



Monessen, Washington County, Pennsylvania Ambient Air Monitoring Report Final March 2015

The Department of Environmental Protection (Department or DEP) conducted a short-term ambient air quality monitoring project of the ArcelorMittal Coke plant in Monessen, Pennsylvania in response to a request from the Southwest Regional Office (SWRO). The SWRO sought to obtain ambient air data prior to and concurrent with the restart of the ArcelorMittal coke plant in Monessen, Pennsylvania. The facility, which had been operating in a hot idle mode since 2009, restarted operations in March 2014. As part of the SWRO request, ambient air samples were collected by DEP prior to the restart of the coke battery as well as after coke battery operations resumed at the four locations shown in Figure 1. These locations include the Monessen Fire Station 81, the Monessen Boat Dock, Walnut Ridge, and the Charleroi COPAMS station. The Charleroi COPAMS station was utilized in this project as an upwind sampling location.

The purpose of this short-term sampling project was to establish a baseline for selected air contaminants and determine if elevated concentrations of those selected air contaminants were detected after the restart of coke operations. This short term project was not designed to provide data for the quantitative estimate of excess lifetime cancer risk, nor are the sample results representative of chemical compounds outside the scope of the project. Based on the results of the short-term project, the Department may conduct subsequent projects near this facility, if warranted.

To support this project the Department deployed multiple types of air sampling equipment. The Department's Bureau of Laboratories Mobile Analytical Unit (MAU) was deployed to conduct monitoring using Open Path Fourier Transfer Infrared Technology (OP-FTIR). In addition to the monitoring conducted by the Department's MAU, air samples were collected in evacuated SUMMA canisters over 24-hour periods at the above mentioned three locations around the ArcelorMittal facility identified in Figure 1. These locations include the Monessen Fire Station 81, the Monessen Boat Dock, Walnut Ridge, and the Charleroi COPAMS station. In addition to the abovementioned sampling, the Department deployed a PM₁₀ sampler at the Monessen Fire Station location. These samples were analyzed for toxic metals utilizing the U.S. Environmental Protection Agency's (EPA) Method 200.8.

The OP-FTIR monitoring was performed by the DEP Bureau of Laboratories using EPA Method TO-16 at the Monessen Fire Station for three days (3/31/14-4/2/14) prior to and three days (4/14/14-4/16/14) after the restart of coke operations. Table 1 lists the results of the OP-FTIR monitoring prior to the restart of the coke plant and Table 2 lists the results of the OP-FTIR monitoring after the restart of the ArcelorMittal facility. The detected concentrations of target analytes are expressed as a maximum concentration, which is the maximum concentration detected during the sampling period, and time weighted average, which is a weighted average of all the detections during the sampling period. The time weighted average is the average concentration of a contaminant a person would be exposed to if inside the sampling area during entire the sampling period. The OP-FTIR results indicate the detection of several contaminants both prior to and after the restart of the coke battery. However, only three air contaminants were detected at concentrations sufficient to produce a measureable time weighted average. Those compounds are carbon monoxide, methane, and nitrous acid.

The highest time weighted average of carbon monoxide and maximum concentration observed was 407 ppb and 1848 ppb, respectively. Both values are well below the EPA's National Ambient Air Quality Standard (NAAQS) annual second maximum 8-hour average standard for carbon monoxide of 9 ppm (9000 ppb).

The highest time weighted average and maximum concentration of methane observed both prior to and after restart of the ArcelorMittal coke battery was 2219 ppb (parts per billion) and 6119 ppb, respectively. Both concentrations were observed prior to the restart of the coke battery. Methane has no demonstrable toxicity other than being a simple asphyxiant.

Nitrous acid (HONO) was detected at concentrations of 12 ppb (time weighted average) and 19 ppb (maximum concentration detected). Nitrous acid is part of the nitrogen oxide family. The EPA uses nitrogen dioxide (NO₂) as the indicator for the larger family of nitrogen oxides. Various studies have shown the concentration ratio of HONO to NO₂ in ambient air can range from 0.01 to .5. The current annual primary and secondary NAAQS for NO₂ in ambient air is 53 ppb, the current 1-hour NAAQS for NO₂ in ambient air is 100 ppb. Assuming a median value of 0.3 for the HONO to NO₂ ratio, an average HONO concentration of 12 ppb indicates an average NO₂ concentration of 40 ppb, which is below the current annual NAAQS for NO₂.

The SUMMA canister samples were analyzed using EPA's Method TO-15 for specific volatile organic compounds. The results of the TO-15 analysis are summarized in Tables 4 and 5. Of the 18 samples taken, four were excluded due to failure to meet quality control standards. It is important to note that due to the quality control failures, the post restart observations at the Walnut Ridge location are based on analytical results of a single sample, thus making it difficult to quantify the impacts the restart of the ArcelorMittal facility has had on the concentrations of these compounds.

As Table 3 indicates, 32 of the 57 TO-15 target compounds were not detected in the samples collected. While the detection rate of compounds in the TO-15 suite varies based on location and local sources, it is not unusual for over 50% of the compounds to not be detected in a group of samples. Results from the samples collected at the Fire Station and Boat Dock locations indicate a slight increase in benzene concentration after restart of the facility. Results from the samples collected at the Walnut Ridge location indicate a slight increase in styrene and toluene concentrations and a significant increase in benzene concentrations after coke operations resumed at the ArcelorMittal facility.

