6010C	11		mg/kg	9
003	RF-3	Solid	Silver	6010C	1.4		mg/kg	9
003	RF-3	Solid	Vanadium	6010C	150		mg/kg	9
003	RF-3	Solid	Zinc	6010C	83		mg/kg	9
004	P-1	Solid	Aluminum	6010C	7600		mg/kg	10
004	P-1	Solid	Antimony	6010C	1.2		mg/kg	10
004	P-1	Solid	Arsenic	6010C	100		mg/kg	10
004	P-1	Solid	Barium	6010C	190		mg/kg	10
004	P-1	Solid	Beryllium	6010C	2.1		mg/kg	10
004	P-1	Solid	Cadmium	6010C	0.23		mg/kg	10
004	P-1	Solid	Calcium	6010C	6200		mg/kg	10
004	P-1	Solid	Chromium	6010C	41		mg/kg	10
004	P-1	Solid	Cobalt	6010C	6.7		mg/kg	10
004	P-1	Solid	Copper	6010C	22		mg/kg	10
004	P-1	Solid	Iron	6010C	9800		mg/kg	10
004	P-1	Solid	Lead	6010C	4.6		mg/kg	10
004	P-1	Solid	Magnesium	6010C	840		mg/kg	10
004	P-1	Solid	Manganese	6010C	44		mg/kg	10
004	P-1	Solid	Mercury	7471B	0.25		mg/kg	10
004	P-1	Solid	Nickel	6010C	20		mg/kg	10
004	P-1	Solid	Potassium	6010C	750		mg/kg	10
004	P-1	Solid	Selenium	6010C	9.4		mg/kg	10
004	P-1	Solid	Sodium	6010C	300		mg/kg	10
004	P-1	Solid	Vanadium	6010C	72		mg/kg	10
004	P-1	Solid	Zinc	6010C	22		mg/kg	10
005	P-2	Solid	Aluminum	6010C	8200		mg/kg	11
005	P-2	Solid	Antimony	6010C	1.3		mg/kg	11
005	P-2	Solid	Arsenic	6010C	110		mg/kg	11
005	P-2	Solid	Barium	6010C	190		mg/kg	11
005	P-2	Solid	Beryllium	6010C	2.2		mg/kg	11
005	P-2	Solid	Cadmium	6010C	0.22		mg/kg	11

Executive Summary (Continued)

Lot Number: KB11042

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
005	P-2	Solid	Calcium	6010C	6400		mg/kg	11
005	P-2	Solid	Chromium	6010C	45		mg/kg	11
005	P-2	Solid	Cobalt	6010C	7.3		mg/kg	11
005	P-2	Solid	Copper	6010C	23		mg/kg	11
005	P-2	Solid	Iron	6010C	11000		mg/kg	11
005	P-2	Solid	Lead	6010C	4.8		mg/kg	11
005	P-2	Solid	Magnesium	6010C	890		mg/kg	11
005	P-2	Solid	Manganese	6010C	45		mg/kg	11
005	P-2	Solid	Mercury	7471B	0.21		mg/kg	11
005	P-2	Solid	Nickel	6010C	22		mg/kg	11
005	P-2	Solid	Potassium	6010C	810		mg/kg	11
005	P-2	Solid	Selenium	6010C	8.5		mg/kg	11
005	P-2	Solid	Sodium	6010C	330		mg/kg	11
005	P-2	Solid	Vanadium	6010C	76		mg/kg	11
005	P-2	Solid	Zinc	6010C	23		mg/kg	11
006	P-3	Solid	Aluminum	6010C	7800		mg/kg	12
006	P-3	Solid	Antimony	6010C	1.5		mg/kg	12
006	P-3	Solid	Arsenic	6010C	110		mg/kg	12
006	P-3	Solid	Barium	6010C	180		mg/kg	12
006	P-3	Solid	Beryllium	6010C	2.1		mg/kg	12
006	P-3	Solid	Cadmium	6010C	0.22		mg/kg	12
006	P-3	Solid	Calcium	6010C	6200		mg/kg	12
006	P-3	Solid	Chromium	6010C	45		mg/kg	12
006	P-3	Solid	Cobalt	6010C	7.0		mg/kg	12
006	P-3	Solid	Copper	6010C	22		mg/kg	12
006	P-3	Solid	Iron	6010C	10000		mg/kg	12
006	P-3	Solid	Lead	6010C	4.7		mg/kg	12
006	P-3	Solid	Magnesium	6010C	860		mg/kg	12
006	P-3	Solid	Manganese	6010C	43		mg/kg	12
006	P-3	Solid	Mercury	7471B	0.24		mg/kg	12
006	P-3	Solid	Nickel	6010C	21		mg/kg	12
006	P-3	Solid	Potassium	6010C	770		mg/kg	12
006	P-3	Solid	Selenium	6010C	8.8		mg/kg	12
006	P-3	Solid	Sodium	6010C	310		mg/kg	12
006	P-3	Solid	Vanadium	6010C	76		mg/kg	12
006	P-3	Solid	Zinc	6010C	22		mg/kg	12

(129 detections)

MINNESOTA VALLEY TESTING LABORATORIES, INC.

1126 N. Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
1411 S. 12th St. ~ Bismarck, ND 58502 ~ 800-279-6885 ~ Fax 701-258-9724
51 L Avenue ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
www.mvtl.com

MEMBER ACIL

Brooke Montgomery
Shealy Environmental
106 Vantage Point Drive
West Columbia SC 29172

Report Date: Feb 13 2009
Work Order #: 81-163
PO #: KB11042
Date Received: 2/12/09

LAB NUMBER	SAMPLE DESCRIPTION	RESULTS - AS RECEIVED
09-M341	RF-1	
	Total Sulfur	0.07 wt. %
		Analyzed on 02/13/09
09-M342	RF-2	
	Total Sulfur	0.27 wt. %
		Analyzed on 02/13/09
09-M343	RF-3	
	Total Sulfur	0.28 wt. %
		Analyzed on 02/13/09
09-M344	P-1	
	Total Sulfur	0.03 wt. %
		Analyzed on 02/13/09
09-M345	P-2	
	Total Sulfur	0.06 wt. %
		Analyzed on 02/13/09
09-M346	P-3	
	Total Sulfur	0.01 wt. %
		Analyzed on 02/13/09

Approved by: D. Zander

Select Responses to
PPRP Data Request No. 2

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Coal Combustion By-Products

2-5 Please provide annual fly ash production quantities for the last five years from both Morgantown and Chalk Point.

RESPONSE TO DR NO. 2-5:

Mirant Morgantown and Chalk Point Fly Ash Generation
Years 2006 to 2010 YTD (tons/year)

Station	Year				
	2006	2007	2008	2009	2010 YTD
Morgantown	178,317	170,243	166,091	166,913	65,096
Chalk Point	118,372	124,333	117,533	112,256	42,208
Total	296,689	294,576	283,624	279,169	107,304

2-7 During the November 5, 2009 pre-application meeting, Mirant's presentation showed that the total amount of fly ash produced by Chalk Point and Morgantown ranges from 290,000 to 370,000 TPY. In addition, there are several references in the CPCN Application that refer to "offsite sources".

a) Does Mirant expect to import and process fly ash from any source other than Morgantown or Chalk Point? If so, please describe all known potential sources.

