Appendix A

Annual and Daily $PM_{2.5}$ Monitoring Data

Data Completeness and Quarterly Averages of Fine Particulate Material in Michigan

Guideline on Data Handling Conventions for the PM NAAQS, p 4 "If you're doing an intermediate calculation, such as quarterly average PM10 value from the 24-hour values, keep all digits on your calculator."

updated 3/4/11

(green shading)	shaded cell indicates sampling frequency changed to 1:6
(blue shading)	shaded cell indicates sampling frequency changed to 1:3 from 1:1
(orange shading)	red'n in samplling frequency from 1:6 to 1:12
(yellow shading)	sampling frequeny increased to daily - +/- 5% NAAQS or s

				First Quarter				Second Quarter				Third Quarter				Fourth Quarter					3-Yr
AIRSID	Site	POC		Sch #	Obs. #	%	Quart.	Sch #	Obs. #	%	Quart.	Sch #	Obs. #	%	Quart.	Sch #	Obs. #	%	Quart.	**Annual**	**Annual**
260990009	New Haven	1	1999	30	24	80	11.66	30	22	***73***	13.55	31	31	100	13.95	5	27	540	11.45	12.66	
260990009	New Haven	1	2000	31	29	94	**16.26**	30	29	97	12.76	31	30	97	12.43	30	25	83	12.22	13.42	
260990009	New Haven	1	2001	30	28	93	14.75	31	28	90	14.68	30	29	97	13.18	31	30	97	11.78	13.60	13.2
260990009	New Haven	1	2002	30	28	93	11.86	30	28	93	13.37	31	30	97	**15.19**	31	31	100	12.98	13.35	13.5
260990009	New Haven	1	2003	30	29	97	14.47	30	26	87	12.92	31	31	100	13.08	30	28	93	10.92	12.85	13.3
260990009	New Haven	1	2004	31	31	100	11.82	30	30	100	11.49	31	30	97	14.23	30	30	100	10.29	11.96	12.7
260990009	New Haven	1	2005	30	30	100	**15.21**	31	31	100	14.21	30	29	97	**16.14**	31	30	97	11.94	14.38	13.1
260990009	New Haven	1	2006	30	30	100	13.68	15	15	100	9.65	15	12	80	9.50	16	15	94	12.27	11.28	12.5
260990009	New Haven	1	2007	30	29	97	12.37	30	29	97	9.58	31	27	87	13.33	30	29	97	12.46	11.94	12.5
260990009	New Haven	1	2008	31	30	97	13.24	30	27	90	9.10	31	30	97	10.91	30	30	100	9.38	10.66	11.3
260990009	New Haven	1	2009	30	28	93	13.71	31	31	100	6.30	30	30	100	8.09	31	27	87	9.85	9.49	10.7
260990009	New Haven	1	2010	30	30	100	9.35	30	30	100	7.27	31	31	100	10.28	31	31	100	8.79	8.92	9.7
261150005	Luna Pier	1	1999	---	---	---	---	---	---	---	---	---	---	---	---	5	5	100	12.56	12.56	
261150005	Luna Pier	1	2000	31	30	97	**16.92**	30	29	97	14.54	31	29	94	14.33	30	29	97	14.96	**15.19**	
261150005	Luna Pier	1	2001	30	27	90	**16.24**	31	25	81	**16.58**	30	29	97	**15.68**	31	30	97	12.69	**15.30**	14.3
261150005	Luna Pier	1	2002	30	30	100	14.99	30	27	90	**17.77**	31	28	90	**15.96**	31	25	81	**16.30**	**16.26**	**15.6**
261150005	Luna Pier	1	2003	30	28	93	**15.93**	30	27	90	12.84	31	31	100	14.36	30	30	100	12.01	13.79	**15.1**
261150005	Luna Pier	1	2004	31	26	84	13.02	30	30	100	12.61	31	31	100	14.83	30	29	90	11.47	12.98	14.3
261150005	Luna Pier	1	2005	30	28	93	**16.50**	31	27	87	13.40	30	27	90	**19.78**	31	30	97	13.10	**15.70**	14.2
261150005	Luna Pier	1	2006	30	27	90	14.55	30	29	97	10.91	31	30	97	12.98	31	30	97	12.45	12.72	13.8
261150005	Luna Pier	1	2007	30	29	97	12.26	30	26	87	11.41	31	29	94	14.87	30	30	100	13.78	13.08	13.8
261150005	Luna Pier	1	2008	31	31	100	13.25	30	30	100	9.76	31	29	94	12.28	30	27	90	10.16	11.36	12.4
261150005	Luna Pier	1	2009	30	30	100	13.84	31	30	97	8.19	30	28	93	9.75	31	27	87	9.54	10.33	11.6
261150005	Luna Pier	1	2010	30	30	100	10.07	30	29	97	7.76	31	31	100	10.73	31	29	94	8.87	9.36	10.4

				First Quarter				Second Quarter				Third Quarter				Fourth Quarter					3-Yr
AIRSID	Site	POC		Sch #	Obs. #	%	Quart.	Sch #	Obs. #	%	Quart.	Sch #	Obs. #	%	Quart.	Sch #	Obs. #	%	Quart.	Annual	Annual
261250001	Oak Park	1	1999	30	25	83	13.83	30	18	60	14.84	31	25	81	14.64	30	26	87	13.32	14.16	
261250001	Oak Park	1	2000	31	24	77	18.57	30	28	93	14.79	31	18	58	11.88	30	20	67	16.31	15.39	
261250001	Oak Park	1	2001	30	28	93	15.58	31	26	84	17.30	30	26	87	14.81	31	16	52	12.23	14.98	14.8
261250001	Oak Park	1	2002	30	15	50	12.73	30	21	70	17.29	31	27	87	16.07	31	27	87	13.90	15.00	15.1
261250001	Oak Park	1	2003	30	28	93	18.39	30	27	90	13.79	31	30	97	13.66	30	30	100	12.48	14.58	14.9
261250001	Oak Park	1	2004	31	30	97	13.73	30	30	100	11.26	31	30	97	14.78	30	27	90	11.26	12.76	14.1
261250001	Oak Park	1	2005	30	27	90	17.49	31	31	100	13.77	30	30	100	17.61	31	30	97	12.99	15.47	14.3
261250001	Oak Park	1	2006	30	27	90	13.51	15	15	100	10.40	15	14	93	10.76	16	16	100	13.78	12.11	13.4
261250001	Oak Park	1	2007	30	30	100	12.48	30	28	93	12.27	31	30	97	14.68	30	30	100	13.89	13.33	13.6
261250001	Oak Park	1	2008	31	30	97	13.59	30	28	93	8.75	31	30	97	11.31	30	30	100	9.79	10.86	12.1
261250001	Oak Park	1	2009	30	30	100	14.24	31	30	97	7.26	30	27	90	9.14	31	31	100	9.47	10.03	11.4
261250001	Oak Park	1	2010	30	29	97	9.91	30	30	100	7.36	31	30	97	10.74	31	29	94	8.46	9.12	10.0
261470005	Port Huron	1	1999	16	23	144	12.13	30	25	83	13.46	31	28	90	15.12	30	27	90	11.94	13.16	
261470005	Port Huron	1	2000	31	21	68	17.04	30	26	87	14.65	31	29	94	12.83	30	26	87	12.87	14.35	
261470005	Port Huron	1	2001	30	28	93	13.65	31	30	97	16.26	30	27	90	14.12	31	27	87	11.81	13.96	13.8
261470005	Port Huron	1	2002	30	29	97	12.13	30	26	87	14.03	31	29	94	16.28	31	29	94	12.91	13.84	14.0
261470005	Port Huron	1	2003	30	24	80	18.73	30	30	100	13.11	31	29	94	13.05	30	27	90	12.11	14.25	14.0
261470005	Port Huron	1	2004	31	28	90	11.44	30	28	93	12.81	31	27	87	13.18	30	29	97	10.99	12.11	13.4
261470005	Port Huron	1	2005	30	30	100	16.76	31	28	90	14.73	30	24	80	16.47	31	29	94	12.41	15.09	13.8
261470005	Port Huron	1	2006	30	30	100	15.52	15	15	100	10.71	15	15	100	9.09	16	16	100	12.86	12.04	13.1
261470005	Port Huron	1	2007	30	29	97	12.64	30	28	93	9.97	31	30	97	14.49	30	29	97	12.64	12.44	13.2
261470005	Port Huron	1	2008	31	30	97	13.66	30	29	97	9.78	31	30	97	11.56	30	29	97	9.31	11.08	11.9
261470005	Port Huron	1	2009	30	27	90	13.99	31	31	100	6.92	30	29	97	8.86	31	30	97	9.19	9.74	11.1
261470005	Port Huron	1	2010	30	28	93	8.53	30	30	100	8.06	31	30	97	10.32	31	31	100	8.86	8.94	9.9
261610008	Ypsilanti	1	1999	---	---	---	---	---	---	---	---	20	18	90	14.72	30	28	93	13.66	14.19	
261610008	Ypsilanti	1	2000	31	13	42	16.82	30	28	93	12.85	31	31	100	13.21	30	30	100	14.16	14.26	
261610008	Ypsilanti	1	2001	30	28	93	15.92	31	30	97	15.46	30	29	97	14.15	31	30	97	12.44	14.49	14.3
261610008	Ypsilanti	1	2002	30	29	97	14.71	30	30	100	14.57	31	26	84	16.43	31	29	94	13.72	14.86	14.5
261610008	Ypsilanti	1	2003	30	25	83	16.70	30	28	93	15.05	31	30	97	14.39	30	29	97	12.78	14.73	14.7
261610008	Ypsilanti	1	2004	31	30	97	13.74	30	28	93	11.76	31	31	100	14.17	30	29	97	11.79	12.87	14.2
261610008	Ypsilanti	1	2005	30	29	97	17.49	31	27	87	14.27	30	29	97	17.69	31	29	94	13.00	15.61	14.4
261610008	Ypsilanti	1	2006	30	24	80	14.80	30	29	97	10.67	31	29	94	13.12	31	23	74	11.61	12.55	13.7
261610008	Ypsilanti	1	2007	30	27	90	12.95	30	27	90	11.68	31	30	97	13.78	30	30	100	13.51	12.98	13.7
261610008	Ypsilanti	1	2008	31	28	90	13.23	30	30	100	9.07	31	31	100	11.21	30	29	97	10.13	10.91	12.1
261610008	Ypsilanti	1	2009	30	29	97	13.50	31	30	97	7.76	30	28	93	9.27	31	31	100	9.21	9.94	11.3
261610008	Ypsilanti	1	2010	30	29	97	9.97	30	28	93	7.32	31	31	100	10.29	31	30	97	9.36	9.24	10.0

				First Quarter				Second Quarter				Third Quarter				Fourth Quarter					3-Yr
AIRSID	Site	POC		Sch #	Obs. #	%	Quart.	Sch #	Obs. #	%	Quart.	Sch #	Obs. #	%	Quart.	Sch #	Obs. #	%	Quart.	**Annual**	**Annual**
261610008	Ypsilanti	2	2001	15	14	93	**16.19**	16	16	100	13.99	15	12	80	12.18	15	14	93	12.86	13.81	
261610008	Ypsilanti	2	2002	15	13	87	12.35	15	11	***73***	13.34	15	11	***73***	13.17	15	14	93	13.14	13.00	
261610008	Ypsilanti	2	2003	15	14	93	**16.80**	15	14	*93*	13.59	16	16	100	**17.41**	15	14	93	12.69	**15.12**	14.0
261610008	Ypsilanti	2	2004	15	14	93	10.29	15	14	93	9.83	16	16	100	13.21	15	15	100	11.01	11.09	13.1
261610008	Ypsilanti	2	2005	15	15	100	**18.79**	15	15	100	**15.01**	15	13	87	**21.35**	16	16	100	11.65	**16.70**	14.3
261610008	Ypsilanti	2	2006	15	12	80	**17.93**	16	13	81	10.52	16	14	88	**11.64**	16	16	100	14.01	13.53	13.8
261610008	Ypsilanti	2	2007	7	6	86	**17.67**	8	6	75	9.47	7	7	100	14.90	8	6	75	**15.17**	14.30	14.8
261610008	Ypsilanti	2	2008	8	13	163	**15.17**	7	7	100	9.70	8	7	88	**18.16**	7	7	100	8.91	12.99	13.6
261610008	Ypsilanti	2	2009	15	14	93	12.97	16	16	100	9.04	15	14	93	8.02	15	14	93	9.17	9.80	12.4
261610008	Ypsilanti	2	2010	15	13	87	8.32	15	15	100	8.11	16	16	100	10.25	15	15	100	10.93	9.40	10.7
261630001	Allen Park	1	1999	---	---	---	---	17	48	282	**18.99**	92	78	85	**16.63**	92	83	90	14.37	**16.66**	
261630001	Allen Park	1	2000	91	81	89	**16.99**	91	86	95	13.69	92	87	95	14.46	92	85	92	**17.08**	**15.56**	
261630001	Allen Park	1	2001	90	76	84	**20.05**	91	80	88	**16.68**	92	86	93	**17.46**	92	55	***60***	14.79	**17.25**	**16.5**
261630001	Allen Park	1	2002	90	78	87	**15.32**	91	72	79	**16.15**	92	66	***72***	**17.33**	92	87	95	**15.02**	**15.96**	**16.3**
261630001	Allen Park	1	2003	90	79	88	**17.37**	91	86	95	**15.25**	92	80	*87*	**15.11**	90	80	89	13.17	**15.23**	**16.1**
261630001	Allen Park	1	2004	91	74	81	**15.41**	91	85	93	12.22	92	89	97	**16.18**	92	83	90	13.14	14.24	**15.1**
261630001	Allen Park	1	2005	90	88	98	**18.45**	91	86	95	13.77	92	89	97	**17.15**	92	86	93	14.38	**15.94**	**15.1**
261630001	Allen Park	1	2006	90	81	90	13.70	91	83	91	11.59	92	87	95	13.76	92	90	98	13.65	13.18	14.5
261630001	Allen Park	1	2007	90	86	96	12.92	91	88	97	10.28	92	86	93	13.74	92	92	100	14.08	12.76	14.0
261630001	Allen Park	1	2008	91	88	97	13.86	91	90	99	10.18	92	86	93	12.98	92	87	95	10.30	11.83	12.6
261630001	Allen Park	1	2009	90	84	93	13.87	91	89	98	8.94	92	79	86	11.32	92	86	93	10.11	11.06	11.9
261630001	Allen Park	1	2010	90	80	89	11.19	91	87	96	8.83	92	84	91	11.83	92	83	90	9.05	10.23	11.0
261630001	Allen Park	2	1999	---	---	---	---	9	6	***67***	**26.08**	15	13	87	**18.22**	15	12	80	14.54	**19.62**	
261630001	Allen Park	2	2000	16	13	81	**16.82**	15	12	80	13.32	15	14	93	**15.29**	15	15	100	**18.57**	**16.00**	
261630001	Allen Park	2	2001	15	14	93	**18.62**	16	15	94	**15.82**	15	15	100	**16.22**	15	13	87	14.22	**16.22**	**17.3**
261630001	Allen Park	2	2002	15	6	***40***	13.10	15	9	***60***	11.80	15	7	***47***	**16.19**	15	15	100	14.63	13.93	**15.4**
261630001	Allen Park	2	2003	15	10	67	**21.21**	15	15	100	**16.63**	16	15	94	**18.77**	15	15	100	13.45	**17.52**	**15.9**
261630001	Allen Park	2	2004	15	15	100	12.03	15	14	93	10.63	16	15	94	13.68	15	14	93	12.96	12.33	**14.6**
261630001	Allen Park	2	2005	15	14	93	**19.61**	15	15	100	**16.22**	15	15	100	**22.47**	16	15	94	12.35	**17.66**	**15.8**
261630001	Allen Park	2	2006	15	13	87	**17.32**	15	13	87	11.35	15	13	87	12.00	16	15	94	14.77	13.86	14.6
261630001	Allen Park	2	2007	7	5	***71***	**18.04**	8	6	75	8.62	7	6	86	**17.47**	8	6	75	**18.47**	**15.65**	**15.7**
261630001	Allen Park	2	2008	8	8	100	14.28	7	7	100	11.31	8	5	***63***	**21.02**	7	7	100	9.06	13.92	14.5
261630001	Allen Park	2	2009	15	15	100	14.55	16	15	94	10.11	15	15	100	9.43	15	11	***73***	11.20	11.32	13.6
261630001	Allen Park	2	2010	monitor moved to Dearborn																	

				First Quarter				Second Quarter				Third Quarter				Fourth Quarter					3-Yr
AIRSID	Site	POC		Sch #	Obs. #	%	Quart.	Sch #	Obs. #	%	Quart.	Sch #	Obs. #	%	Quart.	Sch #	Obs. #	%	Quart.	Annual	Annual
261630015	SW HS	1	1999	12	8	67	18.69	30	27	90	16.54	31	25	81	18.54	30	25	83	16.53	17.57	
261630015	SW HS	1	2000	31	30	97	20.34	30	28	93	17.04	31	31	100	16.29	30	30	100	18.71	18.10	
261630015	SW HS	1	2001	30	29	97	19.33	31	28	90	20.05	30	30	100	17.67	31	27	87	16.07	18.28	18.0
261630015	SW HS	1	2002	30	27	90	16.80	30	27	90	17.42	31	25	81	18.27	31	29	94	17.20	17.42	17.9
261630015	SW HS	1	2003	30	26	87	17.41	30	27	90	15.39	31	30	97	16.68	30	27	90	17.26	16.69	17.5
261630015	SW HS	1	2004	31	31	100	14.95	30	27	90	15.01	31	29	94	17.69	30	28	93	13.90	15.39	16.5
261630015	SW HS	1	2005	30	27	90	20.20	31	27	87	14.73	30	30	100	18.73	31	30	97	15.18	17.21	16.4
261630015	SW HS	1	2006	30	29	97	16.98	30	26	87	12.26	31	28	90	14.93	31	31	100	14.56	14.68	15.8
261630015	SW HS	1	2007	30	28	93	15.15	30	30	100	13.06	31	27	87	15.12	30	29	97	14.82	14.54	15.5
261630015	SW HS	1	2008	31	31	100	16.07	30	30	100	11.00	31	32	103	12.03	30	29	97	12.29	12.85	14.0
261630015	SW HS	1	2009	30	30	100	15.40	31	28	90	8.18	30	29	97	10.35	31	29	94	10.53	11.12	12.8
261630015	SW HS	1	2010	30	30	100	11.35	30	30	100	8.98	31	30	97	11.85	31	30	97	10.51	10.67	11.5
261630016	Linw ood	1	1999	---	---	---	---	17	28	165	19.30	92	79	86	15.76	92	82	89	16.17	17.08	
261630016	Linw ood	1	2000	91	83	91	17.67	91	74	81	13.82	92	78	85	13.52	92	90	98	16.94	15.49	
261630016	Linw ood	1	2001	90	81	90	17.19	91	84	92	15.66	92	83	90	16.57	92	79	86	13.47	15.72	16.1
261630016	Linw ood	1	2002	90	73	81	15.04	91	82	90	15.61	92	75	82	16.78	92	88	96	14.95	15.60	15.6
261630016	Linw ood	1	2003	90	84	93	18.36	91	85	93	15.33	92	86	93	14.94	92	71	77	14.78	15.85	15.7
261630016	Linw ood	1	2004	91	76	84	14.87	91	80	88	12.10	92	82	89	14.78	92	86	93	13.00	13.69	15.0
261630016	Linw ood	1	2005	90	87	97	18.92	91	79	87	14.78	92	84	91	16.62	92	88	96	13.70	16.01	15.2
261630016	Linw ood	1	2006	90	79	88	13.04	15	14	93	11.58	15	13	87	12.58	16	17	106	14.97	13.04	14.2
261630016	Linw ood	1	2007	30	26	87	13.98	30	26	87	12.12	31	30	97	14.74	30	29	97	14.61	13.86	14.3
261630016	Linw ood	1	2008	31	29	94	14.59	30	30	100	9.58	31	29	94	12.61	30	30	100	10.96	11.94	12.9
261630016	Linw ood	1	2009	30	27	90	14.27	31	27	87	8.22	30	26	87	9.23	31	31	100	9.70	10.36	12.1
261630016	Linw ood	1	2010	30	26	87	10.42	30	28	93	8.55	31	31	100	11.34	31	30	97	9.10	9.85	10.7
261630019	E 7 Mile	1	2000	---	---	---	---	21	17	81	13.93	31	24	77	13.74	30	29	97	15.87	14.51	
261630019	E 7 Mile	1	2001	30	26	87	14.58	31	29	94	14.88	30	30	100	14.76	31	30	97	13.79	14.50	
261630019	E 7 Mile	1	2002	30	26	87	14.39	30	28	93	15.83	31	28	90	17.86	31	30	97	14.48	15.64	14.9
261630019	E 7 Mile	1	2003	30	26	87	17.05	30	30	100	14.80	31	30	97	13.98	30	29	97	13.01	14.71	15.0
261630019	E 7 Mile	1	2004	31	31	100	13.23	30	29	97	12.47	31	30	97	15.44	30	29	97	11.76	13.23	14.5
261630019	E 7 Mile	1	2005	30	28	93	19.82	31	31	100	14.48	30	29	97	17.43	31	29	94	14.20	16.48	14.8
261630019	E 7 Mile	1	2006	30	30	100	15.20	15	15	100	10.39	15	14	93	11.78	16	16	100	13.46	12.71	14.1
261630019	E 7 Mile	1	2007	30	30	100	13.20	30	28	93	11.16	31	31	100	14.36	30	27	90	13.31	13.01	14.1
261630019	E 7 Mile	1	2008	31	30	97	13.60	30	30	100	9.51	31	26	84	11.42	30	30	100	10.79	11.33	12.3
261630019	E 7 Mile	1	2009	30	30	100	14.73	31	31	100	7.61	30	26	87	9.88	31	28	90	9.95	10.54	11.6
261630019	E 7 Mile	1	2010	30	30	100	10.27	30	23	77	8.68	31	26	84	11.18	31	29	94	9.44	9.89	10.6

				First Quarter				Second Quarter				Third Quarter				Fourth Quarter					3-Yr
AIRSID	Site	POC		Sch #	Obs. #	%	Quart.	Sch #	Obs. #	%	Quart.	Sch #	Obs. #	%	Quart.	Sch #	Obs. #	%	Quart.	Annual	Annual
261630025	Livonia	1	1999	---	---	---	---	---	---	---	---	15	15	100	15.21	30	19	63	10.93	13.07	
261630025	Livonia	1	2000	31	30	97	16.53	30	28	93	14.08	31	30	97	13.28	30	25	83	14.46	14.59	
261630025	Livonia	1	2001	30	27	90	15.39	31	30	97	15.67	30	29	97	15.14	31	29	94	12.18	14.60	14.1
261630025	Livonia	1	2002	30	18	60	13.33	30	28	93	14.26	31	29	94	16.47	31	28	90	13.43	14.37	14.5
261630025	Livonia	1	2003	30	26	87	15.96	30	28	100	15.36	31	31	100	13.89	30	27	90	11.59	14.20	14.4
261630025	Livonia	1	2004	31	29	94	12.72	30	25	83	11.98	31	28	90	14.13	30	30	100	11.45	12.57	13.7
261630025	Livonia	1	2005	30	26	87	17.86	31	28	90	11.74	30	30	100	17.45	31	30	97	12.68	14.93	13.9
261630025	Livonia	1	2006	30	27	90	13.49	15	14	93	11.23	15	15	100	10.01	16	17	106	12.70	11.86	13.1
261630025	Livonia	1	2007	30	26	87	12.23	30	30	100	10.59	31	31	100	13.76	30	27	90	14.42	12.75	13.2
261630025	Livonia	1	2008	31	27	87	13.56	30	29	97	9.50	31	31	100	11.21	30	30	100	9.77	11.01	11.9
261630025	Livonia	1	2009	30	29	97	13.93	31	31	100	7.40	30	28	93	9.19	31	28	90	9.01	9.88	11.2
261630025	Livonia	1	2010	30	28	93	9.37	30	29	97	6.65	31	27	87	10.98	31	30	97	9.40	9.10	10.0
261630033	Dearborn	1	1999	19	8	42	13.98	30	26	87	16.75	31	28	90	18.31	30	29	97	18.24	16.82	
261630033	Dearborn	1	2000	31	29	94	22.76	30	23	77	20.13	31	27	87	17.56	30	29	97	20.06	20.13	
261630033	Dearborn	1	2001	30	29	97	20.95	31	29	94	18.58	30	28	93	18.27	31	29	94	20.63	19.61	18.9
261630033	Dearborn	1	2002	30	29	97	20.99	30	28	93	18.15	31	29	94	20.22	31	30	97	20.00	19.84	19.9
261630033	Dearborn	1	2003	30	28	93	22.59	30	27	90	19.03	31	27	87	17.83	30	28	93	17.34	19.20	19.5
261630033	Dearborn	1	2004	31	29	94	17.71	30	25	83	16.10	31	25	81	17.46	30	28	93	16.06	16.83	18.6
261630033	Dearborn	1	2005	30	28	93	21.50	31	31	100	16.57	30	28	93	18.22	31	28	90	17.90	18.55	18.2
261630033	Dearborn	1	2006	30	28	93	18.79	30	29	97	12.85	31	27	87	15.56	31	31	100	17.30	16.13	17.2
261630033	Dearborn	1	2007	30	29	97	18.84	30	29	97	15.20	31	29	94	16.02	30	27	90	17.49	16.89	17.2
261630033	Dearborn	1	2008	31	31	100	16.59	30	28	93	11.18	31	30	97	13.51	30	30	100	12.06	13.34	15.4
261630033	Dearborn	1	2009	30	29	97	17.29	31	31	100	8.42	30	27	90	10.42	31	31	100	12.13	12.07	14.1
261630033	Dearborn	1	2010	30	27	90	11.70	30	30	100	9.39	31	30	97	12.32	31	31	100	11.90	11.33	12.2
261630033	Dearborn	2	2010	15	14	93	13.18	15	15	100	10.05	16	15	94	12.30	15	15	100	13.70	12.31	
261630036	Wyandotte	1	1999	14	7	50	17.06	30	17	57	14.55	31	26	84	18.85	30	21	70	14.67	16.28	
261630036	Wyandotte	1	2000	31	16	52	19.30	30	28	93	16.52	31	29	94	15.64	30	30	100	19.07	17.63	
261630036	Wyandotte	1	2001	30	30	100	21.49	31	30	97	17.53	30	29	97	18.53	31	24	77	15.26	18.20	17.4
261630036	Wyandotte	1	2002	30	24	80	15.40	30	28	93	15.98	31	28	90	16.51	31	25	81	17.24	16.28	17.4
261630036	Wyandotte	1	2003	30	24	80	15.07	30	24	80	20.37	31	28	90	16.37	30	29	97	13.45	16.32	16.9
261630036	Wyandotte	1	2004	31	27	87	14.48	30	29	97	12.74	31	29	94	15.91	30	28	93	11.52	13.66	15.4
261630036	Wyandotte	1	2005	30	29	97	16.96	31	28	90	14.93	30	29	97	18.58	31	27	87	15.19	16.42	15.5
261630036	Wyandotte	1	2006	30	29	97	15.10	30	26	87	10.95	31	29	94	13.69	31	29	94	11.94	12.92	14.3
261630036	Wyandotte	1	2007	30	29	97	13.75	30	28	93	11.96	31	30	97	14.60	30	29	97	13.47	13.45	14.3
261630036	Wyandotte	1	2008	31	31	100	12.55	30	29	97	9.47	31	30	97	11.95	30	30	100	9.78	10.94	12.4
261630036	Wyandotte	1	2009	30	28	93	14.21	31	30	97	7.86	30	28	93	9.89	31	25	81	9.47	10.36	11.6
261630036	Wyandotte	1	2010	30	23	77	9.44	30	29	97	7.84	31	29	94	11.30	31	31	100	8.84	9.36	10.2

				First Quarter				Second Quarter				Third Quarter				Fourth Quarter					3-Yr
AIRSID	Site	POC		Sch #	Obs. #	%	Quart.	Sch #	Obs. #	%	Quart.	Sch #	Obs. #	%	Quart.	Sch #	Obs. #	%	Quart.	**Annual**	**Annual**
261630038	New berry	1	2004	---	---	---	---	---	---	---	---	---	---	---	---	2	2	100	**29.70**		
261630038	New berry	1	2005	30	28	93	**16.98**	31	25	81	14.60	30	22	***73***	**17.66**	*vandalism*				**16.41**	
261630038	New berry	1	2006	*vandalism*				30	29	97	11.09	31	27	87	14.34	31	28	90	11.98	12.47	
261630038	New berry	1	2007	30	27	90	13.63	30	27	90	12.85	31	28	90	**15.35**	30	30	100	14.23	14.02	14.3
261630038	New berry	1	2008	31	29	94	13.95	30	30	100	10.15	31	28	90	12.16	30	28	93	10.99	11.81	12.8
261630038	New berry	1	2009	30	25	83	13.24	31	29	94	7.89	30	27	90	9.43	31	29	94	10.12	10.17	12.0
261630038	New berry	1	2010	30	27	90	9.39	30	30	100	8.73	31	31	100	11.92	31	30	97	10.12	10.04	10.7
261630039	FIA\Lafayette St	1	2005									---	7	---	**18.20**	31	28	90	14.25		
261630039	FIA\Lafayette St	1	2006	30	29	97	14.78	30	30	100	11.71	31	31	100	14.20	31	30	97	11.84	13.13	
261630039	FIA\Lafayette St	1	2007	30	29	97	13.83	30	30	100	12.98	31	30	97	14.65	30	28	93	13.86	13.83	13.5
261630039	FIA\Lafayette St	1	2008	31	30	97	14.26	30	28	93	10.70	31	29	94	12.80	30	29	97	11.14	12.23	13.1
261630039	FIA\Lafayette St	1	2009	30	29	97	14.67	31	31	100	7.89	30	30	100	9.44	92	84	91	10.78	10.70	12.3
261630039	FIA\Lafayette St	1	2010	90	83	92	10.69	91	89	98	8.65	92	76	83	11.22	92	84	91	9.62	10.05	11.0

A 3-year annual average of 15.1 ug/m3 would violate the NAAQS according to the data handling conventions in 40 CFR part 50

98^{th} Percentile $PM_{2.5}$ Values Averaged over 3 Years

updated 3/1/11

AIRS ID	Site	POC	Current Sampling Freq	1999 98th % ile	2000 98th % ile	2001 98th % ile	2002 98th % ile	2003 98th % ile	2004 98th % ile	2005 98th % ile	2006 98th % ile	2007 98th % ile	2008 98th % ile	2009 98th % ile	2010 98th % ile	99-01 Avg	00-02 Avg	01-03 Avg	02-04 Avg	03-05 Avg	04-06 Avg	05-07 Avg	06-08 Avg	07-09 Avg	08-10 Avg	09-11 Avg
260990009	New Haven	1	1 in 3	31.9	33.2	42.0	35.6	31.8	31.9	41.5	34.4	29.0	28.9	26.2	25.5	36	37	36	33	35	36	35	31	28	27	26
261150005	Luna Pier	1	1 in 3	18.1	37.2	39.2	42.7	34.7	35.0	49.3	32.6	32.2	28.6	23.6	26.3	32	40	39	37	40	39	38	31	28	26	25
261250001	Oak Park	1	1 in 3	42.8	40.7	39.4	38.4	36.6	32.5	52.2	33.0	35.3	30.4	30.1	27.1	41	40	38	36	40	39	40	33	32	29	29
261470005	Port Huron	1	1 in 3	44.5	33.1	40.5	35.3	37.2	32.2	47.6	37.9	36.3	31.0	29.9	25.8	39	36	38	35	39	39	41	35	32	29	28
261470005	Port Huron	2	---	---	---	35.9	37.7	38.0	---	---	---	---				36	37	37	---	---	---	---	---	---	---	---
261610008	Ypsilanti	1	1 in 3	40.6	30.3	39.7	30.9	38.8	31.5	52.1	31.3	34.5	28.2	28.2	23.3	37	34	36	34	41	38	39	31	30	27	26
261610008	Ypsilanti	2	1 in 6	---	---	39.0	32.6	32.5	31.2	54.6	33.0	30.6	31.3	29.4	22.4	39	36	35	32	39	40	39	32	30	28	26
261630001	Allen Park	1	1 in 1	43.7	38.6	44.2	39.6	40.5	36.9	43.0	32.8	31.0	30.3	29.2	27.8	42	41	41	39	40	38	36	31	30	29	29
261630001	Allen Park	2	1 in 6	44.1	34.6	40.1	30.9	39.2	33.8	58.0	34.2	36.2	32.3	32.4	---	40	35	37	35	44	42	43	34	34	---	---
261630015	SW High Sch.	1	1 in 3	50.2	44.5	42.9	38.2	33.6	36.0	49.7	36.2	34.0	34.3	30.9	26.6	46	42	38	36	40	41	40	35	33	31	29
261630016	Linwood	1	1 in 6	44.5	40.3	40.9	42.7	46.2	38.3	51.8	36.9	34.3	30.0	31.0	27.9	42	41	43	42	45	42	41	34	32	30	29
261630019	E 7 Mile	1	1 in 6	---	42.0	42.0	34.4	37.1	35.0	52.3	36.2	31.9	31.9	29.2	28.6	42	39	38	36	41	41	40	33	31	30	29
261630025	Livonia	1	1 in 6	38.4	35.9	44.7	32.7	38.1	32.2	40.2	30.4	32.8	28.3	29.3	25.3	40	38	39	34	37	34	34	31	30	28	27
261630033	Dearborn	1	1 in 3	45.1	45.1	43.2	45.7	42.8	39.4	50.2	43.1	36.6	31.7	35.7	28.6	44	45	44	43	44	44	43	37	35	32	32
261630033	Dearborn	2	1 in 6						---	---	---	---	---	---	31.5						---	---	---	---	---	---
261630036	Wyandotte	1	1 in 3	45.0	42.7	46.6	34.1	34.8	32.3	46.7	33.2	28.6	26.3	26.9	24.4	45	41	39	34	38	37	36	29	27	26	26
261630038	Newberry	1	1 in 3	---	---	---	---	---	36.8	57.5	28.6	33.4	31.5	25.9	30.4	---	---	---	---	---	41	40	31	30	29	28
261630039	FIA/Lafayette	1	1 in 3	---	---	---	---	---	---	43.9	32.4	34.8	31.7	31.7	27.7	---	---	---	---	---	38	37	33	33	30	30

A 3-year 24-hour average of 36 ug/m3 would violate the NAAQS according to the data handling conventions in 40 CFR part 50

Appendix B

EMISSIONS INVENTORY METHODOLOGY

SUPPORT DOCUMENTATION FOR THE $PM_{2.5}$ REQUEST TO REDESIGNATE TO ATTAINMENT − SOUTHEAST MICHIGAN

March 2011

Table of Contents

1. Introduction

2005 and 2008 Emissions Inventory

Emissions inventory documentation support for the $PM_{2.5}$ Request to Redesignate to Attainment is provided in this appendix. An inventory was prepared for the following Michigan counties: Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne. Mobile estimates for the nonattainment counties were prepared by the Southeast Michigan Council of Governments (SEMCOG). The remaining emission source categories were developed by the Michigan Department of Environmental Quality (MDEQ) and the Lake Michigan Air Director's Consortium (LADCO). LADCO is the Midwest Regional Planning Organization (MRPO) which MDEQ and other Midwest states access for a multitude of technical air quality planning activities. The focus of the inventory effort was to produce emission inventories for the nonattainment year (2005) and the attainment base year (2008). The future year projections (2018 and 2022) take into account existing control measures and measures that are promulgated and known to be on the way. Many of the future year emission estimates for this inventory product were taken from the LADCO Base B Inventory. Where data was not available in the Base B inventory, data from the previous inventory cycle - Base M run was utilized, if appropriate. Procedures used to prepare the Base M inventory product can be found in the *Regional Air Quality Analyses for Ozone, $PM_{2.5}$, and Regional Haze: Technical Support Document*, prepared by LADCO. LADCO has produced numerous summary reports with state and county total emissions, and posted them on their Internet site at:

http://www.ladco.org/tech/emis/

In a related effort, the 2005 and 2008 Michigan statewide inventories were submitted to the U.S. Environmental Protection Agency (EPA) by the MDEQ pursuant to 40 CFR Part 51, Subpart A – Emissions Inventory Reporting Requirements. Many of the more significant methodologies are described in this appendix.