Benzene is a common ambient air pollutant found in motor vehicle exhaust, emissions from oil and coal combustion, smoke from wood-burning fires, fuel vapors and cigarette smoke. The average benzene concentration of the samples collected after the coke battery restart at the Fire Station, the Boat Dock, and Walnut Ridge were 0.005 mg/m³ (1.479 ppb), 0.002 mg/m³ (.737 ppb), and 0.016 mg/m³ (4.94 ppb), respectively, which are all well below the EPA's reference concentration (RfC) for benzene of 0.03 mg/m³¹. The RfC is defined as an estimate of continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime.

Styrene is an organic compound primarily used in the production of plastics and resins. Ambient air concentration of styrene ranges from 0.28 to 0.34 µg/m³ in rural and suburban areas and 0.29 to 3.8 µg/m³ in urban areas³. The average concentration of the samples collected at Walnut Ridge after restart of coke operations was 0.00051 mg/m³ (0.119 ppb), which is below the EPA's reference concentration for styrene of 1 mg/m³².

Toluene is an organic compound that is used as a solvent and fuel additive, giving rise to automobile emissions as the primary source of toluene in ambient air⁴. The average concentration of toluene in ambient air in rural and urban areas is 1.3 and 10.8 mg/m³, respectively⁴. The average concentration of toluene in the samples collected at Walnut Ridge after restart of the coke battery was 0.0074 mg/m³ (1.97 ppb), which is below the EPA's RfC for toluene of 5 mg/m³⁴.

Results from the PM₁₀ samples, found in Table 6, indicate no impact on toxic metal concentrations in ambient air from the restart of the ArcelorMittal facility.

The results of the OP-FTIR, TO-15, and PM₁₀ sampling and analysis conducted by the department indicate non-detects for most of the target compounds. The target compounds that were detected were below any applicable air quality standard; however, due to the limited sample data set, determining the long term impact of the restart of the ArcelorMittal coke battery on the air quality of the surrounding area is problematic. None of the compounds in the various sampling suites utilized were detected at levels to raise immediate concern or where short-term health impacts would be expected. It is recommended that periodic sampling be performed as a follow up to this limited project. These subsequent samples can be utilized to determine if there have been changes to the local air quality.