RESPONSE TO DR NO. 2-7 (a):

Mirant expects to import and process fly ash from the Dickerson Generating Station from time to time. In addition, Mirant seeks authorization to process fly ash from third parties that derives from facilities fired with eastern bituminous coal which has characteristics similar to the fly ash from Morgantown, Chalk and Dickerson.

2-7 During the November 5, 2009 pre-application meeting, Mirant's presentation showed that the total amount of fly ash produced by Chalk Point and Morgantown ranges from 290,000 to 370,000 TPY. In addition, there are several references in the CPCN Application that refer to "offsite sources".

b) Are off-site sources of fly ash from states other than Maryland being contemplated for feedstock? If so, please identify the states and potential off-site sources within them.

RESPONSE TO DR NO. 2-7 (b):

See response to DR No. 2-7(a).

2-7 During the November 5, 2009 pre-application meeting, Mirant's presentation showed that the total amount of fly ash produced by Chalk Point and Morgantown ranges from 290,000 to 370,000 TPY. In addition, there are several references in the CPCN Application that refer to "offsite sources".

c) Will Mirant need to reduce the amount of fly ash processed from Morgantown and/or Chalk Point to accommodate other offsite sources of fly ash in the future? If so, please provide details on the proposed treatment practices of fly ash from Morgantown and/or Chalk Point that is not processed in the STAR facility.

RESPONSE TO DR NO. 2-7 (c):

No.

2-7 During the November 5, 2009 pre-application meeting, Mirant's presentation showed that the total amount of fly ash produced by Chalk Point and Morgantown ranges from 290,000 to 370,000 TPY. In addition, there are several references in the CPCN Application that refer to "offsite sources".

d) Has any of the fly ash from any of the potential off-site sources been tested as a characteristic hazardous waste and failed?

<u>RESPONSE TO DR NO. 2-7 (d)</u>:

See response to DR NO. 2-7(a). Mirant has tested the Dickerson ash for characteristic hazardous waste and the ash was not hazardous.

Biology

2-13 Projects that require grading or sediment control permits for a minimum of 40,000 square feet may also require forest conservation planning under the Maryland Forest Conservation Act. Please provide information/documentation as to whether forest conservation planning has been considered for the Morgantown Site.

RESPONSE TO DR NO. 2-13:

Because the PSC gives due consideration to "need to minimize the loss of forest and the provisions for afforestation and reforestation set forth in the Forest Conversation Act together with all applicable electrical safety codes," when reviewing applications for a CPCN, the project is exempt from the requirements of the Forest Conservation Act. See Nat. Res. Art. §§5-1602(b)(5); 5-1603(f). Moreover, there are no forestry impacts from the project.

Select Responses to
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3-9 The CPCN Application does not discuss compliance with any National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations associated with the project. Owners and operators of industrial, commercial, or institutional boiler or process heater as defined in §63.7575 that is located at, or is part of, a major source of HAP as defined in §63.2 or §63.761 (40 CFR part 63, subpart HH, National Emission Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities), except as specified in §63.7491, are subject to the requirements of 40 CFR Part 63 Subpart DDDDD (National Emission Standards For Hazardous Air Pollutants For Industrial, Commercial, And Institutional Boilers And Process Heaters). Definitions provided within this section include:

> *Boiler* means an enclosed device using controlled flame combustion and having the primary purpose of recovering thermal energy in the form of steam or hot water. Waste heat boilers are excluded from this definition..
>
> *Process heater* means an enclosed device using controlled flame, that is not a boiler, and the unit's primary purpose is to transfer heat indirectly to a process material (liquid, gas, or solid) or to a heat transfer material for use in a process unit, instead of generating steam. Process heaters are devices in which the combustion gases do not directly come into contact with process materials. Process heaters do not include units used for comfort heat or space heat, food preparation for on-site consumption, or autoclaves.

The information in the initial CPCN application does not provide sufficient data on the STAR process to assess applicability with this regulation. Please explain the reasons why NESHAP 40 CFR Part 63 Subpart DDDDD is or is not applicable to the STAR Unit. Within the explanation, with respect to the definitions above:

a) Please confirm the STAR unit will not recover thermal energy in the form of steam or hot water.

RESPONSE TO DR 3-9 (a):

The SEFA STAR unit will not be subject to NESHAP rules under 40 CFR Part 63 Subpart DDDDD. It is not a boiler, because it will not recover thermal energy in the form of steam or hot water. It is also not a process heater, because it does not transfer heat indirectly to a process material and combustion gases do come directly into contact with process materials.

3-9 The CPCN Application does not discuss compliance with any National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations associated with the project. Owners and operators of industrial, commercial, or institutional boiler or process heater as defined in §63.7575 that is located at, or is part of, a major source of HAP as defined in §63.2 or §63.761 (40 CFR part 63, subpart HH, National Emission Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities), except as specified in §63.7491, are subject to the requirements of 40 CFR Part 63 Subpart DDDDD (National Emission Standards For Hazardous Air Pollutants For Industrial, Commercial, And Institutional Boilers And Process Heaters). Definitions provided within this section include:

> *Boiler* means an enclosed device using controlled flame combustion and having the primary purpose of recovering thermal energy in the form of steam or hot water. Waste heat boilers are excluded from this definition..
>
> *Process heater* means an enclosed device using controlled flame, that is not a boiler, and the unit's primary purpose is to transfer heat indirectly to a process material (liquid, gas, or solid) or to a heat transfer material for use in a process unit, instead of generating steam. Process heaters are devices in which the combustion gases do not directly come into contact with process materials. Process heaters do not include units used for comfort heat or space heat, food preparation for on-site consumption, or autoclaves.

The information in the initial CPCN application does not provide sufficient data on the STAR process to assess applicability with this regulation. Please explain the reasons why NESHAP 40 CFR Part 63 Subpart DDDDD is or is not applicable to the STAR Unit. Within the explanation, with respect to the definitions above:

b) Please confirm that combustion gases directly come into contact with process materials.

RESPONSE TO DR 3-9 (b):

Yes.

3-10 According to Mirant's response to Data Request Question 1-1 (g) dated 27 May 2010, the equivalent carbon dioxide (CO_2e) emissions for the project are 28,569 tons per year. Please respond to the following follow-up questions from this determination.

a) Per 40 CFR 98.33, Equation C-3 for calculating CO_2 emissions from solid fuels is stated as:

$$CO_2 = 44/12 * Fuel * CC * 0.91$$

The calculation provided in Mirant's response does not include the 44/12 molecular weight ratio of CO_2 to Carbon. Please explain why the molecular weight ratio was not included and update the emissions calculations accordingly.