2018 and 2022 Growth and Control Factors

To assess progress for attaining air quality goals, LADCO uses emission activity growth and control data to forecast emissions from a 2005 nonattainment year and 2008 attainment year inventories to two future years of interest. These future years include 2018 and 2022 (e.g., 2018 is the first milestone for regional haze reasonable progress demonstrations). As a contractor to LADCO, Pechan prepared emission control factors to support forecasting for 2018 and 2022. Because the incremental level of effort required to develop emission activity growth factors for each year over the 2003-2018 period was nominal, Pechan prepared non-electric generating unit (non-EGU) point, area and non-road source growth factors for each year over this entire period.

For the non-EGU point source, stationary area source and Marine, Air and Railroad (MAR) source sectors, the future year emissions for the LADCO states were derived by applying growth and control factors to the base year inventory. Growth factors were based initially on Economical Growth Analysis System (EGAS version 5.0), and were subsequently modified (for select priority categories) by examining emissions activity data.

The report, *Development of 2005 Base Year Growth and Control Factors for Lake Michigan Air Directors Consortium (LADCO),* describes Pechan's efforts to develop emission growth and control data to support future year air quality modeling by LADCO. The report is organized into a background chapter and:

Chapter II, which describes the development of the emission activity growth data;
Chapter III, which discusses how the emission control data were compiled;
Chapter IV, which describes the preparation of the growth and control factor files;
Chapter V, which identifies projection issues for future consideration; and
Chapter VI, which presents the references consulted in preparing this report.

The Pechan Growth and Control Factor report is too lengthy to be included in this document, but it can be provided upon request or downloaded at:

http://www.ladco.org/reports/technical_support_document/references/ladco_2005_base_yr_growth_and_controls_report_final.pdf

Additional information on the procedures used to project emissions can be found in the *Regional Air Quality Analyses for Ozone, $PM_{2.5}$, and Regional Haze: Technical Support Document*, prepared by LADCO.

2. EGU Point Sources

2005 EGU Point Source Methodology

The 2005 electrical generation unit (EGU) point source data originated with annual emissions data provided to MDEQ via the Michigan Air Emissions Reporting System (MAERS). Temporal allocation was performed by emission unit, month, day of week, and hour using the procedures described in *Temporally Allocating Emissions with CEM Data for Chemical Transport and SIP Modeling*, available at:

http://www.epa.gov/ttn/chief/conference/ei15/session4/edick.pdf

In addition to the heat input-based temporal profiles described in the paper, separate temporal profiles were developed based on Continuous Emissions Monitoring (CEM) reported emissions of nitrogen oxides (NOx) and sulfur dioxide (SO_2) and these profiles were used instead of heat input to temporalize annual emissions of the respective pollutants into winter weekday. The CEM data used as the basis of the profiles was for 2004 through 2006, obtained from the EPA Clean Air Markets Division (CAMD) website:

http://cfpub.epa.gov/gdm/index.cfm?fuseaction=iss.progressresults

2008 EGU Point Source Methodology

Year 2008 EGU annual emissions were obtained from MAERS, and temporally adjusted to represent winter weekday as determined from LADCO base B inventory data.

2018 Future Year EGU Point Source Methodology

In developing emission projections for year 2018, consideration was given to both British Thermal Units (BTU) heat input of EGUs within the 7-county area, as well as scheduled facility improvements such as selective catalytic reduction (SCR) of NOx and flue gas desulfurization (FGD) for reduction of SO_2. Because of several utility and industrial EGUs that experience load-shifting among various units, peaker plant use, and occasional shutdowns, total combined BTU heat input data was obtained for the 7-county region for each year of years 2002 – 2008. Correlation and bivariate regression analysis of each year's BTU heat input was then performed to forecast the 7-county future year boiler BTU heat input requirements. The results of this analysis were then used to predict year 2018 BTU heat input and for comparison with other known Integrated Planning Model (IPM) studies by the EPA in their development of the air transport rule. The EPA relied on the IPM model when developing their base case v.4.10 emission projections for years 2012-2050. The EPA's base case v.4.10 IPM model results consider the national Title IV SO_2 cap-and-trade program, NOx SIP Call regional ozone season cap-and-trade program, and all current settlements and state rules. The EPA base case simulation represents conditions without the proposed transport rule and without the rule it replaces, the Clean Air Interstate Rule (CAIR). The predicted BTU heat input obtained from regression forecasts was then compared to the heat input results obtained by the EPA's base case v.4.10 IPM model results and also with LADCO/Visibility Improvement State and Tribal Association of the Southeast (VISTAS) BTU heat input to determine the reasonableness of the prediction. Deductions were made for selective catalytic reduction and flue gas desulfurization at the Detroit Edison Monroe Power Plant that occurred after year 2008. These additional control measures would explain the further reduction in emissions in the future year 2018 emission forecast.

2022 Future Year EGU Point Source Methodology

Bivariate regression analysis was used to forecast future year 2022 energy demand as BTU heat input of EGUs for the 7-county planning area, as was done in the earlier 2018 forecast. Because emission reductions occurred in earlier years between 2008 and 2018, the later 2022 forecast is reflective of expected energy demand growth after control measures were implemented at the Detroit Edison Monroe Power Plant.

3. Non-EGU Point Sources

2005 Non-EGU Point Source Methodologies

The original source of the 2005 point source data is the 2005 Michigan point source emission inventory. This section of the document describes the compilation and processing of point source emission data submitted to comply with the Consolidated Emission Reporting Rule (CERR) for the EPA National Emissions Inventory (NEI) 2005 inventory.

The data originates with the entry of data by the reporting facilities into MAERS. The electronic data received from the reporting facilities is reviewed and compiled by the MDEQ and exported to the fixed-width text version of the National Inventory Format (NIF). After the exported data is loaded into a PostgreSQL database patterned after the Microsoft (MS) Access version of the NIF, the following processing steps and checks are performed.

Both emissions estimated by default calculations in MAERS and any emissions reported by facility operators are maintained in MAERS. For evaluation and quality assurance purposes, both types of records are included in the exports. To avoid double-counting, where a specific process/pollutant has emission records both reported directly by the facility operator and estimated via MAERS calculations, the latter are excluded.

Portable facilities such as asphalt plants report total throughput and emissions, plus operating percentages for each county in which the portable facility was located during the year. From this information, records are generated for each county of operation, and throughput and emissions are apportioned based on the operating percentages reported by county and process. As geographic coordinates for all operating sites are not reported, coordinates corresponding to the centers of the counties of operation are assigned.

As attention has shifted from total particulate to PM_{10} and $PM_{2.5}$, total particulate records are excluded from the reporting requirements.

Over 99.8% of total criteria pollutant emissions are accounted for by emissions reported by the operator. Therefore, exported criteria emissions estimated via MAERS calculations are excluded.

In the site table, where strFacilityCategory is not set in the export, it is set to “01.”

Mandatory geo-coordinate fields were added to the NIF specifications released in December 2003, well after it would have been possible to collect this information from the reporting facilities for 2002 operations. The following values were deemed most often representative and the exported data are updated accordingly for 2002 data:

> “strHorizontalCollectionMethodCode” is set to '027'
> “strHorizontalAccuracyMeasure” is set to '2000'

“strHorizontalReferenceDatumCode” is set to '001'
“strReferencePointCode” is set to '106'

For 2005, these geographic data elements were requested of the facilities. The defaults above were applied only where data was not provided by the facility.

MAERS tracks emissions of some pollutants that are of interest to the Great Lakes Commission (GLC), but which do not have corresponding pollutant codes in the most recent NIF pollutant code table. Emission records for the following pollutant codes are excluded:

7440508; 8052413; DICDD,TOT; DICDF,TOT; HYDFLUORO; PERFLUORO; TRICDD,TO; TRICDF,TO; CH4; CO2; N20; 117840; 7783064.

Emission records for ammonia are exported with the Chemical Abstract Service number 7664417, rather than the pollutant code NH3. These pollutant codes are updated to NH3. Likewise, records exported with pollutant codes PAH and POM are updated to pollutant codes 234 and 246, respectively.

All criteria and Hazardous Air Pollutant (HAP) emissions are reported at the process level, and the export routines reflect that in the strEmissionDataLevel field of the emission table. This field is set to null for criteria pollutant emission records per EPA guidance.

All emissions are exported as pounds of annual emissions. The EPA guidance suggests that criteria pollutant emission be reported in tons. The field strEmissionUnitNumerator is changed to TON and the filed dblEmissionNumericValue is divided by 2000 for criteria pollutant emission records.

Null values in the quarterly throughput fields of process records are set to zero.

Where quarterly throughput fields of process records sum to zero, throughput percentages are set to 25% for each quarter.

MAERS recognizes a control device code of '909' for a “Roll Media Fiberglass Tack Filter (Tacky 1 side),” which is not recognized in the NIF code tables. Where this control device code is exported, the “strPrimaryDeviceTypeCode” field of the control equipment table is updated to a value of 058.

Because of the exclusion of emission records as described above, referential integrity of the exported data can be compromised. At this point, it is re-established by deleting records stepwise, in the following order.

CE records without corresponding EM records
PE records without corresponding EM records
EP records without corresponding EM records
ER records without corresponding EP records
EU records without corresponding EP records

SI records without corresponding EU records

The data are then checked again for referential integrity and mandatory fields and then loaded into the MS Access shell version of the NIF via append queries that connect to the PostgreSQL data tables via ODBC. The Basic Content and Format Checker is run and its output is reviewed. Where corrections are needed, to assure consistency among data sources, the corrections are made in the MAERS and a full iteration of the export and post-processing steps are performed.

The 2005 point source inventory was incorporated into the LADCO Base M inventory and serve as the basis for Michigan's 2005 CERR submittal.

2008 Stationary Non-EGU Point Source Methodologies

The 2008 point source data have as their original sources the 2008 Michigan point source emission inventory. This section of the document describes the compilation and processing of point source emission data submitted to comply with CERR for the EPA NEI 2005 inventory.

The data originates with the entry of data by the reporting facilities into the MAERS. The electronic data received from the reporting facilities is reviewed and compiled by the MDEQ, and exported to the Consolidated Emissions Reporting Schema (CERS) extendible markup language (XML) text version of the EPA Emissions Inventory System (EIS). After the exported data is loaded into a PostgreSQL database patterned after the MS Access version of the CERS Staging Tables, the following processing steps and checks are performed.

Both emissions estimated by default calculations in MAERS and any emissions reported by facility operators are maintained in MAERS. For evaluation and quality assurance purposes, both types of records are included in the exports. To avoid double-counting, where a specific process/pollutant has emission records both reported directly by the facility operator and estimated via MAERS calculations, the latter are excluded.

Portable facilities such as asphalt plants report total throughput and emissions, plus operating percentages for each county in which the portable facility was located during the year. From this information, records are generated for each county of operation, and throughput and emissions are apportioned based on the operating percentages reported by county and process. As geographic coordinates for all operating sites are not reported, coordinates corresponding to the centers of the counties of operation are assigned.

As attention has shifted from total particulate to PM_{10} and $PM_{2.5}$, total particulate records are excluded from the reporting requirements.

Over 99.8% of total criteria emissions are accounted for by emissions reported by the operator, therefore exported criteria emissions estimated via MAERS calculations are excluded.

All criteria and HAP emissions are reported at the process level.

All emissions are exported as pounds of annual emissions. The EPA guidance suggests that criteria pollutant emissions be reported in tons. The CERS emissions field is converted to TONs and the emissions unit field is changed to TON.

Null values in the quarterly throughput fields of process records are set to zero.

Where quarterly throughput fields of process records sum to zero, throughput percentages are set to 25% for each quarter.

The 2008 point source inventory was incorporated into the LADCO Base B inventory and serve as the basis for Michigan's 2008 CERR submittal.

2018 and 2022 Future Year Stationary Non-EGU Point Source Methodologies

A Correlation/Regression analysis of energy demand as expressed as BTU heat input for actual year fuel consumption of years 2002-2008 obtained from MAERS was used to derive future year growth factors. The results of this analysis did not indicate any trend with time within the 7-county planning region. Future year 2018 and 2022 emission projections take into consideration a 7-year average of the BTU heat input from non-EGU sources. Additional analysis was performed at the statewide level using Energy Information Administration fuel BTU heat input data for years 2002-2008. Unlike the Southeast Michigan 7-county area, which didn't show any trend with time, the statewide correlation/regression analysis showed a declining trend with time in BTU heat input. It was found that the 7-year average BTU heat input resulted in growth factors for the 7-county area that were greater than those obtained from the statewide correlation/regression analysis.

4. Stationary Area (Non-point) Sources

2005 and 2008 Stationary Area Source Emission Inventory

The following is a description of the various area source categories that were inventoried as part of the years 2005 and 2008 emissions inventories as required by the EPA under CERR. It also provides documentation as part of the development of a broader emissions inventory (which encompasses point, area, non-road mobile, on-road mobile, and biogenic sources) that is being developed to support State Implementation Plan (SIP) requirements for attainment demonstrations.

Summary of Area Sources and Respective Air Pollutants Inventoried for 2005 Inventory

Seq #	Area Source Description	SCCs	SIC	CO	NH3	NOx	PM10-PRI	PM25-PRI	SOX	VOC
1	Residential coal	2104001000	8811	√	√	√	√	√	√	√
2	Residential distillate oil	2104004000	8811	√	√	√	√	√	√	√
3	Residential kerosene	2104011000	8811	√	√	√	√	√	√	√
4	Residential natural gas	2104006000	8811	√	√	√	√	√	√	√
5	Residential propane	2199007000	8811	√		√	√	√	√	√
6	Commercial coal	2103002000	9999	√	√	√	√	√	√	√
7	Commercial distillate oil	2103004000	9999	√	√	√	√	√	√	√
8	Commercial kerosene	2103011005	9999	√	√	√	√	√	√	√
9	Commercial natural gas	2103006000	9999	√	√	√	√	√	√	√
10	Commercial residual oil	2103005000	9999	√	√	√	√	√	√	√
11	Industrial coal	2102002000	3999	√	√	√	√	√	√	√
12	Industrial distillate oil	2102004000	3999	√	√	√	√	√	√	√
13	Industrial kerosene	2102011000	3999	√	√	√	√	√	√	√
14	Industrial natural gas	2102006000	3999	√	√	√	√	√	√	√
15	Industrial residual oil	2102005000	3999	√	√	√	√	√	√	√
16	Remedial action	2660000000	9511	√		√	√		√	√
17	Municipal landfills	2620030000	4953	√		√	√	√		√

Stationary Source Fossil Fuel Combustion

The combustion of natural gas, propane-liquefied petroleum gas (LPG), distillate fuel oil, kerosene, and residual fuel oil in small boilers, furnaces, heaters, and stoves are also a source of VOC, NOx, particulates, SO_2, and ammonia emissions. Because these sources are so numerous to be identified in point source inventories, this area source category attempts to provide a collective estimate of emissions from these smaller energy consumption sources by subtracting all fuel used by point sources from total fuel consumption. Procedures for the estimation of these smaller sources are presented in the EPA's documents entitled:

1. *Volume II, Chapter 2 of the Emission Inventory Improvement Program January 2001 Preferred and Alternate Methods for Estimating Air Emissions from Boilers.*

2. *Emission Inventory Improvement Program –April 6, 1999, Area Source Category Abstract- Fuel Oil and Kerosene Combustion.*

3. *Emission Inventory Improvement Program –April 6, 1999, Area Source Category Abstract-Natural Gas and LPG Combustion.*

4. *Emission Inventory Improvement Program –April 6, 1999, Area Source Category Abstract-Coal Combustion.*

5. *Documentation for the Draft 1999 National Emissions Inventory (Version 3.0) for Criteria Air Pollutants and Ammonia.*

6. Hanke, B.H, manuscript prepared for U.S Environmental Protection Agency entitled: *A National Methodology and Emission Inventory for Residential Fuel Combustion.*

This documentation involves determination of total fuel consumption over an area with subsequent fuel deductions made for point source fuel consumption, and then applying emissions factors to estimate fuel emissions.

Total fuel consumption information was based on data supplied from U.S. Department of Energy, Energy Information Administration (EIA) documents. The unaccounted fuel consumption was then apportioned to individual counties using U.S. Census Bureau information for the individual end use sector fuel types based on LADCO states methodology. Area source fuel emissions were reported for the following residential, commercial/institutional, and industrial end use sectors. Since utility boilers are accounted as point sources, area source emissions are not reported for this end use sector.

Residential Boilers & Furnaces

County emission estimates for the residential end use sector were based on the consumption of natural gas, propane-LPG, distillate fuel oil, kerosene, and coal. This energy consumption information was obtained from U.S. Department of Energy, EIA data. Since the EIA merely provides statewide fuel consumption totals, county fuel consumption estimates were obtained by apportioning the fuel consumption based on the number of year 2000 occupied household census counts using the given fuel. Emission estimates were calculated using the following mathematical equation:

$$Cf = Ch/Sh \times Sf$$

Where:

Cf = Estimated county residential sector consumption of a given fuel type for year 2005

Ch = Number of year 2000 census occupied households in a given county that utilize a given fuel type

Sh = Total number of year 2000 census occupied households statewide that utilize a given fuel type

Sf = Total statewide residential sector consumption of a given fuel type

Michigan Residential Fuel Consumption Information Sources

Residential Fuel Type	U.S. Dept of Energy, EIA Data Sources
Natural gas	Natural Gas Annual 2005, Michigan Table 48
Propane LPG	Petroleum Marketing Annual, 2005, Table 49: Prime Supplier Sales Volumes of Aviation Fuels, Propane and Residual Fuel Oil by PAD District and State
Distillate fuel oil	Fuel Oil and Kerosene Sales 2005 Report, Table 19: Adjusted Sales for Residential Use: Distillate Fuel Oil and Kerosene, 2005
Kerosene	Fuel Oil and Kerosene Sales 2005 Report, Table 18: Adjusted Sales of Kerosene by Energy Use
Coal	EIA Annual Coal Report 2005, Table 26 U.S. Coal Consumption by End Use Sector, by Census Division and State 2005, 2004 (Thousand Short Tons)

Upon obtaining county residential fuel consumption estimates for the various fuel types in all Michigan counties Cf, emission estimates were obtained by applying an emission factor that is specific to that fuel type. These emission factors were obtained from various EPA publications.

Michigan Residential Fuel Emission Factors

Residential Fuel Type	Units	CO	NH_3	NOx	PM_{10}-PRI	PM_{25}-PRI	SO_2	VOC
Natural gas	Lbs/million cubic feet	40	0.49	94	7.6	7.6	0.6	5.5
Propane LPG	Lbs/1,000 gal	3.2		13	0.68	0.68	0.1	0.5
Distillate fuel oil	Lbs/1,000 gal	5.0	0.8	18	2.38	2.13	42.60	0.7
Kerosene	Lbs/1,000 gal	4.8	0.8	17.4	2.38	2.13	41.1	0.7
Coal	Lbs/ton	275	0.000565	3.0	18.63	4.86	37.83	10

Sources of Emission Factors:

1. U.S. Environmental Protection Agency *Documentation for the Draft 1999 National Emissions Inventory (Version 3.0) for Criteria Air Pollutants and Ammonia.*

2. Hanke, B.H, manuscript prepared for U.S Environmental Protection Agency entitled: *A National Methodology and Emission Inventory for Residential Fuel Combustion.*

3. U.S. Environmental Protection Agency. Final Report on *Development and Selection of Ammonia Emission Factors.*

The resulting emission estimates were reported by individual fuel type using the following SCC codes:

Michigan Residential Combustion Emission SCC Codes

Residential Fuel Type	SCC
Natural gas	2104006000
Propane LPG	2199007000
Distillate fuel oil	2104004000
Kerosene	2104011000
Coal	2104001000

Commercial/Institutional Boilers and Furnaces

Estimation of fuel combustion by the commercial/institutional sector was performed using an adaptation of a methodology presented in the following EPA publications:

1. *Emission Inventory Improvement Program –April 6, 1999, Area Source Category Abstract- Fuel Oil and Kerosene Combustion*

2. *Emission Inventory Improvement Program –April 6, 1999, Area Source Category Abstract-Natural Gas and LPG Combustion*

3. *Emission Inventory Improvement Program –April 6, 1999, Area Source Category Abstract-Coal Combustion*

County emission estimates for the commercial/institutional end use sector were based on the consumption of natural gas, residual fuel oil, distillate fuel oil, kerosene, and coal. This energy consumption information was obtained from U.S. Department of Energy, EIA data. Fuels were subtracted for point sources, and the net area fuel contribution was apportioned or allocated using procedures instructed by LADCO. This procedure involved statewide commercial/institutional fuel apportionment to a county level using the commercial/institutional employment data as obtained from U.S. Department of Commerce, Bureau of Census publication entitled *County Business Patterns, Michigan: 2003* (CBP/03-24 issued September, 2005). County fuel estimates of individual fuel types were estimated using the following equation:

$$Cf = Ce/Se \times Sf$$

Cf = Estimated county commercial/institutional sector consumption of a given fuel type
Ce = Total county employment in the commercial/institutional sector
Se = Statewide employment in commercial/institutional sector
Sf = Statewide commercial/institutional sector consumption of a given fuel type

Because the Energy Information data includes diesel fuel totals within the distillate fuel oil total, these motor vehicle fuels were deducted to provide only an estimate of #1, #2, and #4 fuel oils.

Michigan Commercial/Institutional Fuel Consumption Information Sources

Fuel Type	U.S. Dept of Energy, EIA Data Sources
Natural gas	Natural Gas Annual 2005, Michigan Table 48
Residual fuel oil	Fuel Oil and Kerosene Sales 2005 Report, Table 17: Adjusted Sales of Residual Oil by Energy Use, 2004 and 2005
Distillate fuel oil	Fuel Oil and Kerosene Sales 2005 Report, Table 20: Adjusted Sales for Commercial Use: Distillate Fuel Oil, Residual Fuel Oil and Kerosene 2005
Kerosene	Fuel Oil and Kerosene Sales 2005 Report, Table 18: Adjusted Sales of Kerosene by Energy Use
Coal	EIA Annual Coal Report 2005, Table 26 U.S. Coal Consumption by End Use Sector, by Census Division and State 2005, 2004 (Thousand Short Tons)

Upon obtaining county commercial/institutional fuel consumption estimates for the various fuel types in all Michigan counties Cf, emission estimates were obtained by applying an emission factor that is specific to that fuel type. These emission factors were obtained from various EPA publications.

Michigan Commercial/Institutional Fuel Emission Factors

Commercial/Institutional Fuel Type	Units	CO	NH_3	Nox	PM_{10}-PRI	PM_{25}-PRI	SO_2	VOC
Natural gas	Lbs/million cubic feet	84	0.49	100	7.6	7.6	0.6	5.5
Residual fuel oil	Lbs/1,000 gal	5	0.80	55	9.07	3.37	194.05	1.13
Distillate fuel oil	Lbs/1,000 gal	5	0.80	20	2.38	2.13	53.96	0.34
Kerosene	Lbs/1,000 gal	5	0.80	18	2.38	2.13	41.1	0.713
Coal	Lbs/ton	6	0.000565	7.5	6.0	2.2	36.86	0.05

Sources of Emission Factors:

1. LADCO state uniform adopted emission factors for commercial/institutional natural gas combustion.

2. U.S. Environmental Protection Agency. FIRES database.

3. U.S. Environmental Protection Agency. *Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, 5th Edition and Supplements (AP-42).*

4. U.S. Environmental Protection Agency. Final Report on *Development and Selection of Ammonia Emission Factors.*

The resulting emission estimates were reported by individual fuel type using the following SCC codes:

Michigan Commercial/Institutional Combustion Emission SCC Codes

Fuel Type	SCC
Natural gas	2103006000
Residual fuel oil	2103005000
Distillate fuel oil	2103004000
Kerosene	2103011005
Coal	2103002000

Industrial Boilers and Furnaces

Estimation of fuel combustion emissions of industrial boilers and furnaces was performed in similar manner as the commercial/institutional sector. Statewide industrial fuel consumption information was obtained from the U.S. Department of Energy, EIA publications. Point source deductions were made for each fuel type to obtain the area contribution that was then apportioned to the county level using LADCO prescribed procedures.

County fuel consumption estimates of natural gas, residual fuel oil, distillate fuel oil, kerosene, and coal were based upon the following mathematical equation:

$$Cf = Ce/Se \times Sf$$

Cf = Estimated county industrial sector consumption of a given fuel type
Ce = Total county employment in the industrial sector
Se = Statewide employment in industrial sector
Sf = Statewide industrial sector consumption of a given fuel type

Michigan Industrial Fuel Consumption Information Sources

Industrial Fuel Type	U.S. Dept of Energy, EIA Data Sources
Natural gas	Natural Gas Annual 2005, Michigan Table 48
Residual fuel oil	Fuel Oil and Kerosene Sales 2005 Report, Table 17: Adjusted Sales of Residual Oil by Energy Use, 2004 and 2005
Distillate fuel oil	Fuel Oil and Kerosene Sales 2005 Report, Table 21: Adjusted Sales for Industrial Use: Distillate Fuel Oil, Residual Fuel Oil, and Kerosene (#1, #2, and #4 fuel oils – excludes diesel oil)
Kerosene	Fuel Oil and Kerosene Sales 2005 Report, Table 18: Adjusted Sales of Kerosene by Energy Use
Coal	EIA Annual Coal Report 2005, Table 26: U.S. Coal Consumption by End Use Sector, by Census Division and State 2005, 2004 (Thousand Short Tons)

County employment data was obtained from the U.S. Department of Commerce, Bureau of Census publication entitled *County Business Patterns, Michigan: 2003 (CBP/03-24 issued September, 2005)*. Upon obtaining county industrial fuel consumption estimates for the various fuel types in all Michigan counties Cf, emission estimates were obtained by applying an emission factor that is specific to that fuel type. These emission factors were generally based on the LADCO adopted emissions factors.

Michigan Industrial Fuel Emission Factors

Industrial Fuel Type	Units	CO	NH_3	NOx	PM_{10}-PRI	PM_{25}-PRI	SO_2	VOC
Natural gas	Lbs/million cubic feet	84	3.2	100	7.6	7.6	0.6	5.5
Residual fuel oil	Lbs/1,000 gal	5.0	0.8	55	7.17	4.67	157	0.28
Distillate fuel oil	Lbs/1,000 gal	5.0	0.8	20	2.3	1.55	53.96	0.2
Kerosene	Lbs/1,000 gal	5.0	0.8	18	2.38	2.13	41.1	0.713
Coal	Lbs/ton	6	0.00057	7.5	6.0	2.2	38	0.05

Sources of Emission Factors:

1. LADCO state uniform adopted emission factors for industrial natural gas, residual fuel oil, distillate fuel oil, and coal combustion.
2. U.S. Environmental Protection Agency. FIRES database.
3. U.S. Environmental Protection Agency. *Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, 5th Edition and Supplements (AP-42).*
4. U.S. Environmental Protection Agency. Final Report on *Development and Selection of Ammonia Emission Factors.*

Emission estimates were reported using the following SCC codes:

Michigan Industrial Combustion Emission SCC Codes

Industrial Fuel Type	SCC
Natural gas	2102006000
Residual fuel oil	2102005000
Distillate fuel oil	2102004000
Kerosene	2102011000
Coal	2102002000

Remedial Action, Site Clean Up & Leaking Storage Tanks

Evaporative VOC emissions occur during remediation and cleanup at sites of environmental contamination. Such remediation activities may include air stripping or sparging of a VOC from contaminated groundwater or incineration of a spoil material removed from a contaminated site. In some instances carbon adsorption may be required to reduce VOC emitted during air stripping or spraying operations.

Estimation of VOC loss from remedial action activities was determined by summing the allowable emissions from permits to those parties that were engaged in such activities as provided by the MDEQ, Air Quality Division (AQD), Permit Section. Although site remediation activities are subject to NESHAPs, these requirements did not apply at the time of the year 2005 emissions inventory. Emissions were reported using an SCC of 2660000000.

Municipal Waste Landfills

A municipal solid waste landfill is defined as any facility that is regulated under Subtitle D of the Resource Conservation and Recovery Act (RCRA) that receives primarily household and/or commercial wastes.

VOCs are produced from municipal solid waste by: the volatilization of the waste material itself, the microbiological (anaerobic) putrefaction of organic waste materials that result in the formation of organic acids and alcohols that are vaporized, and the chemical reaction of one or more waste materials or chemical decomposition intermediate. The rate at which VOCs are emitted from a landfill is dependent upon the structural design of cells, the waste composition (physical/chemical properties), the moisture content of the waste, the amount of waste disposed, temperature, age of the landfill, the chemical reactivity of the waste, the microbiological toxicity of the waste, and the effectiveness of landfill gas collection systems. Where landfill gas is collected for use in boilers, internal combustion engines (reciprocating and turbines) or flared at the landfill site, there are additional air pollutants such as NOx, particulates ($PM_{2.5}$ and PM_{10}), and carbon monoxide produced from incomplete combustion.

Estimation of VOC emissions from municipal landfills were based on the revised technical procedures presented in the EPA publication entitled: *Volume III, Chapter 15 of the Emission Inventory Improvement Program January 2001 Revised Final Guidance for Landfills*. In this publication, the preferred method for the estimation of area source emissions is to use the LandGem model or the equations from the *Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, 5th Edition and Supplements (AP-42)* section on landfills. LandGem is a computer-based model that uses the same equations as that of AP-42. The emissions calculation for the estimation of landfill gas requires site specific information including: landfill design capacity, accumulated waste totals from operation of the landfill, and existing control requirements from landfill gas collection systems. Landfills may be subject to either new source performance standards (*40 Code of Federal Regulations Part 60 Subpart WWW*) or emission guidelines (*40 Code of Federal Regulations, Part 60, Subpart Cc*). Landfills are now also subject to NESHAPs that became effective on January 16, 2003. For those landfills that were not being reported in the point source inventory, area emission estimates were reported on the basis on LandGem model simulations using the SCC of 2620030000. These simulations reflected total waste receipts under the prior year 1999 inventory with addition made for waste receipts for years 2000-2005 as obtained from annual reports by the *MDEQ, Waste and Hazardous Division Report of Solid Waste Landfilled in Michigan*. For those landfills that operated landfill gas collection/combustion systems, emission estimates considered Tables 2.4-3 and 2.4-5 of AP-42 with adjustments considered for a landfill gas methane collection efficiency of 75% of LandGem model predicted methane generation at a given landfill site.

Non-Methane Organic Compound Control Efficiencies for Landfill Gas Combustion from AP-42

Combustion Control Device	Typical Control Efficiency (%)
Boilers	98
Flares	99.2
Gas Turbines	94.4
IC Engine	97.2

Emission Rates for Secondary Compounds from Landfill Gas Combustion (Based upon lbs/ Million Cubic Feet of Landfill Gas Combusted)

Combustion Control Device	NOx	$PM_{2.5}$-PRI	PM_{10}-PRI	CO
Flare	40	17	17	750
IC Engine	250	48	48	470
Boiler	33	8.2	8.2	5.7
Gas Turbines	87	22	22	230

Open Burning: Municipal Solid Waste

For the category of open burning of municipal solid waste (MSW), EPA's methodology from Appendix A of *Documentation for the Final 2002 Nonpoint Sector (Feb 06 Version) National Emission Inventory for Criteria and Hazardous Air Pollutants* was followed. The ratio of urban to rural population was obtained from 2000 U.S. Census data, per the EPA's method, then multiplied by a 2005 U.S. Census Bureau estimate of the county population in Michigan to obtain an estimate of rural population in 2005. Per capita emission factors were used, after first excluding those counties where the population was greater than 80% urban under EPA's presumption that open burning of MSW would not occur there.

Outdoor Wood Boilers

The Wisconsin methodology distributed by Bart Sponseller was followed. Per that methodology, the MARAMA emission factor of 13.82 g/kg wood burned was used.

An estimate of 11.68 cords/yr/unit in Michigan was obtained from Brian Brady, AQD. Brian serves as the AQD's outdoor wood boiler expert.

Michigan estimated an average weighted density of 1.65 tons/cord of wood, based on information contained within Table 8 of the USDA survey report *Residential Fuelwood Consumption and Production in Michigan, 1992*.

Per the Wisconsin methodology, it was assumed that 90% of outdoor wood boilers are used in rural areas and 10% are used in urban areas. To determine which counties were urban and which were rural, staff reviewed the list of counties, which are part of Michigan's Consolidated Statistical Areas (metropolitan areas) and determined that the 22 affected counties should be considered as urban. Ten percent of the 29,568 Michigan outdoor wood boilers were apportioned to the urban counties by population. The remaining 90% of the outdoor wood boilers were apportioned to the 61 rural counties by population.

2005 Residential Wood Burning

Michigan utilized the EIIP methodology's alternative method for estimating emissions from residential wood burning, by apportioning data from the U.S. Census Bureau and the EIA.

Two options were available to estimate wood burning households per county.

- Housing Units with Wood Heat by County was determined by using 1990 U.S. Census Data, Database C90STF3C1, Summary Level State, for House Heating Fuel for Occupied Housing Units (http://venus.census.gov/cdrom/lookup). Although this data is for the 1990 year, it did provide a value for each county.

- Housing Units with Wood Heat by County was determined by using the U.S. Census Bureau's DP-4, Profile of Selected Housing Characteristics: 2000, Data Set: Census 2000 Summary File 3 (SF 3) for Michigan. This file provided a *total* value of households using wood heating. However, no breakdown was given by county.

The AQD staff used the 2000 number of total wood burning households in Michigan, and used the 1990 county proportions of the 1990 total to apportion the 2000 value to the county level.

Then based on county value for number of wood burning households, the value for state wood use in cords was apportioned to each county. The 2003 state wood use in cords data came from the US MAP States Page, *Table 8, Residential Energy Consumption Estimates, Selected Years 1960-2003, Michigan*, from the U.S. Department of Energy, EIA:

http://www.eia.doe.gov/emeu/states/sep_use/res/use_res_mi.html

Data for 2005 was not available at the time the 2005 inventory was developed.

Once county wood use in cords was produced, the next step was to determine the wood weight in tons for each county. Wood weight was determined by estimating a weighted average wood weight of 1.65 tons per cord, from species and consumption data from Table 8 of the USDA report, "Residential Fuelwood Consumption and Production in Michigan, 1992."

Michigan did not have data available on the number of catalytic and non-catalytic woodstoves in Michigan, but did utilize 1993 survey data which showed the proportions of fireplaces to woodstoves by county in Michigan. This was used to apportion wood weight per county between wood stoves and fireplaces. SCCs and emission factors were selected for fireplaces – cordwood (2104008001), and woodstoves – general (2104008010).

No ozone season activity was estimated, as staff felt it was unlikely that residents would utilize their fireplaces or wood stoves between June 1 and August 31 of each year.