Figure 1 Monessen Project Area

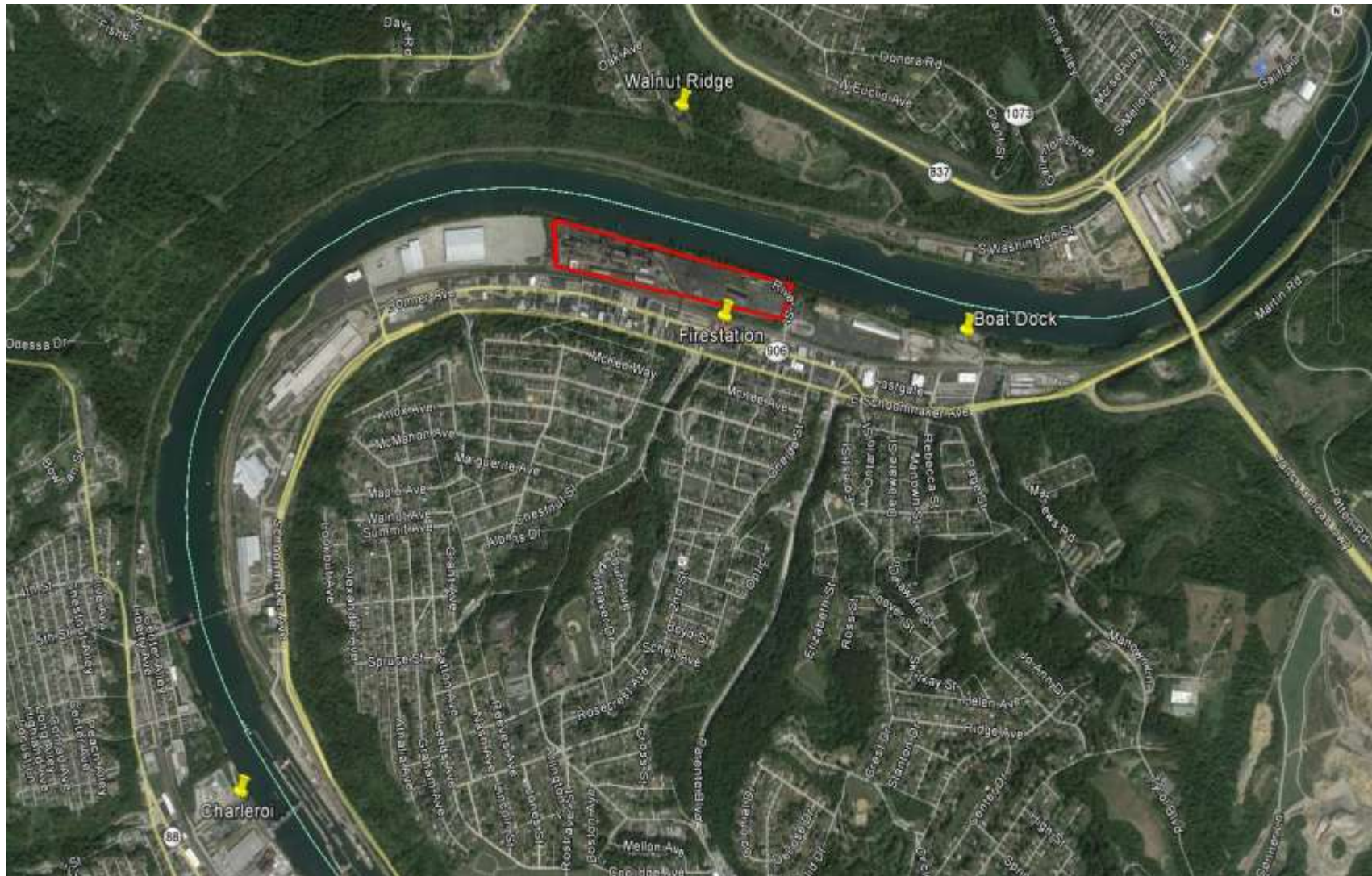


Table 1. OP-FTIR Results prior to Restart of the ArcelorMittal Facility

Compound	Sample ID: 31MAR14MLG0548 Analysis Date: 03/31/2014 Analysis Location: Monessen Fire Hall 811 Parking Lot Analysis Time: 05:48 - 12:00				Sample ID: 31MAR14MLG1641 Analysis Date: 03/31/2014 Analysis Location: Monessen Fire Hall 811 Parking Lot Analysis Time: 16:41 - 23:59				Sample ID: 01APR14MLG0500 Analysis Date: 04/01/2014 Analysis Location: Monessen Fire Hall 811 Parking Lot Analysis Time: 05:00 -			
	Reporting Limit (ppb)	Time Weighted Average Concentration (ppb)	Maximum Concentration (ppb)	Time of Maximum Concentration (24 hour)	Reporting Limit (ppb)	Time Weighted Average Concentration (ppb)	Maximum Concentration (ppb)	Time of Maximum Concentration (24 hour)	Reporting Limit (ppb)	Time Weighted Average Concentration (ppb)	Maximum Concentration (ppb)	Time of Maximum Concentration (24 hour)
1,2,4-Trimethyl benzene	440	--	--	10:20	292	--	--	--	411	--	--	--
2-Methyl Butane	62	--	--	--	54	--	--	--	178	--	--	--
2-Methyl Pentane	75	--	--	--	59	--	--	--	135	--	--	--
3-Methyl Pentane	73	--	--	--	55	--	--	--	147	--	--	--
Acetaldehyde	365	--	--	--	173	--	191	23:58	294	--	--	--
Ammonia	15	--	--	--	7	--	9	20:08	12	--	20	8:05
Benzene	280	--	--	--	221	--	--	--	270	--	--	--
Carbon Disulfide	431	--	--	--	432	--	--	--	721	--	--	--
Carbon Monoxide	35	203	875	9:09	23	219	919	23:16	33	407	1019	10:15
Carbonyl Sulfide	41	--	--	--	17	--	--	--	20	--	--	--
Chloroform	56	--	--	--	13	--	--	--	42	--	--	--
Chloromethane	484	--	--	--	311	--	--	--	479	--	--	--
Dimethyl sulfide	172	--	199	9:10	139	--	--	--	262	--	--	--
Ethane	189	--	--	--	138	--	279	21:12	320	--	567	8:21
Ethanol	104	--	--	--	38	--	--	--	96	--	--	--
Ethylbenzene	184	--	--	--	182	--	--	--	585	--	--	--
Ethylene	39	--	--	--	17	--	17	21:19	32	--	--	--
Formaldehyde	29	--	--	--	22	--	--	--	35	--	--	--
Hydrogen Chloride	42	--	--	--	31	--	--	--	41	--	--	--
Hydrogen Sulfide	16468	--	--	--	10313	--	--	--	16261	--	--	--
Iso-Butane	49	--	--	--	40	--	--	--	107	--	--	--
Methane	160	326	1435	11:41	93	485	2424	21:05	170	2219	6119	8:18
Methanol	20	--	102	6:18	16	--	633	19:38	20	--	57	5:44
Methyl mercaptan	345	--	423	8:49	310	--	627	22:49	555	--	--	--
Methyl tert-butyl ether (MTBE)	23	--	28	10:32	16	--	--	--	20	--	--	--
Methylamine	255	--	--	--	166	--	192	22:38	238	--	250	5:29
m-Xylene	131	--	--	--	72	--	--	--	106	--	110	6:05
Naphthalene	56	--	--	--	28	--	--	--	46	--	--	--
n-Butane	70	--	113	9:57	52	--	91	18:36	116	--	--	--
n-Heptane	457	--	--	--	421	--	499	22:10	1384	--	--	--
n-Hexane	151	--	--	--	132	--	160	18:09	433	--	--	--
Nitric Acid	31	--	--	--	22	--	44	23:27	31	--	44	5:06
Nitric Oxide	2446	--	--	--	899	--	--	--	1721	--	--	--
Nitrogen Dioxide	202	--	--	--	190	--	--	--	566	--	--	--
Nitrous Acid	10	--	--	--	6	--	--	--	9	--	--	--
Nitrous Oxide	44	--	--	--	22	--	37	23:56	40	--	69	5:39
n-Octane	352	--	358	9:57	321	--	458	18:06	1049	--	--	--
n-Pentane	111	--	--	--	82	--	161	17:38	242	--	--	--
o-Xylene	103	--	--	--	47	--	--	--	103	--	--	--
Ozone	42	--	--	--	32	--	258	19:38	39	--	--	--
Propane	87	--	--	--	74	--	--	--	219	--	--	--
p-Xylene	389	--	--	--	166	--	--	--	281	--	--	--
Styrene	43	--	--	--	34	--	--	--	41	--	--	--
Sulfur Dioxide	351	--	--	--	184	--	202	21:15	330	--	--	--
Toluene	200	--	--	--	124	--	--	--	303	--	--	--
Triethylamine	41	--	--	--	21	--	--	--	33	--	--	--