RESPONSE TO DR 3-10(a):

The conversion for molecular weight ratio of CO_2 to Carbon was inadvertently omitted. The corrected calculation is as follows:

CO_2 equivalents (CO_2e) are provided based on the protocols outlined for General Stationary Fuel Combustion Sources under the Mandatory Reporting of Greenhouse Gases, Final Rule, 40 CFR Part 98. CO_2e for the STAR process will include CO_2 direct emissions from ash processing, and CO_2 direct and CH_4 and N_2O equivalent from propane firing. Per 40 CFR 98.33, CO_2e of CH_4 and N_2O mass emissions are only required for units firing fuels listed in Table C-2. Therefore CO_2e includes only CH_4 and N_2O as a result of propane firing.

Ash Processing

$$CO2 = 44/12 * Fuel * CC * 0.91 \text{ (Eq. C-3)}$$

CO2 = 44/12 * (400,000 tons ash) * (0.0773) * 0.91 = 103,169 metric tons per year CO2

Where:
Fuel = Annual mass of the solid fuel combusted, from company records as defined in § 98.6 (short tons).
CC = Annual average carbon content of the solid fuel (percent by weight, expressed as a decimal fraction, e.g., 95% = 0.95).

Propane Combustion

Based on an estimated 16 cold starts per year with 3,000 gallons of propane per cold startup and estimated 30 warm starts per year with 1,500 gallons of propane per warm startup. The total annual propane consumption is estimated at 93,000 gallons.

$$CO2, CH4 \text{ or } N2O = 1 \times 10^{-3} * fuel * HHV * EF \text{ (Eq. C-8)}$$

$CO2 = 1 \times 10^{-3}$ * 93,000 gallons * 0.091 MMBtu/gal * 61.46 kg CO2/MMBtu = 520 metric tons per year CO2

$CH4 = 1 \times 10^{-3}$ * 93,000 gallons * 0.091 MMBtu/gal * 3.0×10^{-3} kg CH4/MMBtu = 0.025 metric tons per year CH4

$N2O = 1 \times 10^{-3}$ * 93,000 gallons * 0.091 MMBtu/gal * 6.0×10^{-4} kg N2O/MMBtu = 0.005 metric tons per year N2O

Total CO_2e

$$CO2e = CO2_{ash} + CO2_{Propane} + 21(CH4) + 310(N2O)$$

CO2e = 103,169 + 520 +21(0.025) +310(0.005) = 103,691 metric tons per year.

The CO2e emissions of 103,691 metric tons replace the CO2 emissions presented in Table 10.2-20 of the CPCN EA. The CO2 emissions presented in Table 10.2-20 for the Project equal 80,000 tons and were based on an assumption of emissions equal to 1/3 that generated from equivalent Portland cement production, where the Portland cement CO2 emissions are based on EPA AP-42 emission factors.

3-10 According to Mirant's response to Data Request Question 1-1 (g) dated 27 May 2010, the equivalent carbon dioxide (CO_2e) emissions for the project are 28,569 tons per year. Please respond to the following follow-up questions from this determination.

b) Mirant provides 0.773 as the percent weight of the annual average carbon content of the solid fuel. Please explain the basis and provide relevant data to support the carbon content value.

RESPONSE TO DR 3-10(b):

Per the current Ash Utilization model, it is projected that Morgantown will produce 170,000 tons of ash as 6.0% LOI, and Chalk will produce 130,000 tons at 10.0% LOI. This mathematical average is 7.73% feed LOI.

3-10 According to Mirant's response to Data Request Question 1-1 (g) dated 27 May 2010, the equivalent carbon dioxide (CO_2e) emissions for the project are 28,569 tons per year. Please respond to the following follow-up questions from this determination.

c) According to Mirant: "The total annual propane consumption is estimated at 93,000 gallons." This value is based on an "estimated" 16 cold starts and an "estimated" 30 warm starts per year. Please confirm the combined 46 propane starts per year is an estimated maximum number of propane starts per year. If the "estimated" starts per year were average values, please provide estimated maximum propane warm and cold stars per year.

RESPONSE TO DR 3-10(c):

Yes, they are the estimated maximum number of propane starts per year. This is a conservative estimate reflecting the higher number of startups during the initial startup and market buildup in 2012 and 2013.

3-10 According to Mirant's response to Data Request Question 1-1 (g) dated 27 May 2010, the equivalent carbon dioxide (CO_2e) emissions for the project are 28,569 tons per year. Please respond to the following follow-up questions from this determination.

d) According to the Prevention of Significant Deterioration and Title V Greenhouse Gas (GHG) Tailoring Rule (40 CFR Parts 51, 52, 70 and 71) finalized by EPA on 13 May 2010: if a permit is not received by January 2, 2011 and if the revised CO_2e emissions are greater than 75,000 tons per year, the project will be subject to PSD review and Title V Permit requirements for GHG. These requirements will include any GHG applicable requirements (e.g., GHG BACT requirements from a PSD process) and associated monitoring, record-keeping and reporting. Please explain the reasons why the GHG Tailoring Rule is or is not applicable to the STAR Unit, specifically with respect to question 3-8 a) which indicates the project would be subject to this rule. If that is the case, please also provide an analysis of how the STAR project would comply with the requirements of the GHG Tailoring Rule.

RESPONSE TO DR 3-10(d):

Rule does not apply to modifications resulting in greater than 75,000 tpy CO_2e, but less than the PSD thresholds for traditional NSR pollutants until July 1, 2011. 75 Fed. Reg. 31514, 31523 (June 3, 2010). A permit is expected to be issued well before the July 1, 2011 effective date.

The Tailoring Rule provides that for sources permitted between January 2, 2011 and June 30, 2011 (Step 1), only sources currently subject to the PSD permitting program for pollutants other than GHGs would be subject to additional permitting requirements for their GHG emissions under PSD. Id. Thus, where a new or modified source exceeds significant emissions thresholds for a traditional PSD pollutant and *also* increases GHGs by 75,000 tpy CO_2e, it will be required to install Best Available Control Technology (BACT) to reduce GHG emissions. Id. Under Step 2 (July 1, 2011 to June 30, 2013), modifications of existing facilities increasing GHG emissions by 75,000 tpy CO_2e will be subject to PSD permitting requirements, regardless of whether they significantly increase emissions of any other pollutant. Id.

Because the SEFA STAR facility will not exceed significant emissions thresholds for traditional pollutants, it is a minor modification and will not be subject to PSD permitting requirements for GHGs at the time of approval.

3-14 In response to Data Request Question 1-1 (g) dated 27 May 2010, quantified construction emissions were provided via Tables 10.2-22 through 10.2-31. Please respond to the following follow-up questions from this evaluation.

a) The footnote on Table 10.2-28 is not complete. Please update the footnote of Table 10.2-28 to include the full reference for the emission factors.

RESPONSE TO DR 3-14(a):

A revised Table 10.2-28 with the complete footnote is attached hereto.

