The Vinyl Institute

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Via Electronic and First Class Mail

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RE: Supplemental Information for Reconsideration: *National Emission Standards for Hazardous Air Pollutants for Polyvinyl Chloride and Copolymers Production* (PVC MACT"), 77 Fed. Reg. 22,848 (April 17, 2012)

Dear Ms. Howard:

As a follow up to the November 19, 2013 conference call and webcast between the Vinyl Institute PVC MACT Working Group (hereinafter, "Working Group")[1] and the U.S. Environmental Protection Agency (EPA"), this submission provides, as you requested, the charts and data presented to the Agency with further explanation. The Working Group remains committed to ensuring that EPA has sufficient data on which to base a PVC MACT rule that complies with the mandates of the Clean Air Act (the "Act") and related legal precedents, that allows the PVC and copolymer industry to continue producing the mix of products upon which its customers depend, and that permits U.S. manufacturers to grow their businesses in a competitive global environment. In pursuit of those goals, we would like to reemphasize several critical points as the Agency considers this submission:

1. The D.C. Circuit has repeatedly held that EPA may reasonably estimate emissions performance provided that it does so based on actual data from the best performers in the industry;

2. While certain pollution control devices in the PVC industry are well known and achieve a similar level of control, the key to ultimate emission levels is the variability of resin recipes. Therefore, the best performing "similar" source used to set new source limits, as required by the Act, is the one for which data from a broad array of resin slates is available. This notion also is in keeping with Section 112(d)(2)'s mandate that emission control

[1] In addition to Vinyl Institute (VI) members Formosa Plastics Corporation, U.S.A., Occidental Chemical Corporation/Oxy Vinyls, LP, Mexichem Specialty Resins Inc. (formerly PolyOne Corporation), Shintech Inc., and Westlake Chemical Corporation, the PVC MACT Working Group has included non-VI members The Dow Chemical Company and Axiall (formerly Georgia Gulf) Corporation. The Vinyl Institute, Inc., founded in 1982, is a U.S. trade association representing the leading manufacturers of vinyl, vinyl chloride monomer, vinyl additives and modifiers, and vinyl compound materials.

measures should not "in any way compromise" trade secrets or intellectual property rights.

The history of this rulemaking supports these points. As we have pointed out before, the D.C. Circuit in *Mossville Environmental Action Now v. EPA*, upheld EPA's determination that it was impossible to determine the best performing five sources in the PVC production category because of the great variability in residual vinyl chloride monomer (RVCM) emissions resulting from product slates.[2] Indeed, the data collected by EPA during this rulemaking further demonstrates that this variability is a result of the type of resin being produced, not the technology or processes applied to control emissions.

Although the D.C. Circuit has stated that EPA cannot base the MACT floor exclusively on technology if non-technology factors, such as inputs, affect emission levels,[3] nowhere has the court indicated that EPA could so restrict inputs as to change the nature of the product produced by the affected facilities. Restrictions on PVC ingredients are particularly problematic for this rulemaking, as PVC ingredients and recipes are not drop-in replacements for the industry's customer base.[4] The problems in the Agency's current approach are especially evident in the new source emission limits, because the limits as currently set would restrict future facilities to the limited product slate used to set the limit.

I. New Source Non-VC TOHAP Limit for Stripped Suspension Resins Does Not Truly Reflect the Best Performing Facility

As the Working Group has stated often, the resin strippers used in the PVC industry are designed to control VC, the major raw material used and the only common ingredient used within every facility. Although focused on VC control, the resin strippers also control, to a degree,[5] the individual hazardous air pollutants (HAPs) that constitute total organic HAP (TOHAP). What drives residual non-VC TOHAP, however, is the initial concentration of non-VC TOHAP in the resin sample, which is largely a function of

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[2] *Mossville Environmental Action Now v. EPA*, 370 F.3d 1232, 1242-43 (D.C. Cir. 2004). The D.C. Circuit supported the validity of this approach most recently in *NACWA v. EPA*, No. 11-1131 at *32, *69 (D.C. Cir. Aug. 20, 2013) (Sewage Sludge Incinerator MACT case).

[3] *Sierra Club v. EPA*, 479 F.3d 875, 883 (D.C. Cir. 2007) ("EPA's decision to base floors exclusively on technology even though non-technology factors affect emission levels thus violates the Act.").

[4] Docket Document EPA-HQ-OAR-2002-0037-0146 at p. 7-11; Docket Document EPA-HQ-OAR-2002-0037-0561 at p. 6-7.

[5] As noted before, additional stripping to increase removal of HAPs results in significant degradation of the resin. Docket Document EPA-HQ-OAR-2002-0037-0146 at 12, 37; Docket Document EPA-HQ-OAR-2002-0037-0146 at 12, 37; Docket Document EPA-HQ-OAR-2002-0037-0146, Attachment 4 (Vendor Letters Regarding Stripping of PVC Slurries) and Attachment 5 (Powerpoint Presentation from Oxy Vinyls, LP – Joint Industry/EPA Meeting, June 30, 2011, Regarding PVC Stripping to Reduce PVC RVCM and Impact of Particle Morphology and Column Operating Parameters).

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resin recipes and product slates.[6] This makes determining "the emission control that is achieved in practice by the **best controlled similar source**"[7] (*i.e.*, the new source MACT floor) practically impossible for TOHAP, because sources with strippers capable of the "best" level of performance are not "similar" and residual TOHAP is not indicative of achievable control.

This issue is most prominent for suspension resins, a subcategory that encompasses a broad range of resin grades, resin recipes, and product uses. As discussed with EPA during the November 19th conference call, the Working Group examined the stripped resin data for suspension resins provided in response to the 2009 Section 114 Request. The interactive database demonstrated during the meeting is included with this letter as **Attachment I**.[8] As the Working Group noted, when these different resins (made with different recipes) are compared to the 15 ppm non-VC TOHAP new source limit for suspension resin, it is clear that very few resins can comply with this limit, as seen in **Figure 1**.

[6] Table 1 "Suspension and Dispersion Resin Chemistry"[6] in the Working Group's comments on the proposed PVC MACT provides additional information on the roles of different ingredients. Docket Document EPA-HQ-OAR-2002-0037-0146 at 11.

[7] 42 U.S.C. § 7412(d)(3).

[8] Letter designators were assigned to each resin grade to blind the data.

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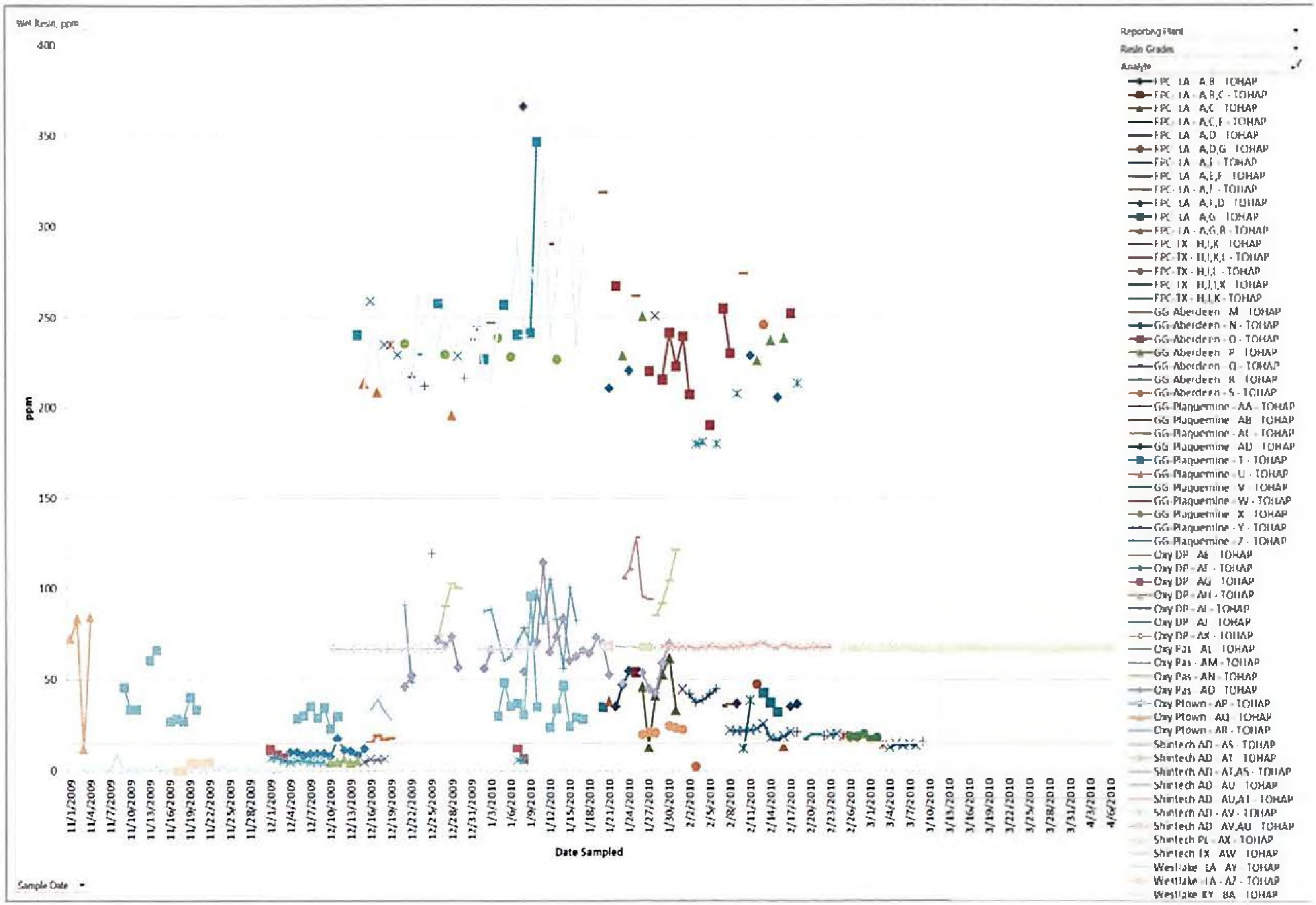

Figure 1: Non-VC TOHAP Concentrations by Resin Recipe

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This fact is unsurprising, given that the facility used to set the new source non-VC TOHAP limit for suspension resin only manufactured two resins during the sampling period. This limited product slate encompasses only a sliver of the product ingredient and morphology combinations used in suspension resins, as illustrated in **Figure 2**.

