

APPENDIX C

**DOCUMENTATION FOR 112(c)(6) EMISSION ESTIMATES OBTAINED FROM EPA'S
112(K) INVENTORY**

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Basis for Input Data

The Aerospace estimates were derived from data provided by the EPA's Emissions Standards Division. The 16-PAH (Naphthalene) estimate was based on the calculation for handwipe cleaning which would be:

(Percentage usage of HAP) X (Total HAPs from Process)

16-PAH : 0.8476 % x 19,3023 (tons HAP for Handwipe*yr) = **1,636 tons of 16-PAH/yr**

Hg 1% x 399 tons for inorganic HAPs/yr = **4 tons of Mercury/yr**

References

Memo from Dave Reeves, Midwest Research Institute to Barbara Driscoll, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards regarding HAP emission estimates for aerospace surface coating. November 11, 1997.

Memo from Dave Reeves, Midwest Research Institute to Barbara Driscoll, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards regarding HAP emission estimates for aerospace surface coating. November 17, 1997.

Telephone conversation between Dave Reeves, Midwest Research Institute and Bridget Kosmicki, Eastern Research Group. Subject: Emissions from aerospace surface coating. November 18, 1997.

U.S. Environmental Protection Agency. National Emission Standard For Hazardous Air Pollutants (NESHAP) for the Aerospace Industry - Background Information for Proposed Standards. Preliminary Draft. Research Triangle Park, NC. April 1994.

Basis for Input Data

Emission estimates for Coke By-Product Recovery Plants are based on emissions reported to the Toxic Release Inventory (TRI) in 1992. TRI emissions data (based on 19 facilities) were provided by Lula Melton (EPA/ESD).

References:

1. Fascimile sent by Lula Melton, U.S. EPA, to Julie H. Tucker, Eastern Research Group, Inc. on July 29, 1997.

APPENDIX C: Revisions from 112(k) Inventory - Coke Ovens: By-product Recovery Plants

Calculations:

National Emissions for Coke By-Product Recovery Plants (a)		
Facility	Location	16-PAH (b)
ABC Coke	Tarrant, AL	74
Acme Steel Co.	Chicago, IL	8,110
Bethlehem Steel	Burns Harbor, IN	37,500
Citizens Gas	Indianapolis, IN	14,461
Empire Coke Co.	Holt, AL	150
Erie Coke Corp.	Erie, PA	100
Geneva Steel	Geneva, UT	6,874
Gulf States Steel	Gadsden, AL	4,420
LTV Steel Corp.	South Chicago, IL	500
LTV Steel Corp. (c)	Warren, OH	1,862
LTV Steel Corp.	Pittsburg, PA	1,600
National Steel	Ecorse, MI	332
New Boston Coke	New Boston, OH	5,916
Shenango, Inc.	Pittsburg, PA	20,978
Sloss Industries	Birmingham, AL	R
Tonawanda Coke	Tonawanda, NY	603
USS	Gary, IN	52,080
USS (c)	Clairton, PA	
Wheeling-Pitts. Steel	Follansbee, WV	
TOTAL (lbs/year):		155,560
TOTAL (tons/year):		77.78

NOTE: R= TRI emissions for this facility include both coke by-product plant and chemical specialty plant. Emissions only from coke by-product plant are not available.

(a) These emission estimates are from 1992 Toxic Release Inventory (TRI). ESD extracted these emission estimates based on facility codes for coke by-product recovery plants that were operating in 1992. Emissions data could not be extracted from the 1990 TRI database because data identifying which plants were operating in 1990 are not readily available.

(b) Includes only Anthracene and Naphthalene.

(c) Estimates are from 1990 TRI database using facility identification codes recently provided (12/4/97) by Lula Melton, EPA/ESD.

Basis for Input Data

Mercury

The activity level for Stationary Reciprocating Internal Combustion Engines comes from the 112(c)(6) report for all sectors (industrial, commercial/institutional, industrial bore, and utility). {U.S. EPA, 1997}.

