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Via Electronic Mail and Overnight Delivery

American Municipal Power-Ohio, Inc.

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RE: American Municipal Power Generating Station
Response to Questions Regarding 112(g) MACT Analysis and Supplemental Information Regarding Auxiliary Boiler (B003)

Dear Dean and Rod:

On July 18, 2008, American Municipal Power-Ohio, Inc. (AMP-Ohio) submitted a Clean Air Section 112(g) analysis for AMP-Ohio's proposed American Municipal Power Generating Station (AMPGS). On January 9, 2009, Rod sent me an electronic mail which included follow-up questions regarding AMP-Ohio's 112(g) analysis. This letter contains supplemental information regarding auxiliary boiler (B003) and responds to each question as follows:

Ohio EPA Question/Comment 1:

On page 5 of the 112(g) analysis dated July 18, 2008, there is a list of pollutants representing the expected HAPs. Is this a complete list of HAPs that will be emitted? If not, then please provide additional HAPs.

AMP-Ohio Response:

The only MACT standard proposed by USEPA for coal and oil fired electric generating units (EGUs) was issued in January 2004. *See* 69 Fed. Reg. 4652 (Proposed NESHAP; and, in the Alternative, Proposed Standards of Performance for New and Existing Stationary Sources: Electric Steam Generating Units, January 30, 2004). This EGU MACT proposal did not include standards for any non-mercury HAP. *See, also*, 65 Fed. Reg. 79825 (Regulatory Finding on the Emission of HAPs from EGUs, December 20, 2000).

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USEPA's position that mercury is the only HAP necessary to address for an EGU MACT determination is articulated, in detail, in the January 2004 proposed standard. *See, also*, USEPA's conclusions regarding CAA Section 112(n)(1)(A) in the January 2004 proposal. Thus, mercury is the only HAP that should be subject to a case-by-case MACT determination per CAA Section 112(g)(2)(B) and O.A.C. 3745-31-28(E)(4). Specifically, if a federal MACT standard has been proposed, case-by-case MACT requirements applied to the source shall have considered those emission limitations and requirements of the proposed MACT standard. However, AMP-Ohio also understands that the EGU MACT continues to be an unsettled issue due to litigation and court rulings.

AMP-Ohio did identify HAPs in addition to mercury in both its original May 2006 application and in the July 2008 112(g) supplemental analysis. Specifically, the Permit-to-Install (PTI) application submitted by AMP-Ohio in May 2006 included emission calculations for each HAP that could be emitted at an uncontrolled rate greater than 1.0 ton per year (TPY).[1] Despite the fact that mercury is the only HAP subject to a case-by-case analysis in concert per CAA 112(g)(2)(B) and O.A.C. 3745-31-28(E)(4), the 112(g) analysis submitted by AMP-Ohio in July 2008 also identifies a list of all HAPs that could be emitted an uncontrolled rate greater than 1.0 ton per year (p.7 Table 3-1).

Based on your request, Table 1 below identifies the HAPs listed in Section 1.1 of AP-42[2] with an estimated annual maximum uncontrolled emission rate equal to or greater than 0.01 TPY (10 pounds or more of uncontrolled emissions per year) per boiler that have not previously been identified in the PTI application or 112(g) materials submitted by AMP-Ohio.[3] The actual controlled emission rates of each HAP will be significantly less than the uncontrolled rates identified in this table.

Table 1
Estimated Uncontrolled Emission Rates for HAPs Identified in AP-42
(Emitted at a Rate of Less than 1 TPY)

HAP	Estimated Maximum Annual Uncontrolled Emissions (B001 and B002) (tpy)
Acrolein	0.40
Methylene chloride	0.40
Formaldehyde	0.33

[1] The instructions in the permit application direct the applicant to provide emission estimates for each HAP air pollutant that has potential emissions greater than 1 ton per year (TPY). These instructions are consistent with Ohio's air toxic law and regulation. R.C. 3704.03(F)(3)(c); O.A.C. 3745-114.