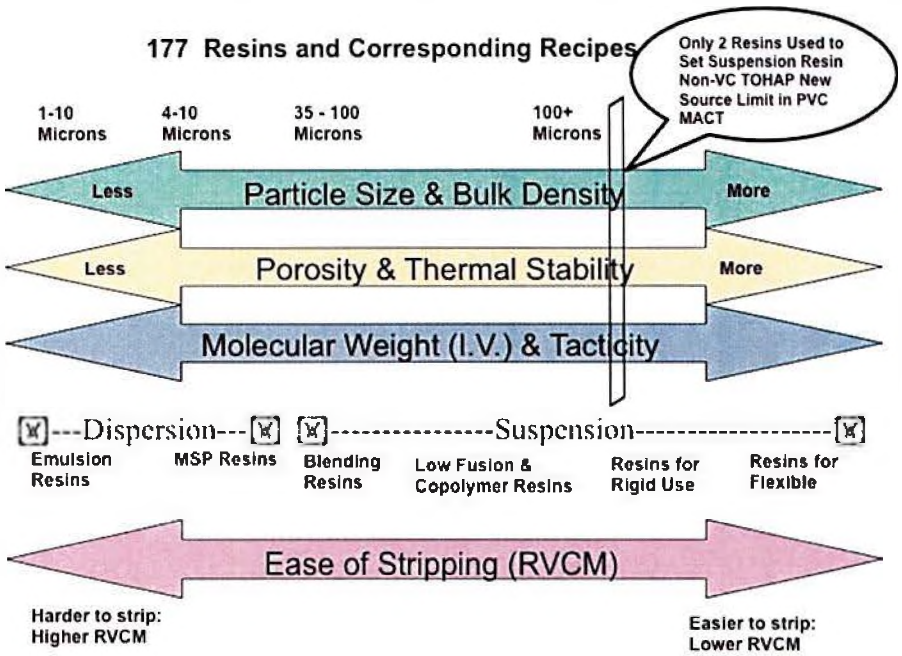

Figure 2: Resin Morphology

Figure 1 also makes clear that the high concentrations observed for some resins are a function of resin recipe rather than stripper performance. For example, Oxy Vinyls, LP Deer Park (Oxy DP) produced several resins that were consistently below the 15 ppm non-VC TOHAP limit and several resins that were always above the limit. This discrepancy is common to the subcategory, as several other facilities produced some resins near the 15 ppm limit and others significantly above the new source limit.

Returning to the initial point, recall that the resin stripper is designed to remove VC. Thus, the best measure of whether a resin stripper is performing well is VC concentration. Viewed from this perspective, some of the sources and resins that are the worst performers (for TOHAP) should actually be considered among the best performers. For example, two resins produced by Axiall Plaquemine had some of the highest TOHAP concentrations, but were in the top ten for VC concentration.[9] Moreover, the best performer used to set the new source limit for VC, Formosa Baton Rouge, would be unable to meet the new source TOHAP limit for any of its resins based on the average TOHAP concentration.

[9] Axiall Plaquemine AB and V resins. Please note that Axiall is identified as "GG" in **Figure 1** and **Attachment I**.

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To better illustrate the difficulty in selecting a best performer, the Working Group reviewed the VC and TOHAP concentration range and average for each resin grade for which such data is available. This information, presented below in **Table 1** and included as **Attachment II**, demonstrates that only four resins (highlighted in green) could be produced at a new PVC facility to meet both the new source VC and non-VC TOHAP limits on a continual basis. If the low range of non-VC TOHAP data is used, another eight resins (highlighted in blue) would be expected to be made on an occasional basis and meet the new source VC and TOHAP limits. Of the 53 total suspension resins studied during the 2009 Section 114 Request, some 41 grades would not be able to be produced at all under the new source VC and non-VC TOHAP limits.

The Working Group recognizes that under the PVC MACT, existing sources must meet a non-VC TOHAP limit of 670 ppm. Given, however, that (1) to date the industry has not had to design strippers that control for TOHAP, and (2) the 15 ppm new source limit is based on two resins, none of which can meet the new source VC limits, Working Group members currently are unaware of any technology that would provide for such combined VC and TOHAP performance across the entire slate of resins produced by the industry, even in a newly designed facility. In short, 15 ppm represents a dramatic reduction in TOHAP by any sort of measure and would appear, by extrapolation, to preclude the continued production of 85% of resins now produced by the PVC industry. The Working Group previously identified the wide variation in stripped resin performance on an individual HAP basis in its August 17, 2013 letter, which further emphasizes the difficulty in selecting a best performer.[10]

Table 1: Stripped Resin Data by Grade by Producer
(Source: 2009 S114 Request for 30 Day Resin Analysis)

		Vinyl Chloride M107 New Source Limit = 7.3 ppm			Non-VC TOHAP New Source Limit = 15 ppm		
Reporting Plant	Resin Grades Sampled	Min. (ppm)	Max. (ppm)	Average (ppm)	Min. (ppm)	Max. (ppm)	Average (ppm)
FPC- LA	A,B	0.21	1.11	0.54	35.05	54.63	41.61
	A,B,C	1.08	1.08	1.08	54.12	54.12	54.12
	A,C	0.14	0.86	0.35	12.[illegible]	61.75	41.24
	A,C,E	0.11	0.11	0.11	44.37	44.37	44.37
	A,[illegible]	0.[illegible]	[illegible]	0.69	11.[illegible]	38.45	25.10
	A,D,G	0.43	0.43	0.43	47.42	47.42	47.42
	A,E	0.29	1.51	0.73	37.43	44.57	40.86
	A,E,F	2.07	2.07	2.07	35.80	35.80	35.80
	A,F	0.47	0.47	0.47	36.42	36.42	36.42
	A,F,D	0.18	0.18	0.18	36.88	36.88	36.88
	A,G	0.22	0.60	0.37	32.09	42.63	36.67
	A,G,B	0.[illegible]	0.52	[illegible]	13.[illegible]	38.18	25.82
FPC-TX	H,I,K	0.51	1.05	0.70	12.56	25.36	18.70
	H,I,K,L	0.[illegible]	0.57	0.56	14.28	19.10	16.69
	H,I,L	0.52	0.75	0.58	17.11	19.87	18.45
	H,J,I,K	0.57	0.68	0.62	15.62	21.05	18.51
	H,J,K	0.60	0.75	0.67	17.31	19.80	18.90

[10] Docket Document EPA-HQ-OAR-2002-0037-0561 at 15.

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Table 1: Stripped Resin Data by Grade by Producer
(Source: 2009 S114 Request for 30 Day Resin Analysis)

		Vinyl Chloride M107 New Source Limit = 7.3 ppm			Non-VC TOHAP New Source Limit = 15 ppm		
Reporting Plant	Resin Grades Sampled	Min. (ppm)	Max. (ppm)	Average (ppm)	Min. (ppm)	Max. (ppm)	Average (ppm)
Axiall-Aberdeen	M	0.26	87.63	29.60	261.92	318.63	285.02
	N	1.00	100.39	27.27	205.73	228.91	216.44
	O	0.17	88.10	9.50	190.44	267.50	231.20
	P	1.39	9.02	4.61	226.21	250.42	236.23
	Q	150.90	150.90	150.90	250.79	250.79	250.79
	R	1.09	7.38	3.23	179.75	213.33	192.20
	[illegible]	0.1[illegible]	0.1[illegible]	0.14	2.[illegible]	246.37	124.47
Axiall-Plaquemine	AA	2.25	2.25	2.25	211.96	211.96	211.96
	AB	0.27	0.27	0.27	237.80	290.46	264.13
	AC	0.32	0.32	0.32	246.80	246.80	246.80
	AD	0.41	0.41	0.41	365.76	365.76	365.76
	T	0.23	1,063.00	153.35	226.80	346.35	258.40
	U	3.82	11.50	8.77	196.01	213.72	206.09
	V	0.24	0.24	0.24	228.40	258.79	237.72
	W				234.86	234.86	234.86
	X	0.30	0.86	0.54	226.89	238.37	231.71
	Y	2.27	5.05	3.41	119.17	244.43	199.25
	Z	19.30	19.30	19.30	229.47	229.47	229.47
Oxy DP	AE	0.62	4.28	2.51	15.84	19.42	17.63
	AF	0.29	7.09	2.21	7.[illegible]	17.41	10.18
	AG	0.11	0.36	0.23	6.57	12.84	9.22
	[illegible]	0.06	0.25	0.14	4.65	6.05	5.1[illegible]
	AI	0.03	0.39	0.18	4.60	6.38	5.[illegible]
	AJ	0.02	0.14	0.06	4.39	6.[illegible]	5.[illegible]
	AK	0.06	109.60	18.49	20.11	24.68	22.22
Oxy Pas	AL	2.02	5.65	3.92	48.10	104.90	78.45
	AM	0.57	1.06	0.92	94.49	128.52	107.04
	AN	0.52	1.10	0.75	74.05	121.25	96.37
	AO	2.31	10.60	6.92	42.41	114.32	63.56
Oxy Ptown	AP	3.91	33.00	9.52	22.77	95.67	36.63
	[illegible]	0.[illegible]	[illegible]	0.[illegible]	12.34	84.61	63.31
	AR	0.06	2.61	0.74	27.89	38.82	33.06
Shintech AD	AS	2.36	4.98	3.67	67.28	70.05	68.11
	AT	1.51	1.82	1.66	67.84	67.93	67.89
	AT,AS	4.14	4.14	4.14	67.71	67.71	67.71
	AU	0.25	0.43	0.36	67.77	68.15	68.00
	AU,AT	1.43	1.43	1.43	67.97	67.97	67.97
	AV	0.38	0.38	0.38	68.02	68.02	68.02
	AV,AU	0.37	0.37	0.37	68.23	68.23	68.23
Shintech PL	AX	0.30	3.37	2.01	67.28	68.03	67.72
Shintech TX	AW	3.00	9.00	6.81	66.36	67.19	66.75
Westlake-LA	AY	50.37	142.01	96.45	0.09	8.39	0.69
	AZ	15.00	40.00	23.88	0.09	5.09	3.19
Westlake-KY	BA	4.90	95.08	29.26	207.41	332.41	247.55

-- 4 Resin Grades that can meet both the 7.3 ppm VC limit and the 15 ppm Non-VC TOHAP limit are highlighted in green.
-- 8 Resin Grades that can meet both the 7.3 ppm VC limit and the 15 ppm Non-VC TOHAP limit some of the time are highlighted in blue.

Ultimately, the question is whether the new source suspension resin limit is based on the best-controlled similar source, given the facility resin mix, and whether the limit reflects what is achieved in practice. The Agency is aware that the 2009 Section 114 Request data represents only 44% (53 out of 120) of the total number of

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suspension resins produced by the industry, as shown in **Table 2**. In contrast, Working Group members submitted a 4-year data set for VC, which we would agree can be assumed to represent most, if not all, grades produced by the submitting facilities. A similar assumption cannot be made for the non-VC TOHAP data available to the Agency, however, because the data was obtained only over 30 days of sampling. Such a small data set raises the question of whether the TOHAP data fully captures what is achieved in practice.