TABLE 10.2-28

PERFORMANCE AND EMISSION DATA FOR THE WELDING MACHINE

Parameter		Welding Machine
Performance		
Model		400A
Fuel Type		Gasoline
hp		**20**
No. of Units		1
Fuel Use (Gal/hr)*		1.8
Gal/yr		1,872
Hr/day		8
Days/week		5
Weeks/yr		26
Hrs/yr		1,040
Emissions		
NMHC+NOx - Basis (g/hp-hr)		8.4
Emission rate	(lb/hr)	0.37
	(tpy)	0.19
SO_2 - Basis (g/hp-hr)		
% S*		0.008
Emission rate	(lb/hr)	0.03
	(tpy)	0.01
CO - Basis (g/hp-hr)		455
Emission rate	(lb/hr)	20.04
	(tpy)	10.42
PM/PM10 - Basis (g/hp-hr)		NA
Emission rate	(lb/hr)	NA
	(tpy)	NA

Notes:

*SO2 emissions based on 80 ppm Gasoline and 100% conversion to SO2.

Gasoline NOx and CO emission factors from EPA Emission Standards Reference Guide for Heavy Duty and Nonroad Engines, SI engine < 25 Hp Revision: 7/12/10.

3-14 In response to Data Request Question 1-1 (g) dated 27 May 2010, quantified construction emissions were provided via Tables 10.2-22 through 10.2-31. Please respond to the following follow-up questions from this evaluation.

b) Table 10.2-31 states the estimated average vehicle weight for PM is equal to 22 tons. For PM_{10} and $PM_{2.5}$, the average weight is noted as 32.5 tons, 12.5 tons empty. Please provide the correct average truck weight and update the emissions, if necessary.

RESPONSE TO DR 3-14(b):

The AP-42 emissions factor was applied to the total trip length, including when the trucks are loaded and empty, 32.5 tons and 12.5 tons, respectively. To account for the total truck trip appropriately an average vehicle weight of 22 tons was utilized for PM, PM10, and PM2.5 emission calculations. An updated table with the correct descriptions is attached hereto.

TABLE 10.2-31

Estimation of PM Emission Factors and Rates from Unpaved Roads For Construction Equipment

Parameters		
Scenario		
PM(TSP)	Data	Units/Comments
E=k x $(sl/12)^a$ x $(w/3)^b$; where a = 0.7 and b= 0.45, k = 4.9 for TSP	9.435	round trip lb/VMT
sl = 8.5 AP-42 13.2.2.2	720	round trip miles per year
w estimated = 22 tons average vehicle weight		
	6,793	lb/year
	3.40	tons/year uncontrolled without rainfall
Accounting for rainfall using ((365-P)/365), where P = days	2.34	tons/year controlled with rainfall
ter sprays (Based on 42% to 75% from EPA, 1992)	60	Emission control removal efficiency, %
	0.93	tons/year controlled with water sprays
PM_{10}		
E=k x $(sl/2)^a$ x $(w/3)^b$; where a = 0.9 and b= 0.45, k = 1.5 for PM_{10}	2.696	round trip lb/VMT
sl = 8.5 AP-42 13.2.2.2	720	round trip miles per year
w estimated = 22 tons average vehicle weight		
	1,941	lb/year
	0.97	tons/year uncontrolled without rainfall
Accounting for rainfall using ((365-P)/365), where P = days	0.67	tons/year controlled with rainfall
ter sprays (Based on 42% to 75% from EPA, 1992)	60	Emission control removal efficiency, %
	0.27	tons/year controlled with water sprays
$PM_{2.5}$		
E=k x $(sl/2)^a$ x $(w/3)^b$; where a = 0.9 and b= 0.45, k = 0.15 for $PM_{2.5}$	0.270	round trip lb/VMT (average empty/full truck)
sl = 8.5 AP-42 13.2.2.2	720	round trip miles per truck (estimated)
w estimated = 22 tons average vehicle weight		
	194	lb/year
	0.01	tons/year uncontrolled without rainfall
Accounting for rainfall using ((365-P)/365), where P = days	0.01	tons/year controlled with rainfall
ter sprays (Based on 42% to 75% from EPA, 1992)	60	Emission control removal efficiency, %
	0.0027	tons/year controlled with water sprays

Source: USEPA, 2003; AP-42, Section 13.2.2.2 for Unpaved Roads. Golder 2010

Revision: 7/12/10

3-14 In response to Data Request Question 1-1 (g) dated 27 May 2010, quantified construction emissions were provided via Tables 10.2-22 through 10.2-31. Please respond to the following follow-up questions from this evaluation.

c) Table 10.2-31 notes that trucks will travel 720 round trip miles per year. It is not clear how the value of 720 round trip miles per year was determined. Please provide the approximate miles traveled per truck, trucks per day, and days per year to determine this value.

<u>RESPONSE TO DR 3-14(c)</u>:

The following table provides the basis for the 720 round trip miles per year:

	hours per year	Miles Trip Length	No. Trips/day	days/yr	Miles/y
Wheel Loader	480	0.25	72	20.0	360
Dump Truck	480	0.25	72	20.0	360
Total					720

3-14 In response to Data Request Question 1-1 (g) dated 27 May 2010, quantified construction emissions were provided via Tables 10.2-22 through 10.2-31. Please respond to the following follow-up questions from this evaluation.

d) The source of data provided in the footnote of Table 10.2-31 was listed as AP-42 Section 13.2.2 for Unpaved Roads. From Table 10.2-31, PM emissions with rainfall were calculated using:

$$E = 1-1.2P/8760, \text{ where } P = \text{hours}$$

From AP-42 Section 13.2.2, the appropriate equation to account for long-term rainfall effects is stated as:

$$E_{ext} = E \times [(365-P)/365], \text{ where } P = \text{days of precipitation.}$$

Please verify the correct particulate matter emissions from unpaved road construction equipment when accounting for rainfall and revise Table 10.2-31 as necessary.

<u>RESPONSE TO DR 3-14 (d)</u>:

Table 10.2-31 has been updated to be based on equation:

$$\mathbf{E_{ext} = E \times [(365-P)/365], \text{ where } P = \text{days of precipitation.}}$$

Updated Table 10.2-31 is provided herein.

Water

3-15 On page 5-1 of the CPCN Application, water usage for the STAR facility is described. Please provide the most recent water usage data available for the Morgantown facility in daily average gallons both on a yearly basis and for the month of maximum use for the following:

a) Surface water used as cooling water and process water.

RESPONSE TO DR 3-15(a):

Mirant does not report water withdraw on a daily basis. Mirant only reports water withdrawn monthly. Please see the table below listing the monthly maximum and annual water withdraw for listed activities in 3-15 a, b and c. Please note, the RO system only began operation in November of 2009.

Summary of Morgantown Generating Station's Water Withdraw for 6/2009 to 6/2010

Permit Number	Max. Monthly Withdraw (gallons)	Annual Withdraw (gallons)
CH1967S111(02) (RO system)	90,593,043	403,918,664
CH1967G011(10) (Well Water)	21,708,200	204,615,842
CH1956S003(09) (Cooling Water)	41,939,000,000	386,712,252,636

3-15 On page 5-1 of the CPCN Application, water usage for the STAR facility is described. Please provide the most recent water usage data available for the Morgantown facility in daily average gallons both on a yearly basis and for the month of maximum use for the following:

b) Surface water used to supply the existing flue gas desulfurization system

<u>RESPONSE TO DR 3-15(b)</u>:

See Response to DR 3-15(a).

