



APPENDIX AVAILABLE ON REQUEST

Research Report 147

Atmospheric Transformation of Diesel Emissions

Barbara Zielinska et al.

Appendix G. Concentration of Species Collected During Winter 2005 Campaign (Electronic Database)

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This document was reviewed by the HEI Health Review Committee but did not undergo the HEI scientific editing and production process.

Alkanes

WINTER 2005 (without N0x denuder)

Cn	Mnemonic	Data in ug/mg EC EC (mg) Compound	GAS PHASE (XAD Denuder)				PARTICLE PHASE (Filter +XAD cartridge)			
			D05w		D05wN		D05w		D05wN	
			0.45 n=3	0.15 stdev	0.15 n=3	0.03 stdev	0.45 n=3	0.15 stdev	0.15 n=3	0.03 stdev
n-Alkanes										
nC14	TDEC	Tetradecane	6.30	4.42	9.68	3.36	4.79	0.85	9.11	10.60
nC15	PENTAD	Pentadecane	6.19	3.96	7.03	3.75	4.31	2.91	0.76	1.07
nC16	HEXAD	Hexadecane	4.41	3.08	3.35	1.09	4.38	3.03	4.86	5.52
nC17	HEPD	Heptadecane	4.43	6.27	0.00	0.00	5.15	3.22	5.55	3.59
nC18	OCTAD	Octadecane	1.41	1.10	0.36	0.06	0.07	0.10	6.56	9.16
nC19	NONAD	Nonadecane	0.89	0.32	0.00	0.00	0.18	0.25	0.29	0.41
nC20	EICOSA	Eicosane	0.32	0.46	0.00	0.00	0.11	0.10	0.00	0.00
nC21	HENEIC	Heneicosane	0.11	0.16	0.00	0.00	0.16	0.18	0.56	0.79
nC22	DOCOSA	Docosane	0.59	0.55	0.12	0.17	0.53	0.28	0.66	0.78
nC23	TRICOSA	Tricosane	0.05	0.07	0.08	0.11	0.83	0.57	1.21	1.32
nC24	TETCOS	Tetracosane	0.06	0.08	0.25	0.19	0.67	0.31	0.95	1.34
nC25	PENCOS	Pentacosane	0.20	0.21	0.00	0.00	0.61	0.44	0.75	1.06
nC26	HEXCOS	Hexacosane	0.04	0.05	0.00	0.00	1.07	1.04	0.92	0.92
nC27	HEPCOS	Heptacosane	0.07	0.06	0.00	0.00	0.10	0.14	0.47	0.55
nC28	OCTCOS	Octacosane	0.00	0.00	0.00	0.00	0.54	0.48	0.15	0.14
nC29	NONCOS	Nonacosane	0.00	0.00	0.00	0.00	0.49	0.69	0.48	0.07
nC30	TRICONT	triacontane	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.45
nC31	HTRICONT	hentriacontane	0.00	0.00	0.00	0.00	0.02	0.03	0.03	0.04
nC32	DTRICONT	dotriacontane	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.18
nC33	TTRICONT	tritriacontane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
nC34	TETRICONT	tetracontane	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.19
nC35	PTRICONT	pentatriacontane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
nC36	HXTRICONT	hexatriacontane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
nC37	HPTRICONT	heptatriacontane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
nC38	OTRICONT	octatriacontane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
nC39	NTRICONT	nonatriacontane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
nC40	TECONT	tetracontane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
n-Alkylcyclohexane										
cC13	HPYCYHX	Heptylcyclohexane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
cC14	OCYCYHX	Octylcyclohexane	1.25	0.77	1.39	0.40	0.00	0.00	0.00	0.00
cC15	NOYCYHX	Nonylcyclohexane	1.34	0.96	0.70	0.18	0.00	0.00	0.00	0.00
cC16	DECYHX	Decylcyclohexane	0.72	0.09	0.00	0.00	0.00	0.00	1.04	1.47
cC17	DEC1YHX	Undecylcyclohexane	1.71	0.44	0.44	0.62	0.00	0.00	0.00	0.00
cC18	DEC2YHX	Dodecylcyclohexane	0.15	0.21	0.00	0.00	0.03	0.04	0.00	0.00
cC19	DEC3YHX	Tridecylcyclohexane	0.00	0.00	0.18	0.26	0.00	0.00	0.00	0.00
cC20	DEC4YHX	Tetradecylcyclohexane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
cC21	DEC5YHX	Pentadecylcyclohexane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
cC22	DEC6YHX	Hexadecylcyclohexane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
cC23	DEC7YHX	Heptadecylcyclohexane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
cC24	DEC8YHX	Octadecylcyclohexane	0.00	0.00	0.00	0.00	0.15	0.09	0.23	0.32
cC25	DEC9YHX	Nonadecylcyclohexane	0.00	0.00	0.00	0.00	0.07	0.10	0.00	0.00
cC26	CYHXEIC	Eicosylcyclohexane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
cC27	CYHXHEN	Heneicosylcyclohexane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
iso-Alkanes										
iC14	NORFARN	Norfarnesane	0.54	0.76	0.00	0.00	0.00	0.00	0.00	0.00
iC15	FARNES	Farnesane	1.03	1.46	5.05	7.15	0.00	0.00	0.00	0.00
iC18	NORPRST	Norpristane	2.41	3.41	0.00	0.00	0.48	0.68	0.00	0.00
iC19	HEPTDPRIS	Pristane	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
iC20	PHYTAN	Phytane	0.95	0.77	0.00	0.00	0.07	0.10	1.80	2.54
Sum Alkanes (micrograms/mg EC)			35.18	29.66	28.63	17.34	24.81	15.63	36.99	42.51

