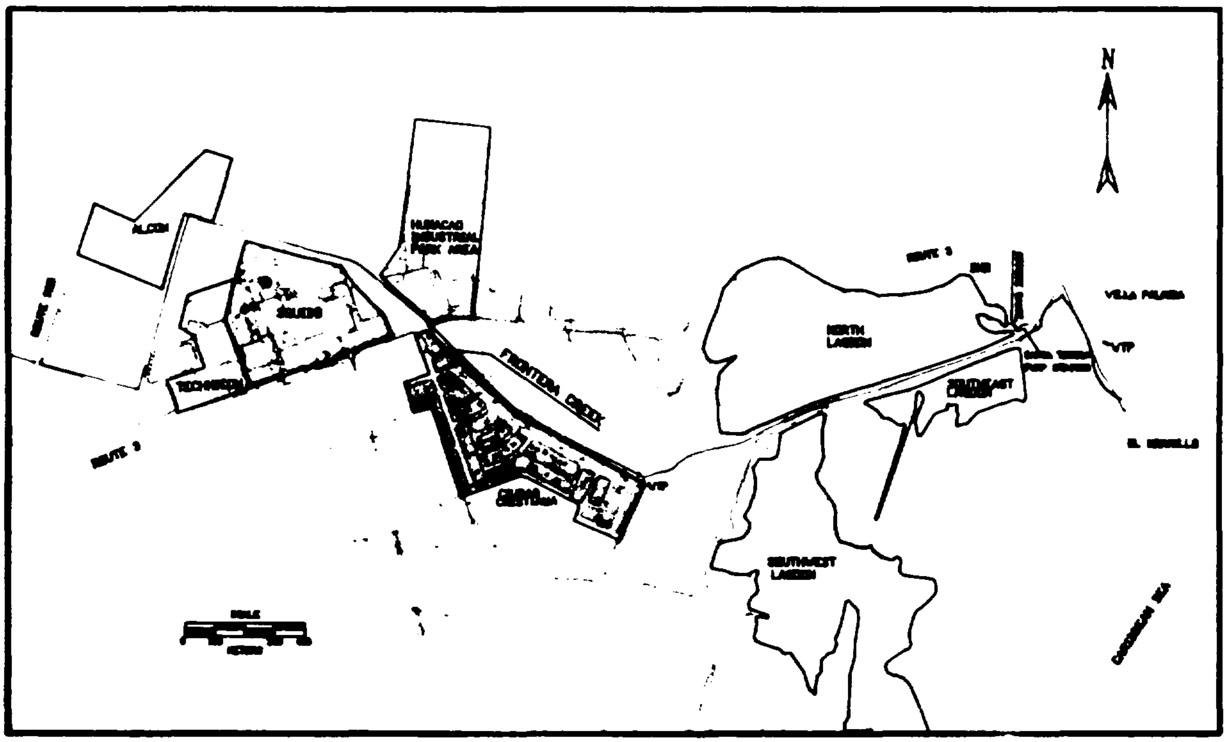
REMEDIAL INVESTIGATION REPORT

For

FRONTERA CREEK SITE
HUMACAO, PUERTO RICO

Volume 7 of 7

(Appendices, Part 2)



DYNAMAC CORPORATION

Environmental Risk Management Division

R E V I S E D   D R A F T

February 1991

FRO 001 1788

VOLUME 7
APPENDICES 5 - 8

APPENDIX 5: ETC Data for HSL Samples

APPENDIX 6: EPA Data Table Comparing EPA, Dynamac and EQB Mercury Results for Split Samples Collected at Cristiana

APPENDIX 7: Data Validation Summary; Quality Assurance/Quality Control Data

APPENDIX 8: Toxicological Profiles

- Toxicological Profile for Acetone
- Toxicological Profile for Carbon Disulfide
- Toxicological Profile for Chloromethane
- Toxicological Profile for Ethylbenzene
- Toxicological Profile for Mercury
- Toxicological Profile for Methyl Ethyl Ketone
- Toxicological Profile for Methyl Isobutyl Ketone
- Toxicological Profile for Methylene Chloride
- Toxicological Profile for Toluene
- Toxicological Profile for Xylene

FRO 001 1789

5

ETC Data for HSL Samples

OneStep®
INDEX SYSTEM

Contents

Christiana Creek Surface Soil 1

Test Borings 2

Surface Water 3

Sediment Samples 4

Industrial Samples 5

Biota Samples 6

7

8

FRO 001 1792

Cardinal®

1: Cristiana Creek Surface Soil

FRO 001 1793

DYNAMAC CORPORATION

CHRISTIANA CREEK SURFACE SOIL

		S CCSSA01	S CCSSA08	S CCSSB07	S CCSSD05	S CCSSD13	S CCSSD20	S CCSSD48
		880203	880204	880128	880203	880203	880203	880204
		BD0413	BD0417	BD0338	BD0414	BD0415	BD0416	BD0418
VOLATILE COMPOUNDS								
Benzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Bromoform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chloroform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dichlorobromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl bromide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	5.78	27.7	ND	7.98	7.47	BMDL	18.2
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Trans-dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acetone	ug/kg	62.5	45.3	21.6	73.1	83.8	137	41.4
Carbon disulfide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl ethyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl-iso-butyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Styrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	ug/kg	ND	ND	ND	ND	ND	ND	ND
m-Xylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
o+p-Xylenes	ug/kg	ND	ND	ND	ND	ND	ND	ND

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CHRISTIANA CREEK SURFACE SOIL

		S CCSSE09	S CCSSE20	S CCSSG08	S CCSSK08	S CCSSH07	S CCSSI06	S CCSSI12
		880202	880204	880203	880203	880203	880204	880203
		BD0345	BD0419	BD0347	BD0348	BD0349	BD0420	BD0350
VOLATILE COMPOUNDS								
Benzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Bromoform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chloroform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dichlorobromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl bromide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	7.59	ND	7.32	7.89	9.08	28.6	BMDL
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Trans-dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	ND	ND	ND	ND	69.2	ND	ND
Acetone	ug/kg	51.0	110	64.2	63.3	62.7	43.8	77.2
Carbon disulfide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl ethyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl-iso-butyl ketone	ug/kg	ND	ND	42.9	ND	307	ND	ND
Styrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	ug/kg	ND	ND	ND	ND	ND	ND	ND
m-Xylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
o+p-Xylenes	ug/kg	ND	ND	ND	ND	ND	ND	ND

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CHRISTIANA CREEK SURFACE SOIL

		S CCSS126	S CCSSK06	S CCSSN46	S CCSSN55	S CCSS008	S CCSSP29	S CCSSR03
		880205	880205	880205	880202	880129	880128	880128
		BD2544	BD2545	BD2546	BD0346	BD0344	BD0339	BD0340
VOLATILE COMPOUNDS								
Benzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Bromoform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chloroform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dichlorobromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl bromide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	25.4	ND	34.3	9.61	33.1	27.0	ND
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Trans-dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acetone	ug/kg	97.0	108	38.2	61.7	21.1	13.9	12.6
Carbon disulfide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl ethyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl-iso-butyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Styrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	ug/kg	ND	ND	ND	ND	ND	ND	ND
m-Xylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
o+p-Xylenes	ug/kg	ND	ND	ND	ND	ND	ND	ND

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CHRISTIANA CREEK SURFACE SOIL

		S CCSSR21	S CCSSS11	S CCSSX12
		880128	880129	880129
		BD0341	BD0342	BD0343
VOLATILE COMPOUNDS				
Benzene	ug/kg	ND	ND	ND
Bromoform	ug/kg	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	ND	ND
Chlorobenzene	ug/kg	ND	ND	ND
Chlorodibromomethane	ug/kg	ND	ND	ND
Chloroethane	ug/kg	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	ND	ND	ND
Chloroform	ug/kg	ND	ND	ND
Dichlorobromomethane	ug/kg	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	ND	ND
Ethylbenzene	ug/kg	ND	ND	ND
Methyl bromide	ug/kg	ND	ND	ND
Methyl chloride	ug/kg	ND	ND	ND
Methylene chloride	ug/kg	24.4	20.0	22.7
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	ND	ND
Toluene	ug/kg	ND	ND	ND
1,2-Trans-dichloroethylene	ug/kg	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	ND	ND
Trichloroethylene	ug/kg	ND	ND	ND
Vinyl chloride	ug/kg	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	ND	ND
2-Hexanone	ug/kg	ND	ND	ND
Acetone	ug/kg	11.8	17.4	14.9
Carbon disulfide	ug/kg	ND	ND	ND
Methyl ethyl ketone	ug/kg	ND	ND	ND
Methyl-iso-butyl ketone	ug/kg	ND	ND	ND
Styrene	ug/kg	ND	ND	ND
Vinyl acetate	ug/kg	ND	ND	ND
m-Xylene	ug/kg	ND	ND	ND
o+p-Xylenes	ug/kg	ND	ND	ND

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CHRISTIANA CREEK SURFACE SOIL

		S CCSSA01	S CCSSA08	S CCSSB07	S CCSSD05	S CCSSD13	S CCSSD20	S CCSSD48
		880203	880204	880128	880203	880203	880203	880204
		BD0413	BD0417	BD0338	BD0414	BD0415	BD0416	BD0418
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	ND	BMDL	ND	ND	BMDL	ND	BMDL
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	BMDL
Di-n-butyl phthalate	ug/kg	ND	BMDL	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Fluorene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Isophorone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

CHRISTIANA CREEK SURFACE SOIL

		S CCSSE09 880202 BD0345	S CCSSE20 880204 BD0419	S CCSSG08 880203 BD0347	S CCSSK08 880203 BD0348	S CCSSH07 880203 BD0349	S CCSSI06 880204 BD0420	S CCSSI12 880203 BD0350
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	ND	ND	ND	ND	ND	6710	BMDL
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	ND	BMDL	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Fluorene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Isophorone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND	BMDL	ND	ND	ND
Pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	ND	ND	ND	ND	ND

FRO 001 1799

DYNAMAC CORPORATION

CHRISTIANA CREEK SURFACE SOIL

		S CCSSI26	S CCSSK06	S CCSSN46	S CCSSN55	S CCSS008	S CCSSP29	S CCSSR03
		880205	880205	880205	880202	880129	880128	880128
		BD2544	BD2545	BD2546	BD0346	BD0344	BD0339	BD0340
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	BMDL	ND	ND	1350	BMDL	BMDL	ND
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	BMDL	BMDL	BMDL	ND	BMDL	BMDL	ND
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/kg	ND	ND	ND	ND	BMDL	BMDL	ND
Fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Fluorene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Isophorone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

CHRISTIANA CREEK SURFACE SOIL

		S CCSSR21	S CCSSS11	S CCSSX12
		880128	880129	880129
		BD0341	BD0342	BD0343
BASE NEUTRAL COMPOUNDS				
Acenaphthene	ug/kg	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	ND	ND	ND
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND
Diethyl phthalate	ug/kg	ND	ND	ND
Dimethyl phthalate	ug/kg	ND	ND	ND
Di-n-butyl phthalate	ug/kg	ND	BMDL	BMDL
2,4-Dinitrotoluene	ug/kg	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND
Di-n-octyl phthalate	ug/kg	BMDL	ND	ND
Fluoranthene	ug/kg	ND	ND	ND
Fluorene	ug/kg	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND
Isophorone	ug/kg	ND	ND	ND
Naphthalene	ug/kg	ND	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND
Pyrene	ug/kg	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	ND

DYNAMAC CORPORATION
CHRISTIANA CREEK SURFACE SOIL

		S CCSSA01	S CCSSA08	S CCSSB07	S CCSSD05	S CCSSD13	S CCSSD20	S CCSSD48
		880203	880204	880128	880203	880203	880203	880204
		BD0413	BD0417	BD0338	BD0414	BD0415	BD0416	BD0418
ACID COMPOUNDS								
2-Chlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzoic acid	ug/kg	ND	ND	ND	ND	ND	ND	ND
PESTICIDES AND AROCLORS								
Aldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Alpha-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Beta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Gamma-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Delta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlordane	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1016	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
CHRISTIANA CREEK SURFACE SOIL

		S CCSSE09	S CCSSE20	S CCSSG08	S CCSSK08	S CCSSH07	S CCSSI06	S CCSSI12
		880202	880204	880203	880203	880203	880204	880203
		BD0345	BD0419	BD0347	BD0348	BD0349	BD0420	BD0350
ACID COMPOUNDS								
2-Chlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzoic acid	ug/kg	ND	ND	ND	ND	ND	ND	ND
PESTICIDES AND AROCLORS								
Aldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Alpha-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Beta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Gamma-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Delta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlordane	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1016	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

CHRISTIANA CREEK SURFACE SOIL

		S CCSS126	S CCSSK06	S CCSSN46	S CCSSN55	S CCSS008	S CCSSP29	S CCSSR03
		880205	880205	880205	880202	880129	880128	880128
		BD2544	BD2545	BD2546	BD0346	BD0344	BD0339	BD0340
ACID COMPOUNDS								
2-Chlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzoic acid	ug/kg	ND	ND	ND	ND	BMDL	ND	ND
PESTICIDES AND AROCLORS								
Aldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Alpha-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Beta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Gamma-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Delta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlordane	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1016	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

CHRISTIANA CREEK SURFACE SOIL

		S CCSSR21	S CCSSS11	S CCSSX12
		880128	880129	880129
		BD0341	BD0342	BD0343
ACID COMPOUNDS				
2-Chlorophenol	ug/kg	ND	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND
Phenol	ug/kg	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND
2-Methylphenol	ug/kg	ND	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND
Benzoic acid	ug/kg	ND	ND	ND
PESTICIDES AND AROCLORS				
Aldrin	ug/kg	ND	ND	ND
Alpha-BHC	ug/kg	ND	ND	ND
Beta-BHC	ug/kg	ND	ND	ND
Gamma-BHC	ug/kg	ND	ND	ND
Delta-BHC	ug/kg	ND	ND	ND
Chlordane	ug/kg	ND	ND	ND
4,4'-DDT	ug/kg	ND	ND	ND
4,4'-DDE	ug/kg	ND	ND	ND
4,4'-DDD	ug/kg	ND	ND	ND
Dieldrin	ug/kg	ND	ND	ND
Endosulfan I	ug/kg	ND	ND	ND
Endosulfan II	ug/kg	ND	ND	ND
Endosulfan sulfate	ug/kg	ND	ND	ND
Endrin	ug/kg	ND	ND	ND
Heptachlor	ug/kg	ND	ND	ND
Heptachlor epoxide	ug/kg	ND	ND	ND
Toxaphene	ug/kg	ND	ND	ND
Endrin ketone	ug/kg	ND	ND	ND
Methoxychlor	ug/kg	ND	ND	ND
Aroclor 1242	ug/kg	ND	ND	ND
Aroclor 1254	ug/kg	ND	ND	ND
Aroclor 1260	ug/kg	ND	ND	ND
Aroclor 1248	ug/kg	ND	ND	ND
Aroclor 1232	ug/kg	ND	ND	ND
Aroclor 1221	ug/kg	ND	ND	ND
Aroclor 1016	ug/kg	ND	ND	ND

DYNAMAC CORPORATION

CHRISTIANA CREEK SURFACE SOIL

		S CCSSA01	S CCSSA08	S CCSSB07	S CCSSD05	S CCSSD13	S CCSSD20	S CCSSD48
		880203	880204	880128	880203	880203	880203	880204
		BD0413	BD0417	BD0338	BD0414	BD0415	BD0416	BD0418
RCRA METALS								
Arsenic	ug/kg	2200	4100	3500	BMDL	2700	BMDL	BMDL
Barium	ug/kg	142000	189000	144000	148000	377000	125000	128000
Cadmium	ug/kg	BMDL	ND	ND	ND	BMDL	ND	ND
Chromium	ug/kg	5600	8600	7400	4500	8200	5500	5500
Lead	ug/kg	4000	11000	9900	5300	8300	3300	8600
Mercury	ug/kg	100	171	189	BMDL	123	BMDL	148
Mercury, Inorganic	ug/kg	BMDL	-	-	-	-	-	89
Selenium	ug/kg	BMDL	BMDL	BMDL	ND	ND	ND	BMDL
Silver	ug/kg	ND	ND	ND	ND	ND	ND	ND
OTHER METALS AND MISC								
Aluminum	ug/kg	15200000	24400000	18800000	9650000	13100000	12800000	8810000
Antimony	ug/kg	ND	ND	ND	ND	ND	ND	ND
Beryllium	ug/kg	170	230	210	100	230	190	150
Calcium	ug/kg	2780000	4470000	3290000	2340000	3520000	2340000	2290000
Cobalt	ug/kg	9900	11000	9000	5800	13000	9700	8000
Copper	ug/kg	19000	40000	27000	11000	24000	20000	16000
Iron	ug/kg	20700000	30600000	22900000	14700000	28300000	25200000	21500000
Magnesium	ug/kg	2920000	4330000	2630000	2250000	2070000	2310000	1540000
Manganese	ug/kg	670000	737000	480000	452000	1980000	768000	667000
Molybdenum	ug/kg	-	-	-	-	-	-	-
Nickel	ug/kg	1600	3000	4700	1400	2300	1500	BMDL
Potassium	ug/kg	280000	460000	370000	630000	410000	310000	300000
Sodium	ug/kg	190000	200000	250000	250000	200000	200000	96000
Thallium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vanadium	ug/kg	60000	83000	63000	42000	74000	69000	63000
Zinc	ug/kg	40000	67000	48000	40000	50000	34000	36000
% Solid	ug/kg	80.0	77.3	82.6	79.1	81.5	75.4	81.2
Cyanide, Total	mg/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

CHRISTIANA CREEK SURFACE SOIL

		S CCSSE09	S CCSSE20	S CCSSG08	S CCSSK08	S CCSSH07	S CCSSI06	S CCSSI12
		880202	880204	880203	880203	880203	880204	880203
		BD0345	BD0419	BD0347	BD0348	BD0349	BD0420	BD0350
RCRA METALS								
Arsenic	ug/kg	2300	BMDL	2700	BMDL	BMDL	BMDL	2000
Barium	ug/kg	138000	141000	148000	129000	242000	47700	108000
Cadmium	ug/kg	ND	ND	ND	BMDL	ND	BMDL	BMDL
Chromium	ug/kg	4800	6600	5600	6300	BMDL	55000	4800
Lead	ug/kg	4900	5100	4700	5200	6200	4000	8000
Mercury	ug/kg	90	BMDL	100	BMDL	BMDL	ND	BMDL
Mercury, Inorganic	ug/kg	-	-	BMDL	-	-	-	BMDL
Selenium	ug/kg	BMDL	BMDL	BMDL	BMDL	ND	BMDL	ND
Silver	ug/kg	ND	ND	ND	ND	ND	ND	ND
OTHER METALS AND MISC								
Aluminum	ug/kg	9490000	13300000	11600000	13600000	5680000	19300000	12200000
Antimony	ug/kg	ND	ND	ND	ND	ND	ND	ND
Beryllium	ug/kg	160	210	240	180	180	270	140
Calcium	ug/kg	2450000	2040000	2860000	2960000	1400000	4100000	2460000
Cobalt	ug/kg	6600	8100	8500	7200	BMDL	41000	8300
Copper	ug/kg	16000	20000	19000	17000	12000	1180000	16000
Iron	ug/kg	16900000	23900000	34000000	20200000	9630000	48300000	19700000
Magnesium	ug/kg	1720000	1620000	1580000	1600000	2250000	6430000	5680000
Manganese	ug/kg	520000	510000	717000	545000	542000	755000	621000
Molybdenum	ug/kg	-	-	-	-	-	-	-
Nickel	ug/kg	1400	2300	1500	1500	BMDL	19000	2100
Potassium	ug/kg	310000	290000	390000	400000	830000	390000	210000
Sodium	ug/kg	190000	150000	200000	130000	120000	120000	140000
Thallium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vanadium	ug/kg	49000	71000	92000	60000	22000	200000	51000
Zinc	ug/kg	33000	35000	37000	35000	38000	144000	51000
% Solid	ug/kg	80.2	76.7	79.8	80.9	90.5	77.0	79.6
Cyanide, Total	mg/kg	ND	ND	ND	ND	ND	ND	ND

FRO 001 1807

DYNAMAC CORPORATION
CHRISTIANA CREEK SURFACE SOIL

		S CCSSI26 880205 BD2544	S CCSSK06 880205 BD2545	S CCSSN46 880205 BD2546	S CCSSN55 880202 BD0346	S CCSS008 880129 BD0344	S CCSSP29 880128 BD0339	S CCSSR03 880128 BD0340
RCRA METALS								
Arsenic	ug/kg	2300	2400	2000	2500	2400	BMDL	2500
Barium	ug/kg	134000	127000	131000	162000	106000	174000	405000
Cadmium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chromium	ug/kg	9100	6000	4400	4400	5400	6600	7900
Lead	ug/kg	5000	5900	6400	11000	37000	4500	7100
Mercury	ug/kg	88	88	BMDL	128	86	BMDL	90
Mercury, Inorganic	ug/kg	BMDL	93	-	BMDL	-	-	ND
Selenium	ug/kg	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL
Silver	ug/kg	ND	ND	ND	ND	ND	ND	ND
OTHER METALS AND MISC								
Aluminum	ug/kg	16000000	13700000	11500000	10700000	7610000	12400000	20100000
Antimony	ug/kg	ND	ND	ND	ND	ND	ND	ND
Beryllium	ug/kg	200	220	210	180	110	220	210
Calcium	ug/kg	2530000	2380000	2260000	2620000	3160000	3260000	4310000
Cobalt	ug/kg	6700	7400	6500	9100	5600	7100	10000
Copper	ug/kg	37000	29000	18000	20000	24000	21000	23000
Iron	ug/kg	23400000	22000000	17400000	21000000	16800000	21800000	28500000
Magnesium	ug/kg	2290000	2400000	2380000	1880000	1850000	2080000	4840000
Manganese	ug/kg	600000	561000	498000	840000	434000	587000	668000
Molybdenum	ug/kg	-	ND	-	-	-	-	-
Nickel	ug/kg	2000	BMDL	BMDL	BMDL	1600	1600	2800
Potassium	ug/kg	350000	290000	280000	290000	210000	270000	330000
Sodium	ug/kg	130000	120000	140000	160000	130000	140000	180000
Thallium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vanadium	ug/kg	67000	60000	49000	73000	45000	63000	76000
Zinc	ug/kg	43000	44000	37000	37000	46000	36000	53000
% Solid	ug/kg	77.5	77.4	67.8	81.3	83.6	78.1	75.5
Cyanide, Total	mg/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

CHRISTIANA CREEK SURFACE SOIL

		S CCSSR21	S CCSSS11	S CCSSX12
		880128	880129	880129
		BD0341	BD0342	BD0343
RCRA METALS				
Arsenic	ug/kg	BMDL	2000	BMDL
Barium	ug/kg	126000	163000	150000
Cadmium	ug/kg	ND	BMDL	ND
Chromium	ug/kg	6700	6600	7100
Lead	ug/kg	6300	11000	5800
Mercury	ug/kg	98	109	112
Mercury, Inorganic	ug/kg	-	-	BMDL
Selenium	ug/kg	BMDL	BMDL	BMDL
Silver	ug/kg	ND	ND	ND
OTHER METALS AND MISC				
Aluminum	ug/kg	20200000	18000000	16600000
Antimony	ug/kg	ND	ND	ND
Beryllium	ug/kg	180	260	230
Calcium	ug/kg	3790000	3060000	2720000
Cobalt	ug/kg	8100	8700	9000
Copper	ug/kg	22000	22000	23000
Iron	ug/kg	24700000	28700000	26500000
Magnesium	ug/kg	3380000	2120000	1860000
Manganese	ug/kg	519000	684000	572000
Molybdenum	ug/kg	-	-	-
Nickel	ug/kg	2300	2200	1900
Potassium	ug/kg	350000	370000	400000
Sodium	ug/kg	150000	270000	180000
Thallium	ug/kg	ND	ND	ND
Vanadium	ug/kg	66000	72000	74000
Zinc	ug/kg	47000	43000	38000
% Solid	ug/kg	81.8	84.5	81.8
Cyanide, Total	mg/kg	ND	ND	ND

DYNAMAC CORPORATION

CHRISTIANA CREEK - BACKGROUND

		S CCSSM01	S CCSSM08	S CCSSK15	S CCSSM15
		880205	880205	880205	880205
		BD0422	BD0424	BD0423	BD0421
VOLATILE COMPOUNDS					
Benzene	ug/kg	ND	ND	ND	ND
Bromoform	ug/kg	ND	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	ND	ND	ND
Chlorobenzene	ug/kg	ND	ND	ND	ND
Chlorodibromomethane	ug/kg	ND	ND	ND	ND
Chloroethane	ug/kg	ND	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	ND	ND	ND	ND
Chloroform	ug/kg	ND	ND	ND	ND
Dichlorobromomethane	ug/kg	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND
Ethylbenzene	ug/kg	ND	ND	ND	ND
Methyl bromide	ug/kg	ND	ND	ND	ND
Methyl chloride	ug/kg	ND	ND	ND	ND
Methylene chloride	ug/kg	13.8	28.3	16.8	7.78
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	ND	ND	ND
Toluene	ug/kg	ND	ND	ND	ND
1,2-Trans-dichloroethylene	ug/kg	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	ND	ND	ND
Trichloroethylene	ug/kg	ND	ND	ND	ND
Vinyl chloride	ug/kg	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND
2-Hexanone	ug/kg	ND	ND	ND	ND
Acetone	ug/kg	19.2	39.2	76.2	10.3
Carbon disulfide	ug/kg	ND	ND	ND	BMDL
Methyl ethyl ketone	ug/kg	ND	ND	ND	ND
Methyl-iso-butyl ketone	ug/kg	ND	ND	ND	ND
Styrene	ug/kg	ND	ND	ND	ND
Vinyl acetate	ug/kg	ND	ND	ND	ND
m-Xylene	ug/kg	ND	ND	ND	ND
o+p-Xylenes	ug/kg	ND	ND	ND	ND

DYNAMAC CORPORATION

CHRISTIANA CREEK - BACKGROUND

		S CCSSM01	S CCSSM08	S CCSSK15	S CCSSM15
		880205	880205	880205	880205
		BD0422	BD0424	BD0423	BD0421
BASE NEUTRAL COMPOUNDS					
Acenaphthene	ug/kg	ND	ND	ND	-
Acenaphthylene	ug/kg	ND	ND	ND	-
Anthracene	ug/kg	ND	ND	ND	-
Benzo(a)anthracene	ug/kg	ND	ND	ND	-
Benzo(a)pyrene	ug/kg	ND	ND	ND	-
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	-
Benzo(ghi)perylene	ug/kg	ND	ND	ND	-
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	-
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	-
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	-
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	-
bis(2-Ethylhexyl)phthalate	ug/kg	BMDL	ND	ND	-
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	-
Butyl benzyl phthalate	ug/kg	ND	ND	ND	-
2-Chloronaphthalene	ug/kg	ND	ND	ND	-
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	-
Chrysene	ug/kg	ND	ND	ND	-
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	-
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	-
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	-
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	-
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	-
Diethyl phthalate	ug/kg	ND	ND	ND	-
Dimethyl phthalate	ug/kg	ND	ND	ND	-
Di-n-butyl phthalate	ug/kg	BMDL	BMDL	BMDL	-
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	-
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	-
Di-n-octyl phthalate	ug/kg	ND	ND	BMDL	-
Fluoranthene	ug/kg	ND	ND	ND	-
Fluorene	ug/kg	ND	ND	ND	-
Hexachlorobenzene	ug/kg	ND	ND	ND	-
Hexachlorobutadiene	ug/kg	ND	ND	ND	-
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	-
Hexachloroethane	ug/kg	ND	ND	ND	-
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	-
Isophorone	ug/kg	ND	ND	ND	-
Naphthalene	ug/kg	ND	ND	ND	-
Nitrobenzene	ug/kg	ND	ND	ND	-
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	-
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	-
Phenanthrene	ug/kg	ND	ND	ND	-
Pyrene	ug/kg	ND	ND	ND	-
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	-
2-Methylnaphthalene	ug/kg	ND	ND	ND	-
2-Nitroaniline	ug/kg	ND	ND	ND	-
3-Nitroaniline	ug/kg	ND	ND	ND	-
4-Chloroaniline	ug/kg	ND	ND	ND	-
4-Nitroaniline	ug/kg	ND	ND	ND	-
Benzyl alcohol	ug/kg	ND	ND	ND	-
Dibenzofuran	ug/kg	ND	ND	ND	-

DYNAMAC CORPORATION

CHRISTIANA CREEK - BACKGROUND

		S CCSSM01	S CCSSM08	S CCSSK15	S CCSSM15
		880205	880205	880205	880205
		BD0422	BD0424	BD0423	BD0421
ACID COMPOUNDS					
2-Chlorophenol	ug/kg	ND	ND	ND	-
2,4-Dichlorophenol	ug/kg	ND	ND	ND	-
2,4-Dimethylphenol	ug/kg	ND	ND	ND	-
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	-
2,4-Dinitrophenol	ug/kg	ND	ND	ND	-
2-Nitrophenol	ug/kg	ND	ND	ND	-
4-Nitrophenol	ug/kg	ND	ND	ND	-
p-Chloro-m-cresol	ug/kg	ND	ND	ND	-
Pentachlorophenol	ug/kg	ND	ND	ND	-
Phenol	ug/kg	ND	ND	ND	-
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	-
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	-
2-Methylphenol	ug/kg	ND	ND	ND	-
4-Methylphenol	ug/kg	ND	ND	ND	-
Benzoic acid	ug/kg	ND	ND	BMDL	-
PESTICIDES AND AROCLORS					
Aldrin	ug/kg	ND	ND	ND	-
Alpha-BHC	ug/kg	ND	ND	ND	-
Beta-BHC	ug/kg	ND	ND	ND	-
Gamma-BHC	ug/kg	ND	ND	ND	-
Delta-BHC	ug/kg	ND	ND	ND	-
Chlordane	ug/kg	ND	ND	ND	-
4,4'-DDT	ug/kg	ND	ND	ND	-
4,4'-DDE	ug/kg	ND	ND	ND	-
4,4'-DDD	ug/kg	ND	ND	ND	-
Dieldrin	ug/kg	ND	ND	ND	-
Endosulfan I	ug/kg	ND	ND	ND	-
Endosulfan II	ug/kg	ND	ND	ND	-
Endosulfan sulfate	ug/kg	ND	ND	ND	-
Endrin	ug/kg	ND	ND	ND	-
Heptachlor	ug/kg	ND	ND	ND	-
Heptachlor epoxide	ug/kg	ND	ND	ND	-
Toxaphene	ug/kg	ND	ND	ND	-
Endrin ketone	ug/kg	ND	ND	ND	-
Methoxychlor	ug/kg	ND	ND	ND	-
Aroclor 1242	ug/kg	ND	ND	ND	-
Aroclor 1254	ug/kg	ND	ND	ND	-
Aroclor 1260	ug/kg	ND	ND	ND	-
Aroclor 1248	ug/kg	ND	ND	ND	-
Aroclor 1232	ug/kg	ND	ND	ND	-
Aroclor 1221	ug/kg	ND	ND	ND	-
Aroclor 1016	ug/kg	ND	ND	ND	-

DYNAMAC CORPORATION
CHRISTIANA CREEK - BACKGROUND

		S CCSSM01 880205 BD0422	S CCSSM08 880205 BD0424	S CCSSK15 880205 BD0423	S CCSSM15 880205 BD0421
RCRA METALS					
Arsenic	ug/kg	BMDL	BMDL	BMDL	-
Barium	ug/kg	282000	127000	145000	-
Cadmium	ug/kg	ND	ND	ND	-
Chromium	ug/kg	5800	7600	6400	-
Lead	ug/kg	8400	3400	4500	-
Mercury	ug/kg	BMDL	ND	ND	-
Mercury, Inorganic	ug/kg	-	ND	ND	-
Selenium	ug/kg	BMDL	ND	ND	-
Silver	ug/kg	ND	BMDL	ND	-
OTHER METALS AND MISC					
Aluminum	ug/kg	14900000	17500000	21400000	-
Antimony	ug/kg	ND	ND	ND	-
Beryllium	ug/kg	270	140	190	-
Calcium	ug/kg	1880000	3000000	4020000	-
Cobalt	ug/kg	6300	14000	13000	-
Copper	ug/kg	21000	38000	46000	-
Iron	ug/kg	28900000	30400000	36700000	-
Magnesium	ug/kg	1250000	9770000	10600000	-
Manganese	ug/kg	557000	1160000	1120000	-
Nickel	ug/kg	2000	4100	3400	-
Potassium	ug/kg	460000	970000	870000	-
Sodium	ug/kg	130000	180000	300000	-
Thallium	ug/kg	ND	ND	ND	-
Vanadium	ug/kg	64000	60000	75000	-
Zinc	ug/kg	49000	65000	72000	-
% Solid	ug/kg	78.2	76.5	68.9	-
Cyanide, Total	mg/kg	ND	ND	ND	-

2: Test Borings

DYNAMAC CORPORATION

TEST BORINGS - ONSITE

		S TBI12D01	S TBI12D04	S TBI12D04	S TBI12D06	S TBN40001	S TBK03D01	S TBN40006
		880308	880308	880308	880308	880301	880301	880301
		803486	803487	8E0812	803488	803480	803481	803482
VOLATILE COMPOUNDS								
Benzene	ug/kg	ND	ND	-	ND	ND	ND	ND
Bromoform	ug/kg	ND	ND	-	ND	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	ND	-	ND	ND	ND	ND
Chlorobenzene	ug/kg	ND	ND	-	ND	ND	ND	ND
Chlorodibromomethane	ug/kg	ND	ND	-	ND	ND	ND	ND
Chloroethane	ug/kg	ND	ND	-	ND	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	ND	ND	-	ND	ND	ND	ND
Chloroform	ug/kg	ND	ND	-	ND	ND	ND	ND
Dichlorobromomethane	ug/kg	ND	ND	-	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	ND	-	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	ND	-	ND	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	ND	-	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	ND	-	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	ND	-	ND	ND	ND	ND
Ethylbenzene	ug/kg	ND	ND	-	ND	ND	ND	ND
Methyl bromide	ug/kg	ND	ND	-	ND	ND	ND	ND
Methyl chloride	ug/kg	ND	ND	-	ND	ND	ND	ND
Methylene chloride	ug/kg	15.0	23.9	-	11.2	ND	27.1	ND
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND	-	ND	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	ND	-	ND	ND	ND	ND
Toluene	ug/kg	ND	ND	-	ND	ND	ND	ND
1,2-Trans-dichloroethylene	ug/kg	ND	ND	-	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	ND	-	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	ND	-	ND	ND	ND	ND
Trichloroethylene	ug/kg	ND	ND	-	ND	ND	ND	ND
Vinyl chloride	ug/kg	ND	ND	-	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	ND	-	ND	ND	ND	ND
2-Hexanone	ug/kg	ND	ND	-	ND	ND	ND	ND
Acetone	ug/kg	53.0	57.1	-	139	43.4	44.5	82.6
Carbon disulfide	ug/kg	ND	ND	-	ND	ND	ND	ND
Methyl ethyl ketone	ug/kg	ND	ND	-	ND	ND	ND	ND
Methyl-iso-butyl ketone	ug/kg	ND	ND	-	ND	ND	ND	ND
Styrene	ug/kg	ND	ND	-	ND	ND	ND	ND
Vinyl acetate	ug/kg	ND	ND	-	ND	ND	ND	ND
m-Xylene	ug/kg	ND	ND	-	ND	ND	ND	ND
o+p-Xylenes	ug/kg	ND	ND	-	ND	ND	ND	ND

DYNAMAC CORPORATION
TEST BORINGS - ONSITE

		S TBB07D01	S TBB07D04	S TBB07D06	S TBK07D06	S TBG08D01	S TBG08D04	S TBG08D06
		880310	880310	880310	880310	880309	880309	880309
		BD3495	BD3496	BD3497	BD3475	BD3489	BD3490	BD3491
VOLATILE COMPOUNDS								
Benzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Bromoform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chloroform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dichlorobromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl bromide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	12.1	11.3	22.6	11.9	12.6	43.7	19.5
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Trans-dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acetone	ug/kg	22.8	82.4	218	76.2	ND	110	247
Carbon disulfide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl ethyl ketone	ug/kg	ND	ND	20.1	ND	ND	ND	45.0
Methyl-iso-butyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Styrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	ug/kg	ND	ND	ND	ND	ND	ND	ND
m-Xylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
o+p-Xylenes	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
TEST BORINGS - ONSITE

		S TBP29D01	S TBP29D04	S TBP29D06	S TBS15D01	S TBK01D01	S TBS15D04	S TBS15D06
		880307	880307	880307	880225	880225	880225	880225
		BD3483	BD3484	BD3485	BC3471	BD3472	BD3473	BD3474
VOLATILE COMPOUNDS								
Benzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Bromoform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chloroform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dichlorobromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl bromide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	11.8	7.17	9.72	ND	ND	ND	44.4
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Trans-dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acetone	ug/kg	26.6	28.2	26.2	11.5	ND	29.2	94.2
Carbon disulfide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl ethyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl-iso-butyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Styrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	ug/kg	ND	ND	ND	ND	ND	ND	ND
m-Xylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
o+p-Xylenes	ug/kg	ND	ND	ND	ND	ND	ND	ND

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DYNAMAC CORPORATION

TEST BORINGS - ONSITE

		S TBB07D01	S TBB07D04	S TBB07D06	S TBK07D06	S TBG08D01	S TBG08D04	S TBG08D06
		880310	880310	880310	880310	880309	880309	880309
		803495	803496	803497	803475	803489	803490	803491
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	ND	ND	ND	ND	BMDL	ND	ND
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	BMDL	BMDL	BMDL	BMDL	ND	ND	ND
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Diphenylhydrazine	ug/kg	-	-	-	-	-	-	-
Fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Fluorene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Isophorone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
TEST BORINGS - ONSITE

		S TBI12D01	S TBI12D04	S TBI12D04	S TBI12D06	S TBN40D01	S TBK03D01	S TBN40D06
		880308	880308	880308	880308	880301	880301	880301
		BD3486	BD3487	BE0812	BD3488	BD3480	BD3481	BD3482
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND	-
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND	-
Anthracene	ug/kg	ND	ND	ND	ND	ND	ND	-
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	-
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	-
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	-
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND	ND	-
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	-
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND	ND	-
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND	ND	-
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND	ND	-
bis(2-Ethylhexyl)phthalate	ug/kg	ND	ND	ND	ND	BMDL	818	-
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	-
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	ND	BMDL	-
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	-
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	-
Chrysene	ug/kg	ND	ND	ND	ND	ND	ND	-
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	-
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	-
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	-
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	-
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND	ND	-
Diethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	-
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	-
Di-n-butyl phthalate	ug/kg	ND	ND	ND	ND	BMDL	ND	-
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	-
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	-
Di-n-octyl phthalate	ug/kg	ND	ND	ND	ND	1380	4880	-
1,2-Diphenylhydrazine	ug/kg	-	ND	-	-	-	-	-
Fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	-
Fluorene	ug/kg	ND	ND	ND	ND	ND	ND	-
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	-
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND	ND	-
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND	ND	-
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	-
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	-
Isophorone	ug/kg	ND	ND	ND	ND	ND	ND	-
Naphthalene	ug/kg	ND	ND	ND	ND	ND	ND	-
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND	ND	-
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND	ND	-
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND	ND	-
Phenanthrene	ug/kg	ND	ND	ND	ND	ND	ND	-
Pyrene	ug/kg	ND	ND	ND	ND	ND	ND	-
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	-
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	-
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	-
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	-
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND	ND	-
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	-
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND	ND	-
Dibenzofuran	ug/kg	ND	ND	ND	ND	ND	ND	-

DYNAMAC CORPORATION

TEST BORINGS - ONSITE

		S TBP29001	S TBP29004	S TBP29006	S TBS15001	S TBK01001	S TBS15004	S TBS15006
		880307	880307	880307	880225	880225	880225	880225
		BD3483	BD3484	BD3485	BD3471	BD3472	BD3473	BD3474
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND	-
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND	-
Anthracene	ug/kg	ND	ND	ND	ND	ND	ND	-
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	-
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	-
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	-
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND	ND	-
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	-
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND	ND	-
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND	ND	-
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND	ND	-
bis(2-Ethylhexyl)phthalate	ug/kg	ND	ND	ND	BMDL	BMDL	BMDL	-
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	-
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	-
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	-
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	-
Chrysene	ug/kg	ND	ND	ND	ND	ND	ND	-
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	-
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	-
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	-
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	-
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND	ND	-
Diethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	-
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	-
Di-n-butyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	-
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	-
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	-
Di-n-octyl phthalate	ug/kg	ND	ND	ND	ND	BMDL	BMDL	-
1,2-Diphenylhydrazine	ug/kg	-	-	-	-	-	-	-
Fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	-
Fluorene	ug/kg	ND	ND	ND	ND	ND	ND	-
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	-
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND	ND	-
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND	ND	-
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	-
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	-
Isophorone	ug/kg	ND	ND	ND	ND	ND	ND	-
Naphthalene	ug/kg	ND	ND	ND	ND	ND	ND	-
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND	ND	-
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND	ND	-
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND	ND	-
Phenanthrene	ug/kg	ND	ND	ND	ND	ND	ND	-
Pyrene	ug/kg	ND	ND	ND	ND	ND	ND	-
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	-
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	-
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	-
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	-
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND	ND	-
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	-
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND	ND	-
Dibenzofuran	ug/kg	ND	ND	ND	ND	ND	ND	-

FRO 001 1820

DYNAMAC CORPORATION

TEST BORINGS - ONSITE

		S TBB07D01	S TBB07D04	S TBB07D06	S TBK07D06	S TBG08D01	S TBG08D04	S TBG08D06
		880310	880310	880310	880310	880309	880309	880309
		BD3495	BD3496	BD3497	BD3475	BD3489	BD3490	BD3491
ACID COMPOUNDS								
2-Chlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzoic acid	ug/kg	ND	ND	ND	ND	ND	ND	ND
PESTICIDES AND AROCLORS								
Aldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Alpha-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Beta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Gamma-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Delta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlordane	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1016	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

TEST BORINGS - ONSITE

		S TB112D01	S TB112D04	S TB112D04	S TB112D06	S TBN40001	S TBK03001	S TBN40D06
		880308	880308	880308	880308	880301	880301	880301
		BD3486	BD3487	BE0812	BD3488	BD3480	BD3481	BD3482
ACID COMPOUNDS								
2-Chlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	-
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	-
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	ND	ND	-
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	ND	ND	-
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	-
2-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	-
4-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	-
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	ND	ND	-
Pentachlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	-
Phenol	ug/kg	ND	ND	ND	ND	ND	ND	-
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	-
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	-
2-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	-
4-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	-
Benzoic acid	ug/kg	ND	ND	ND	ND	ND	ND	-
PESTICIDES AND AROCLORS								
Aldrin	ug/kg	ND	ND	-	ND	ND	ND	-
Alpha-BHC	ug/kg	ND	ND	-	ND	ND	ND	-
Beta-BHC	ug/kg	ND	ND	-	ND	ND	ND	-
Gamma-BHC	ug/kg	ND	ND	-	ND	11	ND	-
Delta-BHC	ug/kg	ND	ND	-	ND	ND	ND	-
Chlordane	ug/kg	ND	ND	-	ND	ND	ND	-
4,4'-DDT	ug/kg	ND	ND	-	ND	IND	IND	-
4,4'-DDE	ug/kg	ND	ND	-	ND	ND	ND	-
4,4'-DDD	ug/kg	ND	ND	-	ND	IND	IND	-
Dieldrin	ug/kg	ND	ND	-	ND	ND	ND	-
Endosulfan I	ug/kg	ND	ND	-	ND	ND	ND	-
Endosulfan II	ug/kg	ND	ND	-	ND	IND	IND	-
Endosulfan sulfate	ug/kg	ND	ND	-	ND	ND	ND	-
Endrin	ug/kg	ND	ND	-	ND	ND	ND	-
Endrin aldehyde	ug/kg	ND	ND	-	ND	-	-	-
Heptachlor	ug/kg	ND	ND	-	ND	10	ND	-
Heptachlor epoxide	ug/kg	ND	ND	-	ND	ND	ND	-
Toxaphene	ug/kg	ND	ND	-	ND	ND	ND	-
Endrin ketone	ug/kg	ND	ND	-	ND	ND	ND	-
Methoxychlor	ug/kg	ND	ND	-	ND	ND	ND	-
Aroclor 1242	ug/kg	ND	ND	-	ND	ND	ND	-
Aroclor 1254	ug/kg	ND	ND	-	ND	ND	ND	-
Aroclor 1260	ug/kg	ND	ND	-	ND	ND	ND	-
Aroclor 1248	ug/kg	ND	ND	-	ND	ND	ND	-
Aroclor 1232	ug/kg	ND	ND	-	ND	ND	ND	-
Aroclor 1221	ug/kg	ND	ND	-	ND	ND	ND	-
Aroclor 1016	ug/kg	ND	ND	-	ND	ND	ND	-

DYNAMAC CORPORATION
TEST BORINGS - ONSITE

		S TBP29001 880307 BD3483	S TBP29004 880307 BD3484	S TBP29006 880307 BD3485	S TBS15001 880225 BD3471	S TBK01D01 880225 BD3472	S TBS15004 880225 BD3473	S TBS15006 880225 BD3474
ACID COMPOUNDS								
2-Chlorophenol	ug/kg	ND	ND	NQ	ND	ND	BMDL	-
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	-
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	ND	ND	-
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	ND	ND	-
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	-
2-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	-
4-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	-
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	ND	ND	-
Pentachlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	-
Phenol	ug/kg	ND	ND	ND	ND	ND	BMDL	-
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	-
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	-
2-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	-
4-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	-
Benzoic acid	ug/kg	ND	ND	ND	ND	ND	ND	-
PESTICIDES AND AROCLORS								
Aldrin	ug/kg	ND	ND	ND	ND	ND	ND	-
Alpha-BHC	ug/kg	ND	ND	ND	ND	ND	ND	-
Beta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	-
Gamma-BHC	ug/kg	ND	ND	ND	ND	ND	ND	-
Delta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	-
Chlordane	ug/kg	ND	ND	ND	ND	ND	ND	-
4,4'-DDT	ug/kg	ND	ND	ND	ND	ND	ND	-
4,4'-DDE	ug/kg	ND	ND	ND	ND	ND	ND	-
4,4'-DDD	ug/kg	ND	ND	ND	ND	ND	ND	-
Dieldrin	ug/kg	ND	ND	ND	ND	ND	ND	-
Endosulfan I	ug/kg	ND	ND	ND	ND	ND	ND	-
Endosulfan II	ug/kg	ND	ND	ND	ND	ND	ND	-
Endosulfan sulfate	ug/kg	ND	ND	ND	ND	ND	ND	-
Endrin	ug/kg	ND	ND	ND	ND	ND	ND	-
Endrin aldehyde	ug/kg	ND	ND	ND	ND	ND	ND	-
Heptachlor	ug/kg	ND	ND	ND	ND	ND	ND	-
Heptachlor epoxide	ug/kg	ND	ND	ND	ND	ND	ND	-
Toxaphene	ug/kg	ND	ND	ND	ND	ND	ND	-
Endrin ketone	ug/kg	ND	ND	ND	ND	ND	ND	-
Methoxychlor	ug/kg	ND	ND	ND	ND	ND	ND	-
Aroclor 1242	ug/kg	ND	ND	ND	ND	ND	ND	-
Aroclor 1254	ug/kg	ND	ND	ND	ND	ND	ND	-
Aroclor 1260	ug/kg	ND	ND	ND	ND	ND	ND	-
Aroclor 1248	ug/kg	ND	ND	ND	ND	ND	ND	-
Aroclor 1232	ug/kg	ND	ND	ND	ND	ND	ND	-
Aroclor 1221	ug/kg	ND	ND	ND	ND	ND	ND	-
Aroclor 1016	ug/kg	ND	ND	ND	ND	ND	ND	-

DYNAMAC CORPORATION
TEST BORINGS - ONSITE

		S TBB07D01 880310 BD3495	S TBB07D04 880310 BD3496	S TBB07D06 880310 BD3497	S TBK07D06 880310 BD3475	S TBG08D01 880309 BD3489	S TBG08D04 880309 BD3490	S TBG08D06 880309 BD3491
RCRA METALS								
Arsenic	ug/kg	2200	ND	ND	ND	BMDL	BMDL	ND
Barium	ug/kg	131000	402000	99900	109000	135000	90800	85400
Cadmium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chromium	ug/kg	7200	5700	4400	8900	7300	BMDL	3100
Lead	ug/kg	8500	2500	3500	2400	7500	2000	1500
Mercury	ug/kg	160	BMDL	BMDL	BMDL	140	BMDL	ND
Mercury, Inorganic	ug/kg	ND	ND	ND	ND	ND	ND	ND
Selenium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Silver	ug/kg	ND	BMDL	ND	ND	ND	ND	ND
OTHER METALS AND MISC								
Aluminum	ug/kg	23700000	15700000	6340000	15700000	15300000	22600000	5570000
Antimony	ug/kg	ND	ND	ND	ND	ND	ND	ND
Beryllium	ug/kg	280	240	160	310	190	ND	170
Calcium	ug/kg	3920000	2400000	1500000	2300000	6490000	3480000	1200000
Cobalt	ug/kg	BMDL	17000	BMDL	9100	8700	19000	BMDL
Copper	ug/kg	29000	25000	34000	37000	21000	21000	31000
Iron	ug/kg	26500000	28100000	9060000	18200000	24500000	33000000	14000000
Magnesium	ug/kg	3230000	5100000	2270000	2960000	3520000	13400000	1190000
Manganese	ug/kg	477000	2410000	147000	289000	673000	1370000	76600
Nickel	ug/kg	3100	2800	2600	3400	3000	2700	BMDL
Potassium	ug/kg	500000	190000	360000	500000	270000	170000	120000
Sodium	ug/kg	300000	440000	220000	280000	470000	830000	230000
Thallium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vanadium	ug/kg	74000	76000	54000	71000	68000	74000	69000
Zinc	ug/kg	55000	49000	34000	44000	48000	83000	19000
% Solid	ug/kg	87.5	85.9	77.4	79.1	89.6	86.4	85.0
Cyanide, Total	mg/kg	11.5	2.4	9.2	ND	ND	ND	ND

FRO 001 1824

DYNAMAC CORPORATION

TEST BORINGS - ONSITE

		S TBI12001	S TBI12004	S TBI12004	S TBI12006	S TBN40001	S TBK03001	S TBN40006
		880308	880308	880308	880308	880301	880301	880301
		BD3486	BD3487	BE0812	BD3488	BD3480	BD3481	BD3482
RCRA METALS								
Arsenic	ug/kg	BMDL	BMDL	-	ND	BMDL	2200	-
Barium	ug/kg	110000	95300	-	74100	132000	128000	-
Cadmium	ug/kg	BMDL	BMDL	-	ND	ND	ND	-
Chromium	ug/kg	3900	2900	-	5400	4000	6800	-
Lead	ug/kg	2000	1200	-	ND	31000	16000	-
Mercury	ug/kg	ND	ND	-	BMDL	140	120	BMDL
Mercury, Inorganic	ug/kg	ND	ND	-	ND	87	BMDL	ND
Selenium	ug/kg	ND	ND	-	ND	ND	ND	-
Silver	ug/kg	ND	ND	-	ND	ND	ND	-
OTHER METALS AND MISC								
Aluminum	ug/kg	16000000	14600000	-	9600000	9130000	11100000	-
Antimony	ug/kg	ND	ND	-	ND	ND	ND	-
Beryllium	ug/kg	210	160	-	160	200	160	-
Calcium	ug/kg	4930000	1700000	-	1400000	9010000	5510000	-
Cobalt	ug/kg	13000	13000	-	BMDL	BMDL	11000	-
Copper	ug/kg	20000	13000	-	30000	18000	18000	-
Iron	ug/kg	26000000	22900000	-	10100000	17000000	19300000	-
Magnesium	ug/kg	9940000	9430000	-	1480000	4100000	4100000	-
Manganese	ug/kg	1120000	863000	-	74700	568000	564000	-
Nickel	ug/kg	BMDL	3800	-	BMDL	2100	BMDL	-
Potassium	ug/kg	180000	90000	-	330000	260000	280000	-
Sodium	ug/kg	1200000	1500000	-	310000	120000	110000	-
Thallium	ug/kg	ND	ND	-	ND	ND	ND	-
Vanadium	ug/kg	60000	53000	-	46000	51000	57000	-
Zinc	ug/kg	84000	64000	-	24000	50000	55000	-
% Solid	ug/kg	89.1	86.8	-	83.4	82.4	82.0	81.9
Cyanide, Total	mg/kg	ND	ND	-	ND	ND	ND	-

FRO 001 1825

DYNAMAC CORPORATION
TEST BORINGS - ONSITE

		S TBP29001	S TBP29004	S TBP29006	S TBS15001	S TBK01D01	S TBS15004	S TBS15006
		880307	880307	880307	880225	880225	880225	880225
		BD3483	BD3484	BD3485	BD3471	BD3472	BD3473	BD3474
RCRA METALS								
Arsenic	ug/kg	2000	ND	BMDL	2000	2300	BMDL	-
Barium	ug/kg	140000	88600	176000	149000	182000	180000	-
Cadmium	ug/kg	BMDL	BMDL	ND	ND	BMDL	ND	-
Chromium	ug/kg	5600	8100	4600	7100	8900	9600	-
Lead	ug/kg	5200	2200	2400	28000	28000	4700	-
Mercury	ug/kg	80	88	BMDL	100	94	ND	-
Mercury, Inorganic	ug/kg	ND	ND	ND	110	BMDL	ND	-
Selenium	ug/kg	BMDL	ND	ND	ND	ND	ND	-
Silver	ug/kg	ND	ND	ND	ND	ND	ND	-
OTHER METALS AND MISC								
Aluminum	ug/kg	9320000	18900000	9320000	15400000	21600000	25800000	-
Antimony	ug/kg	ND	ND	ND	ND	ND	ND	-
Beryllium	ug/kg	200	230	210	200	270	400	-
Calcium	ug/kg	2960000	2200000	1900000	2790000	3030000	3010000	-
Cobalt	ug/kg	BMDL	14000	7700	7800	11000	8500	-
Copper	ug/kg	18000	16000	26000	20000	25000	39000	-
Iron	ug/kg	17600000	29700000	19400000	23700000	33500000	27400000	-
Magnesium	ug/kg	1590000	9130000	1660000	2610000	2180000	3000000	-
Manganese	ug/kg	458000	1060000	354000	537000	930000	316000	-
Nickel	ug/kg	BMDL	3200	BMDL	3500	2700	3100	-
Potassium	ug/kg	220000	150000	120000	340000	410000	310000	-
Sodium	ug/kg	200000	1100000	210000	310000	370000	690000	-
Thallium	ug/kg	ND	ND	ND	ND	ND	ND	-
Vanadium	ug/kg	53000	65000	78000	62000	89000	80000	-
Zinc	ug/kg	30000	62000	23000	59000	60000	57000	-
% Solid	ug/kg	80.1	86.3	83.8	73.0	72.3	73.1	-
Cyanide, Total	mg/kg	ND	ND	ND	ND	ND	ND	-