3-15 On page 5-1 of the CPCN Application, water usage for the STAR facility is described. Please provide the most recent water usage data available for the Morgantown facility in daily average gallons both on a yearly basis and for the month of maximum use for the following:

c) All sources of water used for potable supply and sanitary facilities.

RESPONSE TO DR 3-15(c):

See Response to DR3-15(a).

3-16 Section 4.3 of the CPCN Application indicates that no dewatering is expected for excavations associated with the construction of project foundations.

a) Will there be excavations that reach or exceed a depth of 10 feet during construction activities associated with the proposed project? If so, please provide the location and depth of all such excavations.

RESPONSE TO DR 3-16 (a):

No. Rock column piers will be used which do not require deep excavations.

3-16 Section 4.3 of the CPCN Application indicates that no dewatering is expected for excavations associated with the construction of project foundations.

b) Has Mirant prepared estimates of the amount of dewatering that may be needed during the construction phase of the proposed STAR facility and all associated project components?

RESPONSE TO DR 3-16 (b):

None needed.

3-17 Section 5.3 of the CPCN Application describes the water requirements for the proposed project. It is stated in this section that 24 gpm of process water will be used for "NO_x Process/Control Quench". Please provide more details on this proposed use of process water.

RESPONSE TO DR 3-17:

The process water has dual purposes, the STAR thermal reaction has a maximum temperature which must be controlled to limit temperatures and to avoid slag formation and also limit NOX formations. Thus water is used to quench the gas and reduce the NOX formation. The location of water spray injection is varied to obtain both objectives. The 24 gpm is a maximum flow amount.

Coal Combustion By-Product Management

3-18 Page 1-1 of the CPCN Application states that the STAR process "converts high-carbon fly ash that is otherwise unsuitable for commercial use into low-carbon mineral matter material suitable for commercial use." Please provide the current, typical loss-on-ignition (LOI) concentrations of fly ash produced at the Morgantown, Chalk Point, and Dickerson generating stations. Also, please provide the expected LOI concentration of fly ash that has been processed in the STAR facility and indicate the LOI concentration necessary for commercial use.

RESPONSE TO DR 3-18:

The typical LOI for Morgantown is 6%; Chalk Point is 10%; and Dickerson is 15%. The STAR processed been tested using Morgantown ash with an LOI of 6%. The LOI level for fly ash that is suitable greatest commercial use is less than 3%.

3-19 Page 1-3 of the CPCN Application lists the main components of the proposed project, which include unprocessed ash and product ash storage facilities. Please provide the storage capacity, dimensions (height and diameter), and construction materials for the proposed reactor fly ash feed silo(s) and the product silo(s) and storage dome(s).

RESPONSE TO DR 3-19:

The storage dome has a 30,000 ton capacity is round and has a diameter of 120 feet from grade up to 81 feet before the dome top starts and reaches to a height of 127 feet. The raw feed silo has a 1500 ton capacity is 42ft in diameter and 45 feet tall . The processed flyash silo has a 1500 ton capacity and is 39 feet in diameter and 61 feet tall.

3-20 Page 1-1 of the CPCN Application indicates that a benefit of the STAR facility is the avoidance of landfilling 400,000 tons per year of fly ash, which is the combined projected fly ash production from the Morgantown and Chalk Point generating stations.

a) Please confirm that Mirant intends to process all ash produced by the Morgantown and Chalk Point generating stations once the proposed project is operable.

RESPONSE TO DR 3-20(a):

The fly ash production at Morgantown and Chalk Point generating stations is projected to be in the range of 300,000 to 350,000 tons per year. The 400,000 ton figure sited in the CPCN reflect the combination of the maximum production of the STAR facility, the theoretical maximum output levels of the two generating facilities and possibility of using Dickerson fly ash to supplement ash sales. As our models predict Morgantown and Chalk Point are projected to generate less than 350,000 tons per year of fly ash (which is consistent with historical volumes) and supplemental ash sales from Dickerson are discretionary, 300,000 to 350,000 tons per year of fly ash processing is appropriate for modeling and analysis purposes.

3-20 Page 1-1 of the CPCN Application indicates that a benefit of the STAR facility is the avoidance of landfilling 400,000 tons per year of fly ash, which is the combined projected fly ash production from the Morgantown and Chalk Point generating stations.

b) Please provide Mirant's plan for the disposition of: i) off-spec fly ash from the STAR facility that cannot be processed; ii) unprocessed fly ash from the Morgantown and Chalk Point generating stations in the event of a disruption in the STAR facility's operation; and iii) processed fly ash that cannot be sold for beneficial reuse.

RESPONSE TO 3-20(b):

The STAR facility is not expected to produce any off-spec ash so there will be no need to dispose of off-spec ash. Ash that is not processed and sold will be land filled in either Mirant owned facilities or third-party facilities.

3-20 Page 1-1 of the CPCN Application indicates that a benefit of the STAR facility is the avoidance of landfilling 400,000 tons per year of fly ash, which is the combined projected fly ash production from the Morgantown and Chalk Point generating stations.

c) For each of the materials listed in question 3-18 b), please provide an estimate of the amount of material on an annual basis that would need to be disposed.

RESPONSE TO DR 3-20 (c):

The STAR facility is not expected to produce any off-spec. ash. At this time Mirant cannot provide an estimated split between unprocessed and processed ash. Mirant hopes in time to process 100% of the Morgantown and Chalk Point ash.

3-20 Page 1-1 of the CPCN Application indicates that a benefit of the STAR facility is the avoidance of landfilling 400,000 tons per year of fly ash, which is the combined projected fly ash production from the Morgantown and Chalk Point generating stations.

d) Please confirm that Mirant is continuing to dispose of fly ash produced at the Morgantown Generating Station at the Falkner facility, and the fly ash generated at the Chalk Point Generating Station at the Brandywine facility, and will continue to do so until the STAR facility is operational.

RESPONSE TO 3-20(d):

Mirant plans to place Morgantown's fly ash at Brandywine upon the closure of the Faulkner facility and plans to continue to dispose Chalk Point's fly ash at the Brandywine facility. Once the STAR facility is operational, any unprocessed ash is expected to be placed at the Brandywine facility or other facilities available and permitted for receipt of ash disposal.

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Select Responses to
PPRP Data Request No. 4

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4-2 Table 10.2A-1 of the CPCN Application Supplement, filed on 21 July 2010, shows an annual average heat input of 100 MMBtu/hr for the project and a maximum throughput of 360,000 tons of fly ash per year. To confirm consistency between these values, please provide the average and maximum heating values of the ash to be processed in the STAR facility (in BTU/ lb ash). Please provide documentation to support the basis for these values.