[2] AP-42 Section 1.1 Bituminous and Subbituminous Coal Combustion includes several tables with emission factors for HAPs (refer to tables 1.1-12, 1.1-13 and 1.1-14) Most of the emission factors for HAPs presented in this section of AP-42 have unreliable ratings of "D" and "E". Further, none of the emission factors are based on the use of a control system that is comparable to the system that will be employed at the AMPGS.

[3] The maximum estimated annual uncontrolled emissions are per boiler.

Table 1 Estimated Uncontrolled Emission Rates for HAPs Identified in AP-42 (Emitted at a Rate of Less than 1 TPY)	
HAP	**Estimated Maximum Annual Uncontrolled Emissions (B001 and B002) (tpy)**
Toluene	0.33
Methyl hydrazine	0.24
Methyl bromide	0.22
Carbon disulfide	0.18
Ethyl benzene	0.13
Bis(2-ethylhexyl)phthalate(DEHP)	0.10
Hexane	0.09
Chloroform	0.08
Dimethyl sulfate	0.07
Tetrachloroethylene	0.06
Ethyl chloride	0.06
Ethylene dichloride	0.06
Bromoform	0.05
Xylenes	0.05
Methyl tert butyl ether	0.05
Styrene	0.03
Chlorobenzene	0.03
Methyl methacrylate	0.03
1,1,1-Trichloroethane	0.03
Phenol	0.02
Acetophenone	0.02
Naphthalene	0.02
Vinyl acetate	0.01
2-Chloroacetophenone	0.01
Cumene	0.01

The emission control system at the AMPGS will control all inorganic and organic HAP constituents beyond the level of control that is achieved at any similar power plant that is currently in operation, and it also contemplates and proposes control beyond the MACT floor, which are the standards for development of a case-by-case MACT in O.A.C. 3745-31-28(E) and 40 CFR 63. The use of the Best Available Control Technology (BACT) limits for VOC and PM_{10} as surrogates for organic and metal HAPs emission control also assures the HAPs emitted will be controlled consistent with the requirements of Section 112(g).

Given Ohio EPA's request to identify HAPs at uncontrolled rates below Ohio's air toxics law, AMP-Ohio has also identified HAPs associated with its 150 mmBtu/hr natural gas-fired auxiliary boiler (B003) in the ten pound to one ton range. Originally, B003 was identified as source of negligible HAP emissions (see p.7, Table 3-1). However, based on Ohio EPA's question, AMP-Ohio has included an additional 112(g) analysis to cover

these negligible HAP emissions from the auxiliary boiler. This document accompanies this letter.

Table 3-1 of AMP-Ohio's 112(g) analysis identifies two other negligible sources of HAPs, Z001 and Z002. These sources both have uncontrolled HAP emission rates of less than 10 pounds per year of individual HAPs, so no updated analysis has been included. Finally, AMP-Ohio listed several other emission sources in Table 3-1. These sources all have no measurable HAPs emissions.

Ohio EPA Question/Comment 2:

On page 6 of the 112(g) analysis, there is a statement that says "The annual emissions at the expected utilization are reduced proportionately". What does this mean and what impact does it have on the federally enforceable 112(g) determination?

AMP-Ohio Response:

OAC rule 3745-31-28(D)(1)(i) requires that the 112(g) submission include estimates of the controlled annual emissions at two operating rates: (1) the maximum operating rate; and (2) the expected utilization of capacity.

Section 3 of the 112(g) analysis submitted by AMP-Ohio in July 2008 (refer to Table 3-2) identifies the estimated maximum uncontrolled emissions at the maximum operating rate (i.e. 100% capacity factor). The comment in Table 2-1 (page 6) that "The annual emissions at the expected utilization are reduced proportionately" means if the expected (i.e. actual) operation of a unit is less than a capacity factor of 100%, the expected (or actual) uncontrolled emissions are reduced proportional to the reduction in the capacity factor.

