MEMORANDUM

DATE: April 2024

SUBJECT: Representative Detection Limit (RDL) for Organic HAP for Lime Manufacturing Sources

FROM: Kevin McGinn
Measurement Policy Group, SPPD

TO: Lime Manufacturing Docket: EPA-HQ-OAR-2017-0015

This memorandum describes the process that was used to develop representative detection level (RDL) as well as 3xRDL values for organic HAP in lime manufacturing sources including formaldehyde and acetaldehyde using Fourier transform infrared (FTIR) spectroscopy and for benzene, toluene, ethyl benzene, xylenes, styrene, and napthalene using Method 18 either by direct injection or sorbent trap methodologies. We based these values on tests for undertaken at lime manufacturing sources and used in the assessment of the maximum achievable control technology floor determination.

General Method for Determining RDLs

As explained in the memorandum from Peter Westlin and Raymond Merrill to SPPD Management and MACT Rule Writers, we determine the RDL based on the average of the reported pollutant specific method detection levels (MDLs) for the best performing units (those in the floor). We consider the resulting average MDL characteristic of acceptable source emissions testing performance and representative of companies using the best practices and analytical techniques. Thus, the average MDL is considered an RDL.[1]

When using the RDL in developing emissions standards, we use a multiplication factor of three with the RDL to increase the RDL pollutant concentration to a level where, when measured by the compliance test method, the precision of the test method approximates that of other EPA methods, nominally 10 to 20 percent relative standard deviation.[2,3] This three times the RDL (3xRDL) value expressed in units of the emission standard is then compared to the calculated MACT floor value, and the resulting emission limit is the larger of these two values. This ensures that the emission limit is in a range that can be

[1] *Data and procedure for handling below detection level data in analyzing various pollutant emissions databases for MACT and RTR emissions limits*, revised April 5, 2012. https://www.regulations.gov/document/EPA-HQ-OAR-2010-1042-0264

[2] See *Reference Method Accuracy and Precision (ReMAP): PHASE 1, Precision of Manual Stack Emission Measurements*; American Society of Mechanical Engineers, Research Committee on Industrial and Municipal Waste, February 2001. https://www.regulations.gov/document/EPA-HQ-OAR-2011-0797-0413

[3] The factor of three used in the 3xRDL calculation is based on a scientifically accepted definition of level of quantitation – simply stated, the level where a test method performs with acceptable precision. The level of quantitation has been defined as ten times the standard deviation of seven replicate analyses of a sample at a concentration level close to the MDL (which translates to approximately three times the MDL which is defined as three times the standard deviation of seven replicate analyses of a sample at a concentration level close to the MDL (see 40 CFR Part 136, Appendix B)).

measured with reasonable precision. In other words, if the 3xRDL value is less than or equivalent with the calculated floor (e.g., the value calculated from the UPL), we would conclude that measurement variability has been adequately addressed; if the 3xRDL value is greater than the calculated floor, we would adjust the emissions limit to comport with the 3xRDL value to address measurement variability.

At proposal for this rulemaking, the *Draft Lime Organic HAP RDL Memo* a variety of methods for the determination of the detection level were used in the determination of the RDL for formaldehyde and acetaldehyde by Fourier transform infrared spectroscopy (FTIR). In order to more accurately reflect the impact of the matrix upon sampling, for the final memo we are limiting the type of MDL used to MDC#2 as defined by ASTM Method D6348-12 as this is the only technique present in the data set to do so..

Determination of RDL for Formaldehyde

Tests for formaldehyde were performed at twenty-five different lime kilns. Each test report may cover multiple lime kilns, and where the same detection limit was used for multiple sources in a particular test report, one value per test report was used. Where each source had a different detection limit, each was used. The compliance method for formaldehyde is EPA Method 320 or ASTM Method D6348-12, so the data was filtered for EPA Method 320 and ASTM Method D6348-12 detection limits. In total, seven (7) different detection levels were found in the test reports. The detection limits for each report/source are presented in Table 1. The detection levels were rank-ordered by value of the method detection limit and plotted, as shown in Figure 1. The average of the top 5 sources/reports (0.24 ppmv wet, 0.24 ppmv dry (ppmvd)) was determined to be the RDL.

Determination of RDL for Acetaldehyde

Tests for acetaldehyde were performed at twenty different lime kilns. Each test report may cover multiple lime kilns, and where the same detection limit was used for multiple sources in a particular test report, one value per test report was used. Where each source had a different detection limit, each was used. The compliance method for acetaldehyde is EPA Method 320 or ASTM Method D6348-12, so the data was filtered for EPA Method 320 or ASTM Method D6348-12 detection limits. In total, seven (7) different detection levels were found in the test reports. The detection limits for each report/source are presented in Table 2. The detection levels were rank-ordered by value of the method detection limit and plotted, as shown in Figure 2. The average of the top 5 sources/reports (0.37 ppmv wet, 0.39 ppmvd) was determined to be the RDL. Note that the 1st ranked MDL is estimated to be high because detection limit was not reported in the test report and the lowest reported result was used.

Determination of RDL for Benzene

Tests for benzene were performed at thirty-four different lime kilns. Each test report may cover multiple lime kilns, and where the same detection limit was used for multiple sources in a particular test report at the same facility, one value per test report was used. Where each source had a different detection limit, each was used. EPA Method 18 is being used as the compliance method for this subpart, so data was filtered to that only performed by EPA Method 18, using either the sorbent trap or the direct injection methodology. For several sources, the detection limits were duplicated for multiple sources in the same test report, resulting in fifteen (15) different detection levels to be used in analysis. The detection limits for each report/source are presented in Table 3. The detection levels were rank-ordered by value of the

method detection limits and plotted, as shown in Figure 3. The average of the top 5 sources/reports (0.022 ppmvd) was determined to be the RDL.

Determination of RDL for Toluene

Tests for toluene were performed at twenty-seven different lime kilns. Each test report may cover multiple lime kilns, and where the same detection limit was used for multiple sources in a particular test report, one value per test report was used. Where each source had a different detection limit, each was used. EPA Method 18 is being used as the compliance method for this subpart, so data was filtered to that only performed by EPA Method 18, using either the sorbent trap or the direct injection methodology. For several sources, the detection limits were duplicated for multiple sources in the same test report, resulting in fourteen (14) different detection levels to be used in analysis. The detection limits for each report/source are presented in Table 4. The detection levels were rank-ordered by value of the method detection limits and plotted, as shown in Figure 4. The average of the top 5 sources/reports (0.014 ppmvd) was determined to be the RDL.

Determination of RDL for Ethylbenzene

Tests for ethylbenzene were performed at eleven different lime kilns. Each test report may cover multiple lime kilns, and where the same detection limit was used for multiple sources at the same facility in a particular test report, one value per test report was used. Where each source had a different detection limit, each was used. EPA Method 18 is being used as the compliance method for this subpart, so data was filtered to that only performed by EPA Method 18, using either the sorbent trap or the direct injection methodology. For several sources, the detection limits were duplicated for multiple sources in the same test report, resulting in five (5) different detection levels to be used in analysis. The detection limits for each report/source are presented in Table 5. The detection levels were rank-ordered by value of the method detection limits and plotted, as shown in Figure 5. The average all 5 sources/reports (0.057 ppmvd) was determined to be the RDL.

Determination of RDL for Xylenes

Tests for xylenes (the sum of ortho-, meta- and para-xylene) were performed at twenty-seven different lime kilns. Each test report may cover multiple lime kilns, and where the same detection limit was used for multiple sources in a particular test report, one value per test report was used. Where each source had a different detection limit, each was used. EPA Method 18 is being used as the compliance method for this subpart, so data was filtered to that only performed by EPA Method 18, using either the sorbent trap or the direct injection methodology. For several sources, the detection limits were duplicated for multiple sources in the same test report, resulting in fifteen (15) different detection levels to be used in analysis. The detection limits for each report/source are presented in Table 6. The detection levels were rank-ordered by value of the method detection limits and plotted, as shown in Figure 6. The average of the top 5 sources/reports (0.023 ppmvd) was determined to be the RDL.

