PERMIT-TO-INSTALL APPLICATION
VOLUME V

RESPONSE TO QUESTIONS
FROM OHIO EPA

For:
AMERICAN MUNICIPAL POWER
GENERATING STATION

Submitted By:
AMERICAN MUNICIPAL POWER-OHIO, INC.

GT
Environmental, Inc.

635 Park Meadow Road, Suite 112
Westerville, Ohio 43081
(614) 794-3570

Ohio EPA
State of Ohio Environmental Protection Agency

Southeast District Office

2195 Front Street
Logan, OH 43138

TELE: (740) 385-8501 FAX: (740) 385-6490
www.epa.state.oh.us

Bob Taft, Governor
Bruce Johnson, Lieutenant Governor
Joseph P. Koncelik, Director

May 17, 2006

Re: Meigs County
American Municipal Power
Generating Station
Facility ID 0653000069
PTI 06-08138

Randy Meyer
American Municipal Power - Ohio Incorporated
2600 Airport Drive
Columbus, OH 43219

Dear Mr. Meyer:

This letter is to inform you that on May 15, 2006, this office received your application(s) for a permit to install (PTI) for the above referenced air pollution source(s), and that I have been assigned to process your application. After our initial review, your application has been found to be preliminarily complete, therefore, we can begin the technical review of your application. This preliminary completeness determination does not imply that the application is approvable, only that we have enough information to continue the review. **It does not allow construction, installation or modification of any air contaminant source (emissions unit).**

Applications are generally reviewed on a first come, first serve basis. During the technical review, you may be contacted for additional information or for clarification. Once the review is complete, a PTI recommendation will be prepared either approving or denying the application (if review indicates a denial, you will be contacted to discuss options). The recommendation will then be forwarded to Ohio EPA, Division of Air Pollution Control (DAPC), Central Office for their review and issuance. It is possible they may ask for clarifying information as well before proceeding to issue either a draft permit, a direct final permit, or a denial of the application.

Processing times for applications vary considerably depending upon the complexity of the project, the technical completeness of your application, the approvability of your application and upon the various workloads of the offices reviewing the applications. In order to help your planning, we estimate that a final determination concerning your application will be issued in approximately 6 months. **However, this processing time is a very rough estimate and you should not commit significant funds based on the assumption that you will obtain a permit within the described time.** Please contact me or see our permit status web page at http://www.epa.state.oh.us/dapc/pti/ptimain.html for more information on the expected processing time of your application.

Please be assured that we will do everything possible to process your application in a timely manner. If you have any questions concerning this letter or your application, please contact me at (740) 380-5297 or email dean.ponchak@epa.state.oh.us.

Sincerely,

Dean Ponchak
Environmental Specialist 3
Division of Air Pollution Control
Southeast District Office

DP/mlm

OhioEPA

State of Ohio Environmental Protection Agency

Southeast District Office

2195 Front Street
Logan, OH 43138

TELE: (740) 385-8501 FAX: (740) 385-6490
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Bob Taft, Governor
Bruce Johnson, Lieutenant Governor
Joseph P. Koncelik, Director

August 7, 2006

Re: Meigs County
American Municipal Power
Facility ID # 0653000069
PTI # 06-08138

Randy Meyer
American Municipal Power - Ohio Incorporated
2600 Airport Drive
Columbus, OH 43219

Dear Mr. Meyer:

This office has performed a review of the above referenced permit-to-install application(s) received on May 15, 2006. The purpose of this review is to identify basic deficiencies early in the permit process, and allow you to make corrections. The list below details the additional information or corrections needed that we discussed at our June 8, 2006 meeting. The requested data can be submitted without resending the entire application. Only the pages with missing or incomplete/requested information need to be resubmitted.

1. Please supply additional information on how Amp Ohio arrived at the engineering estimates for all pollutants.

2. Landfill odors are briefly discussed in the application. Ohio EPA would like a more thorough explanation of why/how odors will not be an issue.

3. The proposed fertilizer plant could possibly meet the definition of a "synthetic ammonium sulfate manufacturing plant". Amp Ohio should seek a federal applicability determination on this matter and supply Ohio EPA with said determination.

4. OAC rules 3745-17-07, 3745-17-08, 3745-17-10, and 3745-17-11 regulate particulate emissions(PE). The application refers to PM(particulate matter) emissions. This should be corrected in the application.

5. The paved roadways Emissions Activity Category (EAC) form should define each roadway segment.

6. Please supply wind speed information on the storage piles EAC forms.

7. Ohio EPA requests a more thorough explanation of the barge unloading process for both coal and limestone.

8. Please supplement the BACT analysis by including the Louisville Gas and Electric project.

9. Please supply a more thorough BACT discussion for the auxiliary boiler.

10. Please supplement the cooling tower emissions calculations by including a discussion which describes the total dissolved solids of the water at the cooling cells.

11. It appears that baghouses could be installed at various fugitive emissions points. Please explain why this additional control is not needed.

12. Please provide additional support for the AMP - Meigs County Project BACT determination predicting higher VOC emissions than the Santee Cooper project.

The sooner the needed information is received, the quicker our review can be completed and the sooner we can complete the review of your application. **Note that OAC rule 3745-31-02 prohibits the construction, installation or modification of any air contaminant source (emissions unit) without first obtaining a final permit to install.**

If you have any questions concerning this letter or your application, please contact me at (740) 380-5297 or email dean.ponchak@epa.state.oh.us.

Sincerely,

Dean Ponchak
Environmental Specialist 3
Division of Air Pollution Control
Southeast District Office

DP/mlm

September 28, 2006

AMP OHIO
American Municipal Power-Ohio, Inc.

Mr. Dean Ponchak
Environmental Specialist
Division of Air Pollution Control
Ohio EPA – Southeast District Office
2195 Front Street
Logan, OH 43138

Re: American Municipal Power-Ohio, Inc.
Facility ID No. 06-53-00-0069
PTI No. 06-08138

Dear Mr. Ponchak:

This letter provides information and data to respond to the comments and requests for information in your letter dated August 7, 2006 related to the Permit-to-Install (PTI) application for the American Muncipal Power-Ohio, Inc.'s proposed Meigs County Generating Station (AMPGS).

1. *Please supply additional information on how AMP-Ohio arrived at the engineering estimates for all pollutants.*

The emission estimates in the PTI application submitted for the AMPGS are based on: (a) a review of the emission limitations included as BACT in PSD permits issued for comparable coal-fired power plants; (b) the type of fuel contemplated; and (c) emissions methods that are commonly used in the development of air permit applications for new sources, including the use of AP-42 emission factors, expected capture efficiency, expected control equipment efficiency, etc.

The emissions rates for SO_2, NO_x, PM/PM_{10}, CO, VOC and H_2SO_4 from the two main boilers are based on the expected performance of the FGD, SCR, baghouse, and wet-ESP control systems with good combustion design at the averaging times specified for each pollutant. The proposed emission rates for SO_2 vary for the 3-hour, 24-hour and annual average based on the expected variability of sulfur content in the different coal supplies that could be employed at the AMPGS. The difference in the proposed emission rates for filterable PM_{10} and total PM_{10} (filterable + condensable) is based on the assumption that all of the ammonium sulfate and sulfuric acid emitted by the main boilers will be measured as condensable PM_{10} emissions.

AMP-Ohio 2600 Airport Drive Columbus, Ohio 43219 • **Phone:** 614/337-6222 • **Fax:** 614/337-6220 • www.amp-ohio.org

The engineering estimates for the maximum emission rates for the non-boiler emission units (e.g., coal management, limestone management, etc.) were developed in consultation with the project development engineer based on experience with comparable systems at other coal-fired power plants and other methods commonly used to develop emission rates for new sources.

2. *Landfill odors are briefly discussed in the application. Ohio EPA would like a more thorough explanation of why/how odors will not be an issue.*

Although the materials disposed in the landfill may have a slight odor potential, we believe the waste minimization measures and design and operating features that will be employed mitigate the potential for any significant off-site odor. The measures include:

- Marketing coal combustion and FGD by-products for re-use to minimize the amount of material that must be disposed in the on-site landfill (Note: If an ammonia scrubber is employed, FGD by-product will be processed in the on-site Fertilizer Plant and there will be no wet-FGD by-product disposed of at the on-site landfill.);
- Stabilizing the FGD by-product with ash;
- Minimizing the working face of the landfill; and
- Compacting the materials disposed in the landfill and keeping the landfill well drained.

AMP-Ohio believes the above measures will minimize the chance of any unacceptable off-site odor from the landfill.

3. *The proposed fertilizer plant could possibly meet the definition of a "synthetic ammonium sulfate manufacturing plant". AMP-Ohio should seek a federal applicability determination on this matter and supply Ohio EPA with said determination.*

The PTI application submitted by AMP-Ohio includes options for the use of either limestone or ammonia in the FGD control systems associated with the two main coal-fired boilers. AMP-Ohio has asked the ammonium sulfate scrubber system vendor to request a NSPS Subpart PP applicability determination from the US EPA for the rotary dryer associated with the Fertilizer Plant (P003). AMP-Ohio will provide the applicability determination to Ohio EPA after US EPA reviews this situation and makes a determination.

4. *OAC rules 3745-17-07, 3745-17-08, 3745-17-10, and 3745-17-11 regulate particulate emissions (PE). The application refers to PM (particulate matter) emissions. This should be corrected in the application.*

Enclosed are copies of replacement pages 4 and 5 of the PTI application using the term PE to describe the air pollutant regulated pursuant to OAC rules 3745-17-08, 3745-17-10 and 3745-17-11 and using the term "visible PE" to describe the air pollutant regulated pursuant to OAC rule 3745-

17-07. The PTI application for the AMPGS includes a row of information for the maximum expected emissions of PE in the table of Emissions Information in item 4 for each emissions unit.

AMP-Ohio intended that the terms PM and PE would be considered interchangeable in the PTI application submitted for the AMPGS. This is consistent with the definition of "particulate emissions" in OAC rule 3745-17-01 (B)(11) that states: "Particulate emissions" means particulate matter measurable by the applicable test methods in "Appendix A" of 40 CFRT, Part 60 "Standards of Performance for New Stationary Sources," as such appendix existed on July 1, 2002.

The List of Emissions Units and Summary of Applicable Rules on pages 4 and 5 of the PTI application uses the term PM for both the emissions regulated under the Best Available Control Technology (BACT) requirements of the Prevention of Significant Deterioration (PSD) provisions in OAC Chapter 3745-31 and the emissions regulated pursuant to OAC Chapter 3745-17. PM is one of the pollutants for which the AMPGS will be a major source. Therefore, it is appropriate to list PM as the pollutant regulated for BACT.

5. *The paved roadways Emissions Activity Category (EAC) form should define each roadway segment.*

Enclosed are replacement pages for the paved and unpaved roadways EAC forms (pages 43 and 50 of the PTI application) that identify the Landfill Access Road (Note: Half of the Landfill Access Road is paved and the remainder is unpaved).

6. *Please supply wind speed information on the storage piles EAC forms.*

Enclosed are replacement pages for the coal and limestone storage piles EAC forms (pages 57 and 70 of the PTI application). The meteorological data on these forms is from the EAC Form Instructions. The mean wind speed of 8.7 miles per hour is for the Columbus area (i.e., the nearest location to Meigs County from the cities included in the EAC Form Instructions).

7. *Ohio EPA requests a more thorough explanation of the barge unloading process for both coal and limestone.*

The proposed plan is to install an Equilibrium Crane (E-Crane) with an articulated arm and clamshell bucket at the barge unloading area to unload both coal barges and limestone barges. The operator of the E-Crane will position the articulating arm and load the clamshell bucket at the barge and then swing the articulated arm to a position immediately above the feed hopper to minimize drop height. A water spray dust suppression system will be installed around the perimeter of each feed hopper opening. The material will travel through the feed hopper and be deposited on a covered conveyor. The covered conveyor for the coal unloading transports the coal to a transfer house where it will be either: (1) transferred to a covered conveyor that transports the coal directly to the crusher house; or (2) transferred to a covered conveyor that transports the coal to the coal storage piles. The covered conveyor for the limestone unloading transports the limestone to the limestone storage piles.

As mentioned in this PTI application, AMP-Ohio is considering installing an ammonia-based sulfur dioxide scrubber in lieu of a limestone-based system. If an ammonia-based system is used, pelletized urea or anhydrous ammonia will be unloaded instead of limestone. Urea pellets will be unloaded by the E-crane and conveyed to urea storage domes. Because urea readily reacts with water, unloading and conveying must be performed under dry conditions. Dusting is not expected to be a problem since the material is pelletized. Anhydrous ammonia will be handled as a pressurized liquid and will not result in air emissions under normal conditions.

8. *Please supplement the BACT analysis by including the Louisville Gas and Electric project.*

Enclosed is a table that compares the requirements in the permit issued on January 4, 2006 by the Commonwealth of Kentucky Division for Air Quality to Louisville Gas & Electric Company for Trimble Unit 2. Please note that the permit issued for Trimble Unit 2 involved "netting" for sulfur dioxide (SO_2) and nitrogen oxides (NO_x) and, as a result, the emission limitations for those two pollutants are not based on PSD BACT.

It is AMP-Ohio's view that the requirements in the Trimble Unit 2 permit do not require any changes to the conclusions in the BACT Study submitted with the PTI application for the AMPGS. There are only two PSD BACT pollutants, PM_{10} and VOC, for which the Trimble Unit 2 permit includes emission limits that are more stringent than the BACT proposed for the AMPGS. The difference is not significant for either PM_{10} or VOC.

The Trimble Unit 2 permit includes a 0.018 lb/mmBtu emission limit for total PM_{10} emissions (filterable + condensable). The BACT Study submitted with the PTI application for the AMPGS concluded that the appropriate BACT emission rate for PM_{10} (filterable + condensable) given the range of coals that could be employed at the AMPGS is 0.025 lb/mmBtu. AMP-Ohio does not consider the 0.018 lb/mmBtu emission rate for PM_{10} (filterable + condensable) in the permit for Trimble Unit 2 to be an appropriate BACT emission rate for the AMPGS for several reasons:

(1) It appears the genesis for the limitation specified for Trimble Unit 2 permit is the PM_{10} (filterable + condensable) emission rate of 0.018 lb/mmBtu in the permit issued for the Longview Power Plant. The total PM_{10} emission rate (filterable + condensable) must be greater for any coal-fired boiler than the filterable PM_{10} emission rate because the condensable fraction of the total PM_{10} will include nitrogen and sulfur compounds that will not be measured in a filterable-only test. The permit for the Longview Power Plant fails to recognize that fact and specifies the identical 0.018 lb/mmBtu emission rate for filterable PM_{10} as it does for total (filterable + condensable) PM_{10}.

(2) The BACT determination submitted by Louisville Gas & Electric in the permit application for Trimble Unit 2 includes the following statement: "LG&E notes that many of the BACT determinations are based on permits that have been issued or proposed and contain more stringent emissions limits than are actually being achieved in practice on a consistent basis. LG&E proposes to meet the BACT emission rates; however, LG&E also requests that if (a) these rates cannot be achieved on a consistent basis, even after optimization of the air pollution

control equipment, and (b) if no other units are actually achieving these levels in practice on a consistent basis, that higher achievable levels be permitted." This indicates that LG&E was well aware that the combination of emission control systems that comprise BACT for large coal-fired boilers have not been installed, operated and tested to verify performance to emission standards. As a result, LG&E specifically requested that the BACT emission rates be set based on actual performance testing at Trimble Unit 2.

(3) The PSD permit for the Prairie State Generating Company, LLC issued by the Illinois EPA in April 2005 addresses the issue of actual control equipment performance by setting a BACT limit of 0.035 lb/mmBtu for total (filterable + condensable) PM_{10} with a provision that the limit be reevaluated based on actual performance testing (refer to page 15 of the Prairie State PSD permit).

(4) The condensable fraction of PM_{10} emissions from coal combustion units is greatly impacted by the sulfur content of the fuels employed. Since the AMPGS will combust a number of different coals, including Ohio coal, it is likely the average sulfur content could be greater at times than will be the case with the range of coals that will be employed at LG&E Trimble.

The Trimble Unit 2 permit includes a 0.0032 lb/mmBtu emission limit for VOC emissions. AMP-Ohio does not consider the 0.0032 lb/mmBtu emission rate for VOC in the permit for Trimble Unit 2 to be an appropriate BACT emission rate for the AMPGS for several reasons:

(1) The difference between the BACT limit of 0.0037 lb/mmBtu proposed for the AMPGS and 0.0032 lb/mmBtu is very minor and is within the range of variability in stack test results.

(2) All of the BACT determinations identified by AMP-Ohio rely on good engineering design and good combustion practices to minimize VOC emissions. Energy efficiency dictates that the design and operation of the boilers minimizes the amount of unburned hydrocarbons that contribute to VOC emissions. The VOC emissions rates specified in the recently issued PSD permits range from 0.0024 lb/mmBtu (Santee Cooper Cross Generating Station) to 0.0072 lb/mmBtu (Thoroughbred Generating, Company, LLC). The proposed VOC emission rate for the AMPGS of 0.0037 lb/mmBtu falls towards the lower end of this range.

(3) The VOC limit of 0.0035 lb/mmBtu for the Elm Road Generating Facility was specified as the Lowest Achievable Emission Rate (LAER). The proposed VOC emission rate for the AMPGS of 0.0037 lb/mmBtu is closer to LAER than many of the other BACT determinations made subsequent to the issuance of the permit to the Elm Road Generating Facility.

(4) The permit for Trimble Unit 2 does not have a compliance method specified for the VOC emission rate of 0.0032 lb/mmBtu. The permit for Trimble Unit 2 specifies that compliance with the VOC limit shall be demonstrated by complying with the carbon monoxide emission limit.

9. *Please supply a more thorough BACT analysis for the auxiliary boiler.*

A comparison of the emission limits proposed for the auxiliary boiler at the AMPGS versus other recent PSD permits is presented in the following table:

Pollutant/Parameter	Plant	Limit
General Operations	AMPGS	Use of NG ≤10% capacity factor ≤150 mmBtu/hr
	Prairie State	Use of NG ≤10% capacity factor ≤500 hrs/yr ≤245 mmBtu/hr
	Longview	Use of NG ≤3,000 hrs/rolling 12-mo ≤225 mmBtu/hr ≤675 mmcf NG/rolling 12-mo
	Elm Road	Use of NG or fuel oil w/S content of ≤0.003% by weight ≤498,000 mmBtu/rolling 12-mo w/ ≤122,500 mmBtu from fuel
Nitrogen Oxides (NO_x)	AMPGS	21 lb/hr (0.14 lb/mmBtu)
	Prairie State	0.167 lb/mmBtu (40.9 lb/hr)
	Longview	22.1 lb/hr (0.098 lb/mmBtu)
	Elm Road	0.036 lb/mmBtu NG 0.09 lb/mmBtu fuel oil
Sulfur Dioxide (SO_2)	AMPGS	0.09 lb/hr (0.0006 lb/mmBtu)
	Prairie State	None
	Longview	0.004 lb/hr (0.000018 lb/mmBtu)
	Elm Road	0.0024 lb/mmBtu NG 0.0032 lb/mmBtu fuel oil
PM/PM_{10}	AMPGS	1.14 lb/hr (0.0076 lb/mmBtu)
	Prairie State	None
	Longview	0.50 lb/hr (0.00222 lb/mmBtu)
	Elm Road	0.007 lb/mmBtu NG 0.05 lb/mmBtu fuel oil
Volatile Organic Compounds (VOC)	AMPGS	0.83 lb/hr (0.0055 lb/mmBtu)
	Prairie State	0.013 lb/mmBtu (3.25 lb/hr)
	Longview	1.21 lb/hr (0.0054 lb/mmBtu)
	Elm Road (LAER)	0.0060 lb/mmBtu NG 0.0050 lb/mmBtu fuel oil
Carbon Monoxide (CO)	AMPGS	12.6 lb/hr (0.084 lb/mmBtu)

Pollutant/Parameter	Plant	Limit
	Prairie State	0.11 lb/mmBtu (27.5 lb/hr)
	Longview	9.0 lb/hr (0.04 lb/mmBtu)
	Elm Road	0.075 lb/mmBtu NG 0.075 lb/mmBtu fuel oil

AMP-Ohio believes the information and data in the above table demonstrates that the operating limitations and emission limitations proposed in the PTI application for the AMPGS represent BACT for emissions from the auxiliary boiler (B003). The proposed restrictions for the AMPGS are equivalent to or more stringent than the limits included in recent PSD permits for other comparable units.

10. *Please supplement the cooling tower emissions calculations by including a discussion which describes the total dissolved solids of the waste at the cooling cells.*

The PM/PM_{10} emission estimates presented in the PTI application for the AMPGS assumed a Total Dissolved Solids (TDS) concentration of 350 milligrams per liter (mg/L). This TDS concentration resulted in maximum PM/PM_{10} emission rates of 0.17 lb/hr and 0.77 tons per year for both sets of cooling cells (P001 and P002). This assumption is comparable to the Ohio River water quality data reported for the AEP Great Bend Site (TDS concentration of 354 mg/L). A copy of the data for the Great Bend Site is enclosed.

11. *It appears that baghouses could be installed at various fugitive emissions points.* ***Please explain why this additional control is not needed.***

Although it may be possible to install baghouse dust collectors to control PM/PM_{10} emissions at a number of additional locations, the project development engineer has recommended the use of enclosures, water sprays and misting for effective control of PM/PM_{10} and visible emissions. The use of baghouse dust collectors are not cost-effective or practical. AMP-Ohio believes the visible emissions limitations proposed in the PTI application are consistent with the use of BACT for PM/PM_{10} control for such units and in concert with other similar source BACT determinations.

12. *Please provide additional support for the AMP - Meigs County Project BACT determination predicting higher VOC emissions than the Santee Cooper project.*

A VOC emission rate of 0.0024 lb/mmBtu is specified in the Santee Cooper Cross Generating Station permit. Subsequent to the issuance of the Santee Cooper permit, permits were issued for the following power plants with BACT determinations for VOC emissions greater than the rate specified for Santee Cooper:

Plant	Permit Date	VOC Emission Rate
Longview Power Plant (WV)	March 2004	0.004 lb/mmBtu
Thoroughbred Generating Company, LLC (KY)	February 2005	0.0072 lb/mmBtu

Prairie State Generating Company, LLC (WI)	April 2005	0.004 lb/mmBtu

As noted above in our comments concerning the permit recently issued for LG&E Trimble Unit 2, AMP-Ohio believes there is little substantive difference in the BACT determinations for VOC emissions from any of these facilities. All of the BACT limits for VOC and CO for these boilers are based on the use of good combustion design and operation. Energy efficiency dictates that the design and operation of the boilers minimizes the amount of unburned hydrocarbons that contribute to VOC emissions. The proposed VOC emission rate for the AMPGS of 0.0037 lb/mmBtu falls towards the lower end of the range specified as BACT in recent PSD permits.

Thank you for assisting AMP-Ohio with the completion of a timely review of the PTI application for the AMPGS. To that end, AMP-Ohio and GT Environmental would like to set up a short meeting in Ohio EPA's Central Office to discuss these responses and other additional questions you may have. I will follow-up shortly to schedule such a meeting. In the meantime, please do not hesitate to contact me at 337-6222 if you have any questions.

Sincerely,

Randy Meyer
Manager of Environmental Affairs

Enclosures

Cc: Scott Kiesewetter, AMP-Ohio

April Bott, Chester, Willcox & Saxbe
Chuck Taylor, GT Environmental
Rod Windle, Ohio EPA, Central Office

Louisville Gas & Electric Company Trimble Unit No. 2
vs
AMPGS

LG&E Unit No. 2:
6,942 mmBtu/hr and 750 MW
Fuels: Eastern Bituminous and Western Sub-Bituminous with No.2 Fuel Oil (start-up)

Pollutant	Facility	Control System	Limitations	Compliance Method
PM_{10}	LG&E Trimble No. 2	Pulse Jet Fabric Filter + Wet Electrostatic Precipitator (ESP)	BACT: 0.018 lb/mmBtu (filterable + Condensable)	Average of three 1-hr test runs
	AMPGS	Baghouse (Fabric Filter) + Wet ESP	BACT: 0.025 lb/mmBtu (filterable + Condensable)	Average of three 1-hr test runs
PM	LG&E Trimble No. 2	Pulse Jet Fabric Filter	NSPS: 0.015 lb/mmBtu (filterable) 3-hr rolling average	CEM
PM_{10}	AMPGS	Baghouse (Fabric Filter	BACT: 0.015 lb/mmBtu (filterable)	Average of three 1-hr test runs
Opacity	LG&E Trimble No. 2	Pulse Jet Fabric Filter + Wet ESP	NSPS: 20% as a 6-min average (except up to 27% for no more than one 6-minute period per hour)	COM
	AMPGS	Baghouse (Fabric Filter) + Wet ESP	BACT: 20% as a 6-min average (except up to 27% for no more than one 6-minute period per hour)	COM
SO_2	LG&E Trimble No. 2	Wet Flue Gas Desulfurization (FGD)	Netting: 8.94 tons/day 3,263.1 tons per rolling 12-month period *Note: 8.94 tons/day = an average of 0.113 lb/mmBtu at 95% of maximum heat input*	CEM
	AMPGS	Wet FGD	BACT: 0.24 lb/mmBtu 3-hr rolling average 0.184 lb/mmBtu 24-hr rolling average 0.15 lb/mmBtu 30-day rolling average	CEM
CO	LG&E Trimble No. 2	Good Combustion Controls	BACT: 0.10 lb/mmBtu 30-day rolling average 0.5 lb/mmBtu 3-hr rolling average	CEM
	AMPGS	Good Combustion Controls	BACT: 0.154 lb/mmBtu 3-hr rolling average	CEM
VOC	LG&E Trimble No. 2	Good Combustion Controls	BACT: 0.0032 lb/mmBtu 3-hr rolling average	Compliance w/CO limits constitutes compliance w/VOC limit
	AMPGS	Good Combustion Controls	BACT: 0.0037 lb/mmBtu 3-hr rolling average	Average of three 1-hr test runs

Pollutant	Facility	Control System	Limitations	Compliance Method
NO_x	LG&E Trimble No. 2	Selective Catalytic Reduction (SCR)	Netting: 4.17 tons/day 1,506.72 tons per rolling 12-month period *Note: 4.17 tons/day = an average of 0.053 lb/mmBtu at 95% of maximum heat input*	CEM
	AMPGS	SCR	BACT: 0.07 lb/mmBtu 30-day rolling average	CEM
H_2SO_4	LG&E Trimble No. 2	Wet ESP	BACT: 26.6 lb/hr 3-hr rolling average *Note: 26.6 lb/hr = an average of 0.00403 lb/mmBtu at 95% of maximum heat input*	SO_2 CEM and Initial Stack Test to Correlate H_2SO_4 to SO_2
	AMPGS	Wet ESP	BACT: 0.0075 lb/mmBtu 3-hr rolling average	Method 8 Test
HF	LG&E Trimble No. 2	Wet FGD	BACT: 1.55 lb/hr 3-hr rolling average *Note: 1.55 lb/hr = an average of 0.00024 lb/mmBtu at 95% of maximum heat input*	SO_2 CEM and Initial Stack Test to Correlate HF to SO_2
	AMPGS	Wet FGD		
Hg	LG&E Trimble No. 2	Wet FGD + Wet ESP	40 CFR 60.45a (CAMR): 13×10^{-6} lb/MWh (gross output)	CEM
	AMPGS	Wet FGD + Wet ESP	Meet CAMR requirements.	
Pb	LG&E Trimble No. 2	Wet FGD + Wet ESP	0.55 tons per 12-month rolling period	NA
	AMPGS	Wet FGD + Wet ESP	0.51 lb/hr and 0.22 tons/yr for each of two boilers	NA
Other Toxics	LG&E Trimble No. 2	Overall Control System	Control systems for other pollutants are deemed satisfactory for other toxic emissions	NA
	AMPGS	Overall Control System	Meet "Air Toxic Policy" and overall control system	NA

based on maximum ORSANCO stat

pretreated to remove NH3 should be worse case - high chem cond.

TABLE A

Wastewater Characterization- AEP Great Bend Site, Ohio River (Variable Cooling Tower Cycles (Variable Evap Rate), all stream flows avg except Grey Water at Design conditions) 25200-100

	Units	Ohio River Water (clarified)	Ohio River Water Total Conc.	Ohio River Water Dissolved Con.	Ultra Filter Reject	Steam Generator Blowdown	Reverse Osmosis Reject (98% Salt Rejection)	Neut Demin Regen Waste	Cooling Tower Blowdown	Oily Water CPI Effluent	Treated Sanitary Sewage	Grey Water (Pretreated)	Treated Grey Water	Coal Pile Runoff	Landfill Leachate	Offsite Slag Handling Runoff	Effluent to Retention Pond
Flow Annual Avg)	gpm	8,118			19	30	363	36	1041	5	20	826	826				2340
Misc. Parameters																	
Temperature					35	140	35.0	40.0	63.000	70	70	93	93				89.73
pH	Std	6.6 - 8.1	6.6 - 8.1		8-9						7.5	9	38906				6-9
Sp. Cond					0	0	0.0	0.0	0.000	0		16,000	17000				6000.214
Alk	(mg/l) as $CaCO_3$			81	0	0	100	100	200.000	0		680	50				124
Cl	mg/l	60	60		60	0.1	241	608	301.200	60	50	4000	4000				1593.6
F	mg/l	0.368	0.368		0.368	0	1	0	1.840	0.368		75	75				27.5
Ammonia as N	mg/l	0.903	0.903	0.667	0.903	0	3.612	0	4.515	0.903		30	3.45				3.8
Nitrite/Nitrate as N	mg/l	5.17	5.17		5.17	0	21	0.0	25.850	5.17		2.7	10				18.3
Phosphate	mg/l	0.048	0.048		0.048	0	0	0.0	0.240	0.048	21	0.5	0.5				0.5
Total P	mg/l	0.31	0.31				1	0.0	1.550								
Sulfide	mg/l					0	0	0.0	0.000	0		5	0.115				0.04
Sulfite	mg/l					0	0	0.0	0.000	0		15	0.115				0.04
Sulfate	mg/l	131.2	131.2		131	0	525	1672	656.000	131		4000	4000				1812
Thiocyanate	mg/l					0.1	0	0	0.000	0		15	1.15				0.4
Total Cyanide	mg/l	0.005	0.005		0.005	0	0	0	0.025	0.005		3	0.0575				0.0346
Formate	mg/l					0	0	0	0.000	0		3000	11.5				4.1
BOD	mg/l	4				11.3	16	0	20.000	4	20	1200	34.5				23.9
CBOD	mg/l	2					8	0	10.000	2			10				9.2
COD	mg/l					0	0	0	0.000	0		1500	172.5				61
Oil & Grease	mg/l					0	0	0	0.000	4		4	4				1.4
Total Phenolics	mg/l	0.007	0.007		0.007	0	0	0	0.035	0.007		0.05	0.05				0.04
Free Sulfur	mg/l					0	0	0	0.000	0		10	10				3.5
Total Dissolved Solids	mg/l	354		354	354	50	1416	4500	1770.000	354	500	17000	17000				7085
Total Suspended Solids	mg/l	20	617		500	0	4	50	100.000	30	20	20	1				51
Total Inorganic Carbon	mg/l					0	0	0.0	0.000	0		200	200				71
Total Organic Carbon	mg/l		22.5		0	1	0	0.0	0.000	0		2000	115				41
Total Residual Chlorine (TRC)	mg/l					0	0	0	0.200	0							0.089
Total Hardness	mg/l		173						0.000								
Fecal Coliform	#/100 ml								0.000								
Fecal Coliform	#/100 ml								0.000								
Metals																	
Aluminum	mg/l	0.023	1.900	0.023	0.023	0	0.092	0	0.115	0.023		12.000	0.12				0.108
Antimony	mg/l	0.00051	0.0007	0.0005		0	0.002	0	0.003	0.0005		0.1000	0.115				0.0420
Arsenic	mg/l	0.0022	0.002	0.0022	0.0022	0	0.009	0	0.011	0.0022		0.3	0.0115				0.010
Barium	mg/l	0.0573	0.060	0.0571	0.0573	0	0.229	0	0.286	0.0573		0.23	0.2645				0.3
Beryllium	mg/l	0.00002	0.00002	0.00002	0	0	0.0000	0	0.000	0.00002		0.02	0.0009775				0.00039
Boron	mg/l	0.1119		0.1119	0.1119	0	0.448	0	0.560	0.1119		50	57.5				21
Cadmium	mg/l	0.0001	0.00032	0.0001	0.0001	0	0.0004	0	0.001	0.0001		0.1	0.00115				0.0007
Calcium	mg/l	48.9	53.2	48.9	49	139	195.600	0	244.500	49		75	86.25				172
Total Chromium	mg/l	0.0014	0.00327	0.0014	0.0014	0	0.006	0	0.007	0.0014		0.2	0.046				0.020
Chromium (III)	mg/l				0	0	0.000	0	0.000	0		0.2	0.046				0.016
Chromium (VI)	mg/l	0.0015	0.00327	0.0014	0.0015	0	0.006	0	0.008	0.0015		0					0.0043
Cobalt	mg/l	0.001		0.001		0	0.004	0	0.005	0.001		0.01	0.0115				0.007
Copper	mg/l	0.0031	0.00539	0.0031	0.0031	0	0.012	0	0.016	0.0031		0.1	0.00023				0.0089
Iron	mg/l	0.261	3.29	0.077	0.2606	0.7	1.042	0	1.303	0.2606		0.12	0.0115				0.8
Lead	mg/l	0.00012	0.00493	0.00012	0.00012	0	0.000	0	0.001	0.00012		0.2	0.00115				0.0007
Lithium	mg/l	0.0152		0.0152			0.061	0	0.076								
Magnesium	mg/l	15.2	16.8	15.2	15.2	43.1	60.800	0	76.000	15.2		8.8	10.12				48
Manganese	mg/l	0.1350	0.316	0.124	0.1350	0.38	0.540	0	0.675	0.1350		1.4	0.0805				0.4
Mercury	mg/l	0.0000025	0.0000131	0.0000019	0.0000025	0	0.0000102	0	1st Tower x5 0.000	0.0000025		0.063	0.00023				0.0000884
Molybdenum	mg/l	0.0078		0.0078		0.02	0.031	0	0.039	0.0078		0.05	0.0575				0.043
Nickel	mg/l	0.0031	0.00795	0.0031	0.0031	0.01	0.012	0	0.016	0.0031		0.1	0.115				0.05
Potassium	mg/l		4.35		0	0	0.000	0	0.000	0		55	63.25				22
Selenium	mg/l	0.0016	0.0016	0.0016	0.0016	0	0.006	0	0.008	0.0016		0.05	0.0575				0.025
Silica	mg/l		6.34		0	0	0.000	0	0.000	0							0
Silver	mg/l	0.00014	0.00078	0.00014	0.00014	0	0.001	0	0.001	0.00014		0.05	0.000115				0.0004
Sodium	mg/l		47.33		0	0	0.000	0	0.000	0		5000	5750				2029
Strontium	mg/l	0.3092		0.3092	0.3092	1	1.237	0	1.546	0.3092		8.5	9.775				4.3
Thallium	mg/l	0.0001	0.0001	0.0001	0.0001	0	0.000	0	0.001	0.0001		0.2	0.00391				0.0017
Tin	mg/l				0	0	0.000	0	0.000	0		3	0.575				0.20
Titanium	mg/l				0	0	0.000	0	0.000	0		0.05	0.0575				0.02
Uranium	mg/l	0.001		0.001			0.004	0	0.005								
Vanadium	mg/l	0.006		0.006	0.006	0	0.024	0	0.030	0.006		0.1	0.115				0.06
Zinc	mg/l	0.0076	31	0.0076	0.0076	0	0.030	0	0.038	0.0076		0.05	0.0115				0.03

Cooling Tower COC 5
Evaporation Rate 4165

4165 Max Summer Evaporation
2029 Min Winter Evaporation
2820 Average Case - Shoulder Month (October)

List of Emissions Units[1] and Summary of Applicable Rules					
Page	**Emissions Unit ID[2]**	**Description**	**PSD BACT**	**OAC Rule 3745-31-05 BAT**	**Other Applicable Rule(s)**
7	*B001*	*Boiler #1* *5,191 mmBtu/hr* *Pulverized Coal-Fired Boiler*	*NO_x, SO_2, PM/PM_{10}, CO, VOC, and H_2SO_4*	*all air pollutants >1.0 tpy that are not included in BACT*	*NSPS Subpart Da (SO_2, PM and NO_x)* *CAIR (NO_x and SO_2)* *CAMR (Mercury)* *Title IV Allowances (SO_2)* *Title IV NO_x* *OAC rule 3745-31-05 (BAT)* *OAC rule 3745-17-07 (visible PE)* *OAC rule 3745-17-10 (PE)* *OAC chapter 3745-14 (NO_x)* *OAC rule 3745-18-59 (SO_2)* *OAC rule 3745-21-08 (CO)* *OAC rule 3745-23-06 (NO_x)*
15	*B002*	*Boiler #2* *5,191 mmBtu/hr* *Pulverized Coal-Fired Boiler*			
23	*B003*	*150 mmBtu/hr* *Natural Gas-Fired Auxiliary Boiler*	*NO_x, SO_2, PM/PM_{10}, CO, VOC, and H_2SO_4*	*all air pollutant >1.0 tpy that are not included in BACT*	*NSPS Subpart Db (no limits due to 10% capacity factor)* *MACT Subpart DDDDD* *OAC rule 3745-17-07 (visible PE)* *OAC rule 3745-17-10 (PE)* *OAC chapter 3745-14 (NO_x)* *OAC rule 3745-18-59 (SO_2)* *OAC rule 3745-21-08 (CO)* *OAC rule 3745-23-06 (NO_x)*
29	*F001*	*Landfill (ash and FGD by-product)[3]*	*PM/PM_{10}*	*None*	*OAC rule 3745-17-07 (visible PE)* *OAC rule 3745-17-08 (PE)*
39	*F002*	*Paved Roadways and Parking Areas*	*PM/PM_{10}*	*None*	
46	*F003*	*Unpaved Roadways*	*PM/PM_{10}*	*None*	
53	*F004*	*Active and Inactive Coal Storage Piles*	*PM/PM_{10}*	*None*	
59	*F005*	*Limestone Barge Unloading[3]*	*PM/PM_{10}*	*None*	
66	*F006*	*Limestone Storage Piles[3]*	*PM/PM_{10}*	*None*	
72	*P001*	*Cooling Cells for Boiler #1*	*PM/PM_{10}*	*None*	*None*
77	*P002*	*Cooling Cells for Boiler #2*	*PM/PM_{10}*	*None*	
84	*P003*	*Fertilizer Plant[3]*	*PM/PM_{10}*	*None*	*OAC rule 3745-17-07 (visible PE)* *OAC rule 3745-17-08 (PE)* *OAC rule 3745-17-11 (PE)* *NSPS Subpart PP[4]*
94	*P901*	*Coal Barge Unloading and Transfer House*	*PM/PM_{10}*	*None*	*OAC rule 3745-17-07 (visible PE)* *OAC rule 3745-17-08 (PE)* *OAC rule 3745-17-11 (PE)*
100	*P902*	*Coal Crushing*	*PM/PM_{10}*	*None*	*NSPS Subpart Y (opacity)* *OAC rule 3745-17-07 (visible PE)* *OAC rule 3745-17-08 (PE)* *OAC rule 3745-17-11 (PE)*

List of Emissions Units[1] and Summary of Applicable Rules					
Page	**Emissions Unit ID[2]**	**Description**	**PSD BACT**	**OAC Rule 3745-31-05 BAT**	**Other Applicable Rule(s)**
108	*P903*	*Limestone Preparation Building[3]*	*PM/PM_{10}*	*None*	*NSPS Subpart OOO (PM and opacity)* *OAC rule 3745-17-07 (visible PE)* *OAC rule 3745-17-08 (PM)* *OAC rule 3745-17-11 (PM)*
116	*P904*	*Gypsum Conveying, Handling and Storage[3]*	*PM/PM_{10}*	*None*	*OAC rule 3745-17-07 (visible PE)* *OAC rule 3745-17-08 (PE)* *OAC rule 3745-17-11 (PE)*
125	*P905*	*Flyash Conveying, Handling and Storage for Boiler #1*	*PM/PM_{10}*	*None*	
132	*P906*	*Flyash Conveying, Handling and Storage for Boiler #2*	*PM/PM_{10}*	*None*	

Notes:

[1] There are two emergency diesel engines that are exempt from air permit requirements pursuant to OAC rule 3745-31-03(A)(4)(b) that are not included in this permit application.

