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DATE: September 8, 1986

TITLE: ANALYSIS OF NITRO OIL AND SOIL SAMPLES FOR PCB FORMULATIONS

AUTHORS: B.M. Hughes, D. McKenzie, C. Trang and B. Simpson

ABSTRACT: Ninety oil and 10 soil samples from the Nitro Plant were analyzed for PCB formulations using capillary GC/EC analysis techniques. Approximately 80% of the oils contained no detectable PCB formulations with limits of detection on the order of 10 ug/g or less, and approximately 80% of the soil samples contained less than 50 ug/g PCB formulations.

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APPROVAL DATE: September 9, 1986

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AUTHORS: B.M. Hughes, D. McKenzie, C. Trang and B. Simpson
TITLE: ANALYSIS OF NITRO OIL AND SOIL SAMPLES FOR PCB FORMULATIONS
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ANALYSIS REPORT

DATE: September 4, 1986

LOG NUMBER: U-86-07-22-01 PROJECT NO: 760 28-6232

TO: Jim Fleer/Nitro Plant (1670)

FROM:

Environmental Sciences Center
Monsanto Company
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Title: Analysis of Nitro Oil and Soil Samples for PCB Formulations

ABSTRACT

Ninety oil and 10 soil samples from the Nitro Plant were analyzed for PCB formulations using capillary GC/EC analysis techniques. Approximately 80% of the oils contained no detectable PCB formulations with limits of detection on the order of 10 ug/g or less, and approximately 80% of the soil samples contained less than 50 ug/g PCB formulations.

INTRODUCTION

Oil and soil samples were analyzed using Standard Extraction Methods PCEX02, PCEX03, and PCEX21 and Standard Analysis Method ECAN02. Summaries of these methods are included in a later section of this report.

SUMMARY

Table 1 summarizes the oil analysis results and Table 2 summarizes soil analysis results. A Concentration Code has been included in this table to indicate which samples should be handled as PCB-containing (between 50 and 500 ug/g) or as PCBe (>500 ug/g). Since multiple oil and soil samples were not taken, and multiple analyses were not performed on each sample, it is assumed that our measured concentration is correct from +150% to -50%. These limits are larger than our analytical precision (see the next section on QC results). These liberal error estimates are thought to include unknown factors such as inhomogeneity of PCB concentrations in the sampled systems. This information cannot easily be determined from the set of samples submitted for analysis.

Please note that PCB concentrations in samples 86093 and 86094 could not be determined with a level of detection below 80 ug/g. If it is critical that these samples have lower levels of detection, we will reanalyze using capillary GC/MS analysis methods.

(continued)

QC RESULTS

Table 3 summarizes results of Aroclor spiking studies, Table 4 summarizes surrogate recoveries for soil analyses, and Table 5 summarizes QA/QC results of ESC standard PCB formulation analyses and EPA Quality Control Check sample analyses.

DETAILS

Standard Sampling Method No(s): Samples supplied by Jim Fleer of the Nitro Plant.

Standard Extraction Method No(s): PCEX02 (See PCFS02 for method flow sheet.)
PCEX03 (See PCFS03 for method flow sheet.)
PCEX21 (See PCFS21 for method flow sheet.)

Standard Analysis Method No(s): ECAN02 (See ECFS02 for method flow sheet.)

Sample Identification(s): See Analytical Request Information given in a later section of this report.

Final Report File No(s): A23218

Table File No(s): B23218, C23218, D23218, E23218, F23218, DM232

Also included in this report are:

(1) Summaries of Standard Extraction and Analysis Methods used.

(2) Extraction details for soil samples.

(3) Raw data documentation of reported results.

(4) QA/QC data for selected samples.

(5) Chain-of-custody information for this project.

(6) Analysis Request Information generated at sample login.

(7) Description of important terminology used in Quality Assurance/ Quality Control, Analyte Extraction and Intrumental Analysis.

ANALYST(S): B. Mason Hughes, David McKenzie, Chi Trang, and Branda Simpson

ANALYST APPROVAL: B. Mason Hughes

Time Stamp - <860922.1608>

Table 1. Results of Aroclor Concentrations Detected in Nitro Oil Samples using Standard Extraction Method PCEX02 and Standard Analysis Method ECAN02.

Project No: 760.6232 Date: August 22, 1986

Nitro Sample ID	Amount Weighed (g)	ESC Extraction Number	ESC GC/EC Raw File	LOD (a) (ug/g)	Amount Detected (ug/g)	Conc. Code (b)	Major Aroclor Type(c)
86001	0.930	PCB-1707	BR363	1.0	ND	-	ND
86002	0.946	PCB-1708	BR509	1.0	ND	-	ND
86003	0.915	PCB-1709	BR510	1.0	ND	-	ND
86004	0.920	PCB-1710	BR511	1.0	ND	-	ND
86005	0.987	PCB-1711	BR513	1.0	ND	-	ND
86006	0.992	PCB-1712	BR514	1.0	ND	-	ND
	0.993	PCB-1713-DUP	BR515	1.0	ND	-	ND
METHOD BLANK	0.0	PCB-1714	BR516	1.0	ND	-	ND
86007	0.978	PCB-1715	BR517	1.0	ND	-	ND
86008	0.980	PCB-1716	BR519	1.0	ND	-	ND
86009	0.975	PCB-1717	BR520	1.0	ND	-	ND
86010	0.936	PCB-1718	BR521	1.0	ND	-	ND
86011	0.925	PCB-1719	BR522	1.0	ND	-	ND
86012	0.910	PCB-1720	BR524	1.0	ND	-	ND
86013	0.933	PCB-1721	BR525	1.0	ND	-	ND
86014	0.965	PCB-1722	BR526	1.0	ND	-	ND
	0.970	PCB-1723-DUP	BR531	1.0	ND	-	ND
86015	0.930	PCB-1724	BR532	10.0	26	-	A1260
		PCB-1724+LS	BR940	10.0	24	-	A1260
		PCB-1724+HS	BR965	10.0	29	-	A1260
METHOD BLANK	0.0	PCB-1725	BR533	1.0	ND	-	ND
86016	0.938	PCB-1726	BR534	1.0	ND	-	ND
86017	0.935	PCB-1727	BR536	5.0	150	+	A1260
86018	0.875	PCB-1728	BR537	5.0	39	+	A1260
86019	0.965	PCB-1729	BR538	5.0	220	+	A1260
86020	0.915	PCB-1730	BR540	1.0	ND	-	ND
86021	0.961	PCB-1731	BR541	5.0	51	+	A1260
	0.965	PCB-1732-DUP	BR542	5.0	50	+	A1260
METHOD BLANK	0.0	PCB-1733	BR543	1.0	ND	-	ND
86022	0.912	PCB-1734	BR544	1.0	ND	-	ND
86023	0.943	PCB-1735	BR561	5.0	356	++	A1260
86024	0.963	PCB-1736	BR562	20.0	47	+	A1260
		PCB-1736+LS	BR941	20.0	42	+	A1260
		PCB-1736+HS	BR966	20.0	62	+	A1260
86025	0.934	PCB-1737	BR563	5.0	435	++	A1260
86026	0.925	PCB-1738	BR564	5.0	15	-	A1260
86027	0.960	PCB-1739	BR566	5.0	14	-	A1260
86028	0.981	PCB-1740	BR567	5.0	113	+	A1260
86029	0.943	PCB-1741	BR568	1.0	ND	-	ND
86030	0.965	PCB-1742	BR569	1.0	ND	-	ND
86047	0.975	PCB-1743	BR571	1.0	ND	-	ND
	0.971	PCB-1744-DUP	BR572	1.0	ND	-	ND

(continued)

METHOD							
BLANK	0.0	PCB-1745	BR573	1.0	ND	-	ND
86048	0.960	PCB-1746	BR574	1.0	ND	-	ND
86049	1.020	PCB-1747	BR576	1.0	ND	-	ND
86051	0.980	PCB-1748	BR577	1.0	ND	-	ND
86052	0.964	PCB-1749	BR578	1.0	ND	-	ND
86053	0.970	PCB-1750	BR579	1.0	ND	-	ND
86054	0.990	PCB-1751	BR580	1.0	ND	-	ND
86055	0.996	PCB-1752	BR581	25.0	ND	-	ND
		PCB-1753-DUP	BR583	25.0	ND	-	ND
METHOD							
BLANK	0.0	PCB-1754	BR584	1.0	ND	-	ND
86056	0.960	PCB-1755	BR915	1.0	ND	-	ND
86057	0.958	PCB-1756	BR587	1.0	ND	-	ND
86058	0.977	PCB-1757	BR594	1.0	ND	-	ND
86059	0.967	PCB-1758	BR595	1.0	ND	-	ND
86060	0.987	PCB-1759	BR916	1.0	ND	-	ND
86061	1.000	PCB-1760	BR917	1.0	ND	-	ND
86062	0.980	PCB-1761	BR748	10.0	ND	-	ND
86063	0.975	PCB-1762	BR749	10.0	ND	-	ND
	1.003	PCB-1763-DUP	BR750	10.0	ND	-	ND
METHOD							
BLANK	0.0	PCB-1764	BR752	1.0	ND	-	ND
86064	0.924	PCB-1765	BR753	5.0	ND	-	ND
86065	1.005	PCB-1766	BR754	1.0	ND	-	ND
86066	1.033	PCB-1767	BR755	10.0	ND	-	ND
86067	0.975	PCB-1768	BR918	1.0	ND	-	ND
86068	1.000	PCB-1769	BR758	10.0	ND	-	ND
86069	1.040	PCB-1770	BR921	1.0	ND	-	ND
86070	1.039	PCB-1771	BR760	5.0	ND	-	ND
86071	0.944	PCB-1772	BR761	1.0	ND	-	ND
	0.981	PCB-1773-DUP	BR763	1.0	ND	-	ND
86072	0.960	PCB-1774	BR764	1.0	ND	-	ND
METHOD							
BLANK	0.0	PCB-1775	BR765	1.0	ND	-	ND
86073	0.944	PCB-1669	BR375	1.0	ND	-	ND
86075	0.957	PCB-1670	BR311	1.0	ND	-	ND
86076	0.943	PCB-1671	BR312	1.0	ND	-	ND
86077	0.987	PCB-1672	BR313	1.0	ND	-	ND
86081	0.999	PCB-1673	BR315	1.0	ND	-	ND
86082	1.022	PCB-1674	BR316	1.0	ND	-	ND
86083	0.988	PCB-1675	BR317	1.0	ND	-	ND
86084	0.992	PCB-1676	BR376	1.0	ND	-	ND
86085	1.018	PCB-1677	BR320	1.0	ND	-	ND
86086	1.016	PCB-1678	BR377	1.0	ND	-	ND
	1.018	PCB-1679-DUP	BR379	1.0	ND	-	ND
86087	1.029	PCB-1680	BR380	1.0	ND	-	ND
86088	1.152	PCB-1681	BR326	1.0	ND	-	ND
86089	0.899	PCB-1682	BR327	1.0	ND	-	ND
METHOD							
BLANK	0.0	PCB-1683	BR328	1.0	ND	-	ND
86090	0.958	PCB-1684	BR330	1.0	ND	-	ND
86091	1.228	PCB-1685	BR336	1.0	ND	-	ND
86092	1.242	PCB-1686	BR382	1.0	ND	-	ND
86093	1.059	PCB-1687	BR383	80.0	ND	-	ND
86094	0.967	PCB-1688	BR384	80.0	ND	-	ND

(continued)

86101	0.970	PCB-1689	BR341	1.0	ND	-	ND
86102	1.004	PCB-1690	BR342	1.0	ND	-	ND
86106	0.940	PCB-1691	BR343	1.0	ND	-	ND
86107	0.972	PCB-1692	BR344	1.0	ND	-	ND
	1.012	PCB-1693-DUP	BR346	1.0	ND	-	ND
86108	0.956	PCB-1694	BR386	1.0	ND	-	ND
86109	0.936	PCB-1695	BR387	1.0	ND	-	ND
86110	0.940	PCB-1696	BR388	1.0	ND	-	ND
86111	0.940	PCB-1697	BR390	1.0	8	-	A1254
86112	0.988	PCB-1698	BR352	1.0	ND	-	ND
86113	0.840	PCB-1699	BR353	1.0	ND	-	ND
METHOD							
BLANK	0.0	PCB-1700	BR355	1.0	ND	-	ND
86114	0.895	PCB-1701	BR356	1.0	ND	-	ND
	0.950	PCB-1702-DUP	BR357	1.0	ND	-	ND
86116	0.893	PCB-1703	BR358	1.0	ND	-	ND
86117	1.010	PCB-1704	BR360	1.0	ND	-	ND
86119	0.950	PCB-1705	BR361	1.0	ND	-	ND
86120	0.918	PCB-1706	BR362	1.0	ND	-	ND

Footnotes:

(a) Limit of Detection for the sample. This value is dependent upon amount of sample dilution and matix interferences.

(b) Concentration code which may be used to evaluate whether the sample in question contains <50 ug/g, between 50 and 500 ug/g, or >500 ug/g total PCBs. This code was developed to account for variables such as matrix inhomogenesity, analytical uncertainty, and sampling error. This code is ESC's estimate of how each sample should be handled, with a built-in safety factor of 50% to insure against the reporting of false negative values.

- indicates PCB concentration is less than 50 ug/g.
+ indicates PCB concentration between 50 ug/g and 500 ug/g.
++ indicates PCB concentration greater than 500 ug/g.

(c) Major Aroclor type refers to the Aroclor formulation which the sample contains in quantities greater than 90% of total PCBs present. The value reported for amount detected is the concentration of the major Aroclor formulation present. This concentration is based on the analysis of at least 10 PCB congeners in the given formulition

(continued)

Explanation of symbols:

DUP - Refers to a sample which has been analyzed in duplicate.

LS - Refers to a sample which has been spiked with Aroclor 1254 by combining 0.9 mL of the extract indicated and 0.1 mL DEM-091483-02 (5 ug/mL). LS refers to a low level native analyte spike.

HS - Refers to a sample which has been spiked with Aroclor 1254 by combining 0.9 mL of the extract indicated and 0.1 mL DEM-091483-02 (50 ug/mL). HS refers to a high level native analyte spike.

ND - Indicates that concentrations were not measured above the LOD.

Table stored in file: B23218

ANALYST(S): B. Mason Hughes, D. McKenzie, Chi Trang and Brenda Simpson

ANALYST APPROVAL: B. Mason Hughes

Time Stamp - <860922.1608>

Table 2. Results of Aroclor Concentrations Detected in Nitro Soil Samples using Standard Extraction Methods PCEX21 and PCEX03 and Standard Analysis Method ECAN02.

Project No: 760.28-6232 Date: August 22, 1986

Nitro Sample ID	Amount Weighed (g)	ESC Extraction Number	ESC GC/EC Raw File	LOD (a) (ug/g)	Amount Detected (ug/g)	Conc. Code (b)	Major Aroclor Type(c)
86031	0.94	PCB-1779	BR610	10.0	19	-	A1254
86032	0.97	PCB-1780	BR611	10.0	ND	-	ND
86033	0.99	PCB-1781-C	BR657	1.0	10/4	-	A1254/ A1260
	1.01	PCB-1782-DUP-C	BR658	10.0	16/7	-	"
METHOD BLANK	0.0	PCB-1785	BR614	1.0	ND	-	ND
86035	0.97	PCB-1786	BR615	10.0	8	-	A1260
86036	0.94	PCB-1787-C	BR660	10.0	25	-	A1260
86037	0.96	PCB-1788-C	BR661	1.0	2/5	-	A1254/ A1260
86038	0.99	PCB-1789	BR618	10.0	ND	-	ND
86039	1.03	PCB-1790-C	BR662	10.0	ND	-	ND
86043	0.93	PCB-1791	BR625	10.0	36/11	+	A1254/ A1260
	0.98	PCB-1792-DUP	BR626	10.0	10/6	+	"
86044	1.09	PCB-1795	BR627	10.0	13	-	A1254
86045	0.95	PCB-1796	BR628	10.0	26	-	A1254
86046	1.08	PCB-1797	BR629	10.0	ND	-	ND
METHOD BLANK	0.0	PCB-1798	BR630	1.0	ND	-	ND

Footnotes:

(a) Limit of Detection for the sample, which is dependant upon amount of sample dilution and matix interferences.

(b) Concentration code which may be used to evaluate whether the sample in question contains <50 ug/g, between 50 and 500 ug/g, or >500 ug/g total PCBs. This code was developed to account for variables such as matrix inhomogeneity, analytical uncertainty, and sampling error. This code is ESC's estimate of how each sample should be handled, with a built-in safety factor of 50% to insure against the reporting of false negatives.

- indicates PCB concentration is less than 50 ug/g.
+ indicates PCB concentration between 50 ug/g and 500 ug/g.
++ indicates PCB concentration greater than 500 ug/g.

(c) Major Aroclor type refers to the Aroclor formulation which the sample contains in quantities greater than 90% of total PCBs present. The value reported for amount detected is the concentration of the major Aroclor formulation present. Concentration is based on the analysis of at least 10 PCB congeners in the given formultion

(continued)

Explanation of symbols:

DUP - Refers to a sample which has been analyzed in duplicate.

C - Refers to samples which were extracted using PCEX03. All other samples were extracted using PCEX21.

ND - Indicates that concentrations were not measured above the LOD.

Table stored in file: C23218

ANALYST(S): B. Mason Hughes, D. McKenzie, Chi Trang and Brenda Simpson

ANALYST APPROVAL: B. Mason Hughes

Time Stamp - <860905.0911>

Table 3. Quality Control Results of Aroclor Spiking Studies of Nitro Oil and Soil Samples.

Project No: 760.28-6232 Date: August 22, 1986

Nitro Sample ID	Amount Weighed (g)	ESC Extraction Number	ESC GC/EC Raw File	LOD (a) (ug/g)	Amount Added (ug/g)(b)	Rec. (%) (c)	Aroclor Type Added(d)
86006	0.992	PCB-1712	BR514	1.0	ND	-	ND
	0.993	PCB-1713-DUP	BR515	1.0	ND	-	ND
		PCB-1713+LS	BR938	1.0	5	137	A1254
		PCB-1713+HS	BR963	1.0	50	115	A1254
86010	0.936	PCB-1718	BR521	1.0	ND	-	ND
		PCB-1718+LS	BR939	1.0	5	97	A1254
		PCB-1718+HS	BR964	1.0	50	92	A1254
86015	0.930	PCB-1724	BR532	(This sample contains 26 ug/g A1260)			
		PCB-1724+LS	BR940	20.0	5	0	A1254
		PCB-1724+HS	BR965	20.0	50	156	A1254
86024	0.963	PCB-1736	BR562	(This sample contains 47 ug/g A1260)			
		PCB-1736+LS	BR941	20.0	5	0	A1254
		PCB-1736+HS	BR966	20.0	50	131	A1254
86033	0.99	PCB-1781-C	BR657	(This sample contains 10 ug/g A1254 and 4 ug/g A1260)			
	1.01	PCB-1782-DUP-C	BR658	(This sample contains 16 ug/g A1254 and 7 ug/g A1260)			
	0.94	PCB-1783-LS	BR634	10.0	5	144	A1248
	0.97	PCB-1784-HS	BR638	10.0	50	109	A1248
86043	0.93	PCB-1791	BR625	(This sample contains 36 ug/g A1254 and 11 ug/g A1260)			
	0.98	PCB-1792-DUP	BR626	(This sample contains 10 ug/g A1254 and 6 ug/g A1260)			
	0.99	PCB-1793-LS	BR635	10.0	5	127	A1248
	1.04	PCB-1794-HS	BR639	10.0	50	90	A1248
86055	0.996	PCB-1752	BR581	25.0	ND	-	ND
		PCB-1752+LS	BR928	25.0	5	0	A1254
		PCB-1752+HS	BR950	25.0	50	138	A1254
	0.960	PCB-1753-DUP	BR583	25.0	ND	-	ND
86064	0.924	PCB-1765	BR753	5.0	ND	-	ND
		PCB-1765+LS	BR929	1.0	5	113	A1254
		PCB-1765+HS	BR951	1.0	50	97	A1254
86068	1.000	PCB-1769	BR758	10.0	ND	-	ND
		PCB-1769+LS	BR931	10.0	5	0	A1254
		PCB-1769+HS	BR952	10.0	50	106	A1254
86070	1.039	PCB-1771	BR760	5.0	ND	-	ND
		PCB-1771+LS	BR933	5.0	5	108	A1254
		PCB-1771+HS	BR955	5.0	50	91	A1254
86071	0.944	PCB-1772	BR761	1.0	ND	-	ND
	0.981	PCB-1773-DUP	BR763	1.0	ND	-	ND
		PCB-1773+LS	BR934	1.0	5	98	A1254
		PCB-1773+HS	BR956	1.0	50	92	A1254

(continued)

86073	0.944	PCB-1669	BR375	1.0	ND	-	ND
		PCB-1669+LS	BR935	1.0	5	88	A1254
		PCB-1669+HS	BR957	1.0	50	76	A1254
	1.018	PCB-1679-DUP	BR322	10.0	ND	-	ND
		PCB-1679+LS	BR936	1.0	5	88	A1254
		PCB-1679+HS	BR958	1.0	50	95	A1254
86093	1.059	PCB-1687	BR383	80.0	ND	-	ND
		PCB-1687+LS	BR925	80.0	50	0	A1254
		PCB-1687+HS	BR959	80.0	500	87	A1254
86094	0.967	PCB-1688	BR384	10.0	ND	-	ND
		PCB-1688+LS	BR926	10.0	50	88	A1254
		PCB-1688+HS	BR960	10.0	500	94	A1254
86111	0.940	PCB-1697	BR390	(This sample contains 8 ug/g			A1254)
		PCB-1697+LS	BR927	1.0	5	227	A1254
		PCB-1697+HS	BR962	1.0	50	88	A1254

Footnotes:

(a) Limit of Detection for the sample, which is dependent upon amount of sample dilution and matix interferences.

(b) Amount of Aroclor formulation added to the extract in ug/g.

(c) Percent recovery of Aroclor formulation added.

(d) Aroclor formulation added to extract.

Explanation of symbols:

DUP - Refers to a sample which has been analyzed in duplicate.

LS - Refers to a sample which has been spiked with Aroclor 1248 or 1254 by combining 0.9 mL of the extract indicated and 0.1 mL of a 5 ug/mL Aroclor standard.

HS - Refers to a sample which has been spiked with Aroclor 1248 or 1254 by combining 0.9 mL of the extract indicated and 0.1 mL of a 50 ug/mL Aroclor standard.

ND - Indicates that concentrations were not measured above the LOD.

Table stored in file: D23218

ANALYST(S): B. Mason Hughes, D. McKenzie, Chi Trang and Brenda Simpson

ANALYST APPROVAL: B. Mason Hughes Jr

Time Stamp - <860905.0912>

Table 4. Surrogate Standard Recoveries in Nitro Soils using Standard Extraction Method PCEX21 and PCEX03 and Standard Analysis Method ECAN02.

Project No: 760.28-6232 Date: August 22, 1986

Nitro Sample ID	Amount Weighed (g)	ESC Extraction Number	ESC GC/EC Raw File	Percent Surrogate Recovery Pentachloro-benzene	2,4,6-trichloro biphenyl
86031	0.94	PCB-1779	BR610	77	71
86032	0.97	PCB-1780	BR611	88	74
86033	0.99	PCB-1781-C	BR657		
		PCB-1781	BR612	133	111
	1.01	PCB-1782-DUP-C	BR658		
		PCB-1782-DUP	BR613	101	82
METHOD					
BLANK	0.0	PCB-1785	BR614	108	102
86035	0.97	PCB-1786	BR615	114	103
86036	0.94	PCB-1787-C	BR660		
		PCB-1787	BR616	144	107
86037	0.96	PCB-1788-C	BR661		
		PCB-1788	BR617	129	115
86038	0.99	PCB-1789	BR618	116	105
86039	1.03	PCB-1790-C	BR662		
		PCB-1790	BR624	95	94
86043	0.93	PCB-1791	BR625	98	85
	0.98	PCB-1792-DUP	BR626	73	62
86044	1.09	PCB-1795	BR627	74	58
86045	0.95	PCB-1796	BR628	119	81
86046	1.08	PCB-1797	BR629	120	95
METHOD					
BLANK	0.0	PCB-1798	BR630	85	85

Footnotes:

Explanation of symbols:

DUP - Refers to a sample which has been analyzed in duplicate.

C - Refers to samples which were extracted using PCEX03. All other samples were extracted using PCEX21.

ND - Indicates that concentrations were not measured above the LOD.

Table stored in file: E23218

ANALYST(S): B. Mason Hughes, D. McKenzie, Chi Trang and Brenda Simpson

ANALYST APPROVAL: B. Mason Hughes

Time Stamp - <860905.0821>

Table 5. Results of Quality Assurance Analyses of Aroclor Standards using Standard Analysis Method ECAN02.