Determination of RDL for Styrene

Tests for styrene were performed at twenty-nine different lime kilns. Each test report may cover multiple lime kilns, and where the same detection limit was used for multiple sources in a particular test report, one value per test report was used. Where each source had a different detection limit, each was used. EPA Method 18 is being used as the compliance method for this subpart, so data was filtered to that only

performed by EPA Method 18, using either the sorbent trap or the direct injection methodology. For several sources, the detection limits were duplicated for multiple sources in the same test report, resulting in fourteen (14) different detection levels to be used in analysis. The detection limits for each report/source are presented in Table 7. The detection levels were rank-ordered by value of the method detection limits and plotted, as shown in Figure 7. The average of the top 5 sources/reports (0.0043 ppmvd) was determined to be the RDL.

Determination of RDL for Naphthalene

Tests for naphthalene were performed at twenty-five different lime kilns. Each test report may cover multiple lime kilns, and where the same detection limit was used for multiple sources in a particular test report, one value per test report was used. Where each source had a different detection limit, each was used. EPA Method 18 is being used as the compliance method for this subpart, so data was filtered to that only performed by EPA Method 18, using either the sorbent trap or the direct injection methodology. For several sources, the detection limits were duplicated for multiple sources in the same test report, resulting in eleven (11) different detection levels to be used in analysis. The detection limits for each report/source are presented in Table 8. The detection levels were rank-ordered by value of the method detection limits and plotted, as shown in Figure 8. The average of the top 5 sources/reports (0.0081 ppmvd) was determined to be the RDL.

Determination of RDL for Lime Total Organic HAP (oHAP)

Total organic HAP (total oHAP) is defined by part 63 subpart AAAAA as the sum of the formaldehyde, acetaldehyde, toluene, benzene, o, m, and p xylenes, styrene, ethyl benzene, and naphthalene. The RDL values presented in this memorandum are in ppmvd, to correlate with the UPL determined for these operating units, the total oHAP RDL must be converted to ppmvd at 7% oxygen, the same units as the standard. In order to convert the ppmvd to ppmvd at 7% oxygen, a representative oxygen value of 8.5% oxygen was used. The total oHAP RDL was determined to be 0.86 ppmvd at 7% oxygen. Details are presented in Table 9.

Facility ID	Emission Release Point ID	Test Report	MDL (ppmvw)	Average %M	MDL (ppmvw)
124_Graymont, Inc._Pleasant Gap_PA	326-KNR-006/326-CCO-611	1146_Report No. 5672 Pleasant Gap.pdf	0.11	4.19	0.11
129_Graymont, Inc._Superior_WI	324-KNR-430 324-CCO-484	1296_Graymont (WI) Kiln NO. 4 Lime MACT Diagnostic Test Report 14-288.PDF	0.14	6.18	0.15
125_Graymont, Inc._Delta_UT	Lime_C05_F06_K01	1065_APT Final GWU4112 Diagnostic 11 NOV 14 (with OHAP calc sheet).pdf	0.186	2.73	0.19
129_Graymont, Inc._Superior_WI	322-KNR-230, 322-CCO-284 324-KNR-430, 324-CCO-484	1294_Graymont (WI) Kiln NO. 2 Lime MACT Diagnostic Test Report 14-288.pdf	0.34	6.14	0.36
148_U.S. Lime & Minerals Inc._Batesville_AR	Kiln 2 Kiln 3	015_2021_2184 US Lime AR OHAPS_F.pdf	0.43	5.0	0.45
120_Graymont, Inc._Gulliver_MI	321-KNR-121, 321-CCO-122	1099_Report No. 5672 Port Inland.pdf	1.09	6.69	1.17
128_Graymont, Inc._Green Bay_WI	322-KNR-220, 322-CCO-221	1242_2015 Graymont GB K2 Report No. 5672.pdf	1.09	6.77	1.17
RDL (Average of 1-5)		**RDL (1-5)**	**0.24**		**0.25**