FIRE 6.23 and Source Summary Database (SSD) list the following Area Mobile Source Codes (AMS):

A2104008000: Total wood stoves and fireplaces
A2104008001: (lb/ton dry wood burned): Fireplaces - general
A2104008010: (mg/Mg dry wood burned): Wood stoves - general
A2104008030: (lb/ton dry wood burned): Catalytic wood stoves - general
A2104008050: (lb/ton dry wood burned): Non-catalytic wood stoves - general
A2104008051: (lb/ton dry wood burned): Non-catalytic wood stoves - conventional
A2104008052: (lb/ton dry wood burned): Non-catalytic wood stoves - low emitting
A2104008053: (lb/ton dry wood burned): Non-catalytic wood stoves - pellet fired

Michigan selected AMS codes A2104008001 and A2104008010. These were the most appropriate codes, as data exists for the proportion of woodstoves to fireplaces per county in Michigan, but data was not available on numbers of catalytic or non-catalytic wood stoves. Emission factors for A2104008010 were converted from mg/Mg to lb/ton by multiplying by the conversion factor of 2.00E-06.

References:

1. EPA, *Factor Information Retrieval System Version 6.23*, U.S. Environmental Protection Agency, 2000.

2. EPA, STAPPA, ALAPCO, *Emission Inventory Improvement Program (EIIP)*, Volume III, July 1997, Chapter 2.

2008 Residential Wood Combustion

Michigan utilized the EPA's Residential Wood Combustion tool (RWC_2008_Toolv4.1) to estimate emissions from Residential Wood Combustion for the 2008 emissions inventory. The residential wood combustion tool was modified to address a few deficiencies with Michigan Counties. Double-counting of emissions for SCCs 2104008400, 21048510, and 2104008610 was resolved, and the allocation of appliances for SCC 2104008610 Hydronic heater: outdoor was revised using an inverse population density methodology.

Structure Fires

The EIIP guidance from EIIP Volume III, Chapter 18: *Structure Fires*, was followed. The preferred method for estimating emissions was used, due to the availability of county level structure fire data for 2002. More recent data was not available; the fire statistics data, which was originally kept by the Michigan State Police Fire Marshall Division, is now kept by the Michigan Department of Labor and Economic Growth. DLEG staff were unable to locate more recent county level data on structure fires. The 2002 data was re-used from the 2002 area source submittal. However, it did not provide any detail on the extent of each structure fire, or indicate if the structure was residential or commercial.

The default fuel loading factor provided in the EIIP guidance (1.15 tons of fuel per structure fire) was used. Emission factors for VOC, CO, and NOx were obtained from Table 18.4-1.

Year 2018 and 2022 Stationary Area Source Emission Inventory Projections:

Area sources represent those emission sources that do not report to MAERS. Future year projections take into consideration the corresponding BTU heat input from residential, commercial/institutional, and unaccounted industrial sources. Residential projections considered SEMCOG forecast of expected number of households within the 7-county area. Similarly, regional economic employment forecast from SEMCOG projections was used to derive the non-manufacturing sector employment growth for the 7-county area. For unaccounted industrial sources, growth rates were assumed to be similar as Non-EGU source projections.

5. Non-Road Mobile Sources

Non-Road Emissions Estimation Exclusive of Locomotive, Shipping, and Aircraft Emissions

Non-road equipment population and emission estimates for 2005, 2008, 2018, and 2022 were obtained from the EPA NONROAD2008a model to simulate winter weekday and annual PM2.5, SO2, and NOx emissions. The updated model and technical support documentation can be obtained from: http://www.epa.gov/otaq/nonrdmdl.htm . Fuel property information utilized in LADCO regional emission simulations were from Grant Hetherington of the State of Wisconsin and from EPA NONROAD2008 model documentation.

2005 and 2008 Aircraft Emissions Estimation

To estimate aircraft emissions, aircraft activity was obtained for Michigan airports. Historically this information was obtained from MDOT. However, MDOT was unable to provide updated information for year 2005. In the absence of updated MDOT 2005 aircraft activity data, commercial aircraft and commercial air freight departure information by aircraft model type was obtained from Federal Aviation Administration (FAA) airport records. For determining airport LTO cycles, the Air Traffic Activity Data System (ATADS) air traffic count database of larger towered airports, Terminal Area Forecast (TAF) air traffic operations database of towered and non-towered airports, and G.C.R. & Associates airport activity data were used. Since ATADS provides aircraft operations for a limited number of the states' airports, TAF aircraft operations estimates were considered where ATADS information was unavailable. G.C.R. & Associates, Inc. consultant data was used for the smaller airports of which FAA aircraft operations information was unavailable. The following information from the respective sources was considered in the development of emission estimates:

1. Commercial scheduled and non-scheduled aircraft air carrier activity and commercial air freight activity by aircraft model types;

2. General aviation and air taxi annual local and itinerant operations for year 2005;

3. Military annual local and itinerant operations for year 2005. Due to need to have aircraft operations information expressed as LTO cycles, the following assumptions were made:

    a. For commercial aircraft and commercial air freight activity, the number of annual aircraft annual LTO cycles was assumed to be equal to the number of departures. The daily LTO cycle frequency was then obtained by dividing the yearly LTO cycles by 365.

b. For general aircraft annual local and itinerant airport operations, each respective operations total was divided by two to obtain the corresponding year local and itinerant LTO cycles. The expected daily local and itinerant LTO cycles then were obtained by dividing these annual totals by 365.

c. For military annual local and itinerant operations, each respective operations total was divided by two to obtain the corresponding year local and itinerant LTO cycles. The expected military daily local and itinerant LTO cycles then were obtained by dividing these annual totals by 365.

Airport LTO cycles were further categorized into commercial aircraft by plane and engine type, general aviation itinerant aircraft of unknown aircraft type, general aviation local aircraft of unknown aircraft type, and military aircraft. This was necessary to utilize the U.S. Department of Transportation, FAA Emissions and Dispersion Modeling System 4.5 (EDMS). A description of this model can be found in the FAA publication entitled, *Emissions and Dispersion Modeling System (EDMS) User Manual* (September 2004). Commercial and air freight aircraft emission factors per LTO cycle were determined using EDMS 4.5 for each commercial aircraft type models where possible were used at each towered airport. Default commercial aircraft engine type, and EPA default time in mode values for takeoff, approach, and landing roll times were used in the EDMS 4.5 model simulations.

For those aircraft types that could not be determined using the EDMS 4.5 emissions model, aircraft emission factors based on EPA alternative fleet average procedures were then used to estimate their emissions. These included general aviation and air taxi itinerant aircraft of unknown aircraft type, general aviation local aircraft of unknown aircraft type, and military aircraft. Conversion from total hydrocarbons to VOC was performed and based on the EPA guidance.

Aircraft emissions were then obtained by adding emissions contributions from commercial, itinerant general, and local general aircraft, and were reported using the following SCC codes:

Michigan Aircraft Emission SCC Codes

Aircraft Type	SCC
Military	2275001000
Commercial	2275020000
General Aviation	2275050000

2005 Locomotive and Shipping Emissions Estimation

The 2005 non-road shipping and locomotive emissions were prepared using the same techniques used for the 2002 emissions. These estimates are based on work and a follow-up report (Environ Report for LADCO, *2002 Shipping Emissions Sources,* April 2004) completed by Environ to support LADCO's efforts to prepare a 2002 Air Emissions Inventory. The report describes Environ efforts to develop a shipping 2002 air emissions estimates to support air quality modeling. The Environ report is too long to be included in this document, but it can be provided upon request or downloaded at:

http://ladco.org/reports/rpo/MWRPOprojects/Emissions/Environ_Final_Report_non-road.pdf

The estimate of 2005 locomotive and shipping emissions was made by LADCO in the same manner as the 2002 inventory described above. The 2005 estimates are part of LADCO's Base M inventory.

2008 Locomotive, Shipping, and Aircraft Emissions Estimation

The 2008 emissions are based on work and a follow-up report (E.H. Pechan & Associates, Inc., *Development of Growth and Control Factors for Lake Michigan Air Directors Consortium*, Final Report, December 14, 2004) done by E.H. Pechan & Associates, Inc. (Pechan). This work supports LADCO's efforts to forecast anthropogenic emissions for the purpose of assessing progress for air quality goals, including goals related to regional haze and attainment of the ozone NAAQS. The Pechan growth factors were used to estimate the LADCO Base M future year emissions posted by LADCO in 2007. The future year emissions represent both emission controls that already exist and those that are known to be on the way.

Non-road Mobile Source Emission Inventory Projections to 2018 and 2022

The non-road source categories exclusive of locomotive, shipping, and aircraft were grown in the EPA Mobile source model NMIM. The locomotive, shipping, and aircraft non-NMIM source categories were grown using growth factors provided in the report, *Development of Growth and Control Factors for Lake Michigan Air Directors Consortium,* Final Report, December 14, 2004, prepared by Pechan for LADCO and available upon request.

See **Growing Stationary Non-EGU Point, Stationary Area, Locomotive, Shipping, and Aircraft Categories for the Years 2018 and 2022** in the **Non-EGU Point Sources** section for references and methodology for projecting the Locomotive, Shipping and Aircraft emissions inventory.

6. On-road Mobile Sources

Please refer to the On-road Mobile Source Emissions Inventory for Southeast Michigan – $PM_{2.5}$ Redesignation Request, January 27, 2011, prepared by SEMCOG, and contained in Appendix C.

Appendix C

On-Road Mobile Source Emissions Inventory
for Southeast Michigan
$PM_{2.5}$ Redesignation Request

On-Road Mobile Source Emissions Inventory for Southeast Michigan PM2.5 Redesignation Request

January 27, 2011

Prepared by the
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On-Road Mobile Source Emissions Inventory for Southeast Michigan PM2.5 Redesignation Request

I. Emissions Inventory Summary

Below are the annual and daily on-road mobile source emission inventories for fine particulate (PM2.5), nitrogen oxide (NOx) and sulfur dioxide (SO2). The daily inventory reflects average winter weekday conditions because the highest PM2.5 concentrations generally occur during the winter season.

Table 1: Annual and 24-Hour PM2.5 On-Road Emissions Inventories for Southeast Michigan

Year	Vehicle Population	Annual Inventory				Average Winter Weekday Inventory			
		Vehicle Miles of Travel (millions)	PM2.5 (tons)	NOx (tons)	SO2 (tons)	Vehicle Miles of Travel (millions)	PM2.5 (tons)	NOx (tons)	SO2 (tons)
2005	3,660,074	44,187	5,323	154,294	3,809	126.1	19.2	460.8	8.6
2008	3,647,666	44,156	4,360	119,194	1,066	125.6	15.7	365.3	3.1
2018	3,667,667	44,279	1,633	37,847	310	126.3	6.6	117.8	0.9
2022	3,687,940	44,523	1,311	28,044	294	127.0	5.6	88.1	0.8
2035	3,795,289	45,819	1,123	21,791	283	130.7	4.9	69.2	0.8

II. On-Road Mobile Emissions Inventory Development

The PM2.5 on-road emissions inventories were developed using the U.S. EPA's new Motor Vehicle Emission Simulator (MOVES) model. The analysis used version MOVES2010a, which was released in August 2010. MOVES is EPA's successor to the Mobile6 model. However, in addition to generating mobile emission rates, MOVES also has the capability to calculate on-road mobile emissions inventories, thus eliminating the need for most of the post-processing that was necessary with Mobile6.

To prepare a regional emissions inventory, the user has the choice of modeling each county separately or combining counties to form a custom domain. SEMCOG has chosen the latter option for two reasons. First and foremost, staff believe that traffic count and vehicle population data used in the emissions modeling process are more robust at the regional level and more accurately reflect the travel patterns in the region, which are not confined within county boundaries. For example, the age distribution of vehicles registered within a specific county may not reflect the age distribution of vehicles traveling on that county's roads because of the high amount of inter-county travel in the region. The second reason for choosing the custom domain option is that it saves a significant amount of time. A single MOVES run, whether by county or custom domain, takes approximately one hour. Thus, a typical conformity analysis which requires two separate runs for each of four required analysis years, would take 56 hours if run at the county level but only 8 hours using the custom domain.

MOVES includes default data for many of its necessary data inputs. However, wherever possible SEMCOG has incorporated local data in order to develop the most accurate emissions inventory for Southeast Michigan. These local data inputs are described below. To ease the transition from Mobile6 to MOVES, EPA has provided a number of "conversion tools" that allow users to convert local data inputs used in Mobile6 to the MOVES input format. SEMCOG has taken advantage of several of these tools. Their use is noted under the appropriate sections below.

A. Local Travel Data Inputs

1. Demographic Data

Travel forecasts used to develop the on-road mobile source emissions inventory were based on demographic data from SEMCOG's 2035 Regional Development Forecast (RDF), which was adopted in early 2008. A three-step process was used to develop this forecast.

1) Regional forecast totals of population, households and jobs were generated from the REMI (Regional Economic Models, Inc.) model which forecasts Southeast Michigan's ability to attract and retain population and jobs relative to all other parts of the United States. Regional totals are developed in five-year intervals from the 2005 base year to 2035;

2) The regional totals were then used to develop a small-area forecast that disaggregates regional population, households and jobs into five-acre grid cells using the UrbanSim model. UrbanSim is a computer simulation model for planning and analysis of urban development. It incorporates the interaction between land use, transportation, and public policy. In doing so, it puts future population and jobs into the most desirable grid cells and models residential and nonresidential developments as demand arises.

3) Grid cells from the small-area forecast were aggregated to traffic analysis zones (TAZs) for use in SEMCOG's travel forecasting model.

As noted above, SEMCOG's RDF provides forecasts in five-year increments from 2005 to 2035. The 2008, 2018 and 2022 demographic forecasts used to develop the PM2.5 emissions inventories were interpolated using the two closest five-year forecasts for each of these years (i.e. 2008 was interpolated using the 2005 and 2010 RDF forecasts).

It should also be noted that the 2035 RDF was developed prior to the severe economic downturn in late 2008. The 2040 RDF, which is currently under development and will be completed in March 2012, will likely forecast significantly lower population and employment for the region.

2. SEMCOG's Travel Demand Forecasting Model (TDFM)

Vehicle miles of travel (VMT) forecasts for the on-road emissions inventory were developed using version E5 of SEMCOG's Travel Demand Forecasting Model (TDFM), which was implemented in 2009. The TDFM runs on the TransCAD software platform and utilizes the standard four-step travel modeling process: trip generation, trip distribution, mode choice, and traffic assignment. Detailed documentation on the model is contained in a separate SEMCOG document that is available upon request.

3. Mapping of Travel Demand Model (TDFM) Functional Classes and Area Types to MOVES Road Types

In order to use TDFM travel data in MOVES, the road types used in SEMCOG's model must be reconciled with those used in MOVES. The MOVES model uses four basic road types for on-road activities: Urban Restricted, Urban Unrestricted, Rural Restricted and Rural Unrestricted. The term restricted refers to restricted or limited access roadways. In the SEMCOG region, this includes all freeway facilities. All other roadways in the SEMCOG region are considered unrestricted facilities. The TDFM also includes several special functional classes that are not part of the regular roadway network (e.g. walk only, external zone connectors, transit-only links). These are not included in SEMCOG's emissions modeling.

As TDFM functional classes do not distinguish between urban and rural facilities, another TDFM variable, Area Type, was used as a surrogate. The TDFM defines four area types (urban business, urban, suburban and rural) and assigns one to each roadway link based on the density of households, population and employment in the traffic analysis zone in which the link resides.

Table 2 shows how each area type and functional class in SEMCOG's TDFM is mapped to the four road types used in MOVES.

Table 2: Mapping of TDFM Functional Class and Area Type to MOVES Road Type

<table>
<tr><th rowspan="2">SEMCOG TDFM Functional Class</th><th colspan="4">SEMCOG TDFM Area Type</th></tr>
<tr><th>Urban Business</th><th>Urban</th><th>Suburban</th><th>Rural</th></tr>
<tr><td>1 - Interstate Freeway</td><td colspan="3" rowspan="4">4 – MOVES Urban Restricted Road Type</td><td rowspan="4">2 – MOVES Rural Restricted Road Type</td></tr>
<tr><td>2 - Other Freeway</td></tr>
<tr><td>8 - Ramp</td></tr>
<tr><td>11 - Freeway Connector</td></tr>
<tr><td>4 - Principal Arterial</td><td colspan="3" rowspan="6">5 – MOVES Urban Unrestricted Road Type</td><td rowspan="6">3 – MOVES Rural Unrestricted Road Type</td></tr>
<tr><td>5 - Minor Arterial</td></tr>
<tr><td>6 - Collector</td></tr>
<tr><td>7 - Local</td></tr>
<tr><td>12 - Gravel Road</td></tr>
<tr><td>99 - Centroid connector (local road surrogate)</td></tr>
<tr><td>81-94 Transit Use Only</td><td colspan="4" rowspan="3">Non-road or outside region. Not used in MOVES</td></tr>
<tr><td>90 - External</td></tr>
<tr><td>96 - Walk Only</td></tr>
</table>

4. Vehicle Miles of Travel (VMT)

MOVES requires the user to input annual VMT by the six FHWA Highway Performance Monitoring System (HPMS) vehicle types:

1) Motorcycle
2) Passenger car
3) Other 4-tire, 2-axle vehicles
4) Bus
5) Single unit truck
6) Combination truck

However, local VMT data used in the MOVES model is derived from SEMCOG's Travel Demand Forecast Model, which generates average weekday VMT forecasts and does not currently have the capability to allocate this VMT to different vehicle types. Thus, some adjustments were required to convert the TDFM data into the format required for MOVES. These adjustments are described below.

a. **HPMS Normalization**

In accordance with EPA and FHWA guidance, SEMCOG TDFM VMT was normalized to HPMS VMT by county and road type. Normalization factors were developed by dividing 2009 HPMS VMT by 2009 TDFM VMT. The resulting factors were then applied to TDFM VMT in all analysis years.

b. **Distribution of VMT Among HPMS Vehicle Types**

A two-step process was used to develop this distribution. First, SEMCOG's 2006 screen line traffic count database was used to develop VMT distribution factors among the six HPMS vehicle classes. This database includes 779 traffic classification counts collected throughout the seven-county SEMCOG region. When collected, the counts were classified by FHWA's standard 13 traffic bins. These bins were then aggregated to the six HPMS classifications.

The second step in the process involved adjusting for a recognized bias in the traffic count data toward undercounting the proportion of light trucks, SUVs, and vans. This bias was first recognized in 2004 when local count data was compared to both vehicle registration records and Mobile6 national default data. The bias is likely due to the inability of traffic counting equipment to correctly distinguishing these vehicles from cars, causing them to be classified under the HPMS system as "passenger cars" rather than "other 4-tire, 2-axle vehicles". To correct for this bias, the count data from these two classifications were combined and then redistributed based on the MOVES default distribution. Both the original and adjusted factors are shown in Table 3.

Table 3: VMT Distribution Factors by HPMS Vehicle Types

HPMS Vehicle Type	Before Step 2 Adjustment	After Step 2 Adjustment*
1 Motorcycle	0.011567	0.011567
2 Passenger Car	0.713678	0.534530
3 Other 4-tire, 2-axle vehicles	0.186204	0.365352
4 Bus	0.008705	0.008705
5 Single-Unit Truck	0.039116	0.039116
6 Combination Truck	0.040730	0.040730

* MOVES default split between vehicle types 2 & 3: 59.4% vs. 40.6%

c. **Conversion of Average Weekday VMT to Annual VMT**

Monthly and weekend day adjustment factors were developed using 2004-2006 data from the 150+ permanent traffic recording (PTR) stations in Southeast Michigan. These adjustment factors, along with the HPMS-normalized weekday VMT by vehicle type were then entered into EPA's *aadvmtcalculator_hpms.xls* converter tool to compute the annual VMT and monthly and daily VMT fractions needed for MOVES.

5. Hourly VMT Fractions

Two different data sources were used to develop hourly VMT fractions for MOVES:

1) 2006 screen line traffic counts collected by SEMCOG - All screen line counts include classification data but were only collected on weekdays.

2) 2005 PTR counts for locations within the SEMCOG region - This data includes both weekdays and weekends but all of the count stations are on freeways and only a limited number of these stations collect classification data.

Using this data, SEMCOG was able to develop weekday hourly VMT fractions for each of the four MOVES road types and six HPMS vehicle types. However, for weekends, the count data was not robust enough to develop separate factors by road type or vehicle type so only a single set of hourly VMT factors was developed for all the road types and vehicle types.

6. Road Type Distribution

SEMCOG 2006 screen line counts were used to develop the Road Type Distribution for each HPMS vehicle type. Because these counts were not evenly distributed among the four MOVES road types, the count data was first expanded to reflect the system-wide VMT distribution by road type from the TDFM. Table 4 shows the final distribution factors used in MOVES runs for PM2.5 re-designation request. The same distributions were used for all analysis years.

Table 4: Road Type Distribution Used in MOVES

HPMS Vehicle Type	MOVES Road Type			
	Rural Restricted	Rural Unrestricted	Urban Restricted	Urban Unrestricted
Motorcycle	0.082102	0.080699	0.348661	0.488538
Passenger Car	0.051566	0.092906	0.290307	0.565221
Other 4-tire, 2-axle vehicles	0.054670	0.154881	0.258523	0.531927
Bus	0.115776	0.082206	0.365080	0.436938
Single-Unit Truck	0.080163	0.127845	0.355673	0.436318
Combination Truck	0.171595	0.066330	0.447998	0.314077

7. Average Speed Distributions

MOVES uses the distribution of vehicle hours traveled (VHT) by average speed to determine an appropriate operating mode distribution. To develop the local average speed distribution for Southeast Michigan, SEMCOG used congested speed and VHT output from the TDFM to compute the VHT fraction in each MOVES speed bin. MOVES requires the user to input hourly speed distributions by road type and vehicle class. While SEMCOG's travel model does not provide hourly speed data, it does calculate speeds by four different time periods:

1) AM peak, simulating the hours of 7:00 - 9:00 a.m.;
2) PM peak, simulating the hours of 3:00 - 6:00 p.m.;
3) Mid-day, simulating the hours of 9:00 a.m. - 3:00 p.m.;
4) Off-peak, simulating the hours of 6:00 p.m. - 7:00 a.m.

For MOVES, a separate speed distributions was developed for each of these time periods and applied to all hours within that period. This was done as follows:

- For each time period, the directional congested speed of each roadway link was assigned to one of MOVES 13 speed bins;
- The associated directional VHT on the links was then aggregated by speed bin and MOVES road type;
- Then, for each road type, the VHT fraction in each speed bin was computed.

As no local data is currently available on speed differentiation between vehicle classes, the same distributions were applied to all vehicle types.

Note: Ramp data was not included in the development of the above speed distributions as it was assumed that MOVES makes an internal adjustment for ramps using the user-supplied ramp fractions.

8. Ramp Fractions

Ramp fractions used in MOVES were derived from SEMCOG's Travel Demand Forecast Model. Table 4 shows the TDFM ramp fractions for each of the years modeled in SEMCOG's long-range transportation plan. While the fractions show little variation over time, there is a significant difference between urban and rural areas. Thus, SEMCOG decided to use separate ramp fractions for urban and rural areas in MOVES. Rather than select the fraction associated with any one TDFM forecast year, the average of all six years was chosen. The specific fractions used in MOVES are shown in the far right column of Table 5.

Table 5: Urban and Rural Ramp Fractions

Area Type	**TDFM Forecast Year**							
	2005	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**MOVES**
2-Rural Ramp	0.0412	0.0408	0.0397	0.0398	0.0398	0.0395	0.0393	**0.04**
4-Urban Ramp	0.0795	0.0807	0.0814	0.0812	0.0809	0.0837	0.0843	**0.08**

9. Vehicle Population

Year 2010 vehicle registration data from the Michigan Department of State (DOS) was used to develop the base year vehicle population inputs for MOVES. This data was supplemented with vehicle title data to capture information on public sector fleet vehicles (e.g. those owned and operated by cities, counties, universities, etc.) that do not appear in the registration database. The body style and plate type fields in the DOS database were used to determine the MOVES source type of each vehicle. Table 6 shows how each DOS body style and plate type was mapped to the MOVES source types. Where DOS data did not provide sufficient detail, the data was supplemented with information from other sources including local transit agencies, the National Transit Database, and MOVES default distributions for Southeast Michigan counties.

Table 6. Mapping between MOVES Vehicle Types and Michigan DOS Body Style

MOVES Vehicle Type	Michigan DOS Body Style
11 – Motorcycle	Motorcycle
21 – Passenger Car	2-door; 4-door; Convertible
31 – Passenger Truck	Station Wagon; Non-Commercial Pick-up/Van
32 – Light Commercial Truck	Ambulance; Hearse; Panel; Commercial Pick-up/Van
41 – Intercity Bus	Bus (Apportioned this data between MOVES M41 and M43 vehicle types using split factors from MOVES 2010 default run; data for M42-transit buses was added using local fleet data from local transit providers)
42 – Transit Bus	
43 – School Bus	
51 – Refuse Truck	Dump Truck; Mixer; utility; Wrecker; Stake; Tank (Apportioned this data MOVES M51, M52 and M53 vehicle types using split factors from MOVES 2010 default run.)
52 – Single-unit Short-haul Truck	
53 – Single–unit Long-haul Truck	
54 – Motor Home	Motor Home
61 – Combination Short-haul Truck	Tractor (Apportioned this data between MOVES M61 and M62 vehicle types using split factors from MOVES 2010 default run)
62 – Combination Long-haul Truck	

To generate future year vehicle population data, it was assumed that this population would grow at the same rate as forecasted vehicle miles of travel from the TDFM. The rate of growth between 2010 and each future analysis year was calculated. This rate was then uniformly applied to all 2010 vehicle population source types to generate the future year population.

Detailed documentation on the development of SEMCOG's vehicle population data is contained in a separate SEMCOG mobile emissions model development memo.

10. Vehicle Age Distribution

Year 2010 DOS vehicle registration and title data were also used to develop the vehicle/source type age distribution used in MOVES. The DOS body style field was used to assign each vehicle to one of six HPMS vehicle types (see Table 7 below). Once HPMS vehicle types had been assigned, the data was aggregated by model year and assigned to the appropriate age category. Model years 2010 and 2011 were considered age 0, 2009 was considered age 1 and so on. Model years 1980 and older were grouped into the age 30+ category. The age distribution for each HPMS vehicle type was then computed. The same distributions are used for all analysis years.

Table 7: Mapping between HPMS Vehicle Types and Michigan DOS Body Styles

HPMS Vehicle Type	Michigan DOS Body Style
Motorcycle	Motorcycle
Passenger Car	2-door; 4-door; Convertible
Other 4-tire, 2-axle vehicles	Station Wagon; Non-Commercial Pick-up/Van; Ambulance; Hearse; Panel;
Bus	Bus
Single-unit Short Truck	Dump Truck; Mixer; Utility; Wrecker; Stake; Tank , Motor Home
Combination Truck	Tractor

B. Other Local Data Inputs

1. Temperature and Humidity Data

Temperature and humidity data are required inputs for MOVES. For the PM2.5 on-road mobile emissions inventories, local temperature profiles were developed for each month of the year. To generate these profiles, the average minimum and maximum daily temperatures for each month in Southeast Michigan were computed using 2007-2009 National Weather Service (NWS) local climatological data reports. This data was provided by the Michigan Department of Environmental Quality (MDEQ). EPA's *MeteorologicalDataConverter_Mobile6.xls* tool was then used to convert the average minimum and maximum temperatures to the required hourly temperature inputs for MOVES. Table 8 shows the average min/max temperatures that were used to develop each month's hourly profile.

Table 8: Monthly Average Min/Max Temperatures for PM2.5

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min	18.4	17.2	28.6	39.5	48.7	60.0	61.4	62.9	56.6	44.1	34.3	22.7
Max	32.2	31.5	46.2	60.0	70.2	79.8	81.2	81.8	76.1	62.4	48.6	34.8

SEMCOG's emissions analysis used MOVES default humidity data for Southeast Michigan as no other local data was available.

2. Barometric Pressure

The barometric pressure used for Southeast Michigan was the average of the MOVES default values for SEMCOG's seven counties. Table 9 below shows each county's default value and the resulting average used for the emissions inventory.

Table 9: Barometric Pressure Data used in MOVES

SEMCOG County	MOVES Default Barometric Pressure (inches of Mercury, inHg)
26093 - Livingston	29.113
26099 - Macomb	29.144
26115 - Monroe	29.173
26125 - Oakland	29.146
26147 - St. Clair	29.172
26161 - Washtenaw	29.095
26163 - Wayne	29.069
Average	**29.130**

3. Fuel Supply/Fuel Formulation

In transitioning its mobile emissions modeling from Mobile6 to MOVES, SEMCOG reviewed both the Fuel Supply and Fuel Formulation default values contained in MOVES for counties in Southeast Michigan (Lenawee, Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw and Wayne counties). Only 2005 and later years were reviewed. Earlier years will be reviewed in future if there is a need to model them.

Several adjustments were made to accurately reflect observed ethanol market share data from the Michigan Department of Agriculture as well as State regulation on permitted oxygenates and maximum allowable summertime Reid vapor pressure (RVP) in Southeast Michigan. These adjustments are documented below.

- Corrected the 2012 summertime gasoline RVP for all SEMCOG Counties to reflect the State's legal limit for Southeast Michigan (7.0 psi).

- Zeroed out any market share for gasoline with MTBE or TAME since neither has been used in Michigan since 2003.

- Adjusted the ethanol market share for all SEMCOG counties to match observed data from the Michigan Department of Agriculture's *Consumer Protection Section Annual Reports* for years 2005-2009.

- Set the ethanol market share for all SEMCOG counties to 100% in years 2010 and later. This was the observed share in 2009 and is expected to continue in future due to federal requirements for increased use of biofuels.

The resulting RVP and ethanol market share values used in MOVES after the above corrections are shown in Table 10 below.

Table 10: Revised RVP and Ethanol Market Shares used in MOVES

Year	**Summer RVP** (months 5-9)	**Ethanol Market Share** (all months)
2005	7.8 psi	39.5%
2006	7.8 psi	58.4%
2007	7.0 psi	80.3%
2008	7.0 psi	98.9%
2009	7.0 psi	100.0%
2010 and later	7.0 psi	100.0%

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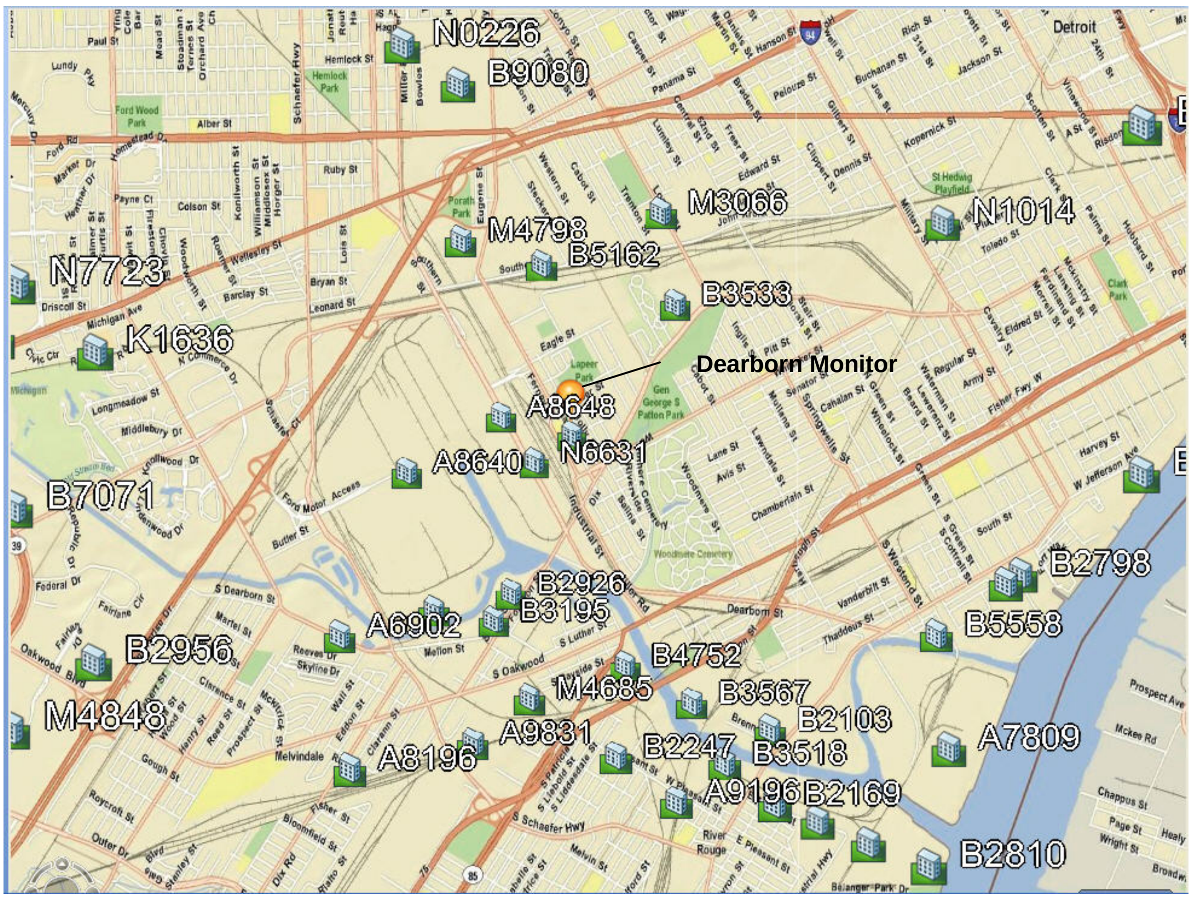
Appendix D

Stationary Source Facility Detail

Purpose of this Appendix

The information in this appendix was collected for the purpose of supplementing inventory data found in Section 5 of the main document. The data in this appendix was collected from company permits, Air Quality Division (AQD) field reports, special studies, and discussions with companies that are in the general vicinity of the Dearborn air monitor, which has the highest $PM_{2.5}$ values in Southeast Michigan. Figure 1 shows the location of emission sources around the Dearborn monitor. These sources will be discussed below. These sources include both large and smaller facilities. Most are still operating but some are closed.

Figure 1. Map of Emission Sources Near the Dearborn Monitor



List of Sources

SRN	Source	SRN	Source
A6902	Darling International Inc	B3533	Edw C Levy Co Plant 1
A7809	US Steel Great Lakes Works	B3567	St Mary's Cement
A8196	M-Lok Riley Plating – OOB*	B4752	Great Lakes Petroleum Terminal – OOB*
A8640	Severstal North America	B5162	Xcel Steel Pickling (formerly Castle Steel)
A8648	Ford Motor Co. - Rouge Complex	B5558	Honeywell – OOB*
A9196	Fabricon Products Inc	B7071	Automotive Components Holding
A9831	Marathon-Ashland Oil Refinery	B9080	Envirosolids, LLC
B2103	Detroit Water and Sewerage Department	K1636	City of Dearborn
B2169	Carmeuse Lime, Inc. (River Rouge Facility)	M3066	Spartan Industrial – OOB*
B2247	Buckeye Terminals LLC (Detroit Terminal)	M4685	Detroit Salt
B2798	Detroit Edison Co. - Delray	M4798	Ferrous Environmental – OOB*
B2810	Detroit Edison Co. - River Rouge	M4848	Ford Motor Allen Park Clay Mine – OOB*
B2926	Sunoco Partners M & T, L.P. (River Rouge Terminal)	N0226	Hinkle MFG LLC
B2956	Ford Motor New Model Program	N1014	Magni Industries Inc
B3195	Cadillac Asphalt Products	N6631	Dearborn Industrial Generation
B3518	United States Gypsum Company	N7723	DTE Energy / Ford World Headquarters

* OOB means “Out of Business.”

The purpose of this source-by-source review is to better understand the types of facilities that may be impacting the $PM_{2.5}$ levels in the vicinity of the Dearborn monitor and activities at the facilities that may have contributed to emission changes over a period of years. Various parameters were acquired, including emissions information, operating schedules, distance and direction from the Dearborn monitor, stack heights, and product throughput.