DYNAMAC CORPORATION

TEST BORINGS - BACKGROUND

		S TBBG2D01	S TBBG2D04	S TBBG2D06	S TBBG4D01	S TBBG4D04	S TBBG4D06
		880222	880222	880222	880224	880224	880224
		BD3477	BD3478	BD3479	BD3492	BD3493	BD3494
ACID COMPOUNDS							
2-Chlorophenol	ug/kg	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND
Benzoic acid	ug/kg	ND	ND	ND	ND	ND	ND
PESTICIDES AND AROCLORS							
Aldrin	ug/kg	ND	ND	ND	ND	ND	ND
Alpha-BHC	ug/kg	ND	ND	ND	ND	ND	ND
Beta-BHC	ug/kg	ND	ND	ND	ND	ND	ND
Gamma-BHC	ug/kg	ND	ND	ND	ND	ND	ND
Delta-BHC	ug/kg	ND	ND	ND	ND	ND	ND
Chlordane	ug/kg	ND	ND	ND	ND	ND	ND
4,4'-DDT	ug/kg	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/kg	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/kg	ND	ND	ND	ND	ND	ND
Dieldrin	ug/kg	ND	ND	ND	ND	ND	ND
Endosulfan I	ug/kg	ND	ND	ND	ND	ND	ND
Endosulfan II	ug/kg	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	ND	ND	ND	ND	ND	ND
Endrin	ug/kg	ND	ND	ND	ND	ND	ND
Heptachlor	ug/kg	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	ND	ND	ND	ND	ND	ND
Toxaphene	ug/kg	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/kg	ND	ND	ND	ND	ND	ND
Aroclor 1242	ug/kg	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	ND	ND	ND	ND	ND	ND
Aroclor 1016	ug/kg	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

TEST BORINGS - BACKGROUND

		S TBBG2D01	S TBBG2D04	S TBBG2D06	S TBBG4D01	S TBBG4D04	S TBBG4D06
		880222	880222	880222	880224	880224	880224
		803477	803478	803479	803492	803493	803494
VOLATILE COMPOUNDS							
Benzene	ug/kg	ND	ND	ND	ND	ND	ND
Bromoform	ug/kg	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	ug/kg	ND	ND	ND	ND	ND	ND
Chloroethane	ug/kg	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	ND	ND	ND	ND	ND	ND
Chloroform	ug/kg	BMDL	BMDL	BMDL	ND	BMDL	ND
Dichlorobromomethane	ug/kg	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	ND	ND	ND	ND	ND	ND
Methyl bromide	ug/kg	ND	ND	ND	ND	ND	ND
Methyl chloride	ug/kg	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	11.8	28.0	12.2	10.5	8.77	23.9
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	ND	ND	ND	ND	ND
Toluene	ug/kg	BMDL	6.18	BMDL	5.41	BMDL	ND
1,2-Trans-dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND
Trichloroethylene	ug/kg	ND	8.19	ND	ND	ND	ND
Vinyl chloride	ug/kg	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	ND	ND	ND	ND	ND	ND
Acetone	ug/kg	37.2	235	56.4	42.4	40.0	212
Carbon disulfide	ug/kg	ND	ND	ND	ND	ND	ND
Methyl ethyl ketone	ug/kg	23.5	89.7	18.1	18.5	22.0	ND
Methyl-iso-butyl ketone	ug/kg	ND	ND	ND	ND	ND	ND
Styrene	ug/kg	ND	ND	ND	ND	ND	ND
Vinyl acetate	ug/kg	ND	ND	ND	ND	ND	ND
m-Xylene	ug/kg	ND	ND	ND	ND	ND	ND
o+p-Xylenes	ug/kg	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
TEST BORINGS - BACKGROUND

		S TBBG2D01	S TBBG2D04	S TBBG2D06	S TBBG4D01	S TBBG4D04	S TBBG4D06
		880222	880222	880222	880224	880224	880224
		BD3477	BD3478	BD3479	BD3492	BD3493	BD3494
BASE NEUTRAL COMPOUNDS							
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	ND	BMDL	BMDL	83.9	ND	BMDL
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND
Fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND
Fluorene	ug/kg	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND	ND
Isophorone	ug/kg	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	ND	ND	ND	ND	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND	ND	ND	ND
Pyrene	ug/kg	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	ND	ND	ND	ND

FRO 001 1829

DYNAMAC CORPORATION

TEST BORINGS - BACKGROUND

		S TBBG2D01	S TBBG2D04	S TBBG2D06	S TBBG4D01	S TBBG4D04	S TBBG4D06
		880222	880222	880222	880224	880224	880224
		BD3477	BD3478	BD3479	BD3492	BD3493	BD3494
RCRA METALS							
Arsenic	ug/kg	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL
Barium	ug/kg	114000	82200	67100	187000	161000	173000
Cadmium	ug/kg	ND	ND	ND	ND	ND	ND
Chromium	ug/kg	12000	6500	9200	7300	8700	11000
Lead	ug/kg	10000	2500	2600	6100	3500	1700
Mercury	ug/kg	BMDL	BMDL	ND	BMDL	ND	ND
Mercury, Inorganic	ug/kg	BMDL	ND	ND	ND	ND	ND
Selenium	ug/kg	ND	ND	ND	ND	ND	ND
Silver	ug/kg	ND	ND	ND	ND	ND	ND
OTHER METALS AND MISC							
% Solid	ug/kg	79.4	71.3	82.6	83.6	84.0	86.6
Cyanide, Total	mg/kg	ND	ND	ND	ND	ND	ND
Aluminum	ug/kg	18500000	14400000	23900000	23600000	19500000	21700000
Antimony	ug/kg	ND	ND	ND	ND	ND	ND
Beryllium	ug/kg	350	240	430	280	280	340
Calcium	ug/kg	2160000	1690000	2390000	4630000	2580000	2570000
Cobalt	ug/kg	50000	15000	15000	16000	15000	7900
Copper	ug/kg	30000	18000	33000	33000	29000	30000
Iron	ug/kg	43700000	33500000	50600000	39800000	41100000	41800000
Magnesium	ug/kg	3150000	2350000	3930000	6990000	7680000	7810000
Manganese	ug/kg	1630000	512000	853000	1090000	1130000	603000
Nickel	ug/kg	7000	1900	4200	4100	3800	4400
Potassium	ug/kg	500000	190000	390000	750000	300000	280000
Sodium	ug/kg	160000	160000	240000	150000	160000	270000
Thallium	ug/kg	ND	ND	ND	ND	ND	ND
Vanadium	ug/kg	110000	97000	130000	100000	100000	96000
Zinc	ug/kg	64000	49000	86000	70000	60000	72000

3: Surface Water

DYNAMAC CORPORATION

SURFACE WATER SAMPLES

		R SW01	R SW02	R SW03	R SW04	R SW05	R SW06	X FB01
		880412	880412	880412	880412	880413	880413	880413
		BD7647	BD7648	BD7643	BD7644	BD7649	BD7650	BD7665
VOLATILE COMPOUNDS								
Benzene	ug/l	ND	ND	ND	ND	BMDL	BMDL	ND
Bromoform	ug/l	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/l	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/l	ND	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	ug/l	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/l	ND	ND	ND	ND	ND	ND	ND
Chloroform	ug/l	ND	ND	ND	ND	ND	ND	6.93
Dichlorobromomethane	ug/l	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/l	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/l	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ug/l	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/l	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/l	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/l	ND	ND	ND	ND	ND	ND	ND
Methyl bromide	ug/l	ND	ND	ND	ND	ND	ND	ND
Methyl chloride	ug/l	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/l	BMDL	14.6	ND	4.31	ND	ND	18.7
1,1,2,2-Tetrachloroethane	ug/l	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ug/l	ND	ND	ND	ND	ND	ND	ND
Toluene	ug/l	ND	ND	ND	ND	ND	BMDL	ND
1,2-Trans-dichloroethylene	ug/l	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/l	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/l	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ug/l	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/l	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/l	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/l	ND	ND	ND	ND	ND	ND	ND
Acetone	ug/l	ND	ND	8.74	ND	11.7	24.0	27.8
Carbon disulfide	ug/l	ND	ND	ND	ND	BMDL	BMDL	ND
Methyl ethyl ketone	ug/l	ND	ND	ND	ND	ND	ND	ND
Methyl-iso-butyl ketone	ug/l	ND	ND	ND	ND	ND	ND	ND
Styrene	ug/l	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	ug/l	ND	ND	ND	ND	ND	ND	ND
m-Xylene	ug/l	ND	ND	ND	ND	ND	ND	ND
o+p-Xylenes	ug/l	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
SURFACE WATER SAMPLES

		R SW07	R SW08	R SW09	R SW10	R SW11	R SW12	X FB02
		880413	880413	880413	880413	880414	880414	880414
		BD7645	BD7651	BD7652	BD7646	BD7653	BD7654	BD7666
VOLATILE COMPOUNDS								
Benzene	ug/l	BMDL	BMDL	BMDL	ND	ND	ND	ND
Bromoform	ug/l	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/l	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/l	ND	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	ug/l	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/l	ND	ND	ND	ND	ND	ND	ND
Chloroform	ug/l	ND	ND	BMDL	BMDL	ND	ND	ND
Dichlorobromomethane	ug/l	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/l	ND	ND	ND	BMDL	17.4	ND	ND
1,2-Dichloroethane	ug/l	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ug/l	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/l	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/l	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/l	BMDL	BMDL	BMDL	6.91	48.0	BMDL	ND
Methyl bromide	ug/l	ND	ND	ND	ND	ND	ND	ND
Methyl chloride	ug/l	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/l	ND	ND	ND	BMDL	60.0	1890	ND
1,1,2,2-Tetrachloroethane	ug/l	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ug/l	ND	ND	ND	ND	ND	ND	ND
Toluene	ug/l	BMDL	13.3	19.5	7.78	15.9	ND	ND
1,2-Trans-dichloroethylene	ug/l	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/l	ND	ND	ND	ND	BMDL	ND	ND
1,1,2-Trichloroethane	ug/l	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ug/l	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/l	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/l	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/l	ND	ND	ND	ND	ND	ND	ND
Acetone	ug/l	18.0	83.4	189	76.0	825	2870	ND
Carbon disulfide	ug/l	ND	BMDL	BMDL	4.33	BMDL	ND	ND
Methyl ethyl ketone	ug/l	6.88	ND	11.7	20.2	ND	ND	5.96
Methyl-iso-butyl ketone	ug/l	4.26	22.0	23.9	220	1590	4650	ND
Styrene	ug/l	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	ug/l	ND	ND	ND	ND	ND	ND	ND
m-Xylene	ug/l	BMDL	BMDL	5.20	21.2	185	BMDL	ND
o+p-Xylenes	ug/l	BMDL	BMDL	BMDL	11.3	98.2	BMDL	ND

FRO 001 1833

DYNAMAC CORPORATION

SURFACE WATER SAMPLES

		R SW13	R SW14	R SW1J	R SW16	R SW17	R SW17	R SW18
		880414	880414	880414	880414	880414	880414	880414
		BD7655	BD7656	BD7657	BD7658	BD7659	BE6202	BD7660
VOLATILE COMPOUNDS								
Benzene	ug/l	ND	ND	ND	ND	ND	-	ND
Bromoform	ug/l	ND	ND	ND	ND	ND	-	ND
Carbon tetrachloride	ug/l	ND	ND	ND	ND	ND	-	ND
Chlorobenzene	ug/l	ND	ND	ND	ND	ND	-	ND
Chlorodibromomethane	ug/l	ND	ND	ND	ND	ND	-	ND
Chloroethane	ug/l	ND	ND	ND	ND	ND	-	ND
Chloroform	ug/l	ND	ND	ND	ND	ND	-	ND
Dichlorobromomethane	ug/l	ND	ND	ND	ND	ND	-	ND
1,1-Dichloroethane	ug/l	ND	ND	ND	ND	ND	-	ND
1,2-Dichloroethane	ug/l	ND	ND	ND	ND	ND	-	ND
1,1-Dichloroethylene	ug/l	ND	ND	ND	ND	ND	-	ND
1,2-Dichloropropane	ug/l	ND	ND	ND	ND	ND	-	ND
cis-1,3-Dichloropropylene	ug/l	ND	ND	ND	ND	ND	-	ND
Ethylbenzene	ug/l	ND	ND	ND	ND	ND	-	ND
Methyl bromide	ug/l	ND	ND	ND	ND	ND	-	ND
Methyl chloride	ug/l	ND	ND	ND	ND	ND	-	ND
Methylene chloride	ug/l	ND	ND	ND	ND	19.5	-	BMDL
1,1,2,2-Tetrachloroethane	ug/l	ND	ND	ND	ND	ND	-	ND
Tetrachloroethylene	ug/l	ND	ND	ND	ND	ND	-	ND
Toluene	ug/l	ND	ND	ND	ND	ND	-	BMDL
1,2-Trans-dichloroethylene	ug/l	ND	ND	ND	ND	ND	-	ND
1,1,1-Trichloroethane	ug/l	ND	ND	ND	ND	ND	-	ND
1,1,2-Trichloroethane	ug/l	ND	ND	ND	ND	ND	-	ND
Trichloroethylene	ug/l	ND	ND	ND	ND	ND	-	ND
Vinyl chloride	ug/l	ND	ND	ND	ND	ND	-	ND
trans-1,3-Dichloropropylene	ug/l	ND	ND	ND	ND	ND	-	ND
2-Hexanone	ug/l	ND	ND	ND	ND	ND	-	ND
Acetone	ug/l	34.8	262	348	205	130	-	184
Carbon disulfide	ug/l	ND	ND	ND	ND	ND	-	ND
Methyl ethyl ketone	ug/l	ND	ND	ND	ND	21.4	-	5.89
Methyl-iso-butyl ketone	ug/l	ND	ND	ND	ND	ND	-	ND
Styrene	ug/l	ND	ND	ND	ND	ND	-	ND
Vinyl acetate	ug/l	ND	ND	ND	ND	ND	-	ND
m-Xylene	ug/l	ND	ND	ND	ND	ND	-	ND
o+p-Xylenes	ug/l	ND	ND	ND	ND	ND	-	ND

DYNAMAC CORPORATION
SURFACE WATER SAMPLES

		R SW19	R SW20	SWTD01	SWFALLS01	X PW1	X PW2
		880414	880414	880525	880525	880414	880414
		BD7661	BD7662	BE4768	BE4769	BD7663	BD7664
VOLATILE COMPOUNDS							
Benzene	ug/l	ND	ND	ND	BMDL	ND	ND
Bromoform	ug/l	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/l	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/l	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	ug/l	ND	ND	ND	ND	ND	ND
Chloroethane	ug/l	ND	ND	ND	ND	ND	ND
Chloroform	ug/l	ND	ND	ND	ND	67.9	69.6
Dichlorobromomethane	ug/l	ND	ND	ND	ND	12.9	15.4
1,1-Dichloroethane	ug/l	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/l	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ug/l	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/l	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/l	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/l	ND	ND	ND	ND	ND	ND
Methyl bromide	ug/l	ND	ND	ND	ND	ND	ND
Methyl chloride	ug/l	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/l	ND	BMDL	BMDL	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/l	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ug/l	ND	ND	ND	ND	ND	ND
Toluene	ug/l	BMDL	BMDL	5.64	19.2	ND	ND
1,2-Trans-dichloroethylene	ug/l	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/l	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/l	ND	ND	ND	ND	ND	ND
Trichloroethylene	ug/l	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/l	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/l	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/l	ND	ND	ND	ND	ND	ND
Acetone	ug/l	87.2	ND	41.4	ND	ND	ND
Carbon disulfide	ug/l	ND	ND	ND	ND	ND	ND
Methyl ethyl ketone	ug/l	4.68	ND	ND	ND	ND	ND
Methyl-iso-butyl ketone	ug/l	ND	ND	ND	ND	ND	ND
Styrene	ug/l	ND	ND	ND	ND	ND	ND
Vinyl acetate	ug/l	ND	ND	ND	ND	ND	ND
m-Xylene	ug/l	ND	ND	ND	ND	ND	ND
o+p-Xylenes	ug/l	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
SURFACE WATER SAMPLES

		R SW01	R SW02	R SW03	R SW04	R SW05	R SW06	X FB01
		880412	880412	880412	880412	880413	880413	880413
		BD7647	BD7648	BD7643	BD7644	BD7649	BD7650	BD7665
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/l	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/l	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/l	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/l	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/l	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/l	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/l	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/l	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/l	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/l	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/l	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/l	ND	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether	ug/l	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/l	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/l	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/l	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/l	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/l	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/l	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/l	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/l	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/l	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/l	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/l	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/l	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/l	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/l	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/l	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL
1,2-Diphenylhydrazine	ug/l	-	-	-	-	-	-	-
Fluoranthene	ug/l	ND	ND	ND	ND	ND	ND	ND
Fluorene	ug/l	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/l	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/l	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/l	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/l	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/l	ND	ND	ND	ND	ND	ND	ND
Isophorone	ug/l	ND	ND	ND	ND	BMDL	BMDL	ND
Naphthalene	ug/l	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene	ug/l	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/l	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/l	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/l	ND	ND	ND	ND	ND	ND	ND
Pyrene	ug/l	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/l	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/l	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/l	ND	-	ND	ND	ND	ND	ND
3-Nitroaniline	ug/l	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/l	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/l	ND	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/l	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/l	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

SURFACE WATER SAMPLES

		R SW07	R SW08	R SW09	R SW10	R SW11	R SW12	X FB02
		880413	880413	880413	880413	880414	880414	880414
		BD7645	BD7651	BD7652	BD7646	BD7653	BD7654	BD7666
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/l	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/l	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/l	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/l	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/l	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/l	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/l	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/l	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/l	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/l	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/l	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/l	ND	ND	ND	ND	3.20	ND	ND
4-Bromophenyl phenyl ether	ug/l	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/l	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/l	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/l	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/l	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/l	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/l	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/l	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/l	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/l	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/l	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/l	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/l	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/l	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/l	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/l	BMDL	BMDL	ND	ND	5.14	ND	ND
1,2-Diphenylhydrazine	ug/l	-	-	-	-	-	-	-
Fluoranthene	ug/l	ND	ND	ND	ND	ND	ND	ND
Fluorene	ug/l	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/l	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/l	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/l	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/l	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/l	ND	ND	ND	ND	ND	ND	ND
Isophorone	ug/l	BMDL	BMDL	12.9	ND	4.61	4.26	ND
Naphthalene	ug/l	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene	ug/l	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/l	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/l	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/l	ND	ND	ND	ND	ND	ND	ND
Pyrene	ug/l	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/l	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/l	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/l	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/l	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/l	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/l	ND	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/l	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/l	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

SURFACE WATER SAMPLES

		R SW13	R SW14	R SW1J	R SW16	R SW17	R SW17	R SW18
		880414	880414	880414	880414	880414	880414	880414
		BD7655	BD7656	BD7657	BD7658	BD7659	BE6202	BD7660
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/l	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/l	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/l	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/l	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/l	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/l	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/l	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/l	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/l	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/l	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/l	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/l	ND	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether	ug/l	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/l	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/l	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/l	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/l	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/l	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/l	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/l	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/l	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/l	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/l	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/l	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/l	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/l	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/l	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/l	ND	ND	ND	ND	ND	ND	ND
1,2-Diphenylhydrazine	ug/l	-	-	-	-	-	ND	-
Fluoranthene	ug/l	ND	ND	ND	ND	ND	ND	ND
Fluorene	ug/l	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/l	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/l	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/l	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/l	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/l	ND	ND	ND	ND	ND	ND	ND
Isophorone	ug/l	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/l	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene	ug/l	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/l	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/l	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/l	ND	ND	ND	ND	ND	ND	ND
Pyrene	ug/l	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/l	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/l	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/l	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/l	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/l	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/l	ND	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/l	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/l	ND	ND	ND	ND	ND	ND	ND

U01 1838

DYNAMAC CORPORATION

SURFACE WATER SAMPLES

		R SW19	R SW20	SWTD01	SWFALLS01	X PW1	X PW2
		880414	880414	880525	880525	880414	880414
		BD7661	BD7662	BE4768	BE4769	BD7663	BD7664
BASE NEUTRAL COMPOUNDS							
Acenaphthene	ug/l	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/l	ND	ND	ND	ND	ND	ND
Anthracene	ug/l	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/l	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/l	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/l	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/l	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/l	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/l	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/l	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/l	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/l	2.42	ND	ND	BMDL	ND	ND
4-Bromophenyl phenyl ether	ug/l	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/l	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/l	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/l	ND	ND	ND	ND	ND	ND
Chrysene	ug/l	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/l	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/l	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/l	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/l	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/l	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/l	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/l	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/l	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/l	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/l	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/l	ND	ND	ND	ND	ND	ND
1,2-Diphenylhydrazine	ug/l	-	-	-	-	-	-
Fluoranthene	ug/l	ND	ND	ND	ND	ND	ND
Fluorene	ug/l	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/l	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/l	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/l	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/l	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/l	ND	ND	ND	ND	ND	ND
Isophorone	ug/l	ND	ND	ND	BMDL	ND	ND
Naphthalene	ug/l	ND	ND	ND	ND	ND	ND
Nitrobenzene	ug/l	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/l	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/l	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/l	ND	ND	ND	ND	ND	ND
Pyrene	ug/l	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/l	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/l	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/l	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/l	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/l	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/l	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/l	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/l	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

SURFACE WATER SAMPLES

		R SW01	R SW02	R SW03	R SW04	R SW05	R SW06	X FB01
		880412	880412	880412	880412	880413	880413	880413
		BD7647	BD7648	BD7643	BD7644	BD7649	BD7650	BD7665
ACID COMPOUNDS								
2-Chlorophenol	ug/l	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/l	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/l	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/l	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/l	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/l	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/l	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/l	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/l	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/l	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/l	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/l	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/l	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	ug/l	ND	ND	ND	ND	ND	ND	ND
Benzoic acid	ug/l	ND	ND	ND	ND	ND	ND	ND
PESTICIDES AND AROCLORS								
Aldrin	ug/l	ND	ND	ND	ND	ND	ND	ND
Alpha-BHC	ug/l	ND	ND	ND	ND	ND	ND	ND
Beta-BHC	ug/l	ND	ND	ND	ND	ND	ND	ND
Gamma-BHC	ug/l	ND	ND	ND	ND	ND	ND	ND
Delta-BHC	ug/l	ND	ND	ND	ND	ND	ND	ND
Chlordane	ug/l	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	ug/l	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/l	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/l	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ug/l	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	ug/l	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	ug/l	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/l	ND	ND	ND	ND	ND	ND	ND
Endrin	ug/l	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/l	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/l	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ug/l	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/l	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/l	ND	ND	ND	ND	ND	ND	ND
alpha-Chlordane	ug/l	-	-	-	-	-	-	-
gamma-Chlordane	ug/l	-	-	-	-	-	-	-
Aroclor 1242	ug/l	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/l	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/l	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/l	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/l	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/l	ND	ND	ND	ND	ND	ND	ND
Aroclor 1016	ug/l	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

SURFACE WATER SAMPLES

		R SW07	R SW08	R SW09	R SW10	R SW11	R SW12	X FB02
		880413	880413	880413	880413	880414	880414	880414
		BD7645	BD7651	BD7652	BD7646	BD7653	BD7654	BD7666
ACID COMPOUNDS								
2-Chlorophenol	ug/l	ND	NC	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/l	ND	NC	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/l	ND	NC	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/l	ND	NC	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/l	ND	NC	ND	ND	ND	ND	ND
2-Nitrophenol	ug/l	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/l	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/l	ND	NC	ND	ND	ND	ND	ND
Pentachlorophenol	ug/l	ND	NC	ND	ND	ND	ND	ND
Phenol	ug/l	ND	ND	ND	BMDL	ND	ND	ND
2,4,6-Trichlorophenol	ug/l	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/l	ND	NC	ND	ND	ND	ND	ND
2-Methylphenol	ug/l	ND	NC	ND	BMDL	ND	ND	ND
4-Methylphenol	ug/l	ND	NC	ND	ND	BMDL	ND	ND
Benzoic acid	ug/l	ND	NC	ND	BMDL	ND	ND	ND

		R SW07	R SW08	R SW09	R SW10	R SW11	R SW12	X FB02
PESTICIDES AND AROCLORS								
Aldrin	ug/l	ND	NC	ND	ND	ND	ND	ND
Alpha-BHC	ug/l	ND	NC	ND	ND	ND	ND	ND
Beta-BHC	ug/l	ND	NC	ND	ND	ND	ND	ND
Gamma-BHC	ug/l	ND	NC	ND	ND	ND	ND	ND
Delta-BHC	ug/l	ND	ND	ND	ND	ND	ND	ND
Chlordane	ug/l	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	ug/l	ND	NC	ND	ND	ND	ND	ND
4,4'-DDE	ug/l	ND	NC	ND	ND	ND	ND	ND
4,4'-DDD	ug/l	ND	NC	ND	ND	ND	ND	ND
Dieldrin	ug/l	ND	NC	ND	ND	ND	ND	ND
Endosulfan I	ug/l	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	ug/l	ND	NC	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/l	ND	NC	ND	ND	ND	ND	ND
Endrin	ug/l	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/l	ND	NC	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/l	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ug/l	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/l	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/l	ND	ND	ND	ND	ND	ND	ND
alpha-Chlordane	ug/l	-	-	-	-	-	-	-
gamma-Chlordane	ug/l	-	-	-	-	-	-	-
Aroclor 1242	ug/l	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/l	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/l	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/l	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/l	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/l	ND	ND	ND	ND	ND	ND	ND
Aroclor 1016	ug/l	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
SURFACE WATER SAMPLES

		R SW13	R SW14	R SW1J	R SW16	R SW17	R SW17	R SW18
		880414	880414	880414	880414	880414	880414	880414
		B07655	B07656	B07657	B07658	B07659	BE6202	B07660
ACID COMPOUNDS								
2-Chlorophenol	ug/l	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/l	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/l	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/l	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/l	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/l	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/l	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/l	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/l	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/l	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/l	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/l	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/l	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	ug/l	ND	ND	ND	ND	ND	ND	ND
Benzoic acid	ug/l	ND	ND	ND	ND	ND	ND	ND
PESTICIDES AND AROCLORS								
Aldrin	ug/l	ND	ND	ND	ND	ND	-	ND
Alpha-BHC	ug/l	ND	ND	ND	ND	ND	-	ND
Beta-BHC	ug/l	ND	ND	ND	ND	ND	-	ND
Gamma-BHC	ug/l	ND	ND	ND	ND	ND	-	ND
Delta-BHC	ug/l	ND	ND	ND	ND	ND	-	ND
Chlordane	ug/l	ND	ND	ND	ND	ND	-	ND
4,4'-DDT	ug/l	ND	ND	ND	ND	ND	-	ND
4,4'-DDE	ug/l	ND	ND	ND	ND	ND	-	ND
4,4'-DDD	ug/l	ND	ND	ND	ND	ND	-	ND
Dieldrin	ug/l	ND	ND	ND	ND	ND	-	ND
Endosulfan I	ug/l	ND	ND	ND	ND	ND	-	ND
Endosulfan II	ug/l	ND	ND	ND	ND	ND	-	ND
Endosulfan sulfate	ug/l	ND	ND	ND	ND	ND	-	ND
Endrin	ug/l	ND	ND	ND	ND	ND	-	ND
Heptachlor	ug/l	ND	ND	ND	ND	ND	-	ND
Heptachlor epoxide	ug/l	ND	ND	ND	ND	ND	-	ND
Toxaphene	ug/l	ND	ND	ND	ND	ND	-	ND
Endrin ketone	ug/l	ND	ND	ND	ND	ND	-	ND
Methoxychlor	ug/l	ND	ND	ND	ND	ND	-	ND
alpha-Chlordane	ug/l	-	-	-	-	-	-	-
gamma-Chlordane	ug/l	-	-	-	-	-	-	-
Aroclor 1242	ug/l	ND	ND	ND	ND	ND	-	ND
Aroclor 1254	ug/l	ND	ND	ND	ND	ND	-	ND
Aroclor 1260	ug/l	ND	ND	ND	ND	ND	-	ND
Aroclor 1248	ug/l	ND	ND	ND	ND	ND	-	ND
Aroclor 1232	ug/l	ND	ND	ND	ND	ND	-	ND
Aroclor 1221	ug/l	ND	ND	ND	ND	ND	-	ND
Aroclor 1016	ug/l	ND	ND	ND	ND	ND	-	ND

DYNAMAC CORPORATION
SURFACE WATER SAMPLES

		R SW19	R SW20	SWTD01	SWFALLS01	X PW1	X PW2
		880414	880414	880525	880525	880414	880414
		BD7661	BD7662	BE4768	BE4769	BD7563	BD7664
ACID COMPOUNDS							
2-Chlorophenol	ug/l	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/l	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/l	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/l	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/l	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/l	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/l	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/l	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/l	ND	ND	ND	ND	ND	ND
Phenol	ug/l	ND	ND	ND	BMDL	ND	ND
2,4,6-Trichlorophenol	ug/l	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/l	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/l	ND	ND	ND	ND	ND	ND
4-Methylphenol	ug/l	ND	ND	ND	ND	ND	ND
Benzoic acid	ug/l	ND	ND	ND	66.0	ND	ND
PESTICIDES AND AROCLORS							
Aldrin	ug/l	ND	ND	ND	ND	ND	ND
Alpha-BHC	ug/l	ND	ND	ND	ND	ND	ND
Beta-BHC	ug/l	ND	ND	ND	ND	ND	ND
Gamma-BHC	ug/l	ND	ND	ND	ND	ND	ND
Delta-BHC	ug/l	ND	ND	ND	ND	ND	ND
Chlordane	ug/l	ND	ND	-	-	ND	ND
4,4'-DDT	ug/l	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/l	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/l	ND	ND	ND	ND	ND	ND
Dieldrin	ug/l	ND	ND	ND	ND	ND	ND
Endosulfan I	ug/l	ND	ND	ND	ND	ND	ND
Endosulfan II	ug/l	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/l	ND	ND	ND	ND	ND	ND
Endrin	ug/l	ND	ND	ND	ND	ND	ND
Heptachlor	ug/l	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/l	ND	ND	ND	ND	ND	ND
Toxaphene	ug/l	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/l	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/l	ND	ND	ND	ND	ND	ND
alpha-Chlordane	ug/l	-	-	ND	ND	-	-
gamma-Chlordane	ug/l	-	-	ND	ND	-	-
Aroclor 1242	ug/l	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/l	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/l	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/l	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/l	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/l	ND	ND	ND	ND	ND	ND
Aroclor 1016	ug/l	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
SURFACE WATER SAMPLES

		R SW01	R SW02	R SW03	R SW04	R SW05	R SW06	X FB01
		880412	880412	880412	880412	880413	880413	880413
		BD7647	BD7648	BD7643	BD7644	BD7649	BD7650	BD7665
RCRA METALS								
Arsenic	ug/l	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL	ND
Barium	ug/l	120	120	145	136	110	100	ND
Cadmium	ug/l	ND	ND	ND	ND	ND	ND	ND
Chromium	ug/l	ND	ND	ND	ND	ND	BMDL	ND
Lead	ug/l	ND	ND	ND	ND	BMDL	ND	ND
Mercury	ug/l	ND	ND	ND	ND	ND	ND	ND
Mercury, Inorganic	ug/l	ND	ND	ND	ND	ND	ND	ND
Selenium	ug/l	ND	ND	ND	ND	ND	ND	ND
Silver	ug/l	ND	ND	ND	ND	ND	ND	ND
OTHER METALS AND MISC								
Aluminum	ug/l	150	150	290	100	48	53	BMDL
Antimony	ug/l	BMDL	BMDL	BMDL	BMDL	ND	ND	ND
Beryllium	ug/l	ND	ND	ND	ND	ND	ND	ND
Boron	ug/l	-	-	-	-	-	-	-
Calcium	ug/l	40300	39300	11000	42700	41500	41100	BMDL
Cobalt	ug/l	BMDL	ND	ND	ND	ND	ND	ND
Copper	ug/l	BMDL	BMDL	BMDL	ND	ND	BMDL	ND
Iron	ug/l	270	270	400	670	210	230	ND
Magnesium	ug/l	167000	170000	89100	136000	12900	12700	BMDL
Manganese	ug/l	230	280	360	660	630	630	ND
Nickel	ug/l	ND	ND	ND	ND	ND	ND	ND
Potassium	ug/l	47800	47600	25900	38700	23600	23800	BMDL
Sodium	ug/l	1390000	1430000	791000	1110000	675000	682000	130
Thallium	ug/l	ND	ND	ND	BMDL	ND	ND	BMDL
Vanadium	ug/l	BMDL	BMDL	BMDL	ND	BMDL	BMDL	ND
Zinc	ug/l	BMDL	ND	ND	BMDL	39	43	BMDL
Cyanide, Total	mg/l	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

SURFACE WATER SAMPLES

		R SW13	R SW14	R SW15	R SW16	R SW17	R SW17	R SW18
		880414	880414	880414	880414	880414	880414	880414
		BD7655	BD7656	BD7657	BD7658	BD7659	BE6202	BD7660
RCRA METALS								
Arsenic	ug/l	BMDL	BMDL	BMDL	BMDL	10	-	BMDL
Barium	ug/l	94	133	120	170	281	-	133
Cadmium	ug/l	ND	ND	ND	ND	ND	-	ND
Chromium	ug/l	ND	ND	ND	ND	65	-	ND
Lead	ug/l	BMDL	BMDL	BMDL	6.9	22	-	BMDL
Mercury	ug/l	ND	ND	ND	ND	.86	-	ND
Mercury, Inorganic	ug/l	ND	ND	ND	ND	.55	-	ND
Selenium	ug/l	ND	ND	ND	ND	ND	-	ND
Silver	ug/l	ND	ND	ND	ND	ND	-	ND
OTHER METALS AND MISC								
Aluminum	ug/l	170	560	250	1700	[illegible]850	-	160
Antimony	ug/l	ND	ND	ND	ND	ND	-	ND
Beryllium	ug/l	ND	ND	ND	ND	BMDL	-	ND
Boron	ug/l	-	-	-	-	-	-	-
Calcium	ug/l	26300	24700	24600	25300	2[illegible]500	-	24200
Cobalt	ug/l	ND	ND	ND	ND	BMDL	-	ND
Copper	ug/l	BMDL	BMDL	BMDL	14	29	-	BMDL
Iron	ug/l	4100	6300	5300	9200	20100	-	5700
Magnesium	ug/l	7310	6960	6690	7270	8810	-	6270
Manganese	ug/l	4760	4840	4200	4040	2370	-	3300
Nickel	ug/l	ND	ND	ND	ND	65	-	ND
Potassium	ug/l	4900	4400	4100	4600	5100	-	4800
Sodium	ug/l	36300	38700	39100	36300	3[illegible]700	-	33800
Thallium	ug/l	ND	ND	ND	ND	ND	-	ND
Vanadium	ug/l	ND	BMDL	BMDL	BMDL	42	-	ND
Zinc	ug/l	31	29	30	69	190	-	37
Cyanide, Total	mg/l	ND	ND	ND	ND	ND	-	ND

DYNAMAC CORPORATION
SURFACE WATER SAMPLES

		R SW07 880413 BD7645	R SW08 880413 BD7651	R SW09 880413 BD7652	R SW10 880413 BD7646	R SW11 880414 BD7653	R SW12 880414 BD7654	X FB02 880414 BD7666
RCRA METALS								
Arsenic	ug/l	BMDL	BMDL	BMDL	ND	ND	BMDL	ND
Barium	ug/l	84	71	86	94	90	75	BMDL
Cadmium	ug/l	ND	ND	ND	ND	ND	ND	ND
Chromium	ug/l	ND	ND	BMDL	ND	ND	ND	BMDL
Lead	ug/l	ND	BMDL	BMDL	ND	BMDL	BMDL	ND
Mercury	ug/l	ND	ND	BMDL	ND	.26	.26	ND
Mercury, Inorganic	ug/l	ND	ND	1.2	ND	ND	.43	ND
Selenium	ug/l	ND	ND	ND	ND	ND	ND	ND
Silver	ug/l	ND	ND	ND	ND	ND	ND	ND
OTHER METALS AND MISC								
Aluminum	ug/l	99	270	170	190	98	250	BMDL
Antimony	ug/l	ND	ND	ND	BMDL	ND	ND	ND
Beryllium	ug/l	ND	ND	ND	ND	ND	ND	ND
Boron	ug/l	-	350	-	-	-	-	-
Calcium	ug/l	39000	39100	37800	38800	31500	30400	BMDL
Cobalt	ug/l	BMDL	ND	ND	BMDL	ND	BMDL	BMDL
Copper	ug/l	ND	ND	BMDL	ND	BMDL	BMDL	ND
Iron	ug/l	230	590	900	950	1100	3600	ND
Magnesium	ug/l	11100	10900	11100	10100	8000	7830	BMDL
Manganese	ug/l	530	470	630	1340	2550	3290	BMDL
Nickel	ug/l	BMDL	ND	-	ND	ND	BMDL	ND
Potassium	ug/l	29000	30700	20500	2600	4800	5700	BMDL
Sodium	ug/l	606000	669000	-	53700	80800	71100	620
Thallium	ug/l	ND	ND	ND	ND	ND	ND	ND
Vanadium	ug/l	ND	BMDL	ND	ND	ND	ND	ND
Zinc	ug/l	34	80	850	BMDL	66	130	ND
Cyanide, Total	mg/l	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

SURFACE WATER SAMPLES

		R SW19	R SW20	SWTD01	SWFALLS01	X PW1	X PW2
		880414	880414	880525	880525	880414	880414
		BD7661	BD7662	BE4768	BE4769	BD7663	BD7664
RCRA METALS							
Arsenic	ug/l	BMDL	BMDL	ND	ND	ND	ND
Barium	ug/l	110	56	32	61	14	19
Cadmium	ug/l	ND	ND	ND	BMDL	ND	ND
Chromium	ug/l	ND	ND	ND	41	ND	ND
Lead	ug/l	BMDL	BMDL	ND	18	BMDL	BMDL
Mercury	ug/l	ND	ND	BMDL	BMDL	ND	ND
Mercury, Inorganic	ug/l	ND	ND	3.0	.25	-	ND
Selenium	ug/l	ND	ND	ND	ND	ND	ND
Silver	ug/l	ND	ND	ND	BMDL	ND	ND
OTHER METALS AND MISC							
Aluminum	ug/l	630	970	260	840	720	790
Antimony	ug/l	ND	ND	ND	BMDL	ND	ND
Beryllium	ug/l	ND	ND	ND	BMDL	ND	ND
Boron	ug/l	-	-	-	-	-	-
Calcium	ug/l	25400	26100	13000	44400	19200	22300
Cobalt	ug/l	ND	BMDL	ND	ND	BMDL	BMDL
Copper	ug/l	BMDL	BMDL	BMDL	290	20	15
Iron	ug/l	5300	2500	2100	3700	1300	250
Magnesium	ug/l	7130	7260	2400	12800	3600	4000
Manganese	ug/l	2370	1110	520	190	23	45
Nickel	ug/l	ND	ND	ND	27	ND	ND
Potassium	ug/l	5600	2100	1000	112000	1100	1300
Sodium	ug/l	45900	23800	20100	598000	10000	11000
Thallium	ug/l	ND	BMDL	ND	ND	ND	ND
Vanadium	ug/l	BMDL	BMDL	ND	BMDL	ND	BMDL
Zinc	ug/l	140	22	52	3560	BMDL	BMDL
Cyanide, Total	mg/l	ND	ND	ND	ND	ND	ND

FRO 001 1847

4: Sediment Samples

FRO 001 1848

DYNAMAC CORPORATION

SEDIMENT SAMPLES - ONSITE

		B FCSEDCL02A	B FCSEDCL04A	B FCSEDCL06A	B FCSEDCL08A	B FCSEDCL09A	B FCSEDCL10A	B FCSEDCL13A
		880420	880419	880505	880505	880504	880504	880504
		BE0772	BE0771	BE1875	BE1874	BE1777	BE1776	BE1775
VOLATILE COMPOUNDS								
Benzene	ug/kg	BMDL	ND	ND	ND	ND	ND	ND
Bromoform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	-	-	-	-	-	-	-
Chloroform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dichlorobromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl bromide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	69.7	5.30	33.9	11.1	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toluene	ug/kg	BMDL	BMDL	ND	ND	11.5	ND	ND
1,2-Trans-dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	ND	ND	8.00	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acetone	ug/kg	ND	144	196	278	370	273	1160
Carbon disulfide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl ethyl ketone	ug/kg	ND	7.40	41.6	232	193	121	113
Methyl-iso-butyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Styrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	ug/kg	ND	ND	ND	ND	ND	ND	ND
m-Xylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
o+p-Xylenes	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

SEDIMENT SAMPLES - ONSITE

		B FCSEDCL16A	B FCSEDCL21A	B FCSEDCL26A	B FCSEDCLA26	B FCSEDCL28A	B FCSEDCL32A	B FCSEDCL33A
		880504	880503	880502	880502	880502	880502	880428
		BE1774	BE1783	BE1782	BE1781	BE1780	BE1779	BE1787
VOLATILE COMPOUNDS								
Benzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Bromoform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	-	-	-	-	-	-	-
Chloroform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dichlorobromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl bromide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	ND	ND	ND	5.92	ND	ND	44.5
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Trans-dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acetone	ug/kg	ND	71.3	85.6	64.6	ND	56.5	619
Carbon disulfide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl ethyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl-iso-butyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Styrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	ug/kg	ND	ND	ND	ND	ND	ND	ND
m-Xylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
o+p-Xylenes	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

SEDIMENT SAMPLES - ONSITE

		# FCSEDCL34A	# FCSEDCL37A	# FCSEDCL40A	# FCSEDCL43A	# FCSEDCL47A	# FCSEDCL51A	# FCSEDCL54A
		880428	880427	880427	880426	880425	880422	880422
		BE1786	BE1785	BE1784	BE1772	BE1773	BE1771	BE1770
VOLATILE COMPOUNDS								
Benzene	ug/kg	ND	ND	ND	BMDL	ND	ND	ND
Bromoform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	-	-	ND	-	-	-	-
Chloroform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dichlorobromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl bromide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl chloride	ug/kg	ND	ND	ND	26.5	ND	ND	11.5
Methylene chloride	ug/kg	33.5	33.7	21.7	58.4	52.5	25.8	93.5
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toluene	ug/kg	ND	ND	ND	BMDL	ND	ND	BMDL
1,2-Trans-dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acetone	ug/kg	113	208	47.4	284	ND	1430	409
Carbon disulfide	ug/kg	ND	ND	ND	74.6	ND	260	204
Methyl ethyl ketone	ug/kg	ND	ND	ND	120	ND	242	104
Methyl-iso-butyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Styrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	ug/kg	ND	ND	ND	ND	ND	ND	ND
m-Xylene	ug/kg	ND	ND	ND	7.53	ND	ND	ND
o+p-Xylenes	ug/kg	ND	ND	ND	BMDL	ND	ND	ND

DYNAMAC CORPORATION

SEDIMENT SAMPLES - ONSITE

		B FCSEDCL57A	B FCSEDCL62A	B SDSEDCL01A	B SCSEDCL07A	B TDSEDCL01A	B TDSEDCL16A	B TDSEDCLA16
		880421	880420	880505	880506	880509	880510	880510
		BE1769	BE0773	BE1876	BE1877	BE1879	BE1880	BE1881
VOLATILE COMPOUNDS								
Benzene	ug/kg	BMDL	BMDL	ND	ND	ND	ND	ND
Bromoform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	ND	ND	ND	ND	ND	BMDL	ND
Chlorodibromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	-	-	-	-	-	-	-
Chloroform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dichlorobromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	ND	BMDL	ND	ND	ND	ND	ND
Methyl bromide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl chloride	ug/kg	24.4	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	79.7	26.5	24.4	21.2	157	ND	109
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toluene	ug/kg	BMDL	BMDL	ND	ND	ND	115	14.6
1,2-Trans-dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acetone	ug/kg	313	ND	254	107	288	185	222
Carbon disulfide	ug/kg	540	ND	ND	8.73	ND	ND	ND
Methyl ethyl ketone	ug/kg	68.2	ND	79.0	ND	48.0	39.6	38.8
Methyl-iso-butyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Styrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	ug/kg	ND	ND	ND	ND	ND	ND	BMDL
m-Xylene	ug/kg	ND	BMDL	ND	ND	ND	ND	ND
o+p-Xylenes	ug/kg	ND	BMDL	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

SEDIMENT SAMPLES - ONSITE

		B FLSED01A	B FLSED11A	B FLSEDA11	B FLSED14A	B FLSED14A	B FLSED17A	B MCSED02A
		880523	880523	880523	880516	880523	880523	880517
		BE4755	BE4756	BE4757	BE1884	BE0764	BE0765	BE1883
VOLATILE COMPOUNDS								
Benzene	ug/kg	ND	ND	ND	-	ND	ND	ND
Bromoform	ug/kg	ND	ND	ND	-	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	ND	ND	-	ND	ND	ND
Chlorobenzene	ug/kg	ND	ND	ND	-	ND	ND	BMDL
Chlorodibromomethane	ug/kg	ND	ND	ND	-	ND	ND	ND
Chloroethane	ug/kg	ND	ND	ND	-	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	-	-	-	-	-	-	-
Chloroform	ug/kg	ND	ND	ND	-	ND	ND	ND
Dichlorobromomethane	ug/kg	ND	ND	ND	-	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	ND	ND	-	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	ND	ND	-	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	ND	ND	-	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	ND	ND	-	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	ND	ND	-	ND	ND	ND
Ethylbenzene	ug/kg	ND	ND	ND	-	ND	ND	ND
Methyl bromide	ug/kg	ND	ND	ND	-	ND	ND	ND
Methyl chloride	ug/kg	25.0	13.8	239	-	147	1730	ND
Methylene chloride	ug/kg	7.79	BMDL	33.2	-	24.8	338	5.28
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND	ND	-	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	ND	ND	-	ND	ND	ND
Toluene	ug/kg	ND	ND	ND	-	ND	ND	BMDL
1,2-Trans-dichloroethylene	ug/kg	ND	ND	ND	-	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	ND	ND	-	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	ND	ND	-	ND	ND	ND
Trichloroethylene	ug/kg	ND	ND	ND	-	ND	ND	ND
Vinyl chloride	ug/kg	ND	ND	ND	-	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	ND	ND	-	ND	ND	ND
2-Hexanone	ug/kg	ND	ND	ND	-	ND	ND	ND
Acetone	ug/kg	293	185	2290	-	1180	2980	6.75
Carbon disulfide	ug/kg	14.9	17.3	209	-	BMDL	230	ND
Methyl ethyl ketone	ug/kg	62.3	18.6	95.2	-	145	624	ND
Methyl-iso-butyl ketone	ug/kg	ND	ND	ND	-	ND	ND	ND
Styrene	ug/kg	ND	ND	ND	-	ND	ND	ND
Vinyl acetate	ug/kg	22.3	BMDL	ND	-	13.0	BMDL	ND
m-Xylene	ug/kg	ND	ND	ND	-	ND	ND	ND
o+p-Xylenes	ug/kg	ND	ND	ND	-	ND	ND	ND

DYNAMAC CORPORATION

SEDIMENT SAMPLES - ONSITE

		B FCSEDCL02A	B FCSEDCL04A	B FCSEDCL06A	B FCSEDCL08A	B FCSEDCL09A	B FCSEDCL10A	B FCSEDCL13A
		880420	880419	880505	880505	880504	880504	880504
		BE0772	BE0771	BE1875	BE1874	BE1777	BE1776	BE1775
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	BMDL
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	BMDL
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	921
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	ND	BMDL	ND	ND	ND	BMDL	BMDL
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND	ND	ND	ND	BMDL
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Diphenylhydrazine	ug/kg	-	-	ND	ND	-	-	ND
Fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	BMDL
Fluorene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	BMDL
Isophorone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pyrene	ug/kg	ND	ND	ND	ND	ND	ND	BMDL
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

SEDIMENT SAMPLES - ONSITE

		B FCSEDCL16A	B FCSEDCL21A	B FCSEDCL26A	B FCSEDCLA26	B FCSEDCL28A	B FCSEDCL32A	B FCSEDCL33A
		880504	880503	880502	880502	880502	880502	880428
		BE1774	BE1783	BE1782	BE1781	BE1780	BE1779	BE1787
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	BMDL	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	BMDL	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	BMDL	BMDL	BMDL	BMDL	ND	BMDL	ND
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND	ND	ND	BMDL	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Diphenylhydrazine	ug/kg	-	ND	-	-	-	-	-
Fluoranthene	ug/kg	ND	ND	ND	ND	ND	BMDL	ND
Fluorene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Isophorone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pyrene	ug/kg	ND	ND	ND	ND	ND	BMDL	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	ND	ND	ND	ND	ND

FRO 001 1855

DYNAMAC CORPORATION

SEDIMENT SAMPLES - ONSITE

		B FCSEDCL34A	B FCSEDCL37A	B FCSEDCL40A	B FCSEDCL43A	B FCSEDCL47A	B FCSEDCL51A	B FCSEDCL54A
		880428	880427	880427	880426	880425	880422	880422
		BE1786	BE1785	BE1784	BE1772	BE1773	BE1771	BE1770
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	918	ND	ND	BMDL	BMDL	5770	ND
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Diphenylhydrazine	ug/kg	-	-	-	-	-	-	-
Fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Fluorene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Isophorone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

SEDIMENT SAMPLES - ONSITE

		B FCSEDCL57A	B FCSEDCL62A	B SDSEDCL01A	B SDSEDCL07A	B TDSEDCL01A	B TDSEDCL16A	B TDSEDCLA16
		880421	880420	880505	880506	880509	880510	880510
		BE1769	BE0773	BE1876	BE1877	BE1879	BE1880	BE1881
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	ND	2940	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Diphenylhydrazine	ug/kg	-	-	ND	ND	ND	ND	ND
Fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Fluorene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Isophorone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

SEDIMENT SAMPLES - ONSITE

		B FLSED01A	B FLSED11A	B FLSEDA11	B FLSED14A	B FLSED14A	B FLSED17A	B MCSED02A
		880523	880523	880523	880516	880523	880523	880517
		BE4755	BE4756	BE4757	BE1884	BE0764	BE0765	BE1883
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/kg	ND	ND	ND	ND	-	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND	ND	-	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	-	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	-	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	-	ND	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	-	ND	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	-	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	-	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	-	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	-	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	-	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	ND	ND	ND	ND	-	ND	ND
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	-	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	-	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	-	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	-	ND	ND
Chrysene	ug/kg	ND	ND	ND	ND	-	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	-	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	-	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	-	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	-	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	-	ND	ND
Diethyl phthalate	ug/kg	ND	ND	ND	ND	-	ND	ND
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	-	ND	ND
Di-n-butyl phthalate	ug/kg	ND	ND	ND	BMDL	-	ND	BMDL
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	-	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	-	ND	ND
Di-n-octyl phthalate	ug/kg	ND	ND	ND	ND	-	ND	ND
1,2-Diphenylhydrazine	ug/kg	ND	ND	ND	ND	-	ND	ND
Fluoranthene	ug/kg	ND	ND	ND	ND	-	ND	ND
Fluorene	ug/kg	ND	ND	ND	ND	-	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	-	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	-	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	-	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND	ND	-	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	-	ND	ND
Isophorone	ug/kg	ND	ND	ND	ND	-	ND	ND
Naphthalene	ug/kg	ND	ND	ND	ND	-	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND	ND	-	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	-	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	-	ND	ND
Phenanthrene	ug/kg	ND	ND	ND	ND	-	ND	ND
Pyrene	ug/kg	ND	ND	ND	ND	-	ND	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	-	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	-	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND	ND	-	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND	ND	-	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND	-	-	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND	ND	-	ND	ND
Benzyl alcohol	ug/kg	BMDL	BMDL	BMDL	ND	-	BMDL	ND
Dibenzofuran	ug/kg	ND	ND	ND	ND	-	ND	ND

FRO 001 1858

DYNAMAC CORPORATION

SEDIMENT SAMPLES - ONSITE

		B FCSEDCL02A	B FCSEDCL04A	B FCSEDCL06A	B FCSEDCL08A	B FCSEDCL09A	B FCSEDCL10A	B FCSEDCL13A
		880420	880419	880505	880505	880504	880504	880504
		BE0772	BE0771	BE1875	BE1874	BE1777	BE1776	BE1775
ACID COMPOUNDS								
2-Chlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	-	ND	ND	ND	ND	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzoic acid	ug/kg	ND	ND	ND	ND	ND	ND	ND
PESTICIDES AND AROCLORS								
Aldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Alpha-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Beta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Gamma-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Delta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlordane	ug/kg	-	-	ND	ND	-	-	-
4,4'-DDT	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	ND	ND	ND	ND	I ND	ND	I ND
Toxaphene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	ND	ND	-	-	ND	ND	ND
Methoxychlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
alpha-Chlordane	ug/kg	ND	ND	-	-	ND	ND	ND
gamma-Chlordane	ug/kg	ND	ND	-	-	ND	ND	ND
Aroclor 1242	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1016	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

SEDIMENT SAMPLES - ONSITE

		B FCSEDCL34A	B FCSEDCL37A	B FCSEDCL40A	B FCSEDCL43A	B FCSEDCL47A	B FCSEDCL51A	B FCSEDCL54A
		880428	880427	880427	880426	880425	880422	880422
		BE1786	BE1785	BE1784	BE1772	BE1773	BE1771	BE1770
ACID COMPOUNDS								
2-Chlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzoic acid	ug/kg	ND	ND	ND	ND	ND	ND	ND
PESTICIDES AND AROCLORS								
Aldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Alpha-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Beta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Gamma-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Delta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlordane	ug/kg	-	-	-	-	-	-	-
4,4'-DDT	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
alpha-Chlordane	ug/kg	ND	ND	ND	ND	ND	ND	ND
gamma-Chlordane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1016	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

SEDIMENT SAMPLES - ONSITE

		B FCSEDCL57A	B FCSEDCL62A	B SDSEDCL01A	B SDSEDCL07A	B TDSEDCL01A	B TDSEDCL16A	B TDSEDCLA16	B FLS
		880421	880420	880505	880506	880509	880510	880510	8
		BE1769	BE0773	BE1876	BE1877	BE1879	BE1880	BE1881	B
ACID COMPOUNDS									
2-Chlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND	
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND	
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND	
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND	
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND	
2-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND	
4-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND	
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Pentachlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Phenol	ug/kg	ND	ND	ND	ND	ND	ND	ND	
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND	
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND	
2-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND	
4-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Benzoic acid	ug/kg	ND	ND	ND	ND	ND	ND	ND	
PESTICIDES AND AROCLORS									
Aldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Alpha-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Beta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Gamma-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Delta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Chlordane	ug/kg	-	-	ND	ND	ND	ND	ND	
4,4'-DDT	ug/kg	ND	ND	ND	ND	ND	ND	ND	
4,4'-DDE	ug/kg	ND	ND	ND	ND	ND	ND	ND	
4,4'-DDD	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Dieldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Endosulfan I	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Endosulfan II	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Endosulfan sulfate	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Endrin	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Heptachlor	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Heptachlor epoxide	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Toxaphene	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Endrin ketone	ug/kg	ND	ND	-	-	-	-	-	
Methoxychlor	ug/kg	ND	ND	ND	ND	ND	ND	ND	
alpha-Chlordane	ug/kg	ND	ND	-	-	-	-	-	
gamma-Chlordane	ug/kg	ND	ND	-	-	-	-	-	
Aroclor 1242	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Aroclor 1254	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Aroclor 1260	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Aroclor 1248	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Aroclor 1232	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Aroclor 1221	ug/kg	ND	ND	ND	ND	ND	ND	ND	
Aroclor 1016	ug/kg	ND	ND	ND	ND	ND	ND	ND	