Table 1. Formaldehyde Method Detection Limits

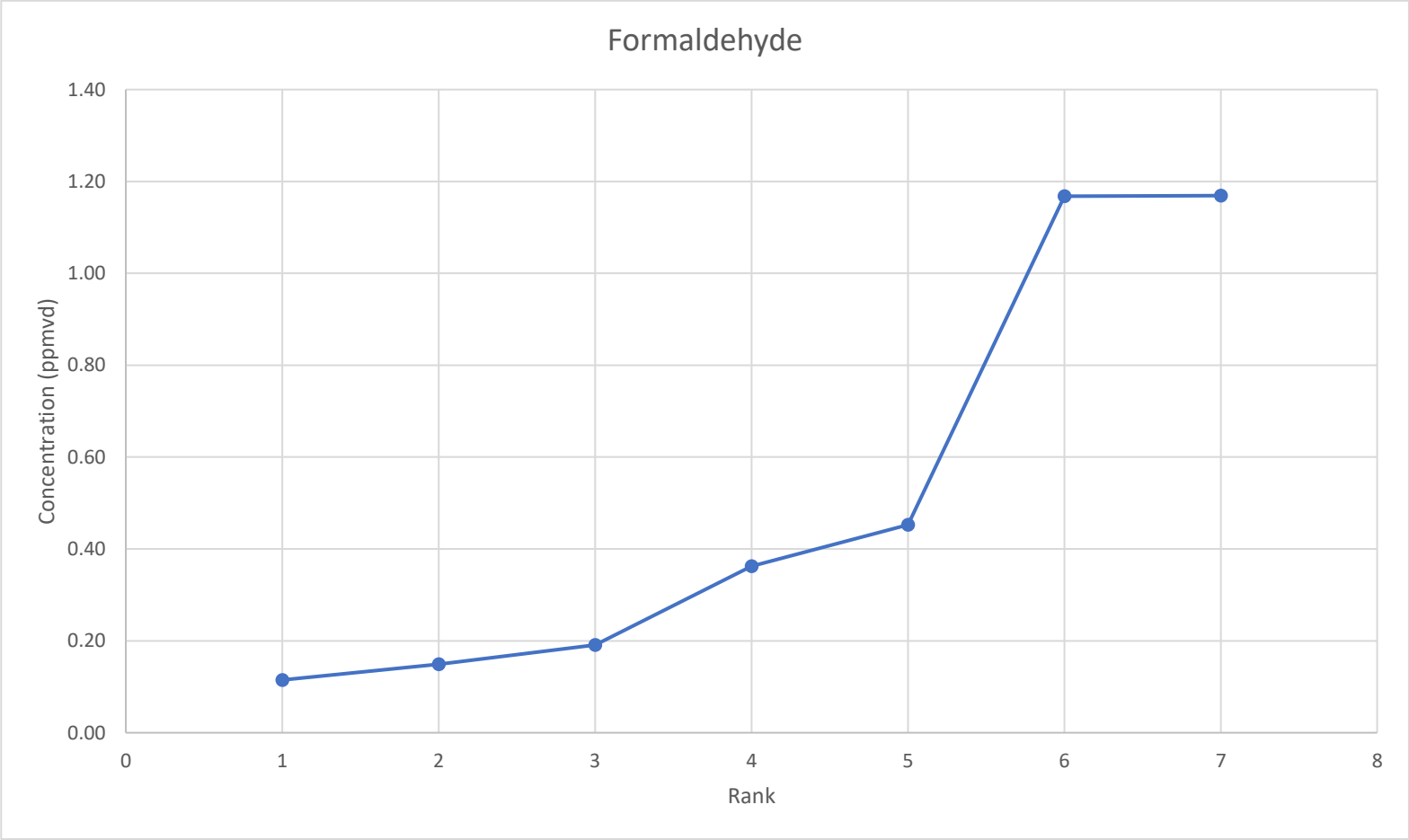

Figure 1. Formaldehyde Rank Plotted Detection Limits

Facility ID	Emission Release Point ID	Test Report	MDL (ppmvw)	Average %M	MDL (ppmvw)
124_Graymont, Inc._Pleasant Gap_PA	326-KNR-006/326-CCO-611	1146_Report No. 5672 Pleasant Gap.pdf	0.23	4.19	0.24
125_Graymont, Inc._Delta_UT	Lime_C05_F06_K01	1065_APT Final GWU4112 Diagnostic 11 NOV 14 (with OHAP calc sheet).pdf	0.322	2.73	0.33
129_Graymont, Inc._Superior_WI	322-KNR-230, 322-CCO-284 324-KNR-430, 324-CCO-484	1294_Graymont (WI) Kiln NO. 2 Lime MACT Diagnostic Test Report 14-288.pdf	0.38	6.14	0.40
129_Graymont, Inc._Superior_WI	324-KNR-430 324-CCO-484	1296_Graymont (WI) Kiln NO. 4 Lime MACT Diagnostic Test Report 14-288.PDF	0.38	6.18	0.41
120_Graymont, Inc._Gulliver_MI	321-KNR-121, 321-CCO-122	1099_Report No. 5672 Port Inland.pdf	0.55	6.69	0.589
128_Graymont, Inc._Green Bay_WI	322-KNR-220, 322-CCO-221	1242_2015 Graymont GB K2 Report No. 5672.pdf	0.55	6.77	0.590
148_U.S. Lime & Minerals Inc._Batesville_AR	Kiln 2 Kiln 3	015_2021_2184 US Lime AR OHAPS_F.pdf	0.98	5.0	1.03
RDL (Average of 1-5)			**0.37**		**0.39**

Table 2. Acetaldehyde Method Detection Limits

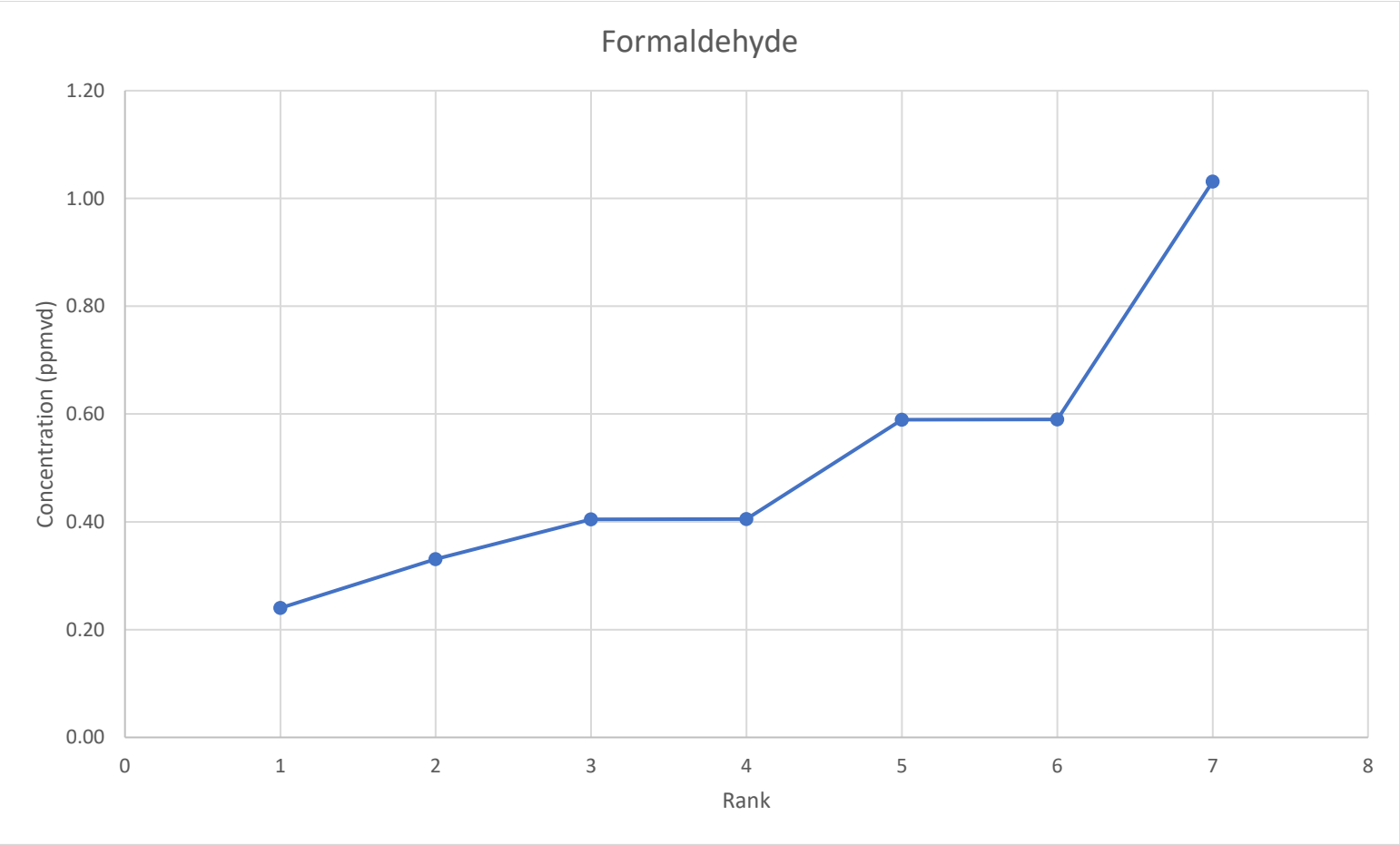

Figure 2. Acetaldehyde Rank Plotted Detection Limits

ICR_ID	Emission Unit ID No.	Test Report	Method	Mass (ug)	MDL (ppm) (for Sorbent trap - assumed 60 L volume)
124_Graymont, Inc._Pleasant Gap_PA	326-KNR-006/326-CCO-611 328-KNV-008	EPA-HQ-OAR-2017-0015-0164-A8.pdf	18 (Sorbent trap)	1.052	0.0054
145_Mississippi Lime Company_Ste. Genevieve_MO	EP-183H, E-187N	021_MRK8_MRK10_oHAPsTHC_Public.pdf	18 (Sorbent trap)	4.4	0.023
145_Mississippi Lime Company_Ste. Genevieve_MO	EP-640, EP-645	022_RK1_RK2_oHAPsTHC_Public.pdf	18 (Sorbent trap)	4.4	0.023
145_Mississippi Lime Company_Ste. Genevieve_MO	EP-289, EP-380, EP-424, EP-425	023_TSK_SSK1_oHAPsTHC_Public.pdf	18 (Sorbent trap)	4.4	0.023
132_Lhoist North America_Calera_AL_ (Montevallo Plant)	Kiln 2, Kiln 3, & Kiln 4	005_2021 1012 Alabama NESHAP Test Report - oHAP.pdf	18 (Sorbent trap)	5.68	0.029
133_Lhoist North America_Calera_AL_ (O'Neal Plant)	Kiln 1	005_2021 1012 Alabama NESHAP Test Report - oHAP.pdf	18 (Sorbent trap)	5.68	0.029
148_U.S. Lime & Minerals Inc._Batesville_AR	Kiln 2, Kiln 3	015_2021_2184 US Lime AR OHAPS_F.pdf	18 (Sorbent trap)	5.68	0.029
129_Graymont, Inc._Superior_WI	322-KNR-230, 322-CCO-284, 324-KNR-430, 324-CCO-484	1294_Graymont (WI) Kiln NO. 2 Lime MACT Diagnostic Test Report 14-288.pdf	18 (Direct injection)	N/A	0.09
129_Graymont, Inc._Superior_WI	324-KNR-430, 324-CCO-484	1296_Graymont (WI) Kiln NO. 4 Lime MACT Diagnostic Test Report 14-288.PDF	18 (Direct injection)	N/A	0.09
124_Graymont, Inc._Pleasant Gap_PA	326-KNR-006/326-CCO-611	1146_Report No. 5672 Pleasant Gap.pdf	18 (Sorbent trap)	20.2	0.104
127_Graymont, Inc._Eden_WI	331-KNR-121 (K121), 331-CCO-122 (N122)	1202_Report No. 5672 Eden, Wisconsin.pdf	18 (Sorbent trap)	20.2	0.104
128_Graymont, Inc._Green Bay_WI	322-KNR-220, 322-CCO-221	1242_2015 Graymont GB K2 Report No. 5672.pdf	18 (Sorbent trap)	20.2	0.104
120_Graymont, Inc._Gulliver_MI	321-KNR-121, 321-CCO-122	1099_Report No. 5672 Port Inland.pdf	18 (Sorbent trap)	20.2	0.104
129_Graymont, Inc._Superior_WI	324-KNR-430, 324-CCO-484	1296_Graymont (WI) Kiln NO. 4 Lime MACT Diagnostic Test Report 14-288.PDF	18 (Direct injection)	N/A	0.15
125_Graymont, Inc._Delta_UT	321-KNR-020	1065_APT Final GWU4112 Diagnostic 11 NOV 14 (with OHAP calc sheet).pdf	18 (Direct injection)	N/A	0.20
RDL (Average of 1-5)					**0.022**