Project No: 760.28-6232 Date: August 22, 1986

QA/QC Sample ID	Sample Amount Weighed (g)	ESC GC/EC Raw File	Aroclor Amount Detected (ug/g) [A]	Correct Amount (ug/g) [B]	A/B	Major Aroclor Type
QA/QC50 (a)	0.9509	BR606	46.7	50.0	0.934	A1260
(5.0)		BR646	46.1	"	0.922	"
		BR647	49.1	"	0.982	"
QA/QC500 (b)	0.9645	BR607	507	500	1.014	"
(5.0)		BR648	518	"	1.036	"
		BR649	566	"	1.132	"
A1260(.74)	-	BR558	0.76	0.74	1.027	"
"	-	BR905	0.72	"	0.973	"
"	-	BR947	0.74	"	1.000	"
"	-	BR604	0.66	"	0.892	"
"	-	BR644	0.76	"	1.027	"
"	-	BR653	0.68	"	0.919	"
"	-	BR669	0.69	"	0.932	"
A1254(1.0)	-	BR904	0.94	1.00	0.940	A1254
"	-	BR946	1.06	"	1.060	"
"	-	BR643	1.10	"	1.10	"
"	-	BR652	1.07	"	1.070	"
"	-	BR668	0.94	"	0.944	"

Footnotes:

(a) 50 mg Aroclor 1260/kg Dila AX Oil. EPA PCB Quality Control Check Sample. (4-8736 Lot No. LA-0-9051)

(b) 500 mg Aroclor 1260/kg Diala AX Oil. EPA PCB Quality Control Check Sample. (4-8735 Lot No. LA-0-8801)

Table stored in file: F23218

ANALYST(S): B. Mason Hughes, D. McKenzie, Chi Trang and Brenda Simpson

ANALYST APPROVAL: B. Mason Hughes

MONS 024276

The following pages describe Standard Sampling, Extraction, and/or Analysis Methods used for this project.

ESC Standard Extraction Method (SEM) TITLE: PCBs in Non-EC Active Matrices

ESC Standard Extraction Method No: PCEX02

MATRI(X),(CES):	TYPICAL SAMPLE SIZE (g)	TYPICAL EXTRACT VOLUME (ml)
Soils and other non-EC active solids and solvents	0.5 - 5.0	10

TYPICAL ANALYTES: Aroclors 1232, 1242, 1248, 1254, 1260, 1262, trichlorobiphenyl isomers through octachlorobiphenyl isomers

ESC Standard Analysis Method Nos: ECAN01, ECAN02

INTERFERENCES: Any electron capturing species in the retention time region of trichlorobiphenyl isomers through octachlorobiphenyl isomers.

TYPICAL SURROGATES	TYPICAL RECOVERIES (%)
pentachlorobenzene	50 - 120
2,4,6-trichlorobiphenyl	50 - 120

APPARATUS AND MATERIALS:
Burdick and Jackson benzene or hexane for sample extraction or dilution.
Ultrasonic bath.
Nitrogen for extract volume reduction.
Disposable glassware.
(See flow sheet for this extraction method in PCFS02.)

LIMITATIONS: Method applies only to matrices which do not contain interfering electron capturing species in the trichlorobiphenyl through octachlorobiphenyl isomer retention time region.

SAFETY PRECAUTIONS: See PCB handling protocols in laboratory safety manual.

DATES OF METHOD CREATION AND UPDATES: 10/31/83, 2/3/84, 10/5/84

MONS 024278

FLOW SHEET PCFS02

FOR ESC EXTRACTION METHOD PCEX02

SAMPLE ID: ---------- MRC EXTRACT # ----------

---------- LOG NO: ----------

EXTRACTION DATE and TIME: ----------

SAMPLE COLOR AND DESCRIPTION ----------

FINAL WEIGHT ----------

WEIGH OUT SAMPLE INTO A 14 OR 40 mL PIERCE VIAL [ ]

INITIAL WEIGHT ----------

SAMPLE WEIGHT ----------

SURROGATE SPIKE OF SAMPLE [ ]

ADD 10 mL BENZENE TO SAMPLE. [ ]

ULTRASONICATE SAMPLE FOR 1/2 HOUR IN A SOUND BATH. [ ]

PLACE 1 mL OF THE EXTRACT INTO A 1 1/2 mL VIAL FOR ANALYSIS. [ ]

NITROGEN BLOW DOWN IF REQUIRED [ ]

FINAL VOLUME ---------- mL

EXTRACT NO: ----------

DATE/TIME COMPLETED ----------

ANALYST: ----------

ESC JOB NO: ----------

MONS 024279

ESC Standard Extraction Method (SEM)
TITLE: PCBs in Non-EC Active Matrices

ESC Standard Extraction Method No:
PCEX21

MATRI(X),(CES):

Soils and other non-EC active solids and solvents

TYPICAL SAMPLE SIZE (g)	TYPICAL EXTRACT VOLUME (ml)
0.5 - 5.0	10

TYPICAL ANALYTES: Aroclors 1232, 1242, 1248, 1254, 1260, 1262, trichlorobiphenyl isomers through octachlorobiphenyl isomers

ESC Standard Analysis Method Nos:
ECAN01, ECAN02

INTERFERENCES: Any electron capturing species in the retention time region of trichlorobiphenyl isomers through octachlorobiphenyl isomers that is non acid hydrolyzable

TYPICAL SURROGATES	TYPICAL RECOVERIES (%)
pentachlorobenzene	50 - 120
2,4,6-trichlorobiphenyl	50 - 120

APPARATUS AND MATERIALS:
Burdick and Jackson benzene or hexane for sample extraction or dilution.
Pierce vials.
Sulfuric acid at varying concentrations.
Ultrasonic bath.
Disposable glassware.
(See flow sheet for this extraction method in PCFS21.)

LIMITATIONS: Method applies only to matrices which do not contain interfering electron capturing species in the trichlorobiphenyl through octachlorobiphenyl isomer retention time region.

SAFETY PRECAUTIONS: See PCB handling protocols in laboratory safety manual.

DATES OF METHOD CREATION AND UPDATES: 12/17/84

FLOW SHEET PCFS21

FOR ESC EXTRACTION METHOD PCEX21

SAMPLE ID: ---------- MRC EXTRACT # ----------

---------- LOG NO: ----------

EXTRACTION DATE and TIME: ----------

SAMPLE COLOR AND DESCRIPTION ----------

WEIGH OUT SAMPLE INTO A 14 OR 40 mL PIERCE VIAL	[ ]	SAMPLE WEIGHT----------
SURROGATE SPIKE OF SAMPLE	[ ]	---------- ----------
ADD 10.0 mL BENZENE TO SAMPLE.	[ ]	
ULTRASONICATE SAMPLE FOR 1/2 HOUR IN A SOUND BATH.	[ ]	
PLACE 2 mL OF THE EXTRACT INTO A 7 mL VIAL	[ ]	
ADD 2 mL ------ SULFURIC ACID AND SHAKE	[ ]	
ALLOW PHASES TO SEPARATE REMOVE 1 mL FOR ANALYSIS.	[ ]	FINAL VOLUME 10.0 mL ----------

EXTRACT NO: ----------

DATE/TIME COMPLETED ----------

ANALYST: ----------

ESC JOB NO: ----------

MONS 024281

ESC Standard Extraction Method (SEM) — ESC Standard Extraction Method No:
TITLE: PCBs in Non-EC Active Matrices — PCEX03

MATRI(X),(CES):	TYPICAL SAMPLE SIZE (g)	TYPICAL EXTRACT VOLUME (ml)
Soils and other non-EC active solids,solvents and oils.	0.5 - 5.0	10

TYPICAL ANALYTES: Aroclors 1232, 1242, 1248, 1254, 1260, 1262, trichlorobiphenyl isomers through octachlorobiphenyl isomers

ESC Standard Analysis Method Nos: ECAN01, ECAN02

INTERFERENCES: Any electron capturing species in the retention time region of trichlorobiphenyl isomers through octachlorobiphenyl isomers which are not removed by the three-phase silica-gel column.

TYPICAL SURROGATES	TYPICAL RECOVERIES (%)
pentachlorobenzene	50 - 120
2,4,6-trichlorobiphenyl	50 - 120

APPARATUS AND MATERIALS:
Burdick and Jackson hexane for sample extraction or dilution.
Sodium sulfate for drying the sample matrix.
Silica gel columns impregnated with potassium permanganate, sulfuric acid, and potassium hydroxide.
Nitrogen for extract volume reduction.
Disposable glassware.
(See flow sheet for this extraction method in PCFS03.)

LIMITATIONS: Method applies only to matrices which do not contain interferring electron capturing species in the trichlorobiphenyl through octachlorobiphenyl isomer retention time region when electron capture analytical methods are used. This limitation does not apply to mass spectrometric methods.

SAFETY PRECAUTIONS: See PCB handling protocols in laboratory safety manual.

DATES OF METHOD CREATION AND UPDATES: 2/13/84, 9/25/84

MONS 024282

FLOW SHEET PCFS03

FOR ESC EXTRACTION METHOD PCEX03

SAMPLE ID: ---------- MRC EXTRACT # ----------

---------- LOG NO: ----------

EXTRACTION DATE and TIME: ----------

WEIGH OUT SAMPLE INTO
A 14 mL VIAL [ ]

SURROGATE
SPIKE OF SAMPLE [ ]

DRY SAMPLE IF NEEDED BY
ADDING ABOUT 0.1 g [ ]
Na_2SO_4 TO VIAL

DILUTE SAMPLE IN VIAL [ ]
WITH HEXANE AND PLACE
ONTO CLEAN-UP COLUMN.

QUANTITATIVELY RINSE
VIAL ONTO COLUMN WITH [ ]
4 X 1 mL RINSES.

ELUTE SAMPLE INTO 50 mL
CENTRIFUGE TUBE WITH [ ]
40 mL HEXANE.

NITROGEN BLOW DOWN TO
_____mL [ ]

EXTRACT NO: ----------

DATE/TIME COMPLETED ----------

ANALYST: ----------

ESC JOB NO: ----------

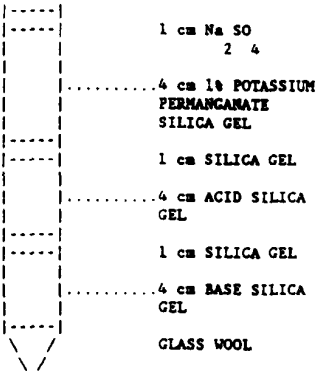
FINAL WEIGHT ----------

INITIAL WEIGHT ----------

SAMPLE WEIGHT ----------

RINSE COLUMN WITH 2 X 20 mL
HEXANE [ ]

CLEAN-UP
COLUMN DESCRIPTION
25 mL DISPO PIPET



ESC Standard Analysis Method (SAM) — ESC Standard Analysis Method No:
TITLE: Aroclor Formulations in Solvents — ECAN02

ANALYTICAL INSTRUMENT AND MODE OF OPERATION: HP-5880 Capillary GC/EC interfaced to an HP-3357-LAS Laboratory Data System

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TYPICAL ANALYTE	TYPICAL INSTRUMENT LEVEL OF DETECTION (LOD) (ug/ml)	TYPICAL PRECISION @ 10X LOD (%)	TYPICAL ACCURACY @ 10X LOD (%)
Aroclor formulations 1232, 1242, 1248, 1254, 1260, and 1262	0.1	30	30

INTERFERENCES AND LIMITATIONS: Any electron capturing species in the retention time region of trichlorobiphenyl through octachlorobiphenyl isomers are potential interferences. Exact retention times of most likely PCB isomers can be obtained from the analysis of Aroclor 1248, Aroclor 1254 or Aroclor 1260 formulations.

CHROMATOGRAPHIC COLUMN: 30-meter fused silica J&W DB-5 (0.25 uM) with wide bore (0.32mm).

COLUMN TEMPERATURE PROGRAM: 130(1)/4/300 — INJECTION TYPE: Splitless

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CALIBRATION AND STANDARDIZATION: Use internal standard quantitation technique and calibrate instrument response factors from authentic Aroclor formulation standards. Use a minimum of 10 PCB isomers for the determination of formulation identity and quantity.

CALCULATIONS: Formulation concentration =
(isomer RRF)(isomer area/internal standard area)

where: RRF is the relative response factor for the appropriate PCB isomer in a given formulation. Formulation concentration is obtained from the average of at least 10 such calculations.

SAFETY PRECAUTIONS: See PCB handling protocols in laboratory safety manual.

DATE OF METHOD CREATION: 10/25/83, 2/3/84 Time Stamp - <860821.1510>

FLOW SHEET ECFS02

FOR ESC ANALYSIS METHOD ECAN02

EXTRACT ID: ---------- ESC EXTRACT # ----------

---------- LOG NO: ----------

EC LOGBOOK PAGE NUMBER: ----------

EXTRACT COLOR AND DESCRIPTION ----------

PLACE 150 uL EXTRACT
OR AROCLOR STANDARD,
AND 150 uL INTERNAL [ ]
STANDARD SOLUTION CONTAINING .
0.04 ug/mL CL6-BENZENE IN .
BENZENE IN A 1.6 mL .
AUTOSAMPLER VIAL. .
.

PLACE VIAL IN AUTOSAMPLER [ ] .
TRAY OF HP-5880. .
.

RECORD ELECTRON CAPTURE [ ] . . . . . [ ]
AND GAS CHROMATOGRAPHIC .
OPERATING PARAMETERS AND .
3357-LAS FILE INFORMATION .
IN INSTRUMENT LOGBOOK. .
.
[ ]

CALCULATE RRFs FOR 10 - 30 PCB CONGENERS IN THE APPROPRIATE AROCLOR FORMULATION, USING THE AROCLOR CONCENTRATION AS THE ANALYTE CONCENTRATION FOR EACH PCB CONGENER.

CALCULATE CONCENTRATION OF AROCLOR FORMULATION BY AVERAGING THE VALUES DETERMINED FROM THE 10 - 30 PCB CONGENERS.

Where:

$$\text{RRF = Relative Response Factor} = \frac{\text{(congener area in Aroclor standard)}}{\text{(CL6-benzene area)(Aroclor concentration)}}$$

$$\text{Aroclor Concentration} = \frac{\text{(congener area)}}{\text{(CL6-benzene area) (RRF)}}$$

THESE EQUATIONS ASSUME THAT THE SAME AMOUNT OF INTERNAL STANDARD IS ADDED TO EXTRACTS AND STANDARDS.

The above calculations are performed for 10 - 30 PCB congeners and the values averaged to yield an average Aroclor formulation concentration.

MS FILE NUMBER: ---------- DATE/TIME COMPLETED ----------/-------

ANALYST: ---------- ESC JOB NO: ----------

The following pages show extraction details for samples associated with this project.

FLOW SHEET PCFS21

FOR ESC EXTRACTION METHOD PCEX21

SAMPLE ID: #86031 ---------- MRC EXTRACT # PCB-1779 ----------

U-86-07-22-01

---------- LOG NO: ----------

EXTRACTION DATE and TIME: 8-17-86 ----------

SAMPLE COLOR AND DESCRIPTION WHITE/GRAY SOIL ----------

WEIGH OUT SAMPLE INTO A 14 OR 40 mL PIERCE VIAL	[X]	SAMPLE WEIGHT 0.94 g.
SURROGATE SPIKE OF SAMPLE	[X]	100 ul DEM-050885-01(10ug/ml&20ug/ml)
ADD 10.0 mL BENZENE TO SAMPLE.	[X]	
ULTRASONICATE SAMPLE FOR 1/2 HOUR IN A SOUND BATH.	[X]	
PLACE 2 mL OF THE EXTRACT INTO A 7 mL VIAL	[X]	
ADD 2 mL 75 % ------ SULFURIC ACID AND SHAKE	[X]	
ALLOW PHASES TO SEPARATE REMOVE 1 mL FOR ANALYSIS.	[X]	FINAL VOLUME 10.0 mL

EXTRACT NO: PCB-1779 ----------

DATE/TIME COMPLETED 8-17-86 ----------

ANALYST: SIMPSON/MCKENZIE ----------

ESC JOB NO: 760.28-6232 ----------

MONS 024287

FLOW SHEET PCFS21

FOR ESC EXTRACTION METHOD PCEX21

SAMPLE ID: #86032 ---------- MRC EXTRACT # PCB-1780 ----------

U-86-07-22-01

---------- LOG NO: ----------

EXTRACTION DATE and TIME: 8-17-86 ----------

SAMPLE COLOR AND DESCRIPTION BROWN WITH WHITE SOIL ----------

WEIGH OUT SAMPLE INTO A 14 OR 40 mL PIERCE VIAL	[X]	SAMPLE WEIGHT---------- 0.97 g.
SURROGATE SPIKE OF SAMPLE	[X]	100 ul DEM-050885-01(10ug/ml&20ug/ml) ---------- ----------
ADD 10.0 mL BENZENE TO SAMPLE.	[X]	
ULTRASONICATE SAMPLE FOR 1/2 HOUR IN A SOUND BATH.	[X]	
PLACE 2 mL OF THE EXTRACT INTO A 7 mL VIAL	[X]	
ADD 2 mL 75 % ------ SULFURIC ACID AND SHAKE	[X]	
ALLOW PHASES TO SEPARATE REMOVE 1 mL FOR ANALYSIS.	[X]	FINAL VOLUME ---------- 10.0 mL

EXTRACT NO: PCB-1780 ----------

DATE/TIME COMPLETED 8-17-86 ----------

ANALYST: SIMPSON/MCKENZIE ----------

ESC JOB NO: 760.28-6232 ----------

MONS 024288

FLOW SHEET PCFS21

FOR ESC EXTRACTION METHOD PCEX21

SAMPLE ID: #86033 ---------- MRC EXTRACT # PCB-1781
U-86-07-22-01
---------- LOG NO: ----------
EXTRACTION DATE and TIME: 8-17-86 ----------
SAMPLE COLOR AND DESCRIPTION PINK WITH BROWN & WHITE SOIL ----------

WEIGH OUT SAMPLE INTO A 14 OR 40 mL PIERCE VIAL	[X]	SAMPLE WEIGHT 0.99 g.
SURROGATE SPIKE OF SAMPLE	[X]	100 ul DEM-050885-01(10ug/ml&20ug/ml)
ADD 10.0 mL BENZENE TO SAMPLE.	[X]	
ULTRASONICATE SAMPLE FOR 1/2 HOUR IN A SOUND BATH.	[X]	
PLACE 2 mL OF THE EXTRACT INTO A 7 mL VIAL	[X]	
ADD 2 mL 75 % ------ SULFURIC ACID AND SHAKE	[X]	
ALLOW PHASES TO SEPARATE REMOVE 1 mL FOR ANALYSIS.	[X]	FINAL VOLUME 10.0 mL

EXTRACT NO: PCB-1781 ----------
DATE/TIME COMPLETED 8-17-86 ----------
ANALYST: SIMPSON/MCKENZIE ----------
ESC JOB NO: 760.28-6232 ----------

FLOW SHEET PCFS21

FOR ESC EXTRACTION METHOD PCEX21

SAMPLE ID: #86033 DUPLICATE — PCB-1782

MRC EXTRACT # U-86-07-22-01

LOG NO:

EXTRACTION DATE and TIME: 8-17-86

SAMPLE COLOR AND DESCRIPTION: PINK WITH BROWN & WHITE SOIL

WEIGH OUT SAMPLE INTO A 14 OR 40 mL PIERCE VIAL	[X]	SAMPLE WEIGHT 1.01 g.
SURROGATE SPIKE OF SAMPLE	[X]	100 ul DEM-050885-01(10ug/ml&20ug/ml)
ADD 10.0 mL BENZENE TO SAMPLE.	[X]	
ULTRASONICATE SAMPLE FOR 1/2 HOUR IN A SOUND BATH.	[X]	
PLACE 2 mL OF THE EXTRACT INTO A 7 mL VIAL	[X]	
ADD 2 mL 75 % SULFURIC ACID AND SHAKE	[X]	
ALLOW PHASES TO SEPARATE REMOVE 1 mL FOR ANALYSIS.	[X]	FINAL VOLUME 10.0 mL

EXTRACT NO: PCB-1782

DATE/TIME COMPLETED: 8-17-86

ANALYST: SIMPSON/MCKENZIE

ESC JOB NO: 760.28-6232

MONS 024290

FLOW SHEET PCFS21

FOR ESC EXTRACTION METHOD PCEX21

SAMPLE ID: #86033 LOW SPIKE — MRC EXTRACT # PCB-1783 U-86-07-22-01 — LOG NO:

EXTRACTION DATE and TIME: 8-17-86

SAMPLE COLOR AND DESCRIPTION: PINK WITH BROWN & WHITE SOIL

WEIGH OUT SAMPLE INTO A 14 OR 40 mL PIERCE VIAL	[X]	SAMPLE WEIGHT .94 g.
SURROGATE SPIKE OF SAMPLE	[X]	100 ul DEM-050885-01(10ug/ml&20ug/ml) 100 ul DEM-010385-02(100ug/ml)
ADD 10.0 mL BENZENE TO SAMPLE.	[X]	
ULTRASONICATE SAMPLE FOR 1/2 HOUR IN A SOUND BATH.	[X]	
PLACE 2 mL OF THE EXTRACT INTO A 7 mL VIAL	[X]	
ADD 2 mL 75 % ------ SULFURIC ACID AND SHAKE	[X]	
ALLOW PHASES TO SEPARATE REMOVE 1 mL FOR ANALYSIS.	[X]	FINAL VOLUME 10.0 mL

EXTRACT NO: PCB-1783

DATE/TIME COMPLETED: 8-17-86

ANALYST: SIMPSON/MCKENZIE

ESC JOB NO: 760.28-6232

MONS 024291

FLOW SHEET PCFS21

FOR ESC EXTRACTION METHOD PCEX21

SAMPLE ID: #86033 HIGH SPIKE — MRC EXTRACT #: PCB-1784 U-86-07-22-01 — LOG NO:

EXTRACTION DATE and TIME: 8-17-86

SAMPLE COLOR AND DESCRIPTION: PINK WITH BROWN & WHITE SOIL

WEIGH OUT SAMPLE INTO A 14 OR 40 mL PIERCE VIAL	[X]	SAMPLE WEIGHT: .97 g.
SURROGATE SPIKE OF SAMPLE	[X]	100 ul DEM-050885-01(10ug/ml&20ug/ml) 100 ul DEM-010385-02(1000ug/ml)
ADD 10.0 mL BENZENE TO SAMPLE.	[X]	
ULTRASONICATE SAMPLE FOR 1/2 HOUR IN A SOUND BATH.	[X]	
PLACE 2 mL OF THE EXTRACT INTO A 7 mL VIAL	[X]	
ADD 2 mL 75 % ------ SULFURIC ACID AND SHAKE	[X]	
ALLOW PHASES TO SEPARATE REMOVE 1 mL FOR ANALYSIS.	[X]	FINAL VOLUME: 10.0 mL

EXTRACT NO: PCB-1784

DATE/TIME COMPLETED: 8-17-86

ANALYST: SIMPSON/MCKENZIE

ESC JOB NO: 760.28-6232

MONS 024292

FLOW SHEET PCFS21

FOR ESC EXTRACTION METHOD PCEX21

SAMPLE ID: BLANK ---------- MRC EXTRACT # PCB-1785 ----------
U-86-07-22-01
---------- LOG NO: ----------
EXTRACTION DATE and TIME: 8-17-86 ----------
SAMPLE COLOR AND DESCRIPTION METHOD BLANK ----------

WEIGH OUT SAMPLE INTO A 14 OR 40 mL PIERCE VIAL	[X]	SAMPLE WEIGHT 0.00 g.
SURROGATE SPIKE OF SAMPLE	[X]	100 ul DEM-050885-01(10ug/ml&20ug/ml)
ADD 10.0 mL BENZENE TO SAMPLE.	[X]	
ULTRASONICATE SAMPLE FOR 1/2 HOUR IN A SOUND BATH.	[X]	
PLACE 2 mL OF THE EXTRACT INTO A 7 mL VIAL	[X]	
ADD 2 mL 75 % ------ SULFURIC ACID AND SHAKE	[X]	
ALLOW PHASES TO SEPARATE REMOVE 1 mL FOR ANALYSIS.	[X]	FINAL VOLUME 10.0 mL

EXTRACT NO: PCB-1785 ----------
DATE/TIME COMPLETED 8-17-86 ----------
ANALYST: SIMPSON/MCKENZIE ----------
ESC JOB NO: 760.28-6232 ----------

MONS 024293

FLOW SHEET PCFS21

FOR ESC EXTRACTION METHOD PCEX21

SAMPLE ID: #86035 ---------- MRC EXTRACT # PCB-1786 U-86-07-22-01

LOG NO: ----------

EXTRACTION DATE and TIME: 8-17-86

SAMPLE COLOR AND DESCRIPTION DARK BLACK SOIL

WEIGH OUT SAMPLE INTO A 14 OR 40 mL PIERCE VIAL	[X]	SAMPLE WEIGHT 0.97 g.
SURROGATE SPIKE OF SAMPLE	[X]	100 ul DEM-050885-01(10ug/ml&20ug/ml)
ADD 10.0 mL BENZENE TO SAMPLE.	[X]	
ULTRASONICATE SAMPLE FOR 1/2 HOUR IN A SOUND BATH.	[X]	
PLACE 2 mL OF THE EXTRACT INTO A 7 mL VIAL	[X]	
ADD 2 mL 75 % SULFURIC ACID AND SHAKE	[X]	
ALLOW PHASES TO SEPARATE REMOVE 1 mL FOR ANALYSIS.	[X]	FINAL VOLUME 10.0 mL

EXTRACT NO: PCB-1786

DATE/TIME COMPLETED 8-17-86

ANALYST: SIMPSON/MCKENZIE

ESC JOB NO: 760.28-6232

MONS 024294

FLOW SHEET PCFS21

FOR ESC EXTRACTION METHOD PCEX21

SAMPLE ID: #86036 ---------- MRC EXTRACT # PCB-1787 U-86-07-22-01

LOG NO: ----------

EXTRACTION DATE and TIME: 8-17-86 ----------

SAMPLE COLOR AND DESCRIPTION DARK/LIGHT BROWN SOIL ----------

WEIGH OUT SAMPLE INTO A 14 OR 40 mL PIERCE VIAL	[X]	SAMPLE WEIGHT 0.94 g.
SURROGATE SPIKE OF SAMPLE	[X]	100 ul DEM-050885-01(10ug/ml&20ug/ml)
ADD 10.0 mL BENZENE TO SAMPLE.	[X]	
ULTRASONICATE SAMPLE FOR 1/2 HOUR IN A SOUND BATH.	[X]	
PLACE 2 mL OF THE EXTRACT INTO A 7 mL VIAL	[X]	
ADD 2 mL 75 % SULFURIC ACID AND SHAKE	[X]	
ALLOW PHASES TO SEPARATE REMOVE 1 mL FOR ANALYSIS.	[X]	FINAL VOLUME 10.0 mL