-- indicates concentration less than reporting limit

*Sampling stopped due to equipment issues

Table 1 (Continued). OP-FTIR Results prior to Restart of the ArcelorMittal Facility

Compound	Sample ID: 01APR14MLG1655 Analysis Date: 04/01/2014 Analysis Location: Monessen Fire Hall 811 Parking Lot Analysis Time: 16:55 - 00:00				Sample ID: 02APR14MLG0500 Analysis Date: 04/02/2014 Analysis Location: Monessen Fire Hall 811 Parking Lot Analysis Time: 05:00 - 12:00				Sample ID: 02APR14MLG2301** Analysis Date: 04/02/2014 Analysis Location: Monessen Fire Hall 811 Parking Lot Analysis Time: 23:01 - 00:00*			
	Reporting Limit (ppb)	Time Weighted Average Concentration (ppb)	Maximum Concentration (ppb)	Time of Maximum Concentration (24 hour)	Reporting Limit (ppb)	Time Weighted Average Concentration (ppb)	Maximum Concentration (ppb)	Time of Maximum Concentration (24 hour)	Reporting Limit (ppb)	Time Weighted Average Concentration (ppb)	Maximum Concentration (ppb)	Time of Maximum Concentration (24 hour)
1,2,4-Trimethyl benzene	350	--	--	--	309	--	--	--	291	--	--	--
2-Methyl Butane	33	--	--	--	34	--	--	--	131	--	--	--
2-Methyl Pentane	57	--	--	--	63	--	--	--	110	--	--	--
3-Methyl Pentane	47	--	--	--	43	--	--	--	119	--	--	--
Acetaldehyde	250	--	--	--	186	--	--	--	201	--	287	23:41
Ammonia	9	--	--	--	8	--	--	--	8	--	--	--
Benzene	238	--	--	--	247	--	--	--	260	--	--	--
Carbon Disulfide	177	--	--	--	197	--	--	--	306	--	--	--
Carbon Monoxide	28	40	848	22:51	20	84	1290	6:35	18	158	738	23:42
Carbonyl Sulfide	17	--	--	--	8	--	--	--	9	--	--	--
Chloroform	22	--	--	--	13	--	--	--	8	--	--	--
Chloromethane	344	--	--	--	333	--	--	--	373	--	--	--
Dimethyl sulfide	102	--	--	--	114	--	138	10:22	260	--	--	--
Ethane	125	--	--	--	128	--	--	--	267	--	342	23:24
Ethanol	57	--	--	--	40	--	--	--	35	--	--	--
Ethylbenzene	113	--	180	21:00	118	--	--	--	429	--	--	--
Ethylene	22	--	--	--	18	--	--	--	18	--	--	--
Formaldehyde	23	--	--	--	25	--	--	--	31	--	--	--
Hydrogen Chloride	34	--	--	--	36	--	--	--	40	--	--	--
Hydrogen Sulfide	10121	--	--	--	12590	--	--	--	15804	--	--	--
Iso-Butane	32	--	--	--	36	--	--	--	86	--	--	--
Methane	116	--	337	23:02	105	154	1046	9:45	115	1629	3079	23:18
Methanol	17	--	22	18:50	19	--	--	--	21	--	--	--
Methyl mercaptan	218	--	414	21:00	229	--	398	5:30	599	--	--	--
Methyl tert-butyl ether (MTBE)	17	--	--	--	22	--	40	8:54	21	--	29	23:48
Methylamine	190	--	--	--	180	--	--	--	217	--	--	--
m-Xylene	96	--	--	--	78	--	--	--	78	--	--	--
Naphthalene	38	--	--	--	28	--	--	--	26	--	--	--
n-Butane	48	--	60	20:59	49	--	--	--	97	--	--	--
n-Heptane	283	--	--	--	315	--	--	--	1017	--	--	--
n-Hexane	82	--	148	19:05	83	--	--	--	319	--	--	--
Nitric Acid	25	--	36	17:17	28	--	43	5:43	25	--	--	--
Nitric Oxide	1329	--	--	--	926	--	--	--	654	--	--	--
Nitrogen Dioxide	140	--	316	18:40	130	--	--	--	430	--	--	--
Nitrous Acid	7	--	--	--	9	--	--	--	8	--	--	--
Nitrous Oxide	21	--	--	--	15	--	--	--	16	--	--	--
n-Octane	227	--	575	18:53	254	--	--	--	771	--	--	--
n-Pentane	60	--	130	21:00	54	--	70	5:50	175	--	--	--
o-Xylene	56	--	148	18:40	48	--	--	--	51	--	--	--
Ozone	36	--	45	17:26	37	--	--	--	38	--	--	--
Propane	47	--	--	--	47	--	--	--	174	--	--	--
p-Xylene	244	--	--	--	143	--	--	--	133	--	--	--
Styrene	39	--	--	--	39	--	--	--	40	--	--	--
Sulfur Dioxide	242	--	--	--	218	--	--	--	193	--	--	--
Toluene	138	--	--	--	121	--	--	--	154	--	--	--
Triethylamine	28	--	--	--	22	--	--	--	26	--	--	--