Table 2: Number of Suspension Resin Grades Sampled in 2009 S114 Request

Company & Facility	Resin Type	# of Resin Grades	# of Resins Sampled in 2009 S114 Request
Axiall Aberdeen	Suspension	7	7
Axiall Plaquemine	Suspension	17	11
Formosa Baton Rouge	Suspension	15	7
Formosa Point Comfort	Suspension	15	5
Oxy Vinyls, LP Deer Park	Suspension	9	7
Oxy Vinyls, LP Pasadena	Suspension	6	3
Oxy Vinyls, LP Pedricktown	Suspension	10	4
Shintech Addis	Suspension	12	4
Shintech Freeport	Suspension	12	1
Shintech Plaquemine	Suspension	12	1
Westlake Calvert City	Suspension	1	1
Westlake Geismar	Suspension	4	2
Totals		**120**	**53**

In light of the disparity in TOHAP data, the Working Group reviewed the data provided in **Table 1** for indications on how best to identify "the emission control that is achieved in practice by the best controlled **similar source**." **Table 3** shows the range of VC and non-VC TOHAP values for each facility during the 30-day sampling period. The Working Group submits that EPA could use these ranges to develop a reasonable estimate of the best performing facility, as permitted by D.C. Circuit precedent, that not only provides the needed variability that accounts for the many different resin grades and their corresponding recipe ingredients, but one that represents what is actually achieved in practice for a number of different resin grades.

Table 3: VC and TOHAP for Suspension Resin Facilities Using 4-Year and 30-Day Databases*

Rank	Suspension Resin Analysis	VC 4-year					VC 30-day					TOHAP 30-day			
4 Yr. VC AVG	Facility	# Resins	Min. (ppm)	Max. (ppm)	Avg. (ppm)	Median (ppm)	# Resins	Min. (ppm)	Max. (ppm)	Avg. (ppm)	Median (ppm)	Min. (ppm)	Max. (ppm)	Avg. (ppm)	Median (ppm)
1	Formosa Baton Rouge	15	0.05	19.83	0.54	0.40	7	0.11	2.07	0.55	0.41	13.21	62.22	39.80	38.84
2	Oxy Vinyls, LP Deer Park	9	0.01	49.29	0.86	0.40	7	0.06	109.60	4.91	0.41	6.26	24.80	12.11	8.98
3	Formosa Point Comfort	15	0.44	23.63	1.70	1.52	5	0.51	1.05	0.66	0.62	13.02	26.02	19.08	19.21
4	Shintech Plaquemine	12	0.05	11.04	3.38	3.30	1	0.30	3.37	2.01	2.07	67.53	68.28	67.97	67.99
5	Shintech Freeport	12	0.55	14.82	3.64	3.56	1	3.00	9.00	6.81	7.00	67.36	68.19	67.75	67.74
6	Axiall Plaquemine	17	0.20	35.69	3.68	2.70	11	0.23	1,063.00	45.56	0.76	128.19	365.76	241.13	235.79
7	Oxy Vinyls, LP Pasadena	6	0.72	28.33	5.51	4.79	3	0.84	8.85	4.57	5.10	50.96	128.65	77.22	73.92
8	Shintech Addis	12	0.31	24.67	6.11	5.83	4	0.25	4.98	3.02	3.49	67.53	70.30	68.32	68.22
9	Oxy Vinyls, LP Pedricktown	10	0.01	73.19	6.89	5.83	4	0.06	33.00	7.63	7.31	12.83	95.94	39.59	33.92
10	Westlake Calvert City	1	0.10	194.10	13.55	9.63	1	4.90	95.08	29.26	21.00	207.56	332.63	247.75	239.46
11	Axiall Aberdeen	7	0.26	163.59	18.65	14.88	7	0.14	150.90	16.42	2.33	181.17	329.72	236.93	233.79
12	Westlake Geismar	4	5.00	201.67	68.91	65.00	2	33.39	142.01	91.93	96.03	0.19	8.49	1.09	0.33

*Data for this table is located in Attachment II.

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This is not to suggest that the Agency should set a new source limit by resin type or grade, but rather that simply averaging the VC and TOHAP concentrations to identify the best performing facility overlooks the wide range of resin recipe variability that exists within each facility. New source limits for suspension resin facilities were based on the VC performance of Formosa Baton Rouge, and the TOHAP performance of Westlake Geismar. The Working Group submits, however, that when taking into consideration the number of resins sampled, VC and TOHAP concentration ranges, as well as data consistency and other factors, Formosa Baton Rouge should be used to set both the new source VC and TOHAP limits.

In reaching this conclusion, the Working Group first compared the two facilities with the lowest average 4-year vinyl chloride data. As **Table 4** below indicates, the Working Group noted that the Oxy Vinyls, LP Deer Park facility achieved the lowest level of residual VC in a single sample with a concentration of 0.01 ppm, but had a wide variation in VC profile, as evidenced by the highest measurement of 49 ppm. Moreover, as both facilities had an identical median of 0.4 ppm, it follows that the Deer Park measurements above the median were significantly higher than those of the Formosa Baton Rouge facility. Thus, it is not surprising that the Deer Park facility had a higher 4-year average (0.86 ppm) than the Formosa Baton Rouge facility (0.54).

Given that both facilities had a median measurement of 0.4 ppm over four years, and that the lowest VC concentration measured varied by no more than 0.06 ppm, the Working Group submits that the resin stripping performance between the two facilities is nigh indistinguishable, and that any variations can be attributed to differences in resin slates. Critically, a comparison of the 4-year and 30-day VC data for the Deer Park facility indicates that even after sampling seven resins with less variability, the median figure for the 30-day data set was fairly close, if not identical. The Baton Rouge facility is the better one on which to base the new source limit, however, because: (1) it produced 15 different resins during the 4-year data collection; (2) the Deer Park facility is an area source; (3) the Baton Rouge facility is a major source; and most importantly, (4) its 30-day VC data produced almost identical results to the 4-year VC data set.

The similarity of the 30-day and 4-year data set is important because it provides a means of obtaining real world calculations for the UPL developed for the new source limit. The Working Group submits that if use of the UPL on the 30-day VC data set yields an estimated future sample value that appears within the 4-year data set, then use of the UPL on the 30-day TOHAP is also supportable. Indeed, at 7.3 ppm, the new source VC limit does not appear to reflect the level of variability achieved in practice by either of the facilities with the lowest VC concentration, and arguably should be raised to 20 ppm to reflect the condition that the new source in practice meet the limit all day and every day, even during startup, shutdown, and malfunction (SSM) events. Nevertheless, EPA's calculation of 7.3 ppm using 99.9 percentile is highly supportable with the data reported in the 4-year data set.

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Table 4: VC and TOHAP Comparison at Best Performer Candidate Facilities														
	VC 4-year					VC 30-day					TOHAP 30-day			
Facility	# Resins	Min. (ppm)	Max. (ppm)	Avg. (ppm)	Median (ppm)	# Resins	Min. (ppm)	Max. (ppm)	Avg. (ppm)	Median (ppm)	Min. (ppm)	Max. (ppm)	Avg. (ppm)	Median (ppm)
Deer Park	9	0.01	49.3	0.86	0.4	7	0.06	109.6	4.9	0.41	6.3	24.8	12.1	9
Baton Rouge	15	0.05	19.8	0.54	0.4	7	0.11	2.07	0.55	0.41	13.2	62.2	39.8	38.8
Westlake Geismar	4	5	201.7	68.9	65	2	33.4	142	91.9	96.0	0.19	8.5	1.1	0.33

Turning to the new source TOHAP calculation, we believe that a similar analysis supports the use of the Baton Rouge facility to set the non-VC TOHAP limit. The Westlake Geismar facility produces very few resins and even fewer of these (only two) were sampled for TOHAP. Indeed, the fact that Westlake Geismar did not achieve its lowest 4-year VC concentration (5 ppm) during the 30-day Section 114 sampling, suggests that it also did not reach its highest TOHAP concentration during the 30-day Section 114 sampling either during which time the facility's lowest VC concentration was 33.4 ppm. Given the apparent inverse correlation at this facility between low TOHAP and high VC concentrations, one would expect a higher TOHAP value than that measured during the 30-day sampling (8.5 ppm), as the resin VC concentration approaches the aforementioned 4-year low.

Compare this to Formosa Baton Rouge, which makes 15 resins and sampled seven grades for TOHAP. Seven resins present greater opportunity to measure variability than two, and the Working Group submits that the Baton Rouge facility presents the best opportunity for developing the new source TOHAP limit. Using the 99.9% UPL calculations in **Table 5**, the Working Group submits that the new source non-VC TOHAP limit should be set at 78 ppm, which corresponds favorably with actual measurements obtained from the Baton Rouge facility. This value is based on the use of 99.9% UPL as further explained below, and is consistent with the 99.9 percentile approach (*i.e.*, 1 in 1,000) used in the determination of the VC limit. The full calculations for these approaches are included as **Attachment III**.

Table 5: Non-VC TOHAP New Source Suspension Resin Limits				
Plant Limit Is Based On	Non-VC TOHAP (ppm)			
	99% UPL (m=1)	99.9% UPL (m=1)	99th Percentile	99.9th Percentile
Formosa Baton Rouge	67	78	67	77

The Working Group believes that calculation of non-VC TOHAP limit using 99.9% UPL is justifiable over the 99% UPL since when using the UPL on the 30 day VC data set, the 99% UPL under-predicts the top 1% and 0.1% of the data values in the 4 year VC data set for two out of the three facilities examined, as shown in Table 6.

Table 6: New Source Vinyl Chloride Limit Determination Comparing UPL Based on 30-Day Data Set to Maximum Value in 4-Year Data Set			
Plant 30-Day UPL Is Based On	Vinyl Chloride (ppm)		
	99% UPL	99.9% UPL	Max. Value From 4 Year Data
Formosa Baton Rouge	3	5	19.83
Oxy Vinyls, LP Deer Park	58	79	49.29
Formosa Point Comfort	2	2	23.63

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Since the use of the UPL essentially says "99% (or 99.9%) of all future runs will be below this number," the 4-year data was studied in **Table 7** to determine the number of data points over each of these limits and how that compared to 1% or 0.1% of the amount of data points.