EXTRACT NO: PCB-1787

DATE/TIME COMPLETED 8-17-86

ANALYST: SIMPSON/MCKENZIE

ESC JOB NO: 760.28-6232

MONS 024295

FLOW SHEET PCFS21

FOR ESC EXTRACTION METHOD PCEX21

SAMPLE ID: #86037 ---------- MRC EXTRACT # PCB-1788 U-86-07-22-01

LOG NO: ----------

EXTRACTION DATE and TIME: 8-17-86 ----------

SAMPLE COLOR AND DESCRIPTION DARK BROWN WITH LIGHT BROWN SOIL ----------

WEIGH OUT SAMPLE INTO A 14 OR 40 mL PIERCE VIAL	[X]	SAMPLE WEIGHT 0.96 g.
SURROGATE SPIKE OF SAMPLE	[X]	100 ul DEM-050885-01(10ug/ml&20ug/ml)
ADD 10.0 mL BENZENE TO SAMPLE.	[X]	
ULTRASONICATE SAMPLE FOR 1/2 HOUR IN A SOUND BATH.	[X]	
PLACE 2 mL OF THE EXTRACT INTO A 7 mL VIAL	[X]	
ADD 2 mL 75 % ------ SULFURIC ACID AND SHAKE	[X]	
ALLOW PHASES TO SEPARATE REMOVE 1 mL FOR ANALYSIS.	[X]	FINAL VOLUME 10.0 mL

EXTRACT NO: PCB-1788 ----------

DATE/TIME COMPLETED 8-17-86 ----------

ANALYST: SIMPSON/MCKENZIE ----------

ESC JOB NO: 760.28-6232 ----------

MONS 024296

FLOW SHEET PCFS21

FOR ESC EXTRACTION METHOD PCEX21

SAMPLE ID: #86038 ---------- MRC EXTRACT # PCB-1789

U-86-07-22-01

---------- LOG NO: ----------

EXTRACTION DATE and TIME: 8-17-86 ----------

SAMPLE COLOR AND DESCRIPTION BROWN SOIL ----------

WEIGH OUT SAMPLE INTO A 14 OR 40 mL PIERCE VIAL	[X]	SAMPLE WEIGHT 0.99 g.
SURROGATE SPIKE OF SAMPLE	[X]	100 ul DEM-050885-01(10ug/ml&20ug/ml)
ADD 10.0 mL BENZENE TO SAMPLE.	[X]	
ULTRASONICATE SAMPLE FOR 1/2 HOUR IN A SOUND BATH.	[X]	
PLACE 2 mL OF THE EXTRACT INTO A 7 mL VIAL	[X]	
ADD 2 mL 75 % ------ SULFURIC ACID AND SHAKE	[X]	
ALLOW PHASES TO SEPARATE REMOVE 1 mL FOR ANALYSIS.	[X]	FINAL VOLUME 10.0 mL

EXTRACT NO: PCB-1789 ----------

DATE/TIME COMPLETED 8-17-86 ----------

ANALYST: SIMPSON/MCKENZIE ----------

ESC JOB NO: 760.28-6232 ----------

MONS 024297

FLOW SHEET PCFS21

FOR ESC EXTRACTION METHOD PCEX21

SAMPLE ID: #86039 ---------- MRC EXTRACT # PCB-1790 U-86-07-22-01

LOG NO: ----------

EXTRACTION DATE and TIME: 8-17-86

SAMPLE COLOR AND DESCRIPTION BROWN WITH ORANGE SOIL

WEIGH OUT SAMPLE INTO A 14 OR 40 mL PIERCE VIAL	[X]	SAMPLE WEIGHT 1.03 g.
SURROGATE SPIKE OF SAMPLE	[X]	100 ul DEM-050885-01(10ug/ml&20ug/ml)
ADD 10.0 mL BENZENE TO SAMPLE.	[X]	
ULTRASONICATE SAMPLE FOR 1/2 HOUR IN A SOUND BATH.	[X]	
PLACE 2 mL OF THE EXTRACT INTO A 7 mL VIAL	[X]	
ADD 2 mL 75 % ------ SULFURIC ACID AND SHAKE	[X]	
ALLOW PHASES TO SEPARATE REMOVE 1 mL FOR ANALYSIS.	[X]	FINAL VOLUME 10.0 mL

EXTRACT NO: PCB-1790

DATE/TIME COMPLETED 8-17-86

ANALYST: SIMPSON/MCKENZIE

ESC JOB NO: 760.28-6232

MONS 024298

FLOW SHEET PCFS21

FOR ESC EXTRACTION METHOD PCEX21

SAMPLE ID: #86043 ---------- MRC EXTRACT # PCB-1791 U-86-07-22-01

LOG NO: ----------

EXTRACTION DATE and TIME: 8-17-86

SAMPLE COLOR AND DESCRIPTION: BROWN WITH WHITE SOIL

WEIGH OUT SAMPLE INTO A 14 OR 40 mL PIERCE VIAL	[X]	SAMPLE WEIGHT: 0.93 g.
SURROGATE SPIKE OF SAMPLE	[X]	100 ul DEM-050885-01(10ug/ml&20ug/ml)
ADD 10.0 mL BENZENE TO SAMPLE.	[X]	
ULTRASONICATE SAMPLE FOR 1/2 HOUR IN A SOUND BATH.	[X]	
PLACE 2 mL OF THE EXTRACT INTO A 7 mL VIAL	[X]	
ADD 2 mL 75 % ------ SULFURIC ACID AND SHAKE	[X]	
ALLOW PHASES TO SEPARATE REMOVE 1 mL FOR ANALYSIS.	[X]	FINAL VOLUME: 10.0 mL

EXTRACT NO: PCB-1791

DATE/TIME COMPLETED: 8-17-86

ANALYST: SIMPSON/MCKENZIE

ESC JOB NO: 760.28-6232

MONS 024299

FLOW SHEET PCFS21

FOR ESC EXTRACTION METHOD PCEX21

SAMPLE ID: #86043 DUPLICATE — PCB-1792 — MRC EXTRACT # U-86-07-22-01 — LOG NO:

EXTRACTION DATE and TIME: 8-17-86

SAMPLE COLOR AND DESCRIPTION: BROWN WITH WHITE SOIL

WEIGH OUT SAMPLE INTO A 14 OR 40 mL PIERCE VIAL	[X]	SAMPLE WEIGHT: 0.98 g.
SURROGATE SPIKE OF SAMPLE	[X]	100 ul DEM-050885-01(10ug/ml&20ug/ml)
ADD 10.0 mL BENZENE TO SAMPLE.	[X]	
ULTRASONICATE SAMPLE FOR 1/2 HOUR IN A SOUND BATH.	[X]	
PLACE 2 mL OF THE EXTRACT INTO A 7 mL VIAL	[X]	
ADD 2 mL 75 % SULFURIC ACID AND SHAKE	[X]	
ALLOW PHASES TO SEPARATE REMOVE 1 mL FOR ANALYSIS.	[X]	FINAL VOLUME: 10.0 mL

EXTRACT NO: PCB-1792

DATE/TIME COMPLETED: 8-17-86

ANALYST: SIMPSON/MCKENZIE

ESC JOB NO: 760.28-6232

MONS 024300

FLOW SHEET PCFS21

FOR ESC EXTRACTION METHOD PCEX21

SAMPLE ID: #86043 LOW SPIKE — MRC EXTRACT #: PCB-1793 U-86-07-22-01 — LOG NO:

EXTRACTION DATE and TIME: 8-17-86

SAMPLE COLOR AND DESCRIPTION: BROWN WITH WHITE SOIL

WEIGH OUT SAMPLE INTO A 14 OR 40 mL PIERCE VIAL	[X]	SAMPLE WEIGHT: 0.99 g.
SURROGATE SPIKE OF SAMPLE	[X]	100 ul DEM-050885-01(10ug/ml&20ug/ml) 100 ul DEM-010385-02(100ug/ml)
ADD 10.0 mL BENZENE TO SAMPLE.	[X]	
ULTRASONICATE SAMPLE FOR 1/2 HOUR IN A SOUND BATH.	[X]	
PLACE 2 mL OF THE EXTRACT INTO A 7 mL VIAL	[X]	
ADD 2 mL 75 % ------ SULFURIC ACID AND SHAKE	[X]	
ALLOW PHASES TO SEPARATE REMOVE 1 mL FOR ANALYSIS.	[X]	FINAL VOLUME: 10.0 mL

EXTRACT NO: PCB-1793

DATE/TIME COMPLETED: 8-17-86

ANALYST: SIMPSON/MCKENZIE

ESC JOB NO: 760.28-6232

MONS 024301

FLOW SHEET PCFS21

FOR ESC EXTRACTION METHOD PCEX21

SAMPLE ID: #86043 HIGH SPIKE — PCB-1794

MRC EXTRACT # U-86-07-22-01

LOG NO: ----------

EXTRACTION DATE and TIME: 8-17-86

SAMPLE COLOR AND DESCRIPTION: BROWN WITH WHITE SOIL

WEIGH OUT SAMPLE INTO A 14 OR 40 mL PIERCE VIAL	[X]	SAMPLE WEIGHT: 1.04 g.
SURROGATE SPIKE OF SAMPLE	[X]	100 ul DEM-050885-01(10ug/ml&20ug/ml) 100 ul DEM-010385-02(1000ug/ml)
ADD 10.0 mL BENZENE TO SAMPLE.	[X]	
ULTRASONICATE SAMPLE FOR 1/2 HOUR IN A SOUND BATH.	[X]	
PLACE 2 mL OF THE EXTRACT INTO A 7 mL VIAL	[X]	
ADD 2 mL 75 % SULFURIC ACID AND SHAKE	[X]	
ALLOW PHASES TO SEPARATE REMOVE 1 mL FOR ANALYSIS.	[X]	FINAL VOLUME: 10.0 mL

EXTRACT NO: PCB-1794

DATE/TIME COMPLETED: 8-17-86

ANALYST: SIMPSON/MCKENZIE

ESC JOB NO: 760.28-6232

MONS 024302

FLOW SHEET PCFS21

FOR ESC EXTRACTION METHOD PCEX21

SAMPLE ID: #86044 ---------- MRC EXTRACT # PCB-1795 ----------

U-86-07-22-01

---------- LOG NO: ----------

EXTRACTION DATE and TIME: 8-17-86 ----------

SAMPLE COLOR AND DESCRIPTION BROWN WITH WHITE SOIL ----------

WEIGH OUT SAMPLE INTO A 14 OR 40 mL PIERCE VIAL	[X]	SAMPLE WEIGHT 1.09 g.
SURROGATE SPIKE OF SAMPLE	[X]	100 ul DEM-050885-01(10ug/ml&20ug/ml)
ADD 10.0 mL BENZENE TO SAMPLE.	[X]	
ULTRASONICATE SAMPLE FOR 1/2 HOUR IN A SOUND BATH.	[X]	
PLACE 2 mL OF THE EXTRACT INTO A 7 mL VIAL	[X]	
ADD 2 mL 75 % ------ SULFURIC ACID AND SHAKE	[X]	
ALLOW PHASES TO SEPARATE REMOVE 1 mL FOR ANALYSIS.	[X]	FINAL VOLUME 10.0 mL ----------

EXTRACT NO: PCB-1795 ----------

DATE/TIME COMPLETED 8-17-86 ----------

ANALYST: SIMPSON/MCKENZIE ----------

ESC JOB NO: 760.28-6232 ----------

MONS 024303

FLOW SHEET PCFS21

FOR ESC EXTRACTION METHOD PCEX21

SAMPLE ID: #86045 ---------- MRC EXTRACT # PCB-1796

LOG NO: U-86-07-22-01

EXTRACTION DATE and TIME: 8-17-86

SAMPLE COLOR AND DESCRIPTION: DARK BROWN WITH WHITE SOIL

WEIGH OUT SAMPLE INTO A 14 OR 40 mL PIERCE VIAL	[X]	SAMPLE WEIGHT: 0.95 g.
SURROGATE SPIKE OF SAMPLE	[X]	100 ul DEM-050885-01(10ug/ml&20ug/ml)
ADD 10.0 mL BENZENE TO SAMPLE.	[X]	
ULTRASONICATE SAMPLE FOR 1/2 HOUR IN A SOUND BATH.	[X]	
PLACE 2 mL OF THE EXTRACT INTO A 7 mL VIAL	[X]	
ADD 2 mL 75 % SULFURIC ACID AND SHAKE	[X]	
ALLOW PHASES TO SEPARATE REMOVE 1 mL FOR ANALYSIS.	[X]	FINAL VOLUME: 10.0 mL

EXTRACT NO: PCB-1796

DATE/TIME COMPLETED: 8-17-86

ANALYST: SIMPSON/MCKENZIE

ESC JOB NO: 760.28-6232

MONS 024304

FLOW SHEET PCFS21

FOR ESC EXTRACTION METHOD PCEX21

SAMPLE ID: #86046 ---------- MRC EXTRACT # PCB-1797 ----------
LOG NO: U-86-07-22-01 ----------
EXTRACTION DATE and TIME: 8-17-86 ----------
SAMPLE COLOR AND DESCRIPTION DARK BROWN CLAY ----------

WEIGH OUT SAMPLE INTO A 14 OR 40 mL PIERCE VIAL	[X]	SAMPLE WEIGHT 1.08 g.
SURROGATE SPIKE OF SAMPLE	[X]	100 ul DEM-050885-01(10ug/ml&20ug/ml)
ADD 10.0 mL BENZENE TO SAMPLE.	[X]	
ULTRASONICATE SAMPLE FOR 1/2 HOUR IN A SOUND BATH.	[X]	
PLACE 2 mL OF THE EXTRACT INTO A 7 mL VIAL	[X]	
ADD 2 mL 75 % ------ SULFURIC ACID AND SHAKE	[X]	
ALLOW PHASES TO SEPARATE REMOVE 1 mL FOR ANALYSIS.	[X]	FINAL VOLUME 10.0 mL

EXTRACT NO: PCB-1797 ----------
DATE/TIME COMPLETED 8-17-86 ----------
ANALYST: SIMPSON/MCKENZIE ----------
ESC JOB NO: 760.28-6232 ----------

MONS 024305

FLOW SHEET PCFS21

FOR ESC EXTRACTION METHOD PCEX21

SAMPLE ID: BLANK ---------- MRC EXTRACT # PCB-1798

U-86-07-22-01

---------- LOG NO: ----------

EXTRACTION DATE and TIME: 8-17-86

SAMPLE COLOR AND DESCRIPTION METHOD BLANK

WEIGH OUT SAMPLE INTO A 14 OR 40 mL PIERCE VIAL	[X]	SAMPLE WEIGHT 0.00 g.
SURROGATE SPIKE OF SAMPLE	[X]	100 ul DEM-050885-01(10ug/ml&20ug/ml)
ADD 10.0 mL BENZENE TO SAMPLE.	[X]	
ULTRASONICATE SAMPLE FOR 1/2 HOUR IN A SOUND BATH.	[X]	
PLACE 2 mL OF THE EXTRACT INTO A 7 mL VIAL	[X]	
ADD 2 mL 75 % ------ SULFURIC ACID AND SHAKE	[X]	
ALLOW PHASES TO SEPARATE REMOVE 1 mL FOR ANALYSIS.	[X]	FINAL VOLUME 10.0 mL