-- indicates concentration less than reporting limit

*Sampling stopped due to equipment issues

Table 2. OP-FTIR Results after Restart of the ArcelorMittal Facility

Compound	Sample ID: 14APR14MLG0500 Analysis Date: 04/14/2014 Analysis Location: Monessen Fire Hall 811 Parking Lot Analysis Time: 05:00 - 12:00				Sample ID: 14APR14MLG1706 Analysis Date: 04/14/2014 Analysis Location: Monessen Fire Hall 811 Parking Lot Analysis Time: 17:06 - 00:00				Sample ID: 15APR14MLG0500 Analysis Date: 04/15/2014 Analysis Location: Monessen Fire Hall 811 Parking Lot Analysis Time: 05:00 - 12:00			
	Reporting Limit (ppb)	Time Weighted Average Concentration (ppb)	Maximum Concentration (ppb)	Time of Maximum Concentration (24 hour)	Reporting Limit (ppb)	Time Weighted Average Concentration (ppb)	Maximum Concentration (ppb)	Time of Maximum Concentration (24 hour)	Reporting Limit (ppb)	Time Weighted Average Concentration (ppb)	Maximum Concentration (ppb)	Time of Maximum Concentration (24 hour)
1,2,4-Trimethyl benzene	426	--	--	--	432	--	--	--	307	--	--	--
2-Methyl Butane	33	--	--	--	53	--	--	--	30	--	43	6:22
2-Methyl Pentane	69	--	--	--	81	--	--	--	57	--	--	--
3-Methyl Pentane	45	--	--	--	63	--	--	--	38	--	54	6:07
Acetaldehyde	252	--	--	--	357	--	--	--	207	--	--	--
Ammonia	13	--	--	--	16	--	--	--	9	--	21	5:51
Benzene	267	--	--	--	262	--	284	18:41	231	--	336	7:44
Carbon Disulfide	177	--	--	--	299	--	--	--	157	--	--	--
Carbon Monoxide	33	--	152	9:56	28	114	1848	23:04	22	45	386	9:35
Carbonyl Sulfide	14	--	--	--	14	--	--	--	9	--	--	--
Chloroform	32	--	--	--	46	--	--	--	18	--	--	--
Chloromethane	458	--	--	--	455	--	--	--	323	--	--	--
Dimethyl sulfide	111	--	141	5:40	159	--	--	--	104	--	305	8:01
Ethane	133	--	163	5:38	175	--	--	--	115	--	--	--
Ethanol	86	--	113	6:24	99	--	--	--	48	--	--	--
Ethylbenzene	119	--	124	8:29	171	--	302	18:33	112	--	171	10:36
Ethylene	32	--	--	--	42	--	--	--	21	--	79	6:12
Formaldehyde	28	--	--	--	29	--	--	--	24	--	--	--
Hydrogen Chloride	40	--	--	--	40	--	--	--	35	--	--	--
Hydrogen Sulfide	15735	--	--	--	16505	--	--	--	10589	--	--	--
Iso-Butane	36	--	--	--	49	--	--	--	31	--	--	--
Methane	118	--	193	9:05	102	438	4372	21:34	83	135	2268	8:02
Methanol	20	--	--	--	20	--	48	17:29	17	--	22	11:46
Methyl mercaptan	236	--	--	--	315	--	--	--	218	--	272	10:39
Methyl tert-butyl ether (MTBE)	23	--	26	10:41	22	--	33	22:34	18	--	25	6:23
Methylamine	236	--	--	--	236	--	--	--	185	--	--	--
m-Xylene	115	--	--	--	111	--	--	--	78	--	--	--
Naphthalene	39	--	--	--	39	--	--	--	28	--	--	--
n-Butane	53	--	63	5:54	66	--	87	21:37	41	--	--	--
n-Heptane	318	--	--	--	453	--	--	--	285	--	--	--
n-Hexane	82	--	--	--	129	--	--	--	74	--	--	--
Nitric Acid	32	--	--	--	31	--	--	--	24	--	--	--
Nitric Oxide	1797	--	--	--	1510	--	--	--	807	--	--	--
Nitrogen Dioxide	146	--	--	--	190	--	--	--	128	--	404	7:09
Nitrous Acid	7	11	19	11:03	7	12	19	17:30	7	--	16	5:46
Nitrous Oxide	31	--	--	--	42	--	--	--	18	--	26	7:29
n-Octane	261	--	319	8:54	356	--	--	--	236	--	--	--
n-Pentane	57	--	95	5:32	80	--	--	--	48	--	--	--
o-Xylene	101	--	146	5:53	104	--	--	--	52	--	57	7:16
Ozone	41	--	45	11:04	39	--	--	--	35	--	--	--
Propane	46	--	--	--	74	--	--	--	42	--	57	6:43
p-Xylene	224	--	--	--	227	--	--	--	145	--	--	--
Styrene	43	--	--	--	42	--	--	--	36	--	--	--
Sulfur Dioxide	299	--	--	--	321	--	--	--	201	--	--	--
Toluene	175	--	222	6:19	215	--	--	--	122	--	--	--
Triethylamine	30	--	--	--	41	--	50	23:28	24	--	43	5:47