Table 3. Benzene Method Detection Limits

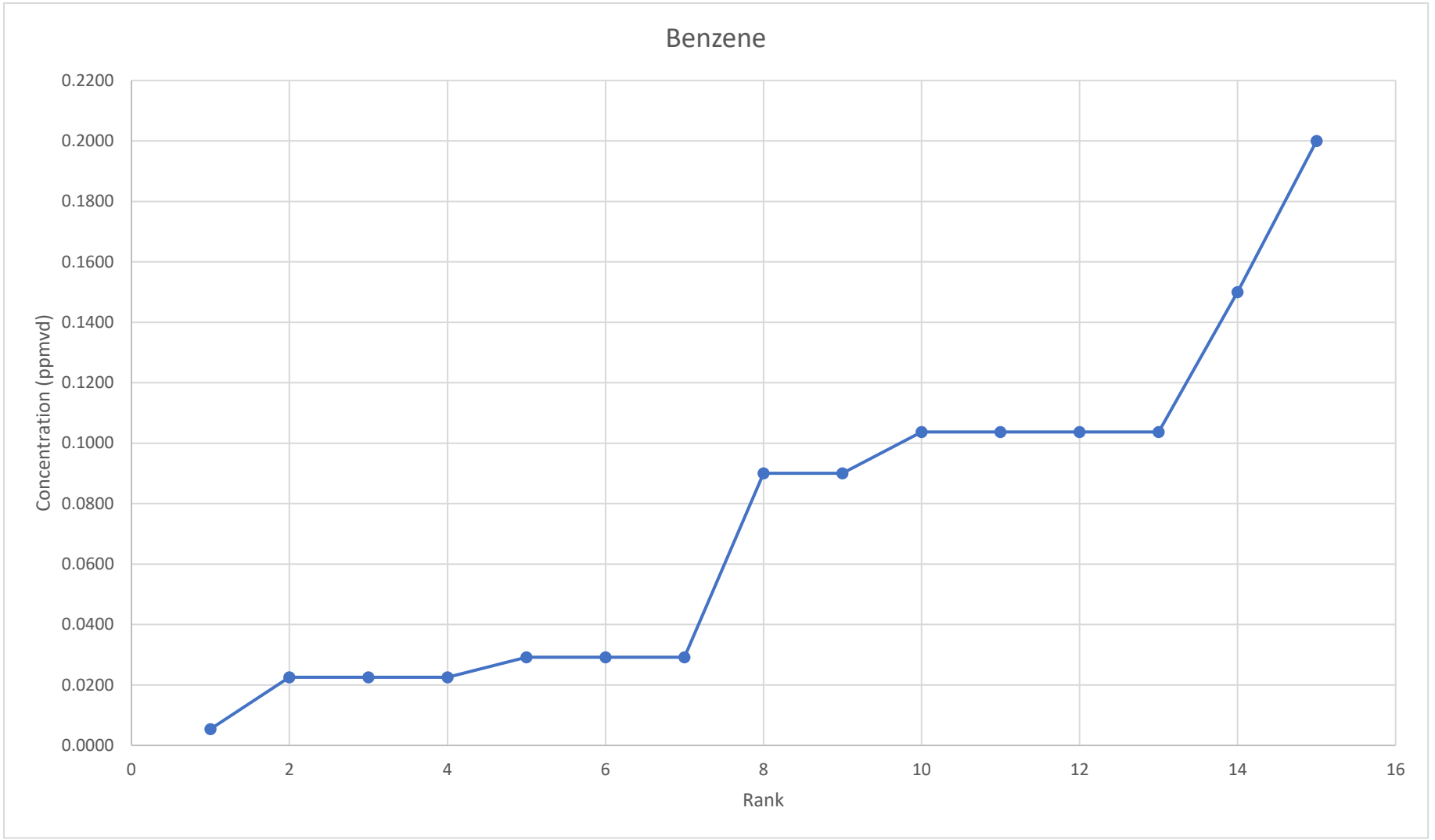

Figure 3. Benzene Rank Plotted Detection Limits

ICR_ID	Emission Unit ID No	Test Report	Method	Mass (ug)	MDL (ppmvd)[4]
145_Mississippi Lime Company_Ste. Genevieve_MO	EP-183H EP-187N	021_MRK8_MRK10_oHAPsTHC_Public.pdf	18 (Sorbent trap)	2.96	0.013
145_Mississippi Lime Company_Ste. Genevieve_MO	EP-640, EP-645	022_RK1_RK2_oHAPsTHC_Public.pdf	18 (Sorbent trap)	2.96	0.013
145_Mississippi Lime Company_Ste. Genevieve_MO	EP-289	023_TSK_SSK1_oHAPsTHC_Public.pdf	18 (Sorbent trap)	2.96	0.013
148_U.S. Lime & Minerals Inc._Batesville_AR	Kiln 2, Kiln 3	015_2021_2184 US Lime AR OHAPS_F.pdf	18 (Sorbent trap)	3.822	0.017
132_Lhoist North America_Calera_AL_(Montevallo Plant)	Kiln 2 Kiln 3 & Kiln 4	005_2021 1012 Alabama NESHAP Test Report - oHAP.pdf	18 (Sorbent trap)	3.823	0.017
133_Lhoist North America_Calera_AL_(O'Neal Plant)	Kiln 1	005_2021 1012 Alabama NESHAP Test Report - oHAP.pdf	18 (Sorbent trap)	3.823	0.017
124_Graymont, Inc._Pleasant Gap_PA	326-KNR-006/326-CCO-611 328-KNV-008	EPA-HQ-OAR-2017-0015-0164-A8.pdf	18 (Sorbent trap)	6.34	0.028
120_Graymont, Inc._Gulliver_MI	321-KNR-121, 321-CCO-122	1099_Report No. 5672 Port Inland.pdf	18 (Sorbent trap)	21.55	0.094
124_Graymont, Inc._Pleasant Gap_PA	326-KNR-006/326-CCO-611	1146_Report No. 5672 Pleasant Gap.pdf	18 (Sorbent trap)	21.55	0.094
128_Graymont, Inc._Green Bay_WI	322-KNR-220, 322-CCO-221	1242_2015 Graymont GB K2 Report No. 5672.pdf	18 (Sorbent trap)	21.55	0.094
127_Graymont, Inc._Eden_WI	331-KNR-121 (K121), 331-CCO-122 (N122)	1202_Report No. 5672 Eden, Wisconsin.pdf	18 (Sorbent trap)	21.55	0.094
129_Graymont, Inc._Superior_WI	324-KNR-430, 324-CCO-484	1296_Graymont (WI) Kiln NO. 4 Lime MACT Diagnostic Test Report 14-288.PDF	18 (Direct injection)		0.1
129_Graymont, Inc._Superior_WI	322-KNR-230, 322-CCO-284	1294_Graymont (WI) Kiln NO. 2 Lime MACT Diagnostic Test Report 14-288.pdf	18 (Direct injection)		0.13
125_Graymont, Inc._Delta_UT	321-KNR-020	1065_APT Final GWU4112 Diagnostic 11 NOV 14 (with OHAP calc sheet).pdf	18 (Direct injection)		0.2
RDL (Average of 1-5)					**0.014**

Table 4. Toluene Method Detection Limits

[4] For calculation of ppmv from mass, an assumed volume of 60 L was used.

