

APPENDIX C:

Recalculation of Specific Results Presented in APPENDIX B:

(Modeled Outdoor Concentrations of Hazardous Air Pollutants:

Analysis of Data from the Cumulative Exposure Project

For the Urban Area Source Program)

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Introduction

EPA used the CEP urban chapter (Appendix B) as one of three analyses to identify HAPs for listing under section 112(k). All HAPs whose estimated ambient concentrations exceeded risk-based concentrations (RBCs; termed “health benchmarks”) in 50 or more of 28,314 urban census tracts were tagged for consideration as section 112(k) HAPs. These results were combined with those from two other analyses of urban HAPs, so this “tag” represented about one-third of the final selection process.

Following the September 1998 urban air toxics strategy proposal, EPA received substantive comments on our use of the CEP in selecting HAPs. First, commentors expressed concern about our inclusion of background in our estimates of ambient concentrations. These commentors believed it was both unfair and counterproductive to consider background levels (caused by natural sources or distant emissions) to select HAPs and source categories for regulation, because background represents emissions that section 112(k) may lack the authority to regulate. This could hypothetically result in punishing industries that emit high-background HAPs with an additional regulatory burden, and lead to regulating emissions that contribute little to overall risk. The CEP analysis estimated that background concentrations for some HAPs were already above RBCs, even in the absence of local emissions, leading directly to an automatic CEP “tag” for consideration as an urban HAP. Although the CEP results represented only one-third of the total urban HAP selection process, this use of background concentrations may have influenced the proposed list.

Second, commentors noted that the background concentration used for one HAP, DEHP, was incorrect. EPA confirmed this, and determined that ambient concentrations should be adjusted for DEHP, independent of the first issue.

Third, commentors pointed out that some RBCs used as benchmarks in the CEP urban chapter (which was developed from work submitted for publication in early 1998) were no longer current, and that some others were not consistent with those used by the OAQPS staff ranking analysis. Although there were few significant discrepancies between the RBCs used by OAQPS and the CEP authors, EPA agreed that some potential existed for the overall 112(k) HAP list to be affected by them.

We addressed all three comments by recalculating the CEP results (percentages of census tracts estimated to exceed RBCs) for specific HAPs, using consistent RBCs and omitting background concentrations.

Methods

Only the 42 HAPs for which EPA has publicly-reviewed inventories were considered for recalculation, because EPA does not intend to propose any other HAPs for listing under section 112(k). Of these 42 HAPs, we selected all that were originally assigned either (1) a background

concentration, or (2) an RBC different from the one used in the most recent EPA risk-related ranking analysis (described in Section 2.3 of the Technical Support Document). These criteria produced a list of 23 HAPs (Table C-1) to be recalculated. Of these, 11 HAPs had background concentrations, 8 of which already exceeded the RBC. Twenty-one HAPs had at least one updated RBC, although only 3 carcinogen RBCs and 13 non-carcinogen RBCs had changed more than twofold.

RBCs used in the recalculations were the same as those used for Case 1 of the chronic inhalation indexes used in the risk-related ranking analysis. Ambient concentrations for the 23 HAPs selected for recalculation were modeled for each urban census tract using the most recent version of ASPEN, using the same input assumptions and emission data used for the original CEP modeling. As in Appendix B, urban census tracts were defined as tracts having a population density greater than 750 people/km². The number of urban census tracts that were recalculated was 28,272, slightly lower than the 28,314 tracts reported in Appendix B for the original CEP calculations. The modeling conditions were otherwise not altered, and their description in Appendix B remains current. All ratios of modeled concentrations to RBCs were recalculated, and urban census tracts having a ratio greater than one were recounted for each of the 23 HAPs.

Results and Discussion

Table C-2 compares the original CEP urban chapter results with the recalculated results for each of the 23 HAPs, in terms of percentages of census tracts estimated to exceed the RBC. HAPs that exceeded RBCs in 50 or more census tracts (0.177%) were given the CEP “tag” for potential concern.