Since AMPGS is a baseload facility, AMP-Ohio expects that the boilers will be utilized at or near 100% of capacity. However, AMP-Ohio cannot forecast the exact expected capacity factor for each boiler at this time. If the actual utilization of each boiler is less than 100%, HAP emissions will be less than the maximum annual emission rates presented in the PTI application and the 112(g) analysis. For example, the maximum annual uncontrolled acetaldehyde emission rate at a 100% capacity factor is 0.79 tons per boiler (refer to Table 3-2 in the 112(g) analysis). If the actual annual average capacity factor is 75%, the estimated uncontrolled acetaldehyde emissions would be 75% of the emission rate at the 100% capacity factor (e.g., the estimated annual uncontrolled acetaldehyde emissions at a 75% capacity factor = 75% x 0.79 tons = 0.59 tons). The 112(g) analysis submitted by AMP-Ohio assumes that both boilers could operate at the maximum capacity for the entire year (i.e. rather than the expected capacity factor).

Given the fact that AMP-Ohio needs and intends to use AMPGS as a baseload facility, AMP-Ohio must contemplate utilization at or very near 100%. Thus, for 112(g) purposes, utilization must also be evaluated at or near the maximum operating capacity and all standards should be set accordingly.

Ohio EPA Question/Comment 3:

Please provide detailed calculations as to how the HAP emissions on page 8 of the 112(g) analysis were determined. Please provide any additional HAPs provided in answer #1. Additionally, please note the apparent typo on page 15 regarding "1.7 lb/mmBtu" and "3.6 lb/mmBtu". To avoid further confusion and provide additional clarity, please express the HAP emission limits from the facilities compared in the 112(g) analysis in "lb(s)/trillion Btu".

AMP-Ohio Response:

The estimated maximum annual emission rates for the HAPs listed in Table 3-2 on page 8 of the 112(g) analysis are contained in the PTI application submitted by AMP-Ohio in May 2006 (refer to the Emissions Calculations Tab of Volume I of the PTI application). As specifically identified on pages 1-2 on the emissions calculations tab of Volume I, these HAP emissions estimates submitted were based primarily on AP-42 emission factor calculations.
The additional uncontrolled emission estimates set forth in the AMP-Ohio Response to Question 1 table are based on AP-42 emission factors that are expressed in units of "lb of HAP emitted per ton of coal burned" with the maximum estimated annual coal utilization for each boiler. Please let us know if you would like the actual calculation worksheets, and we will be happy to provide them to you.

The statement in the second paragraph on page 15 and the permit information/data in Table 4-10 was intended to communicate the mercury limitations established in recent coal-fired power plant permits: 1.7 x 10^{-6} lb/mmBtu in the permit issued for MidAmerican Energy Company CBEC Boiler 4 (June 17, 2003)[4] to 3.6 x 10^{-6} lb/mmBtu in the permit issued for Santee Cooper Cross Generating Station Units 3 and 4 (February 5, 2004). The exclusion of the "x 10^{-6}" was a typographical error in the text of this paragraph.

The summaries of the HAP emission limitations in Tables 4-1 through 4-9 present the emission limits in the units that are specified in the air permits issued for each plant. Some of the permits are expressed in lb/ trillion mmBtu, some are expressed in 10^{-6} lb/mmBtu and some are expressed in units of 10^{-6} lb/MWh. The comparison of mercury emission limits in Table 4-10 presents the emission limits in a common format of 10^{-6} lb/mmBtu (i.e., lb/trillion Btu). Emission limitations expressed as 10^{-6} lb/mmBtu are equivalent to emission limits expressed as lb/trillion Btu (or lb/10^{-12} Btu).

Ohio EPA Question/Comment 4:

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[4] This mercury limit was rescinded in May 2005 under Permit No. 03-A-425P2.

Please provide numeric justification for VOC being used as a surrogate to organic HAP, PM-10 being used as a surrogate for metal HAP and cyanide HAP, and hydrochloric acid being used as a surrogate for HF (i.e., how is compliance with organic HAP proven via compliance with VOC, etc.).