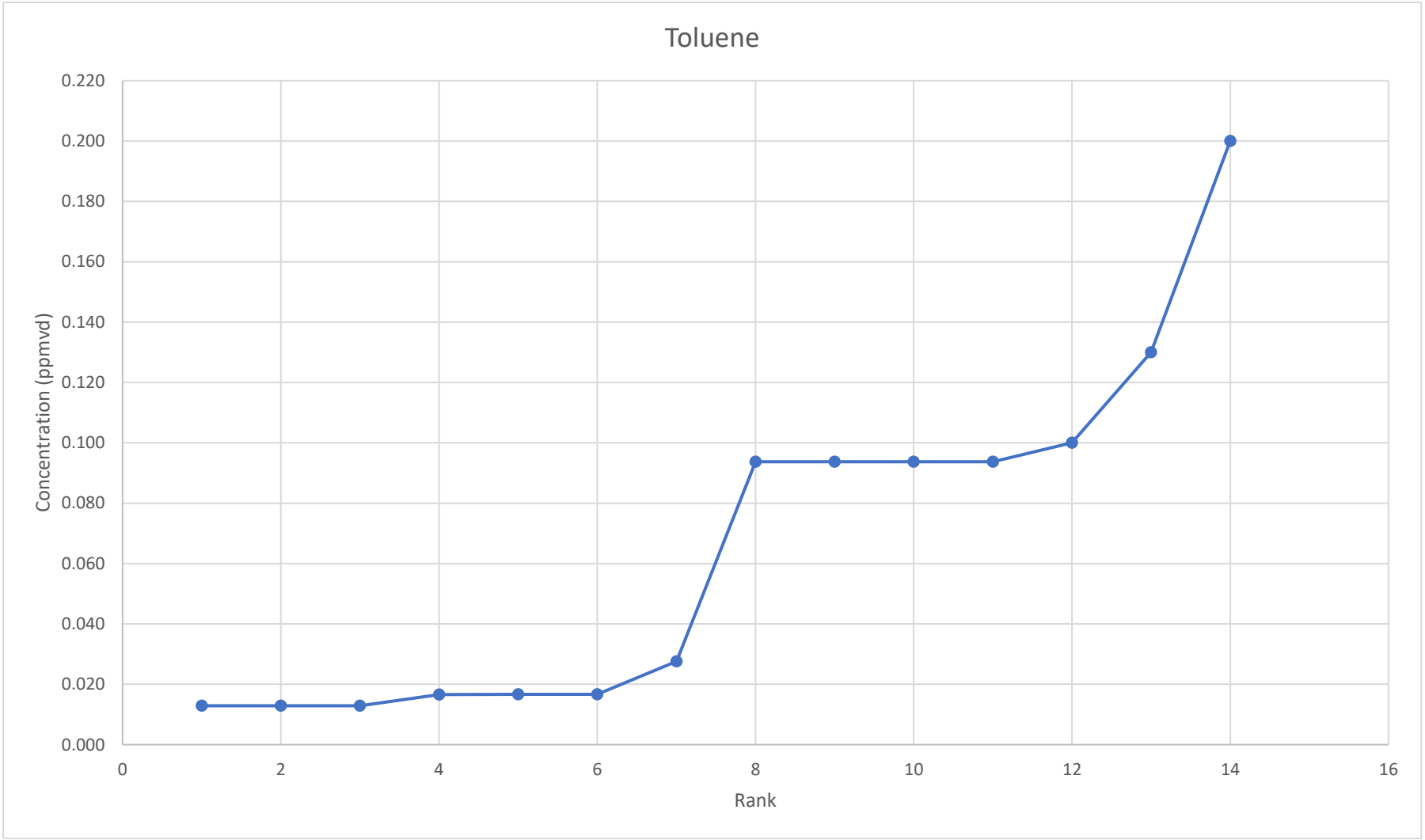

Figure 4. Toluene Rank Plotted Detection Limits

ICR_ID	Emission Unit ID No	Test Report	Method	Mass (ug)	MDL (ppmvd)[5]
124_Graymont, Inc._Pleasant Gap_PA	326-KNR-006/326-CCO-611 328-KNV-008	EPA-HQ-OAR-2017-0015-0164-A8.pdf	18 (Sorbent trap)	1.432	0.0054
132_Lhoist North America_Calera_AL_(Montevallo Plant)	Kiln 2, Kiln 3, & Kiln 4	005_2021 1012 Alabama NESHAP Test Report - oHAP.pdf	18 (Sorbent trap)	4.029	0.015
133_Lhoist North America_Calera_AL_(O'Neal Plant)	Kiln 1	005_2021 1012 Alabama NESHAP Test Report - oHAP.pdf	18 (Sorbent trap)	4.029	0.015
129_Graymont, Inc._Superior_WI	322-KNR-230, 322-CCO-284	1294_Graymont (WI) Kiln NO. 2 Lime MACT Diagnostic Test Report 14-288.pdf	18 (Direct injection)	N/A	0.09
129_Graymont, Inc._Superior_WI	324-KNR-430, 324-CCO-484	1296_Graymont (WI) Kiln NO. 4 Lime MACT Diagnostic Test Report 14-288.PDF	18 (Direct injection)	N/A	0.16
RDL (Average of 1-5)					**0.057**

Table 5. Ethylbenzene Method Detection Limits

[5] For calculation of ppmv from mass, an assumed volume of 60 L was used.