RESPONSE TO DR NO. 4-2:

The CPCN Application Supplement, filed on 21 July 2010, assumed the same annual average heat input of 100 MMBtu/hr as the original project configuration in order to project emissions conservatively. The 100 MMBtu/hr heat input is associated with fly ash processing of 400,000 TPY and is calculated as follows:

Source		TPY	TPH	LOI
Morgantown		240,000	27.40	6.00%
Off-Site		160,000	18.26	10.00%
Total Feed		400,000	45.66	7.60%
Heat Input (MM Btu/hr)	Annual Average	100.6		

Where :

Heat Input (MMBtu/hr) = TPH x 2,000 lb/Ton x LOI x Carbon Heat Content / 1,000,000

TPH = 45.66
Loss on Ignition (LOI) = 7.6% = amount unburned carbon in fly ash.
Carbon Heat Content = 14,500 Btu/lb = upper range of heat content of bituminous coal

Please note that the Application Supplement did not assume a "maximum throughput of 360,000 tons." Rather, it provided illustrative computations that assumed a throughput of 360,000 tons. As the Application Supplement explains, compliance will be maintained utilizing a continuous emission monitor that assures that emissions do not exceed maximum annual amounts, rolling monthly. With the reduction of processing rate from 400,000 TPY to 360,000 TPY the associated annual average heat input is reduced from 100 MMBtu/hr to 87 MMbtu/hr as follows:

Source		TPY	TPH	LOI
Morgantown		240,000	27.40	6.00%
Off-Site		120,000	13.70	10.00%
Total Feed		360,000	41.10	7.33%
Heat Input (MM Btu/hr)	Annual Average	87.4		

While the annual average heat input is reduced based on the reduction of annual fly ash processing, an annual average heat input of 100 MMBtu/hr is proposed to provide operational flexibly, based on the variations of LOI and heat content , while maintaining regulatory compliance.

The estimated range of heating value of ash to be processed in the STAR facility (in BTU/ lb ash) is from 870 Btu/lb to 1,450 Btu/lb. Typical ash analysis from Morgantown maybe found in Appendix C, Analytical Report 5, Raw Feed and Product Samples (C-618 analysis) of February 2009 TRC Emission Test Report.

4-3 Page 9 of Mirant's CPCN Application Supplement, filed on 21 July 2010, states that: "Mirant will install and operate NO_X and SO_2 Continuous Emission Monitors (CEMs) on the STAR exhaust stack." However, the supplemental application does not indicate how CEMs will be used to demonstrate compliance with emissions or operational limitations for the project. Please describe in detail how the CEMs will be used to demonstrate compliance with the proposed operational and emissions limits. Details shall include, but not be limited to, data recorded, frequency of records, how emissions are tracked, and quality controls.

RESPONSE TO DR NO. 4-3:

Mirant proposes to install NOx, SO2, CO and O2 or CO2 CEMs that meet the accuracy and quality assurance requirements in 40 CFR 60 App. B, Performance Specifications 2, 3 and 4A. Mirant will use the algorithms for the calculation of mass NOx, SOx, CO and Heat Input presented in 40 CFR 75 App. F to determine lb/hour mass emissions for NOx, SO2, and CO. This data will be recorded hourly and will be summarized monthly to produce 12 month rolling by month averages. The emission data will be provided to MDE quarterly as part of Mirant's ongoing reporting requirements for the Morgantown Station.

4-8 As noted in Table 10.2A-6, the VOC emission factor is 0.0165 lb/MMBtu per vendor guarantee. No vendor guarantee was provided for VOCs in the application. Please provide a basis for the guarantee.

RESPONSE TO DR NO. 4-8:

VOC emissions were provided by the vendor and based on an emission factor equal to 10% of the CO emission factor. This ratio of CO to VOC emissions is consistent with AP-42 factors for coal fired units and therefore a reasonable assumption for the STAR process.

Socioeconomics

4-10 It is noted by the Portland Cement Association (http://www.cement.org/econ/industry.asp) that there is seasonal variation in the demand for concrete (about 2/3 of total annual production is consumed between May and October) and that domestic manufacturers of Portland cement typically stockpile inventories during the winter, and ship product in the summer.

a) Does Mirant anticipate seasonal variations in the demand for processed or "product" ash?

RESPONSE TO DR 4-10(a):

Yes, demand for concrete is seasonal with winter demand lower than summer demand. This seasonality for concrete will result in lower demand for product in winter months.

4-10 It is noted by the Portland Cement Association (http://www.cement.org/econ/industry.asp) that there is seasonal variation in the demand for concrete (about 2/3 of total annual production is consumed between May and October) and that domestic manufacturers of Portland cement typically stockpile inventories during the winter, and ship product in the summer.

b) Does the proposed facility have the capacity to stockpile inventories of product ash during seasons of low demand?

RESPONSE TO DR 4-10(b):

Yes, as part of the STAR facility, a 30,000 ton enclosed product storage dome will be built. This dome was sized to take into account the seasonality of product ash sales and the anticipated seasonal production of ash from Morgantown and Chalk Point, which is highest during the summer months when construction/demand for concrete is also at its highest.

4-10 It is noted by the Portland Cement Association (http://www.cement.org/econ/industry.asp) that there is seasonal variation in the demand for concrete (about 2/3 of total annual production is consumed between May and October) and that domestic manufacturers of Portland cement typically stockpile inventories during the winter, and ship product in the summer.

c) If, at any time, the demand for product ash is less than supply and stockpiles at Morgantown exceed the capacity of the storage dome, how will Mirant disposition the ash?

RESPONSE TO DR NO. 4-10(c):

If at any point the storage dome is full, ash will not be processed, but instead will be stored in feed ash silos until the product storage dome has capacity. If no capacity exists in the feed ash silos and the product storage dome, then unprocessed ash would need to be disposed of in landfills.

4-12 In Mirant's response to PPRP Data Request 2, Question 2-8, received on 23 June 2010, it is projected that the STAR FGD system will produce 6,972 tons of gypsum per year. Will this projected gypsum production change as a result of the modification to the STAR FGD system described on page 1 of Mirant's CPCN application supplement, submitted on 20 July 2010? If so, please provide a r revised projection.

<u>RESPONSE TO DR 4-12:</u>

The projected gypsum production presented in the response to PPRP Data Request 2 Question 2-8 will change as a result of the upgraded STAR's FGD system. The STAR's upgraded FGD system is now projected to produce 7,265 tons of gypsum per year.

Select Responses to
PPRP Data Request No. 5

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Mirant Mid-Atlantic, LLC's Responses to
PPRP Data Request No. 5
Morgantown Ash Beneficiation Project
PSC Case No. 9229

Air Quality

5-1 Mirant's Response to PPRP Data Request No. 3, Question 3-5 noted that EPA had identified coal combustion by-products (e.g., fly ash) as "non-hazardous ingredients." Furthermore, Mirant demonstrated knowledge of the legitimacy criteria that the ingredient material must be satisfied to classify the material to determine that the ingredient is not a waste. For clarity, please provide individual responses to the following legitimacy criteria questions. Please make sure responses to the questions consider the guidance for making these determinations located in the preamble to the proposed rule [75 Fed. Reg. 107, p. 31883 (June 4, 2010)].

a. Is the ingredient material managed as a valuable commodity?

