PERSPECTIVES OF HAPS — LOOKING BEYOND SECTION 129: A PANEL DISCUSSION

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Rigo's Comments on What We Already Know About Emissions of Section 112 Pollutants From MWCs

The EPA is in the process of promulgating additional Emission Guidelines for existing MWCs and New Source Performance Standards for the pollutants listed in Section 129 of the 1990 Clean Air Act Amendments. The Section 129 list includes several pollutants found in Section 112 regulating Hazardous Air Pollutants (HAPs).

Double jeopardy is minimized however, because the Section 112 residual risk management provisions are limited to the HAPs found in Section 129. That is, only hydrochloric acid, lead, cadmium, mercury, dioxin, and dibenzofuran emissions from MWCs might eventually be managed below Maximum Achievable Control Technology (MACT) emission rates if the residual risk due to post-MACT emissions exceed one in a million.

Today's panel addresses a number of questions raised by the regulations: What do we know about measuring HAPs, how many are actually emitted, and what is the cost of testing and reporting non-Section 129 HAPs?

The federal the EPA is beginning to define a lower or *de minimis* level below which emissions are considered insignificant. In March, the EPA proposed *de minimis* emission levels for the 189 HAPs listed in Section 112. These levels include specific chemicals to begin detailing some of the generic groups listed in the 1990 CAAA. These *de minimis* levels provide a bench mark to gage if additional study is warranted.

Limiting the scope of pollutants regulated at the federal level does not, however, constrain a state's ability to regulate. For example, Califomia's AB2588 requires testing, reporting, and regulation of a plethora of HAPs. At least one state requires an inventory of all HAPs emissions above 1 lb/year. Other states have declared a lower reporting limit of 10 lb/day or about 1.9 TPY, compared to the Federal major source triggers of 10 TPY of any HAP or 25 TPY of all HAPs added together.

Table 1 presents the EPA's proposed 40 CFR 63.44 de minimis levels for HAPs in tons per year [TPY]. I re-expressed these levels in terms of equivalent concentrations emitted from an incinerator burning 1000 TPD of MSW. The conversion assumed that 4500 Btu/lb MSW is burned during 8760 hr/year, at rating, and used appropriate F-factors and equations found in 40 CFR 60, Appendix A, Method 19. To determine the de minimis equivalent concentrations for other size plants, simply multiply the tabulated equivalent concentrations by 1000 divided by the plant size of interest. That is, de minimis limits for a 500 TPD plant are twice the tabulated values.

The right-hand side of Table 1 includes measured HAPs concentrations extracted from the proprietary MWC emissions data base my company has been maintaining since the early 1980s. Stack concentrations are for normal operating condition runs. Dioxin emissions from high temperature ESP-equipped facilities were excluded to avoid confounding effects. The number of runs and detects are also provided.

We were able to develop concentration estimates for 69 HAPs; however, 16 of these are for organic compounds that have been looked for and not found in 6 to 21 attempts. The tabulated concentrations are either: (a) the average of all the detected values or (b) the detection limits (shown in parentheses) when the results were all below the laboratory detection or quantification limit. The tabulation combines different types of plants and air pollution control systems so the results are indicative of the overall performance of the industry, but may be directly applicable to specific facilities.

The tabulated HAPs concentrations, however, are conservative. When data is highly censored (lots of below-detection-limits results) and skewed like typical trace stack and environmental emissions, the average of detected run values significantly over-states the maximum likely test value. For example, the tabulated Benzene value of 1400 µg/DSCM @ 7% O_2 is the average of the 34 detected values found in 56

tests. Twenty-two of the runs did not result in quantifiable amounts of benzene! The highest likely test result is less than 5 µg/DSCM @ 7% O_2 when the full data set is used to estimate an achievable emission rate. That is, 5 µg/DSCM @ 7% O_2 is an appropriate testing limit assuming that each MWC in a two-unit plant is tested annually for Benzene emissions at the 95% statistical confidence level. This is roughly a 280 times reduction between the screening approach and expected three-run average test results. These screening estimates should not be used to describe the likely performance of a specific plant or type of MWC. They are an easily determined conservative estimate that can be used to find what might be high enough concentrations to warrant further investigation.

A comparison of the 1000 TPD equivalent *de minimis* and average concentrations from the database indicates that Section 129 regulations cover most of the compounds where there is a reasonable chance that significant emissions may occur. The 1000 TPD MWC screening concentrations for hydrogen fluoride, arsenic, chromium, and phosphorous are also above the equivalent *de minimis* concentrations. This indicates that a refined case-by-case assessment of these pollutants should be performed to determine if further consideration is warranted for these elements and compounds.