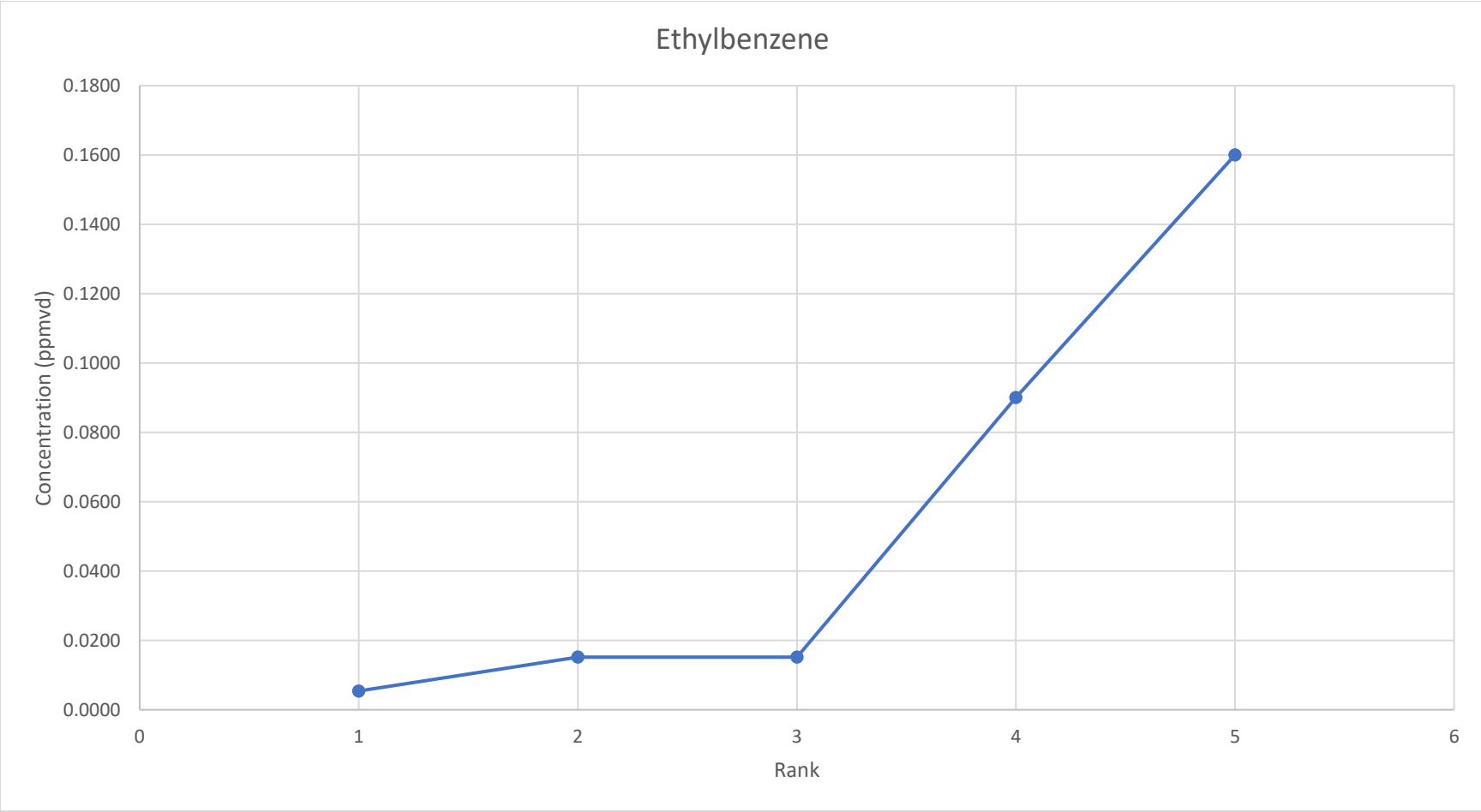

Figure 5. Ethylbenzene Rank Plotted Detection Limits

ICR_ID	Emission Unit ID No	Test Report	Method	Mass (ug)	MDL (ppmvd)[6]
145_Mississippi Lime Company_Ste. Genevieve_MO	EP-183H EP-187N	021_MRK8_MRK10_oHAPsTHC_Public.pdf	18 (Sorbent trap)	5.4	0.020
145_Mississippi Lime Company_Ste. Genevieve_MO	EP-640, EP-645	022_RK1_RK2_oHAPsTHC_Public.pdf	18 (Sorbent trap)	5.4	0.020
145_Mississippi Lime Company_Ste. Genevieve_MO	EP-289	023_TSK_SSK1_oHAPsTHC_Public.pdf	18 (Sorbent trap)	5.4	0.020
148_U.S. Lime & Minerals Inc._Batesville_AR	Kiln 2, Kiln 3	015_2021_2184 US Lime AR OHAPS_F.pdf	18 (Sorbent trap)	6.973	0.026
132_Lhoist North America_Calera_AL_(Montevallo Plant)	Kiln 2, Kiln 3, & Kiln 4	005_2021 1012 Alabama NESHAP Test Report - oHAP.pdf	18 (Sorbent trap)	6.974	0.026
132_Lhoist North America_Calera_AL_(Montevallo Plant)	Kiln 1	005_2021 1012 Alabama NESHAP Test Report - oHAP.pdf	18 (Sorbent trap)	6.974	0.026
124_Graymont, Inc._Pleasant Gap_PA	326-KNR-006/326-CCO-611 328-KNV-008	EPA-HQ-OAR-2017-0015-0164-A8.pdf	18 (Sorbent trap)	16.28	0.061
125_Graymont, Inc._Delta_UT	321-KNR-020	1065_APT Final GWU4112 Diagnostic 11 NOV 14 (with OHAP calc sheet).pdf	18 (Direct injection)	N/A	0.2
129_Graymont, Inc._Superior_WI	322-KNR-230, 322-CCO-284	1294_Graymont (WI) Kiln NO. 2 Lime MACT Diagnostic Test Report 14-288.pdf	18 (Direct injection)	N/A	0.2
120_Graymont, Inc._Gulliver_MI	321-KNR-121, 321-CCO-122	1099_Report No. 5672 Port Inland.pdf	18 (Sorbent trap)	69.25	0.26
128_Graymont, Inc._Green Bay_WI	322-KNR-220, 322-CCO-221	1242_2015 Graymont GB K2 Report No. 5672.pdf	18 (Sorbent trap)	69.25	0.26
124_Graymont, Inc._Pleasant Gap_PA	326-KNR-006/326-CCO-611	1146_Report No. 5672 Pleasant Gap.pdf	18 (Sorbent trap)	69.525	0.26
127_Graymont, Inc._Eden_WI	331-KNR-121 (K121), 331-CCO-122 (N122)	1202_Report No. 5672 Eden, Wisconsin.pdf	18 (Sorbent trap)	69.525	0.26
129_Graymont, Inc._Superior_WI	324-KNR-430	1296_Graymont (WI) Kiln NO. 4 Lime MACT Diagnostic Test Report 14-288.PDF	18 (Direct injection)	N/A	0.4
129_Graymont, Inc._Superior_WI	324-CCO-484	1296_Graymont (WI) Kiln NO. 4 Lime MACT Diagnostic Test Report 14-288.PDF	18 (Direct injection)	N/A	0.61
RDL (Average of 1-5)					**0.023**

Table 6. Xylenes Method Detection Limits

[6] For calculation of ppmv from mass, an assumed volume of 60 L was used.