EXTRACT NO: PCB-1798

DATE/TIME COMPLETED 8-17-86

ANALYST: SIMPSON/MCKENZIE

ESC JOB NO: 760.28-6232

MONS 024306

The following pages show calculations or raw data documentation of reported results.

```
S=45 COMMAND ?

EXCESS TIME

  ONE

READY
>LI-S.BMS06


AUG 21, 1986     9:11
SEQUENCE: BMS06      ON CRN 14
CHANNEL 32

SUBSEQUENCE  1

 METHOD
 PCBSSM:MH

 DIALG-PRG  PARAM-FILE
 /N

 #WSHS  #PMPS  STOP
   5.     5.    1

 ISO  POST-BTL#  POST-#WSHS
 NO .      0.          1

 SAMPLES
     SAMPLE-NAME     BTL# PROC-FILE   RAW-FILE    %DIL-F  STD-AMT  SMP-AMT
  1  BLANK         ,   1. BP601 :MH. BR601 :MH. 100.00. 1.0000. 1.0000
  2  A1248 (1.0)   ,   2. BP602 :MH. BR602 :MH. 100.00. 1.0000. 1.0000
  3  A1254 1.0     ,   3. BP603 :MH. BR603 :MH. 100.00. 1.0000. 1.0000
  4  A1260 0.74    ,   4. BP604 :MH. BR604 :MH. 100.00. 1.0000. 1.0000
  5  BLANK         ,   5. BP605 :MH. BR605 :MH. 100.00. 1.0000. 1.0000
  6  QA/QC50(5)    ,   6. BP606 :MH. BR606 :MH. 100.00. 1.0000. 1.0000
  7  QA/QC500(5    ,   7. BP607 :MH. BR607 :MH. 100.00. 1.0000. 1.0000
  8  BLANK         ,   8. BP608 :MH. BR608 :MH. 100.00. 1.0000. 1.0000
  9  SPK           ,   9. BP609 :MH. BR609 :MH. 100.00. 1.0000. 1.0000
 10  P1779         ,  10. BP610 :MH. BR610 :MH. 100.00. 1.0000. 1.0000
 11  P1780         ,  11. BP611 :MH. BR611 :MH. 100.00. 1.0000. 1.0000
 12  P1781         ,  12. BP612 :MH. BR612 :MH. 100.00. 1.0000. 1.0000
 13  P1782         ,  13. BP613 :MH. BR613 :MH. 100.00. 1.0000. 1.0000
 14  P1785         ,  14. BP614 :MH. BR614 :MH. 100.00. 1.0000. 1.0000
 15  P1786         ,  15. BP615 :MH. BR615 :MH. 100.00. 1.0000. 1.0000
 16  P1787         ,  16. BP616 :MH. BR616 :MH. 100.00. 1.0000. 1.0000
 17  P1788         ,  17. BP617 :MH. BR617 :MH. 100.00. 1.0000. 1.0000
 18  P1789         ,  18. BP618 :MH. BR618 :MH. 100.00. 1.0000. 1.0000
 19  BLANK         ,  19. BP619 :MH. BR619 :MH. 100.00. 1.0000. 1.0000
 20  A1248 1.0     ,  20. BP620 :MH. BR620 :MH. 100.00. 1.0000. 1.0000
 21  A1260 0.74    ,  21. BP621 :MH. BR621 :MH. 100.00. 1.0000. 1.0000
 22  BLANK         ,  22. BP622 :MH. BR622 :MH. 100.00. 1.0000. 1.0000
 23  SPK           ,  23. BP623 :MH. BR623 :MH. 100.00. 1.0000. 1.0000
 24  P1790         ,  24. BP624 :MH. BR624 :MH. 100.00. 1.0000. 1.0000
 25  P1791         ,  25. BP625 :MH. BR625 :MH. 100.00. 1.0000. 1.0000
 26  P1792         ,  26. BP626 :MH. BR626 :MH. 100.00. 1.0000. 1.0000
 27  P1795         ,  27. BP627 :MH. BR627 :MH. 100.00. 1.0000. 1.0000
 28  P1796         ,  28. BP628 :MH. BR628 :MH. 100.00. 1.0000. 1.0000
 29  P1797         ,  29. BP629 :MH. BR629 :MH. 100.00. 1.0000. 1.0000
 30  P1798         ,  30. BP630 :MH. BR630 :MH. 100.00. 1.0000. 1.0000
 31  BLANK         ,  31. BP631 :MH. BR631 :MH. 100.00. 1.0000. 1.0000
 32  SPK           ,  32. BP632 :MH. BR632 :MH. 100.00. 1.0000. 1.0000
 33  L3 SPI        ,  33. BP633 :MH. BR633 :MH. 100.00. 1.0000. 1.0000
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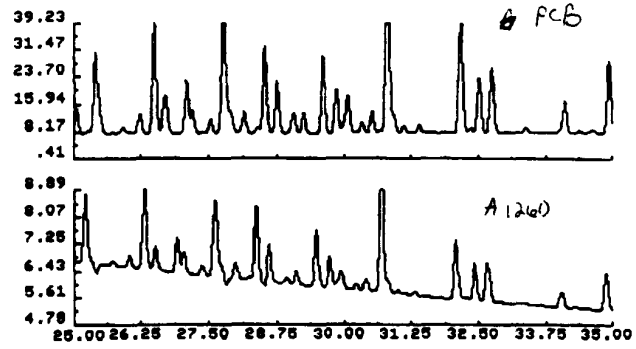
MONS 024308

34	P1793	,	34,	BP634	:MH,	BR634	:MH,	100.00,	1.0000, 1.0000
35	P1793	,	35,	BP635	:MH,	BR635	:MH,	100.00,	1.0000, 1.0000
36	LS SPK	,	36,	BP636	:MH,	BR636	:MH,	100.00,	1.0000, 1.0000
37	HS SPK	,	37,	BP637	:MH,	BR637	:MH,	100.00,	1.0000, 1.0000
38	P1794	,	38,	BP638	:MH,	BR638	:MH,	100.00,	1.0000, 1.0000
39	P1794	,	39,	BP639	:MH,	BR639	:MH,	100.00,	1.0000, 1.0000
40	HS SPK	,	40,	BP640	:MH,	BR640	:MH,	100.00,	1.0000, 1.0000
1	BLANK	,	41,	BP641	:MH,	BR641	:MH,	100.00,	1.0000, 1.0000
42	A1248 1.0	,	42,	BP642	:MH,	BR642	:MH,	100.00,	1.0000, 1.0000
43	A1254 1.0	,	43,	BP643	:MH,	BR643	:MH,	100.00,	1.0000, 1.0000
44	A1260 0.74	,	44,	BP644	:MH,	BR644	:MH,	100.00,	1.0000, 1.0000
45	BLANK	,	45,	BP645	:MH,	BR645	:MH,	100.00,	1.0000, 1.0000
46	QA/QC50(5)	,	46,	BP646	:MH,	BR646	:MH,	100.00,	1.0000, 1.0000
47	QA/QC50(5)	,	47,	BP647	:MH,	BR647	:MH,	100.00,	1.0000, 1.0000
48	QA/QC500(5)	,	48,	BP648	:MH,	BR648	:MH,	100.00,	1.0000, 1.0000
49	QA/QC500(5)	,	49,	BP649	:MH,	BR649	:MH,	100.00,	1.0000, 1.0000
50	BLANK	,	50,	BP650	:MH,	BR650	:MH,	100.00,	1.0000, 1.0000
51	A1248 (1.0)	,	51,	BP651	:MH,	BR651	:MH,	100.00,	1.0000, 1.0000 1.07
52	A1254 (1.0)	,	52,	BP652	:MH,	BR652	:MH,	100.00,	1.0000, 1.0000 0.68
53	A1260 (.74)	,	53,	BP653	:MH,	BR653	:MH,	100.00,	1.0000, 1.0000
54	SPK	,	54,	BP654	:MH,	BR654	:MH,	100.00,	1.0000, 1.0000
55	PCB-1664-C	,	55,	BP655	:MH,	BR655	:MH,	100.00,	1.0000, 1.0000
56	PCB-1665-C	,	56,	BP656	:MH,	BR656	:MH,	100.00,	1.0000, 1.0000
57	PCB-1781-C	,	57,	BP657	:MH,	BR657	:MH,	100.00,	1.0000/10 0.0[illegible] 1254/1260
58	PCB-1782-C	,	58,	BP658	:MH,	BR658	:MH,	100.00,	1.0000/5 1.0100 "
59	BLANK	,	59,	BP659	:MH,	BR659	:MH,	100.00,	1.0000, 1.0000
60	PCB-1787-C	,	60,	BP660	:MH,	BR660	:MH,	100.00,	1.0000/20 1.0[illegible] 1260
61	PCB-1788-C	,	61,	BP661	:MH,	BR661	:MH,	100.00,	1.0000/10 C[illegible] 1254/1260
62	PCB-1790-C	,	62,	BP662	:MH,	BR662	:MH,	100.00,	1.0000/10 1.0[illegible]
63	PCB-1776-C	,	63,	BP663	:MH,	BR663	:MH,	100.00,	1.0000, 1.0000
64	PCB-1777-C	,	64,	BP664	:MH,	BR664	:MH,	100.00,	1.0000, 1.0000
65	PCB-1778-C	,	65,	BP665	:MH,	BR665	:MH,	100.00,	1.0000/40 0.0[illegible]
66	BLANK	,	66,	BP666	:MH,	BR666	:MH,	100.00,	1.0000, 1.0000
67	A1248 (1.0)	,	67,	BP667	:MH,	BR667	:MH,	100.00,	1.0000, 1.0000
68	A1254 (1.0)	,	68,	BP668	:MH,	BR668	:MH,	100.00,	1.0000, 1.0000 0.[illegible]
69	A1260 (.74)	,	69,	BP669	:MH,	BR669	:MH,	100.00,	1.0000, 1.0000 0.69
70	BLANK	,	70,	BP670	:MH,	BR670	:MH,	100.00,	1.0000, 1.0000
71	SPK	,	71,	BP671	:MH,	BR671	:MH,	100.00,	1.0000, 1.0000
72	BLANK	,	72,	BP672	:MH,	BR672	:MH,	100.00,	1.0000, 1.0000
73	LS SPK	,	73,	BP673	:MH,	BR673	:MH,	100.00,	1.0000, 1.0000
74	PCB-1665LS-C	,	74,	BP674	:MH,	BR674	:MH,	100.00,	1.0000, 1.0000
75	PCB-1790LS-C	,	75,	BP675	:MH,	BR675	:MH,	100.00,	1.0000, 1.0000
76	PCB-1777LS-C	,	76,	BP676	:MH,	BR676	:MH,	100.00,	1.0000, 1.0000
77	LS SPK	,	77,	BP677	:MH,	BR677	:MH,	100.00,	1.0000, 1.0000
78	BLANK	,	78,	BP678	:MH,	BR678	:MH,	100.00,	1.0000, 1.0000
79	HS SPK	,	79,	BP679	:MH,	BR679	:MH,	100.00,	1.0000, 1.0000
80	PCB-1665HS-C	,	80,	BP680	:MH,	BR680	:MH,	100.00,	1.0000, 1.0000
81	PCB-1790HS-C	,	81,	BP681	:MH,	BR681	:MH,	100.00,	1.0000, 1.0000
82	PCB-1777HS-C	,	82,	BP682	:MH,	BR682	:MH,	100.00,	1.0000, 1.0000
83	HS SPK	,	83,	BP683	:MH,	BR683	:MH,	100.00,	1.0000, 1.0000
84	BLANK	,	84,	BP684	:MH,	BR684	:MH,	100.00,	1.0000, 1.0000
85	A1248 (1.0)	,	85,	BP685	:MH,	BR685	:MH,	100.00,	1.0000, 1.0000
86	A1254 (1.0)	,	86,	BP686	:MH,	BR686	:MH,	100.00,	1.0000, 1.0000
87	A1260 (.74)	,	87,	BP687	:MH,	BR687	:MH,	100.00,	1.0000, 1.0000
88	MIPCB549	,	88,	BP688	:MH,	BR688	:MH,	100.00,	1.0000, 1.0000
89	BLANK	,	89,	BP689	:MH,	BR689	:MH,	100.00,	1.0000, 1.0000
90	SPKLSMI550	,	90,	BP690	:MH,	BR690	:MH,	100.00,	1.0000, 1.0000
91	BLANK	,	91,	BP691	:MH,	BR691	:MH,	100.00,	1.0000, 1.0000
92	MIPCB550	,	92,	BP692	:MH,	BR692	:MH,	100.00,	1.0000, 1.0000
93	BLANK	,	93,	BP693	:MH,	BR693	:MH,	100.00,	1.0000, 1.0000
94	MIPCB551	,	94,	BP694	:MH,	BR694	:MH,	100.00,	1.0000, 1.0000
95	BPPCB422	,	95,	BP695	:MH,	BR695	:MH,	100.00,	1.0000, 1.0000
96	BPPCB423	,	96,	BP696	:MH,	BR696	:MH,	100.00,	1.0000, 1.0000
97	BPPCB424M	,	97,	BP697	:MH,	BR697	:MH,	100.00,	1.0000, 1.0000
98	A1254(1.0)	,	98,	BP698	:MH,	BR698	:MH,	100.00,	1.0000, 1.0000
99	/E								

PCB-1727



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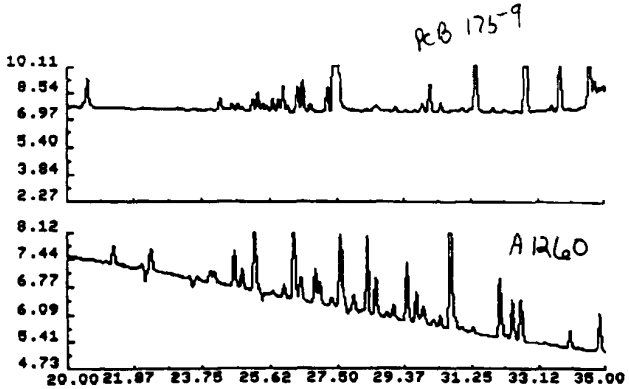
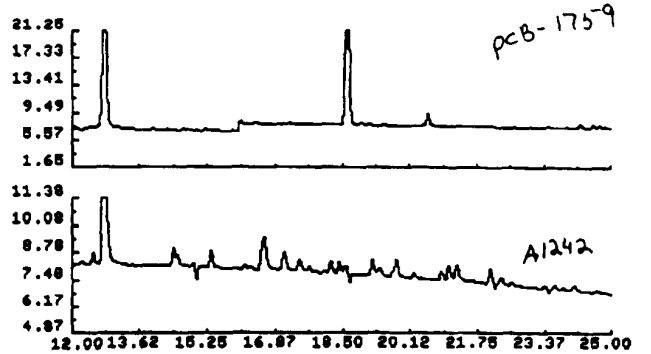
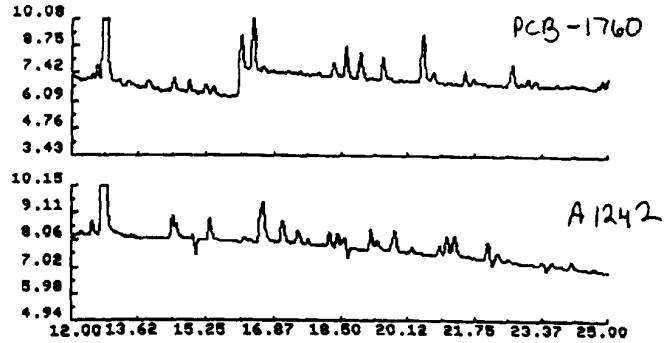
Bottom Raw: BR530 (25.0- 35.0) (Enlarged x 10.0)



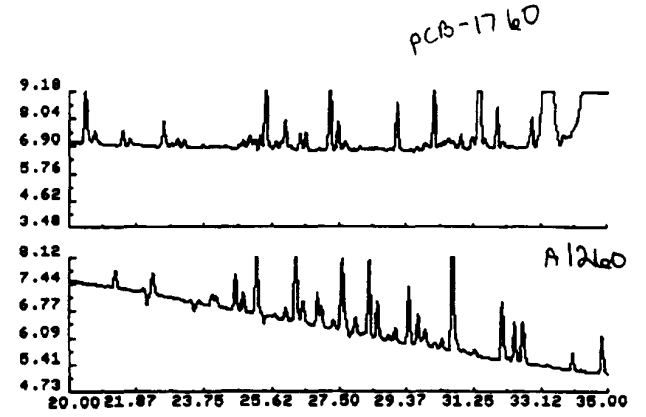
Top Raw: BR916 (20.0- 35.0) (Enlarged x 25.0)
Bottom Raw: BR908 (20.0- 35.0) (Enlarged x 10.0)



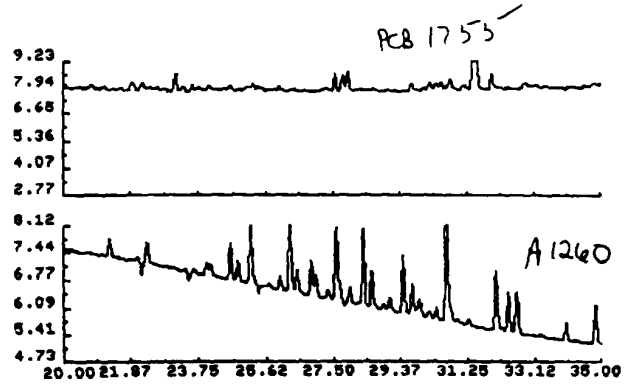
Top Raw: BR916 (12.0- 25.0) (Enlarged x 10.0)
Bottom Raw: BR902 (12.0- 25.0) (Enlarged x 8.0)



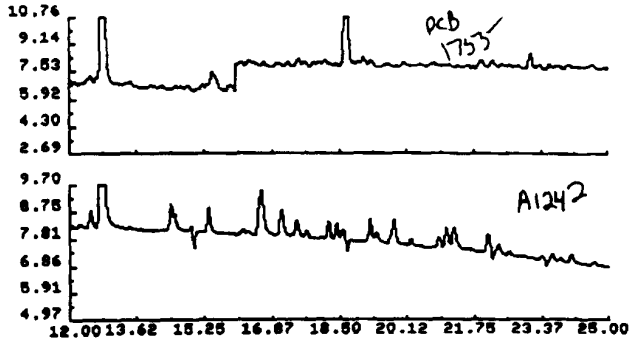
Top Raw: BR917 (12.0- 25.0) (Enlarged x 12.0)
Bottom Raw: BR902 (12.0- 25.0) (Enlarged x 10.0)



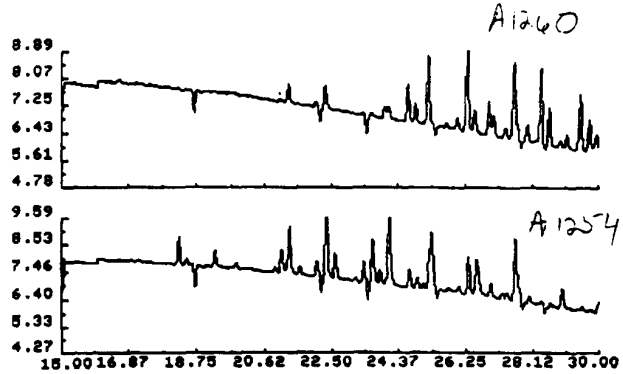
Top Raw: BR917 (20.0- 35.0) (Enlarged x 14.0)
Bottom Raw: BR905 (20.0- 35.0) (Enlarged x 10.0)



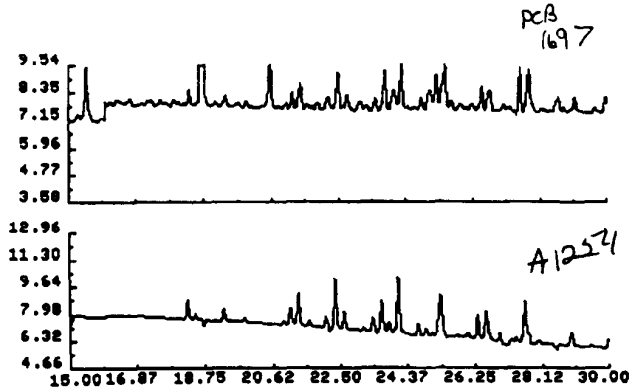
Top Raw: BR915 (20.0- 35.0) (Enlarged x 10.0)
Bottom Raw: BR905 (20.0- 35.0) (Enlarged x 10.0)



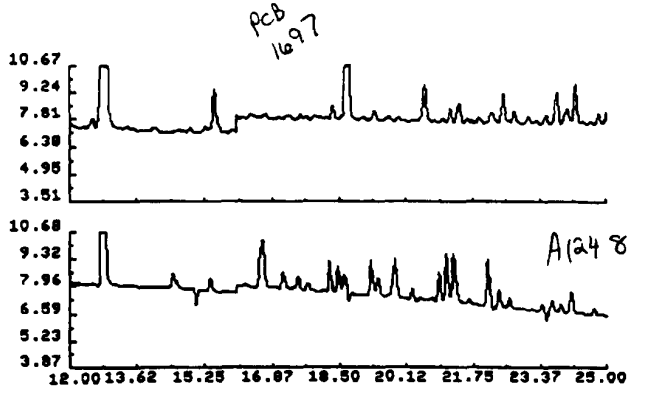
Top Raw: BR915 (12.0- 25.0) (Enlarged x 8.0)
Bottom Raw: BR902 (12.0- 25.0) (Enlarged x 11.0)



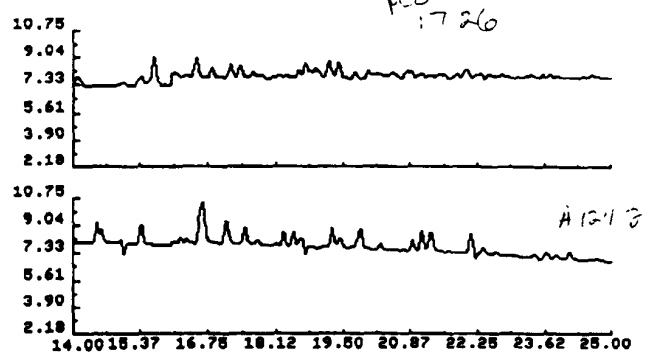
Top Raw: BR530 (15.0- 30.0) (Enlarged x 10.0)
Bottom Raw: BR549 (15.0- 30.0) (Enlarged x 10.0)



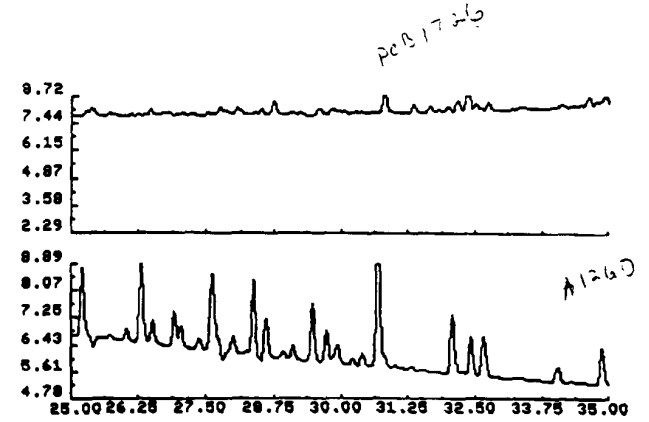
Top Raw: BR390 (15.0- 30.0) (Enlarged x 12.0)
Bottom Raw: BR393 (15.0- 30.0) (Enlarged x 6.0)



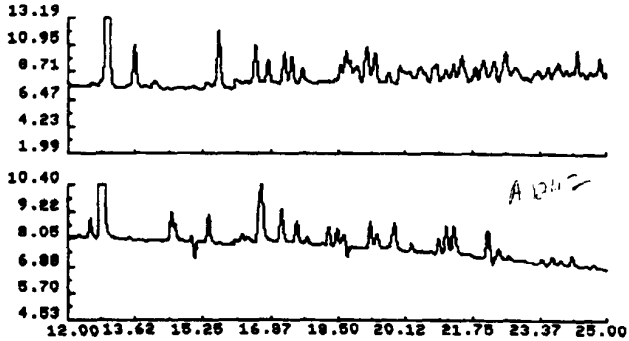
Top Raw: BR390 (12.0- 25.0) (Enlarged x 10.0)
Bottom Raw: BR392 (12.0- 25.0) (Enlarged x 5.0)



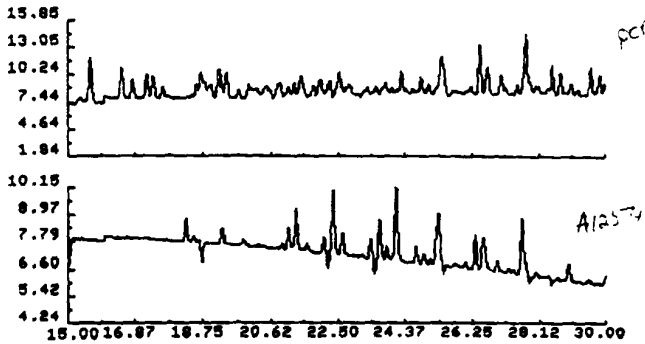
Relative Plots
Top Raw: BR534 (14.0- 25.0) (Enlarged x 15.0)
Bottom Raw: BR547 (14.0- 25.0) (Enlarged x 15.0)



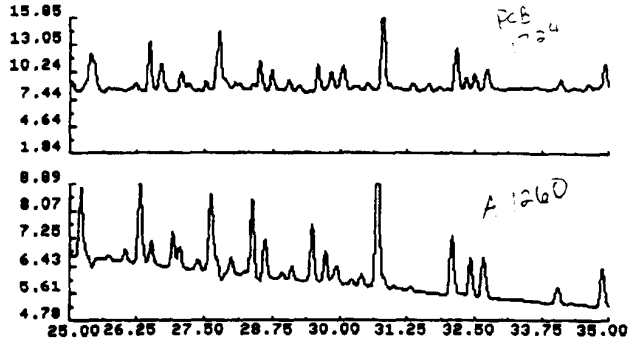
Top Raw: BR534 (25.0- 35.0) (Enlarged x 20.0)
Bottom Raw: BR530 (25.0- 35.0) (Enlarged x 10.0)



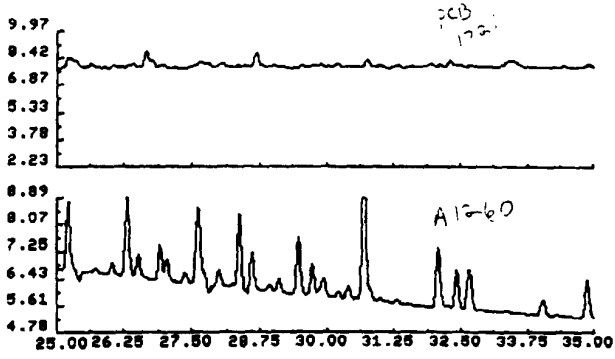
Top Raw: BR532 (12.0- 25.0) (Enlarged x 5.0)
Bottom Raw: BR547 (12.0- 25.0) (Enlarged x 10.0)



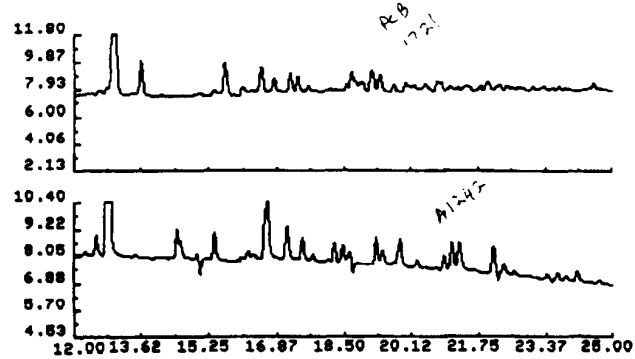
Top Raw: BR532 (15.0- 30.0) (Enlarged x 4.0)
Bottom Raw: BR649 (15.0- 30.0) (Enlarged x 9.0)



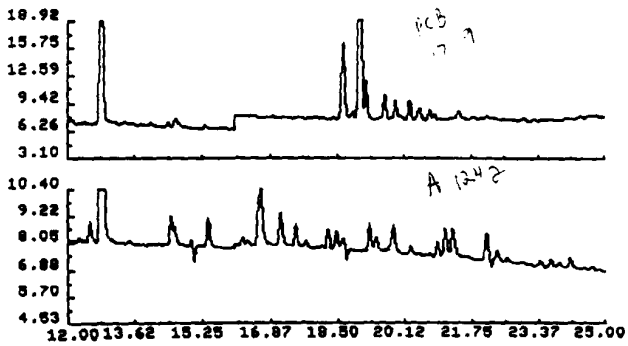
Top Raw: BR532 (25.0- 35.0) (Enlarged x 4.0)
Bottom Raw: BR530 (25.0- 35.0) (Enlarged x 10.0)



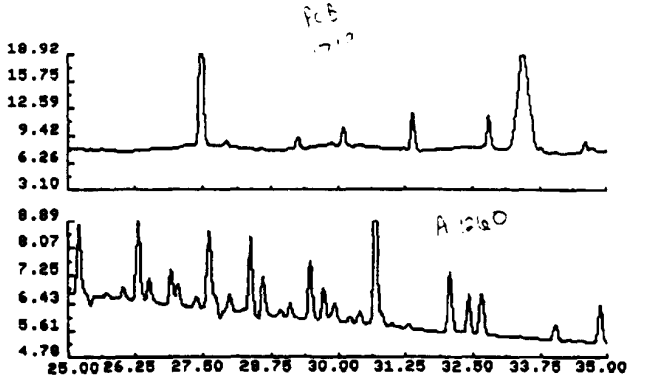
Top Raw: BR525 (25.0- 35.0) (Enlarged x 10.0)
Bottom Raw: BR530 (25.0- 35.0) (Enlarged x 10.0)



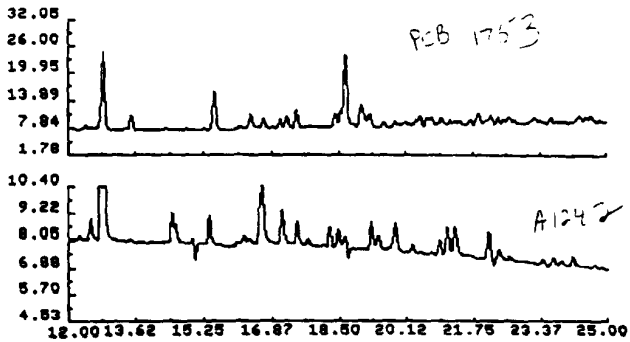
Top Raw: BR526 (12.0- 25.0) (Enlarged x 8.0)
Bottom Raw: BR547 (12.0- 25.0) (Enlarged x 10.0)



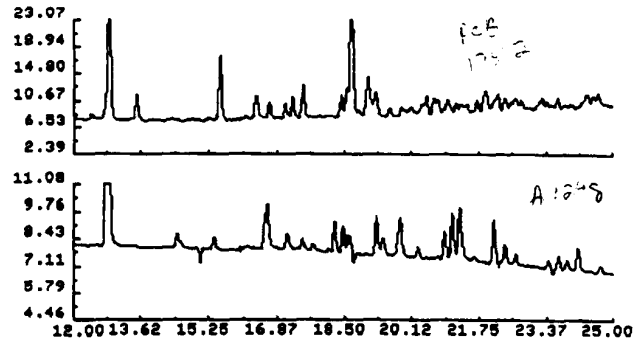
Top Raw: BR522 (12.0- 25.0) (Enlarged x 5.0)
Bottom Raw: BR547 (12.0- 25.0) (Enlarged x 10.0)



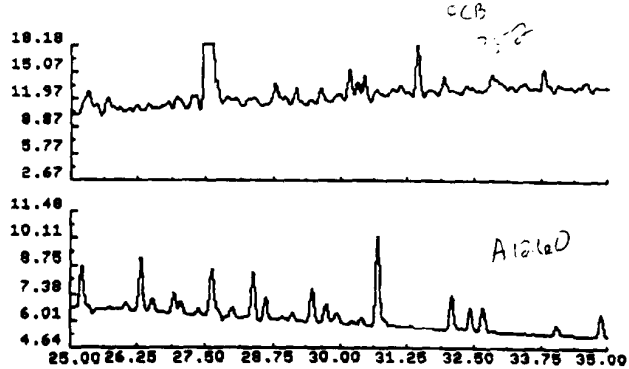
Top Raw: BR522 (25.0- 35.0) (Enlarged x 5.0)
Bottom Raw: BR530 (25.0- 35.0) (Enlarged x 10.0)



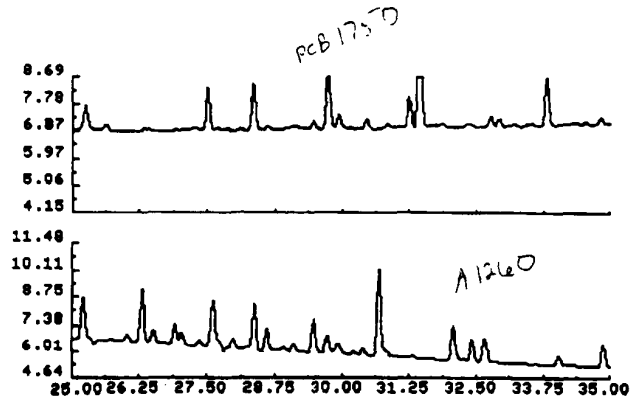
Top Raw: BR583 (12.0- 25.0) (Enlarged x 8.0)
Bottom Raw: BR547 (12.0- 25.0) (Enlarged x 10.0)



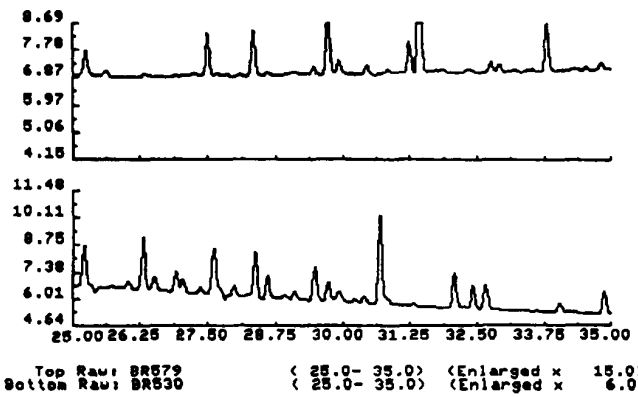
Top Raw: BR581 (12.0- 25.0) (Enlarged x 15.0)
Bottom Raw: BR548 (12.0- 25.0) (Enlarged x 10.0)



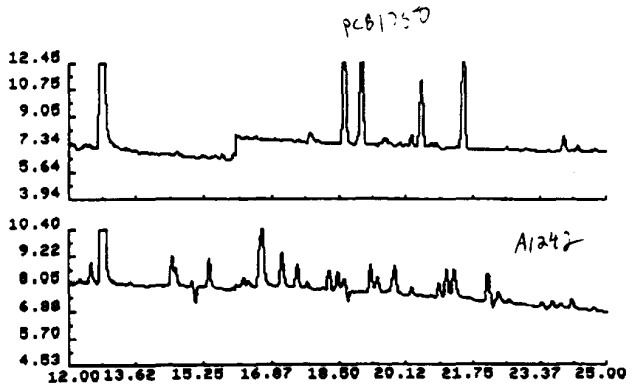
Top Raw: BR501 (25.0- 35.0) (Enlarged x 20.0)
Bottom Raw: BR530 (25.0- 35.0) (Enlarged x 6.0)



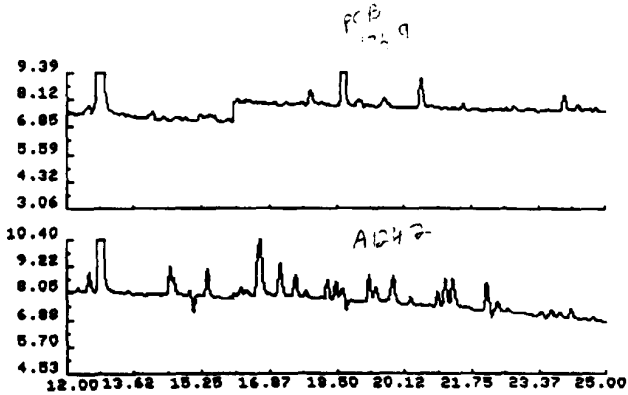
Top Raw: BR579 (25.0- 35.0) (Enlarged x 15.0)
Bottom Raw: BR530 (25.0- 35.0) (Enlarged x 6.0)



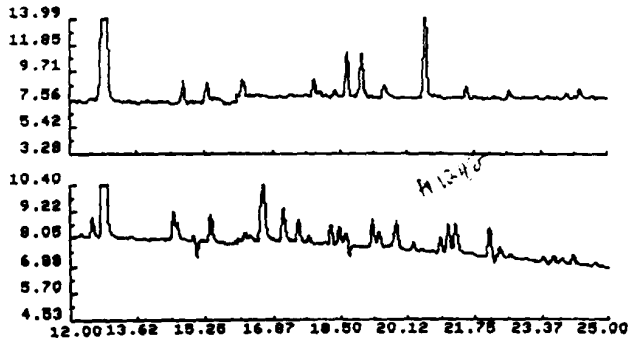
Top Raw: BR579 (25.0- 35.0) (Enlarged x 15.0)
Bottom Raw: BR530 (25.0- 35.0) (Enlarged x 6.0)



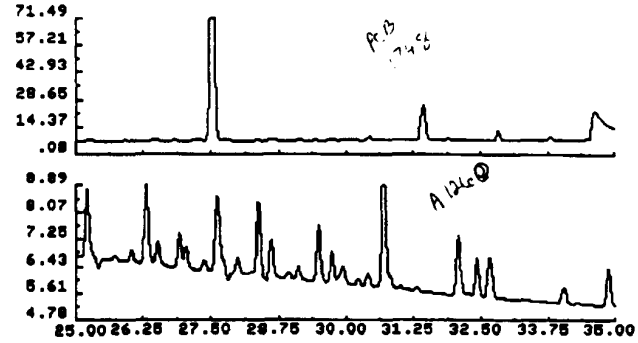
Top Raw: BR579 (12.0- 25.0) (Enlarged x 8.0)
Bottom Raw: BR547 (12.0- 25.0) (Enlarged x 10.0)



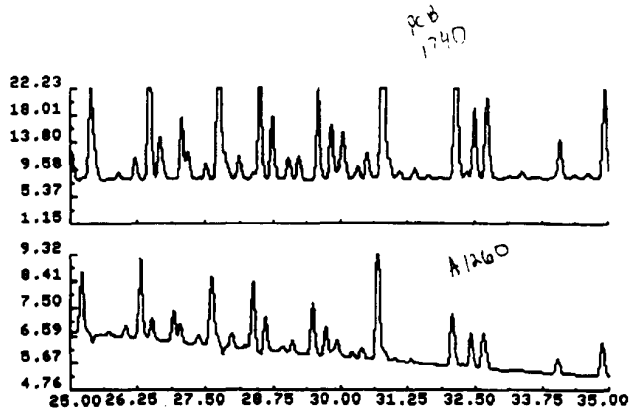
Top Raw: BR570 (12.0- 25.0) (Enlarged x 20.0)
Bottom Raw: BR547 (12.0- 25.0) (Enlarged x 10.0)



Top Raw: BR577 (12.0- 25.0) (Enlarged x 20.0)
Bottom Raw: BR547 (12.0- 25.0) (Enlarged x 10.0)

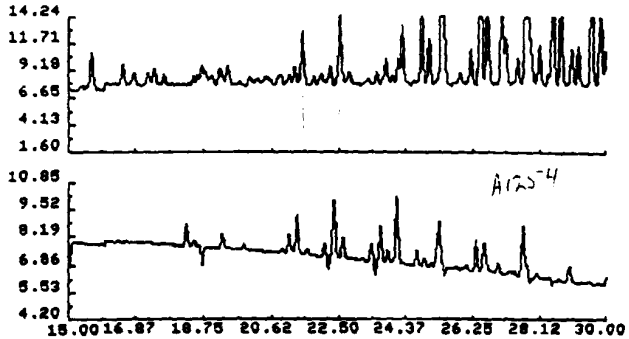


Top Raw: BR577 (25.0- 35.0) (Enlarged x 3.0)
Bottom Raw: BR530 (25.0- 35.0) (Enlarged x 10.0)

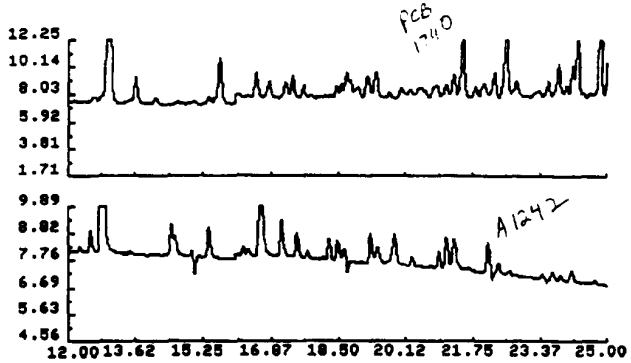


Top Raw: BR567 (25.0- 35.0) (Enlarged x 3.0)
Bottom Raw: BR530 (25.0- 35.0) (Enlarged x 9.0)

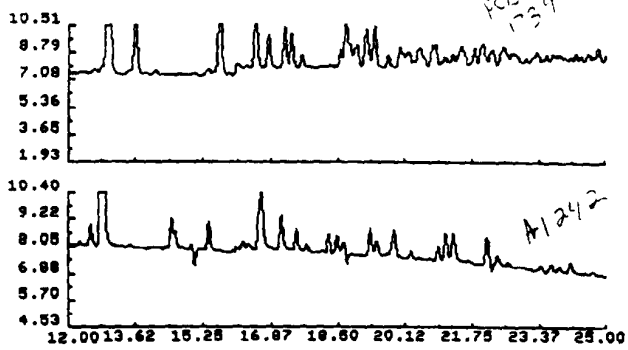
PCB 1741



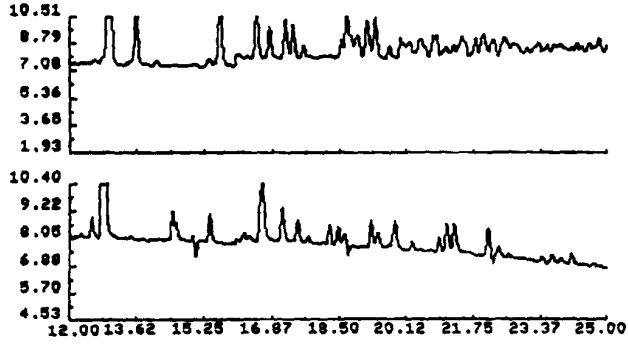
Top Raw: BR567 (15.0- 30.0) (Enlarged x 5.0)
Bottom Raw: BR549 (15.0- 30.0) (Enlarged x 8.0)



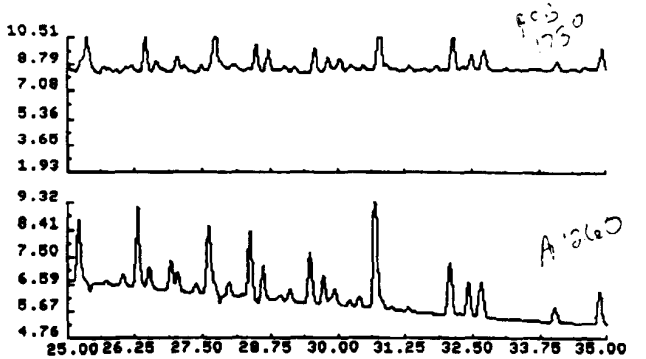
Top Raw: BR567 (12.0- 25.0) (Enlarged x 6.0)
Bottom Raw: BR547 (12.0- 25.0) (Enlarged x 11.0)



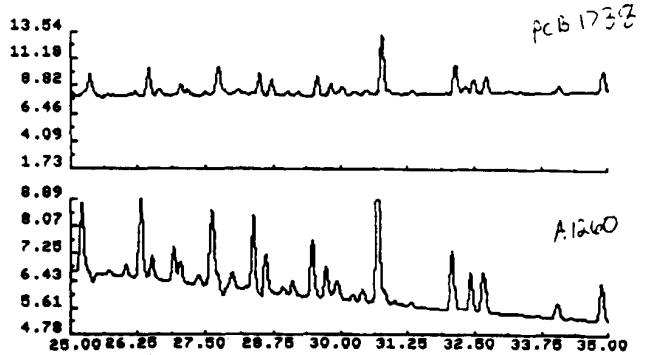
Top Raw: BR566 (12.0- 25.0) (Enlarged x 8.0)
Bottom Raw: BR547 (12.0- 25.0) (Enlarged x 10.0)



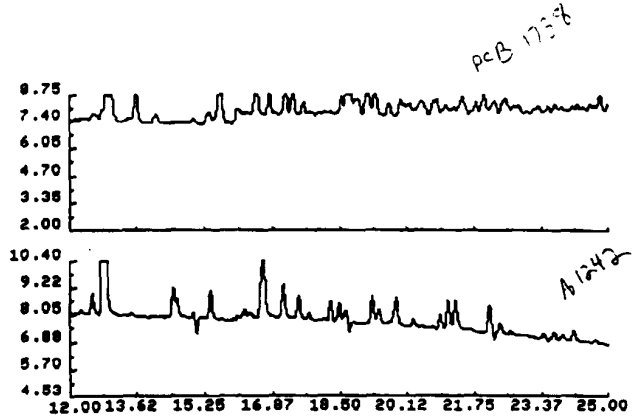
Top Raw: BR566 (12.0- 25.0) (Enlarged x 8.0)
Bottom Raw: BR547 (12.0- 25.0) (Enlarged x 10.0)



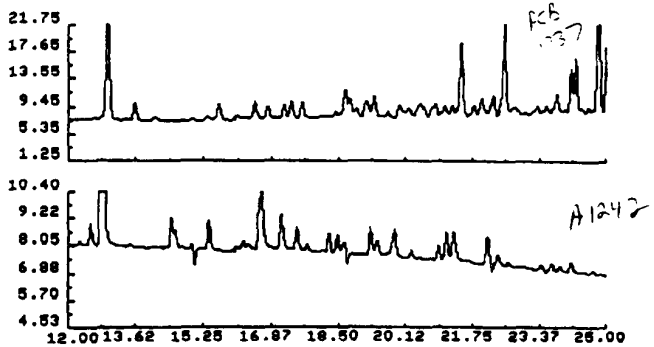
Top Raw: BR566 (25.0- 35.0) (Enlarged x 8.0)
Bottom Raw: BR530 (25.0- 35.0) (Enlarged x 9.0)



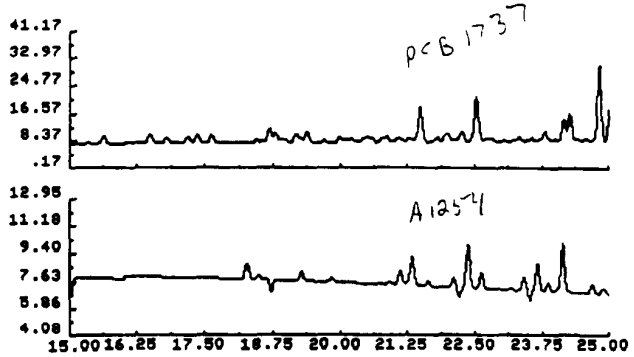
Top Raw: BR564 (25.0- 35.0) (Enlarged x 8.0)
Bottom Raw: BR630 (25.0- 35.0) (Enlarged x 10.0)



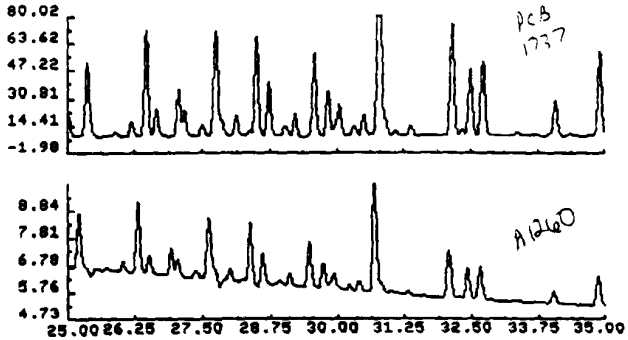
Top Raw: BR564 (12.0- 25.0) (Enlarged x 14.0)
Bottom Raw: BR547 (12.0- 25.0) (Enlarged x 10.0)



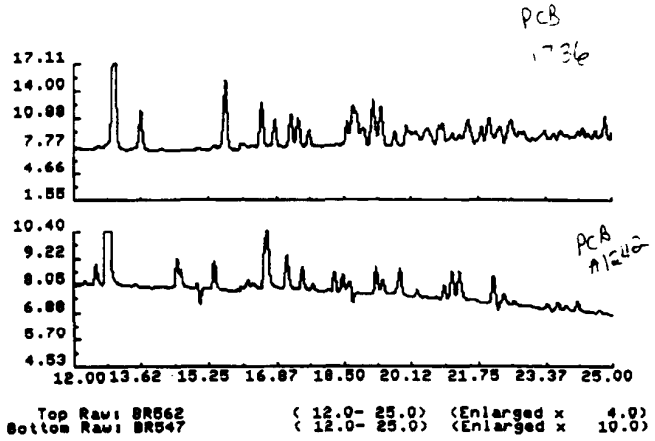
Top Raw: BR563 (12.0- 25.0) (Enlarged x 8.0)
Bottom Raw: BR547 (12.0- 25.0) (Enlarged x 10.0)



Top Raw: BR563 (15.0- 25.0) (Enlarged x 4.0)
Bottom Raw: BR549 (15.0- 25.0) (Enlarged x 6.0)



Top Raw: BR563 (25.0- 35.0) (Enlarged x 2.0)
Bottom Raw: BR530 (25.0- 35.0) (Enlarged x 8.0)


PCB
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10.88
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9.22
8.05
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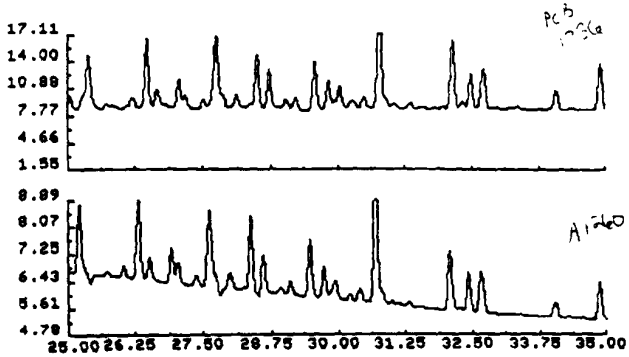
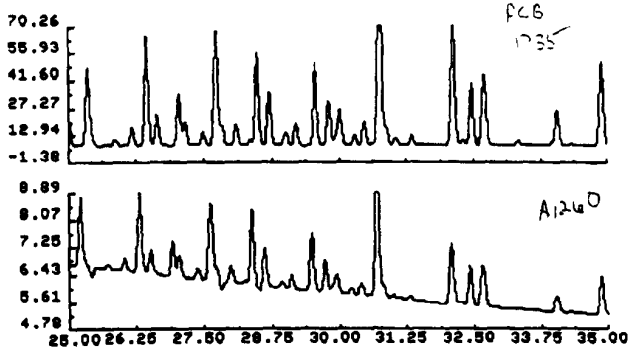
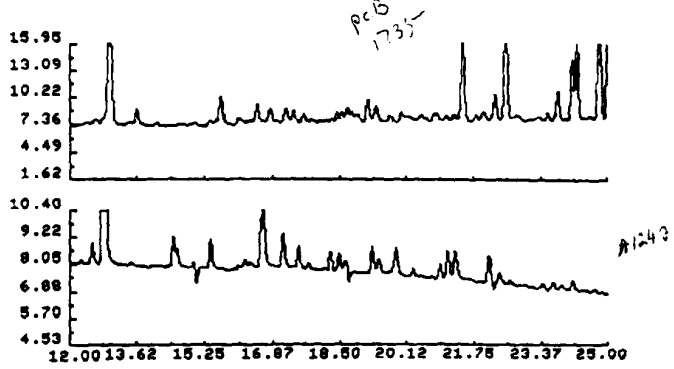
PCB
Aroclor
12.00 13.62 15.25 16.87 18.50 20.12 21.75 23.37 25.00
Top Raw: BR562 (12.0- 25.0) (Enlarged x 4.0)
Bottom Raw: BR547 (12.0- 25.0) (Enlarged x 10.0)



Top Raw: BR562 (25.0- 35.0) (Enlarged x 4.0)
Bottom Raw: BR530 (25.0- 35.0) (Enlarged x 10.0)

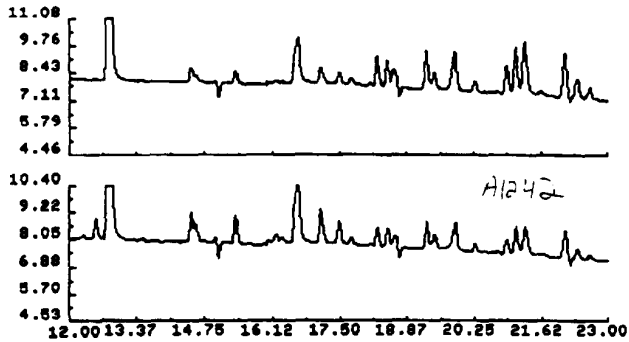


Top Raw: BR561 (25.0- 35.0) (Enlarged x 2.0)
Bottom Raw: BR530 (25.0- 35.0) (Enlarged x 10.0)

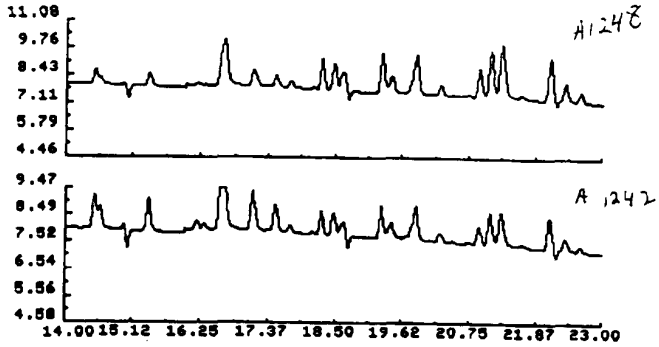


Top Raw: BR561 (12.0- 25.0) (Enlarged x 10.0)
Bottom Raw: BR547 (12.0- 25.0) (Enlarged x 10.0)

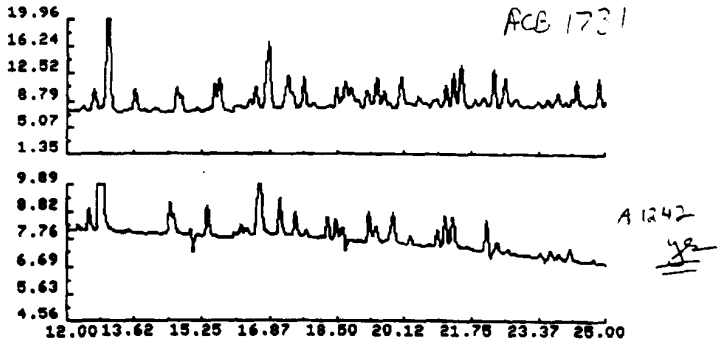
A1242



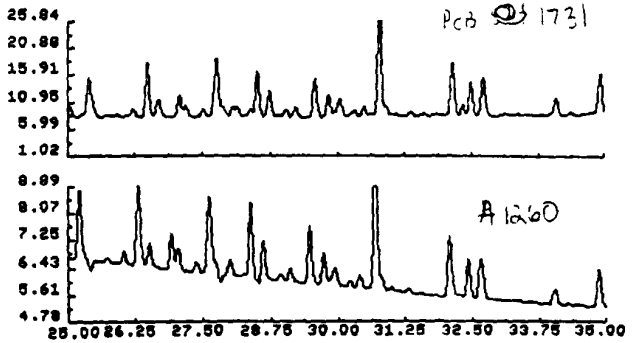
Top Raw: BR548 (12.0- 23.0) (Enlarged x 10.0)
Bottom Raw: BR547 (12.0- 23.0) (Enlarged x 10.0)



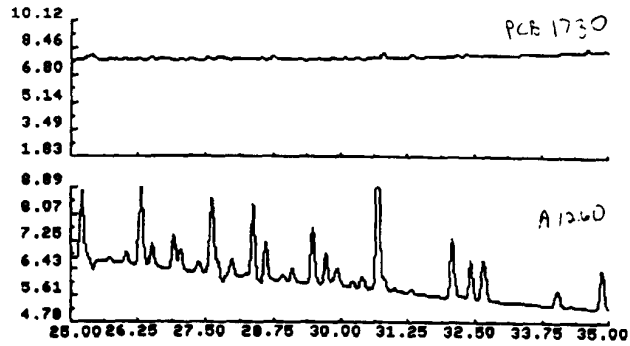
Top Raw: BR548 (14.0- 23.0) (Enlarged x 10.0)
Bottom Raw: BR547 (14.0- 23.0) (Enlarged x 12.0)



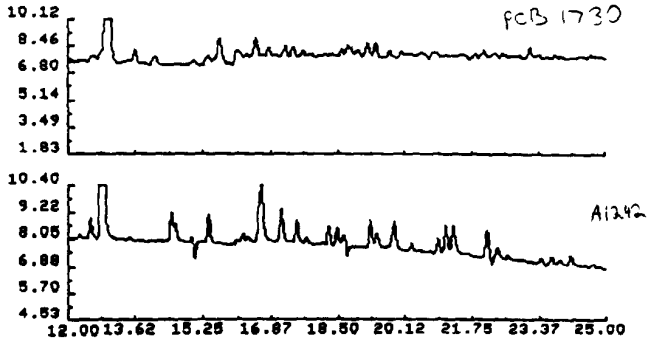
Top Raw: BR541 (12.0- 25.0) (Enlarged x 4.0)
Bottom Raw: BR547 (12.0- 25.0) (Enlarged x 11.0)



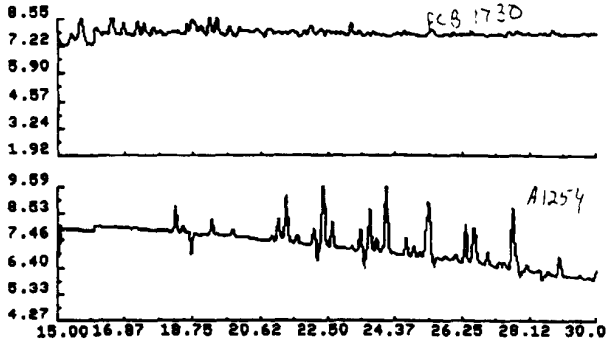
Top Raw: BR541 (25.0- 35.0) (Enlarged x 3.0)
Bottom Raw: BR530 (25.0- 35.0) (Enlarged x 10.0)



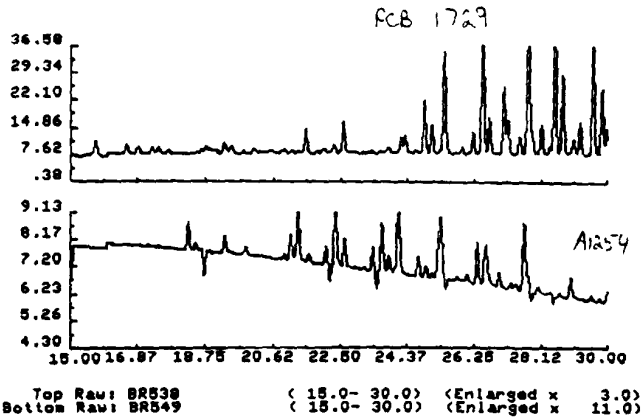
Top Raw: BR640 (25.0- 35.0) (Enlarged x 8.0)
Bottom Raw: BR530 (25.0- 35.0) (Enlarged x 10.0)



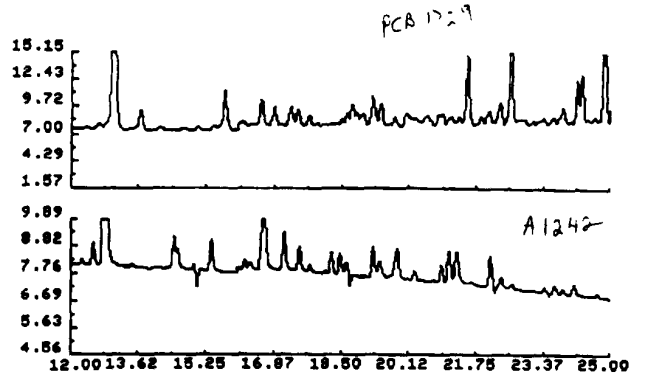
Top Raw: BR540 (12.0- 25.0) (Enlarged x 8.0)
Bottom Raw: BR547 (12.0- 25.0) (Enlarged x 10.0)



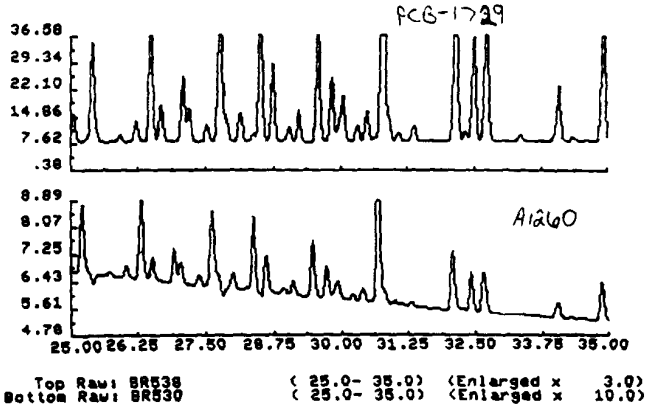
Top Raw: BR540 (15.0- 30.0) (Enlarged x 10.0)
Bottom Raw: BR649 (15.0- 30.0) (Enlarged x 10.0)



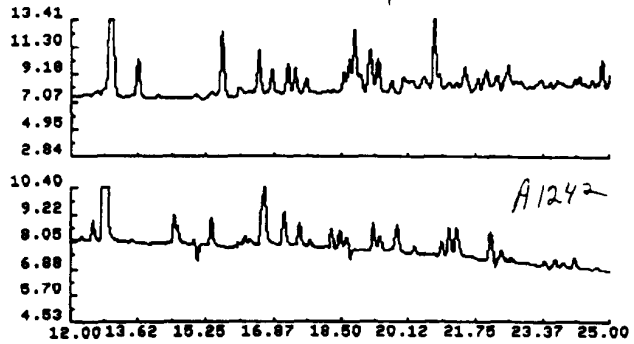
Top Raw: BR538 (15.0- 30.0) (Enlarged x 3.0)
Bottom Raw: BR549 (15.0- 30.0) (Enlarged x 11.0)



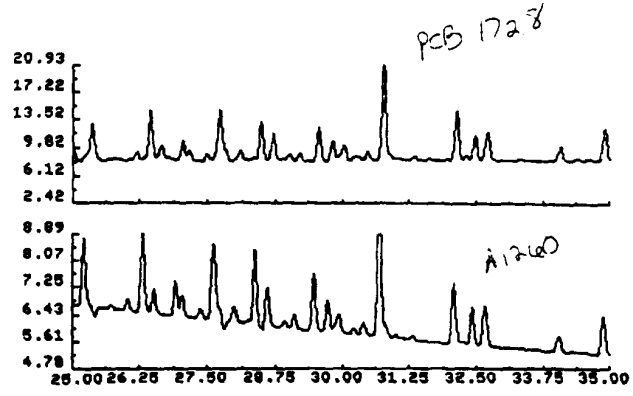
Top Raw: BRB38 (12.0- 25.0) (Enlarged x 8.0)
Bottom Raw: BR547 (12.0- 25.0) (Enlarged x 11.0)


PCB-1229
36.58
29.34
22.10
14.86
7.62
.38
8.89
8.07
7.25
6.43
5.61
4.78
A1260
25.00 26.25 27.50 28.75 30.00 31.25 32.50 33.75 35.00
Top Raw: BR538 (25.0- 35.0) (Enlarged x 3.0)
Bottom Raw: BR530 (25.0- 35.0) (Enlarged x 10.0)

PCB 1728

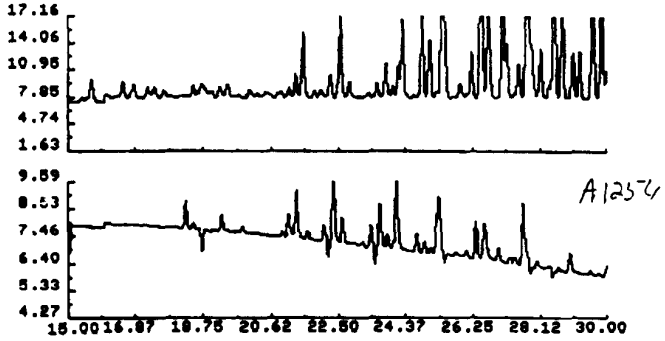


Top Raw: BR537 (12.0- 25.0) (Enlarged x 7.0)
Bottom Raw: BR547 (12.0- 25.0) (Enlarged x 10.0)



