



**MID-MICHIGAN ENERGY, LLC**  
c/o LS Power Development, LLC  
400 Chesterfield Center, Suite 110  
St. Louis, Missouri 63017  
(636) 532-2200 · Fax (636) 532-2250

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*Via Overnight Mail*

May 30, 2008

Mr. D. John Vial, Sr. Environmental Engineer  
Michigan Department of Environmental Quality, Air Quality Division  
Constitution Hall  
525 West Allegan Street  
3rd Floor, North Tower  
Lansing, MI 48933

**RECEIVED**  
JUN 01 2008  
AIR QUALITY DIV.

Re: Permit to Install (PTI) Application Number 297-07  
Mid-Michigan Energy Station  
Midland, Michigan

Dear Mr. Vial:

Thank you for your continued efforts on completing the application review portion of Mid-Michigan Energy's (MME) efforts to obtain a Permit to Install (PTI). MME had several take-aways from our recent meeting, all but one of which MME believes have been resolved.

At the meeting, Mr. Jim Haywood identified a concern with the conservative estimate that all potential chromium emissions from the proposed Mid-Michigan Energy Station (MMES) were assumed to be hexavalent chromium. After discussion, MME committed to review this assumption and provide additional information in the event that MME chose to use a different speciation for chromium emissions.

There are five boilers associated with the proposed MMES. Based on AP-42 and other EPA data, these boilers may have chromium emissions. The emission rates and references are provided in Appendix C of the application. Based on additional information included in EPA's October 1996 "Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units – Interim Final Report" (Interim Report), MME proposes that a speciation of 11% hexavalent chromium should be used for all five boilers. EPA utilized an 11% fraction in the February 1998 "Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units –Final Report to Congress" with a citation to the Interim Report. Appendix H of the Interim Report provides the basis for that value showing that for coal-fired facilities the average was 11% with a range of 0.4% to 23%. In addition, the value for the test unit with the same general configuration as the proposed MMES had a hexavalant chromium percentage of 9.6% (Attachment 1). It is MME's understanding that the standard speciation utilized by MDEQ is 10%. MME has not been able to identify speciation data for gas-fired boilers. Therefore, MME proposes to use the same 11% speciation for the gas-boilers. MME feels that this is a conservative assumption given that chromium levels in natural gas are very low. In order to be

conservative, the trivalent chromium emission rate was left unchanged. Updated screening results (Table 6-11 of the PTI application) utilizing this speciation are provided in Attachment 2.

In addition, MME would like to provide additional information on the selection of species evaluated in the recently submitted 112(g) analysis. EPA first evaluated emissions of hazardous air pollutants (HAPs) from coal-fired electric generating units in the February 1998 "Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units – Final Report to Congress."<sup>1</sup> To draft that report, EPA comprehensively tested existing power plants for HAPs and created a priority list for further evaluation. To determine priority HAPs, the overall list of 189 HAPs was narrowed to a list of 67 potentially emitted by electric units. The 14 identified priority HAPs were then further analyzed through inhalation risk assessments, multipathway analyses, and/or long-range transport modeling.<sup>2</sup> This HAPs analysis indicated that other than mercury emissions, utility units are responsible for "very small percentages of total anthropogenic emissions."<sup>3</sup> Specifically for the multipathway analyses conducted for radionuclide emissions, EPA found "[t]he risks due to exposure to radionuclide emissions from utilities are substantially lower than the risks due to exposure to natural background radiation."<sup>4</sup> Overall, EPA identified that based on the information and analyses available, mercury was the HAP of greatest concern and of the other 14 priority HAPs only dioxins and arsenic might need further study. The evaluations of the other 11 priority HAPs were found to be below levels of concern.<sup>5</sup> Mercury continued to be the only HAP of concern identified by EPA when it issued the December 20, 2000 finding to regulate coal-fired electric generating units.<sup>6</sup> EPA, in the proposed MACT standards, determined that only mercury emissions from coal-fired power plants warranted rulemaking; however, the case-by-case MACT determination previously submitted by MME is for mercury, non-mercury metals, acid gases and organics. This HAPs categorization was taken from the archived documents generated by the EPA Utility MACT Working Group<sup>7</sup>, a stakeholder group engaged to provide recommendations on the scope and structure of the MACT for electric utility generating units.

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<sup>1</sup> <http://www.epa.gov/ttn/atw/combust/utiltox/utoxpg.html>

<sup>2</sup> *Ibid.* Volume 1 – Page 4-4.

<sup>3</sup> *Ibid.* Volume 1 – Page 14-1.

<sup>4</sup> *Ibid.* Volume 1 – Page 9-14.