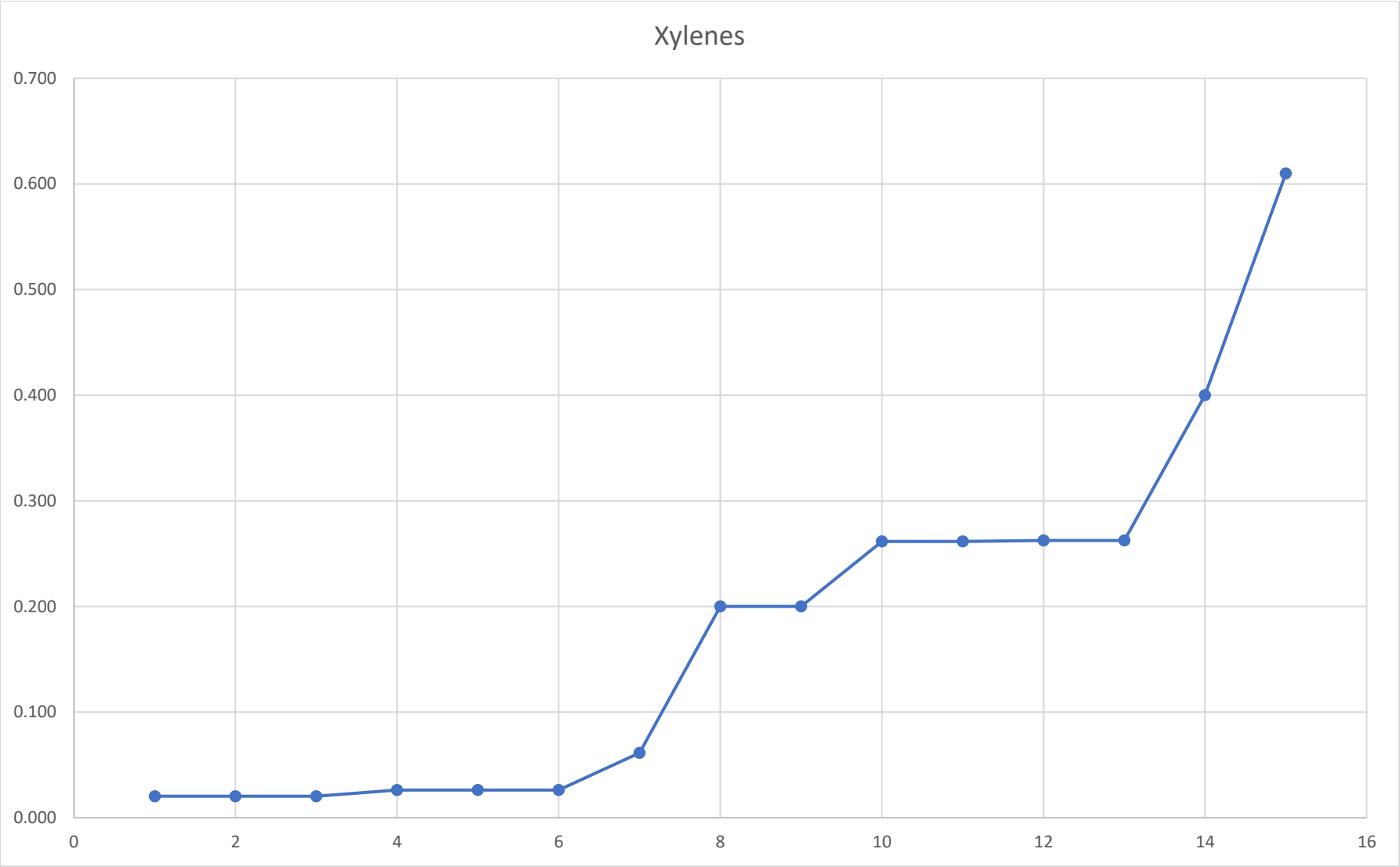

Figure 6. Xylenes Rank Plotted Detection Limits

ICR_ID	Emission Unit ID No	Test Report	Method	Mass (ug)	MDL (ppmvd)[7]
145_Mississippi Lime Company_Ste. Genevieve_MO	EP-183H, E-187N	021_MRK8_MRK10_oHAPsTHC_Public.pdf	18 (Sorbent trap)	1.00	0.0038
145_Mississippi Lime Company_Ste. Genevieve_MO	EP-640, EP-645	022_RK1_RK2_oHAPsTHC_Public.pdf	18 (Sorbent trap)	1.00	0.0038
145_Mississippi Lime Company_Ste. Genevieve_MO	EP-289, EP-380, EP-424, EP-425	023_TSK_SSK1_oHAPsTHC_Public.pdf	18 (Sorbent trap)	1.00	0.0038
132_Lhoist North America_Calera_AL_(Montevallo Plant)	Kiln 2, Kiln 3, & Kiln 4	005_2021 1012 Alabama NESHAP Test Report - oHAP.pdf	18 (Sorbent trap)	1.291	0.0050
133_Lhoist North America_Calera_AL_(O'Neal Plant)	Kiln 1	005_2021 1012 Alabama NESHAP Test Report - oHAP.pdf	18 (Sorbent trap)	1.291	0.0050
148_U.S. Lime & Minerals Inc._Batesville_AR	Kiln 2 & Kiln 3	015_2021_2184 US Lime AR OHAPS_F.pdf	18 (Sorbent trap)	1.291	0.0050
124_Graymont, Inc._Pleasant Gap_PA	326-KNR-006/326-CCO-611 328-KNV-008	EPA-HQ-OAR-2017-0015-0164-A8.pdf	18 (Sorbent trap)	5.44	0.0209
129_Graymont, Inc._Superior_WI	322-KNR-230, 322-CCO-284	1294_Graymont (WI) Kiln NO. 2 Lime MACT Diagnostic Test Report 14-288.pdf	18 (Direct injection)	N/A	0.08
129_Graymont, Inc._Superior_WI	324-KNR-430	1296_Graymont (WI) Kiln NO. 4 Lime MACT Diagnostic Test Report 14-288.PDF	18 (Direct injection)	N/A	0.08
120_Graymont, Inc._Gulliver_MI	321-KNR-121, 321-CCO-122	1099_Report No. 5672 Port Inland.pdf	18 (Sorbent trap)	22.63	0.087
124_Graymont, Inc._Pleasant Gap_PA	326-KNR-006/326-CCO-611	1146_Report No. 5672 Pleasant Gap.pdf	18 (Sorbent trap)	22.63	0.087
127_Graymont, Inc._Eden_WI	331-KNR-121 (K121), 331-CCO-122 (N122)	1202_Report No. 5672 Eden, Wisconsin.pdf	18 (Sorbent trap)	22.63	0.087
128_Graymont, Inc._Green Bay_WI	322-KNR-220, 322-CCO-221	1242_2015 Graymont GB K2 Report No. 5672.pdf	18 (Sorbent trap)	22.63	0.087
129_Graymont, Inc._Superior_WI	324-CCO-484	1296_Graymont (WI) Kiln NO. 4 Lime MACT Diagnostic Test Report 14-288.PDF	18 (Direct injection)	N/A	0.14
RDL (Average of 1-5)					**0.0043**

Table 7. Styrene Method Detection Limits

[7] For calculation of ppmv from mass, an assumed volume of 60 L was used.