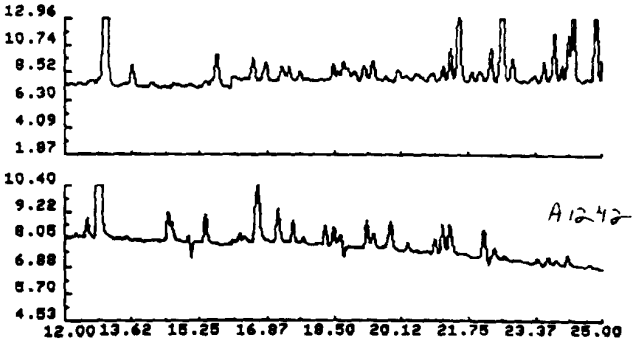
Top Raw: BR537 (25.0- 35.0) (Enlarged x 4.0)
Bottom Raw: BR530 (25.0- 35.0) (Enlarged x 10.0)

PCB 1727

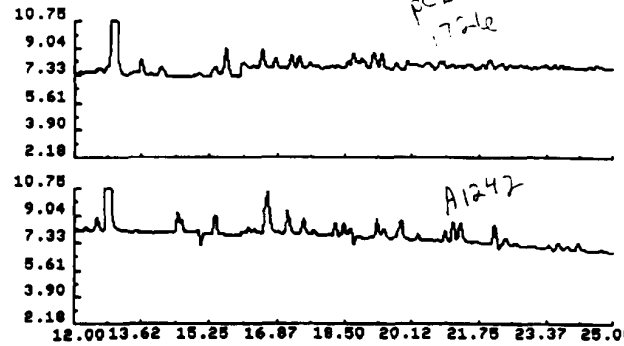


Top Raw: BR536 (15.0- 30.0) (Enlarged x 5.0)
Bottom Raw: BR549 (15.0- 30.0) (Enlarged x 10.0)

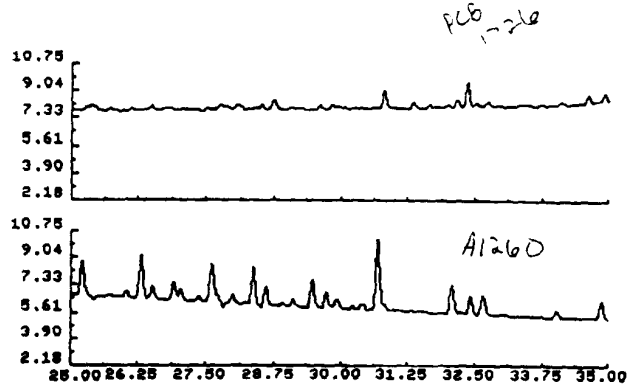
PCB 1727



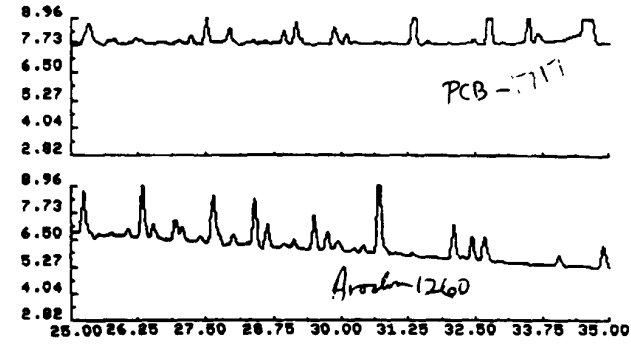
Top Raw: 8R536 (12.0- 25.0) (Enlarged x 7.0)
Bottom Raw: 8R547 (12.0- 25.0) (Enlarged x 10.0)



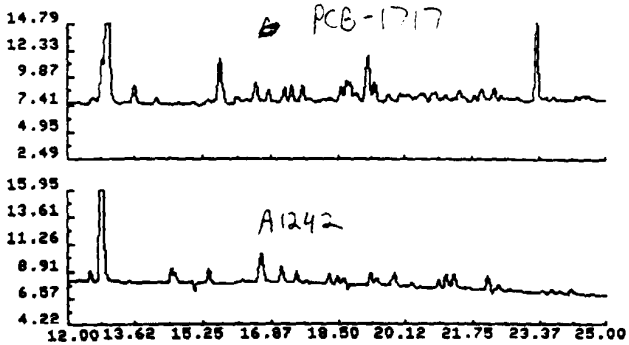
Relative Plots
Top Raw: BR534 (12.0- 25.0) (Enlarged x 15.0)
Bottom Raw: BR547 (12.0- 25.0) (Enlarged x 15.0)



Relative Plots
Top Raw: BR534 (25.0- 35.0) (Enlarged x 15.0)
Bottom Raw: BR530 (25.0- 35.0) (Enlarged x 15.0)



Relative Plots
Top Raw: BR520 (25.0- 35.0) (Enlarged x 10.0)
Bottom Raw: BR550 (25.0- 35.0) (Enlarged x 10.0)



Top Raw: BR520 (12.0- 25.0) (Enlarged x 5.0)
Bottom Raw: BR547 (12.0- 25.0) (Enlarged x 5.0)

The following pages show QA/QC data for selected samples.

AUG 15, 1996 8:50
SEQUENCE: BMS09 ON CRN 1
CHANNEL 32

SUBSEQUENCE 1

METHOD
PCESSM:MH

DIALG-PRG PARAM-FILE
:N

#WSHS #PMPS STOP
5. 5. 1

ISC POST-BTL# POST-#WSHS
NO . 0. 1

SAMPLES

	SAMPLE-NAME	BTL#	PROC-FILE	RAW-FILE	%DIL-F	STD-AMT	SMP-AMT
1	BLANK ,	1,	BP901 :MH,	BR901 :MH,	100.00,	1.0000,	1.0000
2	A1242 0.944 ,	2,	BP902 :MH,	BR902 :MH,	100.00,	1.0000,	1.0000
3	A1248 1.0 ,	3,	BP903 :MH,	BR903 :MH,	100.00,	1.0000,	1.0000
4	A1254 1.0 ,	4,	BP904 :MH,	BR904 :MH,	100.00,	1.0000,	1.0000
5	A1260 0.74 ,	5,	BP905 :MH,	BR905 :MH,	100.00,	1.0000,	1.0000
6	A1262 1.0 ,	6,	BP906 :MH,	BR906 :MH,	100.00,	1.0000,	1.0000
7	BLANK ,	7,	BP907 :MH,	BR907 :MH,	100.00,	1.0000,	1.0000
8	P1776 1:10 ,	8,	BP908 :MH,	BR908 :MH,	100.00,	1.0000,	1.0000
9	P1777 1:10 ,	9,	BP909 :MH,	BR909 :MH,	100.00,	1.0000,	1.0000
10	P1778 ,	10,	BP910 :MH,	BR910 :MH,	100.00,	1.0000,	1.0000
11	BLANK ,	11,	BP911 :MH,	BR911 :MH,	100.00,	1.0000,	1.0000
12	P1752 1:100 ,	12,	BP912 :MH,	BR912 :MH,	100.00,	1.0000,	1.0000
13	P1753 1:100 ,	13,	BP913 :MH,	BR913 :MH,	100.00,	1.0000,	1.0000
14	P1755 1:100 ,	14,	BP914 :MH,	BR914 :MH,	100.00,	1.0000,	1.0000
15	P1755 1:10 ,	15,	BP915 :MH,	BR915 :MH,	100.00,	1.0000,	1.0000
16	P1759 1:10 ,	16,	BP916 :MH,	BR916 :MH,	100.00,	1.0000,	1.0000
17	P17e0 1:10 ,	17,	BP917 :MH,	BR917 :MH,	100.00,	1.0000,	1.0000
18	P17e3 1:10 ,	18,	BP918 :MH,	BR918 :MH,	100.00,	1.0000,	1.0000
19	BLANK ,	19,	BP919 :MH,	BR919 :MH,	100.00,	1.0000,	1.0000
20	P1770 1:100 ,	20,	BP920 :MH,	BR920 :MH,	100.00,	1.0000,	1.0000
21	P1770 1:10 ,	21,	BP921 :MH,	BR921 :MH,	100.00,	1.0000,	1.0000
22	BLANK ,	22,	BP922 :MH,	BR922 :MH,	100.00,	1.0000,	1.0000
23	LS SEK ,	23,	BP923 :MH,	BR923 :MH,	100.00,	1.0000,	1.0000
24	P177s 1:10LS,	24,	BP924 :MH,	BR924 :MH,	100.00,	1.0000,	1.0000
25	P1887LS1:100,	25,	BP925 :MH,	BR925 :MH,	100.00,	1.0000,	1.0000
26	P1888LS1:100,	26,	BP926 :MH,	BR926 :MH,	100.00,	1.0000,	1.0000
27	P1897LS1:10 ,	27,	BP927 :MH,	BR927 :MH,	100.00,	1.0000,	1.0000
28	P1752LS1:10 ,	28,	BP928 :MH,	BR928 :MH,	100.00,	1.0000,	1.0000
29	P17e5LS1:10 ,	29,	BP929 :MH,	BR929 :MH,	100.00,	1.0000,	1.0000
30	BLANK ,	30,	BP930 :MH,	BR930 :MH,	100.00,	1.0000,	1.0000
31	P17e9LS1:10 ,	31,	BP931 :MH,	BR931 :MH,	100.00,	1.0000,	1.0000
32	P1770LS1:100,	32,	BP932 :MH,	BR932 :MH,	100.00,	1.0000,	1.0000
33	P1771LS1:10 ,	33,	BP933 :MH,	BR933 :MH,	100.00,	1.0000,	1.0000
34	P1773LS1:10 ,	34,	BP934 :MH,	BR934 :MH,	100.00,	1.0000,	1.0000
35	P1869LS1:100,	35,	BP935 :MH,	BR935 :MH,	100.00,	1.0000,	1.0000
36	P1e79LS1:10 ,	36,	BP936 :MH,	BR936 :MH,	100.00,	1.0000,	1.0000
37	BLANK ,	37,	BP937 :MH,	BR937 :MH,	100.00,	1.0000,	1.0000

ND
ND
ND
ND
ND
ND

Spike (and dup) Blank LOD

5
50
50 — 25
5 — 2
5 — 5

5
50 — 25
5 — 5
5 — 2
50 — 10
5 — 2

MONS 024370

37	P1713LS1:10	,	38,	BP938	:MH,	BR938	:MH.	100.00,	1.0000,	1.0000
39	P1713LS1:10	,	39,	BP939	:MH,	BR939	:MH.	100.00,	1.0000,	1.0000
40	P1724LS1:10	,	40,	BP940	:MH,	BR940	:MH.	100.00,	1.0000,	1.0000
41	P1736LS1:10	,	41,	BP941	:MH,	BR941	:MH.	100.00,	1.0000,	1.0000
42	BLANK	,	42,	BP942	:MH,	BR941	:MH.	100.00,	1.0000,	1.0000
43	LS SPF	,	43,	BP943	:MH,	BR943	:MH.	100.00,	1.0000,	1.0000
44	BLANK	,	44,	BP944	:MH,	BR944	:MH.	100.00,	1.0000,	1.0000
45	A12e2 1.0	,	45,	BP945	:MH,	BR945	:MH.	100.00,	1.0000,	1.0000
46	A1254 1.0	,	46,	BP946	:MH,	BR946	:MH.	100.00,	1.0000,	1.0000
47	A1260 0.74	,	47,	BP947	:MH,	BR947	:MH.	100.00,	1.0000,	1.0000
48	BLANK	,	48,	BP948	:MH,	BR948	:MH.	100.00,	1.0000,	1.0000
49	HS SPF	,	49,	BP949	:MH,	BR949	:MH.	100.00,	1.0000,	1.0000
50	P1752HS1:10	,	50,	BP950	:MH,	BR950	:MH.	100.00,	1.0000,	1.0000
51	P1765HS1:10	,	51,	BP951	:MH,	BR951	:MH.	100.00,	1.0000,	1.0000
52	P1769HS1:10	,	52,	BP952	:MH,	BR952	:MH.	100.00,	1.0000,	1.0000
53	P1770HS1:100.	,	53,	BP953	:MH,	BR953	:MH.	100.00,	1.0000,	1.0000
54	BLANK	,	54,	BP954	:MH,	BR954	:MH.	100.00,	1.0000,	1.0000
55	P1771HS1:10	,	55,	BP955	:MH,	BR955	:MH.	100.00,	1.0000,	1.0000
56	P1773HS1:10	,	56,	BP956	:MH,	BR956	:MH.	100.00,	1.0000,	1.0000
57	P1e69HS1:100,	,	57,	BP957	:MH,	BR957	:MH.	100.00,	1.0000,	1.0000
58	P1679HS1:10	,	58,	BP958	:MH,	BR958	:MH.	100.00,	1.0000,	1.0000
59	P1687HS1:100,	,	59,	BP959	:MH,	BR959	:MH.	100.00,	1.0000,	1.0000
60	P1688HS1:100,	,	60,	BP960	:MH,	BR960	:MH.	100.00,	1.0000,	1.0000
61	BLANK	,	61,	BP961	:MH,	BR961	:MH.	100.00,	1.0000,	1.0000
62	P1697HS1:10	,	62,	BP962	:MH,	BR962	:MH.	100.00,	1.0000,	1.0000
63	P1713HS1:10	,	63,	BP963	:MH,	BR963	:MH.	100.00,	1.0000,	1.0000
64	P1713HS1:10	,	64,	BP964	:MH,	BR964	:MH.	100.00,	1.0000,	1.0000
65	P1724HS1:10	,	65,	BP965	:MH,	BR965	:MH.	100.00,	1.0000,	1.0000
66	P1736HS1:10	,	66,	BP966	:MH,	BR966	:MH.	100.00,	1.0000,	1.0000
67	P1736HS1:10	,	67,	BP967	:MH,	BR967	:MH.	100.00,	1.0000,	1.0000
68	HS SPF	,	68,	BP968	:MH,	BR968	:MH.	100.00,	1.0000,	1.0000
69	A1242 0.944	,	69,	BP969	:MH,	BR969	:MH.	100.00,	1.0000,	1.0000
70	A1242 1.0	,	70,	BP970	:MH,	BR970	:MH.	100.00,	1.0000,	1.0000
71	A1254 1.0	,	71,	BP971	:MH,	BR971	:MH.	100.00,	1.0000,	1.0000
72	A1260 0.74	,	72,	BP972	:MH,	BR972	:MH.	100.00,	1.0000,	1.0000
73	A1262 1.0	,	73,	BP973	:MH,	BR973	:MH.	100.00,	1.0000,	1.0000
74	FA55ED	,	74,	BP974	:MH,	BR974	:MH.	100.00,	1.0000,	1.0000
75	FA55ED	,	75,	BP975	:MH,	BR975	:MH.	100.00,	1.0000,	1.0000
76	FA55ED	,	76,	BP976	:MH,	BR976	:MH.	100.00,	1.0000,	1.0000
77	FA55ED	,	77,	BP977	:MH,	BR977	:MH.	100.00,	1.0000,	1.0000
78	FA55ED	,	78,	BP978	:MH,	BR978	:MH.	100.00,	1.0000,	1.0000
79	FA55ED	,	79,	BP979	:MH,	BR979	:MH.	100.00,	1.0000,	1.0000
80	FA55ED	,	80,	BP980	:MH,	BR980	:MH,	100.00,	1.0000,	1.0000
81	FA55ED	,	81,	BP981	:MH,	BR981	:MH,	100.00,	1.0000,	1.0000
82	FA55ED	,	82,	BP982	:MH,	BR982	:MH,	100.00,	1.0000,	1.0000
83	FA55ED	,	83,	BP983	:MH,	BR983	:MH.	100.00,	1.0000,	1.0000
84	FA55ED	,	84,	BP984	:MH,	BR984	:MH,	100.00,	1.0000,	1.0000
85	FA55ED	,	85,	BP985	:MH,	BR985	:MH,	100.00,	1.0000,	1.0000
86	BLANK	,	86,	BP986	:MH,	BR986	:MH,	100.00,	1.0000,	1.0000
87	M.BLANK	,	87,	BP987	:MH,	BR987	:MH.	100.00,	1.0000,	1.0000
88	A1254(1.0)	,	88,	BP988	:MH,	BR988	:MH,	100.00,	1.0000,	1.0000
89	BLANK	,	89,	BP989	:MH,	BR989	:MH,	100.00,	1.0000,	1.0000
90	EFFS	,	90,	BP990	:MH,	BR990	:MH.	100.00,	1.0000,	1.0000
91	LSSPFS	,	91,	BP991	:MH,	BR991	:MH.	100.00,	1.0000,	1.0000
92	HSSPFS	,	92,	BP992	:MH,	BR992	:MH,	100.00,	1.0000,	1.0000
93	BLANK	,	93,	BP993	:MH,	BR993	:MH.	100.00,	1.0000,	1.0000
94	EE									

927
962

JO 18- 1986 15:03
SEQUENCE: BMS06 ON CRN 14
CHANNEL 32

SUBSEQUENCE 1

METHOD
PCBSSM:MH

DIALG-FRO PARAM-FILE
/N

#WSHS #FMPS STOP
5. 5. 1

LOO POST-BTL# POST-#WSHS
0. 1

SAMPLES

	SAMPLE-NAME	BTL#	PROC-FILE	RAW-FILE	%DIL-F	STD-AMT	SMP-AMT
1	BLANK	1.	BP601 :MH,	BR601 :MH,	100.00,	1.0000,	1.0000
2	A1248 (1.0)	2.	BP602 :MH,	BR602 :MH,	100.00,	1.0000,	1.0000
3	A1254 1.0	3.	BP603 :MH,	BR603 :MH,	100.00,	1.0000,	1.0000
4	A1260 0.74	4.	BP604 :MH,	BR604 :MH,	100.00,	1.0000,	1.0000
5	BLANK	5.	BP605 :MH,	BR605 :MH,	100.00,	1.0000,	1.0000
6	QA/QC50(5)	6.	BP606 :MH,	BR606 :MH,	100.00,	1.0000,	1.0000
7	QA/QC500(5)	7.	BP607 :MH,	BR607 :MH,	100.00,	1.0000,	1.0000
8	BLANK	8.	BP608 :MH,	BR608 :MH,	100.00,	1.0000,	1.0000
9	SPK	9.	BP609 :MH,	BR609 :MH,	100.00,	1.0000,	1.0000
10	P1779	10.	BP610 :MH,	BR610 :MH,	100.00,	1.0000,	1.0000
11	P1780	11.	BP611 :MH,	BR611 :MH,	100.00,	1.0000,	1.0000
12	P1781	12.	BP612 :MH,	BR612 :MH,	100.00,	1.0000,	1.0000
13	P1782	13.	BP613 :MH,	BR613 :MH,	100.00,	1.0000,	1.0000
14	P1785	14.	BP614 :MH,	BR614 :MH,	100.00,	1.0000,	1.0000
15	P1786	15.	BP615 :MH,	BR615 :MH,	100.00,	1.0000,	1.0000
16	P1787	16.	BP616 :MH,	BR616 :MH,	100.00,	1.0000,	1.0000
17	P1788	17.	BP617 :MH,	BR617 :MH,	100.00,	1.0000,	1.0000
18	P1789	18.	BP618 :MH,	BR618 :MH,	100.00,	1.0000,	1.0000
19	BLANK	19.	BP619 :MH,	BR619 :MH,	100.00,	1.0000,	1.0000
20	A1248 1.0	20.	BP620 :MH,	BR620 :MH,	100.00,	1.0000,	1.0000
21	A1260 0.74	21.	BP621 :MH,	BR621 :MH,	100.00,	1.0000,	1.0000
22	BLANK	22.	BP622 :MH,	BR622 :MH,	100.00,	1.0000,	1.0000
23	SPK	23.	BP623 :MH,	BR623 :MH,	100.00,	1.0000,	1.0000
24	P1790	24.	BP624 :MH,	BR624 :MH,	100.00,	1.0000,	1.0000
25	P1791	25.	BP625 :MH,	BR625 :MH,	100.00,	1.0000,	1.0000
26	P1792	26.	BP626 :MH,	BR626 :MH,	100.00,	1.0000,	1.0000
27	P1795	27.	BP627 :MH,	BR627 :MH,	100.00,	1.0000,	1.0000
28	P1796	28.	BP628 :MH,	BR628 :MH,	100.00,	1.0000,	1.0000
29	P1797	29.	BP629 :MH,	BR629 :MH,	100.00,	1.0000,	1.0000
30	P1798	30.	BP630 :MH,	BR630 :MH,	100.00,	1.0000,	1.0000
31	BLANK	31.	BP631 :MH,	BR631 :MH,	100.00,	1.0000,	1.0000
32	SPK	32.	BP632 :MH,	BR632 :MH,	100.00,	1.0000,	1.0000
33	LS SPK/A1260	33.	BP633 :MH,	BR633 :MH,	100.00,	1.0000,	1.0000
34	P1783	34.	BP634 :MH,	BR634 :MH,	100.00,	1.0000,	1.0000
35	P1793	35.	BP635 :MH,	BR635 :MH,	100.00,	1.0000,	1.0000
36	LS SPK	36.	BP636 :MH,	BR636 :MH,	100.00,	1.0000,	1.0000
37	HS SPK	37.	BP637 :MH,	BR637 :MH,	100.00,	1.0000,	1.0000
38	P1784	38.	BP638 :MH,	BR638 :MH,	100.00,	1.0000,	1.0000
39	P1794	39.	BP639 :MH,	BR639 :MH,	100.00,	1.0000,	1.0000

MONS 024372

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40  HS SPI          , 40, BP640 :MH, BR640 :MH, 100.00, 1.0000, 1.0000 (1.2)
41  BLANK           , 41, BP641 :MH, BR641 :MH, 100.00, 1.0000, 1.0000
42  A1248 1.0       , 42, BP642 :MH, BR642 :MH, 100.00, 1.0000, 1.0000
43  A1254 1.0       , 43, BP643 :MH, BR643 :MH, 100.00, 1.0000, 1.0000 1.10
44  A1260 0.74      , 44, BP644 :MH, BR644 :MH, 100.00, 1.0000, 1.0000 0.76
45  BLANK           , 45, BP645 :MH, BR645 :MH, 100.00, 1.0000, 1.0000
46  FE527           , 46, BP646 :MH, BR646 :MH, 100.00, 1.0000, 1.0000
47  FE528           , 47, BP647 :MH, BR647 :MH, 100.00, 1.0000, 1.0000
48  FE529           , 48, BP648 :MH, BR648 :MH, 100.00, 1.0000, 1.0000
49  BLANK           , 49, BP649 :MH, BR649 :MH, 100.00, 1.0000, 1.0000
50  FE530           , 50, BP650 :MH, BR650 :MH, 100.00, 1.0000, 1.0000
51  FE531           , 51, BP651 :MH, BR651 :MH, 100.00, 1.0000, 1.0000
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59  FE538           , 59, BP659 :MH, BR659 :MH, 100.00, 1.0000, 1.0000
60  BLANK           , 60, BP660 :MH, BR660 :MH, 100.00, 1.0000, 1.0000
61  FE539           , 61, BP661 :MH, BR661 :MH, 100.00, 1.0000, 1.0000
62  FE540           , 62, BP662 :MH, BR662 :MH, 100.00, 1.0000, 1.0000
63  FE541           , 63, BP663 :MH, BR663 :MH, 100.00, 1.0000, 1.0000
64  FE542           , 64, BP664 :MH, BR664 :MH, 100.00, 1.0000, 1.0000
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66  FE544           , 66, BP666 :MH, BR666 :MH, 100.00, 1.0000, 1.0000
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68  FE546           , 68, BP668 :MH, BR668 :MH, 100.00, 1.0000, 1.0000
69  BLANK           , 69, BP669 :MH, BR669 :MH, 100.00, 1.0000, 1.0000
70  A1254(1.0)      , 70, BP670 :MH, BR670 :MH, 100.00, 1.0000, 1.0000
71  BLANK           , 71, BP671 :MH, BR671 :MH, 100.00, 1.0000, 1.0000
72  M.B5            , 72, BP672 :MH, BR672 :MH, 100.00, 1.0000, 1.0000
73  SPM5            , 73, BP673 :MH, BR673 :MH, 100.00, 1.0000, 1.0000
74  BLANK           , 74, BP674 :MH, BR674 :MH, 100.00, 1.0000, 1.0000
75  FA564C          , 75, BP675 :MH, BR675 :MH, 100.00, 1.0000, 1.0000
76  BLANK           , 76, BP676 :MH, BR676 :MH, 100.00, 1.0000, 1.0000
77  FA565D          , 77, BP677 :MH, BR677 :MH, 100.00, 1.0000, 1.0000
78  BLANK           , 78, BP678 :MH, BR678 :MH, 100.00, 1.0000, 1.0000
79  FA566D          , 79, BP679 :MH, BR679 :MH, 100.00, 1.0000, 1.0000
80  BLANK           , 80, BP680 :MH, BR680 :MH, 100.00, 1.0000, 1.0000
81  FA567D          , 81, BP681 :MH, BR681 :MH, 100.00, 1.0000, 1.0000
82  BLANK           , 82, BP682 :MH, BR682 :MH, 100.00, 1.0000, 1.0000
83  A1254(1.0)      , 83, BP683 :MH, BR683 :MH, 100.00, 1.0000, 1.0000
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85  BLANK           , 85, BP685 :MH, BR685 :MH, 100.00, 1.0000, 1.0000
86  SPI HSMI549     , 86, BP686 :MH, BR686 :MH, 100.00, 1.0000, 1.0000
87  BLANK           , 87, BP687 :MH, BR687 :MH, 100.00, 1.0000, 1.0000
88  MIPCB549        , 88, BP688 :MH, BR688 :MH, 100.00, 1.0000, 1.0000
89  BLANK           , 89, BP689 :MH, BR689 :MH, 100.00, 1.0000, 1.0000
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91  BLANK           , 91, BP691 :MH, BR691 :MH, 100.00, 1.0000, 1.0000
92  MIPCB550        , 92, BP692 :MH, BR692 :MH, 100.00, 1.0000, 1.0000
93  BLANK           , 93, BP693 :MH, BR693 :MH, 100.00, 1.0000, 1.0000
94  MIPCB551        , 94, BP694 :MH, BR694 :MH, 100.00, 1.0000, 1.0000
95  BPPCB422        , 95, BP695 :MH, BR695 :MH, 100.00, 1.0000, 1.0000
96  BPPCB423        , 96, BP696 :MH, BR696 :MH, 100.00, 1.0000, 1.0000
97  BPPCB424M       , 97, BP697 :MH, BR697 :MH, 100.00, 1.0000, 1.0000
98  A1254(1.0)      , 98, BP698 :MH, BR698 :MH, 100.00, 1.0000, 1.0000
99  /E
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MONS 024373

The following pages show chain-of-custody information for this project.

MONSANTO COMPANY/
Environmental Sciences Center

Inter-Office
Correspondence

From: David McKenzie (U4F)
Monsanto Company/
Environmental Sciences Center
800 N. Lindbergh Blvd.
St. Louis, Mo. 63167

cc: Jim Fleer
Mason Hughes
Paul Sherman

Date: June 11, 1986

Time Stamp - <860612.0830>

Subject: Sending a sampling kit for oil and soil samples to the Nitro Plant

---

To: Jim Fleer
Nitro Plant
1 Monsanto Rd.
Nitro, WV 25143

Enclosed you will find: 120 bottles for sampling, ESC oil and soil sampling methodolgies, Chain-of-Custody forms, and labels. The information in the methods should prove useful. The bottles are capped with Teflon faced septa which should face the sample. Please fill out the Chain-of-Custody forms and return them with the samples. The original shipping box (kit) contains vermiculate, which should be shipped back with the samples to absorb any liquid in case of breakage. If there are any questions, feel free to call.

David McKenzie
(314) 694-1497

Time Stamp - <860611.1105>

ESC Chain-of-Custody Form

Monsanto Company/Environmental Sciences Center
800 N. Lindbergh Blvd.
St. Louis, Mo. 63167

(314) 694-1464

Project Number: 24000691424651

Project Name: Environmental Testing

Project Manager: James E. Fleer

Sample ID	Description	Remarks
[illegible]	Hydraulic Fluid	Hydraulic Fluid
[illegible]	Hydraulic Fluid	[illegible]
[illegible]	Hydraulic Fluid	[illegible]
[illegible]	Hydraulic Fluid	[illegible]