An example of additional information that can be helpful in understanding emissions impacting the Dearborn area can be seen by comparing emissions inventories for 2005 to 2008 (see Tables 5 and 6 in the main document), NO_X and SO_2 emissions from electric generating unit (EGU) and non-EGU point sources in the 7-county nonattainment area increase between 2005 and 2008 for the annual inventory. However, this may not reflect the changes that are occurring at sources that are in the more immediate vicinity of the Dearborn monitor. Some of these facilities may have reduced their emissions which may have a positive impact on $PM_{2.5}$ levels in the area, which is not obvious by the 7-county emissions data. In general, since local sources have a bigger impact on the nearby Dearborn monitor than more distant sources, they deserve to be analyzed in greater detail.

It should be noted that attempts were made to obtain detailed information for other sources as well. Sources throughout the 7-county nonattainment area were screened to determine permanent and enforceable reductions made between 2005 and 2008. However, emissions inventories and permits to install (PTI) do not give clear indications of what controls are installed or when controls are installed. Therefore, it made the most sense to focus limited resources on analyzing sources near the Dearborn monitor.

Other Consideration - Emission Inventory Challenges of PM2.5

Using emission inventories for $PM_{2.5}$ and precursors is the primary metric required to demonstrate the reason for an area moving from nonattainment to attainment. This is detailed in Section 5 of the main document. The use of inventories brings some inherent issues described here and is the reason for considering other metrics of information in making a robust demonstration, as has been done in Section 6 of the main document and in this appendix. The Michigan Air Emissions Reporting System (MAERS) emissions inventory from 1998-2008 was evaluated. Emissions inventory trends are very difficult to interpret since the data is always changing. Companies may report emission units (reporting group or individual units), source classification codes (SCCs), etc. differently from year to year. In addition, emission factors that are used to calculate the emissions are frequently changed by the Environmental Protection Agency (EPA) as better data becomes available. If no emission factor is available, the company does not have to report emissions for that pollutant. The company may also use different methods for calculating emissions from year to year, including federal emission factory stack testing and continuous emission monitoring (CEM).

In the case of particulate matter (PM), major changes have occurred over the last ten years. In 1998, only PM-primary and PM_{10}-primary were reported. In 1999, a few companies voluntarily started reporting $PM_{2.5}$-primary. In 2002 PM-primary was no longer reported, only PM_{10}-primary and $PM_{2.5}$-primary. In 2004, PM_{10}-filterable and $PM_{2.5}$-filterable started to be reported, thus, PM_{10}-primary, PM_{10}-filterable, $PM_{2.5}$-primary and $PM_{2.5}$-filterable are reported for each SCC. Each emissions unit may have more than one SCC and may report emissions for PM_{10} and/or $PM_{2.5}$ that are either filterable or primary.

Other Metrics Used

Emissions of primary $PM_{2.5}$ are obviously important when assessing a nearby facility's potential impacts on the monitor. Emissions of $PM_{2.5}$ precursors, SO_2 and NO_X, are also important to understand. Depending on the facility distance to the monitor, these precursors may have time to react to form $PM_{2.5}$ in the form of sulfates and nitrates. Stack heights are important because they affect dispersion of the pollutants. Tall stacks produce pollutant plumes that may not impact a nearby ground level monitor, but can influence a monitor at some distance away. Short stacks tend to have the opposite effect, impacting nearby sources.

Process throughput (or production) usually is a more consistent measure of what is happening at an industrial process than reported emissions when looking at trends. The emissions are often calculated based on throughput, but emission factors may change over time as described previously. However, throughput will not indicate decreases in emissions if control equipment is added.

The location of a facility relative to the Dearborn monitor is important. Wind, in the area are predominantly from the south and southwest, so sources located in this upwind direction from the monitor will have a much larger impact than sources in other directions. The proximity of a source to the monitor also can determine the level of impact the source may have. A facility's operating schedule can be informative, particularly if the facility has seasonal changes. For the daily $PM_{2.5}$ standard, high $PM_{2.5}$ levels occur more often in winter months, so a company's operating schedule could suggest higher or lower impacts to the Dearborn monitor during the more critical winter months.

Determining emission trends from a nearby facility is important in judging how the facility may have impacted $PM_{2.5}$ levels in the area over the 2005 – 2008 time period, which represents the change from not meeting the $PM_{2.5}$ standard to meeting the standard at the Dearborn monitor. However, throughput may provide an even clearer picture of a facility's impact in cases where emission data may be less reliable as described in the previous paragraphs. Reporting of throughput by a facility is usually a much more stable metric than emissions, and companies generally keep good records of throughput. Throughput trends therefore are also used to help understand changes in potential emission impacts from facilities near the Dearborn monitor. It should be noted that throughput does not account for controls that may be added to a process at a facility, resulting in lower emissions from the year the controls were added into the future. Aside from this, increases and decreases in throughput can be expected to result in increases and decreases in emissions.

In the following facility studies, emission trends are compared to throughput trends to help show reliability of emissions information. Also, years when the two metrics diverge can show that additional controls may have been added.

Ultimately, these evaluations of facilities may provide insight into whether emissions reductions can be expected to be permanent or are fluctuations in throughput. One requirement of the redesignation state implementation plan (SIP) is to show that emission reductions that led to the area meeting the standard are permanent and enforceable, as described in Section 5 of the main document. These facility studies may provide some clues as to the source of reductions when this information is not readily available and whether reductions are permanent. The trends themselves also can provide insight on expectations for future emissions and impacts on the ambient air in the vicinity of the Dearborn monitor.

FACILITY DETAILS

Severstal

Severstal North America, Inc. operates an integrated steel mill at the Rouge Industrial Complex in Dearborn, Michigan. The Rouge Industrial Complex is located at 3001 Miller Road in Dearborn, Michigan (Wayne County). The complex is bounded by Rotunda Drive on the north, Miller Road on the east, Dix Avenue and Rouge River on the south, and Schaefer Road on the west. The area is mainly industrial, and the nearest residence is approximately 1500 ft east of Miller Road. This mill is less than one mile southeast of the Dearborn air monitoring station (Dearborn monitor).

Severstal operations cover approximately 500 acres, occupying the southern half of the Rouge complex. Operations include three blast furnaces (BFA, BFB, BFC) with only BFB currently operational, a waste oxides reclamation facility, a basic oxygen furnace (BOF) shop, two continuous casters, a hot strip mill, and cold mill operations. The plant produces sheet steel that is used in a variety of manufacturing applications. Ford Motor Company operates the remainder of the complex. Severstal North America, Inc. is independent of the Ford Motor Company and is an autonomous producer of steel.

The steel mill runs year around, 24 hours per day, seven days per week. The stack emission heights are generally over 150 ft for the major emissions units. The annealing furnaces have shorter stacks at 64 feet. A few minor emission sources have baghouse stacks ranging from 27 to 51 feet. Severstal may also have some areas of fugitive emissions that are not as well documented.

A review of the company's emission inventory data from 1998 through 2008 indicates that the facility's operations have decreased since approximately 2005. The BOF and the blast furnaces with their stoves are the major sources of emissions and throughput at Severstal.

Comparing emissions trends to throughput trends indicates that they generally match, but there is an occasional year that diverges (see Figure 2 through 4). Emission factors used to calculate emissions for a process can be determined by the company, and they are occasionally revised. For example, Severstal used AP-42 factors for their blast furnace cast house operations in 1998, but in 1999-2007, they used stack test data from another steel mill. In 2008, they ran their own stack tests and are now using those values. Severstal has done additional on-site stack tests and will be using those results for future emissions reports. Thus throughput may more accurately represent emissions to ambient air over several years, unless controls are added.

Figure 2. BOF Emissions to Throughput Comparison at Severstal

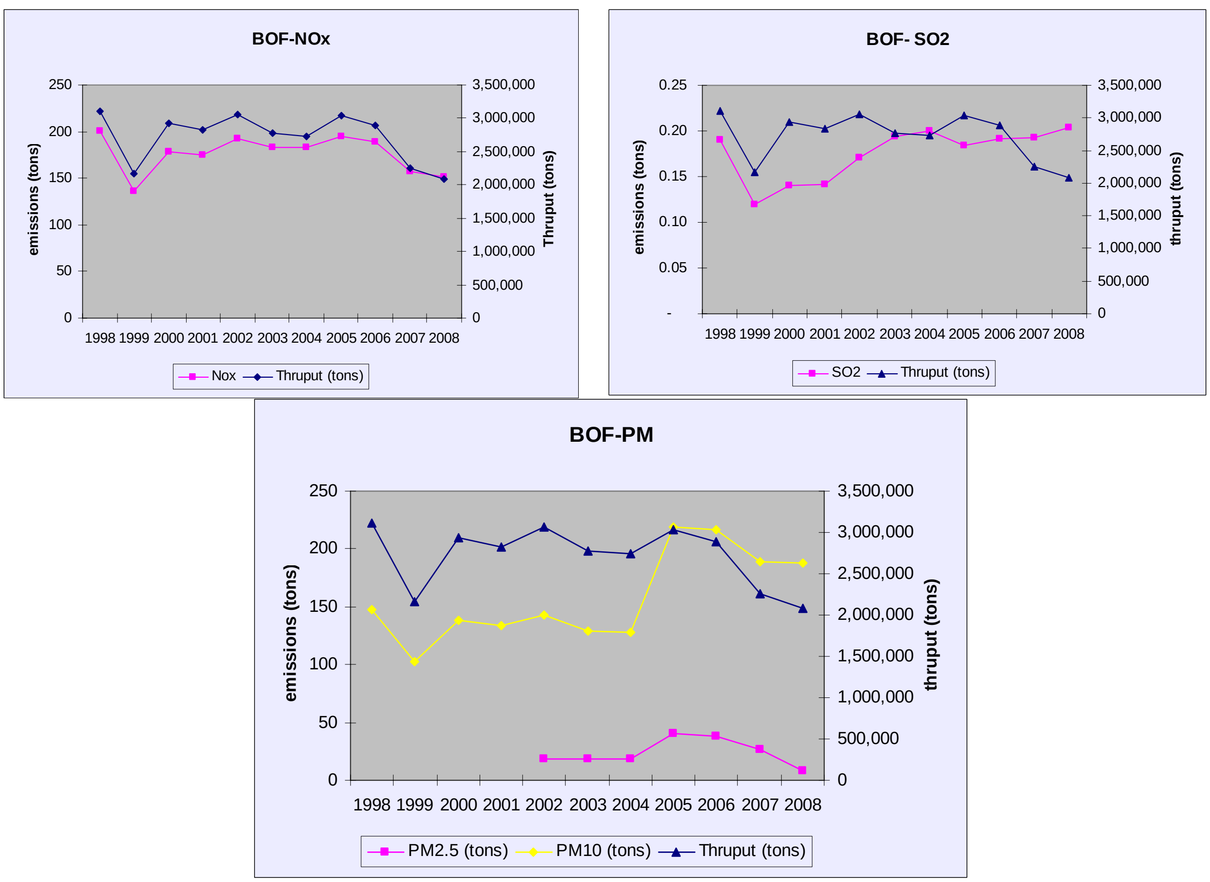


Figure 3. Blast Furnace Emissions to Throughput Comparisons at Severstal

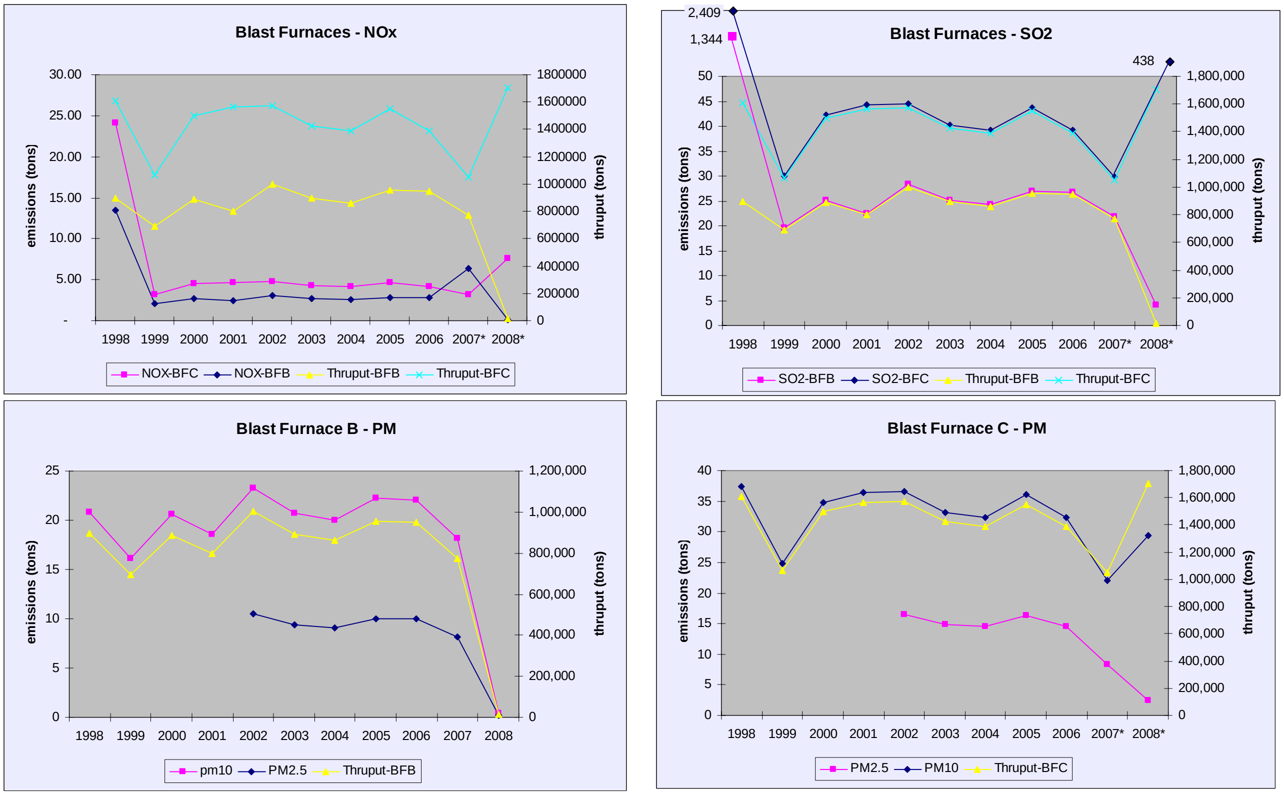
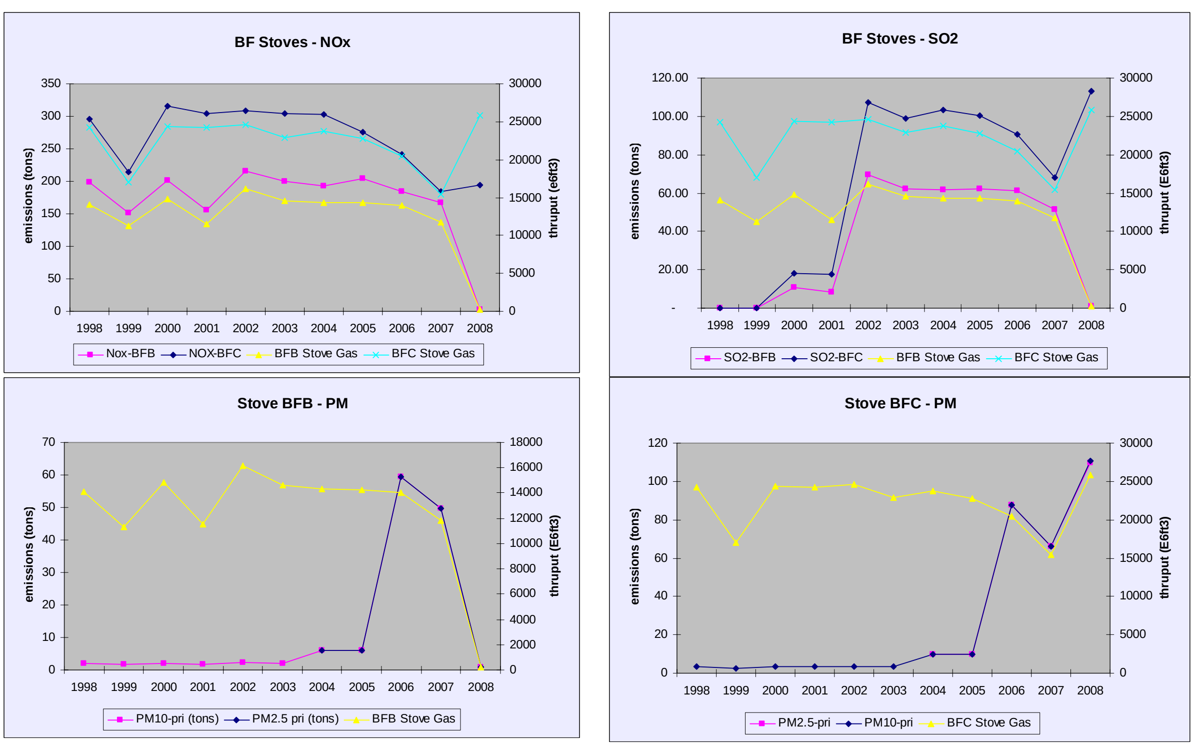


Figure 4. Blast Furnace Stove Emissions to Throughput Comparisons at Severstal



A different comparison can be made with throughput compared to ambient $PM_{2.5}$. For Severstal, this comparison does show some correlation. In 2007, baghouse controls for the BOF and blast furnace C were added. In January 2008, blast furnace B was severely damaged; requiring shut down and has not been repaired. The company indicated that when the blast furnace B does start up again, it will be controlled by a baghouse. In 2008 throughput began to increase for the BOF and Blast Furnace C, but ambient $PM_{2.5}$ decreased. This decrease in ambient $PM_{2.5}$ may be due to the blast furnace B shut down, as well as the impact of the new controls (see Figure 57).

Figure 5. BOF Throughput to Ambient $PM_{2.5}$ Concentrations at the Dearborn Monitor

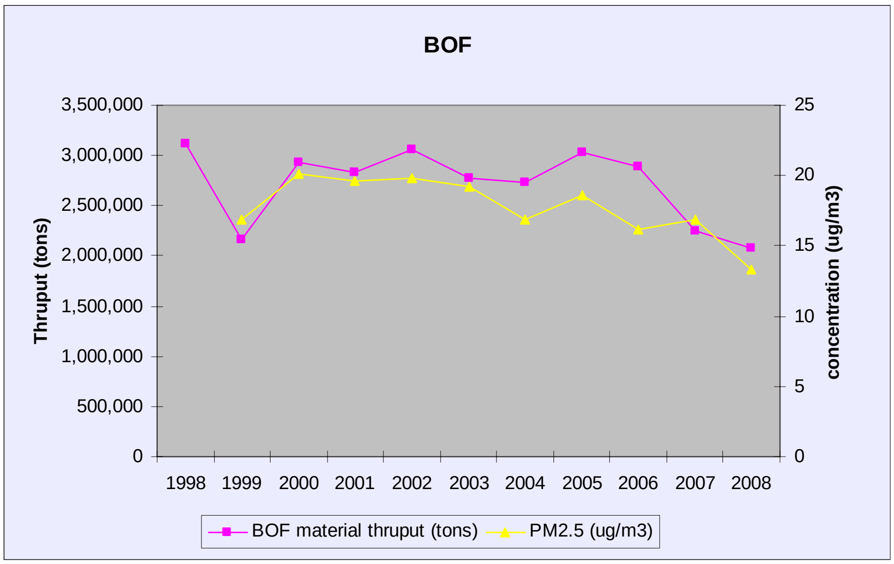


Figure 6. Blast Furnace Throughput to Ambient $PM_{2.5}$ Concentrations at the Dearborn Monitor

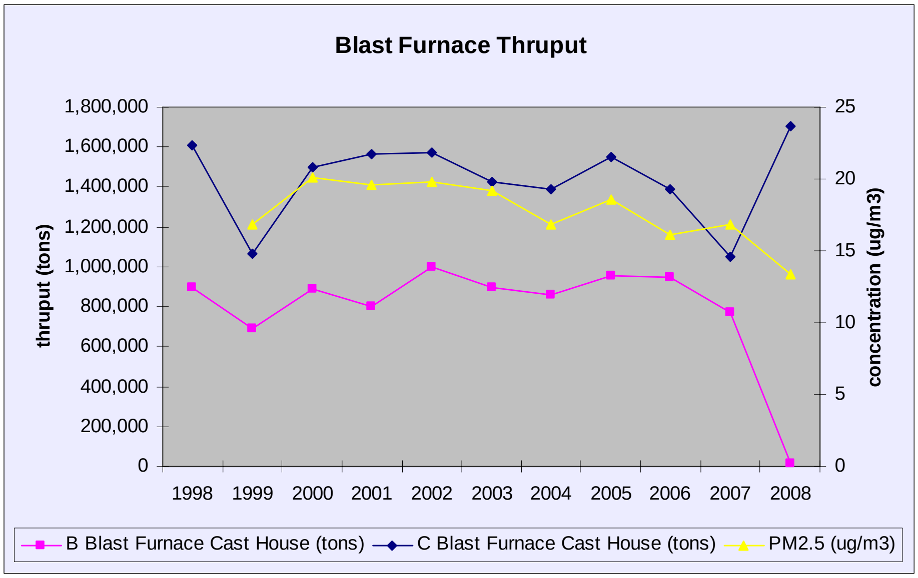
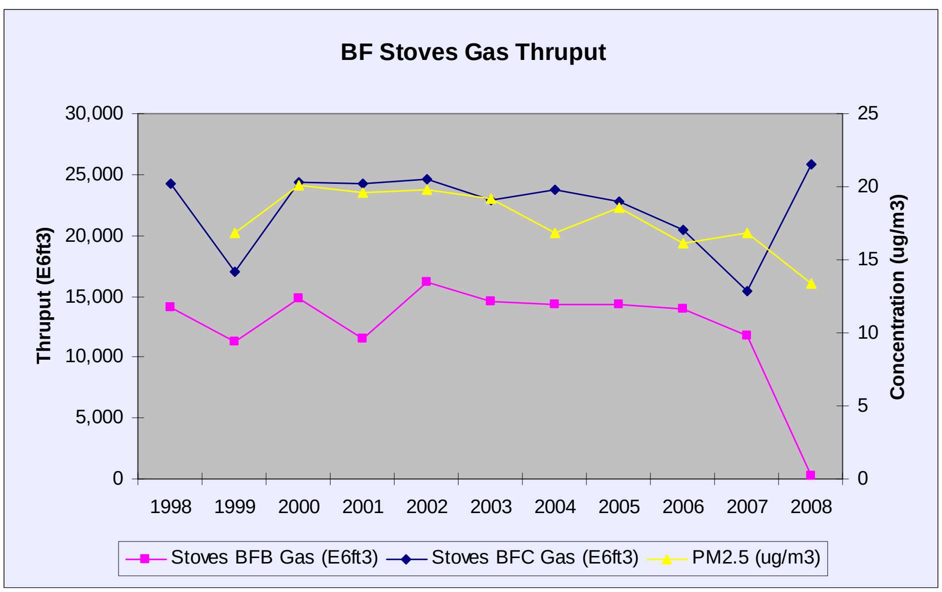


Figure 7. Blast Furnace Stoves Throughput to Ambient $PM_{2.5}$ Concentrations at the Dearborn Monitor



Severstal, being a major emissions source located very near and directly upwind of the Dearborn monitor, is considered to directly impact $PM_{2.5}$ levels at the monitor. With the recent (2007) installation of additional PM controls to the steel mill, ambient $PM_{2.5}$ showed attainment for $PM_{2.5}$ NAAQS for the first time at the Dearborn monitor. A major reason can be explained by additional Severstal controls, and this source is a likely candidate for contingency measures if additional controls are needed in the Dearborn area.

US Steel

United States Steel, Great Lakes Works operates an integrated steel mill that has been in operation since August 1930. It is located just south of the city of Detroit. The site consists of approximately 1100 acres that span along the Detroit River through the cities of Ecorse and River Rouge. The facility includes the Main Plant Area, the 80-inch Hot Strip Mill, and the iron making and coke-making operations on Zug Island. The plant produces flat-rolled steel products for the automotive, appliance, container, service center, and piping and tubing industries. It should be noted that the coke-making operations have been sold to another company.

The primary iron producing facility is located on Zug Island, in the city of River Rouge. Zug Island is bordered by the Rouge River on the north, south, and west sides and the Detroit River on the east side. The Zug Island facility includes three operating blast furnaces, one coke oven, coke by-product recovery plant, and three boiler houses. The facility site is zoned heavy industrial. The nearest residential area is approximately 0.6 miles from the facility. This portion of the facility is located 2.5 miles southeast of the Dearborn monitor.

The 80-inch Hot Strip Mill facility is located in the city of River Rouge between the Zug Island and Main Plant facility location. The 80-inch Hot Strip Mill facility includes the hot strip finishing and shipping building, scale pit, coil storage and shipping building, slab yard, and 80-inch hot strip mill. The facility site is zoned heavy industrial. The nearest residential area is approximately 1.5 miles from the facility.

The Main Plant Area is located on a 682-acre site located in the city of Ecorse. It is bordered by the Detroit River on the east, by the 80-inch Hot Mill Strip facility on the north, by the E.W. Levy Plant No. 5 on the south and Jefferson Avenue to the west. The following steel-making operations are located at the Main Plant: No. 2 Basic Oxygen Process (#2 BOP), Vacuum Degasser, Ladle Metallurgical Facility (LMF), Pickle Line, Electrogalvanizing Line, No. 4 tandem cold mill, Annealing Furnace, and Boiler House. The plant site is zoned heavy industrial. The nearest residential area is approximately 0.5 mile from the facility.

US Steel has several large emitting sources, and in some cases, the emissions do not follow throughput (see Figures 8 through 14). In particular, some units' emissions in 2004 and 2005 do not follow throughput (see Figure 8 through 12). Information is not available to explain these changes. Also, emission factors used are not reported for several years in the AQD MAERS program, so the reason for changes are difficult to track.

Figure 8. 80” Strip mill emissions to throughput comparison at US Steel.

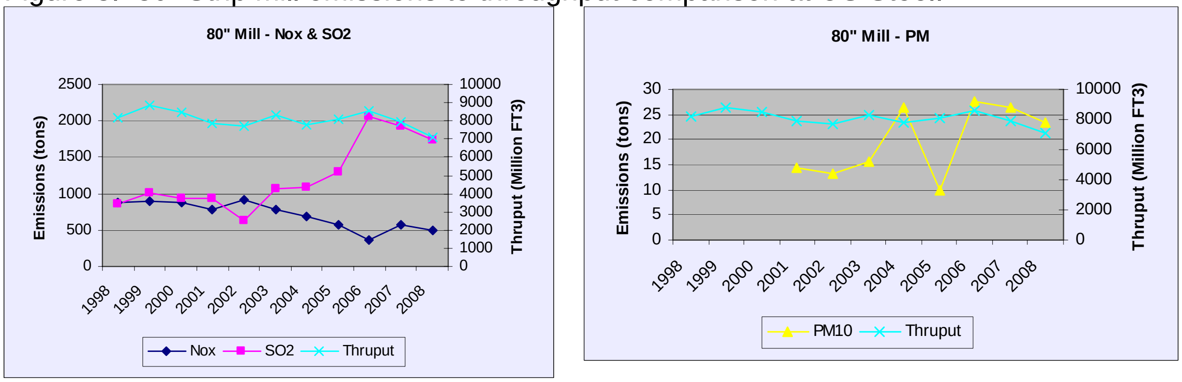


Figure 9. Blast furnaces B and D emissions to throughput comparison at US Steel.

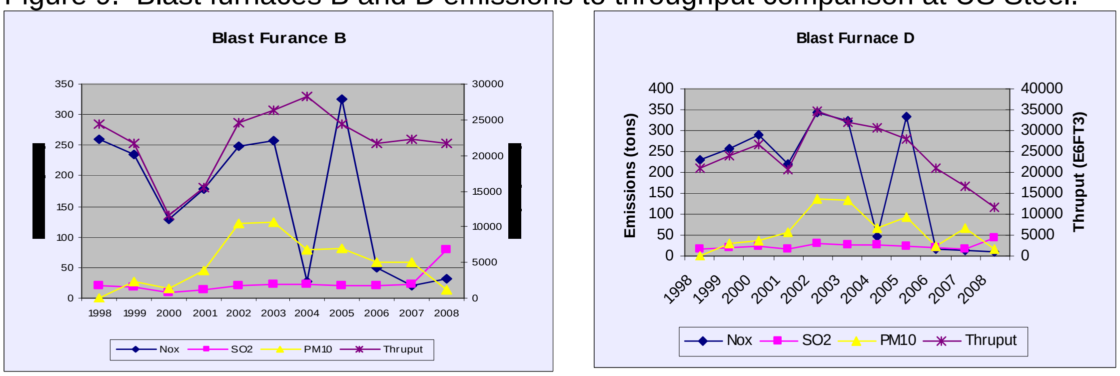


Figure 10. Coke oven emissions to throughput comparison at US Steel.

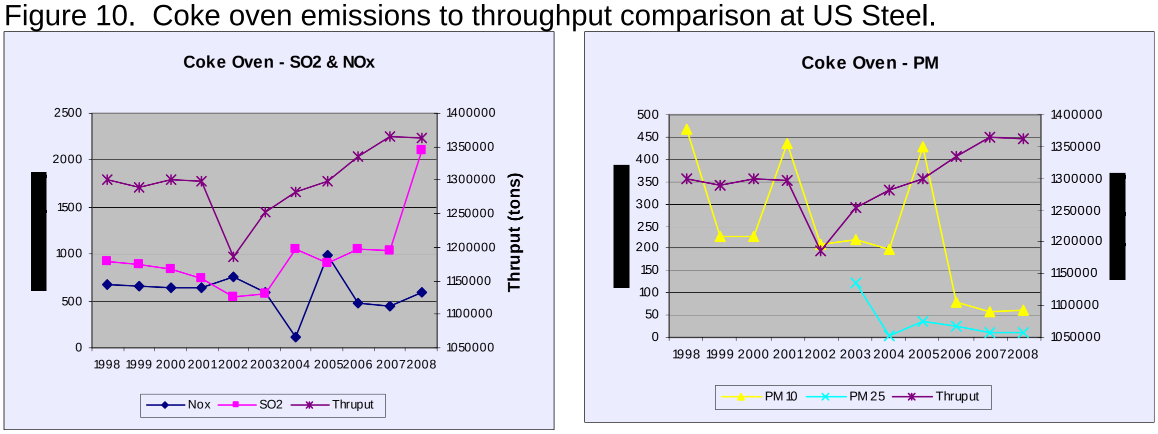


Figure 11. Coke oven gas flare emissions to throughput comparison at US Steel.

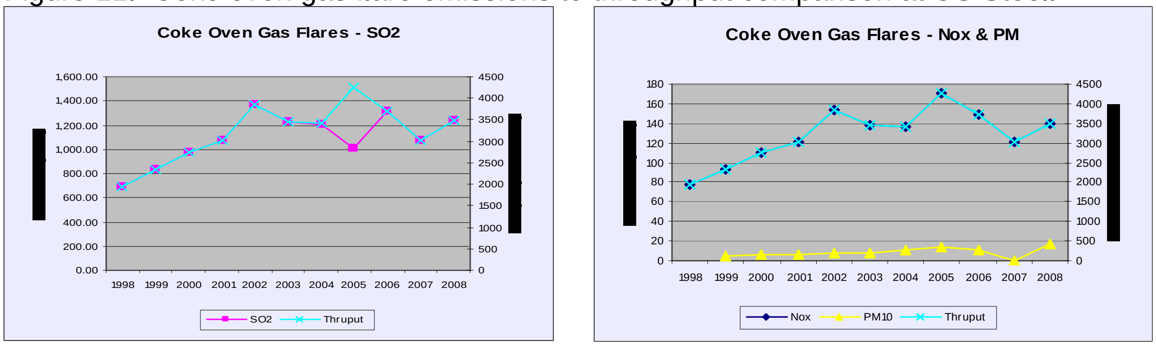


Figure 12. BOF emissions to throughput comparison at US Steel.

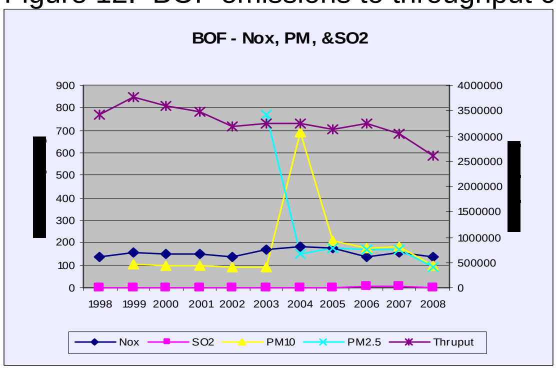


Figure 13. Zug Island boiler house #1 emissions to throughput comparison at US Steel.