[2] These emissions unit IDs were assigned for reference. Ohio EPA may assign different IDs when the PTI application is processed.

[3] The AMPGS will employ a Wet FGD control system, but is still considering whether to use limestone or ammonia. As a result, this PTI application includes the emissions units needed for both options.

[4] It is unclear if the NSPS Subpart PP applies to the rotary dryer associated with the Fertilizer Plant (P003). The AMPGS believes this rule was not intended to apply to this type of process.

EMISSIONS ACTIVITY CATEGORY FORM
ROADWAYS AND PARKING AREAS: FUGITIVE DUST EMISSIONS

This form is to be completed for all Roadways and Parking Areas. State/Federal regulations which may apply to Roadways and Parking Areas are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list.

1. Reason this form is being submitted (Check one)

   ☑ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. F001) _____

2. Maximum Operating Schedule: ***24*** hours per day; ***365*** days per year

   If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. _____

3. Complete the table below for each road segment or parking area.

ID	Road Segment or Parking Area Description	Length (miles) or Area (ft^2)	Year Installed	Surface Type (check one)	Surface Composition (check one)
A	***Employee and Visitor Passenger and Delivery Vehicles***	***0.57 miles***	***2012***	☑ paved ☐ unpaved	☑ asphalt ☐ gravel ☑ concrete ☐ dirt ☐ chip & seal ☐ other_____
B	***Front End Loader (Main Plant)***	***NA***	***2012***	☑ paved ☐ unpaved	☑ asphalt ☐ gravel ☑ concrete ☐ dirt ☐ chip & seal ☐ other_____
C	***Landfill Access Road - Fly Ash Haul Trucks (from boiler to landfill)****	***0.5 miles***	***2012***	☑ paved ☐ unpaved	☑ asphalt ☐ gravel ☑ concrete ☐ dirt ☐ chip & seal ☐ other_____
D	***Landfill Access Road - Bottom Ash Haul Trucks (from boiler to landfill)****	***0.5 miles***	***2012***	☑ paved ☐ unpaved	☑ asphalt ☐ gravel ☑ concrete ☐ dirt ☐ chip & seal ☐ other_____
E	***Landfill Access Road - Gypsum Haul Trucks (from wet-FGD unit to landfill)****	***0.5 miles***	***2012***	☑ paved ☐ unpaved	☑ asphalt ☐ gravel ☑ concrete ☐ dirt ☐ chip & seal ☐ other_____

**** Note: There are three entries on this table for the same paved roadway segment. One row of information is for each type of material that may be hauled to the landfill from the main boiler building. One-half of the Landfill Access Road length (0.5 miles) is paved and the remainder (0.5 miles) is unpaved.***

Section II – Specific Air Contaminant Source Information

EMISSIONS ACTIVITY CATEGORY FORM
ROADWAYS AND PARKING AREAS: FUGITIVE DUST EMISSIONS

This form is to be completed for all Roadways and Parking Areas. State/Federal regulations which may apply to Roadways and Parking Areas are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list.

1. Reason this form is being submitted (Check one)

   ☑ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. F001) _____

2. Maximum Operating Schedule: ***24*** hours per day; ***365*** days per year

   If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. _____

3. Complete the table below for each road segment or parking area.

ID	Road Segment or Parking Area Description	Length (miles) or Area (ft^2)	Year Installed	Surface Type (check one)	Surface Composition (check one)
A	***Front End Loader (Main Plant)***	***NA***	***2012***	☐ paved ☑ unpaved	☐ asphalt ☑ gravel ☐ concrete ☐ dirt ☐ chip & seal ☐ other_____
B	***Bulldozer (Main Plant)***	***NA***	***2012***	☐ paved ☑ unpaved	☐ asphalt ☑ gravel ☐ concrete ☐ dirt ☐ chip & seal ☐ other_____
C	***Bulldozer (Landfill)***	***NA***	***2012***	☐ paved ☑ unpaved	☐ asphalt ☐ gravel ☐ concrete ☐ dirt ☐ chip & seal ☑ other_____
D	***Roller (Landfill)***	***NA***	***2012***	☐ paved ☑ unpaved	☐ asphalt ☐ gravel ☐ concrete ☐ dirt ☐ chip & seal ☑ other_____
E	***Landfill Access Road - Fly Ash Haul Trucks (from boiler to landfill)****	***0.5 miles***	***2012***	☐ paved ☑ unpaved	☐ asphalt ☑ gravel ☐ concrete ☐ dirt ☐ chip & seal ☐ other_____
F	***Landfill Access Road - Bottom Ash Haul Trucks (from boiler to landfill)****	***0.5 miles***	***2012***	☐ paved ☑ unpaved	☐ asphalt ☑ gravel ☐ concrete ☐ dirt ☐ chip & seal ☐ other_____
G	***Landfill Access Road - Gypsum Haul Trucks (from wet-FGD unit to landfill)****	***0.5 miles***	***2012***	☐ paved ☑ unpaved	☐ asphalt ☑ gravel ☐ concrete ☐ dirt ☐ chip & seal ☐ other_____

**** Note: There are three entries on this table for the same un paved roadway segment. One row of information is for each type of material that may be hauled to the landfill from the main boiler building. One-half of the Landfill Access Road length (0.5 miles) is paved and the remainder (0.5 miles) is unpaved.***

EMISSIONS ACTIVITY CATEGORY FORM
STORAGE PILES

This form is to be completed for each storage pile. State/Federal regulations which may apply to storage piles are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list.

1. Reason this form is being submitted (Check one):

   ☑ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. P001) _____

2. Maximum Operating Schedule: ***24*** hours per day; ***365*** days per year

   If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. _____

3. Meteorological data at or near storage pile area:

   a. mean number of days per year in which >0.01 inch of precipitation occurred ***140**** days
   b. percentage of time wind speed exceeds 12 miles per hour: ***30 **** %
   c. mean wind speed: ***8.7*** miles per hour
   d. source of meteorological data: (a) ***EAC Form Instructions***
      (b) _____
      (c) _____

   ****Note: The emissions estimating methodology does not employ the default values recommended in the EAC Form instructions.***

4. Description of storage pile activities:

ID	Type of Material Stored	Method of Load-in (check one or more)	Method of Load-out (check one or more)
A	***Coal-Active***	☑ conveyor/stacker: ☐ front-end loader ☐ other (describe): _____	☐ bucket wheel reclaimer ☑ under pile feed ☐ rake reclaimer ☐ pan scraper ☐ front-end loader ☐ other: _____
B	***Coal-Active***	☑ conveyor/stacker: ☐ front-end loader ☐ other (describe): _____	☐ bucket wheel reclaimer ☑ under pile feed ☐ rake reclaimer ☐ pan scraper ☐ front-end loader ☐ other: _____
C	***Coal-Inactive***	☐ conveyor/stacker: ☐ front-end loader ☑ other (describe): ***Bulldozer***	☐ bucket wheel reclaimer ☐ under pile feed ☐ rake reclaimer ☐ pan scraper ☐ front-end loader ☑ other: ***Bulldozer***
D	***Coal-Inactive***	☐ conveyor/stacker: ☐ front-end loader ☑ other (describe): ***Bulldozer***	☐ bucket wheel reclaimer ☐ under pile feed ☐ rake reclaimer ☐ pan scraper ☐ front-end loader ☑ other: ***Bulldozer***

EMISSIONS ACTIVITY CATEGORY FORM
STORAGE PILES

This form is to be completed for each storage pile. State/Federal regulations which may apply to storage piles are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list.

1. Reason this form is being submitted (Check one):

   ☑ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. P001) _____

2. Maximum Operating Schedule: ***24*** hours per day; ***365*** days per year

   If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. _____

3. Meteorological data at or near storage pile area:

   a. mean number of days per year in which >0.01 inch of precipitation occurred ***140**** days
   b. percentage of time wind speed exceeds 12 miles per hour: ***30 **** %
   c. mean wind speed: ***8.7*** miles per hour
   d. source of meteorological data: (a) ***EAC Form Instructions***
      (b) _____
      (c) _____

   ****Note: The emissions estimating methodology does not employ the default values recommended in the EAC Form instructions.***

4. Description of storage pile activities:

ID	Type of Material Stored	Method of Load-in (check one or more)	Method of Load-out (check one or more)
A	***Limestone Active Storage Pile***	☑ conveyor/stacker: ☐ front-end loader ☐ other (describe): _____	☐ bucket wheel reclaimer ☐ under pile feed ☐ rake reclaimer ☐ pan scraper ☐ front-end loader ☑ other: ***bulldozer/hopper***
B	***Limestone Inactive Storage Pile***	☐ conveyor/stacker: ☐ front-end loader ☑ other (describe): ***Bulldozer***	☐ bucket wheel reclaimer ☐ under pile feed ☐ rake reclaimer ☐ pan scraper ☐ front-end loader ☑ other: ***bulldozer/hopper***

November 9, 2006

AMP OHIO
American Municipal Power-Ohio, Inc.

Mr. Dean Ponchak
Environmental Specialist
Division of Air Pollution Control
Ohio EPA – Southeast District Office
2195 Front Street
Logan, OH 43138

Re: American Municipal Power Generating Station
Facility ID No. 06-53-00-0069
PTI No. 06-08138

Dear Mr. Ponchak:

Thank you once again for taking the time to meet with me and the other representatives of AMP-Ohio on October 16, 2006 to discuss our response to your technical questions concerning the air Permit-to-Install (PTI) application for the AMP Generating Station (AMPGS). This letter and attachments supplement the information provided in our letter dated September 28, 2006. For clarity, the responses below are numbered to correspond to the numbering system used in the September 28, 2006 letter. With the exception of the five items addressed below, AMP-Ohio understands that Ohio EPA has determined the information and data provided in our September 28, 2006 letter adequately addresses the questions raised in your letter dated August 7, 2006.

1. *Ohio EPA requested that AMP-Ohio provide additional information to explain the mercury (Hg) emission rate of 0.0000043 lb/mmBtu (4.3 lb/10^{12} Btu) associated with the two main coal-fired boilers.*

The AMPGS is designed to combust a variety of coals. The permit for the AMPGS must allow the flexibility for the use of various fuel blends as coal could be purchased from different suppliers with mines in Ohio, other eastern states and/or western states.

The naturally occurring Hg in the coal is the source of Hg emissions from coal combustion. The Hg content of coals and the form in which the Hg is present vary by coal seam and significantly from region to region. Figure 3 in the enclosed report from the United States Geological Survey (USGS) shows the variation in Hg content of coals by region, which ranges from an average of 7.8 lb Hg/10^{12} Btu for Illinois Basin coals to 27.0 lb Hg/10^{12} Btu for Gulf Coast region coals. Northern Appalachian coals, including Ohio coal, have an average Hg content of 18.8 lb Hg/10^{12} Btu.

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When coal is burned the Hg in the coal is released as either elemental mercury or oxidized mercury. Oxidized Hg can be present as either a particulate or gaseous pollutant. Some of the elemental Hg may be oxidized by an SCR control system. The control of Hg emissions is dependent on the specific form that Hg takes during the combustion process and can vary significantly from one type of coal to another. Oxidized Hg can be effectively controlled with conventional wet-FGD systems. Comparable removal efficiencies are more difficult to achieve for the elemental Hg due to its volatility. *See, enclosed*, Wet FGD Enhanced Mercury Control for Coal-Fired Utility Boilers, M. Milobowski, Babcock & Wilcox Company, August 2001.

The system for controlling Hg emissions from the two main boilers at the AMPGS includes a SCR, pulsejet baghouse, wet-FGD and wet-ESP. The baghouse and wet-ESP will control the particulate forms of Hg and the wet-FGD and wet-ESP will control the oxidized forms of Hg. The project conceptual design engineer estimates the use of this control system, with the worst case Hg content coal, will result in maximum Hg emissions from the full-load operation of each boiler of no more 0.0223 lb Hg/hr (equivalent to 0.0000043 lb/mmBtu (4.3 lb/10^{12} Btu) at a design heat input capacity of 5,191 mmBtu/hr). The maximum annual Hg emission rate for each boiler is 195.8 lb (0.098 tons) with 8,760 hrs of operation at the maximum hourly emission rate.

The AMPGS will be subject to the Clean Air Mercury Rule (CAMR)[1] and Ohio's CAMR rules and will operate within the allowance-based cap-and-trade system established by that rule as well as the individual boiler emission limitations in 40 CFR § 60.45a. In addition, although specifically excluded from the requirements of the Ohio EPA "Air Toxic Policy" pursuant to the provisions of ORC Sec. 3704.03 (F)(4)(f), the air quality modeling submitted with the PTI application for the AMPGS predicted a maximum off-site 1-hour average air quality impact of 0.002 $\mu g/m^3$ that is less than 0.1% of the MAGLC (refer to Volume IV – Section 8 Ohio Air Toxics).[2]

AMP-Ohio believes that the PTI application for the AMPGS supports the issuance of a PTI that limits the Hg emissions from each boiler as follows: (a) no more than 0.0223 lb Hg/hr; and (b) compliance with the CAMR. This is consistent with the most recent PSD permits for pulverized coal-fired boilers:

(1) Louisville Gas & Electric Trimble Unit No. 2 (issued 1/4/06) which includes Hg limits of 13 x 10-6 lbs/MWh (gross output) (0.00098 lb/hr at 750 MW) and compliance with 40 CFR 60.45a [Note: LG&E stated in the application for Trimble Unit No. 2 that "Unit 2 will have a mercury emission rate at or below USEPA's determination of achievable rates from units utilizing ESP, SCR and WFGD emission control

[1] 70 FR 28606 (May 18, 2005) Final CAMR rule with Revised NSPS for New and Existing Electric Steam Generating Units.

[2] This is comparable to the maximum predicted off-site impact permitted by Ohio EPA in the final PTI issued for the FDS Coke Plant, LLC (PTI No. 04-01360 on June 14, 2004). That permit allows 0.006 lb/hr of Hg emissions with a predicted maximum off-site impact of 0.0022 $\mu g/m^3$.

technologies." LG&E also stated that "LG&E proposes to meet BACT emission rates; however, LG&E also requests that if (a) these rates cannot be achieved on a consistent basis, even after optimization of the air pollution control equipment, and (b) if no other units are actually achieving these levels in practice on a consistent basis, that higher achievable levels be permitted." AMP-Ohio interprets these comments to indicate that while LG&E believes the control systems proposed for Trimble Unit No. 2 will achieve the requested emission rates, they also wanted the flexibility to alter the emission rates if the rates cannot be achieved in practice on a consistent basis; and

(2) Prairie State Generating Company, LLC (issued 4/28/05) that requires either: (a) compliance with standards adopted by the US EPA pursuant to the Clean Air Act (i.e., CAMR), or (b) alternate requirements if CAMR is not in effect.

3. Ohio EPA requested that AMP-Ohio provide a copy of the request submitted to US EPA seeking a federal applicability determination related to the NSPS Subpart PP for the rotary dryer associated with the Fertilizer Plant.

AMP-Ohio has contacted the vendor for the ammonia-based scrubbing alternative and requested they provide us a copy of their communication with US EPA. We will forward that information to Ohio EPA as soon as possible.

4. The List of Emission Units and Summary of Applicable Rules on page 5 of the PTI application for emissions unit P903 – Limestone Preparation Building refers to PM instead of PE.

Enclosed is a copy of page 5 of the application with the appropriate references to "PM" changed to "PE".

5. Ohio EPA requested that Item 3 on the EAC form for paved and unpaved roadways be revised to identify only the roadway segments rather than having an entry for each type of vehicle operated on each roadway segment (pages 43 and 50 of the PTI application).

Enclosed are revised EAC Forms for the Paved Roadways (F002) and the Unpaved Roadways (F003) that have been completed in the manner requested by Ohio EPA.

11. Ohio EPA requested that AMP-Ohio provide a further explanation for the BACT determination for PM/PM_{10} control for the coal, limestone and ash handling operations.

Enclosed is a set of tables that were extracted from the PTI application with an additional column of information that highlights in bold face type the points where a baghouse or fabric filter dust collector is proposed and to further explain the basis for the BACT determination for each emissions point where a baghouse or fabric filter is not proposed.

There are numerous emission points where the PTI application for the AMPGS includes a baghouse or fabric filter. The following table summarizes the estimated uncontrolled PM_{10} emission rates for emissions points that are controlled by baghouses versus those that are controlled with another mechanism (dust suppressant, enclosure, fogging system, etc.). All of the larger sources of PM_{10} emissions and more than 97% of the total uncontrolled PM_{10} emissions from these operations will be controlled with a fabric filter/baghouse control device.

Emission Unit	**Estimated Uncontrolled PM_{10}**		
	Controlled by a Baghouse	**Controlled with Another System**	**Total**
F004 Coal Storage Piles	NA	6.86	6.86
F005 Limestone Barge Unloading	NA	0.52	0.52
F006 Limestone Storage Piles	NA	0.78	0.78
P901 Coal Barge Unloading	NA	8.24	8.24
P902 Coal Crushing	825.94	13.53	839.47
P903 Limestone Prep	112.63	0.33	112.96
P904 Gypsum Handling	NA	1.82	1.82
P905 & P906 Flyash Handling	150.17	0.02	150.19
Total	1,088.74	32.09	1,120.84
	97.14%	2.86%	100.0%

The decision to employ a fabric filter versus other means of fugitive dust control was made after determining a number of factors, including the greater potential for spontaneous combustion and the high percentage of fines associated with the use of PRB coal. These factors impact the choice of dust suppression with the use of water sprays at some locations and the use of fogging systems at other locations. The use of a baghouse to control a minor source of emissions could pose an unnecessary fire/explosion risk for little or perhaps no gain in PM_{10} control efficiency. AMP-Ohio believes that the combination of baghouses, filter dust collectors, and wet suppression systems identified in the PTI application are consistent with BACT for these processes.

AMP-Ohio further reviewed the RBLC entries for recent coal-fired boiler projects in an effort to ascertain the PM_{10} control systems specified for support operations. We believe that many of the RBLC records present a summary of the control systems employed and may not include all facets of the overall control system for material handling operations, conveyor transfer points, etc. Some entries for coal-fired boilers do not include any information for support operations (e.g., coal handling, limestone handling, etc.). In the PTI application for the AMPGS, coal crushing, limestone preparation and ash management all employ one or more baghouses to control PM_{10} emissions from some emission points while other emission points will be controlled with either wet suppression or fogging systems. A summary RBLC entry could be developed that

identifies only the baghouse control. Based on our knowledge of other power plant projects, such oversimplification is often the case.

The entries for the Bull Mountain No. 1, LLC Roundup Power Project and CLECO Power, LLC illustrate the diversity in how BACT determinations are summarized in the RBLC:

Bull Mountain No. 1, LLC. The RBLC entry for Bull Mountain No. 1, LLC Roundup Power Project (RBLC ID MT-0022 for Permit Number 3182-00 issued on July 21, 2003) contains a single entry for "Material Transfer, Coal Handling and Transfer Points". This entry notes that BACT for these operations is "Dust Suppression Systems and Enclosures. Baghouse."

CLECO Power, LLC. The RBLC entry for CLECO Power, LLC (RBLC ID LA-0202 for Permit Number PSD-LA-711 issued on February 23, 2006) contains entries for various process operations that are components of coal, limestone and ash handling systems. This RBLC entry includes the following BACT specifications for coal handling operations:

CLECO Power, LLC	
Coal Handling Operation	**BACT Specification**
Barge Unloading	Wind Screen and Dust Suppression Water Spray
Receiving Hopper Enclosure Transfer Houses 1, 2 & 3	Dust Suppression System
Outside Conveyors	Hooded Conveyors
Fuel Reclaim Hoppers Drop Point	Slight Negative Pressure from Conveyor Tunnel Ventilation
Transfer House 4	Dust Suppression System
Crusher House	Dust Suppression System
Transfer Bay and Tripper Conveyor to Silos	Baghouse

In making its BACT determination, AMP-Ohio also reviewed the permits issued for the three most recent "green field" coal-fired power plants to determine the BACT specifications for coal handling in those comparison permits: (a) Prairie State Generating, LLC (Permit 01100065 issued April 28, 2005 by the Illinois Environmental Protection Agency); (b) Thoroughbred Generating, LLC (Permit V-02-001 issued February 17, 2005 by the Kentucky Division for Air Quality); and (c) Longview Power, LLC facility (Permit R14-0024 issued March 2, 2004 by the West Virginia Department of Environmental Protection).

Prairie State Generating, LLC. The coal handling operations are addressed in pages 37 – 45 and Table II of Attachment 1 of the Prairie State Generating, LLC permit. The permit requires that the coal handling operations be controlled by "enclosures or covers and fogging, material quality, or application of water or other dust suppressants so as to minimize fugitive emissions to the extent practicable". This permit also specifies that these operations shall either: (1) have no visible emissions as determined by Method 22; or (2) achieve a nominal control efficiency of at least 99% from the uncontrolled emission rate using appropriate US EPA emission factors. The emission rates specified in Table II include PM emissions from conveyor unloading, transfer house, crusher building, hoppers, etc. of no more than 0.479 lb/hr and 2.10 tpy.

Thoroughbred Generating, LLC. The coal handling operations are addressed on pages 19 - 25 of the Thoroughbred Generating, LLC permit and include the use of enclosures and baghouse, bin filters, partial enclosure/low drop/filter and telescopic chutes. The permit requires that "the permittee shall install control methods selected as BACT". The permit also includes the NSPS visible emission limit of 20% opacity and a specification that the "discharge of visible fugitive dust emissions beyond the property line is prohibited".

Longview Power, LLC. The coal handling operations are addressed in pages 12 – 14 of the Longview Power, LLC permit and include the use of wind screens, dust suppression and enclosures. The permit limits visible emissions from the coal crushers, conveying equipment and storage silos to no more than 20% opacity (6-minute average). The permit also specifies PM and PM_{10} emission limits for vents from the coal crushers and for the six storage silos. The only dust collector mentioned in the permit is the dust collector associated with the six storage silos.

AMP-Ohio believes that the control measures specified as BACT in the permit application for the AMPGS are comparable or superior to the control measures required in other recent PSD permits for coal-fired power plant support operations.

AMP-Ohio believes this letter and attachments address all of the questions raised by Ohio EPA during your technical review of the air PTI application for the AMPGS. Since we are close to the point where Ohio EPA will be issuing a draft PTI, we would like to formally request that Ohio EPA schedule and announce a public meeting concurrent with the issuance of the draft PTI.

Thank you once again for assisting AMP-Ohio with the completion of a timely review of the PTI application for the AMPGS. Please contact me at 614-337-6222 if you have any questions concerning this letter or enclosures.

On Behalf of the Members,

Randy Meyer
Manager of Environmental Affairs

Enclosures

cc: Scott Kiesewetter, AMP-Ohio
Chuck Taylor, GT Environmental

Mercury in U.S. Coal—Abundance, Distribution, and Modes of Occurrence

Introduction

In February 1998, The U.S. Environmental Protection Agency (EPA, 1998a,b) issued a report citing mercury emissions from electric utilities as the largest remaining anthropogenic source of mercury released to the air. EPA officials estimated that about 50 tons of elemental mercury are emitted each year from U.S. coal-burning powerplants, with lesser amounts coming from oil- and gas-burning units. According to EPA estimates, emissions from coal-fired utilities account for 13 to 26 percent of the total (natural plus anthropogenic) airborne emissions of mercury in the United States. On December 14, 2000, the EPA announced that it will require a reduction in mercury emissions from coal-fired powerplants, with regulations proposed by 2003 and final rules for implementation completed by 2004 (EPA, 2000).

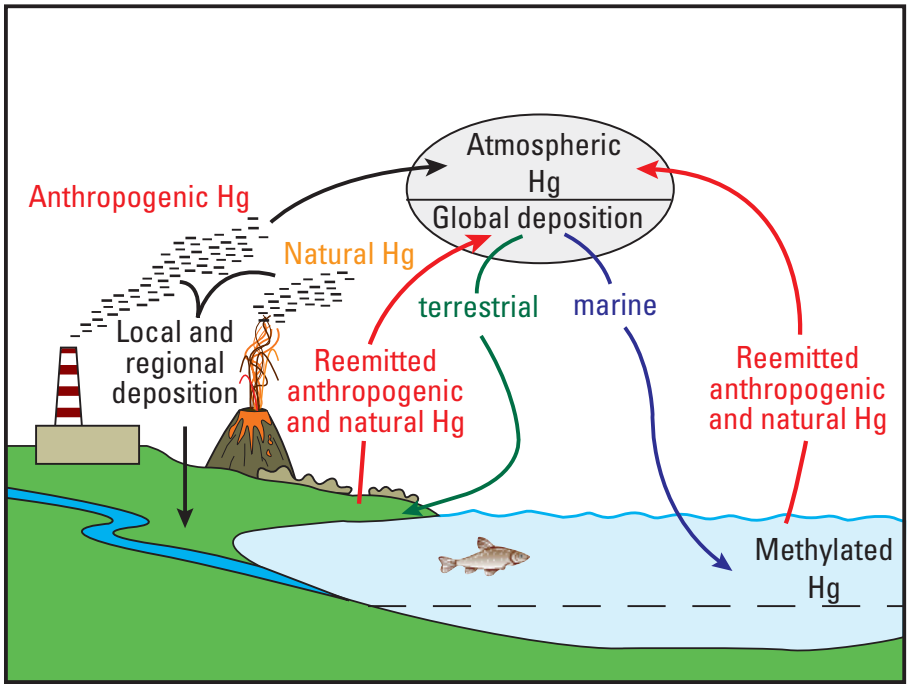

Figure 1. Simplified geochemical cycle of mercury (Hg).

Environmental Significance of Mercury

The mercury (Hg) directly emitted from powerplants generally is not considered harmful; however, in the natural environment, mercury can go through a series of chemical transformations that convert elemental mercury to a highly toxic form that is concentrated in fish and birds (fig. 1). The most toxic form of mercury is methylmercury, an organic form created by a complex bacterial conversion of inorganic mercury. Methylation rates (creation of methylmercury) in ecosystems are a function of mercury availability, bacterial population, nutrient load, acidity and oxidizing conditions, sediment load, and sedimentation rates (National Research Council, 1978).

Methylmercury enters the food chain, particularly in aquatic organisms, and bioaccumulates. Bioaccumulation is the enrichment of a substance in an organism and includes bioconcentration from environmental concentrations and additional uptake via the food chain. Cases of mercury poisoning have been documented in people who eat contaminated fish for prolonged periods, both in the United States and abroad. Pregnant women and subsistence fishermen are particularly vulnerable. Because high levels of mercury have been detected in fish, many U.S. States have issued advisories that restrict fishing.

Reduction in mercury emissions from U.S. coal-fired powerplants may help minimize or avoid health problems caused by exposure to excess mercury. There are several ways in which this reduction can be accomplished. One option to reduce the quantity of mercury in the atmosphere is to use high-rank coals. Generally, moisture in coal decreases and calorific value (thermal energy) increases as coal rank (degree of maturation) increases. Therefore, powerplants that burn high-rank coal in their boilers require less coal for a given thermal output. Thus, for coals having similar mercury concentrations, the higher rank coals will contribute less mercury to the environment. Additional options include selective mining of coal (avoiding parts of a coal bed that are higher in mercury content), coal washing (to reduce the amount of mercury in the coal delivered to the powerplants), switching from coal to natural gas, and postcombustion removal of mercury from the powerplant stack emissions. Information on the abundance, distribution, and forms of mercury in coal may be helpful in selecting the most efficient and cost-effective options for mercury reduction.

Abundance and Distribution of Mercury in Coal

The U.S. Geological Survey (USGS) has compiled a nationwide coal information database over the last 25 years. A subset of the data, called COALQUAL (Bragg and others, 1998) contains analyses of over 7,000 coal samples that have been collected or calculated to represent the entire thickness of a coal bed in the ground.

Figure 2 is a histogram of the mercury values in the COALQUAL database for conterminous U.S. coal. Statistics for all analyses indicate a mean of 0.17 part per million (ppm), with a median and standard deviation of 0.11 ppm and 0.17, respectively. About 80 percent of the mercury concentrations in the database are less than 0.25 ppm. The maximum mercury database value for coal in the ground is 1.8 ppm, after deleting one higher value as a statistical outlier.

Table 1 shows the median and mean values for mercury concentrations (in ppm) and calorific values (British thermal units per pound (Btu/lb)), as well as the number of analyses, for selected coal-producing regions in the United States, using the COALQUAL database. The mercury data in table 1 have been calculated back to an as-received basis, approximately the mercury concentration of the coal in the ground.

Northern Appalachian area coal has the highest mean and median values for mercury, with coal from the southern Appalachian area having the second highest value and coal from the central Appalachian area slightly lower. Coal from these three areas has extremely high calorific values. Coal from the Uinta region has the lowest mean and median mercury values of all indicated areas. Some western U.S. coals are low in mercury but are also low in calorific value, because they are low in rank.

The concentration of mercury can also be presented on an equal-energy basis (input load) in pounds (lb) per trillion (10^{12}) Btu to provide a convenient unit of comparison between coal from different areas (fig. 3). This is a simple calculation, dividing as-received mercury ppm values by Btu/lb and expressing the value on a 10^{12} Btu basis. The data from COALQUAL used in this analysis yield a mean U.S. input load of 14 lb Hg/10^{12} Btu (with a median of 9.7 and a standard deviation of 15). The calculated input loads from individual samples were used to calculate a mean value for each of the selected coal-producing regions listed in table 1. Mean mercury input loads were divided into arbitrary 5-unit intervals and are color-coded in figure 3. According to the Energy Information Administration (EIA, 2001), U.S. coal production, which can be roughly correlated with usage, is similar between coal regions east and west of the Mississippi River (38 and 48 percent, respectively). About 14 percent of U.S. production comes from coal in the Interior areas.

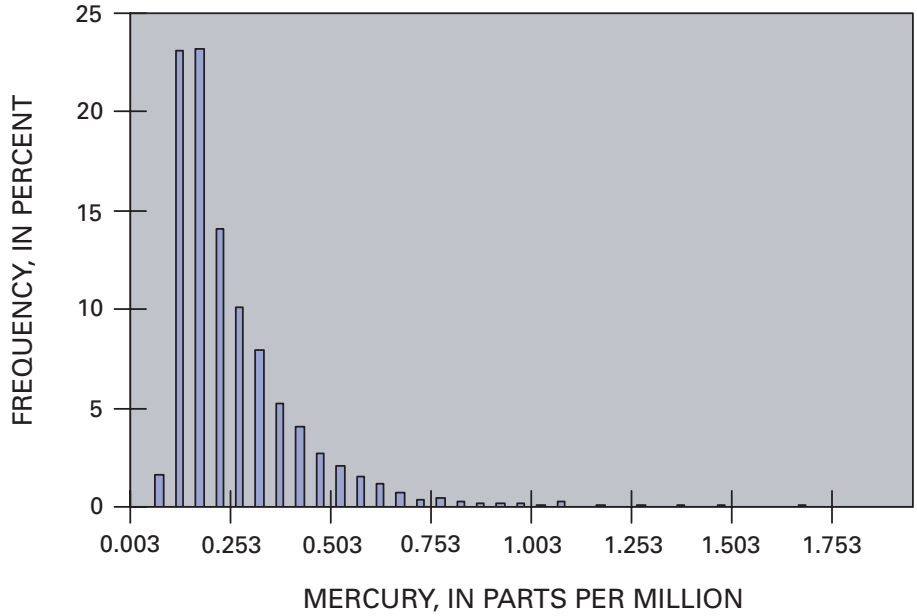

Figure 2. Histogram of mercury concentrations (remnant moisture, whole coal basis) for conterminous U.S. coal from the COALQUAL database.

On the basis of the information shown in figure 3, the Gulf Coast lignite may have the highest potential for mercury emissions, and the Green River coal from western Wyoming may have the lowest mercury emissions on an equal-energy basis. Of the two major bituminous coal-producing regions, samples from the Appalachian region contain higher mercury levels than those from the Eastern Interior. Samples from the Powder River Basin are slightly higher in mercury levels than the subbituminous coals of the San Juan River Basin.

Modes of Occurrence and Reduction of Mercury

The COALQUAL data set does not take into account the potentially substantial reduction of mercury by physical coal cleaning, because the analyses represent coal as it exists in the ground. The modes of occurrence of an element in coal can affect the way the element behaves during coal cleaning, combustion, and leaching.

Table 1. Median and mean values for mercury concentrations (in parts per million (ppm)) and calorific values (in British thermal units per pound (Btu/lb) on an as-received, whole coal basis for selected coal-producing regions in the United States.

[No. = number of analyses]

Coal-producing region	Mercury (ppm)			Calorific value (Btu/lb)		
	Median	Mean	No.	Median	Mean	No.
Appalachian, northern	0.19	0.24	1,613	12,570	12,440	1,506
Appalachian, central	.10	.15	1,747	13,360	13,210	1,648
Appalachian, southern	.18	.21	975	12,850	12,760	969
Eastern Interior	.07	.10	289	11,510	11,450	255
Fort Union	.08	.10	300	6,280	6,360	277
Green River	.06	.09	388	9,940	9,560	264
Gulf Coast	.13	.16	141	6,440	6,470	110
Pennsylvania Anthracite	.10	.10	51	12,860	12,520	39
Powder River	.06	.08	612	8,050	8,090	489
Raton Mesa	.05	.09	40	12,500	12,300	34
San Juan River	.04	.08	192	9,340	9,610	173
Uinta	.04	.07	253	11,280	10,810	226
Western Interior	.14	.18	286	11,320	11,420	261
Wind River	.08	.15	42	9,580	9,560	42

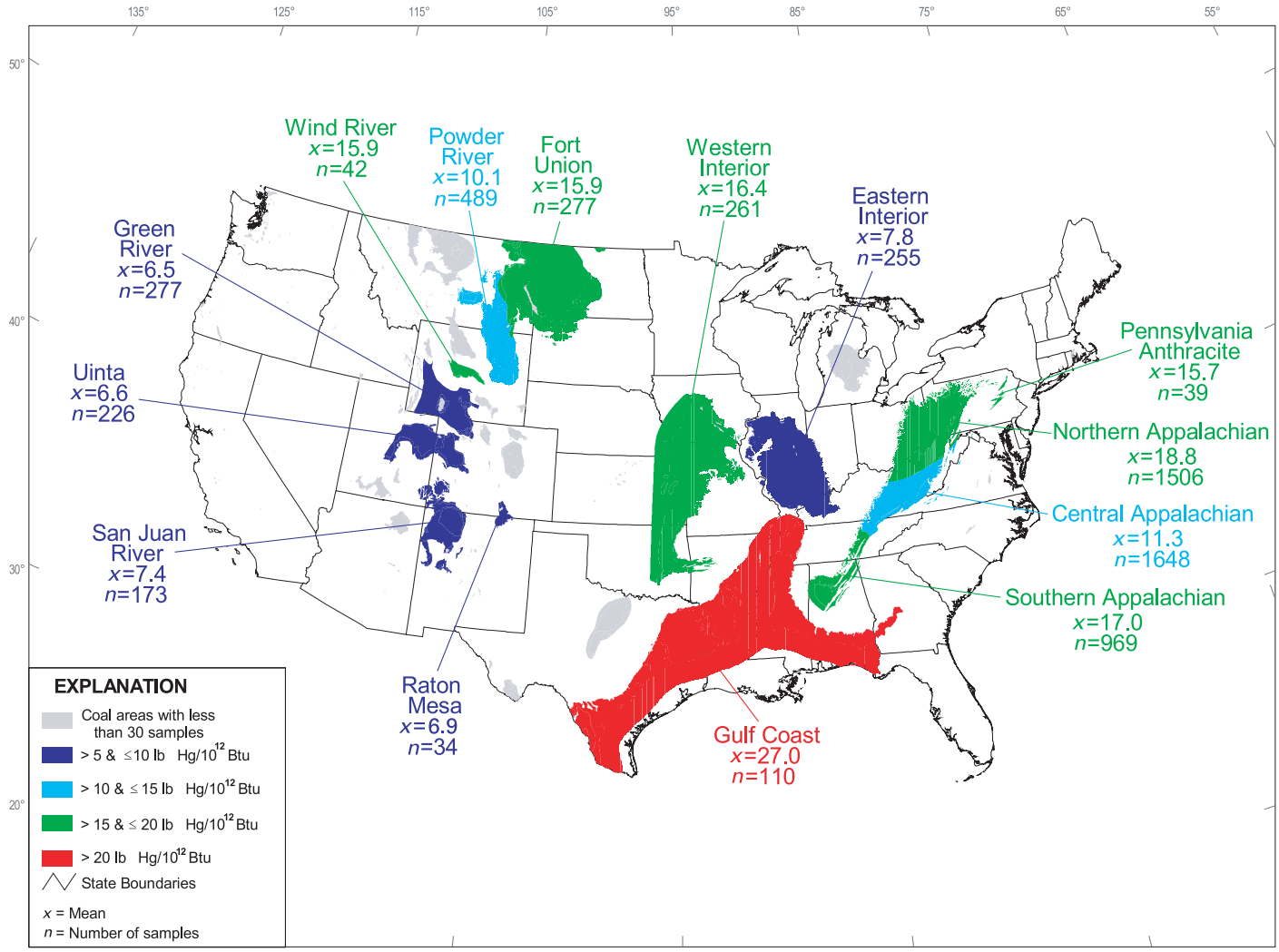

Figure 3. Mercury input loadings (in pounds of mercury per 10^{12} British thermal units (lb Hg/10^{12} Btu)) of in-ground coal for selected U.S. coal-producing regions.