The emission factor for Mercury comes from AP-42. {U.S. EPA, 1996}

A national estimate for Mercury emissions from natural gas-fired Stationary Reciprocating Internal Combustion Engines will be calculated.

References

U.S. Environmental Protection Agency. 1990 Inventory of Section 112(c)(6) Pollutants: Polycyclic Organic Matter (POM), 2,3,7,8-Tetrachlorodibenzo-P-Dioxin (TCDD)/ 2,3,7,8-Tetrachlorodibenzofuran (TCDF), Polychlorinated Biphenyl Compounds (PCBs), Hexachlorobenzene, Mercury, and Alkylated Lead. Final Report. Research Triangle Park, North Carolina. January 1998.

U.S. Environmental Protection Agency. Compilation of Air Pollutant Emission Factors, 5th Edition and Supplements, AP-42, Volume I: Stationary Point and Area Sources. Research Triangle Park, North Carolina. 1996.

Basis for Input Data

The estimate for this source category was based on emission factors and adjusted activity data provided by the EPA's Emission Standards Division.

References

Memo from Rick Marinshaw, Midwest Research Institute to Bill Neuffer, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards regarding HAP emission estimates for clay manufacture. July 1997.

Telephone conversation between Bill Neuffer, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards and Bridget Kosmicki, Eastern Research Group. Subject: Emissions from clay products manufacture. July 1997.

U.S. Environmental Protection Agency. Compilation of Air Pollutant Emission Factors, 5th Edition, AP-42, Volume I: Stationary Point and Area Sources. Draft. Research Triangle Park, North Carolina. 1997.

APPENDIX C: Revisions from 112(k) Inventory - Other Structural Clay Products

Calculations:

Source Category: Other Structural Clay Products

1990 Activity Levels^a Source	1995 Activity (tons/year)	1990 Adjustment^b	Adjusted 1990 Production Rate (tons/year)
Brick			
Kiln, gas-fired	10,118,351	5%	9,612,433
Kiln, coal-fired	1,511,182	5%	1,435,623
Kiln, saw dust-fired	1,511,182	5%	1,435,623

Source	Mercury Emission Factor (lb/ton produced)^c	Naphthalene Emission Factor (lb/ton produced)^c
Brick		
Kiln, gas-fired	7.5E-06	6.50E-05
Kiln, coal-fired	9.6E-05	1.00E-05
Kiln, saw dust-fired	7.5E-06	3.40E-04

Source	1990 Emission^d	
	Mercury	Naphthalene
Brick		
Kiln, gas-fired (lb/year)	7.2E+01	6.20E-02
Kiln, coal-fired (lb/year)	1.4E+02	1.40E+01
Kiln, saw dust-fired (lb/year)	1.1E+01	4.90E+02
Total 1990 Emission (lb/year)	2.2E+02	1.10E+03
Total 1990 Emission (ton/year)	1.1E-01	5.60E-01

^aMemo from Rick Marinshaw of Midwest Research Institute to Bill Neuffer, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards regarding HAP emission estimates for clay manufacture. July 1997.

^b Telephone conversation between Bill Neuffer, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards and Bridget Kosmicki, Eastern Research Group. Subject: Emissions from clay products manufacture. July, 1997.

^c U.S. Environmental Protection Agency. Compilation of Air Pollutant Emission Factors, 5th Edition, AP-42, Volume I: Stationary Point and Area Sources. Draft. Research Triangle Park, North Carolina. 1997.

^d Emission(lb/year) = 1990 Activity (tons produced/year) * Emission Factor (lb pollutant emitted/ton)

Basis for Input Data

A 1990 base year estimate for mercury for this source category was provided by U.S. EPA/ESD (Holloway, 1997).

The mercury estimate provided was 1.9 tons.

It was also noted that there are 124 pulp and paper mills in the US with kraft recovery combustion sources that will be subject to Section 112 regulation.