-- indicates concentration less than reporting limit

*Sampling stopped due to equipment issues

Table 2 (Continued). OP-FTIR Results after Restart of the ArcelorMittal Facility

Compound	Sample ID: 15APR14MLG1637 Analysis Date: 04/15/2014 Analysis Location: Monessen Fire Hall 811 Parking Lot Analysis Time: 16:37 - 00:00				Sample ID: 16APR14MLG0500 Analysis Date: 04/16/2014 Analysis Location: Monessen Fire Hall 811 Parking Lot Analysis Time: 05:00 - 12:00				Sample ID: 16APR14MLG1625 Analysis Date: 04/16/2014 Analysis Location: Monessen Fire Hall 811 Parking Lot Analysis Time: 16:25 - 00:00			
	Reporting Limit (ppb)	Time Weighted Average Concentration (ppb)	Maximum Concentration (ppb)	Time of Maximum Concentration (24 hour)	Reporting Limit (ppb)	Time Weighted Average Concentration (ppb)	Maximum Concentration (ppb)	Time of Maximum Concentration (24 hour)	Reporting Limit (ppb)	Time Weighted Average Concentration (ppb)	Maximum Concentration (ppb)	Time of Maximum Concentration (24 hour)
1,2,4-Trimethyl benzene	260	--	--	--	212	--	--	--	312	--	--	--
2-Methyl Butane	28	--	--	--	19	--	24	8:53	36	--	--	--
2-Methyl Pentane	52	--	--	--	37	--	--	--	55	--	--	--
3-Methyl Pentane	36	--	--	--	24	--	--	--	45	--	--	--
Acetaldehyde	160	--	--	--	114	--	--	--	232	--	--	--
Ammonia	7	--	13	23:29	6	--	--	--	10	--	--	--
Benzene	206	--	--	--	181	--	247	6:07	217	--	254	23:40
Carbon Disulfide	160	--	--	--	93	--	--	--	184	--	--	--
Carbon Monoxide	22	48	1837	22:15	20	--	153	11:18	25	57	582	22:16
Carbonyl Sulfide	11	--	--	--	7	--	--	--	21	--	--	--
Chloroform	12	--	--	--	8	--	--	--	28	--	--	--
Chloromethane	262	--	--	--	211	--	--	--	312	--	--	--
Dimethyl sulfide	94	--	--	--	69	--	--	--	115	--	237	21:28
Ethane	103	--	225	17:48	67	--	--	--	120	--	--	--
Ethanol	36	--	84	19:54	27	--	96	8:53	54	--	55	19:03
Ethylbenzene	99	--	143	20:09	76	--	144	5:18	118	--	--	--
Ethylene	17	--	99	23:29	14	--	--	--	25	--	--	--
Formaldehyde	21	--	--	--	18	--	--	--	22	--	--	--
Hydrogen Chloride	31	--	--	--	27	--	--	--	33	--	--	--
Hydrogen Sulfide	8327	--	--	--	6329	--	--	--	10405	--	--	--
Iso-Butane	28	--	--	--	19	--	--	--	33	--	--	--
Methane	79	106	4922	23:02	65	--	1778	5:06	97	138	3166	23:41
Methanol	15	--	--	--	13	--	23	7:58	16	--	--	--
Methyl mercaptan	190	--	280	18:06	147	--	--	--	221	--	--	--
Methyl tert-butyl ether (MTBE)	15	--	--	--	13	--	--	--	17	--	--	--
Methylamine	159	--	--	--	134	--	--	--	176	--	--	--
m-Xylene	66	--	--	--	56	--	73	6:06	88	--	--	--
Naphthalene	24	--	--	--	20	--	--	--	35	--	--	--
n-Butane	39	--	--	--	25	--	--	--	45	--	--	--
n-Heptane	260	--	--	--	185	--	--	--	304	--	--	--
n-Hexane	69	--	--	--	48	--	--	--	89	--	--	--
Nitric Acid	20	--	32	21:35	17	--	--	--	23	--	--	--
Nitric Oxide	736	--	--	--	423	--	--	--	1293	--	--	--
Nitrogen Dioxide	119	--	--	--	91	--	109	9:35	137	--	--	--
Nitrous Acid	6	--	10	16:43	5	--	--	--	7	--	11	20:29
Nitrous Oxide	16	--	19	19:52	11	--	25	7:52	24	--	--	--
n-Octane	216	--	308	19:57	157	--	--	--	246	--	--	--
n-Pentane	45	--	92	20:59	30	--	--	--	61	--	--	--
o-Xylene	41	--	--	--	32	--	--	--	61	--	--	--
Ozone	31	--	56	19:57	27	--	29	6:23	33	--	34	23:21
Propane	39	--	--	--	27	--	--	--	50	--	--	--
p-Xylene	127	--	--	--	101	--	--	--	225	--	--	--
Styrene	34	--	--	--	30	--	--	--	36	--	--	--
Sulfur Dioxide	166	--	190	21:01	130	--	--	--	223	--	--	--
Toluene	98	--	--	--	80	--	--	--	128	--	--	--
Triethylamine	20	--	--	--	17	--	--	--	27	--	--	--