Table 7: Number of Data Points Predicted by UPL Above Limit in 4-Year VC Data Set

Plant 30 Day UPL Is Based On	Count of 4 Year Data Over 99% UPL	Count of 4 Year Data Over 99.9% UPL	Count of Total Data Points	1% of Total Data Points	0.1% of Total Data Points
Formosa Baton Rouge	11	6	1,446	14	1
Oxy Vinyls, LP Deer Park	0	0	1,305	13	1
Formosa Point Comfort	1,056	890	1,461	15	1

The numbers should closely match between the 99% UPL and 1% columns and between the 99.9% UPL and 0.1% columns, but it comes close for Formosa Baton Rouge. Examining the 4-year data set would drive the new source suspension resin VC limit to be 20 ppm, since the best performer (Formosa Baton Rouge) must be in compliance all day, and every day, even during startup, shutdown, and malfunction events. Yet the new source VC limit was established at 7.3 ppm, which is approximately the 99.9 percentile limit determined with the 4-year data set. Given that the 99.9% UPL for Formosa Baton Rouge calculates to be only 5 ppm VC, the conclusion can be reached that the 99.9% UPL under-reports the values for expected future runs. Applying this reasoning and example adds further support for the use of 99.9% UPL for the TOHAP determination using the data from the best performing VC facility. Further examination of the data sets shows that Formosa Baton Rouge and Formosa Point Comfort composited their resin samples during the 30-day Section 114 Request, while Oxy Vinyls, LP Deer Park did not. This would be a further reason to use Formosa Baton Rouge as the new source facility for determining both VC and non-VC TOHAP limits because compliance will be demonstrated using a weighted average of the resins produced during the sampling period.

The Working Group submits that comparison of the Section 114 30-day sampling data set to the 4 years of samples collected during normal plant operations generally provides a suitable means of validating the UPLs and illustrates that it can be a good predictor of maximum values for the PVC resin industry at the 99.9% level or higher. The UPL considers the **variability of the data** only, not the factors that make up that variability. In the case of vinyl chloride analysis, a number of factors will influence minimum and maximum number ranges, including:

1. Resin slate – some resins strip more easily than others, so the data represents a different resin slate practically every day;
2. Processing rates – highly variable from day to day, which will affect stripping efficiency to a degree;
3. Stripper operating conditions – small changes in temperature and pressure due to system fluctuations will influence residual vinyl chloride content;
4. Analytical test methods – there is inherent variability in every analytical test procedure, and test equipment must be calibrated daily to smooth out

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this variability. We do not know the techniques used by each laboratory, so it is difficult to remove analytical procedure as a variable.

In summary, the Working Group submits that taking into consideration the issues noted above concerning the resin data sets, variability in resin slates, VC and TOHAP concentration ranges, and other factors, Formosa Baton Rouge should be used to set both the new source VC limit (using the 99.9 percentile approach, which EPA did in the final PVC MACT rule) and the new source TOHAP limit (using a 99.9% UPL) for stripped resin. The Working Group's calculations can be found in **Attachment III**.

II. Approaches for Existing and New Source Limits for Process Wastewater

A. EPA Must Incorporate Monthly Averages from 13 Month VC Wastewater Data for Existing and New Source Limits

The Working Group previously provided supplemental wastewater (WW) VC data in letters dated August 17, 2013[11] and October 31, 2013.[12] Combined, these supplemental submissions provided EPA with a total of 13 months of VC data for every facility in the Working Group for which such data is available. This significantly expands the number of data points (from 211 for the top 5 in the 30-day data set to 2,986 for the same top 5 in the 13-month data set) and better supports the use of resulting monthly averages of wastewater stripper performance for most of the existing PVC facilities in the U.S. by incorporating data that is more representative for almost all resin grades produced at each facility. The Working Group is unaware of any principled or rational basis for not incorporating the full extent of this data into the MACT floor calculations for both existing and new sources so that the VC limits include seasonal variations in production volumes, process efficiencies, and product slates. Of the wastewater data available to the Agency, only the 13-month VC data set reflects the "average emission limitation achieved" and the "emission control achieved in practice," respectively.[13]

The Working Group notes that not all facilities had the same number of data points available per month. Since the number of VC sample results for PVC industry wastewater strippers varied from once a month/week to multiple samples per day, normalization of the data must be done before performing statistical analyses to develop emission limits. The Working Group expects that EPA will use the 13-month data set to determine the best performers and set the VC WW limits using 13 monthly averages of the top 5 performing facilities. As the Agency has recognized in other rulemakings, the method for determining compliance should reflect the statistical method used to calculate the MACT floor. Consequently, EPA should allow compliance through monthly sample averaging rather than a single grab sample for both VC and TOHAP sampling. The resin database illustrates the variation in product slates at any given facility from one day to the next. Because the use of monthly averages to set the WW limit will not account for the spikes that occur due to product slate variation, monthly

[11] Docket Document EPA-HQ-OAR-2002-0037-0561, Attachment II.

[12] Docket Document EPA-HQ-OAR-2002-0037-0570.

[13] 42 U.S.C. § 7412(d)(3).

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sample averaging for compliance is necessary. Following this concept, the Working Group calculated vinyl chloride limits, detailed in **Table 8,** using 13 monthly averages for which the full calculations are provided as **Attachment IV**.

Table 8: VC Wastewater Limit Determination Using 13-Month Data Set

Existing Sources		New Sources	
Top 5 Facilities	Monthly Averages (ppm, 99 % UPL, m=1)	Best Performing Facility	Monthly Averages (ppm, 99 % UPL, m=1)
1. Oxy Pasadena, TX 2. Formosa LA 3. Shintech Freeport, TX 4. Oxy Deer Park, TX 5. Shintech Plaquemine, LA	3.1	1. Oxy Pasadena, TX	0.43

B. Determining Best Performers for Process Wastewater TOHAP Limits

Wastewater steam strippers used by PVC facilities have been designed to remove vinyl chloride in accordance with the VC NESHAP. Other non-VC TOHAP constituents may be removed to a lesser degree than vinyl chloride; however, their removal has historically not been a design criterion. Therefore, the floor analysis for other TOHAP needs to focus on the performance for TOHAP using the best performing facilities for vinyl chloride concentration at the outlet of the steam stripper.

Table 9a: Range, Average, and Median for Vinyl Chloride in Steam Stripped Wastewater

Rank (by 13 Month Avg VC)	Wastewater Analysis		VC 13 Month				VC 30 Day			
	Homopolymer Facility	Total # Resins	Min. (ppm)	Max. (ppm)	Avg. (ppm)	Median (ppm)	Min. (ppm)	Max. (ppm)	Avg. (ppm)	Median (ppm)
1	Oxy Vinyls, LP Pasadena	6	0.01	0.91	0.04	0.01	0.01	0.91	0.07	0.02
2	Formosa Baton Rouge	15	0.00	17.70	0.11	0.02	0.01	0.20	0.04	0.03
3	Shintech Freeport	12	0.01	1.81	0.11	0.08	0.01	0.08	0.02	0.01
4	Oxy Vinyls, LP Deer Park	9	0.01	4.64	0.28	0.13	0.01	0.95	0.11	0.04
5	Shintech Plaquemine	12	0.01	3.87	0.52	0.48	0.01	0.18	0.05	0.04
6	Westlake Calvert City	1	0.00	123.51	0.52	0.01	0.01	0.01	0.01	0.01
7	Shintech Addis	12	0.03	2.16	0.59	0.64	0.03	0.18	0.08	0.08
8	Axiall Aberdeen	7	0.05	8.01	1.00	0.77	0.39	5.35	1.75	1.43
9	Westlake Geismar	4	0.01	9.67	1.20	0.62	0.31	3.60	1.31	1.10
10	Formosa Point Comfort	15	0.01	6.12	1.49	1.57	0.10	0.60	0.20	0.10
11	Axiall Plaquemine	17	0.14	8.78	2.63	2.28	0.14	8.78	2.63	2.28
12	Mexichem Pedricktown	11	0.02	9.63	3.41	2.82	0.02	9.63	4.02	3.60
13	Mexichem Henry	12	0.08	17.84	3.60	1.75	0.08	17.84	7.36	7.14
Rank (by 13 Month Avg VC)	Copolymer Facility	# Resins	Min. (ppm)	Max. (ppm)	Avg. (ppm)	Median (ppm)	Min. (ppm)	Max. (ppm)	Avg. (ppm)	Median (ppm)
1	Formosa Delaware	14	0.01	16.78	0.78	0.41	0.10	16.78	1.25	0.38
2	Formosa TX SPVC	20	N/A	N/A	N/A	N/A	1.30	9.89	3.04	2.50

Product slates are the determining factor for TOHAP profiles throughout the PVC facility. Each of the 177 product grades produced by the industry has a unique recipe and yields a unique TOHAP profile, reflected in the WW stream at each facility. Although steam strippers designed to remove vinyl chloride also will be effective at removing other insoluble analytes, soluble HAPs are not as well removed. It stands to reason that, overall, the best performers for WW stripping of organic HAPs are those that achieve in practice the lowest VC effluent concentration. Oxy Vinyls, LP Pasadena

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plant, the best VC performer, has very comparable TOHAP performance to the rest of the industry when soluble analytes are not included in the sum, as depicted in the far right columns of **Table 9b**.