Thus, the element's mode of occurrence has an important influence on its environmental and technological impacts. Because of the low concentrations (commonly less than 0.2 ppm) of mercury and its volatility, it is particularly difficult to determine the modes of mercury occurrence in coal. USGS research indicates that much of the mercury in coal is associated with pyrite, which generally forms after the coal is compacted (fig. 4). Other forms of mercury that have been reported in coal are organically bound, elemental, and in sulfide and selenide minerals (fig. 5).

The U.S. Geological Survey is collaborating on research to determine if the modes of occurrence of mercury in coal influence the formation of mercury species during the combustion process and thus the likelihood of mercury capture from the gas. The USGS has also collaborated with industry on research to assess the removability of mercury from coal by conventional physical coal-cleaning techniques. The results of these studies indicate that, on the average, 37 percent of the mercury is removed by coal cleaning (Toole-O'Neil and others, 1999). The information that the USGS is generating on mercury distribution and modes of occurrence is also relevant to mercury reduction by fuel switching, selective mining, and chemical coal cleaning. Flue gas controls on mercury (sorbent injection and hydrothermal treatment technologies) are also being evaluated by research organizations as possible economic solutions for mercury reduction.

Summary

The concentration of mercury in coal samples from the U.S. Geological Survey's COALQUAL database averages 0.17 ppm for in-ground coal in the conterminous United States. Mean values range from 0.07 ppm for coal samples from the Uinta region to 0.24 ppm for samples from the northern Appalachian coal-producing region. On an equal-energy basis, Gulf Coast coal samples have the highest input load values (27.0 lb Hg/10^{12} Btu), and the Green River region samples have the lowest values (6.5 lb Hg/10^{12} Btu).

The COALQUAL database is an extremely valuable source of information for raw or in-ground trace-element concentrations in U.S. coals and, if adjusted for the effect of coal cleaning in appropriate coals, can provide a first estimate of as-shipped mercury concentration in coal where data are not available. Physical coal cleaning is a viable method of reducing mercury that enters the combustion system and, therefore, reducing mercury that enters the atmosphere. The mean mercury concentration of eastern U.S. coals may be less than reported, if the impact of physical coal cleaning is considered.

—By Susan J. Tewalt, Linda J. Bragg, and Robert B. Finkelman

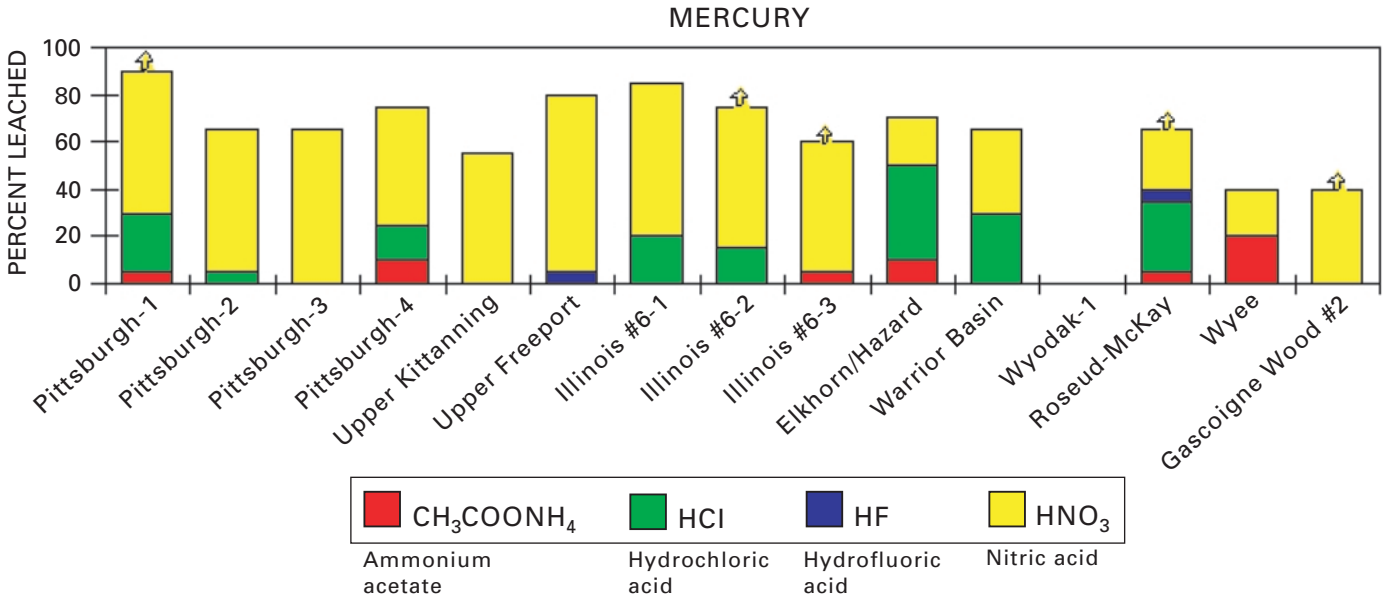

Figure 4. Selective leaching results for 15 coal samples (12 from the United States) (Palmer and others, 1998). The yellow bars indicate the proportion of mercury leached by nitric acid. This mercury is believed to be associated with the sulfide minerals, such as pyrite. Direct analysis of pyrite grains by a laser ablation mass analyzer indicated mercury concentrations consistent with selective leaching data. The green bars indicate the mercury leached by hydrochloric acid; much of this mercury may have come from oxidized pyrite. Arrows indicate minimum values.

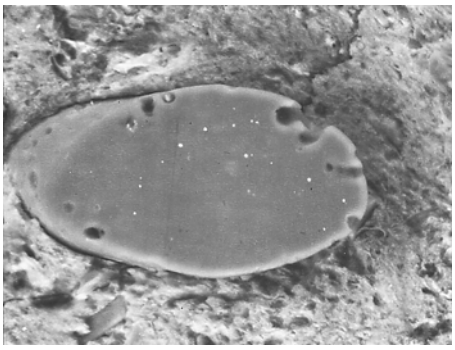

Figure 5. Scanning electron photomicrograph of a polished block of lignite from California. The minute (less than 1 micrometer) bright spots are rare grains of mercury selenide.

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Wet FGD Enhanced Mercury Control for Coal-Fired Utility Boilers

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BR-1716
(RDTPA 01-11)

Abstract

The Babcock & Wilcox Company (B&W) and McDermott Technology Inc. (MTI) have had a continuing program over the past decade for optimizing mercury control technologies using conventional flue gas clean-up equipment, and addressing the design/commercialization issues of such control approaches.

Results from testing conducted at B&W's Clean Environment Development Facility (CEDF) indicate the possibility of achieving 90% or greater mercury removal in a wet scrubber with the addition of a small amount of a proprietary reagent, with no adverse effects on scrubber operation or performance. Preliminary investigation into the fate of the mercury captured in the wet scrubber indicates that the mercury resides in the solid phase, in a form that is insoluble and thermally stable. Test results were encouraging enough that B&W and MTI, with funding assistance from the U.S. Department of Energy's (U.S. DOE) National Energy Technology Laboratory and the Ohio Coal Development Office (OCDO) within the Ohio Department of Development, is demonstrating this control technology at two utility power plants.

This paper addresses: (a) results of CEDF tests; (b) fate of mercury investigation findings; (c) results of mercury speciation tests; and (d) design/test plan for utility-scale demonstrations.

Introduction

Under the Clean Air Act Amendments of 1990, the United States Environmental Protection Agency (U.S. EPA) was mandated to evaluate emissions of hazardous air pollutants from fossil fuel-fired electric generating units and to provide a summary report to Congress on emissions, controls, and health impacts. The U.S. EPA, key state environmental agencies, and regional associations continue to evaluate the need for regulation of mercury emissions from coal-fired boilers to reduce human exposure to this persistent, bio-accumulative trace element. Mercury is emitted from coal-fired boilers in very low concentrations. However, as a group, coal-fired boilers represent a major unregulated source of mercury emissions to the environment. The U.S. EPA, U.S. DOE and EPRI have recently completed analysis of the 1999 Information Collection Request data in which they all have estimated that coal-fired utility boilers emit anywhere between 42 – 45 tons of mercury per year in the U.S. The potential for mercury regulations suggests viable, cost-effective control strategies for coal-fired utilities are required. Currently, one of the U.S. EPA's main mercury regulatory objectives is to ensure the availability of environmentally sound and cost-effective mercury control technologies. Along these lines, the study also states that the EPA-reported mercury exposure guidelines are "scientifically justifiable," clearing a major hurdle for regulating mercury emissions.[1]

Over a decade ago B&W and MTI had the vision to focus on hazardous air pollutants (HAPs) control for the electric power industry. One major aspect of that focus was the creation of the Advanced Emissions Control Development Program (AECDP) – sponsored by the U.S. DOE, OCDO, and B&W. Through these efforts, several approaches to improve mercury control for wet scrubbing systems were identified for further investigation (four wet scrubbing mercury emission control patents are currently pending by B&W and MTI).

Wet FGD systems are currently installed on about 25% of the coal-fired utility generating capacity in the U.S., representing about 15% of the total number of U.S. coal-fired units. FGD

systems can provide a cost-effective near-term mercury emissions control option with a proven history of commercial operation. For boilers already equipped with FGD systems, the incremental cost of *any* vapor phase mercury removal achieved is minimal. To be widely accepted and implemented, technical approaches which improve mercury removal performance for existing wet FGD systems should also have low incremental costs and have little or no impact on operation and SO_2 removal performance.

A major directive of the AECDP was to investigate and/or develop methodologies for enhancing mercury removal performance for wet FGD systems. During the program, several approaches were developed and subsequently investigated. Results from two of the approaches were promising enough to warrant additional work to refine the technical approaches and further improve the mercury removal performance.

The recently completed *Mercury Control for Coal-Fired Utilities* Program – co-funded by the OCDO and B&W – was focused on taking the wet scrubber mercury removal concepts identified during the AECDP studies and optimizing them for implementation in a commercial demonstration at a utility site. Areas of investigation included:

- **Concept Evaluation.** This activity was directed at determining how topics such as current regulation status, potential market impact, conceptual design, and process economics would affect the selection of a commercial host site and the eventual commercialization of the enhanced removal concepts.
- **10 MW_e Testing for Technology Performance Optimization.** Testing in the 100 MBtu/hr B&W Clean Environment Development Facility (CEDF) was conducted to optimize the mercury control technologies and to address design/commercialization issues associated with the mercury control approaches.
- **Fate of Mercury.** This activity was directed at determining what happens to the mercury after it is removed from the flue gas stream. Removing the mercury from the gas stream may not be enough if it ultimately ends up in an unstable form in the liquid or solids byproduct streams where it can be re-released to the environment. Tasks such as byproduct sample analysis, thermal stability of the byproducts, and mercury compound identification were included in this activity.

Enhanced Wet FGD Mercury Control

Technical Approach

The work was made possible by the state-of-the-art CEDF. Figure 1 provides an isometric view of the CEDF. The 100 MBtu/hr CEDF integrates combustion and post-combustion testing capabilities to facilitate the development of the next generation of power generation equipment. The furnace has been carefully designed to yield combustion zone temperatures, flow patterns, and residence times representative of commercial boilers. Boiler convection pass and air heater simulators maintain representative conditions through the entire boiler system. Back-end systems include both a baghouse and an electrostatic precipitator for particulate control, sorbent injection systems, and wet and dry scrubbers for SO_2 control.

The CEDF pilot wet scrubber facility was designed to allow simulation of commercial FGD systems. The wet scrubber system includes the absorber tower, a slurry recirculation tank, a reagent feed system, and a mist eliminator wash system. The 50-ft high by 2-ft diameter absorber tower is constructed of Plexiglas to permit visual observation of the slurry sprays. Pre-pulverized limestone is mixed with make-up water in the reagent feed tank. The solids content of the recirculating slurry is maintained at 12 to 15%. To achieve the desired liquid/gas ratio (L/G), any combination of four levels of single-spray nozzles may be used. The wet scrubber is equipped with a removable gas flow distribution plate to simulate both tray tower and open spray tower scrubber designs. An air sparger ring in the bottom of the recirculation tank is used for forced oxidation operation. Spent slurry from the scrubber is dewatered using a hydroclone circuit. The hydroclone underflow is discharged to settling tanks where the solids settle out and water is decanted to the clarified recycle water tank for re-use in the scrubber. A variable speed ID fan located downstream of the scrubber is used to control the gas flow rate through the scrubber.

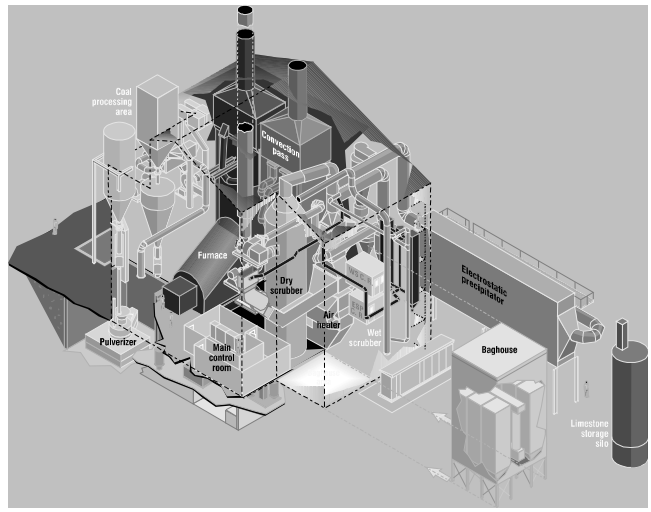

Figure 1 Isometric view of the Clean Environment Devlopment Facility.

The scrubber was operated as a tray tower, limestone forced oxidation (LSFO) system for this test program. The baseline operating conditions for the wet scrubber were selected to provide a direct comparison with tests performed during the AECDP. Operation at the baseline pH and slurry spray flux resulted in a 90 to 95% SO_2 removal efficiency when firing an Ohio 5&6 coal blend. The baseline scrubber operating conditions are summarized in Table 1.

A higher oxidation air flow rate (than that available commercially) was used to compensate for the limited height of slurry above the air sparger in the absorber recirculation tank. The pilot is limited to a slurry height of approximately 12 feet above the

Table 1
Baseline Wet Scrubber Operating Parameters

Nominal Slurry pH	5.4
Nominal L/G Ratio	120 gal/1000 acf
Nominal Tower Velocity	9 ft/sec
Spray Flux	65 - 70 gpm/ft^2
Above Tray Spray Header Flow (3)	60 - 65 gpm each
Under Tray Spray Header Flow	20 gpm
Oxidation Air Stoichiometry Range	2 - 8 mol/mol

sparger, which is in contrast to a typical commercial system value of 18 feet. Previous operation with this pilot scrubber has demonstrated that an oxidation air stoichiometry of 4 to 5 is necessary to maintain greater than 99% oxidation.

The Ontario Hydro Method was used to measure total and speciated mercury emissions. For each unique test condition, triplicate Ontario Hydro sample trains were performed at each sampling location. Results from each set of three measurements were then averaged to provide a "test" value. The impinger solutions from the Ontario Hydro Method sample trains were analyzed for mercury using Cold Vapor Atomic Absorption Spectroscopy (CVAAS). This method is used to determine both the elemental and oxidized forms of mercury. The analysis follows EPA reference method SW7470 (CVAAS).

Two test campaigns were conducted in the CEDF, firing a blend of Ohio 5 and Ohio 6 coals. The goal for the first test campaign (Phase IA) was to expand on the single-point exploratory tests performed during the AECDP. The goal of the second campaign (Phase IB) was to further develop the most promising approach from Phase IA in preparation for a utility-scale demonstration.

The pilot wet scrubber was operated with flue gas taken from the ESP outlet. Scrubber operating parameters (L/G, tower velocity, pH, etc.) were held constant for the duration of testing to eliminate their effect on mercury removal. Triplicate baseline Ontario Hydro measurements were performed prior to any additive addition to determine nominal scrubber mercury removal levels. Subsequent tests were conducted with varying additive feed rates and additive combinations. As mentioned above, triplicate Ontario Hydro measurements were performed for each test at the wet scrubber inlet and wet scrubber outlet.

Approach 1

Testing performed to evaluate the effect of Approach 1 on wet scrubber mercury removal served a two-fold purpose: 1) the single condition tested during the AECDP may not have been optimal, and 2) because of the need for greater care in the handling, use and storage of the reagent used in Approach 1, identifying and evaluating alternate reagents providing similar reactivity (and greater safety) to that used in Approach 1 was deemed essential to industry acceptance. Several tests were performed during Phase IA evaluating both the standard and alternate Approach 1 reagent. A summary of the Phase IA test results is shown in Figure 2. In the figure, average speciated mercury concentrations in the flue gas are shown for each test. Each group of two bars represents the wet scrubber inlet and outlet concentrations for a given test. Each bar is further divided to show oxidized and elemental mercury concentrations. The number above the outlet bar shows the average total mercury removal for that test. The error bars represent the maximum and minimum mercury concentration for each location and each test. Finally, the test ID relates to the relative reactivity of Approach 1 reagent used for a given test, compared to the reactivity used in the AECDP exploratory test. For example, "0.1X" indicates that 1/10th the amount of the reagent used in the AECDP test was used for this particular Phase IA test.

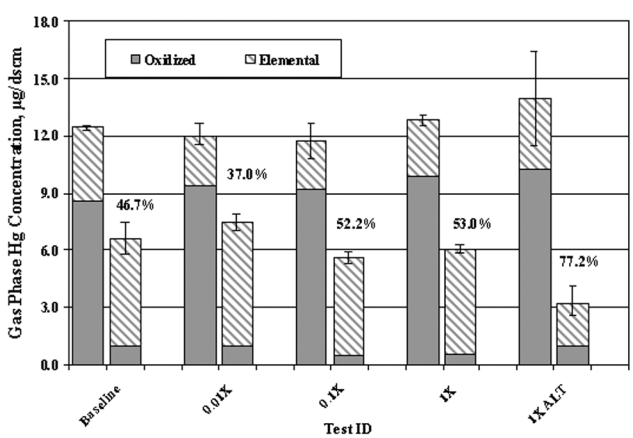

Figure 2 Summary of Approach 1 wet scrubber mercury removal performance Phase IA tests.

Table 2
Oxidized and Elemental Mercury Removal – Approach 1

Test Description	Oxidized Removal, %	Elemental Removal, %	Total Removal, %
0.01X	89.6	(147.0)	37.0
0.1X	94.7	(102.5)	52.2
1X	93.7	(78.8)	53.0
AECDP (1X)	92.1	12.9	70.7

As shown in the figure, the Approach 1 reagent yielded little to no improvement over baseline mercury removal levels, in contrast to the improvement from 46% to 71% observed during the AECDP exploratory test. The primary cause for the lack of improvement was the apparent inability of the Approach 1 reagent to suppress the emission of elemental mercury from the wet scrubber. This observation is further illustrated in Table 2. In the table, removal performance is shown for each test for both the oxidized and elemental forms of mercury. Similar levels of oxidized mercury removal were observed during both test programs; elemental mercury levels increased across the scrubber for each of the three Phase IA tests, compared with a 13% *reduction* during the AECDP test. Subsequent data and sample analysis identified no noticeable differences between the scrubber conditions for the AECDP and Phase IA tests which could be responsible for the variation in mercury removal performance. The lack of an identifiable cause for the removal performance discrepancies indicated that the theorized mechanism for Approach 1 may not be as straightforward as initially thought and that small differences in scrubber operation can have a large effect on removal performance. These results, combined with potentially substantial safety issues associated with the Approach 1 reagent, solidified the need for identifying and evaluating alternate reagents.

Two tests with the alternate Approach 1 reagent were performed during the Phase IA tests. The results for one of these are shown in Figure 2 (identified as "1X ALT"). The second test was conducted with a combination of reagents and was not included in the figure. As shown in the figure, mercury removal with the alternate reagent (fed to the scrubber to obtain the same reactivity as the corresponding amount of the Approach 1 reagent) was higher than all of the Phase IA tests with the Approach 1 reagent and higher than the AECDP test (77% vs. 70%). No effect, deleterious or beneficial, was observed with respect to scrubber operation during the tests with the alternate reagent.

An additional benefit was observed during the second alternate reagent test. Scrubber operation during this test was less than optimal due to a large pH excursion. Mercury removal for this test was actually higher (79% vs. 77%), indicating that the

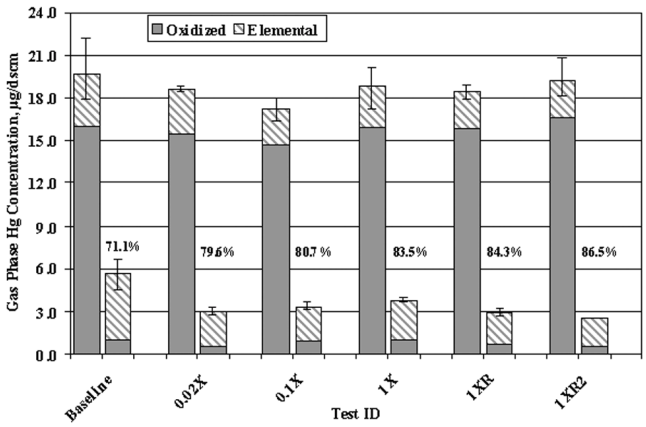

Figure 3 Summary of alternate reagent wet scrubber mercury removal performance Phase IB tests.

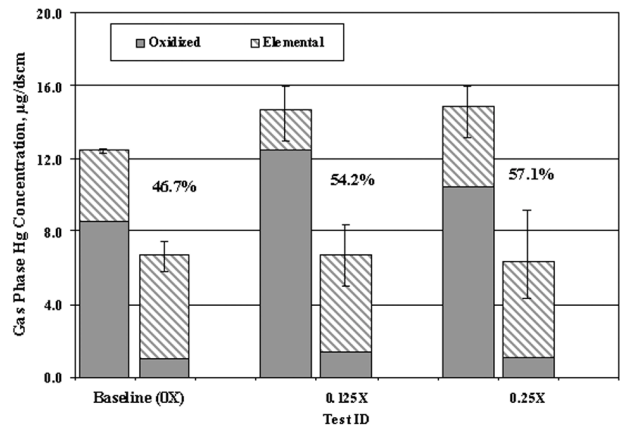

Figure 4 Summary of Approach 2 wet scrubber mercury removal performance Phase IA tests.

alternate reagent may not be as susceptible to variances in scrubber operation as the original Approach 1 reagent appears to be. Based on the Phase IA test results it was decided that a major focus of Phase IB would be to more extensively evaluate the Approach 1 alternate reagent.

Figure 3 presents a summary of the Phase IB tests conducted with the alternate reagent. Similar to Figure 2, the test ID relates to the relative reactivity of Approach 1 reagent used for a given test, compared to the amount used in the AECDP exploratory test. For example, "0.1X" indicates that 1/10th the reactivity of the reagent used in the AECDP test was used for this particular Phase IB test. As can be seen from the data presented, although baseline mercury removals were higher than during the Phase IA tests (most likely due to higher levels of mercury in the coal being oxidized and then removed in the scrubber), elemental mercury concentrations once again increased across the scrubber.

The data in the figure also show that high mercury removals were obtained across the scrubber while using the alternate reagent. For these tests, two forms of the alternate reagent were evaluated. The first form (identified as "1XR2" in the figure) was the same as that evaluated during Phase IA. The remaining tests were conducted with a similar form (the same active ingredient), which is more economical and more readily available. It can be seen that very similar removal levels were observed with both forms of the alternate reagent.

Approach 2

Two tests were conducted during the Phase IA test campaign to evaluate the Approach 2 reagent over a range of concentrations. During the AECDP exploratory test, a single concentration of reagent was used. This concentration was based on an estimated slurry composition and as such may not have been optimal. Further analysis indicated that much lower concentrations were necessary due to the reagent's effect on scrubber operation. Upon addition of the Approach 2 reagent, wet scrubber operation under "typical" conditions becomes increasingly difficult, particularly with respect to pH control. The Approach 2 reagent can adversely affect the dissolution rate of the limestone in the slurry recirculation tank, which in turn affects the slurry pH. This condition is sometimes referred to as "blinding" in that the limestone particles are "blinded" or prevented from dissolving into solution at their normal rate. At the same time, absorption of SO_2 from the flue gas continues, decreasing the slurry pH. It was therefore necessary to determine, if possible, the minimum amount of reagent required to still improve mercury removal performance. A summary of the Phase IA Approach 2 reagent tests is shown in Figure 4.

The data in the figure indicate that although mercury removal performance increased over the baseline level, the improvement was not to the level observed during the AECDP test (46% to 73%). As observed during the Approach 1 tests, it appears that the Approach 2 reagent was ineffective in suppressing elemental mercury emissions at the scrubber outlet. In addition, adverse scrubber operation was observed during both tests, even at 1/8th the amount used during the AECDP test. Further testing during the Phase IB test campaign, designed to identify how little Approach 2 reagent can be added to the scrubber without affecting performance, indicated essentially no mercury removal performance improvement before the onset of adverse scrubber operation.

Fate of Mercury Determination

Previous research has shown that much of the mercury released during coal combustion is either removed with the fly ash or can be absorbed in subsequent flue gas desulfurization (FGD) processes, if it is in the oxidized form. However, little work has been done to determine if the mercury removed with Coal Combustion Products (CCP) is in a stable form or a form that can be leached into ground water or vaporized in subsequent treatment or utilization processes. The use of additives, either in the flue gas or the FGD system, to enhance mercury removal may also affect the suitability of CCP for reuse or alter the stability of Hg within these wastes. The objectives of this work are to determine the ultimate fate of mercury contained in CCP and how emerging mercury control technologies may affect this fate.

The American Coal Ash Association publishes a breakdown of all the CCP produced in the U.S. each year and how much of this material is recycled for other uses. For ash, the main use is the cement/grout industry (13%) and most of the rest is landfilled (66%). A small percentage is used for other purposes. For FGD wastes, a large portion is landfilled (91%) and some is used in the wallboard industry (6%). Therefore, this work concentrated on the fate of mercury as it applies to landfills and the cement and wallboard industries. Samples were tested for leaching characteristics via Toxicity Characteristic Leaching Procedure (TCLP) – EPA Method 13Y – analysis and for thermal stability as it applies to the cement and wallboard processes.

Table 3
Results of Mercury Analyses in Phase IA Waste Samples

Wet Scrubber Sludge Analysis			Hg in Solids, mg/kg dry				Filtrate
Test	Code	% solids	Std 1	Std 2	HNO3	HNO3/HCl	mg/l
1	Baseline	38.9	#N/A	0.072	0.064	0.069	<0.00050
2	App 1 0.1x	39.2	#N/A	0.074	0.074	0.064	
3	App 1 0.01 x	39.1	#N/A	0.069	0.072	0.079	
4	App 1 1.0x	48.0	#N/A	0.075	0.081	0.081	
5	Alt App1	48.8	#N/A	0.160	0.160	0.160	
6	App2 0.25x	52.3	#N/A	0.130	0.130	0.140	<0.00050
7	Alt App1+App2	52.6	0.21	0.190	0.190	0.190	<0.00050
8	App1+App2	52.7	#N/A	0.150	0.150	0.160	<0.00050
9	App2 0.125x	54.8	#N/A	0.093	0.091	0.100	<0.00050

#N/A = Non Detect

Conventional Chemical Testing

Waste samples from the Phase IA pilot tests were collected from the wet scrubber and ESP for each test. These samples were then analyzed for total mercury by an outside laboratory. The procedure used by the outside laboratory was developed to screen samples, prior to performing the more costly TCLP analyses, to determine if the sample contained enough mercury to warrant a TCLP analysis. Therefore, the detection limit was set near 0.2 mg/kg, as specified in the TCLP for mercury. Column 4, labeled "Std 1", of Table 3 shows that non-detects were obtained for all but one sample.

These results would have sufficed if meeting TCLP concentration limits were the only goal, but in order to study the various technologies, more precise values were needed. Therefore, the analytical methods were revised to decrease the detection limits and produce the values shown in Column 5 – "Std 2". TCLP tests were not conducted on the scrubber samples because the low mercury concentrations assure that all samples would be under the TCLP limits.

Additional tests were also conducted with simplified digestion procedures as shown in Columns 6 – "HNO_3" and 7 – "HNO_3/HCl". The digestion step in the procedure used for "Std 1" and "Std 2" was modified because it was originally designed to dissolve *all* metal species in fly ash. However, because of the low volatility of mercury it is unlikely that any would be present within the fly ash particles that form at high temperatures in the upper furnace. The original procedure involved heating the sample for 1 hour in aqua regia (a mixture of concentrated HCl and concentrated HNO_3). The new procedures use a 50% acid solution and no heating, making the modified procedure much less time consuming.

Figure 5 is a comparison of the three digestion procedures. The good agreement between the methods suggests that the mercury is not strongly tied up within the fly ash or gypsum crystals and is relatively easy to get into solution. This does not imply that it will leach in landfills since a 50% nitric acid solution is much stronger than rainwater or the dilute acetic acid solutions used in TCLP tests. However, this does imply the mercury is not strongly bound with the fly ash or gypsum particles.

The final column of Table 3 shows that no mercury could be detected in the filtrate (liquid phase) of the five slurry samples tested. This is important because it shows that the form of mercury in these samples is not soluble (i.e. not $HgCl_2$) and that the solubility was not affected by the use of the mercury control enhancement approaches evaluated in Phase IA. This information, combined with the results from past tests that indicate mercury is present as a fine particle, hints that the mercury is present as mercury sulfide (HgS).

Thermal Decomposition Tests

Normal wet chemistry and other analytical methods can not be used to distinguish the various mercury compounds in CCP wastes because they are present in very small amounts. However, B&W recently purchased a mercury analyzer from PS Analytical that is capable of detecting mercury at very low concentrations in gas streams. The analyzer was used to develop a method that entails thermally decomposing samples of CCP waste to produce a plot of mercury concentration as a function of time and temperature. Different mercury compounds have significantly different vapor pressures at any given temperature. Theoretically, these differences could be used to determine what mercury compounds exist in CCP waste.

The test apparatus consists of an argon source, an argon flow meter, a temperature-controlled tube furnace, a high temperature furnace, an impinger to convert all mercury to Hg^0, a chiller to remove water vapor, space to test various traps and filters, and a PS Analytical Mercury Analyzer (PSA). The samples were first heated to 140C to evaporate all liquid water and evolve the waters

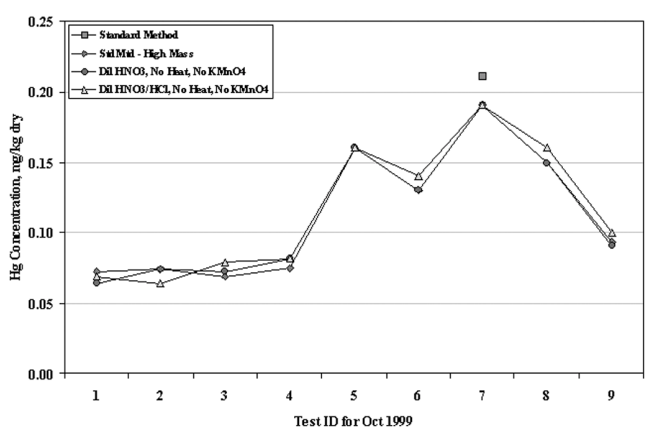

Figure 5 Mercury concentrations in wet scrubber hydroclone underflow slurry Phase IA tests.

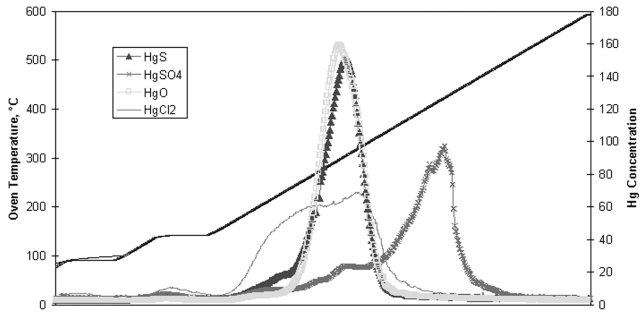

Figure 6 TDC for the mercury standards.

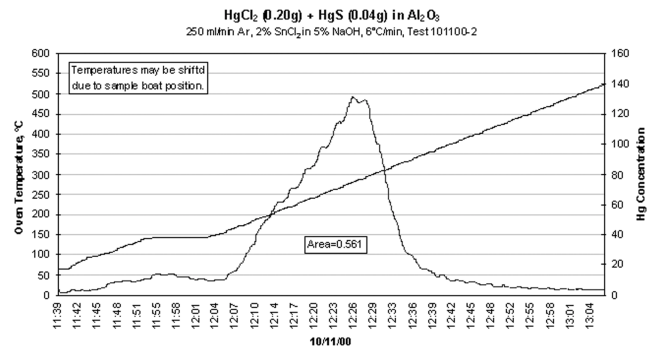

Figure 7 TDC for the combined $HgCl_2$ and HgS standards.

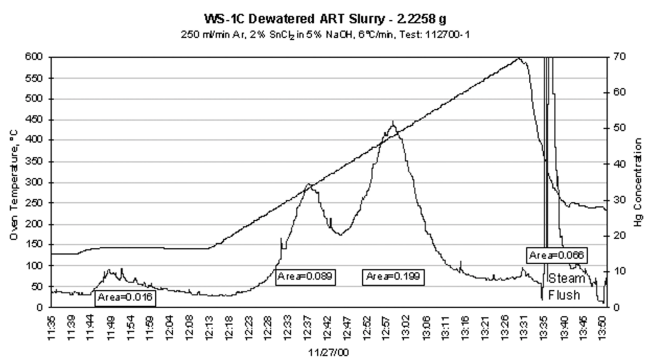

Figure 8 TDC for WS-1C WFGD sludge (baseline).

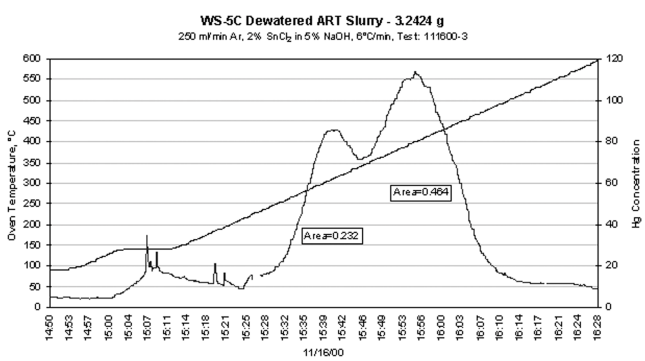

Figure 9 TDC for WS-5C WFGD sludge (Alt App1).

of hydration from gypsum, and then to 600C at a rate of 6C/min. The temperature of 140C was chosen to simulate the temperatures within the rotary kiln of a typical wallboard plant. This is the highest temperature that most CCP wastes are typically exposed to. Gases from the control oven then flow through the pyrolyzer to convert gaseous mercury compounds to elemental mercury. Mercury concentration in the gas is then measured by atomic fluorescence in the PSA and the data displayed and stored as a function of time and temperature.

For this method to be successful it was important to develop and test standards made from pure mercury compounds in order to generate plots for comparison with CCP wastes. Several of the most likely compounds that may form in the wet scrubber environment were chosen, namely mercuric chloride ($HgCl_2$), mercuric sulfide (HgS), mercuric sulfate ($HgSO_4$) and mercuric oxide (HgO).

Figure 6 shows the thermal decomposition curve (TDC) for the four standards. The figure shows several important things as described below:

- **$HgCl_2$.** This compound is stable below 140C in that only a small fraction of the total mercury is evolved up to 140C. Also, the onset temperature for the main peak is about 160C. This is the temperature at which the analyzer was first able to detect mercury in an argon flow of 250 ml/min. Finally, the peak itself is very broad and flat and has a small final peak at about 320C.
- **HgO.** Compared to $HgCl_2$, this compound has an onset temperature of about 230C; the peak is very sharp and has a maximum at about 300C. The compound is also stable below 140C.
- **$HgSO_4$.** In contrast to the others, this curve has a pronounced shoulder with an onset of about 250C. The peak height is the highest for any standard yet tested at 425C. The compound is also stable below 140C.
- **HgS.** This curve has an onset temperature of about 175C and a sharp peak at 300C. The compound is also stable below 140C.

Figure 7 shows the TDC for a combination of the $HgCl_2$ and HgS standards. The figure shows the effect of having multiple compounds within the same sample with similar expected peak temperatures. The resulting TDC is a very nice addition of the two separate curves. The low onset temperature and broad flat peak of the $HgCl_2$ curve produces a broad, gradually sloping shoulder on the combined curve. This demonstrates the difficulty in using this technique if the CCP wastes contain multiple compounds.

Upon completion of standard development, the next step involved testing select waste samples. Two examples of WFGD slurry tested were for Tests WS-1C and WS-5C (refer to Table 3 for test identification). Figure 8 shows the baseline for WFGD slurry in Phase IA. The curve clearly shows that the slurry contains two mercury compounds, one with a peak temperature of about 300C, and one with a peak temperature of about 400C. The first peak is smaller than the second peak. The first peak may be either HgO or HgS and the second peak corresponds well with $HgSO_4$.

Figure 9 shows the TDC for Alternate Approach 1 for Phase IA. The mercury removal for this process increased from 47% to 77%. Compared to Figure 8, the first peak is more prominent than in the baseline tests.

The thermal decomposition method using the mercury analyzer appears to be a viable way of detecting small amounts of mercury in CCP wastes. With further development, the method could be advanced to measure mercury quantities and distinguish between mercury compounds at a fraction of the cost and time of

conventional wet chemistry methods. The method produced distinct thermal decomposition curves for four pure mercury compounds that correlate well to vapor pressure data for these compounds. However, it was difficult to distinguish between HgS and HgO in samples containing more than one compound because the TDCs overlapped each other. Analytical techniques are available to separate overlapping peaks, but this was beyond the scope of this study. The WFDG sludge produced in the CEDF contained two distinct mercury compounds. Comparisons with four standards indicated that one of the compounds may be HgS or HgO and the other may be $HgSO_4$. However, not enough mercury compounds were tested to show this conclusively.