RESPONSE TO DR NO. 5-1(a):

Yes. EPA proposed that a non-hazardous secondary material used as an ingredient will be considered to be managed as a valuable commodity based on the following factors:

> **(A) The storage of the non-hazardous secondary material prior to use must not exceed reasonable time frames;**
> **(B) Where there is an analogous ingredient, the non-hazardous secondary material must be managed in a manner consistent with the analogous ingredient or otherwise be adequately contained to prevent releases to the environment;**
> **(C) If there is no analogous ingredient, the non-hazardous secondary material must be adequately contained to prevent releases to the environment;**

75 Fed. Reg. 31844, 31893 (June 4, 2010) quoting proposed 40 CFR 241.3(d)(2)(i).

The non-hazardous secondary material (fly-ash) will be stored within a reasonable timeframe. Although, EPA chose not to define "reasonable timeframe" due to variations among materials and industries, the fly-ash will generally be stored for a very short timeframe, a few hours to a few months, as explained below. See 75 Fed. Reg. at 31880. After fly-ash from the generating facilities is produced, Mirant will either (a) process the fly-ash in the STAR facility and store it for a short period of time in a 30,000 ton enclosed storage dome for sale either immediately or at later date, or (b) in the event the storage dome is at full capacity, landfill the fly ash. The timing of the processed ash in the storage dome depends upon demand for the product, which tends to have seasonal variation. Whereas demand for cement and cement substitute

products is greatest during the spring and summer months, storage time could be as little as no time or a couple of hours. During the winter, storage time is not expected to exceed a few months.

Regardless of storage duration, the fly ash will be adequately contained to prevent releases to the environment. The fly ash will be stored in a 30,000 ton fully enclosed storage dome with a contained bottom. This one-hundred percent covered dome will ensure the fly ash remains dry and will not release into the environment. These procedures are equal to or more protective of storage measures within the cement industry for raw materials (e.g. limestone, gypsum).

Mirant Mid-Atlantic, LLC's Responses to
PPRP Data Request No. 5
Morgantown Ash Beneficiation Project
PSC Case No. 9229

5-1 Mirant's Response to PPRP Data Request No. 3, Question 3-5 noted that EPA had identified coal combustion by-products (e.g., fly ash) as "non-hazardous ingredients." Furthermore, Mirant demonstrated knowledge of the legitimacy criteria that the ingredient material must be satisfied to classify the material to determine that the ingredient is not a waste. For clarity, please provide individual responses to the following legitimacy criteria questions. Please make sure responses to the questions consider the guidance for making these determinations located in the preamble to the proposed rule [75 Fed. Reg. 107, p. 31883 (June 4, 2010)].

b. Does the ingredient material provide a useful contribution to the production or manufacturing process?

RESPONSE TO DR 5-1(b):

Yes. EPA's proposed rule states that

> **The non-hazardous secondary material used as an ingredient must provide a useful contribution to the production or manufacturing process. The secondary material provides a useful contribution if it contributes a valuable ingredient to the product or intermediate or is an effective substitute for a commercial product.**

75 Fed. Reg. 31844, 31893 (June 4, 2010) quoting proposed 40 CFR 241.3(d)(2)(ii).

The fly ash is an essential ingredient to both the production process and the finished product. The fly ash provides the fuel for the production process and the raw material for the finished product (i.e. cement substitute). Moreover, the fly ash is an effective substitute for cement in concrete.

5-1 Mirant's Response to PPRP Data Request No. 3, Question 3-5 noted that EPA had identified coal combustion by-products (e.g., fly ash) as "non-hazardous ingredients." Furthermore, Mirant demonstrated knowledge of the legitimacy criteria that the ingredient material must be satisfied to classify the material to determine that the ingredient is not a waste. For clarity, please provide individual responses to the following legitimacy criteria questions. Please make sure responses to the questions consider the guidance for making these determinations located in the preamble to the proposed rule [75 Fed. Reg. 107, p. 31883 (June 4, 2010)].

c. Is the ingredient material used to produce a valuable product or intermediate?

RESPONSE TO DR 5-1(c):

Yes, the fly ash will be converted into a substitute cement product, which will be sold to third parties, such as construction companies, builders, and other vendors. This is consistent with proposed EPA requirements stating that

> **(iii) The non-hazardous secondary material used as an ingredient must be used to produce a valuable product or intermediate. The product or intermediate is valuable if:**
> **(A) The material is sold to a third party, or**
> **(B) The material is used as an effective substitute for a commercial product or as an ingredient or intermediate in an industrial process.**

75 Fed. Reg. 31844, 31893 (June 4, 2010) quoting proposed 40 CFR 241.3(d)(2)(iii).

Mirant Mid-Atlantic, LLC's Responses to
PPRP Data Request No. 5
Morgantown Ash Beneficiation Project
PSC Case No. 9229

5-1 Mirant's Response to PPRP Data Request No. 3, Question 3-5 noted that EPA had identified coal combustion by-products (e.g., fly ash) as "non-hazardous ingredients." Furthermore, Mirant demonstrated knowledge of the legitimacy criteria that the ingredient material must be satisfied to classify the material to determine that the ingredient is not a waste. For clarity, please provide individual responses to the following legitimacy criteria questions. Please make sure responses to the questions consider the guidance for making these determinations located in the preamble to the proposed rule [75 Fed. Reg. 107, p. 31883 (June 4, 2010)].

d. Does use of the ingredient material result in products that contain contaminants at levels that are comparable or lower in concentration to those found in traditional products that are manufactured without the ingredient material?

RESPONSE TO DR 5-1(d):

Yes. Products, such as concrete, that are manufactured with the "ingredient material" (i.e., STAR fly ash) have virtually the same chemical composition as products that are manufactured with competitive ingredients currently available in the marketplace.

The vast majority of fly ash is comprised of oxides, such as silica, alumina, iron and other minor elements, such as MgO Na2O, K2O, CaO, SO3, etc. These are the same elements found in cement, although the compounds are different. When fly ash is used as a partial replacement for cement in concrete, it reacts with the hydration products from cement to form "pozzolanic" reaction products that are the same as those that are produced by cement hydration – primarily calcium silicates (C-S-H). Therefore, the reaction products that are formed from the fly ash pozzolanic reaction are virtually indistinguishable from the reaction products formed from cement. Also, trace elements found in fly ash and cement are very similar and any non-reactive trace elements that may be found in cement and fly ash are typically encapsulated by the "glue" produced by these cementious and pozzolanic reactions. See V. M. Malhotra and A.A. Ramezanianpour, Fly Ash in Concrete, 2nd Edition (1994): pp. 13-28.