[illegible]	Hydraulic Fluid	[illegible]
[illegible]	Hydraulic Fluid	[illegible]
[illegible]	Hydraulic Fluid	[illegible]

Relinquished by (Signature)	Date/Time	Transport Carrier (i.e. Air Bill No., etc.)	Received by (Signature)	Date/Time
[signature]	7/21/86 16:00	CMM965027136	[signature]	7/22/86

BCHAIN:MH:22

MONS 024376

Time Stamp - <860611.1105>

ESC Chain-of-Custody Form

Monsanto Company/Environmental Sciences Center
800 N. Lindbergh Blvd.
St. Louis, Mo. 63167

(314) 694-1464

Project Number: 24000691424651

Project Name: Environmental Testing

Project Manager: James E. Fleer

Sample ID	Description	Remarks
[illegible]	Hydraulic Fluid	Hydraulic Tank
[illegible]	Hydraulic Fluid	Hydraulic Tank
[illegible]	Hydraulic Fluid	Hydraulic Press
[illegible]	Hydraulic Fluid	[illegible]
[illegible]	Hydraulic Fluid	South Bend Lathe
[illegible]	Dielectric Fluid	Sub G
[illegible]	Dielectric Fluid	Sub P

Relinquished by (Signature)	Date/Time	Transport Carrier (i.e. Air Bill No., etc.)	Received by (Signature)	Date/Time
[illegible]	7/21/86 16:00	CRW965027136	[illegible]	7-22-86

BCHAIN:MH:22

MONS 024377

Time Stamp - <860611.1105>

ESC Chain-of-Custody Form

Monsanto Company/Environmental Sciences Center
800 N. Lindbergh Blvd.
St. Louis, Mo. 63167

(314) 694-1464

Project Number: 24000691424651

Project Name: Environmental Testing

Project Manager: James E. Fleer

Sample ID	Description	Remarks
E6615	Hy Dielectric Fluid	Sub I
E6616	Dielectric Fluid	Sub M
E6617	Dielectric Fluid	Sub F
E6618	Dielectric Fluid	Sub J
E6619	Dielectric Fluid	Sub C
E6620	Dielectric Fluid	Sub H
E6621	Dielectric Fluid	Sub G

Relinquished by (Signature)	Date/Time	Transport Carrier (i.e. Air Bill No., etc.)	Received by (Signature)	Date/Time
James E. Fleer	7/11/86 16:00	CR965027136	Danny McKaye	7-22-86

BCHAIN:MH:22

MONS 024378

Time Stamp - <860611.1105>

ESC Chain-of-Custody Form

Monsanto Company/Environmental Sciences Center
800 N. Lindbergh Blvd.
St. Louis, Mo. 63167

(314) 694-1464

Project Number: 24000691424651

Project Name: Environmental Testing

Project Manager: James E. Fleer

Sample ID	Description	Remarks
[illegible]	Dielectric Fluid	Sub U
[illegible]	Dielectric Fluid	Sub B
[illegible]	Dielectric Fluid	Sub K
[illegible]	Dielectric Fluid	Sub [illegible]
[illegible]	Dielectric Fluid	Sub N
[illegible]	Dielectric Fluid	Sub C
[illegible]	Dielectric Fluid	Sub D

Relinquished by (Signature)	Date/Time	Transport Carrier (i.e. Air Bill No., etc.)	Received by (Signature)	Date/Time
[illegible]	7/21/86 [illegible]	CBW965027136	[illegible]	7-22-86

BCHAIN:MH:22

MONS 024379

Time Stamp - <860611.1105>

ESC Chain-of-Custody Form

Monsanto Company/Environmental Sciences Center
800 N. Lindbergh Blvd.
St. Louis, Mo. 63167

(314) 694-1464

Project Number: 24000691424651

Project Name: Environmental Testing

Project Manager: James E. Fleer

Sample ID	Description	Remarks
E6C27	Dielectric Fluid	Sub S
E6C36	Dielectric Fluid	Sub R
E6C31	Soil	Sub C
E6C32	Soil	Sub C
E6C33	Soil	Sub C
E6C34	No Sample	
E6C35	Soil	Sub C

Relinquished by (Signature)	Date/Time	Transport Carrier (i.e. Air Bill No., etc.)	Received by (Signature)	Date/Time
	7/21/86 16:00	CRN965027136		7-22-86

BCHAIN:MH:22

MONS 024380

Time Stamp - <860611.1105>

ESC Chain-of-Custody Form

Monsanto Company/Environmental Sciences Center
800 N. Lindbergh Blvd.
St. Louis, Mo. 63167

(314) 694-1464

Project Number: 24000691424651

Project Name: Environmental Testing

Project Manager: James E. Fleer

Sample ID	Description	Remarks
/ [illegible]	Soil	Sub B East
/ [illegible]	Soil	Sub [illegible]
/ [illegible]	Soil	Sub [illegible]
/ [illegible]	Soil	Sub F North
[illegible]	No Sample	
[illegible]	No Sample	
[illegible]	No Sample	

Relinquished by (Signature)	Date/Time	Transport Carrier (i.e. Air Bill No., etc.)	Received by (Signature)	Date/Time
[illegible]	7/21/86 16:02	CRW965027136	[illegible]	7-22-86

BCHAIN:MH:22

MONS 024381

Time Stamp - <860611.1105>

ESC Chain-of-Custody Form

Monsanto Company/Environmental Sciences Center
800 N. Lindbergh Blvd.
St. Louis, Mo. 63167

(314) 694-1464

Project Number: 24000691424651

Project Name: Environmental Testing

Project Manager: James E. Fleer

Sample ID	Description	Remarks
/ E6C43	Soil	Sub C Location 3
/ E6C44	Soil	Sub C Location 2
/ E6C45	Soil	Sub C Location 1
/ E6C46	Soil	Sub B
/ E6C47	Hydraulic Fluid	Transformer T-781
/ E6C48	Hydraulic Fluid	T-2 Feeder #4
/ E6C49	Hydraulic Fluid	Transformer T-311

Relinquished by (Signature)	Date/Time	Transport Carrier (i.e. Air Bill No., etc.)	Received by (Signature)	Date/Time
	7/21/86 14:00	CMW655027136		7-22-86

BCHAIN:MH:22

MONS 024382

Time Stamp - <860611.1105>

ESC Chain-of-Custody Form

Monsanto Company/Environmental Sciences Center
800 N. Lindbergh Blvd.
St. Louis, Mo. 63167

(314) 694-1464

Project Number: 24000691424651

Project Name: Environmental Testing

Project Manager: James E. Fleer

Sample ID	Description	Remarks
[illegible]	No Sample	
[illegible]	Hydraulic Fluid	A-13 Forklift
[illegible]	Hydraulic Fluid	A-11 Forklift
[illegible]	Hydraulic Fluid	Transtracker T-41
[illegible]	Hydraulic Fluid	Transtracker T-452
[illegible]	Hydraulic Fluid	A-7 Forklift
[illegible]	Hydraulic Fluid	Transtracker T-41

Relinquished by (Signature)	Date/Time	Transport Carrier (i.e. Air Bill No., etc.)	Received by (Signature)	Date/Time
[illegible]	7/21/86 16:06	CRW965027136	[illegible]	7-22-86

BCHAIN:MH:22

MONS 024383

Time Stamp - <860611.1105>

ESC Chain-of-Custody Form

Monsanto Company/Environmental Sciences Center
800 N. Lindbergh Blvd.
St. Louis, Mo. 63167

(314) 694-1464

Project Number: 24000691424651

Project Name: Environmental Testing

Project Manager: James E. Fleer

Sample ID	Description	Remarks
E6057	Hydraulic Fluid	Transformer T-112
E6058	Hydraulic Fluid	Transformer T-111
E6059	Hydraulic Fluid	A-12 Forklift
E6060	Hydraulic Fluid	A-10 Forklift
E6061	Hydraulic Fluid	Maintenance Sweeper #61
E6062	Hydraulic Fluid	A-15 Forklift
E6063	Hydraulic Fluid	A-17 Forklift

Relinquished by (Signature)	Date/Time	Transport Carrier (i.e. Air Bill No., etc.)	Received by (Signature)	Date/Time
[signature]	7/21/86 16:00	CR965027136	[signature]	7-22-86

BCHAIN:MH:22

MONS 024384

Time Stamp - <860611.1105>

ESC Chain-of-Custody Form

Monsanto Company/Environmental Sciences Center
800 N. Lindbergh Blvd.
St. Louis, Mo. 63167

(314) 694-1464

Project Number: 24000691424651

Project Name: Environmental Testing

Project Manager: James E. Fleer

Sample ID	Description	Remarks
[illegible]4	Hydraulic Fluid	AS Finish
[illegible]5	Hydraulic Fluid	Composite
[illegible]6	Hydraulic Fluid	AS Finish
[illegible]	Hydraulic Fluid	AS Finish
[illegible]	Hydraulic Fluid	Dump Truck
[illegible]	Hydraulic Fluid	Tank [illegible]
[illegible]	Hydraulic Fluid	Dump Truck 6-6

Relinquished by (Signature)	Date/Time	Transport Carrier (i.e. Air Bill No., etc.)	Received by (Signature)	Date/Time
[illegible]	7/3/86 1600	CRW965027136	[illegible]	7-22-86

BCHAIN:MH:22

MONS 024385

Time Stamp - <860611.1105>

ESC Chain-of-Custody Form

Monsanto Company/Environmental Sciences Center
800 N. Lindbergh Blvd.
St. Louis, Mo. 63167

(314) 694-1464

Project Number: 24000691424651

Project Name: Environmental Testing

Project Manager: James E. Fleer

Sample ID	Description	Remarks
86071	Hydraulic Fluid	Dumpster
86072	Hydraulic Fluid	Transtanker T-913
86073	Hydraulic Fluid	Transtanker T-451
86074	No Sample	
86075	Dielectric Fluid	Plant Reclosure
86076	Dielectric Fluid	Spare Plant Reclosure
86077	Hydraulic Fluid	Cook Belt Electromagnet

Relinquished by (Signature)	Date/Time	Transport Carrier (i.e. Air Bill No., etc.)	Received by (Signature)	Date/Time
[signature]	7/21/86 16:02	CRW965027136	[signature]	7-22-86

BCHAIN:MH:22

MONS 024386

Time Stamp - <860611.1105>

ESC Chain-of-Custody Form

Monsanto Company/Environmental Sciences Center
800 N. Lindbergh Blvd.
St. Louis, Mo. 63167

(314) 694-1464

Project Number: 24000691424651

Project Name: Environmental Testing

Project Manager: James E. Fleer

Sample ID	Description	Remarks
[illegible]	No Sample	
[illegible]	No Sample	
[illegible]	No Sample	
/ [illegible]	Hydraulic Fluid	[illegible]
/ [illegible]	Hydraulic Fluid	[illegible]
/ [illegible]	Hydraulic Fluid	[illegible]
/ [illegible]	Hydraulic Fluid	[illegible]

Relinquished by (Signature)	Date/Time	Transport Carrier (i.e. Air Bill No., etc.)	Received by (Signature)	Date/Time
[illegible]	7/21/86 16:02	CRW965027136	[illegible]	7-22-86

BCHAIN:MH:22

MONS 024387

Time Stamp - <860611.1105>

ESC Chain-of-Custody Form

Monsanto Company/Environmental Sciences Center
800 N. Lindbergh Blvd.
St. Louis, Mo. 63167

(314) 694-1464

Project Number: 24000691424651

Project Name: Environmental Testing

Project Manager: James E. Fleer

Sample ID	Description	Remarks
86085	Hydraulic Fluid	B45 [illegible] Filter
86086	Hydraulic Fluid	B 42 Filter
86087	Hydraulic Fluid	B 42 Centrifuge
86088	Hydraulic Fluid	B-42 Lower
86089	Hydraulic Fluid	B 37 Lower
86090	Hydraulic Fluid	B-34 Lower
86091	Hydraulic Fluid	[illegible] Hydraulic System

Relinquished by (Signature)	Date/Time	Transport Carrier (i.e. Air Bill No., etc.)	Received by (Signature)	Date/Time
[illegible]	7/21/86 16:02	CRN965027136	[illegible]	7-22-86

BCHAIN:MH:22

MONS 024388

Time Stamp - <860611.1105>

ESC Chain-of-Custody Form

Monsanto Company/Environmental Sciences Center
800 N. Lindbergh Blvd.
St. Louis, Mo. 63167

(314) 694-1464

Project Number: 24000691424651

Project Name: Environmental Testing

Project Manager: James E. Fleer

Sample ID	Description	Remarks
[illegible]	Hydraulic Fluid	[illegible] Hydraulic System
[illegible]	Hydraulic Fluid	[illegible]
[illegible]	Hydraulic Fluid	[illegible]
[illegible]	No Sample	
[illegible]	No Sample	
[illegible]	No Sample	
[illegible]	No Sample	

Relinquished by (Signature)	Date/Time	Transport Carrier (i.e. Air Bill No., etc.)	Received by (Signature)	Date/Time
[illegible]	7/21/86 [illegible]	CRW965027136	[illegible]	7-22-86

BCHAIN:MH:22

MONS 024389

Time Stamp - <860611.1105>

ESC Chain-of-Custody Form

Monsanto Company/Environmental Sciences Center
800 N. Lindbergh Blvd.
St. Louis, Mo. 63167

(314) 694-1464

Project Number: 24000691424651

Project Name: Environmental Testing

Project Manager: James E. Fleer

Sample ID	Description	Remarks
60177	No Sample	
60178	No Sample	
60179	Hydraulic Fluid	15% Hydraulic Fluid
60180	Hydraulic Fluid	Both to Hydraulic Fluid
60163	No Sample	
60164	No Sample	
60165	No Sample	

Relinquished by (Signature)	Date/Time	Transport Carrier (i.e. Air Bill No., etc.)	Received by (Signature)	Date/Time
[signature]	7/21/86 1615	CRW965027136	[signature]	7-22-86

BCHAIN:MH:22

Time Stamp - <860611.1105>

ESC Chain-of-Custody Form

Monsanto Company/Environmental Sciences Center
800 N. Lindbergh Blvd.
St. Louis, Mo. 63167

(314) 694-1464

Project Number: 24000691424651

Project Name: Environmental Testing

Project Manager: James E. Fleer

Sample ID	Description	Remarks
[illegible]	Hydraulic Fluid	Transtanker T-72
[illegible]	Hydraulic Fluid	Transtanker T-[illegible]
[illegible]	Hydraulic Fluid	[illegible]
[illegible]	Hydraulic Fluid	Truck Loader
[illegible]	Hydraulic Fluid	Truck Loader
[illegible]	Hydraulic Fluid	Transtanker T-315
[illegible]	Hydraulic Fluid	Transtanker T-314

Relinquished by (Signature)	Date/Time	Transport Carrier (i.e. Air Bill No., etc.)	Received by (Signature)	Date/Time
James E. Fleer	7/21/86 10:00	CRW965027136	David McKeegan	7-22-86

BCHAIN:MH:22

MONS 024391

Time Stamp - <860611.1105>

ESC Chain-of-Custody Form

Monsanto Company/Environmental Sciences Center
800 N. Lindbergh Blvd.
St. Louis, Mo. 63167

(314) 694-1464

Project Number: 24000691424651

Project Name: Environmental Testing

Project Manager: James E. Fleer

Sample ID	Description	Remarks
EG113	Hydraulic Fluid	Transtanker T-313
EG114	Hydraulic Fluid	Transtanker T-312
EG115	Air Sample	
EG116	Hydraulic Fluid	Transtanker T-14
EG117	Hydraulic Fluid	BMC Crane
EG118	Air Sample	
EG119	Hydraulic Fluid	P&H Crane
EG120	Hydraulic Fluid	Transtanker T-34

Relinquished by (Signature)	Date/Time	Transport Carrier (i.e. Air Bill No., etc.)	Received by (Signature)	Date/Time
James E. Fleer	7/21/86 16:00	CRW965027136	David M. Kaye	

BCHAIN:MH:22

MONS 024392

The following pages describe Analytical Request Information generated for this project.

Time Stamp - <860905.0818>

MONSANTO COMPANY/ENVIRONMENTAL SCIENCES CENTER

ANALYSIS REQUEST

DATE: 7-22-86 LOG NO: U-86-07-22-01

REQUESTER: Nitro/Jim Fleer PROJECT NO: 760.28-6232

LOGIN NOTEBOOK PAGE: 32

REPORT RESULTS TO: FILES/MEES, Hughes, Sherman, Trang, McKenzie, Simpson

ANALYSIS REQUESTS SENT TO: FILES, Mees, Hughes, McKenzie, Trang

SAMPLE PICKUP BY: McKenzie

SAMPLE LOCATION: U-420

SAMPLE DESCRIPTION FOR 100 SAMPLES

SAMPLE IDENTIFICATION	NUMBER OF BOTTLES	ESC NUMBER(S)
86001	1 x 7 mL	PCB-1707
86002	1 x 7 mL	PCB-1708
86003	1 x 7 mL	PCB-1709
86004	1 x 7 mL	PCB-1710
86005	1 x 7 mL	PCB-1711
86006	1 x 7 mL	PCB-1712, PCB-1713-DUP
METHOD BLANK		PCB-1714
86007	1 x 7 mL	PCB-1715
86008	1 x 7 mL	PCB-1716
86009	1 x 7 mL	PCB-1717
86010	1 x 7 mL	PCB-1718
86011	1 x 7 mL	PCB-1719
86012	1 x 7 mL	PCB-1720
86013	1 x 7 mL	PCB-1721
86014	1 x 7 mL	PCB-1722, PCB-1723-DUP
86015	1 x 7 mL	PCB-1724
METHOD BLANK		PCB-1725
86016	1 x 7 mL	PCB-1726
86017	1 x 7 mL	PCB-1727
86018	1 x 7 mL	PCB-1728
86019	1 x 7 mL	PCB-1729
86020	1 x 7 mL	PCB-1730
86021	1 x 7 mL	PCB-1731, PCB-1732-DUP
METHOD BLANK		PCB-1733
86022	1 x 7 mL	PCB-1734
86023	1 x 7 mL	PCB-1735
86024	1 x 7 mL	PCB-1736
86025	1 x 7 mL	PCB-1737
86026	1 x 7 mL	PCB-1738
86027	1 x 7 mL	PCB-1739
86028	1 x 7 mL	PCB-1740
86029	1 x 7 mL	PCB-1741
86030	1 x 7 mL	PCB-1742
86031	1 x 7 mL	PCB-1779
86032	1 x 7 mL	PCB-1780

86033	1 x 7 mL	PCB-1781, PCB-1782-DUP
METHOD BLANK		PCB-1785
86035	1 x 7 mL	PCB-1786
86036	1 x 7 mL	PCB-1787
86037	1 x 7 mL	PCB-1788
86038	1 x 7 mL	PCB-1789
86039	1 x 7 mL	PCB-1790
86043	1 x 7 mL	PCB-1791, PCB-1792-DUP
86044	1 x 7 mL	PCB-1795
86045	1 x 7 mL	PCB-1796
86046	1 x 7 mL	PCB-1797
METHOD BLANK		PCB-1798
86047	1 x 7 mL	PCB-1743, PCB-1744-DUP
METHOD BLANK		PCB-1745
86048	1 x 7 mL	PCB-1746
86049	1 x 7 mL	PCB-1747
86051	1 x 7 mL	PCB-1748
86052	1 x 7 mL	PCB-1749
86053	1 x 7 mL	PCB-1750
86054	1 x 7 mL	PCB-1751
86055	1 x 7 mL	PCB-1752, PCB-1753-DUP
METHOD BLANK		PCB-1754
86056	1 x 7 mL	PCB-1755
86057	1 x 7 mL	PCB-1756
86058	1 x 7 mL	PCB-1757
86059	1 x 7 mL	PCB-1758
86060	1 x 7 mL	PCB-1759
86061	1 x 7 mL	PCB-1760
86062	1 x 7 mL	PCB-1761
86063	1 x 7 mL	PCB-1762, PCB-1763-DUP
METHOD BLANK		PCB-1764
86064	1 x 7 mL	PCB-1765
86065	1 x 7 mL	PCB-1766
86066	1 x 7 mL	PCB-1767
86067	1 x 7 mL	PCB-1768
86068	1 x 7 mL	PCB-1769
86069	1 x 7 mL	PCB-1770
86070	1 x 7 mL	PCB-1771
86071	1 x 7 mL	PCB-1772, PCB-1773-DUP
86072	1 x 7 mL	PCB-1774
METHOD BLANK		PCB-1775
86073	1 x 7 mL	PCB-1669
86075	1 x 7 mL	PCB-1670
86076	1 x 7 mL	PCB-1671
86077	1 x 7 mL	PCB-1672
86081	1 x 7 mL	PCB-1673
86082	1 x 7 mL	PCB-1674
86083	1 x 7 mL	PCB-1675
86084	1 x 7 mL	PCB-1676
86085	1 x 7 mL	PCB-1677
86086	1 x 7 mL	PCB-1678, PCB-1679-DUP
86087	1 x 7 mL	PCB-1680
86088	1 x 7 mL	PCB-1681
86089	1 x 7 mL	PCB-1682
METHOD BLANK		PCB-1683
86090	1 x 7 mL	PCB-1684
86091	1 x 7 mL	PCB-1685
86092	1 x 7 mL	PCB-1686
86093	1 x 7 mL	PCB-1687
86094	1 x 7 mL	PCB-1688

86101	1 x 7 mL	PCB-1689
86102	1 x 7 mL	PCB-1690