<sup>5</sup> *Ibid.* Volume 1 – Page ES-27.

<sup>6</sup> 65 FR 79825-79831, December 20, 2000.

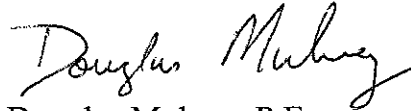
<sup>7</sup> <http://www.epa.gov/ttn/atw/combust/utiltox/utoxpg.html>

Mr. Vial  
May 30, 2008

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Please contact me at (636) 532-2200 or via email at [dmulvey@lspower.com](mailto:dmulvey@lspower.com) if you have questions on this submittal.

Very truly yours,

A handwritten signature in cursive script that reads "Douglas Mulvey".

Douglas Mulvey, P.E.  
Environmental Engineer

Cc: Jim Haywood, MDEQ, with enclosures

Enclosures: as noted

**ATTACHMENT 1**



PB97-114524

United States  
Environmental Protection  
Agency

Office of Air Quality  
Planning and Standards  
Research Triangle Park, NC 27711

EPA-453/R-96-013c  
October 1996

Air



# Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units -- Interim Final Report

## Volume 3. Appendices H - M



REPRODUCED BY: **NTIS**  
U.S. Department of Commerce  
National Technical Information Service  
Springfield, Virginia 22161

that different test methods were used for measuring total mercury and for measuring species. Ranges for elemental and ionic mercury (mercury (+2)) were  $4.60 \times 10^{-1}$  lb/10<sup>12</sup> Btu to 14.7 lb/10<sup>12</sup> Btu and  $2.72 \times 10^{-2}$  lb/10<sup>12</sup> Btu to 5.49 lb/10<sup>12</sup> Btu, respectively. The split between elemental and ionic mercury was not consistent from one site to another. About half the sites had more ionic mercury, while the rest have more elemental mercury. The average proportion of elemental mercury from 10 test sites was 62 percent, while the ionic mercury was 38 percent. When median values are used, 43 percent was elemental and 57 percent was ionic. For coal only, the average values from 9 samples were 59 percent for elemental mercury and 41 percent for ionic mercury (median percentages were 40 and 60 for elemental and ionic, respectively). For oil, only one sample was found to contain ionic mercury; elemental mercury was not detected. Statistics on a percentage basis for mercury are given in Table H-4.

H.2.3.3.2 Chromium. Total chromium was measured at most sites. The median value was 6.42 lb/10<sup>12</sup> Btu, with a range of  $4.11 \times 10^{-1}$  lb/10<sup>12</sup> Btu to 13.8 lb/10<sup>12</sup> Btu. The median value for the 11 tests showing chromium (VI) was  $8.89 \times 10^{-1}$  lb/10<sup>12</sup> Btu with a range of  $2.37 \times 10^{-2}$  lb/10<sup>12</sup> Btu to 6.04 lb/10<sup>12</sup> Btu. The amount of chromium (VI) for these 11 test sites averaged 11 percent (median 12 percent) of all speciated chromium, with a range of 0.4 percent to 34 percent. Separate tests for chromium (III) were not made. When divided between coal- and oil-fired utilities, chromium (VI) averaged 11 percent (median 10 percent) for the four coal-fired sites, with a range from 0.4 percent to 23 percent. Seven oil-fired boilers averaged 20 percent chromium (VI) (median 23 percent), with a range from 5 percent to 34 percent. No other sites were available for testing.

It should be noted that chromium (VI) is easily reduced to chromium (III) when in reducing conditions. Stack conditions lead to rapid reduction of existing chromium (VI), as experienced during field testing.<sup>2</sup> This factor may influence (reduce) the levels of chromium (VI) measured in the stack and downwind from the stack while the chromium (VI) remains in reducing conditions. Even in ambient conditions, the half-life of chromium (VI) is about 15 hours. Table H-5 gives statistics on a percentage basis for speciated chromium.