Mercury Speciation Testing

This section presents the results from mercury speciation testing conducted in MTI's 5 million Btu/hr Small Boiler Simulator (SBS) facility. The objective of the testing was to evaluate the effectiveness of a SCR catalyst with respect to converting elemental mercury present in coal-fired flue gas to an oxidized form (for potential subsequent removal in a WFGD system).

The U.S. DOE has set a target of 90% for mercury control in coal-fired power plants. B&W and MTI have demonstrated various means for controlling up to 86+% of vapor-phase mercury emitted during the combustion of Ohio coal. As successful as the programs have been to date, it is unlikely that this target will be met without addressing the vapor-phase mercury that is emitted in the elemental form. The specific goal of these tests was to decrease the elemental mercury concentration in the flue gas sufficiently so that overall removal efficiencies exceeding 90% can be reliably achieved. A method for improving the oxidation of elemental mercury involved the use of a conventional SCR catalyst as a means to facilitate Hg oxidation.

To evaluate the effect an SCR catalyst would have on Hg speciation, a prototype "catalyst device" was designed and manufactured, and was sized to simulate a full-scale SCR reactor on a coal-fired boiler. The device was connected to the Ontario Hydro sample probe. Two tests were conducted while burning a Mahoning 7 coal. Two sets of triplicate Ontario Hydro sample trains were conducted. The first set (referred to as "SCR") was performed with the "catalyst device" assembly attached to the front of the Ontario Hydro sample probe. In this arrangement, all of the flue gas passing through the device would also pass through the Ontario Hydro train, thereby determining the oxidative performance of the catalyst. The second set (referred to as "Reference") was performed concurrently to the "SCR" train and at the same duct location. This triplicate set was used to determine the speciation of the untreated flue gas. Because these parallel sets were conducted at the same duct location and at the same time, the differences in speciation (if any) could be directly attributed to the SCR catalyst. A summary description of each test is given below, followed by a table outlining the pertinent operating conditions:

- **Test 1 – Effect of SCR catalyst at "typical" temperatures.** For this test, Ontario Hydro sampling was performed at the convection pass outlet of the SBS. The coal firing rate was controlled to maintain a stable flue gas temperature at the sampling location. The target flue gas temperature was 750F, near the median for a typical utility SCR module. The goal of this test was to determine how well existing (and future) SCR modules, originally installed for NO_X reduction, would affect Hg speciation.

Table 4
Summary of Operating and Sampling Conditions

Test ID Parameter	Test 1	Test 2
Avg. Flue Gas Temperature, F	742	389
Avg. Sampling Rate, cfm	0.60	0.61
Avg. O_2, %	6.1	7.3

- **Test 2 – Effect of SCR catalyst at "low" temperatures.** For this test, Ontario Hydro sampling was performed at the inlet to the AECDP baghouse. The coal firing rate was controlled to maintain a stable flue gas temperature at the sampling location. The target flue gas temperature was 350F, near the median for a typical utility ESP inlet. The goal of this test was to evaluate the effectiveness of the SCR catalyst solely as a Hg speciation device (for example, to work in tandem with an existing WFGD system for multipollutant control). Table 4 presents a summary of operating and sampling conditions.

In Figure 10, the mercury speciation results for Test 1 ("typical" SCR temperatures) are presented. Each bar shown in the figure represents a single Ontario Hydro sample train and is identified either as a "SCR" train (flue gas has contacted the SCR panels in the "catalyst device") or a "Reference" train (flue gas is untreated). From left to right, each "SCR"/"Reference" pair of bars represents a simultaneous pair of Ontario Hydro sample trains. Each bar is divided to show the amount of oxidized and elemental mercury present in the flue gas. The numerical percentage above each bar represents the percent oxidized mercury present in the flue gas.

It can be seen from the data that at "typical" SCR operating temperatures substantial mercury oxidation can be achieved. For the 3 sets of parallel Ontario Hydro sample trains the average percent oxidized mercury present increased from 50.9% untreated to 93.4% in the presence of the SCR catalyst. In addition, for each "SCR"/"Reference" bar set, the total mercury present is similar indicating that the gas- phase mercury is remaining in the gas phase (and not, for example, adsorbing onto the catalyst surface).

In Figure 11, the mercury speciation results for Test 2 ("low" temperatures) are presented. As in Figure 10, each bar shown in the figure represents a single Ontario Hydro sample train and is identified either as a "SCR" train (flue gas has contacted the SCR panels in the "catalyst device") or a "Reference" train (flue gas is

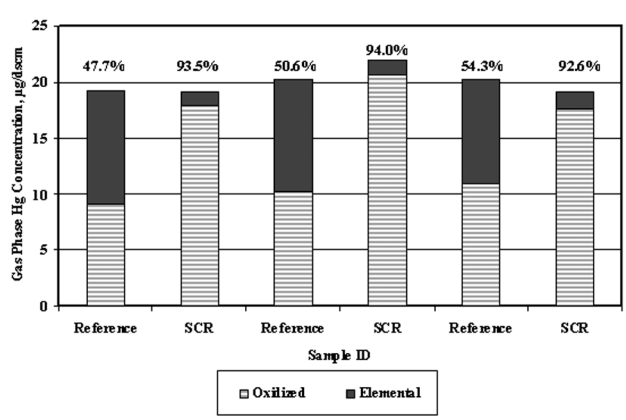

Figure 10 Test 1 - effect of SCR catalyst on Hg speciation.

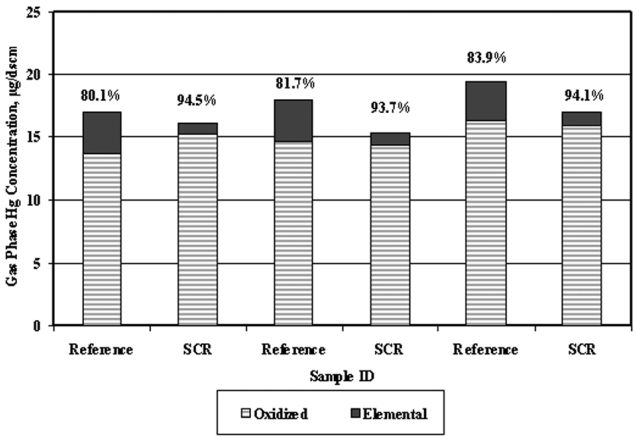

Figure 11 Test 2 - effect of SCR catalyst on Hg speciation.

untreated). From left to right, each "SCR"/"Reference" pair of bars represents a simultaneous pair of Ontario Hydro sample trains. Each bar is divided to show the amount of oxidized and elemental mercury present in the flue gas. The numerical percentage above each bar represents the percent oxidized mercury present in the flue gas.

Similar to Test 1, it can be seen from the data that the SCR catalyst can increase the percentage of oxidized mercury present in the flue gas, even at "low" temperatures such as those observed at an ESP or WFGD inlet. During this test, however, the effect was not as dramatic, primarily due to a much larger percentage (50.9% vs. 81.9%) of the mercury in the flue gas already existing in an oxidized form. This is most likely due to the flue gas having to travel a long (100+ ft) section of ductwork prior to reaching the sampling location. Although insulated to maintain temperature and prevent moisture condensation, this ductwork offers a very high surface area/flue gas volume ratio, increasing the potential for fly ash and/or iron oxide catalyzed oxidation of the elemental mercury in the flue gas. Nevertheless, the flue gas treated by the SCR catalyst contained a higher percentage of oxidized mercury (81.9% vs. 94.1%) than the untreated flue gas.

Although the excellent Hg oxidation performance results from the two SCR tests indicate the technology has great promise, it should be noted that the tests were essentially bench-scale in nature (with respect to the catayst) although a concerted effort was undertaken to emulate a larger-scale unit as closely as possible.

Design/Test Plan for Utility-Scale Field Demonstrations

The utility-scale field testing of the B&W and MTI enhanced wet FGD mercury control technology is being jointly funded by the U.S. Department of Energy's National Energy Technology Laboratory, the Ohio Coal Development Office within the Ohio Department of Development and B&W. Michigan South Central Power Agency (MSCPA) and Cinergy are providing the host sites and associated support. B&W is providing project management, test skid design and fabrication, and economic evaluation. MTI is providing Ontario Hydro sampling, data collection, chemical analyses, and DOE/OCDO contract management.

The main goal for the field testing of the technology is to obtain mercury removal performance data and cost information. Testing at the 55 MWe MSCPA Endicott Station began May 7, 2001, and consisted of 15 days of parametric testing at three reagent feed rates to identify optimum operating conditions, followed by 14 days of verification testing at the optimum reagent feed condition. Following the verification test, OCDO and B&W are funding a four-month, long-term test at Endicott. Testing at the 1300 MWe Cinergy Zimmer Station, scheduled for the fall of 2001, will consist of a 14-day verification test at the optimum reagent feed condition determined from the tests at Endicott. Data from the Zimmer tests will be used to identify scale-up issues and uncover any differences in mercury removal between the two plants. Both stations burn high-sulfur Ohio coal, but are equipped with different types of wet scrubbing systems as described in Table 5.

To facilitate minimal construction and tie-in at each plant site, the reagent feed and metering system is mounted on a 4 ft x 8 ft skid. Two reagent metering pumps are mounted on the skid, one sized for the MSCPA Endicott test, the other for Cinergy's Zimmer test. The pumps are equipped with variable frequency controllers to achieve a 100:1 turndown. Auxiliary equipment includes in-line flow meters, pulsation dampeners, pressure switches, strainers and a calibration tube. The skid is equipped with a dilution water control system for added flexibility in varying additive feed concentration. Chemical hose is used to connect the reagent supply tanker (being used for storage) to the skid, and the skid to the absorber recirculation piping.

Endicott Parametric Test

Baseline mercury removal for the existing limestone slurry wet scrubber was established first in the parametric test. This was accomplished with a triplicate set of Ontario Hydro gas measurements at the wet scrubber inlet and outlet (1 set x 3 Ontario Hydros x 2 locations). The Ontario Hydro method applies to determination of particulate and gaseous mercury emissions from industrial, utility and municipal sources. Particulate and gaseous emissions are withdrawn, isokinetically, from a source and collected on either a quartz fiber filter, in potassium chloride (KCl) solutions, in acidic peroxide, or in acidic potassium permanganate ($KMnO_4$) solutions. Oxidized mercury is collected in the KCl impingers, and elemental mercury is collected in the peroxide and potassium permanganate impingers. During analysis, the mercury collected in the impingers is reduced to elemental mercury, aerated from the solution, and measured by cold vapor atomic absorption spectroscopy (CVAAS). For all sampling, strict stationary source emissions testing quality assurance procedures, as specified by the Ontario Hydro method, are being used to control all potential sources of sample contamination.

At this writing, baseline testing has been completed and parametric testing is underway. Three incremental reagent flow rates are being tested following the baseline test. The main goal is to optimize mercury removal. At least two sets of triplicate Ontario

Table 5
Typical Wet Scrubber Operating Conditions

Operating Condition	Endicott Station	Zimmer Station
Slurry Reagent	Limestone	Thiosorbic Lime
Oxidation	In-situ	Ex-situ
Slurry pH	5.4 – 5.6	5.8 – 6.0
Liquid-to-Gas Ratio	78 gal/1000 acf	21 gal/1000 acf
Inlet SO_2 Concentration	3600 ppm	3300 ppm
SO_2 Removal Efficiency	92%	95%
Gypsum Use	Cement, Agricultural	Wallboard

Hydro measurements will be made for each flow rate at the scrubber inlet and outlet (3 flows x 2 sets x 3 Ontario Hydros x 2 locations).

An on-line mercury analyzer is being used to monitor mercury removal and assist in setting the reagent flow rates. Data from the mercury analyzer provides qualitative trends useful in making operational adjustments. Once optimum conditions have been reached, Ontario Hydro sampling can begin. Samples of process streams are being collected for each test condition, Samples being collected include coal, precipitator ash, waste ash, limestone feed slurry, wet scrubber slurry, gypsum, treated water and water treatment sludge.

Immediately following the parametric test, testing will be suspended so the Ontario Hydro samples can be analyzed at MTI's chemistry lab. Results will be used to determine optimum operating conditions for the performance verification test.

Endicott Performance Verification Test

The baseline mercury removal for the existing wet scrubber system will again be measured before beginning the performance verification test. This will be accomplished with one triplicate set of Ontario Hydro measurements at the wet scrubber inlet and outlet (1 set x 3 Ontario Hydros x 2 locations).

The performance verification test will be conducted for 14 days to demonstrate consistent and reliable operation at optimum conditions. Operating conditions will be held steady throughout the performance verification. Reagent flow will be adjusted to follow load if the plant must reduce load during the evening. Only one set of Ontario Hydro measurements will be made at the wet scrubber inlet and outlet each day (1 set x 1 Ontario Hydro x 2 locations x 14 days).

The mercury analyzer will be used throughout the performance verification test. Data from the analyzer is expected to provide qualitative trends. Ontario Hydro measurements will be compared with analyzer data as part of the data analysis. Samples of the key process streams identified during the parametric testing will be collected for each test condition.

Endicott Long Term Operation

Four months of extended operation will be conducted at the Endicott Station following the performance verification test. The purpose of this test is to continue the verification test and to study the extended effects of the technology on scrubber performance and by-product utilization. During this task, B&W and MTI personnel will only visit the site for a few days every two weeks to perform Ontario Hydro sampling and to collect plant data and process samples. It should be noted that plant data and mercury analyzer data will be monitored remotely from MTI in Alliance, Ohio. This task is believed to be necessary to achieve rapid market acceptance. Operating conditions will be held steady throughout this verification test. One set of triplicate Ontario Hydro samples will be acquired every two weeks.

Zimmer Verification Test

Upon completion of testing at Endicott, all equipment will be removed from the Endicott location and moved to the Zimmer Station. A 14-day performance verification test, the same as that run at Endicott, will be conducted on the wet FGD system at Zimmer.

Expected Results

All Ontario Hydro impinger solutions and particulate samples will be analyzed for total and speciated mercury as appropriate. Selected process streams will be analyzed for total mercury. Other analyses of the process streams (percent oxidation, total solids, etc.) will be performed as needed. Results of the Ontario Hydro measurements, mercury analyzer data, wet scrubber system operating samples/data and mercury sequestration analyses will be used to perform an overall analysis of the B&W/MTI enhanced wet FGD mercury removal technology.

There are several important results expected from these field tests. The most important is a performance curve that shows mercury removal as a function of reagent feed rate. The initial reagent feed rate at Endicott will be based on pilot data from B&W's Clean Environment Development Facility (CEDF). High levels of mercury removal were demonstrated at a stoichiometric ratio of about 2 ppm of reactant per 20 ug/Nm^3 Hg in the flue gas entering the wet scrubber. Subsequent feed rates will be adjusted upward or downward depending on the results of the first Endicott test. It is expected that high mercury removal can be achieved at a stoichiometric ratio of about 0.2 ppm reactant per 20 ug/Nm^3 Hg.

Another important result will be to demonstrate that this mercury removal process sequesters the mercury in a stable form in the gypsum by-product from the wet scrubber at levels below those specified in the TCLP procedure (0.2 mg/l). To demonstrate this, waste water and gypsum samples from representative test conditions will be analyzed for total mercury and, if warranted, TCLPs will be performed. The thermal stability of representative samples will also be tested by determining the temperature at which mercury is released from the sample by thermal decomposition using the mercury analyzer.

Other expected results include:

- The operation and performance of the wet scrubber are not affected by this mercury removal process.
- High mercury removal levels can be sustained over extended operation at a full-scale facility.
- The continuous mercury analyzer will produce qualitative, and possibly quantitative, results comparable to the Ontario Hydro results for both elemental and oxidized mercury.
- The reagent handling/injection equipment will operate reliably with little intervention.
- The reagent can be handled safely.

Summary

Pilot-scale testing was conducted in the B&W CEDF with the goal of optimizing wet scrubber-based mercury control technologies and addressing design/commercialization issues associated with the mercury control approaches. Results from two series of testing indicated that high levels of mercury removal (>80%) can be repeatedly achieved with small amounts of a proprietary reagent, with no adverse effects on scrubber operation or SO_2 removal. Preliminary investigation into the fate of the mercury captured in the wet scrubber indicates that the mercury resides in the solid phase as a fine particle and appears to be present in two distinct mercury compounds - either HgS or HgO and $HgSO_4$. An investigation aimed at the effect a SCR catalyst has on flue gas Hg speciation showed an increase in the percentage of oxidized mercury in the flue gas across the SCR. Based on the encouraging pilot-scale results, B&W and MTI are currently demonstrating the wet FGD mercury removal technology at full-scale at the MSCPA Endicott Station and will be demonstrating at the Cinergy Zimmer Station during the fall of 2001.

Project Sponsors

The *Advanced Emissions Control Development Program* was jointly funded by the U. S. Department of Energy's National Energy Technology Laboratory, the Ohio Coal Development Office within the Ohio Department of Development, and Babcock & Wilcox – a McDermott Company.

The *Mercury Control for Coal-Fired Utilities* Program was jointly funded by the Ohio Coal Development Office within the Ohio Department of Development and Babcock & Wilcox – a McDermott Company.

The *Full-Scale Testing of Enhanced Mercury Control for Wet FGD Systems* Program is being jointly funded by the U.S. Department of Energy's National Energy Technology Laboratory, the Ohio Coal Development Office within the Ohio Department of Development and Babcock & Wilcox – a McDermott Company. Michigan South Central Power Agency (MSCPA) and Cinergy are providing the host sites and associated support.

References

1. Industry News for July 11, 2000: "Scientists support EPA regulations on mercury."

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EMISSIONS ACTIVITY CATEGORY FORM
ROADWAYS AND PARKING AREAS: FUGITIVE DUST EMISSIONS

This form is to be completed for all Roadways and Parking Areas. State/Federal regulations which may apply to Roadways and Parking Areas are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list.

1. Reason this form is being submitted (Check one)

   ☑ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. F001) _____

2. Maximum Operating Schedule: ***24*** hours per day; ***365*** days per year

   If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. _____

3. Complete the table below for each road segment or parking area.

ID	Road Segment or Parking Area Description	Length (miles) or Area (ft^2)	Year Installed	Surface Type (check one)	Surface Composition (check one)
A	***Roadways in the vicinity of the Main Plant***	***NA***	***2012***	☐ paved ☑ unpaved	☐ asphalt ☑ gravel ☐ concrete ☐ dirt ☐ chip & seal ☐ other_____
B	***Landfill surface***	***NA***	***2012***	☐ paved ☑ unpaved	☐ asphalt ☐ gravel ☐ concrete ☐ dirt ☐ chip & seal ☑ other_____
C	***Landfill Access Road****	***0.5 miles***	***2012***	☐ paved ☑ unpaved	☐ asphalt ☑ gravel ☐ concrete ☐ dirt ☐ chip & seal ☐ other_____

**** Note: One-half of the Landfill Access Road length (0.5 miles) is paved and the remainder (0.5 miles) is unpaved.***

Section II – Specific Air Contaminant Source Information

4. Complete the table below for each paved road segment or parking area. ***Paved Roadways are included as emissions unit F002.***

ID	Silt Loading (g/m^2)	Vehicle Type	Avg. Weight (tons)	Avg. Speed (mph)	Vehicle Miles Traveled (vmt/yr)	Control Method(s)	Application or Usage Frequency
						☐ sweeping ☐ flushing ☐ watering ☐ good housekeeping ☐ other: _____	

5. Identify all the places that the permittee's roadways and parking lots meet a public road. Use the Road Segment or Parking Area ID from the table above to identify the permittee's roadway and parking lots that are involved.

_____ _____

_____ _____

Describe how any foreign materials deposited on public paved roadways will be removed.

☐ Flushing with water ☐ Wet sweeping ☐ Sweeping with vacuum truck ☐ Other. Describe _____

Section II – Specific Air Contaminant Source Information

6. Complete the table below for each unpaved road segment or parking area.

ID	Silt Content (%)	Surface Material Moisture Content (%)	Vehicle Type	Avg. Weight (tons)	Avg. Speed (mph)	Vehicle Miles Traveled (vmt/yr)	Control Method(s)	Application or Usage Frequency
A	***5.1***	*	***Front End Loader***	***54.6***	***5***	***7,300***	☐ oiling ☑ watering ☑ surface improvement ☑ chemical stabilization	***As Needed****
A	***5.1***	*	***Bulldozer***	***49***	***2***	***9,125***	☐ oiling ☑ watering ☑ surface improvement ☑ chemical stabilization	***As Needed****
B	***5.1***	*	***Bulldozer***	***49***	***2***	***7,300***	☐ oiling ☑ watering ☐ surface improvement ☐ chemical stabilization	***As Needed****
B	***5.1***	*	***Roller***	***40***	***5***	***7,300***	☐ oiling ☑ watering ☐ surface improvement ☐ chemical stabilization	***As Needed****
C	***5.1***	*	***Flyash Haul Truck***	***35***	***15***	***11,839***	☐ oiling ☑ watering ☑ surface improvement ☑ chemical stabilization	***As Needed****
C	***5.1***	*	***Bottom Ash Haul Truck***	***35***	***15***	***2,967***	☐ oiling ☑ watering ☑ surface improvement ☑ chemical stabilization	***As Needed****
C	***5.1***	*	***Gypsum Haul Truck***	***35***	***15***	***24,966***	☐ oiling ☑ watering ☑ surface improvement ☑ chemical stabilization	***As Needed****

**** Emission estimates assume 140 days/year with greater than 0.01 inches of precipitation.***

7. The use of used oil for dust suppression is prohibited. Used oil is any oil that has been refined from crude oil, or any synthetic oil, that has been used, and, as a result of that use, is contaminated by physical or chemical impurities. See OAC rule 3745-279-01. Used oil does not include oils that have been refined from crude oil that have not been used or any synthetic oil that has not been used.

If oiling is being used for dust suppression, is only virgin oil being used?
☐ Yes ☐ No ☑ Not using oil

List of Emissions Units[1] and Summary of Applicable Rules					
Page	**Emissions Unit ID[2]**	**Description**	**PSD BACT**	**OAC Rule 3745-31-05 BAT**	**Other Applicable Rule(s)**
108	*P903*	*Limestone Preparation Building[3]*	*PM/PM_{10}*	*None*	*NSPS Subpart OOO (PM and opacity)* *OAC rule 3745-17-07 (visible PE)* *OAC rule 3745-17-08 (PE)* *OAC rule 3745-17-11 (PE)*
116	*P904*	*Gypsum Conveying, Handling and Storage[3]*	*PM/PM_{10}*	*None*	*OAC rule 3745-17-07 (visible PE)* *OAC rule 3745-17-08 (PE)* *OAC rule 3745-17-11 (PE)*
125	*P905*	*Flyash Conveying, Handling and Storage for Boiler #1*	*PM/PM_{10}*	*None*	
132	*P906*	*Flyash Conveying, Handling and Storage for Boiler #2*	*PM/PM_{10}*	*None*	

Notes:

[1] There are two emergency diesel engines that are exempt from air permit requirements pursuant to OAC rule 3745-31-03(A)(4)(b) that are not included in this permit application.

[2] These emissions unit IDs were assigned for reference. Ohio EPA may assign different IDs when the PTI application is processed.

[3] The AMPGS will employ a Wet FGD control system, but is still considering whether to use limestone or ammonia. As a result, this PTI application includes the emissions units needed for both options.

[4] It is unclear if the NSPS Subpart PP applies to the rotary dryer associated with the Fertilizer Plant (P003). The AMPGS believes this rule was not intended to apply to this type of process.

EMISSIONS ACTIVITY CATEGORY FORM
ROADWAYS AND PARKING AREAS: FUGITIVE DUST EMISSIONS

This form is to be completed for all Roadways and Parking Areas. State/Federal regulations which may apply to Roadways and Parking Areas are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list.

1. Reason this form is being submitted (Check one)

   ☑ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. F001) _____

2. Maximum Operating Schedule: ***24*** hours per day; ***365*** days per year

   If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. _____

3. Complete the table below for each road segment or parking area.

ID	Road Segment or Parking Area Description	Length (miles) or Area (ft^2)	Year Installed	Surface Type (check one)	Surface Composition (check one)
A	***Employee and Visitor Passenger and Delivery Vehicles***	***0.57 miles***	***2012***	☑ paved ☐ unpaved	☑ asphalt ☐ gravel ☑ concrete ☐ dirt ☐ chip & seal ☐ other_____
B	***Roadways in the vicinity of the Main Plant***	***NA***	***2012***	☑ paved ☐ unpaved	☑ asphalt ☐ gravel ☑ concrete ☐ dirt ☐ chip & seal ☐ other_____
C	***Landfill Access Road****	***0.5 miles***	***2012***	☑ paved ☐ unpaved	☑ asphalt ☐ gravel ☑ concrete ☐ dirt ☐ chip & seal ☐ other_____

**** Note: One-half of the Landfill Access Road length (0.5 miles) is paved and the remainder (0.5 miles) is unpaved.***

Section II – Specific Air Contaminant Source Information

4. Complete the table below for each paved road segment or parking area.

ID	Silt Loading (g/m^2)	Vehicle Type	Avg. Weight (tons)	Avg. Speed (mph)	Vehicle Miles Traveled (vmt/yr)	Control Method(s)	Application or Usage Frequency
A	***9.7***	***Passenger vehicles and delivery trucks***	***2***	***15***	***83,220***	☑ sweeping ☐ flushing ☑ watering ☑ good housekeeping ☐ other: _____	***As Needed****
B	***9.7***	***Front End Loader***	***54.6***	***5***	***7,300***	☑ sweeping ☐ flushing ☑ watering ☑ good housekeeping ☐ other: _____	***As Needed****
C	***9.7***	***Flyash Haul Truck***	***35***	***15***	***11,839***	☑ sweeping ☐ flushing ☑ watering ☑ good housekeeping ☐ other: _____	***As Needed****
C	***9.7***	***Bottom Ash Haul Truck***	***35***	***15***	***2,967***	☑ sweeping ☐ flushing ☑ watering ☑ good housekeeping ☐ other: _____	***As Needed****
C	***9.7***	***Gypsum Haul Truck***	***35***	***15***	***24,966***	☑ sweeping ☐ flushing ☑ watering ☑ good housekeeping ☐ other: _____	***As Needed****

**** Emission estimates assume 140 days/year with greater than 0.01 inches of precipitation.***

5. Identify all the places that the permittee's roadways and parking lots meet a public road. Use the Road Segment or Parking Area ID from the table above to identify the permittee's roadway and parking lots that are involved.

Segment A - Plant Entrance _____ _____

_____ _____

Describe how any foreign materials deposited on public paved roadways will be removed.

☑ Flushing with water ☑ Wet sweeping ☑ Sweeping with vacuum truck ☐ Other. Describe _____

Section II – Specific Air Contaminant Source Information

6. Complete the table below for each unpaved road segment or parking area. ***Unpaved Roadways are included as emissions unit F003.***

ID	Silt Content (%)	Surface Material Moisture Content (%)	Vehicle Type	Avg. Weight (tons)	Avg. Speed (mph)	Vehicle Miles Traveled (vmt/yr)	Control Method(s)	Application or Usage Frequency
							☐ oiling ☐ watering ☐ surface improvement ☐ chemical stabilization	

7. The use of used oil for dust suppression is prohibited. Used oil is any oil that has been refined from crude oil, or any synthetic oil, that has been used, and, as a result of that use, is contaminated by physical or chemical impurities. See OAC rule 3745-279-01. Used oil does not include oils that have been refined from crude oil that have not been used or any synthetic oil that has not been used.

If oiling is being used for dust suppression, is only virgin oil being used?
☐ Yes ☐ No ☑ Not using oil

American Municipal Power Generating Station
Coal Storage Piles (F004)

Emission Points	Overall Capture & Control Efficiency (%)	Control Description	Max. Controlled Emissions (tons/yr) PM	Max. Controlled Emissions (tons/yr) PM_{10}	Response to Ohio EPA Question Concerning Dust Collectors
Standpipe A to Active Storage Pile A	90	Dust Suppressant	**Note 1**	**Note 1**	The natural moisture content of the coal and the use of dust suppressants will minimize the potential for fugitive dust from the coal storage piles. The maximum annual emissions from the use of these control measures is no more than 0.62 tons of PM_{10}. There is no practical use of baghouse control systems with this emissions unit and the use of such a system at this location could creat an oportunity for spontaneous combustion in the baghouse hopper.
Standpipe B to Active Storage Pile B	90	Dust Suppressant	0.29	0.14	
Standpipe A Storage Pile Wind Erosion	90	Dust Suppressant	**Note 1**	**Note 1**	
Standpipe B Storage Pile Wind Erosion	90	Dust Suppressant	0.15	0.07	
Active Storage Pile A to A Belt Feeders	95	Enclosure & Fogging Dust Suppression w/exhaust fan	**Note 1**	**Note 1**	
Active Storage Pile B to B Belt Feeders	95	Enclosure & Fogging Dust Suppression w/exhaust fan	0.15	0.07	
Active Storage Pile A to Inactive Storage Pile A by Bulldozer	90	Dust Suppressant	**Note 1**	**Note 1**	
Active Storage Pile B to Inactive Storage Pile B by Bulldozer	90	Dust Suppressant	0.15	0.07	
Inactive Storage Pile to Active Storage Pile A by Bulldozer	90	Dust Suppressant	**Note 1**	**Note 1**	
Inactive Storage Pile to Active Storage Pile B by Bulldozer	90	Dust Suppressant	0.15	0.07	
Bulldozer to Inactive Storage Pile A	90	Dust Suppressant	**Note 2**	**Note 2**	
Inactive Storage Pile A Wind Erosion	90	Dust Suppressant	**Note 2**	**Note 2**	
Inactive Storage Pile A to Standpipe Storage Pile A by Bull Dozer	90	Dust Suppressant	**Note 2**	**Note 2**	
Bulldozer to Inactive Storage Pile B	90	Dust Suppressant	0.15	0.07	
Inactive Storage Pile B Wind Erosion	90	Dust Suppressant	0.15	0.07	
Inactive Storage Pile B to Standpipe Storage Pile B by Bull Dozer	90	Dust Suppressant	0.15	0.07	
Total			**1.31**	**0.62**	

Note 1 - Assume all material diverted to Standpipe B
Note 2 - Assume all material diverted to Eastern Storage Pile (Pile B)

American Municipal Power Generating Station
Limestone Barge Unloading (F005)

Emission Points	Overall Capture & Control Efficiency (%)	Control Description	Max. Controlled Emissions (tons/yr) PM	Max. Controlled Emissions (tons/yr) PM_{10}	Response to Ohio EPA Question Concerning Dust Collectors
Barge Unloading					
Crane Unloading to Hopper	90	Wet suppression	0.041	0.020	The natural moisture content of the limestone and the use of wet suppression will minimize the potential for fugitive dust during barge unloading. The maximum annual emissions from the use of these control measures is no more than 0.05 tons of PM_{10}. There is no practical use of baghouse control systems with this emissions unit.
Hopper to Belt Feeder	90	Wet suppression	0.045	0.016	
Belt Feeder to L-1	90	Wet suppression	0.045	0.016	
Total			**0.13**	**0.05**	

American Municipal Power Generating Station
Limestone Storage Piles (F006)

Emission Points	Overall Capture & Control Efficiency (%)	Control Description	Max. Controlled Emissions (tons/yr) PM	Max. Controlled Emissions (tons/yr) PM_{10}	Response to Ohio EPA Question Concerning Dust Collectors
Active Limestone Storage Pile					
L-1 to Storage Pile (P902-F2)	75	Telescopic Chute	0.10	0.05	The natural moisture content of the limestone and the use of wet suppression will minimize the potential for fugitive dust from the limestone storage piles. The maximum annual emissions from the use of these control measures is no more than 0.11 tons of PM_{10}. There is no practical use of baghouse control systems with this emissions unit.
Storage Pile Wind Erosion (P902-F2)	90	Wet suppression	0.04	0.02	
Storage Pile Unloading (P902-F2)	90	Wet suppression	0.04	0.02	
Bull Dozer to Hopper (P902-F2)	90	Wet suppression	0.04	0.02	
Inactive Limestone Storage Pile					
Bull Dozer to Storage Pile	90	Wet suppression	**Note 1**	**Note 1**	
Storage Pile Wind Erosion	90	Wet suppression	**Note 1**	**Note 1**	
Storage Pile Unloading	90	Wet suppression	**Note 1**	**Note 1**	
Total			**0.23**	**0.11**	

Note 1 - Assume all material diverted past inactive storage pile

American Municipal Power Generating Station
Coal Barge Unloading (P901)

Emission Points	Overall Capture & Control Efficiency (%)	Control Description	Max. Uncontrolled Emissions (lbs/hr)		Max. Controlled Emissions (lbs/hr)		Max. Controlled Emissions (tons/yr)		Response to Ohio EPA Question Concerning Dust Collectors
			PM	PM_{10}	PM	PM_{10}	PM	PM_{10}	
Barge Unloading									
Crane Unloading into Hopper (P901-F1)	90	Wet suppression	2.09	0.99	0.21	0.099	0.29	0.14	The natural moisture content of the coal and the use of wet suppression will minimize the potential for fugitive dust during barge unloading. The maximum annual emissions from the use of these control measures is no more than 0.42 tons of PM_{10}. There is no practical use of baghouse control systems with this emissions unit and the use of such a system at this location could create an opportunity for spontaneous combustion in the baghouse hopper.
Hopper onto Belt Feeder (P901-F1)	90	Wet suppression	2.09	0.99	0.21	0.099	0.29	0.14	
Belt Feeder onto C-1 (P901-F1)	90	Wet suppression	2.09	0.99	0.21	0.099	0.29	0.14	
Transfer House									
C-1 to C-2 (P901-S)	95	Enclosure & Residual Dust Suppression w/exhaust fan	2.09	0.99	0.10	0.05	0.15	0.07	The natural moisture content of the coal and the use of wet suppression will minimize the potential for fugitive dust from this transfer house. The maximum annual emissions from the use of these control measures is no more than 0.07 tons of PM_{10}. There is no practical use of baghouse control systems with this emissions unit and the use of such a system at this location could create an opportunity for spontaneous combustion in the baghouse hopper
C-1 to C-4 (P901-S)	95	Enclosure & Residual Dust Suppression w/exhaust fan	**Note 1**	**Note 1**	**Note 1**	**Note 1**	**Note 1**	**Note 1**	
Reclaim Tunnel									
C-2 to C-3 (P901-F2)	90	Residual Dust Suppression	2.09	0.99	0.21	0.10	0.29	0.14	The natural moisture content of the coal and the use of wet suppression will minimize the potential for fugitive dust during this operation. The maximum annual emissions from the use of these control measures is no more than 0.28 tons of PM_{10}. There is no practical use of baghouse control systems with this emissions unit and the use of such a system at this location could create an opportunity for spontaneous combustion in the baghouse hopper
C-2 to Standpipe A (P901-F2)	90	Residual Dust Suppression	**Note 2**	**Note 2**	**Note 2**	**Note 2**	**Note 2**	**Note 2**	
C-3 to Standpipe B (P901-F2)	90	Residual Dust Suppression	2.09	0.99	0.21	0.10	0.29	0.14	
Total			**12.54**	**5.93**	**1.15**	**0.54**	**1.60**	**0.75**	

Note 1 - Assume all material diverted to C-2

Note 2 - Assume all material diverted to Standpipe B

American Municipal Power Generating Station
Coal Crushing (P902)

Emission Points	Overall Capture & Control Efficiency (%)	Control Description	Max. Controlled Emissions (tons/yr) PM	Max. Controlled Emissions (tons/yr) PM_{10}	Response to Ohio EPA Question Concerning Dust Collectors
Belt Feeders A to C-5A (P902-S1)	95	Enclosure & Fogging Dust Suppression w/exhaust fan	**Note 1**	**Note 1**	The natural moisture content of the coal and the use of wet suppression will minimize the potential for fugitive dust during this operation. The maximum annual emissions from the use of these control measures is no more than 0.14 tons of PM_{10}. There is no practical use of baghouse control systems with this emissions unit and the use of such a system at this location could create an opportunity for spontaneous combustion in the baghouse hopper.
Belt Feeders A to C-5B (P902-S1)	95	Enclosure & Fogging Dust Suppression w/exhaust fan	**Note 1**	**Note 1**	
Belt Feeders B to C-5A (P902-S1)	95	Enclosure & Fogging Dust Suppression w/exhaust fan	0.15	0.07	
Belt Feeders B to C-5B (P902-S1)	95	Enclosure & Fogging Dust Suppression w/exhaust fan	0.15	0.07	
Crusher House					
C-4 to Surge Bin (P902-S2/S3)	99	**Enclosure & Baghouse**	**Note 7**	**Note 7**	**Baghouses or filter duct collectors will be utilized to control PM_{10} emissions from these emissions points.**
C-5A to Surge Bin (P902-S2/S3)	99	**Enclosure & Baghouse**	**Note 7**	**Note 7**	
C-5B to Surge Bin (P902-S2/S3)	99	**Enclosure & Baghouse**	**Note 7**	**Note 7**	
Surge Bin to Belt Feeder #1 (P902-S2/S3)	95	Enclosure & Fogging Dust Suppression w/exhaust fan	0.15	0.07	The natural moisture content of the coal and the use of wet suppression will minimize the potential for fugitive dust during this operation. The maximum annual emissions from the use of these control measures is no more than 0.54 tons of PM_{10}. There is no practical use of baghouse control systems with this emissions unit and the use of such a system at this location could create an opportunity for spontaneous combustion in the baghouse hopper.
Surge Bin to Belt Feeder #2 (P902-S2/S3)	95	Enclosure & Fogging Dust Suppression w/exhaust fan	**Note 2**	**Note 2**	
Surge Bin to Belt Feeder #3 (P902-S2/S3)	95	Enclosure & Fogging Dust Suppression w/exhaust fan	**Note 2**	**Note 2**	
Surge Bin to Belt Feeder #4 (P902-S2/S3)	95	Enclosure & Fogging Dust Suppression w/exhaust fan	**Note 2**	**Note 2**	
Belt Feeder #1 to Crusher #1 (P902-S2/S3))	95	Enclosure & Fogging Dust Suppression w/exhaust fan	0.15	0.07	
Belt Feeder #2 to Crusher #2 (P902-S2/S3)	95	Enclosure & Fogging Dust Suppression w/exhaust fan	**Note 3**	**Note 3**	
Belt Feeder #2 to Crusher #2 (P902-S2/S3)	95	Enclosure & Fogging Dust Suppression w/exhaust fan	**Note 3**	**Note 3**	
Belt Feeder #2 to Crusher #2 (P902-S2/S3)	95	Enclosure & Fogging Dust Suppression w/exhaust fan	**Note 3**	**Note 3**	
Crusher #1 (P902-S2/S3)	95	Enclosure & Fogging Dust Suppression w/exhaust fan	0.75	0.33	
Crusher #2 (P902-S2/S3)	95	Enclosure & Fogging Dust Suppression w/exhaust fan	**Note 4**	**Note 4**	
Crusher #3 (P902-S2/S3)	95	Enclosure & Fogging Dust Suppression w/exhaust fan	**Note 4**	**Note 4**	
Crusher #4 (P902-S2/S3)	95	Enclosure & Fogging Dust Suppression w/exhaust fan	**Note 4**	**Note 4**	
Crusher #1 to C-6B (P902-S2/S3)	95	Enclosure & Fogging Dust Suppression w/exhaust fan	0.15	0.07	
Crusher #2 to C-6B (P902-S2/S3)	95	Enclosure & Fogging Dust Suppression w/exhaust fan	**Note 5**	**Note 5**	
Crusher #3 to C-6A (P902-S2/S3)	95	Enclosure & Fogging Dust Suppression w/exhaust fan	**Note 5**	**Note 5**	
Crusher #4 to C-6A (P902-S2/S3)	95	Enclosure w/exhaust fan Fogging dust suppression	**Note 5**	**Note 5**	
Surge Bin #1 Baghouse (P902-S4)	99	**Enclosure & Baghouse**	0.38	0.38	**Baghouses or filter duct collectors will be utilized to control PM_{10} emissions from these emissions points.**
Surge Bin #2 Baghouse (P902-S5)	99	**Enclosure & Baghouse**	0.38	0.38	