PAH

WINTER 2005 (without NOx denuder)
Data in ug/mg EC

Mnemonic	Compound	GAS PHASE (XAD Denuder)				PARTICLE PHASE (Filter +XAD cartridge)			
		D05w		D05wN		D05w		D05wN	
		n=3	stdev	n=3	stdev	n=3	stdev	n=3	stdev
	EC (mg)	0.445	0.148	0.150	0.028	0.445	0.148	0.150	0.028
NAPHTH	Naphthalene	8.448	1.642	0.872	1.113	0.032	0.004	0.179	0.013
BIPHEN	Biphenyl	0.509	0.154	1.738	1.501	0.171	0.242	0.781	0.114
ACNAPY	Acenaphthylene	0.183	0.040	0.103	0.146	0.224	0.025	0.897	1.027
ACNAPE	Acenaphthene	0.072	0.010	0.185	0.196	0.430	0.153	0.332	0.404
FLUORE	Fluorene	0.763	0.369	2.450	1.834	0.003	0.004	0.293	0.044
PHENAN	Phenanthrene	0.470	0.084	0.009	0.012	0.501	0.307	1.488	0.016
ANTHRA	Anthracene	0.003	0.004	0.043	0.039	0.063	0.061	0.367	0.427
FLUORA	Fluoranthene	0.014	0.019	0.000	0.000	0.079	0.030	0.390	0.323
PYRENE	Pyrene	0.022	0.023	0.046	0.043	0.108	0.047	0.369	0.119
BZCPHEN	Benzo(c)phenanthrene	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.017
BGHIFL	Benzo(ghi)fluoranthene	0.000	0.000	0.000	0.000	0.018	0.026	0.762	0.860
CP_CDPYR	Cyclopenta(c,d)pyrene	0.000	0.000	0.000	0.000	0.002	0.003	0.041	0.058
BAANTH	Benzo(a)anthracene	0.001	0.002	0.003	0.004	0.003	0.004	0.029	0.042
CHR_TR	Chrysene-Triphenylene	0.001	0.002	0.003	0.004	0.011	0.012	0.056	0.079
BBJKFL	Benzo(b+j+k)fluoranthene	0.001	0.001	0.003	0.004	0.072	0.089	0.072	0.081
BAFL	Benzo(a)fluoranthene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
BEPYRN	BeP	0.000	0.000	0.000	0.000	0.002	0.001	0.007	0.001
BAPYRN	BaP	0.000	0.000	0.000	0.000	0.009	0.012	0.000	0.000
PERYLE	Perylene	0.000	0.000	0.008	0.011	0.014	0.007	0.000	0.000
DBAJAN	Dibenzo(a,j)anthracene	0.000	0.000	0.000	0.000	0.007	0.007	0.024	0.033
IN123PYR	Indeno[123-cd]pyrene	0.047	0.054	0.000	0.000	0.002	0.001	0.069	0.086
DBAHACAN	Dibenzo(ah+ac)anthracene	0.000	0.000	0.000	0.000	0.005	0.005	0.065	0.092
BBCHR	Benzo(b)chrysene	0.000	0.000	0.000	0.000	0.006	0.000	0.024	0.033
BGHIPE	Benzo(ghi)perylene	0.001	0.002	0.000	0.000	0.015	0.008	0.055	0.056
ANTHAN	Anthanthrene	0.000	0.000	0.000	0.000	0.003	0.004	0.038	0.054