AMP-Ohio Response

AMP-Ohio considered both the floor and the beyond the floor limits in its consideration of the appropriateness of utilizing VOC as a surrogate for organic HAPs. Organic HAPs are a subset of VOCs that occur due to incomplete combustion of the organic matter in coal. While we recognize that some projects have proposed the use of CO, organic HAPs are a subset of VOCs, so the establishment of a VOC limit (as opposed to CO) is a more direct surrogate measurement. More generally, the issuance of recent permits is consistent with USEPA's long-held position that the use of surrogates to establish MACT standards is appropriate and acceptable. See, also, *Natl. Lime Assoc. v. EPA,* 233 F.3d 625 (EPA may use a surrogate to regulate HAPs if it is reasonable to do so).

Operating units (i.e. MACT floor) utilizing this approach include Santee Cooper Cross 3, Springerville 3, Council Bluffs and Weston 4. VOC limits range from 0.024-0.036 lb/MMBtu. Permitted units not yet in operation (i.e. beyond the MACT floor) utilizing this approach include Desert Rock, Nebraska City 2, Longleaf and Thoroughbred. VOC limits range from 0.003-0.0036 lb/MMBtu.

Since there is no technically feasible ad-on control technology available for the control of organic compounds, efficient boiler combustion (i.e. good combustion practices) is both the MACT floor and beyond the floor standard. The overall air pollution control system that will be employed at the AMPGS includes a series of components (i.e., good combustion design, overfire air, low-NO_x burners, Selective Catalytic Reduction, Pulsejet Baghouse, Wet Flue Gas Desulfurization and Wet Electrostatic Precipitator). This series of air pollution controls is not currently in operation at any other similar coal-fired power plant. Thus, the level of control achieved from this control system for all pollutants emitted by the AMPGS (criteria pollutants and HAPs) will be equivalent or superior to the best available control systems that are currently in operation and those permitted but yet to operate. The provisions for monitoring and compliance assurance for criteria pollutants that are included in the permit issued for the AMPGS by Ohio EPA ensure that the overall control system is operating properly and effectively controlling both criteria pollutant emissions and HAPs.

While Ohio EPA did not specifically ask the question, AMP-Ohio would like to confirm that it used a similar approach in the development of its proposed metals HAPs limit. Specifically, PM_{10}-filterable was used a surrogate for metals HAPs (other than mercury). Since these metal HAPs will be in particulate matter form (i.e. solid rather than gaseous state) when they reach the control equipment, they will comprise a small subset of PM_{10} - filterable (i.e. they will be invariably present in the PM_{10}-filterable emissions). Further, EPA has determined that metals HAPs are efficiently and readily captured by PM control equipment and that no other control equipment has demonstrated the same ability to

achieve reductions of metals HAPs. Units utilizing this approach include Santee Cooper Cross 3, Springerville 3, MidAmerican, Wygen and Hardin. Filterable PM limits range from 0.012-0.018 lb/MMBtu.

Ohio EPA Question/Comment 5:

In your analysis you state that carbon injection is not an effective supplement to other control systems. Please provide a detailed explanation to justify this position while considering the MidAmerican and Turk facilities' commitment to use activated carbon injection.

AMP-Ohio Response

The discussion on page 10 of the section 112(g) analysis submitted in July 2008 presents the basis for AMP-Ohio's position regarding the use of activated carbon injection ("ACI") to supplement the overall emission control system that will be utilized to control emissions from B001 and B002 at the AMPGS. AMP-Ohio determined, in performing both its MACT floor and beyond-the-floor analyses, that AMPGS's host of control technology distinguished it from other recent projects, including MidAmerican and Turk. These distinctions are explained as follows.

AMPGS will utilize a host of emissions control equipment, including the use of: a SCR, a wet FGD, a Wet ESP and a Baghouse/FF. As you know, AMP-Ohio intends to utilize Powerspan's ammonia-based wet FGD (compared to the standard limestone-based wet FGD); thus, there is no other project that compares directly with AMPGS. In addition, AMPGS will utilize both a baghouse and a wet ESP, again, making its control system design distinct from other recent projects. Powerspan's ECO process is a non-thermal plasma process that is expected to produce beyond-the-floor mercury reductions for MACT purposes. However, as you also know, this technology has not yet been deployed at a facility the size of AMPGS, so it is impossible to establish hard data regarding mercury reductions. MidAmerican and Turk will both utilize dry FGD control, which is not equivalent to the mercury-capturing ability of a wet FGD.