American Municipal Power Generating Station
Coal Crushing (P902)

Emission Points	Overall Capture & Control Efficiency (%)	Control Description	Max. Controlled Emissions (tons/yr) PM	Max. Controlled Emissions (tons/yr) PM_{10}	Response to Ohio EPA Question Concerning Dust Collectors
Tripper House					
C-6A to C-7A	95	Enclosure w/exhaust fan Fogging dust suppression	**Note 6**	**Note 6**	The natural moisture content of the coal and the use of wet suppression will minimize the potential for fugitive dust during this operation. The maximum annual emissions from the use of these control measures is no more than 0.54 tons of PM_{10}. There is no practical use of baghouse control systems with this emissions unit and the use of such a system at this location could create an opportunity for spontaneous combustion in the baghouse hopper
C-6B to C-7B	95	Enclosure w/exhaust fan Fogging dust suppression	**Note 7**	**Note 7**	
C-7A to Tripper House Bin #1	95	Enclosure w/exhaust fan Fogging dust suppression	**Note 7**	**Note 7**	
C-7A to Tripper House Bin #2	95	Enclosure w/exhaust fan Fogging dust suppression	**Note 8**	**Note 8**	
C-7B to Tripper House Bin #1	95	Enclosure w/exhaust fan Fogging dust suppression	**Note 8**	**Note 8**	
C-7B to Tripper House Bin #2	95	Enclosure w/exhaust fan Fogging dust suppression	**Note 8**	**Note 8**	
Tripper House Baghouse #1 (P902-S6)	99	**Enclosure & Baghouse**	3.75	3.75	**Baghouses or filter duct collectors will be utilized to control PM_{10} emissions from these emissions points.**
Tripper House Baghouse #2 (P902-S7)	99	**Enclosure & Baghouse**	3.75	3.75	
Total			**9.73**	**8.94**	

Note 1 - Assume all material diverted to Standpipe B

Note 2 - Assume all material fed diverted to Surge Bin Belt Feeder #1

Note 3 - Assume all material diverted to Crusher #1

Note 4 - Assume all material processed in Crusher #1

Note 5 - Assume all material diverted from Crusher #1 to C-6B

Note 6 - Controlled emissions are emitted from Baghouse at a rate of 0.005 gr/dscf

Note 7 - Assume all material diverted from C-6A to C-7A

Note 8 - Assume all material diverted from C-7A to Tripper House Bin #1

American Municipal Power Generating Station
Limestone Preparation Building (P903)

Emission Points	Overall Capture & Control Efficiency (%)	Control Description	Max. Controlled Emissions (tons/yr) PM	Max. Controlled Emissions (tons/yr) PM_{10}	Response to Ohio EPA Question Concerning Dust Collectors
Hopper to Belt Feeder (P903-F)	90	Wet suppression	0.04	0.02	The use of wet suppression will minimize the potential for fugitive dust from conveyor transfer point associated with this emissions unit. The maximum annual emissions from the use of these control measures is no more than 0.04 tons of PM_{10}. There is no practical use of baghouse control systems with this operation.
Belt Feeder to L-2 (P903-F)	90	Wet suppression	0.04	0.02	
L-2 to Day Bin #1		**Bin Vent Filter**	**Note 1**	**Note 1**	**Baghouses or filter duct collectors will be utilized to control PM_{10} emissions from these emissions points.**
L-2 to L-3		**Baghouse**	**Note 2**	**Note 2**	
L-3 to Day Bin #2		**Bin Vent Filter**	**Note 2**	**Note 2**	
Bin Vent Filter #1 (P903-S2)	99	**Bin Vent Filter**	0.28	0.28	
Bin Vent Filter #2 (P903-S3)	99	**Bin Vent Filter**	0.28	0.28	
Insertable Dust Collector (P903-S1)	99	**Baghouse**	0.56	0.56	
Total			**1.22**	**1.16**	

Note 1 - Assume all material diverted to L-3

Note 2 - Controlled emissions are emitted from Baghouse at a rate of 0.005 gr/dscf

American Municipal Power Generating Station
Gypsum Conveying, Handling & Storage (P904)

Emission Points	Overall Capture & Control Efficiency (%)	Control Description	Max. Controlled Emissions (tons/yr) PM	Max. Controlled Emissions (tons/yr) PM_{10}	Response to Ohio EPA Question Concerning Dust Collectors
Gypsum Dewatering Building					The natural moisture content of the gypsum will minimize the potential for fugitive dust from the gypsum conveying, handling and storage system. The maximum annual emissions from the use of these control measures is no more than 0.14 tons of PM_{10}. There is no practical use of baghouse control systems with this emissions unit. It is possible Ohio EPA will conclude this emissions unit qualifies as de minimis and be exempt from the PTI requirements.
Gypsum Dewatering Building	**Note 1**	**Note 1**	**Note 1**	**Note 1**	
Gypsum Emergency Stockout Pile					
G-2 to Emergency Storage Pile	**Note 2**	Wet Gypsum	**Note 3**	**Note 3**	
Storage Pile Wind Erosion	**Note 2**	Wet Gypsum	**Note 3**	**Note 3**	
Storage Pile Unloading	**Note 2**	Wet Gypsum	**Note 3**	**Note 3**	
Gypsum Transfer House					
G-1 to G-3	95	Enclosure & Wet Gypsum w/exhaust fan	0.04	0.01	
Gypsum Storage Shed					
G-3 to Gypsum Storage Pile	**Note 2**	Wet Gypsum	0.07	0.03	
Storage Pile Wind Erosion	**Note 2**	Wet Gypsum	0.07	0.03	
Storage Pile Unloading	**Note 2**	Wet Gypsum	0.07	0.03	
Bull Dozer to Hopper	90	Wet Gypsum	0.07	0.03	
Gypsum Reclaim Hopper					
Hopper to G-4A	95	Enclosure & Wet Gypsum w/exhaust fan	0.04	0.01	
G-4A to G-4	95	Enclosure & Wet Gypsum w/exhaust fan	0.04	0.01	
Barge Loading					
G-4 to Hopper	90	Wet Gypsum	0.07	0.03	
Hopper to Barge	**Note 2**	Wet Gypsum w/telescopic chute	0.07	0.03	
Total			**0.33**	**0.14**	

Note 1 - Emissions are assumed to be negligible because the gypsum is wet and these operations are conducted with an enclosure.

Note 2 - The AP-42 Section 13.2.4 emission factor already takes into account the moisture content of the gypsum.

Note 3 - Assume all material diverted to G-1

American Municipal Power Generating Station
Fly Ash Conveying, Handling & Storage (P905 & P906)

Emission Points	Overall Capture & Control Efficiency (%)	Control Description	Max. Controlled Emissions (tons/yr) PM	Max. Controlled Emissions (tons/yr) PM_{10}	Response to Ohio EPA Question Concerning Dust Collectors
P905 - Boiler B001					
Unit 1 Mechanical Exhausters	99	**Fabric Filter**	0.47	0.47	**A fabric filter dust collector will be utilized to control PM_{10} emissions from these emissions points.**
Unit 1 Bin Vent Filter Exhaust	99	**Fabric Filter**	0.28	0.28	
Unit 1 Truck Loading	95	Enclosure & Wet Load Out	0.0009	0.0004	The use of wet suppression within an enclosure will minimize the potential for fugitive dust from the truck loading operation. The maximum annual emissions from the use of these control measures is no more than 0.0008 tons of PM_{10}. There is no practical use of baghouse control systems with this operation.
Total P905			**0.75**	**0.75**	
P906 - Boiler B002					
Unit 2 Mechanical Exhausters	99	**Fabric Filter**	0.47	0.47	**A fabric filter dust collector will be utilized to control PM_{10} emissions from these emissions points.**
Unit 2 Bin Vent Filter Exhaust	99	**Fabric Filter**	0.28	0.28	
Unit 2 Truck Loading	95	Enclosure & Wet Load Out	0.0009	0.0004	The use of wet suppression within an enclosure will minimize the potential for fugitive dust from the truck loading operation. The maximum annual emissions from the use of these control measures is no more than 0.0008 tons of PM_{10}. There is no practical use of baghouse control systems with this operation.
Total P906			**0.75**	**0.75**	

February 22, 2007

Mr. Dean Ponchak
Environmental Specialist
Division of Air Pollution Control
Ohio EPA – Southeast District Office
2195 Front Street
Logan, OH 43138

Re: American Municipal Power Generating Station
Facility ID No. 06-53-00-0069
PTI No. 06-08138

Dear Mr. Ponchak:

Thank you for contacting AMP-Ohio with the additional questions that were posed in your e-mail of January 24, 2007 concerning the Permit-to-Install (PTI) application for the AMPGS. This letter provides a response to each of your questions. Please insert this letter with the enclosed divider tab as a supplement to Volume V of the PTI application for the AMPGS.

1. *P901 (Coal Barge Unloading) – Section II of the application states that the control efficiency for this emissions unit will be 50-75%. The emissions calculations utilize 90-95%. Please explain this discrepancy.*

The emission calculations submitted with the PTI application for the Coal Barge Unloading (P901) operation include the correct estimated control efficiency of 90-95% for the use of wet suppression and minimizing drop height to control PM_{10} emissions. The emission estimates presented in the PTI application for P901 are based on this information. The information in item 5 (i.e., 50-70%) of Section II on page 95 of the permit application is a typographical error. Enclosed is a replacement page 95 to insert into the PTI application notebook that includes the correct control efficiency range of 90-95%.

2. *P903 (Limestone Preparation Building) – The application does not specify any type of crushing or grinding for this emissions unit. Please describe this operation in detail, including individual operations within the building.*

The process flow diagram in Section II of the PTI application on page 110 inadvertently omitted two Weigh Feeders, two ball mills (grinders), two back-up ball mills (grinders) and the Mill Slurry Sump in the Limestone Preparation Building (P903). Enclosed is a replacement page 110 to insert into the PTI application notebook that contains an updated

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AMP-Ohio 2600 Airport Drive Columbus, Ohio 43219 • **Phone:** 614/337-6222 • **Fax:** 614/337-6220 • www.amp-ohio.org

process flow diagram. As indicated in the process flow diagram, limestone will be transferred from the two day bins through enclosed weigh feeders to the ball mills. Grinding water is added as the limestone is discharged into the ball mills. There are two ball mills associated with each day bin. Only one ball mill in each pair will be operating at any time. Our design engineers do not expect PM_{10} emissions from the transfer of the limestone from the day bins into the weigh feeders (the weigh feeders are bolted to the base of the day bins), from the discharge from the weigh feeders to the ball mills (the weigh feeders are bolted to the ball mills), from the operation of the ball mills (water is introduced as the limestone is fed into the ball mills to produce a slurry), when the ground limestone/water slurry is discharged from the ball mills to the mill slurry sump or during the classification/distribution of the slurry prior to storage in the reagent storage tank. The limestone slurry is conveyed to the FGD units from the reagent storage tank.

The PTI application submitted by AMP-Ohio for the AMPGS identifies 40 CFR Subpart OOO as an "Other Applicable Rule" for the P903-Limestone Preparation Building (refer to the table on page 5 of the PTI application). The PTI application also identifies Subpart OOO as an applicable requirement in the BACT discussion for material handling operations.

The estimated dust collector/baghouse emission rate (0.005 grains/dscf) presented in the PTI application for the AMPGS is more restrictive than the 0.05 gram/dscm limit for stack discharges in Subpart OOO (0.05 gram/dscm = 0.022 gr/dscf). AMP-Ohio expects the PTI issued by Ohio EPA to include the baghouse discharge rates identified in the PTI application as well as the applicable visible emission limitations in 40 CFR Part 60 Subpart OOO.

3. *P905 (Flyash Conveying, Handling and Storage) – The proposed truck loading operation calculations assume a moisture content of 15% Please verify that the true moisture content of the material being loaded is 15% Also, you have proposed a two-sided enclosure with water mist as control. Please explain how fugitive emissions will be prevented during times of inclement (freezing) weather when a water mist can't be used. This may require the use of an alternate emissions control strategy to insure continuous compliance.*

Our design engineers have included two options for flyash loadout: (1) If the flyash is being sent to the on-site landfill, the flyash will be fed through a pin mixer where water will be added to achieve a moisture content of 15%. The wet flyash will then be loaded into an open top truck for transport to the landfill; or (2) If the flyash is sold for use in cement manufacturing, it will be kept dry and a telescoping chute with a vacuum dust collection system will be employed to load tanker trucks. Water mist sprays will be used at the entrance and exit of the two-sided enclosure under both flyash load-out options.

AMP-Ohio believes the control systems for both operating scenarios will be sufficient to prevent unacceptable visible fugitive emissions during truck loading. The PM_{10} emission estimates for this operation are unaffected by a small change in the assumed moisture

content. Nonetheless, AMP-Ohio proposed the use of a water mist at the entrance and exit of the two-sided enclosure to further enhance the overall control system. AMP-Ohio believes that the water mist can be successfully operated during all but the most extreme weather conditions.

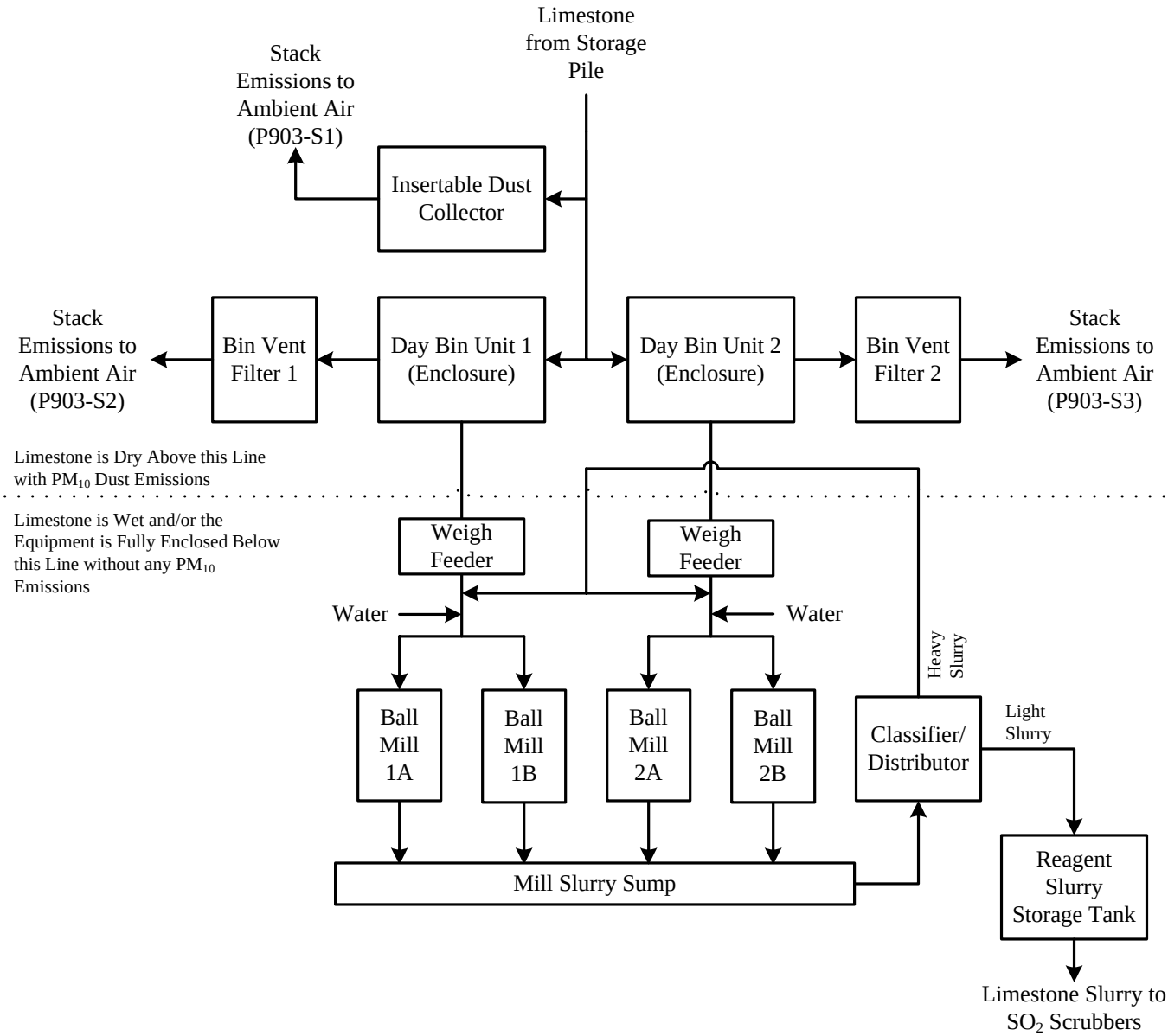
Thank you once again for assisting AMP-Ohio with the completion of a timely review of the PTI application for the AMPGS. Please contact me at 614-337-6222 if you have any questions concerning this letter or the enclosures.

Sincerely,

Randy Meyer
Manager of Environmental Affairs

Enclosures (divider tab for Volume V, revised page 95 and revised page 110)

Limestone Preparation Building
(P903)
Flow Diagram



Section II – Specific Air Contaminant Source Information

5. **Does this air contaminant source employ emissions control equipment?**

☑ **Yes** – fill out the applicable information below.

☐ **No** – proceed to item #6.

Note: Pollutant abbreviations used below: Particulates = PE; Organic Compounds = OC; Sulfur Dioxide = SO_2; Nitrogen Oxides = NO_X; Carbon Monoxide = CO

☑ **Other**, describe ***Wet suppression***

Manufacturer: ***Unknown*** Year installed: ***2012***

What do you call this control equipment: ***Coal Handling Enclosures***

Pollutant(s) controlled: ☑ PE ☐ OC ☐ SO_2 ☐ NO_X ☐ CO ☐Other

Estimated capture efficiency (%) ***NA*** Basis for efficiency: ***NA***

Design control efficiency (%) ***90-95*** Basis for efficiency: ***Engineering Judgment***

☐ This is the only control equipment on this air contaminant source

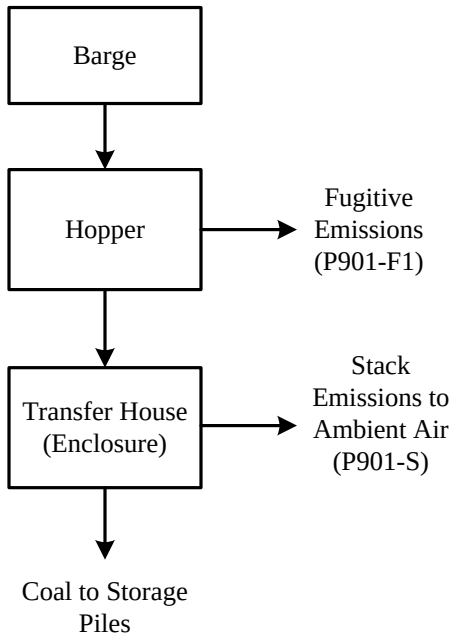
If no, this control equipment is: ● Primary ○ Secondary ○ Parallel

List any other air contaminant sources that are also vented to this control equipment: ***None***

6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in this application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.

A Process Flow Diagram is on the following page.

Coal Barge Unloading (P901)
Flow Diagram



March 29, 2007

Randy Meyer
American Municipal Power-Ohio, Inc.
2600 Airport Drive
Columbus, Ohio 43219

Re: Request for more information concerning the May 2006 AMP Generating Station application for an air permit

Dear Mr. Meyer:

I would like to begin this request by extending my appreciation for American Municipal Power's (AMP) expeditious response with the February 21, 2007 responses. I have a couple more requests before we finalize our evaluation of your application..

First, I (Ohio EPA) would like to know the projected amounts of H2S, flourides, beryllium, and total reduced sulfur compound air emissions and, if significant, how AMP wishes to address those pollutants. If calculations are performed to support the projected amounts then please submit those to Dean Ponchak and myself.

Additionally, I would like to know why the utility boilers can not meet 0.13 lb/mmBtu on a 3-hour average for carbon monoxide as Best Available Control Technology (BACT). The Longview facility has committed to meeting a 0.11 lb/mmBtu on a 3-hour average and AMP has currently committed to 0.154 lb/mmBtu on a 3 hour average. If BACT was view as a range, AMP's current proposal is near the bottom of that range where Santee Cooper at 0.16 lb/mmBtu on a 3 hour average would be the lowest.

Please submit this information as expeditious as possible so that Ohio EPA can continue to evaluate your application. If you have any questions regarding this letter or request that Ohio EPA contacts US EPA regarding this then please contact me at (614) 644-3697.

Sincerely,

Rod Windle
Ohio EPA
Division of Air Pollution Control

cc: Dean Ponchak, Ohio EPA, SEDO

April 10, 2007

AMP OHIO
American Municipal Power-Ohio, Inc.

Mr. Rod Windle
Ohio EPA
Division of Air Pollution Control
P.O. Box 1049
Columbus, OH 43216-1049

Re: American Municipal Power Generating Station
Facility ID No. 06-53-00-0069
PTI No. 06-08138

Dear Mr. Windle:

Thank you for contacting AMP-Ohio with the additional questions that were posed in your letter dated March 29, 2007 concerning the Permit-to-Install (PTI) application for the AMPGS. This letter provides a response to each of your questions. Please insert this letter with the enclosed divider tab as a supplement to Volume V of the PTI application for the AMPGS.

1. *Ohio EPA would like to know the projected amounts of H_2S, fluorides, beryllium and total reduced sulfur compound air emissions and, if significant, how AMP wishes to address those pollutants. If calculations are performed to support the projected amounts then please submit those.*

<u>H_2S (hydrogen sulfide)</u>

The sulfur dioxide (SO_2) emission calculations submitted with the PTI application for the AMPGS are based on the conservative assumption that all of the sulfur in the fuel will convert to SO_2. AMP-Ohio does not believe that any significant amount of H_2S will be emitted as a result of fuel combustion in the boilers. AP-42 Section 1.1 - <u>Bituminous and Subbituminous Coal Combustion</u> does not mention H_2S emissions from coal combustion and we have not identified any other power plant boiler permit that includes an allowable emission rate for H_2S. If any H_2S is emitted from the combustion process, the proposed Best Available Control Technology (BACT) systems for SO_2 (wet-FGD) and H_2SO_4 (wet-ESP) will be effective in controlling the small amount of H_2S that may be emitted.

Fluorides

The PTI application for the AMPGS includes emission estimates for hydrogen fluorides (HF). Please refer to page 2 of 21 in the Emission Calculations tab of Volume I of the PTI application for the AMPGS. The estimated maximum emission rate for HF provided by our project development engineer is 0.00102 lb/mmBtu. This emission rate and the maximum estimated HF emission rates of 5.3 lb/hr and 23.2 TPY were included in the PTI application submitted for the AMPGS.

The air quality impact analysis presented with the PTI application submitted for the AMPGS demonstrates that the maximum estimated hourly HF emission rate will result in off-site air quality impact that is less than the MAGLC defined by the Ohio EPA "Air Toxic Policy". Please refer to Table 8-1 Maximum Acceptable Ground Level Concentration (MAGLC) Assessment Pursuant to the Ohio EPA Air Toxic Policy on page 29 of the Ohio EPA Air Toxics tab of Volume III of the PTI application for the AMPGS.

Beryllium

The amount of beryllium that could potentially be emitted from the combustion of fuel in the boilers at the AMPGS relates to the concentration of the beryllium in the coal supply and the effectiveness of the overall air pollution control system. Beryllium may be present in very small amounts in one or more of the coals burned at the AMPGS. AP-42 Section 1.1 Table 1.1-18 Emission Factors for Trace Metals from Controlled Coal Combustion includes an emission factor of 0.000021 lb of beryllium per ton of coal burned. The use of this emission factor results in an estimate of 116 lb/yr (0.058 tons) of beryllium emissions from the boilers at the AMGS. This emissions rate is negligible and substantially less than the 1.0 ton per year emission rate specified in the instructions on the PTI application form for "air toxics" and/or HAP emissions.

Total Reduced Sulfur (TRS) Compounds

Please refer to the response presented above for H_2S. AMP-Ohio does not believe that any significant amount of TRS compounds will be emitted as a result of fuel combustion in the boilers. If any TRS compounds are emitted from the combustion process, the proposed Best Available Control Technology (BACT) systems for SO_2 (wet-FGD) and H_2SO_4 (wet-ESP) will also be effective in controlling the small amount of TRS compounds that may be emitted.

2. *Ohio EPA would like to know why the utility boilers can not meet 0.13 lb/mmBtu on a 3-hour average for carbon monoxide as Best Available Control Technology (BACT). The Longview facility has committed to meeting 0.11 lb/mmBtu on a 3-hour average and AMP has currently committed to 0.154 lb/mmBtu on a 3-hour average. If BACT was viewed as a range, AMP's current proposal is near the bottom of that range where Santee Cooper at 0.16 lb/mmBtu on a 3-hour average would be the lowest.*

AMP-Ohio is not familiar with the basis for the 0.11 lb/mmBtu 3-hour average CO emission rate in the Longview permit. Our project development engineer believes that the 3-hour average CO emission rate that can reliably be achieved with Good Combustion Practices at the units at the AMPGS is 0.154 lb/mmBtu. It is possible that the actual CO emission rate will be less than this amount and possibly as low as 0.13 lb/mmBtu or lower. However, our project development engineer has advised us that a lower emission rate may not be reliably achieved given the variability in the fuels that could be burned at the AMPGS.

The averaging time associated with any CO emission limitations is important because of the variability in fuel inputs and boiler operations. This is particularly the case with units such as the AMPGS where a wide variety of coals may be burned and operating loads may be varied over short periods of time. Fuel variability has less influence on the variability of emissions with boilers such as Longview that will burn a single coal supply. As you know, a given emission rate is less stringent when compliance is determined on a 24-hour or 30-day average basis than it would be if compliance were determined on a 3-hour average basis. This concept is critical to the comparison of the CO emission rates established as BACT in comparable pulverized coal-fired boiler permits.

We disagree with the conclusion that the 0.154 lb/mmBtu 3-hour average CO emission rate proposed for the AMPGS is at the high end of the BACT range defined by the recent PSD permits presented for comparison in the BACT Study submitted with the PTI application for the AMPGS. Please refer to Table 5-1 Comparison of Proposed CO and VOC BACT with Other Recent Comparable PSD Permits on page 29 of the Main Boiler CO/VOC tab of Volume II of the PTI application.

Other than Santee Cooper (which has a higher 3-hour average CO emission limit of 0.16 lb/mmBtu) and Longview (which has a lower 3-hour average CO emission limit of 0.11 lb/mmBtu), the other comparable facilities have CO emission limits which are specified with *averaging times that are longer than 3-hours*. Because the averaging times associated with the CO emission limits are significantly longer in the PSD permits issued for the Prairie State, Thoroughbred and Elm Road facilities, AMP-Ohio believes the CO emission limits in those permits are comparable to, or greater than, the *0.154 lb/mmBtu 3-hour average* CO emission rate proposed for the AMPGS. For example, we do not believe the *0.12 lb/mmBtu 24-hr block* CO emission rate for Prairie State should be interpreted as being more stringent than the CO emission rate proposed for the AMPGS.

AMP-Ohio has also examined two recent PSD permits that were not available to us at the time the BACT Study for the AMPGS was prepared. This examination provides further evidence to support the "top down" assessment that the 0.154 lb/mmBtu 3-hour average CO emission rate proposed for the AMPGS is representative of BACT. The recent PSD permits examined by AMP-Ohio are:

(1) Final PSD permit issued by the Missouri Department of Natural Resources to Kansas City Power & Light for Unit 2 (a 8,100 mmBtu/hr pulverized coal-fired boiler) at the Iatan Generating Station in January 2006; and

(2) Final PSD permit issued by the Oklahoma Department of Environmental Quality to the Western Farmers Electric Cooperative for Unit 2 (a 7,125 mmBtu/hr pulverized coal-fired boiler) at the Hugo Generating Station in February 2007.

Both of these recent PSD permits define BACT for CO emissions control as the use of "good combustion practices". The permit for the Iatan Generating Station includes a *0.14 lb/mmBtu 30-day rolling average* CO emission limitation and the permit for the Hugo Generating Station includes a *0.15 lb/mmBtu 30-day rolling average* CO emission limitation. The determination of BACT for CO emissions from Unit 2 at the Hugo Generating Station is particularly important given that this is the most recent PSD permit issued for a pulverized coal-fired boiler. *The conclusion we continue to reach is the 0.154 lb/mmBtu 3-hour average CO emission rate proposed for the AMPGS is equivalent or more stringent than the emission rates established as BACT in other PSD permits issued for pulverized coal-fired boilers.*

Thank you once again for assisting AMP-Ohio with the completion of a timely review of the PTI application for the AMPGS. Please contact me at 614-337-6222 if you have any questions concerning this letter.

Sincerely,

Randy Meyer
Manager of Environmental Affairs

May 15, 2007

AMP OHIO
American Municipal Power-Ohio, Inc.

Mr. Dean Ponchak
Environmental Specialist
Division of Air Pollution Control
Ohio EPA – Southeast District Office
2195 Front Street
Logan, OH 43138

Re: American Municipal Power-Ohio
Facility ID No. 06-53-00-0069
PTI No. 06-08138

Dear Mr. Ponchak:

Thank you once again for taking the time to confer with me and the other representatives of AMP-Ohio on May 2, 2007 to discuss your technical questions concerning how the use of an ammonia-based FGD control system is addressed in the application for the AMP Generating Station (AMPGS). This letter and enclosures supplement the information previously provided in the application submitted by AMP-Ohio for the AMPGS as follows:

1. Pages 4 and 5 of the PTI application have been revised to update the emissions unit list consistent with our discussion and the subsequent determination that the dry fertilizer crystals will be loaded into trucks or barges rather than into trucks or railcars. The revised list of emissions units now includes Fertilizer Crystallization Plant (P003), Dry Fertilizer Material Handling (P004) and Dry Fertilizer Barge Loading (P907). The descriptions of the emissions units on pages 4 and 5 have been updated to reflect the potential that urea will be used in lieu of limestone in the Limestone/Urea Barge Unloading (F005), Limestone/Urea Storage (F006) and Limestone/Urea Preparation Building (P903).

2. Pages 84 through 93 of the PTI application have been updated consistent with the identification of the Fertilizer Crystallization Plant (P003) as a separate emissions unit. This includes updated allowable emissions rates (including the use of the AP-42 emission factor for low-NO_x burners for the combustion of natural gas in the dryer component of this emissions unit), the deletion of the baghouse control system (this control unit is associated with emissions unit P004), an updated process flow diagram, and corresponding updates to the other information provided in the original PTI application.

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3. Pages 93a through 93g have been added to the PTI application to identify the Dry Fertilizer Material Handling (P004) as a separate emissions unit. PM/PM_{10} emissions that result from the operation of this unit will be captured and controlled by the baghouse that was originally included in emissions unit P003. We do not believe there will be any fugitive emissions released from the building where this equipment is located.

4. Pages 139 through 144 have been added to the PTI application to identify the equipment associated with the Dry Fertilizer Barge Loading (P907) operation. This emissions unit was not included in the original application. The information and data included in the revised PTI application are based on the "worst case" assumption that all of the dry fertilizer crystals will be loaded into barges and that none of the material will be loaded into trucks at emissions unit P004. Enclosed is a copy of an updated General Arrangement drawing (GA-01; Revision 12) that shows the two transfer points on the enclosed conveyor associated with the transfer of dry fertilizer to the barge loading area (Item 42 on the drawing).

5. The summary of non-boiler particulate emissions on page 4 of the Emission Calculations has been revised to include rows for the two additional emissions units associated with the fertilizer production operation (i.e., P004 and P907) and to revise the emissions unit designations for the Limestone/Urea Barge Unloading (F005), Limestone/Urea Storage (F006) and Limestone/Urea Preparation Building (P903). The addition of emissions unit P004 does not change the previous PM_{10} emissions estimates (emissions from emissions unit P004 were originally included in emissions unit P003). The addition of emissions unit P907 increases the annual non-boiler PM_{10} emissions rate by 0.95 tons per year. The substitution of urea for limestone in emissions units F005, F006 and P903 will not increase any PM_{10} emission rate from the estimates presented in the original PTI application.

6. The emissions estimates for the Fertilizer Crystallization Plant (P003) on page 13 of the Emission Calculations have been revised to delete the baghouse and PM_{10} emissions associated with the dry fertilizer material handling operations that are now included with emissions unit P004. The NO_x emissions estimates for this unit have been reduced to reflect the use of the low-NO_x burner for natural gas combustion in the rotary dryer.

7. Page 13a has been added to the Emissions Calculations to provide PM_{10} emission estimates for the Fertilizer Plant Dry Material Handling (P004) operation. The emissions from this unit were included in emissions unit P003 in the original application.

8. Page 19a has been added to the Emissions Calculations to provide estimates for the Dry Fertilizer Barge Loading (P907) operation. The worst case emissions rate from this operation of 0.95 tons per year of PM_{10} was not included in the original application.

Thank you once again for assisting AMP-Ohio with the completion of a timely review of the PTI application for the AMPGS. Please contact me at 614-337-6222 if you have any questions concerning this letter or enclosures.

On behalf of the members,

Randy Meyer
Director of Environmental Affairs

Enclosures

List of Emissions Units[1] and Summary of Applicable Rules					
Page	**Emissions Unit ID[2]**	**Description**	**PSD BACT**	**OAC Rule 3745-31-05 BAT**	**Other Applicable Rule(s)**
7	*B001*	*Boiler #1* *5,191 mmBtu/hr* *Pulverized Coal-Fired Boiler*	*NO_x, SO_2, PM/PM_{10}, CO, VOC, and H_2SO_4*	*all air pollutants >1.0 tpy that are not included in BACT*	*NSPS Subpart Da (SO_2, PM and NO_x)* *CAIR (NO_x and SO_2)* *CAMR (Mercury)* *Title IV Allowances (SO_2)* *Title IV NO_x* *OAC rule 3745-31-05 (BAT)* *OAC rule 3745-17-07 (visible PE)* *OAC rule 3745-17-10 (PE)* *OAC chapter 3745-14 (NO_x)* *OAC rule 3745-18-59 (SO_2)* *OAC rule 3745-21-08 (CO)* *OAC rule 3745-23-06 (NO_x)*
15	*B002*	*Boiler #2* *5,191 mmBtu/hr* *Pulverized Coal-Fired Boiler*			
23	*B003*	*150 mmBtu/hr* *Natural Gas-Fired Auxiliary Boiler*	*NO_x, SO_2, PM/PM_{10}, CO, VOC, and H_2SO_4*	*all air pollutant >1.0 tpy that are not included in BACT*	*NSPS Subpart Db (no limits due to 10% capacity factor)* *MACT Subpart DDDDD* *OAC rule 3745-17-07 (visible PE)* *OAC rule 3745-17-10 (PE)* *OAC chapter 3745-14 (NO_x)* *OAC rule 3745-18-59 (SO_2)* *OAC rule 3745-21-08 (CO)* *OAC rule 3745-23-06 (NO_x)*
29	*F001*	*Landfill (ash and FGD by-product)[3]*	*PM/PM_{10}*	*None*	*OAC rule 3745-17-07 (visible PE)* *OAC rule 3745-17-08 (PE)*
39	*F002*	*Paved Roadways and Parking Areas*	*PM/PM_{10}*	*None*	
46	*F003*	*Unpaved Roadways*	*PM/PM_{10}*	*None*	
53	*F004*	*Active and Inactive Coal Storage Piles*	*PM/PM_{10}*	*None*	
59	*F005*	*Limestone/Urea Barge Unloading[3]*	*PM/PM_{10}*	*None*	
66	*F006*	*Limestone/Urea Storage[3]*	*PM/PM_{10}*	*None*	
72	*P001*	*Cooling Cells for Boiler #1*	*PM/PM_{10}*	*None*	*None*
77	*P002*	*Cooling Cells for Boiler #2*	*PM/PM_{10}*	*None*	
84	*P003*	*Fertilizer Crystallization Plant[3]*	*NO_x, SO_2, PM/PM_{10}, CO and VOC*	*None*	*OAC rule 3745-17-07 (visible PE)* *OAC rule 3745-17-11 (PE)* *OAC chapter 3745-14 (NO_x)* *OAC rule 3745-18-59 (SO_2)* *OAC rule 3745-21-08 (CO)* *OAC rule 3745-23-06 (NO_x)* *NSPS Subpart PP is not applicable[4]*
93a	*P004*	*Dry Fertilizer Material Handling*	*PM/PM_{10}*	*None*	*OAC rule 3745-17-07 (visible PE)* *OAC rule 3745-17-11 (PM)*
94	*P901*	*Coal Barge Unloading and Transfer House*	*PM/PM_{10}*	*None*	*OAC rule 3745-17-07 (visible PE)* *OAC rule 3745-17-08 (PE)* *OAC rule 3745-17-11 (PE)*

List of Emissions Units[1] and Summary of Applicable Rules

Page	Emissions Unit ID[2]	Description	PSD BACT	OAC Rule 3745-31-05 BAT	Other Applicable Rule(s)
100	*P902*	*Coal Crushing*	*PM/PM_{10}*	*None*	*NSPS Subpart Y (opacity)* *OAC rule 3745-17-07 (visible PE)* *OAC rule 3745-17-08 (PE)* *OAC rule 3745-17-11 (PE)*
108	*P903*	*Limestone/Urea Preparation Building[3]*	*PM/PM_{10}*	*None*	*NSPS Subpart OOO (PM and opacity)* *OAC rule 3745-17-07 (visible PE)* *OAC rule 3745-17-08 (PE)* *OAC rule 3745-17-11 (PE)*
116	*P904*	*Gypsum Conveying, Handling and Storage[3]*	*PM/PM_{10}*	*None*	*OAC rule 3745-17-07 (visible PE)* *OAC rule 3745-17-08 (PE)* *OAC rule 3745-17-11 (PE)*
125	*P905*	*Flyash Conveying, Handling and Storage for Boiler #1*	*PM/PM_{10}*	*None*	
132	*P906*	*Flyash Conveying, Handling and Storage for Boiler #2*	*PM/PM_{10}*	*None*	
139	*P907*	*Dry Fertilizer Barge Loading[3]*	*PM/PM_{10}*	*None*	*OAC rule 3745-17-07 (visible PE)* *OAC rule 3745-17-08 (PE)*

Notes:

[1] There are two emergency diesel engines that are exempt from air permit requirements pursuant to OAC rule 3745-31-03(A)(4)(b) that are not included in this permit application.