Table H-2-3. Speciation Data from Utility Boiler Tests for Metals (lb/10<sup>12</sup> Btu)

Test Site	Fuel	Control	ARSENIC	AS III	AS V	CHROM	CHROM6
DOE Baldwin	Coal	ESP	1.21E+01			4.63E+01	
DOE Boswell	Coal	FF	3.44E+01			2.04E+00	
DOE Cardinal	Coal	ESP	3.10E+00			6.17E+00	2.37E-02
DOE Creek	Coal	ESP/FGD	1.18E+00			5.88E+01	
DOE Niles2	Coal	ESP	4.23E+01			3.05E+00	
DOE NilesNox2 (FF)	Coal	FF/SCR	9.09E+00			1.18E+00	
DOE NilesNox2 (WSA)	Coal	FF/SCR/WSA	5.22E-01			2.10E+01	
DOE Spring	Coal	SDA/FF	1.37E-01			5.30E+00	
DOE Yates	Coal	ESP/JBR	1.20E+00			1.14E+00	
NSP-A.S. King	Coal	ESP	2.25E+00			8.68E+00	
NSP-BD-1-3-4	Coal	ESP	4.27E-01			1.84E+00	
NSP-BD-2	Coal	ESP	5.33E-01			6.66E+00	
NSP-HB-3-4-5-6	Coal	ESP	3.32E+00			7.00E+00	
NSP-Riv-6-7	Coal	FF	1.11E+00			1.38E+02	
NSP-Riv-8	Coal	ESP	3.91E-01			3.99E+00	
NSP-Sher-1-2	Coal	FGD	2.83E-01			5.62E+00	6.54E-01
NSP-Sher-3	Coal	SDA/FF	4.85E-02			9.21E+00	8.89E-01
Site 10	Coal	FBC/FF	7.45E-01			1.64E+00	
Site 102	Coal	ESP	2.91E+00			8.59E+00	
Site 11	Coal	ESP/FGD	6.04E-01			4.14E+00	
Site 110	Coal	HESP/CESP	1.40E+00	6.69E-01	1.38E+00	1.27E+01	
Site 110A	Coal	HESP/CESP	9.48E+00	3.03E-01	1.70E-01	3.04E+01	
Site 111	Coal	SDA/FF	2.13E-01			4.25E+00	
Site 112 (a)	Oil	ESP	2.46E+00			3.77E+00	
Site 114	Coal	ESP	7.13E+00			1.36E+01	
Site 115	Coal	FF	7.53E-01			6.61E-01	
Site 117 (a)	Oil	SCR	2.90E+00			1.99E+01	
Site 118	Oil	ESP	5.50E-01			3.30E+00	1.89E-01
Site 119 (a)	Oil	ESP				1.86E+00	1.85E-01
Site 12	Coal	ESP/FGD	1.77E+00			9.75E+00	
Site 120	Gas	None	1.58E-01				
Site 121	Gas	None	1.17E-01				
Site 13	Oil	PJFF	4.00E-02			1.70E+00	
Site 14	Coal	SDA/PJFF	5.00E-01			4.11E-01	
Site 15	Coal	ESP	1.34E+01			1.11E+01	
Site 16/OFA	Coal	ESP	9.45E+01			3.75E+01	
Site 16/OFA/LNB (b)	Coal	ESP	1.04E+02			2.08E+01	6.04E+00
Site 18	Coal	ESP/COHPAC	3.60E+01			2.50E+01	
Site 19	Coal	ESP	7.90E+00			1.30E+01	
Site 21	Coal	ESP/FGD	6.17E+00			2.74E+00	
Site 22	Coal	ESP	8.70E-02				
EPRI-103/Oil	Oil	None	3.63E+00			3.48E+00	1.04E+00
EPRI-104/Oil	Oil	None	6.53E+00			3.00E+00	ND
EPRI-105/Oil	Oil	None	4.13E+00			2.10E+00	4.20E-01
EPRI-106/Oil	Oil	None	2.70E+01			7.27E+00	3.78E+00
EPRI-107/Oil	Oil	None	1.27E+01			7.93E+00	1.67E+00
EPRI-108/Oil	Oil	None	7.76E+00			ND	3.05E+00
EPRI-109/Oil	Oil	None	1.01E+00			1.10E+01	
Average			9.98E+00	4.86E-01	7.72E-01	1.34E+01	1.63E+00
Median			2.25E+00	4.86E-01	7.72E-01	6.42E+00	8.89E-01
Max			1.04E+02	6.69E-01	1.38E+00	1.38E+02	6.04E+00
Min			4.00E-02	3.03E-01	1.70E-01	4.11E-01	2.37E-02
See notes at the end of table H-2-1							
ARSENIC = Total Arsenic							
AS III = Trivalent Arsenic							
AS V = Pentavalent Arsenic							
CHROM = Total Chromium							
CHROM6 = Hexavalent Chromium							
(continued...)							