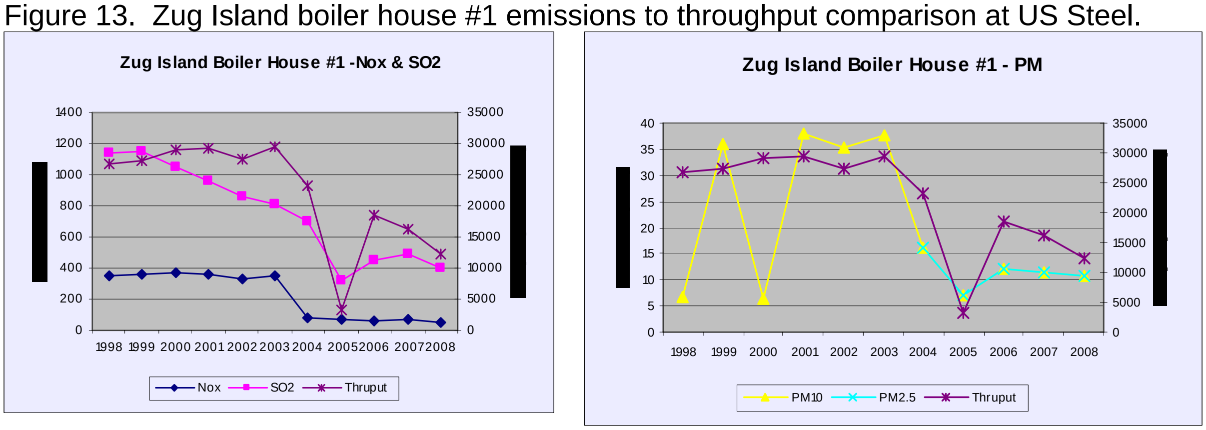
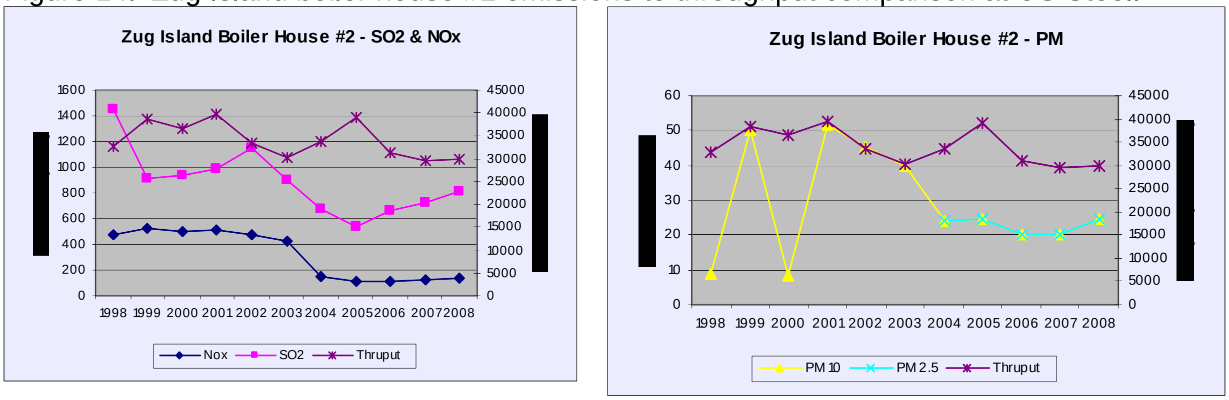


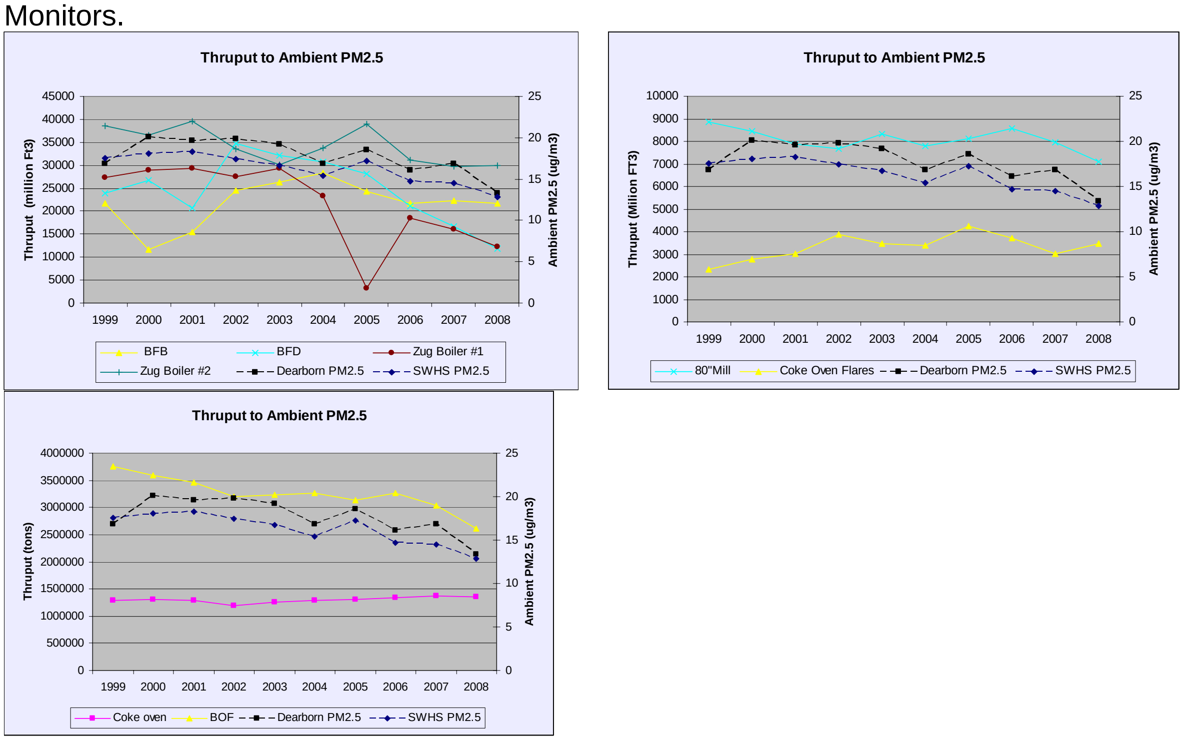
Figure 14. Zug Island boiler house #2 emissions to throughput comparison at US Steel.



Since throughput does not follow emissions very well, another comparison was made. Throughput was compared to ambient $PM_{2.5}$ at the Dearborn monitor and at the Southwest High School (SWHS) monitor, since US Steel is much closer and upwind of the SWHS monitor. This comparison shows some correlation for some emission units, but not for others (see Figure 15).

It should be noted that while US Steel is a large emissions source, it may have less impact on the Dearborn monitor than other large sources in the area, since it is downwind of the monitor.

Figure 15. Throughput to Ambient $PM_{2.5}$ Concentrations at the Dearborn and SWHS Monitors.



Marathon-Ashland Petroleum LLC

Marathon Ashland Petroleum LLC. – Detroit Refinery and Detroit Light Products Terminal are located at 1300 Fort Street and 12700 Toronto Street in the southwest part of the city of Detroit. The facilities are sited between Interstate Highway I-75, Fort Street, Oakwood Avenue and Dix Avenue and the Rouge River. The nearest residential area is approximately 100 feet west of Stocker Avenue near the Rouge River Terminal. Marathon is located two miles south of the Dearborn monitor. The refinery operates 24 hours per day, seven days per week and 52 weeks per year.

Marathon Ashland Petroleum LLC refinery processes approximately 72,000 barrels per day of crude oil, which is refined into a product mix of liquefied petroleum gases, gasoline, fuel oil, asphalt, and other products. The makeup of this production will vary depending on the type of crude used as charge stocks. The finished products leave the facility via truck, lake tanker, railroad car, or pipeline.

The refinery is organized into five complexes for operations and maintenance purposes. Complex I has the Crude and Vacuum Units. Complex II consists of the Unifiner, Alkylation, and Sulfur Recovery units. Complex III includes the Fluid Catalytic Cracking Unit (FCCU) and other Light Ends Units. Complex IV includes the Catalytic Reformers, Hydrotreaters, and Boilers; and Complex V contains the Storage and Blending Facilities, as well as the Marine Loading Facilities. The refinery operations are controlled by a Distributed Control Computer System.

Crude oil is the raw material the refinery utilizes to create finished products such as fuels and asphalt. The refinery is staged such that processing alters the physical and chemical state of the crude oil, which in turn, produces marketable products. Both sweet and sour crude oils are processed at the Detroit refinery. Sour crude contains a higher content of sulfur components than sweet crude. All crude oil is pipelined into the refinery. Other raw material may be brought into the refinery by pipeline or is transported in trucks including iso-butane, n-butane, toluene, xylene, ethanol, gas oil and catalysts.

Reviewing the company's emission inventory and throughput data from 1998 through 2008 indicated that the facility's operations had actually increased for the years 2006 through 2008; i.e., the same time period as the decreased emissions shown on the Dearborn monitor. Marathon reported source emissions using the emissions factors within MAERs. The material and fossil fuel throughput amounts for the largest units at this location, the FCCU, Zurn Boiler and B&W Boiler were used to determine whether significant changes in operations had occurred. See Figure 16 through Figure 19. The graphs begin in the year 2003 and go through 2008. Prior to 2003 the operations at the facility were intermittent. Emissions for $PM_{2.5}$ were not reported, and back calculations of the emissions using the most current emission factor did not show anything significant.

The Detroit Heavy Oil Upgrade project (DHOUP) air permit (most recent permitting activity) has specific emission limits for the FCCU, Zurn Boiler and B&W Boiler, which are federally enforceable. In addition, the refinery purchased 80 tons of PM_{10} emission credits for offsetting purposes during the permitting for the DHOUP project. Per the facility and district staff contact, the credits were never used and were retired from use.

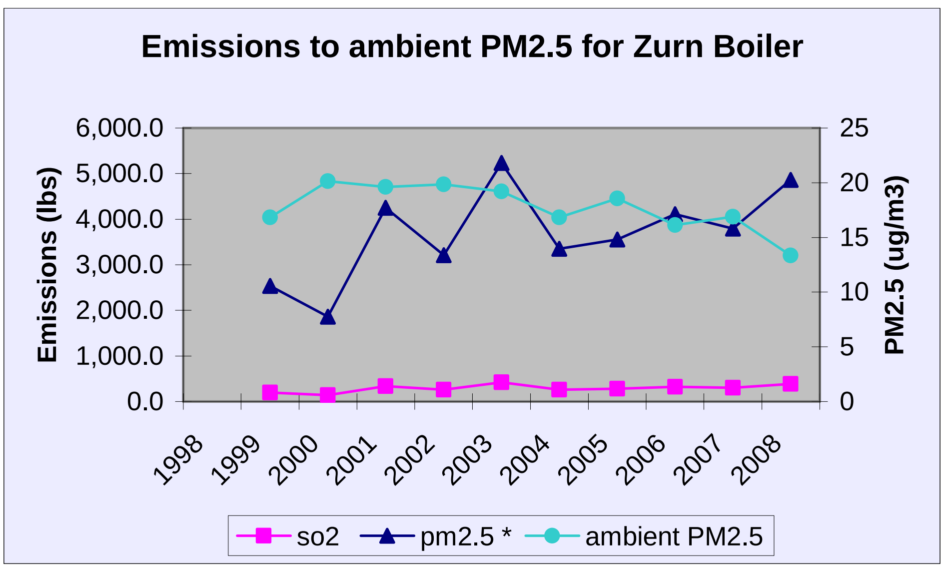
The offsets were purchased from Central Wayne Recovery and Carmeuse Lime. Central Wayne Recovery was located in Inkster MI, near Dearborn. The facility ceased all operations in the fall of 2003. Therefore the reductions are permanent.

Carmeuse Lime (formerly known as Detroit Lime) was located on Dix Road in Detroit near Dearborn. The facility ceased all operations in Fall 2002. Therefore the reductions are permanent.

Zurn Boiler

The Zurn Boiler's normal operations are year-round 24 hours a day. The exhaust stack for this unit is 150 feet high with an inside diameter of 72 inches. This unit is centrally located within the facility boundaries. The facility originally proposed removal of the Zurn boiler (at 210 mmbtu/hr) and replacing it with a new boiler (rated at 300 mmbtu/hr). However, the facility determined that the extra steam generating capacity was not necessary and kept the Zurn boiler in operation. The Zurn boiler has the capacity to burn refinery fuel gas, but only uses natural gas at this time. The Zurn boiler has federally enforceable permitted emission limits for NOx, CO, VOC, PM and PM_{10}. The Zurn boiler also has a material throughput limit of 210,000 cubic feet per hour of fuel burned. The Zurn Boiler has a federally enforceable permit limit requiring installation and maintenance of multi-staged low-NOx burners. Figure 16 shows a comparison of emissions to ambient $PM_{2.5}$ at the Dearborn monitor.

Figure 16. Zurn Boiler Emissions to Ambient $PM_{2.5}$ at Dearborn Monitor



*$PM_{2.5}$ emissions calculated based on throughput.

FCCU

The FCCU's normal operations are year-round, 24 hours a day. The exhaust stack for this unit is 195 feet high with an inside diameter of 72 inches. This unit is centrally located within the facility boundaries. Per the company contact, the FCCU has had major control projects installed to help reduce PM from the unit. In December 2004, the refinery installed Electrostatic Precipitators on the exhaust portion of this stream to reduce PM below the federal limits. After they began using higher sulfur crude (tar sands?) they experienced an increase of PM rates in 2008. In late 2008, the facility installed an ammonia injection system to condition the gas plume on the unit to keep PM at conservative levels below the company's allowable limits. Overall the facility estimates that the ammonia injection system installation reduced NOx emission by 20 percent. Per the facility, they have reduced criteria pollutant emissions by 75 percent through the installation of state of the art technologies (see Figure 17 and Figure 18).

Figure 17. Emissions to Throughput Comparison for the FCCU at Marathon

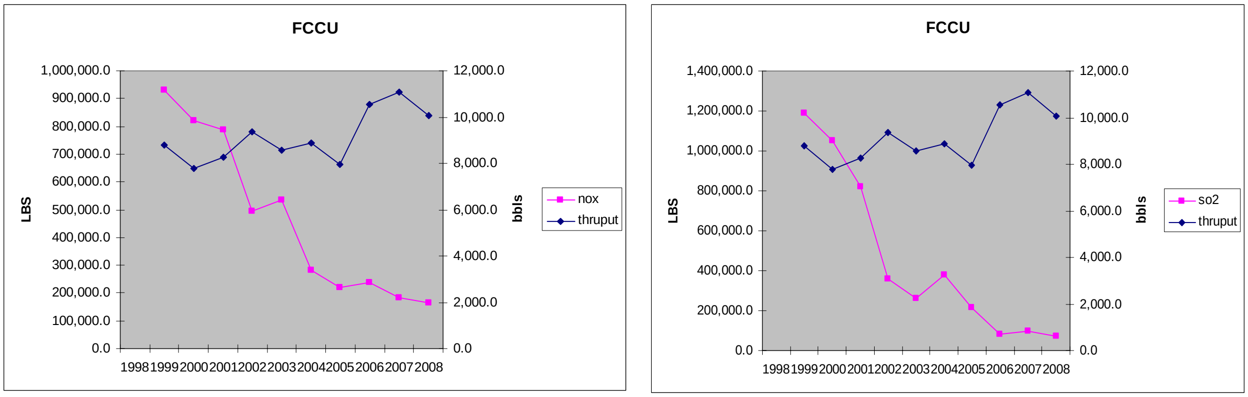
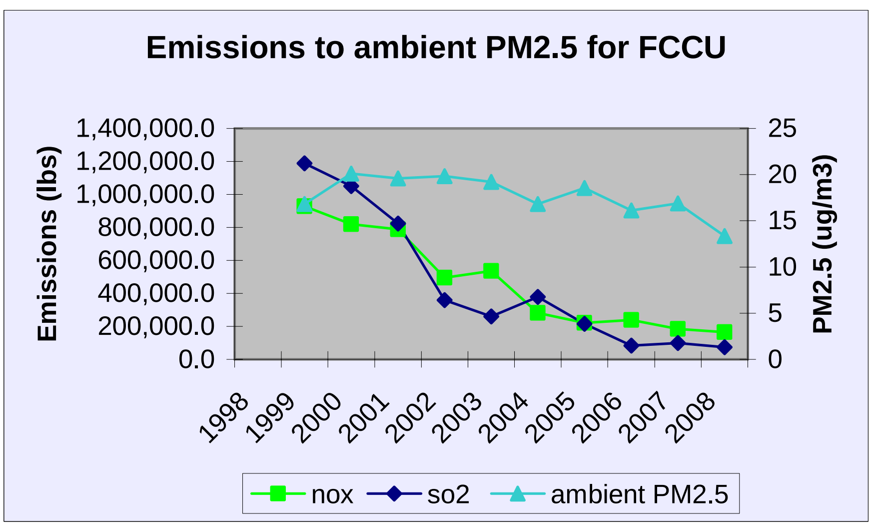


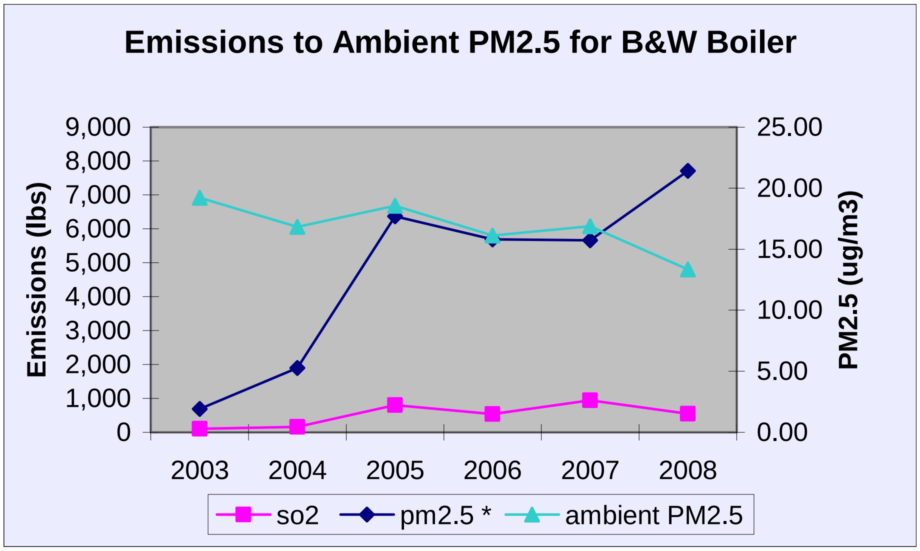
Figure 18. FCC Emissions to Ambient $PM_{2.5}$ at Dearborn Monitor



<u>B&W Boiler</u>

The B&W Boiler's normal operations are year-round, 24 hours a day. The exhaust stack for this unit is 150 feet high with an inside diameter of 80 inches. However, this unit is centrally located within the facility boundaries. The B&W boiler has federally enforceable permitted emission limits for NOx, CO, VOC, PM and PM_{10}. In addition, the unit has a SO_2 federally enforceable permit limit. The B&W boiler also has a federally enforceable material throughput limit of 300,000 cubic feet per hour of fuel burned. The boiler has a low NOx burner and flue gas recirculation control system. The B&W boiler burns natural and process gases (see Figure 19).

Figure 19. B&W Boiler Emissions for Marathon to Ambient $PM_{2.5}$ at Dearborn Monitor



*$PM_{2.5}$ emissions calculated based on throughput.

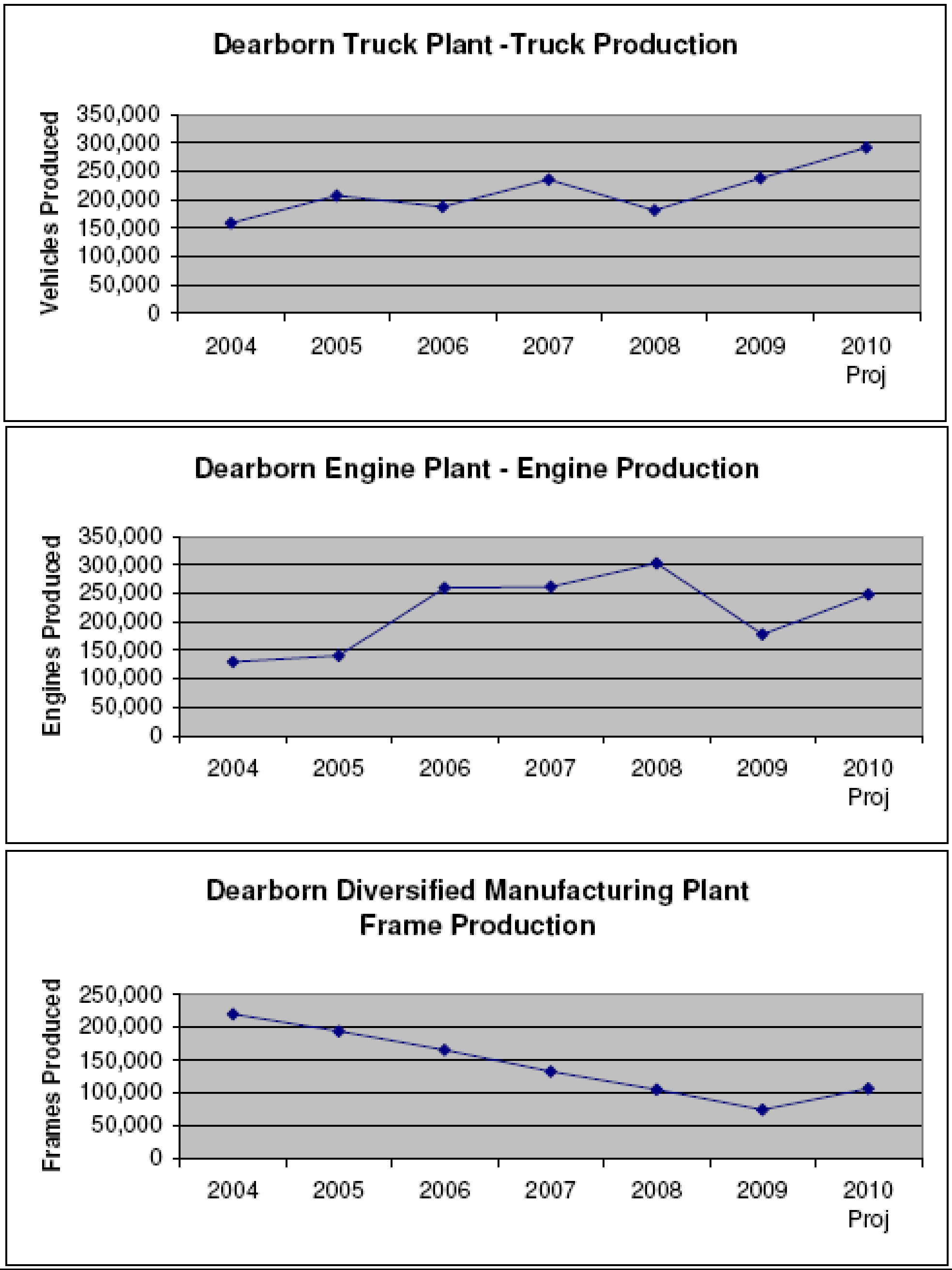
Ford Motor Company - Rouge Complex

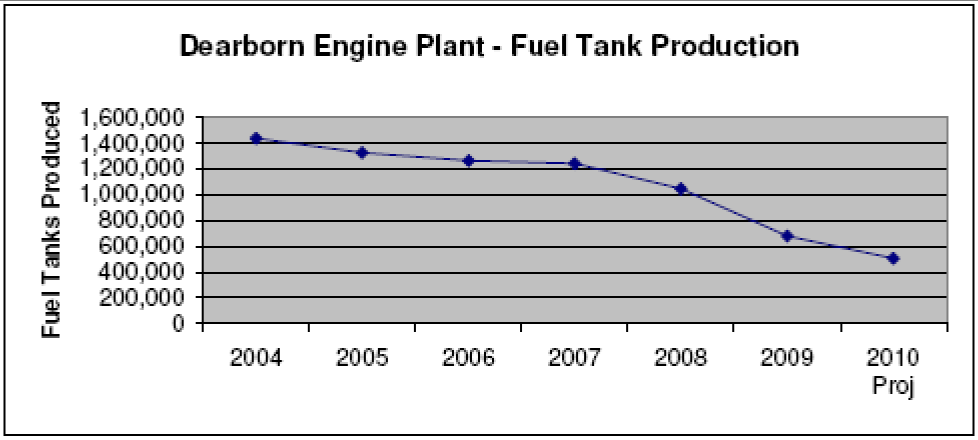
The Ford Motor Company Dearborn Assembly Plant is located on Miller Road in the city of Dearborn, part of the Rouge Industrial Complex. The facility is bounded by Rotunda Drive to the north, by Interstate 94 on the northwest, Schaefer Avenue to the west, the Rouge River to the south and Miller Road to the east. It is located less than one mile west of the Dearborn monitor.

The Ford Dearborn Rouge Complex consists of four individual manufacturing plants that produce automobile and automobile components, as follows: an assembly plant that produces and paints vehicles, an engine and fuel tank manufacturing plant that produces automobile engines and metal fuel tanks, a stamping plant that stamps vehicle body panels and similar body parts for other vehicles, and a diversified manufacturing plant that electrocoats and manufactures vehicle frames.

Ford operations at the Rouge complex have not experienced the economic downslide as have other Ford facilities. Series F-150 trucks are built in the complex and production levels have been relatively stable. See Figure 20 for production information for the four plants. Ford ceased foundry operations around 1981 in the closing of the Specialty Foundry. The steel-making operations located in the complex are currently owned by Severstal.

Figure 20: Productions for the Ford Rouge Complex.

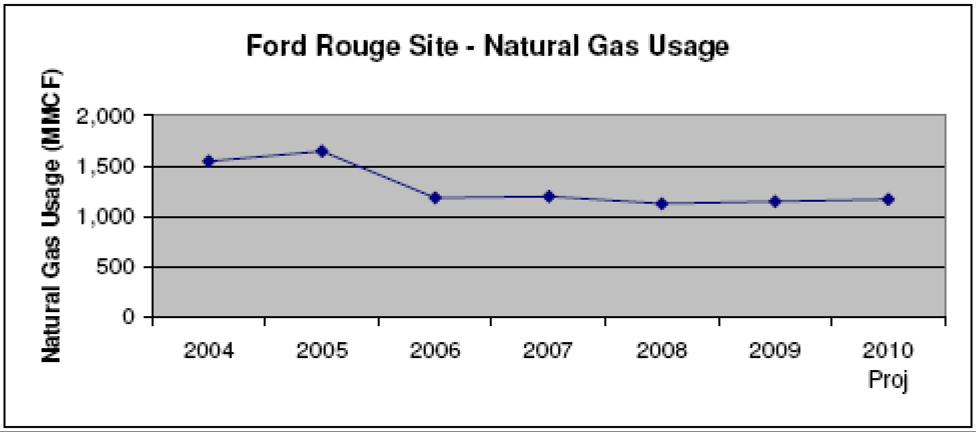




Several emissions were combined under the RG-Paint reporting group, which has natural gas usage reported. RG-Paint reports the total natural gas combustion for the Dearborn Truck Plant paint shop building. The natural gas usage includes the paint shop space heating, booth air supply houses, hot water boilers, coating curing ovens and air emission abatement equipment (thermal oxidizers and carbon adsorption systems). In addition, the EU-NATGASSPACE emission unit includes all the natural gas used for space heating at the Dearborn Truck Plant outside of the paint shop (i.e., body and final assembly buildings). Several other EUs report natural gas usage as well. EU-HEATERSFRAME includes the natural gas used for space heating the Dearborn Diversified Manufacturing Plant (DDMP, formally known as the Dearborn Frame Plant). EU-ECOATFRAME includes the natural gas used in the DDMP Ecoat curing oven. EU-HEATERSENGINE includes the natural gas used for space heating the Dearborn Engine and Fuel Tank Plant.

The old Dearborn Assembly Plant ceased operations in May 2004. A portion of the building was demolished in 2004/2005. The remaining building was decommissioned and put into a cold idle status (natural gas line was blanked) after the heating season in 2005. Although there may have been other efficiency improvements, it appears the shutdown of the old Dearborn Assembly Plant was a significant portion of the decrease in natural gas usage (see Figure 21).

Figure 21: Ford Rouge Complex natural gas usage.



NOx emissions are generated from the combustion of natural gas (space heaters, air houses, ovens, thermal oxidizers) located at the Dearborn Truck Plant (paint and assembly), from natural gas combustion (space heaters and ovens) at the other manufacturing facilities and also from the gasoline combustion associated with engine dynamometer testing (EU-DYNOTEST) located at the Engine Plant. Generally any SO_X and $PM_{2.5}$ emissions result from natural gas combustion and the gasoline combustion in the engine dynameters. In addition, there are $PM_{2.5}$ emissions generated from the painting, body scuffing and machining operations located at Ford manufacturing facilities at the Rouge Complex. In addition to the natural gas, diesel fuel is used for emergency generators and fire pumps, gasoline is used in the engine testing dynamometers and propane is used for the mobile hi-los.

There are three natural gas billing meters to account for all of the natural gas used by Severstal and Ford in the Rouge Complex. The facility indicates that the total natural gas usage allocated to the Ford facilities is a reasonable value. Building-specific usage rates are considered less reliable and provided to the company by Severstal for budgetary purposes. Similarly, the $PM_{2.5}$ due to natural gas combustion will be less reliable on a building by building basis.

Dearborn Industrial Generation (DIG) began providing steam to the facilities at the complex around August 2001. At that time, the temporary 250-MMBTU boilers, in use since the summer of 1999 as interim replacement for the Rouge Powerhouse, were idled in advance of being shutdown and removed.

The facility fugitive dust plan indicates several areas are swept, flushed or treated to keep dust to a minimum. There are two road vacuum/sweepers. These two road sweepers are cleaned daily and sent to the mechanic shop for routine maintenance (grease, inspection, etc.) on a weekly basis. A consent order mentions bulk materials to address road salt stored in a dome and used to melt snow during the winter season and to address the occasional construction-related debris when temporarily stored on site while awaiting proper waste characterization just prior to being hauled offsite. At this time, the road salt is stored in a dome. There is no need for other enclosures as there are no other permanent material stockpiles. The newest Ford facilities in the Rouge Complex are those buildings associated with the Dearborn Truck Plant. The Paint shop became operational in late 2001. Operations in the new final assembly and body shop buildings began during 2004, replacing the former Dearborn Assembly Plant operations.

Ford's Installation of the green roof on the Dearborn Truck Plant Final Assembly building was completed in June 2003. There are no reports estimating any air emission reductions associated with the green roof. There have been some storm water benefits from the green roof. The MDEQ believes that the installation of a green roof (while not documented) impacts the reduction of NOx and possibly $PM_{2.5}$ within the immediate area.

Ford is upwind of the Dearborn monitor; however, its throughput does not correspond well with the ambient $PM_{2.5}$ trends. The major emissions from Ford are VOCs (430 tons per year), which the MDEQ is not analyzing for controls in this SIP. Other pollutants such as NOx (>50 tons per year) and PM (>10 tons per year) are not as large as other facilities in the area, and therefore may have less affect on ambient $PM_{2.5}$ in the Dearborn area.

Dearborn Industrial Generation

Dearborn Industrial Generation (DIG) is located directly east of Severstal Steel, less than one-quarter mile from the Dearborn monitor. DIG is a cogeneration unit that uses blast furnace gas from Severstal to produce electricity and also provides steam back to Severstal for their processes. The facility consists of three natural gas fired combustion turbines (one installed 1999, other two in 2001), three natural gas (NG) and blast furnace gas (BFG) fired boilers (all installed 2001), and two diesel fuel oil fired emergency generators (installed 2003). Two existing flares (previously owned and operated by Rouge/Severstal Steel Company and now owned by DIG, one installed 1936 other in 1999) burn blast furnace gas if it cannot be utilized in the boilers. All three of the boilers are designed to fire a mixture of up to 95 percent BFG and five percent NG (by heat input) or 100 percent NG. The BFG is received from Severstal Steel as a byproduct of their iron and steel-making operations.

The plant runs year around and use for each unit varies by quarter and year. There is no regular pattern of usage. The flares, boilers and all but one combustion turbine have stacks over 150 feet high. The one combustion turbine has a shorter stack at 60 feet.

Emissions appear to mirror throughput in most cases (see

Figure 22 through Figure 24**)**. Emissions are determined by parametric emission monitors (PEMs), CEMs, stack tests or other. MAERS factors are rarely used to determine emissions. Boiler #2 for PM_{10} has lower emissions compared to throughput than the other boilers (see

Figure 22). These numbers are based on stack test emissions. The NOx emissions for the boilers do not follow the throughput. These emissions are combined for natural gas and process gas usage. NOx emissions appear to decrease as process gas throughput increases. Therefore emissions to throughput will not correlate as well as other pollutants. These NOx emissions are based on CEMs or PEMs.

Turbine #3 has lower emissions for PM10 compared to throughput than the other turbines (see Figure 23). All three turbines are equipped with low NOx burners. The emissions are based on stack test emissions.

Figure 22. SO_2, PM_{10} and NOx for Boilers at DIG

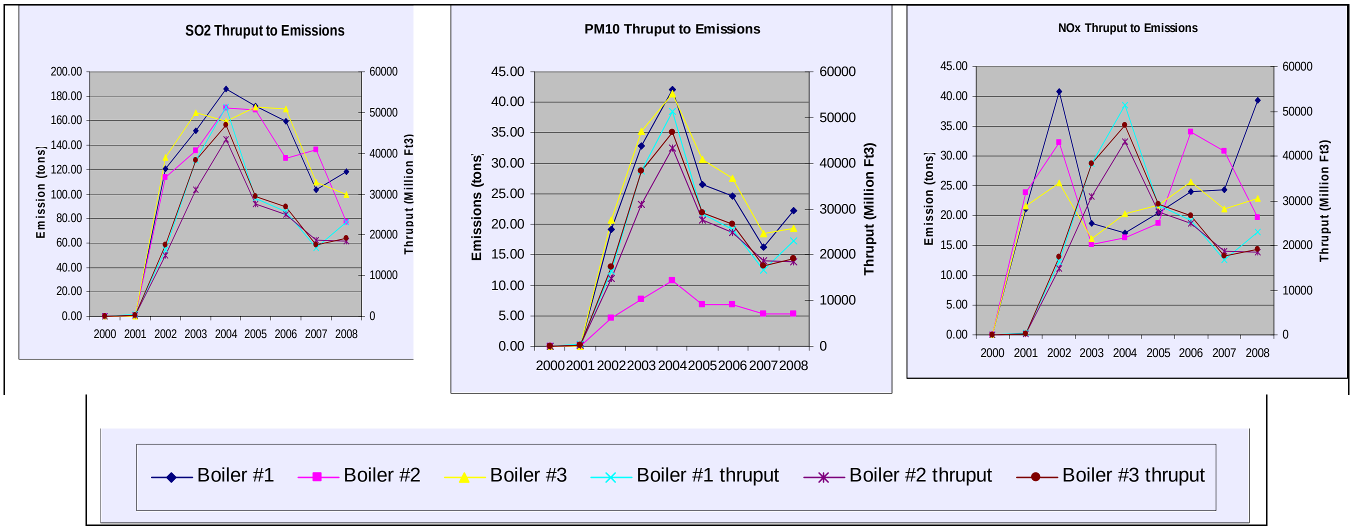
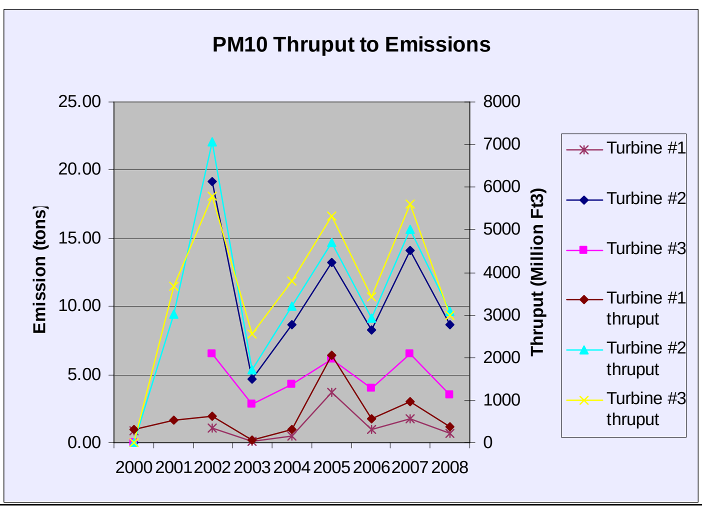


Figure 23. PM_{10} and NOx for Turbines at DIG



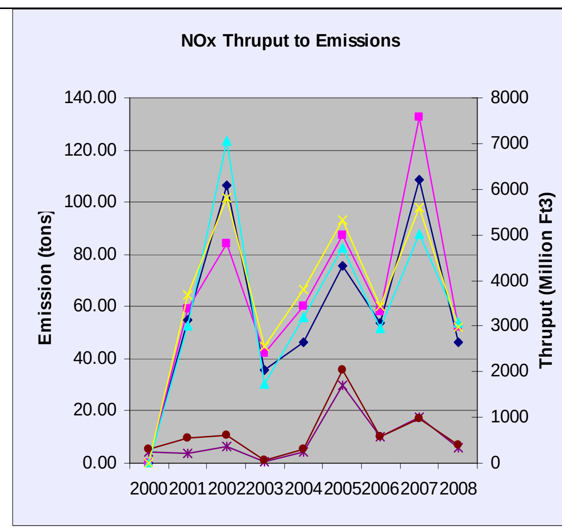
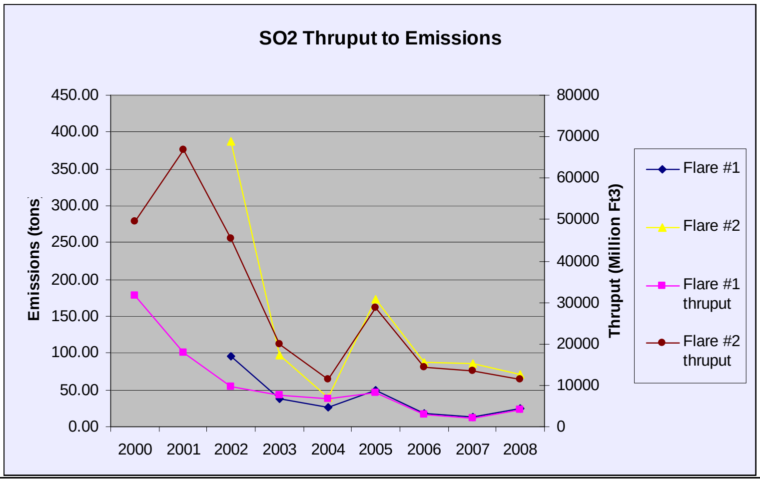
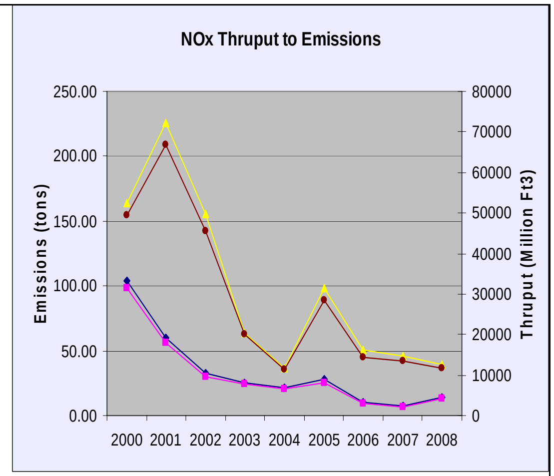