Three substances (MDI, DEHP, and methyl chloride) that were originally estimated to exceed RBCs in 50 or more census tracts no longer met this criterion. The changed status of MDI resulted from an updated RBC; the other two were influenced primarily by the removal of background concentrations. These three substances have been removed from the list of CEP-recommended urban HAPs. The recalculated results also predicted that beryllium concentrations would exceed its RBC in 445 census tracts. Beryllium has been added to the list of CEP-recommended urban HAPs.

Table C-1. Estimated background concentrations and risk-based concentrations (RBCs) used in original CEP calculations presented in Appendix B, compared with revised RBCs used for recalculation.

Pollutant:	Original Background Conc. ($\mu\text{g}/\text{m}^3$)	Cancer Benchmarks		Non-Cancer Benchmarks	
		Original CEP RBC ($\mu\text{g}/\text{m}^3$)	Revised RBC ($\mu\text{g}/\text{m}^3$)	Original CEP RBC ($\mu\text{g}/\text{m}^3$)	Revised RBC ($\mu\text{g}/\text{m}^3$)
Arsenic and compounds		0.00023	0.00023	0.5	0.03
Benzene	0.4800	0.12	0.13	71	60
Beryllium and compounds		0.00042	0.00042	0.0048	0.02
Bis(2-ethylhexyl)phthalate (DEHP)	1.6000	0.25	0.42	71	10
Cadmium and compounds		0.00056	0.00056	3.5	0.01
Carbon tetrachloride	0.8800	0.067	0.067	2.4	40
Chloroform	0.0830	0.043	0.043	35	98
Dioxin/furans	1.5E-08	3.0E-08	3.0E-08		
Ethyl acrylate		0.073	0.071	48	-
Ethylene oxide		0.043	0.01	600	5
Ethylene dichloride	0.0610	0.038	0.038	95	810
Ethylene dibromide	0.0077	0.0045	0.0045	0.2	0.2
Formaldehyde	0.2500	0.077	0.077	3.6	3.7
Hydrazine		0.0002	0.0002	0.24	0.2
Lead		0.013	0.083	1.5	1.5
Methyl chloride	1.2000	0.56	0.56	-	100
4,4'-Methylenediphenyl diisocyanate (MDI)				0.02	0.6
Nickel		0.0042	0.0042	0.24	0.20
Tetrachloroethylene (PCE)	0.1400	1.7	0.17	35	270
Trichloroethylene (TCE)	0.0810	0.59	0.50	640	600
Vinyl chloride		0.012	0.012	26	5
Vinylidene chloride		0.02	0.02	32	20
Xylenes				300	430

Table C-2. Comparison of original CEP results (described in Appendix B) with recalculated results based on revised risk-based concentrations (RBCs), with background removed. (Background concentrations were also removed for the original results in this table.) HAPs for which modeled concentrations exceeded their RBC in 50 or more urban census tracts (0.177% of 28,272 total urban census tracts) were deemed to pose a potential health risk.

HAP	Original CEP Results (from Appendix B)	Recalculated CEP Results
Arsenic and compounds	77%	95.5%
Benzene	100%	99.9%
Beryllium and compounds	<0.1%	1.57%
Bis(2-ethylhexyl)phthalate (DEHP)	100%	0.000707%
Cadmium and compounds	23%	76.7%
Carbon tetrachloride	100%	2.64%
Chloroform	100%	7.02%
Dioxin/furans	22%	66.8%
Ethyl acrylate	2%	1.75%
Ethylene oxide	3%	16.0%
Ethylene dichloride	100%	31.8%
Ethylene dibromide	100%	1.83%
Formaldehyde	100%	99.9%
Hydrazine	1%	1.33%
Lead	20%	58.1%
Methyl chloride	100%	0.124%
4,4'-Methylenediphenyl diisocyanate (MDI)	0.8%	0%
Nickel	57%	79.1%
Tetrachloroethylene (PCE)	6%	95.5%
Trichloroethylene (TCE)	28%	28.4%
Vinyl chloride	53%	52.6%
Vinylidene chloride	<0.1%	0.0778%
Xylenes	<0.1%	0%