DBBKFL	Dibenzo(b,k)fluoranthene	0.000	0.000	0.000	0.000	0.004	0.003	0.003	0.004
DBAEPYR	Dibenzo(a,e)pyrene	0.000	0.000	0.000	0.000	0.002	0.003	0.003	0.004
CORONE	Coronene	0.000	0.000	0.000	0.000	0.005	0.003	0.019	0.015
DBAHPYR	Dibenzo(a,h)pyrene	0.000	0.000	0.000	0.000	0.001	0.002	0.006	0.008
	Alkyl-PAH								
MNAPH2	2-methylnaphthalene	1.407	0.194	0.103	0.146	0.509	0.407	6.083	2.538
MNAPH1	1-methylnaphthalene	0.878	0.061	0.247	0.349	0.529	0.421	3.615	0.653
ENAP12	1+2ethylnaphthalene	0.410	0.057	0.483	0.640	0.858	1.214	5.619	3.379
DMN267	2,6+2,7-dimethylnaphthalene	0.542	0.020	0.015	0.021	0.998	0.589	3.939	0.021
DM1367	1,3+1,6+1,7-dimethylnaphth	1.090	0.073	0.071	0.090	1.327	0.298	5.980	0.994
D14523	1,4+1,5+2,3-dimethylnaphth	0.323	0.003	0.012	0.017	0.382	0.116	1.546	0.750
DMN12	1,2-dimethylnaphthalene	0.102	0.028	0.000	0.000	0.173	0.061	0.460	0.422
M_2BPH	2-Methylbiphenyl	0.462	0.137	14.993	17.580	53.572	75.762	0.035	0.050
M_3BPH	3-Methylbiphenyl	0.656	0.128	5.395	6.422	0.000	0.000	0.457	0.039
M_4BPH	4-Methylbiphenyl	0.223	0.035	2.478	2.960	1.260	1.782	2.584	3.600
EM_12N	1-ethyl-2-methylnaphthalene	0.135	0.017	0.000	0.000	0.431	0.098	0.323	0.457
EM_21N	2-ethyl-1-methylnaphthalene	0.000	0.000	0.012	0.017	0.003	0.004	0.804	0.952
TM235N	2,3,5-trimethylnaphthalene	0.110	0.156	0.000	0.000	0.264	0.342	0.221	0.122
TM245N	2,4,5-trimethylnaphthalene	0.056	0.080	0.000	0.000	0.122	0.047	0.458	0.060
TM145N	1,4,5-trimethylnaphthalene	0.000	0.000	0.000	0.000	0.030	0.042	0.435	0.124
JTMNAP	Trimethylnaphthalenes (6)	1.564	0.354	0.306	0.433	1.112	0.618	5.465	3.040
M_1FLU	1-methylfluorene	0.051	0.072	0.000	0.000	0.000	0.000	0.000	0.000
B_MFLU	Methylfluorenes (2)	0.000	0.000	0.000	0.000	1.147	1.036	4.220	4.204
M_2ANTH	2-methylantracene	0.001	0.002	0.000	0.000	0.553	0.782	8.176	11.554
M_3PHEN	3-methylphenanthrene	0.092	0.037	0.000	0.000	0.112	0.063	0.311	0.059
M_2PHEN	2-methylphenanthrene	0.106	0.024	0.000	0.000	0.214	0.113	0.180	0.070
M_9PHEN	9-methylphenanthrene	0.092	0.045	0.000	0.000	0.289	0.409	1.257	1.062