Another important factor AMP-Ohio considered as part of its MACT analysis was the range of coals AMPGS is designed to burn (this issue has previously been discussed with Ohio EPA as part of Ohio EPA's establishment of a BAT mercury limit in the PTI). Specifically, AMPGS is designed to accommodate eastern bituminous coal as well as western sub bituminous coal. Thus, given the unique host of control equipment proposed by AMP-Ohio as well as the blending of both eastern and western coals, AMP-Ohio has concluded that ACI will not effectively supplement the mercury-control capabilities of AMPGS's proposed system in a way that makes the use of ACI cost-effective (as discussed below). Finally, it is important to reiterate the use of ACI will prevent the beneficial reuse of fly ash.

Ohio EPA Question/Comment 6:

On page 10 of the 112(g) analysis, please explain why activated carbon injection is not cost effective. What are the costs and incremental costs.

AMP-Ohio Response

AMP-Ohio evaluated both the capital and O&M costs during its 112(g) analysis process. As you know, vendors will not provide firm data regarding costs absent a negotiation and purchase process, so all figures are based on broad estimates. Specifically, AMP-Ohio estimates that capital costs for ACI would be in the range of $4.5-5.5 million dollars (based on 2007-2008 data). Annual operating costs range widely, depending on the factors includes. A conservative, low estimate is $6 million dollars (based on 2007-2008 data).

Incremental costs are frankly impossible to ascertain prior to operating AMPGS with its unique host of emissions control equipment. Fundamentally, it is entirely possible that ACI would not remove any additional mercury if added to AMPGS's control system (especially utilizing certain eastern bituminous coal blends). In addition, in order to provide a true incremental comparison, the cost of increased landfill use due to the fact that ACI renders fly ash unusable would have to be included.

The cost of ACI without any demonstrable resulting mercury emission reductions is beyond the requirements of MACT.

Ohio EPA Question/Comment 7:

What is the status of the Prairie State project and how does the mercury control strategy committed to by Prairie State compare to the AMP-Ohio 112(g) analysis?

AMP-Ohio Response:

Table 4-5 of the 112(g) analysis submitted by AMP-Ohio in July 2008 summarizes the HAP emission control requirements in the permit issued in June 2005 that authorized the construction of the Prairie State facility. The permit specifies two options for mercury emissions control that take effect 12 months after the facility commences operation if US EPA has not adopted an electric generating unit (EGU) MACT. One option requires a 95% reduction in mercury emissions and the other option requires the use of activated carbon injection (without a % reduction requirement).

AMP-Ohio believes that the mercury emission control provisions in the permit issued by Ohio EPA for the AMPGS and supported by the section 112(g) analysis submitted by AMP-Ohio are equivalent to or superior to the requirements specified in the permit issued for the Prairie State facility. It is important to note that Prairie State is a "mine mouth" plant with a dedicated coal supply while AMP-Ohio anticipates obtaining coals from different suppliers located in both the eastern and western United States for use at the AMPGS. This alone means that a direct comparison with Prairie State is not appropriate.

Ohio EPA Question/Comment 8:

Please provide the missing footnote "1" on page 15 of the 112(g) analysis.

AMP-Ohio Response

The inclusion of footnote "1" after the word "Mercury" in Table 4-9 is a typographical error. There is no footnote "1" for this table.

Thank you for providing AMP-Ohio the opportunity to respond to your questions. Please do not hesitate to contact me if you have any further questions.

Sincerely,

Randy Meyer
Director of Environmental Affairs

cc: Bob Hodanbosi
Mike Hopkins
Scott Kiesewetter

ND: 4838-4438-3235, v. 1

CLEAN AIR ACT SECTION 112(g) HAZARDOUS AIR POLLUTANT (HAP) MAXIMUM ACHIEVABLE CONTROL TECHNOLOGY (MACT) ANALYSIS

Supplemental Information Regarding Auxiliary Boiler (B003)

For:
AMERICAN MUNICIPAL POWER GENERATING STATION

Submitted By:
AMERICAN MUNICIPAL POWER-OHIO, INC.

February 6, 2009