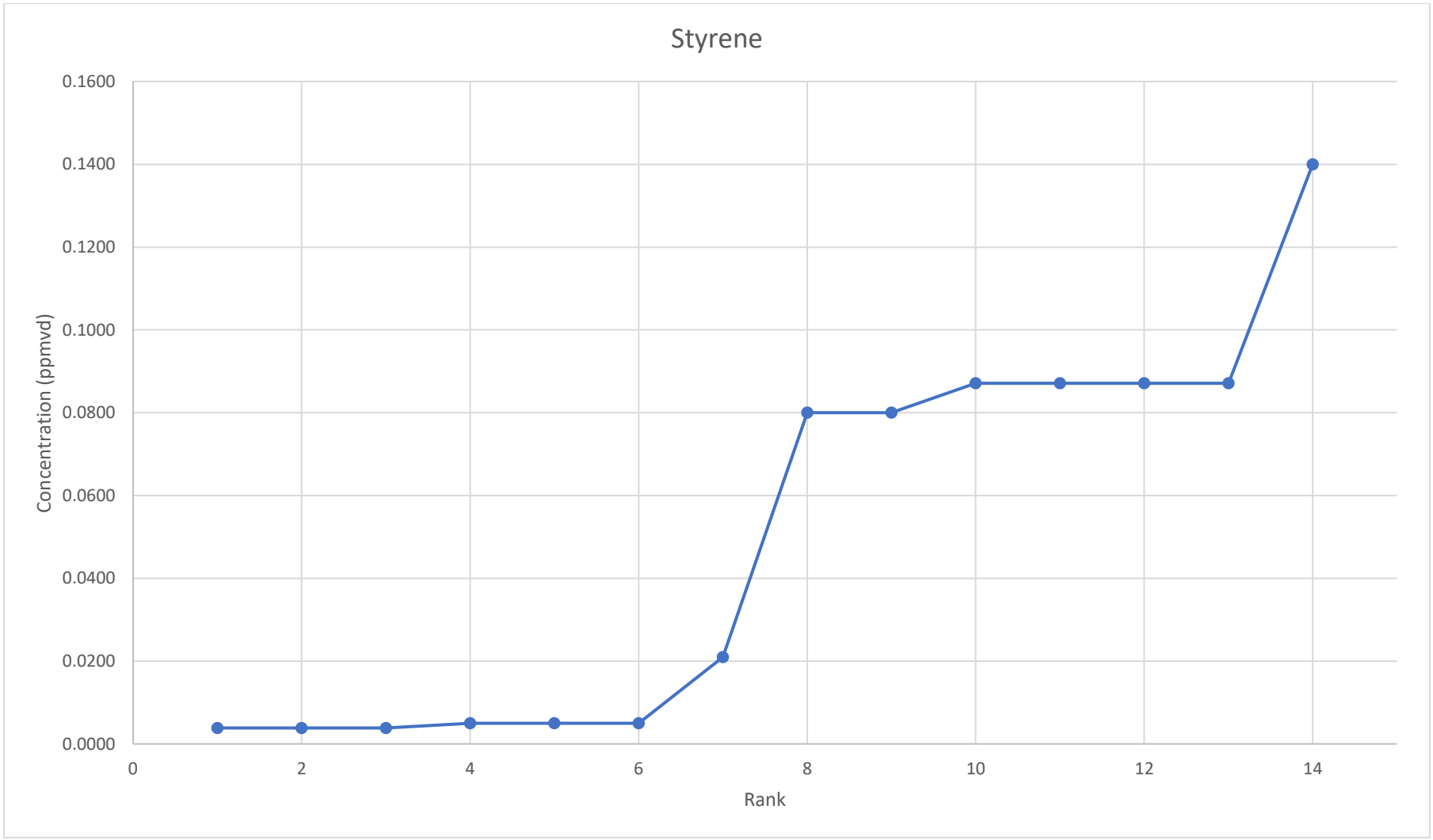

Figure 7. Styrene Rank Plotted Detection Limits

ICR_ID	Emission Unit ID No	Test Report	Method	Mass (ug)	MDL (ppmvd)[8]
145_Mississippi Lime Company_Ste. Genevieve_MO	EP-183H, E-187N	021_MRK8_MRK10_oHAPsTHC_Public.pdf	18 (Sorbent trap)	2.32	0.0073
145_Mississippi Lime Company_Ste. Genevieve_MO	EP-640, EP-645	022_RK1_RK2_oHAPsTHC_Public.pdf	18 (Sorbent trap)	2.32	0.0073
145_Mississippi Lime Company_Ste. Genevieve_MO	EP-289, EP-380, EP-424, EP-425	023_TSK_SSK1_oHAPsTHC_Public.pdf	18 (Sorbent trap)	2.32	0.0073
132_Lhoist North America_Calera_AL_(Montevallo Plant)	Kiln 2, Kiln 3, & Kiln 4	005_2021 1012 Alabama NESHAP Test Report - oHAP.pdf	18 (Sorbent trap)	2.996	0.0094
133_Lhoist North America_Calera_AL_(O'Neal Plant)	Kiln 1	005_2021 1012 Alabama NESHAP Test Report - oHAP.pdf	18 (Sorbent trap)	2.996	0.0094
148_U.S. Lime & Minerals Inc._Batesville_AR	Kiln 2, Kiln 3	015_2021_2184 US Lime AR OHAPS_F.pdf	18 (Sorbent trap)	2.996	0.0094
124_Graymont, Inc._Pleasant Gap_PA	326-KNR-006/326-CCO-611 328-KNV-008	EPA-HQ-OAR-2017-0015-0164-A8.pdf	18 (Sorbent trap)	5.46	0.017
120_Graymont, Inc._Gulliver_MI	321-KNR-121, 321-CCO-122	1099_Report No. 5672 Port Inland.pdf	18 (Sorbent trap)	24.48	0.077
124_Graymont, Inc._Pleasant Gap_PA	326-KNR-006/326-CCO-611	1146_Report No. 5672 Pleasant Gap.pdf	18 (Sorbent trap)	24.48	0.077
127_Graymont, Inc._Eden_WI	331-KNR-121 (K121), 331-CCO-122 (N122)	1202_Report No. 5672 Eden, Wisconsin.pdf	18 (Sorbent trap)	24.48	0.077
128_Graymont, Inc._Green Bay_WI	322-KNR-220, 322-CCO-221	1242_2015 Graymont GB K2 Report No. 5672.pdf	18 (Sorbent trap)	24.48	0.077
RDL (Average of 1-5)					**0.0081**

Table 8. Naphthalene Method Detection Limits

[8] For calculation of ppmv from mass, an assumed volume of 60 L was used.

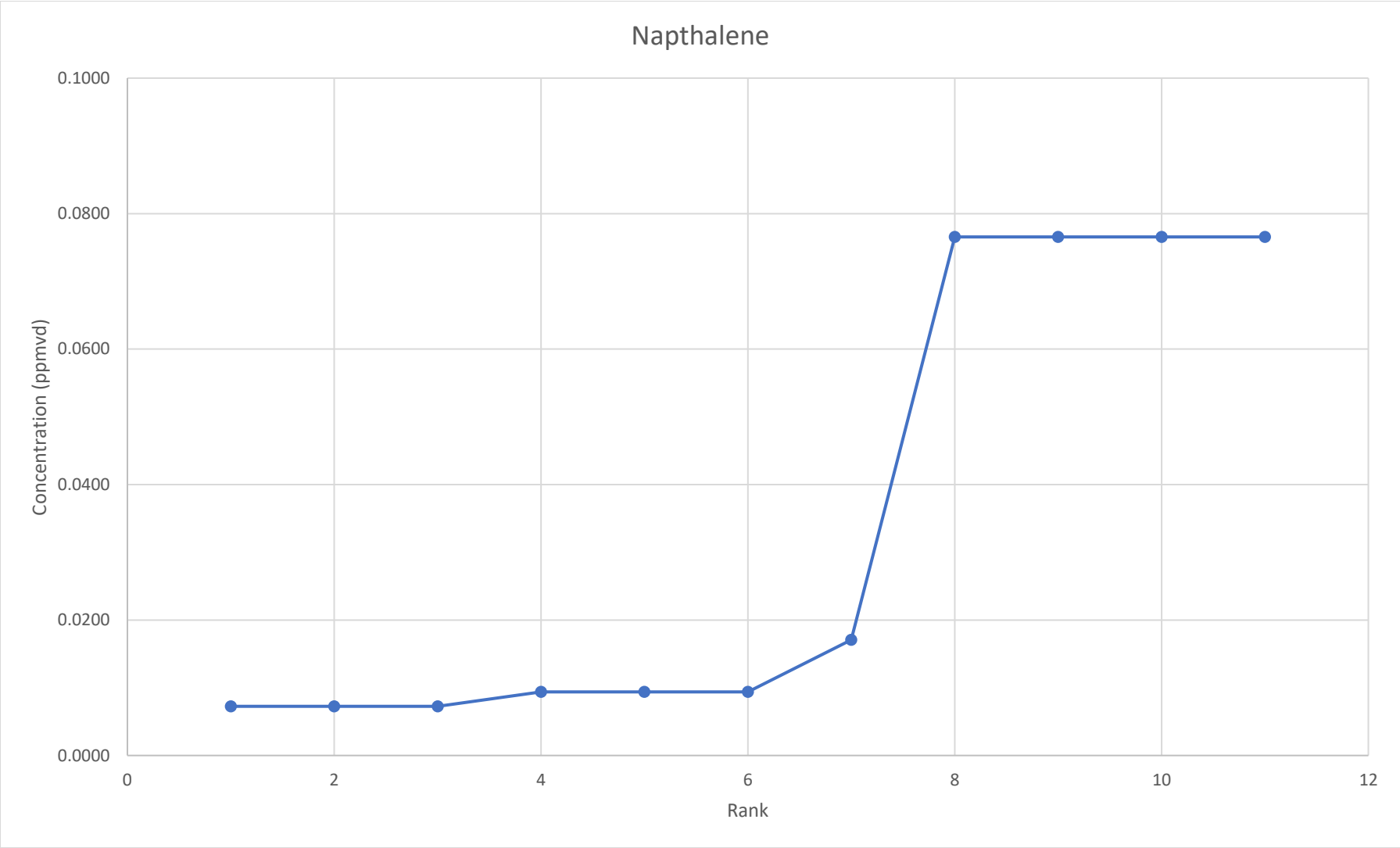

Figure 8. Naphthalene Rank Plotted Detection Limits

Parameter	Concentration
Individual Pollutant RDL (ppmvd)	
Formaldehyde	0.25
Acetaldehyde	0.39
Toluene	0.014
Benzene	0.022
Xylenes	0.023
Styrene	0.0043
Ethyl Benzene	0.057
Naphthalene	0.0081
Total oHAP RDL (ppmvd)	0.77
Oxygen Concentration (%)	8.5
Total oHAP RDL (ppmvd @ 7%O2)	**0.86**

Table 9. Total oHAP RDL