M_45PHEN	4,5-methylenphenanthrene	0.013	0.010	0.000	0.000	0.005	0.006	0.038	0.054
MPHT_1	1-methylphenanthrene	0.027	0.029	0.000	0.000	0.010	0.014	1.672	2.245
DM36PH	3,6-dimethylphenanthrene	0.000	0.000	0.012	0.017	0.006	0.004	0.024	0.033
DM17PH	1,7-dimethylphenanthrene	0.016	0.010	0.000	0.000	0.079	0.068	0.059	0.083
E_DMPH	Dimethylphenanthrene (5)	0.017	0.013	0.000	0.000	0.083	0.070	0.152	0.116
M_9ANT	9-methylantracene	0.000	0.000	0.000	0.000	0.079	0.029	0.379	0.444
M_13FL	1+3-methylfluoranthene	0.000	0.000	0.000	0.000	0.003	0.004	0.009	0.012
C1MFLPY	MeFl/MePy (4)	0.000	0.000	0.000	0.000	0.007	0.007	0.071	0.100
M_4PYR	4-methylpyrene	0.000	0.000	0.000	0.000	0.005	0.005	0.021	0.029
M_1PYR	1-methylpyrene	0.000	0.000	0.000	0.000	0.003	0.004	0.012	0.017
M_7BAA	7-methylbenz(a)anthracene	0.000	0.000	0.003	0.004	0.012	0.007	0.050	0.071
M_3CHR	3-methylchrysene	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.004
CHRY56M	5+6-methylchrysene	0.000	0.000	0.000	0.000	0.002	0.003	0.003	0.004
M_7BPY	7-methylbenzo(a)pyrene	0.000	0.000	0.003	0.004	0.160	0.015	0.000	0.000
	oxy-PAH								
FL9ONE	9-fluorenone	0.757	0.081	1.140	0.959	1.085	0.683	2.346	0.326
XANONE	Xanthone	0.026	0.037	0.000	0.000	0.056	0.054	0.144	0.204
ACQUONE	Acenaphthenequinone	0.000	0.000	0.000	0.000	0.051	0.057	0.305	0.156
PNAPONE	Perinaphthenone	0.000	0.000	0.000	0.000	0.015	0.022	0.128	0.081
ANTHONE	Anthrone	0.029	0.042	0.000	0.000	0.019	0.027	0.071	0.051
ANRQUONE	Anthraquinone	0.006	0.009	0.018	0.025	0.079	0.058	0.279	0.020
ANTAL9	9-Anthraaldehyde	0.000	0.000	0.000	0.000	0.009	0.013	0.635	0.898
BZANTHR	Benzanthrone	0.000	0.000	0.000	0.000	0.004	0.006	0.015	0.021
BAA7_12	Benzo(a)anthracene-7,12-dione	0.000	0.000	0.000	0.000	0.006	0.008	0.006	0.008
BPY910DIH	9,10-dihydrobenzo(a)pyrene-7(8H)-one	1.794	2.458	0.000	0.000	0.007	0.010	0.000	0.000
	S-PAH								
DBTH	Dibenzothiophene	0.000	0.000	0.000	0.000	0.003	0.004	0.029	0.042
BNTIOP	Benzonaphthothiophene	0.000	0.000	0.000	0.000	0.040	0.026	0.020	0.004
Sum PAH	µg/mg EC	21.522	6.619	30.751	34.590	67.507	86.470	65.013	43.185