**ATTACHMENT 2**

**Table 6.11 – Screening Thresholds and Maximum Ambient Air Impact Concentrations of TACs**

CAS	Pollutant	Emission Rate (lb/hr) <sup>10</sup>	Combustion Source	Impact Conc. (ug/m <sup>3</sup> )	Threshold (ug/m <sup>3</sup> )	Less than Threshold	Averaging Period	Notes
50-00-0	Formaldehyde	2.06E-01	All	2.68E-02	8.0E-02	Yes	annual	IRSL
50-32-8	Benzo(a)pyrene	1.77E-05	All	8.75E-07	5.0E-04	Yes	annual	IRSL
53-70-3	Dibenzo(a,h)anthracene	2.06E-06	NG, Diesel	1.02E-06	5.0E-04	Yes	annual	IRSL <sup>1</sup>
56-55-3	Benzo(a)anthracene	3.63E-05	All	1.72E-06	5.0E-03	Yes	annual	IRSL <sup>1</sup>
57-12-5	Cyanide	8.82E-02	Coal	6.38E-03	50	Yes	1 hr	
67-66-3	Choroform	2.44E-02	Coal	1.61E-05	4.0E-01	Yes	annual	IRSL
71-43-2	Benzene	5.57E-01	All	1.75E-01	30	Yes	24 hr	
71-43-2	Benzene	5.42E-01	All	2.43E-03	1.0E-01	Yes	annual	IRSL
74-83-9	Methyl bromide	6.62E-02	Coal	6.05E-04	5	Yes	24 hr	
74-87-3	Methylchloride	2.19E-01	Coal	2.00E-03	90	Yes	24 hr	
74-87-3	Methylchloride	2.19E-01	Coal	1.45E-04	1.6	Yes	annual	IRSL
75-00-3	Ethyl chloride	1.74E-02	Coal	1.59E-04	10,000	Yes	24 hr	
75-07-0	Acetaldehyde	2.39E-01	Coal, Diesel	7.55E-03	9	Yes	24 hr	
75-07-0	Acetaldehyde	2.36E-01	Coal, Diesel	1.99E-04	5.0E-01	Yes	annual	IRSL
75-09-2	Methylene Chloride	1.20E-01	Coal	7.92E-05	2	Yes	annual	IRSL
75-15-0	Carbondisulfide	5.38E-02	Coal	4.92E-04	700	Yes	24 hr	
75-25-2	Bromoform	1.61E-02	Coal	1.06E-05	9.0E-01	Yes	annual	IRSL
77-78-1	Dimethyl sulfate	1.99E-02	Coal	4.32E-04	5.0E-01	Yes	8 hr	
78-59-1	Isophorone	2.40E-01	Coal	1.73E-02	280	Yes	1 hr	
78-59-1	Isophorone	2.40E-01	Coal	1.58E-04	3.7	Yes	annual	IRSL
78-93-3	MEK	1.61E-01	Coal	1.06E-04	5,000	Yes	annual	
100-41-4	Ethylbenzene	3.89E-02	Coal	3.55E-04	1,000	Yes	24 hr	
100-41-4	Ethylbenzene	3.89E-02	Coal	2.57E-05	3	Yes	annual	
100-42-5	Styrene	1.03E-02	Coal	9.45E-05	1,000	Yes	24 hr	
100-42-5	Styrene	1.03E-02	Coal	6.83E-06	1.7	Yes	annual	IRSL
100-44-7	Benzylchloride	2.90E-01	Coal	1.91E-04	2.0E-02	Yes	annual	IRSL
106-97-8	Butane	2.99E+00	NG	6.26E+00	23,800	Yes	8 hr	
106-99-0	1,3 Butadiene	1.23E-04	Diesel	1.32E-03	2	Yes	24 hr	
106-99-0	1,3 Butadiene	2.11E-06	Diesel	1.61E-06	3.0E-02	Yes	annual	IRSL
107-02-8	Acrolein	1.20E-01	Coal, Diesel	9.27E-05	2.0E-02	Yes	annual	
107-02-8	Acrolein	1.20E-01	Coal, Diesel	1.89E-02	5	Yes	1 hr	
107-06-2	Ethylene dichloride	1.65E-02	Coal	1.09E-05	4.0E-02	Yes	annual	IRSL
108-88-3	Toluene	1.10E-01	All	6.73E-02	5,000	Yes	24 hr	
109-66-0	Pentane	3.70E+00	NG	7.75E+00	17,700	Yes	8 hr	
110-54-3	Hexane	2.59E+00	Coal, NG	3.27E+00	700	Yes	24 hr	

<sup>10</sup> A lb/month emission rate can be obtained by multiplying this lb/hour emission rate by the total hours in a month. This calculation would assume a worst case scenario of the facility operating at 100% load during that time period.