FRO 001 1861

DYNAMAC CORPORATION

SEDIMENT SAMPLES - ONSITE

		B FLSED01A	B FLSED11A	B FLSEDA11	B FLSED14A	B FLSED14A	B FLSED17A	B MCSED02A
		880523	880523	880523	880516	880523	880523	880517
		BE4755	BE4756	BE4757	BE1884	BE0764	BE0765	BE1883
ACID COMPOUNDS								
2-Chlorophenol	ug/kg	ND	ND	ND	ND	-	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	-	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	-	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	-	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	-	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND	ND	-	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND	ND	-	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	-	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND	ND	-	ND	ND
Phenol	ug/kg	ND	ND	ND	ND	-	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	-	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	-	ND	ND
2-Methylphenol	ug/kg	ND	ND	ND	ND	-	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND	ND	-	ND	ND
Benzoic acid	ug/kg	ND	ND	ND	ND	-	ND	ND
PESTICIDES AND AROCLORS								
Aldrin	ug/kg	IND	ND	ND	ND	-	ND	ND
Alpha-BHC	ug/kg	IND	ND	ND	ND	-	ND	ND
Beta-BHC	ug/kg	ND	ND	ND	ND	-	ND	ND
Gamma-BHC	ug/kg	ND	ND	ND	ND	-	ND	ND
Delta-BHC	ug/kg	ND	ND	ND	ND	-	ND	ND
Chlordane	ug/kg	-	-	-	ND	-	-	ND
4,4'-DDT	ug/kg	ND	ND	ND	ND	-	ND	ND
4,4'-DDE	ug/kg	ND	ND	ND	ND	-	ND	ND
4,4'-DDD	ug/kg	ND	ND	ND	ND	-	ND	ND
Dieldrin	ug/kg	ND	ND	ND	ND	-	ND	ND
Endosulfan I	ug/kg	ND	ND	ND	ND	-	ND	ND
Endosulfan II	ug/kg	ND	ND	ND	ND	-	ND	ND
Endosulfan sulfate	ug/kg	ND	ND	ND	ND	-	ND	ND
Endrin	ug/kg	ND	ND	ND	ND	-	ND	ND
Heptachlor	ug/kg	ND	ND	ND	ND	-	ND	ND
Heptachlor epoxide	ug/kg	ND	ND	ND	IND	-	ND	ND
Toxaphene	ug/kg	ND	ND	ND	ND	-	ND	ND
Endrin ketone	ug/kg	ND	ND	ND	-	-	ND	-
Methoxychlor	ug/kg	ND	ND	ND	ND	-	ND	ND
alpha-Chlordane	ug/kg	ND	ND	ND	-	-	ND	-
gamma-Chlordane	ug/kg	ND	ND	ND	-	-	ND	-
Aroclor 1242	ug/kg	ND	ND	ND	ND	-	ND	ND
Aroclor 1254	ug/kg	ND	ND	ND	ND	-	ND	ND
Aroclor 1260	ug/kg	ND	ND	ND	ND	-	ND	ND
Aroclor 1248	ug/kg	ND	ND	ND	ND	-	ND	ND
Aroclor 1232	ug/kg	ND	ND	ND	ND	-	ND	ND
Aroclor 1221	ug/kg	ND	ND	ND	ND	-	ND	ND
Aroclor 1016	ug/kg	ND	ND	ND	ND	-	ND	ND

DYNAMAC CORPORATION

SEDIMENT SAMPLES - ONSITE

		B FCSEDCL02A	B FCSEDCL04A	B FCSEDCL06A	B FCSEDCL08A	B FCSEDCL09A	B FCSEDCL10A	B FCSEDCL13A
		880420	880419	880505	880505	880504	880504	880504
		BE0772	BE0771	BE1875	BE1874	BE1777	BE1776	BE1775
RCRA METALS								
Arsenic	ug/kg	10000	6200	4000	5300	10000	2700	8100
Barium	ug/kg	99700	93000	190000	185000	123000	174000	178000
Cadmium	ug/kg	BMDL	ND	ND	ND	ND	ND	ND
Chromium	ug/kg	7300	6100	9200	10000	8600	9400	9600
Lead	ug/kg	4600	2600	8700	15000	6700	BMDL	BMDL
Mercury	ug/kg	BMDL	100	86	230	1000	630	1100
Mercury, Inorganic	ug/kg	ND	ND	BMDL	160	860	570	880
Selenium	ug/kg	ND	ND	ND	BMDL	2600	ND	ND
Silver	ug/kg	BMDL	ND	ND	ND	ND	ND	ND
OTHER METALS AND MISC								
Aluminum	ug/kg	15400000	16200000	15000000	19700000	15000000	20600000	14400000
Antimony	ug/kg	ND	ND	ND	BMDL	ND	ND	ND
Beryllium	ug/kg	300	270	ND	ND	ND	ND	ND
Calcium	ug/kg	1900000	1600000	3490000	3450000	2910000	3020000	3100000
Cobalt	ug/kg	12000	14000	20000	19000	14000	20000	20000
Copper	ug/kg	23000	33000	30000	44000	30000	37000	34000
Iron	ug/kg	26000000	37800000	40600000	35800000	27700000	41500000	36200000
Magnesium	ug/kg	3200000	6500000	4860000	5790000	3970000	5650000	5370000
Manganese	ug/kg	854000	889000	1760000	1780000	811000	1070000	1620000
Nickel	ug/kg	3600	4100	2300	4400	2500	3700	3400
Potassium	ug/kg	280000	270000	340000	390000	260000	410000	290000
Sodium	ug/kg	170000	130000	160000	330000	330000	370000	320000
Thallium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vanadium	ug/kg	68000	83000	100000	98000	93000	110000	100000
Zinc	ug/kg	65000	80000	87000	120000	71000	110000	93000
% Solid	ug/kg	70.3	71.7	65.5	53.1	63.8	57.6	62.3
Cyanide, Total	mg/kg	ND	ND	ND	ND	ND	ND	ND
Sulfate as SO4	mg/kg	360	500	320	1400	2900	290	800
Sulfide as S	mg/kg	BMDL	BMDL	26	BMDL	59	28	26
Total Organic Carbon	mg/kg	8830	13800	21900	56600	32700	29700	17900
Total Organic Carbon	mg/kg	8830	13900	22100	57700	33600	30700	18500

FRO 001 1863

DYNAMAC CORPORATION

SEDIMENT SAMPLES - ONSITE

		B FCSEDCL16A	B FCSEDCL21A	B FCSEDCL26A	B FCSEDCLA26	B FCSEDCL28A	B FCSEDCL32A	B FCSEDCL33A
		880504	880503	880502	880502	880502	880502	880428
		BE1774	BE1783	BE1782	BE1781	BE1780	BE1779	BE1787
RCRA METALS								
Arsenic	ug/kg	5200	BMDL	BMDL	ND	2200	BMDL	BMDL
Barium	ug/kg	161000	145000	80000	65000	33000	117000	86000
Cadmium	ug/kg	ND	ND	BMDL	BMDL	BMDL	BMDL	BMDL
Chromium	ug/kg	7600	5900	13000	7800	5700	6800	56000
Lead	ug/kg	11000	3300	4800	BMDL	2600	6500	2900
Mercury	ug/kg	1540	BMDL	96	BMDL	ND	190	110
Mercury, Inorganic	ug/kg	1030	BMDL	87	90	ND	103	114
Selenium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Silver	ug/kg	ND	BMDL	ND	BMDL	ND	BMDL	ND
OTHER METALS AND MISC								
Aluminum	ug/kg	21900000	13800000	15500000	12700000	6760000	14600000	14100000
Antimony	ug/kg	ND	ND	ND	ND	ND	ND	ND
Beryllium	ug/kg	ND	460	470	470	300	420	340
Calcium	ug/kg	2930000	2300000	2560000	1800000	1300000	3890000	2400000
Cobalt	ug/kg	15000	13000	21000	19000	12000	15000	9900
Copper	ug/kg	33000	28000	28000	20000	24000	24000	26000
Iron	ug/kg	37200000	29500000	41300000	35500000	28200000	29200000	29600000
Magnesium	ug/kg	6570000	2640000	9020000	7110000	3260000	7230000	2360000
Manganese	ug/kg	885000	1020000	874000	743000	197000	675000	264000
Nickel	ug/kg	BMDL	3100	6600	3800	3600	5000	6800
Potassium	ug/kg	390000	190000	280000	190000	290000	280000	360000
Sodium	ug/kg	430000	270000	200000	160000	240000	440000	250000
Thallium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vanadium	ug/kg	100000	94000	120000	110000	100000	92000	93000
Zinc	ug/kg	120000	54000	91000	76000	44000	68000	47000
% Solid	ug/kg	56.2	75.7	83.0	80.1	79.6	85.2	77.0
Cyanide, Total	mg/kg	ND	ND	ND	ND	ND	ND	ND
Sulfate as SO4	mg/kg	1400	1050	1300	BMDL	3300	1050	710
Sulfide as S	mg/kg	180	BMDL	660	700	BMDL	BMDL	BMDL
Total Organic Carbon	mg/kg	27000	7990	3570	9140	3450	22800	9100
Total Organic Carbon	mg/kg	28000	8060	3810	9370	3680	23800	10300

FRO 001 1864

DYNAMAC CORPORATION

SEDIMENT SAMPLES - ONSITE

		B FCSEDCL34A	B FCSEDCL37A	B FCSEDCL40A	B FCSEDCL43A	B FCSEDCL47A	B FCSEDCL51A	B FCSEDCL54A
		880428	880427	880427	880426	880425	880422	880422
		BE1786	BE1785	BE1784	BE1772	BE1773	BE1771	BE1770
Arsenic	ug/kg	BMDL	BMDL	ND	ND	2600	BMDL	BMDL
Barium	ug/kg	62000	101000	131000	162000	47000	104000	50000
Cadmium	ug/kg	BMDL	BMDL	BMDL	BMDL	BMDL	880	860
Chromium	ug/kg	6700	7700	7500	15000	5400	11000	9100
Lead	ug/kg	5800	10000	2200	16000	6200	36000	13000
Mercury	ug/kg	140	110	ND	1000	410	120	BMDL
Mercury, Inorganic	ug/kg	146	100	ND	553	250	181	117
Selenium	ug/kg	ND	ND	ND	ND	ND	BMDL	BMDL
Silver	ug/kg	ND	ND	BMDL	BMDL	ND	ND	BMDL
OTHER METALS AND MISC								
Aluminum	ug/kg	8130000	15200000	11000000	21800000	6230000	22000000	18000000
Antimony	ug/kg	ND	ND	ND	ND	ND	ND	ND
Beryllium	ug/kg	270	380	390	450	200	910	760
Calcium	ug/kg	1600000	1800000	2000000	3080000	920000	2870000	3400000
Cobalt	ug/kg	7300	8300	6300	14000	7200	30000	24000
Copper	ug/kg	17000	24000	21000	51000	18000	110000	49000
Iron	ug/kg	20100000	23200000	21400000	32400000	13000000	44000000	36300000
Magnesium	ug/kg	2190000	1990000	1940000	5120000	1970000	5260000	4970000
Manganese	ug/kg	240000	288000	254000	669000	161000	732000	374000
Nickel	ug/kg	3000	BMDL	BMDL	7600	3700	12000	9200
Potassium	ug/kg	250000	330000	170000	500000	240000	1400000	1200000
Sodium	ug/kg	180000	960000	500000	690000	340000	2800000	2200000
Thallium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vanadium	ug/kg	69000	75000	66000	87000	41000	110000	88000
Zinc	ug/kg	37000	42000	35000	200000	57000	170000	110000
% Solid	ug/kg	71.4	75.4	78.1	55.0	60.9	39.9	47.7
Cyanide, Total	mg/kg	ND	ND	ND	ND	ND	ND	ND
Sulfate as SO4	mg/kg	640	550	1900	1550	910	2040	2100
Sulfide as S	mg/kg	BMDL	10	BMDL	BMDL	520	40	21
Total Organic Carbon	mg/kg	17100	6320	6320	29800	8550	82500	55600
Total Organic Carbon	mg/kg	17800	6730	6380	30300	9150	88800	65200

DYNAMAC CORPORATION

SEDIMENT SAMPLES - ONSITE

		B FCSEDCL57A	B FCSEDCL62A	B SDSEDCL01A	B SDSEDCL07A	B TDSEDCL01A	B TDSEDCL16A	B TDSEDCLA16
		880421	880420	880505	880506	880509	880510	880510
		BE1769	BE0773	BE1876	BE1877	BE1879	BE1880	BE1881
Arsenic	ug/kg	10000	BMDL	BMDL	BMDL	9000	BMDL	BMDL
Barium	ug/kg	73000	5400	129000	186000	278000	78600	78800
Cadmium	ug/kg	BMDL	BMDL	ND	610	ND	ND	ND
Chromium	ug/kg	12000	BMDL	4600	11000	14000	5300	2800
Lead	ug/kg	13000	BMDL	2700	2600	11000	5300	5500
Mercury	ug/kg	370	ND	575	230	3780	197	176
Mercury, Inorganic	ug/kg	228	ND	210	120	2610	158	149
Selenium	ug/kg	ND	ND	ND	ND	1400	ND	ND
Silver	ug/kg	ND	ND	ND	ND	ND	ND	ND
OTHER METALS AND MISC								
Aluminum	ug/kg	30000000	1200000	14800000	9750000	43500000	18000000	12800000
Antimony	ug/kg	ND	ND	ND	ND	BMDL	ND	ND
Beryllium	ug/kg	630	ND	ND	380	ND	ND	ND
Calcium	ug/kg	3510000	5630000	5210000	1600000	5720000	1980000	1200000
Cobalt	ug/kg	21000	BMDL	BMDL	15000	22000	12000	9500
Copper	ug/kg	51000	4400	16000	27000	58000	24000	21000
Iron	ug/kg	49000000	3000000	30400000	27700000	57200000	28100000	24400000
Magnesium	ug/kg	6330000	901000	2670000	1650000	7510000	4320000	4220000
Manganese	ug/kg	408000	57000	270000	1050000	1550000	491000	502000
Nickel	ug/kg	12000	BMDL	BMDL	6200	4700	BMDL	BMDL
Potassium	ug/kg	1600000	190000	250000	160000	650000	290000	190000
Sodium	ug/kg	3260000	420000	520000	68000	530000	180000	150000
Thallium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vanadium	ug/kg	99000	9800	60000	95000	160000	80000	71000
Zinc	ug/kg	140000	8700	40000	33000	160000	69000	61000
% Solid	ug/kg	38.6	77.5	69.6	76.5	44.0	73.2	72.7
Cyanide, Total	mg/kg	ND	ND	ND	ND	ND	ND	ND
Sulfate as SO4	mg/kg	1800	580	1200	BMDL	BMDL	2400	290
Sulfide as S	mg/kg	570	BMDL	BMDL	BMDL	100	BMDL	BMDL
Total Organic Carbon	mg/kg	38000	1600	8020	4870	32900	19300	35600
Total Organic Carbon	mg/kg	38000	1730	8050	4970	35200	20200	36200

FRO 001 1866

DYNAMAC CORPORATION
SEDIMENT SAMPLES - ONSITE

		B FLSED01A	B FLSED11A	B FLSEDA11	B FLSED14A	B FLSED14A	B FLSED17A	B MCSED02A
		880523	880523	880523	880516	880523	880523	880517
		BE4755	BE4756	BE4757	BE1884	BE0764	BE0765	BE1883
Arsenic	ug/kg	14000	2400	2800	6300	-	10000	BMDL
Barium	ug/kg	55000	78100	143000	40000	-	195000	8300
Cadmium	ug/kg	ND	ND	ND	ND	-	ND	ND
Chromium	ug/kg	4900	BMDL	4100	5600	-	7400	ND
Lead	ug/kg	12000	8100	5500	3700	-	7600	BMDL
Mercury	ug/kg	116	ND	ND	ND	-	176	ND
Mercury, Inorganic	ug/kg	116	BMDL	BMDL	ND	-	123	ND
Selenium	ug/kg	ND	ND	ND	ND	-	BMDL	ND
Silver	ug/kg	ND	ND	ND	ND	-	ND	ND
OTHER METALS AND MISC								
Aluminum	ug/kg	8280000	7680000	11200000	22800000	-	22200000	1400000
Antimony	ug/kg	ND	ND	ND	ND	-	ND	ND
Beryllium	ug/kg	ND	ND	ND	ND	-	ND	ND
Calcium	ug/kg	940000	1000000	1700000	1930000	-	1400000	10800000
Cobalt	ug/kg	BMDL	BMDL	7000	BMDL	-	8800	BMDL
Copper	ug/kg	44000	22000	39000	25000	-	57000	BMDL
Iron	ug/kg	24700000	19800000	30900000	45700000	-	24900000	3200000
Magnesium	ug/kg	2500000	2070000	3590000	2410000	-	3340000	440000
Manganese	ug/kg	79000	120000	222000	79000	-	191000	17000
Nickel	ug/kg	ND	ND	ND	ND	-	2100	ND
Potassium	ug/kg	790000	550000	950000	850000	-	610000	140000
Sodium	ug/kg	3960000	1600000	2690000	4760000	-	1900000	570000
Thallium	ug/kg	ND	ND	ND	ND	-	ND	ND
Vanadium	ug/kg	67000	48000	82000	230000	-	89000	9000
Zinc	ug/kg	31000	41000	63000	57000	-	72000	4600
% Solid	ug/kg	55.3	55.5	36.3	47.9	-	52.1	85.1
Cyanide, Total	mg/kg	ND	ND	ND	ND	-	ND	ND
Sulfate as SO4	mg/kg	1500	1900	1400	1700	-	1300	720
Sulfide as S	mg/kg	120	1500	600	3700	-	130	BMDL
Total Organic Carbon	mg/kg	74800	34600	48300	161000	-	75900	3460
Total Organic Carbon	mg/kg	79200	34800	49400	162000	-	76200	3560

DYNAMAC CORPORATION
ONSITE SEDIMENT SAMPLES

		B FCSEDCL04B	B FCSEDCL08B	B FCSEDCL10B	B FCSEDCL16B	B FCSEDCL21B	B FCSEDCL28B	B FCSEDCL33B	B FCSEDCL40B	B FCSEDCL43B	B FCSEDCL54B
		880419	880505	880504	880504	880503	880502	880428	880427	880426	880422
		BE0751	BE0757	BE0756	BE0755	BE0754	BE0753	BE0752	BE0748	BE0747	BE0745
% Solid	ug/kg	77.1	61.2	69.5	71.8	74.4	82.4	86.4	79.8	59.9	38.1
Mercury	ug/kg	114	152	959	738	BMDL	ND	ND	BMDL	2020	425
Mercury, Inorganic	ug/kg	ND	BMDL	576	597	ND	ND	ND	ND	1149	273
Sulfate as SO4	mg/kg	250	BMDL	730	BMDL	1800	2100	730	2300	480	1000
Sulfide as S	mg/kg	BMDL	290	440	150	BMDL	BMDL	BMDL	BMDL	630	730
Total Organic Carbon	mg/kg	8300	29900	15500	17400	8210	3630	7690	2710	52000	174000
Total Organic Carbon	mg/kg	9300	30000	15800	17400	8390	4010	7770	2990	53500	180000

DYNAMAC CORPORATION
ONSITE SEDIMENT SAMPLES

		B FCSEDCLB54	B SDSEDCL02A	B SDSEDCL02B	B SDSEDCL08A	B SDSEDCLA08	B SDSEDCL08B	B TDSEDCL04A	B TDSEDCL04B	B TDSEDCL08A	B TDSEDCLA08
		880422	880505	880505	880506	880506	880506	880506	880506	880509	880509
		BE0746	BE0758	BE0759	BE1758	BE1759	BE1760	BE1761	BE1762	BE1763	BE1764
% Solid	ug/kg	41.8	89.5	86.7	63.5	64.2	77.4	62.6	79.7	71.1	72.0
Mercury	ug/kg	227	89	93	3540	4500	87	2420	141	141	794
Mercury, Inorganic	ug/kg	294	BMDL	BMDL	1990	2010	ND	18700	110	3530	4480
Sulfate as SO4	mg/kg	2900	5500	BMDL	BMDL	BMDL	BMDL	1110	340	800	BMDL
Sulfide as S	mg/kg	1010	BMDL	BMDL	BMDL	BMDL	BMDL	24	BMDL	BMDL	11
Total Organic Carbon	mg/kg	266000	3740	6180	32700	39200	3740	22100	3410	14000	13900
Total Organic Carbon	mg/kg	286000	4220	6700	34900	41600	3930	22600	3600	15000	14500

DYNAMAC CORPORATION
ONSITE SEDIMENT SAMPLES

		B TDSEDCL08B	B TDSEDCL11A	B TDSEDCL12A	B FLSED18A	B FLSED18B	B FLSED24A	B FLSED24B	B MCSED01A	B MCSED01B	B MCSED02B
		880509	880509	880509	880523	880523	880516	880516	880517	880517	880517
		BE1765	BE1722	BE1766	BE1863	BE4761	BE1868	BE1867	BE1864	BE1865	BE1866
% Solid	ug/kg	79.2	75.5	75.3	70.8	70.5	52.4	47.0	83.6	81.2	81.8
Mercury	ug/kg	924	483	706	85	96	145	BMDL	ND	ND	ND
Mercury, Inorganic	ug/kg	187	-	154	90	BMDL	153	111	ND	ND	ND
Sulfate as SO4	mg/kg	890	-	2900	1500	1100	1600	6700	BMDL	BMDL	BMDL
Sulfide as S	mg/kg	BMDL	-	BMDL	320	BMDL	53	BMDL	BMDL	BMDL	BMDL
Total Organic Carbon	mg/kg	4610	-	18000	50100	59600	177000	96200	32000	13800	14300
Total Organic Carbon	mg/kg	4880	-	21600	52300	61200	179000	97800	34400	14700	15500

DYNAMAC CORPORATION
BACKGROUND SEDIMENT

		B BGSEDCL02A	B BGSEDCL04A	B BGSEDCL06A	B BGSEDCLA06	B BGSEDCL08A
		880418	880418	880418	880418	880419
		BE0766	BE0767	BE0768	BE0769	BE0770
VOLATILE COMPOUNDS						
Benzene	ug/kg	ND	ND	ND	ND	ND
Bromoform	ug/kg	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	ND	ND	ND	ND	ND
Chlorodibromomethane	ug/kg	ND	ND	ND	ND	ND
Chloroethane	ug/kg	ND	ND	ND	ND	ND
Chloroform	ug/kg	ND	ND	ND	ND	ND
Dichlorobromomethane	ug/kg	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	ND	ND	ND	ND	ND
Methyl bromide	ug/kg	ND	ND	ND	ND	ND
Methyl chloride	ug/kg	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	ND	ND	ND	ND	41.3
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	ND	ND	ND	ND
Toluene	ug/kg	ND	ND	BMDL	ND	ND
1,2-Trans-dichloroethylene	ug/kg	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	ND	ND	ND	ND
Trichloroethylene	ug/kg	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	ND	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	ND	ND	ND	ND	ND
Acetone	ug/kg	97.8	118	108	69.9	24.3
Carbon disulfide	ug/kg	ND	ND	ND	ND	BMDL
Methyl ethyl ketone	ug/kg	ND	ND	15.5	ND	BMDL
Methyl-iso-butyl ketone	ug/kg	ND	ND	ND	ND	ND
Styrene	ug/kg	ND	ND	ND	ND	ND
Vinyl acetate	ug/kg	ND	ND	ND	ND	ND
m-Xylene	ug/kg	ND	ND	ND	ND	ND
o+p-Xylenes	ug/kg	ND	ND	ND	ND	ND

FRO 001 1871

DYNAMAC CORPORATION

BACKGROUND SEDIMENT

		B BGSEDCL02A	B BGSEDCL04A	B BGSEDCL06A	B BGSEDCLA06	B BGSEDCL08A
		880418	880418	880418	880418	880419
		BE0766	BE0767	BE0768	BE0769	BE0770
BASE NEUTRAL COMPOUNDS						
Acenaphthene	ug/kg	ND	ND	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	BMDL	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/kg	ND	ND	ND	ND	ND
Fluoranthene	ug/kg	ND	ND	ND	ND	ND
Fluorene	ug/kg	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND
Isophorone	ug/kg	ND	ND	ND	ND	ND
Naphthalene	ug/kg	ND	ND	ND	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND	ND	ND
Pyrene	ug/kg	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	-	-	ND

FRO 001 1872

DYNAMAC CORPORATION

BACKGROUND SEDIMENT

		B BGSEDCL02A	B BGSEDCL04A	B BGSEDCL06A	B BGSEDCLA06	B BGSEDCL08A
		880418	880418	880418	880418	880419
		BE0766	BE0767	BE0768	BE0769	BE0770
ACID COMPOUNDS						
2-Chlorophenol	ug/kg	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND	ND	ND
Phenol	ug/kg	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	ND	ND	ND	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND	ND	ND
Benzoic acid	ug/kg	ND	ND	ND	ND	ND
PESTICIDES AND AROCLORS						
Aldrin	ug/kg	ND	ND	ND	ND	ND
Alpha-BHC	ug/kg	ND	ND	ND	ND	ND
Beta-BHC	ug/kg	ND	ND	ND	ND	ND
Gamma-BHC	ug/kg	ND	ND	ND	ND	ND
Delta-BHC	ug/kg	ND	ND	ND	ND	ND
Chlordane	ug/kg	ND	ND	ND	ND	-
4,4'-DDT	ug/kg	ND	ND	ND	ND	ND
4,4'-DDE	ug/kg	ND	ND	ND	ND	ND
4,4'-DDD	ug/kg	ND	ND	ND	ND	ND
Dieldrin	ug/kg	ND	ND	ND	ND	ND
Endosulfan I	ug/kg	ND	ND	ND	ND	ND
Endosulfan II	ug/kg	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	ND	ND	ND	ND	ND
Endrin	ug/kg	ND	ND	ND	ND	ND
Heptachlor	ug/kg	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	ND	ND	ND	ND	ND
Toxaphene	ug/kg	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	ND	ND	ND	ND	ND
Methoxychlor	ug/kg	ND	ND	ND	ND	ND
alpha-Chlordane	ug/kg	-	-	-	-	ND
gamma-Chlordane	ug/kg	-	-	-	-	ND
Aroclor 1242	ug/kg	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	ND	ND	ND	ND	ND
Aroclor 1016	ug/kg	ND	ND	ND	ND	ND

FRO 001 1873

DYNAMAC CORPORATION

BACKGROUND SEDIMENT

		B BGSEDCL02A	B BGSEDCL04A	B BGSEDCL06A	B BGSEDCLA06	B BGSEDCL08A
		880418	880418	880418	880418	880419
		BE0766	BE0767	BE0768	BE0769	BE0770
RCRA METALS						
Arsenic	ug/kg	ND	BMDL	ND	BMDL	ND
Barium	ug/kg	272000	95700	30000	31000	20000
Cadmium	ug/kg	BMDL	BMDL	ND	ND	ND
Chromium	ug/kg	12000	82000	7700	4500	2500
Lead	ug/kg	3900	5800	BMDL	BMDL	2500
Mercury	ug/kg	BMDL	ND	ND	ND	ND
Mercury, Inorganic	ug/kg	ND	ND	ND	ND	ND
Selenium	ug/kg	ND	ND	ND	ND	ND
Silver	ug/kg	BMDL	BMDL	ND	ND	ND
OTHER METALS AND MIAC						
Aluminum	ug/kg	23800000	15600000	3850000	4620000	2890000
Antimony	ug/kg	BMDL	BMDL	ND	ND	ND
Beryllium	ug/kg	560	740	280	260	BMDL
Calcium	ug/kg	2610000	3220000	1200000	1200000	1900000
Cobalt	ug/kg	27000	64000	5300	5100	4300
Copper	ug/kg	34000	85000	21000	18000	13000
Iron	ug/kg	52900000	58800000	25500000	[illegible]700000	20000000
Magnesium	ug/kg	5100000	6540000	1420000	1090000	1010000
Manganese	ug/kg	1470000	1050000	266000	156000	148000
Nickel	ug/kg	5100	64000	5900	BMDL	BMDL
Potassium	ug/kg	400000	410000	290000	440000	270000
Sodium	ug/kg	300000	160000	98000	100000	160000
Thallium	ug/kg	ND	ND	ND	ND	ND
Vanadium	ug/kg	130000	140000	99000	79000	79000
Zinc	ug/kg	84000	110000	22000	20000	14000
% Solid	ug/kg	78.4	86.8	88.4	82.8	90.7
Cyanide, Total	mg/kg	ND	ND	ND	ND	ND
Sulfate as SO4	mg/kg	890	BMDL	BMDL	BMDL	BMDL
Sulfide as S	mg/kg	ND	ND	ND	ND	ND
Total Organic Carbon	mg/kg	20600	13300	8500	7590	8040
Total Organic Carbon	mg/kg	23400	15300	9040	7740	8090

FRO 001 1874

5: Industrial Samples

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISALCN01A	S ISALCN02A	S ISALCN03A	S ISALCN04A	S ISCLCN01A	S ISCLCN02A	S ISDENT01A
		880614	880614	880614	880614	890524	890524	890122
		BE6177	BE6178	BE6176	BE6175	CA0844	CA0845	BH8775
VOLATILE COMPOUNDS								
Benzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Bromoform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	-	-	-	-	-	-	-
Chloroform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dichlorobromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl bromide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	7.75	5.42	ND	6.84	11.1	11.8	ND
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Trans-dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acetone	ug/kg	ND	10.8	BMDL	ND	ND	18.6	ND
Carbon disulfide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl ethyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl-iso-butyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Styrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	ug/kg	ND	ND	ND	ND	ND	ND	ND
m-Xylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
o+p-Xylenes	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISDENT07A	S ISDENT08A	S ISDENT09A	S :SREED06A	S ISREEDA06	S ISREED07A	S ISREED08A
		890122	890122	890122	890122	890123	890122	890122
		BH8776	BH8777	BH8778	BH8771	BH8772	BH8773	BH8774
VOLATILE COMPOUNDS								
Benzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Bromoform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	-	-	-	-	-	-	-
Chloroform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dichlorobromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl bromide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Trans-dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acetone	ug/kg	16.0	BMDL	64.5	37.6	BMDL	BMDL	BMDL
Carbon disulfide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl ethyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl-iso-butyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Styrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	ug/kg	ND	ND	ND	ND	ND	ND	ND
m-Xylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
o+p-Xylenes	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISDENV01A	S ISDENV02A	S ISESPS01A	S ISESPSA01	S ISESPS02A	S ISHWTP01A	S ISHWTP02A
		890713	890713	880826	880826	880826	890720	890720
		CA1120	CA1121	BE6194	BE6195	BE9329	CA1148	CA1149
VOLATILE COMPOUNDS								
Benzene	ug/kg	ND	BMDL	ND	ND	ND	ND	ND
Bromoform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	-	-	ND	ND	ND	-	-
Chloroform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dichlorobromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl bromide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	7.66	8.81	8.13	7.31	23.6	10.8	8.99
1,1,2,2-Tetrachloroethane	ug/kg	BMDL	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toluene	ug/kg	BMDL	BMDL	ND	ND	ND	BMDL	ND
1,2-Trans-dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acetone	ug/kg	16.5	BMDL	16.2	15.9	38.0	ND	25.0
Carbon disulfide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl ethyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl-iso-butyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Styrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	ug/kg	ND	ND	ND	ND	ND	ND	ND
m-Xylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
o+p-Xylenes	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISHWTPA02	S ISHWTPC3A	S ISHWTP04A	S ISHWTP05A	S ISHWTP06A	S ISHWTP07A	S ISHWTP08A
		890720	890712	890712	890720	890712	890720	890720
		CA1156	CA1150	CA1151	CA1152	CA1153	CA1154	CA1155
VOLATILE COMPOUNDS								
Benzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Bromoform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	-	-	-	-	-	-	-
Chloroform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dichlorobromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl bromide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	19.4	7.00	8.10	42.4	19.9	15.0	90.0
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toluene	ug/kg	ND	BMDL	BMDL	ND	ND	ND	ND
1,2-Trans-dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acetone	ug/kg	ND	20.6	ND	18.9	37.2	ND	15.0
Carbon disulfide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl ethyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl-iso-butyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Styrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	ug/kg	ND	ND	ND	ND	ND	ND	ND
m-Xylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
o+p-Xylenes	ug/kg	ND	ND	ND	ND	ND	ND	ND

FRO 001 1879

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISOWNS01A 890523 CA0841	S ISOWNS02A 890523 CA0842	S ISPCR02A 890524 CA0886	S ISPCRA02 890525 CA0887	S ISPCR05A 890524 CA0885	S ISPEER01A 880607 BE6167	S ISPEER01A 880826 BE6193
VOLATILE COMPOUNDS								
Benzene	ug/kg	ND	ND	ND	ND	ND	ND	-
Bromoform	ug/kg	ND	ND	ND	ND	ND	ND	-
Carbon tetrachloride	ug/kg	ND	ND	ND	ND	ND	ND	-
Chlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	-
Chlorodibromomethane	ug/kg	ND	ND	ND	ND	ND	ND	-
Chloroethane	ug/kg	ND	ND	ND	ND	ND	ND	-
2-Chloroethylvinyl ether	ug/kg	-	-	-	-	-	-	-
Chloroform	ug/kg	ND	ND	ND	ND	ND	ND	-
Dichlorobromomethane	ug/kg	ND	ND	ND	ND	ND	ND	-
1,1-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	-
1,2-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	-
1,1-Dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	-
1,2-Dichloropropane	ug/kg	ND	ND	ND	ND	ND	ND	-
cis-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	-
Ethylbenzene	ug/kg	ND	ND	ND	ND	ND	ND	-
Methyl bromide	ug/kg	ND	ND	ND	ND	ND	ND	-
Methyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	-
Methylene chloride	ug/kg	BMDL	10.6	15.4	7.55	BMDL	48.9	-
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	-
Tetrachloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	-
Toluene	ug/kg	ND	ND	ND	ND	ND	ND	-
1,2-Trans-dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	-
1,1,1-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	-
1,1,2-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	-
Trichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	-
Vinyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	-
trans-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	-
2-Hexanone	ug/kg	ND	ND	ND	ND	ND	ND	-
Acetone	ug/kg	ND	BMDL	29.9	ND	ND	12.4	-
Carbon disulfide	ug/kg	ND	ND	ND	ND	ND	ND	-
Methyl ethyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	-
Methyl-iso-butyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	-
Styrene	ug/kg	ND	ND	ND	ND	ND	ND	-
Vinyl acetate	ug/kg	ND	ND	ND	ND	ND	ND	-
m-Xylene	ug/kg	ND	ND	ND	ND	ND	ND	-
o+p-Xylenes	ug/kg	ND	ND	ND	ND	ND	ND	-

DYNAMAC CORPORATION

INDUSTRIAL SAMPLES

		S :SPEER02A	S ISPEER02A	S ISSQBB01A	S ISSQBBA01	S ISSQBB02A	S ISSQBB03A	S ISSQBB04A
		880607	880826	890523	890523	890523	890523	890523
		BE6168	BE6196	CA0830	CA0831	CA0832	CA0833	CA0834
VOLATILE COMPOUNDS								
Benzene	ug/kg	ND	-	ND	ND	ND	ND	ND
Bromoform	ug/kg	ND	-	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	-	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	ND	-	ND	ND	ND	ND	ND
Chlorodibromomethane	ug/kg	ND	-	ND	ND	ND	ND	ND
Chloroethane	ug/kg	ND	-	ND	ND	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	-	-	-	-	-	-	-
Chloroform	ug/kg	ND	-	ND	ND	ND	ND	ND
Dichlorobromomethane	ug/kg	ND	-	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	-	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	-	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	-	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	-	ND	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	-	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	ND	-	ND	ND	ND	ND	ND
Methyl bromide	ug/kg	ND	-	ND	ND	ND	ND	ND
Methyl chloride	ug/kg	ND	-	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	5.99	-	BMDL	BMDL	BMDL	BMDL	BMDL
1,1,2,2-Tetrachloroethane	ug/kg	ND	-	ND	ND	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	-	ND	ND	ND	ND	ND
Toluene	ug/kg	ND	-	ND	ND	ND	ND	ND
1,2-Trans-dichloroethylene	ug/kg	ND	-	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	-	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	-	ND	ND	ND	ND	ND
Trichloroethylene	ug/kg	ND	-	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	ND	-	ND	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	-	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	ND	-	ND	ND	ND	ND	ND
Acetone	ug/kg	6.80	-	BMDL	BMDL	BMDL	BMDL	BMDL
Carbon disulfide	ug/kg	ND	-	ND	ND	ND	ND	ND
Methyl ethyl ketone	ug/kg	ND	-	ND	ND	ND	ND	ND
Methyl-iso-butyl ketone	ug/kg	ND	-	ND	ND	ND	ND	ND
Styrene	ug/kg	ND	-	ND	ND	ND	ND	ND
Vinyl acetate	ug/kg	ND	-	ND	ND	ND	ND	ND
m-Xylene	ug/kg	ND	-	ND	ND	ND	ND	ND
o+p-Xylenes	ug/kg	ND	-	ND	ND	ND	BMDL	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

VOLATILE COMPOUNDS		C ISSBSED01	X ISSBSED02	X ISSBSED03	B ISSBSED04	X ISSBSED05	B ISSBSED06	S ISTECH01A
		890525	890713	890713	890523	890713	890525	880616
		CA0835	CA1106	CA1107	CA0838	CA1108	CA0839	BE6187
		(ug/l)	(ug/l)	(ug/l)		(ug/l)		
Benzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Bromoform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	-	-	-	-	-	-	-
Chloroform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dichlorobromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	ND	ND	ND	ND	ND	54000	ND
Methyl bromide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	101	13.3	23.9	10.0	6.62	3700	ND
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Trans-dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acetone	ug/kg	40800	14.5	13.4	ND	ND	BMDL	ND
Carbon disulfide	ug/kg	ND	51.1	BMDL	ND	BMDL	ND	ND
Methyl ethyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl-iso-butyl ketone	ug/kg	13.5	ND	ND	ND	ND	ND	ND
Styrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	ug/kg	ND	ND	ND	ND	ND	ND	ND
m-Xylene	ug/kg	ND	ND	ND	ND	ND	96500	ND
o+p-Xylenes	ug/kg	ND	ND	ND	ND	ND	33700	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISTECH02A 880615 BE6179	S ISTECH03A 880615 BE6180	S ISTECH04A 880615 BE6181	S ISTECH05A 880615 BE6183	S ISTECH06A 880615 BE6182	S ISTECH07A 880616 BE6185	S ISTECHA07 880616 BE6186
VOLATILE COMPOUNDS								
Benzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Bromoform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	-	-	-	-	-	-	-
Chloroform	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dichlorobromomethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl bromide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ug/kg	12.6	4.98	4.87	ND	5.72	7.04	17.6
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Trans-dichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ug/kg	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acetone	ug/kg	ND	ND	ND	ND	6.50	ND	21.5
Carbon disulfide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl ethyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methyl-iso-butyl ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Styrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	ug/kg	ND	ND	ND	ND	ND	ND	ND
m-Xylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
o+p-Xylenes	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISTECH08A	S ISWJKC01A	S ISWJKC02A
		880615	890714	890714
		BE6184	CA1174	CA1175
VOLATILE COMPOUNDS				
Benzene	ug/kg	ND	ND	ND
Bromoform	ug/kg	ND	ND	ND
Carbon tetrachloride	ug/kg	ND	ND	ND
Chlorobenzene	ug/kg	ND	ND	ND
Chlorodibromomethane	ug/kg	ND	ND	ND
Chloroethane	ug/kg	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	-	-	-
Chloroform	ug/kg	ND	ND	ND
Dichlorobromomethane	ug/kg	ND	ND	ND
1,1-Dichloroethane	ug/kg	ND	ND	ND
1,2-Dichloroethane	ug/kg	ND	ND	ND
1,1-Dichloroethylene	ug/kg	ND	ND	ND
1,2-Dichloropropane	ug/kg	ND	ND	ND
cis-1,3-Dichloropropylene	ug/kg	ND	ND	ND
Ethylbenzene	ug/kg	ND	ND	ND
Methyl bromide	ug/kg	ND	ND	ND
Methyl chloride	ug/kg	ND	ND	ND
Methylene chloride	ug/kg	5.63	BMDL	ND
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND	ND
Tetrachloroethylene	ug/kg	ND	ND	ND
Toluene	ug/kg	ND	ND	ND
1,2-Trans-dichloroethylene	ug/kg	ND	ND	ND
1,1,1-Trichloroethane	ug/kg	ND	ND	ND
1,1,2-Trichloroethane	ug/kg	ND	ND	ND
Trichloroethylene	ug/kg	ND	ND	ND
Vinyl chloride	ug/kg	ND	ND	ND
trans-1,3-Dichloropropylene	ug/kg	ND	ND	ND
2-Hexanone	ug/kg	ND	ND	ND
Acetone	ug/kg	ND	ND	ND
Carbon disulfide	ug/kg	ND	ND	ND
Methyl ethyl ketone	ug/kg	ND	ND	ND
Methyl-iso-butyl ketone	ug/kg	ND	ND	ND
Styrene	ug/kg	ND	ND	ND
Vinyl acetate	ug/kg	ND	ND	ND
m-Xylene	ug/kg	ND	ND	ND
o+p-Xylenes	ug/kg	ND	ND	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISREED03A
		890122
		BH8770
VOLATILE COMPOUNDS		
Benzene	ug/kg	ND
Bromoform	ug/kg	ND
Carbon tetrachloride	ug/kg	ND
Chlorobenzene	ug/kg	ND
Chlorodibromomethane	ug/kg	ND
Chloroethane	ug/kg	ND
Chloroform	ug/kg	ND
Dichlorobromomethane	ug/kg	ND
1,1-Dichloroethane	ug/kg	ND
1,2 Dichloroethane	ug/kg	ND
1,1-Dichloroethylene	ug/kg	ND
1,2-Dichloropropane	ug/kg	ND
cis-1,3-Dichloropropylene	ug/kg	ND
Ethylbenzene	ug/kg	ND
Methyl bromide	ug/kg	ND
Methyl chloride	ug/kg	ND
Methylene chloride	ug/kg	ND
1,1,2,2-Tetrachloroethane	ug/kg	ND
Tetrachloroethylene	ug/kg	ND
Toluene	ug/kg	ND
1,2-Trans-dichloroethylene	ug/kg	ND
1,1,1-Trichloroethane	ug/kg	ND
1,1,2-Trichloroethane	ug/kg	ND
Trichloroethylene	ug/kg	ND
Vinyl chloride	ug/kg	ND
trans-1,3-Dichloropropylene	ug/kg	ND
2-Hexanone	ug/kg	ND
Acetone	ug/kg	BMDL
Carbon disulfide	ug/kg	ND
Methyl ethyl ketone	ug/kg	ND
Methyl-iso-butyl ketone	ug/kg	ND
Styrene	ug/kg	ND
Vinyl acetate	ug/kg	ND
m-Xylene	ug/kg	ND
o+p-Xylenes	ug/kg	ND

DYNAMAC CORPORATION

INDUSTRIAL SAMPLES

		S ISALCN01A	S ISALCN02A	S ISALCN03A	S ISALCN04A	S ISCLCN01A	S ISCLCN02A	S ISDENT01A
		880614	880614	880614	880614	890524	890524	890122
		BE6177	BE6178	BE6176	BE6175	CA0844	CA0845	BH8775
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	1310	ND	ND	BMDL	ND	ND	BMDL
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	BMDL
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Diphenylhydrazine	ug/kg	ND	ND	ND	ND	-	-	-
Fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Fluorene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Isophorone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	ND	ND	ND	ND	ND

FRO 001 1886

DYNAMAC CORPORATION

INDUSTRIAL SAMPLES

		S ISDENT07A	S ISDENT08A	S ISDENT09A	S ISREED06A	S ISREEDA06	S ISREED07A	S ISREED08A
		890122	890122	890122	890122	890123	890122	890122
		BH8776	BH8777	BH8778	BH8771	BH8772	BH8773	BH8774
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	BMDL
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	BMDL
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	BMDL
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	4920	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	BMDL	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND	ND	ND	ND	BMDL
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/kg	ND	ND	ND	ND	BMDL	ND	ND
1,2-Diphenylhydrazine	ug/kg	-	-	-	-	-	-	-
Fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	BMDL
Fluorene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	BMDL
Isophorone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND	ND	ND	ND	BMDL
Pyrene	ug/kg	ND	ND	ND	ND	ND	ND	BMDL
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISDENV01A	S ISDENV02A	S ISESPS01A	S ISESPSA01	S ISESPS02A	S ISHWTP01A	S ISHWTP02A
		890713	890713	880826	880826	880826	890720	890720
		CA1120	CA1121	BE6194	BE6195	BE9329	CA1148	CA1149
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	ND	ND	ND	ND	BMDL	ND	ND
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	ND	ND	BMDL	ND	ND	ND	ND
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	ND	ND	BMDL	BMDL	BMDL	1280	1400
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/kg	4460	ND	ND	ND	ND	BMDL	BMDL
1,2-Diphenylhydrazine	ug/kg	-	-	-	-	-	-	-
Fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Fluorene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Isophorone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	ND	ND	BMDL	BMDL	BMDL	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	ND	ND	-	ND	ND

FRO 001 1888

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

BASE NEUTRAL COMPOUNDS		S ISHWTPA02 890720 CA1156	S ISHWTP03A 890712 CA1150	S ISHWTP04A 890712 CA1151	S ISHWTP05A 890720 CA1152	S ISHWTP06A 890712 CA1153	S ISHWTP07A 890720 CA1154	S ISHWTP08A 890720 CA1155
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	BMDL	ND	ND	BMDL	ND	BMDL	ND
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	1460	ND	ND	1810	ND	1160	2450
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Diphenylhydrazine	ug/kg	-	-	-	-	-	-	-
Fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Fluorene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Isophorone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	ND	ND	ND	ND	ND

FRO 001 1889

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISOWNS01A 890523 CA0841	S ISOWNS02A 890523 CA0842	S ISPCR02A 890524 CA0886	S ISPCRA02 890525 CA0887	S ISPCR05A 890524 CA0885	S ISPEER01A 880607 BE6167	S ISPEER01A 880826 BE6193
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	455	ND	1220	850	ND	15300	BMDL
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	ND	BMDL	BMDL
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	ND	ND	ND	ND	ND	BMDL	ND
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	ND	ND	ND	ND	ND	BMDL	BMDL
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Diphenylhydrazine	ug/kg	-	-	-	-	-	-	-
Fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Fluorene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Isophorone	ug/kg	ND	ND	ND	ND	ND	240	BMDL
Naphthalene	ug/kg	ND	ND	ND	ND	ND	ND	BMDL
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISPEER02A	S ISPEER02A	S ISSQBB01A	S ISSQBBA01	S ISSQBB02A	S ISSQBB03A	S ISSQBB04A
		880607	880826	890523	890523	890523	890523	890523
		BE6168	BE6196	CA0830	CA0831	CA0832	CA0833	CA0834
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	ND	BMDL	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	BMDL	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	ND	BMDL	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Diphenylhydrazine	ug/kg	-	-	-	-	-	-	-
Fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Fluorene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Isophorone	ug/kg	437	BMDL	ND	ND	ND	ND	ND
Naphthalene	ug/kg	ND	BMDL	ND	ND	ND	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	ND	-	ND	ND	ND	ND	ND

FRO 001 1891

DYNAMAC CORPORATION

INDUSTRIAL SAMPLES

		C ISSBSED01	X ISSBSED02	X ISSBSED03	B ISSBSED04	X ISSBSED05	B ISSBSED06	S ISTECH01A
		890525	890713	890713	890523	890713	890525	880616
		CA0835	CA1106	CA1107	CA0838	CA1108	CA0839	BE6187
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/kg	-	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/kg	-	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	-	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	-	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/kg	-	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	-	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/kg	-	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	-	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	-	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	-	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	-	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	-	ND	ND	ND	ND	1230	ND
4-Bromophenyl phenyl ether	ug/kg	-	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	-	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	-	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	-	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	-	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	-	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	-	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	-	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	-	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	-	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	-	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/kg	-	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	-	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/kg	-	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	-	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/kg	-	ND	ND	ND	ND	ND	ND
1,2-Diphenylhydrazine	ug/kg	-	-	-	-	-	-	ND
Fluoranthene	ug/kg	-	ND	ND	ND	ND	BMDL	ND
Fluorene	ug/kg	-	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	-	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	-	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	-	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	-	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	-	ND	ND	ND	ND	ND	ND
Isophorone	ug/kg	-	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	-	ND	ND	ND	ND	BMDL	ND
Nitrobenzene	ug/kg	-	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	-	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	-	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	-	ND	ND	ND	ND	BMDL	ND
Pyrene	ug/kg	-	ND	ND	ND	ND	BMDL	ND
1,2,4-Trichlorobenzene	ug/kg	-	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	-	ND	ND	ND	ND	BMDL	ND
2-Nitroaniline	ug/kg	-	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	-	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg	-	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	-	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/kg	-	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	-	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISTECH02A	S ISTECH03A	S ISTECH04A	S ISTECH05A	S ISTECH06A	S ISTECH07A	S ISTECHA07
		880615	880615	880615	880615	880615	880616	880616
		BE6179	BE6180	BE6181	BE6183	BE6182	BE6185	BE6186
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Diphenylhydrazine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Fluorene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Isophorone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	ND	ND	ND	ND	ND