nPAH

WINTER 2005 (without N0x denuder)

Mnemonic	Data in ng/mg EC	GAS PHASE (XAD Denuder)				PARTICLE PHASE (Filter +XAD cartridge)			
		D05w		D05wN		D05w		D05wN	
		EC (mg)	n=3	stdev	n=3	stdev	EC (mg)	n=3	stdev
ni1naph	1-nitronaphthalene	65.047	11.626	475.091	622.850	249.293	352.471	209.652	2.635
ni1me5n	1-methyl-5-nitronaphthalene	56.270	23.204	12.440	11.391	162.583	212.036	193.828	22.849
ni2naph	2-nitronaphthalene	32.925	6.436	55.934	73.575	75.310	105.778	2.388	2.387
ni2biph	2-nitrobiphenyl	1.005	0.750	31.150	16.758	209.645	294.044	202.196	34.958
ni4me2n	2-methyl-4-nitronaphthalene	41.260	38.228	2.441	2.114	0.514	0.726	14.165	20.032
ni4me1n	1-methyl-4-nitronaphthalene	0.000	0.000	0.000	0.000	4.551	4.462	4.080	5.769
ni6me1n	1-methyl-6-nitronaphthalene	101.715	62.924	7.720	9.623	20.610	16.699	3.609	5.104
ni3biph	3-nitrobiphenyl	1.660	0.717	1.734	1.583	291.200	411.557	1.252	1.107
ni4bph	4-nitrobiphenyl	37.809	32.859	70.287	45.540	537.107	747.938	313.482	60.296
ni2fluo	2-nitrofluorene	0.000	0.000	0.000	0.000	34.865	49.306	9.462	13.381
ni13nap	1,3-dinitronaphthalene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ni15nap	1,5-dinitronaphthalene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ni5acen	5-nitroacenaphthene	0.550	0.511	0.000	0.000	348.462	488.457	313.009	92.426
ni9anthr	9-nitroanthracene	0.465	0.657	0.880	1.244	320.019	449.739	218.638	65.184
ni4phen	4-nitrophenanthrene	0.412	0.583	0.000	0.000	104.811	6.458	0.000	0.000
ni9phen	9-nitrophenanthrene	1.719	1.470	0.800	1.131	48.260	58.681	7.767	9.482
ni3phen	3-nitrophenanthrene	4.929	5.874	4.962	1.502	5877.282	8252.021	508.423	572.017
ni18nap	1,8-dinitronaphthalene	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ni2fluo	2-nitrofluoranthene	0.000	0.000	0.000	0.000	157.832	219.603	24.162	34.170
ni3fluo	3-nitrofluoranthene	0.000	0.000	0.000	0.000	64.603	89.505	115.986	34.019
ni4pyre	4-nitropyrene	0.000	0.000	0.000	0.000	0.000	0.000	1.562	2.208
ni1pyre	1-nitropyrene	0.000	0.000	0.000	0.000	12.064	2.910	16.089	15.921
ni2pyre	2-nitropyrene	0.000	0.000	0.000	0.000	80.312	113.578	0.000	0.000
ni27fluo	2,7-dinitrofluorene	0.000	0.000	0.000	0.000	0.691	0.632	17.699	16.362
ni27f9on	2,7-dinitrofluoren-9-one	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ni7bzanth	7-nitrobenz(a)anthracene	0.000	0.000	0.000	0.000	0.000	0.000	3.843	5.434
ni6chry	6-nitrochrysene	0.000	0.000	0.000	0.000	0.388	0.548	175.495	142.327
Sum NPAH	ng/mg EC	345.763	185.839	663.436	787.310	8600.397	11877.150	2356.783	1158.069
Sum NPAH	ug/mg EC	0.346	0.186	0.663	0.787	8.600	11.877	2.357	1.158

OCEC**WINTER 2005 (without NOx denuder)**

PM Mass (mg)	0.28	0.10	0.42	0.18
	D05w		D05wN	
Data in (ug/mg PM)	n=3	stdev	n=3	stdev
OC1	271.78	104.99	137.34	132.05
OC2	228.20	59.21	164.87	87.02
OC3	137.66	42.54	170.52	58.97
OC4	122.39	131.67	104.38	15.52
POC				
Total OC	760.32	124.98	577.33	180.24
EC1	283.29	92.64	115.43	33.87
EC2	56.01	76.26	10.90	6.48
EC3	5.48	9.49	0.09	0.15
Total EC	344.44	161.58	126.09	39.82
Total C	1104.76	286.25	703.48	144.96
OC/EC	2.40	0.60	5.24	3.34
NO3	9.99	2.63	61.87	54.36
SO4	14.12	6.85	9.26	4.65