The full set of steam stripped WW data submitted to EPA (*see* **Attachment IV**), as summarized and presented in **Table 9a** and **Table 9b,** helps to illustrate this point across the industry.[14]

Table 9b: Range, Average, and Median for TOHAP in Steam Stripped Wastewater

Rank (by 13 Month Avg VC)	Wastewater Analysis		Non-VC TOHAP 30-day				Non-VC, Non-Soluble (Acetophenone & Methanol Excluded) TOHAP 30-day			
	Homopolymer Facility	Total # Resins	Min. (ppm)	Max. (ppm)	Avg. (ppm)	Median (ppm)	Min. (ppm)	Max. (ppm)	Avg. (ppm)	Median (ppm)
1	Oxy Vinyls, LP Pasadena	6	543.27	1,083.13	770.63	753.61	14.71	19.06	16.39	16.14
2	Formosa Baton Rouge	15	18.32	107.65	44.20	37.06	4.76	64.31	17.36	11.72
3	Shintech Freeport	12	46.68	66.24	53.64	51.70	8.24	15.32	13.37	14.05
4	Oxy Vinyls, LP Deer Park	9	18.77	27.79	23.66	23.45	13.66	17.64	15.22	15.16
5	Shintech Plaquemine	12	61.51	106.71	78.61	77.66	10.37	19.72	16.17	16.51
6	Westlake Calvert City	1	14.72	76.38	37.15	35.99	1.32	11.65	3.51	1.77
7	Shintech Addis	12	36.41	81.62	56.64	55.57	6.86	14.26	12.70	13.16
8	Axiall Aberdeen	7	25.48	2,349.68	580.25	209.64	5.14	73.51	12.56	8.42
9	Westlake Geismar	4	12.22	252.94	73.41	35.05	1.38	11.95	4.61	4.31
10	Formosa Point Comfort	15	113.02	226.77	154.27	152.98	2.78	18.92	7.33	5.95
11	Axiall Plaquemine	17	18.39	803.57	209.99	71.70	4.59	32.19	13.71	12.52
12	Mexichem Pedricktown	11	23.66	102.50	49.96	45.23	13.77	43.98	18.89	17.96
13	Mexichem Henry	12	3.98	38.62	17.60	16.76	1.97	16.49	11.88	11.94
Rank (by 13 Month Avg VC)	Copolymer Facility	# Resins	Min. (ppm)	Max. (ppm)	Avg. (ppm)	Median (ppm)	Min. (ppm)	Max. (ppm)	Avg. (ppm)	Median (ppm)
1	Formosa Delaware	14	15.53	10,946.61	585.25	36.91	8.98	10,943.74	452.39	18.41
2	Formosa TX SPVC	20	21.92	4,541.10	458.56	216.49	21.18	4,540.74	454.39	216.15

One question that may arise is whether additional steam stripping of wastewater, as opposed to resin which would experience degradation, is feasible. As the Agency has recognized in other MACTs,[15] however, although repeated stripping of wastewater would seem to be intuitive as a method of control, such repetition, in fact, does not overcome the technical limits from efforts to strip out partially soluble and soluble HAPs. The stripped WW data for the best performer in the industry from a vinyl chloride perspective, Oxy Vinyls, LP Pasadena, shows that even after steam stripping the WW to remove as much vinyl chloride as possible, significant amounts of soluble analytes can still remain.

[14] Please note that data from Dow was not available.

[15] The Miscellaneous Organic NESHAP (MON), the Hazardous Organic NESHAP (HON), and the Pharma MACT all incorporate separate control approaches for WW streams with high concentrations of soluble HAPs, which cannot be effectively removed via WW steam stripping.

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Indeed, the data in **Tables 9a** and **9b** confirms that repeated steam stripping of WW from a PVC facility can be very effective for controlling insoluble analytes such as vinyl chloride, but not as effective at removing partially soluble and soluble analytes such as methanol. Indeed, Oxy Vinyls, LP Pasadena, the best performer for low VC concentration in stripped wastewater with an average VC concentration of 0.04 ppm, has a non-VC TOHAP concentration range of 543 ppm to 1083 ppm. Conversely, Mexichem Henry had the highest average VC in WW (3.6 ppm) yet had one of the lowest non-VC TOHAP ranges (4 ppm to 39 ppm).

Some 54 resin grades were produced at the top 5 VC facilities identified in **Table 9a**, which equates to just over 10 resin grades per facility. If EPA were to base its non-VC TOHAP limit on the data associated with the top 5 VC performers, the limits would address product variability by including a broad spectrum of resins in calculating the limit. Note that producers such as Oxy Vinyls, LP make different resin grades at its Pasadena and Deer Park facilities, both in the top 5 for VC performance. Likewise, Shintech uses different resin recipes at its Freeport, Texas facility than what is being made at its Plaquemine, Louisiana plant, also both in the top 5 for VC performance.

C. Copolymer Production Should be Subcategorized for Wastewater

Examination of the non-VC TOHAP data reveals that facilities that make both PVC and copolymer resins have unique WW emission profiles that reflect the comonomer used. Days of copolymer production at Formosa's Delaware and Point Comfort SPVC plants are readily identifiable by their vinyl acetate profile in their WW.[16] As the Working Group has previously advised, vinyl chloride has low water solubility (2.7 g/L), yet a relatively high Henry's Law coefficient (2.65 x 10^{-2}atm-m^3/mol),[17] which reflects a high level of volatility. Thus, steam in proper proportions and in a properly designed and operated wastewater stripper is the most practical and efficient design for removing vinyl chloride and other relatively insoluble organics in wastewater. Vinyl acetate is much more soluble in water than VC, making it more difficult to control using steam stripping. Compared to vinyl chloride, vinyl acetate has moderate water solubility (23 g/L),[18] and a low Henry's Law coefficient (5.1 x 10^{-4}atm-m^3/mol),[19] which reflects a low level of volatility. Vinyl acetate may not be fully removed by a wastewater stripper, but should have a low HAP emission rate from the wastewater stream in any case.

As shown in **Tables 9a** and **9b**, the WW at these two facilities contains higher non-VC TOHAP, yet these plants' VC performance coincides with the rest of the industry. Examining non-VC TOHAP data in **Table 9b** shows Formosa Delaware values ranging from 15.5 to 10,900 ppm and Formosa TX SPVC values ranging from

[16] Docket Document EPA-HQ-OAR-2002-0037-0561, Figures 4 & 5, at 28, 29.

[17] EPA, Air Emissions Models for Waste and Wastewater, Appendix C. EPA-453/R-94-080A.

[18] Celanese Product Description and Handling Guide Vinyl Acetate, Nov. 2011, http://www.celanese.com/-media/Intermediate%20Chemistry/Files/Product%20Descriptions/Product_Description_and_Handling_Guide-Vinyl_Acetate.pdf.

[19] EPA, Air Emissions Models for Waste and Wastewater, Appendix C. EPA-453/R-94-080A.

21.9 to 4,540 ppm. Thus, the data supports the proposition that wastewater from a facility's copolymer operations should, at the minimum, have a separate non-VC TOHAP limit from that facility's PVC homopolymer operation. The Working Group recommends that copolymer operations, during which the separate copolymer limits would apply, be defined as those when the vinyl acetate concentration in the WW at the stripper exceeds 50 ppm. A concentration-based trigger is necessary because some facilities use a batch WW stripper, such that days of copolymer production do not necessarily correspond with the days the copolymer WW will be stripped.

D. EPA's Original 1,000 ppm TOHAP Limit is Supported by the Data

The Working Group continues to believe that a 1,000 ppm non-VC TOHAP limit, as originally proposed by the Agency,[20] is the best approach; the rationale for this approach is discussed in detail in the Working Group's August 17, 2013 letter, along with the negative consequences that will result if producers are no longer able to manufacture certain resin grades.[21]

The WW data submitted to EPA indicates that a non-VC TOHAP wastewater limit of 1,000 ppm is justifiable. As depicted in **Table 10,** using the top 5 VC performers to determine the non-VC TOHAP limit, at 99% UPL the limit calculates to be 770 ppm and at 99.9% UPL the limit calculates to be 970 ppm. The Working Group notes that limits calculated using this approach appear to adequately address soluble HAPs and support the Agency's original proposal to set the limit at 1,000 ppm TOHAP. It should be mentioned that a 99.9% UPL considers more fully the SSM scenarios now mandated to be controlled as per Section 63.11890(a). Moreover, in concert with the preceding discussion regarding the new source limits for stripped resin and factors contributing to variability, the 99.9% UPL more appropriately predicts this variability for WW in the PVC industry.

Table 10: Non-VC TOHAP Wastewater Limit Determination Using 30-Day Data Set and Top 5 VC Performers

Resins Type	VC Top 5	Non-VC TOHAP (ppm, 99% UPL, m=1)	Non-VC TOHAP (ppm, 99.9% UPL, m=1)
PVC Homopolymer	1. Oxy Pasadena, TX 2. Shintech Freeport, TX 3. Formosa LA 4. Oxy Deer Park, TX 5. Shintech Plaquemine, LA	770	970
PVC Copolymer	1. Formosa DE 2. Formosa SPVC TX	8,400	30,000[22]

As shown in **Table 9b**, the daily high non-VC TOHAP was 1,083 ppm for the OxyVinyls, LP Pasadena facility during the 30-day sampling period. The 30-day non-

[20] *National Emission Standards for Hazardous Air Pollutants for Polyvinyl Chloride and Copolymers Production*, 76 Fed. Reg. 29,528, 29,537, 29,600-01 (May 20, 2011).

[21] Docket Document EPA-HQ-OAR-2002-0037-0561 at 26–37.

[22] Given the magnitude of this number, the Working Group recommends EPA determine the limit at 99.9 percentile for the copolymer data reported by these facilities.

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VC TOHAP data set contains 13 data points out of the total 211 data points that are above the 770 ppm limit, and 3 data points out of 211 that are above the 970 ppm limit. Although the size of the 30-day data set is suitable to apply UPL methods for limit determination, limits based on 99.9 percentile will more appropriately predict what is actually achieved at these facilities across periods of operation far beyond the 30 days studied. The full calculations for these approaches are included in **Attachment V**. However, the Working Group submits that using the top 5 VC performers to establish the non-VC TOHAP limits as described below in Section II.F is the most appropriate method of determining the WW limits separately for soluble and insoluble HAPs.

E. Soluble HAP Analytes Should be Managed Separately from Insoluble Volatile HAP Analytes

If the Agency is unwilling to reconsider their original 1,000 ppm non-VC TOHAP proposal, another alternative may be feasible: soluble HAPs conceivably could be regulated separately as was done in the MON, HON, and Pharma MACTs. **Table 11** sets out the PVC MACT WW analyte list and their status under the MON and HON. In total, MON Tables 8 & 9 encompass 23 of the PVC MACT Table 10 HAPs, while HON Table 9 encompasses 26 of the PVC MACT HAPs. The MON and HON list methanol and acetophenone as soluble HAPs and the Working Group proposes alternatively that a category of soluble HAPs could be established in the PVC MACT that includes at least these two HAP chemicals.