FRO 001 1893

DYNAMAC CORPORATION

INDUSTRIAL SAMPLES

		S ISTECH08A	S ISWJKC01A	S ISWJKC02A
		880615	890714	890714
		BE6184	CA1174	CA1175
BASE NEUTRAL COMPOUNDS				
Acenaphthene	ug/kg	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	ND	ND	ND
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND
Diethyl phthalate	ug/kg	ND	ND	ND
Dimethyl phthalate	ug/kg	ND	ND	ND
Di-n-butyl phthalate	ug/kg	ND	ND	ND
2,4-Dinitrotoluene	ug/kg	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND
Di-n-octyl phthalate	ug/kg	ND	ND	ND
1,2-Diphenylhydrazine	ug/kg	ND	-	-
Fluoranthene	ug/kg	ND	ND	ND
Fluorene	ug/kg	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND
Isophorone	ug/kg	ND	ND	ND
Naphthalene	ug/kg	ND	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND
Pyrene	ug/kg	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISREED03A 890122 BH8770
BASE NEUTRAL COMPOUNDS		
Acenaphthene	ug/kg	ND
Acenaphthylene	ug/kg	ND
Anthracene	ug/kg	ND
Benzo(a)anthracene	ug/kg	ND
Benzo(a)pyrene	ug/kg	ND
Benzo(b)fluoranthene	ug/kg	ND
Benzo(ghi)perylene	ug/kg	ND
Benzo(k)fluoranthene	ug/kg	ND
bis(2-Chloroethoxy)methane	ug/kg	ND
bis(2-Chloroethyl) ether	ug/kg	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND
bis(2-Ethylhexyl)phthalate	ug/kg	BMDL
4-Bromophenyl phenyl ether	ug/kg	ND
Butyl benzyl phthalate	ug/kg	ND
2-Chloronaphthalene	ug/kg	ND
4-Chlorophenyl phenyl ether	ug/kg	ND
Chrysene	ug/kg	ND
Dibenzo(a,h)anthracene	ug/kg	ND
1,2-Dichlorobenzene	ug/kg	ND
1,3-Dichlorobenzene	ug/kg	ND
1,4-Dichlorobenzene	ug/kg	ND
3,3'-Dichlorobenzidine	ug/kg	ND
Diethyl phthalate	ug/kg	BMDL
Dimethyl phthalate	ug/kg	ND
Di-n-butyl phthalate	ug/kg	ND
2,4-Dinitrotoluene	ug/kg	ND
2,6-Dinitrotoluene	ug/kg	ND
Di-n-octyl phthalate	ug/kg	ND
Fluoranthene	ug/kg	ND
Fluorene	ug/kg	ND
Hexachlorobenzene	ug/kg	ND
Hexachlorobutadiene	ug/kg	ND
Hexachlorocyclopentadiene	ug/kg	ND
Hexachloroethane	ug/kg	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND
Isophorone	ug/kg	ND
Naphthalene	ug/kg	ND
Nitrobenzene	ug/kg	ND
N-Nitrosodi-n-propylamine	ug/kg	ND
N-Nitrosodiphenylamine	ug/kg	ND
Phenanthrene	ug/kg	ND
Pyrene	ug/kg	ND
1,2,4-Trichlorobenzene	ug/kg	ND
2-Methylnaphthalene	ug/kg	ND
2-Nitroaniline	ug/kg	ND
3-Nitroaniline	ug/kg	ND
4-Chloroaniline	ug/kg	ND
4-Nitroaniline	ug/kg	ND
Benzyl alcohol	ug/kg	ND
Dibenzofuran	ug/kg	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISALCN01A	S ISALCN02A	S ISALCN03A	S ISALCN04A	S ISCLCN01A	S ISCLCN02A	S ISDENT01A
		880614	880614	880614	880614	890524	890524	890122
		BE6177	BE6178	BE6176	BE6175	CA0844	CA0845	BH8775
ACID COMPOUNDS								
2-Chlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzoic acid	ug/kg	ND	ND	ND	ND	ND	ND	ND
PESTICIDES AND AROCLORS								
Aldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Alpha-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Beta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Gamma-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Delta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/kg	ND	ND	ND	170	ND	ND	ND
Heptachlor epoxide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
alpha-Chlordane	ug/kg	ND	ND	ND	280	ND	ND	ND
gamma-Chlordane	ug/kg	ND	ND	ND	550	ND	ND	ND
Aroclor 1242	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1016	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISDENT07A	S ISDENT08A	S ISDENT09A	S ISREED06A	S ISREEDA06	S ISREED07A	S ISREED08A
		890122	890122	890122	890122	890123	890122	890122
		BH8776	BH8777	BH8778	BH8771	BH8772	BH8773	BH8774
ACID COMPOUNDS								
2-Chlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzoic acid	ug/kg	ND	ND	ND	ND	BMDL	ND	ND
PESTICIDES AND AROCLORS								
Aldrin	ug/kg	ND	ND	IND	ND	ND	ND	ND
Alpha-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Beta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Gamma-BHC	ug/kg	ND	ND	ND	ND	ND	12	2600
Delta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ug/kg	ND	ND	640	ND	ND	ND	ND
Endosulfan I	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
alpha-Chlordane	ug/kg	ND	ND	ND	ND	ND	ND	ND
gamma-Chlordane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1016	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISDENV01A	S ISDENV02A	S ISESPS01A	S ISESPSA01	S ISESPS02A	S ISHWTP01A	S ISHWTP02A
		890713	890713	880826	880826	880826	890720	890720
		CA1120	CA1121	BE6194	BE6195	BE9329	CA1148	CA1149
ACID COMPOUNDS								
2-Chlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzoic acid	ug/kg	ND	ND	ND	ND	ND	ND	ND
PESTICIDES AND AROCLORS								
Aldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Alpha-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Beta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Gamma-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Delta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
alpha-Chlordane	ug/kg	ND	ND	ND	ND	ND	ND	ND
gamma-Chlordane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1016	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISHWTPA02	S ISHWTP03A	S ISHWTP04A	S ISHWTP05A	S ISHWTP06A	S ISHWTP07A	S ISHWTP08A
		890720	890712	890712	890720	890712	890720	890720
		CA1156	CA1150	CA1151	CA1152	CA1153	CA1154	CA1155
ACID COMPOUNDS								
2-Chlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzoic acid	ug/kg	ND	ND	ND	ND	ND	ND	ND
PESTICIDES AND AROCLORS								
Aldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Alpha-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Beta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Gamma-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Delta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
alpha-Chlordane	ug/kg	ND	ND	ND	ND	ND	ND	ND
gamma-Chlordane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1016	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISOWNS01A	S ISOWNS02A	S ISPCR02A	S ISPCRA02	S ISPCR05A	S ISPEER01A	S ISPEER01A
		890523	890523	890524	890525	890524	880607	880826
		CA0841	CA0842	CA0886	CA0887	CA0885	BE6167	BE6193
ACID COMPOUNDS								
2-Chlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzoic acid	ug/kg	ND	ND	ND	ND	ND	ND	ND
PESTICIDES AND AROCLORS								
Aldrin	ug/kg	ND	ND	ND	ND	ND	-	ND
Alpha-BHC	ug/kg	ND	ND	ND	ND	ND	-	ND
Beta-BHC	ug/kg	ND	ND	ND	ND	ND	-	ND
Gamma-BHC	ug/kg	ND	ND	ND	ND	ND	-	ND
Delta-BHC	ug/kg	ND	ND	ND	ND	ND	-	ND
4,4'-DDT	ug/kg	ND	ND	ND	ND	ND	-	ND
4,4'-DDE	ug/kg	ND	ND	ND	ND	ND	-	ND
4,4'-DDD	ug/kg	ND	ND	ND	ND	ND	-	ND
Dieldrin	ug/kg	ND	ND	ND	ND	ND	-	ND
Endosulfan I	ug/kg	ND	ND	ND	ND	ND	-	ND
Endosulfan II	ug/kg	ND	ND	ND	ND	ND	-	ND
Endosulfan sulfate	ug/kg	ND	ND	ND	ND	ND	-	ND
Endrin	ug/kg	ND	ND	ND	ND	ND	-	ND
Heptachlor	ug/kg	173	ND	19.0	30.0	ND	-	ND
Heptachlor epoxide	ug/kg	44.0	ND	ND	ND	ND	-	ND
Toxaphene	ug/kg	ND	ND	ND	ND	ND	-	ND
Endrin ketone	ug/kg	ND	ND	ND	ND	ND	-	ND
Methoxychlor	ug/kg	ND	ND	ND	ND	ND	-	ND
alpha-Chlordane	ug/kg	ND	ND	ND	ND	ND	-	ND
gamma-Chlordane	ug/kg	372	ND	97.4	86.8	ND	-	ND
Aroclor 1242	ug/kg	ND	ND	ND	ND	ND	-	ND
Aroclor 1254	ug/kg	ND	ND	ND	ND	ND	-	ND
Aroclor 1260	ug/kg	ND	ND	ND	ND	ND	-	ND
Aroclor 1248	ug/kg	ND	ND	ND	ND	ND	-	ND
Aroclor 1232	ug/kg	ND	ND	ND	ND	ND	-	ND
Aroclor 1221	ug/kg	ND	ND	ND	ND	ND	-	ND
Aroclor 1016	ug/kg	ND	ND	ND	ND	ND	-	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISPEER02A	S ISPEER02A	S ISSQB801A	S ISSQBBA01	S ISSQB802A	S ISSQB803A	S ISSQB804A
		880607	880826	890523	890523	890523	890523	890523
		BE6168	BE6196	CA0830	CA0831	CA0832	CA0833	CA0834
ACID COMPOUNDS								
2-Chlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzoic acid	ug/kg	ND	ND	ND	ND	ND	ND	ND
PESTICIDES AND AROCLORS								
Aldrin	ug/kg	-	ND	ND	ND	ND	ND	ND
Alpha-BHC	ug/kg	-	ND	ND	ND	ND	ND	ND
Beta-BHC	ug/kg	-	ND	ND	ND	ND	ND	ND
Gamma-BHC	ug/kg	-	ND	ND	ND	ND	ND	ND
Delta-BHC	ug/kg	-	ND	ND	ND	ND	ND	ND
4,4'-DDT	ug/kg	-	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/kg	-	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/kg	-	ND	ND	ND	ND	ND	ND
Dieldrin	ug/kg	-	ND	ND	ND	ND	ND	ND
Endosulfan I	ug/kg	-	ND	ND	ND	ND	ND	ND
Endosulfan II	ug/kg	-	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	-	ND	ND	ND	ND	ND	ND
Endrin	ug/kg	-	ND	ND	ND	ND	ND	ND
Heptachlor	ug/kg	-	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	-	ND	ND	ND	ND	ND	ND
Toxaphene	ug/kg	-	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	-	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/kg	-	ND	ND	ND	ND	ND	ND
alpha-Chlordane	ug/kg	-	ND	ND	ND	ND	ND	ND
gamma-Chlordane	ug/kg	-	ND	ND	ND	ND	ND	ND
Aroclor 1242	ug/kg	-	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	-	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	-	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	-	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	-	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	-	ND	ND	ND	ND	ND	ND
Aroclor 1016	ug/kg	-	ND	ND	ND	ND	ND	ND

FRO 001 1901

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		C ISSBSED01	X ISSBSED02	X ISSBSED03	B ISSBSED04	X ISSBSED05	B ISSBSED06	S ISTECH01A
		890525	890713	890713	890523	890713	890525	880616
		CA0835	CA1106	CA1107	CA0838	CA1108	CA0839	BE6187
ACID COMPOUNDS								
2-Chlorophenol	ug/kg	-	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	-	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	-	ND	ND	ND	ND	BMDL	ND
4,6-Dinitro-o-cresol	ug/kg	-	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	-	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	-	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	-	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/kg	-	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	-	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	-	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	-	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	-	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	-	ND	ND	ND	ND	ND	ND
4-Methylphenol	ug/kg	-	ND	ND	ND	ND	624	ND
Benzoic acid	ug/kg	-	ND	ND	ND	ND	ND	ND
PESTICIDES AND AROCLORS								
Aldrin	ug/kg	-	ND	ND	ND	ND	ND	ND
Alpha-BHC	ug/kg	-	ND	ND	ND	ND	ND	ND
Beta-BHC	ug/kg	-	ND	ND	ND	ND	ND	ND
Gamma-BHC	ug/kg	-	ND	ND	ND	ND	ND	ND
Delta-BHC	ug/kg	-	ND	ND	ND	ND	ND	ND
4,4'-DDT	ug/kg	-	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/kg	-	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/kg	-	ND	ND	ND	ND	ND	ND
Dieldrin	ug/kg	-	ND	ND	ND	ND	ND	ND
Endosulfan I	ug/kg	-	ND	ND	ND	ND	ND	ND
Endosulfan II	ug/kg	-	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	-	ND	ND	ND	ND	ND	ND
Endrin	ug/kg	-	ND	ND	ND	ND	ND	ND
Heptachlor	ug/kg	-	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	-	ND	ND	ND	ND	ND	ND
Toxaphene	ug/kg	-	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	-	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/kg	-	ND	ND	ND	ND	ND	ND
alpha-Chlordane	ug/kg	-	ND	ND	ND	ND	ND	ND
gamma-Chlordane	ug/kg	-	ND	ND	ND	ND	ND	ND
Aroclor 1242	ug/kg	-	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	-	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	-	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	-	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	-	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	-	ND	ND	ND	ND	ND	ND
Aroclor 1016	ug/kg	-	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISTECH02A	S ISTECH03A	S ISTECH04A	S ISTECH05A	S ISTECH06A	S ISTECH07A	S ISTECHA07
		880615	880615	880615	880615	880615	880616	880616
		BE6179	BE6180	BE6181	BE6183	BE6182	BE6185	BE6186
ACID COMPOUNDS								
2-Chlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzoic acid	ug/kg	ND	ND	ND	ND	ND	ND	ND
PESTICIDES AND AROCLORS								
Aldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Alpha-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Beta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Gamma-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Delta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
alpha-Chlordane	ug/kg	ND	ND	ND	ND	ND	ND	ND
gamma-Chlordane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1016	ug/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISTECH08A	S ISWJKC01A	S ISWJKC02A
		880615	890714	890714
		BE6184	CA1174	CA1175
ACID COMPOUNDS				
2-Chlorophenol	ug/kg	ND	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND
Phenol	ug/kg	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND
2-Methylphenol	ug/kg	ND	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND
Benzoic acid	ug/kg	ND	ND	ND
PESTICIDES AND AROCLORS				
Aldrin	ug/kg	ND	ND	ND
Alpha-BHC	ug/kg	ND	ND	ND
Beta-BHC	ug/kg	ND	ND	ND
Gamma-BHC	ug/kg	ND	ND	ND
Delta-BHC	ug/kg	ND	ND	ND
4,4'-DDT	ug/kg	ND	ND	ND
4,4'-DDE	ug/kg	ND	ND	ND
4,4'-DDD	ug/kg	ND	ND	ND
Dieldrin	ug/kg	ND	ND	ND
Endosulfan I	ug/kg	ND	ND	ND
Endosulfan II	ug/kg	ND	ND	ND
Endosulfan sulfate	ug/kg	ND	ND	ND
Endrin	ug/kg	ND	ND	ND
Heptachlor	ug/kg	ND	ND	ND
Heptachlor epoxide	ug/kg	ND	ND	ND
Toxaphene	ug/kg	ND	ND	ND
Endrin ketone	ug/kg	ND	ND	ND
Methoxychlor	ug/kg	ND	ND	ND
alpha-Chlordane	ug/kg	ND	ND	ND
gamma-Chlordane	ug/kg	ND	ND	ND
Aroclor 1242	ug/kg	ND	ND	ND
Aroclor 1254	ug/kg	ND	ND	ND
Aroclor 1260	ug/kg	ND	ND	ND
Aroclor 1248	ug/kg	ND	ND	ND
Aroclor 1232	ug/kg	ND	ND	ND
Aroclor 1221	ug/kg	ND	ND	ND
Aroclor 1016	ug/kg	ND	ND	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISREED03A 890122 BH8770
ACID COMPOUNDS		
2-Chlorophenol	ug/kg	ND
2,4-Dichlorophenol	ug/kg	ND
2,4-Dimethylphenol	ug/kg	ND
4,6-Dinitro-o-cresol	ug/kg	ND
2,4-Dinitrophenol	ug/kg	ND
2-Nitrophenol	ug/kg	ND
4-Nitrophenol	ug/kg	ND
p-Chloro-m-cresol	ug/kg	ND
Pentachlorophenol	ug/kg	ND
Phenol	ug/kg	ND
2,4,6-Trichlorophenol	ug/kg	ND
2,4,5-Trichlorophenol	ug/kg	ND
2-Methylphenol	ug/kg	ND
4-Methylphenol	ug/kg	ND
Benzoic acid	ug/kg	ND
PESTICIDES AND AROCLORS		
Aldrin	ug/kg	ND
Alpha-BHC	ug/kg	ND
Beta-BHC	ug/kg	ND
Gamma-BHC	ug/kg	35
Delta-BHC	ug/kg	ND
4,4'-DDT	ug/kg	ND
4,4'-DDE	ug/kg	ND
4,4'-DDD	ug/kg	ND
Dieldrin	ug/kg	ND
Endosulfan I	ug/kg	ND
Endosulfan II	ug/kg	ND
Endosulfan sulfate	ug/kg	ND
Endrin	ug/kg	ND
Heptachlor	ug/kg	ND
Heptachlor epoxide	ug/kg	ND
Toxaphene	ug/kg	ND
Endrin ketone	ug/kg	ND
Methoxychlor	ug/kg	ND
alpha-Chlordane	ug/kg	ND
gamma-Chlordane	ug/kg	ND
Aroclor 1016	ug/kg	ND
Aroclor 1221	ug/kg	ND
Aroclor 1232	ug/kg	ND
Aroclor 1242	ug/kg	ND
Aroclor 1248	ug/kg	ND
Aroclor 1254	ug/kg	ND
Aroclor 1260	ug/kg	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISALCN01A	S ISALCN02A	S ISALCN03A	S ISALCN04A	S ISCLCN01A	S ISCLCN02A	S ISDENT01A
		880614	880614	880614	880614	890524	890524	890122
		BE6177	BE6178	BE6176	BE6175	CA0844	CA0845	BH8775
RCRA METALS								
Arsenic	ug/kg	BMDL	ND	ND	ND	13000	5400	BMDL
Barium	ug/kg	125000	158000	128000	277000	84000	110000	120000
Cadmium	ug/kg	ND	ND	ND	ND	ND	ND	BMDL
Chromium	ug/kg	7100	8900	16000	3000	4900	8200	6400
Lead	ug/kg	4200	12000	76000	12000	3300	3300	7000
Mercury	ug/kg	114	120	1300	BMDL	ND	BMDL	550
Mercury, Inorganic	ug/kg	101	99	468	-	-	-	-
Selenium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Silver	ug/kg	ND	ND	ND	ND	ND	BMDL	ND
OTHER METALS AND MISC								
Aluminum	ug/kg	18300000	20100000	13900000	4650000	15200000	21000000	14300000
Antimony	ug/kg	ND	ND	ND	BMDL	BMDL	BMDL	ND
Beryllium	ug/kg	ND	ND	ND	BMDL	BMDL	BMDL	ND
Calcium	ug/kg	6810000	3520000	8980000	1900000	7670000	19300000	3500000
Cobalt	ug/kg	15000	19000	11000	BMDL	18000	18000	12000
Copper	ug/kg	29000	42000	44000	11000	19000	22000	36000
Iron	ug/kg	38500000	32700000	30400000	9610000	37100000	40000000	25400000
Magnesium	ug/kg	4430000	6130000	7290000	2310000	6730000	7930000	5080000
Manganese	ug/kg	1080000	995000	806000	516000	1060000	1540000	817000
Nickel	ug/kg	3700	5600	7300	BMDL	BMDL	BMDL	BMDL
Potassium	ug/kg	400000	720000	520000	950000	290000	320000	370000
Sodium	ug/kg	560000	300000	230000	270000	300000	140000	200000
Thallium	ug/kg	ND	ND	ND	ND	BMDL	ND	ND
Vanadium	ug/kg	110000	92000	68000	22000	89000	96000	75000
Zinc	ug/kg	82000	98000	150000	150000	59000	79000	110000
% Solid	ug/kg	88.0	76.1	84.6	93.5	-	-	72.5
Cyanide, Total	mg/kg	ND	ND	ND	ND	-	-	.22

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISDENT07A	S ISDENT08A	S ISDENT09A	S ISREED06A	S ISREEDA06	S ISREED07A	S ISREED08A
		890122	890122	890122	890122	890123	890122	890122
		BH8776	BH8777	BH8778	BH8771	BH8772	BH8773	BH8774
RCRA METALS								
Arsenic	ug/kg	BMDL	BMDL	BMDL	BMDL	BMDL	2900	BMDL
Barium	ug/kg	120000	130000	130000	86000	90000	110000	220000
Cadmium	ug/kg	BMDL	BMDL	BMDL	BMDL	ND	BMDL	BMDL
Chromium	ug/kg	6900	9400	17000	6000	5600	5700	7500
Lead	ug/kg	5900	9800	29000	7400	7200	9400	27000
Mercury	ug/kg	110	160	480	BMDL	BMDL	BMDL	130
Mercury, Inorganic	ug/kg	BMDL	-	384	BMDL	BMDL	-	97
Selenium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Silver	ug/kg	ND	ND	BMDL	ND	ND	ND	5300
OTHER METALS AND MISC								
Aluminum	ug/kg	15100000	14400000	26900000	10200000	9690000	14500000	13400000
Antimony	ug/kg	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL
Beryllium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Calcium	ug/kg	3900000	3900000	27900000	3000000	3300000	3600000	3500000
Cobalt	ug/kg	13000	12000	13000	9800	9000	9400	13000
Copper	ug/kg	31000	30000	81000	22000	20000	23000	29000
Iron	ug/kg	28000000	29600000	32400000	21300000	17900000	23100000	27700000
Magnesium	ug/kg	5000000	5180000	6480000	2500000	2700000	3900000	4300000
Manganese	ug/kg	701000	694000	519000	543000	615000	599000	1160000
Nickel	ug/kg	BMDL	BMDL	8800	BMDL	BMDL	BMDL	BMDL
Potassium	ug/kg	340000	250000	870000	150000	BMDL	400000	330000
Sodium	ug/kg	BMDL	BMDL	510000	BMDL	BMDL	BMDL	BMDL
Thallium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vanadium	ug/kg	82000	90000	100000	64000	48000	68000	80000
Zinc	ug/kg	78000	80000	140000	46000	57000	67000	90000
% Solid	ug/kg	75.2	74.7	65.7	71.8	69.0	85.5	82.1
Cyanide, Total	mg/kg	.97	.15	.06	.13	.71	.35	.41

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISDENV01A	S ISDENV02A	S ISESPS01A	S ISESPSA01	S ISESPS02A	S ISHWTP01A	S ISHWTP02A
		890713	890713	880826	880826	880826	890720	890720
		CA1120	CA1121	BE6194	BE6195	BE9329	CA1148	CA1149
RCRA METALS								
Arsenic	ug/kg	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL
Barium	ug/kg	400000	72000	160000	190000	190000	100000	78000
Cadmium	ug/kg	ND	ND	BMDL	BMDL	610	ND	ND
Chromium	ug/kg	4400	14000	3800	3300	14000	7000	11000
Lead	ug/kg	3000	5800	8100	7700	16000	7400	4600
Mercury	ug/kg	ND	ND	BMDL	BMDL	82	260	150
Mercury, Inorganic	ug/kg	-	-	-	-	-	149	162
Selenium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Silver	ug/kg	ND	ND	ND	BMDL	BMDL	ND	ND
OTHER METALS AND MISC								
Aluminum	ug/kg	22900000	12100000	7300000	6920000	14300000	13400000	42700000
Antimony	ug/kg	16000	BMDL	ND	ND	ND	BMDL	BMDL
Beryllium	ug/kg	ND	ND	BMDL	BMDL	BMDL	BMDL	ND
Calcium	ug/kg	3800000	2900000	2300000	2500000	5270000	3600000	11400000
Cobalt	ug/kg	17000	13000	6100	7100	12000	11000	12000
Copper	ug/kg	37000	21000	17000	18000	53000	24000	31000
Iron	ug/kg	37300000	34000000	12600000	14100000	27500000	26900000	37700000
Magnesium	ug/kg	14200000	4750000	3440000	3230000	2800000	4510000	6000000
Manganese	ug/kg	2770000	699000	589000	664000	1060000	663000	483000
Nickel	ug/kg	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL
Potassium	ug/kg	200000	450000	590000	680000	2100000	760000	800000
Sodium	ug/kg	980000	BMDL	190000	160000	170000	490000	640000
Thallium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vanadium	ug/kg	98000	96000	32000	39000	93000	70000	120000
Zinc	ug/kg	100000	58000	51000	56000	82000	67000	82000
% Solid	ug/kg	-	-	89.1	90.3	77.8	77.7	71.8
Cyanide, Total	mg/kg	ND	ND	ND	-	ND	.45	.29

FRO 001 1908

DYNAMAC CORPORATION

INDUSTRIAL SAMPLES

		S ISHWTPA02	S ISHWTP03A	S ISHWTP04A	S ISHWTP05A	S ISHWTP06A	S ISHWTP07A	S ISHWTP08A
		890720	890712	890712	890720	890712	890720	890720
		CA1156	CA1150	CA1151	CA1152	CA1153	CA1154	CA1155
RCRA METALS								
Arsenic	ug/kg	BMDL	BMDL	BMDL	BMDL	ND	BMDL	3100
Barium	ug/kg	99000	120000	94000	74000	52000	150000	130000
Cadmium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chromium	ug/kg	8600	8100	6500	11000	18000	15000	21000
Lead	ug/kg	3800	3700	3800	4900	6500	6300	11000
Mercury	ug/kg	BMDL	320	ND	180	210	1700	830
Mercury, Inorganic	ug/kg	BMDL	308	ND	166	-	-	-
Selenium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Silver	ug/kg	ND	BMDL	ND	ND	ND	BMDL	BMDL
OTHER METALS AND MISC								
Aluminum	ug/kg	37400000	41300000	14800000	17900000	40000000	43900000	39900000
Antimony	ug/kg	BMDL	21000	15000	BMDL	BMDL	BMDL	BMDL
Beryllium	ug/kg	BMDL	BMDL	BMDL	ND	ND	ND	ND
Calcium	ug/kg	6800000	16600000	2900000	5810000	12800000	84800000	40100000
Cobalt	ug/kg	15000	17000	14000	BMDL	8600	11000	12000
Copper	ug/kg	18000	25000	22000	28000	33000	54000	64000
Iron	ug/kg	44900000	40300000	31300000	16100000	29500000	33900000	36400000
Magnesium	ug/kg	6140000	7530000	7160000	2100000	5760000	6510000	7110000
Manganese	ug/kg	332000	555000	981000	203000	228000	389000	447000
Nickel	ug/kg	BMDL	6200	BMDL	6300	6800	9900	12000
Potassium	ug/kg	540000	680000	550000	260000	1200000	2100000	2100000
Sodium	ug/kg	670000	580000	1100000	600000	410000	3100000	750000
Thallium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vanadium	ug/kg	140000	120000	81000	48000	130000	93000	93000
Zinc	ug/kg	77000	100000	66000	52000	130000	110000	120000
% Solid	ug/kg	73.5	-	-	69.8	-	-	-
Cyanide, Total	mg/kg	.37	ND	ND	.6	ND	.53	.50

FRO 001 1909

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISOWNS01A	S ISOWNS02A	S ISPCR02A	S ISPCRA02	S ISPCR05A	S ISPEER01A	S ISPEER01A
		890523	890523	890524	890525	890524	880607	880826
		CA0841	CA0842	CA0886	CA0887	CA0885	BE6167	BE6193
RCRA METALS								
Arsenic	ug/kg	BMDL	BMDL	BMDL	BMDL	BMDL	430000	-
Barium	ug/kg	180000	97000	95000	110000	85000	159000	-
Cadmium	ug/kg	ND	ND	ND	ND	ND	2900	-
Chromium	ug/kg	5300	8300	11000	13000	5900	12000	-
Lead	ug/kg	30000	13000	8500	8300	3700	43000	-
Mercury	ug/kg	95	BMDL	170	150	110	105	-
Mercury, Inorganic	ug/kg	-	-	-	-	-	-	-
Selenium	ug/kg	BMDL	ND	ND	ND	ND	BMDL	-
Silver	ug/kg	ND	ND	ND	ND	ND	BMDL	-
OTHER METALS AND MISC								
Aluminum	ug/kg	10400000	16900000	21000000	27900000	19500000	23700000	-
Antimony	ug/kg	ND	ND	BMDL	15000	BMDL	ND	-
Beryllium	ug/kg	BMDL	300	BMDL	BMDL	BMDL	ND	-
Calcium	ug/kg	7520000	3000000	2900000	3500000	2300000	11200000	-
Cobalt	ug/kg	8000	15000	17000	23000	15000	18000	-
Copper	ug/kg	25000	19000	27000	28000	17000	46000	-
Iron	ug/kg	20600000	37000000	40000000	56000000	38100000	34100000	-
Magnesium	ug/kg	3780000	5180000	5910000	6930000	3700000	8880000	-
Manganese	ug/kg	839000	788000	570000	646000	1110000	1280000	-
Nickel	ug/kg	BMDL	BMDL	BMDL	BMDL	BMDL	9000	-
Potassium	ug/kg	560000	382000	480000	590000	360000	650000	-
Sodium	ug/kg	170000	170000	250000	260000	BMDL	460000	-
Thallium	ug/kg	BMDL	ND	ND	ND	ND	ND	-
Vanadium	ug/kg	57000	110000	110000	150000	110000	83000	-
Zinc	ug/kg	110000	60000	170000	210000	45000	180000	-
% Solid	ug/kg	-	-	-	-	-	80.3	-
Cyanide, Total	mg/kg	-	-	-	-	-	ND	-

FRO 001 1910

DYNAMAC CORPORATION

INDUSTRIAL SAMPLES

		S ISPEER02A	S ISPEER02A	S ISSQBB01A	S ISSQBBA01	S ISSQBB02A	S ISSQBB03A	S ISSQBB04A
		880607	880826	890523	890523	890523	890523	890523
		BE6168	BE6196	CA0830	CA0831	CA0832	CA0833	CA0834
RCRA METALS								
Arsenic	ug/kg	3500	-	BMDL	BMDL	3600	BMDL	5400
Barium	ug/kg	109000	-	81000	120000	130000	150000	99000
Cadmium	ug/kg	ND	-	ND	ND	ND	ND	ND
Chromium	ug/kg	5800	-	BMDL	BMDL	5000	6200	6700
Lead	ug/kg	70000	-	1900	2600	4800	5200	5900
Mercury	ug/kg	110	-	ND	ND	400	BMDL	840
Mercury, Inorganic	ug/kg	-	-	ND	ND	422	BMDL	721
Selenium	ug/kg	BMDL	-	ND	ND	ND	ND	ND
Silver	ug/kg	BMDL	-	ND	ND	ND	ND	ND
OTHER METALS AND MISC								
Aluminum	ug/kg	18000000	-	16300000	20000000	17400000	14000000	10800000
Antimony	ug/kg	ND	-	ND	ND	BMDL	BMDL	ND
Beryllium	ug/kg	ND	-	ND	BMDL	BMDL	BMDL	BMDL
Calcium	ug/kg	4540000	-	3200000	4780000	2700000	3100000	2400000
Cobalt	ug/kg	14000	-	15000	19000	15000	14000	7600
Copper	ug/kg	49000	-	9700	9800	22000	28000	21000
Iron	ug/kg	29600000	-	16600000	20400000	31700000	32700000	22200000
Magnesium	ug/kg	5740000	-	9130000	11800000	7970000	8510000	3070000
Manganese	ug/kg	818000	-	722000	1090000	1160000	1160000	772000
Nickel	ug/kg	3500	-	BMDL	BMDL	BMDL	BMDL	BMDL
Potassium	ug/kg	520000	-	130000	140000	210000	390000	270000
Sodium	ug/kg	3360000	-	2000000	2500000	590000	1300000	260000
Thallium	ug/kg	ND	-	ND	ND	ND	ND	ND
Vanadium	ug/kg	89000	-	35000	41000	71000	83000	61000
Zinc	ug/kg	120000	-	85000	95000	78000	97000	55000
% Solid	ug/kg	83.4	-	86.0	87.3	86.3	89.8	87.1
Cyanide, Total	mg/kg	ND	-	-	-	-	-	-

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		C ISSBSED01	X ISSBSED02	X ISSBSED03	B ISSBSED04	X ISSBSED05	B ISSBSED06	S ISTECH01A
		890525	890713	890713	890523	890713	890525	880616
		CA0835	CA1106	CA1107	CA0838	CA1108	CA0839	BE6187
RCRA METALS								
Arsenic	ug/kg	-	BMDL	ND	BMDL	BMDL	3300	BMDL
Barium	ug/kg	-	54	BMDL	48000	62	120000	96000
Cadmium	ug/kg	-	BMDL	ND	ND	ND	ND	ND
Chromium	ug/kg	-	ND	ND	19000	BMDL	21000	5900
Lead	ug/kg	-	6.6	14	7700	BMDL	22000	100000
Mercury	ug/kg	.74	BMDL	ND	ND	BMDL	BMDL	160
Mercury, Inorganic	ug/kg	.52	-	-	ND	-	-	108
Selenium	ug/kg	-	ND	ND	ND	ND	ND	ND
Silver	ug/kg	-	ND	ND	BMDL	ND	ND	BMDL
OTHER METALS AND MISC								
Aluminum	ug/kg	-	3600	980	4410000	6200	7480000	9420000
Antimony	ug/kg	-	ND	ND	ND	ND	BMDL	ND
Beryllium	ug/kg	-	ND	ND	ND	ND	BMDL	ND
Calcium	ug/kg	-	14000	6800	3800000	14000	16600000	3570000
Cobalt	ug/kg	-	ND	ND	7100	ND	9600	8900
Copper	ug/kg	-	BMDL	BMDL	25000	12	81000	20000
Iron	ug/kg	-	3700	1000	11800000	6300	19200000	21400000
Magnesium	ug/kg	-	5100	1300	3710000	5200	2840000	1670000
Manganese	ug/kg	-	210	31	337000	270	479000	664000
Nickel	ug/kg	-	ND	ND	8500	ND	37000	BMDL
Potassium	ug/kg	-	3500	970	270000	3700	520000	250000
Sodium	ug/kg	-	23000	6000	BMDL	26000	390000	51000
Thallium	ug/kg	-	ND	ND	ND	ND	BMDL	ND
Vanadium	ug/kg	-	BMDL	BMDL	29000	BMDL	39000	68000
Zinc	ug/kg	-	63	160	694000	94	330000	42000
% Solid	ug/kg	-	-	-	78.5	-	-	82.9
Cyanide, Total	mg/kg	-	ND	ND	-	ND	-	ND

FRO 001 1912

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISTECH02A	S ISTECH03A	S ISTECH04A	S ISTECH05A	S ISTECH06A	S ISTECH07A	S ISTECHA07
		880615	880615	880615	880615	880615	880616	880616
		BE6179	BE6180	BE6181	BE6183	BE6182	BE6185	BE6186
RCRA METALS								
Arsenic	ug/kg	BMDL	BMDL	ND	BMDL	BMDL	BMDL	BMDL
Barium	ug/kg	115000	99000	107000	68000	96000	50000	84000
Cadmium	ug/kg	BMDL	ND	ND	BMDL	ND	ND	ND
Chromium	ug/kg	6000	7000	2900	4200	16000	5800	6000
Lead	ug/kg	5600	14000	7700	17000	74000	19000	14000
Mercury	ug/kg	5600	420	1400	9700	535000	260	220
Mercury, Inorganic	ug/kg	7000	423	591	-	-	-	-
Selenium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Silver	ug/kg	BMDL	ND	ND	ND	ND	ND	ND
OTHER METALS AND MISC								
Aluminum	ug/kg	17800000	11300000	8740000	16500000	9910000	8250000	10800000
Antimony	ug/kg	ND	ND	ND	ND	ND	ND	ND
Beryllium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Calcium	ug/kg	3910000	3270000	2100000	3940000	63700000	7760000	12700000
Cobalt	ug/kg	9900	12000	BMDL	16000	9100	BMDL	16000
Copper	ug/kg	48000	22000	19000	24000	22000	31000	41000
Iron	ug/kg	27300000	24400000	18800000	28700000	26400000	22800000	30000000
Magnesium	ug/kg	6010000	2300000	2760000	6540000	2270000	2580000	3630000
Manganese	ug/kg	834000	719000	443000	894000	444000	452000	981000
Nickel	ug/kg	5000	3700	BMDL	3800	9200	3900	4000
Potassium	ug/kg	380000	590000	840000	180000	390000	200000	200000
Sodium	ug/kg	92000	330000	70000	140000	87000	120000	150000
Thallium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vanadium	ug/kg	70000	80000	55000	72000	56000	56000	72000
Zinc	ug/kg	61000	47000	50000	95000	120000	110000	170000
% Solid	ug/kg	83.7	87.2	89.2	69.2	91.2	74.7	72.3
Cyanide, Total	mg/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISTECH08A	S ISWJKC01A	S ISWJKC02A
		880615	890714	890714
		BE6184	CA1174	CA1175
RCRA METALS				
Arsenic	ug/kg	ND	4600	BMDL
Barium	ug/kg	166000	94000	110000
Cadmium	ug/kg	ND	10000	ND
Chromium	ug/kg	15000	15000	7400
Lead	ug/kg	4700	19000	5900
Mercury	ug/kg	110	160	BMDL
Mercury, Inorganic	ug/kg	120	-	-
Selenium	ug/kg	ND	BMDL	BMDL
Silver	ug/kg	ND	BMDL	ND
OTHER METALS AND MISC				
Aluminum	ug/kg	11100000	13200000	20000000
Antimony	ug/kg	ND	BMDL	BMDL
Beryllium	ug/kg	ND	ND	BMDL
Calcium	ug/kg	5770000	75300000	10200000
Cobalt	ug/kg	10000	11000	16000
Copper	ug/kg	20000	60000	27000
Iron	ug/kg	23300000	27700000	37900000
Magnesium	ug/kg	4530000	6480000	7660000
Manganese	ug/kg	1140000	918000	1120000
Nickel	ug/kg	2800	BMDL	BMDL
Potassium	ug/kg	550000	420000	400000
Sodium	ug/kg	160000	310000	210000
Thallium	ug/kg	ND	ND	ND
Vanadium	ug/kg	56000	65000	100000
Zinc	ug/kg	73000	565000	100000
% Solid	ug/kg	89.2	-	-
Cyanide, Total	mg/kg	ND	ND	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES

		S ISREED03A 890122 BH8770
RCRA METALS		
Arsenic	ug/kg	BMDL
Barium	ug/kg	79000
Cadmium	ug/kg	BMDL
Chromium	ug/kg	7600
Lead	ug/kg	7800
Mercury	ug/kg	BMDL
Mercury, Inorganic	ug/kg	BMDL
Selenium	ug/kg	ND
Silver	ug/kg	ND
OTHER METALS AND MISC		
Aluminum	ug/kg	11400000
Antimony	ug/kg	BMDL
Beryllium	ug/kg	ND
Calcium	ug/kg	2400000
Cobalt	ug/kg	11000
Copper	ug/kg	38000
Iron	ug/kg	23200000
Magnesium	ug/kg	2700000
Manganese	ug/kg	376000
Nickel	ug/kg	BMDL
Potassium	ug/kg	180000
Sodium	ug/kg	BMDL
Thallium	ug/kg	ND
Vanadium	ug/kg	69000
Zinc	ug/kg	51000
% Solid	ug/kg	72.1
Cyanide, Total	mg/kg	.27

FRO 001 1915

DYNAMAC CORPORATION

INDUSTRIAL SAMPLES - BACKGROUND

		S ISBG01A	S ISBG01A	S ISBG02A	S ISBG02A	S ISBG03A	S ISBG04A	S ISBGA04
		880609	880828	880609	880826	890720	880617	880617
		BE6171	BE9335	BE6173	BE9330	CA1180	BE6189	BE6190
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	ND	ND	ND	1620	ND	ND	ND
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	BMDL	ND	BMDL	ND	ND	ND	ND
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	BMDL	BMDL	BMDL	BMDL	1230	ND	ND
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Fluorene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Isophorone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	ND	ND	ND	BMDL	ND	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	ND	ND	ND	ND	ND

FRO 001 1916

DYNAMAC CORPORATION

INDUSTRIAL SAMPLES - BACKGROUND

		S ISBG05A	S ISBG06A	S ISBG06A	S ISBG07A	S ISBG07A	S ISBG08A	S ISBG08A
		880617	880609	880828	880609	880828	880609	880826
		BE6188	BE6169	BE9333	BE6170	BE9334	BE6172	BE9332
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	ND	BMDL	ND	BMDL	ND	BMDL	ND
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	ND	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	ug/kg	ND	ND	BMDL	ND	ND	ND	ND
Fluorene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Isophorone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	ND	ND	BMDL	ND	BMDL	ND	BMDL
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pyrene	ug/kg	ND	ND	BMDL	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	ND	ND	-	ND	ND

FRO 001 1917

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES - BACKGROUND

		S ISBG09A	S ISBG09A	S ISBG10A	S ISBG11A	S ISBG12A	S ISBGA12
		880609	880826	890123	890721	880617	880617
		BE6174	BE9331	BH8780	CA1181	BE6191	BE6192
BASE NEUTRAL COMPOUNDS							
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	ND	ND	BMDL	ND	BMDL	ND
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	BMDL	ND	BMDL	ND	ND	ND
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	BMDL	BMDL	ND	1030	ND	ND
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/kg	ND	ND	ND	BMDL	ND	ND
Fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND
Fluorene	ug/kg	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND	ND
Isophorone	ug/kg	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	ND	BMDL	ND	ND	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND	ND	ND	ND
Pyrene	ug/kg	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	ND	ND	ND	ND

FRO 001 1918

DYNAMAC CORPORATION

INDUSTRIAL SAMPLES - BACKGROUND

		S ISBG01A	S ISBG01A	S ISBG02A	S ISBG02A	S ISBG03A	S ISBG04A	S ISBGA04
		880609	880828	880609	880826	890720	880617	880617
		BE6171	BE9335	BE6173	BE9330	CA1180	BE6189	BE6190
ACID COMPOUNDS								
2-Chlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzoic acid	ug/kg	ND	ND	ND	ND	ND	ND	ND
PESTICIDES AND AROCLOS								
Aldrin	ug/kg	-	ND	-	ND	ND	ND	ND
Alpha-BHC	ug/kg	-	ND	-	ND	ND	ND	ND
Beta-BHC	ug/kg	-	ND	-	ND	ND	ND	ND
Gamma-BHC	ug/kg	-	ND	-	ND	ND	ND	ND
Delta-BHC	ug/kg	-	ND	-	ND	ND	ND	ND
4,4'-DDT	ug/kg	-	ND	-	ND	ND	ND	ND
4,4'-DDE	ug/kg	-	ND	-	ND	ND	ND	ND
4,4'-DDD	ug/kg	-	ND	-	ND	ND	ND	ND
Dieldrin	ug/kg	-	ND	-	ND	ND	ND	ND
Endosulfan I	ug/kg	-	ND	-	ND	ND	ND	ND
Endosulfan II	ug/kg	-	ND	-	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	-	ND	-	ND	ND	ND	ND
Endrin	ug/kg	-	ND	-	ND	ND	ND	ND
Heptachlor	ug/kg	-	ND	-	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	-	ND	-	ND	ND	ND	ND
Toxaphene	ug/kg	-	ND	-	ND	ND	ND	ND
Endrin ketone	ug/kg	-	ND	-	ND	ND	ND	ND
Methoxychlor	ug/kg	-	ND	-	ND	ND	ND	ND
alpha-Chlordane	ug/kg	-	ND	-	ND	ND	ND	ND
gamma-Chlordane	ug/kg	-	ND	-	ND	ND	ND	ND
Aroclor 1242	ug/kg	-	ND	-	ND	ND	ND	ND
Aroclor 1254	ug/kg	-	ND	-	ND	ND	ND	ND
Aroclor 1260	ug/kg	-	ND	-	ND	ND	ND	ND
Aroclor 1248	ug/kg	-	ND	-	ND	ND	ND	ND
Aroclor 1232	ug/kg	-	ND	-	ND	ND	ND	ND
Aroclor 1221	ug/kg	-	ND	-	ND	ND	ND	ND
Aroclor 1016	ug/kg	-	ND	-	ND	ND	ND	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES - BACKGROUND

		S ISBG05A	S ISBG06A	S ISBG06A	S ISBG07A	S ISBG07A	S ISBG08A	S ISBG08A
		880617	880609	880828	880609	880828	880609	880826
		BE6188	BE6169	BE9333	BE6170	BE9334	BE6172	BE9332
ACID COMPOUNDS								
2-Chlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzoic acid	ug/kg	ND	ND	ND	ND	ND	ND	ND
PESTICIDES AND AROCLOS								
Aldrin	ug/kg	ND	-	ND	-	ND	-	ND
Alpha-BHC	ug/kg	ND	-	ND	-	ND	-	ND
Beta-BHC	ug/kg	ND	-	ND	-	ND	-	ND
Gamma-BHC	ug/kg	ND	-	ND	-	ND	-	ND
Delta-BHC	ug/kg	ND	-	ND	-	ND	-	ND
4,4'-DDT	ug/kg	ND	-	ND	-	ND	-	ND
4,4'-DDE	ug/kg	ND	-	ND	-	ND	-	ND
4,4'-DDD	ug/kg	ND	-	ND	-	ND	-	ND
Dieldrin	ug/kg	ND	-	ND	-	ND	-	ND
Endosulfan I	ug/kg	ND	-	ND	-	ND	-	ND
Endosulfan II	ug/kg	ND	-	ND	-	ND	-	ND
Endosulfan sulfate	ug/kg	ND	-	ND	-	ND	-	ND
Endrin	ug/kg	ND	-	ND	-	ND	-	ND
Heptachlor	ug/kg	ND	-	ND	-	ND	-	ND
Heptachlor epoxide	ug/kg	ND	-	ND	-	ND	-	ND
Toxaphene	ug/kg	ND	-	ND	-	ND	-	ND
Endrin ketone	ug/kg	ND	-	ND	-	ND	-	ND
Methoxychlor	ug/kg	ND	-	ND	-	ND	-	ND
alpha-Chlordane	ug/kg	ND	-	ND	-	ND	-	ND
gamma-Chlordane	ug/kg	ND	-	ND	-	ND	-	ND
Aroclor 1242	ug/kg	ND	-	ND	-	ND	-	ND
Aroclor 1254	ug/kg	ND	-	ND	-	ND	-	ND
Aroclor 1260	ug/kg	ND	-	ND	-	ND	-	ND
Aroclor 1248	ug/kg	ND	-	ND	-	ND	-	ND
Aroclor 1232	ug/kg	ND	-	ND	-	ND	-	ND
Aroclor 1221	ug/kg	ND	-	ND	-	ND	-	ND
Aroclor 1016	ug/kg	ND	-	ND	-	ND	-	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES - BACKGROUND

		S ISBG09A	S ISBG09A	S ISBG10A	S ISBG11A	S ISBG12A	S ISBGA12
		880609	880826	890123	890721	880617	880617
		BE6174	BE9331	BH8780	CA1181	BE6191	BE6192
ACID COMPOUNDS							
2-Chlorophenol	ug/kg	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND
Benzoic acid	ug/kg	ND	ND	ND	ND	ND	ND
PESTICIDES AND AROCLOS							
Aldrin	ug/kg	-	ND	ND	ND	ND	ND
Alpha-BHC	ug/kg	-	ND	ND	ND	ND	ND
Beta-BHC	ug/kg	-	ND	ND	ND	ND	ND
Gamma-BHC	ug/kg	-	ND	ND	ND	ND	ND
Delta-BHC	ug/kg	-	ND	ND	ND	ND	ND
4,4'-DDT	ug/kg	-	ND	ND	ND	ND	ND
4,4'-DDE	ug/kg	-	ND	ND	ND	ND	ND
4,4'-DDD	ug/kg	-	ND	ND	ND	ND	ND
Dieldrin	ug/kg	-	ND	ND	ND	ND	ND
Endosulfan I	ug/kg	-	ND	ND	ND	ND	ND
Endosulfan II	ug/kg	-	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	-	ND	ND	ND	ND	ND
Endrin	ug/kg	-	ND	ND	ND	ND	ND
Heptachlor	ug/kg	-	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	-	ND	ND	ND	ND	ND
Toxaphene	ug/kg	-	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	-	ND	ND	ND	ND	ND
Methoxychlor	ug/kg	-	ND	ND	ND	ND	ND
alpha-Chlordane	ug/kg	-	ND	ND	ND	ND	ND
gamma-Chlordane	ug/kg	-	ND	ND	ND	ND	ND
Aroclor 1242	ug/kg	-	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	-	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	-	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	-	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	-	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	-	ND	ND	ND	ND	ND
Aroclor 1016	ug/kg	-	ND	ND	ND	ND	ND

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES - BACKGROUND

		S ISBG01A	S ISBG01A	S ISBG02A	S ISBG02A	S ISBG03A	S ISBG04A	S ISBGA04
		880609	880828	880609	880826	890720	880617	880617
		BE6171	BE9335	BE6173	BE9330	CA1180	BE6189	BE6190
RCRA METALS								
Arsenic	ug/kg	BMDL	-	BMDL	-	BMDL	BMDL	BMDL
Barium	ug/kg	248000	-	98900	-	140000	275000	593000
Cadmium	ug/kg	ND	-	ND	-	ND	ND	ND
Chromium	ug/kg	6700	-	20000	-	2800	28000	28000
Lead	ug/kg	2200	-	67000	-	6100	31000	25000
Mercury	ug/kg	BMDL	-	BMDL	-	BMDL	110	86
Mercury, Inorganic	ug/kg	ND	-	BMDL	-	BMDL	BMDL	BMDL
Selenium	ug/kg	ND	-	ND	-	BMDL	ND	ND
Silver	ug/kg	BMDL	-	ND	-	ND	ND	ND
OTHER METALS AND MISC								
Aluminum	ug/kg	18600000	-	10600000	-	19000000	19000000	17400000
Antimony	ug/kg	ND	-	ND	-	BMDL	ND	ND
Beryllium	ug/kg	ND	-	ND	-	BMDL	ND	ND
Calcium	ug/kg	2700000	-	6400000	-	3000000	590000	580000
Cobalt	ug/kg	26000	-	10000	-	15000	19000	41000
Copper	ug/kg	33000	-	65000	-	19000	74000	77000
Iron	ug/kg	41200000	-	21900000	-	29600000	49900000	54400000
Magnesium	ug/kg	5750000	-	4450000	-	6520000	3320000	3060000
Manganese	ug/kg	1740000	-	551000	-	1250000	1100000	3460000
Nickel	ug/kg	3700	-	9600	-	BMDL	10000	9300
Potassium	ug/kg	350000	-	740000	-	470000	730000	640000
Sodium	ug/kg	200000	-	140000	-	BMDL	120000	130000
Thallium	ug/kg	ND	-	ND	-	ND	ND	ND
Vanadium	ug/kg	120000	-	62000	-	74000	140000	150000
Zinc	ug/kg	60000	-	69000	-	56000	81000	90000
% Solid	ug/kg	81.7	-	93.3	-	77.9	79.2	78.7
Cyanide, Total	mg/kg	ND	-	ND	-	.37	ND	ND

FRO 001 1922

DYNAMAC CORPORATION
INDUSTRIAL SAMPLES - BACKGROUND

		S ISBG05A 880617 BE6188	S ISBG06A 880609 BE6169	S ISBG06A 880828 BE9333	S ISBG07A 880609 BE6170	S ISBG07A 880828 BE9334	S ISBG08A 880609 BE6172	S ISBG08A 880826 BE9332
RCRA METALS								
Arsenic	ug/kg	BMDL	BMDL	-	BMDL	-	BMDL	-
Barium	ug/kg	49000	135000	-	150000	-	98000	-
Cadmium	ug/kg	ND	BMDL	-	ND	-	ND	-
Chromium	ug/kg	18000	50000	-	11000	-	8500	-
Lead	ug/kg	7400	4300	-	8000	-	10000	-
Mercury	ug/kg	150	BMDL	-	BMDL	-	BMDL	-
Mercury, Inorganic	ug/kg	BMDL	BMDL	-	-	-	-	-
Selenium	ug/kg	ND	BMDL	-	BMDL	-	ND	-
Silver	ug/kg	ND	BMDL	-	BMDL	-	ND	-
OTHER METALS AND MISC								
Aluminum	ug/kg	11800000	24600000	-	20300000	-	11300000	-
Antimony	ug/kg	ND	ND	-	ND	-	ND	-
Beryllium	ug/kg	ND	ND	-	ND	-	ND	-
Calcium	ug/kg	2300000	5230000	-	1640000	-	2830000	-
Cobalt	ug/kg	19000	28000	-	31000	-	10000	-
Copper	ug/kg	50000	84000	-	39000	-	35000	-
Iron	ug/kg	36400000	52100000	-	57000000	-	21700000	-
Magnesium	ug/kg	3280000	6520000	-	2120000	-	2810000	-
Manganese	ug/kg	973000	1420000	-	2520000	-	654000	-
Nickel	ug/kg	13000	17000	-	3500	-	3300	-
Potassium	ug/kg	940000	470000	-	350000	-	930000	-
Sodium	ug/kg	91000	230000	-	100000	-	91000	-
Thallium	ug/kg	ND	ND	-	ND	-	ND	-
Vanadium	ug/kg	100000	160000	-	180000	-	68000	-
Zinc	ug/kg	94000	73000	-	58000	-	66000	-
% Solid	ug/kg	77.5	92.3	-	90.7	-	85.8	-
Cyanide, Total	mg/kg	.8	ND	-	ND	-	ND	-

DYNAMAC CORPORATION

INDUSTRIAL SAMPLES - BACKGROUND

		S ISBG09A	S ISBG09A	S ISBG10A	S ISBG11A	S ISBG12A	S ISBGA12
		880609	880826	890123	890721	880617	880617
		BE6174	BE9331	BH8780	CA1181	BE6191	BE6192
RCRA METALS							
Arsenic	ug/kg	BMDL	-	BMDL	BMDL	BMDL	BMDL
Barium	ug/kg	87300	-	130000	87000	110000	117000
Cadmium	ug/kg	ND	-	BMDL	ND	ND	ND
Chromium	ug/kg	8700	-	8600	6600	8500	6000
Lead	ug/kg	1500	-	4200	3100	9700	9100
Mercury	ug/kg	BMDL	-	BMDL	BMDL	88	BMDL
Mercury, Inorganic	ug/kg	-	-	-	-	-	-
Selenium	ug/kg	BMDL	-	ND	ND	ND	ND
Silver	ug/kg	ND	-	ND	ND	ND	ND
OTHER METALS AND MISC							
Aluminum	ug/kg	14200000	-	17900000	24200000	11900000	12200000
Antimony	ug/kg	ND	-	BMDL	BMDL	ND	ND
Beryllium	ug/kg	ND	-	BMDL	ND	ND	ND
Calcium	ug/kg	3940000	-	2100000	3500000	3550000	3540000
Cobalt	ug/kg	9600	-	25000	18000	12000	7800
Copper	ug/kg	23000	-	61000	30000	43000	50000
Iron	ug/kg	25400000	-	20700000	43000000	30000000	29700000
Magnesium	ug/kg	5200000	-	3610000	14300000	6820000	8050000
Manganese	ug/kg	725000	-	339000	1340000	564000	693000
Nickel	ug/kg	4200	-	6800	BMDL	4800	4800
Potassium	ug/kg	640000	-	410000	690000	920000	1300000
Sodium	ug/kg	94000	-	200000	620000	180000	180000
Thallium	ug/kg	ND	-	ND	ND	ND	ND
Vanadium	ug/kg	65000	-	95000	84000	73000	68000
Zinc	ug/kg	59000	-	61000	93000	80000	85000
% Solid	ug/kg	88.3	-	72.9	-	84.3	87.6
Cyanide, Total	mg/kg	ND	-	.11	.23	ND	ND

6: Biota Samples

DYNAMAC CORPORATION

BIOTA SAMPLES - ONSITE

		X CF203	X CF204	X CF220	X CM207	X CM208	X CM220	X X209
		880225	880227	880224	880224	880224	880225	880226
		BH1323	BH1314	BH1322	BH1311	BH1327	BH1336	BH1318
BASE NEUTRAL COMPOUNDS								
Acenaphthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	ND	BMDL	BMDL	ND	BMDL	ND	ND
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ug/kg	ND	BMDL	ND	BMDL	BMDL	BMDL	ND
Fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Fluorene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Isophorone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	ND	ND	ND	ND	ND

FRO 001 1926

DYNAMAC CORPORATION
BIOTA SAMPLES - ONSITE

		X X220	X X227	X X251
		880227	880226	880226
		BH1321	BH1320	BH1325
BASE NEUTRAL COMPOUNDS				
Acenaphthene	ug/kg	ND	ND	ND
Acenaphthylene	ug/kg	ND	ND	ND
Anthracene	ug/kg	ND	ND	ND
Benzo(a)anthracene	ug/kg	ND	ND	ND
Benzo(a)pyrene	ug/kg	ND	ND	ND
Benzo(b)fluoranthene	ug/kg	ND	ND	ND
Benzo(ghi)perylene	ug/kg	ND	ND	ND
Benzo(k)fluoranthene	ug/kg	ND	ND	ND
bis(2-Chloroethoxy)methane	ug/kg	ND	ND	ND
bis(2-Chloroethyl) ether	ug/kg	ND	ND	ND
bis(2-Chloroisopropyl)ether	ug/kg	ND	ND	ND
bis(2-Ethylhexyl)phthalate	ug/kg	ND	ND	ND
4-Bromophenyl phenyl ether	ug/kg	ND	ND	ND
Butyl benzyl phthalate	ug/kg	ND	ND	ND
2-Chloronaphthalene	ug/kg	ND	ND	ND
4-Chlorophenyl phenyl ether	ug/kg	ND	ND	ND
Chrysene	ug/kg	ND	ND	ND
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND
1,2-Dichlorobenzene	ug/kg	ND	ND	ND
1,3-Dichlorobenzene	ug/kg	ND	ND	ND
1,4-Dichlorobenzene	ug/kg	ND	ND	ND
3,3'-Dichlorobenzidine	ug/kg	ND	ND	ND
Diethyl phthalate	ug/kg	ND	ND	ND
Dimethyl phthalate	ug/kg	ND	ND	ND
Di-n-butyl phthalate	ug/kg	ND	ND	ND
2,4-Dinitrotoluene	ug/kg	ND	ND	ND
2,6-Dinitrotoluene	ug/kg	ND	ND	ND
Di-n-octyl phthalate	ug/kg	ND	ND	BMDL
Fluoranthene	ug/kg	ND	ND	ND
Fluorene	ug/kg	ND	ND	ND
Hexachlorobenzene	ug/kg	ND	ND	ND
Hexachlorobutadiene	ug/kg	ND	ND	ND
Hexachlorocyclopentadiene	ug/kg	ND	ND	ND
Hexachloroethane	ug/kg	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ug/kg	ND	ND	ND
Isophorone	ug/kg	ND	ND	ND
Naphthalene	ug/kg	ND	ND	ND
Nitrobenzene	ug/kg	ND	ND	ND
N-Nitrosodi-n-propylamine	ug/kg	ND	ND	ND
N-Nitrosodiphenylamine	ug/kg	ND	ND	ND
Phenanthrene	ug/kg	ND	ND	ND
Pyrene	ug/kg	ND	ND	ND
1,2,4-Trichlorobenzene	ug/kg	ND	ND	ND
2-Methylnaphthalene	ug/kg	ND	ND	ND
2-Nitroaniline	ug/kg	ND	ND	ND
3-Nitroaniline	ug/kg	ND	ND	ND
4-Chloroaniline	ug/kg	ND	ND	ND
4-Nitroaniline	ug/kg	ND	ND	ND
Benzyl alcohol	ug/kg	ND	ND	ND
Dibenzofuran	ug/kg	ND	ND	ND