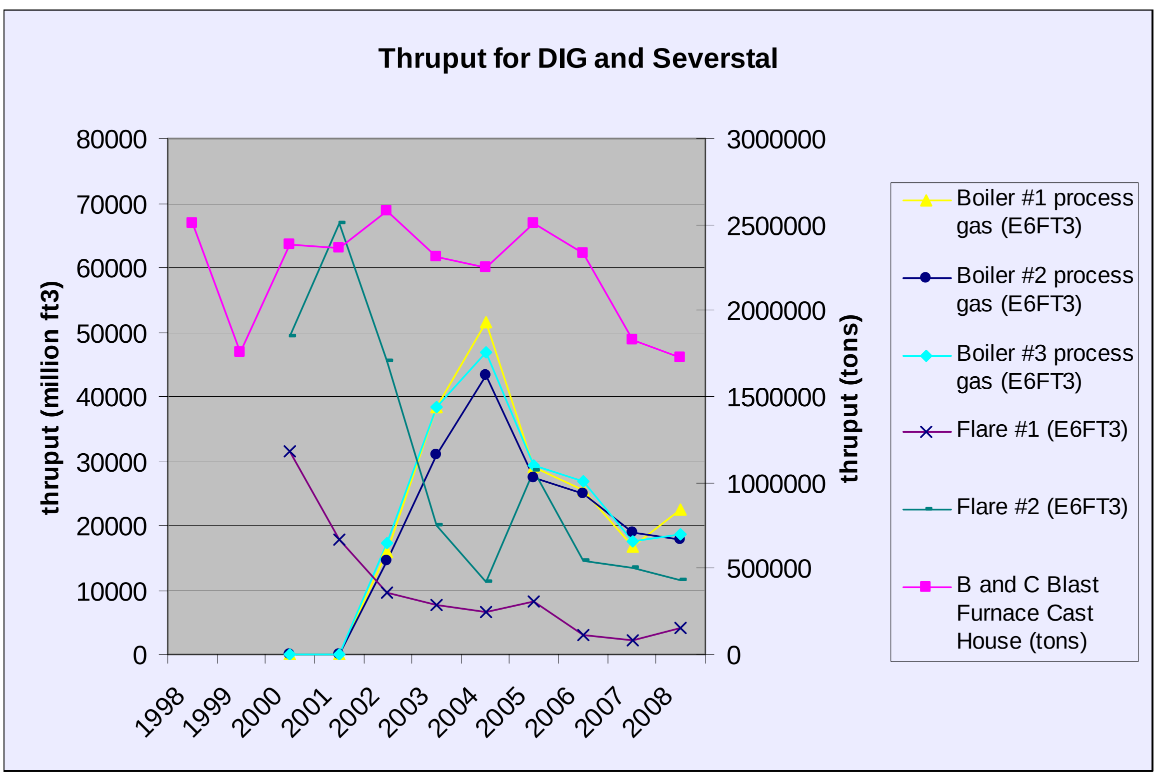
Figure 24. SO_2 and NO_X for Flares at DIG





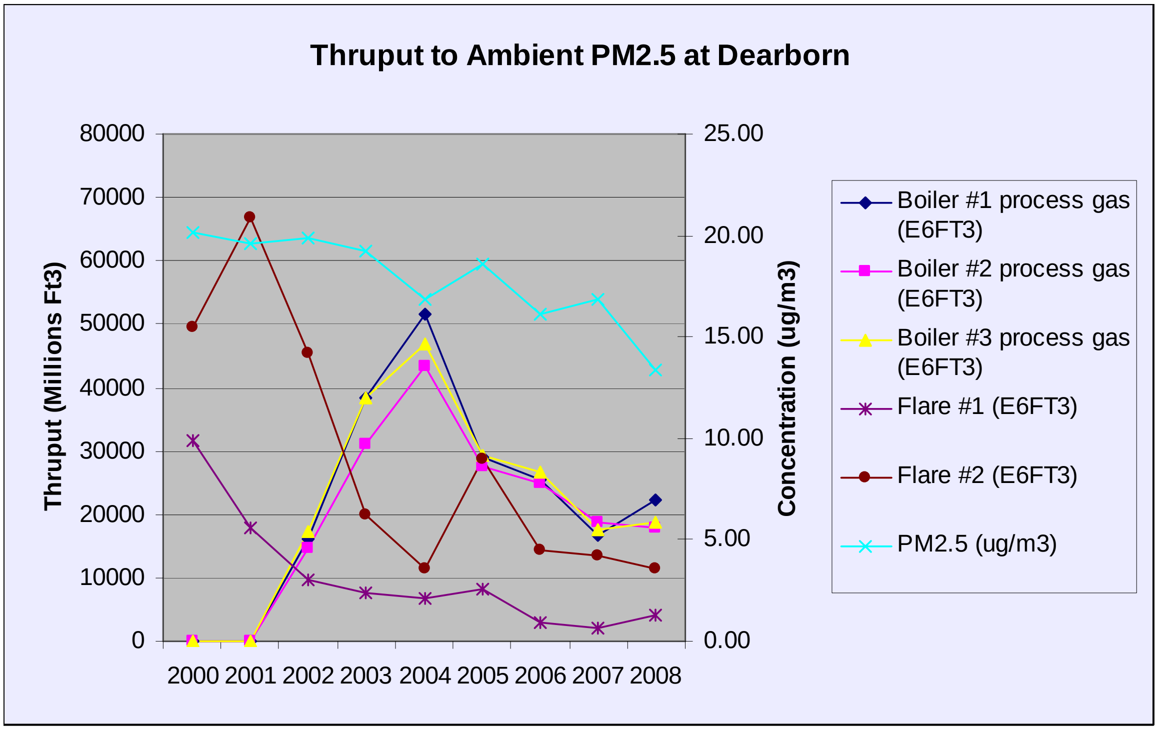
Throughput for the boilers and flares at DIG was compared to throughput at the blast furnaces at Severstal (see Figure 25). For the initial year (2001-2004) the throughput does not align; however, for 2005-2008, throughput correlates for DIG and Severstal. The boilers and one flare were built in 2001. Since they were just starting up, they likely were not in full use until around 2005 where they start to correlate with Severstal's emissions.

Figure 25. Throughput Comparing DIG to Severstal



Ambient $PM_{2.5}$ at Dearborn is decreasing similar to emissions at DIG after 2005, but earlier years do not correspond to $PM_{2.5}$ ambient concentrations (see Figure 26).

Figure 26. Throughput to ambient $PM_{2.5}$ for DIG



Cadillac Asphalt Products Corporation

The Cadillac Asphalt Products Corporation Plant 5A hot mix asphalt facility is located at 670 S. Dix Avenue, Detroit, Michigan. The location is about one half mile south of the Ford Rouge Complex and 1.5 miles south-southwest of the Dearborn monitor.

The facility operates a 525 tons-per-hour parallel flow hot mix asphalt (HMA) process. During a permit modification in 1999, the plant was limited to the use of natural gas and No. 2 fuel oil (where previously it had been allowed to use recycled oils). The maximum allowed production at the facility, based on a 12-month rolling period, is 940,000 tons per year, with a maximum hourly capacity of 525 tons per hour of HMA. The HMA production season in Michigan usually occurs early April through November, depending on weather conditions.

Figure 27 and 28 indicate an increase in the natural gas throughput for 2003 and a significant decrease for asphalt throughputs for 2006 (which can be attributed to the beginning of the economic decline in Michigan). Other than 2006, the asphalt operations were fairly steady. This could imply that emissions from the facility are not reflected in the decreasing $PM_{2.5}$ levels at the Dearborn monitor.

Figure 27. Throughput of Natural Gas in Asphalt Heater

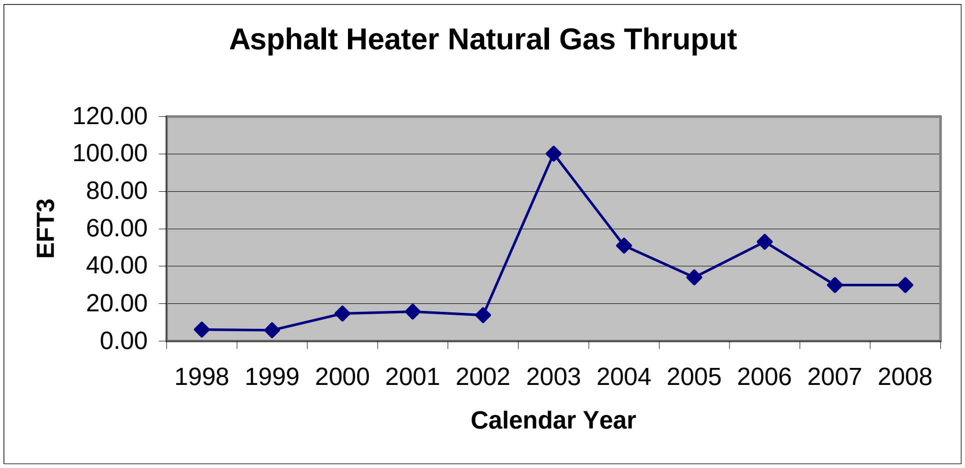
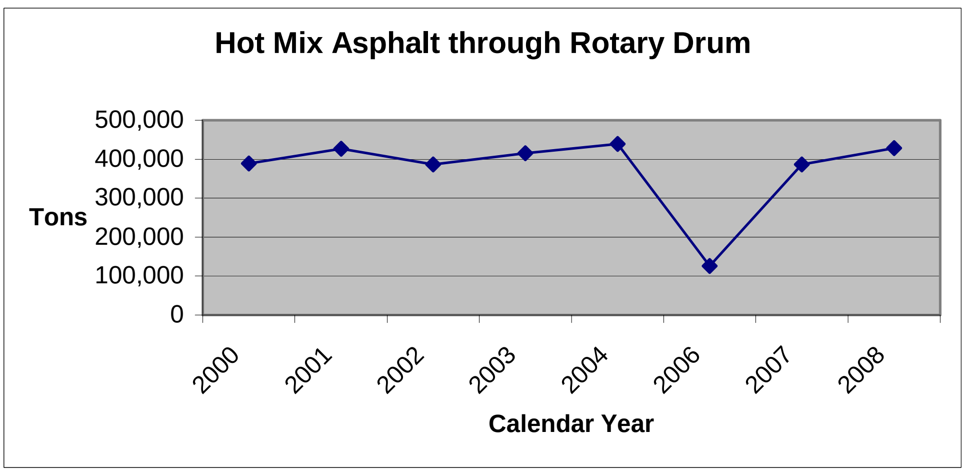


Figure 28. Throughput of Hot Mix Asphalt Through Rotary Drum



US Gypsum

The US Gypsum plant is located 2.5 miles southeast of the Dearborn monitor in River Rouge. This plant emits 50 tons or less of NO_X and 100 tons or less of PM.

Ninety percent of the plant's production is gypsum wallboard. US Gypsum Company's exclusive registered trade name for its gypsum wallboard is Sheetrock. The plant also manufactures cement board, which is used as backing for tiled walls, such as bathrooms.

The primary raw material used is gypsum, or calcium sulfate, which forms airborne particulate air pollution during the manufacturing process. The plant has a large number of baghouse type dust collectors to control these emissions.

US Gypsum has one stack for its mill rock dryer that is 122 feet tall. A second baghouse stack that is discharged inside a building is only 25 feet tall. US Gypsum operates year around, generally 4 to 6 days per week.

Emissions reported in MAERS are based on MAERS emission factors or other factors. The NOx emissions and some PM emissions appear to closely follow the throughput values (see Figure 29 and Figure 30). The emissions do not correlate well with the ambient $PM_{2.5}$ (see Figure 31). US Gypsum does mostly grinding of materials and does not incinerate, therefore, most of it emissions are likely in the PM_{10} fraction rather than the $PM_{2.5}$ fraction.

Figure 29. NO_X Emissions to Throughput Comparison for US Gypsum

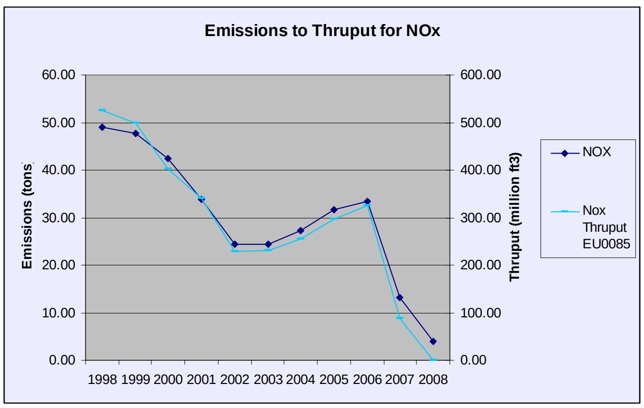


Figure 30. PM_{10} Emissions to Throughput Comparison for US Gypsum

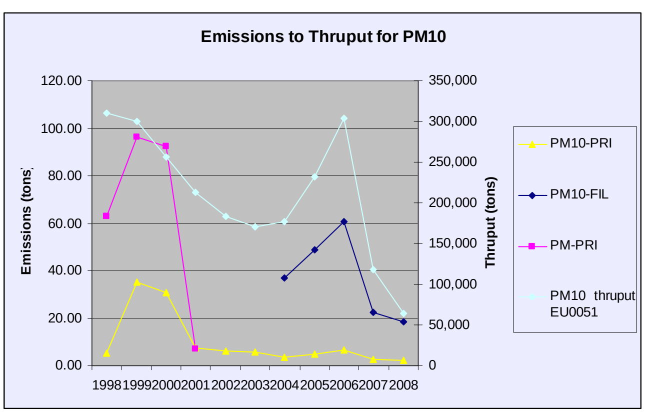
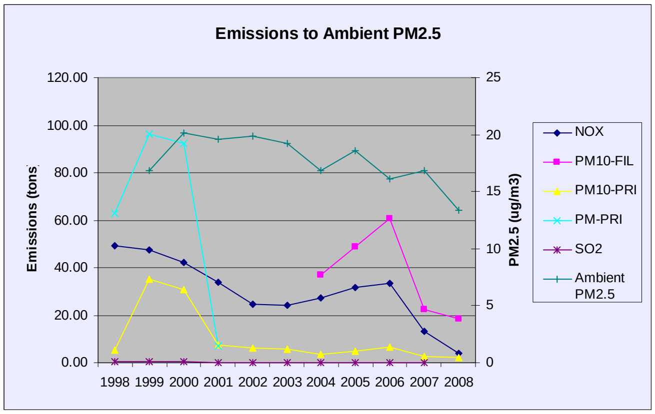


Figure 31. Emissions to Ambient $PM_{2.5}$ Concentrations for US Gypsum



Carmeuse Lime/River Rouge

Carmeuse Lime in River Rouge is approximately 2.5 miles southeast from the Dearborn monitor. Another lime plant, Carmeuse/Detroit Lime was less than a mile from the Dearborn monitor; however, that plant closed down in 2003.

Carmeuse Lime/River Rouge produces lime by the calcination of limestone. Limestone is calcinated in two horizontal rotary kilns. Limestone from the storage pile is transferred to the kilns through transfer stations and conveyors. The facility has two rotary kilns that may be operated simultaneously. The kilns are fired using pulverized coal and natural gas. The gases from the kilns are exhausted through two baghouses.

Three baghouses collect emissions generated by the handling of lime (loadout and rescreen). Flue dust from the kilns is pneumatically conveyed to the flue dust tank where it is stored and loaded into trucks. The flue dust tank and loadout spout are controlled by a dust collector.

Carmeuse Lime/River Rouge is a major emitter of NOx, SO_2 and PM. Carmeuse has two baghouse stacks about 70 feet tall. This plant operates year around and uses mostly MAERS emission factors. The emissions generally follow the throughput of lime (see Figure 32). The emissions do not correlate well to the ambient data at Dearborn. This may be partially explained by the facility distance and direction from the Dearborn monitor (see Figure 33).

Figure 32. Emissions to Throughput Comparison for Carmeuse Lime/River Rouge

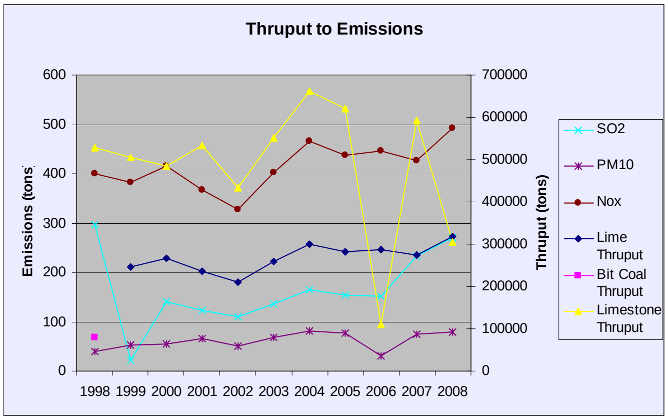
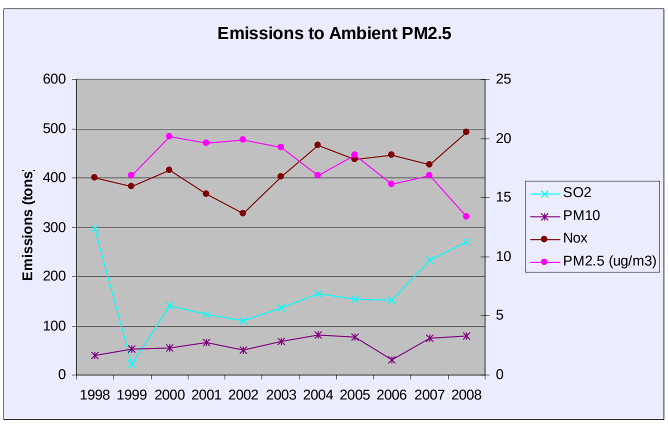


Figure 33. Emissions to Ambient $PM_{2.5}$ Concentrations for Carmeuse Lime/River Rouge



Detroit Wastewater Treatment Plant

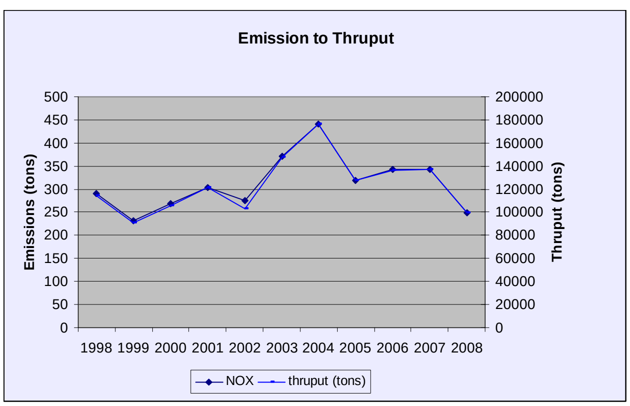
The Detroit Wastewater Treatment Plant is located two miles southeast of the Dearborn monitor. The wastewater treatment plant collects and treats domestic and industrial wastewater from the Metro Detroit area. The treatment capacity of the plant is about two billion gallons per day. The treated wastewater is discharged to the Detroit River. The treatment involves removal of large solids using bar racks and grit chambers, primary and secondary biological treatment for the removal of suspended and dissolved solids, clarification, chlorination of water from secondary clarifiers, sludge dewatering, sludge incineration and ash disposal to a sanitary landfill. The treatment processes are significant sources of volatile organic compound emissions; however, the incineration of sludge from filtration is the major source of NO_X, SO_2, and PM.

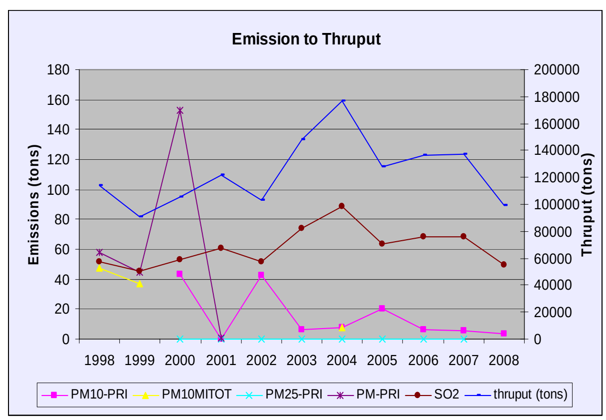
The facility has 14 sludge incinerators controlled by venturi and impingement tray scrubbers. The complex I incinerators (incinerators 1 through 6) were constructed in 1940. The Installation permit (No. C-6657) covers Tall Stack #1 (254 ft tall) for Complex I Sewage Sludge Incinerator System serving Incinerators 1 through 6. The Complex II incinerators were constructed in 1970 and are covered by installation permits C-6649 through C-6656 for incinerators 7 through 14 respectively. Installation permit (No. C-6658) covers Tall Stack #II (254 ft tall) for Complex II sewage sludge incinerator system serving incinerators 7 through 10. Installation permit (No. C-6659) covers Tall Stack III (254 ft tall) for Complex II sludge incinerator system serving incinerators 11 through 14. Each incinerator has a flue (stack). These flues are enclosed within three tall stacks. The six flues for the incinerators Number 1-6 are enclosed in Tall Stack #1, flues for incinerators 7-10 are enclosed in the Tall Stack II and flues for incinerators 11-14 are enclosed in Tall Stack #III. For an observer, only three stacks are visible.

Installation permits (No. C-6628 and C-6629) cover Sludge Mixer #1(East) and Sludge Mixer #1 (West) respectively. The sludge/lime mixing area is also covered by the installation permit (No. C-6629). Because sludge mixers are situated inside the lime pad area, EGLIMEPAD and the sludge mixers (EGSLUDGEMIXER1 and EGSLUDGE MIXER2) are combined into one emission unit. Installation permits (No. C-6630 through C-6635) cover Lime Storage Silos 1 through 6, which are controlled by a fabric filter baghouse. The sludge mixing facility is controlled by a fabric filter baghouse. Complex I and Complex II ash handling systems are controlled by fabric filters.

The plant runs year around. Emissions are calculated using MAERS emission factors (see Figure 34) according to the MAERS inventory. While the SO_2 and NOx correlate with the throughput, the PM does not. In 2005, MAERS emissions factors were reported to be used, but control efficiencies were added.

Figure 34. Emissions to Throughput Comparison for DWTP

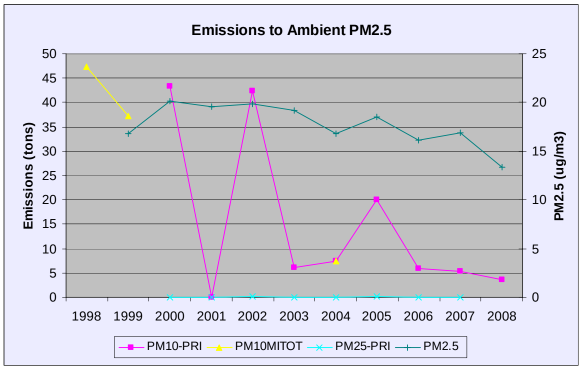


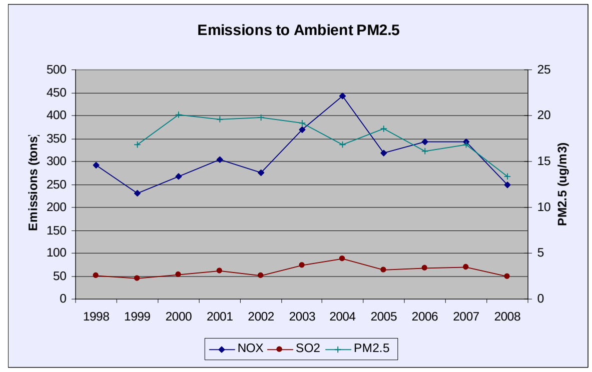


Emissions to ambient data do not correlate well except for the later 3 to 4 years (see

Figure 35). In general, this source's location and controls may partially explain this. The plant has multiple controls for their incinerators, such as demisters, impingement plate scrubbers and venturi scrubbers that control 90-99 percent of PM emissions.

Figure 35. Emissions to Ambient $PM_{2.5}$ Concentrations for DWTP





St. Mary's Cement

St. Mary's is a cement processing plant about 1.5 miles southeast of the Dearborn monitor. The plant has less than 10 tons per year emissions of NO_X and SO_2, and around 25-35 tons of PM_{10} per year. PM emissions are mainly from their grinding mills that have bag house control with 99.9 percent control efficiency of PM_{10}. There are no emissions stacks indicated in MAERS and the majority of their activity occurs in the warmer months. The emissions do not match the throughput (see Figure 36) probably because the emission factors for PM have changed. Also, MAERS indicates the method used as "other," but no other indication of how the emission factor is calculated is shown in MAERS. The emissions do not match the ambient $PM_{2.5}$ (see Figure 37) although there is a slight trend downward for the last four years for both emissions and ambient data. The emissions from this source are not from combustion, but rather grinding, therefore, the size fraction will likely be greater than $PM_{2.5}$, more in the PM_{10} size range. This source is not likely to affect the ambient $PM_{2.5}$ in the Dearborn area for this reason.

Figure 36. Emissions to Throughput Comparison for St. Mary's

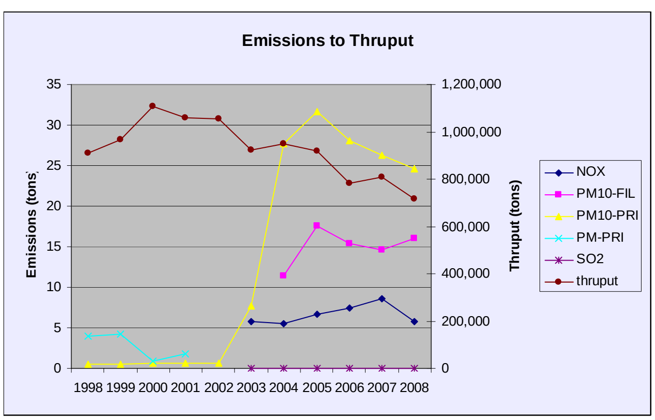
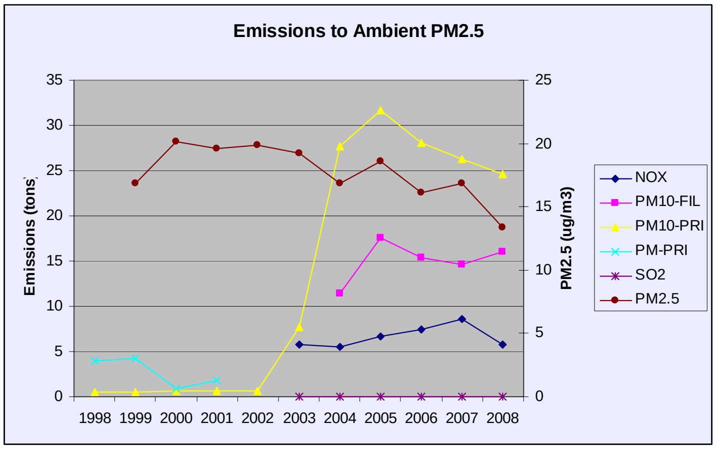


Figure 37. Emissions to Ambient $PM_{2.5}$ Concentrations for St. Mary's



Edward C. Levy Co Plant 1

This company crushes and screens slag. It is located approximately one mile northeast of the Dearborn monitor. Most of their emissions are from hauling on paved and unpaved roads in the form of PM_{10}. Since the operation is crushing, most of the PM is likely in the PM_{10} fraction, not $PM_{2.5}$. This source likely has little effect of the ambient $PM_{2.5}$ is the area.

Darling International, Inc.

The facility is a rendering operation located at 3350 Greenfield Road, Melvindale, Wayne County, Michigan. It is approximately two miles southwest of the Dearborn monitor. This facility has two permits, one for the three boilers in operation at the site and the other permit covers processing operations. As of 2004, to address numerous odor complaints, the facility does not "render" animal carcasses at this location. All carcasses are packaged and sent to another location (Coldwater, Michigan) for processing.

Rendering is a process that converts waste animal tissue into stable, value-added materials. Rendering can refer to any processing of animal byproducts into more useful materials, or more narrowly to the rendering of whole animal fatty tissue into purified fats like lard or tallow. The majority of tissue processed comes from slaughterhouses, but also includes restaurant grease and butcher shop trimmings. This material can include the fatty tissue, bones, and offal, as well as entire carcasses of animals condemned at slaughterhouses, and those that have died on farms.

However, the facility continues to process grease and oils taken in from local restaurants. This includes cooking off the water and filtering any solids remaining in the grease.

Power Plants

Detroit Edison has two power plants in the area. One plant has very tall stacks (>350 ft) and likely doesn't significantly affect the Dearborn monitor. The other plant has natural gas fired combustion turbines that operate only during peak demand. This source has low emissions and may not be impacting the Dearborn monitor significantly.

Small Sources
Several sources have minimal emissions (less than 5 tons) and were not evaluated. These sources include Xcel Steel Pickling, Ford Motor New Model Program, Automotive Components Holding; Envirosolids LLC, City of Dearborn, Detroit Salt, Hinkle MFG LLC, and DTE Energy/Ford World Headquarters.

VOC Sources
Several sources emit primarily VOCs, such as Fabricon Products, Inc.; Buckeye Terminals LLC; Sunoco Partners M&T; LP (River Rouge Terminal); and Magni Industries, Inc. Since the EPA and DEQ did not find that VOCs should be evaluated for possible controls, these sources were not further evaluated.

Sources Out of Business Near the Dearborn Monitor
Several sources that were located near the Dearborn Monitor have ceased operations. These include, M-Lok (aka Riley Plating), Spartan Industrial, Great Lakes Petroleum Terminal (Owens Corning), Ferrous Environmental, Ford Motor Clay Mine and Honeywell Industries (aka Allied Signal and Detroit Tar). Of the four sources indicated above, only Honeywell had significant particulate ($PM_{2.5}$), oxides of nitrogen (NO_X) and oxides of sulfur (SO_X) emissions. The Ford Motor Clay Mine had high particulate emissions due to truck traffic. The remaining two sources emitted VOCs through coating operations.

Honeywell
Honeywell (SRN B5558) is located 2.5 miles southeast of the Dearborn monitor, just north of Zug Island (US Steel). Honeywell ceased operations in 2005, with some minor emissions for volatile organic compounds as the storage tanks were emptied completely. The source permits were voided in calendar year 2005. The facility had boiler and process heater material throughputs of more than 24,801,449 million gallons in 1998 reducing to approximately 533 thousand gallons in 2004. AQD staff believes the data submitted in 1998 was reported erroneously, (i.e., may have been in gallons only) so data is not included in the review. Therefore the material throughput value for the boiler and process heaters in 1999 were approximately 2,200 million gallons of fuel oil. Please note the facility did have a coal fired boiler; however, this boiler was not in operation during the time frame under discussion.

The NO_X emissions decreased from 57 tons per year in 1999 to 1.3 tons in 2004 with zero emissions reported in 2005. The SO_X emissions decreased from 105 tons per year in 1999 to 25.2 tons in 2004 and again no emissions reported for 2005. The $PM_{2.5}$ emissions were reported from 2003 and 2004 and calculated using an emissions factor based on those year's submittals of 2.5 pounds $PM_{2.5}$ per material throughput. The $PM_{2.5}$ emissions were calculated for 1999 as 2.8 tons and reported at 1.4 tons in 2004 (see Figure 38 and Figure 39).

Figure 38. Honeywell Emissions

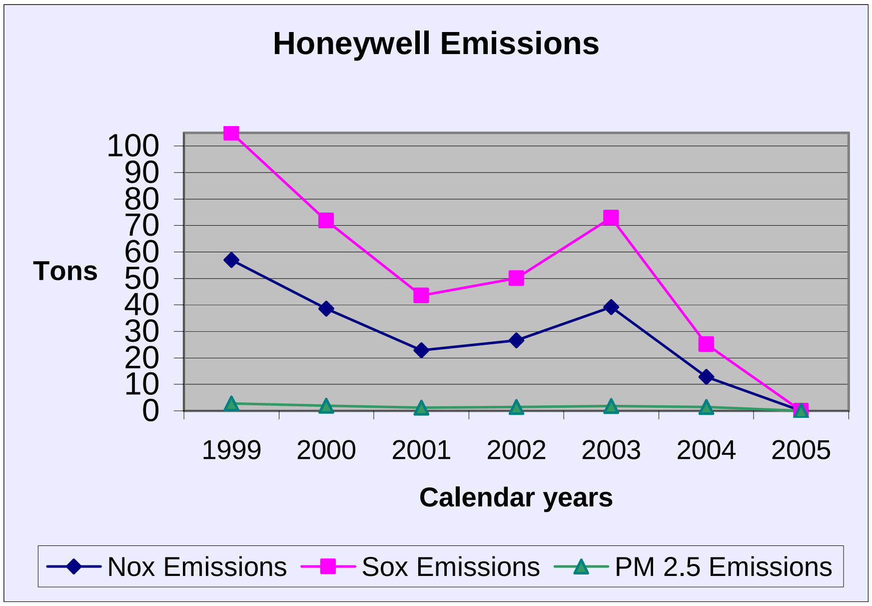
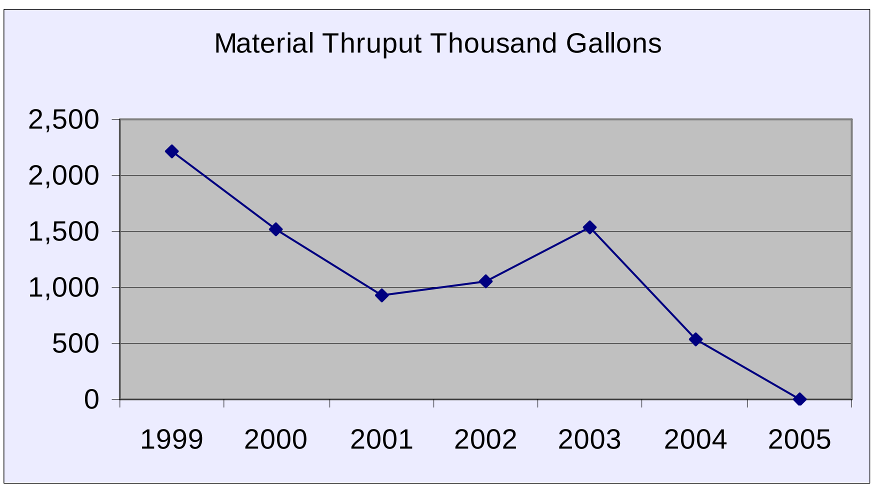


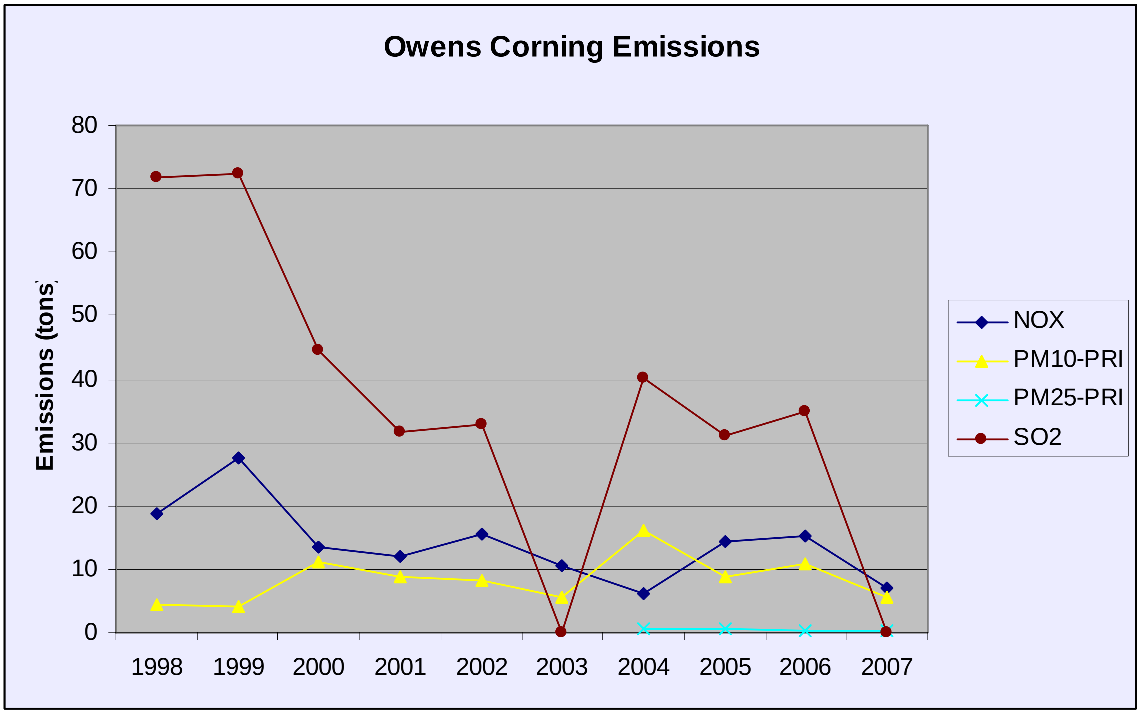
Figure 39. Material Throughput for Honeywell



Great Lakes Petroleum (Owens Corning)

This company was located about 1.5 miles south-southeast of the Dearborn monitor. It produced asphalt, was a small source of NO_X (< 30 tons per year), PM (< 20 tons per year) and emitted 30-70 tons of SO_2 (see Figure 40). Owens Corning shut down their Detroit Plant on January 1, 2008. The company has had their ROP voided and will have their PTIs voided, as well.