Table 11: Treatment of PVC MACT HAPs in MON and HON

CAS No.	HAPs Listed @ Table 10 of PVC MACT (Subpart HHHHHHH)	Partially Soluble HAPs Listed @ Table 8 of MON (Subpart FFFF)	Soluble HAP Listed @ Table 9 of MON & HON (Subparts FFFF and G, respectively)
107211	Ethylene glycol		
67561	Methanol		Yes
75070	Acetaldehyde	Yes	
50000	Formaldehyde		
51285	2,4-dinitrophenol		
98862	Acetophenone		Yes
117817	Bis(2-ethylhexyl) phthalate (DEHP)		
123319	Hydroquinone		
108952	Phenol		
79345	1,1,2,2-tetrachloroethane	Yes	
106990	1,3-butadiene		
540841	2,2,4-trimethylpentane		
71432	Benzene	Yes	
108907	Chlorobenzene	Yes	
67663	Chloroform	Yes	
126998	Chloroprene	Yes	
98828	Cumene	Yes	
75003	Ethyl chloride (Chloroethane)	Yes	
100414	Ethylbenzene	Yes	
107062	Ethylene dichloride (1,2-Dichloroethane)	Yes	
75343	Ethylidene dichloride (1,1-Dichloroethane)	Yes	
74873	Methyl chloride (Chloromethane)	Yes	
75092	Methylene chloride	Yes	
110543	n-Hexane	Yes	
108883	Toluene	Yes	
71556	Methyl chloroform (1,1,1-Trichloroethane)	Yes	
79005	1,1,2-Trichloroethane		
108054	Vinyl acetate	Yes	

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Table 11: Treatment of PVC MACT HAPs in MON and HON			
CAS No.	HAPs Listed @ Table 10 of PVC MACT (Subpart HHHHHHH)	Partially Soluble HAPs Listed @ Table 8 of MON (Subpart FFFF)	Soluble HAP Listed @ Table 9 of MON & HON (Subparts FFFF and G, respectively)
593602	Vinyl bromide		
75014	Vinyl chloride	Yes	
75354	Vinylidene chloride (1,1-Dichloroethylene)	Yes	
1330207	Xylenes (isomers and mixtures)	Yes	

F. *Establishing Separate Limits for Soluble and Insoluble TOHAPs*

Should EPA decide to set separate limits for copolymer wastewater, then the Working Group suggests that EPA consider one of two approaches for calculating the non-VC TOHAP limits. The alternative approach depicted in **Table 12** (*see* **Attachment V**) uses the top 5 VC performers to set the TOHAP limits using a 99% UPL. In this alternative, soluble HAPs (methanol and acetophenone) are segregated and their limits determined separately, and the remaining non-VC TOHAPs are determined without the soluble components. For copolymer operations, the limit for vinyl acetate is calculated separately instead of soluble TOHAPs using only the data points for copolymer production at those facilities (>50 ppm at Formosa's Point Comfort SPVC plant and the designated copolymer data at Formosa's Delaware plant).

Table 12: Alternative Limit for Non-VC and Non-Soluble TOHAP with Solubles Separate (Methanol, Acetophenone)			
Resin Type	VC Top 5	Non-VC & Non-Soluble TOHAP (ppm, 99% UPL, m=1)	Soluble HAP (Methanol & Acetophenone) (ppm, 99% UPL, m=1)
PVC Homopolymer	1. Oxy Pasadena, TX 2. Shintech Freeport, TX 3. Formosa LA 4. Oxy Deer Park, TX 5. Shintech Plaquemine, LA	45	1,100
		Non-VC & Non-VA TOHAP (ppm)	Vinyl Acetate (ppm)
PVC Copolymer	1. Formosa DE 2. Formosa SPVC TX	340	38,000

G. *EPA Should Rely on 99.9% UPL for TOHAP Limit Determination and Monthly Average Compliance Sampling*

In vacating the Part 63 SSM exemption, the D.C. Circuit stated that the Clean Air Act requires "continuous section 112-compliant standards."[23] Thus, the PVC MACT requires that facilities be in compliance with the process WW limits during all types of emission events (normal operations, startups, shutdowns and malfunction events), per Section 63.11890(a). Because the Agency is required to base the emissions limits on the actual performance of existing sources, the limits should reflect all operating scenarios. There will be times when a WW stripper experiences short-term upset conditions or different TOHAP effluent concentrations during a startup or shutdown

[23] *Sierra Club v. EPA*, 551 F.3d 1019, 1027 (D.C. Cir. 2008).

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event. The TOHAP limit should be inclusive of those times. The necessity of this approach is underlined by the method for demonstrating compliance: facilities are to take a "grab" (*i.e.*, instantaneous) sample, so there is no opportunity to average sample results that encompass SSM events over a relatively long period of time.

The limited 30-day WW data for TOHAP does not adequately capture these operating scenarios. The Working Group suggests two potential approaches. As previously discussed, a 99.9% UPL better addresses variability in TOHAP concentrations at the outlet of the WW stripper, whether from differences in resin slates, production rate changes, or SSM events that occur as production lines are switched back and forth from one resin product to another. Using a 99.9% UPL for the TOHAP WW limits would address shortcomings in the data set with regard to data from SSM events.

Alternatively, the Working Group strongly recommends that the Agency allow monthly average compliance sampling by allowing the analysis of up to five samples per month, with averaging of all samples analyzed to determine compliance. This approach would match the Working Group's proposed approach for VC sampling in WW, as discussed in Section II.A of this letter, and appropriately address the comparatively small impact of SSM events on overall WW stripper performance.

III. Alternative Approaches for Process Vent Limits

The Working Group has previously discussed with the Agency the unique challenges associated with applying a process vent limit calculated from facilities using a thermal oxidizer to facilities using vent gas absorbers (VGA") as a control and recovery device for process vents. In the Working Group's August 17, 2013 letter,[24] we proposed and explained how a mass-based limit would address VGAs. As we detail below, a mass-based alternative limit would not need to be adjusted based on confidential production volumes.

To address additional concerns raised by the Agency, the Working Group also submits that an outlet flow applicability threshold of one dry standard cubic meter per minute (DSCMM") should be included for the mass-based limit to prevent any emissions performance differences among facilities with like technology and similar size. With these qualifications, the Working Group views mass-based limits as a necessary option for EPA to include in the reconsidered PVC MACT rule.

The Working Group is also concerned by the new source limits for process vents, which do not account for the capabilities and actual performance of the control devices used in PVC facilities. The Working Group submits that the best performing facility on the basis of VC should be used to set the limits for new sources for all emissions controlled by the thermal oxidizer, in order to meet the Clean Air Act's requirement that new source limits reflect what is achieved in practice.

[24] Docket Document EPA-HQ-OAR-2002-0037-0561 at 56-57.

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A. Clarification on Production Adjustment for Mass-Based Limits

As the Working Group noted in discussions with EPA, process vent volumes are poorly correlated with production rates because the vent volume is driven by the recovery system. **Figure 3** depicts the closed vent system and process vent in an effort to show the typical components, but configurations will vary by plant. Flow from the recovery system is a factor of efficiency and the presence of inerts, non-condensables, impurities, and byproducts. These factors do not increase linearly with production, but are driven by recipe and equipment.

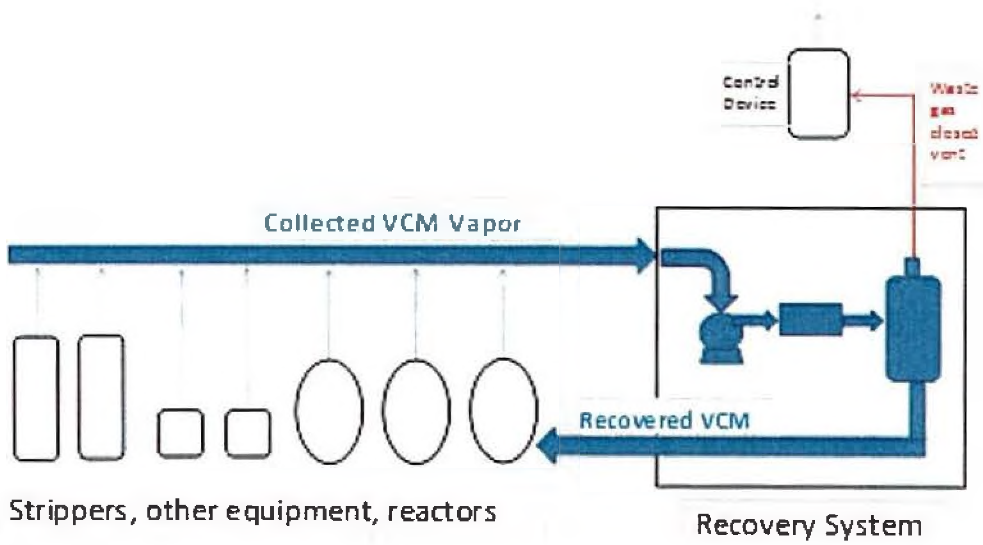

Figure 3: Typical PVCPU Closed Vent Systems

The Working Group suggested in its August 17, 2013 letter an optional demonstration of compliance for output-based mass limits, acknowledging that compliance would be relatively unchanged between concentration- and standardized flow-based mass limits for most facilities.[25] As a result, the Working Group did not propose any production adjustment in its alternate mass limit compliance. The Working Group continues to believe that such an adjustment is neither necessary nor appropriate.

B. Standardized Flow Adjustment Mass-Based Limits as Alternative or in Addition to Oxygen Normalization for Low Flow (VGA) Process Vent Existing Source Limits

The detailed calculations associated with converting volume based limits in the final rule to the alternative compliance mass-based limits and standardized flow adjustments are included in **Attachment VI**. In order to prevent any emissions

[25] Docket Document EPA-HQ-OAR-2002-0037-0561 at 55-58.

performance differences among facilities with like technology and similar size, the Working Group suggests that EPA include an outlet flow applicability threshold for the mass-based limit. Examining the flow of the control device for the top 5 PVC-only plants, reproduced in **Figure 4**, indicates they are in a reasonable range of one another. The Mexichem facilities that use VGAs, however, reported significantly lower flow from the outlet of the control device. Therefore, it would be a simple matter to apply a low flow threshold that would permit VGAs to use a mass-based limit alternative, but that would exclude facilities that use a thermal oxidizer. The Working Group proposes that a threshold of 1 DSCMM would be appropriate. Only Mexichem's VGA units would meet this criteria because the exhaust flow from the other PVC-only thermal oxidizers are all greater than 10 DSCMM.