DYNAMAC CORPORATION

BIOTA SAMPLES - ONSITE

		X CF203	X CF204	X CF220	X CM207	X CM208	X CM220	X X209
		880225	880227	880224	880224	880224	880225	880226
		BH1323	BH1314	BH1322	BH1311	BH1327	BH1336	BH1318
ACID COMPOUNDS								
2-Chlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Phenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
2-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND	ND	ND	ND	ND
Benzoic acid	ug/kg	ND	ND	ND	BMDL	ND	ND	BMDL
PESTICIDES AND AROCLORS								
Aldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Alpha-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Beta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Gamma-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND
Delta-BHC	ug/kg	62	ND	48	ND	ND	ND	ND
4,4'-DDT	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ug/kg	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ug/kg	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ug/kg	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ug/kg	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ug/kg	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ug/kg	ND	ND	ND	ND	ND	ND	ND
alpha-Chlordane	ug/kg	ND	ND	ND	ND	ND	ND	ND
gamma-Chlordane	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1248	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1232	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1221	ug/kg	ND	ND	ND	ND	ND	ND	ND
Aroclor 1016	ug/kg	ND	ND	ND	ND	ND	ND	ND

FRO 001 1928

DYNAMAC CORPORATION

BIOTA SAMPLES - ONSITE

		X X220	X X227	X X251
		880227	880226	880226
		BH1321	BH1320	BH1325
ACID COMPOUNDS				
2-Chlorophenol	ug/kg	ND	ND	ND
2,4-Dichlorophenol	ug/kg	ND	ND	ND
2,4-Dimethylphenol	ug/kg	ND	ND	ND
4,6-Dinitro-o-cresol	ug/kg	ND	ND	ND
2,4-Dinitrophenol	ug/kg	ND	ND	ND
2-Nitrophenol	ug/kg	ND	ND	ND
4-Nitrophenol	ug/kg	ND	ND	ND
p-Chloro-m-cresol	ug/kg	ND	ND	ND
Pentachlorophenol	ug/kg	ND	ND	ND
Phenol	ug/kg	ND	ND	ND
2,4,6-Trichlorophenol	ug/kg	ND	ND	ND
2,4,5-Trichlorophenol	ug/kg	ND	ND	ND
2-Methylphenol	ug/kg	ND	ND	ND
4-Methylphenol	ug/kg	ND	ND	ND
Benzoic acid	ug/kg	BMDL	BMDL	ND
PESTICIDES AND AROCLORS				
Aldrin	ug/kg	ND	ND	ND
Alpha-BHC	ug/kg	ND	ND	ND
Beta-BHC	ug/kg	ND	ND	ND
Gamma-BHC	ug/kg	ND	ND	ND
Delta-BHC	ug/kg	ND	ND	ND
4,4'-DDT	ug/kg	ND	ND	ND
4,4'-DDE	ug/kg	ND	ND	28
4,4'-DDD	ug/kg	ND	ND	ND
Dieldrin	ug/kg	ND	ND	ND
Endosulfan I	ug/kg	ND	ND	ND
Endosulfan II	ug/kg	ND	ND	ND
Endosulfan sulfate	ug/kg	ND	ND	ND
Endrin	ug/kg	ND	ND	ND
Heptachlor	ug/kg	ND	ND	ND
Heptachlor epoxide	ug/kg	ND	ND	ND
Toxaphene	ug/kg	ND	ND	ND
Endrin ketone	ug/kg	ND	ND	ND
Methoxychlor	ug/kg	ND	ND	ND
alpha-Chlordane	ug/kg	ND	ND	ND
gamma-Chlordane	ug/kg	ND	ND	ND
Aroclor 1242	ug/kg	ND	ND	ND
Aroclor 1254	ug/kg	ND	ND	ND
Aroclor 1260	ug/kg	ND	ND	ND
Aroclor 1248	ug/kg	ND	ND	ND
Aroclor 1232	ug/kg	ND	ND	ND
Aroclor 1221	ug/kg	ND	ND	ND
Aroclor 1016	ug/kg	ND	ND	ND

DYNAMAC CORPORATION
BIOTA SAMPLES - ONSITE

		X CF203	X CF204	X CF220	X CM207	X CM208	X CM220	X X209
		880225	880227	880224	880224	880224	880225	880226
		BH1323	BH1314	BH1322	BH1311	BH1327	BH1336	BH1318
RCRA METALS								
Arsenic	ug/kg	BMDL	ND	BMDL	BMDL	ND	ND	ND
Barium	ug/kg	170000	250000	72000	140000	210000	250000	4800
Cadmium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Chromium	ug/kg	ND	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL
Lead	ug/kg	ND	BMDL	ND	ND	ND	BMDL	ND
Mercury	ug/kg	BMDL	ND	BMDL	ND	ND	BMDL	ND
Mercury, Inorganic	ug/kg	ND	ND	ND	ND	ND	ND	ND
Selenium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Silver	ug/kg	ND	ND	BMDL	ND	BMDL	BMDL	ND
OTHER METALS AND MISC								
Aluminum	ug/kg	34000	26000	33000	26000	BMDL	BMDL	ND
Antimony	ug/kg	ND	BMDL	BMDL	BMDL	ND	BMDL	ND
Beryllium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Calcium	ug/kg	42300000	39500000	18700000	60100000	68600000	97800000	16600000
Cobalt	ug/kg	ND	ND	ND	ND	ND	BMDL	ND
Copper	ug/kg	15000	26000	22000	12000	24000	10000	BMDL
Iron	ug/kg	530000	570000	300000	350000	170000	220000	29000
Magnesium	ug/kg	2300000	2490000	1600000	2620000	3430000	4980000	510000
Manganese	ug/kg	480000	493000	460000	385000	567000	527000	11000
Nickel	ug/kg	ND	ND	BMDL	ND	ND	ND	ND
Potassium	ug/kg	2300000	2500000	2300000	1800000	3000000	2400000	2900000
Sodium	ug/kg	3600000	3500000	3200000	3400000	3700000	3700000	1200000
Thallium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Vanadium	ug/kg	ND	ND	ND	ND	ND	ND	ND
Zinc	ug/kg	28000	28000	41000	25000	29000	37000	17000
Cyanide, Total	mg/kg	ND	ND	ND	ND	ND	ND	ND

DYNAMAC CORPORATION

BIOTA SAMPLES - ONSITE

		X X220	X X227	X X251
		880227	880226	880226
		BH1321	BH1320	BH1325
RCRA METALS				
Arsenic	ug/kg	ND	ND	ND
Barium	ug/kg	BMDL	9400	BMDL
Cadmium	ug/kg	ND	ND	ND
Chromium	ug/kg	ND	BMDL	BMDL
Lead	ug/kg	ND	ND	ND
Mercury	ug/kg	BMDL	BMDL	ND
Mercury, Inorganic	ug/kg	ND	ND	ND
Selenium	ug/kg	ND	ND	ND
Silver	ug/kg	ND	ND	ND
OTHER METALS AND MISC				
Aluminum	ug/kg	ND	ND	ND
Antimony	ug/kg	BMDL	ND	ND
Beryllium	ug/kg	ND	ND	ND
Calcium	ug/kg	18800000	22300000	10500000
Cobalt	ug/kg	ND	ND	ND
Copper	ug/kg	BMDL	BMDL	BMDL
Iron	ug/kg	23000	30000	26000
Magnesium	ug/kg	600000	650000	430000
Manganese	ug/kg	11000	20000	8700
Nickel	ug/kg	ND	ND	ND
Potassium	ug/kg	2700000	2500000	2200000
Sodium	ug/kg	1300000	1200000	1100000
Thallium	ug/kg	ND	ND	ND
Vanadium	ug/kg	ND	ND	ND
Zinc	ug/kg	20000	22000	15000
Cyanide, Total	mg/kg	ND	ND	ND

FRO 001 1931

6

EPA Data Table Comparing EPA, Dynamac & EQB Mercury Results
for Split Samples Collected at Cristiana

Table 2
Frontera Creek Site, Humacao, Puerto Rico
Ciudad Cristiana Subsurface Soil Samples
Total Mercury Summary, 1988 Sampling

House/Lot	Sample Depth (feet, unless indicated)	Mercury Concentrations, ppm. EPA	Dynamac	IT Corporation
A8	0-3 inches	ND	0.088	
A8	0.5-1.5	ND	0	
A8	2.0-4.0	NS	0	
A8	4.0-6.0	ND	0	0.04
A8	8.0-10.0	ND	0	0.03
A8	10.0-12.0	ND	0	
A8	12.0-14.0	ND	0	
B7	0-3 inches	ND	0.160	
B7	0.5-2.0	ND	0	
B7	2.0-4.0	ND	0	
B7	4.0-6.0	ND	0.056	
B7	8.0-10.0	0.9	0	
B7	10.0-12.0	ND	0.072	
B7	14.0-16.0	ND	NS	
D34	0-3 inches	0.2	0.160	
D34	0.5-2.0	ND	0	
D34	2.0-4.0	0.7	0	
D34	4.0-6.0	ND	0	
D34	8.0-10.0	ND	0	
D34	14.0-16.0	ND	0	
D34	16.0-18.0	ND	0	
E23	0-3 inches	ND	0	
E23	0.5-1.5	ND	0	
E23	2.0-4.0	ND	0	
E23	4.0-6.0	ND	0.051	
E23	8.0-10.0	0.1	0	
E23	10.0-12.0	ND	0	
E23	14.0-16.0	ND	0	
G8	0-3 inches	0.2	0.140	
G8	0.5-2.0	ND	0	
G8	2.0-4.0	ND	0.053	
G8	4.0-6.0	ND	0.065	
G8	8.0-10.0	ND	0	
G8	10.0-12.0	ND	0	
G8	14.0-16.0	ND	0.073	
I12	3-6 inches	ND	0	0.02u
I12	0.5-2.0	ND	0	
I12	2.0-4.0	ND	0	0.02u
I12	4.0-6.0	ND	0	
I12	8.0-10.0	ND	0.058	
I12	10.0-12.0	ND	0.067	
I12	14.0-16.0	ND	0	

FRO 001 1934

Table 2
Frontera Creek Site
Ciudad Cristiana Subsurface Soil Samples
Total Mercury Summary, 1988 Sampling
Page Two

House/Lot	Sample Depth (feet, unless indicated)	Mercury Concentrations, ppm. EPA	Dynamac	IT Corporation
J14	0-3 inches	ND	0	
J14	0.5-2.0	ND	0	
J14	2.0-4.0	ND	0	
J14	4.0-6.0	ND	0	
J14	8.0-10.0	ND	0	
J14	12.0-14.0	ND	0.068	
J14	14.0-16.0	ND	0	
N40	0-3 inches	ND	0.140	
N40	0.5-2.0	ND	0	
N40	2.0-4.0	ND	0	
N40	4.0-8.0	ND	0	0.02u
N40	8.0-10.0	NS	0	
N40	12.0-14.0	ND	0.049	0.03u
N40	14.0-16.0	ND	0	
P29	0-3 inches	0.7	0.080	
P29	0.5-2.0	0.1	0	0.10
P29	2.0-4.0	ND	0.081	
P29	4.0-6.0	ND	0.088	
P29	8.0-10.0	NS	NS	
P29	10.0-12.0	ND	0.057	0.05
P29	12.0-14.0	ND	0	
P29	14.0-16.0	ND	0	
Q27	0-3 inches	ND	0.084	
Q27	0.5-2.0	ND	0.086	
Q27	2.0-4.0	ND	0.236	
Q27	4.0-6.0	ND	0	
Q27	8.0-10.0	ND	0	0.02u
Q27	10.0-14.0	ND	0.060	0.05
Q27	14.0-16.0	ND	0.059	
S15	0-2 inches	0.16	0.100	0.17
S15	0.5-2.	ND	0	
S15	2.0-4.0	ND	0.034	
S15	6.0-8.0	ND	0	0.03u
S15	8.0-10.0	ND	0	
S15	12.0-14.0	ND	NS	
S15	14.0-16.0	ND	0.053	

Table 2
Frontera Creek Site
Ciudad Cristiana Subsurface Soil Samples
Total Mercury Summary, 1988 Sampling
Page Three

House/Lot	Sample Depth (feet, unless indicated)	Mercury Concentrations, ppm. EPA	Dynamac	IT Corporation
X12	0-3 inches	0.78	0.836	
X12	0.5-2.0	ND	0.223	
X12	2.0-4.0	ND	0	
X12	4.0-6.0	ND	0	
X12	8.0-10.0	ND	0.057	
X12	10.0-12.0	ND	0	
X12	14.0-16.0	ND	0	

Legend
ND - Below CLP detection limit (0.1 ppm)
NS - Not sampled
u - Analyzed for but not detected at the indicated detection limit

FRO 001 1936

7

Data Validation Summary
Quality Assurance/Quality Control Data

DATA VALIDATION SUMMARY

Explanation of QA Flags

Qualified data were identified in the various tables provided in the RI report using EPA Region II QA flags. For example, estimated data are identified by the QA flag "J." The presence of this QA flag next to a particular data point indicates that the detected concentration should be regarded as estimated due to one or more of the quality assurance issues discussed previously.

Rejected data are generally identified by the QA flag "R." The presence of an "R" next to a given data point means that this value should not be considered for data assessment purposes because of significant quality assurance problems identified in the QA review. Of note, for the mercury data, four different Dynamac QA flags (*, **, R1, R2) were used to identify data points originally qualified as rejected ("R") during the QA review. The * and ** flags were applied to rejected data for soil, sediment, groundwater and surface water mercury samples, and one biota sample. The R1 and R2 flags were applied to rejected biota total mercury and bovine inorganic mercury data, respectively. The * flag identifies data rejected due to a greater than 50 percent difference between total and inorganic mercury. The ** QA flag is used for mercury values rejected because of less than 50 percent or greater than 150 percent recovery in the laboratory control sample (LCS). The R1 flag represents biota total mercury values rejected because of poor sample spike recoveries (less than 30 percent). The R2 flag represents bovine inorganic mercury values rejected because of extremely poor laboratory matrix recovery. These data were unrejected by the Dynamac project manager after reviewing the rationale for the rejection provided in the QA assessment.

FRO 001 1939

The presence of a "U" QA flag next to a particular data point, under usual EPA Region II terminology, means that the analyte was not detected. However, in the data tables, estimated values provided by the laboratory are presented for the purposes of full discussion although these data should technically be regarded as non-detected. For mercury data, a "U" QA flag indicates that the detected value was less than the laboratory's MDL, generally around 80 ug/kg for solid matrices, and 0.2 ug/l for aqueous samples. For organic HSL parameters, a "U" QA flag next to a data point indicates generally that the detected value was less than the contract required quantitation limit (CRQL), a generally accepted detection limit determined by EPA. For organic compounds, a "U" QA flag identifies data points where the compound was detected in associated blank samples. In this regard, a "U" QA flag indicates that the reported concentration is less than five times the value detected in the blank(s) or less than ten times the value detected in the blanks for common lab contaminants. For inorganic HSL parameters, a "U" QA flag indicates that the analyte was detected at a concentration less than the instrument detection limit, or IDL. Of note, with the exception of aqueous samples, all reported concentrations are corrected for percent solids.

The data validation assessment presented below provides representative examples of the types of quality assurance issues evaluated for the RI samples. It should be noted that it does not include QA information for the entire RI database.

Total Mercury

The total mercury determinations were generally acceptable for most samples. Quality assurance issues which resulted in sample qualifications are shown ir Table A. Of note, the laboratory did not correct the detection limit for the

FRO 001 1940

percent solids of each sample before determining if the sample result was above the method detection limit (MDL) for reporting purposes. The correct results and MDLs are provided in the subsequent tables. A summary of quality assurance issues identified for total mercury is outlined below.

- The highest number of qualifications to the data for total mercury was due to the standard curve having a correlation coefficient of less than 0.995; however, it was generally greater than 0.990. This may indicate that the analytical system was not linear for the analyses affected. A total of 196 samples was qualified as estimated on this basis.

- Eighteen samples were qualified as estimated results because the LCS results (blank spike analysis) associated with these samples were outside acceptable limits. The LCS analysis is a measure of the effectiveness of the sample preparation procedures. The small number of qualifications based upon this criterion indicates that the total mercury sample preparation procedures were in most cases acceptable.

- A small number of samples (26) was qualified as estimated due to unacceptable calibration check sample results or because the samples were analyzed outside the required continuing calibration frequency. These deficiencies were not systematic and occurred on a sporadic basis, probably due to analyst error.

- The matrix spike analyses performed for total mercury determinations were quite good. Only four matrix spike recoveries were outside acceptable limits. Samples BE1811 to BE1821 were also associated with high matrix spike recoveries and a total of 169 samples was associated with low matrix spike recoveries. The results associated with high matrix spike recovery may be biased high and those associated with low matrix spike recovery may be biased low. The latter results were qualified as estimated. Not surprisingly, the two matrices that exhibited poor matrix spike recoveries were sediment and biota samples.

- Forty-nine samples were analyzed prior to an initial calibration check and thus were qualified as estimated values. This was not systematic and was probably due to analyst error.

- Some sediment samples (17) were qualified as estimated values because the percent solids determinations indicated that the sample had less than 50 percent solids.

- Samples BE6128, BE6129, CA0816, CA0817, CA0819, CA0820 and CA0822 were qualified as estimated results because no percent solids determination was performed. The reported results are on a wet weight rather than a dry weight basis.

- Eleven samples were qualified by the validation team as estimated, because the reported inorganic mercury concentrations were greater than 10 percent but less than 50 percent of the total mercury sample concentrations. Fourteen sample results for total and inorganic mercury were rejected because the reported inorganic mercury concentration was greater than 50 percent of the reported total mercury concentration. However, Dynamac's management team disagrees

FRO 001 1942

with this interpretation. Given that the total mercury method is validated and the inorganic method is not, Dynamac's project team believes that neither the inorganic nor the total mercury data should be rejected. Rather, the team believes that the total mercury values should be used without qualification, and the inorganic mercury values should be viewed as estimates for data assessment purposes.

- Nine total mercury samples were rejected by the Dynamac QA team because the LCS recovery for these samples was less than 50 percent. Dynamac's management, however, concluded that these should be considered as usable estimates for data assessment.

- Ten biota samples were rejected by the Dynamac QA team because the sample spike recovery was less than 30 percent. These rejected samples were collected at all three sites (the Frontera Creek study area, Boqueron and Roosevelt Roads). Dynamac's management is of the opinion that these total mercury values are usable as estimates for data assessment purposes.

Inorganic Mercury

In general, the results for the inorganic mercury determinations were not as good with respect to quality as were the total mercury results. The method used for the determination of inorganic mercury is not a validated method and this may be reflected in the poorer results obtained in the QA analysis.

- The correlation coefficient for the standard curve resulted in the qualification of 95 samples for inorganic mercury determinations.

- As stated in the previous section on total mercury, 14 inorganic sample results were rejected by the QA team. However, Dynamac's management considers these values to be usable as estimates for data assessment.

- Fifty-two sample results for inorganic mercury were qualified as estimated because the LCS results (blank spike analysis) associated with those samples were outside of acceptable limits. Fourteen cow blood and hair samples were also rejected because the recovery of the laboratory matrix spike was extremely poor. Dynamac's management considered the data rejected due to poor recovery of matrix spikes as being usable estimates for data assessment.

- Nine samples were qualified as estimated due to unacceptable calibration check sample results, or because the samples were analyzed outside the required continuing calibration frequency. These deficiencies were not systematic throughout the sample analyses and occurred on a sporadic basis, probably due to analyst error.

- A total of 120 samples was qualified as estimated values for inorganic mercury, since matrix spike recoveries were below acceptable ranges. This indicates that the method may not be effective in determining the true amount of inorganic mercury in the sample for some matrices.

- Two samples (BD7664 and BD7666) for inorganic mercury determinations were qualified as estimated values because they were associated with a matrix spike analysis performed on an identified field blank, therefore, no information concerning the effect of the matrix on the determination of inorganic mercury was available.

- Only two samples were analyzed prior to the analysis of an initial calibration check and were qualified as estimated values. This was not systematic and was probably due to analyst error.

- Some sediment samples (14) were qualified as estimated values because the percent solids determination indicated that the sample had less than 50 percent solids.

- Samples BE6128, BE6129, CA0816 and CA0817 were qualified as estimated results because no percent solids determination was performed. The reported results are on a wet weight rather than a dry weight basis.

- Samples CA1112, CA1113, CA1114 and BF1134 for inorganic mercury were qualified as estimated results because they were not associated with a matrix spike, laboratory duplicate, or preparation blank analysis.

- Another indication that the method used for the determination of inorganic mercury may not have been totally effective was that the LCS recovery was extremely poor (< 50% or > 150%), which resulted in rejecting the inorganic mercury results for 16 samples. Dynamac's management considers data rejected due to poor LCS recovery as being usable estimates for data assessment.

Volatile Organics

The volatile fractions are generally acceptable for all contaminants. The most significant performance violations and analytical problems are listed below.

- Upon initial review, the surface water samples appeared to have additional target analytes in the matrix spike (MS) and matrix spike duplicates (MSD) that were not present in the matrix spike solutions or the samples themselves. Further examination of the data revealed that the MS and MSD were performed on a sample that contained detectable amounts of these analytes, while the majority of the samples in this batch did not contain significant amounts of these analytes. No action was taken.

- In some cases, sample aliquots or units were unclear, or sample receipt dates were either not recorded or were illegible. Dynamac has documentation on file from the subcontract laboratory stating that written verification of aliquot units and receipt dates can be produced, if necessary. Dynamac has received verbal verification of receipt dates and use of appropriate sample aliquots. Therefore, no validation action was taken.

- In some cases, the reported surrogate value did not correspond to the sample being evaluated. Dynamac has a letter from the laboratory on file stating that all appropriate documentation can be made available on request. Because all other criteria were met and no significant problems were uncovered with the data, no action was taken.

- Sample BE1884 was received in a broken container and was not analyzed.

- Acetone was detected at unusually high levels in samples from one batch. Although the values are qualified as estimated because the percent difference was found to be greater than 25, there is no apparent reason to believe that the acetone values detected were not real. The percent difference was exceeded by only 3%. All other QC data were acceptable.

- One sample shuttle (BE0770-73, BE1769-72, BE1789) spent approximately one week in transit before being opened at the laboratory. In this case, sample integrity was compromised (due both to temperature and holding time excesses) and all values were qualified as estimated.

- The reported values for chloroethane were rejected for some samples because the response factor for this compound was < 0.05 during instrument calibration. Chloroethane has been qualified as estimated in other samples because the percent relative standard deviation on initial calibration was > 30% for positive values or > 50% for non-detects. This compound was also qualified as estimated because the percent difference on continuing calibration was > 25% for samples with positive values and > 50% for non-detects.

- The reported values for 2-butanone were rejected for some samples because the response factor for this compound was <0.05 during instrument calibration. 2-butanone has also been qualified as estimated on some samples due to percent relative standard deviation or percent difference variations as described above.

- Other compound values have also been estimated because the percent relative standard deviation or percent difference was out of control on initial or continuing calibrations.

- Values for bromomethane have been rejected in several samples because the percent relative standard deviation or percent difference was greater than 90 percent. No positive values were reported in these samples.

- Values for vinyl acetate were rejected for some samples because the response factor for this compound was < 0.05 during instrument calibration. The values for this compound have also been estimated in some instances because of percent relative standard deviation or percent difference variations as described above.

- Samples CA1150 and CA1151 were rejected because no calibration data were provided by the laboratory. If such calibration data can be obtained and found in compliance, these results can be reconsidered.

- Samples CA1157, CA1160, and CA1161 were received at the laboratory containing air bubbles. All values for these samples have been qualified as estimated.

FRO 001 1948

- Many samples reported to contain detectable amounts of acetone and methylene chloride have been qualified as non-detected because the analytes were present at less than ten times the amount reported for associated trip or method blanks.

- The area counts for all internal standards used in sample CA1152 were outside QC limits. Therefore, all values reported for this sample have been qualified as estimated.

- Samples exceeding the holding time have been qualified as follows: for compounds which have positive reported values, the value should be considered a minimum value but should not be rejected. In the case of non-detects, there is the possibility of a false negative indication; the values were rejected. Values reported below the MDL were qualified as estimated, since there may have been one or more compounds present in the sample which were lost because of excess holding times.

- Carbon dioxide was reported in many of the samples as a tentatively identified compound (TIC). This compound has been rejected in the samples because it is a common laboratory contaminant and should not be considered an actual sample constituent.

Base/Neutrals and Acid Extractables

Overall, the quality of the data for BNAs for the majority of the samples is acceptable. Review of the data revealed exceedances of sample holding times in many cases, which caused the data to be qualified as estimated or rejected as described above. Many of the exceedances of holding times occurred when matrix interferences resulted in reported data outside of control limits. Samples were initially analyzed within holding times, but were then re-extracted and re-analyzed after holding times were exceeded. Other specific problems are listed below.

- Sample BD0424 was rejected because it appears that initial calibration and actual sample analysis were performed on different instruments.

- In several cases, data reviewers were unable to locate the appropriate surrogate data for particular samples. The contract laboratory provided a letter stating where such data could be found. Further examination indicated that the use of surrogates has been correctly and consistently performed. No action was taken.

- A decafluorotriphenolphosphate instrument tune could not be located for sample BD7655, which resulted in qualification of this result as rejected. If such verification can be provided, these data will be reconsidered.

- Values for benzoic acid for some samples have been rejected because the RF for this compound was less than 0.05 for the continuing calibration.

- In several samples, the area counts for internal standards phenanthrene-d10, chrysene-d12, and perylene-d12 were outside QC limits. Data associated with these internal standards were qualified as estimated.

- The analysis date for sample BD3471 was illegible. Therefore, the data associated with this sample have been qualified as estimated until appropriate documentation can be provided.

- In some cases, sample aliquots or units are unclear or sample receipt dates are either not recorded or are illegible. Dynamac has documentation from the contract laboratory on file stating that written verification of aliquot units and receipt dates can be produced, if necessary. Dynamac has received verbal verification of receipt dates and use of appropriate sample aliquots. Therefore, no validation action has been taken.

- Surrogate recoveries for sample BE1877 were outside recovery limits, and values for all compounds associated with this sample have been qualified as estimated.

- Tetrachloroethene and benzene were reported as semivolatile TICs for many of the samples. These compounds have been rejected because they are on the target compound list (TCL) for volatile compounds and should not have been reported as semivolatiles. Other compounds not on the TCL list of volatiles but generally considered volatile compounds have been qualified as TICs. These compounds were also rejected.

FRO 001 1951

Pesticides and PCBs

Overall, the pesticide/PCB data were affected by problems associated with matrix interferences. Approximately one-third of the data appears to have suffered from extreme interference difficulties. The reported values associated with this data were considered estimated. Specific problems with the pesticide/PCB data are as follows:

- The matrix spike duplicate for sample BD3480 was found to be outside the control limits and the data have been qualified as estimated.

- The analysis dates for samples BD3483, BD3485-88, and BD3490-91 are either illegible or missing. Therefore, the data associated with these samples have been qualified as estimated until appropriate documentation can be provided.

- In some cases, sample aliquots or units are unclear or sample receipt dates are either not recorded or are illegible. Dynamac has documentation from the contract laboratory on file stating that written verification of aliquot units and receipt dates can be produced, if necessary. Dynamac has received verbal verification of receipt dates and use of appropriate sample aliquots. Therefore, no validation action has been taken.

- In some samples, 4,4'-DDT exceeded the percent relative standard deviation criteria. 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT values were estimated from the three point standard curve generated in the primary

FRO 001 1952

analysis. The percent difference was also exceeded for several compounds (e.g., endrin, alpha-BHC, endosulfan sulfate) in subsequent individual standard mix (IND) standards in the primary analysis. These compounds were not found to be present in the samples and quantitation was not performed, nor was quantitation performed from the secondary analysis (confirmation) using capillary column. Because no positive values were found in these samples and holding times were not exceeded, no action was taken.

- Holding times were exceeded for the following samples: BE0770-73, BE1769-77, BE1779-87, and BE9333-34. Values for these samples have been qualified as described above for volatiles.

- Surrogate values were found to be outside control limits for BD7648, BE1783, BH8770, BH8773, and CA0841. The values associated for all compounds associated with these samples have been qualified as estimated.

FRO 001 1953

Toxicological Profile for Acetone

TOXICOLOGICAL PROFILE FOR ACETONE

1. What is Acetone?

General Description

Acetone is a highly volatile, colorless liquid with a mint like and fruity odor and a pungent, sweetish taste. It is also known as 2-propanone, dimethyl ketone, methyl ketone, ketone propane, or beta-ketopropane (HSDB, 1990).

Chemical and Physical Properties

Listed below is more specific chemical and physical information to help better identify this substance:

Chemical Identifiers

a. CAS No.: 67-64-1

b. Hazardous Substances Databank No.: 41

c. Molecular Formula: C_3H_6O

d. Molecular Weight: 58.08

Physical Properties

a. Color/Form: colorless liquid (Sax, 1987, as cited in HSDB, 1990)

b. Odor: mint-like (Chris, 1984, as cited in HSDB, 1990), fruity (Verschueren, 1983, as cited in HSDB, 1990)

c. Odor Threshold: low 47.5 mg/cu m, high 1613.9 mg cu m (Amoore et al., 1983, as cited in HSDB, 1990)

d. Melting Point: -95.35° C (Wast, 1986, as cited in HSDB, 1990)

e. Boiling Point: 56.2° C @ 760 mm Hg (Wast, 1986, as cited in HSDB, 1990)

FRO 001 1956

f. Flash Point: -20° C (NFPA, 1986, as cited in HSDB, 1990)

g. Vapor Pressure: 185 mm Hg @ 20° C (Nelson and Webb, 1978, as cited in EPA, 1988)

h. Vapor Density: Not available

i. Specific Gravity: 0.7899 @ 20° C/4° C (Wast, 1986, as cited in HSDB, 1990)

j. Solubility in Water: miscible with water (Merck, 1983, as cited in HSDB, 1990)

k. Solubility in Organic Solvents: soluble in benzene (Wast, 1986, as cited in HSDB, 1990)

l. Log Octanol/Water Partition Coefficient: -0.24 (Hansch, 1979, as cited in HSDB, 1990)

2. What are the sources of acetone in the environment?

Acetone has been identified in vegetation and insects as a naturally occurring, volatile metabolite (Graedel et al, 1986, as cited in HSDB, 1990). It is also a component of the oxidation of humic substances (Verschueren, 1983, as cited in HSDB, 1990) and is produced by the fermentation of West coast kelp (Kirk-Othmer, 1978-present, as cited in HSDB, 1990). Acetone is also released into the environment through multiple uses of the compound. Acetone is produced in large quantities and may be released into the environment as stack emissions, fugitive emissions, and in waste water through the manufacture of methacrylates, as a solvent, and as a chemical intermediate in the manufacture of methyl isobutyl ketone and other chemicals (Chemical Marketing Reporter, 1984, as cited in HSDB, 1990). Release of acetone to both air and water may be expected from its use in the manufacturing of acetaldehyde and acetic acid, and wood pulping (USEPA, 1982, as cited in HSDB, 1990). Acetone is also emitted

FRO 001 1957

from wood burning fire places and tobacco smoke (Graedel et al., 1986 and Lipari et al., 1984, as cited in HSDB, 1990). Acetone has been identified as a volatile component of baked potatoes (Coleman et al.,1981, as cited in HSDB, 1990), roasted filberts (Kinlin et al, 1972, as cited in HSDB, 1990), dried beans and legumes (Lovegren et al., 1979, as cited in HSDB, 1990), and French cognac (TerHeide et al., 1978, as cited in HSDB, 1990).

3. How much acetone is produced and used?

US acetone production in 1974 was 898.5 metric tons. About 40% of acetone is supplied by the production of isobutyl alcohol (Kirk-Othmer, 1978, as cited in HSDB, 1990).

4. How are people usually exposed?

Occupational exposure to acetone will be from dermal contact with solvents containing the chemical and from inhalation of the vapor. The general population is exposed to acetone in the air from auto exhaust, solvents, tobacco smoke, and fireplaces, and from dermal contact with consumer products containing acetone as a solvent. In addition, there will be exposure from foods that naturally contain acetone (HSDB, 1990).

5. To how much acetone are people typically exposed?

In rural sites, the estimated background concentration of acetone in the air is 0.11 ppb (Singh and Hanst, 1981, as cited in HSDB, 1990). In 22 urban sites in the U.S., acetone was measured at a median of 0.350 ppb with a maximum value of 53 ppb (Brodzinsky and Singh, 1982, as cited in HSDB, 1990). In a 1981 study of exposure to solvent vapors in spray painting and glue spraying operations in 7 plants belonging to 3 companies, mean concentrations for 89 exposed individuals in the 3 companies were 1.1, 1.7, and 3.1 ppm; the overall mean was 2.0 ppm with a standard deviation of 6.0 ppm. The average TWA exposure to acetone for higher-aromatic paint spraying, low-aromatic paint spraying, glue spraying, solvent wiping, and paint mixing were 0.9,3.2,2.3,0.9, and 5.6 ppm, respectively (Cresci et al., 1985, as cited in HSDB, 1990). Acetone was ubiquitous in the expired air of 54 normal healthy nonsmoking people with a geometric mean of 101.3 ng/l.

6. What happens to acetone in the body?

Acetone is one of the least toxic industrial solvents. It is highly volatile and may be absorbed in large quantities. Because of its solubility in water, acetone may be absorbed by the blood from the lungs and transported throughout the body. Small quantities may be absorbed through the skin. Elimination in humans is rapid and occurs primarily through the lungs and urine. Acetone absorbed during 8 hours at a concentration of 200 ppm will be completely metabolized or excreted within 16 hours (Encyclopedia of Occupational Health & Safety, 1983, as cited in HSDB, 1990).

7. What are the toxic effects of excess acetone? Does it cause cancer?

Direct contact of acetone with the eyes may produce irritation and corneal injury. High vapor concentrations will produce anesthesia. Compared with other solvents, it has comparatively low acute and chronic toxicities. Acetone does not have sufficient odor warning properties to prevent repeated exposures to vapors which may have adverse effects (Kirk-Othmer, 1978, as cited in HSDB, 1990). Prolonged or repeated skin contact may defat the skin and result in dermatitis (Patty, 1981, as cited in HSDB, 1990). Repeated exposure to 25 to 920 ppm may cause chronic conjunctivitis, pharyngitis, bronchitis, gastritis, and gastroduodenitis (Verschueren, 1983, as cited in HSDB, 1990). Severe toxic effects can occur with exposure to 4,000 ppm for 60 minutes. Symptoms of illness can occur with exposures to 800 ppm for 60 minutes (Verschueren, 1983, as cited in HSDB, 1990). Toxic concentrations in human blood are 200-300 ug/ml; the lethal concentration in human blood is 550 ug/ml (Winek, 1985, as cited in HSDB, 1990). Acetone has not been shown to cause cancer in humans.

8. Which groups face a special exposure to the risks of acetone?

Although no special risk groups have been identified, workers may have the greater opportunity for exposure to acetone.

9. What is the fate of acetone in the environment?

If released to soil, acetone will both volatilize and leach into the ground. Acetone readily biodegrades and there is evidence that it biodegrades fairly rapidly in soil (HSDB, 1990). If released into water, acetone will probably biodegrade. It is readily biodegraded in screening tests, but data from natural water releases are lacking. It will also volatilize with an estimated half-life of 20 hours from a model river. Adsorption to sediment is unlikely (HSDB, 1990) In the atmosphere, acetone will be lost by photolysis and reaction with photochemically produced hydroxyl radicals. Being miscible in water, washout by rain should be an important removal process (Kato et al., 1980, as cited in HSDB, 1990).

10. Exposure and Biological Distribution

Routes of Exposure

Exposure to acetone can occur through inhalation, ingestion, or dermal contact. It is a metabolite released by both plants and animals. Because acetone is produced in large quantities, it is also released industrially in stack and fugitive emissions, during its production as a chemical intermediate and solvent. Most acetone used in solvents ultimately is released into the air. The general population is exposed to acetone in the atmosphere from auto exhaust, solvents, tobacco smoke, and fireplaces, and from dermal contact with consumer products containing acetone as a solvent (HSDB, 1990).

Pharmacokinetics

Absorption

Because of its solubility, acetone is readily absorbed into the blood and distributed throughout the body. In small quantities, acetone may be absorbed by the skin (Encyclopedia of Occupational Health & Safety, 1983, as cited in HSDB, 1990).

Distribution

Acetone is distributed throughout the body rapidly following inhalation or dermal exposure. (Encyclopedia of Occupational Health & Safety, 1983, as cited in HSDB, 1990).

Metabolism

Two pathways for the conversion of acetone to glucose are proposed, the methylglyoxal and the propanediol pathways. In the former, acetone is converted to acetol, to methylglyoxal, to glucose. In the latter, acetol is converted to L-1,2 propanediol, to L-lactaldehyde, and to L-lactic acid. Expression of these pathways, in rats, appears to be dependent on the induction of acetone oxygenase and acetol monooxygenase by acetone (Casazza et al., 1984, as cited in HSDB, 1990). Acute administration of acetone to rats resulted in measurable levels of isopropanol (Lewis et al., 1984, as cited in HSDB, 1990).

Excretion

Acetone is excreted approximately 40-70% in expired breath, 15-30% in the urine, and 10% through the skin (Patty, 1963, as cited in HSDB, 1990).

11. Key Toxicological Studies

Acute Toxicity

In humans, acute toxicity associated with exposure to acetone includes irritation to eyes and nose, and skin dermatitis. Hepatorenal lesions were observed in four people acutely exposed by inhalation or ingestion of acetone (Patty, 1981, as cited in HSDB, 1990). Other symptoms of acute exposure include: early emotional lability, exhilaration, belligerency, impaired motor coordination, slowed reaction time, slurred speech, ataxia, flushing of face, rapid pulse and sweating, nausea and vomiting, drowsiness, and finally coma Gosselin, 1984, as cited in HSDB, 1990). A lethal concentration in blood of 550 ppm has been determined (Winek 1985, as cited in HSDB, 1990).

In single exposures of mice and rats to acetone, CNS depression was observed at 20,256 ppm for 1.5 hours. Acetone was fatal to rats at 126,600 ppm for 1.75-2.25 hours and in mice at 46,000 ppm for 1 hour. Loss of corneal reflex was observed in rats at exposures of 42,200 ppm for 1.75-2.0 hours. In guinea pigs, loss of reflexes was observed at 20,000 ppm after 8-9 hours (Patty, 1981, as cited in HSDB, 1990).

Subchronic Toxicity

In a study of 30 male and 30 female albino rats, acetone was administered by gavage for 30 or 90 days at doses of 0, 100, 500, or 2500 mg/kg/day. No effects were seen at 100 mg/kg/day. Histopathologic evaluation revealed significant increases in renal tubular degeneration and hyaline droplet accumulation at 500 and 2500 mg/kg/day in males and at 2500 mg/kg/day in females. A NOEL of 100 mg/kg/day and a LOAEL of 500 mg/kg/day were established (USEPA, 1987, as cited in USEPA, 1988). Decrements in reflex performance were both dose-related and exposure time-related in a study of rats exposed by inhalation to levels of acetone from 12,600-50,600 ppm for 1, 2, and 3 hours. A clear determination of the time point at which a decrement first occurs could not be determined (Bruckner and Peterson, 1981, as cited in USEPA, 1988). Dermal data were not available.

Chronic Toxicity

Data regarding oral chronic exposure to acetone were not available. In occupational studies, workers exposed to acetone vapors at above 750 ppm complained of irritation to the mucosal membranes, including conjunctivitis, pharyngitis, inflammatory bronchitis, and gastroduodenitis (Raleigh and McGee, 1972, as cited in USEPA, 1988). Dermal data were not available.

Carcinogenicity

Neither human nor animal data are available regarding the carcinogenicity of acetone. The National Toxicology Program has scheduled both rat and mouse bioassays involving drinking water exposures (USEPA, 1988). Acetone has not been evaluated by the U.S. Environmental Protection Agency for evidence of human carcinogenic potential (IRIS, 1990).

Mutagenicity

Acetone has not been shown to be mutagenic in microbial assay systems (McCann et al., 1975, as cited in USEPA, 1988), or cell transformation systems (Freeman et al., 1973, as cited in USEPA, 1990). Acetone gave negative results for chromosomal aberrations and sister chromatid exchange (Norppa et al., 1982, as cited in USEPA, 1988), point mutation in mouse lymphoma cells (Amacher et al, 1980, as cited in USEPA, 1988), and DNA binding (Kubinski et al, 1981, as cited in USEPA, 1988). In one study acetone was reported to produce chromosomal aberrations but no sister chromatid exchange (Kawachi et al, 1980, as cited in USEPA, 1988).

Developmental and Reproductive Effects

Data were not available to assess possible developmental or reproductive effects of acetone. However, it is known that acetone does cross the placenta (Dowty, 1975, as cited in USEPA, 1988).

12. Risk Assessment

Chronic Health Hazard Assessment for Noncarcinogenic Effects (IRIS, 1990)

Routes of Exposure: Oral

Chronic RfD (mg/kg/day): 0.1

Confidence Level: Low

Critical Effect: Increased liver and kidney weight/nephrotoxicity

RfD Basis/RfD Source: Oral/IRIS, 1990

Uncertainty Factor: 1,000

Modifying Factor: 1

13. Regulations Applicable to Acetone

OSHA

Transitional Limits (reference 52 FR 2332 - 1/19/89):

Permissible Exposure Limits (PEL) in Workplace Air:

Time Weighted Average (TWA) (8 hr/day, 40 hr/week): 1,000 ppm (2,400 mg/m^3)

Ceiling Concentration: -

Maximum Peak: -

Final Rule Limits:

Time Weighted Average (TWA) for 8 hr/day, 40 hr/week: 750 ppm (1,800 mg/m^3)

Short-term exposure limit (STEL): 1000 ppm (2,400 ug/m^3)

Ceiling Concentration: -

EPA OERR

Reportable Quantity (RQ): 5,000 lb. (reference IRIS, 1990)

EPA OAQPS

National Emissions Standard (reference 40 FR 60.489 (7/1/87), as cited in HSDB,1990.

Best available technology required in newly constructed, modified, or reconstructed synthetic organic processing units

<u>EPA OSW</u>

Discarded commercial chemical products, off-site specification species, and spill residues (reference 40 CFR 261.33 (7/1/88) as cited in HSDB, 1990.)

Listing as a hazardous waste: Acetone

14. References

HSDB, 1990. Hazardous Substances Databank, Record No. 41 Acetone. Bethesda, MD: National Library of Medicine. January 5, 1990.

IRIS, 1990. Integrated Risk Information System. U.S. Environmental Protection Agency database of health risk assessment information on acetone. Washington, DC: USEPA. January 5, 1990.

USEPA. 1988. U.S. Environmental Protection Agency. Draft Updated Health Effects Assessment for Acetone. Cincinnati, OH: USEPA, Office of Solid Waste and Emergency Response. April 1988.

Toxicological Profile for Carbon Disulfide

TOXICOLOGICAL PROFILE FOR CARBON DISULFIDE

1. What is Carbon Disulfide?

Carbon disulfide is a clear, colorless or faintly yellow mobile liquid. Pure distillates have a sweet, pleasing, and ethereal odor. Its boiling point is 46.5° C at 760 mm Hg. Its solubility is 0.294% in water at 20° C (Merck Index 1983; as cited in HSDB 1990). It is soluble in chloroform, alcohol, and ether. Its melting point is -111.5° C (Weast 1987; as cited in HSDB 1990). Its vapor pressure is 297 torr at 20° C (Kirk-Othmer 1978; as cited in HSDB 1990).

2. Exposure and Biological Distribution

Routes of Exposure

Exposure to carbon disulfide is mostly occupational via inhalation and dermal contact with the vapor or the liquid. Inhalation is the principal route of absorption. While workers engaged in any process using carbon disulfide may be exposed to some degree, in practice, only workers in the viscose rayon industry are exposed to high concentrations (WHO 1979; as cited in HSDB 1990). The general population may be exposed to carbon disulfide from ambient air as well as food items that contain grain that has been fumigated with the chemical (SRC 1990; as cited in HSDB 1990).

Pharmacokinetics

Absorption

Carbon disulfide may be absorbed via the oral, inhalation, or dermal routes (IRIS 1990).

Carbon disulfide vapor is rapidly absorbed when inhaled (Goselin 1984; as cited in HSDB 1990). Absorption seems to be proportional to the concentration of carbon disulfide in the inhaled air (human and rabbit studies)(WHO 1979 and Cohen 1959; both as cited in HSDB 1990) and equilibrium between the carbon disulfide content of inhaled and exhaled air is reached in 1-2 hours (WHO 1979; as cited in HSDB 1990). Carbon disulfide blood concentrations reached maximum levels after 2 hours of exposure (species not indicated) to about 30 ppm of vapor in air (Baselt 1980; as cited in HSDB 1990). Six human volunteers at rest were exposed to 10 and 20 ppm carbon disulfide vapor during 4 consecutive periods of 50 minutes. An apparent steady state was reached during this exposure period, with retention values of 0.374 for exposure to 10 ppm carbon disulfide and 0.410 for exposure to 20 ppm (Gosselin 1984; as cited in HSDB 1990).

Distribution

Following inhalation exposure, carbon disulfide is distributed in the body by the bloodstream, where twice as much is taken up by the erythrocytes as by the plasma. As carbon disulfide is readily soluble in fats and lipids, and binds to amino acids and proteins, it disappears rapidly from the bloodstream and has a high affinity for all tissues and organs. The order of affinity for different organs has not been established in man (WHO 1979; as cited in HSDB 1990). Traces of carbon disulfide absorbed via inhalation have been found in the blood 80 hours after termination of exposure (Gosselin 1984; as cited in HSDB 1990). Large concentrations of both free and bound carbon disulfide are found in brain (guinea pig studies) and peripheral nerve (rat studies) of exposed animals (exposure route not indicated). Blood and fatty tissues contain mainly bound carbon disulfide, whereas liver contains mainly the free compound (NRC 1977; as cited in HSDB 1990). Carbon disulfide can reach fetuses through the placenta or neonates via mother's milk (Cai and Bao 1981; as cited in HSDB 1990).

Metabolism

Carbon disulfide is metabolized by two distinctly different pathways: (1) spontaneous reaction of carbon disulfide with free amino and sulfhydryl groups of amino acids and polypeptides; and (2) microsomal metabolism of carbon disulfide to reactive intermediates capable of covalently binding to tissue macromolecules (Bus 1985; as cited in HSDB 1990). Only some of the urinary metabolites of carbon disulfide have been identified, e.g., thiourea and mercaptothiazolinone (WHO 1979; as cited in HSDB 1990). A small amount of carbon disulfide is apparently converted to hydrogen sulfide (Gosselin 1984; as cited in HSDB 1990). Carbon disulfide reacts with a variety of nucleophilic functional groups: amino to form dithiocarbamic acids, mercapto to form trithiocarbamic acids, hydroxyl to form xanthogenic acids, and compounds with two nucleophilic functional groups to form heterocyclic compounds (Gosselin 1984; as cited in HSDB

1990). Dithiocarbamates are formed during in vitro incubations of carbon disulfide with blood (Bus 1985; as cited in HSDB 1990).

Excretion

Following inhalation exposure to carbon disulfide, between 10 and 30% of absorbed carbon disulfide is excreted by the lung (exhaled), less than 1% is excreted unchanged in the urine, and the remaining 70-90% undergoes biotransformation before excretion in the urine in the form of sulfur-containing metabolites (WHO 1979; as cited in HSDB 1990). The half-life for disappearance of carbon disulfide from blood is estimated to be less than 1 hour (Baselt 1980; as cited in HSDB 1990). A small amount of carbon disulfide is apparently converted to hydrogen sulfide, which is rapidly oxidized to sulfate and excreted in the urine (Gosselin 1984; as cited in HSDB 1990).

3. Key Toxicological Studies

Acute Toxicity

The probable human oral lethal dose of carbon disulfide is between 0.5 and 5 g/kg (Gosselin et al. 1976; as cited in IRIS 1990). The lowest lethal human dose has been reported at 14 mg/kg (NIOSH/RTECS 1985; as cited in IRIS 1990). When carbon difulfide is administered in gelatin capsules, rupture of the capsule can lead to blistering of mucous membranes, respiratory distress, anesthesia, and even death (Rossoff 1974; as cited in HSDB 1990).

Kirk-Othmer (publication year not indicated; as cited in HSDB 1990) reports the following dose vs. effect data for exposure to carbon disulfide in air: 160-230 ppm, slight or none; 320-390 ppm, slight symptoms after several hours; 420-510 ppm, symptoms after 30 minutes; 1150 ppm, serious symptoms after 30 minutes; 3210-3850 ppm, dangerous to life after 30 minutes; and 4815 ppm, fatal in 30 minutes.

In acute poisoning, early excitation of the central nervous system occurs, followed by depression with stupor, restlessness, and unconciousness. If recovery occurs, the patient usually passes through the after-stage of narcosis, with nausea, vomiting, headache, etc. (Sax 1984; as cited in IRIS 1990). Women appear to be more sensitive than men to the neurotoxic effects of carbon disulfide (Gosselin 1984; as cited in HSDB 1990). Also possible are motor disturbances of the bowel, anemia, disturbances of cardiac rhythm, loss of weight, polyuria, and menstrual disorders (IRIS 1990).

Carbon disulfide is mildly to moderately irritating to the skin, eyes, and mucous membranes (Gosselin 1984; as cited in HSDB 1990). Carbon disulfide dissolves the fatty layer of the epidermis; workers who put their hands in liquid carbon disulfide suffer from dry, cracked skin on which eczematous lesions and ulcers appear (Lefaux 1968; as cited in HSDB 1990).

Subchronic/Chronic Toxicity

Workers exposed to an average concentration of 9 ppm carbon disulfide for up to 2 years showed biochemical and nervous changes. The incidence and degree of these changes were proportional to the exposure. At least half of these

FRO 001 1972

workers had been exposed for 20 years and past concentrations exceeded 9 ppm (ACGIH 1986; as cited in HSDB 1990).

Workers exposed to carbon disulfide showed very little increase in morbidity, but showed exposure-dependent increases in pathological changes such as increased frequency of angina and myocardial infarction, systolic and diastolic blood velocity, increased symptoms of muscular weakness, increased low density lipoproteins, increased fasting blood sugar, increased proportion of abnormal sperm forms, and increased incidence of retinal abnormalities (Albright et al. 1984; as cited in HSDB 1990).

Industrially-exposed workers have exhibited neuropsychiatric disorders ranging from irritability to manic-depressive psychosis. Clinical manifestations of nerve damage are blindness and signs of Parkinsonism (Gosselin 1984; as cited in HSDB 1990). Effects on eyesight have been observed before other symptoms became evident. Studies indicated a gradual and slow increase in the sensitivity of the eyes to light. Alterations in dark adaptation also occurred, in most cases after 4 years of exposure (Kirk-Othmer 1978; as cited in HSDB 1990).

In 350 artificial fiber plant workers who had been exposed to carbon disulfide at concentrations of 0.02-0.065 mg/liter (6-21 ppm) and hydrogen sulfide at concentrations of 0.002-0.006 mg/liter (1-4 ppm) for 6 years, the frequency of pathologic changes in the periodontium was significantly higher (p-value not given) than that of the controls. The intensity of these changes increased with length of exposure, although the levels of significance did not. The group exposed to carbon disulfide for less than 5 years had significantly lower (p-value not given) pH values for the mucous membrane and the saliva than did the controls (Gondzik et al. 1969; as cited in HSDB 1990).

A study to detect possible neurophysiologic effects of carbon disulfide was conducted by comparing 100 papermill workers (controls) with 118 male viscose rayon workers who had been exposed to carbon disulfide for a mean of 15 years. Significantly lower conduction velocities were found in exposed workers in the slower motor fibers of the ulnar nerve (39.8 vs. 44.1 m/second, $p < 0.0005$) and the deep peroneal nerve (35.5 vs. 38.2 m/second, $p < 0.0005$). Maximum motor conduction velocities were also significantly lower in exposed workers in the posterior tibial nerve (40.5 vs. 42.4 m/second, $p < 0.0005$) and deep peroneal nerve (45.9 vs. 47.3 m/second, p < 0025 [sic]). The authors regarded these findings as an indication of increased polyneuropathy. The exposed group also had a significantly larger number of abnormal EEGs (21/54 vs. 6/50, $p < 0.01$) (Seppalainen and Tolonen 1974; as cited in HSDB 1990).

In a group of workers exposed to a mean concentration of 7.3 ppm carbon disulfide (equivalent to an oral dose of 10 mg/kg/day) for 12 or more years, significant (p-values not given) alterations were observed in sensory conduction velocity and peroneal motor conduction velocity. The data indicated, in the opinion of the authors, that minimal neurotoxicity was evident, since the reduction in nerve conduction velocity was still within a range of clinically normal values (Johnson et al. 1983; as cited in IRIS 1990).

The prevalence of general fatigue, insomnia, paresthesia, and headaches was significantly higher ($p < 0.001$ for all four symptoms) in carbon disulfide-exposed viscose rayon workers (exposed to 10-30 ppm vapor concentrations in the 1960's, 20-40 ppm in the 1950's, and >40 ppm prior to 1950) than in controls. Psychologic testing revealed mild intellectual impairment, reduction of sensorimotor speed, and impaired psychomotor ability, the severity of which correlated well

FRO 001 1974

with the duration of exposure to carbon disulfide (Seppalainen et al. 1972; as cited in HSDB 1990).

In viscose rayon workers exposed to carbon disulfide (duration and concentrations not indicated), total mortality was 48/343 (14%); in a nonexposed group, mortality was 31/343 (9%)(Tolonen et al. 1979; as cited in HSDB 1990).

Spinners, the workers most heavily exposed to carbon disulfide, have a significantly higher (p-value not given) mortality from all causes than the least-exposed group. The excess mortality is largely accounted for by ischemic heart disease for which the spinners have an SMR of 172. When mortality is related to an exposure score in the same group, mortality from all causes ($p < 0.01$) and mortality from ischemic heart disease ($p < 0.001$) increase with increasing exposure level. When this analysis is repeated covering all ages, these trends become much less strong and only that for ischemic heart disease remains significant ($p < 0.05$). Over the age of 65 there is a tendency for mortality to decline with increasing exposure (Sweetnam et al. 1987; as cited in HSDB 1990).

<u>Carcinogenicity</u>

No studies evaluating the carcinogenic potential of carbon disulfide were available in HSDB (1990) or IRIS (1990).

FRO 001 1975

Mutagenicity

Carbon disulfide was not mutagenic to Salmonella typhimurium strains TA98 or TA100 at 300-1000 mumole, Escherichia coli strain WP2 UVRA at 20-600 mumole with or without metabolic activation, or Drosophila melanogaster at 200-800 ppm (Donner et al. 1981; as cited in HSDB 1990).

Carbon disulfide, at a concentration of 10.2 mug/cu m medium, increased the frequency of sister chromatid exchanges in cultured human peripheral blood lymphocytes by approximately 50%; lower concentrations had no effect (Bassendowska-Karska 1981; as cited in HSDB 1990).

Developmental and Reproductive Toxicity

In a survey of rayon factories where the carbon disulfide concentration in air was 37-56 mg/m^3, female spinners showed a high incidence of menstrual disturbances and pregnancy toxemia (Cai and Bao 1981; as cited in HSDB 1990).