[2] These emissions unit IDs were assigned for reference. Ohio EPA may assign different IDs when the PTI application is processed.

[3] The AMPGS will employ a Wet FGD control system, but is still considering whether to use limestone or ammonia. As a result, this PTI application includes the emissions units needed for both options.

[4] US EPA determined that the ammonium sulfate produced by the Fertilizer Plant does not meet the definition of synthetic ammonium manufacturing plant and is, therefore, not subject to the NSPS Subpart PP.

Section II – Specific Air Contaminant Source Information

1. Company identification (name for air contaminant source for which you are applying): ***P003 – Fertilizer Crystallization Plant***

2. List all equipment that are part of this air contaminant source: ***Natural gas-fired rotary dryer and other equipment associated with the production of dry fertilizer crystals (refer to flow diagram)***

3. Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

   When did/will you begin to install or modify the air contaminant source? (month/year) ***2009***

   When did/will you begin to operate the air contaminant source? (month/year) ***2012*** **OR** after issuance of PTI _____

4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.

   - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if 'Emissions before controls (max), lb/hr' multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
   - If you have no add-on control equipment, 'Emissions before controls' will be the same as 'Actual emissions'.
   - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit emissions in line #8 or have described inherent limitations below.
   - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
   - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01(HHH) and OAC rule 3745-77-01(BB).

Pollutant	Emissions Before Controls (max) (lb/hr)	Actual Emissions (lb/hr)	Actual Emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
PE	***Unknown***	***≤3.86***	***≤16.89***	***3.86***	***16.89***
PM_{10}	***Unknown***	***≤3.86***	***≤16.89***	***3.86***	***16.89***
NO_x	***Unknown***	***≤0.86***	***≤3.74***	***0.23***	***0.99***
SO_2	***Unknown***	***≤0.003***	***≤0.01***	***0.003***	***0.01***
CO	***Unknown***	***≤0.38***	***≤1.66***	***0.38***	***1.66***
VOC	***Unknown***	***≤0.02***	***≤0.11***	***0.02***	***0.11***

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

Refer to the Emission Calculations section of this permit application.

Section II – Specific Air Contaminant Source Information

5. **Does this air contaminant source employ emissions control equipment?**

☑ **Yes** – fill out the applicable information below.

☐ **No** – proceed to item #6.

Note: Pollutant abbreviations used below: Particulates = PE; Organic Compounds = OC; Sulfur Dioxide = SO_2; Nitrogen Oxides = NO_X; Carbon Monoxide = CO

☑ **Wet Scrubber**

Manufacturer: ***Unknown*** Year installed: ***2012***

What do you call this control equipment: ***Fertilizer Plant Scrubber #1***

Pollutant(s) controlled: ☑ PE ☐ OC ☐ SO_2 ☐ NO_X ☐ CO ☐Other

Estimated capture efficiency (%) ***100*** Basis for efficiency: ***Design***

Design control efficiency (%) ***NA*** Basis for efficiency: ***NA***

Type: ☐ Spray Chamber ☐ Packed Bed ☐ Impingement ☑ Venturi ☐Other

Operating pressure drop range (inches of water): Minimum: ***Unknown*** Maximum: ***Unknown***

pH range for scrubbing Liquid : Minimum: ***NA*** Maximum: ***NA***

Scrubbing liquid flow rate (gal/min) ***TBD***

Is scrubbing liquid recirculating: ● Yes ○ No

Water Supply pressure (Note: for spray chambers only) (psig): ***TBD***

☐ This is the only control equipment on this air contaminant source

If no, this control equipment is: ● Primary ○ Secondary ○

List any other air contaminant sources that are also vented to this control equipment: ***None***

☑ **Wet Scrubber**

Manufacturer: ***Unknown*** Year installed: ***2012***

What do you call this control equipment: ***Fertilizer Plant Scrubber #2***

Pollutant(s) controlled: ☑ PE ☐ OC ☐ SO_2 ☐ NO_X ☐ CO ☐Other

Estimated capture efficiency (%) ***100*** Basis for efficiency: ***Design***

Design control efficiency (%) ***NA*** Basis for efficiency: ***NA***

Type: ☐ Spray Chamber ☐ Packed Bed ☐ Impingement ☑ Venturi ☐Other

Operating pressure drop range (inches of water): Minimum: ***Unknown*** Maximum: ***Unknown***

pH range for scrubbing Liquid : Minimum: ***NA*** Maximum: ***NA***

Scrubbing liquid flow rate (gal/min) ***TBD***

Is scrubbing liquid recirculating: ● Yes ○ No

Water Supply pressure (Note: for spray chambers only) (psig): ***TBD***

☐ This is the only control equipment on this air contaminant source

If no, this control equipment is: ● Primary ○ Secondary ○ Parallel

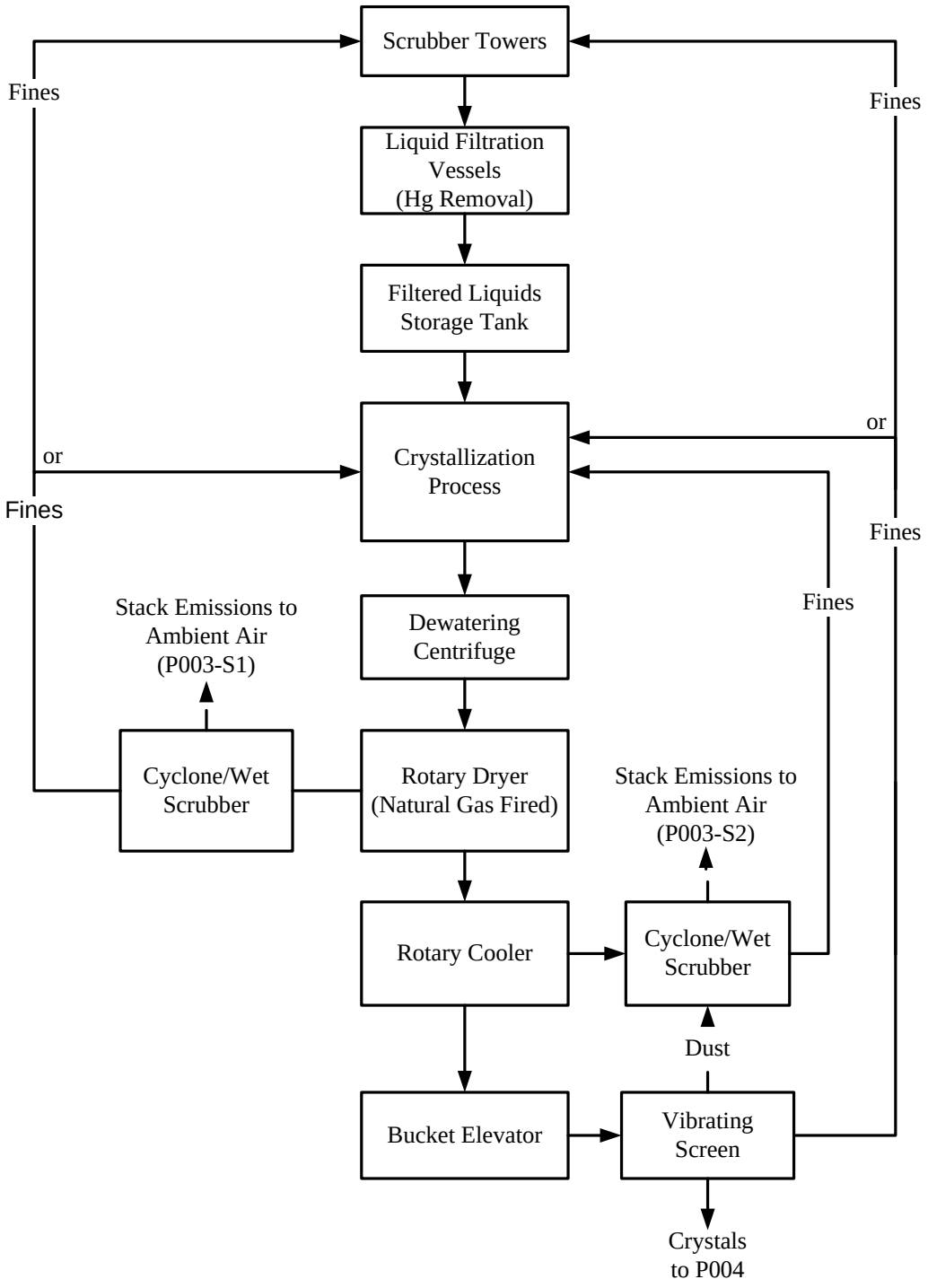
List any other air contaminant sources that are also vented to this control equipment: ***None***

Section II – Specific Air Contaminant Source Information

6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in this application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.

A Process Flow Diagram is on the following page.

Fertilizer Plant (P003)
Crystallization Process
Flow Diagram



Section II – Specific Air Contaminant Source Information

7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio's Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

- Particulate Matter (PM_{10}): 10 tons per year
- Sulfur Dioxide (SO_2): 25 tons per year
- Nitrogen Oxides (NO_X): 25 tons per year
- Carbon Monoxide (CO): 100 tons per year
- Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

Table 7-A, Stack Egress Point Information

Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code*	Stack Egress Point Shape and Dimensions (in) (examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)
P003 Dryer Scrubber Stack (P003-S1)	***A***	***Round: 10 in diameter***	***213***	***125***	***1,650***	***1,625***
P003 Cooler Scrubber Stack (P003-S2)	***A***	***Round: 40 in diameter***	***213***	***125***	***26,500***	***1,625***

*Type codes for stack egress points:

A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

Table 7-B, Fugitive Egress Point Information

Company ID for the Egress Point (examples: Garage Door B, Building C, Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12X30 feet, west wall; outside gravel storage piles; etc.	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)
None					

*Type codes for fugitive egress point:

D. door or window
E. other opening in the building without a duct
F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Section II – Specific Air Contaminant Source Information

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

Table 7-C, Egress Point Additional Information					Table 7-C, Continued			
Company ID or Name for the Egress Point	**Building Height (ft)**	**Building Width (ft)**	**Building Length (ft)**		**Company ID or Name for the Egress Point**	**Building Height (ft)**	**Building Width (ft)**	**Building Length (ft)**
P003 Dryer Scrubber Stack (P003-S1)	***100***	***150***	***150***					
P003 Cooler Scrubber Stack (P003-S2)	***100***	***150***	***150***					

8. Request for Federally Enforceable Limits

As part of this permit application, do you wish to propose voluntary restrictions to limit emissions in order to avoid specific requirements list below, (i.e., are you requesting federally enforceable limits to obtain synthetic minor status)?

☐ Yes
☑ No
☐ Not Sure – Please contact me if this affects me.

If yes, why are you requesting federally enforceable limits? Check all that apply.

a. ☐ to avoid being a "major source" (see OAC rule 3745-77-01(W))
b. ☐ to avoid being a "major MACT source" (see OAC rule 3745-31-01(QQ))
c. ☐ to avoid being a "major modification" (see OAC rule 3745-31-01(RR))
d. ☐ to avoid being a "major stationary source" (see OAC rule 3745-31-01(SS))
e. ☐ to avoid an air dispersion modeling requirement (see Engineering Guide #69)
f. ☐ to avoid another requirement. Describe:_____

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

9. If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable Performance Specification (40 CFR 60, Appendix B)	Pollutant(s) Monitored
None			

10. Do you wish to permit this air contaminant source as a portable source, allowing relocation within the state in accordance with OAC rule 3745-31-03(A)(1)(p) or OAC rule 3745-31-05(F)?

☐ Yes – Note: notification requirements in rules cited above must be followed.
☑ No

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.
See attached Fuel Burning Operation and General Process Operation EAC Forms for emission unit P003.

EMISSIONS ACTIVITY CATEGORY FORM
FUEL BURNING OPERATION

This form is to be completed for each fuel burning operation. State/Federal regulations which may apply to fuel burning operations are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list.

1. Reason this form is being submitted (check one)

☑ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. B001) _____

2. Maximum Operating Schedule: ***24*** hours per day; ***365*** days per year

If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples.

6. Input Capacity (million Btu/hr):

Rated *(Indicate units if other than mmBtu/hr)*	Maximum *(Indicate units if other than mmBtu/hr)*	Normal *(Indicate units if other than mmBtu/hr)*
4.5	***4.5***	***4.5***

4. Output Capacity:

Rated *(lb steam/hr)*	Maximum *(lb steam/hr)*	Normal *(lb steam/hr)*
NA	***NA***	***NA***

☑ Not applicable - operation does not produce steam.

5. Percent of Operating Time Used for:

Process: ***100*** %
Space Heat: ***0*** %
Electric Power: ***0***%

6. Type of Draft (check one):

☑ Natural ☐ Induced ☐ Forced

7. Type of combustion monitoring (check one):

☐ Fuel/Air Ratio ☐ Oxygen ☑ None
☐ Other (describe) _____

Section II – Specific Air Contaminant Source Information

8. Type of Fuel Fired (complete all that apply):

Fuel*	Fired as...	Min. Heat Content (Btu/unit)	Max. % Ash	Max. % Sulfur	Max. Annual Fuel Use	Average Hourly Fuel Use	Maximum Hourly Fuel Use
Natural Gas	☑ Primary Backup	***1,000 Btu/cf***	***NA***	***NA***	***39.42 million cf***	***4,000 cf***	***4,500 cf***

* Please identify all combinations of fuels that are co-fired: _____

** Identify other fuel(s): _____

Coal-Fired Units

9. Type of Coal Firing (check one):

☐ Pulverized-Wet Bottom ☐ Hand-Fired ☐ Chain Grate ☐ Traveling Grate
☐ Pulverized-Dry Bottom ☐ Cyclones ☐ Spreader Stoker ☐ Fluidized Bed
☐ Underfeed Stoker ☐ Other (describe) _____

10. Flyash Reinjection:

☐ Yes ☐ No

11. Overfire Air:

☐ Yes ☐ No

Oil-Fired Units

12. Oil Preheater:

☐ Yes - Indicate Temperature: _____ deg. F
☐ No

EMISSIONS ACTIVITY CATEGORY FORM
GENERAL PROCESS OPERATION

This form is to be completed for each process operation when there is no specific emissions activity category (EAC) form applicable. If there is more than one end product for this process, copy and complete this form for each additional product (see instructions). Several State/Federal regulations which may apply to process operations are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list.

1. Reason this form is being submitted (Check one)

   ☑ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. P001) _____

2. Maximum Operating Schedule: : ***24*** hours per day; ***365*** days per year

   If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. _____

3. End product of this process: ***Fertilizer Crystals***

4. Hourly production rates (indicate appropriate units). Please see the instructions for clarification of "Maximum" and "Average" for new versus existing operations:

Hourly	Rate	Units (e.g., widgets)
Average production	***27 tons***	***fertilizer***
Maximum production	***33 tons***	***fertilizer***

5. Annual production rates (indicate appropriate units) Please see the instructions for clarification of "Maximum" and "Actual" for new versus existing operations:

Annual	Rate	Units (e.g., widgets)
Actual production	***236,520 tons***	***fertilizer***
Maximum production	***289,080 tons***	***fertilizer***

6. Type of operation (please check one):

   ☑ Continuous
   ☐ Batch (please complete items below)

   Minimum cycle* time (minutes): _____
   Minimum time between cycles (minutes): _____
   Maximum number of cycles per daily 24 hour period: _____
   (Note: include cycle time and set up/clean up time.)

   *"Cycle" refers to the time the equipment is in operation.

Section II – Specific Air Contaminant Source Information

7. Materials used in process at maximum hourly production rate (add rows/pages as needed):

Material	Physical State at Standard Conditions	Principle Use	Amount**
Ammonium Sulfate in solution	***Liquid***	***Manufacture dry fertilizer***	***88 tons (17,585 gallons)***

** Please indicate the amount **and** rate (e.g., lbs/hr, gallons/hr, lbs/cycle, etc.).

8. Please provide a narrative description of the process below (e.g., coating of metal parts using high VOC content coatings for the manufacture of widgets; emissions controlled by thermal oxidizer...):

The Fertilizer Plant emissions unit (P003) includes all components associated with the production of dry fertilizer crystals from ammonium sulfate recovery from the optional control system for Boilers B001 and B002.

Section II – Specific Air Contaminant Source Information

1. Company identification (name for air contaminant source for which you are applying): ***P004 – Dry Fertilizer Material Handling***

2. List all equipment that are part of this air contaminant source: ***Material handling equipment and truck loading for dry fertilizer (refer to flow diagram)***

3. Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

   When did/will you begin to install or modify the air contaminant source? (month/year) ***2009***

   When did/will you begin to operate the air contaminant source? (month/year) ***2012*** **OR** after issuance of PTI _____

4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.

   - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if 'Emissions before controls (max), lb/hr' multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
   - If you have no add-on control equipment, 'Emissions before controls' will be the same as 'Actual emissions'.
   - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit emissions in line #8 or have described inherent limitations below.
   - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
   - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01(HHH) and OAC rule 3745-77-01(BB).

Pollutant	Emissions Before Controls (max) (lb/hr)	Actual Emissions (lb/hr)	Actual Emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
PE	***Unknown***	***≤0.36***	***≤1.59***	***0.36***	***1.59***
PM_{10}	***Unknown***	***≤0.36***	***≤1.59***	***0.36***	***1.59***

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

Refer to the Emission Calculations section of this permit application.

Section II – Specific Air Contaminant Source Information

5. **Does this air contaminant source employ emissions control equipment?**

☑ **Yes** – fill out the applicable information below.

☐ **No** – proceed to item #6.

Note: Pollutant abbreviations used below: Particulates = PE; Organic Compounds = OC; Sulfur Dioxide = SO_2; Nitrogen Oxides = NO_X; Carbon Monoxide = CO

☑ **Fabric Filter/Baghouse**

Manufacturer: ***Unknown*** Year installed: ***2012***

What do you call this control equipment: ***Fertilizer Plant Baghouse***

Pollutant(s) controlled: ☑ PE ☐ OC ☐ SO_2 ☐ NO_X ☐ CO ☐Other

Estimated capture efficiency (%) ***100*** Basis for efficiency: ***Design***

Design control efficiency (%) ***NA*** Basis for efficiency: ***NA***

Operating pressure drop range (inches of water): Minimum: ***Unknown*** Maximum: ***Unknown***

Pressure Type: ○ Negative pressure ● Positive pressure

Fabric Cleaning Mechanism: ○ Reverse Air ○ Pulse Jet ○ Shaker ○ Other ***Unknown***

☐ Lime injection or fabric coating agent used: Type: ***NA*** Feed Rate: ***NA***

☐ This is the only control equipment on this air contaminant source

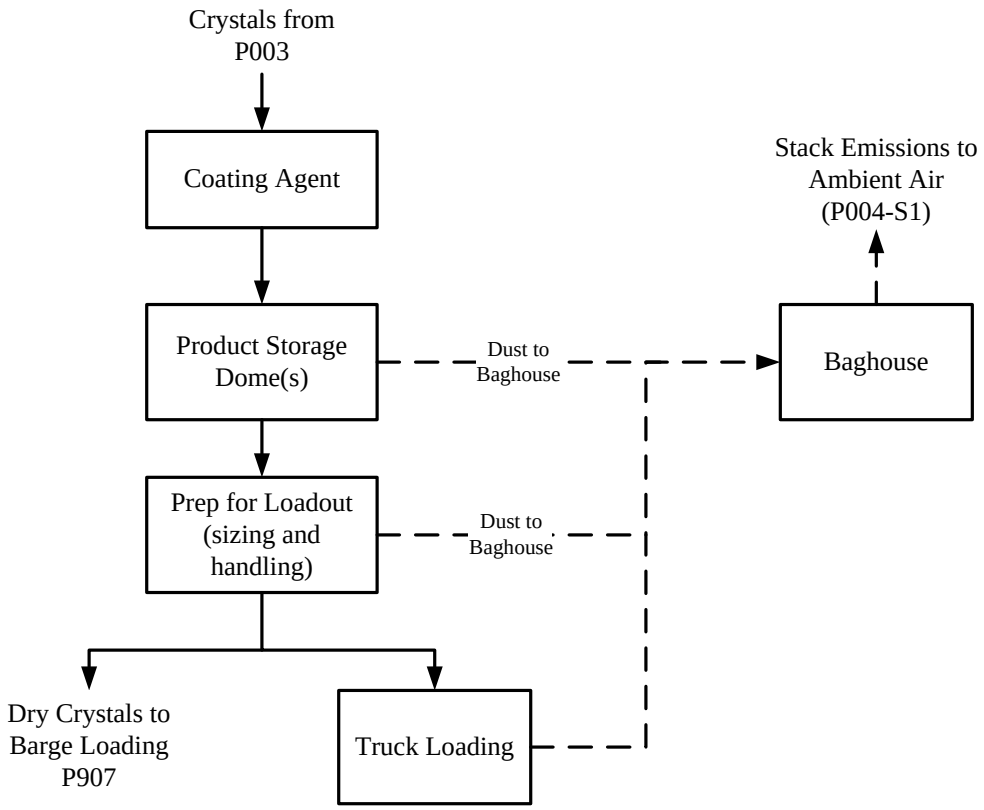
If no, this control equipment is: ● Primary ○ Secondary ○ Parallel ***The baghouse controls emissions from different components of the Fertilizer Plant Dry Material Handling system (refer to flow diagram).***

List any other air contaminant sources that are also vented to this control equipment: ***None***

6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in this application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.

A Process Flow Diagram is on the following page.

Fertilizer Plant Dry Material Handling (P004)
Flow Diagram



Section II – Specific Air Contaminant Source Information

7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio's Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

- Particulate Matter (PM_{10}): 10 tons per year
- Sulfur Dioxide (SO_2): 25 tons per year
- Nitrogen Oxides (NO_X): 25 tons per year
- Carbon Monoxide (CO): 100 tons per year
- Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

Table 7-A, Stack Egress Point Information

Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code*	Stack Egress Point Shape and Dimensions (in) (examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)
P004 Baghouse Stack (P004-S1)	***A***	***Round: 23 in diameter***	***213***	***Ambient***	***8,800***	***1,625***

*Type codes for stack egress points:

A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

Table 7-B, Fugitive Egress Point Information

Company ID for the Egress Point (examples: Garage Door B, Building C, Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12X30 feet, west wall; outside gravel storage piles; etc.	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)
None					

*Type codes for fugitive egress point:

D. door or window
E. other opening in the building without a duct
F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Section II – Specific Air Contaminant Source Information

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

Table 7-C, Egress Point Additional Information					Table 7-C, Continued			
Company ID or Name for the Egress Point	**Building Height (ft)**	**Building Width (ft)**	**Building Length (ft)**		**Company ID or Name for the Egress Point**	**Building Height (ft)**	**Building Width (ft)**	**Building Length (ft)**
P004 Baghouse Stack (P004-S1)	***100***	***150***	***150***					

8. Request for Federally Enforceable Limits

As part of this permit application, do you wish to propose voluntary restrictions to limit emissions in order to avoid specific requirements list below, (i.e., are you requesting federally enforceable limits to obtain synthetic minor status)?

☐ Yes
☑ No
☐ Not Sure – Please contact me if this affects me.

If yes, why are you requesting federally enforceable limits? Check all that apply.

a. ☐ to avoid being a "major source" (see OAC rule 3745-77-01(W))
b. ☐ to avoid being a "major MACT source" (see OAC rule 3745-31-01(QQ))
c. ☐ to avoid being a "major modification" (see OAC rule 3745-31-01(RR))
d. ☐ to avoid being a "major stationary source" (see OAC rule 3745-31-01(SS))
e. ☐ to avoid an air dispersion modeling requirement (see Engineering Guide #69)
f. ☐ to avoid another requirement. Describe:_____

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

9. If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable Performance Specification (40 CFR 60, Appendix B)	Pollutant(s) Monitored
None			

10. Do you wish to permit this air contaminant source as a portable source, allowing relocation within the state in accordance with OAC rule 3745-31-03(A)(1)(p) or OAC rule 3745-31-05(F)?

☐ Yes – Note: notification requirements in rules cited above must be followed.
☑ No

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.

See attached General Process Operation EAC Form for emission unit P004.

EMISSIONS ACTIVITY CATEGORY FORM
GENERAL PROCESS OPERATION

This form is to be completed for each process operation when there is no specific emissions activity category (EAC) form applicable. If there is more than one end product for this process, copy and complete this form for each additional product (see instructions). Several State/Federal regulations which may apply to process operations are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list.

1. Reason this form is being submitted (Check one)

   ☑ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. P001) _____

2. Maximum Operating Schedule: : ***24*** hours per day; ***365*** days per year

   If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. _____

3. End product of this process: ***Fertilizer***

4. Hourly production rates (indicate appropriate units). Please see the instructions for clarification of "Maximum" and "Average" for new versus existing operations:

Hourly	Rate	Units (e.g., widgets)
Average production	***27 tons***	***fertilizer***
Maximum production	***33 tons***	***fertilizer***

5. Annual production rates (indicate appropriate units) Please see the instructions for clarification of "Maximum" and "Actual" for new versus existing operations:

Annual	Rate	Units (e.g., widgets)
Actual production	***236,520 tons***	***fertilizer***
Maximum production	***289,080 tons***	***fertilizer***

6. Type of operation (please check one):

   ☑ Continuous
   ☐ Batch (please complete items below)

   Minimum cycle* time (minutes): _____
   Minimum time between cycles (minutes): _____
   Maximum number of cycles per daily 24 hour period: _____
   (Note: include cycle time and set up/clean up time.)

   *"Cycle" refers to the time the equipment is in operation.

Section II – Specific Air Contaminant Source Information

7. Materials used in process at maximum hourly production rate (add rows/pages as needed):

Material	Physical State at Standard Conditions	Principle Use	Amount**
Ammonium Sulfate in solution	***Liquid***	***Manufacture dry fertilizer***	***88 tons (17,585 gallons)***

** Please indicate the amount **and** rate (e.g., lbs/hr, gallons/hr, lbs/cycle, etc.).

8. Please provide a narrative description of the process below (e.g., coating of metal parts using high VOC content coatings for the manufacture of widgets; emissions controlled by thermal oxidizer...):

The Fertilizer Plant Material Handling emissions unit (P004) includes all components associated with the production and loading of dry fertilizer into trucks from ammonium sulfate recovery from the optional control system for Boilers B001 and B002.

Section II – Specific Air Contaminant Source Information

1. Company identification (name for air contaminant source for which you are applying): ***P907 – Dry Fertilizer Barge Loading***

2. List all equipment that are part of this air contaminant source: ***Conveyors and dry fertilizer loading into barges (refer to flow diagram)***

3. Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

   When did/will you begin to install or modify the air contaminant source? (month/year) ***2009***

   When did/will you begin to operate the air contaminant source? (month/year) ***2012*** **OR** after issuance of PTI _____

4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.

   - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if 'Emissions before controls (max), lb/hr' multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
   - If you have no add-on control equipment, 'Emissions before controls' will be the same as 'Actual emissions'.
   - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit emissions in line #8 or have described inherent limitations below.
   - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
   - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01(HHH) and OAC rule 3745-77-01(BB).

Pollutant	Emissions Before Controls (max) (lb/hr)	Actual Emissions (lb/hr)	Actual Emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
PE	***Unknown***	***≤4.32***	***≤1.60***	***4.32***	***1.60***
PM_{10}	***Unknown***	***≤2.09***	***≤0.95***	***2.09***	***0.95***

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

Refer to the Emission Calculations section of this permit application.

Section II – Specific Air Contaminant Source Information

5. **Does this air contaminant source employ emissions control equipment?**

☑ **Yes** – fill out the applicable information below.

☐ **No** – proceed to item #6.

Note: Pollutant abbreviations used below: Particulates = PE; Organic Compounds = OC; Sulfur Dioxide = SO_2; Nitrogen Oxides = NO_X; Carbon Monoxide = CO

☑ **Fabric Filter/Baghouse**

Manufacturer: ***Unknown*** Year installed: ***2012***

What do you call this control equipment: ***Conveyor Dust Collectors***

Pollutant(s) controlled: ☑ PE ☐ OC ☐ SO_2 ☐ NO_X ☐ CO ☐Other

Estimated capture efficiency (%) ***100*** Basis for efficiency: ***Design***

Design control efficiency (%) ***NA*** Basis for efficiency: ***NA***

Operating pressure drop range (inches of water): Minimum: ***Unknown*** Maximum: ***Unknown***

Pressure Type: ○ Negative pressure ● Positive pressure

Fabric Cleaning Mechanism: ○ Reverse Air ○ Pulse Jet ○ Shaker ○ Other ***Unknown***

☐ Lime injection or fabric coating agent used: Type: ***NA*** Feed Rate: ***NA***

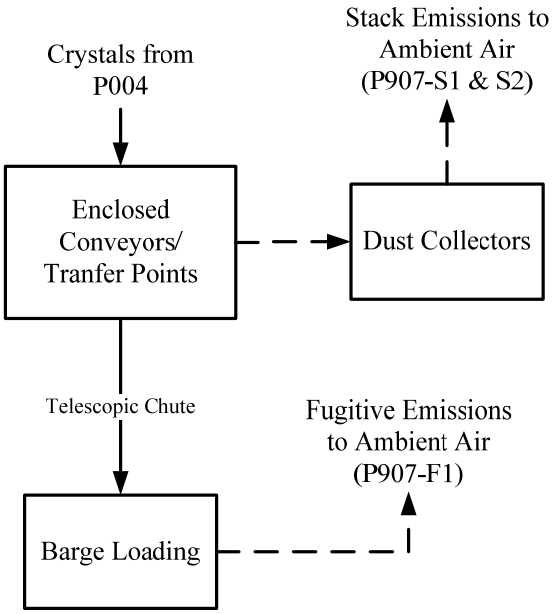
☐ This is the only control equipment on this air contaminant source

If no, this control equipment is: ● Primary ○ Secondary ○ Parallel ***These dust collectors control emissions from material transfer points in the conveyor system for transferring dry fertilizer crystals to the barge loading operation (refer to flow diagram).***

List any other air contaminant sources that are also vented to this control equipment: ***None***

6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in this application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.

Dry Fertilizer Barge Loading (P907)
Flow Diagram



7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio's Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

- Particulate Matter (PM_{10}): 10 tons per year
- Sulfur Dioxide (SO_2): 25 tons per year
- Nitrogen Oxides (NO_X): 25 tons per year
- Carbon Monoxide (CO): 100 tons per year
- Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

Table 7-A, Stack Egress Point Information

Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code*	Stack Egress Point Shape and Dimensions (in) (examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)
NA [(1)]	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***

[(1)] ***Note: The total annual PM_{10} emissions from the Dry Fertilizer Barge Loading (P907) operation are less than 1.0 ton. As a result, this emissions unit was not included in the air quality modeling submitted with this PTI application.***

*Type codes for stack egress points:

A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

Table 7-B, Fugitive Egress Point Information

Company ID for the Egress Point (examples: Garage Door B, Building C, Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12X30 feet, west wall; outside gravel storage piles; etc.	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)
NA [(1)]	***NA***	***NA***	***NA***	***NA***	***NA***

[(1)] ***Note: The total annual PM_{10} emissions from the Dry Fertilizer Barge Loading (P907) operation are less than 1.0 ton. As a result, this emissions unit was not included in the air quality modeling submitted with this PTI application.***

*Type codes for fugitive egress point:

D. door or window
E. other opening in the building without a duct
F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Section II – Specific Air Contaminant Source Information

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

Table 7-C, Egress Point Additional Information					Table 7-C, Continued			
Company ID or Name for the Egress Point	**Building Height (ft)**	**Building Width (ft)**	**Building Length (ft)**		**Company ID or Name for the Egress Point**	**Building Height (ft)**	**Building Width (ft)**	**Building Length (ft)**
NA	***NA***	***NA***	***NA***					

8. Request for Federally Enforceable Limits

As part of this permit application, do you wish to propose voluntary restrictions to limit emissions in order to avoid specific requirements list below, (i.e., are you requesting federally enforceable limits to obtain synthetic minor status)?

☐ Yes
☑ No
☐ Not Sure – Please contact me if this affects me.

If yes, why are you requesting federally enforceable limits? Check all that apply.

a. ☐ to avoid being a "major source" (see OAC rule 3745-77-01(W))
b. ☐ to avoid being a "major MACT source" (see OAC rule 3745-31-01(QQ))
c. ☐ to avoid being a "major modification" (see OAC rule 3745-31-01(RR))
d. ☐ to avoid being a "major stationary source" (see OAC rule 3745-31-01(SS))
e. ☐ to avoid an air dispersion modeling requirement (see Engineering Guide #69)
f. ☐ to avoid another requirement. Describe:_____

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

9. If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable Performance Specification (40 CFR 60, Appendix B)	Pollutant(s) Monitored
None			

10. Do you wish to permit this air contaminant source as a portable source, allowing relocation within the state in accordance with OAC rule 3745-31-03(A)(1)(p) or OAC rule 3745-31-05(F)?

☐ Yes – Note: notification requirements in rules cited above must be followed.
☑ No

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.

See attached General Process Operation EAC Form for emission unit P907.

EMISSIONS ACTIVITY CATEGORY FORM
GENERAL PROCESS OPERATION

This form is to be completed for each process operation when there is no specific emissions activity category (EAC) form applicable. If there is more than one end product for this process, copy and complete this form for each additional product (see instructions). Several State/Federal regulations which may apply to process operations are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list.

1. Reason this form is being submitted (Check one)

   ☑ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. P001) _____

2. Maximum Operating Schedule: : ***24*** hours per day; ***365*** days per year

   If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. _____

3. End product of this process: ***Fertilizer***

4. Hourly production rates (indicate appropriate units). Please see the instructions for clarification of "Maximum" and "Average" for new versus existing operations:

Hourly	Rate	Units (e.g., widgets)
Average production	***27 tons***	***fertilizer***
Maximum production	***33 tons***	***fertilizer***

5. Annual production rates (indicate appropriate units) Please see the instructions for clarification of "Maximum" and "Actual" for new versus existing operations:

Annual	Rate	Units (e.g., widgets)
Actual production	***236,520 tons***	***fertilizer***
Maximum production	***289,080 tons***	***fertilizer***

6. Type of operation (please check one):

   ☑ Continuous
   ☐ Batch (please complete items below)

   Minimum cycle* time (minutes): _____
   Minimum time between cycles (minutes): _____
   Maximum number of cycles per daily 24 hour period: _____
   (Note: include cycle time and set up/clean up time.)

   *"Cycle" refers to the time the equipment is in operation.

Section II – Specific Air Contaminant Source Information

7. Materials used in process at maximum hourly production rate (add rows/pages as needed):

Material	Physical State at Standard Conditions	Principle Use	Amount**
Dry Fertilizer Crystals	***Solid***	***Fertilizer Product***	***33 tons***

** Please indicate the amount **and** rate (e.g., lbs/hr, gallons/hr, lbs/cycle, etc.).

8. Please provide a narrative description of the process below (e.g., coating of metal parts using high VOC content coatings for the manufacture of widgets; emissions controlled by thermal oxidizer...):

The Dry Fertilizer Barge Loading emissions unit (P907) includes all components associated with the transfer of dry fertilizer and loading into barges.

American Municipal Power Generating Station
Summary of Non-Utility Boiler Particulate Emissions

Emission Units	Max. Hourly Emissions (lbs/hr)		Max. Annual Emissions (tons/yr)	
	PM	PM_{10}	PM	PM_{10}
Natural Gas-Fired Auxiliary Boiler (B003)	1.14	1.14	0.50	0.50
Landfill (F001)	0.89	0.42	3.90	1.84
Paved Roadways (F002)	3.45	0.67	15.10	2.94
Unpaved Roadways (F003)	2.07	0.22	9.07	0.96
Coal Storage Piles (F004)	0.36	0.17	1.31	0.62
Limestone/Urea Barge Unloading (F005)	0.88	0.35	0.13	0.05
Limestone/Urea Storage (F006)	1.19	0.56	0.23	0.11
Boiler B001 Cooling Towers (P001)	0.18	0.18	0.77	0.77
Boiler B002 Cooling Towers (P002)	0.18	0.18	0.77	0.77
Fertilizer Crystallization Plant (P003)	3.86	3.86	16.89	16.89
Fertilizer Plant Dry Material Handling (P004)	0.36	0.36	1.59	1.59
Coal Barge Unloading (P901)	1.15	0.54	1.60	0.75
Coal Crushing (P902)	2.20	2.03	9.73	8.94
Limestone/Urea Preparation Building (P903)	0.50	0.35	1.22	1.16
Gypsum Conveying, Handling & Storage (P904)	0.08	0.03	0.33	0.14
Boiler B001 Flyash Conveying, Handling & Storage (P905)	0.17	0.17	0.75	0.75
Boiler B002 Flyash Conveying, Handling & Storage (P906)	0.17	0.17	0.75	0.75
Dry Fertilizer Barge Loading (P907)	4.32	2.09	1.60	0.95
Diesel Engine Emergency Electric Generating Unit (Z001)	2.23	2.23	0.56	0.56
Diesel Engine Emergency Fire Water Pump (Z002)	0.71	0.71	0.18	0.18
Total	**26.07**	**16.43**	**66.97**	**41.23**

American Municipal Power Generating Station
Fertilizer Crystallization Plant (P003)

Emission Point	Max. Heat Input (mmBtu/hr)	Max. Hours of Operation (hrs/yr)	Emission Factors (lbs/MMCF)					Max. Hourly Emissions (lbs/hr)					Max. Annual Emissions (tons/yr)				
			PM/PM_{10}	NO_x	SO_2	CO	VOC	PM/PM_{10}	NO_x	SO_2	CO	VOC	PM/PM_{10}	NO_x	SO_2	CO	VOC
Rotary Dryer (P003-S-1)	4.5	8,760	7.6	50	0.6	84	5.5	0.034	0.23	0.003	0.38	0.02	0.15	0.99	0.01	1.66	0.11

Emission factors from AP-42 Tables 1.4-1 and 1.4-2.