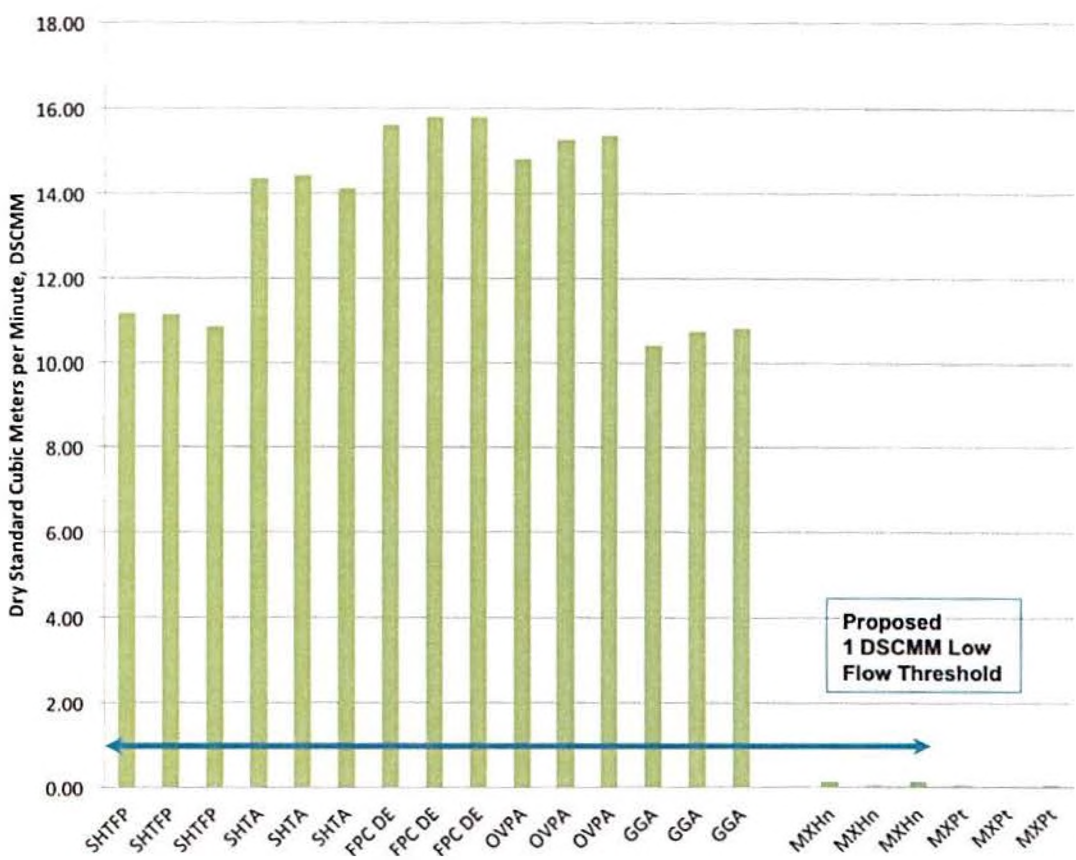

Figure 4: Top 5 (VC Basis) PVC-Only Flow Data (Source: EPA 2009 S114 Emissions Tests)

The rationale for establishing a low flow threshold accounts for the difference in technology used to control emissions. When using a thermal oxidizer, enough air is added to the device to combust the supplemental fuel gas and the incoming process vent emissions. This creates a large outflow volume of combustion byproducts and non-combustibles in the air (mostly nitrogen based) from the control device. The volume of this outflow depends primarily on the load of emissions being combusted, the

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supplemental fuel type, and the design of the unit. In order to determine comparable emissions performance, the outflow volumes are standardized to the 3% oxygen content typical for what is considered good combustion efficiency in a thermal oxidizer-type control device. Any uncombusted process vent emissions are then divided by the total outflow of combustion gases to determine their concentrations, which typically are in the single digits to tens ppm range.

In a VGA-type device, there are no combustion gases to divide the uncaptured process vent emissions, so the concentrations will correspondingly be very high. In theory, the concentration of uncaptured process vent emissions from a VGA-type control device should be tens of thousands of ppm since there are no other gases to divide the process vent emissions by other than inert gases from system vacuum leaks. In reality, a small amount of absorber liquid is vaporized and emitted along with any unabsorbed process vent emissions and inerts. The volume of vaporized absorber liquid and inerts is simply not comparable to the volume of combustion gases from a thermal oxidizer, thus forcing any device that does not use combustion technology to be automatically out of compliance. The range of outlet flow of the top 5 facilities depicted in **Figure 4** is 10.4 to 15.8 DSCMM. This is in stark contrast to the outlet flow range of the two Mexichem VGA units of 0.04 to 0.16 DSCMM. Because the VGA outlet flow is so low, 1 DSCMM would be an appropriate applicability threshold.

C. New Source Limits for Process Vents Should be Based on a Single Control Device for VC, THC, Dioxin, TOHAP and Separate Control Device for HCl

The Working Group is concerned by what appears to be a misapprehension in the rule about the capabilities of the control devices used in PVC facilities. Specifically, the use of different facilities to set the limits for individual HAPs appears to be based on the unsubstantiated belief that plants have the ability to control certain HAPs individually in a thermal oxidizer. The data submitted in response to the 2009 Section 114 Request demonstrates that varying levels of VC and other organic HAPs in the control device emissions are a function of combustion efficiency in the firebox, the amount of auxiliary fuel used, and the process vent destruction load. A thorough analysis of these factors using the Section 114 emissions test data would shed light on what is feasible with these control devices in practice.

Operational factors are significant for combustion efficiency, but it is the physical size and configuration of the firebox, along with the burner technology employed, that drives combustion efficiency and emissions. For the PVC-combined category, the Westlake Geismar thermal oxidizer whose thermal input is 87 MM BTU/hr. set the new source limit for vinyl chloride, whereas the Dow Midland thermal oxidizer whose thermal input is 3 MM BTU/hr. set the new source limits for dioxin, TOHAP, and THC. Westlake Geismar's thermal oxidizer is roughly 30 times larger than the Dow Midland thermal oxidizer, yet it must comply with process vent limits determined on a significantly smaller control device.

The two control devices can hardly be considered to be of like size and therefore should not be used to set the performance standard for the other, nor can these units be

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operationally adjusted to control one HAP over another. For reasons set forth in VI's August 17, 2013 letter, the Working Group is recommending that the Dow control device not be used as a basis for the PVC-combined process vent category.[26] On its face, a new source emission limit that was developed from various thermal oxidizer sizes, configurations, and burner technologies simply cannot reflect "the emission control that is achieved in practice by the best controlled similar source."

Different considerations apply for HCl, which is a byproduct of combustion. HCl is controlled with a separate control device (a scrubber) and emissions for this HAP can be adjusted through varying the operation of the scrubber.

The best performing facility's thermal oxidizer performance data should be used to set the limits for new sources in order to reflect what is achieved in practice. The basis for determining which is the best performing control device should be what the control device was designed to control, namely vinyl chloride. On this basis, **Table 13** was prepared to show how the limits for process vents can be determined for the respective categories. For PVC-only using Shintech Freeport data, there would be no change in the new source limits for organic HAP and hydrocarbons other than the VC correction as explained in Section D below. For PVC-combined using Westlake Geismar data, however, both the dioxin limit and the TOHAP limit increase as does the corrected VC. The detailed calculations are included as **Attachment VII**.

Table 13: New Source Process Vent Calculations Summary (Other than HCl)

Organic HAP & Hydrocarbon Limits Only		Final Rule New Source Determination Basis			VI Proposed New Source Determination Basis		
PVC-Only Process Vent	Vinyl Chloride, ppmv	0.56	Shintech Freeport	3X DL	0.6[1]	Shintech Freeport	3X DL
	Dioxin, ng/dscm	0.038	Formosa Delaware	3X DL	0.038	Shintech Freeport	3X DL
	Total Hydrocarbon, ppmv as C3	7	Shintech Freeport	99.0% UPL	7	Shintech Freeport	99.0% UPL
	Total Organic HAP, ppmv	5.5	Shintech Freeport	3X DL	5.5	Shintech Freeport	3X DL
PVC-Combined Process Vent	Vinyl Chloride, ppmv	0.56	Westlake Geismar	3X DL	0.6[1]	Westlake Geismar	3X DL
	Dioxin, ng/dscm	0.034	Dow Midland	3X DL	0.074	Westlake Geismar	99.0% UPL
	Total Hydrocarbon, ppmv as C3	2.3	Dow Midland	3X DL	2.3	Westlake Geismar	3X DL
	Total Organic HAP, ppmv	5.5	Dow Midland	3X DL	29	Westlake Geismar	99.0% UPL

[1] This value is based on not including a '0' value in determining the industry average detection limit, as explained below.

D. EPA Should Correct the Industry Average Vinyl Chloride Detection Limit for Process Vents

In calculating the industry average detection limit for vinyl chloride process vents emissions using the 2009 and 2010 Section 114 Requests emissions testing data, EPA incorrectly substituted a zero value for the detection limit on the day where no data was reported due to a lab error reported for the vinyl chloride analyte by Formosa Point Comfort, Texas during the facility's August 2, 2011 test run. When the zero value is not included, the three times method detection limit calculates to be 0.60 ppm for vinyl chloride, as detailed in **Attachment VIII**.

[26] Docket Document EPA-HQ-OAR-2002-0037-0561 at 7-11.

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IV. New Compliance Dates Are Needed

A. Uncertainty is Impacting Compliance Planning

As the Agency is aware, the industry has argued that some of the limits promulgated in the final rule constitute clear error. For example, the wastewater limit for existing area sources is based on an erroneous data point from equipment outside the PVCPU. Accordingly, continued delay in promulgating a reconsidered final rule raises significant questions about the feasibility of complying with the current limits. Uncertainty about revisions to other limits ultimately means that industry members simply do not have enough information to design and implement new equipment, if needed.

For example, the Working Group believes that the stripped resin limits for existing sources are appropriate, and some producers may be able to meet the limits with less complicated retrofits while others will need to replace their strippers altogether. However, these limits were challenged in another party's petition for reconsideration, which calls into question whether entirely new resin strippers may be required. Facilities are appropriately reluctant to invest in equipment upgrades to meet the limits in the final rule without knowing whether these changes will be sufficient after the reconsideration proceeding.

Some facilities have taken preliminary steps towards compliance, but remaining work could take years, depending on the outcome of the reconsideration process. For example, some facilities will need to install new wastewater strippers to meet the new requirements, but others may choose to refurbish an existing stripper since only minor improvements in their performance may be needed. The approach a facility takes depends completely on how much improvement in its current performance is needed. Without knowing the final limits, it is impractical to complete a design for either retrofitting or replacing equipment. Resin producers should not be required to expend resources on equipment or modifications that may in the end not be necessary, or worse, might be insufficient to meet an amended limit.

EPA must understand that the many different control devices within a PVC facility are all interdependent. The resin stripper recovers vinyl chloride and other analytes and remaining equilibrium amounts are recovered in the wastewater stripper and eventually some sent to the process vent control device. A change in configuration of the resin stripper will necessarily change the required compliance at the wastewater stripper and thermal oxidizer. In the event that stripped resin limits do not change for existing source facilities, the uncertainty with what the final limits will be for wastewater strippers and process vents will cause challenges if those control devices must be redesigned to handle a new greater load from a reconfigured or replaced resin stripper. Consider as an example a situation where one site must replace its resin stripper to meet the final PVC MACT stripped resin limits. If that plant's WW stripper is already operating at its full capacity, then changes must be completed to the WW stripper to accommodate the potentially increased load from the improved resin stripper operation. But that plant will not have any final performance parameters to reconfigure its WW stripper design to.