References:

Holloway, T. MRI. Memo to B. Driscoll, U.S. Environmental Protection Agency, Emission Standards Division. "Nationwide Baseline Emission Estimates for 112(k) HAP's: NESHAP for Pulp and Paper Combustion Sources ("MACT II")." June 17, 1997.

Basis for Input Data

Emissions associated with the manufacture of tires are based on the model plant developed by INDUS for the EPA's MACT development effort. The model plant was assumed to have a production rate of 40,000 tire per day for 360 days per year or 14,400,000 tires per year.

Emission factors for each of the processes were taken from a study performed by RMA, except for the cementing and building processes where speicated data was not available. Emission factors for compounds 1 to 7 were summed for mixing, milling, extrusion, and calendering. The mean of different tires was used for tire curing. For grinding, an average was calculated for sidewall, carcass and belt grinding. These emissions factors were applied to the pounds of rubber processed in the model plant to estimate emissions from the model plant for each of the pollutants.

To obtain aggregated per tire emission factors, the model plant process emissions were summed for each pollutant and divided by the annual tire production,. These per tire emission factors were applied to the 1990 tire production (264,262,000 tires) to estimate annual emissions for that year.

A list of facilities were taken from an INDUS report and FIP state and county codes were assigned to each facility. Tony Wayne, EPA/OAQPS, approximated the capacity of the facilities on the list and national emissions were proportioned to these facilities relative to these approximate capacities.

References

Letter from Dale A. Louda, Manager of Regulatory Affairs, Rubber Manufactures Association to Ron Ryan, EPA/OAQPS, June 6, 1995.

Rubber Manufacturers Association, Monthly Tire Report, December 1990.

Letter from Wally Sanford, INDUS Corporation, to Tony Wayne, EPA/OAQPS, Rubber Tire Manufacture NESHAP: Revised Emission Estimates, March 14, 1997.

Letter from Wally Sanford, INDUS Corporation, to Tony Wayne, EPA/OAQPS, Rubber Tire Manufacture NESHAP, September 30, 1997.

APPENDIX C: Revisions from 112(k) Inventory - Tire Manufacturing

Calculations:

Model Plant Parameters

Process	Rubber Use (lbs/yr)	Applicable factor	Process	Rubber Use (lbs/yr)	ble factor
Mixing	324,000,000	a	Cementing	324,000,000	Currently no speciated data for this process
Milling	648,000,000	b	Building	324,000,000	Currently no speciated data for this process
Extrusion	194,400,000	c	Curing	324,000,000	e
Calendering	129,600,000	d	Grinding	3,240,000	f

Emission Factors (lb/lb-rubber)

Pollutants	a	b	c	d	e	f
Hexachlorobenzene	6.90E-08	2.49E-08	4.37E-08	2.78E-09		
Naphthalene	7.30E-07	6.17E-07	2.44E-07	1.21E-07	1.66E-07	2.80E-06

Model Plant Estimate (lbs of Pollutant)

Pollutants	Mixing	Millings	Extrusion	Calendering	Curing	Grinding	Total	Aggregate emission factor (lbs/tire)	National Emission Estimate (lbs/yr)*	National Emission Estimate (tons/yr)
Hexachlorobenzene	22	16	8	0	0	0	47	3.290E-06	869.30	0.435
Naphthalene	237	400	47	16	54	9	762	5.294E-05	13,990.67	7.00

Basis for Input Data

Emissions for distillate-fired utility turbines were estimated using emission factors from the following reference:

U.S. Environmental Protection Agency. Factor Information Retrieval (FIRE) System Database, Version 5.1a. Research Triangle Park, North Carolina. September 1995.

For all emission factors except formaldehyde and benzene, it was not stated in the emission factor documentation as to whether controls were or were not in place for the units on which the factors are based. For the formaldehyde and benzene emission factors, the documentation stated that direct flame afterburners were installed on the units on which these factors are based.