Emission Point	Max. Flow Rate (m^3/min)	Max. Uncontrolled PM/PM_{10} Emissions (g/m^3)	Control Efficiency (%)	Max. Controlled PM/PM_{10} Emissions (g/m^3)	Max. Controlled PM/PM_{10} Emissions (lbs/hr)	(tons/yr)
Rotary Dryer Wet Scrubber (P003-S1)	42.5	4	99	0.04	0.22	0.98
Rotary Cooler Wet Scrubber (P003-S2)	680	4	99	0.04	3.60	15.76
				Total	**3.82**	**16.74**

0.011 g/m^3 = 0.005 gr/ft^3

	Max. Hourly Emissions (lbs/hr)					Max. Annual Emissions (tons/yr)				
	PM/PM_{10}	NO_x	SO_2	CO	VOC	PM/PM_{10}	NO_x	SO_2	CO	VOC
Total Emissions	**3.86**	**0.23**	**0.003**	**0.38**	**0.02**	**16.89**	**0.99**	**0.01**	**1.66**	**0.11**

American Municipal Power Generating Station
Fertilizer Plant Dry Material Handling (P004)

Stack Emission Point	Max. Flow Rate (m^3/min)	Max. Uncontrolled PM/PM_{10} Emissions (g/m^3)	Control Efficiency (%)	Max. Controlled PM/PM_{10} Emissions (g/m^3)	Max. Controlled PM/PM_{10} Emissions	
					(lbs/hr)	(tons/yr)
Baghouse (P004-S1)	250	2.5	99	0.011	0.36	1.59
				Total	**0.36**	**1.59**

0.011 g/m^3 = 0.005 gr/ft^3

American Municipal Power Generating Station
Dry Fertilizer Barge Loading (P907)

Stack Emission Point	Max. Flow Rate (ft^3/min)	Max. Controlled PM/PM_{10} Emissions (gr/ft^3)	Max. Controlled PM/PM_{10} Emissions (lbs/hr)	(tons/yr)
Baghouse (P907-S1)	1,000	0.005	0.04	0.19
Baghouse (P907-S2)	1,000	0.005	0.04	0.19
		Total	**0.09**	**0.38**

Fugitive Emission Point	Max. Capacity (tons/hr)	Max. Capacity (tons/yr)	Emission Factors (lbs/ton) PM	PM_{10}	Overall Capture & Control Efficiency (%)	Control Description	Max. Uncontrolled Emissions (lbs/hr) PM	PM_{10}	Max. Controlled Emissions (lbs/hr) PM	PM_{10}	Max. Controlled Emissions (tons/yr) PM	PM_{10}
Dry Fertilizer Loaded into Barges (P907-F1)	500	289,080	0.03388	0.01603	75	Telescopic Chute	16.94	8.01	4.24	2.00	1.22	0.58

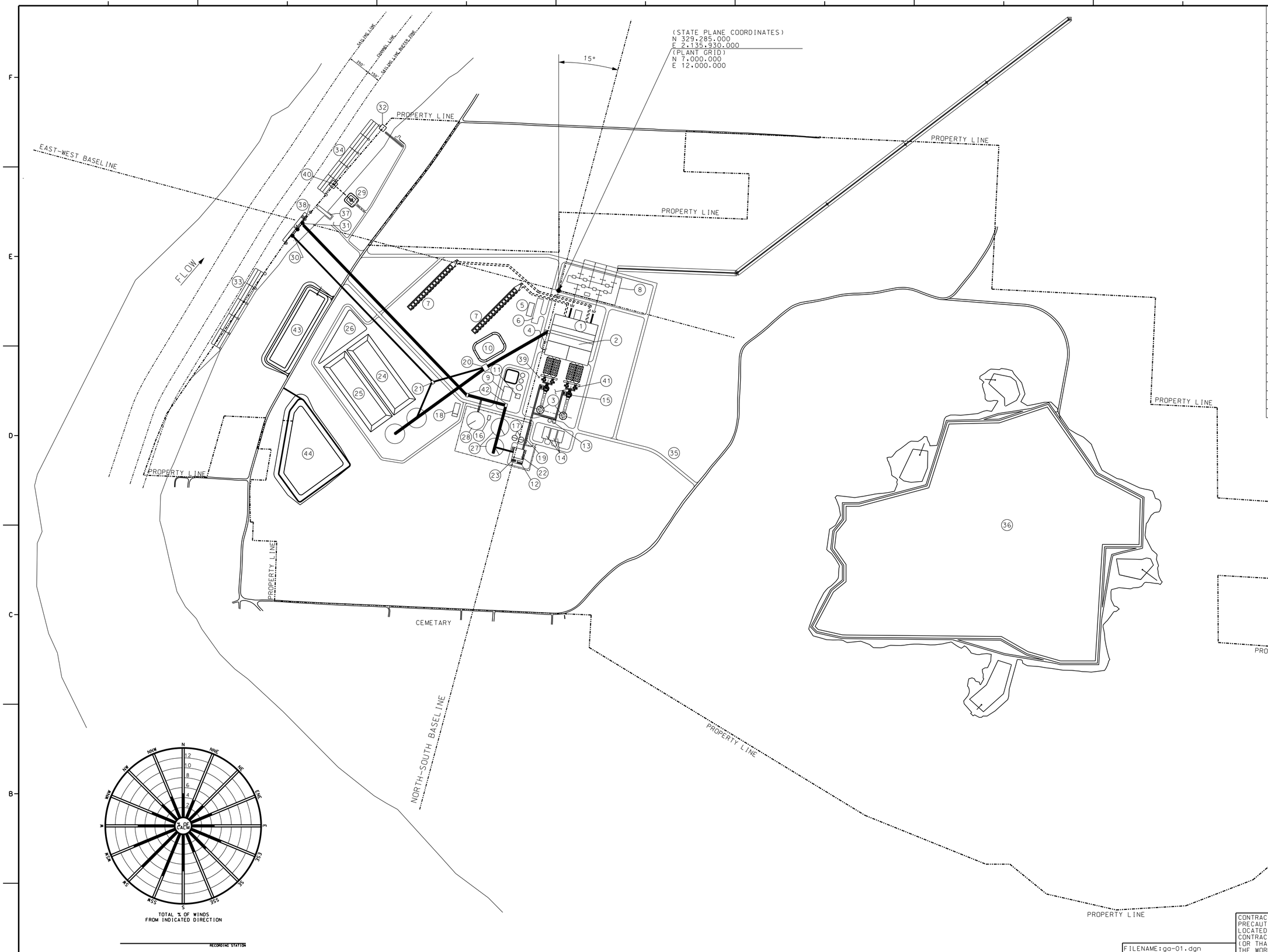
	Max. Hourly Emissions (lbs/hr) PM	PM_{10}	Max. Annual Emissions (tons/yr) PM	PM_{10}
Total Emissions	**4.32**	**2.09**	**1.60**	**0.95**

Note 1 - Assume all dry fertilizer is loaded into barges

Other Notes and Assumptions:

PM emission factor of 0.03388 lbs/ton is based on AP-42 Section 13.2.4 assuming a windspeed of 8.7 mph and a dry fertilizer moisture content of 0.5%

PM_{10} emission factor of 0.01603 lbs/ton is based on AP-42 Section 13.2.4 assuming a windspeed of 8.7 mph and a dry fertilizer moisture content of 0.5%



LEGEND

1	TURBINE BUILDING
2	BOILER BUILDING
3	STACK
4	AUXILIARY BOILER
5	ADMINISTRATION BUILDING
6	PARKING
7	COOLING TOWER
8	345KV SWITCHYARD
9	MAKE-UP WATER TREATMENT FACILITY
10	WASTEWATER HOLDING POND
11	FP & S.W. TANK AND PUMP HOUSE
12	ELECTRICAL SUBSTATION
13	FLY ASH SILOS
14	WAREHOUSES
15	SCRUBBER
16	UREA BUILDING
17	LIQUOR STORAGE TANKS
18	COAL HANDLING OFFICE AND SHED
19	PIPE RACK
20	CRUSHER HOUSE
21	COAL TRANSFER HOUSE
22	FERTILIZER PROCESS BUILDING
23	CLOSED COOLING TOWER
24	INACTIVE COAL STORAGE A
25	INACTIVE COAL STORAGE B
26	COAL PILE RUNOFF POND
27	CRYSTAL STORAGE DOME
28	UREA STORAGE DOME
29	MAKE-UP WATER PUMP HOUSE
30	COAL UNLOADING HOPPER
31	FERTILIZER LOADING
32	OUTFALL STRUCTURE
33	LOADED BARGES
34	UNLOADED BARGES
35	WASTE DISPOSAL ACCESS ROAD
36	SOLID WASTE
37	EQUIPMENT UNLOADING SLIP
38	UREA UNLOADING
39	UREA DAY TANK
40	MAKE-UP WATER INLET
41	FUTURE CO2 SCRUBBER ISLAND
42	UREA/FERTILIZER TRANSFER HOUSE
43	RUNOFF SEDIMENTATION POND
44	DREDGE POND

CONTRACTOR/INSTALLER SHALL TAKE ALL APPROPRIATE PRECAUTIONS TO ENSURE THE SAFETY OF ALL PEOPLE LOCATED ON THE WORK SITE, INCLUDING CONTRACTOR'S/INSTALLER'S PERSONNEL (OR THAT OF ITS SUBCONTRACTOR(S)) PERFORMING THE WORK.

FILENAME: ga-01.dgn

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE
0	02--2005	J. RUBINO			FOR INTERNAL COMMENTS
1	07-22-2005	J. RUBINO			FOR TASK 5 REPORT
2	08-24-2005	N.FICK	WAR		FOR TASK 6 FINAL REPORT
3	12-23-2005	R.A. MILLER	WAR		FOR COMMENT
4	01-10-2006	R.A. MILLER			FOR COMMENT
5	04-03-2006	R.A. MILLER			FOR COMMENT
6	04-07-2006	R.A. MILLER			FOR COMMENT
7	04-14-2006	R.A. MILLER			FOR COMMENT

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE
8	04-20-2006	R.A. MILLER			FOR COMMENT - ADDED ITEM NUMBER
9	05-10-2006	R.A. MILLER			FOR AIR PERMITTING AND MODELING
10	07-10-2006	R.A. MILLER			FOR COMMENTS
11	07-27-2006	R.A. MILLER			FOR COMMENTS
12	03-22-2007	J.SCHOONOVER			FOR REFERENCE

SCALE: 1"=400'

PROJECT NUMBER

GENERAL ARRANGEMENT SITE DEVELOPMENT BASE LOAD FACILITY POWER SPAN

AMERICAN MUNICIPAL POWER GENERATING STATION

Sargent & Lundy LLC

DRAWING NO. GA-01

REV. 12

SHEET OF

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REV. 417.1(2004)

May 31, 2007

AMP OHIO
American Municipal Power-Ohio, Inc.

Mr. Dean Ponchak
Environmental Specialist
Division of Air Pollution Control
Ohio EPA – Southeast District Office
2195 Front Street
Logan, OH 43138

Re: American Municipal Power-Ohio
Facility ID No. 06-53-00-0069
PTI No. 06-08138

Dear Mr. Ponchak:

Thank you for contacting me with your questions concerning the use of urea in lieu of limestone in the wet-FGD system for the AMP Generating Station (AMPGS). This letter and enclosures supplement the information previously provided in the application submitted by AMP-Ohio for the AMPGS as follows:

1. Pages 4 of 21, 10 of 21 and 11 of 21 in the emissions calculations have been revised to reflect the use of urea as an alternative to the use of limestone. The emission estimates for the Limestone/Urea Barge Unloading (F005) operation on page 10 of 21 have been revised to add fugitive emission estimates for urea barge unloading. The emission estimates for Limestone/Urea Storage (F006) on page 11 of 21 have been revised to add fugitive emissions estimates for the storage of the urea in a building enclosure (dome). Page 4 of 21 has been revised to include the "worst case" emissions for both the Limestone/Urea Barge Unloading (F005) operation and Limestone/Urea Storage (F006). In both instances, the use of the urea alternative will slightly increase the maximum fugitive emissions from these units. The total facility-wide maximum annual PM_{10} emission increase is less than one ton (from 41.23 tons using limestone to 42.10 tons using urea).

2. The PTI application and EAC form for the Limestone/Urea Barge Unloading (F005) operation on pages 60 through 65 have been revised consistent with the use of urea as an alternative to limestone. This includes the worst case emission estimates and the addition of screening as an alternate control method if urea is employed.

AMP-Ohio 2600 Airport Drive Columbus, Ohio 43219 • **Phone:** 614/337-6222 • **Fax:** 614/337-6220 • www.amp-ohio.org

3. The PTI application and EAC form for Limestone/Urea Storage (F006) on pages 66 through 71a have been revised consistent with the use of urea as an alternative to limestone. This includes the worst case emissions and urea storage within a building enclosure (dome).

Thank you once again for assisting AMP-Ohio with the completion of a timely review of the PTI application for the AMPGS. Please contact me at 614-337-6222 if you have any questions concerning this letter or enclosures.

On behalf of the members,

Randy Meyer
Director of Environmental Affairs

cc: Scott Kiesewetter/AMP-Ohio

Enclosures

American Municipal Power Generating Station
Summary of Non-Utility Boiler Particulate Emissions

Emission Units	Max. Hourly Emissions (lbs/hr)		Max. Annual Emissions (tons/yr)	
	PM	PM_{10}	PM	PM_{10}
Natural Gas-Fired Auxiliary Boiler (B003)	1.14	1.14	0.50	0.50
Landfill (F001)	0.89	0.42	3.90	1.84
Paved Roadways (F002)	3.45	0.67	15.10	2.94
Unpaved Roadways (F003)	2.07	0.22	9.07	0.96
Coal Storage Piles (F004)	0.36	0.17	1.31	0.62
Limestone/Urea Barge Unloading (F005)	11.96	5.47	1.20	0.55
Limestone/Urea Storage (F006)	3.56	1.68	1.02	0.48
Boiler B001 Cooling Towers (P001)	0.18	0.18	0.77	0.77
Boiler B002 Cooling Towers (P002)	0.18	0.18	0.77	0.77
Fertilizer Crystallization Plant (P003)	3.86	3.86	16.89	16.89
Fertilizer Plant Dry Material Handling (P004)	0.36	0.36	1.59	1.59
Coal Barge Unloading (P901)	1.15	0.54	1.60	0.75
Coal Crushing (P902)	2.20	2.03	9.73	8.94
Limestone/Urea Preparation Building (P903)	0.50	0.35	1.22	1.16
Gypsum Conveying, Handling & Storage (P904)	0.08	0.03	0.33	0.14
Boiler B001 Flyash Conveying, Handling & Storage (P905)	0.17	0.17	0.75	0.75
Boiler B002 Flyash Conveying, Handling & Storage (P906)	0.17	0.17	0.75	0.75
Dry Fertilizer Barge Loading (P907)	4.32	2.09	1.60	0.95
Diesel Engine Emergency Electric Generating Unit (Z001)	2.23	2.23	0.56	0.56
Diesel Engine Emergency Fire Water Pump (Z002)	0.71	0.71	0.18	0.18
Total	**39.53**	**22.67**	**68.82**	**42.10**

Note: The maximum emissions from Limestone/Urea Barge Unloading (F005) operation and Limestone/Urea Storage (F006) are associated with the use of urea.

American Municipal Power Generating Station
Limestone/Urea Barge Unloading (F005)

Emission Points	Max. Capacity (tons/hr)	Max. Capacity (tons/yr)	Emission Factors (lbs/ton)		Overall Capture & Control Efficiency (%)	Control Description	Max. Uncontrolled Emissions (lbs/hr)		Max. Controlled Emissions (lbs/hr)		Max. Controlled Emissions (tons/yr)	
			PM	PM_{10}			PM	PM_{10}	PM	PM_{10}	PM	PM_{10}
Limestone Barge Unloading												
Crane Unloading to Hopper	1,000	299,300	0.002758	0.001304	90	Wet suppression	2.76	1.30	0.28	0.13	0.041	0.020
Hopper to Belt Feeder	1,000	299,300	0.003	0.0011	90	Wet suppression	3.00	1.10	0.30	0.11	0.045	0.016
Belt Feeder to L-1	1,000	299,300	0.003	0.0011	90	Wet suppression	3.00	1.10	0.30	0.11	0.045	0.016
Total Limestone Barge Unloading							**8.76**	**3.50**	**0.88**	**0.35**	**0.13**	**0.05**
Urea Barge Unloading												
Crane Unloading to Hopper	1,000	200,000	0.033883	0.016026	70	Screening and minimize drop height	33.88	16.03	10.16	4.81	1.016	0.481
Hopper to Belt Feeder	1,000	200,000	0.003	0.0011	70	Screening and minimize drop height	3.00	1.10	0.90	0.33	0.090	0.033
Belt Feeder to L-1	1,000	200,000	0.003	0.0011	70	Screening and minimize drop height	3.00	1.10	0.90	0.33	0.090	0.033
Total Urea Barge Unloading							**39.88**	**18.23**	**11.96**	**5.47**	**1.20**	**0.55**

Notes and Assumptions:

PM emission factor of 0.003 lbs/ton is from AP-42 Table 11.19.2-2

PM_{10} emission factor of 0.0011 lbs/ton is from AP-42 Table 11.19.2-2

PM emission factor of 0.002758 lbs/ton is based on AP-42 Section 13.2.4 assuming a windspeed of 8.7 mph and a limestone moisture content of 3%

PM_{10} emission factor of 0.001304 lbs/ton is based on AP-42 Section 13.2.4 assuming a windspeed of 8.7 mph and a limestone moisture content of 3%

PM emission factor of 0.033883 lbs/ton is based on AP-42 Section 13.2.4 assuming a windspeed of 8.7 mph and a urea moisture content of 0.5%

PM_{10} emission factor of 0.016026 lbs/ton is based on AP-42 Section 13.2.4 assuming a windspeed of 8.7 mph and a urea moisture content of 0.5%

American Municipal Power Generating Station
Limestone/Urea Storage (F006)

Emission Points	Max. Capacity (tons/hr)	Max. Capacity (tons/yr)	Emission Factors (lbs/ton)		Overall Capture & Control Efficiency (%)	Control Description	Max. Uncontrolled Emissions (lbs/hr)		Max. Controlled Emissions (lbs/hr)		Max. Controlled Emissions (tons/yr)	
			PM	PM_{10}			PM	PM_{10}	PM	PM_{10}	PM	PM_{10}
Active Limestone Storage Pile												
L-1 to Storage Pile (F006-F1)	1,000	299,300	0.002758	0.001304	75	Telescopic Chute	2.76	1.30	0.69	0.33	0.10	0.05
Storage Pile Wind Erosion (F006-F1)	1,000	299,300	0.002758	0.001304	90	Wet suppression	2.76	1.30	0.28	0.13	0.04	0.02
Storage Pile Unloading (F006-F1)	400	299,300	0.002758	0.001304	90	Wet suppression	1.10	0.52	0.11	0.05	0.04	0.02
Bull Dozer to Hopper (F006-F1)	400	299,300	0.002758	0.001304	90	Wet suppression	1.10	0.52	0.11	0.05	0.04	0.02
Inactive Limestone Storage Pile												
Bull Dozer to Storage Pile (F006-F2)	NA	299,300	0.002758	0.001304	90	Wet suppression	**Note 1**	**Note 1**	**Note 1**	**Note 1**	**Note 1**	**Note 1**
Storage Pile Wind Erosion (F006-F2)	NA	299,300	0.002758	0.001304	90	Wet suppression	**Note 1**	**Note 1**	**Note 1**	**Note 1**	**Note 1**	**Note 1**
Storage Pile Unloading (F006-F2)	NA	299,300	0.002758	0.001304	90	Wet suppression	**Note 1**	**Note 1**	**Note 1**	**Note 1**	**Note 1**	**Note 1**
Total Limestone Storage							**7.72**	**3.65**	**1.19**	**0.56**	**0.23**	**0.11**
Urea Storage Dome												
L-1 to Storage Dome (F006-F1)	1,000	200,000	0.033883	0.016026	90	Building Enclosure	33.88	16.03	3.39	1.60	0.34	0.16
Storage Pile Unloading (F006-F1)	25	200,000	0.033883	0.016026	90	Building Enclosure	0.85	0.40	0.08	0.04	0.34	0.16
Bull Dozer to Hopper (F006-F1)	25	200,000	0.033883	0.016026	90	Building Enclosure	0.85	0.40	0.08	0.04	0.34	0.16
Total Urea Storage							**35.58**	**16.83**	**3.56**	**1.68**	**1.02**	**0.48**

Note 1 - Assume all limestone is diverted past inactive storage pile

Other Notes and Assumptions:

PM emission factor of 0.002758 lbs/ton is based on AP-42 Section 13.2.4 assuming a windspeed of 8.7 mph and a limestone moisture content of 3%

PM_{10} emission factor of 0.001304 lbs/ton is based on AP-42 Section 13.2.4 assuming a windspeed of 8.7 mph and a limestone moisture content of 3%

PM emission factor of 0.033883 lbs/ton is based on AP-42 Section 13.2.4 assuming a windspeed of 8.7 mph and a urea moisture content of 0.5%

PM_{10} emission factor of 0.016026 lbs/ton is based on AP-42 Section 13.2.4 assuming a windspeed of 8.7 mph and a urea moisture content of 0.5%

Section II – Specific Air Contaminant Source Information

1. Company identification (name for air contaminant source for which you are applying): ***F005 – Limestone/Urea Barge Unloading***

2. List all equipment that are part of this air contaminant source: ***Unloading limestone or urea from barges***

3. Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

   When did/will you begin to install or modify the air contaminant source? (month/year) ***2009***

   When did/will you begin to operate the air contaminant source? (month/year) ***2012*** **OR** after issuance of PTI _____

4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.

   - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if 'Emissions before controls (max), lb/hr' multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
   - If you have no add-on control equipment, 'Emissions before controls' will be the same as 'Actual emissions'.
   - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit emissions in line #8 or have described inherent limitations below.
   - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
   - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01(HHH) and OAC rule 3745-77-01(BB).

Pollutant	Emissions Before Controls (max) (lb/hr)	Actual Emissions (lb/hr)	Actual Emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
PE	***NA***	***NA***	***≤1.20***	***NA***	***1.20***
PM_{10}	***NA***	***NA***	***≤0.55***	***NA***	***0.55***

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

Refer to the Emission Calculations section of this permit application.

Section II – Specific Air Contaminant Source Information

5. **Does this air contaminant source employ emissions control equipment?**

☑ **Yes** – fill out the applicable information below.

☐ **No** – proceed to item #6.

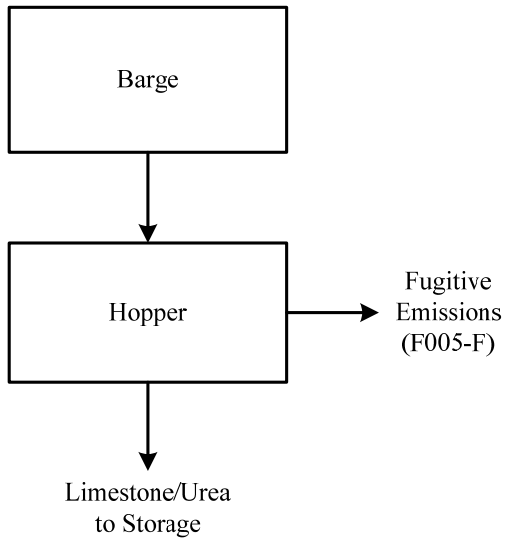
Note: Pollutant abbreviations used below: Particulates = PE; Organic Compounds = OC; Sulfur Dioxide = SO_2; Nitrogen Oxides = NO_X; Carbon Monoxide = CO

☑ **Other**, describe ***Wet Suppression (used with limestone)***
Manufacturer: ***Unknown*** Year installed: ***2012***
What do you call this control equipment: ***Wet Suppression***
Pollutant(s) controlled: ☑ PE ☐ OC ☐ SO_2 ☐ NO_X ☐ CO ☐ Other
Estimated capture efficiency (%) ***NA*** Basis for efficiency: ***NA***
Design control efficiency (%) ***90*** Basis for efficiency: ***Engineering Judgment***
☑ This is the only control equipment on this air contaminant source
If no, this control equipment is: ○ Primary ○ Secondary ○ Parallel
List any other air contaminant sources that are also vented to this control equipment: ***None***
Nitrogen Oxides = NO_X; Carbon Monoxide = CO

☑ **Other**, describe ***Screening (used with urea)***
Manufacturer: ***Unknown*** Year installed: ***2012***
What do you call this control equipment: ***Screening***
Pollutant(s) controlled: ☑ PE ☐ OC ☐ SO_2 ☐ NO_X ☐ CO ☐ Other
Estimated capture efficiency (%) ***NA*** Basis for efficiency: ***NA***
Design control efficiency (%) ***70*** Basis for efficiency: ***Engineering Judgment***
☑ This is the only control equipment on this air contaminant source
If no, this control equipment is: ○ Primary ○ Secondary ○ Parallel
List any other air contaminant sources that are also vented to this control equipment: ***None***

6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in this application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.

Limestone/Urea Barge Unloading (F005) Flow Diagram



Section II – Specific Air Contaminant Source Information

7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio's Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

- Particulate Matter (PM_{10}): 10 tons per year
- Sulfur Dioxide (SO_2): 25 tons per year
- Nitrogen Oxides (NO_X): 25 tons per year
- Carbon Monoxide (CO): 100 tons per year
- Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

Table 7-A, Stack Egress Point Information

Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code*	Stack Egress Point Shape and Dimensions (in) (examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)
NA [(1)]	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***

[(1)] ***Note: The total annual PM_{10} emissions from the Limestone/Urea Barge Unloading (F005) are less than 1.0 ton. As a result, this emissions unit was not included in the air quality modeling submitted with this PTI application.***

*Type codes for stack egress points:

A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

Table 7-B, Fugitive Egress Point Information

Company ID for the Egress Point (examples: Garage Door B, Building C, Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12X30 feet, west wall; outside gravel storage piles; etc.	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)
NA	***NA***	***NA***	***NA***	***NA***	***NA***

*Type codes for fugitive egress point:

D. door or window
E. other opening in the building without a duct
F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Section II – Specific Air Contaminant Source Information

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

Table 7-C, Egress Point Additional Information					Table 7-C, Continued			
Company ID or Name for the Egress Point	**Building Height (ft)**	**Building Width (ft)**	**Building Length (ft)**		**Company ID or Name for the Egress Point**	**Building Height (ft)**	**Building Width (ft)**	**Building Length (ft)**
NA	***NA***	***NA***	***NA***					

8. Request for Federally Enforceable Limits

As part of this permit application, do you wish to propose voluntary restrictions to limit emissions in order to avoid specific requirements list below, (i.e., are you requesting federally enforceable limits to obtain synthetic minor status)?

☐ Yes
☑ No
☐ Not Sure – Please contact me if this affects me.

If yes, why are you requesting federally enforceable limits? Check all that apply.

a. ☐ to avoid being a "major source" (see OAC rule 3745-77-01(W))
b. ☐ to avoid being a "major MACT source" (see OAC rule 3745-31-01(QQ))
c. ☐ to avoid being a "major modification" (see OAC rule 3745-31-01(RR))
d. ☐ to avoid being a "major stationary source" (see OAC rule 3745-31-01(SS))
e. ☐ to avoid an air dispersion modeling requirement (see Engineering Guide #69)
f. ☐ to avoid another requirement. Describe:_____

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

9. If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable Performance Specification (40 CFR 60, Appendix B)	Pollutant(s) Monitored
None			

10. Do you wish to permit this air contaminant source as a portable source, allowing relocation within the state in accordance with OAC rule 3745-31-03(A)(1)(p) or OAC rule 3745-31-05(F)?

☐ Yes – Note: notification requirements in rules cited above must be followed.
☑ No

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.

See attached General Process Operation EAC Form for emissions unit F005.

EMISSIONS ACTIVITY CATEGORY FORM
GENERAL PROCESS OPERATION

This form is to be completed for each process operation when there is no specific emissions activity category (EAC) form applicable. If there is more than one end product for this process, copy and complete this form for each additional product (see instructions). Several State/Federal regulations which may apply to process operations are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list.

1. Reason this form is being submitted (Check one)

   ☑ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. P001) _____

2. Maximum Operating Schedule: : ***24*** hours per day; ***365*** days per year

   If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. _____

3. End product of this process: ***Limestone/Urea***

4. Hourly production rates (indicate appropriate units). Please see the instructions for clarification of "Maximum" and "Average" for new versus existing operations:

Hourly	Rate	Units (e.g., widgets)
Average production	***1,000***	***tons***
Maximum production	***1,000***	***tons***

5. Annual production rates (indicate appropriate units) Please see the instructions for clarification of "Maximum" and "Actual" for new versus existing operations:

Annual	Rate	Units (e.g., widgets)
Actual production	***299,300 (limestone)/ 200,000 (urea)***	***tons***
Maximum production	***299,300 (limestone)/ 200,000 (urea)***	***tons***

6. Type of operation (please check one):

   ☑ Continuous
   ☐ Batch (please complete items below)

   Minimum cycle* time (minutes): _____
   Minimum time between cycles (minutes): _____
   Maximum number of cycles per daily 24 hour period: _____
   (Note: include cycle time and set up/clean up time.)

   *"Cycle" refers to the time the equipment is in operation.

Section II – Specific Air Contaminant Source Information

7. Materials used in process at maximum hourly production rate (add rows/pages as needed):

Material	Physical State at Standard Conditions	Principle Use	Amount**
Limestone/Urea	***Solid***	***Used in Wet FGD System***	***1,000 tons***

** Please indicate the amount **and** rate (e.g., lbs/hr, gallons/hr, lbs/cycle, etc.).

8. Please provide a narrative description of the process below (e.g., coating of metal parts using high VOC content coatings for the manufacture of widgets; emissions controlled by thermal oxidizer...):

The Limestone/Urea Barge Unloading Operation removes limestone/urea from delivery barges and places the limestone/urea on a belt conveyor.

Section II – Specific Air Contaminant Source Information

1. Company identification (name for air contaminant source for which you are applying): ***F006 – Limestone/Urea Storage***

2. List all equipment that are part of this air contaminant source: ***Active and Inactive Limestone Storage Piles or Urea Storage Dome***

3. Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

   When did/will you begin to install or modify the air contaminant source? (month/year) ***2009***

   When did/will you begin to operate the air contaminant source? (month/year) ***2012*** **OR** after issuance of PTI _____

4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.

   - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if 'Emissions before controls (max), lb/hr' multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
   - If you have no add-on control equipment, 'Emissions before controls' will be the same as 'Actual emissions'.
   - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit emissions in line #8 or have described inherent limitations below.
   - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
   - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01(HHH) and OAC rule 3745-77-01(BB).

Pollutant	Emissions Before Controls (max) (lb/hr)	Actual Emissions (lb/hr)	Actual Emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
PE	***NA***	***NA***	***≤1.02***	***NA***	***1.02***
PM_{10}	***NA***	***NA***	***≤0.48***	***NA***	***0.48***

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

Refer to the Emission Calculations section of this permit application.

Section II – Specific Air Contaminant Source Information

5. **Does this air contaminant source employ emissions control equipment?**

☑ **Yes** – fill out the applicable information below.

☐ **No** – proceed to item #6.

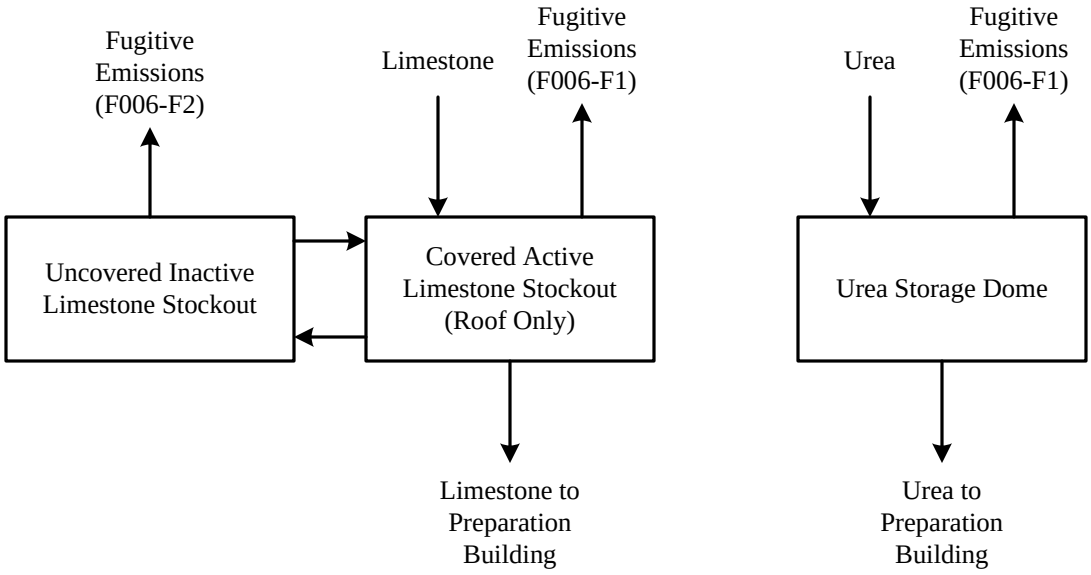
Note: Pollutant abbreviations used below: Particulates = PE; Organic Compounds = OC; Sulfur Dioxide = SO_2; Nitrogen Oxides = NO_X; Carbon Monoxide = CO

☑ **Other**, describe ***Wet Suppression (used with limestone)***
Manufacturer: ***Unknown*** Year installed: ***2012***
What do you call this control equipment: ***Limestone Storage***
Pollutant(s) controlled: ☑ PE ☐ OC ☐ SO_2 ☑ NO_X ☐ CO ☐Other
Estimated capture efficiency (%) ***NA*** Basis for efficiency: ***NA***
Design control efficiency (%) ***90*** Basis for efficiency: ***Engineering Judgment***
☑ This is the only control equipment on this air contaminant source
If no, this control equipment is: ● Primary ○ Secondary ○ Parallel
List any other air contaminant sources that are also vented to this control equipment:

☑ **Other**, describe ***Building Enclosure (used with urea)***
Manufacturer: ***Unknown*** Year installed: ***2012***
What do you call this control equipment: ***Urea Storage***
Pollutant(s) controlled: ☑ PE ☐ OC ☐ SO_2 ☑ NO_X ☐ CO ☐Other
Estimated capture efficiency (%) ***NA*** Basis for efficiency: ***NA***
Design control efficiency (%) ***90*** Basis for efficiency: ***Engineering Judgment***
☑ This is the only control equipment on this air contaminant source
If no, this control equipment is: ● Primary ○ Secondary ○ Parallel
List any other air contaminant sources that are also vented to this control equipment:

6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in this application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.

Limestone/Urea Storage (F006)
Flow Diagram



Section II – Specific Air Contaminant Source Information

7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio's Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

- Particulate Matter (PM_{10}): 10 tons per year
- Sulfur Dioxide (SO_2): 25 tons per year
- Nitrogen Oxides (NO_X): 25 tons per year
- Carbon Monoxide (CO): 100 tons per year
- Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

Table 7-A, Stack Egress Point Information

Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code*	Stack Egress Point Shape and Dimensions (in) (examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)
NA [(1)]	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***

[(1)] ***Note: The total annual PM_{10} emissions from Limestone/Urea Storage (F006) are less than 1.0 ton. As a result, this emissions unit was not included in the air quality modeling submitted with this PTI application.***

*Type codes for stack egress points:

A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

Table 7-B, Fugitive Egress Point Information

Company ID for the Egress Point (examples: Garage Door B, Building C, Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12X30 feet, west wall; outside gravel storage piles; etc.	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)
NA	***NA***	***NA***	***NA***	***NA***	***NA***

*Type codes for fugitive egress point:

D. door or window
E. other opening in the building without a duct
F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Section II – Specific Air Contaminant Source Information

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

Table 7-C, Egress Point Additional Information					Table 7-C, Continued			
Company ID or Name for the Egress Point	**Building Height (ft)**	**Building Width (ft)**	**Building Length (ft)**		**Company ID or Name for the Egress Point**	**Building Height (ft)**	**Building Width (ft)**	**Building Length (ft)**
NA	***NA***	***NA***	***NA***					

8. Request for Federally Enforceable Limits

As part of this permit application, do you wish to propose voluntary restrictions to limit emissions in order to avoid specific requirements list below, (i.e., are you requesting federally enforceable limits to obtain synthetic minor status)?

☐ Yes
☑ No
☐ Not Sure – Please contact me if this affects me.

If yes, why are you requesting federally enforceable limits? Check all that apply.

a. ☐ to avoid being a "major source" (see OAC rule 3745-77-01(W))
b. ☐ to avoid being a "major MACT source" (see OAC rule 3745-31-01(QQ))
c. ☐ to avoid being a "major modification" (see OAC rule 3745-31-01(RR))
d. ☐ to avoid being a "major stationary source" (see OAC rule 3745-31-01(SS))
e. ☐ to avoid an air dispersion modeling requirement (see Engineering Guide #69)
f. ☐ to avoid another requirement. Describe:_____

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

9. If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable Performance Specification (40 CFR 60, Appendix B)	Pollutant(s) Monitored
None			

10. Do you wish to permit this air contaminant source as a portable source, allowing relocation within the state in accordance with OAC rule 3745-31-03(A)(1)(p) or OAC rule 3745-31-05(F)?

☐ Yes – Note: notification requirements in rules cited above must be followed.
☑ No

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.

See attached Storage Pile EAC Form for emission unit F006.

EMISSIONS ACTIVITY CATEGORY FORM
STORAGE PILES

This form is to be completed for each storage pile. State/Federal regulations which may apply to storage piles are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list.