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It is unfair that PVC producers must be financially penalized by complying with one category of limits (*e.g.*, stripped resins) at one date (April 15, 2015) while other inter-related downstream control device limits are corrected (wastewater strippers and process vents) with compliance at a future date, when the design firm handling plant retrofits for compliance needs to have the entire set of limits to use as its design basis for equipment configurations and construction, thereby preventing any economy of scale. More examples of specific impacts of uncertainty are presented in **Attachment IX**, "Examples of Major Issues of Concern with the Final PVC MACT Emission Limit Compliance Date of April 17, 2015." Repeated shutdowns of resin plants to handle changing compliance in a fragmented manner is not only disruptive to that plant and its customer base, it also creates a very unsafe work environment. For example, shutting down the process vent to add in discharge lines from pressure relief devices is most efficiently accomplished during a plant-wide shutdown. Performing this while the plant is operating presents enormous challenges and safety considerations.

B. Time Required for PVC Unit Projects

An example of the time required to design, fund, purchase, construct, startup, and permit a PVC resin stripper at the Westlake Chemicals Calvert City, Kentucky facility is shown in **Table 14**. This was a new stripper added to an existing unit to accommodate higher throughput rates. Start to finish, this project took 26 months, and it was completed during a slow period of construction activity and demand in 2006 through 2008.

Table 14: New Resin Stripper Installation, Westlake, KY

Timeframe	Activity
Oct 2006	Column PFD development
Sep - Oct 2006	Instrument list and specification
Nov 2006	Column P&ID development
Apr 2007	Expansion scope complete
22 May 2007	Expansion AFE approved
Jun 2007	Column shell design spec sheet complete
July - August 2007	Tray evaluation
25 Sep 2007	Kick-off meeting with engineering firm for construction
11 Nov 2007	Tray drawings approved for construction
January - Feb 2008	Civil construction
15 Jan 2008	PO issued for column shell
31 Jan 2008	PO issued for column trays
Mar 2008	Tray installation at column manufacturer
March - May 2008	Auxiliary equipment deliveries (pumps, heat exchangers, etc.)
1 Apr 2008	Column delivery
April 1-15, 2008	Column insulated
15 Apr 2008	Column installed
May 2008	Piping design complete
19 May 2008	Structural steel complete
Sep 2008	Operator training
Nov 3-7, 2008	Plant shutdown for tie-ins (5d)
Nov 2008	Column commissioned

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A second example is provided by Oxy Vinyls, LP in **Attachment X** that documents the time required from start to finish of between 18 to 21 months to retray an existing resin stripper column. A total of six PVC resin strippers were retrayed during its 2006 to 2010 stripper improvement project at the Pasadena, Texas plant pursuant to a consent decree. As Oxy Vinyls, LP notes in **Attachment X**, the need to fully replace a stripper, rather than retray the existing stripper, could significantly impact the time needed to complete the project.

As a result of expanding supplies of low cost natural gas and associated light hydrocarbon liquid petrochemical precursors, the level of petrochemical construction activity is accelerating in the U.S. Gulf Coast region where many PVC producers are located. As shown in **Figure 5**, this is already dramatically increasing demand for skilled construction and craft workers as construction employment will increase some 35% by 2016. This comes at a time when the PVC producers will be required to retrofit and improve their facilities to meet the new tighter emissions limits of the PVC MACT and could extend completion times for these projects.

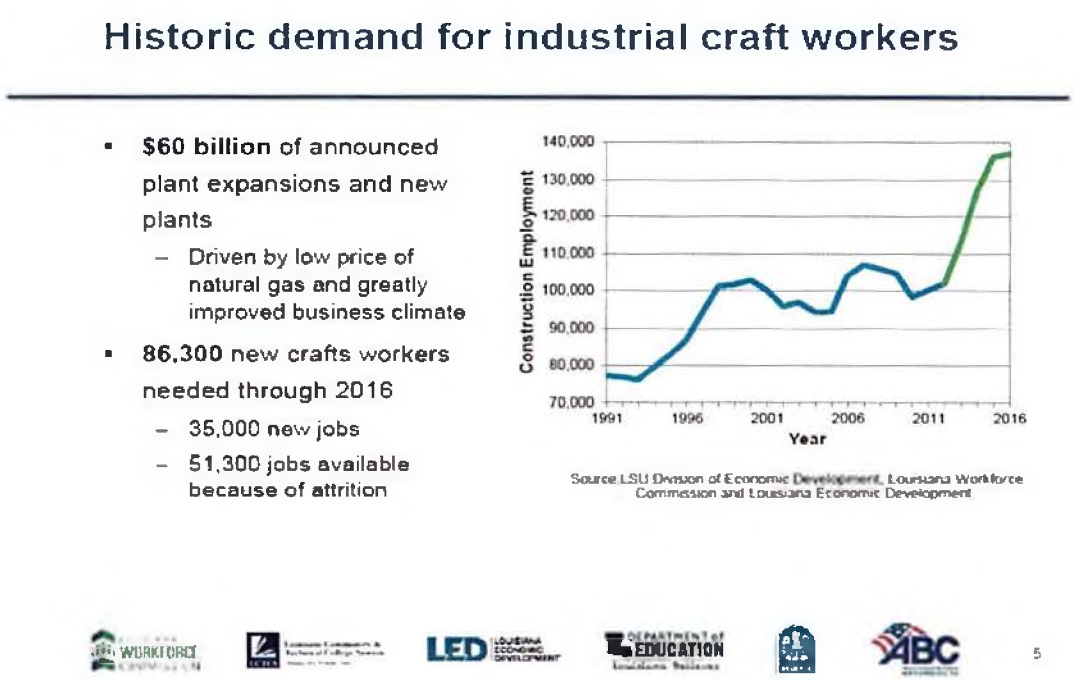

Figure 5: Louisiana Workforce Commission – Workforce Development Task Force

C. New Compliance Date Recommendations

Based on the real examples outlined above, and given that the process construction industry is heavily booked through this time period, the Working Group believes significant time will be required to come into compliance. Decisions on the technological approach must be made significantly in advance of the compliance date.

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The Working Group believes that compliance dates less than 24 months (for retrofits of existing equipment) or 36 months (for replacement of or add-ons to equipment) after the effective date of the reconsidered rule would be impracticable.

V. Summary of Recommendations

The Working Group recognizes that it has proposed or raised a number of different possible approaches to address the issues raised on reconsideration. In order to assist and streamline the Agency's review, we present below a summary of our recommendations on the approaches for revising the PVC MACT during the reconsideration:

A. *New Source Suspension resin limits:*

   1. *Determine non-VC TOHAP limits for suspension resin on the basis of the best VC performer (Formosa Baton Rouge) per **Attachment III**;*

B. *Wastewater Limits:*

   1. *Exclude Dow Midland data from wastewater calculations since it is not based on comparable source steam stripper technology; and*
   2. *Determine vinyl chloride wastewater limits for existing sources (major and area) using 99% UPL based on 13-month vinyl chloride database per **Attachment IV**; and one of the following options:*
      i. *Establish separate non-VC TOHAP limit of 1,000 ppm similar to HON and MON; or*
      ii. *Calculate non-VC TOHAP wastewater limits for existing PVC homopolymer sources (major and area) based on top 5 performers for vinyl chloride (using 99% UPL, the Working Group calculated the limit to be 770 ppm; see **Table 12** and **Attachment III**). Calculate non-VC TOHAP wastewater limits for existing PVC copolymer only operations (using 99% UPL, the Working Group calculated the limit to be 8,400 ppm; see **Table 12** and **Attachment V**); or*
      iii. *Calculate non-VC and non-soluble TOHAP wastewater limits for existing PVC homopolymer sources (major and area) based on top 5 performers for vinyl chloride (using 99% UPL and m=1, the Working Group calculated the non-VC and non-soluble TOHAP limit to be 45 ppm and the soluble limit (methanol & acetophenone) to be 1,100 ppm; see **Table 11** and **Attachment III**). Calculate non-VC and non-vinyl acetate TOHAP wastewater limit for existing PVC VA copolymer only operations (using 99% UPL and m=1, the Working Group calculated the non-VC and non-vinyl acetate limit to be 340 ppm and the vinyl acetate TOHAP wastewater limit to be 38,000 ppm; see **Table 11** and **Attachment V**).*

C. *Process Vent Limits*

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1. *Exclude Dow Midland data from PVC-combined limit determination; and*
2. *Provide alternative mass-based compliance option for low flow control devices (below 1 DSCMM) using volume concentration limits converted to mass limits for all analytes (VC, THC, TOHAP, dioxin, and HCL) and using standardized flow as per Attachment VI; and*
3. *For new source limits for process vents (PVC only and PVC combined), use a single control device to determine the limits for VC, THC, TOHAP, and dioxin based on the best VC performer and set the HCl limit based on the facility with the best HCl performance as per* ***Attachment VII****; and*
4. *Correct Process Vent 3X DL to eliminate '0' value in average determination, resulting in 0.60 ppm limit for vinyl chloride, as per* ***Attachment VIII.***

D. *Compliance Dates*

1. *Establish new compliance dates 36 months after the effective date of the final reconsidered rule.*

* * *

We appreciate the Agency's willingness to include our supplemental data submissions in its determination of emissions limits. The explanations and analysis included in this letter were developed to aid the Agency's understanding of the intricate and complicated operations of the industry and the steps needed to continue the industry's record of year-over-year emissions reductions. We welcome an additional conference call or meeting with OAQPS personnel to go over the details of this document and its implications for the reconsideration of the PVC MACT rule. Please do not hesitate to contact me if you have any questions, or require any additional information.

Sincerely,

Richard P. Krock

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Vinyl Institute PVC MACT Working Group

Attachment Number	Description
Attachment I	Interactive Database for Daily Suspension Resin Grade TOHAP by Plant Using 2009 S114 Data
Attachment II	Daily TOHAP Ranges for New Source Suspension Resins
Attachment III	Non-VC TOHAP New Source Suspension Resin Limits Calculations
Attachment IV	Determination of VC Wastewater Limit Using 13 Month Data Set
Attachment V	Determination of Non-VC TOHAP Limit for Wastewater
Attachment VI	Conversion of Volume-Based Process Vent Limits to Mass-Based Limits and Standardized Flow Adjustment
Attachment VII	New Source Process Vent Limit Calculations Using Single Control Device
Attachment VIII	Correction of 3X Detection Limit for Vinyl Chloride Process Vent Emissions
Attachment IX	Examples of Major Issues of Concern with the Final PVC MACT Emission Limit Compliance Date of April 17, 2015
Attachment X	Oxy Vinyls, LP Resin Stripper Reconfiguration Project Time

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