Another point emerges from the data: the number of non-detects in the HAPs emissions data base indicates that routine testing for all 189 HAPs is probably a waste of money. If field confirmation of this conclusion is desired, the three runs that make up a typical test should be randomly allocated between all the MWC units in a facility; individual compliance tests are unnecessary.

The bottom line is that the majority of the Section 192 HAPs list that has been tested for at MWCs is below the proposed *de minimis* levels.

TABLE 1
COMPARISON OF *DE MINIMIS* AT A 1000 TPD MWC AND MEASURED CONCENTRATIONS

	Proposed TPY *de minimis* levels (March 1994)	Equivalent 7% O2 1000 TPD MWC Stack Concentration	Average Measured Concentration of Detects or Detection Limits @ 7% O2	Number of Tests	Number of Detects
Hydrochloric Acid	10	4.5 PPMdv	149 PPMdv	388	371
Hydrogen Fluoride	0.1	0.08 PPMdv	4.1 PPMdv	140	88
Arsenic Compounds	0.005	2.5 ug/DSCM	50.5 ug/DSCM	299	172
Berrylium Compounds	0.008	0.60 ug/DSCM	0.09 ug/DSCM	159	25
Cadmium Compounds	0.01	4.1 ug/DSCM	11.6 ug/DSCM	340	293
Cobalt Metal & Compounds	0.1	30.3 ug/DSCM	5.3 ug/DSCM	180	66
Chromium Compounds Sans Hex- & Tri-valent	0.01	2.8 ug/DSCM	14.6 ug/DSCM	331	263
Hexavalent Chromium Compounds	0.002	1.3 ug/DSCM	0.5 ug/DSCM	59	22
Mercury Chloride	0.01	4.9 ug/DSCM	276 ug/DSCM	440	439
Manganese & Compounds	0.8	233 ug/DSCM	234 ug/DSCM	223	203
Nickel Compounds	1	302 ug/DSCM	42 ug/DSCM	305	260
Phosphorous	0.1	38 ug/DSCM	103 ug/DSCM	52	44
Lead & compounds	0.01	4.97 ug/DSCM	199 ug/DSCM	416	388
Antimony Compounds	5	2,789 ug/DSCM	123 ug/DSCM	239	141
Selenium & Compounds	0.1	24 ug/DSCM	2.7 ug/DSCM	216	65
Dichlorobenzene(1,4)	3	2,033,196 ng/DSCM	1,292 ng/DSCM	31	24
Trichlorobenzene(1,2,4)	10	6,777,320 ng/DSCM	245 ng/DSCM	34	22
Hexachlorobenzene	0.01	6,777 ng/DSCM	5,880 ng/DSCM	32	18
Trichlorophenol(2,4,5)	1	677,732 ng/DSCM	61 ng/DSCM	24	13
Trichlorophenol(2,4,6)	6	4,066,392 ng/DSCM	546 ng/DSCM	35	27
Pentachlorophenol	0.7	474,412 ng/DSCM	14,937 ng/DSCM	44	29
Polychlorinated biphenyls (Aroclors)	0.009	6,100 ng/DSCM	1,922 ng/DSCM	53	36
Acetaldehyde	9	6,099,588 ng/DSCM	10,359 ng/DSCM	6	6
Benz(a)anthracene*	0.01	6,777 ng/DSCM	20 ng/DSCM	51	14
Benzo(a)pyrene*	0.01	6,777 ng/DSCM	5,395 ng/DSCM	71	11
Benzo(b)fluoranthene*	0.01	6,777 ng/DSCM	16 ng/DSCM	50	19
Biphenyl	10	6,777,320 ng/DSCM	1,479 ng/DSCM	24	24
Bis(2-chloroethyl)ether	0.06	40,664 ng/DSCM	(110) ng/DSCM	6	0
Chrysene*	0.01	6,777 ng/DSCM	3,235 ng/DSCM	79	22
Di-n-butylphthalate	10	6,777,320 ng/DSCM	6,877 ng/DSCM	11	9
Dibenz(a,h)anthracene*	0.01	6,777 ng/DSCM	72 ng/DSCM	51	2
Dibenzo(a,c)pyrene* -- 1,2:7,8 Dibenzopyrene*	0.01	6,777 ng/DSCM	(73) ng/DSCM	21	0
Dibenzofuran	5	3,388,660 ng/DSCM	(45) ng/DSCM	6	0
Dichlorobenzidine(3,3)	0.2	135,546 ng/DSCM	(180) ng/DSCM	6	0
Dimethylbenzo(a)anthracene(7,12)*	0.01	6,777 ng/DSCM	(48) ng/DSCM	21	0
Dimethylphthalate	10	6,777,320 ng/DSCM	639 ng/DSCM	4	4
Dinitrotoluene(2,4)	0.02	13,555 ng/DSCM	(218) ng/DSCM	6	0
Hexachlorobutadiene	0.9	609,959 ng/DSCM	(444) ng/DSCM	6	0
Hexachlorocyclopentadiene	0.1	67,773 ng/DSCM	(509) ng/DSCM	6	0
Hexachloroethane	5	3,388,660 ng/DSCM	(341) ng/DSCM	6	0
Indeno(1,2,3-cd)pyrene*	0.01	6,777 ng/DSCM	6 ng/DSCM	52	9
Isophorone	10	6,777,320 ng/DSCM	(45) ng/DSCM	6	0
Methyl Ethyl Ketone	10	6,777,320 ng/DSCM	(2,114) ng/DSCM	6	0
Naphthalene	10	6,777,320 ng/DSCM	46,335 ng/DSCM	81	73
Nitrobenzene	1	677,732 ng/DSCM	(99) ng/DSCM	6	0
Nitrophenol(4)	5	3,388,660 ng/DSCM	(1,004) ng/DSCM	6	0
Phenol	0.1	67,773 ng/DSCM	423 ng/DSCM	4	2
Quinoline	0.006	4,066 ng/DSCM	83 ng/DSCM	21	6
Benzene	2	1,355,464 ng/DSCM	1,406,212 ng/DSCM	56	34
Bromoform	10	6,777,320 ng/DSCM	(1,428) ng/DSCM	6	0
Methyl Bromide -- Bromomethane	10	6,777,320 ng/DSCM	917 ng/DSCM	9	3