Ovarian function and menstruation were examined in female viscose rayon workers in the following groups: (1) 500 workers in the spinning shop, where carbon disulfide concentrations sometimes exceeded 20 mg/m^3 and hydrogen sulfide concentrations reportedly never exceeded 10 mg/m^3; (2) 209 workers in the trimming department, where the concentration of neither carbon disulfide nor hydrogen sulfide exceeded 10 mg/m^3; and (3) 429 workers in the rewinding-sorting department (controls), not exposed to either substance. Durations of menstrual flow of more than 5 days occurred in 17.8% of the spinners, 10.5% of the trimmers, and 5.1% of the controls ($p < 0.0001$). Workers in the spinning shop experienced irregular menstruation significantly more

FRO 001 1976

frequently than the controls (7.6% vs. 1.6%, respectively; $p < 0.0001$). The frequency of irregular menses increased with longer occupational exposure. Heavy menstrual flow occurred in 12.5% of the spinners, 11% of the trimmers, and 2.3% of the controls ($p < 0.001$); painful menstruation was also significantly more common in exposed workers (36% and 38%) than in controls (17%)(Vasilyeva 1973; as cited in HSDB 1990).

Pregnancy parameter data in 189 women who, before and during pregnancy, were exposed to carbon disulfide vapor in air at concentrations reported to be 2.7 times the Soviet permissible limit of 10 mg/m^3 (3 ppm) were compared with pregnancy data for women in a control group (size not indicated). The rate of threatened pregnancy termination was 25.9/100 prenant women in the exposed group vs. 13.1/100 in the control group ($p < 0.05$). The difference was still significant after adjustment for differences in age and job longevity. When analyzed by age group, threatened pregnancy terminations occurred more frequently in exposed women than in controls in both the 20 to 24-year-old group (12.5% vs. 9.4%) and the 25 to 29-year-old age group (35.4% vs. 13.6%)(levels of significance not indicated). Spontaneous abortions occurred significantly ($p < 0.05$) more frequently in exposed women (14.3%) than in controls (6.8%) (Petrov 1969; as cited in HSDB 1990).

Rats and rabbits were exposed to 62.3 mg/m^3 (20 ppm) or 124.6 mg/m^3 (40 ppm) carbon disulfide in air for 34 weeks before breeding, and during the entire gestation period. These concentrations correspond to estimated equivalent oral doses of 5 and 10 mg/kg for rats and 11 and 22 mg/kg for rabbits. No effects on fetal development were observed in either species exposed to either concentration of carbon disulfide (Hardin et al. 1981; as cited in IRIS 1990).

In a study by NCTR-NTP in rabbits, fetal resorption was the basis for setting a frank effect level (FEL) of 25 mg/kg/day. Fetotoxicity and fetal malformations in this study were not observed in rats at the lowest level (100 mg/kg/day [sic]) of carbon disulfide exposure (Price et al. 1984; as cited in IRIS 1990).

The highest NOEL from the Hardin (1981; as cited in IRIS 1990) study, 22 mg/kg for the rabbit, should not be used for an RfD estimate (IRIS 1990) because adverse effects were seen in rabbit fetuses following oral exposure of pregnant does to 25 mg/kg (Price et al. 1984; as cited in HSDB 1990). Therefore, the highest NOAEL that is below an effect level is the 11 mg/kg estimated low dose from the Hardin study (IRIS 1990).

In two separate experiments, female albino rats were exposed for 2 hours/day during the entire period of pregnancy to carbon disulfide in air at a concentration of 2000 mg/m^3 (642 ppm). In the first experiment, 16.8% preimplantation embryonic mortality occurred in 12 exposed animals compared with 3.3% in 12 control animals ($p < 0.05$). In the second experiment, preimplantation mortality was 22.6% in 12 exposed rats and 6.5% in 14 controls ($p < 0.05$). The reproductive success of each exposed group was lower than that of its control group [experiment 1: 6.8 vs. 9.7 fetuses/rat ($p < 0.05$); and experiment 2: 8.0 vs. 9.3 fetuses/rat (significance level not indicated). There were 7 post-implantation deaths in the fetuses of exposed rats and none in those of the controls. There were no significant differences between treated and control rats in the mean corpus luteum counts or in mean fetal weights (Yaroslavskiy 1969; as cited in HSDB 1990).

Inhalation exposure of pregnant albino rats to 10 and 0.03 mg/m^3 carbon disulfide did not produce congenital malformations or functional biochemical changes in neonates, but did affect postnatal development at 10 mg/m^3, causing impairment of viability, retardation of morphological and sensory development, and behavioral deviations (Tabacova and Balabaeva 1980; as cited in HSDB 1990).

Prenatal inhalation exposure of albino rats to carbon disulfide at 10 and 0.03 mg/m^3 led to inhibition and retardation of development of the mixed function oxidase system (Nikiforov and Tabacova 1980; as cited in HSDB 1990).

Significant fetal malformations (significance level not indicated) were observed in rats exposed to a 0.03 mg/m^3 concentration of carbon disulfide via inhalation over 3 generations. However, this study did not present information on mode [sic] control exposure, animal diet, procedure for selection of F1 and F2 breeding pairs, and purity of the carbon disulfide (hydrogen sulfide, a teratogen, is often found as a contaminant)(Tabatcova et al. 1983; as cited in IRIS 1990).

Ten male mongrel rats (2-5 months old, 200-260 grams) were given intraperitoneal injections of 25 mg/kg carbon disulfide every other day for 120 days. Ten controls were injected with peanut oil and 9 animals were untreated. Treated rats showed marked testicular damage. Advanced regressive lesions involved all parts of the testicles. Spermatogonia were few and sometimes nonexistent in the seminiferous tubules and spermatogenesis was absent. Leydig cells showed degeneration and atrophy (Gondzik 1971; as cited in HSDB 1990).

FRO 001 1979

4. Risk Assessment

Chronic Health Hazard Assessment for Noncarcinogenic Effects (IRIS)

Routes of Exposure: Oral

Chronic RfD (mg/kg/day): 1E-1

Confidence Level: Medium

Critical Effect: Fetal toxicity/malformations

RfD Basis/RfD Source: Inhalation study/IRIS 1990

Uncertainty Factor: 100

Modifying Factor: 1

Note: The oral RfD for carbon disulfide may change in the near future pending the outcome of a further review now being conducted by the Oral RfD Work Group (IRIS 1990).

Carcinogenicity Assessment for Lifetime Exposure (IRIS)

Carbon disulfide has not been evaluated by the U.S. EPA for evidence of human carcinogenic potential.

5. References

HSDB, 1990. Hazardous Substances Databank. Record No. 52 - Carbon disulfide. Bethesda, MD:National Library of Medicine. May 31, 1990.

IRIS, 1990. Integrated Risk Information System. U.S. Environmental Protection Agency database of health risk assessment information on carbon disulfide. Washington, DC:USEPA January 31, 1990.

FRO 001 1980

Toxicological Profile for Chloromethane

TOXICOLOGICAL PROFILE FOR CHLOROMETHANE

1. What is Chloromethane?

Chloromethane (methyl chloride) is a colorless gas under ambient conditions, b.p.- 24C. It has an ethereal odor.

2. Exposure and Biological Distribution

Pharmacokinetics

Absorption

Chloromethane (CM) is absorbed readily from the lungs of humans following inhalation exposure (ATSDR 1989). Alveolar breath levels of CM reached equilibrium within one hour during a 3- or 3.5-hour exposure of men and women to 100 or 200 ppm (Putz - Anderson et al. 1981, as cited in ATSDR 1989). Uptake was not proportional to exposure concentration, but a correlation between alveolar air and blood levels was found. Blood and alveolar air levels of CM also reached equilibrium during the first hour of exposure in six men exposed to 5 or 10 ppm for 6 hours (Nolan et al. 1985, as cited in ATSDR 1989). The levels in blood and expired air were proportional to the exposure concentrations.

Apparent steady-state blood CM concentrations were proportionate to exposure concentrations in Fischer 344 rats and male beagle dogs exposed to 50 or 100 ppm (Landry et al. 1983, as cited in HSDB 1990). Blood concentrations were similar in both species when they were exposed to the

FRO 001 1982

same exposure concentrations. Also, blood CM concentrations in both species reached equilibrium within 1 hour.

Specific studies of the absorption of CM by the oral or dermal routes in humans or animals were unavailable in ATSDR or HSDB.

Distribution

After absorption of CM by the inhalation route, distribution of CM and/or its metabolites is extensive in animals (ATSDR 1989). Total uptake of radioactivity (as mol [^{14}C]-chloromethane equivalents/g wet weight) in whole tissue homogenates following exposure of rats to 500 ppm for 5 hours was 1.21 for lung, 4.13 for liver, 3.43 for kidney, 2.29 for testes, 0.71 for muscle, 0.57 for brain, and 2.42 for intestine (Kornbrust et al. 1982, as cited in ATSDR 1989). Approximately 20% of the radioactivity present in whole tissue homogenates was associated with acid-insoluble material. Most of this activity represented labeling of protein and lipid. Tissue levels of CM (in mg%) in dogs exposed to CM for 6 hours were 4.5 in liver, 4.1 in heart, and 3.7 in brain at 15,000 ppm and 9.3 in liver, 8.1 in heart, and 9.9 in brain at 40,000 ppm (von Oettingen et al. 1949, as cited in ATSDR 1989).

Specific studies of the distribution of CM by the oral or dermal routes in humans or animals were unavailable in ATSDR or HSDB.

Metabolism

Information regarding the metabolism of CM in humans is limited. In a group of six workers exposed to TWA 8-hour workroom concentrations of 30-90 ppm, the urinary excretion of S-methylcysteine, which is formed as a result of conjugation of CM with glutathione, showed wide variation with little correlation to exposure levels (van Doorn et al. 1980, as cited in ATSDR 1989). It was speculated that two distinct populations of individuals exist: fast metabolizers with lower body burdens and higher excretion, and slow metabolizers with higher body burdens and lower excretion. Possible reasons for the differences in CM elimination among the subjects include a deficiency of the enzyme glutathione-S-transferase that catalyzes the conjugation of CM with glutathione, differences in glutathione levels and differences in biliary excretion and fecal elimination of thiolated conjugates (ATSDR 1989).

Excretion

Very little unchanged CM is excreted in the urine of humans following a single breath exposure to CM (ATSDR 1989). Volunteers exposed to 10 or 50 ppm eliminated CM from blood and the expired air in a biphasic manner when exposure ceased (Nolan et al. 1985, as cited in ATSDR 1989). The half-life for the Beta-phase was 50-90 minutes with differences possibly due to different metabolic rates.

In rats exposed to CM for 6 hours and dogs exposed for 3 hours at concentrations of 50 or 1000 ppm, blood levels rose rapidly and reached equilibria proportionate or nearly proportionate to exposure levels (Landry et al. 1983, as cited in ATSDR 1989).

FRO 001 1984

3. Key Toxicological Studies

Acute Toxicity

The central nervous system is the major target of CM toxicity in humans; symptoms include dizziness, staggering, blurred vision, ataxia, muscle incoordination, convulsions, and coma after acute exposure to high levels (ATSDR 1989). Neurological effects have been described in numerous case reports of humans exposed to CM vapors as a result of industrial leaks and leaks from defective home refrigerators (ATSDR 1989). In cases in which exposure was quantified, concentrations were generally $\geq$ 28,000 ppm. However, symptoms of blurred vision, fatigue, vertigo, nausea, vomiting, tremor, and unsteadiness developed in a man and a women a few days after they stored insulated boards containing polystyrene foam in the basement of their house (Lanham 1982, as cited in ATSDR 1989). The concentration of CM in the house was found to be in excess of 200 ppm. In addition, a small decrement in performance in behavioral tests was found in volunteers exposed to 200 ppm (Putz-Anderson et al. 1981, as cited in ATSDR 1989).

High acute exposure can result in death of humans (ATSDR 1989). Case reports of humans who have died from exposure to CM involved the inhalation of fumes that leaked from home refrigerators or industrial cooling systems (ATSDR 1989). Exposure concentrations were probably very high, perhaps >30,000 ppm. Exposure to high concentrations, even as high as 600,000 ppm, although producing neurological effects (Morgan Jones 1942, as cited in ATSDR 1989), need not result in death if exposure is discontinued and/or medical attention is received in time.

The liver and kidney are also common targets of CM toxicity in humans after acute exposure (ATSDR 1989). Case reports of humans exposed to CM vapors have described clinical jaundice and cirrhosis of the liver (Kegel et al. 1929; Mackie 1961; Weinstein 1937; Wood 1951, all as cited in ATSDR 1989). Indicators of renal toxicity, such as a albuminuria, increased serum creatinine and blood urea nitrogen, proteinuria and anuria have been described in case reports of humans exposed to high levels of CM vapors due to refrigerator leaks.

Cardiovascular and gastrointestinal effects, which may be secondary to the neurotoxic effects of CM, have been reported in humans (ATSDR 1989). Cardiovascular effects, such as electrocardiogram abnormalities, tachycardia, increased pulse rate, and decreased blood pressure, and gastrointestinal effects such as nausea and vomiting, have been described in case reports of humans exposed to CM vapors occupationally or accidentally due to refrigerator leaks (ATSDR 1989). Exposure concentrations were probably $\geq$30,000 ppm.

The central nervous system is also the major target of CM toxicity in animals (ATSDR 1989). Severe neurological signs (ataxia, tremors, limb, paralysis, incoordination and convulsions) have been observed in rats, mice, rabbits, guinea pigs, dogs, cats, and monkeys exposed acutely by inhalation to high concentrations of CM (ATSDR 1989). High acute exposures can also result in death in animals (ATSDR 1989). In a number of animals, including rats, mice, guinea pigs, rabbits, dogs, cats, and monkeys, severe neurological effects (such as paralysis, convulsions and opisthotonos) developed before death (Dunn and Smith 1947; Smith and von Oettingen 1947, all as cited in ATSDR 1989). Acute inhalation lethality data in animals indicate that high intermittent concentrations can be tolerated better than lower continuous concentrations

FRO 001 1986

(ATSDR 1989). Acute inhalation studies also indicate that mice are more sensitive than rats to the lethal effects of CM (Chellman et al. 1986; CIIT 1981, as cited in ATSDR 1989). The greater susceptibility of mice may be due to differences in the ability of CM to react with glutathione in the two species (ATSDR 1989).

The liver and kidney are also common targets of CM in animals after acute exposure (ATSDR 1989). Rats exposed acutely to 1000-1500 ppm either showed no liver effects or relatively mild to moderate changes, such as loss of normal areas of basophilia, cloudy swelling, increased liver weight, fatty infiltration, and increased levels of SGPT, SGOT, and serum bilirubin (ATSDR 1989). No necrosis was seen. Acute exposure of mice to 1000-1500 ppm generally resulted in necrosis and degeneration (ATSDR 1989). Mice exposed acutely to a relatively high intermittent concentration had milder liver effects than those exposed to a continuous lower concentration (Landry et al. 1985, as cited in ATSDR 1989). Although no liver effects were observed in dogs and cats (McKenna et al. 1981a,b, as cited in ATSDR 1989), the exposure concentrations (400 or 500 ppm) may not have been high enough to produce liver toxicity in those species (ATSDR 1989).

In acute studies, rats exposed intermittently to 2000-2500 ppm had degeneration and necrosis of the proximal convoluted tubules, while rats exposed continuously to 1000 ppm had evidence of renal failure (Chellman et al. 1986; Morgan et al. 1982; Burek et al. 1981, all as cited in ATSDR 1989). Evidence of regeneration was noted in kidneys of mice exposed acutely to 1000 ppm (Morgan et al. 1982, as cited in ATSDR 1989).

Dogs exposed acutely to 15,000 ppm had an initial rise in heart rate and blood pressure, followed by markedly reduced respiration, decreased heart rate, and a progressive fall in blood pressure until death, which occurred within 4-6 hours (von Oettingen et al. 1949, 1950, as cited in ATSDR 1989). These effects may have resulted from vasodilation due to depression of the central nervous system (ATSDR 1989). Spleen enlargement, suggestive of extramedullary hematopoiesis, and hemoglobinuria, suggestive of intravascular hemolysis, were found in mice exposed 5.5 hr/d to 2400 ppm CM for 11 days (Landry et al. 1985, as cited in ATSDR 1989). No exposure-related effects in hematological parameters were found in dogs or cats exposed continuously for 3 days to 500 ppm (McKenna et al. 1981, as cited in ATSDR 1989), or in rats exposed continuously for 3 days to 2000 ppm (Burek et al. 1981, as cited in ATSDR 1989).

Subchronic Toxicity

Rats exposed to 1000-1500 ppm (5 d/wk, 5 hr/d) for 90 days or 12 months had either no liver effects or relatively mild to moderate changes, such as loss of normal areas of basophilia, cloudy swelling, increased liver weight, fatty infiltration, and increased levels of SGPT, SGOT, and serum bilirubin (ATSDR 1989). No necrosis was seen. Exposure of mice to 1000-1500 ppm (5 d/wk, 6 hr/d) for 90 days, 6 months or 12 months generally resulted in necrosis and degeneration (ATSDR 1989). Renal hyperplasia was observed in mice treated with 1000 ppm (5 d/wk, 6 hr/d) for 12 months (CIIT 1981, as cited in ATSDR 1989). Mice exposed to 1000 ppm (5 d/wk, 6 hr/d) for 6 or 12 months developed tremor and paralysis but had no histopathological lesions (ATSDR 1989).

FRO 001 1988

Chronic Toxicity

No effect on mortality was seen in rats exposed intermittently to 1000 ppm for up to 2 years; however, the same exposure of mice resulted in significantly increased mortality after exposure for 1 year (CIIT 1981, as cited in ATSDR 1989).

No hepatic lesions were observed in rats over the course of 2 years of inhalation exposure (5 d/wk, 6 hr/d) to 1000-1500 ppm (CIIT 1981, as cited in ATSDR 1989). However, similar exposure of mice to 1000-1500 ppm resulted in hepatic degeneration (CIIT 1981, as cited in ATSDR 1989). Renal hyperplasia was observed in mice treated with 1000 ppm (5 d/wk, 6 hr/d) for either 18 months or 24 months (CIIT 1981, as cited in ATSDR 1989).

In animals, the only effects that could be considered immunological effects were lymphoid depletion of the spleen and splenic atrophy observed in mice exposed to 1000 ppm CM for up to 2 years (CIIT 1981, as cited in ATSDR 1989). Reduced numbers of neurons in the granular cell layer of the cerebellum and degenerative changes in the spinal cord were observed in mice exposed to 1000 ppm (5 d/wk, 6 hr/d) for 18 or 24 months (CIIT 1981, as cited in ATSDR 1989).

Carcinogenicity

A retrospective epidemiology study of male workers exposed to CM in a butyl rubber manufacturing plant produced no statistical evidence that the rates of deaths due to cancer at any site were increased in the exposed population (Holmes et al. 1986, as cited in ATSDR 1989).

A high incidence of renal tumors was found in male mice that were exposed to 1000 ppm CM and died or were killed after 12 or more months (CIIT 1981, as cited in ATSDR 1989). Tumors consisted of renal cortex adenomas and adenocarcinomas, papillary cystadenomas, tubular cystadenomas, and papillary cystadenocarcinomas.

Mutagenicity

CM exposure has resulted in dominant lethal mutations in the sperm of male rats (Chellman et al. 1986b, as cited in ATSDR 1989). However, experiments have indicated that the dominant lethal effect may be secondary to epididymal inflammation (Chellman et al. 1986, as cited in ATSDR 1989). CM did not result in unscheduled DNA synthesis in hepatocytes, spermatocytes, or tracheal epithelial cells when male rats were exposed to 3500 ppm, 6 hr/d for 5 days, but did produce a marginal increase in unscheduled DNA synthesis in hepatocytes when rats were exposed to 15,000 ppm for 3 hours (Working et al. 1986, as cited in ATSDR 1989). A positive response was obtained in hepatocytes and spermatocytes exposed in vitro.

Developmental and Reproductive Toxicity

Pregnant rats exposed to CM by inhalation during gestation had decreased body weight gain and produced fetuses with delayed development (Wolkowski-Tyl et al. 1983, as cited in ATSDR 1989). Increased incidences of heart malformations in the fetuses of mouse dams exposed by inhalation to CM during gestational days 6-17 were noted. In contrast to these findings, John-Green et al. (1985, as cited in ATSDR 1989) did not find heart malformations in fetuses of mouse dams exposed to higher concentrations of CM during gestational days 11.5-12.5.

Acute, intermediate, and chronic inhalation exposures of male rats to CM have resulted in such reproductive effects as inflammation of the epididymis and sperm granuloma formation in epidimydides, disruption of spermatogenesis, decreased fertility, and, at higher concentrations, sterility (ATSDR 1989). Testicular effects of CM have been manifested as preimplantation loss in unexposed female rats mated with males exposed to CM (Working et al. 1985, as cited in ATSDR 1989). Testicular lesions were also observed in mice after 18 months of exposure to CM (CIIT 1981, as cited in ATSDR 1989).

4. Risk Assessment

Subchronic and chronic health hazard assessment for noncarcinogenic effects of CM were not available in IRIS. However, subchronic and chronic inhalation RfD's can be derived from the data provided in ATSDR (1989). CIIT (1981) was selected as the primary study because it identified a NOAEL (associated with decreased body weight gain) of 225 ppm for both subchronic and chronic exposure. In the CIIT (1981) study, mice were exposed to 225 ppm (464.63 mg/m^3) for 6 hours/day, 5 days/week for either 6 months or 24 months. For the purpose of deriving an RfD, the assumption was made that the animals were predominantly exposed to CM vapors, and that steady state was attained during the exposure period. Adjusting for exposure period, a NOAEL of 82.97 mg/m^3 can be obtained. A subchronic and chronic RfD of 0.83 mg/m^3 (0.24 mg/kg/day) can be derived from the NOAEL for the CIIT (1981) study using an uncertainty factor of 100. The 100 reflects 10 for species-to-species extrapolation and 10 to protect sensitive individuals.

CM has been classified as a group 3 carcinogen, i.e. an agent not classifiable as to its carcinogenicity to humans (IARC 1987, as cited in ATSDR 1989).

5. Regulations Applicable to CM

OSHA

National regulations in air:

Time-weighted average (TWA) (8 hr/day, 40 hr/week): 50 ppm

Short term exposure limit (STEL): 100 ppm

EPA OERR

Reportable Quantity (RQ) - statutory (40 CFR 302.4): 1 lb.

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FRO 001 1993

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FRC 001 1996

Toxicological Profile for Ethylbenzene

TOXICOLOGICAL PROFILE FOR ETHYLBENZENE

1. Exposure and Biological Distribution

Pharmacokinetics

Absorption

Ethylbenzene is expected to be rapidly absorbed via the oral, inhalation, and dermal routes (ATSDR 1990).

No studies were located regarding the absorption of ethylbenzene in humans following oral exposure; however, studies in animals indicate that ethylbenzene is rapidly absorbed by this route. Recovery of ethylbenzene metabolites in the urine of rabbits administered a single dose of 593 mg ethylbenzene/kg was between 72 and 92% of the administered dose 24 hours following exposure (El Masry et al. 1956; as cited in ATSDR 1990). Similarly, 84% of the radioactivity from a single oral dose of 30 mg ethylbenzene/kg administered to rats was recovered within 48 hours (Climie et al. 1983; as cited in ATSDR 1990).

Human volunteers exposed for 8 hours to ethylbenzene vapor in air at concentrations of 23 to 85 ppm retained 64% of the inspired vapor, with only trace amounts in expired air (Bardodej and Bardodejova 1970; as cited in ATSDR 1990); exposure of humans to similar concentrations in another study demonstrated a mean retention rate of 49% (Gromiec and Piotrowski 1984; as cited in ATSDR 1990). Harlan-Wistar rats rapidly absorbed radiolabeled ethylbenzene during respiration, with a retention rate of

44%; possible contributions from dermal exposure were not addressed (Chin et al. 1980b; as in ATSDR 1990).

Studies in humans dermally exposed to liquid ethylbenzene demonstrate rapid absorption through the skin, but absorption of ethylbenzene vapors through the skin appears to be minimal. Absorption rates of 24-33 mg/cm^2/hour and 0.11-0.23 mg/cm^2/hour have been measured for men exposed to liquid ethylbenzene and ethylbenzene from aqueous solutions, respectively. The average amount of ethylbenzene absorbed after the volunteers immersed one hand for up to 2 hours in an aqueous solution of 112 or 156 mg/L solutions was 39.2 and 70.7 mg ethylbenzene, respectively. In contrast, ethylbenzene metabolite levels in urine following dermal exposure of human volunteers to ethylbenzene vapors did not differ from values taken prior to exposure, indicating minimal, if any, dermal absorption of ethylbenzene vapors (Gromiec and Piotrowski 1984; as cited in ATSDR 1990). The limited animal data on dermal absorption of ethylbenzene are inconclusive (ATSDR 1990).

Distribution

No studies were located regarding distribution of ethylbenzene in humans or animals following oral or dermal exposure (ATSDR 1990).

In humans exposed for 2 hours to a mixture of industrial xylene containing 40.4% ethylbenzene, the estimated solvent retention in adipose tissue was 5% of the total uptake (Engstrom and Bjurstrom 1978; as cited in ATSDR 1990). No studies were located concerning the distribution of ethylbenzene in humans following exposure to ethylbenzene alone (ATSDR

1990). Ethylbenzene was shown to be distributed throughout the body in rats following inhalation exposure to radiolabeled ethylbenzene. After exposure to 230 ppm radiolabeled ethylbenzene for 6 hours, the highest levels of radioactivity at 42 hours postexposure were found in the carcass, liver, and gastrointestinal tract, with lower amounts detected in adipose tissue (Chin et al. 1980b; as cited in ATSDR 1990).

Metabolism

In humans exposed via inhalation to ethylbenzene, the major urinary metabolites are mandelic acid (approximately 70%) and phenylglyoxylic acid (approximately 25%). Minor urinary metabolites are 1-phenylethanol (4%), p-hydroxyacetophenone (2.6%), m-hydroxyacetophenone (1.6%), and trace amounts of 1-phenyl-1,2-ethanediol, acetophenone, -hydroxyacetophenone, and 4-ethylphenol (Bardodej and Bardejova 1970 and Engstrom et al. 1984; both as cited in ATSDR 1990). No significant differences in metabolism between oral and inhalation routes were reported in humans or animals; however, the metabolism of ethylbenzene has been found to vary qualitatively and quantitatively with species, sex, and nutritional status (ATSDR 1990). The major urinary metabolites have been traced to hepatic metabolism (Kiese and Lenk 1974 and Sullivan et al. 1976; both as cited in ATSDR 1990); the adrenal cortex may be a major site of extrahepatic ethylbenzene metabolism (Greiner et al. 1976; as cited in ATSDR 1990).

Excretion

Ethylbenzene has been shown to be rapidly metabolized and then eliminated from the body, primarily as urinary metabolites (ATSDR 1990).

No studies were located regarding the excretion of ethylbenzene metabolites in humans following oral exposure to ethylbenzene (ATSDR 1990). Female rats administered a single oral dose of 30 mg radiolabeled ethylbenzene/kg body weight showed very rapid elimination of metabolites, mostly in the urine. Eighty-two percent of the radioactivity was detected in the urine and 1.5 % in the feces (Climie et al. 1983; as cited in ATSDR 1990). In male rats given single oral doses of 350 mg ethylbenzene/kg body weight, the excretion of mandelic acid and phenylglyoxylic acid was detected in the first urine sample collected after exposure. Peak urinary metabolite concentration was reached within 15-19 hours, and ethylbenzene was virtually eliminated by 48 hours following the onset of exposure (Sollenberg 1985; as cited in ATSDR 1990). Quantitative and qualitative differences between species were shown to exist in the percentages of metabolites excreted in the urine (El Masry et al. 1956, Smith et al. 1954a and 1954b, Climie et al. 1983, and Sollenberg 1985; all as cited in ATSDR 1990).

In human volunteers exposed to ethylbenzene by inhalation, the elimination of the ethylbenzene metabolite mandelic acid was rapid; the acid was detected in the first urine sample following the initiation of an 8-hour inhalation exposure to up to 46 ppm ethylbenzene. Elimination of mandelic acid was biphasic, with half-lives of 3.1 hours for the rapid phase and 25 hours for the slow phase. During the exposure period, 23% of the retained ethylbenzene was excreted in the urine; 14 hours after the termination of exposure, an additional 44% of the retained ethylbenzene had been eliminated. The highest urinary excretion rate occurred 6-10 hours after the beginning of the exposure. The metabolic efficiency was independent of the dose level (Gromiec and Piotrowski 1984 and Yamasaki 1984; both as cited in ATSDR 1990). Rats exposed via inhalation to 230 ppm radiolabeled ethylbenzene excreted virtually all of the radioactivity within 24 hours after the onset of exposure. Ninety-one percent of the radioactivity was recovered, primarily in the form of urinary metabolites (Chin et al. 1980a and 1980b; as cited in ATSDR 1990). In rats exposed via inhalation to ethylbenzene at concentrations of 300 or 600 ppm, 83% of the absorbed dose was excreted in the urine within 48 hours of the onset of exposure, with 13% eliminated during the first 6 hours of exposure (Engstrom 1984; as cited in ATSDR 1990). Quantitative differences in the percentages of metabolites excreted in the urine between species were reported by Chin et al. (1980a; as cited in ATSDR 1990).

Following dermal exposure of humans to ethylbenzene, the pattern of excreted metabolites differed significantly from that observed following inhalation exposure. Whereas mandelic acid accounted for approximately 70% of the urinary metabolites eliminated following exposure of humans to ethylbenzene via inhalation (Engstrom et al. 1984; as cited in ATSDR 1990), mandelic acid excreted in humans from exposure to ethylbenzene via the dermal route was only 4.6% of the absorbed ethylbenzene (Dutkiewicz and Tyras 1967; as cited in ATSDR 1990). In the dermal study, no ethylbenzene was reported to be excreted in exhaled air and no further details on the excretion patterns were provided (Dutkiewica and Tyras 1967; as cited in ATSDR 1990). No studies were located regarding the excretion of metabolites in animals following dermal exposure to ethylbenzene (ATSDR 1990).

FRO 001 2002

2. Key Toxicological Studies

Acute Toxicity

Oral Exposure: No studies were found regarding mortality or systemic, dermal, immunological, or neurological effects in humans following acute oral administration of ethylbenzene.

The acute oral LD_{50} in rats following gavage administration is reported to be 94560 ppm (4728 mg/Kg/day) (Smyth et al. 1962; as cited in ATSDR 1990). No studies were found regarding the systemic, dermal, immunological, or neurological effects in animals following acute oral administration of ethylbenzene.

Inhalation Exposure: No studies were found regarding lethality, cardiovascular, gastrointestinal, musculoskeletal, renal, or immunological, effects in humans exposed via inhalation to ethylbenzene (ATSDR 1990). Data are limited on the systemic effects of inhaled ethylbenzene in humans. The information available are from case reports in which quantitative data on concentrations and durations were not reported. In general the systemic effects in humans include pulmonary and ocular irritation and possible hematological alterations (Angerer and Wulf 1985; Thienes and Haley 1972; Yant et al. 1930; as cited in ATSDR 1990). In case studies a male and female patients showed no respiratory effects when exposed to 55.3 ppm ethylbenzene for 15 minutes in an inhalation chamber (Moscato et al. 1987; as cited in ATSDR 1990). Ethylbenzene air concentration of 230 ppm caused momentary eye irritation, a burning sensation, and profuse lacrimation in humans (Thienes and Haley 1972; Yant et al. 1930; as cited in ATSDR 1990). These effects were

FRO 001 2003

concentration-dependent, they became severe at 460 ppm and intolerable at 1200 ppm or higher (Yant et al. 1930; as cited in ATSDR 1990). An acute inhalation study in human volunteers showed no adverse effects when ethylbenzene was inhaled at 100 ppm (435 mg/m^3) (Bardodej and Bardodejova 1970; as cited in IRIS 19). Based on the exposure conditions and an assumed absorption factor of 64%, this is equivalent to a NOAEL of 31.8 mg/Kg/day.

In animal studies, the acute LC_{50} value in rats following inhalation exposure for 2 hours is 13367 ppm, and the dose required to cause 100% mortality in rats is 16698 ppm (Ivanov 1962; as cited in ATSDR 1990). The concentration of ethylbenzene required to cause 50% respiratory depression in mice exposed for 30 or 5 minutes/day for 1 day was 4060 or 1432 ppm, respectively (Nielson and Alarie 1982; De Ceaurriz et al. 1981; as cited in ATSDR 1990). Neurological effects included a moderate activation in motor behavior in rats following a 4-hour inhalation exposure to ethylbenzene concentrations ranging from 400 to 1500 ppm and a narcotic effect at 2180 ppm (Molnar et al. 1986; as cited in ATSDR 1990).

Subchronic Toxicity

No studies were found regarding lethality, systemic, dermal, immunological, or neurological effects in humans or animals following oral exposure to ethylbenzene. A dermal LD_{50} value of 15415 mg/Kg has been reported in rabbits exposed to liquid ethylbenzene (Smyth et al. 1962; as cited in ATSDR 1990).

No studies were available regarding subchronic inhalation toxicity studies of ethylbenzene in humans.

In animals, lethality has been reported to be species dependent. Mortality occurred in mice at half the dose (1200 ppm) that caused death in rats (2400 ppm) when both species were exposed via inhalation to 0, 400, 1200, or 2400 ppm ethylbenzene 6 hour/day for 4 days. The systemic effects of ethylbenzene caused by inhalation are inconclusive due to limitation of data. In general the target organs include the lungs, liver, kidneys, and the hematopoietic system. Rats exposed to ethylbenzene for 6 hour/day for 3 days showed respiratory, hepatic, and renal effects at 2000 ppm (Toftgard and Nilsen 1982; as cited in ATSDR 1990). In rats and mice exposed to ethylbenzene concentrations as high as 782 ppm and rabbits exposed to concentrations as high as 1610 ppm for 4 weeks, showed no changes in gross morphology or histopathology of the intestines (Cragg et al. 1989; as cited in ATSDR 1990). However, in rats exposed to 782 ppm ethylbenzene for 4 weeks, a statistically significant increase in platelet count and mean total leukocyte count of males and females was found (Cragg et al. 1989; as cited in ATSDR 1990). Increased liver-to-body-weight ratios were observed in rats and mice exposed to ethylbenzene for 4 weeks, but the significance of this change is unclear (Cragg et al. 1989; as cited in ATSDR 1990). Eye irritation accompanied by lacrimation was observed in rats exposed to ethylbenzene at 382 ppm for 4 weeks (Cragg et al. 1989; as cited in ATSDR 1990).

Disturbance in neurotransmission occurred at 2000 ppm in rats exposed to ethylbenzene for 6 hour/day for 3 days (Andersson et al. 1981; as cited in ATSDR 1990). In two studies in rabbits, dopamine depletion was observed at 750 ppm when these animals were exposed to ethylbenzene for 12 hour/day for 7 days (Romanelli et al. 1986; Mutti et al. 1988; as cited in ATSDR 1990). No behavioral changes were reported in rats or mice exposed to concentrations of up to 782 ppm ethylbenzene or in rabbits exposed to concentrations of up to 1610 ppm for 4 weeks (Cragg et al. 1989; as cited in ATSDR 1990).

Chronic Toxicity

No chronic toxicity studies in humans or animals were available. In animals some biochemical changes were reported in rats exposed via inhalation to ethylbenzene at 300 ppm for 16 weeks (Elovaara et al. 1985; as cited in ATSDR 1990). Electron microscopical examination showed changes in hepatocyte structure beginning 2 weeks after exposure. The significance of these changes to health effects is unclear. In the same study biochemical renal changes were seen at ethylbenzene concentrations ranging from 50 to 600 ppm (Elovaara et al. 1985; as cited in ATSDR 1990).

In a 20-year study of workers occupationally exposed to an unknown concentration of ethylbenzene, no liver lesions or significant changes in liver function tests were found between exposed and unexposed workers (Bardodej and Cirek 1988; as cited in ATSDR 1990).

Carcinogenicity

No conclusive studies were available on the carcinogenicity of ethylbenzene in humans or animals.

Mutagenicity

Ethylbenzene was shown to increase the mean number of sister chromatid exchanges in human whole blood lymphocyte culture at the highest dose examined without any metabolic activation (Norppa and Vainio 1983; as cited in IRIS 1990). Ethylbenzene at 0.4 mg/plate was not mutagenic for Salmonella strains TA98, TA1535, TA1537, or TA1538 with or without Aroclor 1254 induced rat liver

FRO 001 2006

homogenates (S9) Nestmann et al. 1980; as cited in IRIS 1990). Dean et al. (1985; as cited in IRIS 1990), used a battery of short term tests in the presence and absence of S9 and chromosomal damage in a cultured rat liver cell line. Ethylbenzene was not mutagenic in the concentrations tested (0.2, 2, 20, 50, or 200 g/plate) for S. typhimurium TA98, TA100, TA1535, TA1537, or TA1538 or for E. coli WP2 and WP2uvrA. Ethylbenzene also showed no response in the S. cervisiae JD1 gene conversion assay (IRIS 1990).

Developmental and Reproductive Toxicity

No studies were found regarding the developmental or reproductive effects of ethylbenzene in humans.

In animals few studies were found (ATSDR 1990). In rats, inhalation exposure to ethylbenzene concentrations ranging from 138 to 552 ppm for 24 hours/day for 9 days during gestation days 7-15, caused fetal resorptions and skeletal muscle deformation (Ungvary and Tatrai 1985; as cited in ATSDR 1990). Increased incidences of extra ribs and anomalies of the uropoietic apparatus were seen at the 552 ppm dose. Similar findings were reported in rats exposed to ethylbenzene before mating and during pregnancy at a concentration of 1000 ppm (Andrew et al. 1981; as cited in ATSDR 1990). In both of these studies mild maternal toxicity was reported. No developmental toxicity was seen at 100 ppm, based on this value an intermediate inhalation MRL of 0.29 ppm was calculated (Andrew et al. 1981; as cited in ATSDR 1990). In mice exposed via inhalation to 115 ppm ethylbenzene during gestation days 6-15 for 12 hours/day for 10 days, an increase in the incidence of anomalies of the uropoietic apparatus was found (Ungvary and Tatrai 1985; as cited in ATSDR 1990). No maternal toxicity was evident. In rabbits exposed during gestation to up to 1000 ppm

FRO 001 2007

ethylbenzene, no dose-related effects on the fetuses were noted (Ungvary and Tatrai 1985; Andrew et al. 1981, both as cited in ATSDR 1990). These studies suggest that inhalation of ethylbenzene may cause fetotoxicity at exposure levels of 138 ppm in rats and 115 ppm in mice.

No testicular abnormalities were reported in rats and mice exposed via inhalation to ethylbenzene concentrations as high as 782 ppm and rabbits exposed to ethylbenzene concentrations as high as 1610 ppm for 4 weeks (Cragg et al. 1989; as cited in ATSDR 1990).

3. Risk Assessment

Chronic Health Hazard Assessment for Noncarcinogenic Effects (IRIS 1990)

Route of Exposure: oral

Chronic RfD (mg/kg/day): 0.1

Confidence Level: low

Critical Effect: histopathological changes in the liver and kidneys.

RfD Basis/RfD Source: oral gavage/IRIS, 1990

Uncertainty Factor: 1000

Modifying Factor: 1

Note: Confidence in the chosen study is low because rats of only one sex were tested and the study was not of chronic duration. In addition, confidence in the supporting data is low due to the lack of oral chronic toxicity studies (IRIS). The ATSDR (1990) also has low confidence in this study (Wolf et al. 1956) stating that it lacks details, small number of animals, poor definition of parameters, and lack of statistical analysis of the results.

4. References

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Toxicological Profile for Mercury

TOXICOLOGICAL PROFILE FOR MERCURY

1. What is mercury?

General Description

Mercury (Hg) is a naturally occurring silvery metal which is a liquid at room temperature. Mercury is found in three distinct chemical forms: metallic or elemental mercury, inorganic mercury compounds, and organic mercury compounds. Each of these three forms has its own toxic effects. Inorganic mercury compounds can be changed into organic mercury compounds by living organisms. Organic compounds, specifically methylmercury, are considered to be the most toxic of the three forms.

Chemical and Physical Properties

Listed below is more specific chemical and physical information to help better identify these substances:

Chemical Identifiers - Mercury

a. CAS No.: 7439-97-6

b. Hazardous Substances Databank No.: 1208

c. Molecular Formula: Hg

d. Molecular Weight: 200.59

Physical Properties - Mercury

a. Color/Form: Silvery-white, heavy, mobile, liquid metal; solid mercury is tin-white (Merck, 1983, as cited in HSDB, 1990a)

b. Odor: Odorless (Chris, 1984, as cited in HSDB, 1990a)

c. Odor Threshold: Not applicable

FRO 001 2011

d. **Melting Point: -38.87° C (Merck,1983, as, cited in HSDB, 1990a)**

e. **Boiling Point: 356.72° C (Merck, as cited in HSDB, 1990a)**

f. **Flash Point: No data (HSDB, 1990a)**

g. **Vapor Pressure: 2 x 10^{-3} mm Hg at 15° C (Merck, 1983, as cited in HSDB, 1990a)**

h. **Vapor Density: No data (HSDB, 1990a)**

i. **Specific Gravity: 13.534 at 25°C (Merck, 1983, as cited in HSDB, 1990a)**

j. Solubility in Water: 0.28 u moles/L of water at 25° C (Merck, 1983, as cited in HSDB, 1990a)

k. Solubility in Organic Solvents: soluble in lipids, pentane, and nitric acid; insoluble in dilute hydrochloric acid, hydrogen bromide, hydrogen iodide, and sulfuric acid (HSDB, 1990a)

l. Log Octanol/Water Partition Coefficient: No data (HSDB, 1990a)

Chemical Identifiers - Methylmercury

a. CAS No.: 22967-92-6

b Hazardous Substances Databank No.: 3930

c. Molecular Formula: CH_3Hg

d. Molecular Weight: 215.65

Physical Properties - Methylmercury

No data (HSDB, 1990b)

2. What are the sources of mercury in the environment?

The major source of mercury exposure in the environment is from the release of mercury vapor from natural rocks of all classes. Approximately 25,000 to

FRO 001 2012

50,000 tons of mercury vapor are released from rocks each year (WHO, 1976, as cited in HSDB, 1990a). Other natural sources include releases from volcanos and hot springs (Miller and Buchanan, 1979, as cited in HSDB, 1990a). Significant amounts of mercury are generated by human activities, such as the mining and smelting of metal ores, the combustion of fossil fuels, sewage, and industrial releases (Jonasson and Boyle, 1972; and Friberg, 1986, as cited in HSDB, 1990a).

Methylmercury is formed naturally from both elemental mercury and inorganic mercury by biological activity, in bottom sediments, and soil (Jenson and Jernelov, 1969, as cited in HSDB, 1990b). Potential human sources of methylmercury are from the release of inorganic mercury through its processing, use, and disposal (HSDB, 1990b).

3. How much mercury is produced and used?

In 1986, more than 3.49×10^9g (7.7 million pounds) were mined (Bureau of Mines, 1987, as cited in HSDB, 1990a) and 6.56×10^8g (1.4 million pounds) were imported (Bureau of Mines, 1987, as cited in HSDB, 1990a). Listed below are some of the many uses of mercury:

- Electrical products, such as dry-cell batteries, fluorescent light bulbs, electrical switches, and other control equipment, meters, and instruments;
- Electrolytic preparation of chlorine and caustic soda, known as the chlor-alkali industry (mercury cell process);
- Paint manufacture;
- Dental preparations;

- Catalyst manufacture, pesticides manufacture, general laboratory use, and pharmaceuticals (Kayser, 1982, as cited in HSDB, 1990a)

Methylmercury is no longer produced. Methylmercury components were formerly used extensively in seed treatment as fungicides (Bretherick, 1985, as cited in HSDB, 1990a).

4. How are people usually exposed?

The major route of exposure to mercury in the general population is through food, especially fish and seafood. Another source is from drinking water from contaminated groundwater. However, in terms of total mercury intake, the diet exceeds other media, including air and water, as sources of human exposure and absorption of mercury (USEPA, 1984, as cited in HSDB, 1990,a,b). Exposure in the workplace may occur through inhalation of mercury vapor (USDHHS, 1978).

5. To how much mercury are people typically exposed?

The approximate concentration of mercury in the earth's crust is 80 ppb (Jonasson, 1970, as cited in HSDB, 1990a). Background levels in Canadian soil and glacial deposits ranged from 20 to 50 ppb, and up to 250 ppm near mercury deposits (Jonasson and Boyle, 1972, as cited in HSDB, 1990,a). The worldwide release of mercury vapor from rocks ranges from 25,000 to 150,000 tons of mercury per year (WHO, 1976, as cited in HSDB, 1990a). Peat soil samples from the coastal region of North Carolina during 1983 and 1984 contained 43 to 193 n/ppb total mercury dry weight; methylmercury was not detected (detection limit=25 ng/g dry weight) (DiGuilio and Ryan, 1987, as cited in HSDB, 1990b).

In the United States, background levels of mercury have been reported to range from 5 to 100 ng mercury/L in drinking water, and reported to average 2 to 10 ng mercury/m^3 in air and 100 to 200 ng mercury/g in fish (USEPA, 1984, as cited in HSDB, 1990a). Fish and seafood account for 60% of the intake of total mercury (elemental and methylmercury) in individuals whose drinking water contained less than 2 ug mercury/L of drinking water. However, at concentrations at or above 5 ug mercury/L of drinking water, water exceeds food as the predominant source of mercury exposure (USEPA, 1985).

Fish can accumulate very high levels of mercury because of their very rapid rate of mercury intake and slow rate of mercury elimination. Therefore, the highest levels of mercury are found in larger predator freshwater fish, such as lake trout, pike, and walleye, and larger predator saltwater fish such as shark, swordfish, tuna, and halibut (National Research Council of Canada [NRCC], 1979, as cited in HSDB, 1990a). The ratio of organic to total mercury generally is very high in fish and seafood, with organic mercury entirely in the form of methylmercury (May et al, 1987; Inskip and Piotrowski, 1985; Tollefson and Cordle, 1986, as cited in HSDB, 1990b). The background concentrations of mercury in freshwater fish were reported to range from 50 to 200 ug mercury/kg body weight (Inskip and Piotrowski, 1985, as cited in HSDB, 1990b). A 1979 FDA survey detected a mean total mercury content of 830 ug mercury/kg of net muscle tissue weight in swordfish (DiGuilio and Ryan, 1987, as cited in HSDB, 1990b).

Mercury exposure for the general population has been estimated to be about 1 ug/day from air, less than 2 ug/day from water, and about 20 ug/day from food, but may be up to 74 ug/day depending upon the amount of fish in the diet (Klaassen et al., 1986). Other sources have indicated different amounts of mercury intake. For example, the average daily dietary intake of total mercury was estimated to range from 2,000 to 7,000 ng/day (2-7 ug/day) for adults and up to 1,000 ng/day (1 ug/day) for infants and toddlers (USEPA, 1984, as cited in HSDB, 1990a). EPA estimated that large populations would be exposed to approximately 0.1 ug/day from water; 2.8 to 7.9 ug/day through diet; and 1.6 to 3.2 ug/day from air, primarily due to indoor air exposures (EPA, 1980). Assuming an ambient air level of 50 ng/m^3, the average daily intake of mercury vapor is estimated at 1 ug/day from inhalation (WHO, 1976, as cited in HSDB, 1990a). Assuming an average ambient concentration of 7 ng/m^3, the average daily intake from air is estimated at 0.14 ug total mercury/day. Assuming an average mercury concentration in fish of 0.4 ug/g and an average concentration in other food of 0.004 ug/g, the average daily intake from food is estimated at 16.3 ug total mercury/day (Bennett, 1986, as cited in HSDB, 1990b).

6. What happens to mercury in the body?

The chemical form of mercury determines how it enters, circulates, and is eliminated from the body. The most important route of absorption for mercury vapor is the respiratory tract, with approximately 80% of the amount inhaled being absorbed (Casarett and Doull, 1986, as cited in HSDB, 1990a). The brain is the target organ of inhaled mercury vapor (Patty, 1981, as cited in HSDB, 1990a). Because of its high fat solubility, mercury is rapidly circulated to the brain as well as to the fetus (Casarett and Doull, 1986, as cited in HSDB, 1990a). Elimination of mercury after vapor exposure mainly is in urine and feces. Small amounts are eliminated through sweat, tears, saliva, and breast milk and small amounts of vapor are also exhaled (Friberg, 1986, as cited in HSDB, 1990a).

Ingested mercury is poorly absorbed (Gosselin, 1984, as cited in HSDB, 1990a). Probably less than 0.01% is absorbed from the gastrointestinal tract (Casarett and Doull, 1986 as cited in HSDB, 1990a). The highest concentrations of inorganic mercury are found in the kidneys; these forms do not readily pass into the brain or into the fetus, and are excreted in urine and feces (Goodman, 1985, as cited in HSDB, 1990a).

Methylmercury is absorbed and retained longer from water and food than inorganic mercury (U.S. Dept. of Interior, 1987, as cited in HSDB, 1990b). The central nervous system, including the brain, is the target of ingested methylmercury (Clarkson, 1987, as cited in HSDB, 1990b). Ninety percent of methylmercury is eliminated in feces (WHO, 1976, as cited in HSDB, 1990b).

7. What are the toxic effects of mercury? Can it cause cancer?

Exposure to mercury can produce a wide variety of effects, depending upon the chemical form, the amount, and the route of absorption and elimination of the particular mercury compound. The brain is the target organ of methylmercury and, to a lesser extent, mercury vapor; the kidneys are the target organs of inorganic mercury compounds. Short term inhalation of 1.2 to 8.5 mg/m^3 mercury vapor produces coughing and difficulty breathing, leading to bronchitis and pneumonia; long term inhalation produces central nervous system effects, such as tremors or nervousness. Gingivitis (gum inflammation) is another sign of mercury vapor poisoning. Dermatitis after skin contact also has been reported to occur (Klassen, et al, 1986).

Accidental or intentional ingestion of inorganic mercury compounds has caused abdominal cramps, diarrhea, and suppression of urine formation. Some inorganic compounds have caused ulcers and bleeding in the digestive tract after accidental or intentional poisoning. Individuals also have developed skin sensitization reactions upon contact with the skin (Klassen, et al, 1986).

Organic mercury compounds can cause central nervous system effects and can irritate the eyes, mucous membranes, and skin. Symptoms of poisoning from short and long term exposures include numbness and tingling of the lips, hands, and feet; muscular incoordination; difficulty speaking; tunnel vision; hearing loss; and emotional disturbances. Methylmercury is the most hazardous form of mercury because of its high stability, fat solubility, and chemical properties that allow it to penetrate cell membranes (U.S. Dept. of Interior, 1987, as cited in HSDB, 1990b). Severe poisonings have resulted in irreversible nervous system disorders. Epidemics have been reported in Japan after ingestion of methylmercury-contaminated fish and in Iraq after ingestion of methylmercury-contaminated bread made from wheat which was intended for planting and treated with organic mercury fungicides (Marsh, 1987). Infants born to mothers who ingested large amounts of methylmercury-contaminated fish were mentally retarded and had cerebral palsy and suffered convulsions (USDHHS, 1978). The earliest effects of methylmercury poisoning in humans have been observed at blood concentrations between 200 and 500 ng mercury/mL (WHO, 1976, as cited in IRIS, 1990b). Inorganic mercury and organic mercury have not been shown to cause cancer in humans. There is inadequate evidence of the carcinogenicity of inorganic mercury to animals (IRIS, 1990a).

8. Which groups face a special risk from exposure to mercury?

Because of their developing neurological systems, fetuses, infants and children are more susceptible than adults to the effects of mercury poisoning (USEPA, 1985). Methylmercury has a pronounced toxic effect on developing fetuses; the fetal brain is the most sensitive organ (NAS, 1978, as cited in HSDB, 1990b). Although all forms of mercury cross the placenta to the fetus, there is a tendency for organic mercury compounds to accumulate at higher levels in fetal tissues than in maternal tissues. In addition, because mercury has been reported in the breast milk of women who ingested methylmercury-contaminated foods, neonatal exposure to mercury may be enhanced by nursing (Klaassen, et al, 1986). Therefore, because of the sensitivity of the fetus to mercury, especially methylmercury, pregnant women and women of child-bearing age should avoid exposure to mercury (WHO, 1976, as cited in HSDB, 1990b). In addition, persons with a history of allergies or known sensitivity to mercury, chronic respiratory disease, nervous system disorders, or kidney disorders are at increased risk from exposure to mercury compounds (NIOSH/OSHA, 1981, as cited in HSDB, 1990a, b).

9. What is the fate of mercury in the environment?

Mercury is released to the environment from the natural degassing of the earth's crust (WHO, 1976, as cited in HSDB, 1990a), from fossil fuel combustion (Jonasson and Boyle, 1972, as cited in HSDB, 1990a) from emissions of volcanoes and hot springs (Miller and Buchanan, 1979, as cited in HSDB, 1990a), from the mining and refining of metal ores containing mercury (Jonasson and Boyle, 1972, as cited in HSDB, 1990a), from the disposal of industrial and domestic products, such as batteries, thermometers, and electrical switches (British Dept. of the Environment, 1977, as cited in HSDB, 1990a) and from emissions of cement manufacturers (NRCC, 1979, as cited in HSDB, 1990a). Water-borne mercury pollution may originate in sewage, waste disposal, metal refining operations, or from chlor-alkali plants (NRCC, 1979, as cited in HSDB, 1990a).

Inadequate and improper disposal of industrial mercury wastes increase air and water mercury concentrations (Venugopal, 1978, as cited in HSDB, 1990a). Microorganisms, in turn, including those in human fecal material (Hayes, 1982, as cited in HSDB, 1990b), convert elemental mercury into methylmercury salt and dimethylmercury (CH_3HgCl) , which escape into the atmosphere. Most of these reactions occur in sediments of river and ocean beds. The major source of mercury contamination is disposal of industrial mercury wastes into water where the wastes settle as sediment, only to be recycled into water and air (Venugopal, 1978, as cited in HSDB, 1990a).

Mercury appears to bind to dissolved matter or fine particulates in water more readily than to airborne dust particles or to river and lake bed sediment particles. Mercury can be desorbed into water, transported by fine particles or dissolved substances in water, and redeposited on the bed sediment (NRCC, 1979, as cited in HSDB, 1990a). All forms of mercury (metal, vapor, inorganic, or organic) can be converted into methylmercury. Inorganic forms are converted by natural microbial action in the upper sedimentary layers of sea or lake bottoms (Friberg, 1986, as cited in HSDB, 1990a). In sludge from treated sewage, for example, mercury is concentrated by a factor of several hundred to several thousand over the levels initially present in raw sewage (NRCC, 1979, as cited in HSDB, 1990a). Mercury accumulates and concentrates in the food chain up to a concentration of 10,000 times that of water (Environment Canada, 1982, as cited in HSDB, 1990a). Fish can accumulate mercury to very high levels because of rapid uptake and slow elimination. Predatory fish have higher concentrations than do fish lower in the food chain. The residence time in water is low; the half-life of mercury is approximately 1 year or more. Much of the mercury deposited on land by rainwash appears to re-vaporize within one or two days, especially in areas substantially heated by sunlight (NRCC, 1979, as cited in HSDB, 1990a). On the other hand, mercury is strongly absorbed to soils and sediments and is desorbed very slowly. For example, mercury sprays failed to migrate more than two inches from the surface even after several years (Ross and Stewart, 1972, as cited in MITRA, 1986). Volatilization of mercury from land and lakes has been estimated to increase the airborne mercury concentrations over continental land masses by a factor of 45 (Miller and Buchanan, 1979, as cited in HSDB, 1990a).