Figure 40. Emissions from Owens Corning



Appendix E

Impact of Southeast Michigan’s New Economic Reality on Regional Pollutant Emissions

Provided by SEMCOG

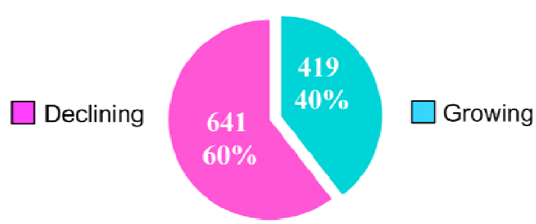
The Impact of Southeast Michigan's New Economic Reality on Regional Pollutant Emissions

While substantial emission reductions have been achieved through implementation of local and national controls included in the PM2.5 State Implementation Plan for Southeast Michigan, significant additional reductions have occurred as a result of the economic transformation that has taken place in the region.

Since 2000, Southeast Michigan has lost over 116,000 people and 400,000 jobs. The recent loss of jobs is almost entirely due to the permanent downsizing of the American auto industry and the overall decline of the manufacturing sector. Since the early 1900s, manufacturing had been the predominant source of jobs in Michigan. However, this has changed significantly over the past decade. Between 2002 and 2007, the state lost nearly 404,000 auto-related jobs, while gaining just over 200,000 jobs in non-manufacturing sectors (Figure 1).

Figure 1
Growing and declining industries in Michigan, 2002-2007

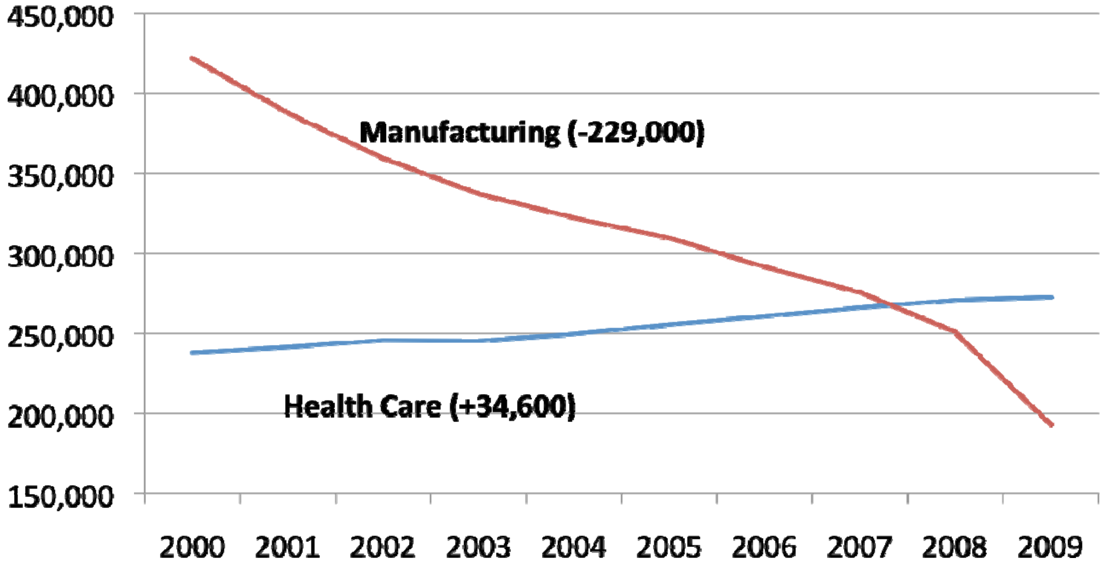
	Number of Industries	Employment					Average Wage MI 2007
		2002	2007	Change	% Change	U.S.	
Growing	419	1,493,461	1,698,384	204,923	13.7%	12.2%	$36,000
e.g. temporary help services, restaurants, hospitals, home health care services.							
Declining	641	2,224,534	1,820,614	-403,920	-18.2%	0.6%	$50,000
e.g. automobile manufacturing, managing offices, vehicle parts manufacturing.							



Source: U.S. Bureau of Labor Statistics, Don Grimes

There is national recognition that the American auto industry and the manufacturing sector as a whole, will never return to its prerecession size and that future jobs in the region will need to come from other sectors. Indeed, this transition is already taking place. By the end of 2007, the number of health care jobs in Southeast Michigan had actually surpassed the number in manufacturing (Figure 2).

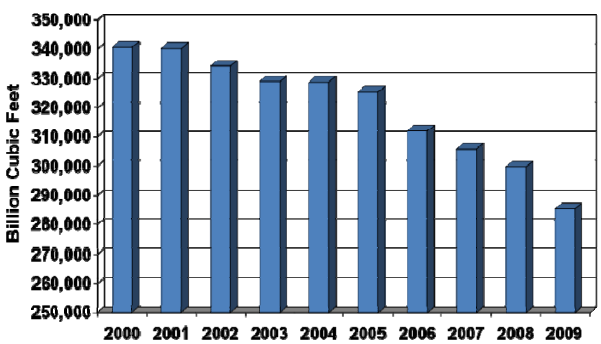
Figure 2
Employment is shifting to less polluting sectors
Manufacturing vs. health care jobs, Southeast Michigan, 2000-2009



Source: SEMCOG analysis of Michigan Labor Market Information data

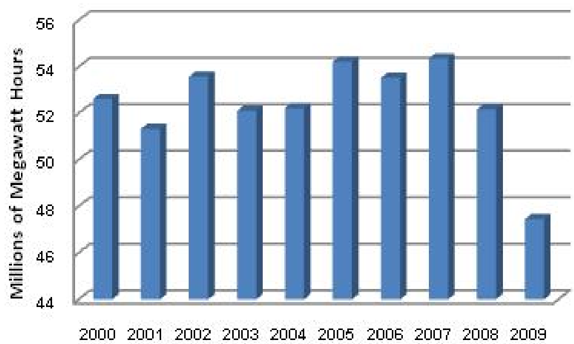
The transition away from manufacturing to a more service and retail based economy has resulted in lower utility consumption. Figures 3, 4 and 5 show the decline in natural gas, electricity and water use over the past decade. Lower utility use means lower pollutant emissions from these sources.

Figure 3
The region is consuming less natural gas
Consumers Energy gas deliveries



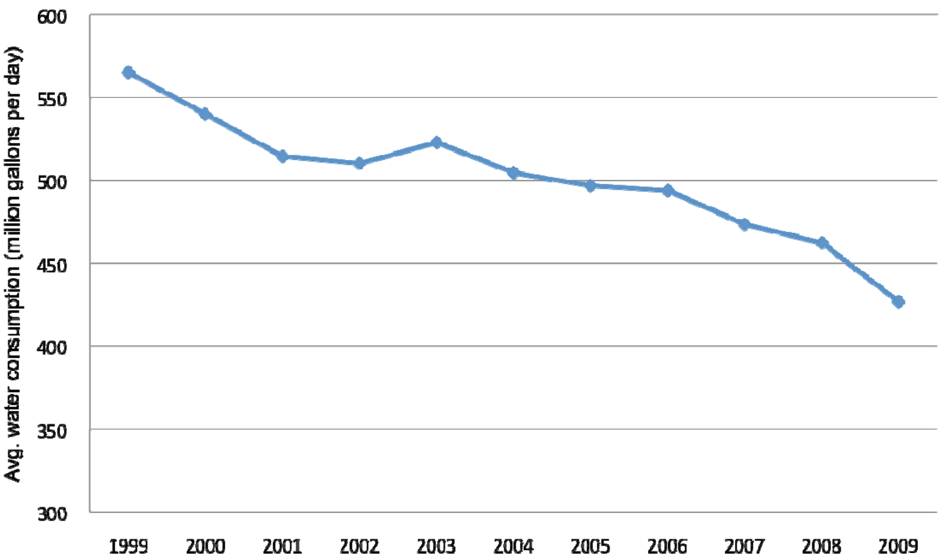
Source: Consumers Energy

Figure 4
The region is also consuming less electricity
DTE electricity deliveries



Source: DTE Energy

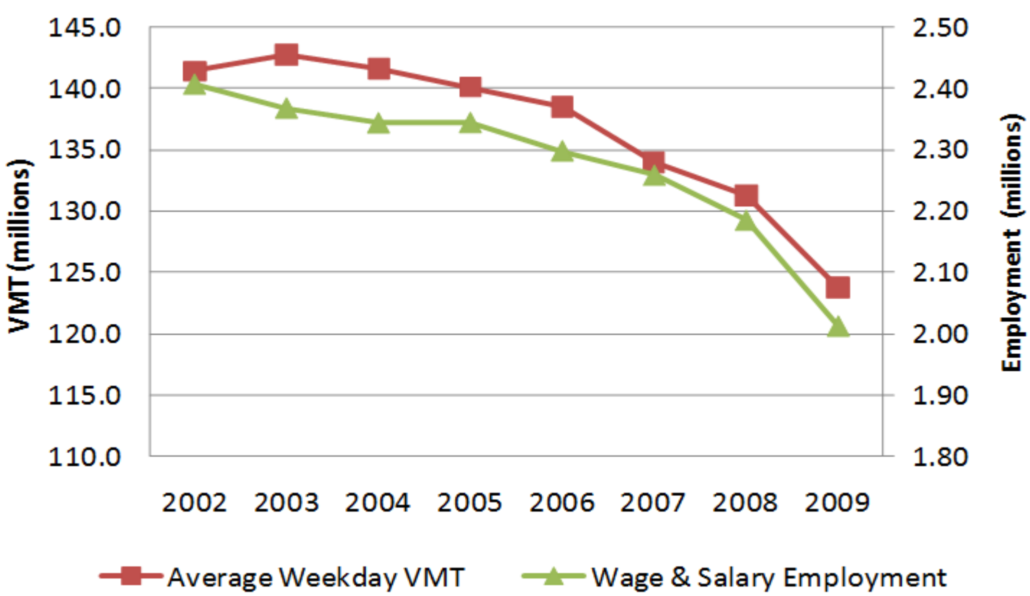
Figure 5
Water use is also declining
Average daily water use, Detroit Water and Sewerage Department



Source: The Foster Group

In addition to the reduction in manufacturing activity and the resulting decline in stationary source pollution, Southeast Michigan has also experienced a significant decrease in vehicle miles of travel (VMT). Since 2002, VMT has declined 13 percent. As would be expected, this decrease has closely mirrored the decline in regional employment (Figure 6).

Figure 6
As jobs have declined, so has travel
Changes in Southeast Michigan employment and travel, 2002-2009

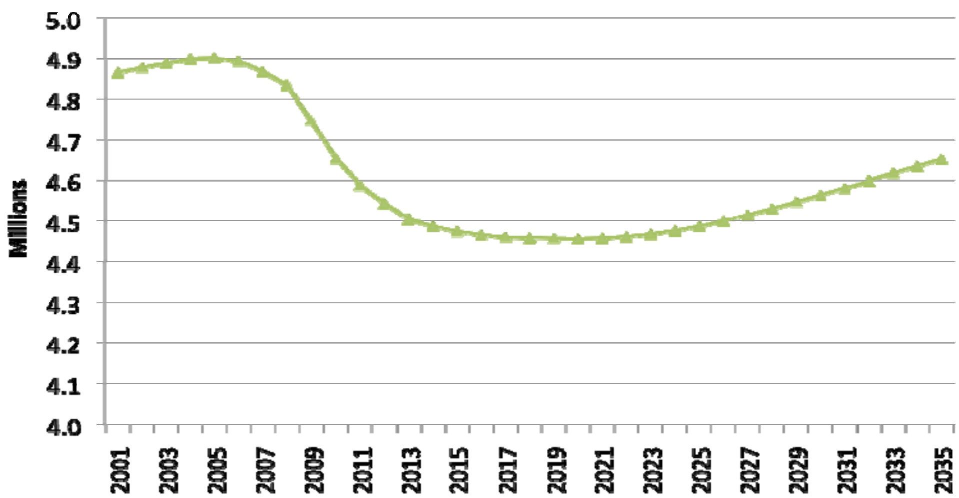


Source: SEMCOG and U.S. Bureau of Economic Analysis

It is important to understand that these economic changes are not a temporary artifact of the current nation-wide recession. As noted earlier, the changes in Southeast Michigan began long before 2008. Employment has been dropping since 2000 and population, which had shown little growth over the last 40 years, began to decline in 2006.

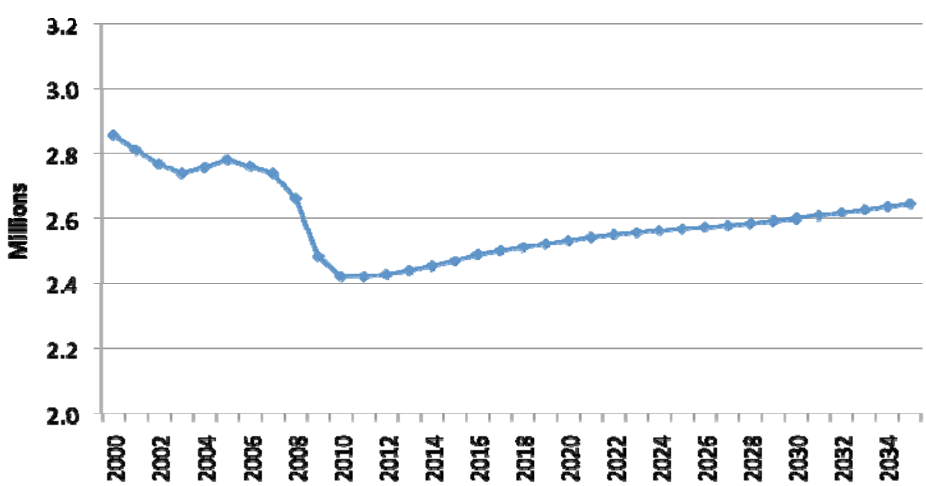
Furthermore, the latest demographic forecasts for the region do not predict much change in this trend for the foreseeable future The latest forecast from the Southeast Michigan Council of Governments (SEMCOG) shows that by 2035 the region will still have 196,000 fewer people and 213,000 fewer jobs than it had in 2000 (Figures 7 and 8).

Figure 7
Southeast Michigan will have 196,000 fewer people in 35 years
Actual and projected population, 2001-2035



Source: SEMCOG

Figure 8
Southeast Michigan will have 213,000 fewer jobs in 35 years
Actual and projected employment, 2000-2035



Source: SEMCOG

As previously shown, the amount of travel in the region is closely tied to the amount of employment. Thus, fewer jobs in the future will also mean less vehicle miles of travel. This reduction, on top of the already expected pollutant decrease from fleet turnover, means on-road mobile source emissions will continue to decline significantly in the future.

The above weight of evidence, coupled with the dramatic decrease in monitored PM2.5 concentrations in the region, clearly indicates that significant and permanent emission reductions have occurred in Southeast Michigan and will remain for the foreseeable future.

Appendix F

Public Hearing and Comments

Calendar Notice of Public Comment Period and Public Hearing

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
PO BOX 30473
LANSING MI 48909-7973

ENVIRONMENTAL CALENDAR *April 25, 2011*

- **ENVIRONMENTAL ASSISTANCE CENTER**
  800-662-9278
  E-mail: deq-assist@michigan.gov

  The DEQ Environmental Assistance Center (EAC) is available to provide direct access to environmental programs, answers to environmental questions, referrals to technical staff, and quick response. Questions on any items listed in the calendar can be referred to the EAC.

- **PUBLICATION SCHEDULE**

  The calendar is published every two weeks, on alternate Mondays, by the Michigan Department of Environmental Quality. We welcome your comments.

- **CALENDAR LISTSERV**

  You may subscribe to receive the DEQ Calendar electronically by sending an e-mail to the listserv at **LISTSERV@LISTSERV.MICHIGAN.GOV** and in the body of the message type Subscribe, DEQ-CALENDAR, and your name.

- **INTERNET ACCESS**
  www.michigan.gov/envcalendar

  The calendar is available on the DEQ Web site in pdf format. Access the calendar at www.michigan.gov/envcalendar .

- **TIMETABLE FOR DECISIONS**

  No decision listed in the DEQ Calendar will be made prior to seven days after the initial Calendar publication date.

- **CONTENTS**

Governor Rick Snyder ♦ Director Dan Wyant

Recycled Paper

Map of DEQ Permit and Other Decisions Before the Office of the Director

Information relating to these decisions is available on the following pages.

MAY 25, 2011	**DEADLINE FOR PUBLIC COMMENT REGARDING MICHIGAN'S REDESIGNATION REQUEST FOR THE ANNUAL AND DAILY FINE PARTICULATE MATTER ($PM_{2.5}$) NON-ATTAINMENT AREA IN SOUTHEAST MICHIGAN**, revised for Livingston, Macomb, Monroe, Oakland, St. Clair, Wayne and Washtenaw Counties. This public comment period meets the public participation requirements for a SIP submittal. The redesignation request can be viewed at www.michigan.gov/deq/0,1607,7-135-3310_30151_31129_50581---,00.html. If requested in writing by May 25, 2011, a hearing will be held May 26, 2011 (see May 26 listing in this calendar). Written comments should be sent to the attention of Lorraine Hickman, Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909; or you may e-mail your comments or request for a public hearing to Lorraine Hickman at hickmanl@michigan.gov. Those interested may contact Lorraine Hickman, Air Quality Division at 517-241-9059 on May 26, 2011, to determine if a hearing was requested and will be held. Information Contact: ***Cindy Hodges***, Air Quality Division, hodgesc@michigan.gov or 517-335-1059.
MAY 26, 2011 **1:00 p.m.-4:00 p.m.**	**TENTATIVELY SCHEDULED PUBLIC HEARING REGARDING MICHIGAN'S REDESIGNATION REQUEST FOR THE ANNUAL AND DAILY FINE PARTICULATE MATTER ($PM_{2.5}$) NON-ATTAINMENT AREA IN SOUTHEAST MICHIGAN**, revised for Livingston, Macomb, Monroe, Oakland, St. Clair, Wayne and Washtenaw Counties. The redesignation request can be viewed at www.michigan.gov/deq/0,1607,7-135-3310_30151_31129_50581---,00.html. If requested in writing by May 25, 2011, a public hearing will be held at 1:00 p.m. in Constitution Hall, Lillian Hatcher Conference Room, 3rd Floor North, 525 West Allegan Street, Lansing, Michigan. Written requests must be received by May 25, 2011, to request a public hearing and should be sent to the attention of Lorraine Hickman, Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909; or you may e-mail your request to hickmanl@michigan.gov. Those interested may contact Lorraine Hickman, Air Quality Division at 517-241-9059 on May 26, 2011, to determine if a hearing was requested and will be held. Information Contact: ***Cindy Hodges***, Air Quality Division, hodgesc@michigan.gov or 517-335-1059.
JUNE 4, 2011	**REQUEST FOR AMBIENT WATER QUALITY DATA FOR MICHIGAN SURFACE WATERS.** The Water Resources Division (WRD) is requesting ambient water quality data (chemical, biological, or physical) that has been obtained by other governmental agencies, nongovernmental organizations, or the public for Michigan surface waters since January 1, 2009. All water quality data submitted to the WRD by June 4, 2011, will be evaluated and potentially used to help prepare Michigan's 2012 Integrated Report. The WRD prepares and submits a biennial report to the United States Environmental Protection Agency to satisfy the listing requirements of Section 303(d) and the reporting requirements of Sections 305(b) and 314 of the Clean Water Act. The Integrated Report describes the status of water quality in Michigan and includes a list of water bodies that are not attaining Michigan Water Quality Standards and require the establishment of pollutant Total Maximum Daily Loads. All ambient water quality data (including associated quality assurance/quality control information) provided for Michigan surface waters may be sent to Mr. Sam Noffke, WRD, using one of the following methods: Mail: Mr. Sam Noffke, Michigan Department of Environmental Quality, Water Resources Division, P.O. Box 30458, Lansing, Michigan 48909-7958 or e-mail: noffkes@michigan.gov. Contact Information: ***Mr. Sam Noffke*** at 517-335-4192.
JUNE 29, 2011	**DEADLINE FOR PUBLIC COMMENT REGARDING RDD OPERATIONS, LLC, ROMULUS, WAYNE COUNTY**, for the proposed requested changes to the draft air quality Permit to Install for the hazardous waste treatment, storage, and disposal facility. The facility is located at 28470 Citrin Drive, Romulus, Michigan. New Source Review public notice documents can be viewed at www.deq.state.mi.us/aps/cwerp.shtml. An informational session will be held May 16, 2011 (see May 16 listing in this calendar), and a public hearing will be held May 17, 2011 (see May 17 listing in this calendar). Written comments are being accepted until June 29, 2011, and should be sent to the attention of Mary Ann Dolehanty, Permit Section Supervisor, Michigan Department of Environmental Quality, Air Quality Division, P.O. Box 30260, Lansing, Michigan 48909. All statements received by June 29, 2011, will be considered by the decision-maker prior to final action. Information Contact: ***Paul Schleusener***, Air Quality Division, 517-335-6828.

Response to Comments

Comment: Several commenters stated the local targeted reductions as well as regional and federal programs including sulfur in fuel limits, acid rain provisions, NO_X SIP call, Clean Air Interstate Rule and its replacement rule and fleet turnovers, helped reduce $PM_{2.5}$ in the nonattainment area.
Response: MDEQ agrees with these comments. Thank you for your support.

Comment: Several commenters recognized the research effort and analysis to develop the state implementation plan (SIP) and correctly identify the sources contributing to the $PM_{2.5}$ problem.
Response: MDEQ agrees with these comments. Thank you for your support.

Comment: Several commenters encourage the MDEQ to recognize the progress in improving air quality and it should be recognized by an attainment designation.
Response: MDEQ agrees with these comments. Thank you for your support.

Comment: Several commenters indicated that EPA is looking to tighten the $PM_{2.5}$ standard, thus MDEQ should not attempt to redesignate the area to attainment.
Response: Unless EPA revokes the current standards, Michigan still must show that all areas are attaining the current standards, regardless of whether EPA changes the standard in the future. Furthermore, MDEQ was recently told by senior EPA program staff that there is no current estimate when new $PM_{2.5}$ standards will be proposed. This uncertainty is another reason to move forward with redesignation to attainment.

Comment: Several commenters indicated the economic downturn in Michigan as the reason the 7-county area reached attainment. For this reason, the cause of the lower monitored $PM_{2.5}$ is not permanent or enforceable. When the economy improves, emissions will increase and the area may fall back into nonattainment.
Response: MDEQ acknowledges that there has been an economic downturn, but believes that permanent and enforceable emissions reductions have occurred beyond the downturn to bring the area into attainment. Reductions from federal control programs for the on-road mobile sector, acid rain program, NO_X SIP call, local stationary source controls, and permanent closure of facilities (permit withdrawn) are permanent and enforceable. These emission reductions are significant, and the reduction in $PM_{2.5}$ levels can reasonably be attributed to these emission reductions.

Also, the maintenance plan which is part of this redesignation proposal clearly demonstrates that future year emissions will remain below those of the 2008 attainment year. The demonstration uses a variety of estimates to project future emissions based on growth estimates for the various categories of sources that make up the emissions inventory. The maintenance plan also includes a list of contingency measures. Contingency measures are a menu of additional controls from which to choose further emissions reductions in the event an area violates the National Ambient Air Quality Standards (NAAQS).

Furthermore, economic projections from the Southeast Michigan Council of Governments (SEMCOG) (see Appendix E) indicates that many of the manufacturing jobs in southeast Michigan are gone permanently, and MDEQ cannot assume that emission levels will return to pre-recession levels. An excerpt from the SEMCOG projections follows:

> "The recent loss of jobs is almost entirely due to the permanent downsizing of the American auto industry and the overall decline of the manufacturing sector. . . Between 2002 and 2007, the state lost nearly 404,000 auto-related jobs, while gaining just over 200,000 jobs in non-manufacturing sectors. . . There is national recognition that the American auto industry and the manufacturing sector as a whole, will never return to its prerecession size and that future jobs in the region will need to come from other sectors. . . The transition away from manufacturing to a more service and retail based economy has resulted in lower utility consumption . . .[and] decline in stationary source pollution."

Comment: Consumers Energy and BASF commented that continued success in attaining air quality standards is essential to the health and economic revitalization and competiveness of our state.
Response: MDEQ agrees with these comments and continues to implement programs to attain and maintain the NAAQS.

Comment: Several commenters stated that $PM_{2.5}$ has many health effects including cardiovascular disease in post-menopausal women, premature mortality, heart attacks, strokes, cardiovascular hospital admissions, respiratory hospital admissions, asthma emergency room visits, asthma exacerbations and chronic bronchitis. Added to that is a lack of health insurance and medical facilities. These all add to a greater concern of the issue of $PM_{2.5}$ emissions and the health implication of redesignating. Such a move will prove to be a detriment to vulnerable groups.
Response: MDEQ acknowledges that serious health issues can be attributed to $PM_{2.5}$ at levels above the NAAQS and has made attainment of the NAAQS a priority. In setting the 1997 annual $PM_{2.5}$ NAAQS and the 2006 daily NAAQS, EPA believed, based on all available data, that the standards were protective of human health. Now that the air quality in the 7-county area is meeting these levels, the area should be designated attainment as provided for in the Clean Air Act (CAA). Part of the CAA requirements for an area to qualify for redesignation is the development of a maintenance plan that projects that the area will remain in attainment of the standard for at least 10 years. MDEQ makes this demonstration in this redesignation proposal. MDEQ also will continue monitoring $PM_{2.5}$ levels in the area and will continue requiring permits for new or modified sources in the area to demonstrate that any emissions of $PM_{2.5}$ from these sources are to be within legal levels.

Comment: The Michigan Environmental Council (MEC) commented that their primary concern with the redesignation is that it does not account for the downturn in the economy, and they use electric generation data to make their point. They point out that the MDEQ data shows an increase in electric generation unit (EGU) emissions for the years 2005 to 2008 but that the department uses data from 2007 to 2010 to demonstrate attainment of the standard. MEC also stated that electric energy usage was lower in 2007-2009, but then increased in 2010 by 6.1 percent and is expected to increase by another 2.3 percent in 2011 according to the Public Service Commission. Since MDEQ used 2007-2010 to demonstrate attainment, it did not take into account the current increases in electrical demand.
Response: MDEQ did take into account EGU activity and emissions for the years described in the MEC comments through 2010 in developing the redesignation request. The fact that actual emissions from EGUs in southeast Michigan increased during the years leading to attainment of the standard simply shows that other sources are responsible for the drop in emissions in the area of the Dearborn monitor, traditionally the monitor with the highest $PM_{2.5}$ levels. If the energy usage increased by 6.1 percent statewide in 2010, it is not reflected in the monitored values for 2010, which were the lowest recorded for all monitors in southeast Michigan.

Further, the maintenance plan in this redesignation plan accounts for all emissions in the area and demonstrates that total emissions will continue to decrease into the future years, through 2022. The maintenance plan emission projections are based on the best estimates available of growth in the area. It also should be noted that DTE Energy stated they began reducing emissions at the Monroe power plant, the largest EGU source in the state, starting in 2010 (see statement from Michael Lebeis below). Other EGUs will likely install additional controls to address EPA's proposed Transport Rule in the next several years. These additional EGU controls were not taken into account in the 2008 and future emissions inventories of this designation request.

Comment: Several groups requested an extension of the comment period.
Response: The notice of the public comment period along with an opportunity to request a public hearing were posted in the MDEQ calendar on April 25, 2011 for a 30-day comment period, which ended on May 25, 2011. A public hearing was requested on May 20 and was held on May 26, 2011. MDEQ believes that there was adequate time during the 30-day comment period for interested parties to provide comments and does not believe that an extension of the comment period is warranted.

Comment: Clean Water Action commented that it is likely when there is an upswing in the economy; monitors such as Allen Park that is currently at 14.6 micrograms per cubic meter (ug/m^3) could be expected to exceed the current standard again and therefore should not be designated as in attainment.
Response: The current monitored design value for Allen Park for 2008-2010 is 11.0 ug/m^3, well below the standard. This monitor has been showing attainment since 2006. MDEQ believes that the maintenance plan in this redesignation plan does adequately address any upswing in the economy through 2022 and predicts that the entire redesignation area will remain in attainment.

Comment: Clean Water Action commented that in Dearborn, which is nearest to nonattainment, it looks like daily values are below the NAAQS, only in the most recent previous three years, which shifted in one year. This is evidence that the changes in air quality are not permanent.
Response: MDEQ believes these changes are due to permanent and enforceable permitted controls that were installed near the Dearborn monitor. Controls were installed and began operation in the late summer of 2007 at the steel mill near that monitor. The annual average at the Dearborn monitor dropped from 16.89 in 2007 to 13.34 ug/m^3 in 2008. The monitored values at Dearborn have continued to be as low or lower for 2009 and 2010 since the controls were added at the steel mill. Further, as stated in previous responses, the maintenance plan demonstrates continued emission reductions through 2022.

Comment: Clean Water Action commented that the state has not yet performed a diesel hotspot analysis, and they are not entirely confident that these monitors have been correctly located to best represent the potential danger zones from fine particulate emissions.
Response: MDEQ is uncertain what a diesel hotspot analysis is. However, two of the monitors in Wayne County, Newberry and FIA-Lafayette Street were installed using a community air toxics grant from EPA to specifically address diesel issues. Newberry was installed to monitor near the proposed Detroit Intermodal Freight Terminal and FIA-Lafayette was installed to monitor the Ambassador Bridge Traffic. Both Newberry and FIA-Lafayette Street monitors are below the annual standard at 10.7 and 11.0 ug/m^3, respectively and below the daily standard at 29 and 30 ug/m^3, respectively.

Comment: Clean Water Action commented that no safe threshold for $PM_{2.5}$ exposure has been determined. So since PM from diesel emissions is particularly deadly and spikes in exposure are not represented by the averaging of monitoring data, this needs to be considered as the state seeks redesignation status.
Response: The current NAAQS standards for $PM_{2.5}$ are intended to be protective of public health. When air monitors show that a nonattainment area is meeting these standards, the CAA provides for the mechanism of redesignation to reflect that the air meets the standards. MDEQ is following this path and believes it is the appropriate action. MDEQ agrees that diesel emissions are a source of concern and encourages further study of emissions and impacts on public health.

Comment: Clean Water Action commented that EPA is expected to soon tighten the standards for $PM_{2.5}$. The $PM_{2.5}$ standards are expected to be 13 ug/m^3 averaged over three years or lower. If the monitoring data reflected in the 2008-2010 average remains the same, then the Allen Park and Dearborn monitors show levels that would be back in nonattainment. However, there is the possible standard of 12 and that would put Ypsilanti, Allen Park, SWHS, Dearborn, and FIA-Lafayette Street out of compliance.
Response: Based on the 2008-2010 3-year averages, the highest monitor, Dearborn, is showing 12.2 ug/m^3. The remaining monitors are showing 11.5 ug/m^3 or less. Furthermore, unless EPA revokes the current standard, Michigan still must show that they are attaining the current standards, regardless of whether EPA changes the standard in the future. Recent information presented by EPA officials suggests that new $PM_{2.5}$ standards will not be proposed in the near future.

Comment: Two commenters from the Sierra Club commented that "diesel emissions may be a significant risk driver in the context of the total cancer risks estimated in this [DATI] report for the other Detroit area air toxics." (MDEQ DATI Report, 2010). They go on to say that it raises a number of concerns about whether these levels would actually be adequate to protect public health. It is important that the MDEQ consider the existing international trucking traffic in this area and the projected truck traffic from the proposed bridge, which was not considered here. Diesel pollution should be considered because of traffic going to and from the Ambassador Bridge, and any new bridge to come.
Response: MDEQ has accounted for truck traffic in the area. Emissions from Ambassador Bridge traffic, both now and in the future, are included in the on-road emissions inventory SEMCOG prepared for the $PM_{2.5}$ redesignation request. Current and expected future travel across the bridge is included in SEMCOG's travel demand model, which produces the vehicle miles of travel that are input to the MOVES emissions model to calculate on-road emissions. Regarding levels of $PM_{2.5}$, as pointed out in a previous response in this document, the monitor near the Ambassador Bridge, FIA-Lafayette Street, is showing attainment for the annual $PM_{2.5}$ standard at 11.0 ug/m^3 for 2008-2010, well below the NAAQS.

Comment: DTE Energy commented that the 2005, 2008 and future year inventories used in this redesignation request does not accurately portray emissions at the Monroe Power Plant. The selective catalytic reduction (SCR) controls were not used year-round until 2009. In 2010, SO_2 emissions dropped by over 50,000 tons due to operation of flue gas desulfurization (FGDs) controls, and the projected inventory between 2008 and 2018 only predicted a total drop of 28,000 tons. In addition, DTE intends to add FGDs on the remaining two units and an SCR on the remaining unit by 2014. Since DTE went through the process of permitting, these reductions are enforceable and permanent.
Response: These additional reductions, beyond what is calculated in the emissions inventory, will help to ensure that the area remains in attainment of the standard.