-- indicates concentration less than reporting limit

*Sampling stopped due to equipment issues

Table 3. EPA TO-15 Target Compounds

1,1,1-Trichloroethane*	2-Butanone	Cyclohexane
1,1,2,2-Tetrachloroethane*	2-Hexanone	Dibromochloromethane*
1,1,2-Trichloroethane*	2-Methoxy-2-methylpropane (MTBE)*	Dichlorodifluoromethane
1,1,2-Trichlorotrifluoroethane	2-Propenal (acrolein)	Dichloromethane
1,1-Dichloroethane*	4-Methyl-2-pentanone	Ethylbenzene
1,1-Dichloroethene*	Acetone	Hexachloro-1,3-butadiene*
1,2,4-Trichlorobenzene*	Benzene	m/p-Xylene
1,2,4-Trimethylbenzene	Bromodichloromethane*	n-Heptane
1,2-Dibromoethane*	Bromoform*	n-Hexane
1,2-Dichlorobenzene*	Bromomethane*	o-Xylene
1,2-Dichloroethane*	Carbon disulfide*	Propene
1,2-Dichloropropane*	Carbon tetrachloride	Styrene
1,2-Dichlorotetrafluoroethane*	Chlorobenzene*	Tetrachloroethene
1,3,5-Trimethylbenzene	Chloroethane*	Tetrahydrofuran*
1,3-Butadiene*	Chloroethene (vinyl chloride)*	Toluene
1,3-Dichlorobenzene*	Chloroform*	trans-1,2-Dichloroethene*
1,4-Dichlorobenzene*	Chloromethane	trans-1,3-Dichloropropene*
1-Bromopropane*	cis-1,2-Dichloroethene*	Trichloroethene*
1-Ethyl-4-methylbenzene	cis-1,3-Dichloropropene*	Trichlorofluoromethane

*Compounds not detected during sampling

Table 4. TO-15 Samples Collected prior to Restart of the ArcelorMittal Facility

Sample ID	O2014002716	O2014002717	O2014002712	O2014002713	O2014002714	O2014002718	O2014002719
Sample Date	4/1/2014	4/2/2014	3/31/2014	4/1/2014	4/2/2014	3/31/2014	4/1/2014
Sample Type	24 hr	24 hr	24 hr	24 hr	24 hr	24 hr	24 hr
Sample Location	Monessen Boat Dock	Monessen Boat Dock	Monessen Fire Station	Monessen Fire Station	Monessen Fire Station	Walnut Ridge	Walnut Ridge
Units	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv
Compound							
1,1,2-Trichlorotrifluoroethane	0.090*	0.089*	0.075*	0.111*	0.092*	0.086*	0.097*
1,2,4-Trimethylbenzene	0.032*	0.089*	0.215	0.045*	0.090*	0.052*	ND
1,3,5-Trimethylbenzene	ND	ND	0.073*	ND	ND	ND	ND
1-Ethyl-4-methylbenzene	ND	0.026*	0.089*	ND	0.031*	ND	ND
2-Hexanone	ND	ND	ND	0.046*	ND	ND	ND
Acetone	--	--	3.332	7.617	3.947	3.955	6.079
Acrolein	--	--	0.415	0.767	0.424	0.539	0.613
Benzene	0.183	0.302	0.893	0.255	0.309	0.751	0.191
Carbon Tetrachloride	0.108*	0.101*	0.098*	0.130*	0.103*	0.102*	0.105*
Chloromethane	0.421	0.484	0.301	0.866	0.568	0.578	0.549
Cyclohexane	ND	ND	0.210	ND	0.045*	ND	ND
Dichlorodifluoromethane	0.340	0.510	0.380	0.759	0.617	0.620	0.606
Ethylbenzene	ND	0.162	0.206	ND	0.133	0.066*	ND
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND
MEK	--	--	0.454	0.609	1.554	0.389	0.574
MIBK	ND	0.050*	ND	ND	0.041*	ND	ND
Methylene Chloride	--	--	0.193	0.126*	--	--	0.160
Propene	0.318	1.250	1.134	1.589	1.804	2.027	1.040
Styrene	ND	ND	0.064*	ND	ND	0.046*	ND
Tetrachloroethene	0.052*	0.051*	0.145	ND	0.059*	0.062*	ND
Toluene	0.216	2.086	1.029	0.294	1.623	0.780	0.134*
Trichlorofluoromethane	0.282	0.281	0.245	0.344	0.286	0.304	0.309
m/p-Xylene	0.109*	0.766	0.962	0.132*	0.618	0.295	ND
n-Heptane	ND	0.097*	0.342	ND	0.081*	0.070*	ND
n-Hexane	0.063*	0.136	0.579	0.151*	0.151	0.144	0.074*
o-Xylene	ND	0.191	0.182	0.045*	0.161	0.072*	ND