86106	1 x 7 mL	PCB-1691
86107	1 x 7 mL	PCB-1692, PCB-1693-DUP
86108	1 x 7 mL	PCB-1694
86109	1 x 7 mL	PCB-1695
86110	1 x 7 mL	PCB-1696
86111	1 x 7 mL	PCB-1697
86112	1 x 7 mL	PCB-1698
86113	1 x 7 mL	PCB-1699
METHOD BLANK		PCB-1700
86114	1 x 7 mL	PCB-1701, PCB-1702-DUP
86116	1 x 7 mL	PCB-1703
86117	1 x 7 mL	PCB-1704
86119	1 x 7 mL	PCB-1705
86120	1 x 7 mL	PCB-1706

RECORDED BY: McKenzie

The above samples were extracted using Standard Extraction Methods PCEX02, PCEX03 and PCEX21. See final report for details of which samples were extracted with which method.

REQUIRED ANALYSES: PCBs

EXTRACTION LOGBOOK NOTEBOOK PAGE: 158613, 158614

ANALYTICAL TECHNIQUES:

TECHNIQUE (EN)	DATE COMPLETED	ESC STANDARD ANALYSIS METHOD	INSTRUMENT LOGBOOK PAGE
x GC/EC (18)	8/22/86	ECAN02	157,267A - 157,272B

FINAL REPORT NOTEBOOK PAGE: 3,434,426

OTHER NOTEBOOK PAGES:

QUALITATIVE: x SEMIQUANTITATIVE: QUANTITATIVE: x

REQUIRED QA/QC: SEE GOOD LABORATORY PRACTICES MANUAL

COMPLETION DATE REQUESTED:

COMMENTS:

SAMPLE DISPOSITION: -- HOLD FOR 60 DAYS

SAFETY PRECAUTIONS: SEE SAFE LABORATORY PRACTICES MANUAL

ANALYSIS REQUEST FILE NAME: AA232

The following sections describe important terminology used in Quality Assurance/Quality Control, Analyte Extraction and Instrumental Analysis. ESC and ESC/UAG Good Laboratory Practices Manuals can be obtained by contacting Bill Maas (U4E) METS 544-1499.

Quality Assurance/Quality Control Terminology

This section describes commonly used terminology and phrases which are used in conjunction with Quality Assurance/Quality Control (QA/QC). This information may be helpful in understanding some details of QA/QC procedures which have been incorporated in the present report. The following two sections also give useful information concerning terminology used in analyte extraction and instrumental analysis of samples and sample extracts.

Quality Assurance/Quality Control - Terminology used to describe activities which are designed to produce analytical results of known quality. In an effort to minimize costs of environmental analyses, specific QA/QC elements have been incorporated into ESC/UAG extraction and analysis steps which should not unduly burden analytical studies with large development and method validation costs. This approach has been taken so that sets of samples can be analyzed for various analytes without extensively validating methods over wide concentration ranges and without using methods which are designed for only one matrix.

One price which one pays for this approach is that analytical precision and accuracy are sacrificed, somewhat. However, in many cases, when clearly defined regulatory limits have been set, confirming that the analyte is present at levels well below or well above the limit does not need the type of accuracy that is required when the regulated analyte concentration is in the vicinity of the regulatory limit. In these latter cases, more extensive QA/QC procedures are required than are included in the present study.

Precision - Terminology used to evaluate the reproducibility of a certain determination. Parameters which affect analysis precision range from sample acquisition, to sample storage, to sample extraction, and finally to sample extract analysis. Normally, the major factor which affects the precision of the analysis is the sample extraction step. This step normally results in sample analysis precision on the order of + or - 30%.

The precision of a result can be determined in a number of ways. Replicate analyses of the same sample, followed by the calculation of a percent relative standard deviation for that determination is the most popular method of assessing precision. However, this calculation should not be made when there are less than three replicate points from which to calculate the percent relative standard deviation. In addition, replicate extractions and instrumental analyses must be performed. Therefore obtaining percent relative standard deviation data can be very expensive and is not normally obtained unless large studies are being conducted. A second method of assessing precision is with the use of duplicate analyses. The present report includes results of at least one sample which was analyzed in duplicate. NOTE!! It is the responsibility of the analysis requestor to review these data and draw his own conclusions concerning the precision of the determination, and, more importantly, if the precision of the determination meets his needs.

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Accuracy - Terminology used to determine the "correctness" of the data. The accuracy of most steps in the analysis of samples is typically on the order of 10%. However, when analyte concentrations in the sample extracts approach the level of detection of a determination, accuracy as well as precision can approach 100% or greater. The accuracy of a determination of an analyte which is present at concentrations which are much greater than the instrumental level of detection is most strongly affected by the homogeniety of the sample matrix and the precision of the extraction step, which results in typical accuracies in environmental analyses to be on the order of 30%. Normally, the accuracy of standard solutions which are used to calibrate analytical instrumentation is well below this amount, and therefore is normally not an important factor in producing inaccurate data. From time to time, analyte responses of standard solutions from different sources will be compared to standard solutions used for instrument calibration. This information is normally included in the section entitled "QA/QC Results".

The accuracy of a result can be estimated in a number of ways. The current study uses surrogate standard recovery and native analyte recovery information to aid in assessing the accuracy of a result. This recovery information, normally reported as percent recovery, gives you information concerning the percent of surrogate standards and native analytes which were recovered after adding to your sample matrix and performing the various extractions, clean-ups, and instrumental analyses associated with the determination. The use of surrogates also assumes that the spiked surrogates are bound in the matrix in the same way as the analytes of interest. Surrogate standards are added to every sample while native analytes are added to only 10% of each set of samples. Therefore surrogate standard recovery data could be used to correct the reported results of an analyte concentration, if the user of the data feel such corrsctions are warranted. NOTE!! No data reported in this study include any correction for surrogate standard recovery. It is the responsibility of the person requesting the analyses to apply appropriate recovery corrections, if he/she feels that such corrections are warranted.

Bias - Terminology used to describe how the accuracy of a determination may be affected. A low bias means that values below the correct value are normally measured. A high bias means that values above the correct value are normally measured. The instrumental analysis step of extract analysis normally does not contribute significantly to analysis bias. Most bias in environmental analysis is introduced in the sample extraction step. A low bias is introduced when the sample is not completely extracted and the extract does not contain 100% of the analyte. A high bias is introduced when the final volume of the extract is less than the correct volume. Surrogate Standards (SS), which are discussed in the next section, can be used to determine the amount of bias which is incorporated in the reported result. NOTE!! No data reported in this report includes any correction for this bias. It is the responsibility of the person requesting the analyses to apply appropriate bias corrections, if he/she feels that such corrections are warranted.

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Level of Detection (LOD) - Terminology used to indicate what analyte concentration will produce a signal-to-noise ratio of 10. For the present report, this value is not experimentally determined. Normally, a Limit of Quantitation is used to determine the threshold concentration above which an analyte can be detected.

Limit of Quantitation (LOQ) - Terminology used to indicate the lowest analyte concentration which can reliably be quantified. The precision of the determination of the analyte concentration at the LOQ is normally on the order of 100%. The LOQ is normally determined experimentally by adding a known amount of analyte to the sample matrix and measuring the percent recovery at the LOQ. In some cases, when there is insufficient sample quantity, or for convenience, an LOQ will be determined using other methods. These methods should be clearly described in this report.

Further Information

The general area of Quality Assurance/Quality Control, along with much of the terminology described above, is very complex. The following references may provide further information which may be useful in understanding the validity of the results reported in this study.

ASTM Standard Practice D4210-83 entitled "Intralaboratory Quality Control Procedures and a Discussion on Reporting Low-Level Data".

ASTM Standard Practice D2777-77 entitled "Determination of Precision and Bias of Methods of Committee D-19 on Water".

An article in Analytical Chemistry, authored by 29 well-known environmental scientists. This article was funded by a grant from the Environmental Protection Agency and acknowledges 24 additional scientists in industry and government who were involved in the review of the article. Its citation is: "Principles of Environmental Analysis", L. H. Keith, et. al., Anal. Chem. 1983, 55, 2210 - 2218.

40 CFR Part 136 entitled "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act; Final Rule and Interim Final Rule and Proposed Rule". This document includes details of EPA's 600-series analysis methods. A current copy of these methods can be found in the October 26, 1984 Federal Register.

QAQCTE:MH

Analyte Extraction Terminology

This section describes commonly used terminology and phrases which are used in conjunction with analyte extraction. This information may be helpful in understanding some details of how analytes in your samples were isolated for instrumental analysis. Instrumental Analysis Terminologies are given in the following section of this report.

Sample - Terminology used to reference the material which you submit for analysis. Samples may be solid, liquid, and in some cases, gases. In general, when a sample is received for analysis, it is logged into the ESC sample login book and proper chain-of-custody documents are maintained in the event this information may be required for litigation purposes.

Analyte - Terminology used to reference specific compounds or formulations of compounds. When an analysis is requested for a certain analyte within a certain sample matrix, normally some type of extraction process is required.

Extraction - This terminology refers to the step which isolates the analyte of interest into an appropriate solvent. Extraction is required for several reasons. In many cases, the concentration of the analyte is below the level of detection of the instrument which will be used for analysis. Therefore, extraction involves removing the analyte of interest from a relatively large volume of sample and placing it into a relatively small volume of solvent. This places the analyte in the solvent at a concentration which can easily be detected by the analytical instrument.

A second reason that extraction is required, is that the sample may not be appropriate for direct instrumental analysis of the analyte of interest. This can be easily understood for analytes in soils. Very few analytical instruments allow soils to be directly inserted into the instrument. Therefore some type of isolation step (i. e. extraction) is required in order to place the analyte in an appropriate matrix for instrumental analysis.

When the analyte of interest is present at sufficient concentration, and the sample matrix can be directly inserted into the analytical instrument, the sample, or the diluted sample, can be directly analyzed. However, this case represents a minority of sample analyses which ESC is asked to perform.

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Matrix - Terminology used to reference the major components of a sample. In most cases, major components are not of direct interest except as they affect the types of extraction steps and other isolation procedures which must be used to isolate the analyte from the sample matrix. For the majority of environmental samples which ESC is asked to analyze, the matrix is normally water or soil. However, many environmental matrices contain relatively high levels of organic compounds which may interfer with the instrumental analysis of the analyte of interest. Therefore, depending upon the analyte of interest, the required level of detection, and the amounts and types of other organic materials which may interfer with the instrumental analysis, extraction methods must be developed which are very specific for a given set of samples. In order to deal with almost a limitless set of matrices, analytes, extraction methods and instrumental methods, an organized approach to sample extraction, followed by instrumental analysis, has been developed at ESC.

Extract - Terminology used to identify the analyte-containing solvent which was obtained from the extraction of a certain matrix.

Extract Clean-up - Terminology used to identify chemical steps which are required in order to reduce the concentration of organic compounds which may be extracted with the analyte of interest. These co-extracted compounds may be at such high levels and/or produce responses so that they interfer with the instrumental analysis of the analyte in the extract.

Extractable Compounds - Terminology which refers to the ability of a compound to be isolated from the sample matrix and placed into the extract solvent. When the sample matrix is primarily soil which contains little organic matter, most organic compounds are extractable compounds. However, when the sample matrix is primarily water, only those compounds which are hydrophobic are extractable compounds.

Standard Extraction Method - Terminology used to reference an organized description of the steps involved in isolating an analyte from a given matrix. These methods are assigned short names which can also be used as computer file names for these methods. The names of specific Standard Extraction Methods which are used in this study are listed in the final report in the section entitled "Details". In addition, copies of these Standard Extraction Methods are shown in a separate section of this report. Standard Extraction Methods also include details of sample clean-up, if required.

Extraction Flow Sheet - Terminology used to reference a graphic description of a Standard Extraction Method. This flow sheet is filled out by the analyst in the laboratory and serves as a detailed record of what occurred in the sample extraction step. Flow sheets of individual sample extractions may be included in a section of this report.