Public Hearing Record

A public hearing was held on May 26, 2011 as requested. Attending the meeting were G. Vinson Hellwig, representing MDEQ Director Dan Wyant, who is the decision-maker; Craig Fitzner, the hearing officer; and Teresa Cooper, Robert Irvine, Cindy Hodges, Mary Maupin, Amy Robinson and Robert Rusch from the MDEQ. Public statements were made by James Clift from the Michigan Environmental Council, Susan Harley from Clean Water Action, Anne Woiwode representing Sierra Club, and Michael Lebeis from DTE Energy. Also attending were Scott Sinkwitts and Kate Ross from CMS Energy, Kurt Kissling from Pepper-Hamilton Law Firm, and Kristin Jabin from the Michigan Clean Cities. The following are statements from the public hearing.

Hearing Officer's Statement

Department of Environmental Quality
Opening Statement
By: Craig Fitzner, Hearings Officer

May 26, 2011

Introduction

Good afternoon. My name is Craig Fitzner, and I am the supervisor of air monitoring unit in the Air Quality Division of the Michigan Department of Environmental Quality. I will be serving as the Hearing Officer for this public hearing on the request for redesignation of southeast Michigan, to attainment status for both the annual and 24-hour $PM_{2.5}$ NAAQS.

With me today are other MDEQ staff who will be assisting with this hearing. Seated with me are Cindy Hodges of the Strategy Development Unit, and Vince Hellwig, Chief of the Air Quality Division, who is the decision-maker for this redesignation request.

Hearing Agenda

To describe how this is going to work today, I will begin with some background information as to why we are here today. I will then describe the purpose of this formal hearing and how your comments will be used. Following that, I will outline the procedures under which we will take your comments and then describe what will happen after today's hearing. It will then be your time to provide comments, and we will spend the majority of time today listening to those comments. At the end of the hearing, I will provide a short summary and closing.

Background Information

By way of background information, the Air Quality Division is responsible for protecting Michigan's air resources. The law governing those responsibilities is Part 5502 of the 1994 Natural Resources and Environmental Protection Act, Public Act 451, as amended. We are here today for a public hearing on the MDEQ's request to EPA to redesignate seven counties in southeast Michigan to attainment status for the annual and 24-hour fine particulate matter standards.

I will now ask Cindy Hodges to summarize the redesignation request.

Purpose of Public Hearing

To fulfill EPA requirements in the redesignation process, the MDEQ must provide a 30-day comment period and the opportunity to request a public hearing in accordance with Section 110 (a) (2) of the Clean Air Act.

The purpose of today's hearing is to give anyone interested in the redesignation request an opportunity to provide input. The MDEQ will consider any comments received in completing the redesignation request.

Procedures

Notice of this hearing was published in the MDEQ calendar and on other MDEQ web pages.

As you came in this afternoon, you were given an opportunity to fill out a public comment card. We request that everybody fill out a card and indicate if you wish to make comments. We will use these cards to maintain a record of people interested in the redesignation request and to call upon those who want to make a statement today. To ensure that the hearing is conducted in a fair manner, we will follow these steps:

1. I will call on those who have indicated on the cards that they would like to speak in the general order in which the cards were turned in. When all the cards have been completed, I will ask if anyone else would like to make a statement.
2. When your name is called, please come to the front of the room, face me, and make your statement. If you have written comments or materials you would like to present, please hand them to me as you come to the microphone. As you begin your comments, please state your name and any group or association you may represent.

How the Information Will be Used

This hearing is being recorded and your comments will be a part of the information the MDEQ will considered in making its decision on this redesignation request. The public comment period for the redesignation request ended May 25, 2011, but comments from this hearing will be accepted as well. Additional information can be submitted until then and will also be considered when the MDEQ completes the redesignation request.

Following the public hearing, the MDEQ staff will review all comments and include them in the redesignation request document including the response to those comments. A copy of the redesignation request including comments will be available on the MDEQ website. These comments will be sent to EPA as part of our redesignation request. Once EPA has determined that the redesignation request is complete, EPA has up to 18 months to propose approval or disapproval of the redesignation request. EPA's proposal and final determination will be published in the federal register.

Thank you for your attention. I will now begin calling the names of those who have indicated they would like to make a statement.

Closing Statement

Thank you for your comments and cooperation today. We appreciate your interest in the redesignation request and that you took the time to be here today.

The hearing is now closed. Thank you again.

Closing time – 4 pm

Staff Background Information Statement

Michigan Department of Environmental Quality
Air Quality Division

Request to Redesignate to Attainment Status
For Both the Annual and 24-Hour $PM_{2.5}$ NAAQS
May 26, 2011
By Cindy Hodges

The State of Michigan, through the Michigan Department of Environmental Quality, is asking the U.S. Environmental Protection Agency to make a determination that southeast Michigan is in attainment with the annual and daily Fine Particulate Matter ($PM_{2.5}$) National Ambient Air Quality Standards (NAAQS) and to approve the maintenance plan as a revision to the Michigan State Implementation Plan. The seven counties in the southeast Michigan $PM_{2.5}$ nonattainment area are Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne.

The EPA established the annual and daily NAAQS for fine particulate matter in 1997 and revised them in 2006. EPA determined that the seven counties should be designated as nonattainment for the annual standard in 2005 and for the daily standard in 2009. The designations were based on design values derived from air quality monitoring data. Annual averages over 15 micrograms per cubic meter ($\mu g/m^3$) and daily averages over 35 $\mu g/m^3$ were considered to be violating the standard. The EPA designated seven counties in Michigan as nonattainment for the annual standard, because monitored design values exceeded these limits.

The MDEQ submitted a State Implementation Plan to EPA in June 2008 demonstrating that both local and regional control programs would bring about reductions in $PM_{2.5}$ levels in the 7-county nonattainment area such that the area would be expected to attain the NAAQS by 2010.

Air quality monitoring data collected in the 2007-2010 period has confirmed that the 7-county southeast Michigan area is attaining the $PM_{2.5}$ annual and daily standards. The most recent 3-year average of the ambient annual concentration is 12.2 ug/m^3, which is below the annual standard of 15.0 ug/m^3. The most recent 3-year average of the daily ambient concentration is 32 ug/m^3, which is below the daily standard of 35 ug/m^3.

The components of the redesignation package include:

- A determination that the area has attained the standard; based on monitoring data, emissions inventory reductions and additional supporting evidence;
- An approved State Implementation Plan for the area;
- A determination that the improvement in air quality is due to permanent and enforceable reductions in emissions;
- A fully approved maintenance plan that includes contingency measures; and
- A determination that all Section 110 and Part D requirements, including monitoring, reporting, and permitting under the Clean Air Act have been met.

The redesignation document summarizes compliance with each required component of the attainment redesignation providing a demonstration to EPA that the 7-county area should be redesignated to attainment of the annual and daily $PM_{2.5}$ NAAQS.

TRANSCRIPT OF COMMENTS FROM ATTENDEES
AT A PUBLIC HEARING ON MDEQ's
$PM_{2.5}$ REDESIGNATION REQUEST TO EPA

AIR QUALITY DIVISION, MDEQ
MAY 26, 2011

James Clift, Michigan Environmental Council

My name is James Clift, I'm the policy director for the Michigan Environmental Council, we are an umbrella group of environmental, public health, conservation groups located across the state.

We think the redesignation of the seven counties in the southeast Michigan area is premature and not in the best interest of the residents of Michigan. The main reason we think so is that we think that the data we're seeing today is not permanent and enforceable, we think it is a reflection of the economic downturn that Michigan has experienced, and we are concerned that when our economy recovers, the data will not keep us below the current standards.

We noted that in the data that the decision is based on, we did have an increase from our electric generating units in the period of 2005 to 2008, but we show the data, when you're looking at the data from the 2007 to 2010 framework, shows a significant decrease in the utilization of these facilities by our utilities; DTE the largest utility in southeast Michigan, dropping down to basically 1998 levels of electricity demand. Since that time, we've got our public service commission talking about a 2.3% increase in demand in 2011, which followed a 6.1% increase in use in 2010. We also have presented documentation from CMS Energy that talks about a 6% decline in the period of 2007 to 2009, but that they expect a 4% increase in the 2010 to 2011 period.

We couple that with the fact that we think there are significant health impacts that we are experiencing under our current particulate matter pollution standards. Those involve premature immortality, cardiovascular hospital admissions, respiratory hospital admissions, and asthma emergency visits. We think that Michigan has avoidable health impacts in this area of over one billion dollars per year if we continue to focus on this area of particulate matter pollution and try to reduce it.

Therefore we think that it's in the best interest of Michigan actually to keep vigilant in reducing this particulate matter pollution in Michigan, reduce those health care costs, and we don't see the redesignation as being helpful in continuing that focus. I appreciate this opportunity to comment. Thank you.

(Mr. Clift's letter was submitted in support of his comment).

RECEIVED MAY 26 2011

May 26, 2011

Michigan Department of Environmental Quality
Air Quality Division
P.O. Box 30260
Lansing, Michigan 48909
Attn: Lorraine Hickman

Re: Redesignation of Southeast Michigan for PM 2.5

Dear Ms. Hickman,

The Michigan Environmental Council is an umbrella group of environmental, conservation and public health groups located across the State of Michigan. We are deeply concerned about the current health impacts that particulate matter pollution is having on Michigan residents today. We think the efforts to redesignate the seven county Southeast Michigan area is premature and not in the best interest of Michigan residents.

Emission reductions are not permanent and enforceable

A key requirement of the redesignation determination is that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the SIP and applicable federal requirements. We do not think that is the case in Southeast Michigan. We think the current data is a reflection of an economic downturn which is temporary in nature. Thus, continued attention to this issue while we recover would be the more efficient manner to address this issue.

Electric Generating Units (EGUs) - Data used in the department request for redesignation shows an increase in emission from EGUs between 2005 and 2008. However, it uses data from 2007 through 2010 to demonstrate attainment with the PM 2.5 standard. However, during the period of 2007-2010 there has been a significant decrease in demand for electricity in Michigan, with DTE dropping to 1998 levels of power demand from its customers. Data from the U.S. Energy Information Administration documents this downturn in electricity production statewide.

2007 - 119,309,936 MWh
2008 - 114,989,806 MWh
2009 - 101,202,605 MWh

Michigan Environmental Council, 119 Pere Marquette, Ste 2A, Lansing, MI 48912

Source: U.S. Energy Information Administration, Form EIA-923, "Power Plant Operations Report" and predecessor forms.

However, utilities are now reporting significant increases in demand in the last twelve months, as demonstrated by the following:

Electricity - Assuming normal summer temperatures, Michigan's total electric sales are projected to increase by 2.3 percent in 2011, following a 6.1 percent increase in 2010. (Summer 2011 Energy Appraisal, Michigan Public Service Commission, May 16, 2011)

Documents recently presented by CMS Energy shows a 6% decline in electricity sales for a period of 2007-2009, but an expected increase of 4% in 2010 and 2011 (attached). In addition, it notes that sales to industrial customers are expected to be up 6% in 2011 over 2010 numbers.

Significant health impacts are still incurred

Health studies continue to demonstrate that significant health impacts are still occurring even at levels that demonstrate attainment with the federal standards. These impacts include premature mortality, cardiovascular hospital admissions, respiratory hospital admissions, asthma emergency room visits, asthma exacerbations and chronic bronchitis. For Michigan, we think the avoidable health care impacts through PM 2.5 reductions exceed $1 billion annually.

Summary

These health impacts coupled with the fact that we expect particulate matter levels to rise as our economy returns we think support caution in redesignation of Southeast Michigan. Instead of entering a mode of trying to maintain its existing levels, we should be actively trying to reduce PM 2.5 levels and reducing the health impacts on residents of Southeast Michigan and the rest of the state.

Sincerely,

James Clift, Policy Director

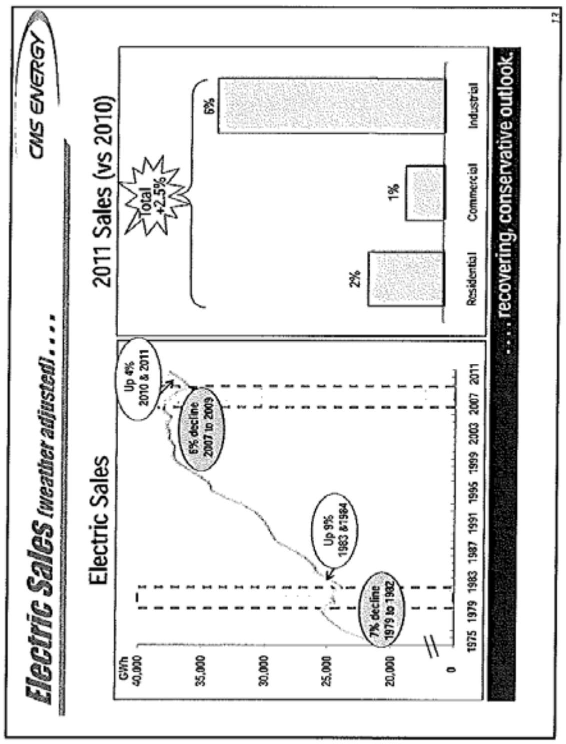
Michigan Environmental Council, 119 Pere Marquette, Ste 2A, Lansing, MI 48912

CMS ENERGY

Growing Forward

Deutsche Bank Alternative Energy, Utilities, & Power Conference
May 11, 2011

Thomas J. Webb
Executive Vice President and CFO


Electric Sales (weather adjusted) . . . .
CMS ENERGY
Electric Sales
GWh
40,000
35,000
30,000
25,000
20,000
0
1975 1979 1983 1987 1991 1995 1999 2003 2007 2011
7% decline 1979 to 1982
Up 9% 1983 & 1984
6% decline 2007 to 2009
Up 4% 2010 & 2011
2011 Sales (vs 2010)
Total +2.5%
2%
1%
6%
Residential
Commercial
Industrial
. . . . recovering, conservative outlook.

Susan Harley, Clean Water Action

Thank you so much for holding this hearing and allowing us the opportunity to comment on the MDEQ's request for redesignation by the EPA of our current 7-county nonattainment status for fine particulates. My name is Susan Harley, I'm the Michigan Policy Director for Clean Water Action. We have over 250,000 members in the state.

First off, I'd like to say that because of the extremely short timeline given regarding the announcement of this public hearing, we would request an extension of the public comment period so that a more thorough analysis can be done of the data presented by the State.

Clean Water Action coordinates the Michigan Diesel Cleanup Campaign and also participates in the Clean Energy Now Coalition that is working to reduce coal plant pollution in the state and transition Michigan to a clean energy economy.

Fine particulate pose a grave danger to human health, including causing premature death, heart attacks and strokes, as well as exasperating existing cardiovascular and respiratory issues such as asthma. I would like to submit to you this study outlining the particular danger from $PM_{2.5}$ that is due to diesel emissions. Whereas it does appear that air monitors are at the moment in compliance with current annual and 24-hour standards for $PM_{2.5}$, we do not believe that the state has proven under the weigh of evidence that these changes are permanent and due to sustainable reductions in air pollutants.

It is likely when there is an upswing in the economy; monitors such as Allen Park that is currently at 14.6 micrograms per cubic meter could be expected to exceed the current standard again and therefore should not be designated as in attainment. Also in Dearborn, which is nearest to nonattainment, it looks like daily values are below the NAAQS, only in the most recent previous three years, which shifted in one year. This is evidence that the changes in air quality are not permanent. Moreover, since the state has not yet done a diesel hotspot analysis, we are not entirely confident that these monitors have been correctly located to best represent the potential danger zones from fine particulate emissions. In addition, no safe threshold for $PM_{2.5}$ exposure has been determined. So since PM from diesel emissions is particularly deadly and spikes in exposure are not represented by the averaging of monitoring data, this needs to be considered as the state seeks redesignation status.

Lastly, the EPA is expected to soon tighten - again - the standards for $PM_{2.5}$. The PM standards coming down the pike are expected to be 13 micrograms per cubic meter averaged over three years. Or lower, if the monitoring data reflected in the 2008-2010 average remains the same, then the following monitors show levels that would be back in nonattainment. If the standard coming from the EPA is 13, Allen Park and Dearborn would be out of attainment status. However, there is the possible standard of 12 and that would put Ypsilanti, Allen Park, SWHS, Dearborn, and FIA-Lafayette Street out of compliance.

For these and for other reasons, we believe it is not in the best interest of the state's residents to move forward at this time with a request for redesignation. Thank you.

(Ms. Harley's comments were submitted in support of her comments as well as the document Clean Air Task Force, 2004, Diesel Emissions: Particulate Matter-Related Health Damages, prepared by Abt Associates, Inc. *Due to the length, this document was not included in this redesignation request but is available upon request).*

RECEIVED MAY 26 2011

Susan Harley

- Thank you for holding this hearing and allowing us the opportunity to comment on the DEQ's request for redesignation by the EPA of our current 7 county non-attainment status for fine particulates.
- Introduce self, and CWA

- However, because of the extremely short timeline given regarding the announcement of the public hearing, we request an extension of the public comment period so that a more thorough analysis can be done on the data presented by the state.

- Clean Water Action coordinates the Michigan Diesel Clean-Up Campaign and also participates in the Clean Energy Now coalition working to reduce coal plant pollution in the state and transition Michigan to a clean energy economy.

- Fine particulates pose a grave danger to human health, including causing premature death, heart attacks and strokes as well as exacerbating existing cardio-vascular and respiratory issues such as asthma.

- I would like to submit to you a health study outlining the particular danger from particulate matter due to diesel emissions.

- Whereas it appears that air monitors are at the moment in compliance with current annual and 24hr standards for PM 2.5, we do not believe the state has proven under the weight of evidence that these changes are **permanent**, and due to sustainable reductions in air pollutants.

Micro grams per cubic meter.

- It is likely when there is an upswing in the economy, monitors such as Allen Park at **14.6** ug/m3 could be expected to exceed the current standard again and therefore should not by designated as in attainment.

- Also, in Dearborn, which is nearest to non attainment, it looks like daily values are below naaqs only in the most recent previous 3 years which shifted in 1 year. This is evidence that the changes in air quality are not permanent.

- Moreover, since the state has not yet done a diesel "hot spot analysis" we are not entirely confident that these monitors have been correctly located to best represent the potential danger zones from fine particulate emissions.

- In addition, no safe threshold for PM 2.5 exposure has been determined.
  So, since PM from diesel emissions is particularly deadly and spikes in exposure are not represented by the averaging of monitoring data, this need to be considered as the state seeks redesignation status.

- Lastly, the EPA is expected to soon tighten again the standards for PM 2.5. The PM standards coming down the pike are expected to be **13** ug/m3 (averaged over three years) or lower, so if the monitoring data reflected in the 2008-2010 average remains the same then the following monitors show levels that will be back in non-attainment -

- Likely standard for out of attainment = **13** ug/m3
  - Allen Park - **14.6** ug/m3
  - Dearborn = **13.9** ug/m3
- Possible standard for out of attainment = **12** ug/m3
  - Ypsilanti = **12.2** ug/m3
  - Allen Park - **14.6** ug/m3
  - SW HS = **12.8** ug/m3
  - Dearborn = **13.9** ug/m3
  - FIA\Lafayette St = **12.1** ug/m3

For these and other reasons, we believe it is not in the best interest of the state's residents to move forward at this time with a request for redesignation.

Thank you.

Ann Woiwode

Thank you for holding the hearing and I want to reiterate the comments from Susan Harley regarding the notice of the hearing itself, the comment period was noticed in two calendars but the actual confirmation that there would be a hearing was only made two days ago and there are a number of people who we are aware of who were unable to come to the hearing, make arrangements to get here with just a two-day notice that the hearing would be held. It would be helpful in future calendars if it's clear that if someone requests a hearing, it will automatically be held, I believe that wasn't clear people were awaiting confirmation that a hearing would be held and when they didn't hear anything until two days before, we literally had people scrambling who were unable to make the hearing.

I am speaking on behalf of the Sierra Club and I want to offer a few comments on the proposed new set of redesignations. As has been said by some others, the monitoring data alone is not sufficient because of these changes in the levels of emissions are not permanent and are not enforceable and that raises a lot of concerns. We want the economy to recover. We want to simultaneously assure that we are protecting the health of people when that happens, and that simply is setting ourselves up for additional health and environmental issues as a result of a recovery that we hope is underway.

There are a couple of other specific observations. From the Detroit Air Toxics Report issued by the MDEQ in Dec. 2010, page ES-3, I want to note that it says that:

> "Elevated cancer risk from diesel particulate matter was found in both the DATI-1 and DATI-2 studies. However, these risks were not included in the above estimates and comparisons due to the greater uncertainty associated with determining diesel particulate matter, ambient concentrations, estimating risks and the limited number of sites with surrogate monitoring data. Although these estimated values are relatively uncertain, they serve to provide a general sense of the contribution DPM may add to the cancer risk for air toxics in the Detroit area. The DATI-2 concentration range resulted in an estimated increased cancer risk of approximately 200 x 10^{-6} associated with the estimated level at Allen Park, the only site with available surrogate data for comparison. In contrast, the DATI-1 risk estimate was over 300 x 10^{-6}. These estimated ranges of cancer risk are considered to have significant uncertainty. However, they suggest that diesel emissions may be a significant risk driver in the context of the total cancer risks estimated in this report for the other Detroit area air toxics."

That raises a number of concern for us about whether these levels would actually be adequate to protect public health. It is important that the MDEQ consider the existing international trucking traffic in this area and the projected truck traffic from the proposed bridge, which was not considered here.

The last observation is that given the proposed $PM_{2.5}$ rules being developed by the EPA, it is premature to submit a redesignation based on the 2006 standard 15 when EPA is considering lowering those standards to 11 to 13 for a 24-hour standard. Many of the area sites monitored would not meet the new standards in this process should consider those proposed standards.

The hearing notice also said that it would be between 1 and 4 PM and I just want to make sure since the late notice that there will be someone to take comments up until 4 PM so there is no one who is left out if they couldn't get here at 1 PM. Thank you.

Mike Lebeis

Yesterday I actually submitted hard copy comments that already went into the record; I just have a few other things to add to that. This is kind of at the request of Joan Weidner. It actually deals with the enforceability of emission reductions that are being implemented in southeast Michigan. The primary location I am commenting on is the Monroe power plant. It turns out that the past actual data were really from 2005 and 2008. The important part about that is that those are years before the flue gas desulfurization was installed on units 3 and 4 and also that was at the time that selective catalytic reduction was installed on units 1, 3 and 4 and was only operated in 2008 during the ozone season because the annual NOx cap did not kick in until 2009 so beginning in 2009, we actually started to winterize our SCR devices so they could operate in a non-ozone season as well as the ozone season. So actually beginning in 2009 and going into the future, those emission reductions that have been acquired by basically putting in the control devices are actually operational now and we have a year or two under our belts to find out what the emissions actually are after putting the devices in.

One thing I want to point out is that 2008 data showed about on the order for units 3 and 4 showed about 58,000 tons of SO_2 and actually 2010 was the first year that the FGDs were running the full year. Actually during that year they dropped to on the order of about just slightly over 1,000 tons. So there is over a 50,000 ton drop in SO_2 emissions, you know, from before the FGDs were installed versus after. The numbers that are projected to go into the future, it shows like between 2008 and 2018 I believe, about a 28,000 ton drop but what we're saying is that actually from the two units that the FGDs are already installed on, we've had almost double that number from just two of the units. And actually we're in the process of installing FGDs on units 1 and 2 and also adding an SCR to unit 2 that is the only unit at the plant that doesn't have one at this time. And those are projected to be installed by on the order of 2014.

The other thing that comes into play is that these emission reductions are going to be enforceable because we actually went through the process of actually getting the permit for them and we went through a back review for both SO_2 and for NOx to actually solidify the numbers to make sure they're enforceable so we think that those are permanent reductions that are going to be taking place in the air shed in southeast Michigan. So we just wanted to get that on record that we believe they are permanent and there's a legitimate reason to use even lower numbers than have been projected at the current estimates at this time. So those are the main things that I wanted to say. Thank you.

Written Comments

DTE Energy Company
One Energy Plaza, Detroit, MI 48226-1221

DTE Energy

May 25, 2011

Ms. Lorraine Hickman
Michigan Dept. of Environmental Quality – Air Quality Division
P.O. Box 30260
Lansing, MI 48909

Subject: **DTE Energy Comments in Support of the Proposal to Revise Michigan's State Implementation Plan (SIP) to Change Its Designation of Southeast Michigan from Non-Attainment to Attainment for Particulate Matter 2.5 Microns or Less in Diameter (PM2.5)**

Dear Ms. Hickman:

DTE Energy has been an extremely interested participant in the process that the Southeast Michigan Ozone Study (SEMOS) Group has been pursuing over the last five years to address high fine particulate matter (PM2.5) levels observed in many areas in the metropolitan Detroit region. DTE Energy is very supportive of the control programs identified in this proposed SIP revision that the State of Michigan has chosen to implement to address the PM2.5 non-attainment issue.

A number of Midwest regional modeling analyses identified the Dearborn monitoring site as one of the most difficult to mitigate sites in this part of the Country. SEMOS coordinated a number of complicated activities to:

- Understand the complex chemistry that plays an important role in forming PM2.5
- Identify which source types contribute to high PM2.5 from local and regional sources and quantifying their contribution
- Develop a strategy to address the local contribution to the key PM2.5 monitoring sites
- Participate in regional control programs to reduce Southeast Michigan's contribution to other high PM2.5 areas, and get regional contributors to our high PM2.5 levels reduced
- Work with the state, local, industry and environmental groups to develop a cost-effective strategy to meet these challenging PM2.5 ambient standards as soon as possible

The PM2.5 SIP strategy, that is described in the documents currently out for public comment on the Michigan Department of Environmental Quality's web site, is based primarily on actual PM2.5 monitoring data, and weight-of-evidence (WOE) analyses that demonstrate that this difficult task has been accomplished. Some modeling studies attempting to quantify regional and local source culpability have had a difficult time resolving the impact of some of the critical components that make up PM2.5. The air quality monitoring basis for this request is much more defendable than a modeling analysis since it relies on Federal Reference Method (FRM) PM2.5 data that is directly tied to the PM2.5 NAAQS.

DE 963-5041 7-08

Three key components that led to southeast Michigan's success in meeting the current 24-hour and annual PM2.5 National Ambient Air Quality Standard (NAAQS) are:

- Regional controls on electric generating unit (EGU) nitrogen oxide (NO_x) and sulfur dioxide (SO_2) reduction programs via the Clean Air Interstate Rule (CAIR) and the upcoming EPA replacement for CAIR, the Clean Air Transport Rule (CATR)
- Local emission reductions from new controls installed on culpable sources close to the PM2.5 monitoring sites with the highest measured concentrations or local sources that have shut down in recent years
- Reduced travel activity by all types of vehicles and small businesses emissions, in response to the recession that hit southeast Michigan extremely hard over the last three years

DTE Energy believes that the proposed NAAQS redesignation request documents provide adequate justification that current PM2.5 levels below the 24-hour and annual PM2.5 NAAQS will continue for the area based on a slow comeback from depressed economic activity and new emission control programs affecting nearly all source types into the future.

Thank you for this opportunity to support the monumental effort that was needed to meet this challenging air quality target.

Skiles W. Boyd
Vice President
Environmental Management & Resources
DTE Energy

Ms. Lorraine Hickman
Michigan Department of
Environmental Quality,
Air Quality Division
P.O. Box 30260
Lansing, MI 48909

Regarding the State of Michigan's move to redesignate seven counties in Southeast MI as attainment. In matters of 2.5 particulate matter and the impact on Environmental Justice communities in Southwest Detroit and in particular in the zip code of 48217, I believe it will cause greater harm to the health and quality of life of the residents in these communities and other communities throughout MI. According to a article in the New England Journal of Medicine, particular matter 2.5 has a direct connection to cardiovascular disease in post-menopausal women. Add to that lack of health insurance, and medical facilities most likely there be will be greater concerns of these issues. The health implication of such a move will prove to be a detriment to vulnerable groups

Heavy truck traffic in SW Detroit is another concern. Diesel pollution should be considered because of traffic going to and from the Ambassador Bridge, and any new bridge to come. Thanking you for your consideration.

Peace
Rhonda Anderson
Field Organizer
National Environmental Justice & Community Partnership Program
Sierra Club/Detroit
2727 Second Ave. suite 320
Detroit, Mi 48201
313 965 0052 office

Proposed Revision to Michigan's State Implementation Plan for Achieving the Particulate Matter less than 2.5 microns in diameter National Ambient Air Quality Standard (NAAQS) Request to Redesignate to Attainment Status For Both the Annual and 24-Hour PM2.5 NAAQS

Southeast Michigan Counties of Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne and Proposed Maintenance Plan for Southeast Michigan April 25, 2011

Comments of Consumers Energy
Jackson, Michigan
May 25, 2011

Submitted via e-mail: hickmanl@michigan.gov

Consumers Energy appreciates the opportunity to submit comments on the Michigan Department of Environmental Quality's (MDEQ) proposed revision of the State of Michigan's State Implementation Plan (SIP) to redesignate the seven-county Southeast Michigan area to attainment for both the 1997 and 2006 PM2.5 National Ambient Air Quality Standards (NAAQS). As a Michigan-based electric and gas utility, the proposed rule would impact facilities owned by our company.

Consumers Energy is proud of its achievements in meeting or exceeding previous Federal and State air regulatory initiatives. These include, but are not limited to Michigan's 1980 sulfur in fuel limitation rule, the Acid Rain provisions of the 1990 Clean Air Act Amendments, and the NOx SIP Call. In addition, we have worked as a member of several committees led by the State of Michigan to develop SIP revisions resulting in the successful redesignations of nonattainment areas to attainment for previous NAAQS for ozone and particulate matter.

The proposed SIP revision targets an area that has qualified for redesignation to attainment for the 1997 and 2006 PM 2.5 NAAQS, on the basis of monitored data for the 3-year period 2008 – 2010. The MDEQ has prepared a complete petition for redesignation to attainment. As proposed, this rule would acknowledge the success achieved by the State of Michigan, working in concert with local governments, regional planning organizations, neighboring states, and industries, in crafting pragmatic strategies to address the causes of nonattainment, to actually resolve nonattainment. In this particular instance, the MDEQ correctly recognized a localized nonattainment problem and worked with a broad based group to solve the problem at hand.

As an active participant in the these efforts to revise the SIP for PM 2.5, as well as the petition to redesignate Southeast Michigan to attainment, Consumers Energy supports this proposal by MDEQ. The specified nonattainment area should be formally redesignated to attainment for both the 1997 and 2006 PM 2.5 NAAQS, with no additional requirements added to the proposed SIP revision and maintenance plan.

While this is an air regulatory success story, we join the MDEQ in recognizing that there is still more work to be done to continue the improvement in Michigan's air quality. We fully expect the EPA to issue a proposal to tighten the PM 2.5 NAAQS later this year. We look forward to working with the MDEQ in the efforts to attain and maintain any revised standard. Continued success is essential to the health and economic revitalization of our State.

If you have any questions regarding Consumers Energy's comments, please direct them to Louis Pocalujka: lppocalujka@cmsenergy.com

Thank you.

Sincerely,

Louis P. Pocalujka, Senior Environmental Planner
Environmental Services Department
Consumer Energy
One Energy Plaza
Jackson, Michigan 49201

SEMCOG . . . Equipping local government leaders now and for the future

Southeast Michigan Council of Governments • 535 Griswold Street, Suite 300 • Detroit, Michigan 48226-3602 • 313-961-4266 • Fax 313-961-4869
www.semcog.org

May 25, 2011

Michigan Department of Environmental Quality
Air Quality Division
P.O. Box 30260
Lansing, MI 48909
Attention: Lorraine Hickman

RE: MDEQ Request for Redesignation of the Annual and Daily PM 2.5 nonattainment area in Southeast Michigan

Dear Ms. Hickman:

The Southeast Michigan Council of Governments (SEMCOG) strongly supports the Michigan Department of Environmental Quality's request for EPA to redesignate Southeast Michigan as an attainment/maintenance area for both the annual and 24-hour fine particulate National Ambient Air Quality Standards. Air monitoring data for the last three years shows that the region is now well within these standards and PM2.5 levels are continuing to decline.

The remarkable progress that has been made is a direct result of the State Implementation Plan (SIP) that was implemented to address the PM2.5 NAAQS and the detailed and thoughtful research and analysis that went into its development. This analysis found the following:

- At the time of designation, six of the eleven monitors in the region were violating the standard. However, they were concentrated in only two of the nonattainment area's seven counties.
- Early analysis indicated there were unique characteristics associated with the areas experiencing the highest concentrations of PM2.5. These areas were also at the heart of previous TSP and PM10 nonattainment areas.
- There was a statistically significant downward trend in PM2.5 concentrations throughout the region. This was consistent with changes in the emissions inventory resulting from national controls.
- The downward trend was greatest at monitors in industrial locations.
- By the end of 2006, four of the original nonattaining monitors were in compliance and the two remaining monitors were measuring much lower levels than at the time of designation.
- The two remaining monitors were both located near major steel manufacturing facilities and speciation data showed elevated iron concentrations compared to other sites in the region.
- The control strategy should focus on additional emission reductions in the vicinity of these two monitors. This was consistent with previous SIPs, which resulted in attainment.

- The weight of evidence accumulated through inventory analysis, modeling, and monitoring data, showed that the region would attain the PM2.5 NAAQS by 2010 as a result of these local controls and the continued phase-in of several multi-state and national control programs.

This is indeed what has happened. Significant emission controls were implemented at the two steel mills and a refinery in the vicinity of these two monitors and the combination of these measures and national controls have brought the last two monitors into compliance, with levels now well below both the annual and 24-hour PM2.5 NAAQS.

Change in PM2.5 Concentrations
($\mu g/m^3$)

Monitor Site	3-Year Annual Average		24-hour 98th Percentile	
	2000-2002	2008-2010	2000-2002	2008-2010
Dearborn	19.9	12.2	45	32
SWHS	17.9	11.5	42	31

We urge the U.S. Environmental Protection Agency to approve the State's request.

Sincerely,

Chuck Hersey
Environmental Program Manager

BASF

The Chemical Company

RECEIVED
MAY 24 2011
AIR QUALITY DIV.

May 23, 2011

Lorraine Hickman
Michigan Department of Environmental Quality, Air Quality Division
P.O. Box 30260
Lansing, Michigan 48909

Dear Ms. Hickman,

On April 25, 2011, the Michigan Department of Environmental Quality (DEQ) requested comments on the Department's proposed request to redesignate southeast Michigan as attainment for particulate matter less than 2.5 microns (PM2.5) and the requisite State Implementation Plan revisions. The ambient air quality of southeast Michigan is important to BASF, the world's leading chemical company, because we have a significant presence in the area. More than 1000 of our employees live in the area and work at one of our production, research, or support facilities.

We are writing to support the Department's redesignation request. As the Department stated in its proposal, monitored levels of fine particulates in southeast Michigan's ambient air have dropped markedly over the past several years, and the ambient air is meeting the PM2.5 national ambient air quality standards (NAAQS). The changes to the industrial landscape of the area and targeted emission reductions at multiple facilities in Dearborn and southwest Detroit have certainly helped this occur. Additional emission reductions from the turnover of the motor vehicle fleet, where BASF pollution control catalyst technology is helping automakers produce ever-cleaner vehicles, will help in reducing future PM emissions.

In order to recognize the progress that has been made in cleaning up southeast Michigan's air, the Department should proceed with its request to redesignate southeast Michigan as attainment for the PM2.5 NAAQS. In addition to broadcasting that the air is clean, redesignation would also improve the competitiveness of the region.

Regards,

J.D. Purvis

J. D. Purvis
Vice President
General Manager

BASF Corporation
1609 Biddle Avenue
Wyandotte, MI 48192
Tel: (734) 324-6100
www.basf.com/usa

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