* Concentration estimated - results below quantitation limit, above MDL

-- Compound present in blank canister

ND non-detect

Table 5. TO-15 Samples Collected after Restart of the ArcelorMittal Facility

Sample ID	O2014003376	O2014003379	O2014003382	O2014003375	O2014003378	O2014003383	O2014003377
Sample Date	4/14/2014	4/15/2014	4/16/2014	4/14/2014	4/15/2014	4/16/2014	4/14/2014
Sample Type	24 hr	24 hr	24 hr	24 hr	24 hr	24 hr	24 hr
Sample Location	Monessen Boat Dock	Monessen Boat Dock	Monessen Boat Dock	Monessen Fire Station	Monessen Fire Station	Monessen Fire Station	Walnut Ridge
Units	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv	ppbv
Compound							
1,1,2-Trichlorotrifluoroethane	0.141	0.093*	0.106*	0.106*	0.098*	0.120*	0.111*
1,2,4-Trimethylbenzene	0.060*	ND	ND	0.048*	0.029*	0.023*	0.115*
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	0.031*
1-Ethyl-4-methylbenzene	0.025*	ND	ND	ND	ND	ND	0.025*
2-Hexanone	0.089*	ND	ND	0.033*	ND	ND	ND
Acetone	8.480	4.092	--	6.501	4.715	5.901	10.610
Acrolein	0.966	0.435	--	0.764	0.548	0.553	1.426
Benzene	0.714	1.354	0.145	1.285	2.972	0.179	4.936
Carbon Tetrachloride	0.157	0.102*	0.112*	0.119*	0.105*	0.122	0.124
Chloromethane	0.820	0.258	0.337	0.403	0.845	0.845	0.792
Cyclohexane	0.043*	ND	ND	ND	ND	ND	0.084*
Dichlorodifluoromethane	0.749	0.280	0.337	0.385	0.730	0.839	0.643
Ethylbenzene	0.036*	ND	ND	ND	ND	0.037*	0.052*
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND
MEK	0.730	0.331	--	0.460	0.392	0.670	0.900
MIBK	0.058*	ND	ND	ND	ND	ND	0.049*
Methylene Chloride	--	--	--	--	--	0.168	--
Propene	0.715	--	--	--	1.454	0.751	1.560
Styrene	0.033*	ND	ND	0.036*	0.047*	ND	0.119*
Tetrachloroethene	0.056*	ND	ND	ND	ND	ND	ND
Toluene	0.342	0.370	0.146	0.530	0.700	0.237	1.973
Trichlorofluoromethane	0.415	ND	0.332	0.334	0.328	0.411	0.383
m/p-Xylene	0.131*	0.084*	0.083*	0.146*	0.132*	0.148*	0.364
n-Heptane	ND	ND	ND	ND	ND	ND	0.064*
n-Hexane	0.140	ND	ND	0.104*	ND	0.051*	0.184
o-Xylene	0.046*	ND	ND	0.045*	0.038*	0.037*	0.101*

* Concentration estimated - results below quantitation limit, above MDL

-- Compound present in blank canister

ND non-detect

Table 6. PM10 Samples

Sample Date	Prior to Restart			After Restart			
	3/31/2014	4/1/2014	4/2/2014	4/11/2014	4/14/2014	4/15/2014	4/16/2014
Lab Sample ID	I2014012401	I2014012402	I2014012403	I2014012404	I2014012405	I2014012406	I2014012407
units	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3
Arsenic	0.00248	0.00116	0.00124	0.00176	0.00138	0.00146	0.00097
Beryllium	<0.00028	<0.00028	<0.00028	<0.00028	<0.00028	<0.00028	<0.00028
Cadmium	0.00140	0.00041	0.00032	0.00170	<0.00028	<0.00028	<0.00028
Chromium	0.00653	<0.00551	<0.00551	<0.00551	<0.00551	<0.00551	<0.00551
Lead	0.03896	<0.00551	0.00631	0.01255	<0.00551	0.00827	0.00651
Manganese	0.05151	0.01765	0.01748	0.01800	0.01205	0.01831	0.02366
Nickel	<0.00551	<0.00551	<0.00551	<0.00551	<0.00551	<0.00551	<0.00551
Particulate Matter	40.19608	18.32108	17.83088	19.91422	14.21569	19.91422	20.46569
Zinc	0.09146	0.03565	0.03634	0.03287	0.02131	0.02495	0.03513

References

1. U.S. Environmental Protection Agency. [Integrated Risk Information System \(IRIS\) on Benzene](#). National Center for Environmental Assessment, Office of Research and Development, Washington, DC. 2009.
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4. Agency for Toxic Substances and Disease Registry (ATSDR). *Toxicological Profile for Toluene*. U.S. Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA. 2000.