Methylmercury is produced by biological activity on inorganic mercury in sediments, rotten fish, and soil; biological activity on inorganic mercury released from disposal of municipal wastes in sanitary landfills and subsequent leaching from these sites; and from emissions from refuse incineration, nonferrous and ferrous metal production, fossil fuel combustion, and chlor-alkali industries. The production and destruction of methylmercury is part of the biogeochemical cycle of mercury. In other words, where mercury is found in the soil, methylmercury may also be found since it is both produced and destroyed by natural bacterial processes upon mercury compounds. The same process occurs in water. However, methylmercury is rapidly accumulated and concentrated in fish, from both water and food, where the consumption of fish and shellfish becomes the major source of exposure of humans to methylmercury (HSDB, 1990b).

10. Exposure and Biological Distribution

Routes of Exposure

Exposure to mercury can occur through ingestion, inhalation, or dermal contact. Because of mercury's ability to bioaccumulate and bioconcentrate in fish and seafood, the principal route of human exposure is through the diet (USEPA, 1984, as cited in HSDB, 1990a). Drinking water appears to be a less important source of exposure than food. When mercury levels exceed 5 ug/L of drinking water, however, water exceeds food as the predominant source of mercury exposure (USEPA, 1985). Mercury's volatilization from natural sources and human-generated releases into the atmosphere permit opportunities for inhalation exposure. Dermal exposure may occur through direct contact with mercury compounds or following exposure to mercury vapor (Grant, 1986, as cited in HSDB, 1990a).

Pharmacokinetics

Absorption

Although the greatest exposure to mercury is through food, the greatest mercury absorption is through the respiratory tract. The percent deposition and retention of mercury vapor in humans is reported to be very high, i.e. 80% (Casarett and Doull, 1986, as cited in HSDB, 1990a). Mercury vapor inhaled by cattle and sheep is presumably absorbed by the respiratory tract and other mucous membranes (Clarke, 1981, as cited in HSDB, 1990a). Inorganic mercury compounds appear to be less well absorbed by the respiratory tract. Inhalation of inorganic mercury ranging from 2.91 to 26.18 mg/m^3 resulted in an average of 24% absorption by the lungs (Browing, 1969, as cited in HSDB, 1990a).

Ingested metallic mercury is very poorly absorbed from the gastro-intestinal tract, i.e., less than 0.01% (Casarett and Doull, 1986, as cited in HSDB, 1990a). Because of poor absorption, oral doses of 100 to 500 grams have been administered to humans with little effect (NRC, 1977,

FRO 001 2022

as cited in HSDB, 1990a). Although the degree of skin absorption in humans in unknown (Casarett and Doull, 1986, as cited in HSDB, 1990a), mercury metal in contact with rabbit conjunctivae has been shown to be absorbed and excreted in urine (Grant, 1986, as cited in HSDB, 1990a).

Methylmercury is absorbed more efficiently than inorganic mercury from water, and probably from food, and is retained longer regardless of route exposure (US Dept. of Interior, as cited in HSDB, 1990b).

Distribution

Once absorbed, lipid-soluble mercury vapor (Hg^0) is selectively distributed to the brain as elemental mercury where susbsequent oxidization to Hg^{+2} causes its retention. A similar selective distribution occurs in the fetus (Casarett and Doull, 1986, as cited in HSDB, 1990a). Elemental mercury (Hg^0) is transported in red blood cells; ionic mercury (Hg^{+2}) is transported in plasma (Hayes, 1982, as cited in HSDB, 1990a). Distribution of radiolabeled mercury appeared complete within 24 hours for most regions of the body, except the head, where peak radioactivity was not attained until two to three days later (USEPA, 1984, as cited in HSDB, 1990a). Elemental mercury moves readily across the placenta and into fetal tissue. Regardless of the chemical form administered, however, fetal tissues attain concentrations at least equal to those of the mother (Casarett and Doull, as cited in HSDB, 1990a).

Inorganic mercury has a markedly nonuniform distribution after absorption, with the highest concentration and retention in the kidneys. Concentrations of inorganic mercury are similar in whole blood and

FRO 001 2023

plasma. Inorganic mercury compounds do not readily cross the blood-brain barrier or the placenta (Goodman, 1985, as cited in HSDB, 1990).

Methylmercury can permeate cell membranes (Venngopal, 1978, as cited in HSDB, 1990b), is distributed to a wide variety of organs, and has an affinity for the brain, especially the posterior cortex (Klaassen, et al., 1986). The developing nervous system is especially susceptible to damage by methylmercury (Clarkson, 1987, as cited in HSDB, 1990b).

Metabolism

In the brain, elemental mercury (Hg^0) is oxidized to the mercuric ion (Hg^{+2}). The oxidative process is enzyme-mediated, with the catalase complex being the most likely site of oxidation (Casarett and Doull, 1986, as cited in HSDB, 1990a). Mercury vapor metabolism in guinea pig fetuses is different from that in mothers following prenatal exposure to mercury vapor. Mercury vapor is most likely oxidized in the fetal liver to ionic mercury (Yoshida et al, 1986, as cited HSDB, 1990a).

Because the mercuric ion (Hg^{+2}) can be methylated by both aerobic and anaerobic bacteria, intestinal flora methylate mercury and can contribute substantially to the methylmercury burden in humans (Hayes, 1982, as cited in HSDB, 1990b). Methylmercury is the most stable of the organic mercury compounds in vivo (WHO, 1976, as cited in HSDB, 1990b).

Excretion

After exposure, elimination of mercury vapor occurs mainly by excretion of mercuric mercury (Hg^{+2}) in urine and feces. Small quantities of vapor are excreted from the lungs of laboratory animals. Other excretion routes are salivary, lacrimal, sweat, and mammary glands. The rate of excretion

FRO 001 2024

is dose-dependent and varies among species. More mercuric mercury is excreted in urine at higher exposure concentrations. Data from human studies indicate that the bulk of mercury is excreted with a biological half-life of 60 days. However, mercury accumulated within the brain is slowly eliminated with a biological half-life which may exceed a year (Friberg, 1986, as cited in HSDB, 1990a).

Fecal elimination accounted for 90% of the total mercury elimination in volunteers given a single dose of methylmercury (WHO, 1976, as cited in HSDB, 1990b). The elimination of organic mercury compounds from the body is lower than for inorganic mercury compounds (Kirk-Othmer, 1978, as cited in HSDB, 1990b). After single intravenous administration of methylmercury chloride to C57BL/6N and BALB/CA mice, males showed significantly higher mercury levels in urine than females; no significant difference was found in fetal mercury concentrations 24 hours post injection (Hirayama and Yatsutake, 1986, as cited in HSDB, 1990b).

The biological half-life of methylmercury in blood is 120 days. The half-life is higher relative to inorganic mercury because of reabsorption from the intestines of methylmercury excreted into the digestive tract with bile (Venugopal, 1978, as cited in HSDB, 1990b). Administration of methylmercury to humans indicated that the whole-body half-life varied between 60 and 80 days. Persons with Minamata poisoning in Japan had a wider range of half-lives: 37 to 137 days in whole blood (NRCC, 1978, as cited in HSDB, 1990b).

11. Key Toxicological Studies

Acute Toxicity

Most of the information concerning acute toxicity of mercury is derived from humans following accidental or intentional ingestion of inorganic mercury salts or accidental or workplace exposure to mercury vapor. The toxicological properties of mercury are determined by the molecular structure of the compound to which a person is exposed, its stability in the body, and its route of biotransformation and excretion. Each mercury compound has its own toxicology relative to dose-effect and dose-response relationships (Friberg,1986, as cited in HSDB, 1990a).

Accidental or intentional ingestion of mercury has caused severe abdominal cramps, bloody diarrhea, and suppression of urine formation. Accidental or intentional ingestion of mercuric salts, e.g., mercuric chloride, has resulted in corrosive ulceration, bleeding, and necrosis of the gastrointestinal tract, followed by shock and circulatory collapse. Mercurous compounds are less corrosive and less toxic because of lower solubility (Klaassen et al, 1986).

Acute exposure to mercury vapor primarily affects the lungs in the form of acute interstitial pneumonitis, bronchitis (Sittig, 1981, as cited in HSDB, 1990a). Acute intoxication from inhalation of mercury vapors in high concentrations was once common among workers who extracted mercury from its ores. Symptoms included metallic taste, nausea, abdominal pain, vomiting, diarrhea, and headache. After a few days, salivary glands swelled, stomatitis and gingivitis developed, and a dark line of mercury sulfide formed on inflamed gums. Teeth became loose; in some instances ulcers formed on the lips and cheeks. In milder cases, recovery occurred within 10-14 days, but in other cases, chronic poisoning developed. Some acute cases have resulted following exposure to vapor concentration of 1.2 to 8.5 mg/m^3 (Patty, 1981, as cited in

FRO 001 2026

HSDB, 1990a). A report of a 54-year old man exposed to unspecified high levels of mercury vapor resulted in a urine concentration of 100 ug/L and a neurological syndrome which disappeared after urinary mercury returned to normal (Adams et al., 1983, as cited in HSDB, 1990a).

Many mercury compounds are irritating to the skin and may produce dermatitis with or without vessication. Contact with the eyes causes ulceration of the conjunctiva or cornea (Gosselin, 1984, as cited in HSDB, 1990a). Contact dermatitis has been reported from mercury amalgam fillings, and mercury skin sensitivity has been reported among dental students (Patty, 1981, as cited in HSDB, 1990a). After topical application of inorganic mercury compounds to skin and mucous membranes, typical manifestations are erythemas and contact dermatitis. Acrodynia, or "pink disease," is a hypersensitivity found in children between four months and four years of age, characterized by a general rash on the body. Acrodynia cases usually had increased levels of mercury in urine (above 50 ug/L (Friberg, 1986, as cited in HSDB, 1990a). The acute lethal dose in humans is 0.04-2.2 mg% or 4-22 ug/mL (Winek, 1985, as cited in HSDB, 1990a). Mercury vapor is extremely toxic to sheep and cattle and causes dyspnea and coughing, nasal discharge, fever, loss of appetite, dermatitis and nephritis (Clarke, 1981, as cited in HSDB, 1990a).

Methylmercury affects the central nervous system, especially the sensory, visual, and auditory areas of the brain; the most severe effects lead to widespread brain damage, resulting in mental derangement, coma, and death (U.S. Dept. of the Interior, 1987, as cited in HSDB, 1990b). Neurotoxicity has been observed from indirect methylmercury intoxication by eating pork raised on contaminated feed. Fatal cases of Minamata disease indicate that at concentrations of methylmercury greater than 8 ug mercury/g of wet brain tissue, equivalent to 60 mg in the human body, overt neurotoxicity appears in adults. A fatal ingested dose in adults is 1 mg of mercury/day over a period of several weeks (Venugopal, 1978, as cited in HSDB, 1990b). The lethal blood level of organic mercury has been reported at >0.06 mg% or >0.6 ug/mL (Winek, 1985, as cited in HSDB, 1990b). When deposited on the skin, methylmercury compounds give no warning. If contact is maintained, second degree burns can result. Sensitization may also occur (Sittig, 1981, as cited in HSDB, 1990b). Skin irritation, blistering, or other dermatitis can occur with or without systemic illness (Hayes, 1982, as cited in HSDB, 1990b).

Subchronic Toxicity

The most extensive episode of mercury poisoning occurred in Iraq during 1971 and 1972 when methylmercury poisoning resulted from the ingestion of contaminated bread made from cereal grains treated with alkyl mercury fungicides. The average period of consumption was from 43 to 68 days. The mean methylmercury content in wheat was 7.9 mg/kg. Approximately 6,000 hospital admissions and 500 deaths were reported. In the most severely affected group, the highest daily intake was 130 ug of mercury/kg (WHO, 1976, as cited in HSDB, 1990b).

Chronic Toxicity

The most consistent and pronounced effects of chronic exposure to mercury vapor are upon the central nervous system, particularly the brain; effects are neurological and psychiatric (Goodman, 1985, as cited in HSDB, 1990a). Four major signs of mercury poisoning are seen: gingivitis, excessive salivation, increased irritability, and muscular tremors. Rarely were all four effects observed in an individual case (Sittig, 1981, as cited in HSDB, 1990a). Although proteinuria may occur (Klaassen et al, 1986) the degree of potential renal damage following chronic mercury vapor exposure is unknown. Severe nephrotic changes have been reported among patients exposed to a combination of mercury dust and vapor, but not among those exposed to vapor only (Friberg, 1986, as cited in HSDB, 1990a).

Chronic exposure to inorganic mercury compounds cause gingevitis, stomatitis, and excessive salivation. Mercurialentis (a colored reflex from the lens) is also observed, but does not indicate intoxication. Anorexia, weight loss, anemia, and muscular weakness are also associated with chronic exposure (Goodman, 1985, as cited in HSDB, 1990a).

The primary target of chronic exposure to methylmercury is the brain. Severe poisoning may produce irreversible brain damage resulting in the loss of higher functions. The effects of chronic poisoning are progressive. In the early stages, fine tremors of the hands, and in some cases, tremors of the face and arms are observed. With continued exposure, tremors increase in severity and become convulsive; slurred speech and difficulty in pronunciation may also occur. Unsteady gait and spastic movements can lead to severe atopia of the arms and legs. Sensory disturbances, including tunnel vision, blindness, and deafness, are common (Sittig, 1981, as cited in HSDB, 1990b). The most severe effects lead to widespread damage, resulting in mental derangement, coma, and death (U.S. Dept. of the Interior, 1987, as cited in HSDB, 1990b).

Two methylmercury poisoning epidemics occurred in Minamata Bay and Niigata, Japan, from 1953 to the early 1960s. These epidemics were caused by the industrial release of methylmercury and other mercury compounds into neighboring waters, followed by the ingestion of mercury-contaminated fish. The median total mercury in fish was estimated between 10 to 11 mg/kg fresh weight. By 1974, 1,200 cases of methylmercury poisoning were identified, of which 55 were fatal. The highest mercury concentrations were found in blood and hair (WHO, 1976, as cited in HSDB, 1990b). Exposure to methylmercury is particularly insidious for two reasons: (1) long latency periods of up to six months between onset of exposure and recognition of symptoms has resulted in exposing large numbers of victims to toxic levels (in excess of 300 g/day) for relatively long periods following ingestion of methylmercury-contaminated food; and (2) nonspecific signs and symptoms resembling those exhibited by other diseases means that adverse effects may not be recognized as related to methylmercury exposure (USEPA, 1985).

The earliest effects in humans occur at blood concentrations between 200 and 500 ng of mercury/mL, for both pre- and postnatal exposures. Blood concentrations correspond to body burdens of 30 to 50 mg mercury/70kg adult, and are equivalent to intakes of 3 to 7 ug/kg/day (WHO, 1976 as cited in IRIS, 1990a).

Available data indicate that methylmercury is the most chronically toxic of the mercury compounds tested (USEPA/OWRS, 1986, as cited in HSDB, 1990b). Methylmercury's toxicity results from its high stability, lipid solubility, and possession of ionic properties that lead to a high ability to penetrate cell membranes (U.S. Dept. of the Interior, 1987, as cited in HSDB, 1990b).

Carcinogenicity

No studies evaluating the carcinogenic potential of metallic, inorganic, or organic mercury in humans were available in HSDB or IRIS. The U.S. Environmental Protection Agency (USEPA) has categorized inorganic mercury as a category D - not classifiable as to human carcinogenicity based on the

FRO 001 2030

unavailibility of human evidence and inadequate animal and supporting data (IRIS, 1990a). Methylmercury has not been evaluated by the USEPA for evidence of human carcinogenic potential (IRIS, 1990b). No classification of the carcinogenicity of metallic mercury was found.

Mutagenicity

Workers exposed to mercury vapor had an increased frequency of aneuploidy in lymphocytes (Friberg, 1986, as cited in HSDB, 1990a). Workers exposed to metallic mercury or mercury amalgams had a significantly increased incidence of lymphocytic aneuploidy, but not structural chromosomal aberrations, relative to controls (NRCC, 1979, as cited in HSDB, 1990a).

Syrian hamsters exposed to 10 mg methylmercury/kg chloride had a significantly increased incidence of hyperploid and hypoploid oocytes relative to negative controls (Maihles, 1983, as cited in HSDB, 1990b). Methylmercury chloride administered in the dust to Drosophila melanogaster at 5 mg/L induced chromosomal nondisjunction. Methylmercury produced small increases in the rate of point mutations (Ramel, 1972, as cited in HSDB, 1990a).

Developmental and Reproductive Toxicity

Infants born to mothers who ingested large amounts of methylmercury-contaminated fish were mentally retarded and had cerebral palsy with convulsions (USDHHS, 1978). Severe cerebral effects have been seen in infants born to mothers who had ingested large amounts of methylmercury-contaminated fish (Sittig, 1981, as cited HSDB, 1990b). Mental retardation has been found in children whose mothers had hair mercury concentrations as low as 18 ppm. Because of their developing neurological systems, fetuses and infants are

FRO 001 2031

apparently more susceptible to the effects of mercury than adults (USEPA, 1985).

Methylmercury has been shown to cause congenital malformations in mice following injection of 30 mg/kg of methylmercury chloride into mice from days 6 through 13 of gestation. Treatment after day 7 was associated with a high incidence of cleft palate and hydrocephalus (Shepard, 1986, as cited in HSDB, 1990b).

Sprague-Dawley rats given 0 or 2.5 ppm methylmercury in drinking water on day 2 of gestation throughout lactation to the time of sacrifice resulted in no gross evidence of maternal toxicity and no gross malformations in pups. Treated litters showed increased pup mortality 48 hours postpartum. Mercury levels in pup livers were significantly different from maternal values at 6, 12, and 18 days postpartum. Significant reductions in body weight and cerebellar weight were observed relative to controls (Howard et al, 1986, as cited in HSDB, 1990b).

Macaca fascicularis females were treated with 0, 50, or 90 ug/kg/day of methylmercury hydroxide 124 days and then time-mated to nontreated males. Reproductive failure measured as nonconception and abortion were related to significantly higher blood concentrations in treated females. None exhibited signs of methylmercury toxicity during breeding or pregnancy. Daily treatment with 90 ug/kg/day for one year produced signs of maternal toxicity in 4 of 7 females. Toxicity was related to increased maternal size, duration of methylmercury treatment, and blood concentration of 2.3 to 2.8 ppm (Burbacher et al, 1984, as cited in HSDB, 1990b).

12. Risk Assessment

Chronic Health Hazard Assessment for Noncarcinogenic Effects (IRIS, 1980b):

Methylmercury

Route of Exposure: Oral

Chronic RfD (mg/kg/day): 0.0003

Confidence Level: Medium

Critical Effect: CNS effects

RfD Basis/RfD Source: Human poisonings/IRIS, 1990b

Uncertainty Factor: 10

Modifying Factor: 1

Health Hazard Assessment for Varied Exposure Durations (USEPA, 1987):

Inorganic Mercury

ODW Health Advisory	Drinking Water Equivalent Level (mg/L)	Uncertainty Factor
1-day	1.58 (estimated)	-
10-day	1.58 (estimated)	-
Longer-term	1.58 (estimated)	-
Lifetime	1.1 (estimated)	1,000

Carcinogenicity Assessment for Lifetime Exposure:

Inorganic Mercury (IRIS, 1990a)

Weight of Evidence Classification - D; not classifiable as to human carcinogenicity.

Basis - No human data are available. Animal and supporting data are inadequate.

Methylmercury has not been evaluated by USEPA for evidence of human carcinogenic potential (IRIS, 1990b).

13. Regulations Applicable to Mercury

OSHA

Transitional Limits (Ref. 54 FR 2332, 1/19/89)

Permissible Limits of Exposure (PEL) in workplace air:

Time-weighted average (TWA) (8 hr/day, 40 hr/week)

Aryl and Inorganic Mercury:

Mercury Vapor:

Methylmercury:

Ceiling Concentration:

Aryl and Inorganic Mercury: 0.1 mg/m^3

Mercury Vapor: 0.1 mg/m^3

Methyl Mercury: 0.1 mg/m^3

Maximum Peak:

Aryl and Inorganic Mercury:

Mercury Vapor:

Methylmercury:

Final Rule Limits:

Time-weighted average (TWA) (8 hr/day, 40 hr/week):

Aryl and Inorganic Mercury:

Mercury Vapor: 0.05 mg/m^3; prevent skin absorption

Methylmercury: 0.01 mg/m^3; prevent skin absorption

Short term exposure limits (STEL):

Aryl and Inorganic Mercury:

Mercury Vapor:

Methylmercury: 0.03 mg/m^3; prevent skin absorption

Ceiling Concentration:

Aryl and Inorganic Mercury: 0.1 mg/m^3; prevent skin absorption

Mercury Vapor:

Methylmercury:

EPA ODW

Maximum Contaminant Level (MCL) in drinking water (reference 40 FR 141, 7/1/87, as cited in HSDB, 1990a,b):

Total Mercury: 0.002 mg/L

EPA OWRS

Toxic pollutant designated persuant to Section 307 (a)(1) of the Clean Water Act; subject to effluent limitations (reference 40 FR 401.15, 7/1/87, as cited in HSDB, 1990a,b):

Total Mercury:

EPA OERR

Reportable Quantity (RQ) (Ref. 50 FR 13456, 4/4/85, as cited in HSDB, 1990a):

Inorganic Mercury: 1 lb (0.454 kg)

Methylmercury:

EPA OSW

Discarded commercial chemical products, off-site specification species, container residues, and spill residues:

Listing as toxic waste (reference 40 FR 261.33, 7/1/87, as cited in HSDB, 1990a):

Mercury:

Listing as hazardous waste:

Mercury (reference 40 FR 261.24, 7/1/87, as cited in HSDB, 1990a):

Methylmercury (reference 40 FR 261.24, 7/1/87, as cited in HSDB, 1990):

EPA OAQPS

National Emission Standards for Mercury:

Emissions from mercury ore processing facilities and mercury cell chlor-alkali plants (total mercury): 2,300 g Hg maximum per 24 hour period (reference 40 FR 61.52a, 7/1/87, as cited in HSDB, 1990a)

Emissions from sludge incineration plants, sludge drying plants, or a combination of these that process wastewater treatment plant sludges (total mercury): 3,200 g Hg maximum per 24 hour period (reference 40 FR 61.52D, 7/1/87, as cited in HSDB, 1990b)

FDA

Permissible level in color additives (total mercury): 1.0 ppm (reference 21 FR 74.102; 21 FR, 74.203; 21 FR, 74.705, 4/1/88)

Action level in fish (methyl mercury only): 1.0 ppm (reference Food Chemical News, as cited in HSDB, 1990b)

Permissible level in bottled water (total mercury): 0.002 mg/L (reference 21 FR 103.35, 4/1/88, as cited in HSDB, 1990a,b)

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FRO 001 2038

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Toxicological Profile for Methyl Ethyl Ketone

TOXICOLOGICAL PROFILE FOR METHYL ETHYL KETONE

1. What is Methyl Ethyl Ketone?

General Description

Methyl ethyl ketone (MEK) is a colorless liquid with an acetone-like odor (sweet, pleasant, and pungent). It is also known as 2-butanone, 3-butanone, and methyl acetone (HSDB, 1990).

Chemical and Physical Properties

Listed below is more specific chemical and physical information to help better identify this substance:

Chemical Identifiers

a. CAS No.: 78-93-3
b. Hazardous Substance Databank No.: 99
c. Molecular Formula: C_4H_8O
d. Molecular Weight: 72.1

Physical Properties

a. Color/Form: colorless liquid (Sax, 1984, as cited in HSDB, 1990)
b. Odor: sweet, pleasant, pungent (Chris, 1984-5); acetone-like (Merck, 1983, as cited in HSDB, 1990)
c. Odor Threshold: low 0.7375 mg/cu m, high 147.5 mg/m^3 (Ruth, 1986, as cited in HSDB, 1990)
d. Melting Point: -86.3° C (Weast, 1986-7, as cited in HSDB, 1990)
e. Boiling Point: 79.6° C (Weast, 1986-7, as cited in HSDB, 1990)
f. Flash Point: -9° C (NFPA, 1986, as cited in HSDB, 1990)

FRO 001 2041

g. Vapor Pressure: 77.5 mm Hg at 20° C (ACGIH, 1986, as cited in HSDB, 1990)

h. Vapor Density: 2.41 (air = 1) (Browning, 1965, as cited in HSDB, 1990)

i. Specific Gravity: 0.805 @ 20° C/4° C (Weast, 1986, as cited in HSDB, 1990)

j. Solubility in Water: 353 g/L @ 10° C (Verschueren, 1983, as cited in HSDB, 1990)

k. Solubility in Organic Solvents: soluble in alcohol, ether, acetone, and benzene (Weast, 1988, as cited in HSDB, 1990)

l. Log Octanol/Water Partition Coefficient: 0.26-0.29 (Hansch, 1979, as cited in HSDB, 1990)

2. What are the sources of MEK in the environment?

MEK is a naturally occurring substance released from volcanoes, forest fires, products of biological degradation, and is a natural component of some foods (Graedel et al., 1978 and Lande et al., 1976, as cited in HSDB, 1990). Released into the environment as a result of emissions from its use as a solvent for lacquers, adhesives, rubber cement, printing inks, paint removers, and cleaning solutions, a catalyst; a carrier; and may be released from waste water resulting from these uses. Other human generated sources include stack emissions, fugitive emissions and waste water related to its production, storage, transport, and disposal. Fumes from combustion processes, such as gasoline exhaust and cigarette smoke also result in releases of MEK (Kirk-Othmer, 1981, Graedel, 1978, Grosjean, 1982, Verschueren, 1983 and Lande et al., 1976, as cited in HSDB, 1990).

3. How much MEK is produced and used?

U.S. MEK production in 1986 was 671 million pounds (USITC, 1985, as cited in HSDB, 1990). U.S. imports of MEK in 1986 were 52 million pounds (Bureau of the Census, 1986, as cited in HSDB, 1990).

4. How are people usually exposed?

Humans will primarily be exposed to MEK from inhalation and dermal contact in occupational settings, especially in the coatings industry, where it is the most common solvent. Since MEK is a natural component in food, ingestion of food items is also a source of exposure. NIOSH has estimated that over 3 million workers are exposed to MEK. The general population is exposed to MEK in the atmosphere from auto exhaust, solvents, tobacco smoke, and from dermal contact with consumer products containing MEK as a solvent. High atmospheric MEK levels are associated with photochemical smog, although it is generally absent from ambient air. It is formed as a result of the natural photooxidation of olefinic hydrocarbons released by automobiles (HSDB, 1990).

5. To how much MEK are people typically exposed?

In a Federal study of drinking water, MEK was detected in less than 5% of the samples (AWWA, 1982, as cited in HSDB, 1990). MEK has been detected in rain in Japan, but not at 5 sites in California (Grosjean and Wright, 1983, as cited in HSDB, 1990). MEK has been detected in gasoline exhaust at levels of less than 0.1-1.0 ppm (Verschueren, 1983, as cited in HSDB,1900) and in cigarette smoke at 50 ppm (Lande et al., 1976, as cited in HSDB, 1990). MEK has been detected in Swiss cheese at 0.3 ppm, and in roasted barley, honey, chicken, oranges, black tea, and rum (Lande et al., 1983, as cited in HSDB, 1990). It has been detected in nonalcoholic beverages at 70 ppm, ice cream and ices at 270 ppm, candy at 100 ppm, and baked goods at 100 ppm (Fenaroli, 1975, as cited in HSDB, 1990). Also, when 32 samples of southern peas were analyzed for volatiles MEK was found in all samples at a mean concentration of 151 ± 80 ppb with a range of 74-390 ppb (Fisher et al., 1979, as cited in HSDB, 1990). The US Environmental Protection Agency (EPA) has defined an acceptable daily intake from oral exposure of 3.2 mg of MEK per day (USEPA, 1988, as cited in HSDB, 1990). Average daily intakes from breathing MEK during photochemical smog episodes are 0 to 825 ug, assuming 0 to 1 ppb MEK in the air (HSDB, 1990).

6. What happens to MEK in the body?

Ketones are readily absorbed through the intact skin and are usually rapidly excreted in expired air (Encyclopedia of Occupational Health & Safety, 1983, as cited in HSDB, 1990). Measurable (2.54 - 13 ug/L) quantities of MEK appeared in expired air of adult humans 3 minutes after dermal exposure to 100 ml applied to 91.5 sq cm of skin (Wurster, 1965, as cited in HSDB, 1990). MEK appears to be more soluble in heart and muscle tissue than lung tissue or fat (Perbellini, 1984, as cited in HSDB, 1990). Four hours after rats recieved MEK orally, MEK and the following metabolits were identified in their blood: 2-butanol, 3-hydroxy-2-butanone, and 2,3-butanediol (Dietz and Traiger, 1979, as cited in HSDB, 1990).

7. What are the toxic effects of excess MEK? Can it cause cancer?

MEK is more irritating than acetone. The vapor is irritating to mucous membranes and conjunctiva at 200 ppm for 15 minutes (Gosselin, 1984, as cited

FRO 001 2044

in HSDB, 1990). Acute exposure can cause central nervous system (CNS) depression and other nerve dysfunctions, fatigue, headache, nausea, sleep disturbance, and alteration of memory (Bang, 1984, as cited in HSDB, 1990). No untoward effects have been reported for chronic exposure at low concentrations. Prolonged exposure to the skin may defat the skin and produce dermatitis (Patty, 1981, as cited in HSDB, 1990). MEK has not been shown to cause cancer in humans.

8. Which groups face a special risk from exposure to MEK?

Although no special risk groups have been identified, workers have the greatest opportunity for exposure to MEK.

9. What is the fate of MEK in the environment?

If released to soils, MEK will both volatilize and leach into the ground. The degradation of MEK in soils is unknown. If released to water, MEK will evaporate into the atmosphere with estimated half-lives of 3 and 12 days in rivers and lakes, respectively. It will biodegrade slowly in fresh and salt water. No information is available regarding its fate in groundwater. MEK does not readily adsorb to sediment. When released into the atmosphere, MEK will degrade by reaction with photochemically produced hydroxyl radicals. Under photochemical smog conditions it may degrade slightly faster (HSDB, 1990).

10. Exposure and Biological Distribution

<u>Routes of Exposure</u>

Exposure to MEK can occur through inhalation, ingestion, or dermal contact. It is produced industrially by stack emissions, and is used as a solvent. The general population is exposed to MEK in the atmosphere from auto exhaust, solvents, tobacco smoke, and from dermal contact with consumer products containing MEK as a solvent.

Pharmacokinetics

Absorption

Ketones are readily absorbed through intact skin and are usually rapidly excreted in expired air (Encyclopedia of Occupational Health & Safety, 1983, as cited in HSDB, 1990).

Distribution

MEK is distributed throughout the body rapidly following inhalation or dermal exposure. (Encyclopedia of Occupational Health & Safety, 1983, as cited in HSDB, 1990). MEK appears to be more soluble in heart and muscle tissue than in lung tissue or fat (Perbellini, 1984, as cited in HSDB, 1990).

Metabolism

MEK has been shown to increase glucuronide output; rabbits receiving it have excreted the glucuronide of 2-butanol in their urine. MEK also occurs in normal human urine and is thought to have a dietary origin; however, its more probable precursor is alpha-methlyacetoacetic acid, MEK has been shown to be reduced in the body with only 30-40% eliminated in expired air (Browning, 1965, as cited in HSDB, 1990). Four hours after rats were given a single oral dose of MEK, their blood contained MEK, 2-butanol, 3-hydroxy-2-butanol, and 2,3-butanediol (Dietz and Traiger, 1979, as cited in HSDB, 1990).

Excretion

Ketones are rapidly excreted in expired air following dermal contact, inhalation or ingestion (Encyclopedia of Occupational Health & Safety, 1983, as cited in HSDB, 1990).

11. Key Toxicological Studies

Acute Toxicity

In humans, acute toxicity associated with exposure to MEK includes dermatitis and irritation to eyes and nose. Acute exposure can cause CNS depression and other nerve dysfunctions, fatigue, headache, nausea, sleep disturbance, and alteration of memory (Bang, 1984, as cited in HSDB, 1990).

In inhalation studies, exposure of rats to 4000 ppm MEK for 2 hours resulted in the death of 4 of 6 animals. Three of six rats exposed to 8000 ppm died in 8 hours; exposure to 10,000 ppm for 1 hour produced eye and nose irritation. Guinea pigs exposed to 3300 ppm for 13.6 hours showed no signs of intoxication. Exposure to 10,000 ppm for a similar period produced irritation of the eyes and nose within 4 minutes and CNS depression after exposure for 4 to 5 hours. Exposure to 33,000 ppm for 200 minutes produced CNS depression and death; exposure to 200,000 ppm resulted in CNS depression after 10 minutes (Patty, 1981, as cited in HSDB, 1990).

Subchronic Toxicity

No pertinent data regarding human or animal subchronic oral toxicity were available (USEPA, 1984). Male and female rats exposed to concentrations of 0, 1250, 2500, or 5000 ppm in air 6 hours/day, 5 days/week, for 90 days exhibited increased SGPT activity at 5000 ppm suggesting a NOAEL of 2500 ppm. Other studies using doses less than this showed no adverse effects (USEPA, 1984). Dermal data were not available.

Chronic Toxicity

Data regarding chronic oral, inhalation, or dermal toxicity of MEK to humans or animals were not available in HSDB or IRIS.

Carcinogenicity

Neither human nor animal data to assess the carcinogenicity of MEK were available in HSDB or IRIS. MEK has not been evaluated by the USEPA for evidence of human carcinogenic potential.

Mutagenicity

Data regarding the mutagenicity of MEK were not available in HSDB or IRIS.

Developmental and Reproductive Toxicity

Pregnant Sprague-Dawley rats were exposed by inhalation to MEK at levels of 1,000 or 3,000 ppm for 7 hours/day on days 6-15 of gestation. No maternal toxicity was observed at either level. Decreased fetal body weight and crown rump length were seen at the lower but not the higher dose. At 1,000 ppm, a significant increase in litters having fetuses with skeletal abnormalities was observed. At 3,000 ppm, a significant increase in litters having fetuses with gross external abnormalities or internal soft-tissues anomalies was seen (Schwetz et al., 1974,as cited in USEPA, 1984).

12. Risk Assessment

Chronic Health Hazard Assessment for Noncarcinogenic Effects (IRIS, 1990):

Route of Exposure: Oral

Chronic RfD (mg/kg/day): 0.05

Confidence Level: Medium

Critical Effect: NOAEL

RfD Basis/RfD Source: Inhalation/IRIS, 1990

Uncertainty Factor: 1,000

Modifying Factor: 1

Carcinogenicity Assessment for Lifetime Exposure (IRIS, 1990):

Weight-of-Evidence classification -- D; not classifiable as to human carcinogenicity.

Basis: no human carcinogenicity data and inadequate animal data.

13. Regulations Applicable to MEK

OSHA

Transitional Limits (reference 52 FR 2332 1/19/89):

Permissible Exposure Levels (PEL) in workplace air:

Weighted Average (TWA) (8 hr/day, 40 hr/week): 200 ppm (590 mg/m^3)

Ceiling Concentration: -

Maximum Peak: -

FRO 001 2049

Final Rule Limits

Time-Weighted Average (TWA) (8 hr/day, 40 hr/week): 200 ppm (590 mg/m^3)

Short-term exposure limit (STEL): 300 ppm (885 ug/m^3)

Ceiling Concentration: -

EPA OERR

Reportable Quantity: 5000 lb. (IRIS, 1990)

EPA OAQPS

National Emissions Standard (reference 40 CFR 60.489 [7/1/87] as cited in HSDB, 1990.)

Best available technology required in newly constructed, modified or reconstructed synthetic organic processing units

EPA OSW

Discarded commercial chemical products, off-site specification species, and spill residues (reference 40 CFR 261.33 [7/1/88] as cited in HSDB, 1990).

Listing as a hazardous waste: MEK

13. References

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FRO 001 2051

Toxicological Profile for Methyl Isobutyl Ketone

FRO 001 2052

TOXICOLOGICAL PROFILE FOR METHYL ISOBUTYL KETONE

1. What is Methyl Isobutyl Ketone?

General Description

Methyl isobutyl ketone (MIBK) is a colorless liquid with a pleasant odor. It is also known as hexone, isobutyl methyl ketone, isopropylacetone, 2-methyl-4-pentanone, 2-methylpropyl methyl ketones, and MIBK.

Chemical and Physical Properties

Listed below is more specific chemical and physical information to help better identify this substance:

Chemical Identifiers

a. CAS No.: 108-10-1

b. Hazardous Substances Databank No.: 148

c. Molecular Formula: $C_6H_{12}O$

d. Molecular Weight: 100.16

Physical Properties

a. Color/Form: Colorless liquid (Merck 1983, as cited in HSDB, 1990)

b. Odor: Pleasant odor (Hawley, 1981, as cited in HSDB, 1990); faint ketone-like and camphor odor (Merck 1983, as cited in HSDB, 1990)

c. Odor threshhold: 0.410 mg/m^3 (Ruth, 1936, as cited in HSDB, 1990)

d. Melting Point: -84.7° C (Wast, 1986, as cited in HSDB, 1990)

e. Boiling Point: 116.8° C at 760 mm Hg (Wast, 1986, as cited in HSDB, 1990)

f. Flash Point: 75° F open cup (Chris, 1984, as cited in HSDB, 1990)

g. Vapor Pressure: 15.7 mm Hg at 20° C (Hawley, 1981, as cited in HSDB, 1990)

h. Vapor Density: 3.5 (air = 1) (NFPA, 1986, as cited in HSDB, 1990)

i. Specific Gravity: 0.7978 at 20° C (Wast, 1986, as cited in HSDB, 1990)

j. Solubility in Water: 20,400 mg/L at 20° C (Lyman, 1982, as cited in HSDB, 1990)

k. Solubility in Organic Solvents: soluble in acetone, alcohol, benzene, chloroform, and ether (Wast, 1986, as cited in HSDB, 1990)

l. Log Octanol/Water Partition Coefficient: 1.19 (Ginnings, 1940, as cited in HSDB, 1990)

2. What are the sources of MIBK in the environment?

Although MIBK has been detected in grapes, oranges, vinagar (Feneroli Handbook of Flavor Ingredients, 1975, as cited in HSDB, 1990), and baked potatos (Coleman, 1981, as cited in HSDB, 1990). MIBK is released to the environment through its processing, multiple uses, disposal of consumer and industrial wastes, and exhaust gas from vehicles (HSDB, 1990).

3. How much MIBK is produced and used?

In 1984, the U.S. chemical industry produced 6.5 x 10^{10} grams (1.43 million pounds) (USITC, 1984, as cited in HSDB, 1990) and imported 9.31 x 10^9 grams (20.55 million pounds) (Bureau of the Census, 1984, as cited in HDSB, 1990). Large quantities of MIBK are used each year, especially in paints and coatings, metal degreasing, pharmaceutical processing, and precious metals extraction. Listed below are some of the many uses of MIBK:

- Solvent for paints and varnishes; manufacturing methyl amyl alcohol; organic chemical synthesis; chemical extraction processing, including uranium extraction (Hawley,1981, as cited in HSDB, 1990);

- Denaturant for rubbing alcohol (OSOL, 1980, as cited in HDSB, 1990);

- Solvent for paints and rare metals extraction, metal degreasing, and in the manufacture of antibiotics (HSDB, 1990);

- Component of drycleaning preparations (Chemical Products Synopsis, 1980, as cited in HDSB, 1990);

- Artificial flavoring added to fruits, rum, and cheese (Furia, 1980, as cited in HDSB, 1990).

4. How are people usually exposed?

MIBK can enter the body if inhaled, swallowed, or absorbed through the skin or the eyes. The major routes of human exposure are inhalation and skin contact during the use of consumer products containing MIBK. Some groups of people may also be exposed to MIBK by inhalation of contaminated air from nearby industrial sources, from areas near landfills, and from drinking water from contaminated groundwater sources (HSDB, 1990). In the workplace, the most likely exposure is from inhalation of the vapors and from skin and eye contact (Patty, 1981, as cited in HSDB, 1990).

5. **To how much MIBK are people typically exposed?**

Background levels of MIBK in air throughout the United States have not been reported. However, estimated levels of MIBK in air surrounding a waste disposal site in Edison, New Jersey, between June and July 1976 ranged from 2.1 to 6.0 ug/m^3 (Pellizari, 1982, as cited in HSDB, 1990). Leached fluids collected from the Southington, Connecticut municipal landfill during 1981 and 1982 contained concentrations of MIBK ranging from 172 to 263 ug/L (Sawhney and Koslosku, 1984, as cited in HSDB, 1990). Leached fluids collected from the Granby, Connecticut municipal landfill during 1981 and 1982 contained concentrations of MIBK ranging from 25 to 150 ppb (Sawhney and Raabe, 1986, as cited in HSDB, 1990). Estimates of a person's average daily intake of MIBK from air or water have not been reported (HSDB, 1990).

6. **What happens to MIBK in the body?**

MIBK's lipid and water solubility result in its rapid absorption through intact skin. It is rapidly excreted through the lungs in exhaled air (Encyclopedia of Occupational Health and Safety, 1983, as cited in HSDB, 1990). In guinea pigs, the liver breaks down MIBK into 4-hydroxy-4-methyl, 2-pentanone, which is considered not to be toxic to the nervous system (Foreign Compound Metabolism in Mammals, 1979, as cited in HSDB, 1990).

7. **What are the toxic effects of MIBK? Can it cause cancer?**

MIBK can affect the central nervous system which includes the brain. Inhalation of MIBK may cause alcohollike effects, such as sluggishness, weakness, dizzines, lightheadedness, headache, incoordination, nausea, and vomiting (ACGIH, 1986, as cited in HDSB, 1990. People exposed to 100 ppm MIBK reported having headaches and nausea (Elkins, 1959, as cited in HSDB, 1990). High vapor concentrations were irritating to the eyes, nose, and throat (ACGIH, 1986, as cited in HSDB, 1990). At 100 ppm, MIBK may irritate the eyes of more sensitive persons.

The target organs for MIBK-induced toxicity are the liver and the kidneys. Four workers exposed to 500ppm MIBK for 20 to 30 minutes a day had slightly enlarged livers. Rats receiving MIBK orally for less than their lifespan (90 days) developed enlarged livers and kidneys as well as kidney damage. When monkeys, dogs, and rats received 100 ppm MIBK for a portion of their lifespans, dogs and monkeys showed no effects, but all rats had kidney damage and enlarged livers and kidneys. MIBK has not been evaluated by the U.S. Environmental Protection Agency (EPA) for evidence of the ability to cause cancer in humans (IRIS, 1990).

8. Which groups face a special risk from exposure to MIBK?

Workers exposed to MIBK-containing solvents, paints, and coatings may be exposed to MIBK by vapor inhalation and by eye and skin contact. The major health hazard is inhalation (Patty, 1981, as cited in HSDB, 1990). Consumers may be exposed to significant amounts of MIBK from vapor inhalation and skin contact during the use of MIBK-containing products, such as paints, coatings, adhesives, rubber cements and certain pesticides.

Individuals may be exposed to MIBK in contaminated air from landfills, municipal dumps, or industries with high MIBK emissions or from drinking contaminated water (HSDB, 1990).

9. **What is the fate of MIBK in the environment?**

MIBK is released to the environment in effluents and emissions from its manufacture and use, from vehicle exhaust, and from land disposal and ocean dumping of MIBK-containing consumer products and industrial wastes. In the air, MIBK will break down through exposure to the sun to form acetone and through reactions with other chemicals, such as nitrogen oxides, MIBK will form to from methyl nitrate. Releases to sources of water will be removed mainly through evaporation and exposure to the sun. It is not expected to reach high concentrations in fish and shellfish nor significantly adsorb to the suspended solids in water or sediments. Releases to the soil will evaporate, break down from exposure to the sun, and leach to groundwater. MIBK is susceptible to extensive leaching and has been detected in landfill leachate. MIBK is not expected to accumulate in the food chain (HSDB, 1990).

10. **Exposure and Biological Distribution**

Routes of Exposure

Exposure to MIBK can occur through inhalation, ingestion, or dermal contact. Because of MIBK's high production, use, and disposal, and subsequent releases to the environment, the principal routes of human exposure are inhalation of ambient air and dermal contact during the use of MIBK-containing products. Another route of exposure is ingestion of drinking water from MIBK-contaminated groundwater sources (HSDB, 1990).

Pharmacokinetics

Absorbtion

Specific studies of the absorption of MIBK by humans and animals were unavailable in HSDB or IRIS. Because of MIBK's high lipid solubility and moderate water solubility, it would be expected to be rapidly absorbed following either inhalation or ingestion. Ketones are readily absorbed through the intact skin (Encyclopedia of Occupational Health and Safety, 1983, as cited in HSDB, 1990). MIBK would be expected to behave similarly.

Distribution

Specific studies of the distribution of MIBK in humans and animals were unavailable in HSDB or IRIS. Once absorbed, MIBK would be expected to be distributed to a wide range of tissues and body fluids.

Metabolism

MIBK was metabolized in the guinea pig by omega-1 oxidization to 4-hydroxy-4-methyl, 2-pentanone and is considered not to be neurotoxic because of the lack of formation of 2,5-diketone (Foreign Compound Metabolism in Mammals, 1979, as cited in HSDB, 1990).

Excretion

Specific studies of MIBK excretion by humans and animals were unavailable in HSDB or IRIS. Ketones are rapidly excreted in exhaled air (Encyclopedia of Occupational Health and Safety, 1983, as cited in HDSB, 1990). MIBK would be expected to behave similarly. In guinea pigs, serum half-lives and clearance times for MIBK were 66 minutes and 6 hours, respectively (Divincenzo et al., 1976, as cited in HDSB, 1990).

11. Key Toxicological Studies

Acute Toxicity

In humans, the target organs are the respiratory system, the eyes, the skin, and the central nervous system (CNS) (NIOSH, 1985, as cited in HSDB, 1990). No case studies of human fatalities following acute MIBK exposures were available in HSDB or IRIS. Humans exposed to 100 ppm MIBK reported experiencing headaches and nausea (Elkins, 1959, as cited in HSDB, 1990). At high vapor concentrations, central nervous system depression occurs with additional symptoms of weakness, incoordination, headache, dizziness, nausea, and vomiting (ACGIH, 1986, as cited in HSDB, 1990). Of 19 workers exposed to 500 ppm MIBK for 20 to 30 minutes a day, more than half complained of weakness, loss of appetite, burning eyes, stomach ache, nausea, vomiting, and sore throat. A few of the 19 experienced insomnia, somnalence, heartburn, and intestinal pain. Six complained of nonspecific colitis, four were said to have slightly enlarged livers. Clinical chemistry tests on all were normal (ACGIH, 1986, as cited in HSDB, 1990).

High vapor concentrations are irritating to the conjunctiva, mucous membranes of the nose and throat, producing eye and throat symptoms in humans (ACGIH, 1986, as cited in HSDB, 1990). At 100 ppm, MIBK may irritate the eyes of more sensitive persons (Thieves, 1972, as cited in HSDB, 1990). One group of workers exposed to 100 ppm developed headache and nausea, whereas another group developed only respiratory tract irritation. Tolerance to MIBK later in the workweek appeared to be lost over the weekend. Most of these effects were not noted at 20 ppm (Patty, 1981, as cited in HSDB, 1990).

In addition to the central nervous system effects, animal studies indicated that the liver and kidneys are also targets of MIBK. Guinea pigs were exposed to concentrations of 1,000, 16,800, or 28,000 ppm MIBK in air. During the first six hours of exposure, animals had a decreased respiratory rate attributed to a low grade CNS depression. Whereas little or no irritation was seen in the eyes or noses of animals at 1,000 ppm, 16,800 ppm caused immediate signs of eye and nose irritation followed by salivation, lacrimation, ataxia, and death. Nine of 10 animals died within six hours of exposure. The highest concentration (28,000 ppm) killed 50% of the animals in 45 minutes. Fatty livers and congestion in the brain, lungs, and spleen were noted (Patty, 1981, as cited in HSDB, 1990). Inhalation of 19,500 ppm produced anesthesia in 7 of 10 mice within 30 minutes. Concentrations above 20,000 ppm produced anesthesia within 30 minutes resulting in the death of most of the animals. Gross examination at necropsy revealed lung congestion (Patty, 1981, as cited in HSDB, 1990). Rat kidney weights and kidney to body weight ratios were significantly increased after two weeks of continuous exposure to 410 mg MIBK/m^3. Kidney and liver organ weights and organ to body weight ratios were increased at the 820 mg/m^3 dose after two weeks (Vernot, 1971, as cited in HDSB, 1990). Juvenile baboons exposed to 1/2 the MIBK TLV for 24 hours per day for seven days had slowed response times in a delayed match-to-sample discrimination task (Geller, et al., 1979, as cited in HSDB, 1990). Six male and six female F344 rats and B6C3F1 mice were exposed to 0, 100, 500, or 2,000 ppm MIBK vapor for 6 hours/day for 5 days. After a two-day interval, exposure was resumed for four more consecutive days. No deaths occurred. At 2,000 ppm absolute and relative liver and kidney weights were significantly increased and an increased incidence of hyaline droplets and epithelial regeneration were observed in male rats . Female mice exposed to 2,000 ppm had significantly increased absolute and relative liver weights and absolute kidney weights

(Phillips et al., 1987, as cited in HSDB, 1990). No acute studies of animals exposed orally to MIBK were available in HSDB or IRIS.

Undiluted (0.1 ml) MIBK produced some irritation 10 minutes after instillation in the rabbit eye. Inflammation and swelling were present after eight hours, and inflammation, swelling, and exudate were present after 24 hours. A single application to rabbit skin produced transient erythema, but daily applications of 10 ml MIBK for 10 days caused drying and flaking of the skin. Moderate irritation of rabbit skin after 24 hours was produced at 500 mg (Patty, 1981, as cited in HSDB, 1990).

Subchronic Toxicity

Subchronic exposure to MIBK resulted in increased liver and kidney weights and nephrotoxicity in animals. Groups of 30 Sprague-Dawley rats per sex were exposed by oral gavage to 0, 50, 250, or 1,000 mg/kg/day for 90 days. Increased liver and kidney weights were observed in males ans females at the high dose. Nephrotoxicity was seen in both male and female rats in the high dose, however no corresponding histopathological lesions were observed in the liver. The NOEL was 50 mg/kg/day and the LOEL was 250 mg/kg/day. An RfD of 0.05 mg/kg/day was derived from this study using the NOEL of 50 mg/kg/day and applying an uncertainty factor of 1,000 (USEPA, 1986, as cited IRIS, 1990).

In subchronic inhalation studies, monkeys, dogs, and rats were exposed continuously to 100 ppm MIBK for 90 days. Dogs and monkeys exhibited no adverse effects. Some kidney inflammation, however, was noted in monkeys All exposed rats showed proximal tubular degeneration and increased kidney and liver weights (MacEwan et al., 1971, as cited in HSDB, 1990). Kidney and liver organ weights and organ to body weight ratios were increased after exposure of rats to 410 mg/m^3 for 90 days (Vernot et al., 1971, as cited in HSDB, 1990). In another subchronic inhalation study, groups of 14 F344 rats and B6C3F1 mice of each sex received whole body exposure to 0, 50, 250, or 1,000 ppm MIBK 6 hours/day, 5 days/week, for 14 weeks. In male rats, absolute and relative liver weights at the high dose were significantly greater than controls. In female rats, absolute, but not relative kidney weights were increased at 250 ppm. Male mice exhibited significantly increased absolute liver weights at 250 or 1,000 ppm and increased relative liver weights at 1,000 ppm. Platelet count was significantly elevated in male rats at 1,000 ppm; eosinophil count was significantly decreased in female rats. Serum cholesterol was significantly elevated in male rats at 250 or 1,000 ppm. Increased urinary glucose was observed in male and female rats at 1,000 ppm. Histopathological examination revealed increased hyaline droplets in male rat kidneys at 250 and 1,000 ppm (Phillips et al, 1987, as cited in HDSB, 1990).

Chronic Toxicity

No chronic toxicity studies in humans or animals were available in HSDB or IRIS.

Carcinogenicity

No studies evaluating the carcinogenic potential of MIBK were available in HSDB or IRIS. MIBK has not been evaluated by the U.S. EPA for evidence of human carcinogenic potential IRIS, 1990).

Mutagenicity

MIBK has been tested for its mutagenic potential in several assays. Results were negative in the following assays: Ames test in Salmonella strains TA98, TA100, TA1535, TA1537, and TA1538 - negative with and without S9; E. coli strains WP2 and WP2 uvrA- with and without S9; Saccharomyces cerevisiae strain JD1 - negative with and without S9; BALB/3T3 mouse embryo cell transformation assay - negative with and without S9; L5178Y TK+/- mouse lymphoma mutagenesis assay - negative with and without S9; mouse micronucleus test (ip injection) - negative; and unscheduled DNA synthesis in rat primary hepatocytes - negative (HSDB, 1990). Based on these studies, MIBK probably is not mutagenic.

Developmental and Reproductive Toxicity

No developmental or reproductive toxicity studies in humans exposed to MIBK were available in HSDB or IRIS. An inhalation teratology study was conducted in F344 rats and CD-1 mice receiving whole body exposures to 0, 300, 1,000, or 3,000 ppm MIBK. At each dose, 35 rats and 30 mice were exposed 6 hours/day on days 6 through 15 of gestation. Maternal toxicity was evident in high dose rats and mice. Fetal toxicity was indicated by reduced fetal body weights in 300 and 3,000 ppm group rats and 3,000 ppm group mice and an increased number of dead fetuses (3,000 ppm group mice) relative to controls. The predominant malformations were skeletal in high dose rats and mice and visceral in high dose mice. No statistically significant differences between control and treatment groups were found for any of the fetal, external, visceral, or skeletal parameters (Bushy Run Research Center, 1984, as cited in HSDB, 1990).

12. Risk Assessment

Chronic Health Hazard Assessment for Noncarcinogenic Effects (IRIS):

Routes of Exposure: Oral

Chronic RfD (mg/kg/day): 0.05

Confidence Level: Low

Critical Effect: Increased liver and kidney weights and nephrotoxicity

RfD Basis/RfD Source: Oral gavage/IRIS, 1990

Uncertainty Factor: 1,000

Modifying Factor: 1

Carcenogenicity Assessment for Lifetime Exposure (IRIS):

MIBK has not been evaluated by the U.S. EPA for evidence of human carcinogenic potential.

13. Regulations Applicable to MIBK

OSHA

Transitional Limits (Ref. 54 FR 2332, 1/19/89):

Permissible exposure limits (PEL) in workplace air:

Time-weighted average (TWA) (8 hr/day, 40 hr week): 100 ppm (410 mg/m^3)

Ceiling Concentration

Maximum Peak

Final Rule Limits:

Time weighted average (TWA) (8hr/day, 40/hr week): 50 ppm (205 mg/m^3)

Short term exposure limit (STEL): 75 ppm (300 mg/m^3)

Ceiling Concentration

EPA OERR

Reportable Quantity (RQ)(Ref. 50 FR 13456, 4/4/85, IRIS, 1990): 5,000 lbs

14. References

HSDB, 1990. Hazardous Substance Databank. Record No. 148 - Methyl Isobutyl Ketone. Bethesda, MD: National Library of Medicine. January 5, 1990.