In order to estimate national emissions for this category it was necessary to obtain an estimate of the heat input to utility turbine units burning distillate fuel. The following reference was used to obtain this data:

Energy Information Administration. 1992. State Energy Data Report. Office of Energy Markets and End Use, U.S. Department of Energy, Washington, D.C.

This reference lists the energy input for "light oil" in the utility sector; light oil is defined as lighter fuel oils distilled off during the refining process. According to this same reference, virtually all petroleum used in internal combustion and gas-turbine engines is light oil. In order to split the consumption of light oil into turbine and engine use, the allocation of 85% turbine use to 15% percent engine use was used. This allocation was taken directly from the following reference:

U.S. Environmental Protection Agency. 1990 Inventory of Section 112(c)(6) Pollutants: Polycyclic Organic Matter (POM), 2,3,7,8-Tetrachlorodibenzo-P-Dioxin (TCDD)/ 2,3,7,8-Tetrachlorodibenzofuran (TCDF), Polychlorinated Biphenyl Compounds (PCBs), Hexachlorobenzene, Mercury, and Alkylated Lead. Final Report. Research Triangle Park, North Carolina. June 1997.

Table C-1

Toxic Release Inventory Estimates Included in 112(c)(6) Inventory

112(c)(6) Source Category	SIC Code	Pollutant	Estimate (tons/yr)
Abrasive Grain (Media) Manufacturing	3291	16-PAH	2.48E+01
Adhesives and Sealants	2891	16-PAH	4.18E+00
Agricultural Chemicals and Pesticides	2879	16-PAH	9.03E+00
Blast Furnaces and Steel Mills	3312	16-PAH	4.99E+02
	3312	Mercury	2.50E-01
Chemical Manufacturing: Cyclic Crude and Intermediate Production	2865	16-PAH	1.04E+02
Chemical Preparations	2899	16-PAH	6.79E+00
Chromium Plating: Chromic Anodizing	3471	Mercury	2.50E-03
Clay Refractories	3255	16-PAH	5.00E-01
Cleaning Products (SICs combined)	*	16-PAH	1.38E+00
Commercial Printing, Gravure	2754	16-PAH	2.89E+01
Commercial Printing, Letterpress, and Screen	2751	16-PAH	1.04E+01
Custom Compound Purchased Resins Manufacturing	3087	Mercury	1.28E-01
Fabricated Metal Products Manufacturing (SICs combined)	*	16-PAH	1.43E+02
Fabricated Rubber Products Manufacturing	3060	16-PAH	1.48E+02
Fiber Cans, Drums, and Similar Products	2655	16-PAH	5.06E+00
Food Products (SICs combined)	*	16-PAH	3.54E+00
Gum and Wood Chemical Manufacturing	2861	16-PAH	5.00E-01
Industrial Gases Manufacturing	2813	16-PAH	9.43E+00
Industrial Inorganic Chemical Manufacturing	2819	16-PAH	1.57E+01
	2819	Mercury	1.00E+00
Industrial Machinery and Electrical Equipment (SICs combined)	*	16-PAH	2.77E+00
Industrial Organic Chemicals Manufacturing	2869	16-PAH	2.27E+02
	2869	Mercury	2.00E-02
Inorganic Pigments Manufacturing	2816	Mercury	5.00E-03
Lubricating Oils and Greases	2992	16-PAH	6.00E-02

Table C-1

Toxic Release Inventory Estimates Included in 112(c)(6) Inventory (Continued)