Water

5-4 Mirant's response to PPRP Data Request No. 2, Question 2-4 included copies of State Water Appropriation Permits Numbered CH1986G015(08) and CH1986G015(07).

a. Please provide the most recent water usage data available for the Morgantown facility on both an annual basis and for the month of maximum usage in gallons for the above mentioned permits.

RESPONSE TO DR NO. 5-4(a):

The water withdrawal amounts for this permit are below the amounts required by MDE to be monitored and reported. Therefore this data is not available. Please note, the permit numbered CH1986G015(07) is no longer in effect. This permit has been superseded by the permit numbered CH1986G015(08).

5-4 Mirant's response to PPRP Data Request No. 2, Question 2-4 included copies of State Water Appropriation Permits Numbered CH1986G015(08) and CH1986G015(07).

b. Will the proposed "Non-process Potable Water Use" of 15 gpm, identified on page 5-2 of Mirant's CPCN Application, be covered by Permit Number CH1986G015(08)?

RESPONSE TO DR NO. 5-4(b):

No. The referenced permit is for the water withdrawal for the sanitary facilities at the Morgantown Combustion Turbine Yard.

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Select Response to
PPRP Data Request No. 6

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6-7 The TRC Emissions Test Report, provided by Mirant in response to Data Request No. 1, Question 1-3, presents a characterization, which includes the mercury content, of the Morgantown fly ash prior to testing in the South Carolina SEFA facility. Have similar physical and chemical analyses been conducted for fly ash originating from the Chalk Point and Dickerson generating facilities? If so, please provide copies of the results of any such characterization analyses.

RESPONSE TO DR 6-7:

Please see attached April 10, 2008 fly ash analysis for Dickerson Generating Station and October 14, 2008 fly ash analysis for Chalk Point Generating Station.

Table 1 – Elemental Analysis

Element	EPA Methods 1311/6020 SPLP (mg/L)	EPA Methods 3052/6020 Total Metals (mg/kg)	EPA Methods 1311/6020 TCLP (mg/L)
Aluminum	3.0	6250	NA
Antimony	0.008	0.90	NA
Arsenic	0.05	39.4	< 1
Barium	0.102	212	< 20
Beryllium	< 0.001	1.19	NA
Boron	< 0.1	< 0.1	NA
Cadmium	0.001	0.47	< 0.2
Chromium	< 0.001	6.74	< 1
Cobalt	< 0.001	4.13	NA
Copper	< 0.001	24.6	NA
Iron	< 0.1	3060	NA
Lead	0.002	14.6	< 1
Manganese	< 0.01	9.0	NA
Mercury	< 0.001	0.31	< 0.04
Molybdenum	.0281	20	NA
Nickel	< 0.001	12.2	NA
Selenium	0.24	20	0.3
Silver	0.001	1.22	< 1.0
Sodium	2.64	1345	NA
Thallium	< 0.001	1.82	NA
Vanadium	0.212	56	NA
Zinc	0.14	119	NA
Chloride	9.1	NA	NA
Nitrate as N	NA	NA	0.15

STANDARD LABORATORIES INC.
NORTHERN DIVISION
P.O. BOX 214
CRESSON, PA 16630
(814) 886-7400

STANDARD LABORATORIES, INC.

DATE: 11-14-2008
SAMPLE NO. 980240

MIRANT CORPORATION
25100 CHALK POINT ROAD
CHALK POINT GENERATING STATION SAMPLE ID: HOPPER # 107
AQUASCO, MD 20608

OPERATING CO.: MIRANT MID ATLANTIC, LLC
SAMPLED BY: CUSTOMER PROVIDED
MINE:
LOCATION: CHALK POINT GEN. STATION

DATE SAMPLED: 10/14/08 DATE RECEIVED: 10/28/08
WEATHER:
GROSS WEIGHT:

OTHER ID: ATTN: GLENN ST CLAIR / FAX:301-843-4475 / E
MAIL:GLENN.STCLAIR@MIRANT.COM / BYERS.ROGAN@MIRANT.COM

CERTIFICATE OF ANALYSIS

TRACE ELEMENTS
D3683 D3684 D3684 (MODIFIED)

MERCURY	486.00 PPB
ARSENIC	34.97 PPM
SELENIUM	2.96 PPM

APPROVED BY ____________

APPROVED BY ____________

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Response to
PPRP Data Request No. 7

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Mirant Mid-Atlantic, LLC's Responses to
PPRP Data Request No. 7
Morgantown Ash Beneficiation Project
PSC Case No. 9229

Air Quality

7-1 Per Table 10.2A-6, Mirant provides a VOC emissions factor of 0.0165 lb/MMBtu and an annual average heat input of 100 MMBtu/hr, which equals an annual average short-term emissions rate of 1.65 lb/hr. Using the Mirant-provided annual average short-term emission rate, PPRP estimates that the STAR reactor will emit 39.6 lb VOC / day (see sample calculation below).

$$0.0165 \frac{lb}{MMBtu} * \frac{100 MMBtu}{hr} = 1.65 \frac{lbVOC}{hr} * \frac{24hr}{day} = 39.6 lbVOC / day$$

Similarly, using the maximum heat input of 140 MMBtu/hr, the maximum short term emissions rate equals 2.31 lb/hr. Based on this value, the maximum daily emissions from the STAR reactor are 55.4 lb VOC / day. The State of Maryland General Emissions Sources regulation COMAR 26.11.06.06B(2)(c) states that: "a person may not cause or permit the discharge of VOC from any installation constructed on or after November 15, 1992 in excess of 20 pounds (9.07 kilograms) per day unless the discharge is reduced by 85 percent or more overall."

Given the information above, please provide an explanation of how the STAR reactor will maintain compliance with this requirement.

RESPONSE TO DR 7-1:

As described in the response to PPRP Data Request No. 4, Item 4-8, the VOC emissions were provided by the vendor and based on an emission factor equal to 10% of the CO emission factor. Table 10.2A-6 provides a conservative estimate of VOC emissions based the referenced emission factor.

VOC destruction is inherent in the STAR process. The STAR reactor is designed to operate with a temperature of greater than 1,500°F. The fly ash entrained in the flue gas passes through a hot cyclone where particles can be returned to the reactor as needed for temperature and product quality control. The processed fly ash is conveyed from the cyclone to the air pre-heater where flue gas temperatures are reduced from 1,500-1,800°F down to approximately 1,200°F. As described in EPA's Air Pollution Control Technology Fact Sheet (EPA-452/F-03-022), typical thermal incinerator design conditions needed to meet 98% VOC or greater control are 1,600°F combustion temperature, and 0.75 second residence time. As confirmed with SEFA, the residence time from the STAR reactor to the air pre-heaters is estimated to be greater than 0.75 seconds. Based on the STAR system design, VOC emissions resulting from the process will be reduced by greater than 85 percent through thermal reduction and therefore meet the requirements of COMAR 26.11.06.06B(2)(c) which states that: "a person may not cause or permit the discharge of VOC from any installation constructed on or after November 15, 1992 in excess of 20 pounds (9.07 kilograms) per day unless the discharge is reduced by 85 percent or more overall."