TABLE 1
COMPARISON OF *DE MINIMIS* AT A 1000 TPD MWC AND MEASURED CONCENTRATIONS (CONT'D)

	Proposed TPY *de minimis* levels (March 1994)	Equivalent 7% O2 1000 TPD MWC Stack Concentration		Average Measured Concentration of Detects or Detection Limits @ 7% O2		Number of Tests	Number of Detects
Carbon Tetrachloride	1	677,732	ng/DSCM	14,844	ng/DSCM	10	5
Chloroform	0.9	609,959	ng/DSCM	2,781	ng/DSCM	13	5
Ethylene Dichloride -- Dichloroethane(1,2)	0.8	542,186	ng/DSCM	(1,299)	ng/DSCM	7	0
Ethylidene Dichloride -- Dichloroethane (1,1)	1	677,732	ng/DSCM	1,058	ng/DSCM	9	3
Propylene Dichloride -- Dichloropropane(1,2)	1	677,732	ng/DSCM	(1,310)	ng/DSCM	7	0
Ethyl Benzene	10	6,777,320	ng/DSCM	22,168	ng/DSCM	11	9
Formaldehyde	2	1,355,464	ng/DSCM	793,390	ng/DSCM	24	15
Methylene chloride -- Chloromethane	10	6,777,320	ng/DSCM	29,690	ng/DSCM	18	16
Styrene	1	677,732	ng/DSCM	18,838	ng/DSCM	12	11
Tetrachloroethene -- Perchloroethylene	10	6,777,320	ng/DSCM	5,454	ng/DSCM	13	11
Toluene	10	6,777,320	ng/DSCM	35,609	ng/DSCM	18	18
Trichloroethane(1,1,2)	1	677,732	ng/DSCM	7,468	ng/DSCM	7	1
Trichloroethylene	10	6,777,320	ng/DSCM	2,960	ng/DSCM	3	3
Vinyl Chloride	0.2	135,546	ng/DSCM	85,251	ng/DSCM	25	9
Xylene(m & p)	10	6,777,320	ng/DSCM	25,425	ng/DSCM	18	17
Xylene(o)	10	6,777,320	ng/DSCM	6,929	ng/DSCM	9	8
Tetrachlorodibenzo-p-dioxin(2,3,7,8)	6E-07	0.41	ng/DSCM	0.45	ng/DSCM	182	137
Dioxins & Furans (TCDD equivalent)*	?		ng/DSCM	1.27	ng/DSCM	171	170

Note: * indicates specifically listed POMs
() indicates the value is for detection limits