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Surrogate Standards (SS) - One important element in the extraction of an analyte from a matrix, is the determination of what percent of the analyte was actually extracted from the matrix. For methods which involve liquid/liquid extraction of water with an organic solvent, or liquid/solid extraction of soils with an organic solvent, it is imperative that data be obtained which gives the analysis requestor information concerning what percentage of the analyte was isolated in the extract during the extraction step. Surrogate Standards serve this important purpose.

The philosophy on the use of Surrogate Standards is as diverse as the analysts who use them. If cost were no object, analyte recovery information could be obtained by the use of standards addition analysis methods. However, since many samples require extensive labor to isolate an analyte into an extract, standards addition analysis methods are too costly for most studies. (A standards addition analysis requires each sample to be extracted and analyzed at least three times.) Surrogate Standards give the same type of information, with only one analysis being required.

A "Surrogate" Standard is a compound which is chosen to behave exactly as the analyte. It is a surrogate for that analyte and thus information obtained for this surrogate can be assumed to also apply to the analyte of interest. For the analysis of regulated analytes, it is important that when data is generated that shows that the analyte is not present, that we can also show that if the regulated analyte were present in the sample matrix, it would have been detected. This is especially true when complex extraction and instrumental analysis steps are involved in this determination. Therefore, when an extraction is performed, a known amount of a Surrogate Standard is added to the sample before any extraction steps take place. When the extract is then analyzed for the analyte of interest, the amount of the Surrogate Standard is also determined. From this information one can document, for each sample, what recoveries were measured for this Surrogate Compound. From this, one can describe some level of confidence on the data generated for the analyte of interest.

A detailed discussion on how Surrogate Standards are chosen is beyond the scope of this section on Analyte Extraction Terminology. ESC normally uses two types of Surrogate Standards. The first is when the surrogate is exactly the same as the analyte of interest, except that the naturally occurring carbon, hydrogen, or halogen atoms in the analyte have been replaced with non-naturally occurring isotopes. These surrogates can be expected to act exactly as the native analytes. One good example of this type of surrogate is the 2,3,7,8-TCDD surrogate in which all carbon atoms are carbon-13 or all chlorine atoms are chlorine-37.

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The second type of Surrogate Standard is one which does not have the same chemical structure as the analyte of interest, but is known, or assumed to act chemically identical to the analyte of interest during the extraction and clean-up steps. Examples of this type of surrogates are deuterated compounds which may be added to a matrix in which any chromatographable materials are to be identified. This approach can only be applied to GC/MS analyses, since the surrogates can be differentiated from the native compounds from their different mass spectra. Since it is not known before sample extraction and extract analysis what analytes may be present, surrogates must be chosen that could not possibly be present in the sample. In addition, since only liquid/liquid or liquid/solid extraction would be involved, with no clean-up (since clean-up would remove compounds in which the requester is interested) any hydrophobic deuterated compound could serve as a surrogate. Normally, phenol-d5, 2-CL-phenol-d4, CL2-benzene-d4, pyrene-d10 and chrysene-d12 are used as Surrogate Standards for the analysis of a wide variety of hydrophobic materials in environmental samples.

A sub-set of this second type of Surrogate Standards are the surrogates which are used in the capillary GC/EC analysis of Aroclor formulations. Since mass spectrometric detection is not used, surrogates which contain unique isotopes cannot be distinguished from their native counterparts. Therefore, other compounds are used as Surrogate Standards since they have been observed to act exactly as the polychlorinated biphenyls (PCBs) in the Aroclor formulations. Any halogenated compound can be used which acts exactly as PCBs in the extraction and clean-up step. ESC normally uses CL5-benzene and 2,4,6-CL3-biphenyl for this purpose.

Native Analytes - Terminology which references the analytes of interest which contain naturally-occurring isotopes of carbon, hydrogen, halogens, etc.

Native Spike - Terminology which references the addition of a known amount of native analytes to the sample matrix. Normally, at least one sample will be spiked with the native analyte at the reported level of detection (low native spike) and at 10 times the level of detection (high native spike). Recoveries of the native analytes provide further documentation on the quality of the analyses performed. For sample sets which contain more than 10 samples, the frequency of low and high native spikes is 10% of the number of samples.

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Method Blank - Terminology which refers to a sample which is known to contain none of the analytes of interest. For water analyses, this is normally Burdick and Jackson Brand Water, de-ionized, or distilled water. For soil, it may be soil which has been previously analyzed and known to contain none of the analytes of interest. All extraction steps, using randomly selected glassware, solvents, and all surrogate spiking solutions must be used. This provides documentation that the analytes of interest were not inadvertantly present in extraction glassware and solvents used in the analysis. A minimum of one method blank must be generated with each set of samples. For sample sets containing more than 10 samples, method blanks are generated at a frequency of 10% of the number of samples.

Duplicate Analyses - Terminology used to indicate the duplicate extraction and duplicate extract analysis of a sample. This provides documention on the precision of an analysis. Normally the precision of environmental analyses of homogeneous samples is on the order of 30%. A minimum of one duplicate analysis is required for each sample set. For sample sets containing more than 10 samples, duplicate analyses are generated at a frequency of 10% of the number of samples.

Further Information

The general area of Analyte Extraction, along with much of the terminology described above, is very complex. The following references may provide further information which may be useful in understanding extraction fundamentals and terminology.

40 CFR Part 136 entitled "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act; Final Rule and Interim Final Rule and Proposed Rule". This document includes details of EPA's 600-series analysis methods. A current copy of these methods can be found in the October 26, 1984 Federal Register.

Statement of Work for the Contract Laboratory Program which is used in conjunction with EPA's Superfund Site studies. A current copy may be obtained by contacting:

Joan F. Fisk, Project Officer
Analytical Support Branch
Hazardous Response Support Division
USEPA
Washington, D. C. 20460

ANEXTE:MH

Instrumental Analysis Terminology

This section describes commonly used terminology and phrases which are used in conjunction with extract analysis. This information may be helpful in understanding some details of how instrumental analyses of sample extracts were performed. The previous section of this report describes terminology associated with analyte extraction.

Sample Extract - Terminology used to describe the solvent containing the analyte of interest which is obtained from some type of sample extraction step. Detailed information on how this extract is prepared can be found in the Standard Extraction Methods and flow sheets associated with the methods. Summaries of these methods which were used for this project can be found in a separate section of this report.

Internal Standard (IS) - Terminology used to reference a compound which is added to the sample extract and standard solutions of the analytes of interest immediately before instrumental analysis. The purpose of the internal standard is to provide data which can be used to correct for variations in injected volumes of extract and standard solutions which may occur during instrumental analysis. The internal standard must not be present in the sample extract. Typical internal standards used in mass spectrometric analyses are benzene-d6, naphthalene-d8, anthracene-d10 and chrysene-d12. These deuterated compounds produce unique mass spectra and are not present in naturally-occurring samples. A commonly used internal standard for GC/EC analysis is hexachlorobenzene.

Internal Standard Quantitation Method - Terminology which refers to a method of data analysis. This method requires that a known amount of an internal standard be added to the sample extract prior to instrumental analysis. Responses of all analytes are calculated relative to the internal standard using the following relationship:

$$RR = \text{Relative Response} = \frac{\text{(Analyte Area)}}{\text{(Internal Standard Area)}}$$

If different volumes of the sample extracts and standard solutions are injected, these differences are reflected by differences in the internal standard area. In addition, if instrument sensitivity changes, these changes are also reflected in changes in the internal standard area. The calculation of the relative response corrects for these types of fluxuations.

In order to determine the analyte concentration-Relative Response relationship, analyte Relative Response Factors are calculated using the following relationship for data obtained from the analysis of standard solutions:

(continued)

$$RRF = \text{Relative Response Factor} = \frac{(\text{Analyte Area})\ (\text{Internal Standard Concentration})}{(\text{Internal Standard Area})\ (\text{Analyte Concentration})}$$

When identical amounts of the internal standard are added to both extracts and standard solutions, the internal standard concentration term in the above equation can be eliminated. When this is done and Relative Response is substituted for the ratio of analyte area to internal standard area, the RRF equation becomes:

RRF = RR/(Analyte Concentration)

Analyte concentrations in the extracts are calculated from the following equation:

Analyte Extract Concentration = RR/RRF

In order to obtain the concentration of the analyte in the sample, the following equation is used:

$$\text{Analyte Sample Concentration} = \frac{(\text{Analyte Extract Concentration})\ (\text{Extract Volume})}{(\text{Amount of Sample Extracted})}$$

The area terms in the above equations may be total ion areas, FID peak areas, EC peak areas, or extractad ion areas. The details of how the internal standard quantitation method is applied to specific methods are described in the various instrumental Standard Analysis Methods.

The following equation shows what calculations should be mada to correct for analytical bias:

$$\text{Analyte Sample Concentration (Corrected for Analytical Bias)} = \frac{(\text{Analyte Sample Concentration})}{(\text{Assumed Analyte Recovery})}$$

The Assumed Analyte Recovery can be obtained from an average of surrogate recoveries or native analyte recoveries, measured for the sample in question. NOTE!! No data reported in this study include any correction for surrogate standard recovery. It is the responsibility of the person requesting the analyses to apply appropriate recovery corrections, if he/she feels that such corrections are warranted.

External Standard Quantitation Method - Terminology which refers to a method of data analysis. This method requires that a known amount of the analyte standard be analyzed under the same conditions as the sample extract. In order to determine the analyte concentration-analyte response relationship, Response Factors are obtained from the following relationship:

(continued)

RF = Response Factor = (Analyte Area)/(Analyte Concentration)

Analyte concentrations in the extracts are calculated from the following equation:

Analyte Extract Concentration = (Analyte Area)/RF

In order to obtain the concentration of the analyte in the sample, the following equation is used:

$$\text{Analyte Sample Concentration} = \frac{(\text{Analyte Extract Concentration})\ (\text{Extract Volume})}{(\text{Amount of Sample Extracted})}$$

The area terms in the above equations may be total ion areas, FID peak areas, EC peak areas, or extracted ion areas. The details of how the external standard quantitation method is applied to specific methods are described in the various instrumental Standard Analysis Methods.

The following equation shows what calculations should be made to correct for analytical bias:

$$\text{Analyte Sample Concentration (Corrected for Analytical Bias)} = \frac{(\text{Analyte Sample Concentration})}{(\text{Assumed Analyte Recovery})}$$

The Assumed Analyte Recovery can be obtained from an average of surrogate recoveries or native analyte recoveries, measured for the sample in question. NOTE!! No data reported in this study include any correction for surrogate standard recovery. It is the responsibility of the person requesting the analyses to apply appropriate recovery corrections, if he/she feels that such corrections are warranted.

Standard Analysis Methods - Terminology used to reference an organized description of the steps involved in the instrumental analysis of a sample or a sample extract. These methods are assigned short names which can also be used as computer file names for these methods. The names of specific instrumental Standard Analysis Methods which are used in this study are listed in the final report in the section entitled "Details". In addition, copies of these Standard Analysis Methods are shown in a separate section of this report. Flow sheets of the Standard Analysis Methods are usually also provided in this section.

Analysis Flow Sheet - Terminology used to reference a graphic description of a Standard Analysis Method. This flow sheet gives specific information on how extracts and standards are analyzed and what types of data reduction methods are used.

(continued)

Further Information

The general area of Extract Analysis, along with much of the terminology described above, is very complex. References provided in the previous section entitled "Analyte Extraction Terminology" may provide further information which may be useful in understanding instrumental analysis fundamentals and terminology.

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