112(c)(6) Source Category	SIC Code	Pollutant	Estimate (tons/yr)
Metal Household Furniture	2514	16-PAH	2.50E-03
Miscellaneous Manufacturing (SICs combined)	*	16-PAH	6.58E+00
Miscellaneous Plastics Products	3079	16-PAH	5.76E+00
Nonmetallic Mineral Products Manufacturing	3299	Mercury	5.00E-03
	3299	16-PAH	2.50E-03
Office Furniture, Except Wood Manufacturing	2522	16-PAH	6.45E+00
Other Miscellaneous (SICs combined)	*	16-PAH	1.45E+00
	*	Mercury	2.50E-01
Other Secondary Nonferrous Metal Recovery	3341	Mercury	2.50E-01
Paints and Allied Products Manufacturing	2851	16-PAH	3.07E+01
	2851	Mercury	7.50E-03
Paper Coated and Laminated, Packaging, nec	2672	16-PAH	5.54E+01
Partitions and Fixtures, Except Wood	2542	16-PAH	4.35E+00
Petroleum Refining: All Processes	2911	Mercury	4.35E-02
Pharmaceuticals Preparations and Manufacturing (SICs combined)	*	16-PAH	7.66E-01
Plastics Foam Products Manufacturing	3086	16-PAH	1.10E+02
Plastics Materials and Resins Manufacturing	2821	16-PAH	8.55E+00
	2821	Mercury	4.00E-03
Porcelain Electrical Supplies	3264	16-PAH	2.08E+00
Primary Metal Products Manufacturing (SICs combined)	*	16-PAH	2.69E+01
Public Building and Related Furniture	2531	16-PAH	1.16E+01
Ship Building & Repair (Surface Coating)	3731	16-PAH	1.44E+01
Surface Active Agents Manufacturing	2843	16-PAH	7.41E+00
Textiles (SICs combined)	*	16-PAH	9.68E+00
Transportation Equipment Manufacture (SICs combined)	*	16-PAH	5.16E+01
Wood Household Furniture Manufacturing	2511	16-PAH	1.13E+01

* For some of the source categories in this inventory, the TRI data for multiple SIC codes were combined. The SIC codes used for these source categories are noted below:

Cleaning Products

2840	2841	2842	2844
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Fabricated Metal Products

3400	3432	3451	3479	3494
3410	3433	3452	3480	3495
3411	3440	3460	3482	3496
3412	3441	3462	3483	3497
3421	3442	3463	3484	3498
3423	3443	3465	3489	3499
3425	3444	3466	3490	
3429	3446	3468	3491	
3430	3448	3469	3492	
3431	3449	3470	3493	

Food Products

2011	2033	2047	2076	2087
2015	2034	2048	2079	2096
2021	2037	2061	2082	2099
2022	2041	2063	2085	
2023	2046	2075	2086	

Industrial Machinery and Electrical Equipment

3510	3536	3549	3564	3579
3511	3537	3550	3565	3581
3519	3540	3551	3566	3582
3523	3541	3552	3567	3585
3524	3542	3554	3568	3586
3530	3543	3555	3569	3589
3531	3544	3556	3571	3592
3532	3545	3559	3572	3593
3533	3546	3561	3573	3594
3534	3547	3562	3575	3599
3535	3548	3563	3577	

Miscellaneous Manufacturing

3911	3944	3953	3965	3995
3914	3949	3961	3990	3996
3931	3951	3963	3991	3999
3940	3952	3964	3993	

Other Miscellaneous

2643	3149	4741	5063	8731
3142	4213	5012	6321	9661
3144	4512	5051	7549	9711

Pharmaceutical Preparations and Manufacturing

2830	2833	2834	2835	2836
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Primary Metal Products Manufacture

3300	3317	3355	3362	3366
3313	3351	3356	3363	3369
3315	3353	3357	3364	3398
3316	3354	3361	3365	3399

Textiles

2211	2259	2281	2299	2384
2221	2260	2282	2311	2389
2231	2261	2284	2321	2399
2251	2262	2295	2325	
2253	2269	2296	2326	
2257	2272	2297	2361	
2258	2273	2298	2381	

Transportation Equipment

3710	3716	3731	3764	3799
3711	3721	3732	3769	
3713	3724	3743	3790	
3714	3728	3751	3792	
3715	3730	3761	3795	