1. Reason this form is being submitted (Check one):

   ☑ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. P001) _____

2. Maximum Operating Schedule: ***24*** hours per day; ***365*** days per year

   If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. _____

3. Meteorological data at or near storage pile area:

   a. mean number of days per year in which >0.01 inch of precipitation occurred ***140*** days
   b. percentage of time wind speed exceeds 12 miles per hour: ***NA*** %
   c. mean wind speed: ***NA*** miles per hour
   d. source of meteorological data: (a) ***NA***
      (b) _____
      (c) _____

4. Description of storage pile activities:

ID	Type of Material Stored	Method of Load-in (check one or more)	Method of Load-out (check one or more)
A	***Limestone Active Storage Pile***	☑ conveyor/stacker: ☐ front-end loader ☐ other (describe): _____	☐ bucket wheel reclaimer ☐ under pile feed ☐ rake reclaimer ☐ pan scraper ☐ front-end loader ☑ other: ***bulldozer/hopper***
B	***Limestone Inactive Storage Pile***	☐ conveyor/stacker: ☐ front-end loader ☑ other (describe): ***Bulldozer***	☐ bucket wheel reclaimer ☐ under pile feed ☐ rake reclaimer ☐ pan scraper ☐ front-end loader ☑ other: ***bulldozer/hopper***
C	***Urea Storage Dome***	☑ conveyor/stacker: ☐ front-end loader ☐ other (describe): _____	☐ bucket wheel reclaimer ☐ under pile feed ☐ rake reclaimer ☐ pan scraper ☐ front-end loader ☑ other: ***bulldozer/hopper***

Section II – Specific Air Contaminant Source Information

5. STORAGE PILE ACTIVITIES:

ID	Number of Separate Piles	Average Silt Content (wt %)	Average Moisture Content (wt %)	Average Pile Surface Area (acres)	Max. Load-in Rate (tons/hr)	Max. Load-in Rate (tons/yr)	Max. Load-out Rate (tons/hr)	Max. Load-out Rate (tons/yr)
A	***1***	***NA***	***3***	***NA***	***1,000***	***299,300***	***400***	***299,300***
B	***1***	***NA***	***3***	***NA***	***1,000***	***299,300***	***400***	***299,300***
C	***1***	***NA***	***0.5***	***NA***	***1,000***	***200,000***	***25***	***200,000***

**** The maximum annual limestone usage for the Wet FGD systems for Boilers B001 and B002 is 299,300 tons and the maximum annual urea usage is 200,000 tons.***

6. WIND EROSION CONTROL METHODS

ID	Enclosure, Covering, and/or Operating Practices (describe)	Chemical Stabilization (check one or more)	Application Frequency	Overall Control Eff. (%)	Basis for Overall Wind Erosion Control Efficiency
A	***Water and/or dust suppressants will be added as needed to meet visible emission limitations.***	☑ water ☑ crusting agents ☐ other: _____	***As Needed***	***90***	***Engineering Judgment***
B	***Water and/or dust suppressants will be added as needed to meet visible emission limitations.***	☑ water ☑ crusting agents ☐ other: _____	***As Needed***	***90***	***Engineering Judgment***
C	***Building enclosure.***	☐ water ☐ crusting agents ☐ other: _____	***NA***	***90***	***Engineering Judgment***

7. LOAD-IN CONTROL METHODS

ID	Enclosure and/or Operating Practices (describe)	Chemical Stabilization	Application Frequency	Overall Control Eff. (%)	Basis for Overall Load-in Control Efficiency
A	***Drop height will be minimized and water will be added as needed to meet visible emission limitations.***	☑ water ☐ dust suppressant ☑ other: ***drop height***	***As Needed***	***90***	***Engineering Judgment***
B	***Drop height will be minimized and water will be added as needed to meet visible emission limitations.***	☑ water ☐ dust suppressant ☑ other: ***drop height***	***As Needed***	***90***	***Engineering Judgment***
C	***Load-in occurs within the building enclosure and drop height will be minimized.***	☐ water ☐ dust suppressant ☑ other: ***drop height***	***NA***	***90***	***Engineering Judgment***

Section II – Specific Air Contaminant Source Information

8. LOAD-OUT CONTROL METHODS

ID	Enclosure and/or Operating Practices (describe)	Chemical Stabilization	Application Frequency	Overall Control Eff. (%)	Basis for Overall Load-out Control Efficiency
A	***Bulldozer feed into hopper will minimize disruption of pile.***	☐ water ☐ dust suppressant ☐ other: _____	***NA***	***90***	***Engineering Judgment***
B	***Bulldozer feed into hopper will minimize disruption of pile.***	☐ water ☐ dust suppressant ☐ other: _____	***NA***	***90***	***Engineering Judgment***
C	***Bulldozer feed into hopper will minimize disruption of pile.***	☐ water ☐ dust suppressant ☐ other: _____	***NA***	***90***	***Engineering Judgment***

AMP OHIO
American Municipal Power-Ohio, Inc.

June 6, 2007

Mr. Dean Ponchak
Environmental Specialist
Division of Air Pollution Control
Ohio EPA – Southeast District Office
2195 Front Street
Logan, OH 43138

Re: American Municipal Power-Ohio
Facility ID No. 06-53-00-0069
PTI No. 06-08138

Dear Mr. Ponchak:

Thank you for contacting me with the additional questions concerning the unloading of urea from barges as well as the additional questions concerning the potential for mercury (Hg) emissions from coal combustion at the AMP Generating Station (AMPGS). This letter and enclosures supplement the information previously provided in the application for the AMPGS as follows:

1. Pages 4 of 21 and 10 of 21 in the emissions calculations have been revised to reflect the use of a four-sided partial enclosure at the hopper where urea is unloaded from barges for transport to storage. The use of the four-sided partial enclosure will reduce the maximum fugitive emissions from unloading urea at this unit as indicated on page 10 of 21. The summary of non-utility boiler emissions on page 4 of 21 has been revised to include the emissions from urea barge unloading as the "worst case" emissions for the Limestone/Urea Barge Unloading (F005) operation.

2. Pages 60 and 61 of the PTI application for the Limestone/Urea Barge Unloading (F005) operation have been revised consistent with the use of the four-sided partial enclosure above the receiving grate on the hopper.

AMP-Ohio 2600 Airport Drive Columbus, Ohio 43219 • Phone: 614/337-6222 • Fax: 614/337-6220 • www.amp-ohio.org

3. The following table presents the expected Hg content of various alternative coals from a fuel supply report prepared for the AMPGS. The worst case coal has a Hg content of 0.24 ppm. Please keep in mind these numbers are highly variable and there is no data on valence state. For example, we expect the Hg emissions will be higher using the PRB coals, even though the Hg content is a third of the Ohio/East Kentucky/West Pennsylvania coals.

Supply Region	Mercury (Hg) ppm
Northern PRB, Southern PRB (8400) and Southern PRB (8800)	0.08
Illinois, Indiana and Western Kentucky	0.10
Eastern Kentucky, Ohio and Western Pennsylvania	0.24
West Virginia	0.19
Southwest Virginia	0.15

Thank you once again for assisting AMP-Ohio with the completion of a timely review of the PTI application for the AMPGS. Please contact me at 614-337-6222 if you have any questions concerning this letter or enclosures.

On behalf of the members,

Randy Meyer
Director of Environmental Affairs

Enclosures

American Municipal Power Generating Station
Summary of Non-Utility Boiler Particulate Emissions

Emission Units	Max. Hourly Emissions (lbs/hr)		Max. Annual Emissions (tons/yr)	
	PM	PM_{10}	PM	PM_{10}
Natural Gas-Fired Auxiliary Boiler (B003)	1.14	1.14	0.50	0.50
Landfill (F001)	0.89	0.42	3.90	1.84
Paved Roadways (F002)	3.45	0.67	15.10	2.94
Unpaved Roadways (F003)	2.07	0.22	9.07	0.96
Coal Storage Piles (F004)	0.36	0.17	1.31	0.62
Limestone/Urea Barge Unloading (F005)	5.98	2.73	0.60	0.27
Limestone/Urea Storage (F006)	3.56	1.68	1.02	0.48
Boiler B001 Cooling Towers (P001)	0.18	0.18	0.77	0.77
Boiler B002 Cooling Towers (P002)	0.18	0.18	0.77	0.77
Fertilizer Crystallization Plant (P003)	3.86	3.86	16.89	16.89
Fertilizer Plant Dry Material Handling (P004)	0.36	0.36	1.59	1.59
Coal Barge Unloading (P901)	1.15	0.54	1.60	0.75
Coal Crushing (P902)	2.20	2.03	9.73	8.94
Limestone/Urea Preparation Building (P903)	0.50	0.35	1.22	1.16
Gypsum Conveying, Handling & Storage (P904)	0.08	0.03	0.33	0.14
Boiler B001 Flyash Conveying, Handling & Storage (P905)	0.17	0.17	0.75	0.75
Boiler B002 Flyash Conveying, Handling & Storage (P906)	0.17	0.17	0.75	0.75
Dry Fertilizer Barge Loading (P907)	4.32	2.09	1.60	0.95
Diesel Engine Emergency Electric Generating Unit (Z001)	2.23	2.23	0.56	0.56
Diesel Engine Emergency Fire Water Pump (Z002)	0.71	0.71	0.18	0.18
Total	**33.55**	**19.94**	**68.23**	**41.83**

Note: The maximum emissions from Limestone/Urea Barge Unloading (F005) operation and Limestone/Urea Storage (F006) are associated with the use of urea.

American Municipal Power Generating Station
Limestone/Urea Barge Unloading (F005)

Emission Points	Max. Capacity (tons/hr)	Max. Capacity (tons/yr)	Emission Factors (lbs/ton)		Overall Capture & Control Efficiency (%)	Control Description	Max. Uncontrolled Emissions (lbs/hr)		Max. Controlled Emissions (lbs/hr)		Max. Controlled Emissions (tons/yr)	
			PM	PM_{10}			PM	PM_{10}	PM	PM_{10}	PM	PM_{10}
Limestone Barge Unloading												
Crane Unloading to Hopper	1,000	299,300	0.002758	0.001304	90	Wet suppression	2.76	1.30	0.28	0.13	0.041	0.020
Hopper to Belt Feeder	1,000	299,300	0.003	0.0011	90	Wet suppression	3.00	1.10	0.30	0.11	0.045	0.016
Belt Feeder to L-1	1,000	299,300	0.003	0.0011	90	Wet suppression	3.00	1.10	0.30	0.11	0.045	0.016
Total Limestone Barge Unloading							8.76	3.50	0.88	0.35	0.13	0.05
Urea Barge Unloading												
Crane Unloading to Hopper	1,000	200,000	0.033883	0.016026	85	4-Sided Partial Enclosure and minimize drop height	33.88	16.03	5.08	2.40	0.508	0.240
Hopper to Belt Feeder	1,000	200,000	0.003	0.0011	85	4-Sided Partial Enclosure and minimize drop height	3.00	1.10	0.45	0.17	0.045	0.017
Belt Feeder to L-1	1,000	200,000	0.003	0.0011	85	4-Sided Partial Enclosure and minimize drop height	3.00	1.10	0.45	0.17	0.045	0.017
Total Urea Barge Unloading							39.88	18.23	5.98	2.73	0.60	0.27

Notes and Assumptions:

PM emission factor of 0.003 lbs/ton is from AP-42 Table 11.19.2-2

PM_{10} emission factor of 0.0011 lbs/ton is from AP-42 Table 11.19.2-2

PM emission factor of 0.002758 lbs/ton is based on AP-42 Section 13.2.4 assuming a windspeed of 8.7 mph and a limestone moisture content of 3%

PM_{10} emission factor of 0.001304 lbs/ton is based on AP-42 Section 13.2.4 assuming a windspeed of 8.7 mph and a limestone moisture content of 3%

PM emission factor of 0.033883 lbs/ton is based on AP-42 Section 13.2.4 assuming a windspeed of 8.7 mph and a urea moisture content of 0.5%

PM_{10} emission factor of 0.016026 lbs/ton is based on AP-42 Section 13.2.4 assuming a windspeed of 8.7 mph and a urea moisture content of 0.5%

Section II – Specific Air Contaminant Source Information

1. Company identification (name for air contaminant source for which you are applying): ***F005 – Limestone/Urea Barge Unloading***

2. List all equipment that are part of this air contaminant source: ***Unloading limestone or urea from barges***

3. Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

   When did/will you begin to install or modify the air contaminant source? (month/year) ***2009***

   When did/will you begin to operate the air contaminant source? (month/year) ***2012*** **OR** after issuance of PTI _____

4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.

   - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if 'Emissions before controls (max), lb/hr' multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
   - If you have no add-on control equipment, 'Emissions before controls' will be the same as 'Actual emissions'.
   - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit emissions in line #8 or have described inherent limitations below.
   - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
   - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01(HHH) and OAC rule 3745-77-01(BB).

Pollutant	Emissions Before Controls (max) (lb/hr)	Actual Emissions (lb/hr)	Actual Emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
PE	*NA*	*NA*	*≤0.60*	*NA*	*0.60*
PM_{10}	*NA*	*NA*	*≤0.27*	*NA*	*0.27*

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

Refer to the Emission Calculations section of this permit application.

Section II – Specific Air Contaminant Source Information

5. **Does this air contaminant source employ emissions control equipment?**

☑ **Yes** – fill out the applicable information below.

☐ **No** – proceed to item #6.

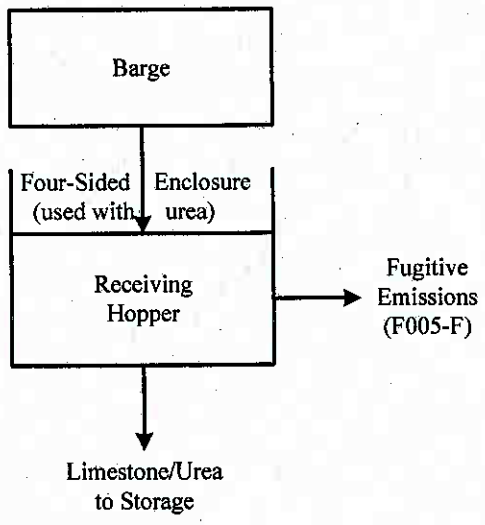
Note: Pollutant abbreviations used below: Particulates = PE; Organic Compounds = OC; Sulfur Dioxide = SO_2; Nitrogen Oxides = NO_X; Carbon Monoxide = CO

☑ **Other**, describe *Wet Suppression (used with limestone)*
Manufacturer: *Unknown* Year installed: *2012*
What do you call this control equipment: *Wet Suppression*
Pollutant(s) controlled: ☑ PE ☐ OC ☐ SO_2 ☐ NO_X ☐ CO ☐ Other
Estimated capture efficiency (%) *NA* Basis for efficiency: *NA*
Design control efficiency (%) *90* Basis for efficiency: *Engineering Judgment*
☑ This is the only control equipment on this air contaminant source
If no, this control equipment is: O Primary O Secondary O Parallel
List any other air contaminant sources that are also vented to this control equipment: *None*
Nitrogen Oxides = NO_X; Carbon Monoxide = CO

☑ **Other**, describe *Four-Sided Partial Enclosure Extending Above the Receiving Grate of Hopper (used with urea)*
Manufacturer: *Unknown* Year installed: *2012*
What do you call this control equipment: *Screening*
Pollutant(s) controlled: ☑ PE ☐ OC ☐ SO_2 ☐ NO_X ☐ CO ☐ Other
Estimated capture efficiency (%) *NA* Basis for efficiency: *NA*
Design control efficiency (%) *85* Basis for efficiency: *Engineering Judgment*
☑ This is the only control equipment on this air contaminant source
If no, this control equipment is: O Primary O Secondary O Parallel
List any other air contaminant sources that are also vented to this control equipment: *None*

6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in this application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.

Limestone/Urea Barge Unloading (F005) Flow Diagram



American Municipal Power Generating Station
Summary of Non-Utility Boiler Particulate Emissions

Emission Units	Max. Hourly Emissions (lbs/hr)		Max. Annual Emissions (tons/yr)	
	PM	PM_{10}	PM	PM_{10}
Natural Gas-Fired Auxiliary Boiler (B003)	1.14	1.14	0.50	0.50
Landfill (F001)	0.89	0.42	3.90	1.84
Paved Roadways (F002)	3.45	0.67	15.10	2.94
Unpaved Roadways (F003)	2.07	0.22	9.07	0.96
Coal Storage Piles (F004)	0.36	0.17	1.31	0.62
Limestone/Urea Barge Unloading (F005)	5.98	2.73	0.60	0.27
Limestone/Urea Storage (F006)	3.56	1.68	1.02	0.48
Boiler B001 Cooling Towers (P001)	0.18	0.18	0.77	0.77
Boiler B002 Cooling Towers (P002)	0.18	0.18	0.77	0.77
Fertilizer Crystallization Plant (P003)	3.86	3.86	16.89	16.89
Fertilizer Plant Dry Material Handling (P004)	0.36	0.36	1.59	1.59
Coal Barge Unloading (P901)	1.15	0.54	1.60	0.75
Coal Crushing (P902)	2.20	2.03	9.73	8.94
Limestone/Urea Preparation Building (P903)	0.50	0.35	1.22	1.16
Gypsum Conveying, Handling & Storage (P904)	0.08	0.03	0.33	0.14
Boiler B001 Flyash Conveying, Handling & Storage (P905)	0.17	0.17	0.75	0.75
Boiler B002 Flyash Conveying, Handling & Storage (P906)	0.17	0.17	0.75	0.75
Dry Fertilizer Barge Loading (P907)	4.32	2.09	1.60	0.95
Diesel Engine Emergency Electric Generating Unit (Z001)	2.23	2.23	0.56	0.56
Diesel Engine Emergency Fire Water Pump (Z002)	0.71	0.71	0.18	0.18
Total	**33.55**	**19.94**	**68.23**	**41.83**

Note: The maximum emissions from Limestone/Urea Barge Unloading (F005) operation and Limestone/Urea Storage (F006) are associated with the use of urea.

American Municipal Power Generating Station
Limestone/Urea Barge Unloading (F005)

Emission Points	Max. Capacity (tons/hr)	Max. Capacity (tons/yr)	Emission Factors (lbs/ton)		Overall Capture & Control Efficiency (%)	Control Description	Max. Uncontrolled Emissions (lbs/hr)		Max. Controlled Emissions (lbs/hr)		Max. Controlled Emissions (tons/yr)	
			PM	PM_{10}			PM	PM_{10}	PM	PM_{10}	PM	PM_{10}
Limestone Barge Unloading												
Crane Unloading to Hopper	1,000	299,300	0.002758	0.001304	90	Wet suppression	2.76	1.30	0.28	0.13	0.041	0.020
Hopper to Belt Feeder	1,000	299,300	0.003	0.0011	90	Wet suppression	3.00	1.10	0.30	0.11	0.045	0.016
Belt Feeder to L-1	1,000	299,300	0.003	0.0011	90	Wet suppression	3.00	1.10	0.30	0.11	0.045	0.016
Total Limestone Barge Unloading							**8.76**	**3.50**	**0.88**	**0.35**	**0.13**	**0.05**
Urea Barge Unloading												
Crane Unloading to Hopper	1,000	200,000	0.033883	0.016026	85	4-Sided Partial Enclosure and minimize drop height	33.88	16.03	5.08	2.40	0.508	0.240
Hopper to Belt Feeder	1,000	200,000	0.003	0.0011	85	4-Sided Partial Enclosure and minimize drop height	3.00	1.10	0.45	0.17	0.045	0.017
Belt Feeder to L-1	1,000	200,000	0.003	0.0011	85	4-Sided Partial Enclosure and minimize drop height	3.00	1.10	0.45	0.17	0.045	0.017
Total Urea Barge Unloading							**39.88**	**18.23**	**5.98**	**2.73**	**0.60**	**0.27**

Notes and Assumptions:

PM emission factor of 0.003 lbs/ton is from AP-42 Table 11.19.2-2

PM_{10} emission factor of 0.0011 lbs/ton is from AP-42 Table 11.19.2-2

PM emission factor of 0.002758 lbs/ton is based on AP-42 Section 13.2.4 assuming a windspeed of 8.7 mph and a limestone moisture content of 3%

PM_{10} emission factor of 0.001304 lbs/ton is based on AP-42 Section 13.2.4 assuming a windspeed of 8.7 mph and a limestone moisture content of 3%

PM emission factor of 0.033883 lbs/ton is based on AP-42 Section 13.2.4 assuming a windspeed of 8.7 mph and a urea moisture content of 0.5%

PM_{10} emission factor of 0.016026 lbs/ton is based on AP-42 Section 13.2.4 assuming a windspeed of 8.7 mph and a urea moisture content of 0.5%

Section II – Specific Air Contaminant Source Information

1. Company identification (name for air contaminant source for which you are applying): ***F005 – Limestone/Urea Barge Unloading***

2. List all equipment that are part of this air contaminant source: ***Unloading limestone or urea from barges***

3. Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

   When did/will you begin to install or modify the air contaminant source? (month/year) ***2009***

   When did/will you begin to operate the air contaminant source? (month/year) ***2012*** **OR** after issuance of PTI _____

4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.

   - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if 'Emissions before controls (max), lb/hr' multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
   - If you have no add-on control equipment, 'Emissions before controls' will be the same as 'Actual emissions'.
   - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit emissions in line #8 or have described inherent limitations below.
   - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
   - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01(HHH) and OAC rule 3745-77-01(BB).

Pollutant	Emissions Before Controls (max) (lb/hr)	Actual Emissions (lb/hr)	Actual Emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
PE	***NA***	***NA***	***≤0.60***	***NA***	***0.60***
PM_{10}	***NA***	***NA***	***≤0.27***	***NA***	***0.27***

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

Refer to the Emission Calculations section of this permit application.

Section II – Specific Air Contaminant Source Information

5. **Does this air contaminant source employ emissions control equipment?**

☑ **Yes** – fill out the applicable information below.

☐ **No** – proceed to item #6.

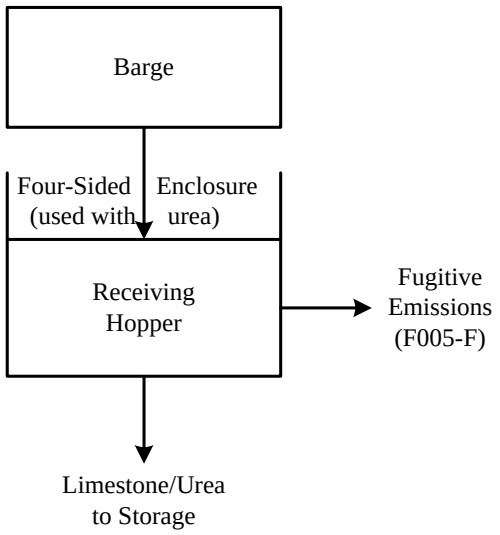
Note: Pollutant abbreviations used below: Particulates = PE; Organic Compounds = OC; Sulfur Dioxide = SO_2; Nitrogen Oxides = NO_X; Carbon Monoxide = CO

☑ **Other**, describe ***Wet Suppression (used with limestone)***
Manufacturer: ***Unknown*** Year installed: ***2012***
What do you call this control equipment: ***Wet Suppression***
Pollutant(s) controlled: ☑ PE ☐ OC ☐ SO_2 ☐ NO_X ☐ CO ☐ Other
Estimated capture efficiency (%) ***NA*** Basis for efficiency: ***NA***
Design control efficiency (%) ***90*** Basis for efficiency: ***Engineering Judgment***
☑ This is the only control equipment on this air contaminant source
If no, this control equipment is: ○ Primary ○ Secondary ○ Parallel
List any other air contaminant sources that are also vented to this control equipment: ***None***
Nitrogen Oxides = NO_X; Carbon Monoxide = CO

☑ **Other**, describe ***Four-Sided Partial Enclosure Extending Above the Receiving Grate of Hopper (used with urea)***
Manufacturer: ***Unknown*** Year installed: ***2012***
What do you call this control equipment: ***Screening***
Pollutant(s) controlled: ☑ PE ☐ OC ☐ SO_2 ☐ NO_X ☐ CO ☐ Other
Estimated capture efficiency (%) ***NA*** Basis for efficiency: ***NA***
Design control efficiency (%) ***85*** Basis for efficiency: ***Engineering Judgment***
☑ This is the only control equipment on this air contaminant source
If no, this control equipment is: ○ Primary ○ Secondary ○ Parallel
List any other air contaminant sources that are also vented to this control equipment: ***None***

6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in this application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.

Limestone/Urea Barge Unloading (F005) Flow Diagram



July 17, 2007

AMP OHIO
American Municipal Power-Ohio, Inc.

Mr. Dean Ponchak
Environmental Specialist
Division of Air Pollution Control
Ohio EPA – Southeast District Office
2195 Front Street
Logan, OH 43138

Re: American Municipal Power-Ohio
Facility ID No. 06-53-00-0069
PTI No. 06-08138

Dear Mr. Ponchak:

This letter and enclosures supplement the information previously provided in the application submitted by AMP-Ohio for the AMPGS. Enclosed are the following items:

1. Page 19 of 23 in the emission calculations has been revised to correct a minor summation error in the maximum hourly and annual emission rates for PM/PM_{10} for the Gypsum Conveying Handling and Storage (P904) operation. The summary of non-utility boiler emissions on page 4 of 23 has also been revised accordingly.

2. Page 116 of the PTI application for the Gypsum Conveying Handling and Storage (P904) operation has been revised to reflect the corrected maximum hourly and annual emission rates for PM/PM_{10}.

3. Emission estimates for the cooling cell associated with the fertilizer plant that support the conclusion that the PM/PM_{10} emissions from this unit are trivial (i.e., less than1.0 lb/day).

Thank you once again for assisting AMP-Ohio with the completion of a timely review of the PTI application for the AMPGS. Please contact me at 614-337-6222 if you have any questions concerning this letter or enclosures.

On behalf of the members,

Randy Meyer
Director of Environmental Affairs

Enclosures

OHIO: AMHERST • ARCADIA • ARCANUM • BEACH CITY • BLANCHESTER • BLOOMDALE • BOWLING GREEN • BRADNER • BREWSTER • BRYAN • CAREY • CELINA • CLEVELAND CLYDE • COLUMBIANA • COLUMBUS • CUSTAR • CUYAHOGA FALLS • CYGNET • DESHLER • DOVER • EDGERTON • ELDORADO • ELMORE • GALION • GENOA • GLOUSTER • GRAFTON GREENWICH • HAMILTON • HASKINS • HOLIDAY CITY • HUBBARD • HUDSON • HURON • JACKSON • JACKSON CENTER • LAKEVIEW • LEBANON • LODI • LUCAS • MARSHALLVILLE MENDON • MILAN • MINSTER • MONROEVILLE • MONTPELIER • NAPOLEON • NEW BREMEN • NEW KNOXVILLE • NEWTON FALLS • NILES • OAK HARBOR • OBERLIN • OHIO CITY • ORRVILLE PAINESVILLE • PEMBERVILLE • PIONEER • PIQUA • PLYMOUTH • PROSPECT • REPUBLIC • ST. CLAIRSVILLE • ST. MARYS • SEVILLE • SHELBY • SHILOH • SOUTH VIENNA • SYCAMORE TIPP. CITY • VERSAILLES • WADSWORTH • WAPAKONETA • WAYNESFIELD • WELLINGTON • WESTERVILLE • WHARTON • WOODSFIELD • WOODVILLE • YELLOW SPRINGS
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MICHIGAN: CLINTON • COLDWATER • DOWAGIAC • HILLSDALE • MARSHALL • UNION CITY • WYANDOTTE
VIRGINIA: BEDFORD • DANVILLE • MARTINSVILLE • RICHLANDS
WEST VIRGINIA: NEW MARTINSVILLE • PHILIPPI

AMP-Ohio 2600 Airport Drive Columbus, Ohio 43219 • **Phone:** 614/337-6222 • **Fax:** 614/337-6220 • www.amp-ohio.org

Section II – Specific Air Contaminant Source Information

1. Company identification (name for air contaminant source for which you are applying): ***P904 – Gypsum Conveying, Handling & Storage***

2. List all equipment that are part of this air contaminant source: ***Gypsum Dewatering Building, Transfer House, Storage Shed, Reclaim Hopper and Barge Loading***

3. Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

   When did/will you begin to install or modify the air contaminant source? (month/year) ***2009***

   When did/will you begin to operate the air contaminant source? (month/year) ***2012*** **OR** after issuance of PTI _____

4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.

   - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if 'Emissions before controls (max), lb/hr' multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
   - If you have no add-on control equipment, 'Emissions before controls' will be the same as 'Actual emissions'.
   - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit emissions in line #8 or have described inherent limitations below.
   - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
   - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01(HHH) and OAC rule 3745-77-01(BB).

Pollutant	Emissions Before Controls (max) (lb/hr)	Actual Emissions (lb/hr)	Actual Emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
PE	***0.97***	***≤0.13***	***≤0.55***	***0.13***	***0.55***
PM_{10}	***0.36***	***≤0.06***	***≤0.23***	***0.06***	***0.23***

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

Refer to the Emission Calculations section of this permit application.

American Municipal Power Generating Station
Summary of Non-Utility Boiler Particulate Emissions

Emission Units	Max. Hourly Emissions (lbs/hr)		Max. Annual Emissions (tons/yr)	
	PM	PM_{10}	PM	PM_{10}
Natural Gas-Fired Auxiliary Boiler (B003)	1.14	1.14	0.50	0.50
Landfill (F001)	0.89	0.42	3.90	1.84
Paved Roadways (F002)	3.45	0.67	15.10	2.94
Unpaved Roadways (F003)	2.07	0.22	9.07	0.96
Coal Storage Piles (F004)	0.36	0.17	1.31	0.62
Limestone/Urea Barge Unloading (F005)	5.98	2.73	0.60	0.27
Limestone/Urea Storage (F006)	3.56	1.68	1.02	0.48
Boiler B001 Cooling Towers (P001)	0.18	0.18	0.77	0.77
Boiler B002 Cooling Towers (P002)	0.18	0.18	0.77	0.77
Fertilizer Crystallization Plant (P003)	3.86	3.86	16.89	16.89
Fertilizer Plant Dry Material Handling (P004)	0.36	0.36	1.59	1.59
Coal Barge Unloading (P901)	1.15	0.54	1.60	0.75
Coal Crushing (P902)	2.20	2.03	9.73	8.94
Limestone/Urea Preparation Building (P903)	0.50	0.35	1.22	1.16
Gypsum Conveying, Handling & Storage (P904)	0.13	0.06	0.55	0.23
Boiler B001 Flyash Conveying, Handling & Storage (P905)	0.17	0.17	0.75	0.75
Boiler B002 Flyash Conveying, Handling & Storage (P906)	0.17	0.17	0.75	0.75
Dry Fertilizer Barge Loading (P907)	4.32	2.09	1.60	0.95
Diesel Engine Emergency Electric Generating Unit (Z001)	2.23	2.23	0.56	0.56
Diesel Engine Emergency Fire Water Pump (Z002)	0.71	0.71	0.18	0.18
Total	**33.61**	**19.96**	**68.45**	**41.92**

Note: The maximum emissions from Limestone/Urea Barge Unloading (F005) operation and Limestone/Urea Storage (F006) are associated with the use of urea.

American Municipal Power Generating Station
Gypsum Conveying, Handling & Storage (P904)

Emission Points	Max. Capacity (tons/hr)	Max. Capacity (tons/yr)	Emission Factors (lbs/ton)		Overall Capture & Control Efficiency (%)	Control Description	Max. Uncontrolled Emissions (lbs/hr)		Max. Controlled Emissions (lbs/hr)		Max. Controlled Emissions (tons/yr)	
			PM	PM_{10}			PM	PM_{10}	PM	PM_{10}	PM	PM_{10}
Gypsum Dewatering Building												
Gypsum Dewatering Building	60.0	499,320	0	0	0	Note 1	**Note 1**	**Note 1**	**Note 1**	**Note 1**	**Note 1**	**Note 1**
Gypsum Emergency Stockout Pile												
G-2 to Emergency Storage Pile	60.0	499,320	0.000290	0.000137	**Note 2**	Wet Gypsum	**Note 3**	**Note 3**	**Note 3**	**Note 3**	**Note 3**	**Note 3**
Storage Pile Wind Erosion	60.0	499,320	0.000290	0.000137	**Note 2**	Wet Gypsum	**Note 3**	**Note 3**	**Note 3**	**Note 3**	**Note 3**	**Note 3**
Storage Pile Unloading	60.0	499,320	0.000290	0.000137	**Note 2**	Wet Gypsum	**Note 3**	**Note 3**	**Note 3**	**Note 3**	**Note 3**	**Note 3**
Gypsum Transfer House												
G-1 to G-3	60.0	499,320	0.003	0.0011	95	Enclosure & Wet Gypsum w/exhaust fan	0.18	0.07	0.01	0.00	0.04	0.01
Gypsum Storage Shed												
G-3 to Gypsum Storage Pile	60.0	499,320	0.000290	0.000137	**Note 2**	Wet Gypsum	0.02	0.01	0.02	0.01	0.07	0.03
Storage Pile Wind Erosion	60.0	499,320	0.000290	0.000137	**Note 2**	Wet Gypsum	0.02	0.01	0.02	0.01	0.07	0.03
Storage Pile Unloading	60.0	499,320	0.000290	0.000137	**Note 2**	Wet Gypsum	0.02	0.01	0.02	0.01	0.07	0.03
Bull Dozer to Hopper	60.0	499,320	0.003	0.0011	90	Wet Gypsum	0.18	0.07	0.02	0.01	0.07	0.03
Gypsum Reclaim Hopper												
Hopper to G-4A	60.0	499,320	0.003	0.0011	95	Enclosure & Wet Gypsum w/exhaust fan	0.18	0.07	0.01	0.00	0.04	0.01
G-4A to G-4	60.0	499,320	0.003	0.0011	95	Enclosure & Wet Gypsum w/exhaust fan	0.18	0.07	0.01	0.00	0.04	0.01
Barge Loading												
G-4 to Hopper	60.0	499,320	0.003	0.0011	90	Wet Gypsum	0.18	0.07	0.02	0.01	0.07	0.03
Hopper to Barge	60.0	499,320	0.000290	0.000137	**Note 2**	Wet Gypsum w/telescopic chute	0.02	0.01	0.02	0.01	0.07	0.03
Total							**0.97**	**0.36**	**0.13**	**0.06**	**0.55**	**0.23**

Note 1 - Emissions are assumed to be negligible because the gypsum is wet and these operations are conducted with an enclosure.

Note 2 - The AP-42 Section 13.2.4 emission factor already takes into account the moisture content of the gypsum.

Note 3 - Assume all material diverted to G-1

Other Notes and Assumptions:

PM emission factor of 0.000290 lbs/ton is based on AP-42 Section 13.2.4 assuming a windspeed of 8.7 mph and a gypsum moisture content of 15%
.
PM_{10} emission factor of 0.000137 lbs/ton is based on AP-42 Section 13.2.4 assuming a windspeed of 8.7 mph and a gypsum moisture content of 15%

PM emission factor of 0.003 lbs/ton is based on AP-42 Table 11.19.2-2

PM_{10} emission factor of 0.0011 lbs/ton is based on AP-42 Table 11.19.2-2

American Municipal Power Generating Station
Cooling Cells for Fertilizer Plant

Total Cooling Water Drift Rate (gpm)	0.022
Total Disolved Solids (mg/L):	350
PM/PM_{10} Emission Rate (lbs/hr):	0.004
PM/PM_{10} Emission Rate (lbs/day):	0.094
PM/PM_{10} Emission Rate (tons/yr):	0.017

Notes and Assumptions:

Emission Rate (lbs/hr) = 0.022 gal/min x 60 min/hr x 350 mg/L x 3.7854 L/gal / (1000 mg/g x 453.6 g/lb)

Emission Rate (tons/yr) = 0.50 lbs/hr x 8760 hrs/yr / 2000 lbs/ton

August 17, 2007

Via Electronic and U.S. Mail

Rod Windle
Division of Air Pollution Control
Ohio EPA
P.O. Box 1049
Columbus, Ohio 43216

AMP OHIO
American Municipal Power-Ohio, Inc.

RE: Ohio EPA's August 14, 2007 Questions: AMP-Ohio's Response (Pending PSD Permit Application for AMPGS)

Dear Rod:

On August 14, 2007, you sent me two questions regarding AMP-Ohio's pending PSD permit application. Your questions, along with AMP-Ohio's responses, are set forth below.

1. *What is AMP-Ohio proposing (or would emit with the proposed) for Hg emission in pounds per year and control efficiency for: blend with 25% western and 75% eastern coal; blend with 50% western and 50% eastern coal; and blend with 75% western and 25% eastern coal?*

AMP-Ohio's Response:

The following table was developed to answer Ohio EPA's question. While this table responds to Ohio EPA's question, please keep in mind that AMP-Ohio is not proposing the following figures as limits, rather these figures represent estimated emissions and efficiencies based on the fuel blends identified by Ohio EPA.

Eastern (%)	Western (%)	Controlled Hg Emissions (lbs / year)	Hg Content (lbs /year)	Control Efficiency (%)
75	25	92.1	644.5	85.71
50	50	102.3	576.8	82.57
25	75	112.5	529.0	78.73

As you will note, the anticipated control efficiencies decrease as the western fuel component increases due to a greater proportion of elemental mercury in western fuels. If mercury is in a particulate or oxidized form, we have assumed 90% control, which represents the highest range of vendor warranties offered for similar boiler projects. Specifically, vendor guarantees are typically limited to a maximum of 90% capture of particulate and ionic mercury. As you know, activated carbon injection is not efficient at controlling elemental mercury, even when a low sulfur coal is burned.

AMP-Ohio 2600 Airport Drive Columbus, Ohio 43219 • Phone: 614/337-6222 • Fax: 614/337-6220 • www.amp-ohio.org

2. *Has AMP-Ohio considered SO3 control other than FGD that could mitigate SO3 in order to allow for carbon injection (i.e. something like trona)?*

AMP-Ohio's Response:
Given the challenges faced by several other power plants in Ohio after retrofit installations of Selective Catalytic Reduction and wet Flue gas desulfurization scrubbers, AMP-Ohio has contemplated the issues of sulfur trioxide formation and potentially resulting sulfuric acid mist. However, because the mercury emission limits proposed by AMP-Ohio in its May 2006 PSD permit application satisfy all applicable mercury regulations, AMP-Ohio did not anticipate that any additional evaluation of the confounding effects presented by sulfur trioxide was needed.

Please do not hesitate to contact me if you have any questions regarding these responses.

On behalf of the members,

Randy Meyer
Director of Environmental Affairs

ND: 4826-0905-9329, v. 1