IRIS, 1990. Integrated Risk Information System. US Environmental Protection Agency database of health risk assessment information on methyl isobutyl ketone. Washington, DC: USEPA. January 5, 1990.

FRO 001 2066

Toxicological Profile for Methylene Chloride

TOXICOLOGICAL PROFILE FOR METHYLENE CHLORIDE

1. What is methylene chloride?

General Description

Methylene chloride is a colorless, volatile liquid with a sweet, pleasant odor. It is also known as dichloromethane, DCM, hexone, methylene bichloride, or methylene dichoride.

Chemical and Physical Properties

Listed below is more specific chemical and physical information to help better identify this substance:

Chemical Identifiers

a. CAS No.: 75-09-2
b. Hazardous Substances Databank No.: 66
c. Molecular Formula: CH_2Cl_2
d. Molecular Weight: 84.94

Physical Properties

a. Color/Form: Colorless liquid (Merck, 1983, as cited in HSDB, 1990)
b. Odor: Sweet, pleasant odor, like chloroform (Chris, 1984, as cited in HSDB, 1990)
c. Odor Threshold: Low = 540 mg/m^3; high = 2160 mg/m^3 (Ruth, 1986, as cited in HSDB, 1990)
d. Melting Point: -95.1° C (Wast, 1988, as cited in HSDB, 1990)

e. Boiling Point: 39.75° C at 760 mm Hg (Merck, 1983, as cited in HSDB, 1990)

f. Flash Point: Not flammable (NFPS, 1986 as cited in HSDB, 1990)

g. Vapor Pressure: 400 mm Hg at 24.1°C (IARC, 1979, as cited in HSDB, 1990)

h. Vapor Density: 2.9 (air = 1) (NFPA, 1986, as cited in HSDB, 1990)

i. Specific Gravity: 1.3266 at 20°C/4° C (Wast, 1989, as cited in HSDB, 1990)

j. Solubility in Water: 20,000 mg/L 20° C; 16,700 mg/L at 25° C (Vershueren, 1983, as cited in HSDB, 1990)

k. Solubility in Organic Solvents: >10% in acetone, ether, and ethanol (Wast, 1989, as cited in HSDB, 1990)

l. Log Octanol/Water Partition Coefficient: 1.25 (Hansch, 1987, as cited in HSDB, 1990)

2. What are the sources of methylene chloride in the environment?

There are no known naturally occurring sources of methylene chloride in the environment (HSDB, 1990). Methylene chloride is released into the environment through its processing and multiple uses (ATSDR, 1987).

3. How much methylene chloride is produced and used?

In 1987, the U.S. chemical industry produced 516 million pounds (Chemical Engineering News, 1988, as cited in HSDB, 1990). In 1986, 37 million pounds were imported (Bureau of the Census, 1986, as cited in HSDB, 1990). Large quantities of methylene chloride are used each year, especially in aerosols, paint removers, metal degreasing, and chemical processing. Listed below are

4069

some of the many uses of methylene chloride:

a. Solvent and cleaning agent in the chemical processing industry (HSDB, 1990);
b. Paint remover, vapor degreasing solvent for metals and plastics (IARC, 1986, as cited in HSDB, 1990);
c. Chemical processing; carrier solvent for insecticides and herbicides; post-harvest fruit and grain fumigant (IARC, 1986, as cited in HSDB, 1990);
d. Decaffeination of coffee; extraction of heat-sensitive substances, such as cocoa, spices, and beer hops (IARC, 1986, as cited in HSDB, 1990)

4. How are people usually exposed?

Methylene chloride can enter the body if inhaled, swallowed, or absorbed through the skin or the eyes (NIOSH/OSHA, 1981, as cited in HSDB, 1990). The major route of human exposure is from the air, which can contain high concentrations from nearby industrial sources. Another source is from drinking water from contaminated groundwater sources (HSDB, 1990). Because methylene chloride evaporates quickly from the skin, the amount absorbed through the skin is small unless the substance is trapped against the skin by clothing or gloves. Very low levels of methylene chloride exposure occur through drinking methylene chloride-processed decaffeinated coffees (ATSDR, 1987).

5. To how much methylene chloride are people typically exposed?

Background levels of methylene chloride in air throughout the United States have been reported to range from 30 to 50 ppt (ATSDR, 1987). Assuming concentrations of 0.4 to 3.8 ppb methylene chloride in air, the average daily intake from air is estimated to range from 28 to 268 ug (Singh, et. al., 1981a, b, 1982, as cited in HSDB, 1990). Methylene chloride is a contaminant of drinking water, surface water, and groundwater throughout the United States. Mean reported concentrations in drinking water were less than or equal to 1 ug/L; maximum concentrations were less that 3 ug/L (ATSDR, 1987). Assuming concentrations of 0 ppb methylene chloride in water for 86% of a group of people and an average of 6.1 ppb methylene chloride in water for 14% of that group, the average daily intake from water is estimated to range from 0 to 12.2 ug (USEPA, 1980, as cited in HSDB, 1990).

6. What happens to methylene chloride in the body?

Methylene chloride's lipid and water solubility results in its rapid absorption following either inhalation or ingestion; it is more slowly absorbed through the skin. The principal exposure route is inhalation; with 50% of inhaled methylene chloride taken up by the human bloodstream after 2 hours of exposure (IARC, 1979, as cited in HSDB, 1990) and distributed to several tissues and body fluids (ATSDR, 1987). The liver breaks down methylene chloride into carbon monoxide, carbon dioxide, formaldehyde, and formic acid (HSDB, 1990). Methylene chloride is absorbed through the placenta following exposure of mothers and is excreted in breast milk (Encyclopedia Occupational Health and Safety, 1983, as cited in HSDB, 1990). Most methylene chlorine is excreted through the lungs in expired air (IARC, 1979, as cited in HSDB, 1990).

7. What are the toxic effects of excess methylene chloride? Can it cause cancer?

Methylene chloride can affect the central nervous system, which includes the brain. Inhalation of methylene chloride at levels above 500 ppm may cause alcohol-like effects, such as sluggishness, irritability, light-headedness, nausea, and headaches, but these symptoms usually disappear after exposure stops. Some of the effects upon the nervous system result from the breakdown of methylene chloride into carbon monoxide. Since tobacco smoking also increases the amount of carbon monoxide in the bloodstream, smokers may be sensitive to the effects of methylene chloride at lower concentrations than nonsmokers. Levels above 500 ppm can irritate the eyes, nose, and throat. It may produce irritation or burns after skin contact and can be severely irritating if splashed in the eyes (ATSDR, 1987).

In animals, the target organs for methylene chloride-induced toxicity are the liver and kidneys. However, studies in humans show that these organs are not affected unless exposure concentrations are high (above 500 ppm). Rats and mice receiving methylene chloride in drinking water throughout their lifetimes developed liver tumors. Rats and mice exposed to methylene chloride in air throughout their lifetimes developed liver cancer; mice also developed lung cancer (IRIS, 1990). Although methylene chloride has not been shown to cause cancer in humans, the animal tests indicated the need to treat it as a potential cancer-causing substance (ATSDR, 1987).

8. Which groups face a special risk from methylene chloride exposure?

Workers in methylene chloride manufacturing, paint remover formulation, polycarbonate resin production, and solvent use have a greater potential for exposure to high concentrations of methylene chloride. Consumers may be exposed to significant amounts of methylene chloride through the use of methylene chloride-containing products, such as paint strippers, adhesives and glues, paint thinners, glass frosting and artificial snow, water repellants, wood stains and varnishes, spray paints, cleaning fluids, and degreasers (ATSDR, 1987).

Since the amount of methylene chloride absorbed depends upon a person's body weight and fat content, obese persons are expected to have a greater risk of accumulating dichloromethane in fat tissues (USEPA, 1983, as cited in HSDB, 1990). Pregnant women and nursing mothers also should avoid exposure to methylene chloride because it crosses the placenta (Encyclopedia of Occupational Health and Safety, 1983, as cited in HSDB, 1990). Because of its breakdown into carbon monoxide in the body, those with heart disease may be at increased risk. In addition, those with skin disorders may be more susceptible to methylene chloride following skin contact (NIOSH/OSHA, 1981, as cited in HSDB, 1990).

9. What is the fate of methylene chloride in the environment?

Most of the large quantities of methylene chloride generated from its processing and use is released into the air where it is broken down through reactions with other chemicals in the air and exposure to the sun. Releases to sources of water are removed mainly through evaporation, and to a lesser extent are broken down through actions of living organisms. It is not expected to significantly adsorb to sediment or to reach high concentrations in fish and shellfish. Releases to the soil evaporate quickly from upper soil layers and

FRO 001 2073

leach to groundwater from lower soil layers. Methylene chloride is not expected to accumulate in the food chain (HSDB, 1990).

10. Exposure and Biological Distribution

Routes of Exposure

Exposure to methylene chloride occurs through inhalation, ingestion, or dermal contact (NIOSH/OSHA, 1981, as cited in HSDB, 1990). Because of methylene chloride's high volatility, high production and consumption, and subsequent releases to the atmosphere, the principal route of human exposure is inhalation of ambient air. Another route of human exposure is ingestion of drinking water originating from methylene chloride-contaminated groundwater sources (HSDB, 1990). Dermal exposure following direct contact with methylene chloride or products which contain it also occur (ATSDR, 1987).

Pharmacokinetics

Absorption

Because of methylene chloride's solubility in both lipids and water, it is rapidly absorbed following either inhalation or ingestion. After two hours of exposure, approximately 50% of inhaled methylene chloride is present in the human bloodstream (IARC, 1979, as cited in HSDB,1990). Whereas at low level blood concentrations of methylene chloride increase linearly with exposure level, at high levels, saturation occurs. The amount absorbed increases with duration of exposure and physical activity. Physical activity for one half hour during exposure to 250 or 500 ppm was found to double absorption but decrease retention from 55 to 40% because of a threefold increase in ventilation rate (ATSDR, 1987). In

FRO 001 2074

addition, because the quantity of methylene chloride absorbed depends upon body weight and fat content, the risk of accumulation in adipose tissue is expected to be greater for obese persons (USEPA, 1983, as cited in HSDB, 1990). Following maternal exposure, methylene chloride is absorbed through the placenta and is found in embryonic tissues; it is excreted in breast milk (Encyclopedia of Occupational Health and Safety, 1983, as cited in HSDB, 1990).

Animal studies show that methylene chloride is directly absorbed from the gastrointestinal tract following ingestion. A single oral dose of 1 or 50 mg/kg of ^{14}C-methylene chloride administered to rats was eliminated in exhaled air as methylene chloride and as carbon monoxide and carbon dioxide metabolites (ATSDR, 1987).

Distribution

Once absorbed, methylene chloride is quickly distributed to a wide range of tissues and body fluids. One hour after exposure of rats to 1,935 mg/m^3 radiolabeled methylene chloride, the highest levels were found in fat, with lower levels in the liver, kidney, and adrenal glands Two hours after exposure, the concentration had decreased by 90% in fat and by 25% in the liver (IARC, 1986).

Metabolism

Rats metabolized only 7% of an administered dose of methylene chloride; up to 5% was converted to carbon monoxide; 92% was excreted unchanged in exhaled air (Baselt, 1988, as cited in HSDB, 1990). Rats converted inhaled methylene chloride into carbon monoxide and carbon dioxide (McKenna, et. al., 1982, as cited in HSDB, 1990). Formaldehyde and formic acid are additional metabolites of methylene chloride (USEPA, 1983, as cited in HSDB, 1990). Studies of factory workers exposed to methylene chloride have confirmed the biotransformation into carbon monoxide and have also demonstrated the increased expiration of carbon monoxide in humans (Foreign Compound Metabolism in Mammals, 1977, as cited in HSDB, 1990). Increases in methylene chloride concentrations lower the oxygen affinity of human hemoglobin by binding to hemoglobin (Saxena, et. al., 1982, as cited in HSDB, 1990).

Excretion

Individuals exposed for two hours to 200 ppm methylene chloride vapor had a blood concentration of 2 mg/L; the blood levels declined with a half-life of 40 minutes after cessation of exposure (Baselt, 1988, as cited in HSDB, 1990). The principal route of excretion of unchanged methylene chloride is the lungs (IARC, 1979, as cited in HSDB, 1990).

11. Key Toxicological Studies

Acute Toxicity

Acute exposure of humans and animal to methylene chloride have indentified the central nervous system and the liver as primary targets. Case studies of methylene chloride poisoning in humans have demonstrated that exposures can be fatal. Lethal doses could not be determined (ATSDR, 1987). A lethal level in blood, however, was determined to be 200 mg/L (Winek, 1985, as cited in HSDB, 1990). In acute experimental inhalation studies in humans, methylene chloride administered at concentrations above 300 ppm for up to four hours altered behavioral performance, as manifested by decreased visual and auditory functions. At 800 ppm, psychomotor tasks were impaired. These findings are

FRO 001 2076

supported by acute animal studies showing methylene chloride effects upon the nervous system. For example, rats exposed to 1,000 ppm methylene chloride for 24 hours had reduced sleeping time. Inhalation exposure of rats to 500 ppm for 10 days also resulted in mild liver effects in rats. Inhalation LC50 values ranged from 11,000 ppm in guinea pigs to 16,000 ppm in mice. Oral LD50 values ranged from 1,000 mg/kg in mice to 4,000 mg/kg in rats (ATSDR, 1987).

Instillation of 0.1 and 0.01 mL liquid methylene chloride into rabbit eyes caused persistent lacrimation, inflammation of the lids and conjuntivae, conjunctival edema, sloughing, increased intraocular pressure, iritis, and keratitis. Increased corneal thickness developed in rabbits exposed to methylene chloride vapors at 1,750 and 17,500 mg/m^3 (504 and 5,040 ppm) (HSDB, 1990).

Subchronic Toxicity

Subchronic exposure to methylene chloride resulted in mild liver and kidney effects in animals. Mice, rats, and dogs administered 100 ppm methylene chloride by inhalation for 100 days developed vacuolization and fatty changes in the liver. Rats exposed to 25 or 100 ppm methylene chloride for 100 days developed degenerative and regenerative changes in the kidney tubules.

Chronic Toxicity

After one year of exposure, a chemist developed toxic encephalosis with acoustical and optical delusions and hallucinations (ACGIH, 1986, as cited in HSDB, 1990). Three years of occupational exposure to 300 to 1,000 ppm methylene chloride caused memory loss, intellectual impairment, balance disturbances and bilateral temporal lobe degeneration in a 58-year old man (Barrowcliff and Knell, 1979, as cited in HSDB, 1990).

Chronic oral exposure to methylene chloride in drinking water resulted in hepatic biological alterations, decreased body weight gain, and biochemical changes in the blood of rats exposed to 50 mg/kg/day for 104 weeks. Rats exposed by inhalation to 500 ppm for 2 years showed an increased incidence of multinucleated hepatocytes (ATSDR, 1987). From a 24-month chronic oral toxicity study of methylene chloride in rats, the NOAEL values of 5.85 and 6.47 mg/kg/day for males and females, respectively, and the LOAEL values of 52.58 and 58.32 mg/kg/day for males and females, respectively, were based on liver toxicity (IRIS, 1990).

Carcinogenicity

Occupational epidemiological studies of workers exposed to methylene chloride have not reported statistically significant increases in deaths from cancer (IRIS, 1990; ATSDR, 1987; and HSDB, 1990). However, carcinogenic responses have been produced in animals exposed to methylene chloride. Methylene chloride caused an increased incidence of hepatocellular carcinomas in female F344 rats exposed to 0, 5, 50, 125 or 250 mg/kg/day methylene chloride in drinking water for two years. This increased incidence was significant when compared with matched but not with historical controls. Male rats showed no increased incidence. In the same study, B6C3F1 mice consumed 0, 60, 125, 185 or 250 mg/kg/day methylene chloride in water. Male, but not female, mice showed nonsignificant increases in combined incidence of neoplastic nodules and hepatocellular carcinomas (National Coffee Association (NCA), 1982, 1983, as cited in IRIS, 1990). Sprague-Dawley rats exposed to 0, 500, 1,500, or 3,500 ppm of inhaled methylene chloride for 6 hours/day, 5 days/week for two years had increased incidences of mammary tumors in both males and females. Male rats also developed salivary gland sarcomas (Burek et al, 1984, as cited in IRIS, 1990). Male and female F344/N rats and B6C3F1 mice were exposed to methylene chloride 6 hours/day, 5 days/week for two years at concentrations of 0, 1,000, 2,000 or 4,000 ppm for rats and 0, 2,000, or 4,000 ppm for mice. Mammary adenomas and fibroadenomas were increased in male and female rats as were mononuclear cell leukemias in female rats. Among male and female mice, increased incidences of hepatocellular adenomas and carcinomas and highly significant dose-dependent increases in alveolar/bronchiolar adenomas and carcinomas were found (NTP, 1986, as cited in IRIS, 1990). Based on the weight of evidence from animal studies indicating increased cancer incidence in rats and mice and on inadequate human data, EPA has classified methylene chloride as category B2, a probable human carcinogen.

Mutagenicity

There is clear evidence of mutagenicity in bacteria, mixed results in tests of yeast, *Drosophila*, and mammalian cells in culture, and generally negative results in mammalian cells *in vivo*. Based on evidence of *in vitro* clastogenicity and insensitivity of *in vivo* UDS and DNA binding studies, methylene chloride is considered to be a weak mutagen (ATSDR, 1987).

Developmental and Reproductive Toxicity

No developmental or reproductive studies in humans exposed to methylene chloride were available in HSDB or IRIS. In animals, no prominent teratogenic potential has been shown to exist and results were negative in a two-generation inhalation reproductive toxicity study. However, studies have demonstrated the ability of methylene chloride to cross the placental barrier (ATSDR, 1987).

FRO 001 2079

12. Risk Assessment

Chronic Health Hazard Assessment for Noncarcinogenic Effects (IRIS, 1990):

Route of Exposure: Oral

Chronic RfD (mg/kg/day): 0.06

Confidence Level: Medium

Critical Effect: Liver Toxicity

RfD Basis/RfD Source: Water/IRIS, 1990

Uncertainty Factor: 100

Modifying Factor: 1

Health Hazard Assessment for Varied Exposure Durations (IRIS, 1990):

ODW Health Advisory	Child Drinking Water Equivalent Level (mg/L)	Adult Drinking Water Equivalent Level (mg/L)	Uncertainty Factor
1-day	13.3	----	1000
10-day	1.5	----	100
Longer-term	0.5	1.75	----
Lifetime	----	1.75	----

Carcinogenicty Assessment for Lifetime Exposure (IRIS, 1990)

Weight of Evidence: B2

Oral Slope Factor ($Q,_2$) $(mg/kg/day)^{-1}$: $7.5x10^{-3}$

Drinking Water Unit Risk $(ug/L)^{-1}$: $2.1x10^{-7}$

Excess Lifetime Cancer Risk 10^{-4} (ug/L): 500

Excess Lifetime Cancer Risk 10^{-5} (ug/L): 50

Excess Lifetime Cancer Risk 10^{-6} (ug/L): 5

Inhalation Slope Factor ($Q,_2$) $(mg/kg/day)^{-1}$: $1.4x10^{-2}$

Inhalation Unit Risk $(ug/m^3)^{-1}$: $4.1x10^{-6}$

FRO 001 2080

Excess Lifetime Cancer Risk 10^{-4} (ug/m^3): 20

Excess Lifetime Cancer Risk 10^{-5} (ug/m^3): 2

Excess Lifetime Cancer Risk 10^{-6} (ug/m^3): 0.2

13. Regulations Applicable to Methylene Chloride

OSHA

Permissible exposure limit (PEL) in workplace air (reference 54 FR 2332,1/19/89):

Time-weighted average (TWA) (8 hr/day, 40 hr/week): 500 ppm

Ceiling concentration: 1,000 ppm

Maximum peak (not to exceed 5 min. in any 2 hours): 2,000 ppm

EPA OERR

Reportable quantity (RQ) (reference 50 FR 13456, 4/4/85, IRIS, 1990): 1,000 lb

EPA OWRS

Ambient water quality criteria for protection of human health (reference IRIS, 1990)

Water and fish consumption: 0.19 ug/l

Fish consumption only: 15.7 ug/l

EPA OWRS

Ambient water quality criteria for the protection of aquatic organisms (reference IRIS, 1990):

Acute LEC (freshwater only): $1.1x10^4$ ug/L
Chronic (freshwater only): $1.2x10^4$ ug/L
Acute LEC (freshwater only): $1.2x10^4$ ug/L
Chronic LEC (marine): $6.4x10^3$ ug/L

Toxic Pollutant designed to section 307 (a)(1) of the Clean Water Act; subject to effluent limitations (reference 40 CFR 401.15, 7/1/88, as cited in HSDB, 1990)

EPA OAQPS

National Emissions Standards (references 40 CFR 60.489, 7/1/88, as cited in HSDB, 1990):

Best available technology required in newly constructed, modified, or reconstructed synthetic organic chemical processing units

EPA FIFRA

Exempted from the requirement of a tolerance for residues when used as apost-harvest fumigant for the following grains: barley, corn, oats, popcorn, rice, rye, sorghum, wheat, and citrus (references 40 CFR 180.1010, 7/1/88, as cited in HSDB, 1990):

FDA

An indirect food additive for use only as a component of adhesives (reference 21 CFR 175.105, 4/1/88, as cited in HSDB, 1990):

As a deliverant in color additive mixtures in ink for marking fruits and vegetables (reference 21 CFR 73.1, 4/1/88, as cited in HSDB, 1990):

14. References

ATSDR. 1987. Agency for Toxic Substances and Disease Registry. Draft Toxicological Profile for Methylene Chloride. Oak Ridge, TN: Oak Ridge National Laboratory. December 1987.

HSDB. 1990. Hazardous Substances Databank. Record No. 66 - Dichloromethane (Methylene Chloride). Bethesda, MD: National Library of Medicine. January 5, 1990.

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Toxicological Profile for Toluene

FRO 001 2084

TOXICOLOGICAL PROFILE FOR TOLUENE

1. What is Toluene?

General Description

Toluene is a clear, colorless liquid with a sweet smell. It is also known as methylbenzene and phenylmethane. Trade names include Toluol, Methacide and Methylbenzol.

Chemical and Physical Properties

Listed below is more specific chemical and physical information to help better identify this substance:

Chemical Identifiers

a. CAS NO.: 108-88-3
b. Hazardous Substances Databank No.: 131
c. Molecular Formula: $C_6H_5CH_3$
d. Molecular Weight: 92.15

Physical Properties

a. Odor Threshold: 0.04 to 1.0 mg/L for water (EPA 1987a; as cited in ATSDR 1989); 8.0 mg/L for air (HSDB 1988; as cited in ATSDR 1989)
b. Melting Point: -95C (Weast 1985; as cited in ATSDR 1989)
c. Boiling Point: 110.6C (Weast 1985; as cited in ATSDR 1989)
d. Vapor Pressure: 22 mm Hg at 20C (Verschueren 1977; as cited in ATSDR 1989)

FRO 001 2085

e. Solubility in Water: 515 mg/L at 20C (Verschueren 1977; as cited in ATSDR 1989)

f. Solubility in Organic Solvents: miscible (Windholz 1983; as cited in ATSDR 1989)

g. Log Octanol/Water Partition Coefficient: 2.79 (Mabey et al. 1982; as cited in ATSDR 1989)

2. How are People Usually Exposed?

Toluene can enter the body by absorption through the skin, or when a person breathes its vapors, or eats or drinks contaminated food or water. Human exposure occurs mainly by breathing air containing toluene in the workplace or through deliberate glue sniffing or solvent abuse. Since toluene readily evaporates, it can be released to the air when toluene-containing products are used. Automobile exhausts can also be a significant source of toluene emissions to the air (ATSDR 1989).

Petrochemical workers, workers in the chemical industry, dye makers, and paint workers are at the greatest risk of exposure. Because toluene is a common solvent found in many consumer products (e.g., gasoline, nail polish, cosmetics, stain removers, inks, and adhesives), exposures may happen both in the home and outdoors. In addition, exposures to toluene may also occur at hazardous waste sites (ATSDR 1989).

3. Biological Distribution

Pharmacokinetics

Absorption

Toluene is readily absorbed from the respiratory tract in both humans and animals. In human volunteers exposed to 300 mg/m^3 of toluene, uptake was rapid as shown by a high correlation between the alveolar and arterial concentrations of toluene both during and after exposure (Carlsson 1982; as cited in ATSDR 1989).

Absorption by the oral route is less rapid. In rats administered toluene by gavage, maximum blood levels were reached 2-3 hours after dosing, versus 15-30 minutes following inhalation (Pyykko 1983; as cited in ATSDR 1989).

Toluene is absorbed slowly through human skin. The rate of absorption of toluene through human forearm skin ranged from 14-23 $mg/cm^2/hr$ (Dutiewicz and Tyras 1968; as cited in ATSDR 1989).

Distribution

Following inhalation, toluene is distributed to lipoidal and highly vascular tissues. In a case study reported by Takeichi et al (1986; as cited in ATSDR 1989), tissue levels of toluene in blood, lung, liver, and brain were 48, 35, 65, and 80 g/g, respectively, in a man who died following a fall during painting. Distribution of toluene absorbed by the oral and dermal routes is expected to follow a similar pattern but at a slower rate. However, no specific distribution studies in humans and animals following oral or dermal exposure to toluene were found in the available literature to support this supposition (ATSDR 1989).

Metabolism

Toluene is initially converted to benzyl alcohol by cytochrome P-450 enzymes, followed by oxidation to benzaldehyde by alcohol dehydrogenase, and subsequently to benzoic acid by aldehyde dehydrogenase. The benzoic acid is then activated by liver enzymes to form a coenzyme A derivative, which reacts with glycine to form hippuric acid, the major urinary metabolite. Benzoic acid can also react with glucuronic acid to form benzoyl glucuronide. Formation of o-cresol and p-cresol are also catalyzed by cytochrome P-450 enzymes. The latter metabolites are conjugated with sulfate or glucuronic acid and excreted in the urine.

Excretion

Toluene is excreted as the metabolite hippuric acid in the urine In both humans and animals, following inhalation exposures, 60-70% of absorbed toluene can be accounted for as hippuric acid. Excretion in the urine occurs within 12 hours of the exposure (Ogata et al. 1970; as cited in ATSDR 1989). The half-life for toluene in adipose tissue of male humans exposed to 300 ppm toluene for 2 hours ranged from 0.5-2.7 days. Linear regression analysis indicated that toluene concentrations in adipose tissue are lower in subjects with large amounts of body fat (Carlsson and Ljungquist 1982; as cited in ATSDR 1989).

4. Key Toxicological Studies

Acute Toxicity

In humans, the toxicity of acute inhalation exposures to toluene appears to be primarily limited to depression of the central nervous system, a reversible syndrome (ATSDR 1989). Acute exposures to quantities of toluene vapor sufficient to produce unconsciousness fail to produce residual organ damage in humans (ATSDR 1989).

The effect levels for toluene in humans vary. von Oettingen et al. (1942; as cited in ATSDR 1989) reported an inhalation NOAEL of 800 ppm for respiratory effects following a 7 to 8-hour exposure to toluene, and a LOAEL of 200 ppm for mild intoxication. By contrast, Anderson et al. (1983; as cited in ATSDR 1989) reported an inhalation LOAEL of 100 ppm for eye irritation and mild intoxication, and a NOAEL of 40 ppm for neurological effects following a 6-hour exposure. In another study (Baelum 1985; as cited in ATSDR 1989), following a 6.5-hour inhalation exposure to toluene, the LOAEL for mild intoxication (fatigue, sleepiness, decreased manual dexterity, decreased color discrimination, and decreased accuracy in visual perception) was 100 ppm.

In animals the lethality of toluene vapor appears to differ between species. In rats, the inhalation LC50 is 8,800 ppm (Carpenter et al., 1976; as cited in ATSDR), and in mice the LC50 is 5,320 ppm (Svirbely et al., 1943; as cited in ATSDR 1989).

Information on the oral toxicity of toluene in humans is lacking (ATSDR 1989). In rats, the acute oral LD50 of toluene in adult rats is in the range of 5.5 to

7.3 g/kg (Kimura et al., 1971; Smyth et al. 1969; Withey and Hall 1975; Wolf et al. 1956; all as cited in ATSDR 1989). Age may play a role in the acute lethality of toluene; (Kimura et al. 1971; as cited in ATSDR 1989) reported LD50 values of 5.5 to 6.5 g/kg for adult rats, whereas the LD50 for 14-day old rats was markedly lower at 2.6 g/kg.

In humans, dermal contact with toluene may cause skin damage due to its decreasing action (EPA 1983a; as cited in ATSDR 1989). Workers exposed to solvent mixtures, of which toluene was generally the major component, reported abnormal skin conditions (not specified) of the hand.

Repeated application of undiluted toluene to a rabbit ear or shaved skin produced slight to moderate irritation (Wolf et al., 1956; as cited in ATSDR 1989). In guinea pigs, continuous contact with toluene over a 16-hour period, resulted in karyopyknosis, karyolysis, spongiosis, and cellular infiltration of the dermis (Kronevi et al. 1979; as cited in ATSDR 1989); the LOAEL was 1 ml. These data suggest that toluene is slight to moderately irritating to the skin.

Slight irritation of the conjunctival membranes, but no corneal injury was observed in rabbit eyes following direct application of 0.1 ml toluene (the LOAEL) (Hazeleton Laboratories 1962; as cited in ATSDR 1989). These data suggest that toluene is slightly irritating to the eyes. However, Carpenter and Smyth (1946; as cited in ATSDR 1989) reported moderately severe injury to the eyes of rabbits following direct application of 0.005 ml toluene (the LOAEL).

Repeated-Dose/Subchronic Toxicity

No adequate repeated-dose/subchronic studies in humans exposed via inhalation to toluene were available in ATSDR (1989). However, a number of toxic effects have been reported in animals exposed via inhalation to toluene. Principal toxic effects noted include: mortality, neurotoxicity, urinary bladder histopathology, changes in organ weights, histological changes in the liver, respiratory system lesions/irritation, hematologic changes, ototoxicity, renal casts, and immunologic effects. LOAELs for mice range from 2.5 ppm for immunological effects to 2,500 ppm for hepatocellular hypertrophy; in rats, LOAELs range from 100 ppm for decreased locomotor activity to 5,000 ppm for loss of consciousness. Selected examples of toxic responses to the inhalation of toluene vapor are as follows:

5000 ppm, 7 hours/day, 5 days/week, 5 weeks - unconsciousness in rats (this effect not observed at 2500 ppm) (von Oettingen et al. 1942; as cited in ATSDR 1989)

3000 ppm, 6.5 hours/day, 5 days/week, 15 weeks - 80% mortality in rats (no treatment-related deaths at 2500 ppm) (NTP 1989; as cited in ATSDR 1989)

2500 ppm, 6.5 hours/day, 5 days/week, 15 weeks - urinary bladder hemorrhage in rats (this effect not observed at 1250 ppm)(NTP 1989; as cited in ATSDR 1989)

2500 ppm, 6.5 hours/day, 5 days/week, 15 weeks - increased lung and heart weights in rats (these effects not observed at 1250 ppm) (NTP 1989; as cited in ATSDR 1989)

2500 ppm, 6.5 hours/day, 5 days/week, 14 weeks - hepatocellular hypertrophy in mice (this effect not observed at 100 ppm) (NTP 1989; as cited in ATSDR 1989)

2500 ppm, 7 hours/day, 5 days/week, 5 weeks - pulmonary lesions and incoordination in rats (these effects not observed at 600 ppm) (von Oettingen et al. 1942; as cited in ATSDR 1989)

1250 ppm, 6.5 hours/day, 5 days/week, 15 weeks - brain necrosis, increased liver and kidney weights, and decreased leukocyte counts in rats (these effects not observed at 625 ppm) (NTP 1989; as cited in ATSDR 1989)

1250 ppm, 6.5 hours/day, 5 days/week, 14 weeks - increased kidney and brain weights in mice (these effects not observed at 625 ppm) (NTP 1989; as cited in ATSDR 1989)

1200 ppm, 14 hours/day, 14 days - ototoxicity in rats (Pryor et al. 1984; as cited in ATSDR 1989)

1000 ppm, 14 hours/day, 7 days/week, 16 weeks - ototoxicity in rats (this effect not observed at 700 ppm) (Pryor et al. 1984; as cited in ATSDR 1989)

1000 ppm, 16 hours/day, 5 days/week, 2 weeks - auditory impairment in rats (Johnson et al. 1988; as cited in ATSDR 1989)

1000 ppm, 5 hours/day, 8 days - decreased V_ECO_2 in mice (this effect not observed at 100 ppm) (Bushnell et al. 1985; as cited in ATSDR 1989)

800 ppm, 8 hours/day, 7 days - increased liver weight in mice and rabbits (Ungvary et al. 1982; as cited in ATSDR 1989)

625 ppm, 6.5 hours/day, 5 days/week, 14 weeks - increased liver weight, hepatocellular hypertrophy, and 10% mortality in mice (these effects not observed at 100 ppm) (NTP 1989; as cited in ATSDR 1989)

600 ppm, 7 hours/day, 5 days/week, 5 weeks - renal casts and upper airway irritation in rats (von Oettingen et al. 1942; as cited in ATSDR 1989)

500 ppm, 8-16 hours/day, 5 days/week, 12 weeks - EEG changes in rats (Naaisuno 1986; as cited in ATSDR 1989)

400 ppm, 30 days - altered neurotransmitter levels in rats (this effect not observed at 200 ppm) (Ikeda et al. 1986; as cited in ATSDR 1989)

320 ppm, 24 hours/day, 30 days - decreased brain weight in rats (Kyrklund et al. 1987; as cited in ATSDR 1989)

150 ppm, 24 hours/day, 30 days - increased liver weight in mice (Kjellstrand et al. 1985; as cited in ATSDR 1989)

100 ppm, 5 hours/day, 8 days - decreased locomotor activity in rats (Bushnell et al. 1985; as cited in ATSDR 1989)

100 ppm, 6 hours/day, 20 days - neurobehavioral changes in mice (Horiguchi and Inoue 1977; as cited in ATSDR 1989)

100 ppm, 6.5 hours/day, 5 days/week, 14 weeks - increased lung weight in mice (NTP 1989; as cited in ATSDR 1989)

No gastrointestinal or musculoskeletal effects were reported by NTP (1989; as cited in ATSDR 1989) in mice or rats following oral exposure to toluene at dosage levels of up to 5,000 mg/kg/day for 13 weeks. The same dose, however, produced hemorrhages of the urinary bladder in the rats, and a dose of 625 mg/kg/day increased relative liver and kidney weights in rats. In mice, a dose of 312 mg/kg/day increased liver weights, and at 2,500 mg/kg/day kidney weights increased. At 1,250 mg/kg/day, mice exhibited a relative increase in brain weight, whereas the same dose in rats produced brain necrosis.

Administration of toluene in the drinking water to mice over a 42-day period indicated a NOAEL of 19.7 mg/kg/day and a LOAEL of 98.3 mg/kg/day for neurotoxicity. Effects observed included a decrease in open field activity, which suggested functional deficits, although no specific mechanism was identified (Kostas and Hotchin 1981; as cited in ATSDR 1989)

Chronic Toxicity

In humans, the only observed effect of chronically inhaled toluene on the respiratory tract is irritation. Parmeggiani and Sassi (1954; as cited in ATSDR 1989) observed irritation of the upper respiratory tract in workers exposed for several years to 200-800 ppm of toluene. Studies by others found that at an exposure level of 600 ppm for more than 3 years, toluene produced no adverse hematological effects (Banfer 1961; as cited in ATSDR 1989), and at 334 ppm for 7-10 years, 8 hours/day, there was no hepatotoxicity (Lundberg and Hakansson 1985; as cited in ATSDR 1989).

Chronic inhalation exposures of humans to moderate to high concentrations (no levels reported) of toluene are associated with central nervous system disturbances and impaired neuromuscular function. At still higher levels, permanent damage, such as cerebral and cerebellar effects, including ataxia, tremors, and speech, hearing, and vision impairment have been occasionally reported in long-time abusers of toluene. In the latter case, it is important to note that these are often mixed chemical exposures; thus effects seen may not be fully attributable to toluene (ATSDR 1989).

In animals, inhalation exposures of up to 1200 ppm toluene over two years have been studied through the National Toxicology Program. In mice, 1200 ppm toluene, 6.5 hours/day, 5 days/week, for 2 years produced no adverse hematological, respiratory, cardiovascular, renal, or musculoskeletal toxicity; the same NOAEL was reported in rats for hepatic, musculoskeletal, hematological, and cardiovascular toxicity. However, rats exhibited nasal inflammation, gastrointestinal toxicity, and nephropathy at 600 ppm (the LOAEL) on the same exposure schedule; at 1200 ppm, the nephropathy was severe (NTP 1989; as cited in ATSDR 1989).

In rats, no toxic effects were observed on the liver, kidneys, or hematopoietic system following administration of toluene by gavage at a dose level of 590 mg/kg/day over a 6-month period (Wolf et al., 1956; as cited in ATSDR 1989).

<u>Carcinogenicity</u>

None of the available data suggest that toluene is carcinogenic by the inhalation route. Exposure to up to 1200 ppm toluene vapor 6.5 hours/day, 5 days/week for 24 months did not produce an increased incidence of treatment-related

Toxicological Profile for Xylene

neoplastic lesions in Fischer 344 rats or in B6C3F1 mice (NTP 1989; as cited in ATSDR 1989).

No studies were located in the available literature on the carcinogenic effects of toluene following oral exposure to the chemical (ATSDR 1989).

Weiss et al. (1986; as cited in ATSDR 1989) have demonstrated that dermally-administered toluene markedly inhibits skin tumorigenesis in the two-stage mouse model. It is postulated that toluene interferes with a biochemical process within the cell membrane or in the intracellular cascade between the membrane and the nucleus.

Mutagenicity

Based on available studies of humans, the weight of evidence suggests that toluene vapor is not genotoxic, however the results are not conclusive. An increase in sister chromatid exchange frequencies in toluene-exposed workers was reported by Schmid et al. (1985; as cited in ATSDR 1989) and Bauchinger et al. (1982; as cited in ATSDR 1989). However, exchange frequencies ceased to be significantly different at post-exposure periods greater than 2 years (Schmid et al., 1985; as cited in ATSDR 1989). Since the significance of an increase in sister chromatid exchange frequencies is unknown (Morris et al., 1985; as cited in ATSDR 1989), the importance of these findings is unclear. Others have found no correlation between chronic occupational exposures to toluene and increased frequencies of either chromosome aberrations (Haglund et al., 1980; Maki-Paakkanen et al., 1980; as cited in ATSDR 1989) or sister chromatid exchanges (Haglund et al., 1980; as cited in ATSDR 1989).

No information was available on the genotoxic effects of toluene following oral or dermal exposures (ATSDR 1989).

Developmental and Reproductive Toxicology

Concurrent exposure to multiple solvents precludes the use of human occupational studies as indicators of possible developmental effects resulting from toluene exposure. Several studies have shown that inhalation exposure to toluene affects or harms the development of unborn animals. However, when pregnant animals were given a single dose of toluene by the oral route, the unborn animals did not show any developmental problems (ATSDR 1989).

In rats exposed to toluene vapor for 7 hours/day during days 7-16 of gestation, extranumerary ribs were seen at 400 ppm and dilated renal pelves at 200 ppm. Toluene was maternally toxic at both of these concentrations (Courtney et al. 1986; as cited in ATSDR 1989). Inhalation exposure of mice (3-4 hours/day, 9 days) and rabbits (24 hours/day, 14 days) to toluene produced fetal effects at 267 ppm but not at 133 ppm. At the 267 ppm concentration, low fetal weight and retarded skeletal development were seen in mice, and abortion was seen in rabbits (Ungvary and Tatrai 1985; as cited in ATSDR 1989). Inhalation exposure of rats (24 hours/day, 9 days) to 267 ppm toluene also produced low fetal weight and retarded skeletal development (Ungvary 1985; as cited in ATSDR 1989).

Inhalation exposure of two consecutive generations of rats (95 days) to 2000 ppm toluene caused a significant inhibition of growth of the offspring of both generations, both <u>in utero</u> and <u>post partum</u>. No developmental effects were seen at 500 ppm toluene (API 1985; as cited in ATSDR 1989).

No developmental effects were seen in mice given a single oral gavage dose of 2350 mg/kg toluene (Smith 1983; as cited in ATSDR 1989) or 1800 mg/kg toluene (Seidenberg et al. 1986; as cited in ATSDR 1989).

No information is available on the reproductive effect of toluene in humans (ATSDR 1989). A toluene vapor concentration of 2500 ppm, but not 1250 ppm, produced an increase in relative testicular weight in rats exposed 6.5 hours/day, 5 days/week for 15 weeks (NTP 1989; as cited in ATSDR 1989). In contrast, no reproductive effects were reported in rats exposed to 2000 ppm toluene vapor, 6 hours/day, 7 days/week for 95 days (API 1985; as cited in ATSDR 1989) or in mice exposed to 400 ppm toluene vapor, 6 hours/day, 5 days/week for 8 weeks (API 1981; as cited in ATSDR 1989). Also, toluene vapor was not a reproductive toxicant in rats following exposure to 300 ppm, 6 hours/day, 5 days/week, for two years (CIIT 1980; as cited in ATSDR 1989).

No effect on the number of mice producing viable litters was observed following oral administration of a single gavage dose of 2350 mg/kg/day to pregnant/gravid mice (Smith 1983; as cited in ATSDR 1989).

No information was available on the effects of dermal toluene exposure on development and reproduction (ATSDR 1989).

5. Risk Assessment

Subchronic Health Hazard Assessment for Noncarcinogenic Effects (IRIS)

Route of Exposure: Oral

Subchronic RfD (mg/kg/day): 0.2

Confidence Level: Medium

Critical Effect: Changes in liver and kidney weights

RfD Basis/RfD Source: Oral 13-week rat gavage study/IRIS 1990

Uncertainty Factor: 1,000

Modifying Factor: 1

Carcinogenicity Assessment for Lifetime Exposure (IRIS 1990)

Classification D; not classified

Basis for Classification: No human data and inadequate animal data. Toluene did not produce positive results in the majority of genotoxicity test assays.

6. Regulations Applicable to Toluene

OSHA

Permissible Exposure Limits (PEL) in Workplace Air (OSHA 1989; as cited in ATSDR 1989):

Time Weighted Average (TWA) (8 hr/day/,40 hr week): 100 ppm

Short Term Exposure Limit (STEL): 150 ppm

ACGIH

Threshold Limit Values (TLV) (ACGIH 1986; as cited in ATSDR 1989)

TWA: 375 mg/m^3 (100 ppm)

STEL: 560 mg/m^3 (150 ppm)

EPA OWRS

Hazardous Substance Reportable Quantity (40 CFR 116; 40 CFR 117.3; EPA 1985a; as cited in ATSDR 1989): 1,000 lb

EPA OERR

Reportable Quantity (40 CFR 302.4; EPA 1985a; as cited in ATSDR 1989): 1,000 lb

EPA ODW

Maximum Contaminant Level Goal (MCLG) (EPA 1985a; as cited in ATSDR 1989): 2.0 mg/L

References

ATSDR. 1989. Agency for Toxic Substances & Disease Registry. Toxicological Profile for Toluene. U.S. Public Health Service

IRIS. 1990. Integrated Risk Information System. U.S. Environmental Protection Agency database of health risk assessment information on toluene. Washington, D.C. USEPA. September 6, 1990.

Toxicological Profile for Xylene

TOXICOLOGICAL PROFILE FOR XYLENE

1. What is Xylene?

Technical grade xylenes (xylene) is a mixture of three isomers, o-, m- and p-xylene. The properties and toxicities of the three isomers are very similar. The xylenes are produced from petroleum and coal. They are colorless liquids with a sweet odor (ATSDR 1990).

Xylene is often a component of solvents and thinners for paints and varnishes. It is used as a solvent and cleaning agent in a variety of industrial applications (ATSDR 1990).

The three xylene isomers boil in the range 137°-144°C at atmospheric pressure. They are miscible in alcohol and organic solvents, and have water solubility of from 130 to 198 ppm at 25C (ATSDR 1990).

Xylene evaporates readily and burns easily. Xylene can leak into soil, surface and groundwater where it may remain for 6 months or more before being degraded. However, because it evaporates readily, most xylene will enter the atmosphere where it will be broken down by sunlight in a matter of several days (ATSDR 1990).

2. Biological Distribution

Pharmokinetics

Absorption

The three xylene isomers, o-, m- and p-xylene, will be absorbed by all routes, from the lungs by inhalation, from the gastrointestinal tract by ingestion, and through the skin on dermal contact.

On inhalation, it is the retained xylene that is available for absorption into the systemic circulation. In experimental studies with humans, retention of the three xylene isomers was similar and averaged 63.6% (Sedivec and Flek 1979b, as cited in ATSDR 1990). Other authors have estimated that between 49.8 and 72.8% of inhaled xylene is retained (David et al. 1979; Ogata et al. 1970; Riihimaki et al. 1978; 1980; 1979b; Wallen et al. 1985, all as cited in ATSDR 1990). In pregnant mice approximately 30% of an inhalation dose of 600 ppm p-xylene was absorbed in a 10-minute exposure period (Ghantous and Danielsson 1986, as cited in ATSDR 1990).

Oral doses of o- or p-xylene administered to humans were absorbed, as demonstrated by excretion of urinary metabolites (Ogata et al. 1980, as cited in ATSDR 1990). In animals, a minimum of 87-92% of an oral dose of 1.74-1.8 g of o-, m-, or p-xylene was absorbed (Bray et al. 1949, as cited in ATSDR 1990). Other studies have also shown oral absorption in animals (Bakke and Scheline 1970; Patel et al. 1978; Pyykko 1980, all as cited in ATSDR 1990).

The xylenes are absorbed through the skin, but much less readily than through inhalation or ingestion. The amount of m-xylene vapor absorbed through the skin of humans was from 0.1 to 2% of the amount absorbed by inhalation (Riihimaki and Pfaffli 1978, as cited in ATSDR 1990). The absorption rate of m-xylene liquid through the skin of human was estimated to be 2 $g/cm^2/min$ (Engstrom et al. 1977, as cited in ATSDR 1990). The penetration rate of o-xylene through the excised abdominal skin of rats was estimated to be 0.967 $nmol/cm^2/min$ Tsuruta 1982, as cited in ATSDR 1990.

Distribution

Xylenes are soluble in blood and are readily absorbed into the systemic circulation during exposure (Astrand 1982, as cited in ATSDR 1990). In the blood, 90% of the xylene will be associated with serum protein and the remainder with the serum (Riihimaki et al. 1979b, as cited in ATSDR 1990). From the blood, xylene is primarily distributed to adipose tissue. Estimates of the amount of xylene accumulated in fat in humans range from 5 to 10% of an absorbed dose (Astrand 1982; Engstrom and Bjurstrom 1978, as cited in ATSDR 1990).

Studies in mice indicate high uptake of m-xylene and p-xylene in lipid-rich tissues such as brain, fat and blood and in well-perfused organs such as the liver and kidney (Ghantous and Danielsson 1986; Carlsson 1981, as cited in ATSDR 1990). The level of xylene stored in body fat may decrease during chronic exposure owing to an induced increase in metabolic rate (Savolainen et al. 1979a, as cited in ATSDR 1990).

Metabolism

Results of both human and animal studies indicate that the xylenes are phenobarbital-like inducers of liver microsomal cytochrome P-450 (David et al. 1979; Toftgard et al. 1981, as cited in ATSDR 1990). In humans, the xylenes, irrespective of the isomer, the route of administration, the dose, or duration of exposure, are metabolized primarily by oxidation of one of the methyl groups by microsomal mixed function oxidases to give the corresponding toluic acid. The toluic acid is conjugated with glycine to form the corresponding methylhippuric acid which is excreted in the urine (Astrand et al. 1978; Ogata et al. 1979; Riihimaki et al. 1979a, 1979b; Sedivec and Flek 1976b; Senczuk and Orlowski 1978, all as cited in ATSDR 1990). Minor metabolic products, accounting for less than 10% of the absorbed dose, include methylbenzyl alcohols, o-toluic acid glucuronide, and xylenols.

The metabolism of the xylenes in animals is qualitatively similar to that in humans but there are quantitative differences. Metabolism of intraperi-toneally injected o-xylene in rats leads to the urinary excretion of 10 to 56.6% of the administered dose as o-toluic acid glucuronide whereas m- and p-xylene give only about 1% of the corresponding glucuronide and from 49 to 75% of the corresponding methylhippuric acid (Ogata et al. 1980; van Doorn et al. 1980; Sugihara and Ogata 1978, all as cited in ATSDR 1990). In rabbits 60% of an administered dose of o-xylene, 81% of m-xylene, and 88% of p-xylene were excreted in the urine as the corresponding methylhippuric acids (Bray et al. 1949).

A toxic metabolite of p-xylene in animals, but not detected in humans, appears to be p-tolualdehyde (Carlone and Fouts 1974; Patel et al. 1978; Smith et al. 1982, all as cited in ATSDR 1990). The differences observed between humans and animals in the metabolism of the xylenes may in part owe to differences in dose size. Conjugation with glucuronic acid, for example, as well as other elimination pathways, may take over when the pathway through conjugation with glycine becomes saturated (Sedivec and Flek 1976b; Riihimaki et al. 1979b, as cited in ATSDR 1990).

Excretion

In humans, 95% of absorbed xylene is metabolized and excreted in the urine, primarily as methylhippuric acids; the remaining 5% is exhaled unchanged (Astrand et al. 1978; Ogata et al. 1980; Riihimaki et al. 1979a, 1979b; Sedivec and Flek 1976b; Senczuk and Orlowski 1978, all as cited in ATSDR 1990). Less than 0.005% of an absorbed dose is excreted unchanged in the urine and less than 2% is eliminated as xylenols. Excretion is rapid; a significant amount of methylhippuric acid is detected in the urine within 2 hours of inhalation exposure.

There appear to be at least two, possibly three, distinct phases of elimination: too rapid to monitor from the parenchymal organs; relatively rapid from muscle tissue; and slower from adipose tissue (Ogata et al. 1920; Riihimaki et al. 1979a; 1979b, as cited in ATSDR 1990). Human volunteers exposed by inhalation to 100 or 200 ppm m-xylene for 7 hours had excreted 54 or 61% of the respective dose 18 hours after exposure (Ogata et al. 1970, as cited in ATSDR 1990). On intermittent acute exposure of humans to 23-138 ppm m-xylene, excretion of m-methylhippuric acid peaked 6-8 hours after exposure began and decreased rapidly after termination of exposure. Almost no xylene or m-methylhippuric acid was detected in the urine 24 hours after exposure ceased (Senczuk and Orlowski 1978, as cited in ATSDR 1990).

Men given oral doses of 40 mg/kg/day of o- or m-xylene excreted 33.1% o- or 53.1% m-methylhippuric acid in the urine; 1.0% of o-toluic acid glucuronide was also detected in the urine of those given o-xylene. Excretion of metabolites of o-xylene peaked in 3-6 hours and of m-xylene in 1-3 hours after dosing (Ogata et al. 1980, as cited in ATSDR 1990).

After a 15-minute dermal exposure of humans to liquid m-xylene, elimination in exhaled breath of unchanged m-xylene was 2-phased, one phase with a half-life of 1 hour and one with a half-life of 10 hours. Elimination of m-methylhippuric acid in the urine was delayed 2 to 4 hours and the rate was comparable to that following inhalation exposure. The rate of excretion of m-methylhippuric acid 2 hours after the 15-minute dermal exposure was approximately 50 mol/hour (Engstrom et al. 1977; Riihimaki and Pfaffli 1978, as cited in ATSDR 1990).

Toxicology

Because the toxic effects of the xylenes have been thoroughly reviewed (ATSDR 1990), we will only briefly summarize the principal toxic effects here. What follows is mainly excerpted from the Public Health Statement from ATSDR 1990.

Short-term exposure of humans to 100 ppm of the xylenes in air for one day causes eye, nose and throat irritation. Exposure of humans for 70 minutes to

299 ppm xylenes in air results in increased reaction time to a visual stimulus and impaired memory. Exposure to high levels in the air can also cause stomach discomfort, changes in the liver and kidney, difficulty in breathing and impaired lung function. Both short- and long-term exposure to high concentrations of xylene can cause effects on the nervous system including headaches, lack of muscle coordination, dizziness, confusion, and changes in sense of balance.

Studies in animals indicate that the xylenes can cause adverse effects on the liver, kidneys, lungs, heart, and nervous system. Short-term exposure to the xylenes in air causes effects as follows:

1450 ppm, 8 hours/day - Hearing loss in rats

1940 ppm, 4.5 hours/day - Inactivity or unconciousness in rats

2000 ppm, 3 days/week - Biochemical changes in the brain of rats

Longer term inhalation exposure of rats to the xylene causes:

230 ppm, 4 weeks - Changes in blood vessels of the heart, decreased blood flow in th heart, and increased heart rate

300 ppm, 18 weeks - Changes in fat and protein composition of the nerves

600 ppm, 4 weeks - Changes in liver weight

800 ppm, 6 weeks - Hearing loss

FRO 001 2109

Short-term exposure of rats to the xylenes in food causes:

5000 ppm, 1 day - Impaired eye function

40000 ppm, 14 days - Death

Short-term exposure of animals to high levels of xylene can also cause indications of neurotoxic effects including muscular spasms, incoordination, and changes in behavior.

Exposure of pregnant rats to the xylene causes effect such as :

35 ppm in air, 8 days - Decreased placental weight

15846 ppm in food, 10 days - Deacreased bnodyweight and birth defects in fetuses

Teratogenic efeects include skelatal changes and delayed skeletal development from exposure of pregnant rats to high levels of the xylenes.

Information from animal studies is not adequate to determine whether or not the xylenes can cause cancer in humans.

3. Risk Assessment

Chronic Health Hazard Assessment for Noncarcinogenic Effects (IRIS)

Routes of Exposure: Oral

Chronic RfD (mg/kg/day): 2.0

Confidence Level: Medium

Critical Effects: CNS Toxicity indicated by hyperactivity; decreased bodyweight and increased mortality (males)

RfD Basis/RfD Source: Oral gavage, rats (IRIS, 1990)

Uncertainty Factor: 100

Modifying Factor: 1

The oral RfD should be protective against fetotoxic and teratogenic effects.

Route of Exposure: Inhalation (IRIS)

A risk assessment by inhalation is under review by an USEPA work group.

Carcinogenicity Assessment for Lifetime Exposure (IRIS)

Route of Exposure: Oral (gavage, rats)

Classification: D; not classifiable as to human carcinogenicity

Basis: Orally administered technical xylene mixture did not cause significant increases in incidences of tumors in male or female rats or mice

4. References

ATDSR. 1990. Toxicological Profile for Total Xylenes. Agency for Toxic Substances and Disease Registry, US Public Health Service. February 16, 1990.

RIS, 1990. Integrated Risk Information System. US Environmental Protection ency database of health risk assessement information on xylenes. Washington, USEPA. January 31, 1990.