CAS	Pollutant	Emission Rate (lb/hr) <sup>10</sup>	Combustion Source	Impact Conc. (ug/m <sup>3</sup> )	Threshold (ug/m <sup>3</sup> )	Less than Threshold	Averaging Period	Notes
117-81-7	Bis(2-ethylhexyl)phthalate	3.02E-02	Coal	1.99E-05	2.0E-01	Yes	annual	IRSL
121-14-2	2,4-Dinitrotoluene	1.16E-04	Coal	2.52E-06	2	Yes	8 hr	
121-14-2	2,4-Dinitrotoluene	1.16E-04	Coal	7.65E-08	9.0E-03	Yes	annual	IRSL
123-38-6	Propionaldehyde	1.57E-01	Coal	1.04E-04	4	Yes	annual	
127-18-4	Tetrachloroethylene	1.78E-02	Coal	1.17E-05	1.7	Yes	annual	IRSL
193-39-5	Indeno(1,2,3-cd)perylene	2.82E-05	All	1.36E-06	5.0E-03	Yes	annual	IRSL <sup>1</sup>
205-82-3	Benzo(j)fluoranthrene	4.83E-05	All	1.04E-06	5.0E-04	Yes	annual	IRSL
205-99-2	Benzo(b)fluoranthrene	4.91E-05	All	2.57E-06	5.0E-03	Yes	annual	IRSL <sup>1</sup>
207-08-9	Benzo(k)fluoranthrene	4.55E-05	Coal	3.00E-08	5.0E-02	Yes	annual	IRSL <sup>1</sup>
218-01-9	Chrysene	7.03E-05	All	3.28E-06	5.0E-01	Yes	annual	IRSL <sup>1</sup>
1330-20-7	Xylenes	1.94E-02	Coal, Diesel	4.15E-02	100	Yes	24 hr	
1634-04-4	MTBE	1.45E-02	Coal	1.32E-04	3,000	Yes	24 hr	
1746-01-6	2,3,7,8 TCDD	5.92E-09	Coal	3.90E-12	2.30E-08	Yes	annual	IRSL
7439-96-5	Manganese	8.83E-01	Coal, NG	8.75E-03	5.0E-02	Yes	24 hr	
7440-02-0	Nickel	9.80E-02	Coal, NG	8.08E-04	4.2E-03	Yes	annual	IRSL
7440-36-0	Antimony	9.50E-03	Coal	8.68E-05	2.0E-01	Yes	24 hr	
7440-38-2	Arsenic	2.11E-01	Coal, NG	2.10E-04	2.0E-03	Yes	annual	SRSL
7440-41-7	Beryllium	1.43E-02	Coal, NG	1.52E-04	2.0E-02	Yes	24 hr	
7440-41-7	Beryllium	1.71E-05	Coal, NG	4.26E-06	4.0E-04	Yes	annual	IRSL
7440-43-9	Cadmium	3.73E-03	Coal, NG	3.92E-04	6.0E-04	Yes	annual	IRSL
7440-47-3	Chromium III	9.70E-02	Coal, NG	6.24E-03	5.0E+00	Yes	8 hr	
18540-29-9	Chromium VI	1.07E-02	Coal, NG	3.76E-04	0.1	Yes	24 hr	
18540-29-9	Chromium VI	1.07E-02	Coal, NG	6.15E-05	8.3E-05	Yes	annual	IRSL
7440-48-4	Cobalt	3.40E-02	Coal, NG	9.89E-04	2.0E-01	Yes	8 hr	
7647-01-0	HCL	9.16E+00	Coal	8.37E-02	20	Yes	24 hr	
7664-39-3	HF	4.55E+00	Coal	3.29E-01	26	Yes	1 hr	
7664-41-7	NH <sub>3</sub>	2.10E+01	Coal	4.57E-01	10	Yes	8 hr	<sup>3</sup>
7664-93-9	H <sub>2</sub> SO <sub>4</sub>	2.30E+01	Coal	5.01E-01	10	Yes	8 hr	
7782-49-2	Selenium	1.36E-02	Coal, NG	3.67E-04	2	Yes	8 hr	

Notes:

All = coal, natural gas, and diesel

NG = natural gas

<sup>1</sup> Approximate IRSL based on potency relative to 50-32-8 Benzo(a)pyrene.

<sup>2</sup> Impacts of chromium were conservatively compared to the threshold for hexavalent chromium.

<sup>3</sup> Emissions of NH<sub>3</sub> originate from air pollution control equipment (i.e. SCR).

Non-Pollutant Specific Impact Concentrations (ug/m<sup>3</sup>)

	1 hr	8 hr	24 hr	annual
Coal Impacts (1 lb/hr)	0.0723	0.0218	0.0091	0.00066